

Altivar LIFT

Variable speed drive
for synchronous and asynchronous lift motors

Programming Manual

(Software V5.3)

07/2010



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Before you begin

Read and understand these instructions before performing any procedure using this drive.

DANGER

HAZARDOUS VOLTAGE

- Read and understand the Installation Manual before installing or operating the ATV LIFT drive. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical standards in force concerning protective grounding of all equipment.
- Many parts in this variable speed drive, including printed wiring boards, operate at line voltage. DO NOT TOUCH. Use only electrically insulated tools.
- DO NOT touch unshielded components or terminal strip screw connections with voltage present.
- DO NOT short across terminals PA/+ and PC/- or across the DC bus capacitors.
- Install and close all the covers before applying power or starting and stopping the drive.
- Before servicing the variable speed drive
 - Disconnect all power.
 - Place a "DO NOT TURN ON" label on the variable speed drive disconnect.
 - Lock the disconnect in the open position.
- Disconnect all power including external control power that may be present before servicing the drive. WAIT 15 MINUTES to allow the DC bus capacitors to discharge. Then follow the DC bus voltage measurement procedure given in the Installation Manual to verify that the DC voltage is less than 42 Vdc. The drive LEDs are not accurate indicators of the absence of DC bus voltage.

Failure to follow these instructions will result in death or serious injury.

CAUTION

DAMAGED EQUIPMENT

Do not operate or install any drive that appears damaged.

Failure to follow this instruction can result in injury and/or equipment damage.

Documentation structure

The following Altivar LIFT technical documents are available on www.schneider-electric.com as well as on the CD-ROM supplied with the drive.

Installation manual

This describes how to assemble and connect the drive.

Programming Manual

This describes the functions, parameters and use of the drive terminal (integrated display terminal and graphic display terminal). The communication functions are not described in this manual, but in the manual for the bus or network used.

Communication parameters manual

This manual describes:

- The drive parameters with specific information for use via a bus or communication network.
- The operating modes specific to communication (state chart).
- The interaction between communication and local control.

Manuals for Modbus, CANopen, Ethernet, Profibus, INTERBUS, Uni-Telway, FIPIO. and Modbus Plus, etc.


These manuals describe the assembly, connection to the bus or network, signaling, diagnostics, and configuration of the communication-specific parameters via the integrated display terminal or the graphic display terminal. They also describe the communication services of the protocols.

Presentation

ATV LIFT has been specially developed for lift applications and therefore meets the requirements of lift installers:

- Quick, simple drive setup via a dedicated LIFT menu.
- Drive performance that offers optimum comfort.
- Integrated LIFT functions: special lift ramp, inspection function, rollback management, optimization of "half floors", UPS evacuation, etc.

ATV LIFT can only be used with lifts.

 CAUTION
RISK OF INAPPROPRIATE DRIVE BEHAVIOR
The speed loop implemented in the ATV LIFT is specifically adapted to lift applications. It must only be used in a lift application.
Failure to follow these instructions can result in injury and/or equipment damage.

The following options are compatibles with ATV LIFT from a minimum version:

- graphic display terminal from the version V1.1IE24,
- universal encoder interface card (VW3A3409) from the version V1.2IE01.

ATV LIFT selection has been simplified: the sizing of the ATV LIFT is done with the nominal current of the motor. This new policy adapts ATV LIFT references with synchronous motors. Maximum transient current has changed. It was 1.5 In with ATV71L and is now 1.36 In with ATV LIFT.

When migrating a lift application from ATV71L to ATV LIFT, you have to check that the drive does not reach **[current Limitation] (CLi)** state during acceleration or deceleration.

In case of current limitation, adapt the drive parameters if necessary:

- Increase **[Acceleration time] (ACt)**
- Decrease **[Lift Leveling time] (LLt)**

To improve the comfort in the lift, you have also the possibility to use the notch filter function.

- The previous ATV71L references not listed are no longer available. You have to take the higher power rating drive for substitution.
- Commercial reference construction: ATV71LD \mathbf{xxyyZ} where:
 - \mathbf{xx} : Maximum continuous current at 380V.
 - \mathbf{yy} : Three phase supply voltage M3 = 230V & N4 = 380V.

Power Rating	Current Rating	Catalog part number		Mechanical Size	
		ATV71L	ATV LIFT	ATV71L	ATV LIFT
3-phase supply voltage : 200...240V					
5,5kW	27A	ATV71LU55M3Z	ATV71LD27M3Z	175*295*161	230*400*187
7,5kW	33A	ATV71LU75M3Z	ATV71LD33M3Z	210*295*187	230*400*187
11kW	54A	ATV71LD11M3XZ	ATV71LD54M3Z	230*400*187	240*420*210
15kW	66A	ATV71LD15M3XZ	ATV71LD66M3Z	230*400*187	240*420*210
3-phase supply voltage : 380...480V					
4kW	10A	ATV71LU40N4Z	ATV71LD10N4Z	155*260*161	175*295*161
5,5kW	14A	ATV71LU55N4Z	ATV71LD14N4Z	175*295*161	175*295*161
7,5kW	17A	ATV71LU75N4Z	ATV71LD17N4Z	175*295*161	210*295*187
11kW	27A	ATV71LD11N4Z	ATV71LD27N4Z	210*295*187	230*400*187
15kW	33A	ATV71LD15N4Z	ATV71LD33N4Z	230*400*187	230*400*187
22kW	48A	ATV71LD22N4Z	ATV71LD48N4Z	240*420*210	240*550*230

Note: the transfer from the graphic display terminal to the drive is possible from ATV71L to ATV LIFT.

The transfer from ATV LIFT to ATV71 L is not possible.

See [\[3 OPEN/SAVE AS\]](#) page [296](#) for a complete description of configuration transfer.

Vocabulary

Lift command

Electronic card integrating the lift application intelligence: call management, step displays.
The lift command card monitors the slowdown and stop indicators and controls the drive.

Slowdown indicator

Sensor placed at a precise distance (slowdown length) above and below each step.
When the car passes in front of this sensor, the lift command card removes the high speed command (travel speed) and commands a low speed (lift leveling speed).

Stop indicator

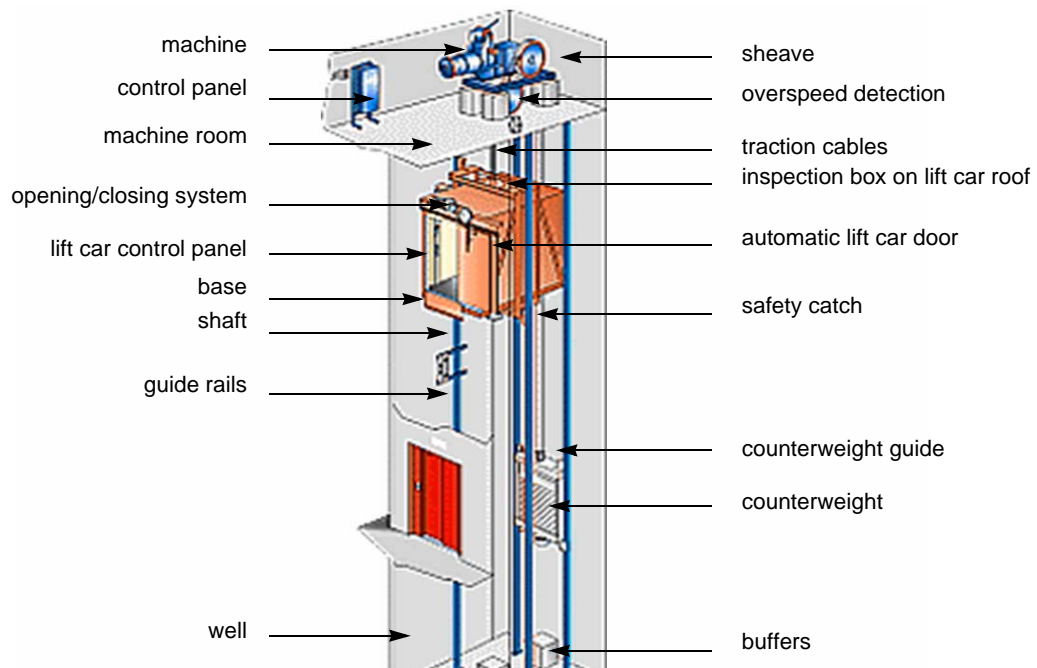
Sensor placed at a precise distance (stop length) above and below each step.
When the car passes in front of this sensor, the lift command card removes the run command. The car should then stop comfortably within the [Stop length] (StL).

Rollback

Movement of the car when the brake is released. In gearless applications where the inertia at the motor is large, the brake release must be specially controlled to cancel this rollback (using an external weight sensor or the rollback management function).

Jerk

Jerk is a measurement of variations in acceleration. It is often related to comfort (comfort is improved as the jerk is reduced).



INSTALLATION

- **1 Consult the Installation Manual**

PROGRAMMING

Procedure applicable if the factory configuration, page [9](#), and use of the [\[1.1 LIFT\] \(LIF-\)](#) menu only are sufficient for the application.



Tips:

- Before you start programming, complete the user setting tables, page [317](#).
- Perform an auto-tuning operation to optimize performance, page [53](#).
- If you get lost, return to the factory settings, page [293](#).



Note: Check that the wiring of the drive is compatible with its configuration.

■ **2 Power up without run command**

- If you are using a separate control power supply, follow the instructions on page [10](#).

■ **3 Select the language, if the drive has a graphic display terminal**

■ **4 Configure the menu** [\[1.1 LIFT\] \(L I F -\)](#)

■ **5 Start**

Factory configuration

Drive factory settings

The Altivar LIFT is factory-set for the most common operating conditions:

- **Motor** frequency: 50 Hz
- Normal stop mode on deceleration lift ramp
- Stop mode in the event of a fault: Freewheel
- Deceleration ramp with leveling speed step.
- Motor thermal current = rated drive current
- Standstill injection braking current = 0.7 x rated drive current, for 0.5 seconds
- No automatic starts after a fault
- Switching frequency 8 kHz.
- Logic inputs:
 - LI1: forward, LI2: reverse (2 operating directions), 2-wire control on transition
 - LI3: Inactive (not assigned)
 - LI4: Lift speed
 - LI5: Inspection mode
 - LI6: Not assigned
- Analog inputs:
 - AI1: Speed reference 0 +10 V
 - AI2: 0-20 mA, inactive (not assigned)
- Relay R1: no
- Relay R2: Brake control
- Analog output AO1: dO1 (logic output)

If the above values are compatible with the application, the drive can be used without changing the settings.

Option card factory settings

The option card inputs/outputs are not factory-set.

Setup - Preliminary recommendations

Turning on and configuring the drive

DANGER

UNINTENDED EQUIPMENT OPERATION

- Before turning on and configuring the Altivar LIFT, check that the PWR (POWER REMOVAL) input is deactivated (at state 0) in order to prevent unintended operation.
- Before turning on the drive, or when exiting the configuration menus, check that the inputs assigned to the run command are deactivated (at state 0) since they can cause the motor to start immediately.

Failure to follow these instructions will result in death or serious injury.

CAUTION

INCOMPATIBLE LINE VOLTAGE

Before turning on and configuring the drive, ensure that the line voltage is compatible with the supply voltage range shown on the drive nameplate. The drive may be damaged if the line voltage is not compatible.

Failure to follow this instruction can result in equipment damage.

Separate control section power supply

When the drive control section is powered independently of the power section (P24 and 0V terminals), whenever an option card is added or replaced, only the power section must be supplied with power next time the drive is powered up.

By default the new card would not be recognized and it would be impossible to configure it, thereby causing the drive to lock in fault mode.

Power switching via line contactor

CAUTION

- Avoid operating the contactor frequently (premature ageing of the filter capacitors).
- Cycle times < 60 s can result in damage to the precharge resistor.

Failure to follow this instruction can result in equipment damage.

User adjustment and extension of functions

- The display unit and buttons can be used to modify the settings and to extend the functions described in the following pages.
- **Return to factory settings** is made easy by the [\[1.12 FACTORY SETTINGS\] \(FCS-\)](#) menu, see page [291](#).
- There are three types of parameter:
 - Display: Values displayed by the drive
 - Adjustment: Can be changed during operation or when stopped
 - Configuration: Can only be modified when stopped and no braking is taking place. Can be displayed during operation.

DANGER

UNINTENDED EQUIPMENT OPERATION

- Check that changes made to the settings during operation do not present any danger.
- We recommend stopping the drive before making any changes.

Failure to follow these instructions will result in death or serious injury.

Setup - Preliminary recommendations

Starting

Important:

- In factory settings mode, the motor can only be supplied with power once the “forward”, “reverse” and “DC injection stop” commands have been reset:
 - On power-up or a manual fault reset or after a stop command.If they have not been reset, the drive will display "nSt" but will not start.
- If the automatic restart function has been configured ([Automatic restart] (Atr) parameter in the [1.8-FAULT MANAGEMENT] (FLt-) menu, see page 265), these commands are taken into account without a reset being necessary.

Test on a low power motor or without a motor

- In factory settings mode, [Output Phase Loss] (OPL) detection page 268 is active (OPL = YES). To check the drive in a test or maintenance environment without having to switch to a motor with the same rating as the drive (particularly useful in the case of high power drives), deactivate [Output Phase Loss] (OPL = nO).



CAUTION

UNINTENDED EQUIPMENT OPERATION

Motor thermal protection will not be provided by the drive if the motor current is less than 0.2 times the rated drive current. Provide an alternative means of thermal protection.

Failure to follow this instruction can result in equipment damage.

Use of the LIFT menu



DANGER

RISK OF UNEXPECTED DRIVE BEHAVIOR

- Identify the precise values of [Nominal car speed] (CSP) and payload [Capacity of the lift] (LCA).
- Check the [Nominal car speed] (CSP) by calculation (See menu [1.1 LIFT] (LIF-), submenu [LIFT DATA] (LdA-) or by measurement.

If the values of [Nominal car speed] (CSP) or [Lift capacity] (LCA) are incorrect, the stop lengths ([Deceleration length] (dEL) and [Stop length] (StL) will not be adhered to.

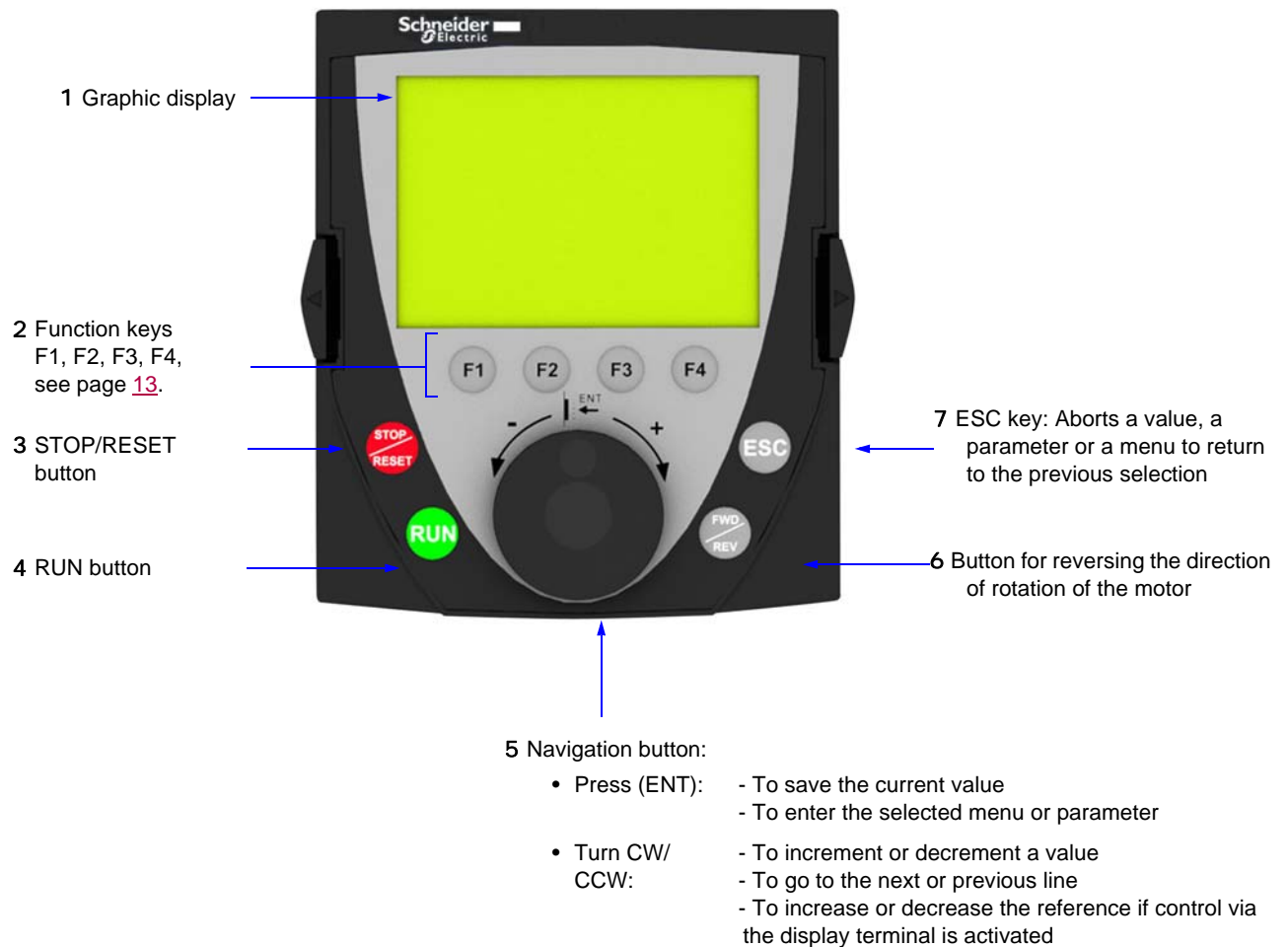
The speed loop preset will not be adapted to the application (risk of instability and lift car slipping).

Failure to follow these instructions will result in death or serious injury.

Graphic terminal

The graphic terminal is optional. The graphic terminal is removable and can be located remotely (on the door of an enclosure, for example) using the cables and accessories available as options (see catalog).

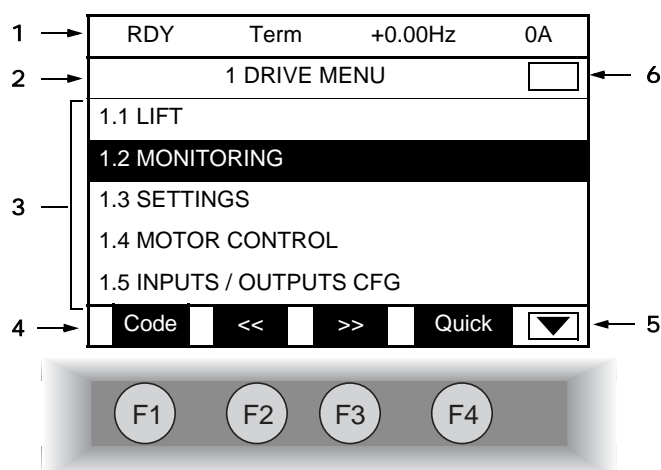
Description of the terminal



Note: Buttons 3, 4, 5 and 6 can be used to control the drive directly, if control via the display terminal is activated.

Graphic terminal

Description of the graphic screen



1. Display line. Its content can be configured; the factory settings show:

- The drive state (see page [14](#))
- The active control channel:
 - Term: Terminals
 - HMI: Graphic terminal
 - MDB: Integrated Modbus
 - CAN: Integrated CANopen
 - NET: Communication card
 - APP: Controller Inside card
- Frequency reference
- Current in the motor

2. Menu line. Indicates the name of the current menu or submenu.



3. Menus, submenus, parameters, values, bar charts, etc., are displayed in drop-down window format on a maximum of 5 lines. The line or value selected by the navigation button is displayed in reverse video.



4. Section displaying the functions assigned to the F1 to F4 keys and aligned with them, for example:

- Code **F1** : Displays the code of the selected parameter, i.e., the code corresponding to the 7-segment display.
- HELP **F1** : Contextual help
- << **F2** : Navigate horizontally to the left, or go to previous menu/submenu or, for a value, go to the next digit up, displayed in reverse video (see the example on page [15](#)).
- >> **F3** : Navigate horizontally to the right or go to next menu/submenu (going to the [2 ACCESS LEVEL] menu in this example) or, for a value, go to the next digit down, displayed in reverse video (see the example on page [15](#)).
- Quick **F4** : Quick navigation, see page [19](#).

The function keys are dynamic and contextual.

Other functions (application functions) can be assigned to these keys via the [1.6 COMMAND] menu.

5.  Indicates that there are no more levels below this display window.
 Indicates that there are more levels below this display window.

6.  Indicates that this display window does not scroll further up.
 Indicates that there are more levels above this display window.

Drive state codes:

- ACC: Acceleration
- CLI: Current limitation
- CTL: Controlled stop on input phase loss
- DCB: DC injection braking in progress
- DEC: Deceleration
- FLU: Motor fluxing in progress
- FST: Fast stop
- NLP: No line power (no line supply on L1, L2, L3)
- NST: Freewheel stop
- OBR: Auto-adapted deceleration
- PRA: Power Removal function active (drive locked)
- RDY: Drive ready
- RUN: Drive running
- SOC: Controlled output cut in progress
- TUN: Auto-tuning in progress
- USA: Undervoltage alarm
- ASA: Measurement of the phase-shift angle in progress

Graphic terminal

Example configuration windows:

RDY	Term	+0.00Hz	0A
5 LANGUAGE			
English			
Français ✓			
Deutsch			
Español			
Italiano			
<<		>> Quick	
Chinese			
Russian			
Turkish			

When only one selection is possible, the selection made is indicated by ✓.
E.g. Only one language can be chosen.

PARAMETER SELECTION	
1.3 SETTINGS	
Ramp increment	<input checked="" type="checkbox"/>
Acceleration	<input checked="" type="checkbox"/>
Deceleration	<input type="checkbox"/>
Acceleration 2	<input type="checkbox"/>
Deceleration 2	<input type="checkbox"/>
Edit	

When multiple selection is possible, the selections made are indicated by ☒.
E.g. A number of parameters can be chosen to form the [USER MENU].

Example configuration window for one value:

RDY	Term	+0.00Hz	0A
Acceleration			
9.51 s			
Min = 0.01		Max = 99.99	
<<		>> Quick	

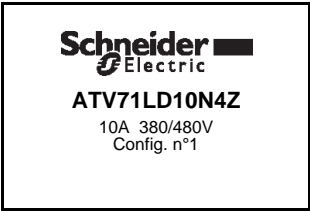
>> →

RDY	Term	+0.00Hz	0A
Acceleration			
9.51 s			
Min = 0.01		Max = 99.99	
<<		>> Quick	

The << and >> arrows (keys F2 and F3) are used to select the digit to be modified, and the navigation button is rotated to increase or decrease this number.

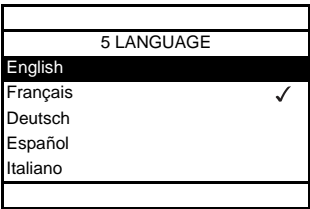
First power-up - [5. LANGUAGE] menu

The first time the drive is powered up, the user will automatically be guided through the menus as far as the [1.1. LIFT] submenu. The parameters in this submenu must be configured and auto-tuning performed before the motor is started up.



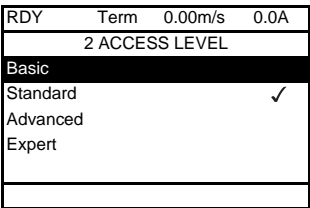
Display for 3 seconds following power-up

3 seconds

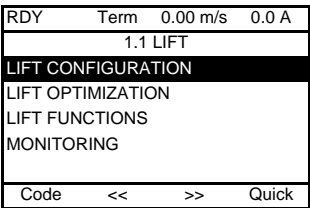


Automatically switches to [5 LANGUAGE] menu 3 seconds later. Select the language and press ENT.

Chinese
Russian
Turkish

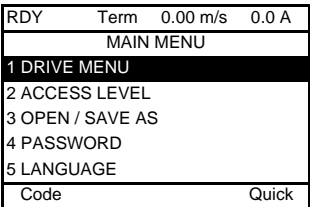


Switches to [2 ACCESS LEVEL] menu (see page 25) Select the access level and press ENT.



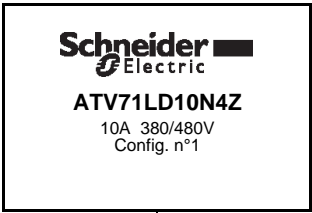
Switches to [1.1 LIFT] (see page 21)

ESC
ESC

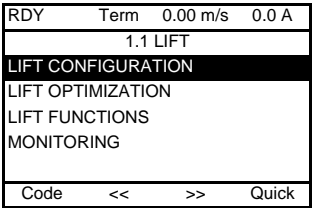


Press ESC twice to return to [MAIN MENU]

Subsequent power ups

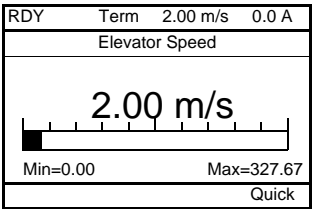


3 seconds



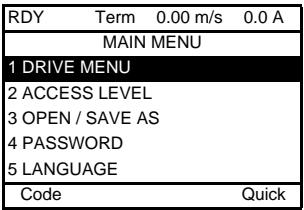
Switches to [1.1. LIFT] 3 seconds later.

10 seconds



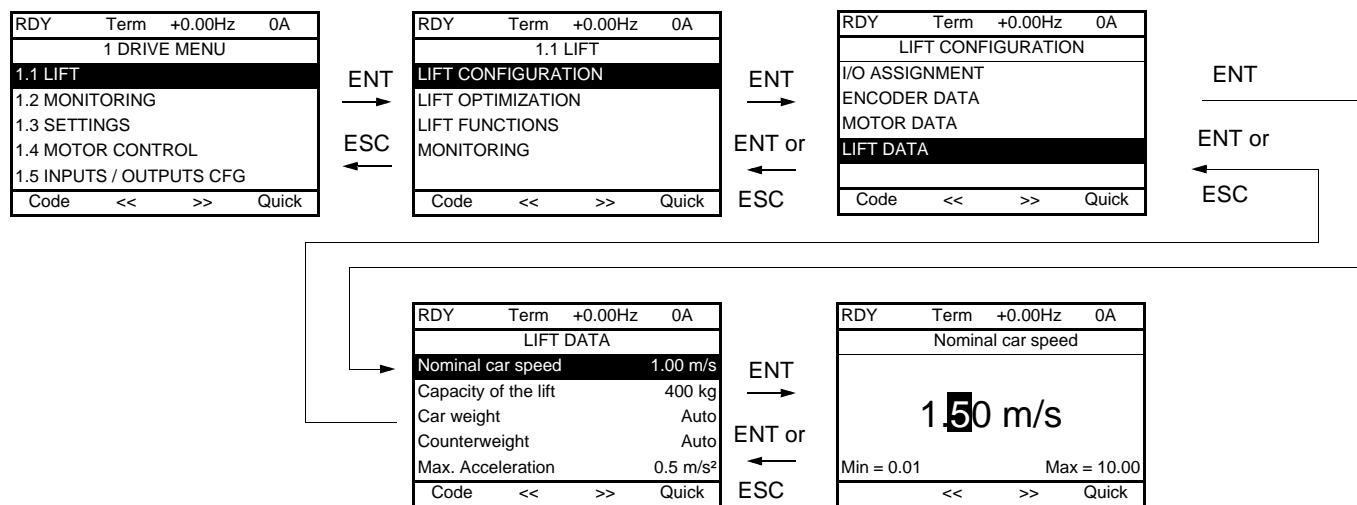
If no operator inputs are made, switches to "Display" automatically 10 seconds later (the display will vary depending on the selected configuration).

ENT or ESC



Users can return to [MAIN MENU] by pressing ENT or ESC.

Programming: Example of accessing a parameter



Accessing the nominal car speed

Note:

- To select a parameter:
 - Turn the navigation button to scroll vertically.
- To modify a parameter:
 - Use the << and >> keys (F2 and F3) to scroll horizontally and select the digit to be modified (the selected digit changes to white on a black background).
 - Turn the navigation button to modify the digit.
- To cancel the modification:
 - Press ESC.
- To save the modification:
 - Press the navigation button (ENT).

Quick navigation

If the "Quick" function is displayed above the F4 key, you can gain quick access to a parameter from any screen.

E.g.

RDY	Term	+0.00Hz	0A
1.4 MOTOR CONTROL			
Standard mot. freq:		50Hz IEC	
Motor control type:		SVC U	
Max frequency:		60 Hz	
Output Ph rotation:		ABC	
Sinus filter:		no	
Code	<<	>>	Quick

Press F4 to access the Quick screen, which contains 4 selection options.

RDY	Term	+0.00Hz	0A
QUICK NAVIGATION			
RETURN TO MAIN MENU			
DIRECT ACCESS TO...			
10 LAST MODIFICATIONS			
GOTO MULTIPOINT SCREEN			
Code			

See page [309](#)

- [HOME]: Return to [MAIN MENU].

RDY	Term	+0.00Hz	0A
MAIN MENU			
1 DRIVE MENU			
2 ACCESS LEVEL			
3 OPEN / SAVE AS			
4 PASSWORD			
5 LANGUAGE			
Code			Quick

- [DIRECT ACCESS TO...] : Opens the direct access window, which will contain the text "1". The function keys << and >> (F2 and F3) can be used to select each of the numbers and the navigation button to increment or decrement the numbers: 1.3 in the example below.

RDY	Term	+0.00Hz	0A
DIRECT ACCESS TO...			
1.3			
SETTINGS			
<< >>			

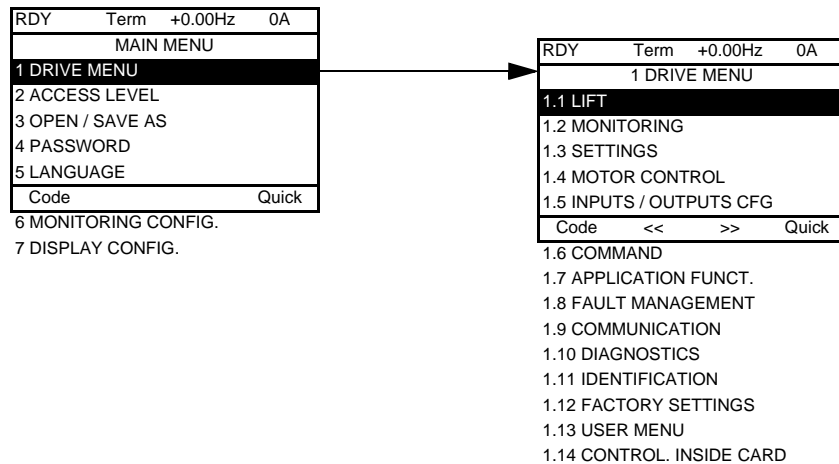
RDY	Term	+0.00Hz	0A
1.3 SETTINGS			
Ramp increment:		01	
Acceleration		9.51 s	
Deceleration:		9.67 s	
Acceleration 2:		12.58 s	
Deceleration 2 :		13.45 s	
Code	<<	>>	Quick

- [10 LAST MODIFICATIONS]: Opens a window in which the last 10 parameters modified can be accessed directly.

RDY	Term	+0.00Hz	0A
10 LAST MODIFICATIONS			
Acceleration:		10 s	
ENA prop.gain:		1.2	
Rated mot. current:		15 A	
Preset speed 4:		20 Hz	
Preset speed 5:		30 Hz	
Code			

RDY	Term	+0.00Hz	0A
Rated mot. current			
15.0 A			
<< >>			

[MAIN MENU] - Menu mapping



Content of [MAIN MENU] menus

[1 DRIVE MENU]	See next page
[2 ACCESS LEVEL]	Defines which menus can be accessed (level of complexity)
[3 OPEN / SAVE AS]	Can be used to save and retrieve drive configuration files
[4 PASSWORD]	Provides password protection for the configuration
[5 LANGUAGE]	Language selection
[6 MONITORING CONFIG.]	Customization of information displayed on the graphic display terminal during operation
[7 DISPLAY CONFIG.]	<ul style="list-style-type: none"> Customization of parameters Creation of a customized user menu Customization of the visibility and protection mechanisms for menus and parameters

[1 DRIVE MENU]

RDY	Term	+0.00Hz	0A
1 DRIVE MENU			
1.1 LIFT			
1.2 MONITORING			
1.3 SETTINGS			
1.4 MOTOR CONTROL			
1.5 INPUTS / OUTPUTS CFG			
Code	<<	>>	Quick
1.6 COMMAND			
1.7 APPLICATION FUNCT.			
1.8 FAULT MANAGEMENT			
1.9 COMMUNICATION			
1.10 DIAGNOSTICS			
1.11 IDENTIFICATION			
1.12 FACTORY SETTINGS			
1.13 USER MENU			
1.14 CONTROL. INSIDE CARD			

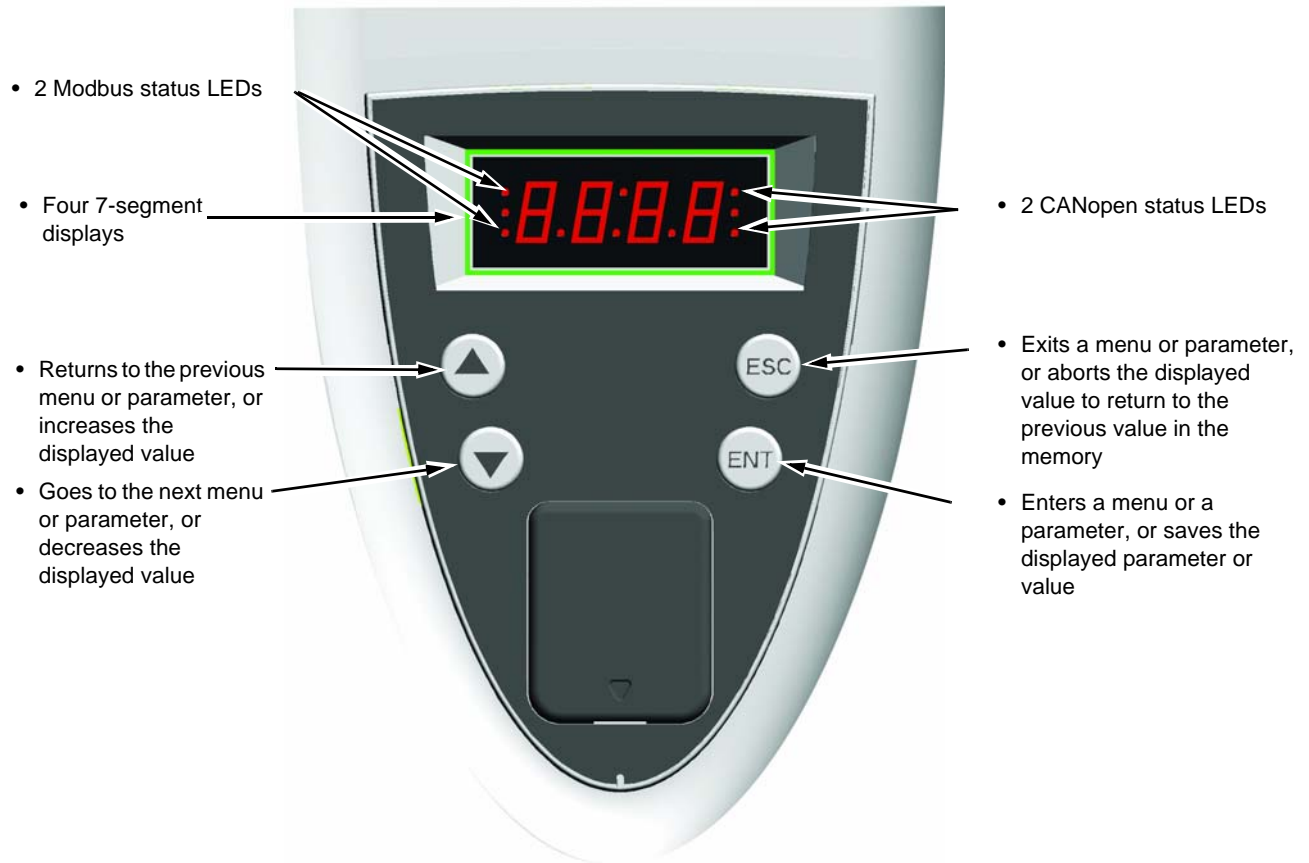
Content of [1. DRIVE MENU] menus:

[1.1 LIFT]:	Lift menu
[1.2 MONITORING]:	Visualization of current, motor and input/output values
[1.3 SETTINGS]:	Accesses the adjustment parameters, which can be modified during operation
[1.4 MOTOR CONTROL]:	Motor parameters (motor nameplate, auto-tuning, switching frequency, control algorithms, etc.)
[1.5 INPUTS / OUTPUTS CFG]:	I/O configuration (scaling, filtering, 2-wire control, 3-wire control, etc.)
[1.6 COMMAND]:	Configuration of command and reference channels (graphic display terminal, terminals, bus, etc.)
[1.7 APPLICATION FUNCT.] :	Configuration of application functions (e.g., preset speeds, PID, brake control, etc.)
[1.8 FAULT MANAGEMENT]:	Configuration of fault management
[1.9 COMMUNICATION]:	Communication parameters (fieldbus)
[1.10 DIAGNOSTICS]:	Motor/drive diagnostics
[1.11 IDENTIFICATION]:	Identifies the drive and internal options
[1.12 FACTORY SETTINGS]:	Access to configuration files and return to factory settings
[1.13 USER MENU]:	Specific menu set up by the user in the [7. DISPLAY CONFIG.] menu
[1.14 CONTROL. INSIDE CARD]:	Configuration of optional Controller Inside card

Integrated display terminal

Altivar LIFT features an integrated display terminal with a 7-segment 4-digit display. The graphic display terminal described on the previous pages can also be connected to this drive as an option.

Functions of the display and the keys



- Note:**
- Pressing ▲ or ▼ does not store the selection.
 - Press and hold down (>2 s) ▲ or ▼ to scroll through the data quickly.

Save and store the selection: ENT

The display flashes when a value is stored.

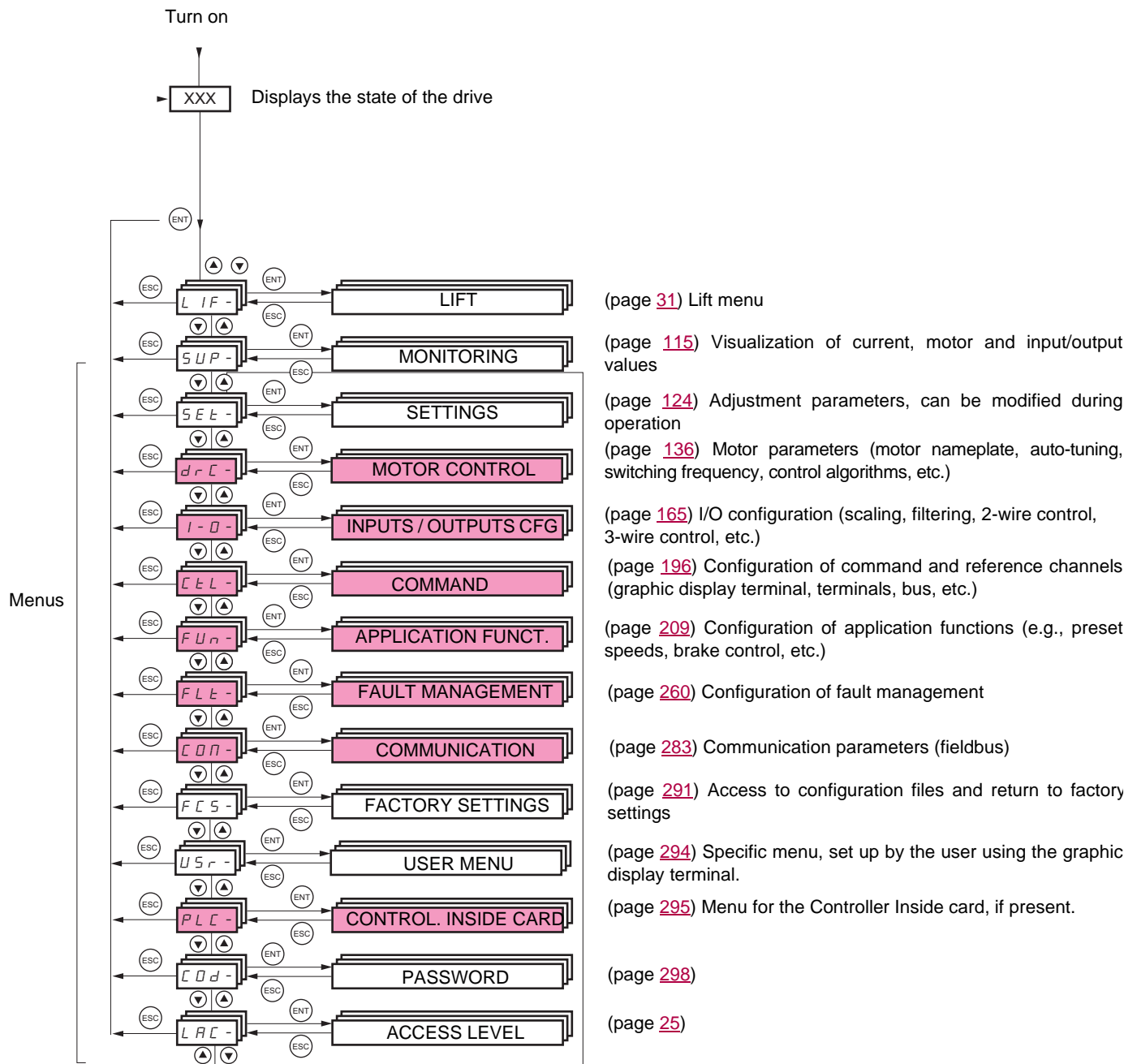
Normal display, with no fault present and no startup:

- 43.0: Display of the parameter selected in the SUP menu (default selection: Lift speed).
- CLl: Current limitation.
- CtL: Controlled stop on input phase loss.
- dCb: DC injection braking in progress.
- FLU: Motor fluxing in progress.
- FSt: Fast stop.
- nLP: No line power (no line supply on L1, L2, L3).
- nSt: Freewheel stop.
- Obr: Auto-adapted deceleration.
- PrA: Power Removal function active (drive locked).
- rdY: Drive ready.
- SOC: Controlled output cut in progress.
- tUn: Auto-tuning in progress.
- USA: Undervoltage alarm.
- ASA: Measurement of the phase-shift angle in progress.

The display flashes to indicate the presence of a fault.

Integrated display terminal

Accessing menus



A dash appears after menu and submenu codes to differentiate them from parameter codes.

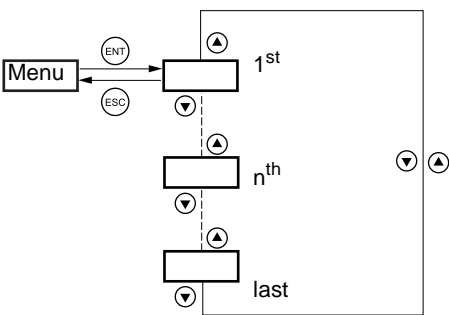
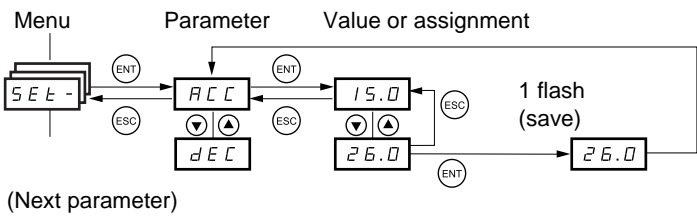
Examples: FUn- menu, ACC parameter.

The grayed-out menus may not be accessible depending on the control access (LAC) configuration.

Integrated display terminal

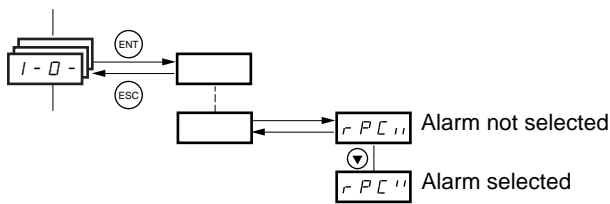
Accessing menu parameters

Save and store the displayed selection: 





All the menus are "drop-down" type menus, which means that after the last parameter, if you continue to press ▼, you will return to the first parameter and, conversely, you can switch from the first parameter to the last parameter by pressing ▲.

Selection of multiple assignments for one parameter



E.g. List of group 1 alarms in **[INPUTS / OUTPUTS CFG]** (I-O-) menu

A number of alarms can be selected by "checking" them as follows.

The digit on the right indicates:  selected,  not selected.

The same principle is used for all multiple selections.

[2. ACCESS LEVEL] (LAC-)

With graphic display terminal

Basic

Access to 5 menus only, and access to 6 submenus only in the [1. DRIVE MENU] menu.

A single function can be assigned to each input.

RDY	Term	+0.00Hz	0A
2 ACCESS LEVEL			
Basic			
Standard			✓
Advanced			
Expert			
<<		>>	
		Quick	

RDY	Term	+0.00Hz	0A
MAIN MENU			
1 DRIVE MENU			
2 ACCESS LEVEL			
3 OPEN / SAVE AS			
4 PASSWORD			
5 LANGUAGE			
Code		<< >>	
		Quick	

RDY	Term	+0.00Hz	0A
1. DRIVE MENU			
1.1 LIFT			
1.2 MONITORING			
1.3 SETTINGS			
1.11 IDENTIFICATION			
1.12 FACTORY SETTINGS			
Code	<<	>>	Quick
1.13 USER MENU			

Standard

This is the factory-set level. Access to all menus.

A single function can be assigned to each input.

RDY	Term	+0.00Hz	0A
MAIN MENU			
1 DRIVE MENU			
2 ACCESS LEVEL			
3 OPEN / SAVE AS			
4 PASSWORD			
5 LANGUAGE			
Code		Quick	
6 MONITORING CONFIG.			

RDY	Term	+0.00Hz	0A
1 DRIVE MENU			
1.1 LIFT			
1.2 MONITORING			
1.3 SETTINGS			
1.4 MOTOR CONTROL			
1.5 INPUTS / OUTPUTS CFG			
Code	<<	>>	Quick
1.6 COMMAND			
1.7 APPLICATION FUNCT.			
1.8 FAULT MANAGEMENT			
1.9 COMMUNICATION			
1.10 DIAGNOSTICS			
O	1.11 IDENTIFICATION		
1.12 FACTORY SETTINGS			
1.13 USER MENU			
1.14 CONTROL. INSIDE CARD			

Advanced

Access to all menus and submenus.

Several functions can be assigned to each input.

RDY	Term	+0.00Hz	0A
MAIN MENU			
1 DRIVE MENU			
2 ACCESS LEVEL			
3 OPEN / SAVE AS			
4 PASSWORD			
5 LANGUAGE			
Code		Quick	
6 MONITORING CONFIG.			
7 DISPLAY CONFIG.			

Expert

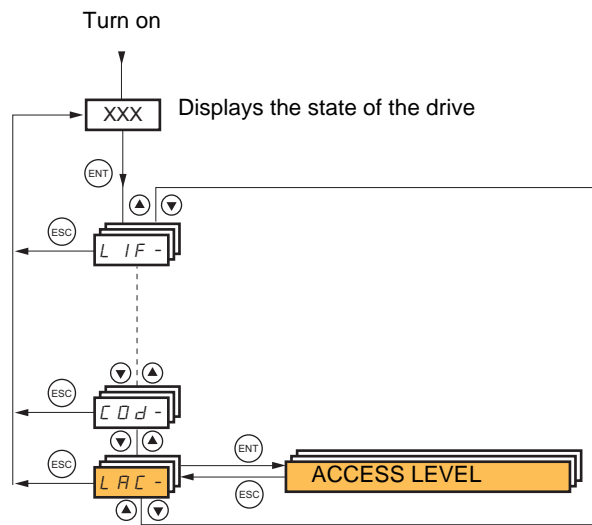
Access to all menus and submenus as for [Advanced] level, and access to additional parameters.

Several functions can be assigned to each input.

RDY	Term	+0.00Hz	0A
MAIN MENU			
1 DRIVE MENU			
2 ACCESS LEVEL			
3 OPEN / SAVE AS			
4 PASSWORD			
5 LANGUAGE			
Code		Quick	
6 MONITORING CONFIG.			
7 DISPLAY CONFIG.			

[2. ACCESS LEVEL] (LAC-)

With integrated display terminal:



Code	Name/Description	Factory setting
L A C -		Std
b A S	<ul style="list-style-type: none">bAS: Limited access to SIM, SUP, SEt, FCS, USr, COd and LAC menus. A single function can be assigned to each input.	
S t d	<ul style="list-style-type: none">Std: Access to all menus on the integrated display terminal. A single function can be assigned to each input.	
A d U	<ul style="list-style-type: none">AdU: Access to all menus on the integrated display terminal. Several functions can be assigned to each input.	
E P r	<ul style="list-style-type: none">EPr: Access to all menus on the integrated display terminal and access to additional parameters. Several functions can be assigned to each input.	

[2. ACCESS LEVEL] (LAC-)

Comparison of the menus that can be accessed on the graphic display terminal/integrated display terminal

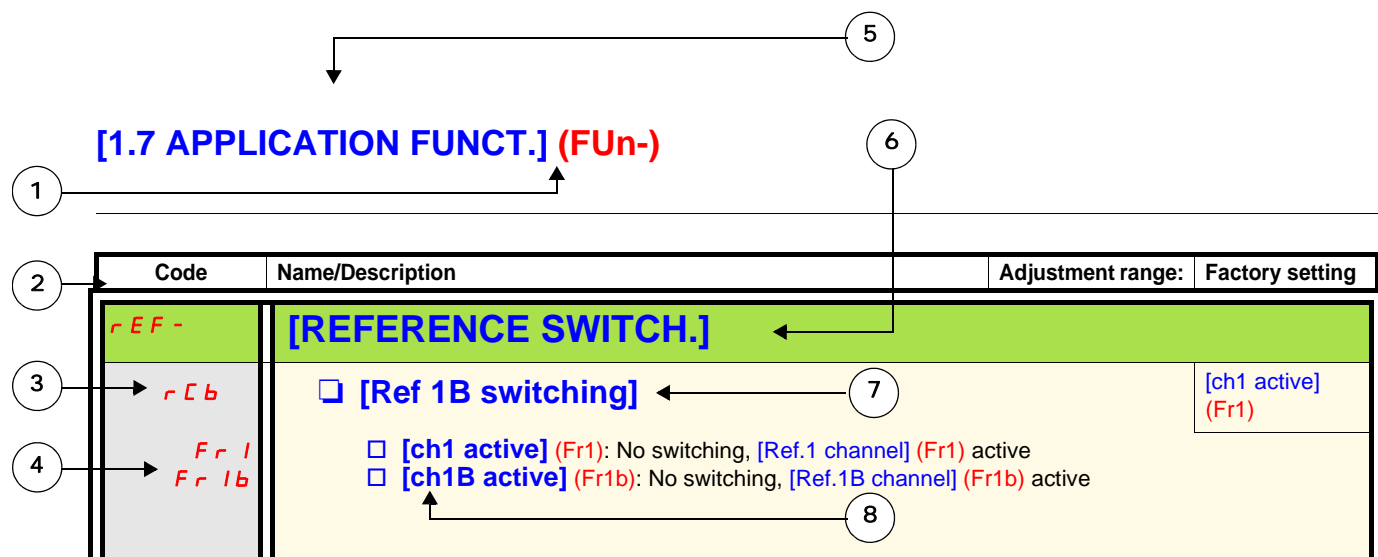
Graphic terminal	Integrated Display Terminal	Access Level			
[2 ACCESS LEVEL] [3 OPEN/SAVE AS] [4 PASSWORD] [5 LANGUAGE] [1 DRIVE MENU] <div> [1.1 LIFT] [1.2 MONITORING] [1.3 SETTINGS] [1.11 IDENTIFICATION] [1.12 FACTORY SETTINGS] [1.13 USER MENU] </div> <p>A single function can be assigned to each input.</p>	L A C - (Access level) - P W D - (Password) - L I F - (Lift) M O N - (Monitoring) S E T - (Settings) - F C S - (Factory settings) U S R - (User menu) <p>A single function can be assigned to each input.</p>	Basic B A S	Standard S E T (factory setting)	Advanced A D V	Expert E P R
<div> [1.4 MOTOR CONTROL] [1.5 INPUTS / OUTPUTS CFG] [1.6 COMMAND] [1.7 APPLICATION FUNCT.] [1.8 FAULT MANAGEMENT] [1.9 COMMUNICATION] [1.10 DIAGNOSTICS] [1.14 CONTROL. INSIDE CARD] (1) </div> [6 MONITORING CONFIG.] <p>A single function can be assigned to each input.</p>	M O T - (Motor control) I - O - (I/O configuration) C M D - (Command) F U N - (Application functions) F L M - (Fault management) C O M - (Communication) - P L C - (Controller Inside card) (1) - <p>A single function can be assigned to each input.</p>				
[7 DISPLAY CONFIG.] <p>Several functions can be assigned to each input.</p>	- <p>Several functions can be assigned to each input.</p>				
Expert parameters <p>Several functions can be assigned to each input.</p>	Expert parameters <p>Several functions can be assigned to each input.</p>				

(1) Can be accessed if the Controller Inside card is present.

Structure of the parameter tables

The parameter tables in the descriptions of the various menus can be used with both the graphic display terminal and the integrated display terminal. They therefore contain information for these two terminals in accordance with the description below.

E.g.



1. Name of menu on 4-digit 7-segment display.

2. Submenu code on 4-digit 7-segment display.

3. Parameter code on 4-digit 7-segment display.

4. Parameter value on 4-digit 7-segment display.
5. Name of menu on graphic display terminal.

6. Name of submenu on graphic display terminal.

7. Name of parameter on graphic display terminal

8. Value of parameter on graphic display terminal



Note:

- The text in square brackets [] indicates what you will see on the graphic display terminal.

Interdependence of parameter values

The configuration of certain parameters modifies the adjustment range of other parameters, in order to reduce the risk of errors. **This may result in the modification of a factory setting or a value you have already selected.**

Finding a parameter in this document

The following assistance with finding explanations on a parameter is provided:

- **With the integrated display terminal:** Direct use of the parameter code index, page [320](#), to find the page giving details of the displayed parameter.
- **With the graphic display terminal:** Select the required parameter and press **F1** : [\[Code\]](#). The parameter code is displayed instead of its name while the key is held down.

Example: ACC

RDY	Term	+0.00Hz	0A
1.3 SETTINGS			
Ramp increment:		01	
Acceleration		9.51 s	
Deceleration:		9.67 s	
Acceleration 2:		12.58 s	
Deceleration 2:		13.45 s	
Code	<<	>>	Quick

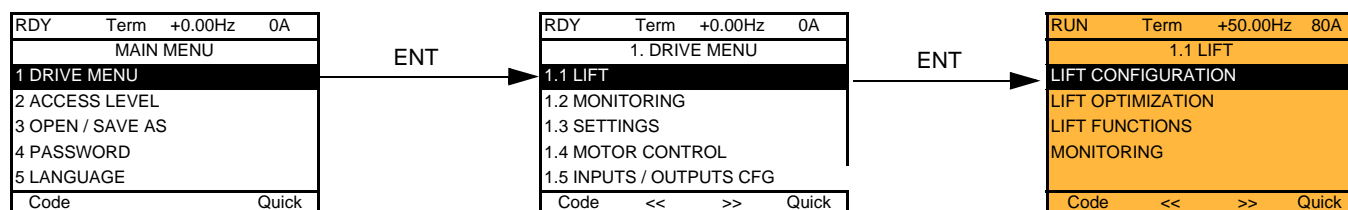
Code →

RDY	Term	+0.00Hz	0A
1.3 SETTINGS			
Ramp increment:		01	
ACC		9.51 s	
Deceleration:		9.67 s	
Acceleration 2:		12.58 s	
Deceleration 2:		13.45 s	
Code	<<	>>	Quick

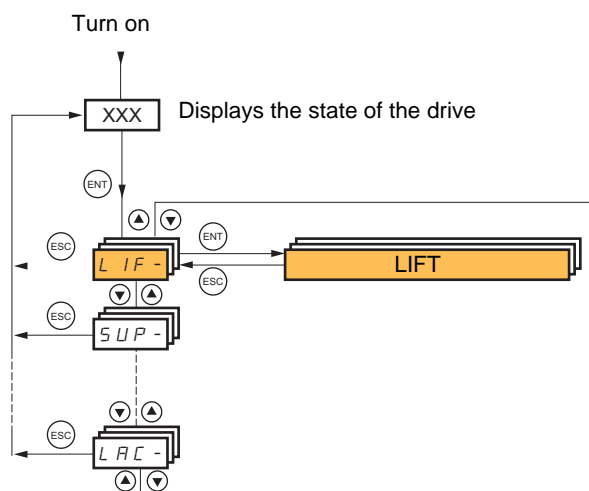
Then use the parameter code index, page [320](#), to find the page giving details of the displayed parameter.

[1.1 LIFT] (LIF-)

With graphic display terminal:



With integrated display terminal:



The [1.1 LIFT] (LIF-) menu is used to apply settings for a lift application.



Note: The parameters of the [1.1 LIFT] (LIF-) menu must be entered in the order in which they appear, as the later ones are dependent on the first ones.

The [1.1 LIFT] (LIF-) menu should be configured **on its own or before the other drive configuration menus**. If a modification has previously been made to any of them, in particular in [1.4 MOTOR CONTROL] (drC-), some [1.1 LIFT] (LIF-) parameters may be changed, for example, the motor parameters if a synchronous motor has been selected. Returning to the [1.1 LIFT] (LIF-) menu after modifying another drive configuration menu **is unnecessary** but does not pose any risk. Changes following modification of another configuration menu **are not therefore described**, to avoid unnecessary complication in this section.

[1.1 LIFT] (LIF-)

Lift configuration

To get started quickly on the ATV LIFT it is essential to follow the instructions below.

The LIFT menu has been designed to be browsed in a linear manner. Go through this menu step by step in order to enter all the parameters required for correct lift configuration.

Before starting to program the drive, identify the data below carefully:

Code	Name/Description	Value
[I/O ASSIGNMENTS] (LIO-)	<i>I/O menu</i>	
	LI1 assignment	.....
	LI2 assignment	.....
	LI3 assignment	.....
	LI4 assignment	.....
	LI5 assignment	.....
	LI6 assignment	.....
	AI1 assignment	.....
	AI2 assignment	.....
	R1 assignment	.....
	R2 assignment	.....
[ENCODER DATA] (End-)	<i>Encoder Data menu</i>	
	Incremental encoder	.....
[Number of pulses] (PGI)	Number of pulses	.....
	Resolver encoder	.....
[Freq.Excit.Resolve] (FrS)	Resolver Excit Freq.	.....
[Resolver poles nbr] (rppn)	Resolver poles nbr	.....
	SinCos encoder	.....
[Encoder supply volt.] (UECU)	Encoder supply volt.	.....
[Sincos lines count] (UELC)	Number of lines	.....
	Dual SinCos encoder	.....
[Encoder supply volt.] (UECU)	Encoder supply volt.	.....
[Sincos lines count] (UELC)	Number of lines	.....
	SinCos EnDat encoder	.....
[Sincos lines count] (UELC)	Sincos lines count	.....
[MOTOR DATA] (Mot-)	<i>Motor Data menu</i>	
[Motor control type] (Ctt)	Motor control type	..... SVC V or FVC or FSY or SYN
	Asynchronous	.....
[Rated motor power] (nPr)	Rated motor power	..... kW
[Rated motor volt.] (UnS)	Rated motor volt.	..... V
[Rated mot. current] (nCr)	Rated mot. current	..... A
[Rated motor freq.] (FrS)	Rated motor freq.	..... Hz
[Rated motor speed] (nSP)	Rated motor speed	..... rpm
	or	.....
	Synchronous	.....
[Motor torque] (tqS)	Motor torque	..... Nm
[Nominal I sync.] (nCrS)	Nominal I sync.	..... A
[Nom motor spdsync.] (nSPS)	Nom motor spdsync	..... rpm
[Pole pairs] (PPnS)	Pole pairs	.....
[LIFT DATA] (LdA-)	<i>Lift Data menu</i>	
[Nominal car speed] (CSP)	Nominal car speed at FRS	..... m/s
[Capacity of the lift] (LCA)	Payload	..... kg
[Lift top speed] (LTS)	Travel speed	..... m/s
[Deceleration length] (dEL)	Deceleration length	..... cm
[Lift leveling time] (LLt)	Lift leveling time	..... s
[Stop length] (StL)	Stop length	..... cm
[Lift leveling speed] (LLS)	Lift leveling speed	..... m/s

Assignment of the inputs/outputs

The ATV LIFT is factory-set with the following I/O assignments:

Logic inputs

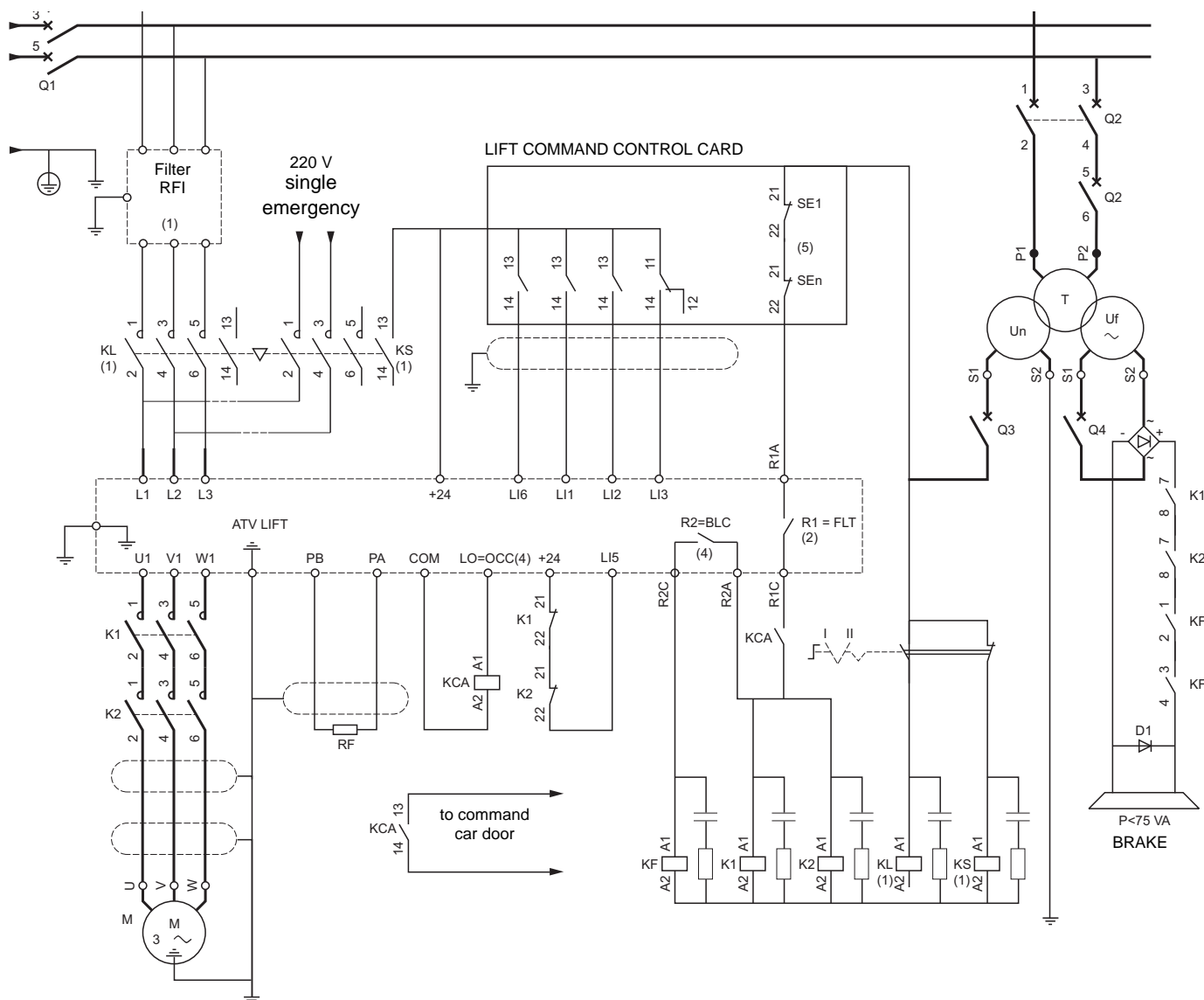
- LI1: Forward
- LI2: Reverse
- LI3: Not assigned
- LI4: Lift speed management
- LI5: Inspection mode
- LI6: Not assigned

Logic outputs

- R1: No
- R2: Brake sequence
- dO1: Output contactor

Analog inputs

- AI1: Channel reference



(1) Optional elements.

(2) Fault relay contacts for remote signalling of drive status (reassignable).

(3) Internal +24 V. If an external +24V supply is used, connect the 0 V on the external supply to the COM terminal, do not use the +24 terminal on the drive, and connect the common of the LI inputs to the +24 V of the external supply.

(4) Assignable relay R2 and logic output LO.

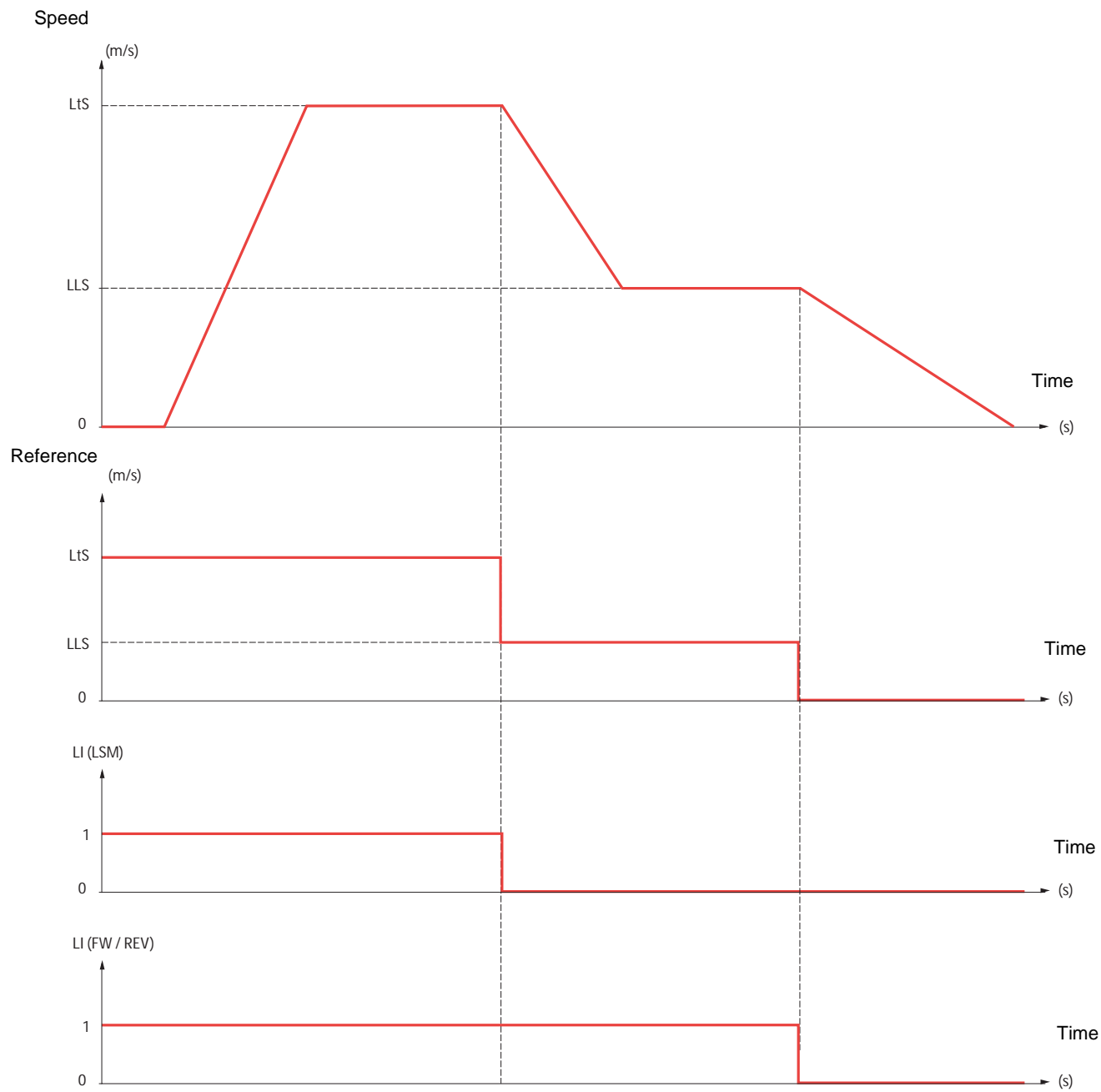
(5) Safety circuit.

[1.1 LIFT] (LIF-)


Code	Name/Description	Adjustment range	Factory setting
L C 0 -	[LIFT CONFIGURATION]		
L I 0 -	[I/O ASSIGNMENTS]		
I N P -	[INPUTS]		
F r d n O L I I - - - C I O I - - - C d 0 0 - -	<input type="checkbox"/> [Forward] <input type="checkbox"/> [No] (nO): Not assigned <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12): If VW3A3203 ESIM card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted <input type="checkbox"/> [C101] (C101) to [C115] (C115): With integrated Modbus in [I/O profile] (IO) <input type="checkbox"/> [C201] (C201) to [C215] (C215): With integrated CANopen in [I/O profile] (IO) <input type="checkbox"/> [C301] (C301) to [C315] (C315): With a communication card in [I/O profile] (IO) <input type="checkbox"/> [C401] (C401) to [C415] (C415): With a Controller Inside card in [I/O profile] (IO) <input type="checkbox"/> [CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] (IO) can be switched with possible logic inputs <input type="checkbox"/> [CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] (IO) can be switched without logic inputs Reads the forward command assignment.		[LI1] (LI1)
r r S n O L I I - - - C I O I - - - C d 0 0 - -	<input type="checkbox"/> [Reverse] <input type="checkbox"/> [No] (nO): Not assigned <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12): If VW3A3203 ESIM card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted <input type="checkbox"/> [C101] (C101) to [C115] (C115): With integrated Modbus in [I/O profile] (IO) <input type="checkbox"/> [C201] (C201) to [C215] (C215): With integrated CANopen in [I/O profile] (IO) <input type="checkbox"/> [C301] (C301) to [C315] (C315): With a communication card in [I/O profile] (IO) <input type="checkbox"/> [C401] (C401) to [C415] (C415): With a Controller Inside card in [I/O profile] (IO) <input type="checkbox"/> [CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] (IO) can be switched with possible logic inputs <input type="checkbox"/> [CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] (IO) can be switched without logic inputs Reverse direction command assignment.		[LI2] (LI2)
n S t n O L I I - - - C I O I - - - C d 0 0 - -	<input type="checkbox"/> [Freewheel stop ass.] <input type="checkbox"/> [No] (nO): Not assigned <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12): If VW3A3203 ESIM card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted <input type="checkbox"/> [C101] (C101) to [C115] (C115): With integrated Modbus in [I/O profile] (IO) <input type="checkbox"/> [C201] (C201) to [C215] (C215): With integrated CANopen in [I/O profile] (IO) <input type="checkbox"/> [C301] (C301) to [C315] (C315): With a communication card in [I/O profile] (IO) <input type="checkbox"/> [C401] (C401) to [C415] (C415): With a Controller Inside card in [I/O profile] (IO) <input type="checkbox"/> [CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] (IO) can be switched with possible logic inputs <input type="checkbox"/> [CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] (IO) can be switched without logic inputs The stop is activated when the input or bit is at inactive state. If the input returns to active state and the run command is still active, the motor will only restart if [2/3 wire control] (tCC) page 166 = [2 wire] (2C) and [2 wire type] (tCt) = [Level] (LEL) or [Fwd priority] (PFO). If not, a new run command must be sent.		[No] (nO)

Lift ramp

Assignment of [Lift Speed Mgt] (LSM) activates the ramp profile specific to the lift.




[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting												
L C 0 -	[LIFT CONFIGURATION] continued														
L I 0 -	[I/O ASSIGNMENTS] continued														
I N P -	[INPUTS] continued														
I S P	<div><input type="checkbox"/> [Inspection]</div> <div>This parameter can be accessed if brake logic control [Brake assignment] (bLC) page 233 have been assigned.<div><input type="checkbox"/> [No] (nO): Function not assigned <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12): If VW3A3203 ESIM card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted.</div>Inspection mode is activated when the assigned input changes to active state.</div>		[LI5] (LI5)												
L S M	<div><input type="checkbox"/> [Lift Speed Mgt]</div> <div>Management of the lift speed Assignment of LSM activates the ramp profile specific to the lift.<div><input type="checkbox"/> [No] (nO): Function not assigned <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12): If VW3A3203 ESIM card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted <input type="checkbox"/> [C101] (C101) to [C115] (C115): With integrated Modbus in [I/O profile] (IO) <input type="checkbox"/> [C201] (C201) to [C215] (C215): With integrated CANopen in [I/O profile] (IO) <input type="checkbox"/> [C301] (C301) to [C315] (C315): With a communication card in [I/O profile] (IO) <input type="checkbox"/> [C401] (C401) to [C415] (C415): With a Controller Inside card in [I/O profile] (IO) <input type="checkbox"/> [CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] (IO) can be switched with possible logic inputs <input type="checkbox"/> [CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] (IO) can be switched without logic inputs</div><div> Note: If LSM has not been assigned, the standard ramp is active (see the [RAMP] (rPt-) submenu in the [1.7 APPLICATION FUNCT.] (Fun-) menu on page 217).</div><div>The input assigned to the lift ramp function commands [Lift top speed] (LtS) page 59.</div><table><tr><th>Reference (1)</th><th>LI (Fwd) or LI (Rev)</th><th>LI [Lift Speed Mgt] (LSM)</th></tr><tr><td>STOP</td><td>0</td><td>X</td></tr><tr><td>[Lift top speed] (LtS)</td><td>1</td><td>1</td></tr><tr><td>[Lift leveling speed] (LLS)</td><td>1</td><td>0</td></tr></table></div>	Reference (1)	LI (Fwd) or LI (Rev)	LI [Lift Speed Mgt] (LSM)	STOP	0	X	[Lift top speed] (LtS)	1	1	[Lift leveling speed] (LLS)	1	0		[LI4] (LI4)
Reference (1)	LI (Fwd) or LI (Rev)	LI [Lift Speed Mgt] (LSM)													
STOP	0	X													
[Lift top speed] (LtS)	1	1													
[Lift leveling speed] (LLS)	1	0													
r C R	<div><input type="checkbox"/> [Output contact. fdbk]</div> <div><div><input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...): See the assignment conditions on page 204.</div></div>		[No] (nO)												
r F t	<div><input type="checkbox"/> [Evacuation assign.]</div> <div><div><input type="checkbox"/> [No] (nO): Function not assigned. <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10) : If VW3A3201 logic I/O card has been inserted. <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12) : If VW3A3203 ESIM card has benn inserted. <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14) : If VW3A3202 extended I/O card has been inserted.</div>Evacuation is activated when the assigned input is at active state, if the drive is stationary. Evacuation is activated when the assigned input is at inactive state, as soon as the drive stops.</div>		[No] (nO)												

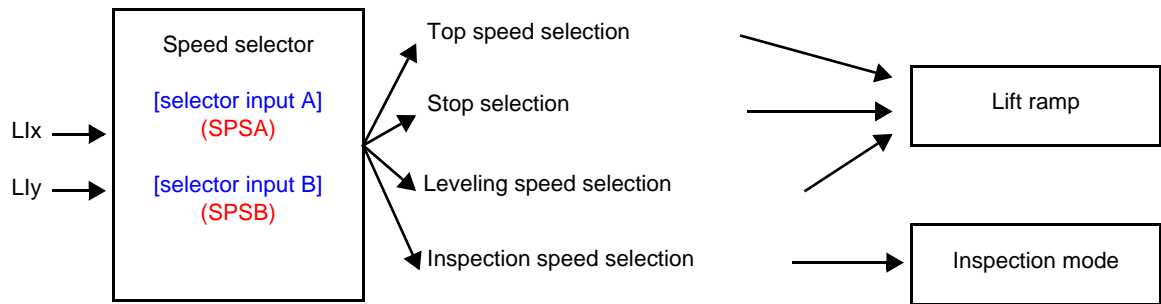
(1) Note: This table is applicable to 2-wire control.

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
LCC-	[LIFT CONFIGURATION] continued		
LIO-	[I/O ASSIGNMENTS] continued		
INP-	[INPUTS] continued		
BCI	<input type="checkbox"/> [Brake contact] If the brake has a monitoring contact (closed for released brake). <input type="checkbox"/> [No] (nO) : Function inactive [LI1] (LI1) : : <input type="checkbox"/> [...] (...) : See the assignment conditions on page 204.		[No] (nO)
FrI	<input type="checkbox"/> [Ref.1 channel] <input type="checkbox"/> [AI1] (AI1) : Analog input, <input type="checkbox"/> [AI2] (AI2) : Analog input, <input type="checkbox"/> [AI3] (AI3) : Analog input, if VW3A3202 extension card has been inserted, <input type="checkbox"/> [AI4] (AI4) : Analog input, if VW3A3202 extension card has been inserted, <input type="checkbox"/> [HMI] (LCC) : Graphic display terminal, <input type="checkbox"/> [Modbus] (Mdb) : Integrated Modbus, <input type="checkbox"/> [CANopen] (CAn) : Integrated CANopen, <input type="checkbox"/> [Com. card] (nEt) : Communication card (if inserted), <input type="checkbox"/> [C.Insid. card] (APP) : Controller Inside card (if inserted), <input type="checkbox"/> [RP] (PI) : Frequency input, if VW3A3202 extension card has been inserted, <input type="checkbox"/> [Encoder] (PG) : Encoder input, if encoder card has been inserted.		[AI1] (AI1)
PES	<input type="checkbox"/> [Weight sensor ass.] This function can be accessed if brake logic control has been assigned (see page 233). If [Weight sensor ass.] (PES) is not [No] (nO) , [Movement type] (bSt) page 233 is forced to [Hoisting] (UEr) . <input type="checkbox"/> [No] (nO) : Function inactive, <input type="checkbox"/> [AI1] (AI1) : Analog input, <input type="checkbox"/> [AI2] (AI2) : Analog input, <input type="checkbox"/> [AI3] (AI3) : Analog input, if VW3A3202 extension card has been inserted, <input type="checkbox"/> [AI4] (AI4) : Analog input, if VW3A3202 extension card has been inserted, <input type="checkbox"/> [RP] (PI) : Frequency input, if VW3A3202 extension card has been inserted, <input type="checkbox"/> [Encoder] (PG) : Encoder input, if encoder card has been inserted. <input type="checkbox"/> [Network AI] (AIU1) : Virtual input via communication bus, to be configured via [AI net. channel] (AIC1) page 175.		[No] (nO)
<div style="text-align: center;">  WARNING </div> <div> UNINTENDED EQUIPMENT OPERATION If the equipment switches to forced local mode (see page 286), the virtual input remains frozen at the last value transmitted. Do not use the virtual input and forced local mode in the same configuration. Failure to follow this instruction can result in death or serious injury. </div>			

Speed selector and lift ramp

This function is accessible only if [ACCESS LEVEL] = [Expert].
A specific mechanism exists for speed selector.

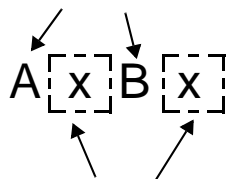


2 or 4 speeds can be selected, requiring 1 or 2 logic inputs respectively.

Combination table for speed selector

Parameter	Assignment possible (1)	State SPSA	State SPSB
[LTS selection] (LtSS)	no	no	no
	A0B0	inactive	inactive
	A1B0	active	inactive
	A0B1	inactive	active
	A1B1	active	active
[LLS selection] (LLSS)	no	no	no
	A0B0	inactive	inactive
	A1B0	active	inactive
	A0B1	inactive	active
	A1B1	active	active
[Stop selection] (StPS)	no	no	no
	A0B0	inactive	inactive
	A1B0	active	inactive
	A0B1	inactive	active
	A1B1	active	active
[ISP selection] (ISPS)	no	no	no
	A0B0	inactive	inactive
	A1B0	active	inactive
	A0B1	inactive	active
	A1B1	active	active

(1)
A and B represent 2 inputs used as selector




These 2 figures represent the state of the corresponding logical input

Example : If SPSA = LI4 and SPSB = LI5, then A0B1 represent LI4 = 0 and LI5 = 1.


Speed selector and lift ramp (continued)



[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L C 0 -	[LIFT CONFIGURATION] continued		
L I 0 -	[I/O ASSIGNMENTS] continued		
I N P -	[INPUTS] continued		
S P S -	[SPEED SELECTOR] Menu accessible if [Lift Speed Mgt] (LSM) page 36 is equal to [No] (nO) and if [ACCESS LEVEL] = [Expert].		
S P S A n O L I I - - L I I 4 C I 0 I - - - C d 0 0 -	<input type="checkbox"/> [selector input A] <input type="checkbox"/> [No] (nO): Not assigned <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12): If VW3A3203 ESIM card has been <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted <input type="checkbox"/> [C101] (C101) to [C115] (C115): With integrated Modbus in [I/O profile] (IO) <input type="checkbox"/> [C201] (C201) to [C215] (C215): With integrated CANopen in [I/O profile] (IO) <input type="checkbox"/> [C301] (C301) to [C315] (C315): With a communication card in [I/O profile] (IO) <input type="checkbox"/> [C401] (C401) to [C415] (C415): With a Controller Inside card in [I/O profile] (IO) <input type="checkbox"/> [CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] (IO) can be switched with possible logic inputs <input type="checkbox"/> [CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] (IO) can be switched without logic inputs		[No] (nO)
S P S B	<input type="checkbox"/> [selector input B] Identical to [selector input A] (SPSA).		[No] (nO)
L t S S n O A 0 B 0 A 1 B 0 A 0 B 1 A 1 B 1	<input type="checkbox"/> [LTS selection] <input type="checkbox"/> [No] (nO) : Not assigned. <input type="checkbox"/> [A0B0] (SPS A0 B0) <input type="checkbox"/> [A1B0] (SPS A1 B0) <input type="checkbox"/> [A0B1] (SPS A0 B1) <input type="checkbox"/> [A1B1] (SPS A1 B1)		[No] (nO)
L L S S	<input type="checkbox"/> [LLS selection] Identical to [LTS selection] (Ltss).		[No] (nO)
S t P S	<input type="checkbox"/> [Stop selection] Identical to [LTS selection] (Ltss).  Note: The brake is closed even if the RUN order is still available (RUN is displayed on the drive)		[No] (nO)
I S P S	<input type="checkbox"/> [ISP selection] Identical to [LTS selection] (Ltss).		[No] (nO)

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L C 0 -	[LIFT CONFIGURATION] continued		
L I 0 -	[I/O ASSIGNMENTS] continued		
O U 0 -	[OUTPUTS]		
b L C	<input type="checkbox"/> [Brake assignment]		[R2] (R2)
n 0	<p> Note: If the brake is assigned, only a ramp stop is possible. Check the [Type of stop] (Stt) page 221.</p> <p>Brake logic control can only be assigned if [Motor control type] (Ctt) page 137 = [SVC V] (UUC), [SVC I] (CUC), [FVC] (FUC) or [Sync.CL] (FSY).</p> <p>Logic output or control relay</p>		
r 2	<input type="checkbox"/> [No] (nO): Function not assigned (in this case, none of the function's parameters can be accessed)		
-	<input type="checkbox"/> [R2] (r2)		
r 5	<p>to</p> <p>[R5] (r5): Relay (selection extended to R3, R4 or R5 if I/O or ESIM cards have been inserted)</p>		
L O 1	<input type="checkbox"/> [LO1] (LO1)		
-	<p>to</p> <p>[LO4] (LO4): Logic output (if one or two I/O cards have been inserted, LO1 to LO2 or LO4 can be selected).</p>		
L O 4	<input type="checkbox"/> [dO1] (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1) page 191 = [No] (nO).		
d O 1			
O C C	<input type="checkbox"/> [Out. contactor ass.]		[dO1] (dO1)
n 0	<p>Logic output or control relay</p> <p><input type="checkbox"/> [No] (nO): Function not assigned (in this case, none of the function's parameters can be accessed).</p>		
L O 1	<input type="checkbox"/> [LO1] (LO1)		
-	<p>to</p> <p>[LO4] (LO4): Logic output (if one or two I/O cards have been inserted, LO1 to LO2 or LO4 can be selected).</p>		
L O 4	<p>[R1] (r1)</p> <p>to</p> <p>[R5] (r5): Relay (selection extended to R3, R4 or R5 if I/O or ESIM cards have been inserted)</p>		
r 1	<input type="checkbox"/> [dO1] (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1) page 191 = [No] (nO).		
-			
r 5			
d O 1			

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L C 0 -	[LIFT CONFIGURATION] continued		
L I 0 -	[I/O ASSIGNMENTS] continued		
O U 0 -	[OUTPUTS] continued		
r I	<input type="checkbox"/> [R1 Assignment]		[No] (nO)
n O	<input type="checkbox"/> [No] (nO): Not assigned		
F L t	<input type="checkbox"/> [No drive flt] (FLt): Drive not faulty (relay normally energized, and de-energized if there is a fault)		
r U n	<input type="checkbox"/> [Drv running] (rUn): Drive running		
F t A	<input type="checkbox"/> [Freq. Th. attain.] (FtA): Frequency threshold attained ([Freq. threshold] (Ftd) page 135)		
F L A	<input type="checkbox"/> [HSP attain.] (FLA): High speed attained		
C t A	<input type="checkbox"/> [I attained] (CtA): Current threshold attained ([Current threshold] (Ctd) page 134)		
S r A	<input type="checkbox"/> [Freq.ref.att] (SrA): Frequency reference attained		
t S A	<input type="checkbox"/> [Th.mot. att.] (tSA): Motor 1 thermal state attained		
A P 2	<input type="checkbox"/> [AI2 AI. 4-20] (AP2): Alarm indicating absence of 4-20 mA signal on input AI2		
F 2 A	<input type="checkbox"/> [Freq. Th. 2 attain.] (F2A): Frequency threshold 2 attained ([Freq. threshold 2] (F2d) page 135)		
t A d	<input type="checkbox"/> [Th.driv.att.] (tAd): Drive thermal state attained		
t t H A	<input type="checkbox"/> [High tq. att.] (ttHA): Motor torque greater than high threshold [High torque thd.] (ttH) page 134.		
t t L A	<input type="checkbox"/> [Low tq. att.] (ttLA): Motor torque less than low threshold [Low torque thd.] (ttL) page 134.		
M F r d	<input type="checkbox"/> [Forward] (MFrd): Motor running forward		
M r r S	<input type="checkbox"/> [Reverse] (MrrS): Motor running in reverse		
t S 2	<input type="checkbox"/> [Th.mot2 att.] (tS2): Motor 2 thermal state attained		
t S 3	<input type="checkbox"/> [Th.mot3 att] (tS3): Motor 3 thermal state attained		
A t S	<input type="checkbox"/> [Neg Torque] (AtS): Negative torque (braking)		
C n F 0	<input type="checkbox"/> [Cnfg.0 act.] (CnF0): Configuration 0 active		
C n F 1	<input type="checkbox"/> [Cnfg.1 act.] (CnF1): Configuration 1 active		
C n F 2	<input type="checkbox"/> [Cnfg.2 act.] (CnF2): Configuration 2 active		
C F P 1	<input type="checkbox"/> [Set 1 active] (CFP1): Parameter set 1 active		
C F P 2	<input type="checkbox"/> [Set 2 active] (CFP2): Parameter set 2 active		
C F P 3	<input type="checkbox"/> [Set 3 active] (CFP3): Parameter set 3 active		
d b L	<input type="checkbox"/> [DC charged] (dbL): DC bus charging		
b r S	<input type="checkbox"/> [In braking] (brS): Drive braking		
P r n	<input type="checkbox"/> [P. removed] (PRM): Drive locked by "Power removal" input		
F q L A	<input type="checkbox"/> [Fr.met. alar.] (FqLA): Measured speed threshold attained: [Pulse warning thd.] (FqL) page 135.		
M C P	<input type="checkbox"/> [I present] (MCP): Motor current present		
L S A	<input type="checkbox"/> [Limit sw. att] (LSA): Limit switch reached		
A G 1	<input type="checkbox"/> [Alarm Grp 1] (AG1): Alarm group 1		
A G 2	<input type="checkbox"/> [Alarm Grp 2] (AG2): Alarm group 2		
A G 3	<input type="checkbox"/> [Alarm Grp 3] (AG3): Alarm group 3		
P 1 A	<input type="checkbox"/> [PTC1 alarm] (P1A): Probe alarm 1		
P 2 A	<input type="checkbox"/> [PTC2 alarm] (P2A): Probe alarm 2		
P L A	<input type="checkbox"/> [LI6=PTC al.] (PLA): LI6 = PTC probe alarm		
E F A	<input type="checkbox"/> [Ext. fault al] (EFA): External fault alarm		
U S A	<input type="checkbox"/> [Under V. al.] (USA): Undervoltage alarm		
U P A	<input type="checkbox"/> [Uvolt warn] (UPA): Undervoltage warning		
A n A	<input type="checkbox"/> [slipping al.] (AnA): Slipping alarm		
t H A	<input type="checkbox"/> [Al. °C drv] (tHA): Drive overheating		
b S A	<input type="checkbox"/> [Load mvt al] (bSA): Braking speed alarm		
b C A	<input type="checkbox"/> [Brk cont. al] (bCA): Brake contact alarm		
S S A	<input type="checkbox"/> [Lim T/I att.] (SSA): Torque limit alarm		
r t A	<input type="checkbox"/> [Trq. ctrl. al.] (rtA): Torque control alarm		
t J A	<input type="checkbox"/> [IGBT al.] (tJA): IGBT alarm		
b O A	<input type="checkbox"/> [Brake R. al.] (bOA): Braking resistor temperature alarm		
A P A	<input type="checkbox"/> [Option al.] (APA): Alarm generated by the Controller Inside card		
A P 3	<input type="checkbox"/> [AI3 AI. 4-20] (AP3): Alarm indicating absence of 4-20 mA signal on input AI3		
A P 4	<input type="checkbox"/> [AI4 AI. 4-20] (AP4): Alarm indicating absence of 4-20 mA signal on input AI4		
r d Y	<input type="checkbox"/> [Ready] (rdY): Drive ready		

[1.1 LIFT] (LIF-)


Code	Name/Description	Adjustment range	Factory setting
L C 0 -	[LIFT CONFIGURATION] continued		
L I 0 -	[I/O ASSIGNMENTS] continued		
O U 0 -	[OUTPUTS] continued		
r 2	<input type="checkbox"/> [R2 Assignment] Identical to R1 (see page 42) with the addition of (shown for information only as these selections can only be configured in the [1.7 APPLICATION FUNCT.] (Fun-) menu): <input type="checkbox"/> [Brk control] (bLC) : Brake contactor control <input type="checkbox"/> [Input cont.] (LLC) : Line contactor control <input type="checkbox"/> [Output cont] (OCC) : Output contactor control <input type="checkbox"/> [DC charging] (dCO) : DC bus precharging contactor control		[Brk control] (bLC)
d O 1	<input type="checkbox"/> [DO1 assignment] Identical to R1 (see page 42) with the addition of (shown for information only as these selections can only be configured in the [1.7 APPLICATION FUNCT.] (Fun-) menu): <input type="checkbox"/> [Brk control] (bLC) : Brake contactor control <input type="checkbox"/> [Input cont.] (LLC) : Line contactor control <input type="checkbox"/> [Output cont] (OCC) : Output contactor control <input type="checkbox"/> [DC charging] (dCO) : DC bus precharging contactor control		[Output cont] (OCC)
A O 1	<input type="checkbox"/> [AO1 assignment] <input type="checkbox"/> [No] (nO) : Not assigned <input type="checkbox"/> [I motor] (OCr) : Current in the motor, between 0 and 2 In (In = rated drive current indicated in the Installation Manual and on the drive nameplate). <input type="checkbox"/> [Motor freq.] (OFr) : Output frequency, between 0 and [Max frequency] (tFr) <input type="checkbox"/> [Ramp out.] (OrP) : Between 0 and [Max frequency] (tFr) <input type="checkbox"/> [Motor torq.] (trq) : Motor torque, between 0 and 3 times the rated motor torque. <input type="checkbox"/> [Sign. torque] (Stq) : Signed motor torque, between -3 and +3 times the rated motor torque. The + sign corresponds to motor mode and the - sign to generator mode (braking). <input type="checkbox"/> [sign ramp] (OrS) : Signed ramp output, between - [Max frequency] (tFr) and + [Max frequency] (tFr) <input type="checkbox"/> [Mot. power] (OPr) : Motor power, between 0 and 2.5 times [Rated motor power] (nPr) <input type="checkbox"/> [Mot thermal] (tHr) : Motor thermal state, between 0 and 200% of the rated thermal state. <input type="checkbox"/> [Drv thermal] (tHd) : Drive thermal state, between 0 and 200% of the rated thermal state. <input type="checkbox"/> [Torque 4Q] (tqMS) : Signed motor torque, between -3 and +3 times the rated motor torque. The + sign and the - sign correspond to the physical direction of the torque, regardless of mode (motor or generator). Example of usage: "master-slave" with the [TORQUE CONTROL] (tOr-) function, page 241. <input type="checkbox"/> [Meas.mot.fr] (OFrr) : Measured motor speed. <input type="checkbox"/> [Sig. o/p frq.] (OFS) : Signed output frequency, between - [Max frequency] (tFr) and + [Max frequency] (tFr) <input type="checkbox"/> [Mot therm2] (tHr2) : Thermal state of motor 2, between 0 and 200% of the rated thermal state. <input type="checkbox"/> [Mot therm3] (tHr3) : Thermal state of motor 3, between 0 and 200% of the rated thermal state. <input type="checkbox"/> [Uns.TrqRef] (Utr) : Torque reference, between 0 and 3 times the rated motor torque. <input type="checkbox"/> [Sign trq ref.] (Str) : Signed torque reference, between -3 and +3 times the rated motor torque. <input type="checkbox"/> [Torque lim.] (tqL) : Torque limit, between 0 and 3 times the rated motor torque. <input type="checkbox"/> [Motor volt.] (UOP) : Voltage applied to the motor, between 0 and [Rated motor volt.] (UnS) <input type="checkbox"/> [dO1] (dO1) : Assigned as logic output. This assignment can only appear if [DO1 assignment] (dO1) page 188 has been assigned. This is the only possible choice in this case, and is displayed for information purposes only.		[dO1] (dO1)

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L C D -	[LIFT CONFIGURATION] continued		
End -	[ENCODER DATA]		
En 5 n O A A b b A b A	<input type="checkbox"/> [Encoder type] This parameter can be accessed if an incremental encoder card has been inserted. To be configured in accordance with the type of encoder used. <input type="checkbox"/> [No] (nO) : Function inactive. <input type="checkbox"/> [AABB] (AAbb) : For signals A, A-, B, B- or A, A-, B, B-, Z, Z-. <input type="checkbox"/> [AB] (Ab) : For signals A, B. <input type="checkbox"/> [A] (A) : For signal A. Value cannot be accessed if [Encoder usage] (EnU) = [Spd fdk reg.] (rEG) .		[AABB] (AAbb)
En U n O S E C r E G P G r	<input type="checkbox"/> [Encoder usage] This parameter can be accessed if an encoder card has been inserted (1). <input type="checkbox"/> [No] (nO) : Function inactive. <input type="checkbox"/> [Fdbk monit.] (SEC) : The encoder provides speed feedback for monitoring only. <input type="checkbox"/> [Spd fdk reg.] (rEG) : The encoder provides speed feedback for regulation and monitoring. This configuration is automatic if the drive is configured for closed-loop operation ([Motor control type] (Ctt) = [FVC] (FUC) or [Sync.CL] (FSY) . If [Motor control type] (Ctt) = [SVC V] (UUC) the encoder operates in speed feedback mode and enables static correction of the speed to be performed. This configuration is not accessible for other [Motor control type] (Ctt) values. <input type="checkbox"/> [Speed ref.] (PGr) : The encoder provides a reference. Can only be selected with an incremental encoder card.		[No] (nO)
En r I n O Y E S	<input type="checkbox"/> [Coder rotation inv.] This parameter can be accessed if an encoder card has been inserted. Activates reversal of encoder rotation. In some assemblies, the encoder positive direction of rotation is reversed in relation to the motor direction. When this is the case, this parameter needs to be activated in order for the motor and the encoder both to have a positive direction of rotation. <input type="checkbox"/> [No] (nO) : Reversal not activated <input type="checkbox"/> [Yes] (YES) : Reversal activated		[No] (nO)
P G I	<input type="checkbox"/> [Number of pulses] Number of pulses per encoder revolution. This parameter can be accessed if a VW3 A3 401 to 407 or VW3 A3 410 and VW3 A3 411 card has been inserted.	100 to 10000	1024
P G R En C P t G	<input type="checkbox"/> [Reference type] This parameter can be accessed if [Encoder usage] (EnU) = [Speed ref.] (PGr) . <input type="checkbox"/> [Encoder] (EnC) : Use of an encoder (incremental encoder only). <input type="checkbox"/> [Freq. gen.] (PtG) : Use of a frequency generator (unsigned reference).		[Encoder] (EnC)
E I L	<input type="checkbox"/> [Freq. min. value] This parameter can be accessed if [Encoder usage] (EnU) = [Speed ref.] (PGr) and if [Reference type] (PGA) = [Freq. gen.] (PtG) . Frequency corresponding to the minimum speed.	- 300 to 300 kHz	0 kHz
E F r	<input type="checkbox"/> [Freq. max value] This parameter can be accessed if [Encoder usage] (EnU) = [Speed ref.] (PGr) and if [Reference type] (PGA) = [Freq. gen.] (PtG) . Frequency corresponding to the maximum speed.	0.00 to 300.00 kHz	300.00 kHz
E F I	<input type="checkbox"/> [Freq. signal filter] This parameter can be accessed if [Encoder usage] (EnU) = [Speed ref.] (PGr) . Interference filtering.	0 to 1000 ms	0 ms

(1) The encoder parameters can only be accessed if the encoder card has been inserted, and the available selections will depend on the type of encoder card used. The encoder configuration can also be accessed in the **[1.5 - INPUTS / OUTPUTS CFG] (I/O)** menu.

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L C D -	[LIFT CONFIGURATION] continued		
End -	[ENCODER DATA] continued		
F r E S 4 8 12	<input type="checkbox"/> [Resolver Exct. Freq.] Resolver excitation frequency. This parameter can be accessed if a VW3 A3 408 encoder card (for resolver) has been inserted. <input type="checkbox"/> [4 kHz] (4) : 4 kHz <input type="checkbox"/> [8 kHz] (8) : 8 kHz <input type="checkbox"/> [12 kHz] (12) : 12 kHz		[8 kHz] (8)
r P P n 2P 4P 6P 8P	<input type="checkbox"/> [Resolver poles nbr] Number of resolver poles. This parameter can be accessed if a VW3 A3 408 encoder card (for resolver) has been inserted. <input type="checkbox"/> [2 poles] (2P) : 2 poles, max. speed 7500 rpm <input type="checkbox"/> [4 poles] (4P) : 4 poles, max. speed 3750 rpm <input type="checkbox"/> [6 poles] (6P) : 6 poles, max. speed 2500 rpm <input type="checkbox"/> [8 poles] (8P) : 8 poles, max. speed 1875 rpm  If the number of motor poles is not a whole multiple of the number of resolver poles , the resolver is a relative encoder and no longer absolute. You should therefore set the [Angle setting activ.] (AtA) parameter = [Power On] (POn) or [Run order] (AUtO) .		[2 poles] (2P)
UECP Und End SCHP SC SSI EnSC	<input type="checkbox"/> [Encoder protocol] Type of encoder used. <input type="checkbox"/> [Undefined] (Und) : Not defined <input type="checkbox"/> [EnDat 2.1] (End) : Endat encoder. <input type="checkbox"/> [Hiperface] (SCHP) : Hiperface encoder <input type="checkbox"/> [SinCos] (SC) : SinCos encoder <input type="checkbox"/> [SSI] (SSI) : SSI encoder <input type="checkbox"/> [EndatSincos] (EnSC) : EndatSincos encoder		[Undefined] (Und)
UECU Und 5U 8U 12U	<input type="checkbox"/> [Encoder supply volt.] Rated voltage of encoder used. The parameter can be accessed if [Encoder protocol] (UECP) is not [Undefined] (Und) . <input type="checkbox"/> [Undefined] (Und) : Not defined <input type="checkbox"/> [5 volts] (5U) : 5 Volts. Only possible value if [Encoder protocol] (UECP) = [EnDat 2.1] (End) or [EndatSincos] (EnSC) . <input type="checkbox"/> [8 volts] (8U) : 8 Volts <input type="checkbox"/> [12 volts] (12U) : 12 Volts To make any changes to this parameter with the integrated display terminal, press and hold down the "ENT" key for 2 s for the change to be taken into account. When using the graphic display terminal, confirmation is requested.		[Undefined] (Und)
UEL C Und -	<input type="checkbox"/> [Sincos lines count] Number of lines. This parameter can be accessed if [Encoder protocol] (UECP) = [SinCos] (SC) or [EndatSinCos] (End) . <input type="checkbox"/> [Undefined] (Und) : Not defined <input type="checkbox"/> 1 to 10000 : 1 to 10,000 lines		[Undefined] (Und)
SSCP Und nO Odd EUEn	<input type="checkbox"/> [SSI parity] Parity. This parameter can be accessed if [Encoder protocol] (UECP) = [SSI] (SSI) . <input type="checkbox"/> [Undefined] (Und) : Not defined <input type="checkbox"/> [No parity] (nO) : No parity <input type="checkbox"/> [Odd parity] (Odd) : Odd parity <input type="checkbox"/> [Even parity] (EUEn) : Even parity		[Undefined] (Und)

[1.1 LIFT] (LIF-)

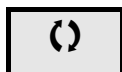
Code	Name/Description	Adjustment range	Factory setting
L C D -	[LIFT CONFIGURATION] continued		
E n d -	[ENCODER DATA] continued		
S S F S <i>U n d</i> -	<input type="checkbox"/> [SSI frame size] Frame length (number of bits). This parameter can be accessed if [Encoder protocol] (UECP) = [SSI] (SSI). <input type="checkbox"/> [Undefined] (Und): Not defined. Only possible value if [SSI parity] (SSCP) = [Undefined] (Und). <input type="checkbox"/> 10 to 27 : 10 to 25 if [SSI parity] (SSCP) = [No parity] (nO) 12 to 27 if [SSI parity] (SSCP) = [Odd parity] (Odd) or [Even parity] (EUEn).		[Undefined] (Und)
E n M r <i>U n d</i> -	<input type="checkbox"/> [Nbr of revolution] Format of the number of revolutions (in number of bits). This parameter can be accessed if [Encoder protocol] (UECP) = [SSI] (SSI). <input type="checkbox"/> [Undefined] (Und): Not defined. Only possible value if [SSI frame size] (SSFS) = [Undefined] (Und). <input type="checkbox"/> 0 to 15 : 0 to [SSI frame size] (SSFS) - 10 if [SSI parity] (SSCP) = [No parity] (nO). 0 to [SSI frame size] (SSFS) - 12 if [SSI parity] (SSCP) = [Odd parity] (Odd) or [Even parity] (EUEn).		[Undefined] (Und)
E n t r <i>U n d</i> -	<input type="checkbox"/> [Turn bit resolution] Resolution per revolution (in number of bits). This parameter can be accessed if [Encoder protocol] (UECP) = [SSI] (SSI). <input type="checkbox"/> [Undefined] (Und): Not defined. Only value possible if [Nbr of revolution] (EnMr) = [Undefined] (Und). <input type="checkbox"/> 10 to 25 : If [SSI parity] (SSCP) = [No parity] (nO), the maximum value is: [SSI frame size] (SSFS) - [Nbr of revolution] (EnMr). If [SSI parity] (SSCP) = [Odd parity] (Odd) or [Even parity] (EUEn), the maximum value is: [SSI frame size] (SSFS) - [Nbr of revolution] (EnMr) - 2.		[Undefined] (Und)
S S C d <i>U n d</i> <i>b i n</i> <i>G r A Y</i>	<input type="checkbox"/> [SSI code type] Type of code. This parameter can be accessed if [Encoder protocol] (UECP) = [SSI] (SSI). <input type="checkbox"/> [Undefined] (Und): Not defined <input type="checkbox"/> [Binary code] (bIn): Binary code <input type="checkbox"/> [Gray code] (GrAY): Gray code.		[Undefined] (Und)
E n S P <i>1 6 0</i> <i>2 0 0</i> <i>3 0 0</i> <i>4 0 0</i> <i>5 0 0</i> <i>6 0 0</i> <i>7 0 0</i> <i>8 0 0</i> <i>A U t O</i>	<input type="checkbox"/> [Clock frequency] This parameter can be accessed if [ACCESS LEVEL] = [Expert] and if [Encoder protocol] (UECP) = [SSI] (SSI) or [EnDat 2.1] (End) ou [EndatSincos] (EnSC). Clock frequency for Endat encoder, SSI encoder and Endat Sincos encoder. <input type="checkbox"/> [160 kHz] (160) <input type="checkbox"/> [200 kHz] (200) <input type="checkbox"/> [300 kHz] (300) <input type="checkbox"/> [400 kHz] (400) <input type="checkbox"/> [500 kHz] (500) <input type="checkbox"/> [600 kHz] (600) <input type="checkbox"/> [700 kHz] (700) <input type="checkbox"/> [800 kHz] (800) <input type="checkbox"/> [Auto] (AUtO) : This value appears only if [Encoder protocol] (UECP) = [SSI] (SSI) and if the version of this encoder board is upper or equal to V1.2IE01.		[500 kHz] (500)
F F A <i>n O</i> <i>Y E S</i>	<input type="checkbox"/> [Encoder filter activ.] This parameter can be accessed if [ACCESS LEVEL] = [Expert] Activation of encoder feedback filter. <input type="checkbox"/> [No] (no): Filter deactivated. <input type="checkbox"/> [Yes] (YES): Filter activated.		[No] (nO)

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting																																										
L C D -	[LIFT CONFIGURATION] continued																																												
End -	[ENCODER DATA] continued																																												
FFr ()	<div><input type="checkbox"/> [Encoder filter value]</div> <div>This parameter can be accessed if [ACCESS LEVEL] = [Expert] and if [Encoder filter activ.] (FFA) = [Yes] (YES). Encoder feedback filter time constant in milliseconds.</div>	0 to 50 ms	Acc. to encoder type																																										
nPL POS NEG	<div><input type="checkbox"/> [LI Active at]</div> <div>This parameter can be accessed if a VWA3203 ESIM card has been inserted. (To be taken into account on the next power-up).</div> <div><input type="checkbox"/> [Positive] (POS): Filter deactivated. <input type="checkbox"/> [Negative] (nEg): Filter deactivated.</div>		[Positive] (POS)																																										
PDI	<div><input type="checkbox"/> [Encod counter div]</div> <div>This parameter can be accessed if a VWA3203 ESIM card has been inserted.</div> <div>This parameter allows to adapt the number of pulses on the ESIM card output depending on the king of input signal :</div> <div>In case of VW3A3401 to VW3A3407 and VW3A3411 card for incremental encoder, output pulses number is [Number of pulses] (PGI) / [Pulses divider] (PDI). In case of VW3A3408 for resolver encoder, output pulses number is 2048 / (PDI). In case of VW3A3409 and VW3A3410 for SinCos encoder, output pulses number is 8192 / (PDI).</div>	1 to 16	1																																										
<table><tr><td>VW3A3203</td><td>VW3A3401 to VW3A3407 and VW3A3411</td><td>VW3A3401 to VW3A3407 and VW3A3411</td><td>VW3A3401 to VW3A3407 and VW3A3411</td><td>VW3A3401 to VW3A3407 and VW3A3411</td><td>VW3A3401 to VW3A3407 and VW3A3411</td></tr><tr><td>ESIM output pulses number</td><td>Incremental encoder 2048</td><td>Incremental encoder 4096</td><td>Incremental encoder 8192</td><td>Not dependind on resolution</td><td>Not dependind on resolution</td></tr><tr><td>512</td><td>PDI = 4</td><td>PDI = 8</td><td>PDI = 16</td><td>PDI = 4</td><td>PDI = 16</td></tr><tr><td>1024</td><td>PDI = 2</td><td>PDI = 4</td><td>PDI = 8</td><td>PDI = 2</td><td>PDI = 8</td></tr><tr><td>2048</td><td>PDI = 1</td><td>PDI = 2</td><td>PDI = 4</td><td>PDI = 1</td><td>PDI = 4</td></tr><tr><td>4096</td><td>Encoder resolution is too low</td><td>PDI = 1</td><td>PDI = 2</td><td>Encoder resolution is too low</td><td>PDI = 2</td></tr><tr><td>8192</td><td>Encoder resolution is too low</td><td>Encoder resolution is too low</td><td>PDI = 1</td><td>Encoder resolution is too low</td><td>PDI = 1</td></tr></table>				VW3A3203	VW3A3401 to VW3A3407 and VW3A3411	VW3A3401 to VW3A3407 and VW3A3411	VW3A3401 to VW3A3407 and VW3A3411	VW3A3401 to VW3A3407 and VW3A3411	VW3A3401 to VW3A3407 and VW3A3411	ESIM output pulses number	Incremental encoder 2048	Incremental encoder 4096	Incremental encoder 8192	Not dependind on resolution	Not dependind on resolution	512	PDI = 4	PDI = 8	PDI = 16	PDI = 4	PDI = 16	1024	PDI = 2	PDI = 4	PDI = 8	PDI = 2	PDI = 8	2048	PDI = 1	PDI = 2	PDI = 4	PDI = 1	PDI = 4	4096	Encoder resolution is too low	PDI = 1	PDI = 2	Encoder resolution is too low	PDI = 2	8192	Encoder resolution is too low	Encoder resolution is too low	PDI = 1	Encoder resolution is too low	PDI = 1
VW3A3203	VW3A3401 to VW3A3407 and VW3A3411	VW3A3401 to VW3A3407 and VW3A3411	VW3A3401 to VW3A3407 and VW3A3411	VW3A3401 to VW3A3407 and VW3A3411	VW3A3401 to VW3A3407 and VW3A3411																																								
ESIM output pulses number	Incremental encoder 2048	Incremental encoder 4096	Incremental encoder 8192	Not dependind on resolution	Not dependind on resolution																																								
512	PDI = 4	PDI = 8	PDI = 16	PDI = 4	PDI = 16																																								
1024	PDI = 2	PDI = 4	PDI = 8	PDI = 2	PDI = 8																																								
2048	PDI = 1	PDI = 2	PDI = 4	PDI = 1	PDI = 4																																								
4096	Encoder resolution is too low	PDI = 1	PDI = 2	Encoder resolution is too low	PDI = 2																																								
8192	Encoder resolution is too low	Encoder resolution is too low	PDI = 1	Encoder resolution is too low	PDI = 1																																								





ESIM card could emulate an encoder signal only if an encoder board is already inserted in the drive.




Parameter that can be modified during operation or when stopped.

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L C 0 -	[LIFT CONFIGURATION] continued		
n 0 E -	[MOTOR DATA]		
C E E	<input type="checkbox"/> [Motor control type]		[SVC V] (UUC)
U U C	<input type="checkbox"/> [SVC V] (UUC) : Open-loop voltage flux vector control with automatic slip compensation according to the load. This type of control is recommended when replacing an ATV58. It supports operation with a number of motors connected in parallel on the same drive (if the motors are identical).		
C U C	<input type="checkbox"/> [SVC I] (CUC) : Open-loop current flux vector control. This type of control is recommended when replacing an ATV58F used in an open-loop configuration. It does not support operation with a number of motors connected in parallel on the same drive.		
F U C	<input type="checkbox"/> [FVC] (FUC) : Closed-loop current flux vector control for motor with encoder. This selection is only possible if an encoder card has been inserted. This type of operation is not possible, however, when using an incremental encoder that generates signal "A" only. This type of control is recommended when replacing an ATV58F used in a closed-loop configuration. It provides better performance in terms of speed and torque accuracy and enables torque to be obtained at zero speed. It does not support operation with a number of motors connected in parallel on the same drive.		
	 It is essential that the encoder check detailed on page 141 is performed successfully before selecting [FVC] (FUC).		
U F 2	<input type="checkbox"/> [V/F 2pts] (UF2) : Simple V/F profile without slip compensation. See page 137 for more details of this parameter.		
U F 5	<input type="checkbox"/> [V/F 5pts] (UF5) : 5-segment V/F profile: Similar to V/F 2 pts profile but also supports the avoidance of resonance phenomena (saturation). See page 137 for more details of this parameter.		
S Y n	<input type="checkbox"/> [Sync. mot.] (SYn) : For permanent magnet synchronous motors with sinusoidal electromotive force (EMF) only. This selection makes the asynchronous motor parameters inaccessible, and the synchronous motor parameters accessible.		
F S Y	<input type="checkbox"/> [Sync.CL] (FSY) : Closed-loop synchronous motor. For permanent magnet synchronous motors with sinusoidal electromotive force (EMF) only, with encoder. This selection is only possible if an encoder card has been inserted; it makes the asynchronous motor parameters inaccessible, and the synchronous motor parameters accessible.		
	This type of operation is not possible, however, when using an incremental encoder that generates signal "A" only.		
	 It is essential that the encoder check detailed on page 141 is performed successfully before selecting [Sync.CL] (FSY).		

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L C D -	[LIFT CONFIGURATION] continued		
n O t -	[MOTOR DATA] continued		
r E Q P	<div><input type="checkbox"/> [Read motor param.]</div>		[No] (nO)
n O Y E S d O n E	<p>This parameter can only be used with BDH, BRH and BSH type motors from the Telemecanique range.</p> <p>Can only be accessed if [Encoder protocol] (UECP) page 180 = [Hiperface] (SCHP). Request to load motor parameters from the encoder EEPROM memory.</p> <p><input type="checkbox"/> [No] (nO): Loading not performed or has failed.</p> <p><input type="checkbox"/> [Yes] (YES): Loading is performed as soon as possible, then the parameter automatically changes to [Done] (dOnE).</p> <p><input type="checkbox"/> [Done] (dOnE):Loading done.</p> <p>The following parameters are loaded: [Angle offset value] (ASU) page 152, [Nom motor spdsync] (nSPS) page 148, [Nominal I sync.] (nCrS) page 148, [Pole pairs] (PPnS) page 148, [Syn. EMF constant] (PHS) page 148, [Cust. stator R syn] (rSAS) page 148, [Autotune L d-axis] (LdS) page 148, and [Autotune L q-axis] (LqS) page 148.</p> <p> Note:</p> <ul style="list-style-type: none">• During loading the drive is in "Freewheel Stop" state with the motor turned off.• If a "line contactor" or "output contactor" function has been configured, the contactor closes during loading.		
r E t P	<div><input type="checkbox"/> [Status motor param]</div>		[Not done] (tAb)
t A b P r O G F A I L d O n E C U S	<p>Can only be accessed if [Encoder protocol] (UECP) page 180 = [Hiperface] (SCHP). Information on the request to load motor parameters from the encoder EEPROM memory (not modifiable).</p> <p><input type="checkbox"/> [Not done] (tAb): Loading has not been performed, default motor parameters will be used.</p> <p><input type="checkbox"/> [In Progress] (PrOG): Loading in progress.</p> <p><input type="checkbox"/> [Failed] (FAIL) : Loading has failed.</p> <p><input type="checkbox"/> [Done] (dOnE): Loading completed successfully.</p> <p><input type="checkbox"/> [Customized] (CUS): Loading completed successfully but one or more motor parameters have subsequently been modified by the user via the display terminal or serial link, or auto-tuning has been performed by [Auto-tuning] (tUn).</p>		

[1.1 LIFT] (LIF-)

Asynchronous motor parameters:

These parameters can be accessed if [Motor control type] (Ctt) page 137 = [SVC V] (UUC), [SVC I] (CUC), [FVC] (FUC), [V/F 2pts] (UF2) or [V/F 5pts] (UF5). In this case, the synchronous motor parameters cannot be accessed.

Code	Name/Description	Adjustment range	Factory setting
L C D -	[LIFT CONFIGURATION] continued		
n O t -	[MOTOR DATA] continued		
n P r	<input type="checkbox"/> [Rated motor power] Rated motor power given on the nameplate, in kW if [Standard mot. freq] (bFr) = [50Hz IEC] (50), in HP if [Standard mot. freq] (bFr) = [60Hz NEMA] (60). $nPr = Uns \times nCr \times \sqrt{3} \times \eta \times \cos \varphi$ Avec : η = rendement et $\cos \varphi$ = facteur de puissance Exemple: Si [Tension nom. mot.] (Uns) = 400 V et [Courant nom. mot.] (nCr) = 11 A, alors $nPr = 400 \times 11 \times \sqrt{3} \times 0,85 \times 0,7$ $nPr = 4,54 \text{ kW}$	Acc. to drive rating	Acc. to drive rating
U n 5	<input type="checkbox"/> [Rated motor volt.] Rated motor voltage given on the nameplate. ATV71L...M3Z: 100 to 240 V ATV71L...N4Z: 200 to 480 V	Acc. to drive rating	According to drive rating and [Standard mot. freq] (bFr)
n C r	<input type="checkbox"/> [Rated mot. current] Rated motor current given on the nameplate.	0.25 to 1.5 In (1)	According to drive rating and [Standard mot. freq] (bFr)
F r 5	<input type="checkbox"/> [Rated motor freq.] Rated motor frequency given on the nameplate. The factory setting is 50 Hz, or preset to 60 Hz if [Standard mot. freq] (bFr) is set to 60 Hz.	10 to 500 Hz	50 Hz
n S P	<input type="checkbox"/> [Rated motor speed] Rated motor speed given on the nameplate. 0 to 9999 rpm then 10.00 to 65.53 krpm on the integrated display terminal. If, rather than the rated speed, the nameplate indicates the synchronous speed and the slip in Hz or as a %, calculate the rated speed as follows: <ul style="list-style-type: none"> Rated speed = Synchronous speed x $\frac{100 - \text{slip as a \%}}{100}$ or Rated speed = Synchronous speed x $\frac{50 - \text{slip in Hz}}{50}$ (50 Hz motors) or Rated speed = Synchronous speed x $\frac{60 - \text{slip in Hz}}{60}$ (60 Hz motors) If the motor is old or wrong motor nameplate, calculate the rated speed as follows: $nSP = \text{Synchronous speed} - 1,5 \times (\text{Synchronous speed} - \text{nominal speed})$ Exemple : $nSP = 1500 - 1,5 \times (1500 - 1430)$ $nSP = 1395 \text{ RPM}$	0 to 65535 rpm	Acc. to drive rating

(1) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

[1.1 LIFT] (LIF-)

Synchronous motor parameters:

These parameters can be accessed if [Motor control type] (Ctt) page 137 = [Sync. mot.] (SYn) or [Sync.CL] (FSY). In this case, the asynchronous motor parameters cannot be accessed.



Important: For synchronous motors, it is crucial to set the current limit. See [Current Limitation] (CLI) page 52.

CAUTION

RISK OF EQUIPMENT DAMAGE


Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization.

Failure to follow this instruction can result in equipment damage.

Code	Name/Description	Adjustment range	Factory setting
L C 0 -	[LIFT CONFIGURATION] continued		
n 0 t -	[MOTOR DATA] continued		
P P n S	<input type="checkbox"/> [Pole pairs] Number of pairs of poles on the synchronous motor.	1 to 50	According to drive rating
n C r S	<input type="checkbox"/> [Nominal I sync.] Rated synchronous motor current given on the nameplate.	0.25 to 1.5 In (1)	According to drive rating
n S P S	<input type="checkbox"/> [Nom motor spdsync] Rated synchronous motor speed given on the nameplate. On the integrated display unit: 0 to 9999 rpm then 10.00 to 60.00 krpm.	0 to 60000 rpm	According to drive rating
t 9 S	<input type="checkbox"/> [Motor torque] Rated motor torque given on the nameplate.	1 to 65,535 Nm	According to drive rating

(1) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L C D -	[LIFT CONFIGURATION] continued		
n O E -	[MOTOR DATA] continued		
I E H	<input type="checkbox"/> [Mot. therm. current] Motor thermal protection current, to be set to the rated current indicated on the nameplate.	0.2 to 1.5 I _n (1)	According to drive rating
C L I	<input type="checkbox"/> [Current Limitation] <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p style="text-align: center;">CAUTION</p> <p>Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization.</p> <p>Failure to follow this instruction can result in equipment damage.</p> <p>Used to limit the motor current.</p> <p> Note 1: If the setting is less than 0.25 I_n, the drive may lock in [Output Phase Loss] (OPF) fault mode if this has been enabled (see page 268). If it is less than the no-load motor current, the limitation no longer has any effect.</p> <p>Note 2: In synchronous mode, this is the maximum permissible current for the motor. If this value has not been defined, use 150% of [Nominal I sync.] (nCrs)</p> </div>	0 to 1.36 I _n (1)	1.36 I _n (1)

[1.1 LIFT] (LIF-)

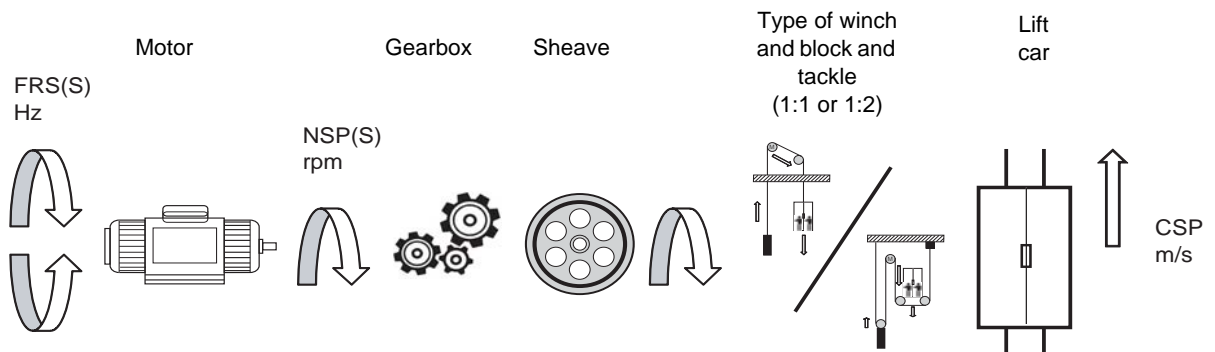
Code	Name/Description	Adjustment range	Factory setting
L C D -	[LIFT CONFIGURATION] continued		
n O E -	[MOTOR DATA] continued		
t U n	<input type="checkbox"/> [Auto tuning] <div style="float: right;">[No] (nO)</div>		
n O Y E S d O n E	<div style="text-align: center;">⚡ ⚠ DANGER</div> <p>HAZARD OF ELECTRIC SHOCK OR ARC FLASH</p> <ul style="list-style-type: none"> During auto-tuning, the motor operates at rated current. Do not service the motor during auto-tuning. <p>Failure to follow these instructions will result in death or serious injury.</p>		
	<div style="text-align: center;">⚠ WARNING</div> <p>LOSS OF CONTROL</p> <ul style="list-style-type: none"> It is essential that the following parameters [Rated motor volt.] (UnS), [Rated motor freq.] (FrS), [Rated mot. current] (nCr), [Rated motor speed] (nSP) and [Rated motor power] (nPr) are correctly configured before starting auto-tuning for asynchronous motor. It is essential that the following parameters [Nominal I sync] (nCrS), [Nom motor spdsync] (nSPS), [Pole pairs.] (PPnS) and [Motor torque] (TqS) are correctly configured before starting auto-tuning for synchronous motor. When one or more of these parameters have been changed after auto-tuning has been performed, [Auto tuning] (tUn) will return [No] (nO) and the procedure will have to be repeated. <p>Failure to follow these instructions can result in death or serious injury.</p>		
	<input type="checkbox"/> [No] (nO) : Auto-tuning not performed. <input type="checkbox"/> [Yes] (YES) : Auto-tuning is performed as soon as possible, then the parameter automatically changes to [Done] (dOnE) . <input type="checkbox"/> [Done] (dOnE) : Use of the values given the last time auto-tuning was performed. Note: <ul style="list-style-type: none"> Auto-tuning is only performed if no stop command has been activated. If a "freewheel stop" or "fast stop" function has been assigned to a logic input, this input must be inactive. Auto-tuning takes priority over any run or prefluxing commands, which will be taken into account after the auto-tuning sequence. If auto-tuning fails, the drive displays [No] (nO) and, depending on the configuration of [Autotune fault mgt] (tnL) page 280, may switch to [Auto-tuning] (tnF) fault mode. Auto-tuning may last for 1 to 2 seconds. Do not interrupt the process. Wait for the display to change to "[Done] (dOnE)" or "[No] (nO)". 		

(1) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

[1.1 LIFT] (LIF-)

Lift data

Identification of the [Nominal car speed] (CSP) and payload [Capacity of the lift] (LCA)



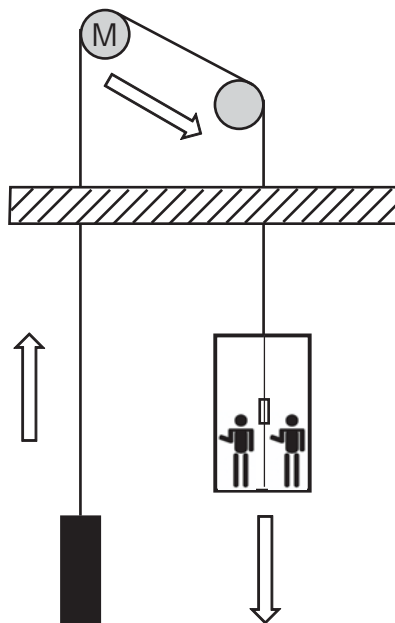
For the nominal motor frequency [Rated motor freq.] (FrS) / [Nominal freq sync.] (FrSS) the car speed is [Nominal car speed] (CSP) = m/s.

Ratio 1:1

$$\text{CSP [m/s]} = 3.14 \times \text{Sheave radius [meters]} \times \text{NSP(S) [rpm]} / (60 \times \text{Gearbox radius})$$

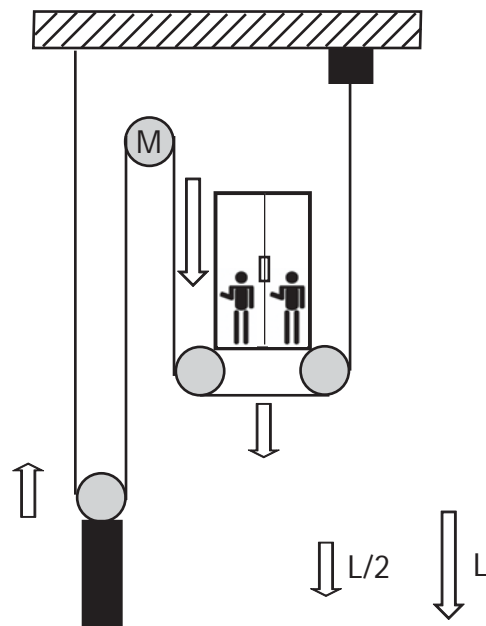
Ratio 1:2

$$\text{CSP [m/s]} = 1.57 \times \text{Sheave radius [meters]} \times \text{NSP(S) [rpm]} / (60 \times \text{Gearbox radius})$$



Ratio 1:1

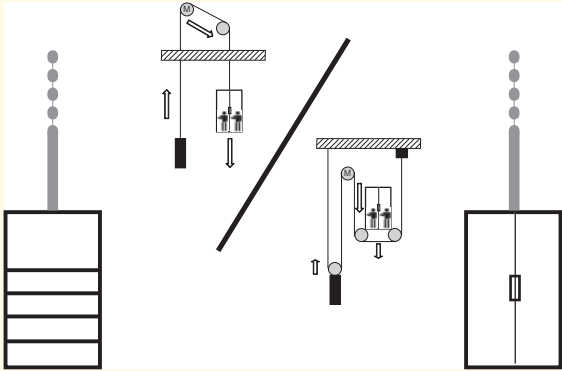
The car movement is equal to the length of cable unwound by the motor.



Ratio 1:2

The car movement is equal to half the length of cable unwound by the motor.

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L C D -	[LIFT CONFIGURATION] continued		
L d R -	[LIFT DATA]		
L S P	<div><input type="checkbox"/> [Nominal car speed]</div> <p>The nominal car speed corresponds to the linear speed of the lift car when the motor runs at its rated speed ([Rated motor freq.] (FrS) for an asynchronous motor or [Nominal freq sync.] (FrSS) for a synchronous motor). The [Nominal car speed] (CSP) therefore integrates the various gear ratios (sheave sizes, type of block and tackle, use of a gearbox or not).</p> <p>Type of winch and block and tackle (1:1 or 1:2)</p> <div><p>[Capacity of the lift] (LCA) LCA = kg</p><p>[Counterweight] (CtM) CTM = kg</p><p>[Car weight] (CMA) CMA = kg</p></div>	0.01 to 10.00 m/s	1.00 m/s

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L C D -	[LIFT CONFIGURATION] continued		
L d A -	[LIFT DATA] continued		
L C A	<input type="checkbox"/> [Capacity of the lift] The payload corresponds to the maximum permissible load in the lift car. It must always be stated in the lift car (for example: 630 kg - 8 persons) This value can only be trusted <ul style="list-style-type: none"> • If the lift has been balanced correctly, i.e., if the weight of the counterweight is similar to the weight of the car when half-loaded. In other words if CtM is similar to CMA + (LCA/2) • The weight of the empty car is similar to the payload If not, the values of CtM and CMA calculated by the drive must be re-entered manually.	0 to 48,000 kg	400 kg
C N A	<input type="checkbox"/> [Car weight] This parameter can be accessed if [ACCESS LEVEL] = [Expert] Weight of lift car When CMA = AUTO the system inertia calculation uses an estimated car weight. When CMA <> AUTO the system inertia calculation uses the car weight entered by the user.		[Estimated] (AUtO)
A U t O	<input type="checkbox"/> [Estimated] (AUtO)		
C t A	<input type="checkbox"/> [Counterweight] This parameter can be accessed if [ACCESS LEVEL] = [Expert] Weight of counterweight When CtM = AUTO the system inertia calculation uses an estimated counterweight. When CtM <> AUTO the system inertia calculation uses the counterweight entered by the user.		[Estimated] (AUtO)
A U t O	<input type="checkbox"/> [Estimated] (AUtO)		
A C A	<input type="checkbox"/> [Comfort accel.] This parameter can be accessed if [ACCESS LEVEL] = [Expert] This parameter defines the maximal acceleration and deceleration authorized during the movements of the lift.	0.10 to 5.00 m/s ²	0.80 m/s ²

[1.1 LIFT] (LIF-)

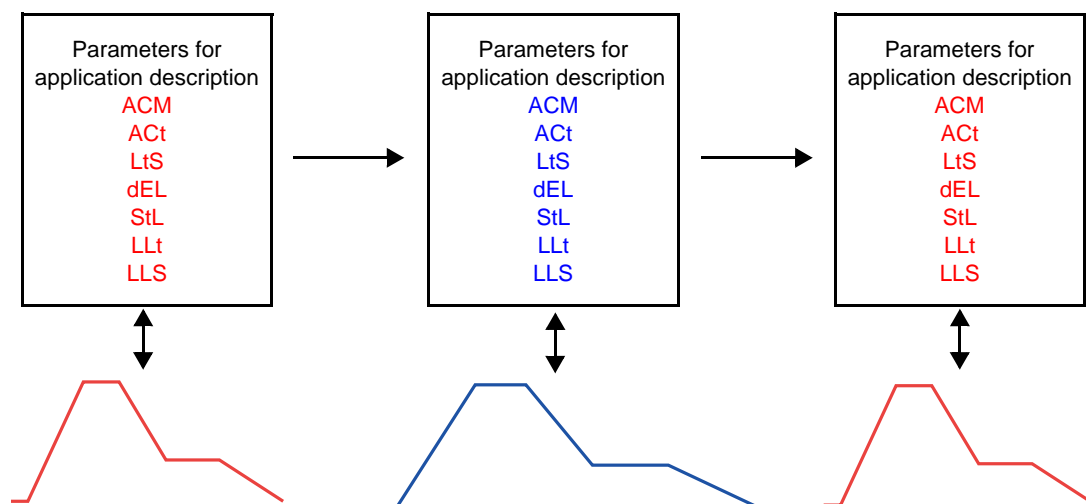
Parameters management

Regarding the parameters that define the ramp profile, 2 kinds of parameters can be defined:

- Parameters for the application description: [Acceleration time] (ACt), [Lift top speed] (LtS), [Deceleration length] (dEL), [Stop length] (StL), [Lift leveling time] (LLt), [Lift leveling speed] (LLS), [Comfort accel.] (ACM) page 59, 60 and 56.
- Parameters for optimization : [Jerk round 1] (JAr1), [Jerk round 2] (JAr2), [Jerk round 3] (JAr3), [Jerk round 4] (JAr4), [Jerk round 5] (JAr5), [Jerk round 6] (JAr6) page 61.

When the application parameters are the same, the same default (that is to say without optimization settings) behaviour must be provided by the drive.

In the following drawings, identical colours indicates identical value and behaviour.



Once the application description parameters are set, an optimization phase can start.



Nota: The adjustment of optimization parameters and [Comfort accel.] (ACM) parameter can modify parameters for application description in order to stay consistent with the optimization required.

Following interaction can eventually occur:

- The modification of [Jerk round 1] (JAr1) and [Jerk round 2] (JAr2) parameters can update [Acceleration time] (ACt).
- The modification of [Jerk round 3] (JAr3) and [Jerk round 4] (JAr4) parameters can update [Lift leveling speed] (LLS) and / or [Lift leveling time] (LLt).
- The modification of [Jerk round 5] (JAr5) and [Jerk round 6] (JAr6) parameters can update [Lift leveling speed] (LLS) and / or [Lift leveling time] (LLt).
- The modification of [Comfort accel.] (ACM) can update [Acceleration time] (ACt), [Lift leveling speed] (LLS) and / or [Lift leveling time] (LLt).

Whatever the optimization choices, [Comfort accel.] (ACM), [Lift top speed] (LtS), [Deceleration length] (dEL) and [Stop length] (StL) parameters cannot be changed.

The setting of optimization parameters must be done as the last step of commissioning. During this optimization phase, if the application description parameters are modified to some unacceptable values, then it is necessary to modify them again.

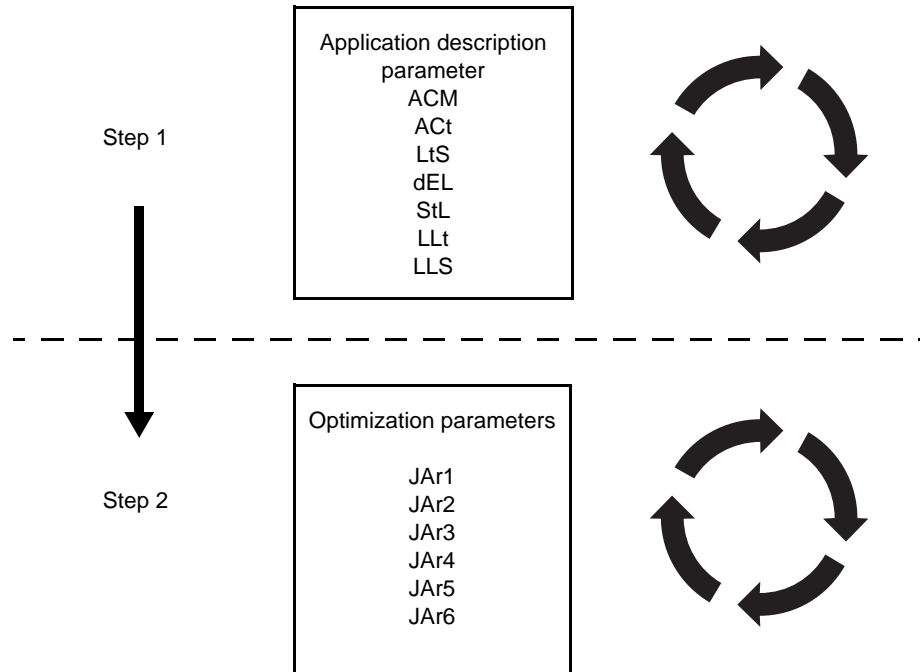
In this case, any modification of one of the application description parameters will have as consequence to reset the optimization parameters.

Parameters management (continued)

In conclusion, the lift menu allows to adjust the ramp in 2 steps.

Step 1 : Adjust only the application description parameters. Once these parameters are well adjusted, go to the second step.

Step 2 : Adjust optimization parameters.



[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L C D -	[LIFT CONFIGURATION] continued		
L d R -	[LIFT DATA] continued		
L t S	<input type="checkbox"/> [Lift top speed] This parameter can be accessed if [Lift Speed Mgt] (LSM) is not [No] (nO). The travel speed corresponds to the linear speed of the car in steady state (high speed). This can be less than the [Nominal car speed] (CSP) if the motor is oversized in relation to the installation.	0.10 to 10.00 m/s	1.00 m/s
A C t	<input type="checkbox"/> [Acceleration time] This parameter can be accessed if [Lift Speed Mgt] (LSM) is not [No] (nO). The acceleration time corresponds to the time the car will take to attain its [Lift top speed] (LtS). The acceleration time should be consistent with the desired travel speed so that the car travels at a constant speed for at least a few seconds. If the acceleration time is too short, acceleration will be too strong, making the ride uncomfortable. If the acceleration time is too long, the travel speed can never be attained and the half floor function will then be activated systematically. The travel time will not therefore be optimized for normal floors.	0.50 to 60.00 s	3 s
	<p>The graph illustrates the speed profile of a lift over time. The vertical axis represents Speed (m/s) and the horizontal axis represents Time (s). The profile starts at JAR1 (0,0), accelerates linearly to JAR2 (LtS, ACt), remains at LtS until JAR3, then decelerates linearly to JAR4 (LLS, LLt). It remains at LLS until JAR5, then decelerates linearly to JAR6 (0). Key distances are marked: dEL (cm) is the distance from JAR3 to the end of the LLS segment, and StL (cm) is the distance from JAR5 to the end of the LLS segment.</p>		
S t L	<input type="checkbox"/> [Stop length] This parameter can be accessed if [Lift Speed Mgt] (LSM) is not [No] (nO). The stop length corresponds to the distance separating the stop indicator from the step the car is destined to reach. The drive considers the [Stop length] (StL) as being the distance still to be traveled by the car when the drive loses the run command. This distance is taken into account when calculating the deceleration profile.	1.0 to 300, 0 cm	10.0 cm

[1.1 LIFT] (LIF-)


Code	Name/Description	Adjustment range	Factory setting
LCD -	[LIFT CONFIGURATION] continued		
LdA -	[LIFT DATA] continued		
LLS	<input type="checkbox"/> [Lift leveling speed] This parameter can be accessed if [Lift Speed Mgt] (LSM) is not [No] (nO) . The lift leveling speed is calculated by the drive automatically. If the calculated speed is not suitable (because it corresponds to a mechanical resonance frequency for example), it can be re-entered manually. In this case, the lift leveling time should be recalculated.	0.01 to 0.50 m/s	0.10 m/s
LLt	<input type="checkbox"/> [Lift leveling time] This parameter can be accessed if [Lift Speed Mgt] (LSM) is not [No] (nO) . The lift leveling time corresponds to the time the car will spend at lift leveling speed in steady state. If the lift leveling time is too short, the ride will be uncomfortable (rolling sensation). If the lift leveling time is too long, the ramp between LtS and LLS will be intense (loss of comfort).	0.50 to 10.00 s	2.00 s
dEL	<input type="checkbox"/> [Deceleration length] This parameter can be accessed if [Lift Speed Mgt] (LSM) is not [No] (nO) . The slowdown length corresponds to the distance separating the slowdown indicator from the floor the car is destined to reach. The drive considers the dEL as being the distance still to be traveled by the car when the drive receives the low speed signal (or loss of the high speed signal). This distance is taken into account when calculating the deceleration profile.	10.0 to 999.9 cm	120.0 cm

[1.1 LIFT] (LIF-)

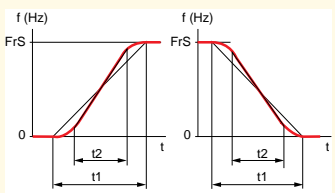
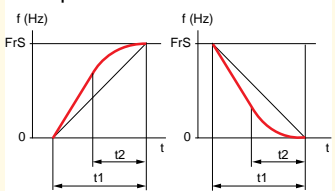
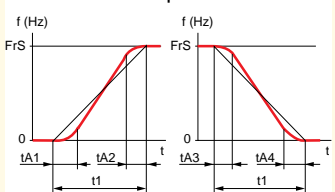
Ramp optimisation

Jerks JAr1 to JAr6 correspond to the maximum permissible jerk values for each rounding.

If one of the roundings is not satisfactory (for example: starting too sudden) it can be re-entered manually. In this case, the associated rounding (for example: arrival at travel speed) will automatically be revised to keep it consistent. Some application data can also be modified (travel speed, lift leveling time, acceleration time). However, the slowdown and stop lengths are always adhered to.

Code	Name/Description	Adjustment range	Factory setting
L C D -	[LIFT CONFIGURATION] continued		
L d R -	[LIFT DATA] continued		
r O P -	[RAMP OPTIM.]  Note: This function can be accessed if [Lift Speed Mgt] (LSM) is not [No] (nO)		
J A r 1	<input type="checkbox"/> [Jerk round 1] Decreasing JAr1 and JAr2 may increase the acceleration time [Acceleration time] (ACt) .	0.01 to 3.00 m/s ³	According to application parameters
J A r 2	<input type="checkbox"/> [Jerk round 2] Decreasing JAr1 and JAr2 may increase the acceleration time [Acceleration time] (ACt) .	0.01 to 3.00 m/s ³	According to application parameters
J A r 3	<input type="checkbox"/> [Jerk round 3] Decreasing JAr3 and JAr4 may decrease the time at [Lift leveling time] (LLt) .	0.01 to 3.00 m/s ³	According to application parameters
J A r 4	<input type="checkbox"/> [Jerk round 4] Decreasing JAr3 and JAr4 may decrease the time at [Lift leveling time] (LLt) .	0.01 to 3.00 m/s ³	According to application parameters
J A r 5	<input type="checkbox"/> [Jerk round 5] Decreasing JAr5 and JAr6 may decrease the [Lift leveling speed] (LLS) .	0.01 to 3.00 m/s ³	According to application parameters
J A r 6	<input type="checkbox"/> [Jerk round 6] Decreasing JAr5 and JAr6 may decrease the [Lift leveling speed] (LLS) .	0.01 to 3.00 m/s ³	According to application parameters

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L C D -	[LIFT CONFIGURATION] continued		
L d A -	[LIFT DATA] continued		
Inr	<input type="checkbox"/> [Ramp increment] This parameter can be accessed if [Lift Speed Mgt] (LSM) is equal to [No] (nO). <input type="checkbox"/> [0.01]: Ramp up to 99.99 seconds <input type="checkbox"/> [0.1]: Ramp up to 999.9 seconds <input type="checkbox"/> [1]: Ramp up to 6000 seconds This parameter is valid for [Acceleration] (ACC), [Deceleration] (dEC), [Acceleration 2] (AC2) and [Deceleration 2] (dE2).	0.01 - 0.1 - 1	0.1
ACC	<input type="checkbox"/> [Acceleration] This parameter can be accessed if [Lift Speed Mgt] (LSM) is equal to [No] (nO). Time to accelerate from 0 to the [Rated motor freq.] (FrS) (page 50). Make sure that this value is compatible with the inertia being driven.	0.01 to 6000 s (1)	3.0 s
dEC	<input type="checkbox"/> [Deceleration] This parameter can be accessed if [Lift Speed Mgt] (LSM) is equal to [No] (nO). Time to decelerate from the [Rated motor freq.] (FrS) (page 50) to 0. Make sure that this value is compatible with the inertia being driven.	0.01 to 6000 s (1)	3.0 s
rPt	<input type="checkbox"/> [Ramp type] This parameter can be accessed if [Lift Speed Mgt] (LSM) is equal to [No] (nO). <input type="checkbox"/> [Linear] (LIn) <input type="checkbox"/> [S ramp] (S) <input type="checkbox"/> [U ramp] (U) <input type="checkbox"/> [Customized] (CUS)		[Linear] (LIn)
LIn S U CUS	<p>S ramps</p>  <p>The rounding coefficient is fixed, where $t_2 = 0.6 \times t_1$ and t_1 = set ramp time.</p> <p>U ramps</p>  <p>The rounding coefficient is fixed, where $t_2 = 0.5 \times t_1$ and t_1 = set ramp time.</p> <p>Customized ramps</p>  <p>tA1: adjustable from 0 to 100% tA2: adjustable from 0 to (100% - tA1) tA3: adjustable from 0 to 100% tA4: adjustable from 0 to (100% - tA3) As a % of t_1, where t_1 = set ramp time</p>		

(1) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to [Ramp increment] (Inr).

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting															
L C D -	[LIFT CONFIGURATION] continued																	
L d R -	[LIFT DATA] continued																	
L A 1	<div><input type="checkbox"/> [Begin Acc round] (1)</div> <div>This parameter can be accessed if [Lift Speed Mgt] (LSM) is equal to [No] (nO). Rounding of start of acceleration ramp as a % of the [Acceleration] (ACC) or [Acceleration 2] (AC2) ramp time. Can be set between 0 and 100%</div>	0 to 100%	50%															
L A 2	<div><input type="checkbox"/> [End Acc round] (1)</div> <div>This parameter can be accessed if [Lift Speed Mgt] (LSM) is equal to [No] (nO). Rounding of end of acceleration ramp as a % of the [Acceleration] (ACC) or [Acceleration 2] (AC2) ramp time. Can be set between 0 and (100% - [Begin Acc round] (tA1)).</div>		50%															
L A 3	<div><input type="checkbox"/> [Begin Dec round] (1)</div> <div>This parameter can be accessed if [Lift Speed Mgt] (LSM) is equal to [No] (nO). Rounding of start of deceleration ramp as a % of the [Deceleration] (dEC) or [Deceleration 2] (dE2) ramp time. Can be set between 0 and 100%</div>	0 to 100%	40%															
L A 4	<div><input type="checkbox"/> [End Dec round] (1)</div> <div>This parameter can be accessed if [Lift Speed Mgt] (LSM) is equal to [No] (nO). Rounding of end of deceleration ramp as a % of the [Deceleration] (dEC) or [Deceleration 2] (dE2) ramp time Can be set between 0 and (100% - [Begin Dec round] (tA3)).</div>		60%															
F r t	<div><input type="checkbox"/> [Ramp 2 threshold]</div> <div>This parameter can be accessed if [Lift Speed Mgt] (LSM) is equal to [No] (nO). Ramp switching threshold The 2nd ramp is switched if the value of Frt is not 0 (0 deactivates the function) and the output frequency is greater than Frt. Threshold ramp switching can be combined with [Ramp switch ass.] (rPS) switching as follows:</div> <table><tr><th>LI or bit</th><th>Frequency</th><th>Ramp</th></tr><tr><td>0</td><td><Frt</td><td>ACC, dEC</td></tr><tr><td>0</td><td>>Frt</td><td>AC2, dE2</td></tr><tr><td>1</td><td><Frt</td><td>AC2, dE2</td></tr><tr><td>1</td><td>>Frt</td><td>AC2, dE2</td></tr></table>	LI or bit	Frequency	Ramp	0	<Frt	ACC, dEC	0	>Frt	AC2, dE2	1	<Frt	AC2, dE2	1	>Frt	AC2, dE2	0 to 500 or 1600 Hz according to rating	0 Hz
LI or bit	Frequency	Ramp																
0	<Frt	ACC, dEC																
0	>Frt	AC2, dE2																
1	<Frt	AC2, dE2																
1	>Frt	AC2, dE2																
r P S	<div><input type="checkbox"/> [Ramp switch ass.]</div> <div>Ramp switching threshold This parameter can be accessed if [Lift Speed Mgt] (LSM) is equal to [No] (nO).</div> <div><input type="checkbox"/> [No] (nO): Not assigned. <input type="checkbox"/> [LI1] (LI1) : <input type="checkbox"/> [...] (...): See the assignment conditions on page 204.<ul style="list-style-type: none">ACC and dEC are enabled when the assigned input or bit is at inactive state.AC2 and dE2 are enabled when the assigned input or bit is at active state.</div>		[No] (nO)															

(1) Parameter can also be accessed in the **[1.3 SETTINGS] (SEt-)** menu.

[1.1 LIFT] (LIF-)


Code	Name/Description	Adjustment range	Factory setting
L C D -	[LIFT CONFIGURATION] continued		
L d R -	[LIFT DATA] continued		
A C 2 ★	<input type="checkbox"/> [Acceleration 2] See page 219 This parameter can be accessed if [Lift Speed Mgt] (LSM) is equal to [No] (nO) . Time to accelerate from 0 to the [Rated motor freq.] (FrS) . Make sure that this value is compatible with the inertia being driven.	0.01 to 6000 s (1)	5.0 s
d E 2 ★	<input type="checkbox"/> [Deceleration 2] See page 219 This parameter can be accessed if [Lift Speed Mgt] (LSM) is equal to [No] (nO) . Time to decelerate from the [Rated motor freq.] (FrS) to 0. Make sure that this value is compatible with the inertia being driven.	0.01 to 6000 s (1)	5.0 s

(1) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to [\[Ramp increment\] \(Inr\)](#).

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

[1.1 LIFT] (LIF-)

The [LIFT OPTIMISATION] menu is used to make adjustments easily in order to optimise the lift ride comfort if necessary.

Code	Name/Description	Adjustment range	Factory setting
LDP -	[LIFT OPTIMISATION]  Note: This menu is visible from [ACCESS LEVEL] = [Standard]		
NCQ -	[MOTOR OPTIMISATION]		
tUS tAb PEnd PrOG FA IL dOnE Strd CUS	<input type="checkbox"/> [Auto tuning state] [Not done] (tAb) For information only, cannot be modified. <input type="checkbox"/> [Not done] (tAb): The default stator resistance value is used to control the motor. <input type="checkbox"/> [Pending] (PEnd): Auto-tuning has been requested but not yet performed. <input type="checkbox"/> [In Progress] (PrOG): Auto-tuning in progress. <input type="checkbox"/> [Failed] (FAIL): Auto-tuning has failed. <input type="checkbox"/> [Done] (dOnE): The stator resistance measured by the auto-tuning function is used to control the motor. <input type="checkbox"/> [Entered R1] (Strd) The drive uses the stator resistance given by the parameter (rSC) <input type="checkbox"/> [Customized] (CUS): Auto-tuning has been performed, but at least one of the parameters [Autotune L d-axis] (LdS), [Autotune L q-axis] (LqS) or [Cust. stator R syn] (rSAS) has subsequently been modified. The following auto-tuning parameters are affected: <ul style="list-style-type: none"> • [Cust stator resist.] (rSA), [Idw] (IdA), [LFw] (LFA) and [Cust. rotor t const.] (trA) page 147 for asynchronous motors. • [Cust. stator R syn] (rSAS) page 148 for synchronous motors. 		

These parameters can be accessed in asynchronous motor profiles and in [Expert] mode.

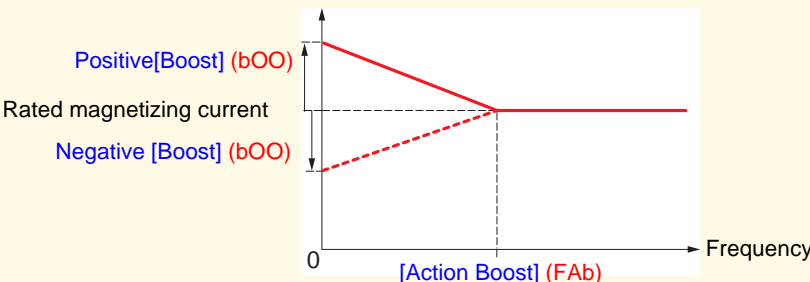
Code	Name/Description	Adjustment range	Factory setting
rSN	<input type="checkbox"/> [Stator R measured] Cold stator resistance, calculated by the drive, in read-only mode. Value in milliohms ($m\Omega$) up to 75 kW (100 HP), and in hundredths of milliohms ($m\Omega/100$) above 75 kW (100 HP).		
rSA	<input type="checkbox"/> [Cust stator resist.] Cold state stator resistance (per winding), modifiable value. In milliohms ($m\Omega$) up to 75 kW (100 HP), and in hundredths of milliohms ($m\Omega/100$) above 75 kW (100 HP). On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).		
LFN	<input type="checkbox"/> [Lfr] Leakage inductance in mH, calculated by the drive, in read-only mode.		
LFA	<input type="checkbox"/> [Lfw] Leakage inductance in mH, modifiable value.		
IdN	<input type="checkbox"/> [Idr] Magnetizing current in A, calculated by the drive, in read-only mode.		
IdA	<input type="checkbox"/> [Idw] Magnetizing current in A, modifiable value.		
trN	<input type="checkbox"/> [T2r] Rotor time constant in mS, calculated by the drive, in read-only mode.		
trA	<input type="checkbox"/> [Cust. rotor t const.] Rotor time constant in mS, modifiable value.		

[1.1 LIFT] (LIF-)

These parameters can be accessed in synchronous motor profiles.

Code	Name/Description	Adjustment range	Factory setting
LDP -	[LIFT OPTIMISATION] continued		
PCD -	[MOTOR OPTIMISATION] continued		
rSNS	<input type="checkbox"/> [R1rS] This parameter can be accessed if [ACCESS LEVEL] = [Expert] Cold state stator resistance (per winding), in read-only mode. This is the drive factory setting or the result of the auto-tuning operation, if it has been performed. Value in milliohms (mΩ). On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).		
rRS	<input type="checkbox"/> [Cust. stator R syn] This parameter can be accessed if [ACCESS LEVEL] = [Expert] Cold state stator resistance (per winding) The factory setting is replaced by the result of the auto-tuning operation, if it has been performed. The value can be entered by the user, if he knows it. Value in milliohms (mΩ). On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).	According to drive rating	According to drive rating
LdNS	<input type="checkbox"/> [Measured Ld-axis] This parameter can be accessed if [ACCESS LEVEL] = [Expert]		
LdS	<input type="checkbox"/> [Autotune L d-axis] Axis "d" stator inductance in mH (per phase). On motors with smooth poles [Autotune L d-axis] (LdS) = [Autotune L q-axis] (LqS) = Stator inductance L.	0 to 655.3	According to drive rating
LqNS	<input type="checkbox"/> [Measured Lq-axis] This parameter can be accessed if [ACCESS LEVEL] = [Expert]		
LqS	<input type="checkbox"/> [Autotune L q-axis] Axis "q" stator inductance in mH (per phase). On motors with smooth poles [Autotune L d-axis] (LdS) = [Autotune L q-axis] (LqS) = Stator inductance L.	0 to 655.3	According to drive rating
PHS	<input type="checkbox"/> [Syn. EMF constant] Synchronous motor EMF constant, in 0.1 mV per rpm or 1 mV per rpm (peak voltage per phase), according to the value of [Increment EMF] (IPHS) . On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).	0 to 65535	According to drive rating
IPHS	<input type="checkbox"/> [Increment EMF] Increment for the [Syn. EMF constant] (PHS) parameter. <input type="checkbox"/> [0.1 mV/rpm] (0.1) : 0.1mV per rpm <input type="checkbox"/> [1 mV/rpm] (1) : 1mV per rpm		[0.1mV/rpm] (0.1)

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
LDP -	[LIFT OPTIMISATION] continued		
NCB -	[MOTOR OPTIMISATION] continued		
b00	<input type="checkbox"/> [Boost] <p>This parameter can be accessed if [ACCESS LEVEL] = [Expert] and if [Motor control type] (Ctt) page 137 is not [Sync.CL] (FSY). Adjustment of the motor magnetizing current at low speed, as a % of the rated magnetizing current. This parameter is used to increase or reduce the time taken to establish the torque. It allows gradual adjustment up to the frequency set by [Action Boost] (FAb). Negative values apply particularly to tapered rotor motors.</p> <p>Magnetizing current</p>  <p>Positive[Boost] (b00)</p> <p>Rated magnetizing current</p> <p>Negative [Boost] (b00)</p> <p>0</p> <p>[Action Boost] (FAb)</p> <p>Frequency</p>	- 100 to 100%	0
FAb	<input type="checkbox"/> [Action Boost] <p>This parameter can be accessed if [ACCESS LEVEL] = [Expert] and if [Motor control type] (Ctt) page 137 is not [Sync.CL] (FSY). Frequency above which the magnetizing current is no longer affected by [Boost] (b00).</p>	0 to 500 Hz	0 Hz
SLP	<input type="checkbox"/> [Slip compensation] <p>This parameter can be accessed if [Motor control type] (Ctt) is not [V/F 2pts] (UF2) or [V/F 5pts] (UF5). Adjusts the slip compensation around the value set by the rated motor speed. The speeds given on motor nameplates are not necessarily exact.</p> <ul style="list-style-type: none"> • If slip setting < actual slip: the motor is not rotating at the correct speed in steady state, but at a speed lower than the reference. • If slip setting > actual slip: The motor is overcompensated and the speed is unstable. 	0 to 300 %	100 %

Velocity Loop

The ATV LIFT speed loop ensures optimum comfort in the lift car while complying with the speed references produced by the automatic ramp profile.

The ATV LIFT speed loop is configured automatically by the drive from the application data (car speed and payload).

In the majority of applications, there is no need to re-enter the speed loop settings. However, if you are not satisfied with the lift behavior, refer to the Procedure for setting the speed loop paragraph on page [70](#).

Description of the loop

The ATV LIFT speed loop consists of the following elements:

- [Fr.Loop.Stab] (StA): Stability (attenuation coefficient)
- [FreqLoopGain] (FLG): Gain (passband)
- [K speed loop filter] (SFC): Reference filter constant
- [Real motor inertia] (JMOt) and [Estim. motor inertia] (JCAL): Motor inertia (JMOt can be accessed in read/write mode and JCAL is read-only).
- [Application Inertia] (JAPL): Application inertia (pre-calculated)

The total inertia used in the loop is

- JMOt + JAPL when JMOt is not 0
- JCAL + JAPL when JMOt = Auto

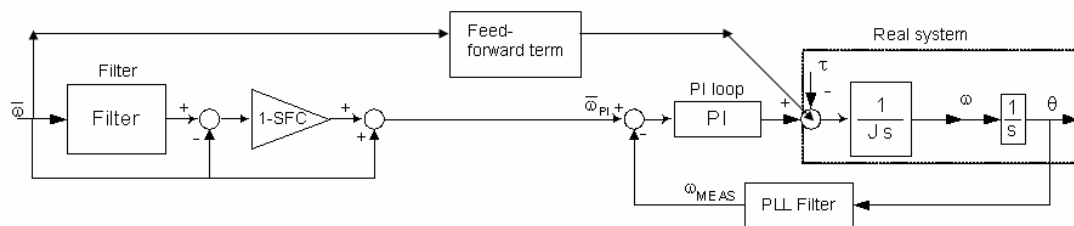
In expert mode:

- [Feed forward] (FFP): Feed forward term gain
- [Bandwidth feedfor.] (FFU): Feed forward term bandwidth

This description of the loop can include the filter on the speed measurement, as it is closely linked to the final setting of this loop:

- [Encoder filter value] (FFr): Filter time constant
- [Encoder filter active] (FFA): Activation of the filter

Here then is the block diagram for this speed loop:



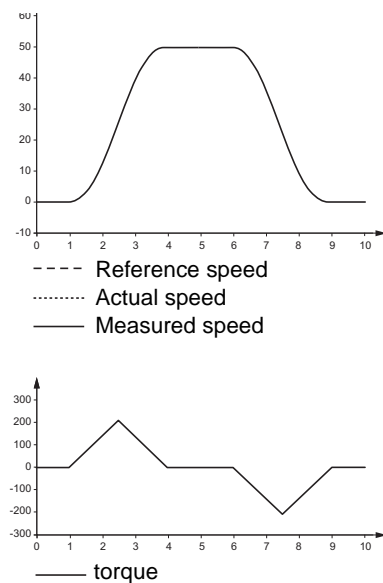
[1.1 LIFT] (LIF-)

Basic operation

In the case of standard operation, the speed loop should be preset using the [Capacity of the lift] (LCA) and [Nominal car speed] (CSP) parameters as follows:

1. The total weight of the application is estimated using [Capacity of the lift] (LCA)
2. The total inertia of the application is estimated using the total weight, [Nominal car speed] (CSP) and [Nom motor spdsync] (nSPS) (or [Rated motor speed] (nSP) for asynchronous motors)
3. The speed regulator bandwidth and attenuation are predefined and adapted to the lift application
4. The regulator is predefined as being a PI speed regulator (SFC = 100%) for synchronous motors and as having intermediate behavior between a PI and an IP for synchronous motors (SFC = 65%). Note: An IP speed regulator is obtained if SFC = 0%.
5. The filter constant applied to the speed reference is calculated using SFC
6. The speed controller **Kp and Ki gains** are calculated using the inertia, the bandwidth and the attenuation
7. The lift speed loop also has an additional **feedforward compensation** term for the acceleration and deceleration torque. By default this is not active. Its gain can be set by [Feed forward] (FFP), set initially at 0%. This term is based on an acceleration observer whose predefined bandwidth corresponds to [Bandwidth feedfor.] (FFU) = 100%. This can be modified if necessary.
8. When a closed-loop control profile (with speed feedback) is being used, there is the possibility of using a **filter on the measured speed**, to reduce the measurement noise. This filter is preset according to the [Motor torque] (TqS) and the resolution of the encoder used (resolution detected automatically)

Thus, in the case of fairly good correspondence between the drive inertia and the actual inertia, for the usual lift ramps, an encoder with resolution $>2^{16}$ (\Rightarrow [Encoder filter value] (FFR) = 3 ms), the actual speed should follow the reference speed exactly:



In the above example, the default inertia is that of the drive and the inertia parameter equals the default inertia. The roundings are all at 50% and the ramps at 3 s.

[1.1 LIFT] (LIF-)

Procedure for setting the speed loop

This procedure must be used in inspection mode (see page 36). The lift ramps should then be set. It can be re-entered from setting item 6 in normal operation if necessary.

As explained in previous sections, **the inertia** is the essential (and in the great majority of cases the only) parameter to be set.

1. Start by entering the lift capacity [Capacity of the lift] (LCA) correctly and checking that the linear speed [Nominal car speed] (CSP), [Rated motor speed] (nSP) or [Nom. motor spdsync] (nSPS) and rated frequency for asynchronous motors [Rated motor freq.] (FrS) or the number of pole pairs for synchronous motors [Pole pairs] (PPnS) are entered correctly
2. The [Car weight] (CMA) et [Counterweight] (CtM) parameters are updated again depending on [Capacity of the lift] (LCA), and therefore the total inertia of the application is calculated. If the the car weight and counterweight weight are known, it is better to enter them separately
3. The synchronous motor torque [Motor torque] (tqS) and the number of motor pole pairs [Poles pair number] (PPn) or [Pole pairs] (PPnS) update the estimated motor inertia (JCAL in read-only and [Real motor inertia] (JMOT) in read/write mode). If the motor inertia is known, it is better to enter it in [Real motor inertia] (JMOT). You should be aware that our estimate of the inertia takes account of a "long cylinder" lift motor model. If a flat lift motor is used, it is vital to fill in this parameter.

To sum up, in order to find the inertia you should enter:

At minimum	As a preference
[Capacity of the lift] (LCA)	[Capacity of the lift] (LCA)
[Nominal car speed] (CSP)	[Nominal car speed] (CSP)
[Rated motor speed] (nSP) or [Nom motor spdsync] (nSPS)	[Rated motor speed] (nSP) or [Nom motor spdsync] (nSPS)
[Motor torque] (tqS)	[Motor torque] (tqS)
[Poles pair number] (PPn) or [Pole pairs] (PPnS)	[Poles pair number] (PPn) or [Pole pairs] (PPnS)
	[Car weight] (CMA)
	[Counterweight] (CtM)
	[Real motor inertia] (JMOT)

4. When little is known about the parameters (weights, rated speed, etc.), the total application inertia can be set directly as follows:
 - Increase [Real motor inertia] (JMOT) and/or [Capacity of lift] (LCA) (to increase [Application Inertia] (JAPL)) up to the system stability limit (noise and strong vibrations in the car)
 - Reduce [Real motor inertia] (JMOT) and/or [Capacity of lift] (LCA) (to reduce [Application Inertia] (JAPL)) to eliminate strong vibrations; these can be reduced until slow oscillations on the speed or speed overshoots occur which are easily felt in the car; in this case the inertia should be increased again
5. The default values of StA, FLG, SFC, FFP, FFU are suitable in the vast majority of cases. The pre-calculated value of [Encoder filter value] (FFR) is suitable in the vast majority of applications.

Exceptions:

6. A very loud noise and rapid oscillations on starting in inspection mode can be due to overestimation of the inertia (see "Influence of the [Fr.Loop.Stab] (StA) et [FreqLoopGain] (FLG)" paragraph, page 75). The parameters involved in calculating the inertia, items 1, 2 and 3, should be reviewed.
7. Should the revised inertia (item 4) not give satisfactory results, it is possible to make the control system slacker, by reducing [FreqLoopGain] (FLG) and/or increasing [Fr.Loop.Stab.] (StA), or more reactive, by increasing [FreqLoopGain] (FLG) and/or reducing [Fr.Loop. Stab.] (StA) (see "Influence of the [Fr.Loop.Stab.] (StA) and [FreqLoopGain] (FLG)parameters" paragraph).
8. Background noise (high-frequency vibration) during operation or during rollback can be reduced by increasing the [Encoder filter value] (FFr) parameter (see "Influence of the [Encoder filter value] (FFr) parameter" paragraph, page 79). In this case, do not forget to re-enter [FreqLoopGain] (FLG) if necessary.
9. If it is necessary to reduce [Encoder filter value] (FFr) for the rollback (to have a faster reaction) and if the system allows it (without increasing the background noise), there is no need to re-enter [FreqLoopGain] (FLG), because it will also be correct for a smaller [Encoder filter value] (FFr).
10. If a system mechanical resonance is reached at a particular speed, rather slow oscillations may appear. You can:
 - Reduce [FreqLoopGain] (FLG)
 - And/or increase [Fr.Loop.Stab] (StA)
 - And/or increase [Feed forward] (FFP) (to increase the gains only in transient operation, not at steady state)
 - And/or reduce [K speed loop filter] (SFC) (in this case you need to re-enter the ramp settings, as delays will be introduced during speed following)

[1.1 LIFT] (LIF-)

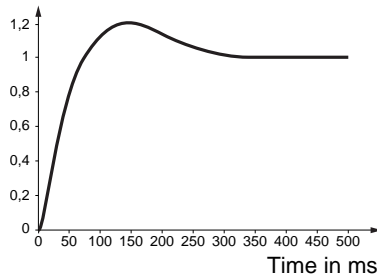
Influence of the [FreqLoopGain](FLG) and [Fr.Looped.Stab] (StA) parameters

These parameters are used to adjust the response of the speed loop obtained from the inertia, in particular when this is not known.

- [Fr.Looped.Stab] (StA): Used to adapt the return to steady state after a speed transient, according to the dynamics of the machine. Gradually increase the stability to increase control loop attenuation and thus reduce any overspeed.
- [FreqLoopGain] (FLG): Used to adapt the response of the machine speed transients according to the dynamics (passband). For machines with high resistive torque, high inertia or fast cycles, increase the gain gradually.

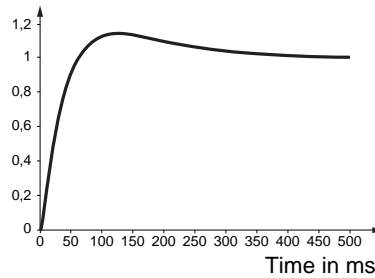
Initial response

Reference division



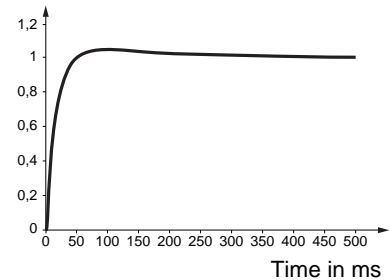
Increase in StA ↗

Reference division



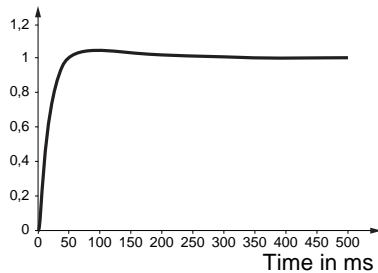
Increase in StA ↗↗

Reference division



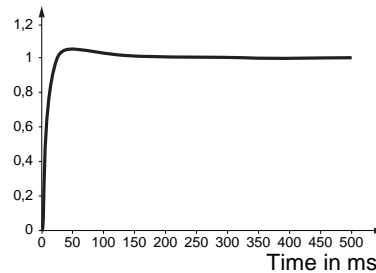
Initial response

Reference division



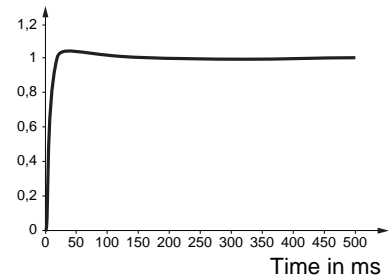
Increase in FLG ↗

Reference division



Increase in FLG ↗↗

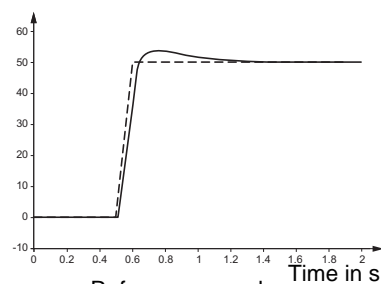
Reference division



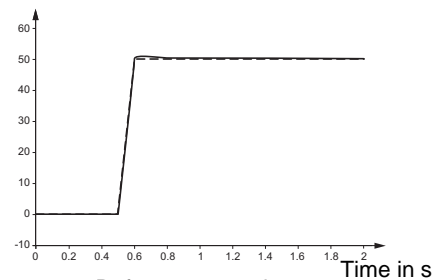
For a better understanding of the influence of the [FreqLoopGain] (FLG) and [Fr.Looped.Stab] (StA) parameters, we will look at 2 types of example:

- A very short linear ramp (a very unlikely scenario for the lift, but very useful for the example)
- The same ramp rounded (ACC=DEC=3s) as before (like the lift)

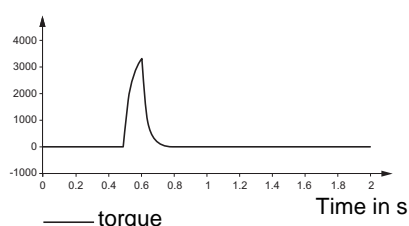
1. Very short linear ramp



--- Reference speed
..... Actual speed
—— Measured speed

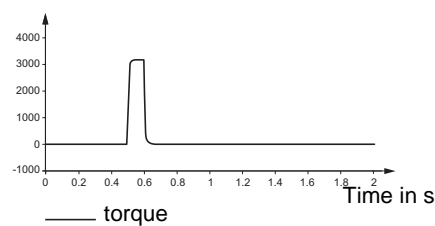


--- Reference speed
..... Actual speed
—— Measured speed



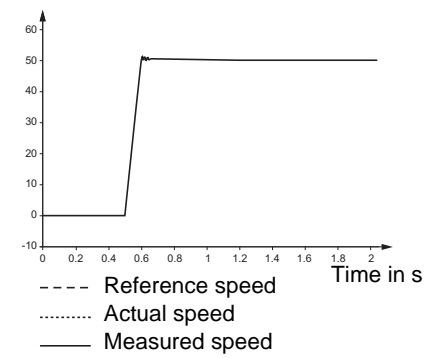
—— torque

1) Default loop settings, Jvar = J real

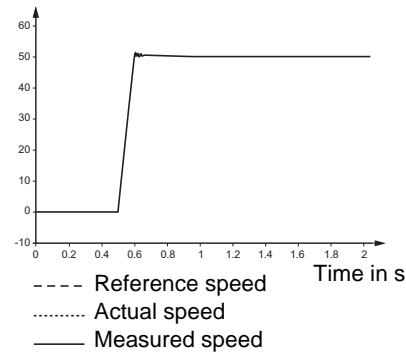


—— torque

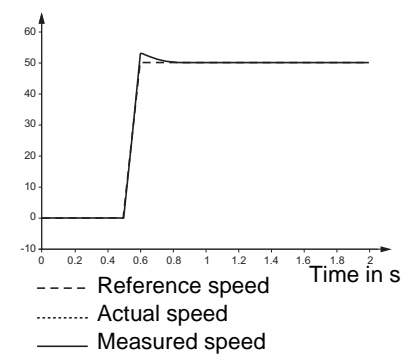
2) Fig. 1 + STA increased to 80



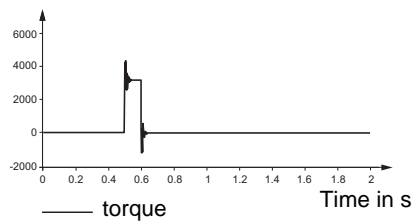
3) Fig. 2 + FLG increased to 60



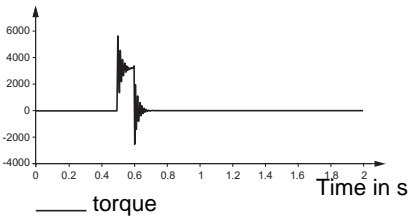
4) Fig. 3 + FLG increased to 100



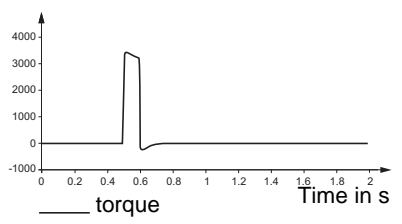
5) Fig. 4 + STA decreased to 20



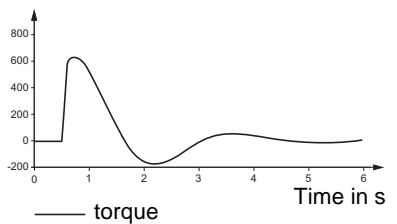
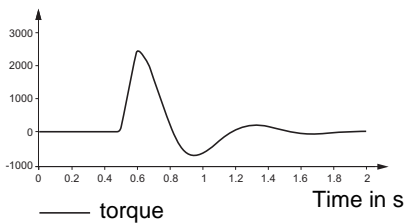
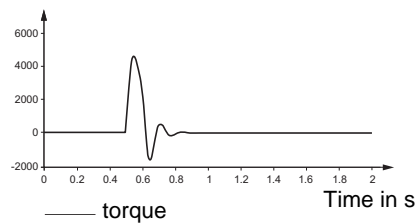
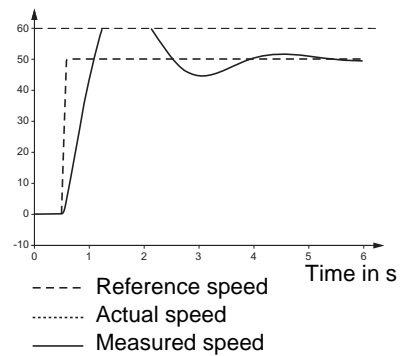
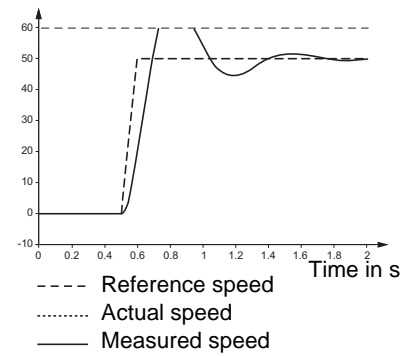
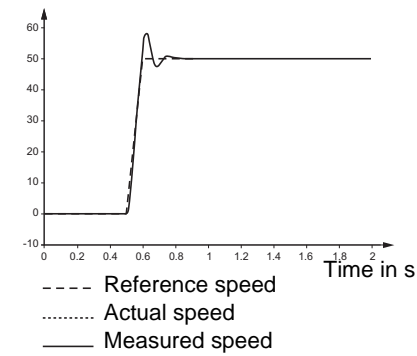
6) Fig. 5 + STA decreased to 5



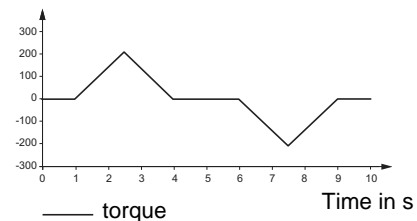
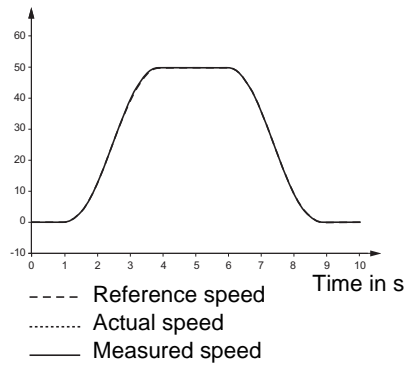
7) Fig. 6 + FLG decreased to 20



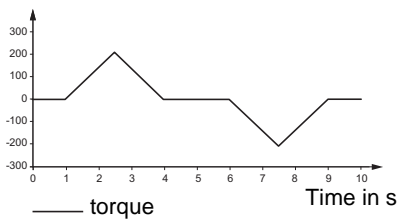
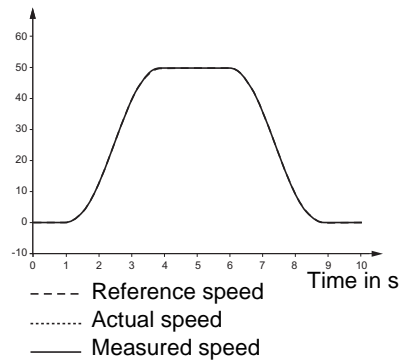
8) Fig. 7 + FLG decreased to 5



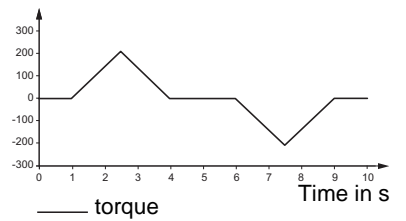
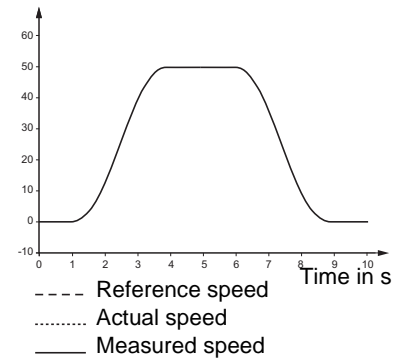
2. Ramp rounded to 3 s



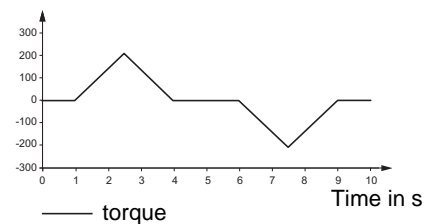
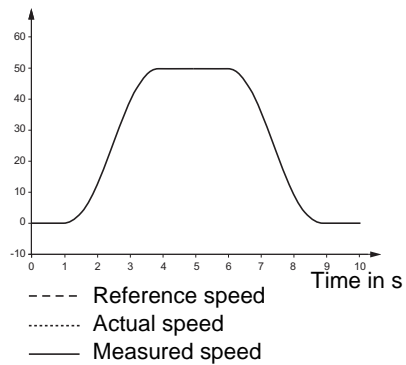
1) Default loop settings $J_{var} = J_{real}$



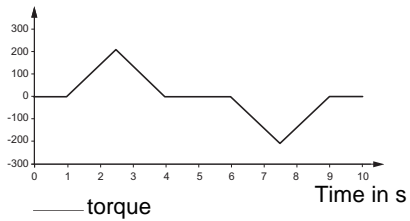
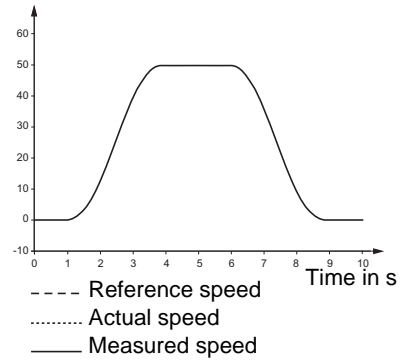
2) Fig. 1 + STA increased to 80



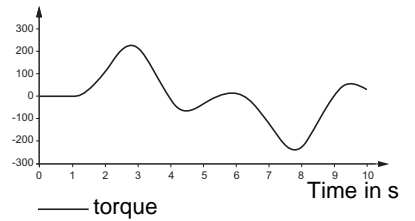
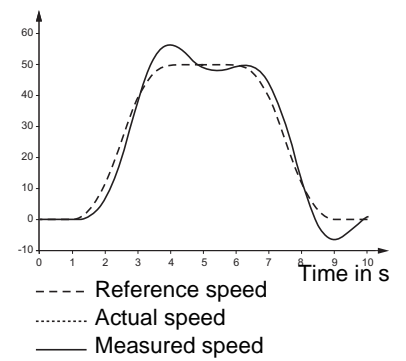
3) Fig. 2 + FLG increased to 60



4) Fig. 3 + FLG increased to 100



5) Fig. 4 + STA decreased to 5

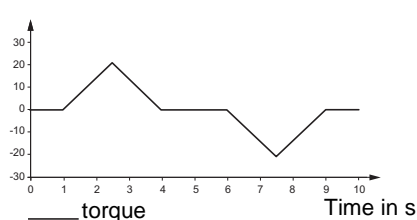
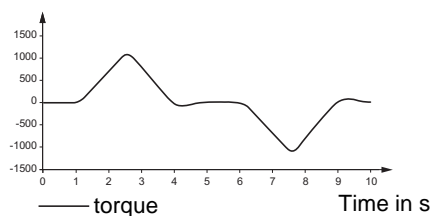
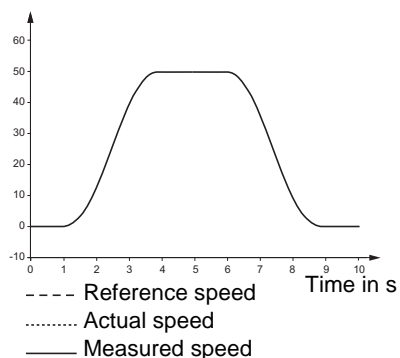
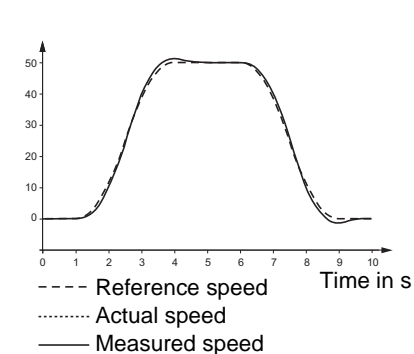


6) Fig. 5 + FLG decreased to 5

From these latest figures (except the last), we can clearly see the little influence of [\[FreqLoopGain\]](#) (FLG) and [\[Fr.Loop.Stab\]](#) (StA) when the inertia is well defined (drive inertia adapted to the actual inertia). In summary, only an important dip in the [\[FreqLoopGain\]](#) (FLG) (bandwidth) can make the control system very slack, and therefore oscillating.

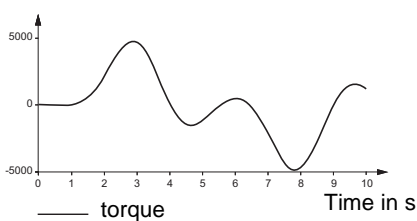
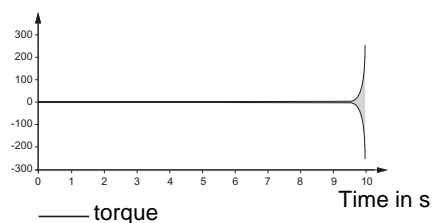
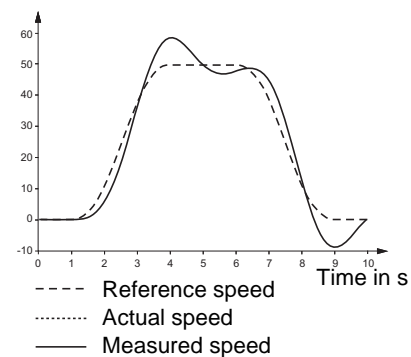
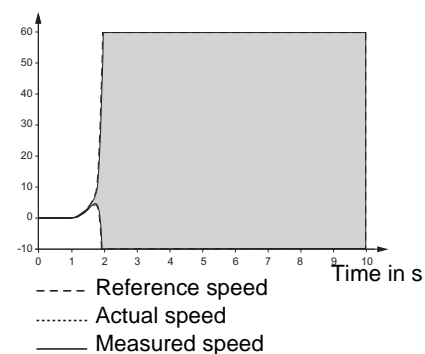
Robustness of basic operation

Speed following is very robust when large variations of inertia occur. Let us look at the same example (with all default values, except for inertia):



Underestimation of the inertia by a factor of 5 (actual inertia is 5 kg.m²) is also hardly noticeable.

Underestimation of the inertia (actual inertia is 0.1 kg.m²) brings the system toward the limit of stability, but a factor of 10 is acceptable.



Significant overestimation of the actual inertia (ratio 33.33).

Significant underestimation of the actual inertia (ratio 20).

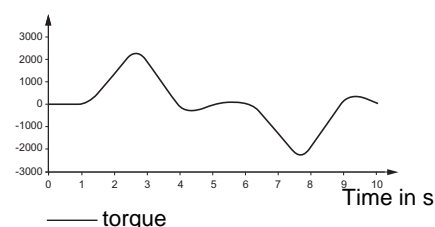
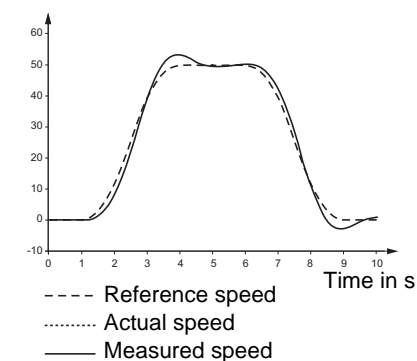
Note that underestimation by a ratio of 30 is preferable to overestimation by a ratio of 30, since the control system remains stable (**Note:** in this case the risk is that the response will be too slow and the lift will be caught too late).

[1.1 LIFT] (LIF-)

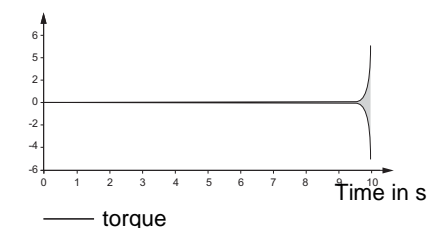
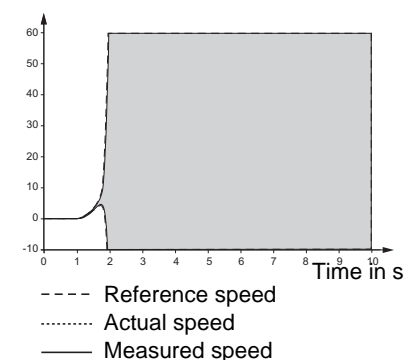
Influence of the [FreqLoopGain] (FLG) and [Fr.Loop.Stab] (StA) parameters for the ATV LIFT

Given these latest results, in the great majority of lift applications, there is no point in changing the settings of [Fr.Loop.Stab] (StA) and [FreqLoopGain] (FLG).

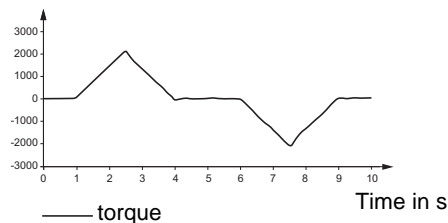
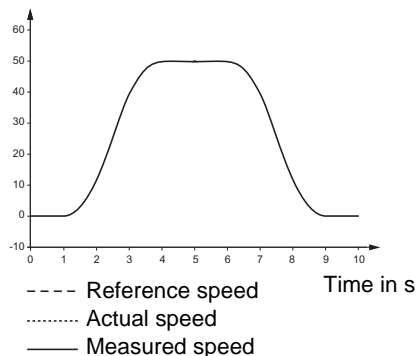
Moreover, the settings of StA/FLG differ from the default values and usually hide incorrectly defined inertia:



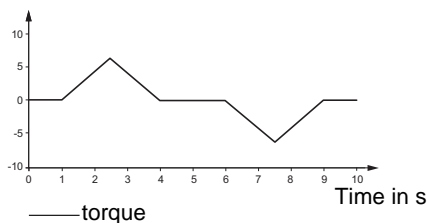
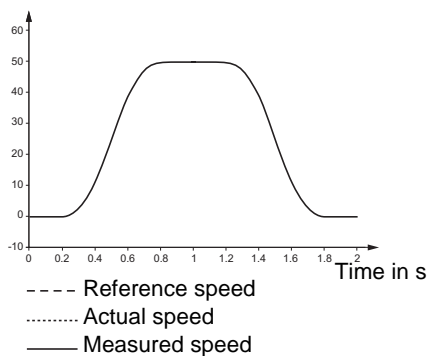
Inertia underestimated by a ratio of 10, default loop values.



Significant overestimation of the actual inertia (ratio 33.33).



An increase of FLG to 100% resolves the problem of speed following while producing torque oscillations.



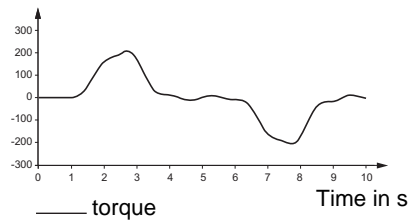
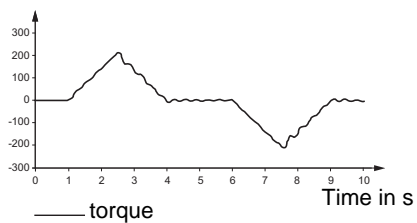
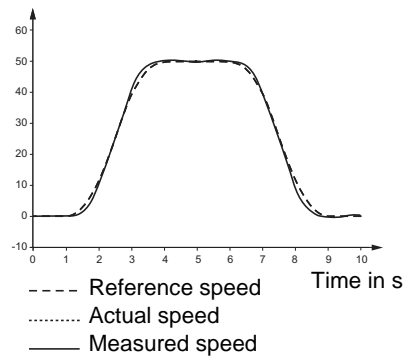
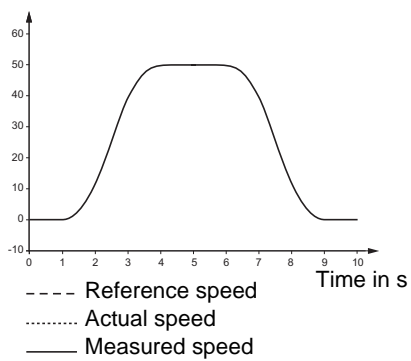
A decrease of FLG resolves the problem of speed following, while nonetheless covering incorrect estimation of the inertia.

The inertia should therefore be redefined rather than changing the gains [FreqLoopGain] (FLG) or [Fr.Loop.Stab] (StA).

However, even in the case of well defined inertia, it is sometimes useful to reduce the gain [FreqLoopGain] (FLG) or increase the stability [Fr.Loop.Stab] (StA) to make the system even slacker. A slack control system is useful for example to avoid exciting the mechanical resonance frequencies of the lift or the motor.

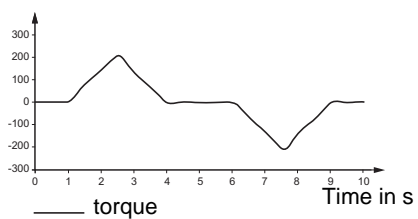
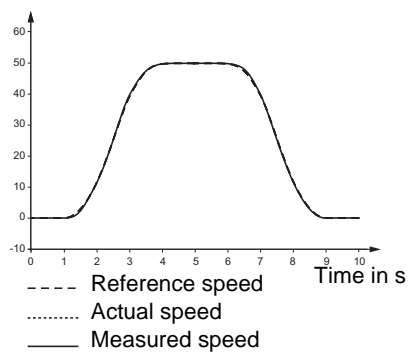
[1.1 LIFT] (LIF-)

E.g.



Let's consider that the mechanical system is causing a resonance at the speed used. Even if the speed is followed correctly, the torque oscillations show discomfort.

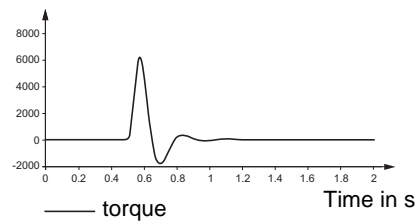
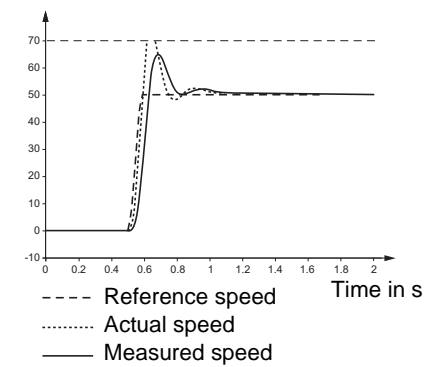
By reducing FLG the little oscillations reduce, giving way to larger oscillations which are felt less in the car.



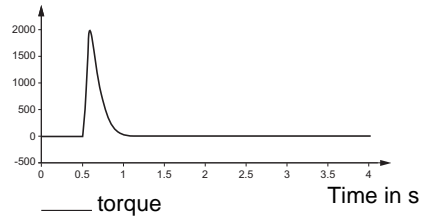
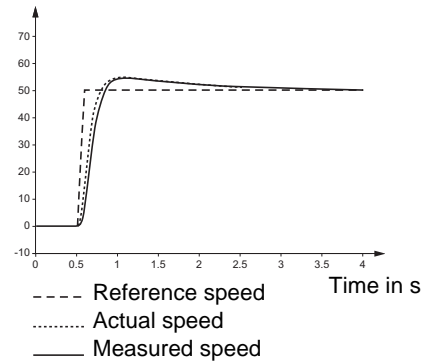
By increasing STA to 100%, the system is dampened further. This reduces the oscillations.

[1.1 LIFT] (LIF-)

Another example of the advantage of the slacker system is when you need to use a very large filter on the speed measurement (also see section on [Encoder filter value](#) (FFr)):



Very short ACC ramp (0.1 s), very long FFR (40 ms).



By reducing the passband FLG the speed oscillations are eliminated. A normal response is regained with a PI regulator (SFC = 100).

[1.1 LIFT] (LIF-)

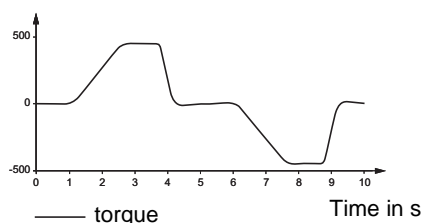
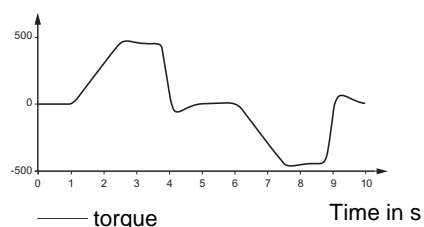
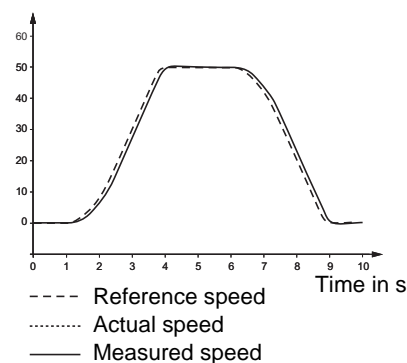
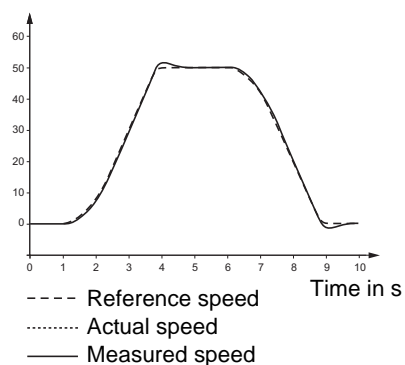
Influence of the [K speed loop filter] parameter (SFC)

The filter on the speed reference converts the PI regulator (SFC = 100%) to an IP regulator (SFC = 0%).

An IP regulator never has an overshoot. The price to be paid is a delay in the actual speed compared to the reference speed.

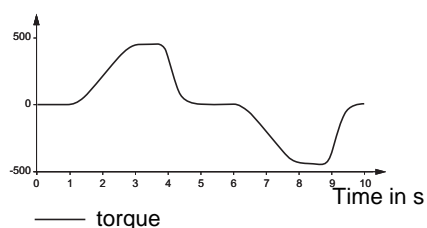
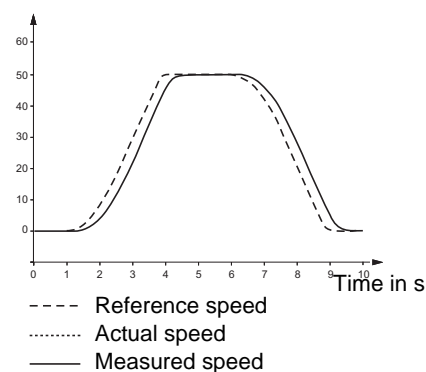
In the great majority of lift applications it should be left at the default value: 100% for synchronous motors, 65% for asynchronous motors.

It can be useful when using steep ramp profiles. However, it could be said that in this case it hides an incorrect definition of the ramp rounds. Nonetheless, it can be seen as another degree of freedom for increasing comfort.



Inertia underestimated (ratio 3), rounding of end of ramp 10%, SFC = 100%

If SFC = 65%, a good compromise between the speed overshoot and the delay on the command is obtained.



If SFC = 0%, the speed overshoot is eliminated and comfortable jerks are obtained.

We should also point out that the reduction in [K speed loop filter] (SFC) also improves behavior in the event of mechanical resonance. In this case, it can be used even together with the increase in [Fr.Looping.Stab] (StA) and/or the reduction in [Freq Loop Gain] (FLG).

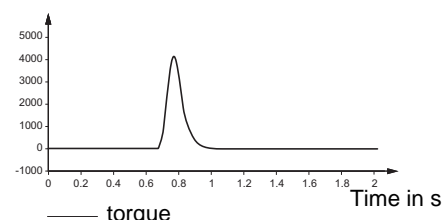
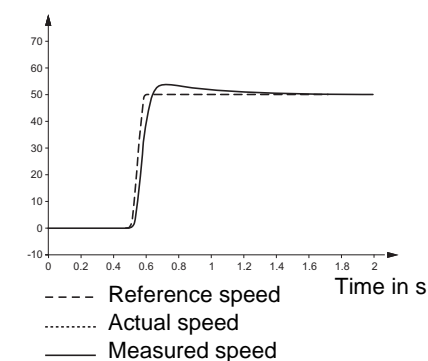
Influence of the [Encoder filter value] (FFr) parameter

The [Encoder filter value] (FFR) filter is pre-positioned in the case of the lift to a value that depends on the actual encoder resolution and the rated motor torque. It can be modified as follows:

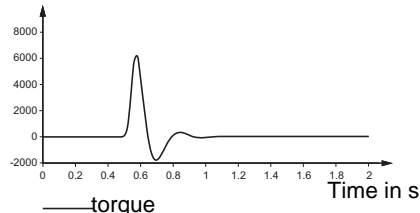
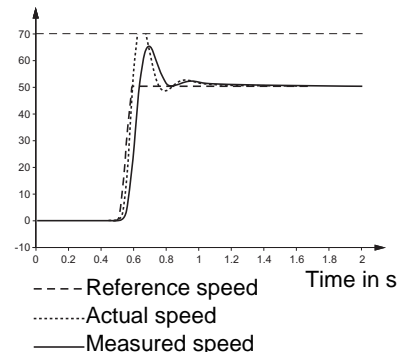
- **The FFR value is increased** to reduce the acoustic noise or background (high frequency) vibration in the cables; this vibration is usually due to the measurement noise (quality of the encoder cables, EMC interference, length of cable etc.).
- **FFR is reduced** to be able to increase (with the other dynamic gains) the dynamics of the response

For a better understanding of the filter's influence on the measured speed, we will also look at the example of a short ramp (the influence of this parameter for the usual lift application ramps is much less pronounced):

Example with PI structure 100%



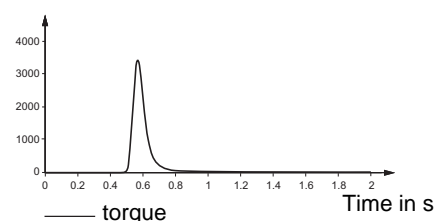
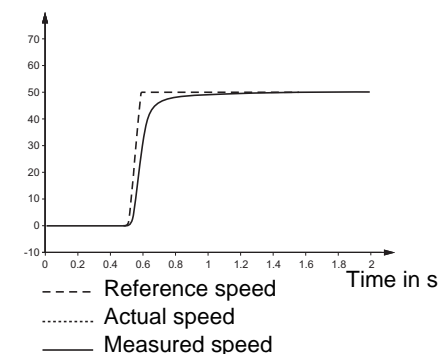
Default loop settings, Jvar = J real, ACC = 0.1 s, FFR = 3 ms



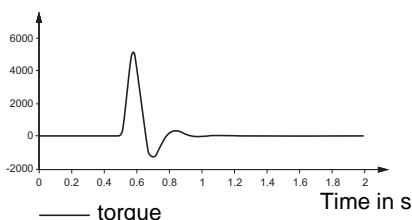
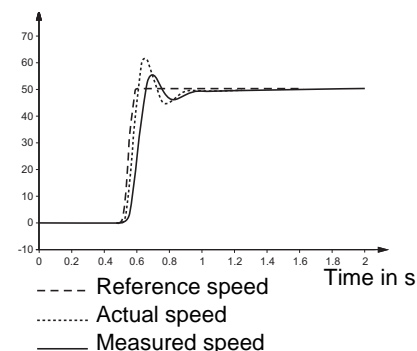
Very long FFR (40 ms).

Remember that the speed oscillations that appear in this latter case can be reduced by decreasing [FreqLoopGain] (FLG) (see section on the advantages of [FreqLoopGain] (FLG) and [Fr.Loop.Stab] (StA)), page 71).

Example with an intermediate PI/IP structure (SFC = 80%):



SFC = 80%, FFR = 3 ms



SFC = 80%, FFR = 40 ms: A system without overshoot can be converted into a system with overshoot and a little oscillation due to too much filtering on the speed feedback.

In this case too, [FreqLoopGain] (FLG) must be reduced to reduce oscillations (and overshoots).

You should be aware that too large a filtering constant reduces the performance of the rollback function, since the rollback gains will be applied to the filtered speed.

The FFR setting will therefore be a compromise between the noise and oscillations in normal operation and rejection of interference by the rollback.

[1.1 LIFT] (LIF-)

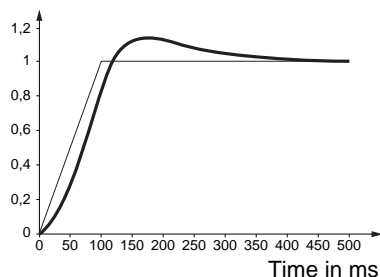
Use of [Feed forward] (FFP) and [Bandwidth feedfor.] (FFU)

In the case of lifts, such as applications with fairly slow dynamics (ramps 3 s, significant rounding, high inertia), this term is not essential.

[Feed forward] (FFP) is used to adjust the level of dynamic torque feedforward required for accelerating and decelerating the inertia. The effect of this parameter on ramp following is illustrated below. Increasing the value of FFP allows the ramp to be followed more closely. However, if the value is too high, overspeed occurs. The optimum setting is obtained when the speed follows the ramp precisely; this depends on the accuracy of the [Application Inertia] (JAPL) parameter, page 81, and the [Encoder filter value] (FFr) parameter setting, page 181.

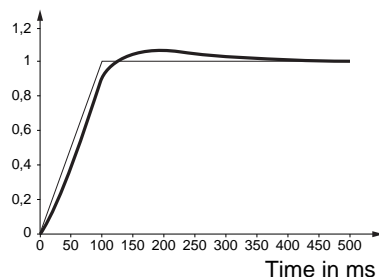
Initial response with FFP = 0

Reference division



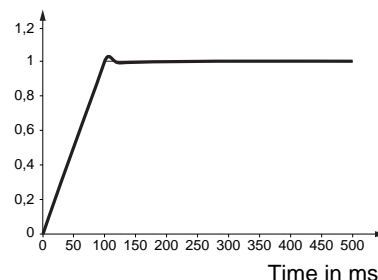
Increase in FFP ↗

Reference division



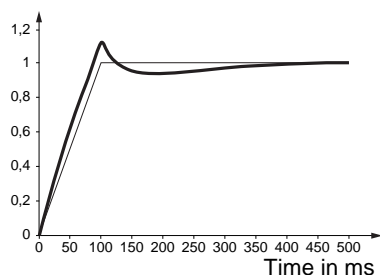
Increase in FFP ↗↗

Reference division



Increase in FFP ↗↗↗

Reference division



As we have shown in the "Robustness of basic operation" paragraph, page 74, [Feed forward] (FFP) can be useful to hide inertia estimation errors.

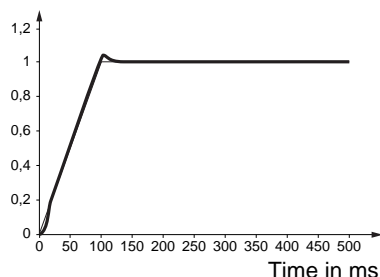
[Feed forward] (FFP) can also be used to separate the effect of the Kp and Ki speed regulator gains, on acceleration/deceleration and during steady state operation (because it must be said that this term only acts on a change of speed reference, therefore only in transient operation).

The [Feed forward] (FFP) parameter serves no purpose during rollback, since there is no acceleration of the reference (speed reference 0 Hz).

[Bandwidth feedfor.] (FFU) is used to adjust the bandwidth of the dynamic torque feedforward term. The effect of this parameter on ramp following is illustrated below. Decreasing the value of FFU reduces the effect of noise on the speed reference (torque ripple). However, too great a decrease in relation to the ramp settings (on short ramps) causes a delay, and ramp following is adversely affected. Increasing the value of FFU allows the ramp to be followed more closely, but also heightens noise sensitivity. The optimum setting is obtained by reaching the best compromise between ramp following and the existing noise sensitivity.

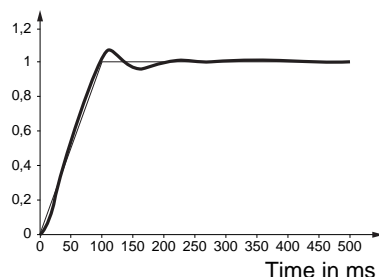
Initial response with FFU = 100%

Reference division



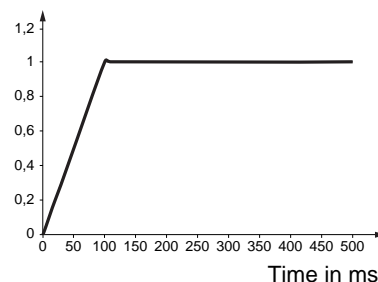
Reduction in FFU ↘↘

Reference division





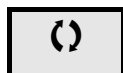
Increase in FFU ↗↗

Reference division





[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
LOP -	[LIFT OPTIMISATION] continued		
SPL -	[SPEED LOOP]		
JCAL	<input type="checkbox"/> [Estim. motor inertia] This parameter is read-only. The parameter JCAL shows the estimated motor inertia. See below [Application Inertia] (JAPL).	0.01 to 655.35 kgm ²	-
JMOT AUTO	<input type="checkbox"/> [Real motor inertia] <input type="checkbox"/> [Estimated] (AUTO) The parameter JMOT allows to adjust the motor inertia. See below [Application Inertia] (JAPL). The following formula allows to calculate the [Real motor Inertia] (JMOT) from the flywheel effect (GD ²): $JMOT = (GD^2 / 4)$.	[Estimated] (AUTO) to 655.35 kgm ²	[Estimated] (AUTO)
JAPL	<input type="checkbox"/> [Application Inertia] This parameter is only readable. It is updated lwhen the [Car weight] (CMA) parameter is modified. The total inertia is: - [Real motor Inertia] (JMOT) + [Application Inertia] (JAPL) when [Real motor Inertia] (JMOT) is different from [Estimated] (AUTO) . - [Estim. motor inertia] (JCAL) + [Application Inertia] (JAPL) when [Real motor Inertia] (JMOT) is equal to [Estimated] (AUTO) . <div style="background-color: black; color: white; text-align: center; padding: 5px;">⚠ DANGER</div> <div style="background-color: #f0f0f0; padding: 10px;"> UNINTENDED EQUIPMENT OPERATION If the value of [Application Inertia] (JAPL) parameter is incorrect, it can cause speed instability and loss of motor control, which could lead to a sudden drop. The inertia may vary significantly according to the application; in general, it is very high for lifts. As such, the default value does not guarantee correct operation. Failure to follow these instructions will result in death or serious injury. </div>		
SEB 	<input type="checkbox"/> [Fr.Loop.Stab] Stability: Used to adapt the return to steady state after a speed transient, according to the dynamics of the machine. Gradually increase the stability to increase control loop attenuation and thus reduce any overspeed.	0 to 100 %	20 %
FLG 	<input type="checkbox"/> [FreqLoopGain] Frequency loop gain: Used to adapt the pace of the machine speed transients according to the dynamics. For machines with high resistive torque, high inertia or fast cycles, increase the gain gradually. [FreqLoopGain] (FLG) is set to 20% when [Motor control type] (Ctt) is set to [Sync. mot.] (SYn) or [Sync.CL] (FSY) .	0 to 100 %	6 %




Parameter that can be modified during operation or when stopped.

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
LDP -	[LIFT OPTIMISATION] continued		
SPL -	[SPEED LOOP] continued		
SFC 	<input type="checkbox"/> [K speed loop filter] Speed loop filter coefficient. See page 68 for more details of the effect of this parameter.	0 to 100 %	According to [Motor control type] (Ctt)
FFA nO YES	<input type="checkbox"/> [Encoder filter activ.] This parameter can be accessed if [ACCESS LEVEL] = [Expert] Activation of encoder feedback filter. <input type="checkbox"/> [No] (no): Filter deactivated <input type="checkbox"/> [Yes] (YES): Filter activated		[No] (nO)
FFr 	<input type="checkbox"/> [Encoder filter value] This parameter can be accessed if [ACCESS LEVEL] = [Expert] and if [Encoder filter activ.] (FFA) = [Yes] (YES). Encoder feedback filter time constant in milliseconds.	0 to 50 ms	Acc. to encoder type
FFP	<input type="checkbox"/> [Feed forward] This parameter can be accessed if [ACCESS LEVEL] = [Expert] Percentage of the high-performance regulator feedforward term. 100% corresponds to the term calculated using the value of [Application Inertia] (JAPL) page 81.	0 to 200 %	0 %
FFU	<input type="checkbox"/> [Bandwidth feedfor.] This parameter can be accessed if [ACCESS LEVEL] = [Expert] Bandwidth of the high-performance speed loop feedforward term, as a percentage of the predefined value.	20 to 500 %	100 %

Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu and [1.4 MOTOR CONTROL] (drC-).

 Parameter that can be modified during operation or when stopped.

Notch filter

Vibrations naturally exist in lift systems and have disturbing consequences as noises and/or vibrations in the car.

These vibrations can come from mechanical roots as

- the elastic ropes resonance,
- impacts at guide rail joint,
- conjunction between guide rail and guide shoe,
- high ratios between the inertia of the application and of the motor (typicalli in direct drive application with no gear box),

and also electric noise coming from the motor.

To insure improved comfort the ATV LIFT drive provides 2 optional notch filters to reject effects of the mechanical resonance and consequently improve the speed behaviour.

The notch filter attenuates a band of frequencies around its central frequency within it bandwidth and with maximum attenuation defined by its depth :

- NFFx : Filter central frequency,
- NFBx : Bandwidth of the attenuation that will be applied by the filter (with of the notch),
- NFDx : Depth of the attenuation that will be applied by the filter.

When vibrations are rejected significant improvement of overall travel comfort is achievable. In particular:

- Speed loop setting is easier and less dependant on the system parameter variation (load, lift car position etc.).
- Speed loop damping is improved and lift car vibrations eliminated.
- Increased speed loop gains can be used for better speed ramp tracking and more accurate level positioning.
- Increased gains of the roll back controller are achievable without incurring vibrations in the car.

[1.1 LIFT] (LIF-)

The ATV LIFT provides 2 identical cascaded notch filters that can be configured and enabled independently.

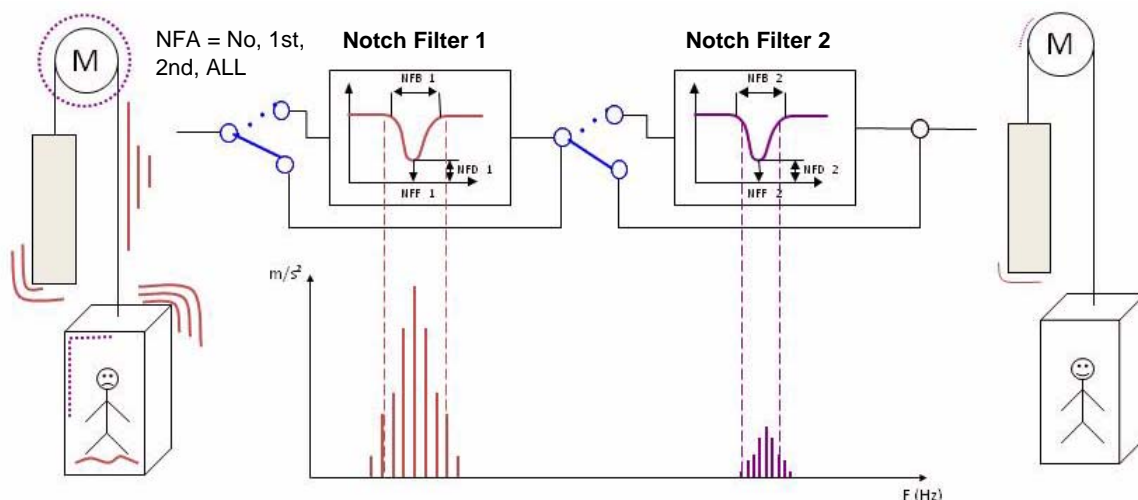
By default, notch filter 1 is set to provide compensation of the typical lift mechanical resonant mode which is can be usually found in 15 Hz..25 Hz range.

The default settings of notch filter 2 are selected to provide additional attenuation at higher frequencies if the notch filter 1 can not be set to provide sufficiently attenuation in the frequency range required in a particular lift installation (typically with very high load/motor inertia mismatch).

Usually, using only notch filter 1 with its default settings is sufficient to remove vibrations that are felt in the car.

The ATV LIFT provides 2 different notch filters that can be configured and enable independently: the default setting of notch filter 1 concerned mechanical vibrations while default setting of notch filter 2 concerned electrical vibrations.

Usually, using only notch filter 1 with its default values is sufficient to remove vibrations that are felt in the car.



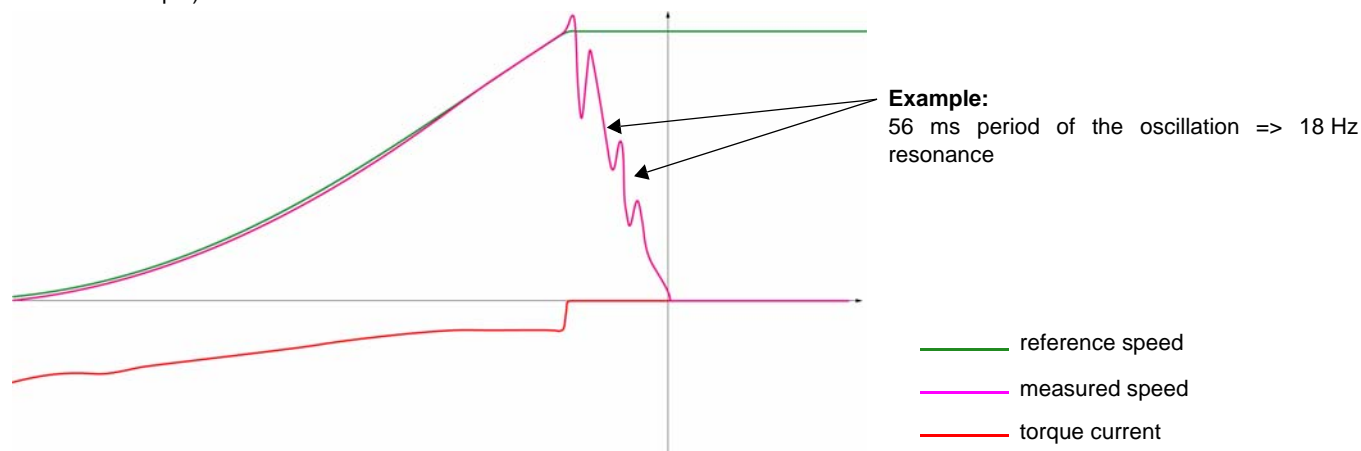
Commissioning

Activation of the notch filter should be typically considered in direct drive applications (no gear boxes) where load to motor inertia ratio is high. The notch filter central frequency should be set at or slightly higher than to the mechanical resonant frequency. The mechanical natural resonant frequency can be detected if the mechanical system is excited by sudden torque variations. So the main task is to identify as close as possible the resonant frequency.

To commission properly the notch filter 1 and in order to be sure that the origin of these vibrations is mechanical resonance, a simple test may be done:

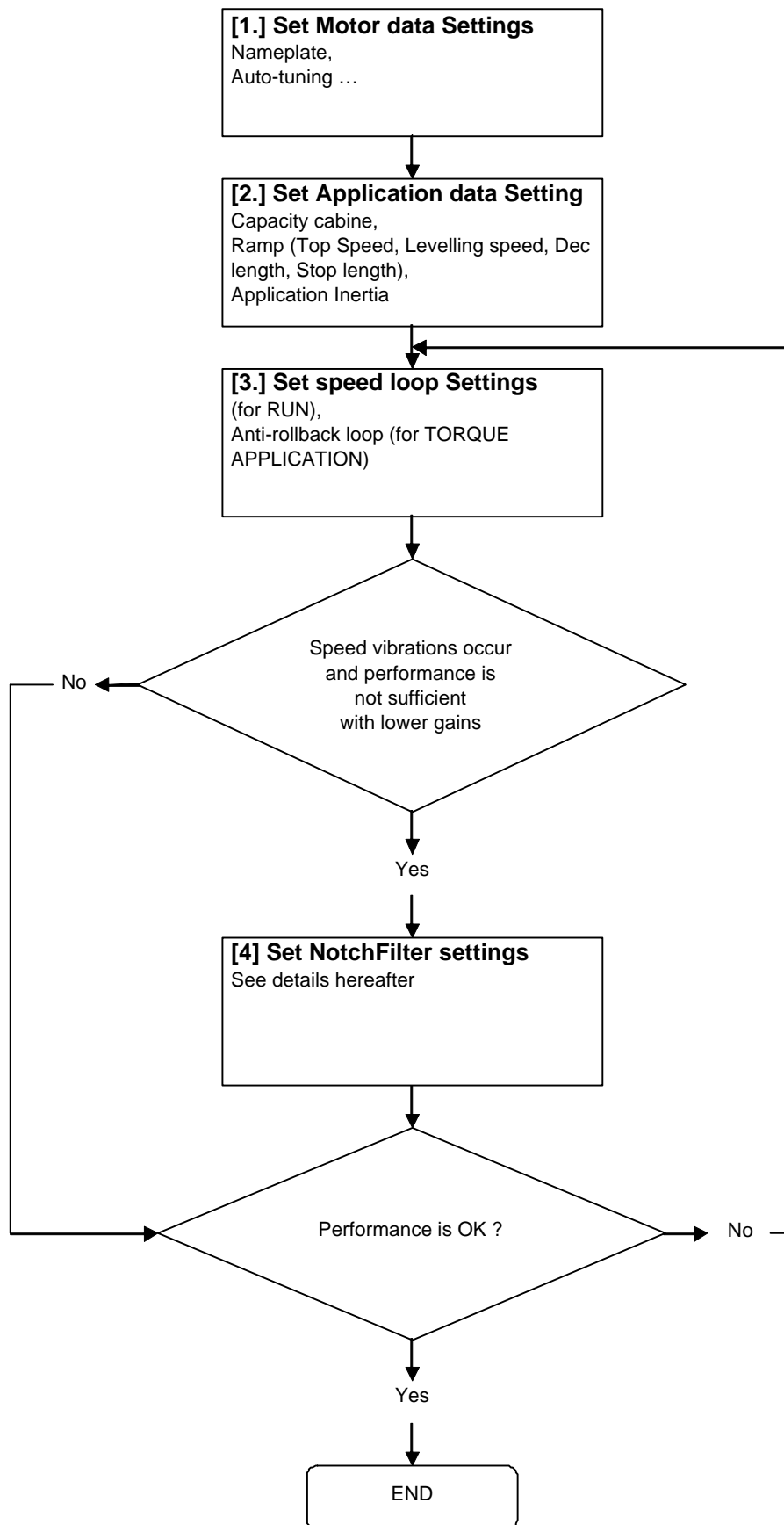
- remove roll-back management,
- start in inspection,
- stop.

During stop during down movement with empty car at mid in **freewheel**, the measured speed will contain exactly the resonant frequencies of the application. The speed may be observed with an external equipment (tacho meter for example).

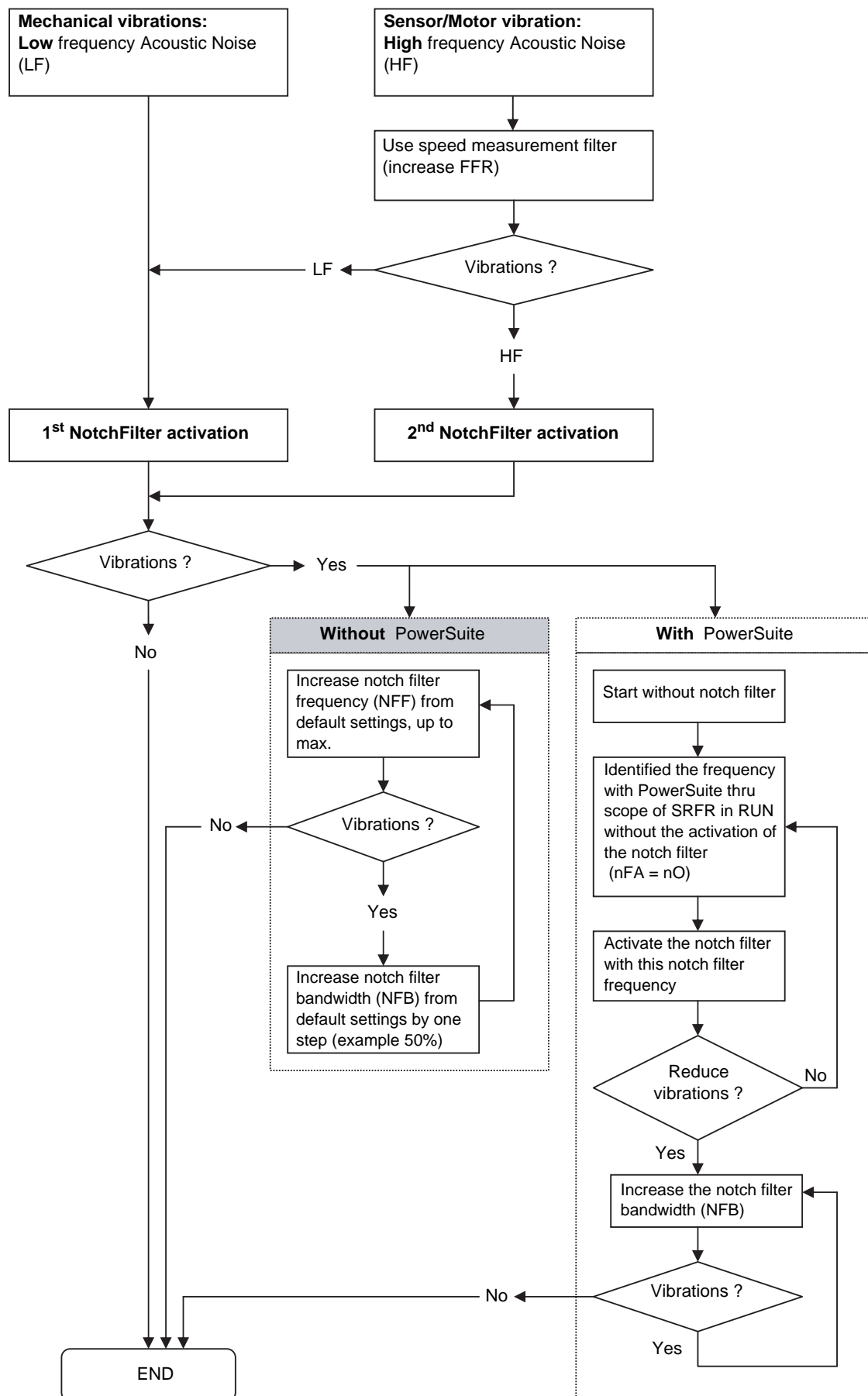


If it is impossible to measure the speed, we should consider that usual mechanical resonances are between 15 and 25 Hz.

Remark: Possible speed vibrations seen during drive run normally appear at frequencies higher than the mechanical resonant frequency depending on the settings of the speed loop, speed-back filter and motor parameters. Thus it is important to identify real natural resonance frequency (above explained observation during free wheeling is one possibility).



[4] Set NotchFilter settings




[1.1 LIFT] (LIF-)

Code	Name/Description	Factory setting
LDP -	[LIFT OPTIMISATION] continued	
SPL -	[SPEED LOOP] continued	
nFA	<input type="checkbox"/> [Notch Filter Activ.] This parameter activates the notch filter function. 2 independent notch filters can be configured.	[No] (nO)
1St	<input type="checkbox"/> [First] (1St) : notch filter 1 enabled	
2nd	<input type="checkbox"/> [2nd] (2nd) : notch filter 2 enabled	
ALL	<input type="checkbox"/> [All] (ALL) : notch filters 1 and 2 enabled	
nO	<input type="checkbox"/> [No] (nO) : no notch filter enabled	

Parameters that can be accessed in [Expert] mode

Code	Name/Description	Adjustment range	Factory setting
SSL -	[SPEED LOOP] (continued)		
nFF1	<input type="checkbox"/> [Notch Filter Freq 1] Notch filter 1 central frequency. Parameter accessible only if [Notch Filter Activ.] (nFA) = [First] (1St) or [All] (ALL) .	10..150 Hz	15
nFb1	<input type="checkbox"/> [Notch Filter Bdw 1] Notch filter 1 bandwidth. Parameter accessible only if [Notch Filter Activ.] (nFA) = [First] (1St) or [All] (ALL) . This parameter defines the bandwidth of the notch filter 1. Filter with higher bandwidth will provide better stability margin when the load resonant frequency changes (with car position or load). Note: rising the bandwidth can interfere with the expect drive dynamic (reducing the dynamic of the speed loop).	10..400%	100
nFd1	<input type="checkbox"/> [Notch Filter Activ.] Notch filter 1 gain. Parameter accessible only if [Notch Filter Activ.] (nFA) = [First] (1St) or [All] (ALL) . This parameter defines the gain of the notch filter 1 at the central frequency. When NFD1=100%, no filter is applied	0..100%	10
nFF2	<input type="checkbox"/> [Notch Filter Freq 2] Notch filter 2 central frequency. Parameter accessible only if [Notch Filter Activ.] (nFA) = [2nd] (2nd) or [All] (ALL) .	10..150 Hz	85
nFb2	<input type="checkbox"/> [Notch Filter Bdw 2] Notch filter 2 bandwidth. Parameter accessible only if [Notch Filter Activ.] (nFA) = [2nd] (2nd) or [All] (ALL) . This parameter defines the bandwidth of the notch filter 2. Filter with higher bandwidth will provide better stability margin when the load resonant frequency changes (with car position or load). Note: rising the bandwidth can interfere with the expect drive dynamic (reducing the dynamic of the speed loop).	10..400%	100
nFd2	<input type="checkbox"/> [Notch Filter Activ.] Notch filter 2 gain. Parameter accessible only if [Notch Filter Activ.] (nFA) = [2nd] (2nd) or [All] (ALL) . This parameter defines the gain of the notch filter 1 at the central frequency. When NFD1=100%, no filter is applied.	0..100%	25

[1.1 LIFT] (LIF-)

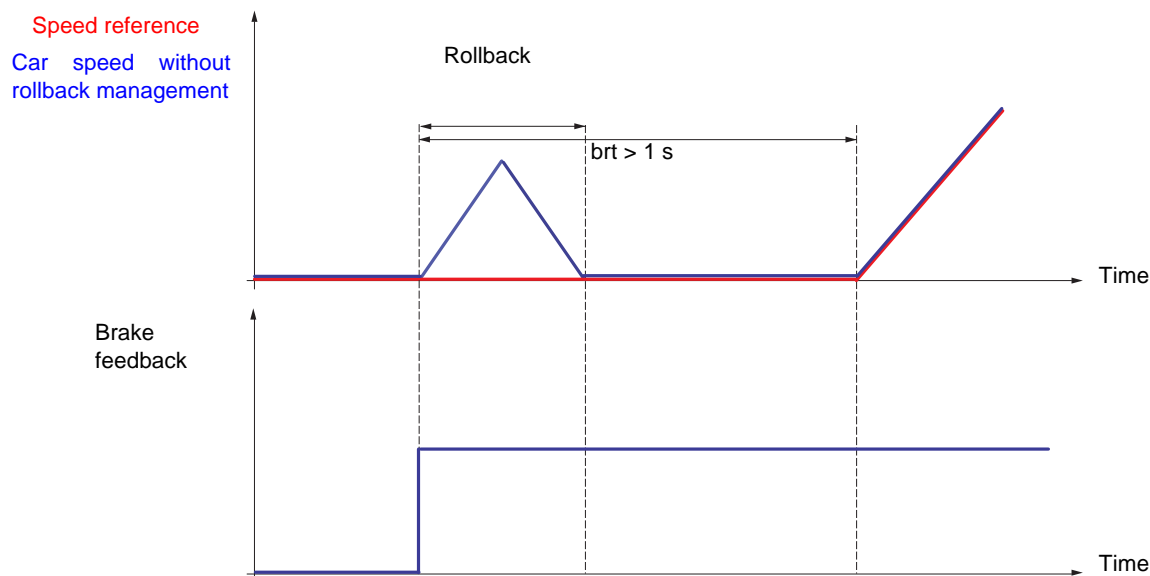
Code	Name/Description	Adjustment range	Factory setting
LDP -	[LIFT OPTIMISATION] continued		
StA -	[START ADJUSTMENT]		
brS -	[BRAKE START]		
	 Note: This menu is visible if [Brake assignment] (bLC) is not [No] (nO)		
brt	<input type="checkbox"/> [Brake Release time] Brake release time delay	0.00 to 5.00 s	0.50 s
blr	<input type="checkbox"/> [Brake release freq] This parameter can be accessed if [Motor control type] (Ctt) page 137 is not [FVC] (FUC) or [Sync.CL] (FSY) and if [Movement type] (bSt) page 233 is [Hoisting] (UEr). Brake release frequency threshold (initialization of acceleration ramp).	[Auto] (AUtO) to 10.0 Hz	[Auto] (AUtO)
AU t O -	<input type="checkbox"/> [Auto] (AUtO): The drive takes a value equal to the nominal motor slip, calculated using the drive parameters. <input type="checkbox"/> 0 to 10 Hz: Manual setting		
lbr	<input type="checkbox"/> [Brake release I FW] (1)	-1.32 In to 1.32 In	0 A
	This parameter can be accessed if [Weight sensor ass.] (PES) = [No] (nO) (see page 239). Brake release current threshold for Ascending or Forward movement.		
bIP nO YES 2 lbr	<input type="checkbox"/> [Brake impulse] This parameter can be accessed if [Motor control type] (Ctt) page 137 is not [FVC] (FUC) or [Sync.CL] (FSY) and if [Movement type] (bSt) page 233 is [Hoisting] (UEr). <input type="checkbox"/> [No] (nO): The motor torque is given in the required operating direction, at current lbr. <input type="checkbox"/> [Yes] (YES): The motor torque is always Forward (check that this direction corresponds to ascending), at current lbr. <input type="checkbox"/> [2 lBR] (2lbr): The torque is in the required direction, at current lbr for Forward and lrd for Reverse, for certain specific applications.		[Yes] (YES)

(1) In corresponds to the rated drive current indicated in the Installation Manual or on the drive nameplate.

Rollback management

In some lift applications (gearless with high inertia), a jolt can be felt in the car at the start of any movement when the brake is released. At this moment (since there is no external weight sensor), the torque applied by the motor is not yet at the level needed to hold the car. A slight movement (up or down, depending on the general equilibrium) occurs. This movement is known as a "rollback".

The [Rollback MGT] (rbM) function, page 89 can only be accessed in closed-loop mode ([Motor control type] (Ctt) , page 137 = [Sync.CL] (FSY) or [FVC] (FUC)). It increases the drive's rigidity control during release of the mechanical brake to cancel any movement during the brake release time ([Brake Release time] (brt) , page 87).



The [Rollback MGT] (rbM) function can be used to avoid the effects of rollback once the following parameters have been set:

- The speed loop parameters must be set and must not be modified after the [Rollback MGT] (rbM) function has been activated.
- The [Encoder filter value] parameter (FFr) page 47 must be configured with an appropriate value and must not be modified after the [Rollback MGT] (rbM) function has been activated.
- The current parameter [Brake release I FW] (lbr) page 87 can be adjusted to apply a current level corresponding to the most common load scenario (approximately 25% of the total load).
- The brake release sequence must be configured with an appropriate brake release time [Brake Release time] (brt) (typically brt > 1 second).

Recommended settings:

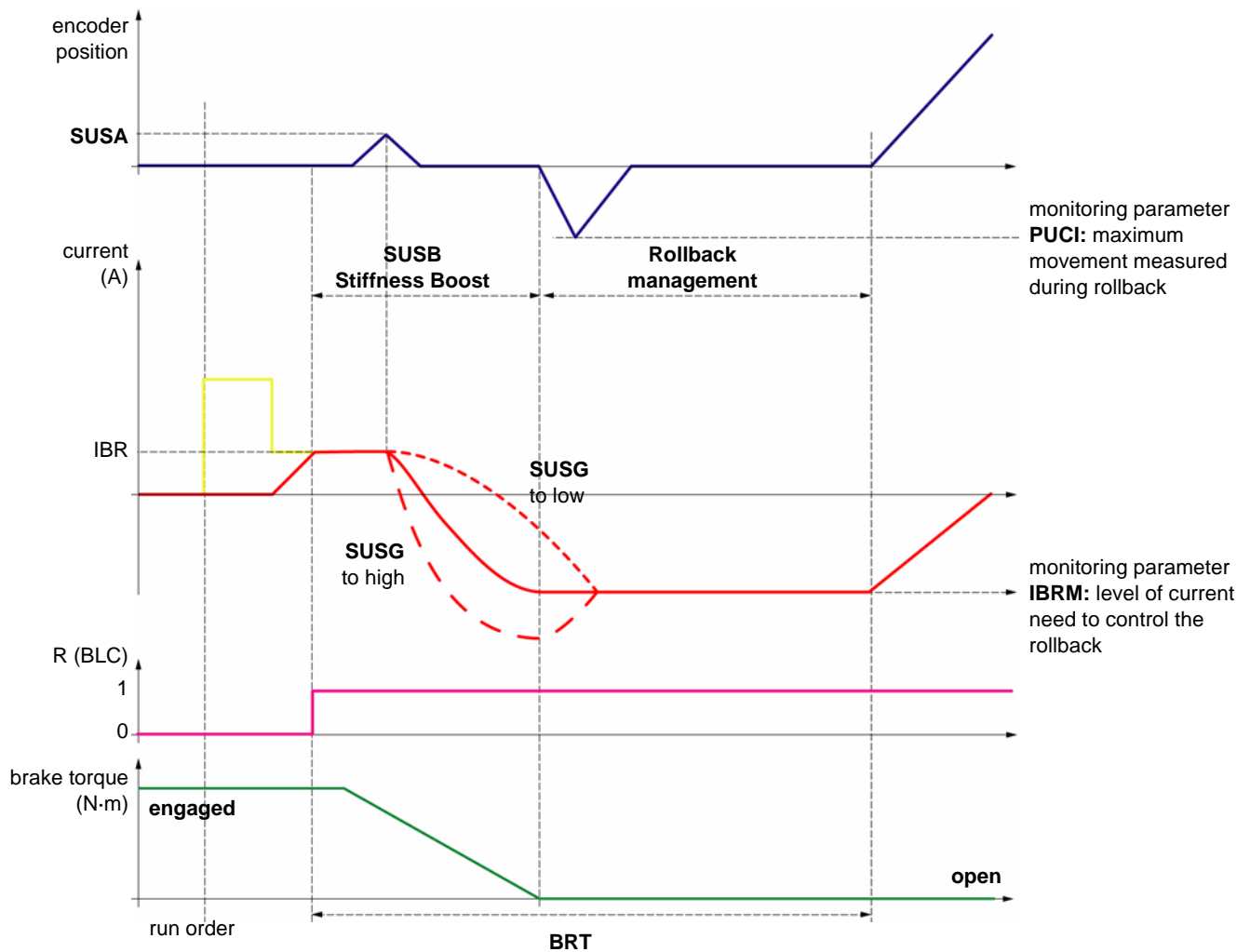
- It is essential to set the speed loop correctly in order to have satisfactory rollback management (correct ramp following and well damped response). Initial optimisation of the initial speed loop must be performed using the [Rollback MGT] (rbM) function = [No] (nO) (deactivated).
- We recommend gradually increasing the [Rbk Compensation] (rbC) gain from 0 until the rollback movement is reduced to the desired level.
- If vibrations occur while the [Rbk Compensation] (rbC) gain is being increased, it must be reduced until these stop. It is possible to increase damping with the [Rbk Damping] (rbd) parameter, this allows the [Rbk Compensation] (rbC) gain to be increased again.
- **Note:** A high setting of the [Rbk Damping] (rbd) parameter can amplify the encoder noise. It is therefore advisable to keep the value as low as possible.
- The performance of the rollback compensation function will be limited by the system resonance frequencies and the encoder feedback resolution. Encoders with a low resolution do not necessarily offer the desired rollback management.
- **Note:** You should allow adequate time after the brake is released and prioritize starting of the speed ramp to control the rollback in order to stabilize the lift position.

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
LDP -	[LIFT OPTIMISATION] continued		
STAR -	[START ADJUSTMENT] continued		
rbn -	[ROLLBACK MGT] Menu accessible: - If [Motor control type] (Ctt) page 137 = [Sync.CL] (FSY) or [FVC] (FUC), - If brake logic control [Brake assignment] (bLC) page 233 has been assigned.		
rbn	<input type="checkbox"/> [Rollback MGT] Activation of Rollback MGT function <input type="checkbox"/> [No] (nO) <input type="checkbox"/> [Yes] (YES)		[No] (nO)
rbC	<input type="checkbox"/> [Rbk Compensation] This parameter can be accessed if [Rollback MGT] (rbM) = [Yes] (YES) Rollback compensation gain.	0 to 1,000 %	100 %
rbd	<input type="checkbox"/> [Rbk Damping] This parameter can only be accessed when [ACCESS LEVEL] = [Expert] and if [Rollback MGT] (rbM) = [Yes] (YES). Rollback coefficient damping.	0 to 1,000 %	50 %

Start-up stiffness boost

The Start-up stiffness boost adapts the IBR current level according to the encoder feedback while the brake is opening. The Start-up stiffness boost operates during the first part after the Run order: when the load torque becomes predominant and when the breaking torque due to the mechanical brake progressively reduces. As a consequence, at the end of the braking operation, the resulting opening current level set in the parameter IBR is internally re-adjusted according to the response of the system.



[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
LDP -	[LIFT OPTIMISATION] continued		
STAR -	[START ADJUSTMENT] continued		
rbM -	[ROLLBACK MGT] continued Menu accessible: - If [Motor control type] (Ctt) page 137 = [Sync.CL] (FSY) or [FVC] (FUC), - If brake logic control [Brake assignment] (bLC) page 233 has been assigned.		
SUSb	<input type="checkbox"/> [Start Stiffnes Boost] Activation of start-up stiffness boost function. Note: This function is compliant with the rollback management function [Rollback MGT] (rbM). For best result, it is recommended to activate both. <input type="checkbox"/> [No] (nO) <input type="checkbox"/> [Yes] (YES)		[No] (nO)

Parameters that can be accessed in [Expert] mode

Code	Name/Description	Adjustment range	Factory setting
LDP -	[LIFT OPTIMISATION] continued		
STAR -	[START ADJUSTMENT] continued		
SUSA	<input type="checkbox"/> [Activation Angle] This parameter defines the angular movement threshold at which the start-up stiffness boost is activated to modify the current level applied during (brt) [Brake Release time]. It defines an angular variation. A same angular variation could contain deferent numbers of encoder lines according the encoder resolution. As usual, high resolution provides good behaviour. Note: too low settings can provide bad regulation because of the encoder noise.	0..10	2
SUSG	<input type="checkbox"/> [Stiffness gain] This parameter defines the gain apply on the current regulation when the (SUSA) [Activation Angle] is reached.	0..1000 %	100 %

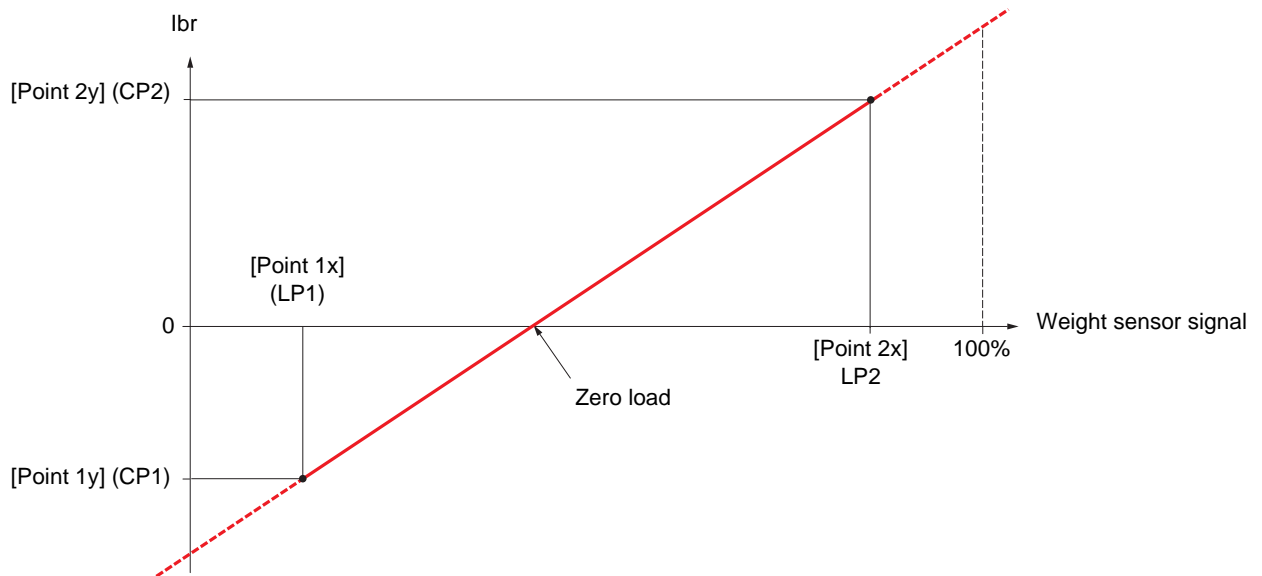
External weight measurement

This function uses the information supplied by a weight sensor to adapt the current [Brake release I FW] (lbr) of the [BRAKE LOGIC CONTROL] (bLC-) function. The signal from the weight sensor can be assigned to an analog input (usually a 4 - 20 mA signal), to the pulse-in input or to the encoder input, according to the type of weight sensor.

Examples include


- Measurement of the total weight of a hoisting winch and its load.
- Measurement of the total weight of an elevator winch, the cabin and counterweight.

The current [Brake release I FW] (lbr) is adapted in accordance with the curve below.




This curve can represent a weight sensor on an elevator winch, where zero load on the motor occurs when the load in the cabin is not zero.

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
LDP -	[LIFT OPTIMISATION] continued		
SLA -	[START ADJUSTMENT] continued		
ELN -	[EXTERNAL WEIGHT MEAS.]		
PES nO A11 A12 A13 A14 PI PG AIU1	<div><input type="checkbox"/> [Weight sensor ass.]</div> <div>This function can be accessed if brake logic control has been assigned (see page 233). If [Weight sensor ass.] (PES) is not [No] (nO), [Movement type] (bSt) page 233 is forced to [Hoisting] (UEr). <div><input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [AI1] (AI1): Analog input <input type="checkbox"/> [AI2] (AI2): Analog input <input type="checkbox"/> [AI3] (AI3): Analog input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [AI4] (AI4): Analog input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [RP] (PI): Frequency input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [Encoder] (PG): Encoder input, if encoder card has been inserted <input type="checkbox"/> [Network AI] (AIU1): Virtual input via communication bus, to be configured via [AI net. channel] (AIC1) page 175.</div></div> <div><div> WARNING</div><div>UNINTENDED EQUIPMENT OPERATION If the equipment switches to forced local mode (see page 286), the virtual input remains frozen at the last value transmitted. Do not use the virtual input and forced local mode in the same configuration. Failure to follow this instruction can result in death or serious injury.</div></div>	[No] (nO)	
LP1	<div><input type="checkbox"/> [Point 1 X]</div> <div>0 to 99.99% of signal on the assigned input. [Point 1x] (LP1) must be less than [Point 2x] (LP2). This parameter can be accessed if [Weight sensor ass.] (PES) has been assigned.</div>	0 to 99.99 %	0
CP1	<div><input type="checkbox"/> [Point 1Y]</div> <div>Current corresponding to the load [Point 1 X] (LP1), in A. This parameter can be accessed if [Weight sensor ass.] (PES) has been assigned.</div>	-1.36 to +1.36 In (1)	- In
LP2	<div><input type="checkbox"/> [Point 2X]</div> <div>0.01 to 100 % of signal on the assigned input. [Point 2x] (LP2) must be greater than [Point 1x] (LP1). This parameter can be accessed if [Weight sensor ass.] (PES) has been assigned.</div>	0.01 to 100 %	50 %
CP2	<div><input type="checkbox"/> [Point 2Y]</div> <div>Current corresponding to the load [Point 2x] (LP2), in A. This parameter can be accessed if [Weight sensor ass.] (PES) has been assigned.</div>	-1.36 to +1.36 In (1)	0
lbrA ()	<div><input type="checkbox"/> [lbr 4-20 mA loss]</div> <div>Brake release current in the event of the loss of the weight sensor information. This parameter can be accessed if the weight sensor has been assigned to an analog current input and the 4-20 mA loss fault is deactivated. Recommended settings: - 0 for lifts - Rated motor current for a hoisting application</div>	0 to 1.36 In (1)	0

(1) In corresponds to the rated drive current indicated in the Installation Manual or on the drive nameplate.

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
LDP -	[LIFT OPTIMISATION] continued		
StD -	[STOP ADJUSTMENT]  Note: This menu is visible if [Brake assignment] (bLC) is not [No] (nO)		
bEn () AUtO -	<input type="checkbox"/> [Brake engage freq] Brake engage frequency threshold This parameter can be accessed if [Motor control type] (Ctt) page 137 is not [FVC] (FUC) or [Sync.CL] (FSY). <input type="checkbox"/> [Auto] (AUtO): The drive takes a value equal to the nominal motor slip, calculated using the drive parameters. <input type="checkbox"/> 0 to 10 Hz: Manual setting	(1)	[Auto] (AUtO)
bEt ()	<input type="checkbox"/> [Brake engage time] Brake engage time (brake response time).	0.00 to 5.00 s (1)	0.30 s
t bE ()	<input type="checkbox"/> [Brake engage delay] Time delay before request to engage brake. To delay brake engagement, if you wish the brake to be engaged when the drive comes to a complete stop.	0.00 to 5.00 s (1)	0 s

(1) Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu and in the [1.7 APPLICATION FUNCT.] (FUN-) menu.

 Parameter that can be modified during operation or when stopped.

Inspection

It can only be accessed if the [\[Brake assignment\] \(bLC\)](#) page [233](#) function have already been assigned.

It is used for operation at a fixed preset speed that is independent of all other references and over which it takes priority. The whole trajectory of the elevator can thus be covered and the necessary checks performed.

This function requires:

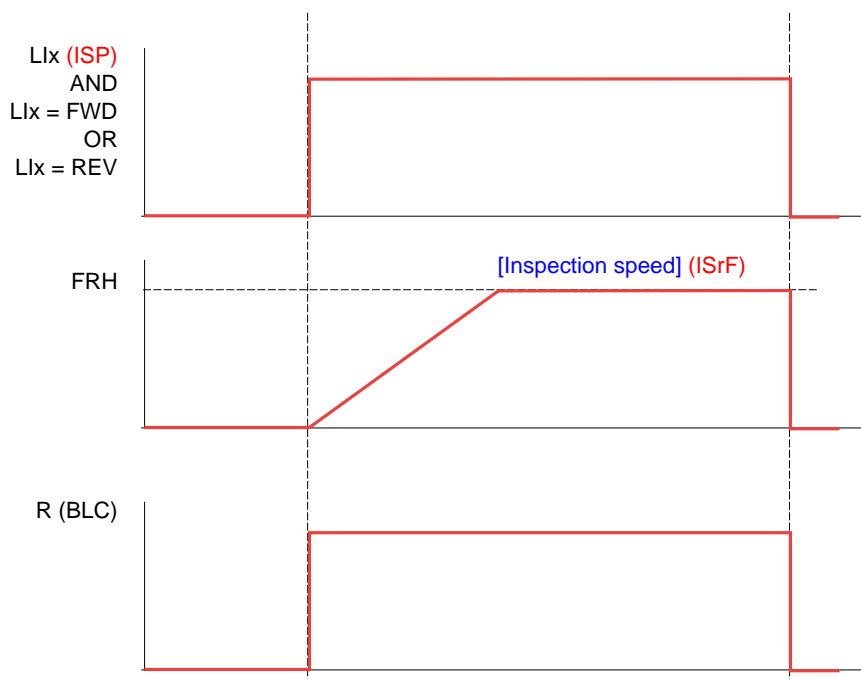
- A logic input to control the "inspection" mode.
- An appropriate frequency reference (inspection speed).

When the assigned logic input is at active state, inspection mode is activated:

- When a run command is given, the motor starts up normally, with output contactor command and brake logic control, until it reaches the inspection speed.
- When the run command is disabled, the motor changes to freewheel stop and brake logic control and output contactor command functions are triggered immediately.

[1.1 LIFT] (LIF-)

Inspection mode



Reference (1)	LI (Fwd) or LI (Rev)	[Lift Speed Mgt] (LSM)	[Inspection] (ISP)
STOP	0	1 or 0	1 or 0
[Lift top speed] (LtS)	1	1	0
[Lift leveling speed] (LLS)	1	0	0
[Inspection] (ISP)	1	1 or 0	1

(1) Note: This table is applicable to 2-wire control only.

Code	Name/Description	Adjustment range	Factory setting
L F n -	[LIFT FUNCTIONS]		
ISP -	[INSPECTION MODE]		
ACC	<input type="checkbox"/> [Acceleration] Time to accelerate from 0 to the [Rated motor freq.] (FrS) page 143 for an asynchronous motor or [Nominal freq sync.] (FrSS) page 149 for a synchronous motor. Make sure that this value is compatible with the inertia being driven.	0.1 to 6000.0 s (2)	3.0 s
ISP	<input type="checkbox"/> [Inspection] This parameter can be accessed if brake logic control [Brake assignment] (bLC) page 233 has been assigned. <input type="checkbox"/> [No] (nO): Function not assigned. <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted. <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12): If VW3A3203 ESIM card has been inserted. <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted. Inspection mode is activated when the assigned input changes to active state.		[LI5] (LI5)
ISrF	<input type="checkbox"/> [Inspection speed] Value of the "inspection" mode frequency reference. This parameter can be accessed if [Inspection] (ISP) is not [No] (nO).	0 à 25 Hz	According to drive rating

(2) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to [Ramp increment] (Inr).

[1.1 LIFT] (LIF-)

Evacuation function

When a lift is stuck between 2 floors due to a power outage, it must be possible to evacuate its occupants within a reasonable period of time. This function requires an emergency power supply to be connected to the drive. This power supply is at a reduced voltage, and only allows a derated operating mode, at reduced speed, but with full torque.

This function requires:

- One logic input to control "evacuation" operation
- Reduction of the voltage monitoring threshold
- An appropriate low speed reference

Following a power outage, the drive can restart without going into [Undervoltage] (USF) fault mode if the corresponding logic input is at active state at the same time.

CAUTION

- This input must not be at active state when the drive is powered from the line supply. To ensure this and also avoid any short-circuits, supply changeover contactors must be used.
- Set this input to 0 before connecting the emergency power supply to the line supply.

Failure to follow these instructions can result in equipment damage.

Code	Name/Description	Adjustment range	Factory setting
L F n -	[LIFT FUNCTIONS] continued		
r F t -	[EVACUATION]		
r F t n 0 L I 1 - - L I 1 4	<input type="checkbox"/> [Evacuation assign.] <input type="checkbox"/> [No] (nO): Function not assigned. <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted. <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12): If VW3A3203 ESIM card has been inserted. <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted. Evacuation is activated when the assigned input is at active state, if the drive is stationary. Evacuation is activated when the assigned input is at inactive state, as soon as the drive stops.		[No] (nO)
r S U	<input type="checkbox"/> [Evacuation Input V.] Minimum permissible AC voltage value of the emergency power supply. This parameter can be accessed if [Evacuation assign.] (rFt) is not [No] (nO).	220 to 320 V	220 V
r S P ()	<input type="checkbox"/> [Evacuation freq.] Value of the "evacuation" mode frequency reference. This parameter can be accessed if [Evacuation assign.] (rFt) is not [No] (nO). The adjustment range is determined by the [Low speed] (LSP) (page 126), [Rated motor freq.] (FrS) page 143 for an asynchronous motor or [Nominal freq sync.] (FrSS) page 149 for a synchronous motor and [Rated motor volt.] (UnS) (page 143) parameters and by [Evacuation Input V.] (rSU) above. Example with an asynchronous motor: • If $LSP < (FrS \times rSU/UnS)$: $rSP \text{ min.} = LSP$, $rSP \text{ max.} = (FrS \times rSU/UnS)$ • If $LSP \geq (FrS \times rSU/UnS)$: $rSP = (FrS \times rSU/UnS)$ With a synchronous motor: Same formula using FrSS in place of FrS and 400 V in place of UnS.		5 Hz



Parameter that can be modified during operation or when stopped

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L F n -	[LIFT FUNCTIONS] continued		
O C C -	[OUTPUT CONTACTOR CMD]		
O C C n O L O 1 - L O 4 r 2 - r 5 d O 1	<input type="checkbox"/> [Out. contactor ass.] Logic output or control relay <input type="checkbox"/> [No] (nO): Function not assigned (in this case, none of the function's parameters can be accessed) <input type="checkbox"/> [LO1] (LO1) to [LO4] (LO4): Logic output (if one or two I/O cards have been inserted, LO1 to LO2 or LO4 can be selected) [R2] (r2) to [R5] (r5): Relay (selection of R2 extended to R3, R4 or R5 if I/O or ESIM cards have been inserted) <input type="checkbox"/> [dO1] (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1) page 191 = [No] (nO).		[dO1] (dO1)
r C A n O L I 1 - - -	<input type="checkbox"/> [Output contact. fdbk] <input type="checkbox"/> [No] (nO): Function inactive. <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...): See the assignment conditions on page 204. The motor starts up when the assigned input or bit changes to inactive state.		[No] (nO)
d b s ()	<input type="checkbox"/> [Delay to motor run] Time delay for: <ul style="list-style-type: none"> Motor control following the sending of a run command Output contactor fault monitoring, if the feedback has been assigned. If the contactor fails to close at the end of the set time, the drive will lock in FCF2 fault mode. This parameter can be accessed if [Out. contactor ass.] (OCC) has been assigned or if [Output contact. fdbk] (rCA) has been assigned. The time delay must be greater than the closing time of the output contactor.	0.05 to 60.00 s	0.15 s
d a s ()	<input type="checkbox"/> [Delay to open cont.] Time delay for output contactor opening command following motor stop. This parameter can be accessed if [Output contact. fdbk] (rCA) has been assigned. The time delay must be greater than the opening time of the output contactor. If it is set to 0, the fault will not be monitored. If the contactor fails to open at the end of the set time, the drive will lock in FCF1 fault mode.	0.00 to 5.00 s	0.10 s



Parameter that can be modified during operation or when stopped.

Half floor

When a lift sets off from floors and half floors, the cycle time for half floors can be too long, as the elevator does not have time to reach full speed before crossing the slowdown limit switch. As a result, the slowdown time is unnecessarily long. The "half floor" function can be used to compensate this phenomenon.

When the former ramp is used

The "half floor" function can be used to compensate this by not triggering slowdown until the speed reaches a preset threshold [Half-floor speed] (HLS) in order that the final part of the path will be the same as for a standard floor.

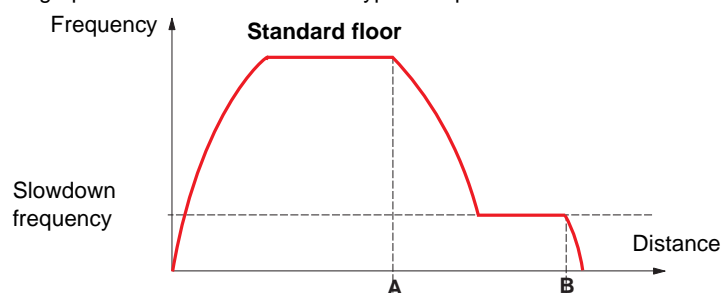
When the new ramp is used

If the [Lift speed mgt.] (LSM) function is assigned, the "half-floor" function is automatically:

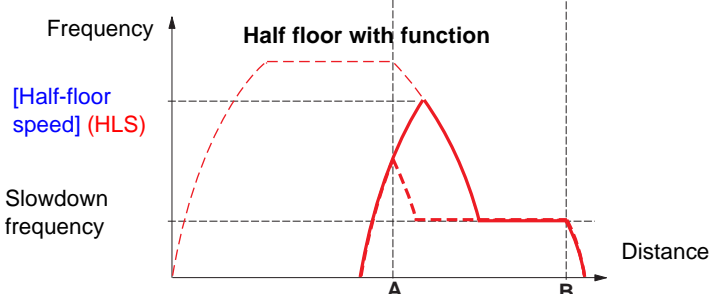
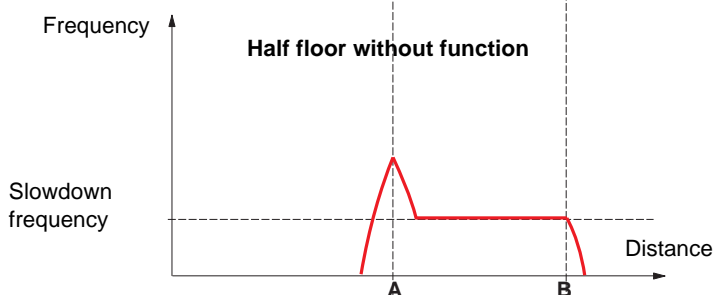
- activated if the high speed reference is lost before the lift has reached its [Lift top speed] (LtS)
- configured according to the distance still to be covered [Deceleration length] (dEL) when the high speed reference is lost.

If the [Lift Speed Mgt] (LSM) function is not assigned, the "half-floor" function must then be configured with the target speed to be reached by the lift before it starts to decelerate.

The graphs below show the various types of operation with an without the function for using the former ramp:



A: Slowdown limit switch reached
B: Stop limit switch reached



The function is only activated if, when the slowdown limit switch is tripped, the motor frequency is less than [Half-floor speed] (HLS). Acceleration is then maintained up to this value prior to slowing down. The final part of the path is identical to that of the standard floor.

Code	Name/Description	Adjustment range	Factory setting
L F n -	[LIFT FUNCTIONS] continued		
H F F -	[HALF FLOOR]		
H L S	<input type="checkbox"/> [Half-floor speed]		[No] (nO)
n O -	<p>Activation and adjustment of the "half floor" function. This function has priority over all speed reference functions (preset speeds, for example) with the exception of those generated via fault monitoring (fallback speed, for example).</p> <p><input type="checkbox"/> [No] (nO): Function inactive.</p> <p><input type="checkbox"/> 0.1 Hz to 500.0 Hz: Activation of the function by adjusting the motor frequency to be reached prior to slowing down.</p>		

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L F n -	[LIFT FUNCTIONS] continued		
F t d -	[FREQ. THRESHOLD]		
F t d	<input type="checkbox"/> [Freq. threshold] Frequency threshold for [Freq.Th.att.] (FtA) function assigned to a relay or a logic output (see page 182), or used by the [PARAM. SET SWITCHING] (MLP-) function, page 252 .	0.0 to 1,600 Hz	[High speed] (HSP)
F 2 d	<input type="checkbox"/> [Freq. threshold 2] Frequency threshold for [Freq. Th. 2 attain.] (F2A) function assigned to a relay or a logic output (see page 182), or used by the [PARAM. SET SWITCHING] (MLP-) function, page 252 .	0.0 to 1,600 Hz	[High speed] (HSP)

(1)Parameter can also be accessed in the [\[1.3 SETTINGS\] \(SEt-\)](#) menu.

[1.1 LIFT] (LIF-)

Deferred stop on thermal alarm

This function prevents the lift stopping between two floors if the drive or motor overheats, by authorizing operation until the next stop. At the next stop, the drive is locked until the thermal state falls back to a value, which undershoots the set threshold by 20%. E.g. A trip threshold set at 80% enables reactivation at 60%.

One thermal state threshold must be defined for the drive, and one thermal state threshold for the motor(s), which will trip the deferred stop.

Code	Name/Description	Adjustment range	Factory setting
L F n -	[LIFT FUNCTIONS] continued		
S A L -	[THERMAL ALARM STOP]		
S A L n O Y E S	<input type="checkbox"/> [Thermal alarm stop] <input type="checkbox"/> [No] (nO) : Function inactive (in this case, the following parameters cannot be accessed) <input type="checkbox"/> [Yes] (YES) : Deferred stop on thermal alarm		[No] (nO)
	<div style="text-align: center;">CAUTION</div> <div> <p>The drive and motor are no longer protected in the event of thermal alarm stops. This invalidates the warranty. Check that the possible consequences do not present any risk. Failure to follow this instruction can result in equipment damage.</p> </div>		
t H R ()	<input type="checkbox"/> [Drv therm. state al] Thermal state threshold of the drive tripping the deferred stop.	0 to 118 %	100 %
t t d ()	<input type="checkbox"/> [Motor therm. level] Thermal state threshold of the motor tripping the deferred stop.	0 to 118 %	100 %
t t d 2 ()	<input type="checkbox"/> [Motor2 therm. level] Thermal state threshold of the motor 2 tripping the deferred stop.	0 to 118 %	100 %
t t d 3 ()	<input type="checkbox"/> [Motor3 therm. level] Thermal state threshold of the motor 3 tripping the deferred stop.	0 to 118 %	100 %

() Parameter that can be modified during operation or when stopped.

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L F n -	[LIFT FUNCTIONS] continued		
O P L -	[OUTPUT PHASE LOSS]		
O P L n O Y E S O A C	<input type="checkbox"/> [Output Phase Loss] <input type="checkbox"/> [No] (nO) : Function inactive. <input type="checkbox"/> [Yes] (YES) : Tripping on OPF fault with freewheel stop. <input type="checkbox"/> [Output cut] (OAC) : No fault triggered, but management of the output voltage in order to avoid an overcurrent when the link with the motor is re-established. Note: [Output Phase Loss] (OPL) is forced to [No] (nO) if [Motor control type] (Ctt) page 137 = [Sync. mot.] (SYn) or [Sync.CL] (FSY) .		[Yes] (YES)
O d t ()	<input type="checkbox"/> [OutPh time detect] Time delay for taking the [Output Phase Loss] (OPL) fault into account.	0.5 to 10.0 s	0.5 s



Parameter that can be modified during operation or when stopped.

Parameter set switching [PARAM. SET SWITCHING]

A set of 1 to 15 parameters from the [1.3 SETTINGS] (SEt-) menu on page 124 can be selected and 2 or 3 different values assigned. These 2 or 3 sets of values can then be switched using 1 or 2 logic inputs or control word bits. This switching can be performed during operation (motor running).

It can also be controlled on the basis of one or two frequency thresholds, whereby each threshold acts as a logic input (0 = threshold not attained, 1 = threshold attained).

	Values 1	Values 2	Values 3
	Parameter 1 Parameter 2 Parameter 3 Parameter 4 Parameter 5 Parameter 6 Parameter 7 Parameter 8 Parameter 9 Parameter 10 Parameter 11 Parameter 12 Parameter 13 Parameter 14 Parameter 15	Parameter 1 Parameter 2 Parameter 3 Parameter 4 Parameter 5 Parameter 6 Parameter 7 Parameter 8 Parameter 9 Parameter 10 Parameter 11 Parameter 12 Parameter 13 Parameter 14 Parameter 15	Parameter 1 Parameter 2 Parameter 3 Parameter 4 Parameter 5 Parameter 6 Parameter 7 Parameter 8 Parameter 9 Parameter 10 Parameter 11 Parameter 12 Parameter 13 Parameter 14 Parameter 15
Input LI or bit or frequency threshold 2 values	0	1	0 or 1
Input LI or bit or frequency threshold 3 values	0	0	1

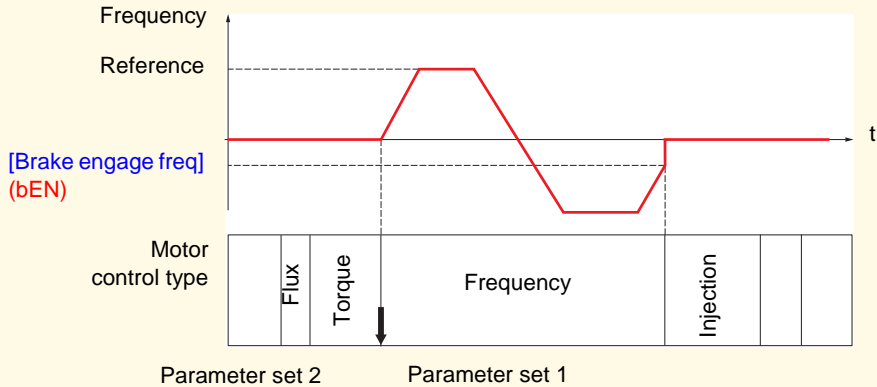
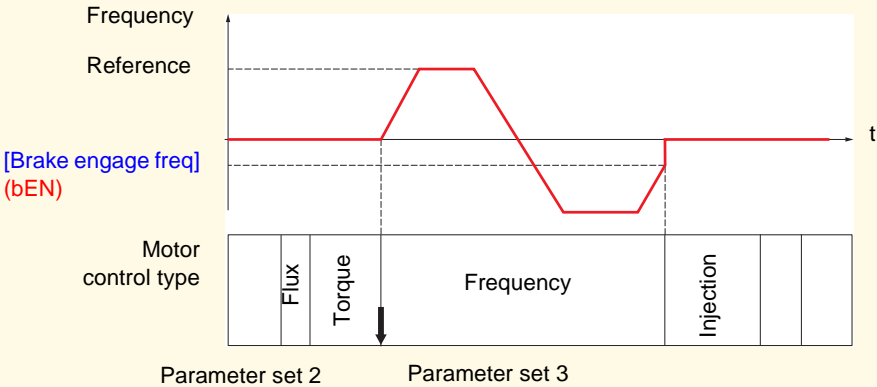


Note: Do not modify the parameters in the [1.3 SETTINGS] (SEt-) menu, because any modifications made in this menu [1.3 SETTINGS] (SEt-) will be lost on the next power-up. The parameters can be adjusted during operation in the [PARAM. SET SWITCHING] (MLP-) menu, on the active configuration.

Note: Parameter set switching cannot be configured from the integrated display terminal.

Parameters can only be adjusted on the integrated display terminal if the function has been configured previously via the graphic display terminal, by PowerSuite or via the bus or communication network. If the function has not been configured, the **MLP-** menu and the **PS1-**, **PS2-**, **PS3-** submenus will not appear.



[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L F n -	[LIFT FUNCTIONS] continued		
Π L P -	[PARAM. SET SWITCHING]		
CH A 1 n O F t A F 2 A t A P	<input type="checkbox"/> [2 Parameter sets] <input type="checkbox"/> [No] (nO) : Function inactive <input type="checkbox"/> [Freq.Th.att.] (FtA) : Switching via [Freq. threshold] (Ftd) page 135. <input type="checkbox"/> [Freq. Th. 2 attain.] (F2A) : Switching via [Freq. threshold 2] (F2d) page 135. <input type="checkbox"/> [Ramp Mode] (tAP) : Switching during the brake sequence. This new assignment can be used, for example, to set high gains on brake release before starting the ramp (useful in lift applications). 		[No] (nO)
L I 1 - - -	<input type="checkbox"/> [LI1] (LI1) ... <input type="checkbox"/> [...] (...) : See the assignment conditions on page 204. Switching 2 parameter sets		
CH A 2 n O F t A F 2 A t A P	<input type="checkbox"/> [3 Parameter sets] <input type="checkbox"/> [No] (nO) : Function inactive <input type="checkbox"/> [Freq.Th.att.] (FtA) : Switching via [Freq. threshold] (Ftd) page 135. <input type="checkbox"/> [Freq. Th. 2 attain.] (F2A) : Switching via [Freq. threshold 2] (F2d) page 135. <input type="checkbox"/> [Ramp Mode] (tAP) : Switching during the brake sequence. This new assignment can be used, for example, to set high gains on brake release before starting the ramp (useful in lift applications). 		[No] (nO)
L I 1 - - -	<input type="checkbox"/> [LI1] (LI1) ... <input type="checkbox"/> [...] (...) : See the assignment conditions on page 204. Switching 3 parameter sets Note: In order to obtain 3 parameter sets, [2 parameter sets] must also be configured.		

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting																																																
L F n -	[LIFT FUNCTIONS] continued																																																		
n L P -	[PARAM. SET SWITCHING] continued																																																		
S P S	<div><input type="checkbox"/> [PARAMETER SELECTION]</div> <div>This parameter can only be accessed on the graphic display terminal if [2 parameter sets] is not [No]. Making an entry in this parameter opens a window containing all the adjustment parameters that can be accessed. Select 1 to 15 parameters using ENT (a tick then appears next to the parameter). Parameter(s) can also be deselected using ENT. E.g. <table><tr><th colspan="2">PARAMETER SELECTION</th></tr><tr><th colspan="2">1.3 SETTINGS</th></tr><tr><td>Ramp increment</td><td><input checked="" type="checkbox"/></td></tr><tr><td>-----</td><td><input type="checkbox"/></td></tr><tr><td>-----</td><td><input type="checkbox"/></td></tr><tr><td>-----</td><td><input checked="" type="checkbox"/></td></tr></table></div>	PARAMETER SELECTION		1.3 SETTINGS		Ramp increment	<input checked="" type="checkbox"/>	-----	<input type="checkbox"/>	-----	<input type="checkbox"/>	-----	<input checked="" type="checkbox"/>	0.5 to 10.0 s	0.5 s																																				
PARAMETER SELECTION																																																			
1.3 SETTINGS																																																			
Ramp increment	<input checked="" type="checkbox"/>																																																		
-----	<input type="checkbox"/>																																																		
-----	<input type="checkbox"/>																																																		
-----	<input checked="" type="checkbox"/>																																																		
P S 1 -	<div><input type="checkbox"/> [SET 1]</div> <div>This parameter can be accessed if at least 1 parameter has been selected in [PARAMETER SELECTION]. Making an entry in this parameter opens a settings window containing the selected parameters in the order in which they were selected. With the graphic display terminal: : <table><tr><td>RDY</td><td>Term</td><td>+0.00Hz</td><td>0A</td></tr><tr><td colspan="4">SET1</td></tr><tr><td>Acceleration:</td><td></td><td>9.51 s</td><td rowspan="5">ENT →</td></tr><tr><td>Deceleration:</td><td></td><td>9.67 s</td></tr><tr><td>Acceleration 2:</td><td></td><td>12.58 s</td></tr><tr><td>Deceleration 2 :</td><td></td><td>13.45 s</td></tr><tr><td>Begin Acc round:</td><td></td><td>2.3 s</td></tr><tr><td>Code</td><td colspan="3">Quick</td></tr></table></div>	RDY	Term	+0.00Hz	0A	SET1				Acceleration:		9.51 s	ENT →	Deceleration:		9.67 s	Acceleration 2:		12.58 s	Deceleration 2 :		13.45 s	Begin Acc round:		2.3 s	Code	Quick			<table><tr><td>RDY</td><td>Term</td><td>+0.00Hz</td><td>0A</td></tr><tr><td colspan="4">Acceleration</td></tr><tr><td colspan="4">9.51 s</td></tr><tr><td colspan="2">Min = 0.1</td><td colspan="2">Max = 999.9</td></tr><tr><td colspan="2"><<</td><td colspan="2">>> Quick</td></tr></table>	RDY	Term	+0.00Hz	0A	Acceleration				9.51 s				Min = 0.1		Max = 999.9		<<		>> Quick		
RDY	Term	+0.00Hz	0A																																																
SET1																																																			
Acceleration:		9.51 s	ENT →																																																
Deceleration:		9.67 s																																																	
Acceleration 2:		12.58 s																																																	
Deceleration 2 :		13.45 s																																																	
Begin Acc round:		2.3 s																																																	
Code	Quick																																																		
RDY	Term	+0.00Hz	0A																																																
Acceleration																																																			
9.51 s																																																			
Min = 0.1		Max = 999.9																																																	
<<		>> Quick																																																	
P S 2 -	<div><input type="checkbox"/> [SET 2]</div> <div>This parameter can be accessed if at least 1 parameter has been selected in [PARAMETER SELECTION]. Procedure identical to [SET 1] (PS1-).</div>																																																		
P S 3 -	<div><input type="checkbox"/> [SET 3]</div> <div>This parameter can be accessed if [3 parameter sets] is not [No] and if at least 1 parameter has been selected in [PARAMETER SELECTION]. Procedure identical to [SET 1] (PS1-).</div>																																																		

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
L F n -	[LIFT FUNCTIONS] continued		
n O I -	[NOISE LEVEL]		
S F r 	<input type="checkbox"/> [Switching freq.] (1)	According to rating	According to rating
	<p>Switching frequency setting.</p> <p>Adjustment range: This can vary between 2.5 and 16 kHz, but the minimum and maximum values, as well as the factory setting, can be limited in accordance with the rating and the configuration of the [Sinus filter] (OFI) and [Motor surge limit] (SUL) parameters, page 161.</p> <p>Adjustment with drive running: If the initial value is greater than or equal to 2.5 kHz, a minimum of 2.5 kHz must be maintained while running. Adjustment with the drive stopped: No restrictions.</p> <p> Note: In the event of excessive temperature rise, the drive will automatically reduce the switching frequency and reset it once the temperature returns to normal.</p> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>CAUTION</p> <p>On ATV71LD10N4 drives, if the RFI filters are disconnected (operation on an IT system), the drive's switching frequency must not exceed 4 kHz. Failure to follow these instructions can result in equipment damage.</p> </div>		
n r d n O Y E S	<input type="checkbox"/> [Noise reduction]	<input type="checkbox"/> [No] (nO): Fixed frequency. <input type="checkbox"/> [Yes] (YES): Frequency with random modulation. Random frequency modulation prevents any resonance, which may occur at a fixed frequency.	
		<input type="checkbox"/> [Yes] (YES)	

(1) Parameter can also be accessed in the [\[1.3 SETTINGS\] \(SEt-\)](#) menu and [\[1.4 MOTOR CONTROL\] \(drC-\)](#) menu.



Parameter that can be modified during operation or when stopped.

Preset speeds

The preset speeds have no effect if the new lift ramp is used.

2, 4, 8 or 16 speeds can be preset, requiring 1, 2, 3 or 4 logic inputs respectively.




Note: You must configure 2 and 4 speeds in order to obtain 4 speeds.
You must configure 2, 4 and 8 speeds in order to obtain 8 speeds.
You must configure 2, 4, 8, and 16 speeds in order to obtain 16 speeds.

Combination table for preset speed inputs

16 speeds LI (PS16)	8 speeds LI (PS8)	4 speeds LI (PS4)	2 speeds LI (PS2)	Speed reference
0	0	0	0	Reference (1)
0	0	0	1	SP2
0	0	1	0	SP3
0	0	1	1	SP4
0	1	0	0	SP5
0	1	0	1	SP6
0	1	1	0	SP7
0	1	1	1	SP8
1	0	0	0	SP9
1	0	0	1	SP10
1	0	1	0	SP11
1	0	1	1	SP12
1	1	0	0	SP13
1	1	0	1	SP14
1	1	1	0	SP15
1	1	1	1	SP16

(1) See the diagram on page [198](#): Reference 1 = (SP1).

[1.1 LIFT] (LIF-)

Code	Name/Description	Adjustment range	Factory setting
P55 -	[PRESET SPEEDS]  Note: This function cannot be used with certain other functions. Follow the instructions on page 210 .		
P52 nD L I I - - -	<input type="checkbox"/> [2 preset speeds] <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...): See the assignment conditions on page 204 .		[No] (nO)
P54 nD L I I - - -	<input type="checkbox"/> [4 preset speeds] <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...): See the assignment conditions on page 204 . To obtain 4 speeds you must also configure 2 speeds.		[No] (nO)
P58 nD L I I - - -	<input type="checkbox"/> [8 preset speeds] <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...): See the assignment conditions on page 204 . To obtain 8 speeds you must also configure 2 and 4 speeds.		[No] (nO)
P516 nD L I I - - -	<input type="checkbox"/> [16 preset speeds] <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...): See the assignment conditions on page 204 . To obtain 16 speeds you must also configure 2, 4 and 8 speeds.		[No] (nO)

[1.1 LIFT] (LIF-)

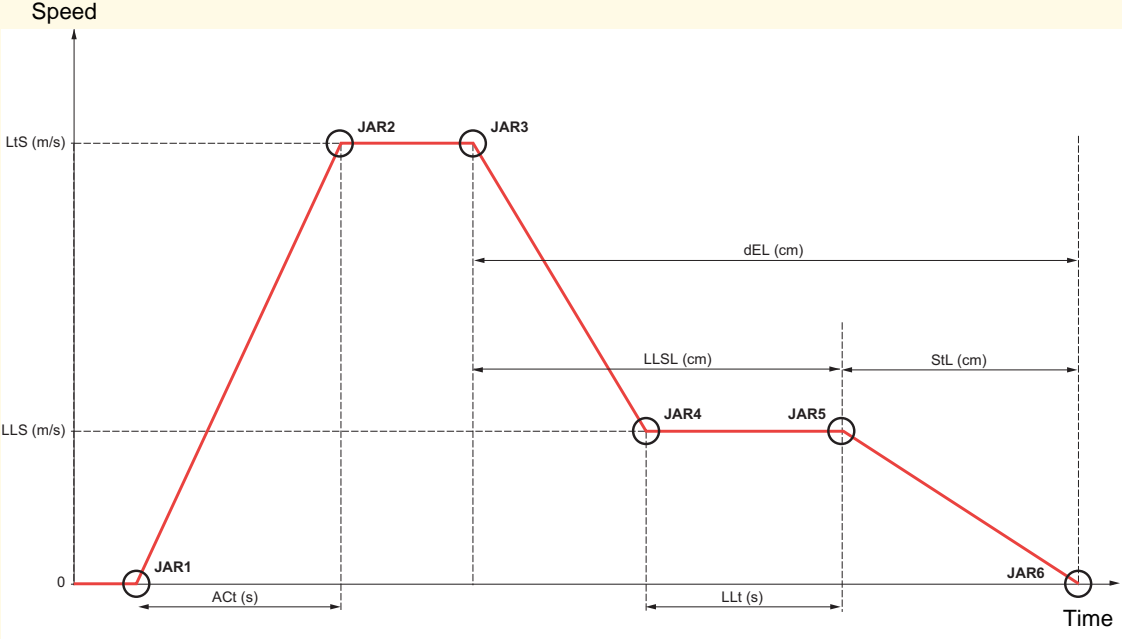
Code	Name/Description	Adjustment range	Factory setting
	[PRESET SPEEDS] (continued)		
SP 2 ()	<input type="checkbox"/> [Preset speed 2] (1)	0 to 1600 Hz	10 Hz
SP 3 ()	<input type="checkbox"/> [Preset speed 3] (1)		15 Hz
SP 4 ()	<input type="checkbox"/> [Preset speed 4] (1)		20 Hz
SP 5 ()	<input type="checkbox"/> [Preset speed 5] (1)		25 Hz
SP 6 ()	<input type="checkbox"/> [Preset speed 6] (1)		30 Hz
SP 7 ()	<input type="checkbox"/> [Preset speed 7] (1)		35 Hz
SP 8 ()	<input type="checkbox"/> [Preset speed 8] (1)		40 Hz
SP 9 ()	<input type="checkbox"/> [Preset speed 9] (1)		45 Hz
SP 10 ()	<input type="checkbox"/> [Preset speed 10] (1)		50 Hz
SP 11 ()	<input type="checkbox"/> [Preset speed 11] (1)		55 Hz
SP 12 ()	<input type="checkbox"/> [Preset speed 12] (1)		60 Hz
SP 13 ()	<input type="checkbox"/> [Preset speed 13] (1)		70 Hz
SP 14 ()	<input type="checkbox"/> [Preset speed 14] (1)		80 Hz
SP 15 ()	<input type="checkbox"/> [Preset speed 15] (1)		90 Hz
SP 16 ()	<input type="checkbox"/> [Preset speed 16] (1)		100 Hz
The appearance of these [Preset speed x] (SPx) parameters is determined by the number of speeds configured.			

(1)Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

() Parameter that can be modified during operation or when stopped.

[1.1 LIFT] (LIF-)

The parameters in this menu are read-only.

Code	Name/Description
LND -	[MONITORING]
dDt	<input type="checkbox"/> [Travel distance] km
ESP	<input type="checkbox"/> [Lift Speed] m/s
rFr	<input type="checkbox"/> [Output frequency] Hz
LCr	<input type="checkbox"/> [Motor current] A
nDt	<input type="checkbox"/> [Number of travels] In thousands
LLSL	<input type="checkbox"/> [Lenght in LLS] Measure in cm of the distance crossed with a speed reference [Lift leveling speed] (LLS) . 
brn	<input type="checkbox"/> [Pre-Torque Current] Level of current needed during the last brake opening, in Amps.
PUC I	<input type="checkbox"/> [Rlbk angl. variation] level of rollback measured during last brake opening.
EnJ	<input type="checkbox"/> [IGBT alarm number]

Encoder selection guide

Introduction

An encoder must be used with a synchronous motor for nominal operation.

The encoder is generally selected by the motor manufacturer. However, the ATV LIFT allows the following encoders to be used:

- Incremental
- SinCos
- SinCos Hiperface
- SinCos EnDat
- SSI
- Resolver
- Absolute SinCos

With an asynchronous motor, the use of an encoder is not essential. Everything depends on the performance required by the lift manufacturer.

The use of an encoder is recommended for

- High car speeds (more than 1.5 m/s)
- Highly reversible machines
- Systems where precise stopping is critical
- Greater comfort when the brake is released and applied

Selection criteria

Where the drive is concerned, the selection criteria for the encoder are

Immunity to EMC interference

- Analog transmission encoders (resolver, SinCos, incremental, SinCos Hiperface) are sensitive to EMC interference.
- Digital transmission encoders (SSI, EnDat) are more robust.

Absolute/relative

An absolute encoder has an image of the position of the rotor, whereas a relative encoder only has information on the rotor speed. The only consequences for the drive are that, with a synchronous motor, an angle test has to be performed on each power-up with the relative encoder, whereas an absolute encoder requires only one angle test on the first power-up.

Resolution

Depending on the encoder technology, the drive can "interpolate" the encoder signals to obtain a better speed resolution than that indicated by the encoder.

Examples include

- With a 4096 line (2^{12}) incremental encoder, the drive can have a resolution 4 times more accurate, in other words 16384 points (2^{14}).
- With a SinCos encoder having the same resolution (4096 lines, (2^{12})), the drive can have a resolution 1000 times more accurate, in other words 4,194,304 points (2^{22}).

The encoder resolution has a direct effect on rollback management. Depending on the desired comfort level, an encoder with more or less precision can be used.

The following data are given for guidance. Comfort depends on many parameters (type of block and tackle, mechanism, nominal speed, reversibility of the machine, type of brake, use of an external weight sensor, etc.).

[1.1 LIFT] (LIF-)

Encoder selection guide (continued)

However, it is considered that at least 16 bits of useful resolution for the drive (the green range) are necessary for an acceptable comfort level in all loading conditions without using an external weight sensor. Below this value, discomfort may be felt.

Speed				weight
	Medium resolution required	High resolution required	High resolution required	
3 m/s				
1 m/s	Low resolution sufficient	Medium resolution required	Medium resolution required	
	Low resolution sufficient	Low resolution sufficient	Medium resolution required	
		200 kg	800 kg	

	Encoder resolution		Resolution used by the ATV LIFT for different encoder technologies						
	No. of bits	No. of lines	EnDat SSI		SinCos SinCos Hiperface SinCos EnDat Absolute SinCos		Incremental		Resolveur (number of poles)
			No. of bits	Points used	No. of bits	Points used	No. of bits		
low resolution	1	2			11	2048			
low resolution	2	4			12	4096			
low resolution	3	8			13	8192			
low resolution	4	16			14	16384			
low resolution	5	32			15	32768			
low resolution	6	64			16	65536			
low resolution	7	128			17	131072			
low resolution	8	256			18	262144	10	1024	
low resolution	9	512			19	524288	11	2048	
low resolution	10	1024			20	1048576	12	4096	
low resolution	11	2048			21	2097152	13	8192	
low resolution	12	4096			22	4194304	14	16384	
low resolution	13	8192	13	8192	22	4194304	15	32768	13 (2 poles; 1 pp)
medium resol.	14	16384	14	16384	22	4194304	16	65536	14 (4 or 6 poles; 2 or 3 pp)
medium resol.	15	32768	15	32768	22	4194304	16	65536	15 (8 poles; 4 pp)
medium resol.	16	65536	16	65536	22	4194304	16	65536	
high resolution	17	131072	17	131072	22	4194304	16	65536	
high resolution	18	262144	18	262144	22	4194304	16	65536	
high resolution	19	524288	19	524288	22	4194304	16	65536	
high resolution	20	1048576	20	1048576	22	4194304	16	65536	
high resolution	21	2097152	21	2097152	22	4194304	16	65536	
high resolution	22	4194304	22	4194304	22	4194304	16	65536	

Encoder selection guide (continued)

Summary

The table below summarizes the main criteria for the selection of an encoder:

Encoder	Transmission type	Absolute/relative	Typical resolution
Incremental	Analog	Relative	8192 units
Resolver	Analog	Absolute	8 poles
SinCos / Absolute SinCos	Analog	Relative	2048 lines
SinCos Hiperface	Analog + digital on power-up	Absolute	Not available on the lift market
EnDat	Digital	Absolute	Endat 13 bit with SinCos 1024 line
SSI	Digital	Absolute	Not available on the lift market

Operation without an encoder

The ATV LIFT provides for open-loop operation with a synchronous motor, which can be used in degraded mode.

This configuration can be used for:

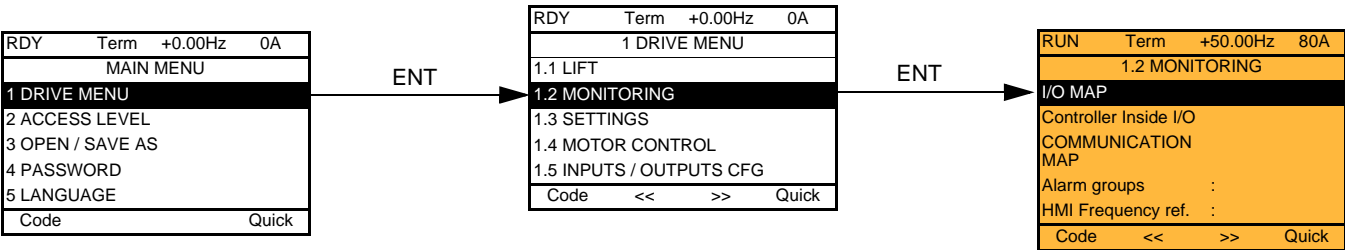
- Performing the encoder test
- Evacuating persons if the encoder is faulty

However, the brake sequence is not compatible with open-loop operation with a synchronous motor. Stopping is therefore carried out in freewheel mode, as in the inspection mode (safety operation).

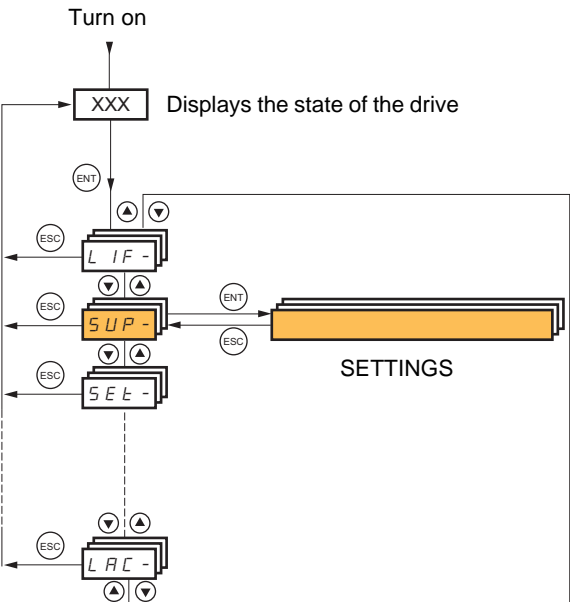
Diagnostics and troubleshooting

Problem	Probable cause	Remedy
Stop length incorrect	<ul style="list-style-type: none"> The [Nominal car speed] (CSP) is incorrect The [Stop length] (StL) is incorrect 	<ul style="list-style-type: none"> Using a tachometer, measure the actual speed of the car cable when the motor rotates at its nominal speed (NSP or NSPS) Check that the [Nominal car speed] (CSP) is correct for the sheave radius (in metres) and the nominal motor speed: <ul style="list-style-type: none"> Ratio 1:1 $CSP [m/s] = 6.28 \times \text{Sheave radius [m]} \times NSPS [rpm]/60$ Ratio 1:2 $CSP [m/s] = 3.14 \times \text{Sheave radius [m]} \times NSPS [rpm]/60$ Adjust StL to the value measured in the lift shaft Reposition stop flags in the lift shaft at the stop length StL
Vibration during travel	<ul style="list-style-type: none"> Inertia estimated incorrectly Special application (special winch, belt type cable, etc.) 	<ul style="list-style-type: none"> Check that the payload [Capacity of lift] (LCA) page 56 is entered correctly Check that the lift is properly balanced (at half load, the current when ascending should be the same as the current when descending). Manually re-enter the following values: <ul style="list-style-type: none"> Weight of counterweight [Counterweight] (CtM) Weight of empty car [Car weight] (CMA) Re-enter FLG and StA (see speed loop optimization, page 68)
The lift leveling time is not as configured in LLt	<ul style="list-style-type: none"> The slowdown indicator is not positioned at the distance configured in [Deceleration length] (dEL). 	<ul style="list-style-type: none"> Adjust [Deceleration length] (dEL), page 60, to the value measured in the lift shaft Reposition the slowdown indicators in the lift shaft at the [Deceleration length] (dEL).
Drive in tNF state	<ul style="list-style-type: none"> It has not been possible to perform tUN correctly. 	<ul style="list-style-type: none"> Consider forcing the motor contactors if the installation requires it.
The car jerks when the brake is released		<ul style="list-style-type: none"> Activate the rollback function. See page 88. Deactivate the motor phase loss detection
[DB unit sh. circuit]	<ul style="list-style-type: none"> Short-circuit output from braking unit Braking unit not connected 	<ul style="list-style-type: none"> Check the wiring of the braking unit and the resistor Check the braking resistor
[Precharge]	<ul style="list-style-type: none"> Precharge relay control fault or damaged precharge resistor 	<ul style="list-style-type: none"> Turn the drive off and then back on again. Check the internal connections.
[Thyr. soft charge]	<ul style="list-style-type: none"> DC bus charging fault (thyristors) 	<ul style="list-style-type: none"> Inspect/repair the drive.
[Encoder coupling]	<ul style="list-style-type: none"> Break in encoder's mechanical coupling 	<ul style="list-style-type: none"> Check the encoder's mechanical coupling.
In close loop, during the first run order, the drive stays in [Current Limitation] (CLI) and stays to 0 Hz	<ul style="list-style-type: none"> encoder signal reversed 	<ul style="list-style-type: none"> Reverse the direction of rotation of the encoder with the parameter [Coder rotation inv.] (EnRI) Do an encoder check. See page 141.
The drive is locked in (nSt) or (nLP).	<ul style="list-style-type: none"> when an encoder board VW3A3409 is used. 	<ul style="list-style-type: none"> Complete the encoder board settings.

With graphic display terminal:

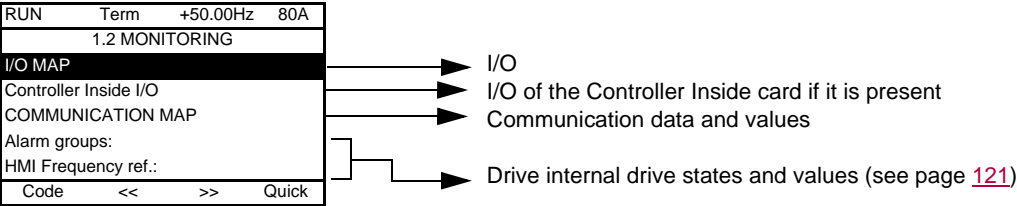


With integrated display terminal:

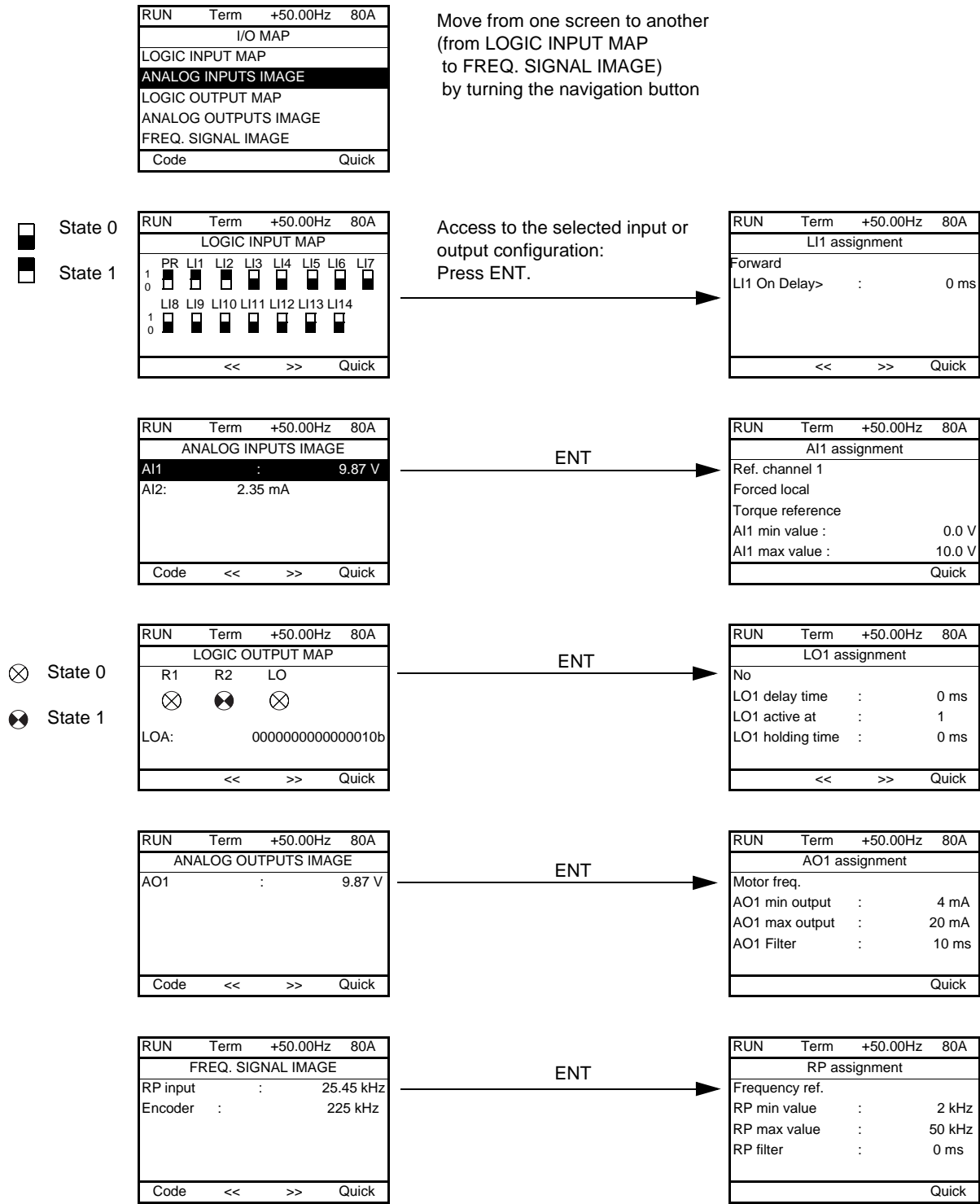


With graphic display terminal

This menu can be used to display the inputs/outputs, the drive internal states and values, and the communication data and values.



I/O



With graphic display terminal

Controller Inside card I/O

RUN	Term	+50.00Hz	80A
Controller Inside I/O			
C. INSIDE CARD LI MAP			
Control. Inside AI MAP			
Control. INSIDE LO MAP			
Control. Inside AO Map			
Code		Quick	

Move from one screen to another
(from C. INSIDE CARD LI MAP
to CONTROL. INSIDE AO MAP)
by turning the navigation button

- ☐ State 0
- ☐ State 1

RUN	Term	+50.00Hz	80A
C. INSIDE CARD LI MAP			
1	LI51	LI52	LI53
0	LI54	LI55	LI56
	LI57	LI58	
1	LI59	LI60	
0			
<<		>>	
		Quick	

RUN	Term	+50.00Hz	80A
Control. Inside AI MAP			
AI51 : 0 mA			
AI52 : 9.87 V			
Code		<< >> Quick	

ENT

RUN	Term	+50.00Hz	80A
AI51			
0 mA			
Min = 0.001		Max = 20,000	
<<		>> Quick	

- ☐ State 0
- ☐ State 1

RUN	Term	+50.00Hz	80A
Control. INSIDE LO MAP			
1	LO51	LO52	LO53
0	LO54	LO55	LO56
<<		>>	
		Quick	

RUN	Term	+50.00Hz	80A
Control. Inside AO Map			
AO51 : 0 mA			
AO52 : 9.87 V			
Code		<< >> Quick	

ENT

RUN	Term	+50.00Hz	80A
AO51			
0 mA			
Min = 0.001		Max = 20,000	
<<		>> Quick	

With graphic display terminal
Communication

RUN	Term	+50.00Hz	80A
COMMUNICATION MAP			
Command Channel :		Modbus	
Cmd value :		ABCD Hex	
Active ref. channel:		CANopen	
Frequency ref. :		- 12.5 Hz	
ETA status word:		2153 Hex	
Code		Quick	
W3141 : F230 Hex			
W2050 : F230 Hex			
W4325 : F230 Hex			
W0894 : F230 Hex			
COM. SCANNER INPUT MAP _____			
COM SCAN OUTPUT MAP _____			
CMD. WORD IMAGE _____			
FREQ. REF. WORD MAP _____			
MODBUS NETWORK DIAG			
MODBUS HMI DIAG			
CANopen MAP			
PLC CARD SCANNER			

[COMMUNICATION MAP] indicates the types of bus used for control or reference, the corresponding command and reference values, the status word, the words selected in the [DISPLAY CONFIG.] menu, etc.
The display format (hexadecimal or decimal) can be configured in the [DISPLAY CONFIG.] menu.

RUN	Term	+50.00Hz	80A
COM. SCANNER INPUT MAP			
Com Scan In1 val.:		0	
Com Scan In2 val.:		0	
Com Scan In3 val.:		0	
Com Scan In4 val.:		0	
Com Scan In5 val.:		0	
Code		Quick	
Com Scan In6 val.:		0	
Com Scan In7 val.:		0	
Com Scan In8 val.:		0	

RUN	Term	+50.00Hz	80A
COM SCAN OUTPUT MAP			
Com Scan Out1 val.:		0	
Com Scan Out2 val.:		0	
Com Scan Out3 val.:		0	
Com Scan Out4 val.:		0	
Com Scan Out5 val.:		0	
Code		Quick	
Com Scan Out6 val.:		0	
Com Scan Out7 val.:		0	
Com Scan Out8 val.:		0	

RUN	Term	+50.00Hz	80A
CMD. WORD IMAGE			
Modbus cmd.:		0000 Hex.	
CANopen cmd.:		0000 Hex.	
COM. card cmd. :		0000 Hex.	
C Inside Card Cmd.:		0000 Hex.	
Code		Quick	

RUN	Term	+50.00Hz	80A
FREQ. REF. WORD MAP			
Modbus ref.:		0.0 Hz	
CANopen ref.:		0.0 Hz	
Com. card ref. :		0.0 Hz	
C Inside Card Ref.:		0.0 Hz	
Code		Quick	

[COM. SCANNER INPUT MAP] and [COM SCAN OUTPUT MAP]:
Visualization of registers exchanged periodically (8 input and 8 output) for integrated Modbus and for fieldbus cards.

With graphic display terminal
Communication (continued)






RUN	Term	+50.00Hz	80A
COMMUNICATION MAP			
Command Channel :		Modbus	
Cmd value :		ABCD Hex	
Active ref. channel:		CANopen	
Frequency ref. :		- 12.5 Hz	
ETA status word:		2153 Hex	
Code		Quick	
W3141 : F230 Hex			
W2050 : F230 Hex			
W4325 : F230 Hex			
W0894 : F230 Hex			
COM. SCANNER INPUT MAP			
COM SCAN OUTPUT MAP			
CMD. WORD IMAGE			
FREQ. REF. WORD MAP			
MODBUS NETWORK DIAG _____			
MODBUS HMI DIAG _____			
CANopen MAP _____			
PLC CARD SCANNER			

The state of the LEDs, the periodic data, the address, the speed, and the format, etc, is given for each bus.

- ⊗ LED off
- ⊙ LED on

RUN	Term	+50.00Hz	80A
MODBUS NETWORK DIAG			
COM LED :		⊗	
Mb NET frames nb.			
Mb NET CRC errors			
Code		Quick	

RUN	Term	+50.00Hz	80A
MODBUS HMI DIAG			
COM LED :		⊙	
Mb HMI frames nb.			
Mb HMI CRC errors			
Code		Quick	

Communication via CANopen			
RUN	Term	+50.00Hz	80A
CANopen MAP			
RUN LED:			
ERR LED:			
PDO1 IMAGE			
PDO2 IMAGE			
PDO3 IMAGE			
Code		Quick	
Canopen NMT state			
Number of TX PDO		0	
Number of RX PDO		0	
Error code		0	
RX Error Counter		0	
TX Error Counter		0	

PDO images are only visible if CANopen has been enabled (address other than OFF) and if the PDOs are active.

PDO configuration using the network tool.
Some PDOs cannot be used.

RUN	Term	+50.00Hz	80A
PDO1 IMAGE			
Received PDO1-1 : FDBA Hex			
Received PDO1-2			
Received PDO1-3			
Received PDO1-4			
Transmit PDO1-1 : FDBA Hex			
Code		Quick	
Transmit PDO1-2			
Transmit PDO1-3			
Transmit PDO1-4			

RUN	Term	+50.00Hz	80A
PDO2 IMAGE			
Received PDO2-1 : FDBA Hex			
Received PDO2-2			
Received PDO2-3			
Received PDO2-4			
Transmit PDO2-1 : FDBA Hex			
Code		Quick	
Transmit PDO2-2			
Transmit PDO2-3			
Transmit PDO2-4			

RUN	Term	+50.00Hz	80A
PDO3 IMAGE			
Received PDO3-1 : FDBA Hex			
Received PDO3-2			
Received PDO3-3			
Received PDO3-4			
Transmit PDO3-1 : FDBA Hex			
Code		Quick	
Transmit PDO3-2			
Transmit PDO3-3			
Transmit PDO3-4			

With graphic display terminal
Communication (continued)

RUN	Term	+50.00Hz	80A
COMMUNICATION MAP			
Command Channel :		Modbus	
Cmd value :		ABCD Hex	
Active ref. channel:		CANopen	
Frequency ref.:		- 12.5 Hz	
ETA status word:		2153 Hex	
Code		Quick	
W3141 : F230 Hex			
W2050 : F230 Hex			
W4325 : F230 Hex			
W0894 : F230 Hex			
COM. SCANNER INPUT MAP			
COM SCAN OUTPUT MAP			
CMD. WORD IMAGE			
FREQ. REF. WORD MAP			
MODBUS NETWORK DIAG			
MODBUS HMI DIAG			
CANopen MAP			
PLC CARD SCANNER			

RUN	Term	+50.00Hz	80A
PLC CARD SCANNER			
Input scanner			
Output scanner			
Code		Quick	

RUN	Term	+50.00Hz	80A
Input scanner			
Prg.card. scan in 1:		0	
Prg.card. scan in 2:		0	
Prg.card. scan in 3:		0	
Prg.card. scan in 4:		0	
Prg.card. scan in 5:		0	
Code		Quick	
Prg.card. scan in 6:		0	
Prg.card. scan in 7:		0	
Prg.card. scan in 8:		0	

RUN	Term	+50.00Hz	80A
Output scanner			
PLC card.scan Out1:		0	
PLC card.scan Out2:		0	
PLC card.scan Out3:		0	
PLC card.scan Out4:		0	
PLC card.scan Out5:		0	
Code		Quick	
PLC card.scan Out6:		0	
PLC card.scan Out7:		0	
PLC card.scan Out8:		0	

[Input scanner] and [Output scanner]:
Visualization of registers exchanged periodically (8 input and 8 output).

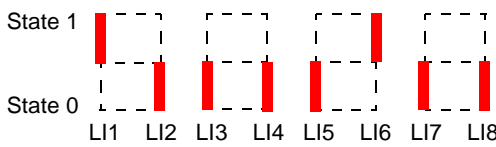
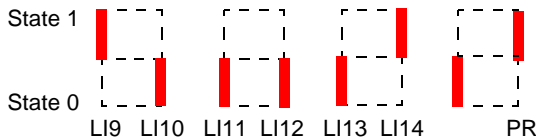
[1.2 MONITORING] (SUP-)

With graphic display terminal: Drive internal states and values

Name/Description	
[Alarm groups] (ALGr)	Current alarm group numbers
[HMI Frequency ref.] (LFr)	in Hz. Frequency reference via the graphic display terminal (can be accessed if the function has been configured).
[HMI torque ref.] (Ltr)	as a % of the rated torque. Torque reference via graphic display terminal.
[Multiplying coeff.] (MFr)	as a % (can be accessed if [Multiplier ref. -] (MA2,MA3) page 216 has been assigned)
[Frequency ref.] (FrH)	in Hz
[Torque reference] (trr)	as a % of the rated torque (can be accessed if the function has been configured)
[Output frequency] (rFr)	in Hz
[Measured output fr.] (MMF)	in Hz: The measured motor speed is displayed if an encoder card has been inserted, otherwise 0 appears.
[Pulse in. work. freq.] (FqS)	in Hz: Frequency of the "Pulse input" input used by the [FREQUENCY METER] (FqF-) function, page 279.
[Motor current] (LCr)	in A
[ENA avg speed] (AUS)	in Hz: The parameter can be accessed if [ENA system] (EnA) = [Yes] (YES) (see page 159)
[Lift speed] (ESP)	in m/s
[Motor speed] (SPd)	in rpm
[Motor voltage] (UOP)	in V
[Motor power] (OPr)	as a % of the rated power
[Motor torque] (Otr)	as a % of the rated torque
[Mains voltage] (ULn)	in V. Line voltage from the point of view of the DC bus, motor running or stopped.
[Travel distance] (dOt)	in km
[Number of travels] (nOt)	Number of travels in thousands
[Motor thermal state] (tHr)	as a %
[Drv.thermal state] (tHd)	as a %
[DBR thermal state] (tHb)	as a % (can only be accessed on high rating drives)
[Consumption] (APH)	in Wh, kWh or MWh (accumulated consumption)
[Run time] (rH)	in seconds, minutes or hours (length of time the motor has been switched on)
[Power on time] (PtH)	in seconds, minutes or hours (length of time the drive has been switched on)
[IGBT alarm counter] (tAC)	in seconds (length of time the "IGBT temperature" alarm has been active)
[Date/Time] (CLO)	Current date and time generated by the Controller Inside card (can be accessed if the card has been inserted)
[- - - -] (o02)	Words generated by the Controller Inside card (can be accessed if the card has been inserted)
to	
[- - - -] (o06)	
[Config. active] (CnFS)	Active configuration [Config. n°0, 1 or 2]
[Utilised param. set] (CFPS)	[Set n°1, 2 or 3] (can be accessed if parameter switching has been enabled, see page 252)
[ALARMS] (ALr-)	List of current alarms. If an alarm is present, a ✓ appears.
[OTHER STATE] (SSt-)	List of secondary states:
	<ul style="list-style-type: none"> - [In motor fluxing] (FLX): In motor fluxing - [PTC1 alarm] (PtC1): Probe alarm 1 - [PTC2 alarm] (PtC2): Probe alarm 2 - [LI6=PTC alarm] (PtC3): LI6 = PTC probe alarm - [Fast stop in prog.] (FSt): Fast stop in progress - [Current Th. attained] (CtA): Current threshold attained ([Current threshold] (Ctd) page 134) - [Freq. Th. attained] (FtA): Frequency threshold attained ([Freq. threshold] (Ftd) page 135) - [Freq. Th. 2 attained] (F2A): 2nd frequency threshold attained ([Freq. threshold 2] (F2d) page 135) - [Frequency ref. att.] (SrA): Frequency reference attained - [Motor th. state att.] (tSA): Motor 1 thermal state attained - [External fault alarm] (EtF): External fault alarm - [Auto restart] (AUtO): Automatic restart in progress - [Remote] (FtL): Line mode control - [Auto-tuning] (tUn): Performing auto-tuning - [Undervoltage] (USA): Undervoltage alarm - [Cnfg.1 act.] (CnF1): Configuration 1 active - [Cnfg.2 act.] (CnF2): Configuration 2 active - [HSP attained] (FLA): High speed attained - [Load slipping] (AnA): Slipping alarm - [Set 1 active] (CFP1): Parameter set 1 active - [Set 2 active] (CFP2): Parameter set 2 active - [Set 3 active] (CFP3): Parameter set 3 active - [In braking] (brS): Drive braking - [DC bus loading] (dbL): DC bus charging - [Forward] (MFrd): Motor running forward - [Reverse] (MrrS): Motor running in reverse - [High torque alarm] (ttHA): Motor torque higher than high threshold [High torque thd.] (ttH) page 134. - [Low torque alarm] (ttLA): Motor torque less than low threshold [Low torque thd.] (ttL) page 134. - [Freq. meter Alarm] (FqLA): Measured speed threshold attained: [Pulse warning thd.] (FqL) page 135.

With integrated display terminal

This menu can be used to display the drive inputs, states and internal values.

Code	Name/Description	Adjustment range	Factory setting
I 0 7 -	I/O MAP		
L 1 A -	Logic input functions		
L 1 A to L 1 4 A	Can be used to display the functions assigned to each input. If no functions have been assigned, nO is displayed. Use the ▲ and ▼ arrows to scroll through the functions. If a number of functions have been assigned to the same input, check that they are compatible.		
L 1 5 1	State of logic inputs LI1 to LI8		
	Can be used to visualize the state of logic inputs LI1 to LI8 (display segment assignment: high = 1, low = 0) <div> <p>State 1</p>  <p>State 0</p> <p>LI1 LI2 LI3 LI4 LI5 LI6 LI7 LI8</p> </div> <p>Example above: LI1 and LI6 are at 1; LI2 to LI5, LI7 and LI8 are at 0.</p>		
L 1 5 2	State of logic inputs LI9 to LI14 and Power Removal		
	Can be used to visualize the state of logic inputs LI9 to LI14 and PR (Power Removal) (display segment assignment: high = 1, low = 0) <div> <p>State 1</p>  <p>State 0</p> <p>LI9 LI10 LI11 LI12 LI13 LI14 PR</p> </div> <p>Example above: LI9 and LI14 are at 1, LI10 to LI13 are at 0 and PR (Power Removal) is at 1.</p>		
A 1 A -	Analog input functions		
A 1 1 A A 1 2 A A 1 3 A A 1 4 A	Can be used to display the functions assigned to each input. If no functions have been assigned, nO is displayed. Use the ▲ and ▼ arrows to scroll through the functions. If a number of functions have been assigned to the same input, check that they are compatible.		

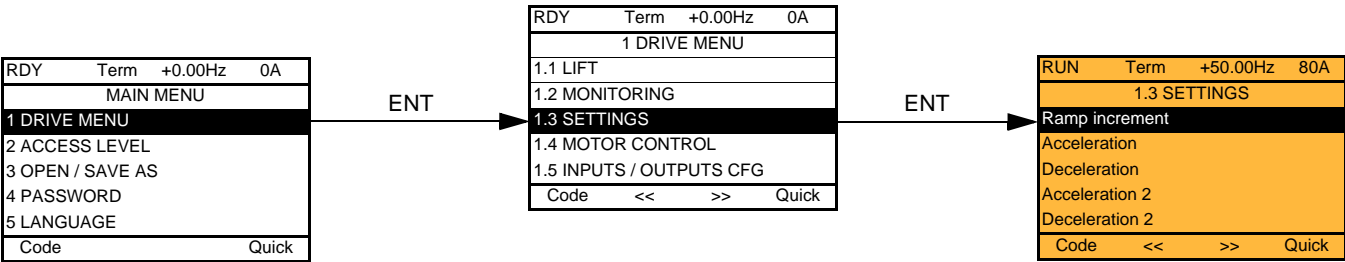
[1.2 MONITORING] (SUP-)

With integrated display terminal: Drive internal states and values

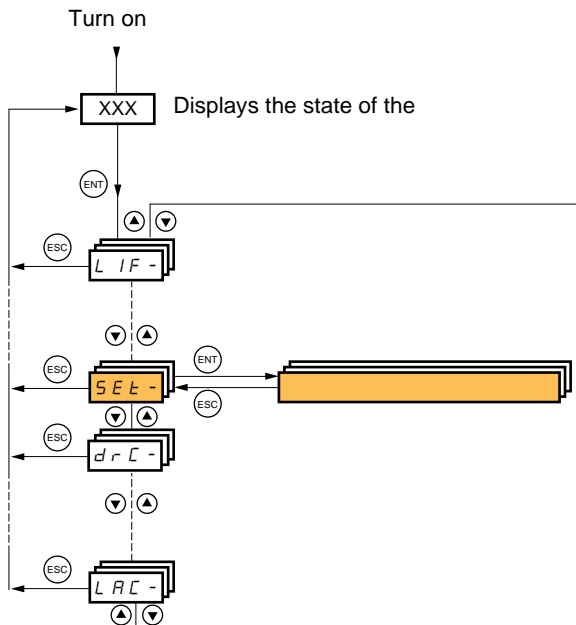
Code	Name/Description	Unit
ALGr	Alarm groups: Current alarm group numbers	
MF	Multiplication coefficient (can be accessed if [Multiplier ref. -] (MA2,MA3) page 216 has been assigned)	%
FfH	Frequency ref.	Hz
Tr	Torque reference: Can be accessed if the function has been configured	%.
rFr	Output frequency	Hz
nnF	The measured motor speed is displayed if an encoder card has been inserted, otherwise 0 appears.	Hz
FqS	Frequency of the "Pulse input" used by the [FREQUENCY METER] (FqF-) function, page 279 .	Hz
LCr	Motor current	A
AUS	ENA avg SPEED: This parameter can be accessed if EnA = YES (see page 159)	Hz
ESP	Lift speed	m/s
SPd	Motor speed	rpm
UOP	Motor voltage	V
OPr	Motor power	%
OTr	Motor torque	%
ULn	Line voltage: Line voltage from the point of view of the DC bus, motor running or stopped.	V
dOt	Travel distance	km
nOt	Number of travels	10 ³
tHr	Motor thermal state	%
tHd	Drv thermal state	%
tHb	DBR thermal state: Can be accessed on high rating drives only.	%
APH	Consumption	Wh, kWh or MWh
rEtH	Run time: Length of time the motor has been turned on	seconds, minutes or hours
PtH	Power on time: Length of time the drive has been turned on	
tAc	IGBT alarm counter: Length of time the "IGBT temperature" alarm has been active	seconds
CLD-	tIME, dAY: Current date and time generated by the Controller Inside card (can be accessed if the card has been inserted)	
o02	Word generated by the Controller Inside card (can be accessed if the card has been inserted)	
o03	Word generated by the Controller Inside card (can be accessed if the card has been inserted)	
o04	Word generated by the Controller Inside card (can be accessed if the card has been inserted)	
o05	Word generated by the Controller Inside card (can be accessed if the card has been inserted)	
o06	Word generated by the Controller Inside card (can be accessed if the card has been inserted)	
CnFS	Config. active: CnF0, 1 or 2 (can be accessed if motor or configuration switching has been enabled, see page 256)	
CFPS	Utilised param. set: CFP1, 2 or 3 (can be accessed if parameter switching has been enabled, see page 252)	

[1.3 SETTINGS] (SEt-)

With graphic display terminal:



With integrated display terminal:



[1.3 SETTINGS] (SEt-)

The adjustment parameters can be modified with the drive running or stopped.

⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

- Check that changes made to the settings during operation do not present any danger.
- We recommend stopping the drive before making any changes.





Failure to follow these instructions will result in death or serious injury.

Code	Name/Description	Adjustment range	Factory setting
<i>Inr</i> <i>0.01</i> <i>0.1</i> <i>1</i>	<input type="checkbox"/> [Ramp increment] <input type="checkbox"/> [0.01] : Ramp up to 99.99 seconds <input type="checkbox"/> [0.1] : Ramp up to 999.9 seconds <input type="checkbox"/> [1] : Ramp up to 6000 seconds This parameter is valid for [Acceleration] (ACC), [Deceleration] (dEC), [Acceleration 2] (AC2) and [Deceleration 2] (dE2).	0.01 - 0.1 - 1	0.1
<i>ACC</i>	<input type="checkbox"/> [Acceleration] Time to accelerate from 0 to the [Rated motor freq.] (FrS) (page 143). Make sure that this value is compatible with the inertia being driven.	0.01 to 6000 s (1)	3.0 s
<i>dEC</i>	<input type="checkbox"/> [Deceleration] Time to decelerate from the [Rated motor freq.] (FrS) (page 143) to 0. Make sure that this value is compatible with the inertia being driven.	0.01 to 6000 s (1)	3.0 s
<i>AC2</i> ★	<input type="checkbox"/> [Acceleration 2] See page 219 Time to accelerate from 0 to the [Rated motor freq.] (FrS). Make sure that this value is compatible with the inertia being driven.	0.01 to 6000 s (1)	5.0 s
<i>dE2</i> ★	<input type="checkbox"/> [Deceleration 2] See page 219 Time to decelerate from the [Rated motor freq.] (FrS) to 0. Make sure that this value is compatible with the inertia being driven.	0.01 to 6000 s (1)	5.0 s
<i>tA1</i> ★	<input type="checkbox"/> [Begin Acc round] See page 218 Rounding of start of acceleration ramp as a % of the [Acceleration] (ACC) or [Acceleration 2] (AC2) ramp time.	0 to 100 %	50 %
<i>tA2</i> ★	<input type="checkbox"/> [End Acc round] See page 218 - Rounding of end of acceleration ramp as a % of the [Acceleration] (ACC) or [Acceleration 2] (AC2) ramp time. - Can be set between 0 and (100% - [Begin Acc round] (tA1))		50 %
<i>tA3</i> ★	<input type="checkbox"/> [Begin Dec round] See page 218 Rounding of start of deceleration ramp as a % of the [Deceleration] (dEC) or [Deceleration 2] (dE2) ramp time.	0 to 100 %	40 %


(1) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to **[Ramp increment]** (Inr).

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

[1.3 SETTINGS] (SEt-)

Code	Name/Description	Adjustment range	Factory setting
EA4 	<input type="checkbox"/> [End Dec round] See page 218 - Rounding of end of deceleration ramp as a % of the [Deceleration] (dEC) or [Deceleration 2] (dE2) ramp time. - Can be set between 0 and (100% - [Begin Dec round] (tA3)).		60 %
LSP	<input type="checkbox"/> [Low speed] Motor frequency at minimum reference, can be set between 0 and [High speed] (HSP).		0 Hz
HSP	<input type="checkbox"/> [High speed] Motor frequency at maximum reference, can be set between [Low speed] (LSP) and [Max frequency] (tFr). The factory setting changes to 60 Hz if [Standard mot. freq] (bFr) = [60Hz NEMA] (60). <div style="border: 1px solid black; padding: 5px; text-align: center;"> CAUTION </div> <div style="border: 1px solid black; padding: 5px;"> <p>For permanent magnet synchronous motors, the maximum permissible speed must not be exceeded, otherwise demagnetization may occur. The maximum speed permitted by the motor, drive chain or application must not be exceeded at any time.</p> <p>Failure to follow this instruction can result in equipment damage.</p> </div>		50 Hz
IEH	<input type="checkbox"/> [Mot. therm. current] Motor thermal protection current, to be set to the rated current indicated on the nameplate.	0.2 to 1.5 In (1)	According to drive rating
SFC 	<input type="checkbox"/> [K speed loop filter] Speed loop filter coefficient. See page 68 for more details of the effect of this parameter.	0 to 100	According to [Motor control type] (Ctt)
SLA 	<input type="checkbox"/> [Fr.Loop.Stab] Stability: Used to adapt the return to steady state after a speed transient, according to the dynamics of the machine. Gradually increase the stability to increase control loop attenuation and thus reduce any overspeed. See page 68 for more details of the effect of this parameter.	0 to 100 %	20 %
FLG 	<input type="checkbox"/> [FreqLoopGain] Frequency loop gain: Used to adapt the pace of the machine speed transients according to the dynamics. Gradually increase the gain to increase the control loop passband. See page 68 for more details of the effect of this parameter. [FreqLoopGain] (FLG) is set to 20% when [Motor control type] (Ctt) is set to [Sync. mot.] (SYn) or (FSY).	0 to 100 %	6 %

(1) In corresponds to the rated drive current indicated in the Installation Manual or on the drive nameplate.

 Parameter that can be modified during operation or when stopped.

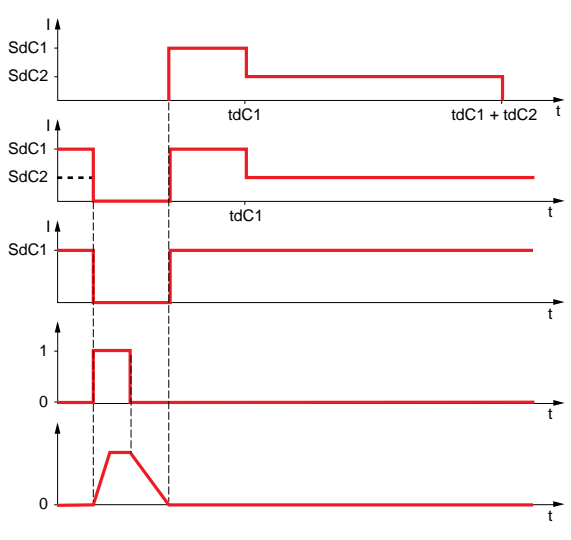
[1.3 SETTINGS] (SEt-)

Code	Name/Description	Adjustment range	Factory setting
GPE ★	<input type="checkbox"/> [ENA prop.gain] See page 159	1 to 9999	250
GIE ★	<input type="checkbox"/> [ENA integral gain] See page 159	0 to 9999	100
UF r ★	<input type="checkbox"/> [IR compensation] See page 160	25 to 200 %	100 %
SLP ★	<input type="checkbox"/> [Slip compensation] See page 145	0 to 300 %	100 %
dCF ★	<input type="checkbox"/> [Ramp divider] See page 221	0 to 10	4
IdC ★	<input type="checkbox"/> [DC inject. level 1] See page 222 Level of DC injection braking current activated via logic input or selected as stop mode. <div style="border: 1px solid black; padding: 10px; text-align: center;">CAUTION Check that the motor will withstand this current without overheating. Failure to follow this instruction can result in equipment damage.</div>	0.1 to 1.41 In (1)	0.64 In (1)
tdI ★	<input type="checkbox"/> [DC injection time 1] See page 222 Maximum current injection time [DC inject. level 1] (IdC). After this time the injection current becomes [DC inject. level 2] (IdC2).	0.1 to 30 s	0.5 s
IdC2 ★	<input type="checkbox"/> [DC inject. level 2] See page 222 Injection current activated by logic input or selected as stop mode, once period of time [DC injection time 1] (tdI) has elapsed. <div style="border: 1px solid black; padding: 10px; text-align: center;">CAUTION Check that the motor will withstand this current without overheating. Failure to follow this instruction can result in equipment damage.</div>	0.1 In (2) to [DC inject. level 1] (IdC)	0.5 In (1)
tdC ★	<input type="checkbox"/> [DC injection time 2] See page 222 Maximum injection time [DC inject. level 2] (IdC2) for injection selected as stop mode only.	0.1 to 30 s	0.5 s

(1) In corresponds to the rated drive current indicated in the Installation Manual or on the drive nameplate.





★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

[1.3 SETTINGS] (SEt-)

Code	Name/Description	Adjustment range	Factory setting
SdC1 ★	<input type="checkbox"/> [Auto DC inj. level 1] Level of standstill DC injection current. This parameter can be accessed if [Auto DC injection] (AdC) page 223 is not [No] (nO) . This parameter is forced to 0 if [Motor control type] (Ctt) page 137 = [Sync. mot.] (SYn) or [Sync.CL] (FSY) .	0 to 1.2 In (1)	0.7 In (1)
EdC1 ★	<input type="checkbox"/> [Auto DC inj. time 1] Standstill injection time. This parameter can be accessed if [Auto DC injection] (AdC) page 223 is not [No] (nO) . If [Motor control type] (Ctt) page 137 = [FVC] (FUC) or [Sync. mot.] (SYn) or [Sync.CL] (FSY) this time corresponds to the zero speed maintenance time.	0.1 to 30 s	0.5 s
SdC2 ★	<input type="checkbox"/> [Auto DC inj. level 2] 2 nd level of standstill DC injection current. This parameter can be accessed if [Auto DC injection] (AdC) page 223 is not [No] (nO) . This parameter is forced to 0 if [Motor control type] (Ctt) page 137 = [Sync. mot.] (SYn) or [Sync.CL] (FSY) .	0 to 1.2 In (1)	0.5 In (1)
EdC2 ★	<input type="checkbox"/> [Auto DC inj. time 2] 2 nd standstill injection time. This parameter can be accessed if [Auto DC injection] (AdC) page 223 = [Yes] (YES) .	0 to 30 s	0 s
AdC	SdC2	Operation 	
YES	x	Note: When [Motor control type] (Ctt) page 137 = [FVC] (FUC) or [Sync.CL] (FSY) : [Auto DC inj. level 1] (SdC1) , [Auto DC inj. level 2] (SdC2) and [Auto DC inj. time 2] (tdC2) are not accessible. Only [Auto DC inj. time 1] (tdC1) can be accessed. This then corresponds to a zero speed maintenance time.	
Ct	≠ 0		
Ct	= 0		
Run command			
speed			

(1) In corresponds to the rated drive current indicated in the Installation Manual or on the drive nameplate.


[1.3 SETTINGS] (SEt-)

Code	Name/Description	Adjustment range	Factory setting
S F r 	<input type="checkbox"/> [Switching freq.] (2) See page 106 .	According to rating	According to rating
C L 1 	<input type="checkbox"/> [Current Limitation] See page 52 .	0 to 1.36 In (1)	1.36 In (1)
C L 2 	<input type="checkbox"/> [I Limit. 2 value] See page 246  Note: If the setting is less than 0.25 In, the drive may lock in [Output Phase Loss] (OPF) fault mode if this has been enabled (see page 268). If it is less than the no-load motor current, the limitation no longer has any effect. m	0 to 1.36 In (1)	1.36 In (1)
<div style="text-align: center;">CAUTION</div> <p>Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization. Failure to follow this instruction can result in equipment damage.</p>			

(1) In corresponds to the rated drive current indicated in the Installation Manual or on the drive nameplate.

(2) Parameter can also be accessed in the [\[1.4 MOTOR CONTROL\] \(drC-\)](#) menu and [\[1.1 LIFT\] \(LIF-\)](#) menu.

 Parameter that can be modified during operation or when stopped.

 These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

[1.3 SETTINGS] (SEt-)

Code	Name/Description	Adjustment range	Factory setting
FLU FnC FCE FnD	<input type="checkbox"/> [Motor fluxing] <input type="checkbox"/> [Not cont.] (FnC) : Non-continuous mode <input type="checkbox"/> [Continuous] (Fct) : Continuous mode. This option is not possible if [Angle setting type] (ASt) pages 151 is [With load] (brC) or if [Auto DC injection] (AdC) page 223 is [Yes] (YES) or if [Type of stop] (Stt) page 221 is [Freewheel] (nSt) . <input type="checkbox"/> [No] (FnO) : Function inactive. This option is not possible if [Motor control type] (Ctt) page 137 = [SVCI] (CUC) or [FVC] (FUC) . If [Motor control type] (Ctt) page 137 = [SVCI] (CUC) , [FVC] (FUC) or [Sync. mot.] (SYn) , the factory setting is replaced by [Not Cont.] (FnC) . If [Motor control type] (Ctt) page 137 = [Sync.CL] (FSY) , [Motor fluxing] (FLU) is forced to [No] (FnO) . In order to obtain rapid high torque on startup, magnetic flux needs to already have been established in the motor. <ul style="list-style-type: none"> In [Continuous] (Fct) mode, the drive automatically builds up flux when it is powered up. In [Not cont.] (FnC) mode, fluxing occurs when the motor starts up. The flux current is greater than nCr (configured rated motor current) when the flux is established and is then adjusted to the motor magnetizing current. <div style="border: 1px solid black; padding: 5px; text-align: center;"> CAUTION Check that the motor will withstand this current without overheating. Failure to follow this instruction can result in equipment damage. </div> If [Motor control type] (Ctt) page 137 = [Sync. mot.] (SYn) , the [Motor fluxing] (FLU) parameter must be active ([No] (FnO) is not permitted): this parameter causes rotor angle detection or alignment (according to the configuration of [Angle setting type] (ASt) page 151) and not fluxing. <ul style="list-style-type: none"> If [Brake assignment] (bLC) page 233 is not [No] (nO), the [Motor fluxing] (FLU) parameter has no effect. <div style="display: flex; align-items: center;"> Note: If [Angle setting type] (ASt) = [W/o load] (nLd), the motor may rotate one full revolution during measurement. </div>		[No] (FnO)
tLS	<input type="checkbox"/> [Low speed time out] Maximum operating time at [Low speed] (LSP) (see page 126) Following operation at LSP for a defined period, a motor stop is requested automatically. The motor will restart if the reference is greater than LSP and if a run command is still present. Note: A value of 0 indicates an unlimited period of time. <div style="display: flex; align-items: center;"> Note: If [Low speed time out] (tLS) is not 0, [Type of stop] (Stt) page 221 is forced to [Ramp stop] (rMP) (only if a ramp stop can be configured). The [Low speed time out] (tLS) has no effect if the lift ramp is used </div>	0 to 999.9 s	0 s

(1) In corresponds to the rated drive current indicated in the Installation Manual or on the drive nameplate.

★

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

[1.3 SETTINGS] (SEt-)

Code	Name/Description	Adjustment range	Factory setting
SP 2 ★	<input type="checkbox"/> [Preset speed 2] See page 226 Preset speed 2	0 to 1,600 Hz	10 Hz
SP 3 ★	<input type="checkbox"/> [Preset speed 3] See page 226 Preset speed 3	0 to 1,600 Hz	15 Hz
SP 4 ★	<input type="checkbox"/> [Preset speed 4] See page 226 Preset speed 4	0 to 1,600 Hz	20 Hz
SP 5 ★	<input type="checkbox"/> [Preset speed 5] See page 226 Preset speed 5	0 to 1,600 Hz	25 Hz
SP 6 ★	<input type="checkbox"/> [Preset speed 6] See page 226 Preset speed 6	0 to 1,600 Hz	30 Hz
SP 7 ★	<input type="checkbox"/> [Preset speed 7] See page 226 Preset speed 7	0 to 1,600 Hz	35 Hz
SP 8 ★	<input type="checkbox"/> [Preset speed 8] See page 226 Preset speed 8	0 to 1,600 Hz	40 Hz
SP 9 ★	<input type="checkbox"/> [Preset speed 9] See page 226 Preset speed 9	0 to 1,600 Hz	45 Hz
SP 10 ★	<input type="checkbox"/> [Preset speed 10] See page 226 Preset speed 10	0 to 1,600 Hz	50 Hz
SP 11 ★	<input type="checkbox"/> [Preset speed 11] See page 226 Preset speed 11	0 to 1,600 Hz	55 Hz
SP 12 ★	<input type="checkbox"/> [Preset speed 12] See page 226 Preset speed 12	0 to 1,600 Hz	60 Hz
SP 13 ★	<input type="checkbox"/> [Preset speed 13] See page 226 Preset speed 13	0 to 1,600 Hz	70 Hz
SP 14 ★	<input type="checkbox"/> [Preset speed 14] See page 226 Preset speed 14	0 to 1,600 Hz	80 Hz

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

[1.3 SETTINGS] (SEt-)

Code	Name/Description	Adjustment range	Factory setting
SP 15 ★	<input type="checkbox"/> [Preset speed 15] See page 226 Preset speed 15	0 to 1,600 Hz	90 Hz
SP 16 ★	<input type="checkbox"/> [Preset speed 16] See page 226 Preset speed 16	0 to 1,600 Hz	100 Hz
MF r	<input type="checkbox"/> [Multiplying coeff.] Multiplying coefficient, can be accessed if [Multiplier ref.-] (MA2,MA3) page 216 has been assigned to the graphic terminal	0 to 100 %	100 %

(1) If a graphic display terminal is not in use, values greater than 9999 will be displayed on the 4-digit display with a period mark after the thousand digit, e.g., 15.65 for 15650.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

[1.3 SETTINGS] (SEt-)

Code	Name/Description	Adjustment range	Factory setting
I b r ★	<input type="checkbox"/> [Brake release I FW] See page 233 Brake release current threshold for lifting or forward movement	-1.32 In to 1.32 In (2)	0
I r d ★	<input type="checkbox"/> [Brake release I Rev] See page 233 Brake release current threshold for lowering or reverse movement	0 to 1.32 In (2)	0
b r t ★	<input type="checkbox"/> [Brake Release time] See page 234 Brake release time delay	0.00 to 5.00 s	0.50 s
b I r ★	<input type="checkbox"/> [Brake release freq] See page 234 Brake release frequency threshold	[Auto] (AUtO) 0 to 10 Hz	[Auto] (AUtO)
b E n ★	<input type="checkbox"/> [Brake engage freq] See page 234 Brake engage frequency threshold	[Auto] (AUtO) 0 to 10 Hz	[Auto] (AUtO)
t b E ★	<input type="checkbox"/> [Brake engage delay] See page 234 Time delay before request to engage brake. To delay the engaging of the brake, for horizontal movement only, if you wish the brake to engage when the drive comes to a complete stop.	0 to 5.00 s	0 s

(1) If a graphic display terminal is not in use, values greater than 9999 will be displayed on the 4-digit display with a period mark after the thousand digit, e.g., 15.65 for 15650.

(2) In corresponds to the rated drive current indicated in the Installation Manual or on the drive nameplate.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

[1.3 SETTINGS] (SEt-)

Code	Name/Description	Adjustment range	Factory setting
b E t ★	<input type="checkbox"/> [Brake engage time] See page 234 Brake engage time (brake response time)	0.00 to 5.00 s	0.30 s
J d C ★	<input type="checkbox"/> [Jump at reversal] See page 235	[Auto] (AUtO) 0 to 10 Hz	[Auto] (AUtO)
t t r ★	<input type="checkbox"/> [Time to restart] See page 235 Time between the end of a brake engage sequence and the start of a brake release sequence.	0 to 5.00 s	0 s
t L I n ★	<input type="checkbox"/> [Motoring torque lim] See page 244 Torque limitation in generator mode, as a whole % or in 0.1% increments of the rated torque in accordance with the [Torque increment] (IntP) parameter, page 244 .	0 to 300 %	100 %
t L I G ★	<input type="checkbox"/> [Gen. torque lim] See page 244 Torque limitation in generator mode, as a whole % or in 0.1% increments of the rated torque in accordance with the [Torque increment] (IntP) parameter, page 244 .	0 to 300 %	100 %
C t d	<input type="checkbox"/> [Current threshold] Current threshold for [I attained] (CtA) function assigned to a relay or a logic output (see page 182).	0 to 1.36 In (1)	In (1)
t t H	<input type="checkbox"/> [High torque thd.] High current threshold for [High tq. att.] (ttHA) function assigned to a relay or a logic output (see page 182), as a % of the rated motor torque.	-300% to +300%	100 %
t t L	<input type="checkbox"/> [Low torque thd.] Low current threshold for [Low tq. att.] (ttLA) function assigned to a relay or a logic output (see page 182), as a % of the rated motor torque.	-300% to +300%	50 %

(1) In corresponds to the rated drive current indicated in the Installation Manual or on the drive nameplate.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

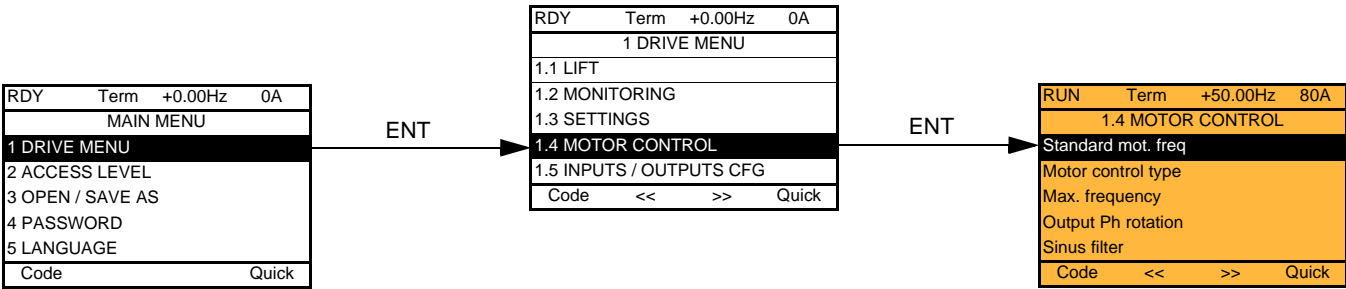
[1.3 SETTINGS] (SEt-)

Code	Name/Description	Adjustment range	Factory setting
F 9 L ★	<input type="checkbox"/> [Pulse warning thd.] Speed threshold measured by the [FREQUENCY METER] (FqF-) function, page 279 , assigned to a relay or a logic output (see page 182).	0 Hz at 30.00 kHz	0 Hz
F t d	<input type="checkbox"/> [Freq. threshold] Frequency threshold for [Freq.Th.att.] (FtA) function assigned to a relay or a logic output (see page 182), or used by the [PARAM. SET SWITCHING] (MLP-) function, page 252 .	0.0 to 1,600 Hz	[High speed] (HSP)
F 2 d	<input type="checkbox"/> [Freq. threshold 2] Frequency threshold for [Freq. Th. 2 attain.] (F2A) function assigned to a relay or a logic output (see page 182), or used by the [PARAM. SET SWITCHING] (MLP-) function, page 252 .	0.0 to 1,600 Hz	[High speed] (HSP)
F F t ★	<input type="checkbox"/> [Freewheel stop Thd] See page 221 This parameter supports switching from a ramp stop or a fast stop to a freewheel stop below a low speed threshold. It can be accessed if [Type of stop] (Stt) = [Fast stop] (FSt) or [Ramp stop] (rMP) . <input type="checkbox"/> 0.0: Does not switch to freewheel stop. <input type="checkbox"/> 0.1 to 1,600 Hz: Speed threshold below which the motor will switch to freewheel stop.	0.0 to 1,600 Hz	0.0
t t d ★	<input type="checkbox"/> [Motor therm. level] See page 267 Trip threshold for motor thermal alarm (logic output or relay).	0 to 118 %	100 %
L b C ★	<input type="checkbox"/> [Load correction] See page 162 Rated correction in Hz.	0 to 1,000 Hz	0

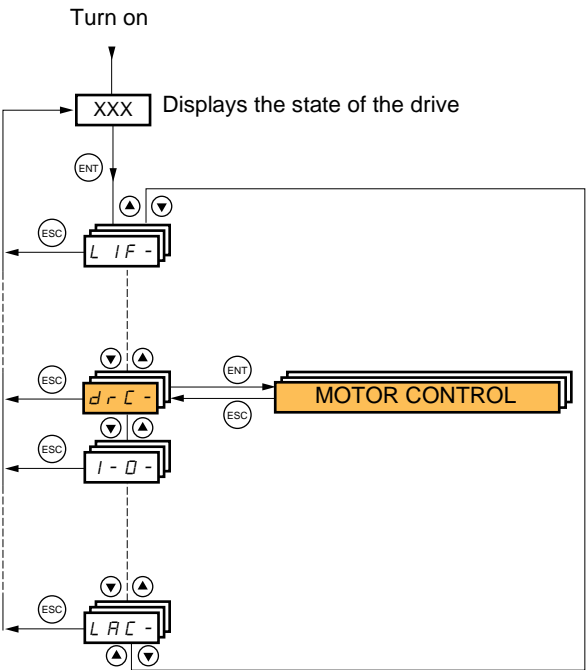
★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

[1.4 MOTOR CONTROL] (drC-)

With graphic display terminal:



With integrated display terminal:



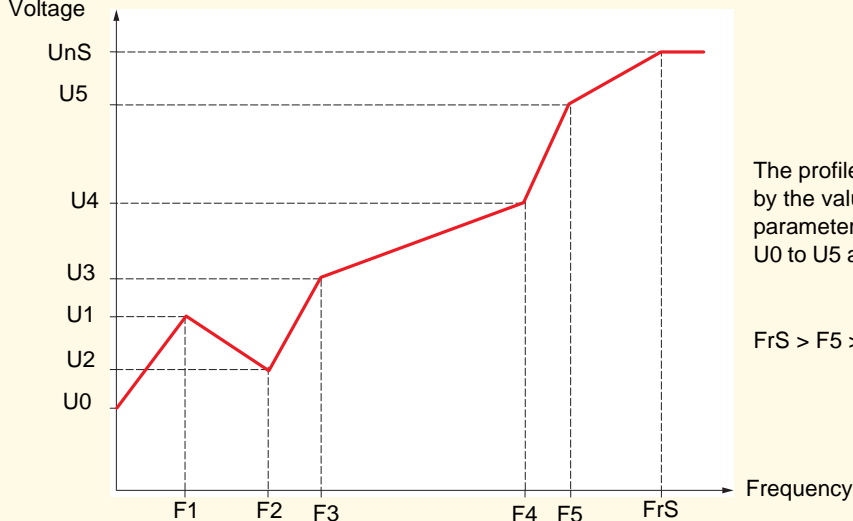


[1.4 MOTOR CONTROL] (drC-)

The parameters in the **[1.4 MOTOR CONTROL] (drC-)** menu can only be modified when the drive is stopped and no run command is present, with the following exceptions:


- [\[Auto tuning\] \(tUn\)](#) page [154](#) and [\[Angle auto-test\] \(ASA\)](#) page [151](#), which can cause the motor to start up.
- Parameters containing the sign **Q** in the code column, which can be modified with the drive running or stopped.

Code	Name/Description	Adjustment range	Factory setting
bFr SD 60	<input type="checkbox"/> [Standard mot. freq] <input type="checkbox"/> [50Hz IEC] (50): IEC <input type="checkbox"/> [60Hz NEMA] (60): NEMA This parameter modifies the presets of the following parameters: [High speed] (HSP) page 126, [Freq. threshold] (Ftd) page 135, [Rated motor volt.] (UnS) page 143, [Rated motor freq.] (FrS) page 143 and [Max frequency] (tFr) page 138.		
Ctt UUC CUC FUC UF2	<input type="checkbox"/> [Motor control type] <input type="checkbox"/> [SVC V] (UUC): Open-loop voltage flux vector control with automatic slip compensation according to the load. This type of control is recommended when replacing an ATV58. It supports operation with a number of motors connected in parallel on the same drive (if the motors are identical). <input type="checkbox"/> [SVC I] (CUC): Open-loop current flux vector control. This type of control is recommended when replacing an ATV58F used in an open-loop configuration. It does not support operation with a number of motors connected in parallel on the same drive. <input type="checkbox"/> [FVC] (FUC): Closed-loop current flux vector control for motor with encoder. This selection is only possible if an encoder card has been inserted. This type of operation is not possible, however, when using an incremental encoder that generates signal "A" only. This type of control is recommended when replacing an ATV58F used in a closed-loop configuration. It provides better performance in terms of speed and torque accuracy and enables torque to be obtained at zero speed. It does not support operation with a number of motors connected in parallel on the same drive. <input type="checkbox"/> [V/F 2pts] (UF2): Simple V/F profile without slip compensation. It supports operation with: <ul style="list-style-type: none"> - Special motors (wound rotor, tapered rotor, etc.) - A number of motors in parallel on the same drive. - High-speed motors. - Motors with a low power rating in comparison to that of the drive. <div style="text-align: center; margin-top: 20px;"> <p>The profile is defined by the values of parameters UnS, FrS and U0.</p> </div>	[SVC V] (UUC)	


[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range	Factory setting
C t t U F 5	<input type="checkbox"/> [Motor control type] (continued) <input type="checkbox"/> [V/F 5pts] (UF5): 5-segment V/F profile: Similar to V/F 2 pts profile but also supports the avoidance of resonance phenomena (saturation).  <p>The profile is defined by the values of parameters UnS, FrS, U0 to U5 and F0 to F5.</p> $FrS > F5 > F4 > F3 > F2 > F1$		
S Y n F S Y	<input type="checkbox"/> [Sync. mot.] (SYn): For permanent magnet synchronous motors with sinusoidal electromotive force (EMF) only. This selection makes the asynchronous motor parameters inaccessible, and the synchronous motor parameters accessible. <input type="checkbox"/> [Sync.CL] (FSY): Closed-loop synchronous motor. For permanent magnet synchronous motors with sinusoidal electromotive force (EMF) only, with encoder. This selection is only possible if an encoder card has been inserted. It makes the asynchronous motor parameters inaccessible, and the synchronous motor parameters accessible. This function is not possible, however, when using an incremental encoder that generates signal "A" only.  It is essential that the encoder check detailed on page 141 is performed successfully before selecting [Sync.CL] (FSY).		
t F r	<input type="checkbox"/> [Max frequency] The factory setting is 60 Hz, or preset to 72 Hz if [Standard mot. freq] (bFr) is set to 60 Hz. The maximum value is limited by the following conditions: <ul style="list-style-type: none"> It must not exceed 10 times the value of [Rated motor freq.] (FrS) page 143 for an asynchronous motor or [Nominal freq sync.] (FrSS) page 149 for a synchronous motor. It must not exceed 500 Hz if [Motor control type] (Ctt) (page 137) is not V/F Values between 500 Hz and 1600 Hz are only possible in V/F control. In this case, configure [Motor control type] (Ctt) before [Max frequency] (tFr).	10 to 1,600 Hz	
P H r A b C A C b	<input type="checkbox"/> [Output Ph rotation] <input type="checkbox"/> [ABC] (AbC): Forward <input type="checkbox"/> [ACB] (ACb): Reverse This parameter can be used to reverse the direction of rotation of the motor without reversing the wiring.  Do not modify the [Output Ph rotation] (PHr) parameter when [Motor control type] (Ctt) page 137 = [FVC] (FUC) or [Sync.CL] (FSY). The direction of rotation must be modified, if required, before or during the encoder check procedure detailed on page 141, when [Motor control type] (Ctt) is not [FVC] (FUC) or [Sync.CL] (FSY). Otherwise, checking and measuring procedures must be performed again ([Angle auto-test] (ASA) and [Angle offset value] (ASU) return to [No] (nO)).		[ABC] (AbC)


[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range	Factory setting
OFI nO YES	<input type="checkbox"/> [Sinus filter] <input type="checkbox"/> [No] (nO) : No sinus filter <input type="checkbox"/> [Yes] (YES) : Use of a sinus filter, to limit overvoltages on the motor and reduce the ground fault leakage current. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;">CAUTION</p> <p>If [Sinus filter] (OFI) = [Yes] (YES), [Max frequency] (tFr) page 138 must not exceed 100 Hz.</p> <p>Failure to follow this instruction can result in equipment damage.</p> </div>		[No] (nO)
SFr 	<input type="checkbox"/> [Switching freq.] (1) See page 106 .	According to rating	According to rating

(1) Parameter can also be accessed in the **[1.3 SETTINGS] (SEt-)** menu and **[1.1 LIFT] (LIF-)** menu.


 Parameter that can be modified during operation or when stopped.

[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range	Factory setting
CL I (↻)	<div><div><div><div><div><div></div></div></div><div><div>[Current Limitation]</div><div>(1)</div></div></div><div>Used to limit the motor current.  Note: If the setting is less than 0.25 In, the drive may lock in Output Phase Loss (OPF) fault mode if this has been enabled (see page 268). If it is less than the no-load motor current, the limitation no longer has any effect.</div></div></div> <div><div>CAUTION</div><div>Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization. Failure to follow this instruction can result in equipment damage.</div></div>	0 to 1.36 In (2)	1.36 In (2)

(1) Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

(2) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

 Parameter that can be modified during operation or when stopped.

[1.4 MOTOR CONTROL] (drC-)

Selecting the encoder

Follow the recommendations in the catalog and the Installation Manual.



Note 1: When an encoder is used with a VW3 A3 408 or VW3 A3 409 card, it is only possible to configure the "encoder" input for speed feedback. Functions can only be configured as references or inputs with a VW3 A3 401 to 407 and VW3 A3 411 card.

Note 2: When an encoder is used with a VW3 A3 409 card, the drive remains locked in stop mode (and displays nSt or nLp) if the encoder is not fully configured.

Encoder check procedure

This procedure applies to all types of encoder.

1. Configure the parameters of the encoder used, pages [178](#) to [181](#).
2. Set [\[Motor control type\] \(Ctt\)](#) to a value other than [\[FVC\] \(FUC\)](#) and [\[Sync.CL\] \(FSY\)](#), even if it is the required configuration. For example, use [\[SVC V\] \(UUC\)](#) for an asynchronous motor and [\[Sync. mot.\] \(SYn\)](#) for a synchronous motor.
3. Configure the motor parameters in accordance with the specifications on the rating plate.
 - Asynchronous motor (see page [143](#)): [\[Rated motor power\] \(nPr\)](#), [\[Rated motor volt.\] \(UnS\)](#), [\[Rated mot. current\] \(nCr\)](#), [\[Rated motor freq.\] \(FrS\)](#), [\[Rated motor speed\] \(nSP\)](#).
 - Synchronous motor (see page [148](#)): [\[Nominal I sync\] \(nCrS\)](#), [\[Nom motor spdsync\] \(nSPS\)](#), [\[Pole pairs.\] \(PPnS\)](#), [\[Syn. EMF constant\] \(PHS\)](#), [\[Autotune L d-axis\] \(LdS\)](#), [\[IAutotune L q-axis\] \(LqS\)](#), [\[Cust. stator R syn\] \(rSAS\)](#). [\[Current limitation\] \(CLI\)](#) must not exceed the maximum motor current, **otherwise demagnetization may occur**.
4. Set [\[Encoder usage\] \(EnU\)](#) = [\[No\] \(nO\)](#).
5. Perform auto-tuning.
6. Set [\[Encoder check\] \(EnC\)](#) = [\[Yes\] \(YES\)](#).
7. Check that the rotation of the motor is safe.
8. Set the motor rotating at stabilized speed $\approx 15\%$ of the rated speed for at least 3 seconds, and use the [\[1.2-MONITORING\] \(SUP-\)](#) menu to monitor its behavior.
9. If it trips on an [\[Encoder fault\] \(EnF\)](#), [\[Encoder check\] \(EnC\)](#) returns to [\[No\] \(nO\)](#).
 - Check the parameter settings and perform auto-tuning again (see steps 1 to 5 above).
 - Check that the mechanical and electrical operation of the encoder, its power supply and connections are all OK.
 - Reverse the direction of rotation of the motor ([\[Output Ph rotation\] \(PHr\)](#) parameter page [138](#)) or the encoder signals.
10. Repeat the operations from step 6 onwards until [\[Encoder check\] \(EnC\)](#) changes to [\[Done\] \(dOnE\)](#).
11. If necessary, change [\[Motor control type\] \(Ctt\)](#) to [\[FVC\] \(FUC\)](#) or [\[Sync.CL\] \(FSY\)](#). In the case of [\[Sync.CL\] \(FSY\)](#), go on to perform the "Procedure for measuring the phase-shift angle between the motor and the encoder" page [150](#).

[1.4 MOTOR CONTROL] (drC-)


Code	Name/Description	Adjustment range	Factory setting
EnS -	[ENCODER FEEDBACK] Can only be accessed if an encoder card has been inserted.		
EnC nO YES dOnE	<input type="checkbox"/> [Encoder check] Check encoder feedback. See procedure on previous page. This parameter can be accessed if an encoder card has been inserted (1). <input type="checkbox"/> [Not done] (nO) : Check not performed. <input type="checkbox"/> [Yes] (YES) : Activates monitoring of the encoder. <input type="checkbox"/> [Done] (dOnE) : Check performed successfully. The check procedure checks: <ul style="list-style-type: none"> - The direction of rotation of the encoder/motor - The presence of signals (wiring continuity) - The number of pulses/revolution If a fault is detected, the drive locks in [Encoder fault] (EnF) fault mode.		[Not done] (nO)
EnU nO SEC rEG PGr	<input type="checkbox"/> [Encoder usage] This parameter can be accessed if an encoder card has been inserted (1). <input type="checkbox"/> [No] (nO) : Function inactive. <input type="checkbox"/> [Fdbk monit.] (SEC) : The encoder provides speed feedback for monitoring only. <input type="checkbox"/> [Spd fdk reg.] (rEG) : The encoder provides speed feedback for regulation and monitoring. This configuration is automatic if the drive is configured for closed-loop operation ([Motor control type] (Ctt) = [FVC] (FUC) or [Sync.CL] (FSY)). If [Motor control type] (Ctt) = [SVC V] (UUC) the encoder operates in speed feedback mode and enables static correction of the speed to be performed. This configuration is not accessible for other [Motor control type] (Ctt) values. <input type="checkbox"/> [Speed ref.] (PGr) : The encoder provides a reference. Can only be selected with an incremental encoder card.		[No] (nO)

(1) The encoder parameters can only be accessed if the encoder card has been inserted, and the available selections will depend on the type of encoder card used. The encoder configuration can also be accessed in the **[1.5 - INPUTS / OUTPUTS CFG] (I/O)** menu.

[1.4 MOTOR CONTROL] (drC-)

Asynchronous motor parameters:

These parameters can be accessed if [Motor control type] (Ctt) page 137 = [SVC V] (UUC), [SVC I] (CUC), [FVC] (FUC), [V/F 2pts] (UF2) or [V/F 5pts] (UF5). In this case, the synchronous motor parameters cannot be accessed.

Code	Name/Description	Adjustment range
ASY -	[ASYNC. MOTOR] Can only be accessed if [Motor control type] (Ctt) page 137 = [SVC V] (UUC), [SVC I] (CUC), [FVC] (FUC), [V/F 2pts] (UF2), or [V/F 5pts] (UF5).	
nPr	<input type="checkbox"/> [Rated motor power] Rated motor power given on the nameplate, in kW if [Standard mot. freq] (bFr) = [50Hz IEC] (50), in HP if [Standard mot. freq] (bFr) = [60Hz NEMA] (60).	Acc. to drive rating
UnS	<input type="checkbox"/> [Rated motor volt.] Rated motor voltage given on the nameplate. ATV71L...M3XZ: 100 to 240 V, ATV71L...N4Z: 200 to 480 V	Acc. to drive rating
nCr	<input type="checkbox"/> [Rated mot. current] Rated motor current given on the nameplate.	0.25 to 1.5 In (1)
FrS	<input type="checkbox"/> [Rated motor freq.] Rated motor frequency given on the nameplate. The factory setting is 50 Hz, or preset to 60 Hz if [Standard mot. freq] (bFr) is set to 60 Hz. The maximum value is limited to 500 Hz if [Motor control type] (Ctt) (page 137) is not V/F. Values between 500 Hz and 1,600 Hz are only possible in V/F control. In this case, configure [Motor control type] (Ctt) before [Rated motor freq.] (FrS).	10 to 1,600 Hz
InSP I ID	<input type="checkbox"/> [rpm increment] Increment of parameter [Rated motor speed] (nSP). <input type="checkbox"/> [x1 rpm] (1): Increment of 1 rpm, to be used if [Rated motor speed] (nSP) does not exceed 65535 rpm. <input type="checkbox"/> [x10 rpm] (10): Increment of 10 rpm, to be used if [Rated motor speed] (nSP) exceeds 65535 rpm.  Note: Changing [rpm increment] (InSP) will restore [Rated motor speed] (nSP) to its factory setting.	
nSP	<input type="checkbox"/> [Rated motor speed] Rated motor speed given on the nameplate. Adjustable between 0 and 65535 rpm if [rpm increment] (InSP) = [x1 rpm] (1) or between 0.00 and 96.00 krpm if [rpm increment] (InSP) = [x10 rpm] (10). 0 to 9999 rpm then 10.00 to 65.53 or 96.00 krpm on the integrated display terminal. If, rather than the rated speed, the nameplate indicates the synchronous speed and the slip in Hz or as a %, calculate the rated speed as follows: <ul style="list-style-type: none"> Rated speed = Synchronous speed x $\frac{100 - \text{slip as a \%}}{100}$ or Rated speed = Synchronous speed x $\frac{50 - \text{slip in Hz}}{50}$ (50 Hz motors) or Rated speed = Synchronous speed x $\frac{60 - \text{slip in Hz}}{60}$ (60 Hz motors) 	0 to 96000 rpm

(1) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

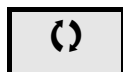
[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range	Factory setting
ASY -	[ASYNC. MOTOR] (continued)		
U 0	<input type="checkbox"/> [U0] V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 2pts] (UF2) or [V/F 5pts] (UF5)	0 to 600 or 1000 V according to rating	0
U 1	<input type="checkbox"/> [U1] V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 600 or 1000 V according to rating	0
F 1	<input type="checkbox"/> [F1] V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 1,600 Hz	0
U 2	<input type="checkbox"/> [U2] V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 600 or 1000 V according to rating	0
F 2	<input type="checkbox"/> [F2] V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 1,600 Hz	0
U 3	<input type="checkbox"/> [U3] V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 600 or 1000 V according to rating	0
F 3	<input type="checkbox"/> [F3] V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 1,600 Hz	0
U 4	<input type="checkbox"/> [U4] V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 600 or 1000 V according to rating	0
F 4	<input type="checkbox"/> [F4] V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 1,600 Hz	0
U 5	<input type="checkbox"/> [U5] V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 600 or 1000 V according to rating	0
F 5	<input type="checkbox"/> [F5] V/F profile setting. This parameter can be accessed if [Motor control type] (Ctt) = [V/F 5pts] (UF5)	0 to 1,600 Hz	0

[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range	Factory setting
ASY -	[ASYNC. MOTOR] (continued)		
UC2 nO YES	<input type="checkbox"/> [Vector Control 2pt] <input type="checkbox"/> [No] (nO) : Function inactive. <input type="checkbox"/> [Yes] (YES) : Function active. Used in applications in which the motor rated speed and frequency need to be exceeded in order to optimize operation at constant power, or when the maximum voltage of the motor needs to be limited to a value below the line voltage. The voltage/frequency profile must then be adapted in accordance with the motor's capabilities to operate at maximum voltage UCP and maximum frequency FCP.		[No] (nO)
UCP	<input type="checkbox"/> [V. constant power] This parameter can be accessed if [Vector Control 2pt] (UC2) = [Yes] (YES)	According to drive rating	According to drive rating and [Standard mot. freq] (bFr)
FCP	<input type="checkbox"/> [Freq. Const Power] This parameter can be accessed if [Vector Control 2pt] (UC2) = [Yes] (YES)	According to drive rating and [Rated motor freq.] (FrS)	= [Standard mot. freq] (bFr)
SLP ()	<input type="checkbox"/> [Slip compensation] (1) This parameter can be accessed if [Motor control type] (Ctt) is not [V/F 2pts] (UF2) or [V/F 5pts] (UF5) . Adjusts the slip compensation around the value set by the rated motor speed. The speeds given on motor nameplates are not necessarily exact. <ul style="list-style-type: none"> • If slip setting < actual slip: the motor is not rotating at the correct speed in steady state, but at a speed lower than the reference. • If slip setting > actual slip: The motor is overcompensated and the speed is unstable. 	0 to 300%	100%

(1) Parameter can also be accessed in the **[1.3 SETTINGS] (SEt-)** menu.



Parameter that can be modified during operation or when stopped.

[1.4 MOTOR CONTROL] (drC-)

Asynchronous motor parameters that can be accessed in [Expert] mode

These include:

- Special parameters.
- Parameters calculated by the drive during auto-tuning, in read-only mode. For example, [Stator R measured](rSM), calculated cold stator resistance.
- The possibility of replacing some of these calculated parameters with other values, if necessary. For example, [Cust stator resist.](rSA), measured cold stator resistance.

When a parameter is modified by the user, the drive uses it in place of the calculated parameter.

If auto-tuning is performed or if one of the motor parameters on which auto-tuning depends is modified ([Rated motor volt.] (UnS), [Rated motor freq.] (FrS), [Rated mot. current] (nCr), [Rated motor speed] (nSP), [Rated motor power] (nPr)), the modified parameters return to their factory setting.

Code	Name/Description	Adjustment range	Factory setting
ASY -	[ASYNC. MOTOR] (continued)		
r S n	<input type="checkbox"/> [Stator R measured] Cold stator resistance, calculated by the drive, in read-only mode. Value in milliohms (mΩ) up to 75 kW (100 HP), and in hundredths of milliohms (mΩ/100) above 75 kW (100 HP).		
I d n	<input type="checkbox"/> [Idr] Magnetizing current in A, calculated by the drive, in read-only mode.		
L F n	<input type="checkbox"/> [Lfr] Leakage inductance in mH, calculated by the drive, in read-only mode.		
t r n	<input type="checkbox"/> [T2r] Rotor time constant in mS, calculated by the drive, in read-only mode.		
n S L	<input type="checkbox"/> [Nominal motor slip] Nominal slip in Hz, calculated by the drive, in read-only mode. To modify the nominal slip, modify the [Rated motor speed] (nSP) (page 143).		
P P n	<input type="checkbox"/> [Poles pair number] Number of pairs of poles, calculated by the drive, in read-only mode.		

[1.4 MOTOR CONTROL] (drC-)

Asynchronous motor parameters that can be accessed in [Expert] mode, continued

Code	Name/Description
ASY -	[ASYNC. MOTOR] (continued)
r s R	<input type="checkbox"/> [Cust stator resist.] Cold state stator resistance (per winding), modifiable value. In milliohms ($m\Omega$) up to 75 kW (100 HP), and in hundredths of milliohms ($m\Omega/100$) above 75 kW (100 HP). On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).
I d R	<input type="checkbox"/> [Idw] Magnetizing current in A, modifiable value.
L f R	<input type="checkbox"/> [Lfw] Leakage inductance in mH, modifiable value.
t r R	<input type="checkbox"/> [Cust. rotor t const.] Rotor time constant in mS, modifiable value.

[1.4 MOTOR CONTROL] (drC-)

Synchronous motor parameters:

These parameters can be accessed if [Motor control type] (Ctt) page 137 = [Sync. mot.] (SYn) or [Sync.CL] (FSY). In this case, the asynchronous motor parameters cannot be accessed.



Important: For synchronous motors, it is crucial to set the current limit. See [Current Limitation] (CLI) page 140.

CAUTION

Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization.

Failure to follow this instruction can result in equipment damage.

Code	Name/Description	Adjustment range	Factory setting
SYn -	[SYNCHRONOUS MOTOR] Can only be accessed if [Motor control type] (Ctt) page 137 = [Sync.CL] (FSY) or [Sync. mot.] (SYn).		
nCrS	<input type="checkbox"/> [Nominal I sync.] Rated synchronous motor current given on the nameplate.	0.25 to 1.5 In (1)	According to drive rating
nSPS	<input type="checkbox"/> [Nom motor spdsync] Rated synchronous motor speed given on the nameplate. On the integrated display unit: 0 to 9999 rpm then 10.00 to 60.00 krpm.	0 to 60000 rpm	According to drive rating
PPnS	<input type="checkbox"/> [Pole pairs] Number of pairs of poles on the synchronous motor.	1 to 50	According to drive rating
IPHS 0.1 1	<input type="checkbox"/> [Increment EMF] Increment for the [Syn. EMF constant] (PHS) parameter. <input type="checkbox"/> [0.1 mV/rpm] (0.1): 0.1mV per rpm <input type="checkbox"/> [1 mV/rpm] (1): 1mV per rpm		[0.1mV/rpm] (0.1)
PHS	<input type="checkbox"/> [Syn. EMF constant] Synchronous motor EMF constant, in 0.1 mV per rpm or 1 mV per rpm (peak voltage per phase), according to the value of [Increment EMF] (IPHS). On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).	0 to 65535	According to drive rating
LdS	<input type="checkbox"/> [Autotune L d-axis] Axis "d" stator inductance in mH (per phase). On motors with smooth poles [Autotune L d-axis] (LdS) = [Autotune L q-axis] (LqS) = Stator inductance L.	0 to 655.3	According to drive rating
LqS	<input type="checkbox"/> [Autotune L q-axis] Axis "q" stator inductance in mH (per phase). On motors with smooth poles [Autotune L d-axis] (LdS) = [Autotune L q-axis] (LqS) = Stator inductance L.	0 to 655.3	According to drive rating
rSR5	<input type="checkbox"/> [Cust. stator R syn] Cold state stator resistance (per winding) The factory setting is replaced by the result of the auto-tuning operation, if it has been performed. The value can be entered by the user, if he knows it. Value in milliohms (mΩ) up to 75 kW (100 HP), and in hundredths of milliohms (mΩ/100) above 75 kW (100 HP). On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).	According to drive rating	According to drive rating

(1) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description
SYN -	[SYNCHRONOUS MOTOR] (continued)
RE9P nO YES dOnE	<div> <input type="checkbox"/> [Read motor param.] <div>[No] (nO)</div> </div> <p>This parameter can only be used with BDH, BRH and BSH type motors from the Telemecanique range.</p> <p>Can only be accessed if [Encoder protocol] (UECP) page 180 = [Hiperface] (SCHP). Request to load motor parameters from the encoder EEPROM memory.</p> <ul style="list-style-type: none"> <input type="checkbox"/> [No] (nO): Loading not performed or has failed. <input type="checkbox"/> [Yes] (YES): Loading is performed as soon as possible, then the parameter automatically changes to [Done] (dOnE). <input type="checkbox"/> [Done] (dOnE): Loading done. <p>The following parameters are loaded: [Angle offset value] (ASU) page 152, [Nom motor spdsync] (nSPS) page 148, [Nominal I sync.] (nCrS) page 148, [Pole pairs] (PPnS) page 148, [Syn. EMF constant] (PHS) page 148, [Cust. stator R syn] (rSAS) page 148, [Autotune L d-axis] (LdS) page 148, and [Autotune L q-axis] (LqS) page 148.</p> <p>Note:</p> <ul style="list-style-type: none"> During loading the drive is in "Freewheel Stop" state with the motor turned off. If a "line contactor" or "output contactor" function has been configured, the contactor closes during loading.
RELP tAb PrOG FAIL dOnE CUS	<div> <input type="checkbox"/> [Status motor param] <div>[Not done] (tAb)</div> </div> <p>Can only be accessed if [Encoder protocol] (UECP) page 180 = [Hiperface] (SCHP). Information on the request to load motor parameters from the encoder EEPROM memory (not modifiable).</p> <ul style="list-style-type: none"> <input type="checkbox"/> [Not done] (tAb): Loading has not been performed, default motor parameters will be used. <input type="checkbox"/> [In progress] (PrOG): Loading in progress. <input type="checkbox"/> [Failed] (FAIL): Loading has failed. <input type="checkbox"/> [Done] (dOnE): Loading completed successfully. <input type="checkbox"/> [Customized] (CUS): Loading completed successfully but one or more motor parameters have subsequently been modified by the user via the display terminal or serial link, or auto-tuning has been performed by [Auto-tuning] (tUn).

Synchronous motor parameters that can be accessed in [Expert] mode

Code	Name/Description
SYN -	[SYNCHRONOUS MOTOR] (continued)
r5rS	<div> <input type="checkbox"/> [R1rS] </div> <p>Cold state stator resistance (per winding), in read-only mode. This is the drive factory setting or the result of the auto-tuning operation, if it has been performed. Value in milliohms (mΩ) up to 75 kW (100 HP), and in hundredths of milliohms (mΩ/100) above 75 kW (100 HP). On the integrated display unit: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).</p>
Fr5S	<div> <input type="checkbox"/> [Nominal freq sync.] </div> <p>Motor frequency at rated speed in Hz, calculated by the drive (rated motor frequency), in read-only mode.</p>

(1) Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

(2) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

 Parameter that can be modified during operation or when stopped.

[1.4 MOTOR CONTROL] (drC-)

Closed-loop synchronous motor

Operation on a synchronous motor in a closed loop configuration requires an encoder providing the exact position of the motor rotor. The phase-shift angle of the encoder in relation to the rotor must therefore be determined. The drive can perform this measurement automatically.

Selecting a resolver type encoder



If the number of motor poles is not a whole multiple of the number of resolver poles, the resolver is a relative encoder and no longer absolute. You should therefore set the [Angle setting activ.] (AtA) parameter = [Power On] (POn) or [Run order] (AUtO).

Procedure for measuring the phase-shift angle between the motor and the encoder

Preliminary remarks:

Select the [Angle setting type] (ASt) measuring mode according to the type of machine being driven:

- [Angle setting type] (ASt) = [W/o load] (nLd): Measurement with motion, if the rotation of the motor is free (no load, brake released) and safe. During measurement current flows through the motor, which may cause it to rotate one full revolution.

WARNING

UNINTENDED EQUIPMENT OPERATION

Check that the rotation of the motor will not cause any dangerous movements.

Failure to follow this instruction can result in death or serious injury.

- [Angle setting type] (ASt) = [With load] (brC): Measurement without motion, motor with or without load, brake engaged or released. This mode is recommended for a lift, for example. **You must adhere to the following instructions:**
 - The motor rotor must not move during measurement, otherwise the result will be incorrect.
 - In some cases, the measurement current can cause tripping on an [Overcurrent] (OCF) fault; if so, use [W/o load] (nLd) mode. This occurs when using low-inductance motors, high-speed motors, or motors in which the rated voltage is well below the supply voltage of the drive.
 - In some cases, the measurement can cause tripping on an [Angle error] (ASF) fault. This occurs if the motor rotor has moved during measurement (only detected in closed-loop mode), a motor phase is disconnected or if the motor inductance is too high, thus limiting the measurement current (in this case, use [W/o load] (nLd) mode).
- [Angle setting type] (ASt) = [Optimised] (brCO): Measurement without motion, possible with or without load, brake engaged or released. Optimizing the angle detection time, based on the second detection request, even after the product has been turned off.

1. First, follow the "Encoder check procedure" on page [141](#).
2. Set [Motor control type] (Ctt) = [Sync.CL] (FSY).
3. If you have selected [Angle setting type] (ASt) = [W/o load] (nLd): For measurement with motion, check that the motor is running safely and can turn freely **without resistive or driving torque. If these conditions are not met, the resulting measurement will be inaccurate.**
4. Set [Angle auto-test] (ASA) = [Yes] (YES). The measurement is performed and [Angle auto-test] (ASA) changes to [Done] (dOnE). The [Angle offset value] (ASU) parameter changes from [No] (nO) to a numerical value proportional to the electrical angle measured ($8191 = 360^\circ$).
5. If required, configure automatic measurements using [Angle setting activ.] (AtA). If [Angle setting type] (ASt) = [W/o load] (nLd), ensure that the safety conditions outlined earlier are met at all times.
If using a relative encoder (incremental or SinCos), it is recommended that you set [Angle setting activ.] (AtA) = [Power On] (POn) or [Run order] (AUtO).
6. If an [Angle error] (ASF) fault occurs, [Angle auto-test] (ASA) returns to [No] (nO).
 - Check that the parameters and instructions relating to this procedure have been carried out correctly and perform the measurement again.




Notes

The phase-shift angle must be re-measured each time:


- The motor is changed
- The encoder is changed
- The coupling between the motor and encoder is removed
- The [Output Ph rotation] (PHr) parameter is modified
- The [Coder rotation inv.] (EnRI) parameter is modified.

If a relative encoder (incremental or SinCos) is used, measurement must be repeated each time the motor is turned off/on. It is therefore recommended that you set [Angle setting activ.] (AtA) = [Power On] (POn) or [Run order] (AUtO).

[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range
ASA -	[ANGLE TEST SETTING] Can only be accessed if [Motor control type] (Ctt) page 137 = [Sync.CL] (FSY)	
ASL brC nLd brCO	<input type="checkbox"/> [Angle setting type] Mode for measuring the phase-shift angle between the motor and the encoder. <input type="checkbox"/> [With load] (brC) : Measurement without motion, possible with or without load, brake engaged or released. <input type="checkbox"/> [W/o load] (nLd) : Measurement with motion, only for free motors (brake released), without load. <input type="checkbox"/> [Optimized] (brCO) : Measurement without motion, possible with or without load, brake engaged or released. Optimizing the angle detection time, based on the second detection request, even after the product has been turned off.  Note: If [Angle setting type] (ASL) = [W/o load] (nLd), the motor may rotate one full revolution during measurement.	[With load] (brC)
ASA nO YES dOnE	<input type="checkbox"/> [Angle auto-test] Measurement of the phase-shift angle between the motor and the encoder. <input type="checkbox"/> [No] (nO) : Measurement not performed or has failed, or [Output Ph rotation] (PHr) has been modified, or [Coder rotation Inv.] (EnRI) has been modified. <input type="checkbox"/> [Yes] (YES) : Measurement is performed as soon as possible, then the parameter automatically changes to [Done] (dOnE). <input type="checkbox"/> [Done] (dOnE) : Use of the value given the last time the measurement was performed. Important: <ul style="list-style-type: none"> It is essential that all the motor parameters are configured correctly before performing measurements: <ul style="list-style-type: none"> [Nominal I sync.] (nCrS), [Current Limitation] (CLI), [Nom motor spdsync] (nSPS), [Pole pairs] (PPnS), [Syn. EMF constant] (PHS), [Autotune L d-axis] (LdS), [Autotune L q-axis] (LqS), [Cust. stator R syn] (rSAS). Measurement is only performed if no stop command has been activated. If a "freewheel stop" or "fast stop" function has been assigned to a logic input, this input must be inactive. Measurement takes priority over any run commands, which will be taken into account after the measurement sequence. If measurement fails, the drive displays [No] (nO) and changes to [Angle Error] (ASF) fault mode. Measurement may take several seconds. Do not interrupt the process. Wait for the display to change to "[Done] (dOnE)" or "[No] (nO)".  Note: If a "line contactor" or "output contactor" function has been configured, the contactor closes during measurement.	[No] (nO)
ASL nO L I 1 - - -	<input type="checkbox"/> [Angle auto test] Measurement of the phase-shift angle between the motor and the encoder by means of a logic input or command bit. <input type="checkbox"/> [No] (nO) : Not assigned <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...) : See the assignment conditions on page 204. Measurement is performed when the assigned bit or input changes to 1.  Note: If a "line contactor" or "output contactor" function has been configured, the contactor closes during measurement.	[No] (nO)



[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range
ASA -	[ANGLE TEST SETTING] (continued)	
AtA nO POn AUtO	<input type="checkbox"/> [Angle setting activ.] Activation of automatic measurement of the phase-shift angle between the motor and encoder when using a relative encoder (incremental or SinCos). <input type="checkbox"/> [No] (nO) : Function inactive. <input type="checkbox"/> [Power On] (POn) : Measurement is performed on each power-up (1). <input type="checkbox"/> [Run order] (AUtO) : Measurement is performed on each run command if necessary, i.e., if parameter [Angle offset value] (ASU) is set to [No] (nO) . This option is recommended for use with a VW3 A3 401 to 407 card, and with the VW3 A3 411 card when the "line contactor" function has been configured (loss of angle on each stop) (1). If [Angle setting activ.] (AtA) = [Power On] (POn) or [Run order] (AUtO) , it is advisable to set [Angle setting type] (ASt) = [With load] (brC) .  Note: If a "line contactor" or "output contactor" function has been configured, the contactor closes during measurement. Note: At each multi-motor configuration switching, the drive performs an automatic measurement of the phase-shift angle at next run order.	[Run order] (AUtO):
ASU nO -	<input type="checkbox"/> [Angle offset value] Phase-shift angle between the motor and the encoder. <input type="checkbox"/> [No] (nO) : Measurement has not been performed or has failed, or [Output Ph rotation] (PHr) has been modified, or measurement has been lost due to powering down (1), or [Coder rotation inv.] (EnRI) has been modified. <input type="checkbox"/> 0 to 8191: Phase-shift angle. 8191 corresponds to 360°.	[No] (nO)
AStS tAb PEnd PrOG FAIL dOnE CUS	<input type="checkbox"/> [Angle setting status] Information on the phase-shift angle measurement between the motor and the encoder (cannot be modified). <input type="checkbox"/> [Not done] (tAb) : Phase-shift angle not defined. <input type="checkbox"/> [Pending] (PEnd) : Measurement requested but not yet performed. <input type="checkbox"/> [In progress] (PrOG) : Measurement in progress. <input type="checkbox"/> [Failed] (FAIL) : Measurement failed. <input type="checkbox"/> [Done] (dOnE) : Measurement performed successfully. <input type="checkbox"/> [Customized] (CUS) : The phase-shift angle value has been entered by the user via the display terminal or serial link.	[Not done] (tAb)

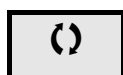
(1) Powering down causes a loss of measurement data in the following cases:

- With a VW3 A3 401 to 407 and VW3 A3 411 card:
 - Every time the power section is turned off, even if the drive control section has a separate power supply (for example, if the "line contactor" function has been configured).
- With a VW3 A3 409 card and a SinCos encoder:
 - Every time the power section is turned off, if the drive control section does not have a separate power supply.
 - Only when the drive control section is turned off (if it has a separate power supply via the 0 and P24 terminals).
 - If the resolver has a number of poles which is not a multiple of the number of motor poles.
- With a VW3 A3 410 card:
 - VW3 A3 410 card manage SINCOS encoders providing signal for the mechanical position of the rotor (if wired) in addition of standard sincos signals of the speed feedback.
 - This mechanical position information is useful with synchronous motor (PMSM) because no more angle test is required at power on (just one is needed at the installation as the absolute encoder).

[1.4 MOTOR CONTROL] (drC-)


Code	Name/Description	Adjustment range	Factory setting
FL I -	[FLUXING BY LI] Cannot be accessed if [Motor control type] (Ctt) page 137 = [Sync.CL] (FSY).		
FLU  FnC FCE FnO	<input type="checkbox"/> [Motor fluxing] (1) <input type="checkbox"/> [Not cont.] (FnC): Non-continuous mode <input type="checkbox"/> [Continuous] (FCt): Continuous mode. This option is not possible if [Angle setting type] (ASt) page 153 is [With load] (brC) or if [Auto DC Injection] (AdC) page 223 is [Yes] (YES) or if [Type of stop] (Stt) page 221 is [Freewheel] (nSt). <input type="checkbox"/> [No] (FnO): Function inactive. This option is not possible if [Motor control type] (Ctt) page 137 = [SVCI] (CUC) or [FVC] (FUC). If [Motor control type] (Ctt) page 137 = [SVCI] (CUC), [FVC] (FUC) or [Sync. mot.] (SYn), the factory setting is replaced by [Not Cont.] (FnC). In order to obtain rapid high torque on startup, magnetic flux needs to already have been established in the motor. <ul style="list-style-type: none"> • In [Continuous] (FCt) mode, the drive automatically builds up flux when it is powered up. • In [Not cont.] (FnC) mode, fluxing occurs when the motor starts up. The flux current is greater than nCr (configured rated motor current) when the flux is established and is then adjusted to the motor magnetizing current. <div style="border: 1px solid black; padding: 5px; text-align: center;"> CAUTION Check that the motor will withstand this current without overheating. Failure to follow this instruction can result in equipment damage. </div> If [Motor control type] (Ctt) page 137 = [Sync. mot.] (SYn), the [Motor fluxing] (FLU) parameter must be active ([No] (FnO) is not permitted): this parameter causes rotor angle detection or alignment (according to the configuration of [Angle setting type] (ASt) page 151) and not fluxing. If [Brake assignment] (bLC) page 233 is not [No] (nO), the [Motor fluxing] (FLU) parameter has no effect.		[No] (FnO)
ASL brC nLd brCO	<input type="checkbox"/> [Angle setting type] This parameter can be accessed only if [Motor control type] (Ctt) page 137 = [Sync. mot.] (SYn) Mode for measuring the phase-shift angle between the motor and the encoder. <input type="checkbox"/> [With load] (brC): Measurement without motion, possible with or without load, brake engaged or released. <input type="checkbox"/> [W/o load] (nLd): Measurement with motion, only for free motors (brake released), without load. <input type="checkbox"/> [Optimized] (brCO): Measurement without motion, possible with or without load, brake engaged or released. Optimizing the angle detection time, based on the second detection request, even after the product has been turned off. Note: If [Angle setting type] (ASt) = [W/o load] (nLd), the motor may rotate one full revolution during measurement. 		[With load] (brC)

(1) Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.



Parameter that can be modified during operation or when stopped.

[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range
tUn -	[AUTOMATIC TUNE]	
tUn nO YES dOnE	<input type="checkbox"/> [Auto tuning] <input type="checkbox"/> [No] (nO) : Auto-tuning not performed. <input type="checkbox"/> [Yes] (YES) : Auto-tuning is performed as soon as possible, then the parameter automatically changes to [Done] (dOnE) . <input type="checkbox"/> [Done] (dOnE) : Use of the values given the last time auto-tuning was performed. Important: <ul style="list-style-type: none"> It is essential that all the motor parameters are correctly configured before starting auto-tuning. <ul style="list-style-type: none"> Asynchronous motor: [Rated motor volt.] (UnS), [Rated motor freq.] (FrS), [Rated mot. current] (nCr), [Rated motor speed] (nSP), [Rated motor power] (nPr) page 143. Synchronous motor: [Nominal I sync.] (nCrS), [Nom motor spdsync] (nSPS), [Pole pairs] (PPnS), [Syn. EMF constant] (PHS), [Autotune L d-axis] (LdS), [Autotune L q-axis] (LqS) page 148. If at least one of these parameters (except [Syn. EMF constant] (PHS), [Autotune L d-axis] (LdS), [Autotune L q-axis] (LqS)) is modified after auto-tuning has been performed, [Auto tuning] (tUn) will return to [No] (nO) and must be repeated. Auto-tuning is only performed if no stop command has been activated. If a "freewheel stop" or "fast stop" function has been assigned to a logic input, this input must be inactive. Auto-tuning takes priority over any run or prefluxing commands, which will be taken into account after the auto-tuning sequence. If auto-tuning fails, the drive displays [No] (nO) and, depending on the configuration of [Autotune fault mgt] (tnL) page 280, may switch to [Auto-tuning] (tnF) fault mode. Auto-tuning may last for 1 to 2 seconds. Do not interrupt the process. Wait for the display to change to "[Done] (dOnE)" or "[No] (nO)". <p> Note:</p> <ul style="list-style-type: none"> During auto-tuning the motor operates at rated current. If the "line contactor" or "output contactor" function has been configured, the contactor closes during auto-tuning. 	[No] (nO)
Aut nO YES	<input type="checkbox"/> [Automatic autotune] <input type="checkbox"/> [No] (nO) : Function inactive. <input type="checkbox"/> [Yes] (YES) : Auto-tuning is performed on every power-up. Important: Same comments as for [Auto tuning] (tUn) above.	[No] (nO)
tUL nO L I I - - -	<input type="checkbox"/> [Auto-tune assign.] Assignment of auto-tuning to a logic input or control bit. <input type="checkbox"/> [No] (nO) : Not assigned <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...) : See the assignment conditions on page 204. Auto-tuning is performed when the assigned bit or input changes to 1. Important: Same comments as for [Auto tuning] (tUn) above.	[No] (nO)

[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range
tUn-	[AUTOMATIC TUNE] (continued)	
tUS	<input type="checkbox"/> [Auto tuning state] For information only, cannot be modified. <ul style="list-style-type: none"> <input type="checkbox"/> [Not done] (tAb): The default stator resistance value is used to control the motor. <input type="checkbox"/> [Pending] (PEnd): Auto-tuning has been requested but not yet performed. <input type="checkbox"/> [In progress] (PrOG): Auto-tuning in progress. <input type="checkbox"/> [Failed] (FAIL): Auto-tuning has failed. <input type="checkbox"/> [Done] (dOnE): The stator resistance measured by the auto-tuning function is used to control the motor. <input type="checkbox"/> [Customized] (CUS): Auto-tuning has been performed but at least one of the parameters [Autotune L d-axis] (LdS), [Autotune L q-axis] (LqS) or [Cust. stator R syn] (rSAS) has subsequently been modified. The following auto-tuning parameters are affected: <ul style="list-style-type: none"> • [Cust stator resist.] (rSA), [Idw] (IdA), [LFw] (LFA) and [Cust. rotor t const.] (trA) page 147 for asynchronous motors. • [Cust. stator R syn] (rSAS) page 148 for synchronous motors. 	[Not done] (tAb)

[1.4 MOTOR CONTROL] (drC-)



Code	Name/Description	Adjustment range	Factory setting
SSL -	[SPEED LOOP]		
SFC ()	<input type="checkbox"/> [K speed loop filter] (1) Speed loop filter coefficient. See page 68 for more details of the effect of this parameter.	0 to 100	According to [Motor control type] (Ctt)
SLR ()	<input type="checkbox"/> [Fr.Loop.Stab] (1) Stability: Used to adapt the return to steady state after a speed transient, according to the dynamics of the machine. Gradually increase the stability to increase control loop attenuation and thus reduce any overspeed.	0 to 100 %	20 %
FLG ()	<input type="checkbox"/> [FreqLoopGain] (1) Frequency loop gain: Used to adapt the pace of the machine speed transients according to the dynamics. For machines with high resistive torque, high inertia or fast cycles, increase the gain gradually. [FreqLoopGain] (FLG) is set to 20% when [Motor control type] (Ctt) is set to [Sync. mot.] (SYn) or [Sync.CL] (FSY).	0 to 100 %	6 %


(1) Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu and [1.1 LIFT] (LIF-).

() Parameter that can be modified during operation or when stopped.

[1.4 MOTOR CONTROL] (drC-)

Parameters that can be accessed in **[Expert]** mode

Code	Name/Description	Adjustment range	Factory setting
SSL -	[SPEED LOOP] (continued)		
FFP 	<input type="checkbox"/> [Feed forward] Percentage of the high-performance regulator feedforward term. 100% corresponds to the term calculated using the value of [Application Inertia] (JAPL) page 81 .	0 to 200 %	0 %
FFU 	<input type="checkbox"/> [Bandwidth feedfor.] Bandwidth of the high-performance speed loop feedforward term, as a percentage of the predefined value.	20 to 500 %	100 %

 Parameter that can be modified during operation or when stopped.

[1.4 MOTOR CONTROL] (drC-)

[ENA SYSTEM]

ENA SYSTEM is a control profile designed for rotating machines with unbalanced load. **It only applies to asynchronous motors.**

It is used primarily for oil pumps. The operating principle applied:

- Allows operation without a braking resistor
- Reduces mechanical stress on the rod
- Reduces line current fluctuations
- Reduces energy consumption by improving the electric power/current ratio.

[ENA prop.gain]

This setting is used to achieve a compromise between the reduced energy consumption (and/or line current fluctuations) and the mechanical stress to which the rod is subject.

Energy is saved by reducing current fluctuations and increasing the current while retaining the same average speed.

[ENA integral gain]

This setting is used to smooth the DC bus voltage.

Start up the machine with a low integral and proportional gain (proportional 25% and integral 10%) in order to avoid an overvoltage trip in the absence of a braking resistor. See if these settings are suitable.

Recommended adjustments to be made during operation:

- To eliminate the braking resistor and, therefore, the increase in the DC bus voltage:
Display the machine speed on the graphic display terminal.
Reduce the integral gain value until the machine speed drops. When this point is reached, increase the integral gain until the machine speed stabilizes.
Use the graphic display terminal or an oscilloscope to check that the DC bus voltage is stable.
- To save energy:
Reducing the proportional gain (gradually) may increase energy savings by reducing the maximum value of the line current, but it will increase speed variations and, therefore, mechanical stress.
The aim is to identify settings that will enable energy to be saved and minimize mechanical stress.
When reducing the proportional gain, it may be necessary to readjust the integral gain in order to avoid an overvoltage trip.

Note: Once the adjustments are complete, check that the pump starts up correctly. If the ENA integral gain setting is too low, this may lead to insufficient torque on startup.

[Reduction ratio]

This setting corresponds to the motor speed ahead of gearbox/speed after gearbox ratio. This parameter is used to display the average speed in Hz and the machine speed in customer units (e.g., in strokes per minute) on the graphic display terminal. In order to be displayed on the graphic display terminal, these values must be selected in the [1.2 MONITORING] (SUP-) menu.

Adjustment recommendations for prevention of tripping on an [Overspeed] (SOF) fault

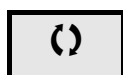
ENA SYSTEM authorizes overspeed, which can trigger an [Overspeed] (SOF) fault. To avoid this occurring, it is advisable to increase the value of the following parameters slightly:

- [Max frequency] (tFr) page [138](#).
- [Overspd. pulse thd.] (FqA) page [279](#), if the "frequency meter" function is configured.

[1.4 MOTOR CONTROL] (drC-)

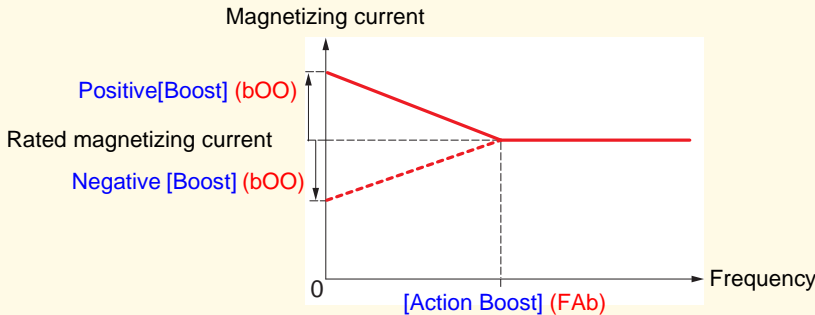
Code	Name/Description	Adjustment range	Factory setting
SSL -	[SPEED LOOP] (continued)		
EnA nO YES	<input type="checkbox"/> [ENA system] This parameter can be accessed if [Motor control type] (Ctt) = [SVC V] (UUC), see page 137. <input type="checkbox"/> [No] (nO) : Function inactive <input type="checkbox"/> [Yes] (YES) : Function active		[No] (nO)
GPE ()	<input type="checkbox"/> [ENA prop.gain] (1) This parameter can be accessed if [ENA system] (EnA) = [Yes] (YES)	1 to 9999	250
GIE ()	<input type="checkbox"/> [ENA integral gain] (1) This parameter can be accessed if [ENA system] (EnA) = [Yes] (YES)	0 to 9999	100
rRP ()	<input type="checkbox"/> [Reduction ratio] (1) This parameter can be accessed if [ENA system] (EnA) = [Yes] (YES)	10.0 to 999.9	10

(1) Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.



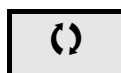
Parameter that can be modified during operation or when stopped.

[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range	Factory setting
b00	<input type="checkbox"/> [Boost] (1) This parameter can be accessed if [ACCESS LEVEL] = [Expert] and if [Motor control type] (Ctt) page 137 is not [Sync.CL] (FSY) . Adjustment of the motor magnetizing current at low speed, as a % of the rated magnetizing current. This parameter is used to increase or reduce the time taken to establish the torque. It allows gradual adjustment up to the frequency set by [Action Boost] (FAb) . Negative values apply particularly to tapered rotor motors. 	-100% to 100%	0
FAb	<input type="checkbox"/> [Action Boost] (1) This parameter can be accessed if [ACCESS LEVEL] = [Expert] and if [Motor control type] (Ctt) page 137 is not [Sync.CL] (FSY) . Frequency above which the magnetizing current is not longer affected by [Boost] (b00) .	0 to 500 Hz	0
UFr ()	<input type="checkbox"/> [IR compensation] (2) This parameter can be accessed if [Motor control type] (Ctt) page 137 is not [V/F 2pts] (UF2) or [V/F 5pts] (UF5) . Used to optimize the torque at very low speed (increase [IR compensation] (UFr) if the torque is insufficient). Check that the [IR compensation] (UFr) value is not too high when the motor is warm (risk of instability).	25 to 200%	100%
nrd n0 YES	<input type="checkbox"/> [Noise reduction] <input type="checkbox"/> [No] (n0) : Fixed frequency. <input type="checkbox"/> [Yes] (YES) : Frequency with random modulation. Random frequency modulation prevents any resonance, which may occur at a fixed frequency.		[Yes] (YES)

(1) These two parameters cannot be accessed in closed-loop synchronous mode **[Sync.CL] (FSY)**.

(2) Parameter can also be accessed in the **[1.3 SETTINGS] (SEt-)** menu.



Parameter that can be modified during operation or when stopped.

[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range	Factory setting
SUL nO YES	<input type="checkbox"/> [Motor surge limit.] This function limits motor overvoltages and is useful in the following applications: <ul style="list-style-type: none"> - NEMA motors - Japanese motors - Spindle motors - Rewound motors <input type="checkbox"/> [No] (nO) : Function inactive <input type="checkbox"/> [Yes] (YES) : Function active This parameter is forced to [No] (nO) if [Sinus filter] (OFI) page 139 = [Yes] (YES) . This parameter can remain = [No] (nO) for 230/400 V motors used at 230 V, or if the length of cable between the drive and the motor does not exceed: <ul style="list-style-type: none"> - 4 m with unshielded cables - 10 m with shielded cables 		[No] (nO)
SOP	<input type="checkbox"/> [Volt surge limit. opt] Optimization parameter for transient overvoltages at the motor terminals. Can be accessed if [Motor surge limit.] (SUL) = [Yes] (YES) . Set to 6, 8, or 10 µs, according to the following table.		10 µs

The value of the "SOP" parameter corresponds to the attenuation time of the cable used. It is defined to prevent the superimposition of voltage wave reflections resulting from long cable lengths. It limits overvoltages to twice the DC bus rated voltage.



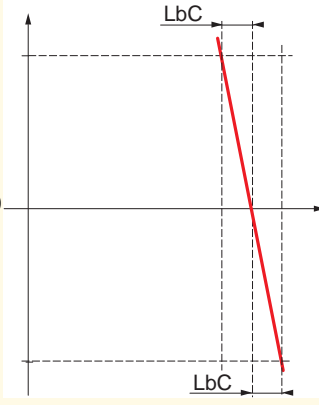
The tables on the following page give examples of correspondence between the "SOP" parameter and the length of the cable between the drive and the motor. For longer cable lengths, a sinus filter or a dV/dt protection filter must be used.

- For motors in parallel, the sum of all the cable lengths must be taken into consideration. Compare the length given in the table row corresponding to the power for one motor with that corresponding to the total power, and select the shorter length. E.g. Two 7.5 kW (10 HP) motors - take the lengths on the 15 kW (20 HP) table row, which are shorter than those on the 7.5 kW (10 HP) row, and divide by the number of motors to obtain the length per motor (with unshielded "GORSE" cable and SOP = 6, the result is 40/2 = 20 m maximum for each 7.5 kW (10 HP) motor).


In special cases (for example, different types of cable, different motor powers in parallel, different cable lengths in parallel, etc.), we recommend using an oscilloscope to check the overvoltage values obtained at the motor terminals.

To retain the overall drive performance, do not increase the SOP value unnecessarily.

[1.4 MOTOR CONTROL] (drC-)

Code	Name/Description	Adjustment range	Factory setting
Ubr 	[Braking level] DC bus voltage threshold above which the braking transistor cuts in to limit this voltage. ATV71L...M3Z: factory setting 395 V. ATV71L...N4Z: factory setting 785 V. The adjustment range depends on the voltage rating of the drive and the [Mains voltage] (UrES) parameter, page 272.		According to drive voltage rating
bbA nO YES	[Braking balance] <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [Yes] (YES): Function active, to be used on drives connected in parallel via their DC bus. Used to balance the braking power between the drives. The [Braking level] (Ubr) parameter must be set to the same value on the various drives. The value [Yes] (YES) is possible only if [Dec ramp adapt.] (brA) = [No] (nO) (see page 220).		[No] (nO)
LbA nO YES	[Load sharing] When 2 motors are connected mechanically and therefore at the same speed, and each is controlled by a drive, this function can be used to improve torque distribution between the two motors. To do this, it varies the speed based on the torque. <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [Yes] (YES): Function active The parameter can only be accessed if [Motor control type] (Ctt) page 137 is not [V/F 2pts] (UF2) or [V/F 5pts] (UF5).		[No] (nO)
LbC 	[Load correction] (1) Rated correction in Hz. This parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES) <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">Torque</div>  <div style="margin-left: 10px;">Frequency</div> </div>	0 to 1,000 Hz	0

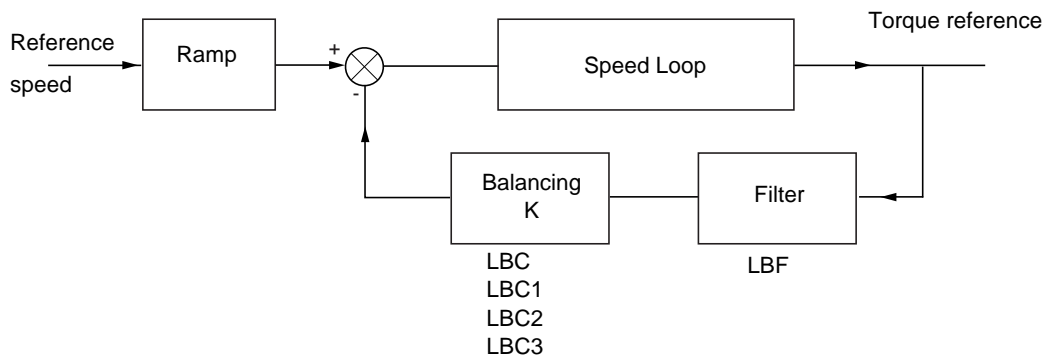
(1) Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

 Parameter that can be modified during operation or when stopped.

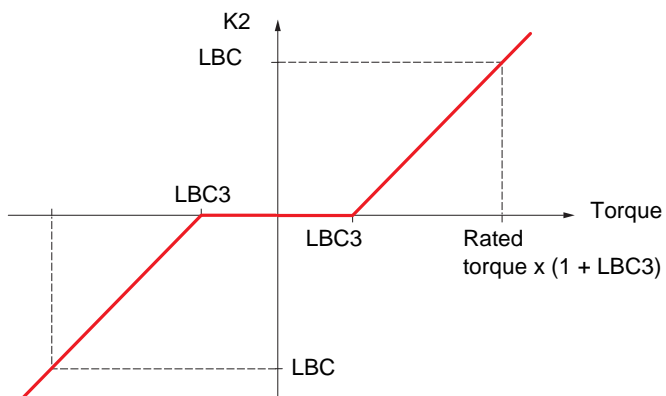
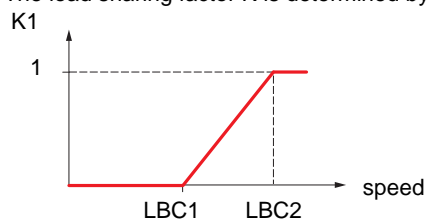
[1.4 MOTOR CONTROL] (drC-)

Load sharing, parameters that can be accessed at Expert level

Principle

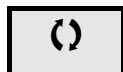


The load sharing factor K is determined by the torque and speed, with two factors K1 and K2 ($K = K1 \times K2$).



[1.4 MOTOR CONTROL] (drC-)

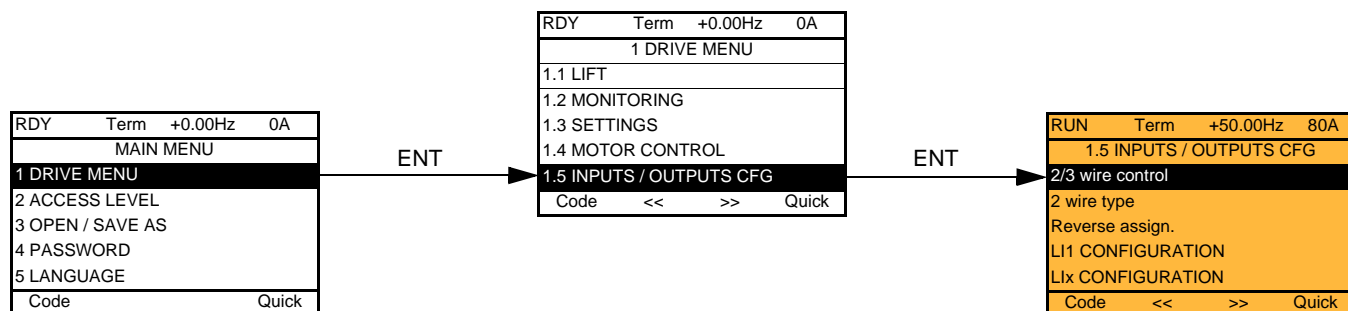
Code	Name/Description	Adjustment range	Factory setting
LbC1 ()	<input type="checkbox"/> [Correction min spd] This parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES) Minimum speed for load correction in Hz. Below this threshold, no corrections are made. Used to prevent correction at very low speed if this would hamper rotation of the motor.	0 to 999.9 Hz	0
LbC2 ()	<input type="checkbox"/> [Correction max spd] This parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES) Speed threshold in Hz above which maximum load correction is applied.	[Correction min spd] (LbC1) + 0.1 at 1,000 Hz	0.1
LbC3 ()	<input type="checkbox"/> [Torque offset] This parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES) Minimum torque for load correction as a % of the rated torque. Below this threshold, no corrections are made. Used to avoid torque instabilities when the torque direction is not constant.	0 to 300 %	0 %
LbF ()	<input type="checkbox"/> [Sharing filter] This parameter can be accessed if [Load sharing] (LbA) = [Yes] (YES) Time constant (filter) for correction in ms. Used in the event of flexible mechanical coupling in order to avoid instabilities.	100 ms to 20 s	100 ms



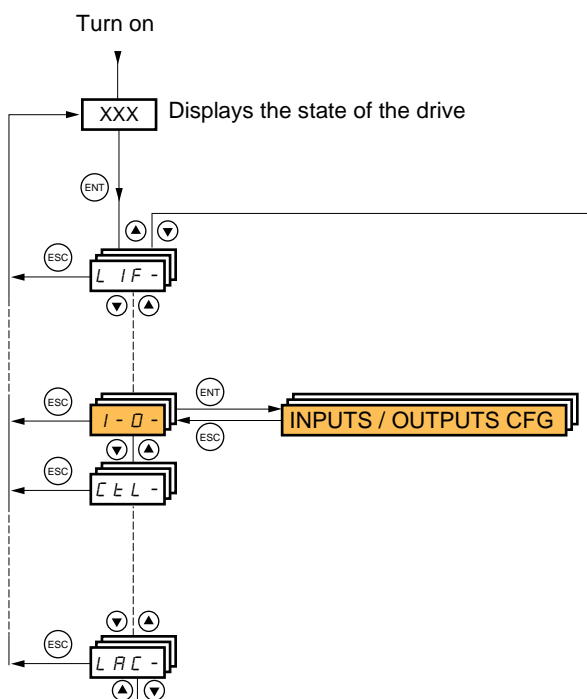
Parameter that can be modified during operation or when stopped.

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

With graphic display terminal:

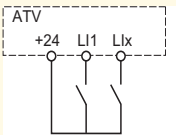
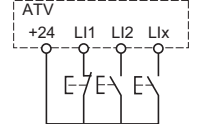


With integrated display terminal:




[1.5 INPUTS / OUTPUTS CFG] (I-O-)

The parameters in the [1.5 INPUTS / OUTPUTS CFG] (I-O-) menu can only be modified when the drive is stopped and no run command is present.

Code	Name/Description	Adjustment range	Factory setting
tCC 2C 3C	<input type="checkbox"/> [2/3 wire control] <input type="checkbox"/> [2 wire] (2C) <input type="checkbox"/> [3 wire] (3C) <p>2-wire control: This is the input state (0 or 1) or edge (0 to 1 or 1 to 0), which controls running or stopping.</p> <p>Example of "source" wiring:</p>  <p>LI1: Forward LIx: Reverse</p> <p>3-wire control (pulse commands): A "forward" or "reverse" pulse is sufficient to control startup, a "stop" pulse is sufficient to control stopping.</p> <p>Example of "source" wiring:</p>  <p>LI1: Stop LI2: Forward LIx: Reverse</p> <div style="border: 1px solid black; padding: 10px; margin-top: 20px;"> <p style="text-align: center;">⚠ WARNING</p> <p>UNINTENDED EQUIPMENT OPERATION</p> <p>To change the assignment of [2/3 wire control] (tCC) press and hold down the "ENT" key for 2 s. It causes the following functions to return to factory setting: [2 wire type] (tCt) and [Reverse assign.] (rrS) below, and all functions which assign logic inputs and analog inputs. The macro configuration selected will also be reset if it has been customized (loss of custom settings). It is advisable to configure this parameter before configuring the [1.6 COMMAND] (CtL-) and [1.7 APPLICATION FUNCT.] (FUn-) menus. Check that this change is compatible with the wiring diagram used.</p> <p>Failure to follow this instruction can result in death or serious injury.</p> </div>		[2 wire] (2C)
tCC LEL trn PFO	<input type="checkbox"/> [2 wire type] <input type="checkbox"/> [Level] (LEL) : State 0 or 1 is taken into account for run (1) or stop (0). <input type="checkbox"/> [Transition] (trn) : A change of state (transition or edge) is necessary to initiate operation, in order to prevent accidental restarts after a break in the power supply. <input type="checkbox"/> [Fwd priority] (PFO) : State 0 or 1 is taken into account for run or stop, but the "forward" input always takes priority over the "reverse" input.		[Transition] (trn)
rrS nO LI1 - - - C101 - - - Cd00 -	<input type="checkbox"/> [Reverse assign.] <input type="checkbox"/> [No] (nO) : Not assigned <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10) : If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12) : If VW3A3203 ESIM card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14) : If VW3A3202 extended I/O card has been inserted <input type="checkbox"/> [C101] (C101) to [C115] (C115) : With integrated Modbus in [I/O profile] (IO) <input type="checkbox"/> [C201] (C201) to [C215] (C215) : With integrated CANopen in [I/O profile] (IO) <input type="checkbox"/> [C301] (C301) to [C315] (C315) : With a communication card in [I/O profile] (IO) <input type="checkbox"/> [C401] (C401) to [C415] (C415) : With a Controller Inside card in [I/O profile] (IO) <input type="checkbox"/> [CD00] (Cd00) to [CD13] (Cd13) : In [I/O profile] (IO) can be switched with possible logic inputs <input type="checkbox"/> [CD14] (Cd14) to [CD15] (Cd15) : In [I/O profile] (IO) can be switched without logic inputs <p>Assignment of the reverse direction command.</p>		[LI2] (LI2)

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

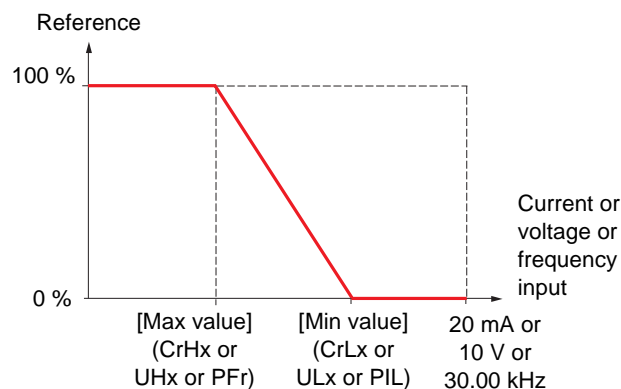
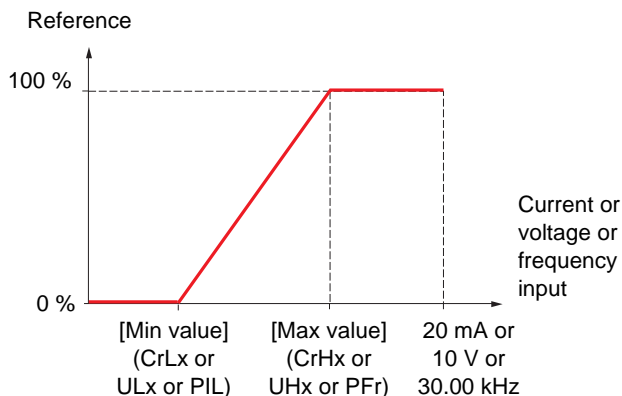
Code	Name/Description	Adjustment range	Factory setting
L I -	[LI1 CONFIGURATION]		
L I R	<input type="checkbox"/> [LI1 assignment] Read-only parameter, cannot be configured. It displays all the functions that are assigned to input LI1 in order to check for multiple assignments.		
L I d	<input type="checkbox"/> [LI1 >On Delay] This parameter is used to take account of the change of the logic input to state 1 with a delay that can be adjusted between 0 and 200 milliseconds, in order to filter out possible interference. The change to state 0 is taken into account without delay.	0 to 200 ms	0
	<div style="text-align: center;">  WARNING </div> <div> UNINTENDED EQUIPMENT OPERATION Check that the delay set does not pose a risk or lead to undesired operation. The relative order in which these inputs are taken into account may be modified according to the delay values of the various logic inputs, and thus lead to unintended operation. Failure to follow this instruction can result in death or serious injury. </div>		
L - -	[LIx CONFIGURATION]		
	All the logic inputs available on the drive are processed as in the example for LI1 above, up to LI6, LI10 or LI14, depending on whether or not option cards have been inserted.		

Configuration of analog inputs and Pulse input

The minimum and maximum input values (in volts, mA, etc.) are converted to % in order to adapt the references to the application.

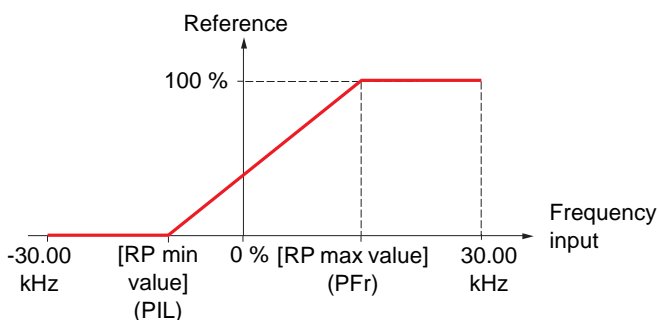
Minimum and maximum input values:

The minimum value corresponds to a reference of 0% and the maximum value to a reference of 100%. The minimum value may be greater than the maximum value:



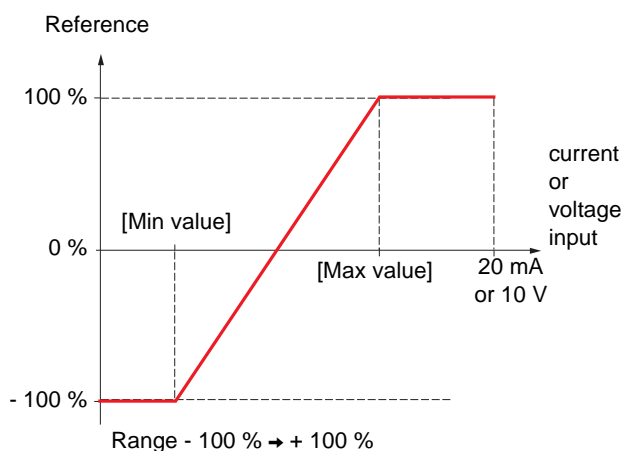
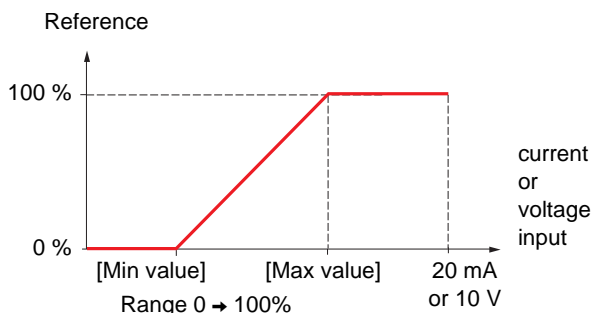
For +/- bidirectional inputs, the min. and max. are relative to the absolute value, for example, +/- 2 to 8 V.

Negative min. value of Pulse input:

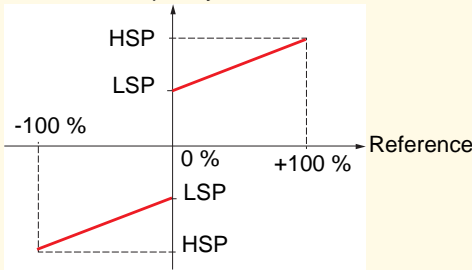
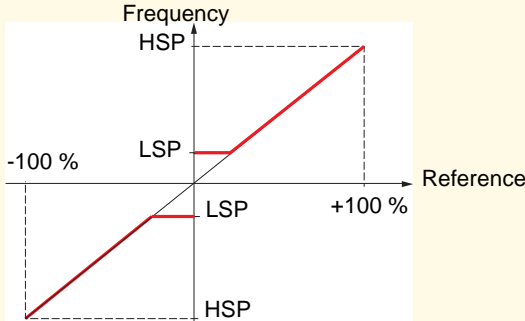
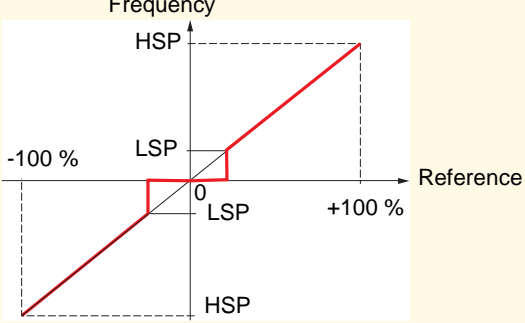
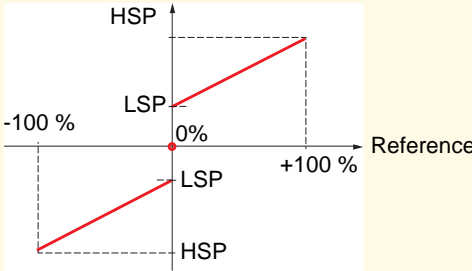


Range (output values): For analog inputs only

This parameter is used to configure the reference range to [0% → 100%] or [-100% → +100%] in order to obtain a bidirectional output from a unidirectional input.



[1.5 INPUTS / OUTPUTS CFG] (I-O-)

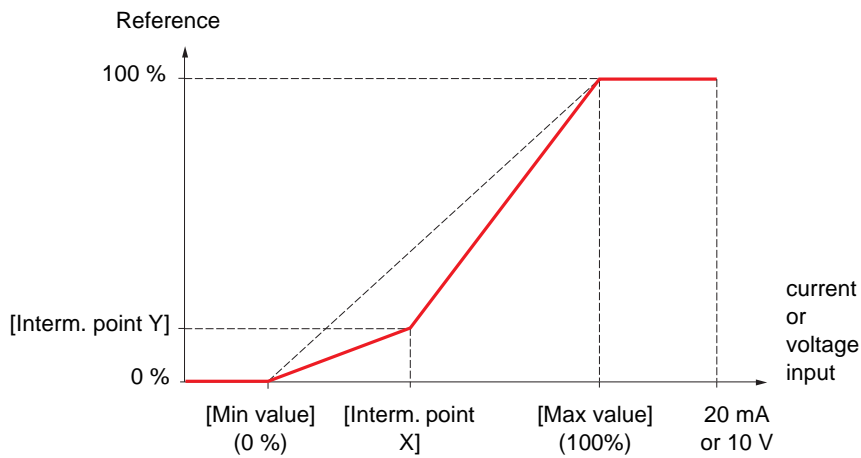
Code	Name/Description	Adjustment range	Factory setting
bSP	<input type="checkbox"/> [Reference template]		[Standard] (bSd)
bSd	<input type="checkbox"/> [Standard] (bSd) <p>At zero reference the frequency = LSP</p> 		
bLS	<input type="checkbox"/> [Pedestal] (bLS) <p>At reference = 0 to LSP the frequency = LSP</p> 		
bnS	<input type="checkbox"/> [Deadband] (bnS) <p>At reference = 0 to LSP the frequency = 0</p> 		
bnS0	<input type="checkbox"/> [Deadband 0] (bnS0) <p>This operation is the same as [Standard] (bSd), except that in the following cases at zero reference, the frequency = 0:</p> <ul style="list-style-type: none"> • The signal is less than [Min value], which is greater than 0 (example 1 V on a 2 - 10 V input) • The signal is greater than [Min value], which is greater than [Max value] (example 11 V on a 10 - 0 V input). <p>If the input range is configured as "bidirectional", operation remains identical to [Standard] (bSd).</p> <p>This parameter defines how the speed reference is taken into account, for analog inputs and Pulse input only.</p> <p>The limits are set by the [Low speed] (LSP) and [High speed] (HSP) parameters, page 126.</p> 		

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Delinearization: For analog inputs only

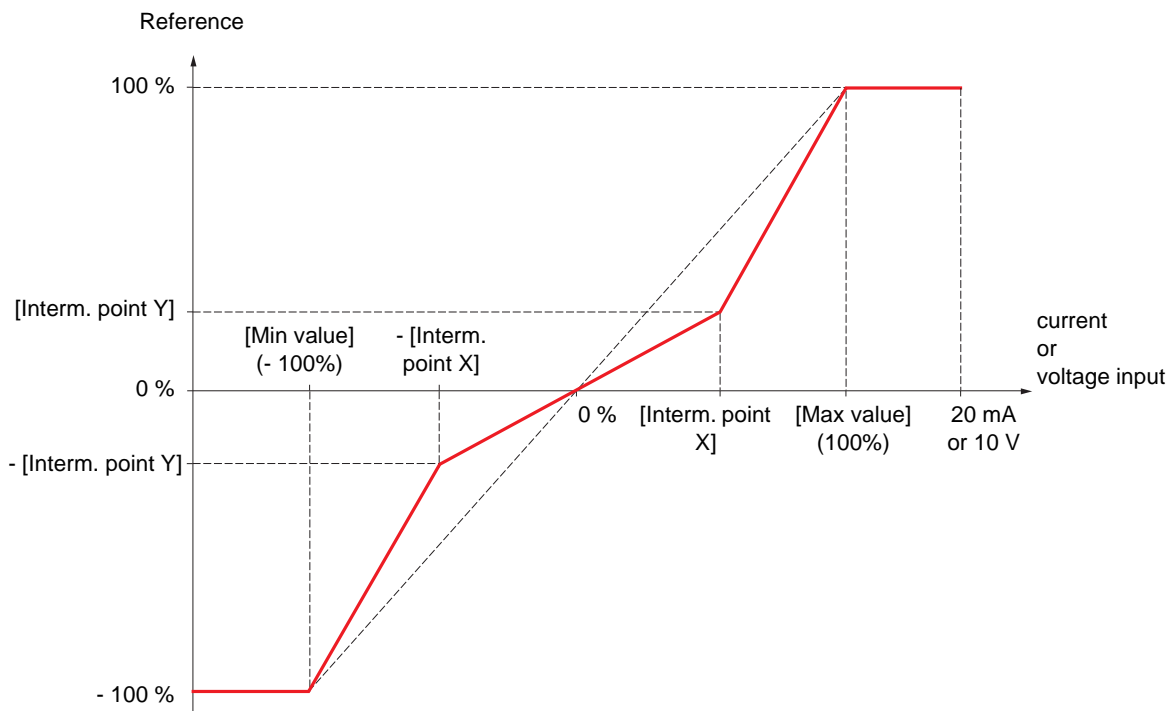
The input can be delinearized by configuring an intermediate point on the input/output curve of this input:

For range 0 → 100%



Note: For [Interm. point X], 0% corresponds to [Min value] and 100% to [Max value]

For range -100% → 100%



[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
A I I -	[AI1 CONFIGURATION]		
A I I A	<input type="checkbox"/> [AI1 assignment] Read-only parameter, cannot be configured. It displays all the functions associated with input AI1 in order to check, for example, for compatibility problems.		
A I I E 10U n 10U	<input type="checkbox"/> [AI1 Type] <input type="checkbox"/> [Voltage] (10U) : Positive voltage input (negative values are interpreted as zero: the input is unidirectional). <input type="checkbox"/> [Voltage +/-] (n10U) : Positive and negative voltage input (the input is bidirectional).		[Voltage] (10U)
U I L 1	<input type="checkbox"/> [AI1 min value]	0 to 10.0 V	0 V
U I H 1	<input type="checkbox"/> [AI1 max value]	0 to 10.0 V	10.0 V
A I I F	<input type="checkbox"/> [AI1 filter] Interference filtering.	0 to 10.00 s	0 s
A I I E	<input type="checkbox"/> [AI1 Interm. point X] Input delinearization point coordinate. • 0% corresponds to [AI1 min value] (UIL1) . • 100% corresponds to [AI1 max value] (UIH1) .	0 to 100 %	0 %
A I I S		0 to 100 %	0 %
	<input type="checkbox"/> [AI1 Interm. point Y] Output delinearization point coordinate (frequency reference).		

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
A 12 -	[AI2 CONFIGURATION]		
A 12A	<input type="checkbox"/> [AI2 assignment] Read-only parameter, cannot be configured. It displays all the functions associated with input AI2 in order to check, for example, for compatibility problems.		
A 12E 10U 0A	<input type="checkbox"/> [AI2 Type] <input type="checkbox"/> [Voltage] (10U) : Voltage input <input type="checkbox"/> [Current] (0A) : Current input		[Current] (0A)
C r L 2	<input type="checkbox"/> [AI2 min. value] This parameter can be accessed if [AI2 Type] (AI2t) = [Current] (0A)	0 to 20.0 mA	0 mA
U I L 2	<input type="checkbox"/> [AI2 min. value] This parameter can be accessed if [AI2 Type] (AI2t) = [Voltage] (10U)	0 to 10.0 V	0 V
C r H 2	<input type="checkbox"/> [AI2 max. value] This parameter can be accessed if [AI2 Type] (AI2t) = [Current] (0A)	0 to 20.0 mA	20.0 mA
U I H 2	<input type="checkbox"/> [AI2 max. value] This parameter can be accessed if [AI2 Type] (AI2t) = [Voltage] (10U)	0 to 10.0 V	10.0 V
A 12F	<input type="checkbox"/> [AI2 filter] Interference filtering.	0 to 10.00 s	0 s
A 12L POS nEG	<input type="checkbox"/> [AI2 range] <input type="checkbox"/> [0 - 100%] (POS) : Unidirectional input <input type="checkbox"/> [+/- 100%] (nEG) : Bidirectional input E.g. On a 0/10 V input - 0 V corresponds to reference - 100% - 5 V corresponds to reference 0 % - 10 V corresponds to reference + 100%		
A 12E	<input type="checkbox"/> [AI2 Interm. point X] Input delinearization point coordinate. • 0% corresponds to [Min value] if the range is 0 → 100%. • 0% corresponds to $\frac{[\text{Max value}] + [\text{Min value}]}{2}$ if the range is -100% → + 100%. • 100% corresponds to [Max value] .	0 to 100 %	0 %
A 12S	<input type="checkbox"/> [AI2 Interm. point Y] Output delinearization point coordinate (frequency reference).	0 to 100 %	0 %


[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
A I3 -	[AI3 CONFIGURATION] Can be accessed if a VW3A3202 option card has been inserted		
A I3A	<input type="checkbox"/> [AI3 assignment] Read-only parameter, cannot be configured. It displays all the functions associated with input AI3 in order to check, for example, for compatibility problems.		
A I3E DA	<input type="checkbox"/> [AI3 Type] Read-only parameter, cannot be configured. <input type="checkbox"/> [Current] (0 A) : Current input		[Current] (0A)
CrL3	<input type="checkbox"/> [AI3 min. value]	0 to 20.0 mA	0 mA
CrH3	<input type="checkbox"/> [AI3 max. value]	0 to 20.0 mA	20.0 mA
A I3F	<input type="checkbox"/> [AI3 filter] Interference filtering.	0 to 10.00 s	0 s
A I3L POS nEG	<input type="checkbox"/> [AI3 range] <input type="checkbox"/> [0 - 100%] (POS) : Unidirectional input <input type="checkbox"/> [+/- 100%] (nEG) : Bidirectional input E.g. On a 4 - 20 mA input - 4 mA corresponds to reference - 100% - 12 mA corresponds to reference 0 % - 20 mA corresponds to reference + 100% Since AI3 is, in physical terms, a bidirectional input, the [+/- 100%] (nEG) configuration must only be used if the signal applied is unidirectional. A bidirectional signal is not compatible with a bidirectional configuration.		[0 - 100%] (POS)
A I3E	<input type="checkbox"/> [AI3 Interm. point X] Input delinearization point coordinate. • 0% corresponds to [Min value] (CrL3) if the range is 0 → 100%. • 0% corresponds to $\frac{\text{[AI3 max. value] (CrH3)} - \text{[AI3 min. value]}}{2}$ if the range is -100% → +100%. • 100% corresponds to [AI3 max. value] (CrH3) .	0 to 100 %	0 %
A I3S	<input type="checkbox"/> [AI3 Interm. point Y] Output delinearization point coordinate (frequency reference).	0 to 100 %	0 %

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
A 14 -	[AI4 CONFIGURATION] Can be accessed if a VW3A3202 option card has been inserted		
A 14A	<input type="checkbox"/> [AI4 assignment] Read-only parameter, cannot be configured. It displays all the functions associated with input AI4 in order to check, for example, for compatibility problems.		
A 14E 10U 0A	<input type="checkbox"/> [AI4 Type] <input type="checkbox"/> [Voltage] (10U) : Voltage input <input type="checkbox"/> [Current] (0A) : Current input		[Voltage] (10U)
C r L 4	<input type="checkbox"/> [AI4 min value] This parameter can be accessed if [AI4 Type] (AI4t) = [Current] (0A)	0 to 20.0 mA	0 mA
U I L 4	<input type="checkbox"/> [AI4 min value] This parameter can be accessed if [AI4 Type] (AI4t) = [Voltage] (10U)	0 to 10.0 V	0 V
C r H 4	<input type="checkbox"/> [AI4 max value] This parameter can be accessed if [AI4 Type] (AI4t) = [Current] (0A)	0 to 20.0 mA	20.0 mA
U I H 4	<input type="checkbox"/> [AI4 max value] This parameter can be accessed if [AI4 Type] (AI4t) = [Voltage] (10U)	0 to 10.0 V	10.0 V
A 14F	<input type="checkbox"/> [AI4 filter] Interference filtering.	0 to 10.00 s	0 s
A 14L P 0 5 n E G	<input type="checkbox"/> [AI4 range] <input type="checkbox"/> [0 - 100%] (POS) : Unidirectional input <input type="checkbox"/> [+/- 100%] (nEG) : Bidirectional input E.g. On a 0/10 V input - 0 V corresponds to reference - 100% - 5 V corresponds to reference 0 % - 10 V corresponds to reference + 100%		[0 - 100%] (POS)
A 14E	<input type="checkbox"/> [AI4 Interm.point X] Input delinearization point coordinate. • 0% corresponds to [Min value] if the range is 0 → 100%. • 0% corresponds to $\frac{[\text{Max value}] + [\text{Min value}]}{2}$ if the range is -100% → + 100%. • 100% corresponds to [Max value] .	0 to 100 %	0 %
A 14S	<input type="checkbox"/> [AI4 Interm.point Y] Output delinearization point coordinate (frequency reference).	0 to 100 %	0 %

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
AU I -	[VIRTUAL AI1]		
A I C I	<input type="checkbox"/> [AI net. channel] Virtual input. [No] (nO) : Not assigned (in this case, the virtual input does not appear in the analog input assignment parameters for the functions) <input type="checkbox"/> [Modbus] (Mdb) : Integrated Modbus <input type="checkbox"/> [CANopen] (CAn) : Integrated CANopen <input type="checkbox"/> [Com. card] (nEt) : Communication card (if inserted) <input type="checkbox"/> [C.Insid. card] (APP) : Controller Inside card (if inserted) Scale: The value 8192 transmitted by this input is equivalent to 10 V on a 10 V input.		[No] (nO)
n O			
M d b			
C A n			
n E t			
A P P			
<div style="text-align: center;">  WARNING </div> <div> UNINTENDED EQUIPMENT OPERATION If the equipment switches to forced local mode (see page 286), the virtual input remains frozen at the last value transmitted. Do not use the virtual input and forced local mode in the same configuration. Failure to follow this instruction can result in death or serious injury. </div>			

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

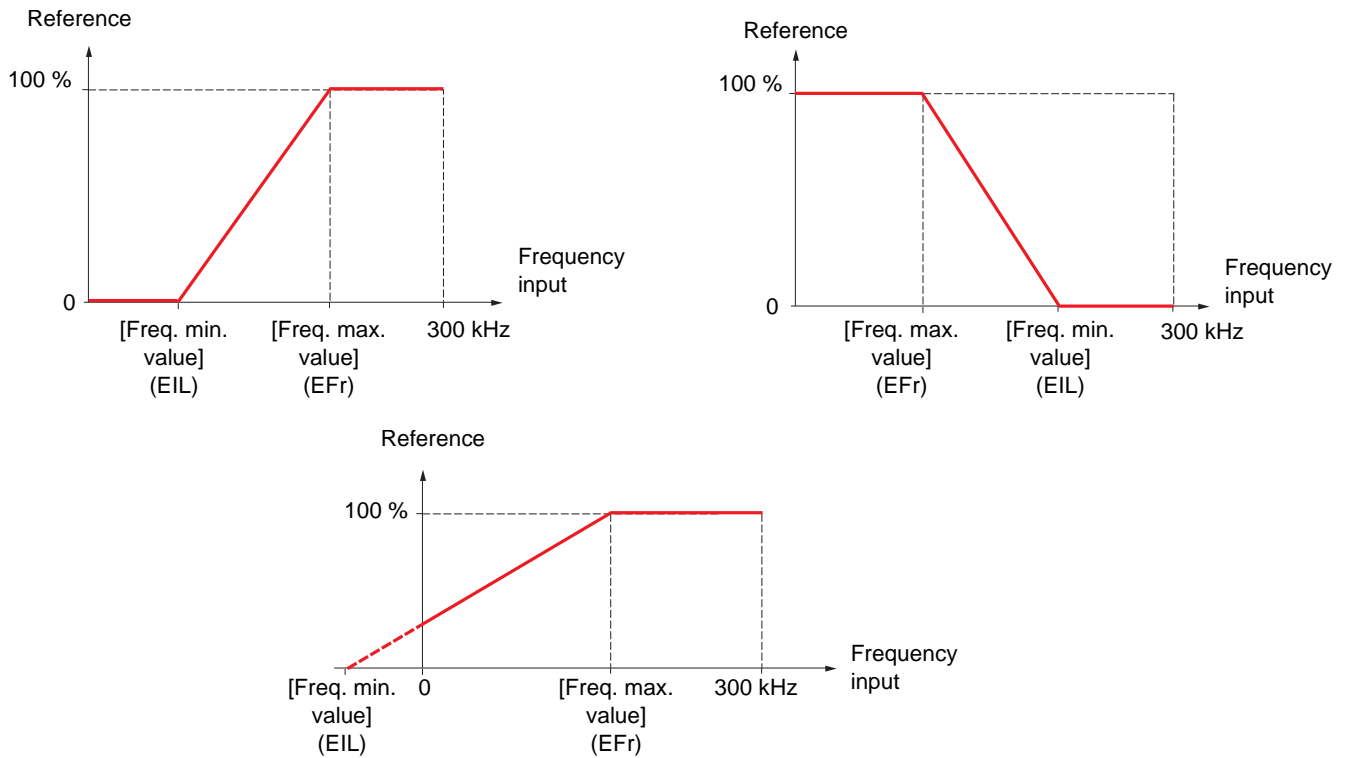
Code	Name/Description	Adjustment range	Factory setting
PL I -	[RP CONFIGURATION] Can be accessed if a VW3A3202 option card has been inserted		
P I R	<input type="checkbox"/> [RP assignment] Read-only parameter, cannot be configured. It displays all the functions associated with the Pulse In input in order to check, for example, for compatibility problems.		
P I L	<input type="checkbox"/> [RP min value] Frequency corresponding to the minimum speed	- 30.00 to 30.00 kHz	0
P F r	<input type="checkbox"/> [RP max value] Frequency corresponding to the maximum speed	0 to 30.00 kHz	30.00 kHz
P F I	<input type="checkbox"/> [RP filter] Interference filtering.	0 to 1000 ms	0

Configuration of the encoder input serving as a reference, with a frequency generator

This reference is not signed, therefore the directions of operation must be given via the control channel (logic inputs, for example).

Minimum and maximum values (input values):

The minimum value corresponds to a minimum reference of 0% and the maximum value to a maximum reference of 100%. The minimum value may be greater than the maximum value. It may also be negative.



A reference can be obtained at zero frequency by assigning a negative value to the minimum value.

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

The encoder configuration can also be accessed in the [1.4 MOTOR CONTROL] (drC-) menu.




Note 1: When an encoder is used with a VW3 A3 408 or VW3 A3 409 card, it is only possible to configure the "encoder" input for speed feedback. Functions can only be configured as references or inputs with a VW3 A3 401 to 407 and VW3 A3 411 card.

Note 2: When an encoder is used with a VW3 A3 409 card, the drive remains locked in stop mode (displays nSt or nLP) if the encoder is not fully configured.

Code	Name/Description	Adjustment range	Factory setting
IE n -	[ENCODER CONFIGURATION] The encoder parameters can only be accessed if an encoder card has been inserted, and the selections available will depend on the type of encoder card used.		
EnS nO AA bb Ab A	<input type="checkbox"/> [Encoder type] This parameter can be accessed if an incremental encoder card has been inserted. To be configured in accordance with the type of encoder used. <input type="checkbox"/> [No] (nO): Function inactive. <input type="checkbox"/> [AABB] (AA bb): For signals A, A-, B, B- or A, A-, B, B-, Z, Z- <input type="checkbox"/> [AB] (Ab): For signals A, B. <input type="checkbox"/> [A] (A): For signal A. Value cannot be accessed if [Encoder usage] (EnU) = [Spd fdk reg.] (rEG)		[AABB] (AA bb)
EnC nO YES dOnE	<input type="checkbox"/> [Encoder check] Check encoder feedback. See procedure page 141. This parameter can be accessed if an encoder card has been inserted and if [Encoder usage] (EnU) is not [Speed ref.] (PGr). <input type="checkbox"/> [Not done] (nO): Check not performed. <input type="checkbox"/> [Yes] (YES): Activates monitoring of the encoder. <input type="checkbox"/> [Done] (dOnE): Check performed successfully. The check procedure checks: - The direction of rotation of the encoder/motor - The presence of signals (wiring continuity) - The number of pulses/revolution If a fault is detected, the drive locks in [Encoder fault] (EnF) fault mode.		[Not done] (nO)
EnU nO SEC rEG PGr	<input type="checkbox"/> [Encoder usage] This parameter can be accessed if an encoder card has been inserted. <input type="checkbox"/> [No] (nO): Function inactive, In this case, the other parameters cannot be accessed. <input type="checkbox"/> [Fdbk monit.] (SEC): The encoder provides speed feedback for monitoring only. <input type="checkbox"/> [Spd fdk reg.] (rEG): The encoder provides speed feedback for regulation and monitoring. This configuration is automatic if the drive is configured for closed-loop operation ([Motor control type] (Ctt) = [FVC] (FUC) or [Sync.CL] (FSY). If [Motor control type] (Ctt) = [SVC V] (UUC) the encoder operates in speed feedback mode and enables static correction of the speed to be performed. This configuration is not accessible for other [Motor control type] (Ctt) values. <input type="checkbox"/> [Speed ref.] (PGr): The encoder provides a reference. Can only be selected with an incremental encoder card.		[No] (nO)
Enr I nO YES	<input type="checkbox"/> [Coder rotation inv.] This parameter can be accessed if an encoder card has been inserted. Activates reversal of encoder rotation. In some assemblies, the encoder positive direction of rotation is reversed in relation to the motor direction. When this is the case, this parameter needs to be activated in order for the motor and the encoder both to have a positive direction of rotation. <input type="checkbox"/> [No] (nO): Reversal not activated <input type="checkbox"/> [Yes] (YES): Reversal activated		[No] (nO)

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
	[ENCODER CONFIGURATION] (continued)		
P G I	<input type="checkbox"/> [Number of pulses] Number of pulses per encoder revolution. This parameter can be accessed if a VW3 A3 401 to 407 or VW3 A3 411 card has been inserted.	100 to 10000	1024
P G R	<input type="checkbox"/> [Reference type] This parameter can be accessed if [Encoder usage] (EnU) = [Speed ref.] (PGr) . <input type="checkbox"/> [Encoder] (EnC) : Use of an encoder (incremental encoder only). <input type="checkbox"/> [Freq. gen.] (PtG) : Use of a frequency generator (unsigned reference).		[Encoder] (EnC)
E n C P t G			
E I L	<input type="checkbox"/> [Freq. min. value] This parameter can be accessed if [Encoder usage] (EnU) = [Speed ref.] (PGr) and if [Reference type] (PGA) = [Freq. gen.] (PtG) . Frequency corresponding to the minimum speed.	- 300 to 300 kHz	0
E F r	<input type="checkbox"/> [Freq. max value] This parameter can be accessed if [Encoder usage] (EnU) = [Speed ref.] (PGr) and if [Reference type] (PGA) = [Freq. gen.] (PtG) . Frequency corresponding to the maximum speed.	0.00 to 300 kHz	300 kHz
E F I	<input type="checkbox"/> [Freq. signal filter] This parameter can be accessed if [Encoder usage] (EnU) = [Speed ref.] (PGr) . Interference filtering.	0 to 1000 ms	0
F r E S	<input type="checkbox"/> [Resolver Exct. Freq.] Resolver excitation frequency. This parameter can be accessed if a VW3 A3 408 encoder card (for resolver) has been inserted. <input type="checkbox"/> [4 kHz] (4) : 4 kHz <input type="checkbox"/> [8 kHz] (8) : 8 kHz <input type="checkbox"/> [12 kHz] (12) : 12 kHz		[8 kHz] (8)
4 8 12			
r P P n	<input type="checkbox"/> [Resolver poles nbr] Number of resolver poles. This parameter can be accessed if a VW3 A3 408 encoder card (for resolver) has been inserted. <input type="checkbox"/> [2 poles] (2P) : 2 poles, max. speed 7500 rpm <input type="checkbox"/> [4 poles] (4P) : 4 poles, max. speed 3750 rpm <input type="checkbox"/> [6 poles] (6P) : 6 poles, max. speed 2500 rpm <input type="checkbox"/> [8 poles] (8P) : 8 poles, max. speed 1875 rpm  If the number of motor poles is not a whole multiple of the number of resolver poles, the resolver is a relative encoder and no longer absolute. You should therefore set the [Angle setting activ.] (AtA) parameter = [Power On] (POn) or [Run order] (AUtO).		[2 poles] (2P)
2 P 4 P 6 P 8 P			

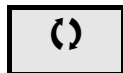
[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
	[ENCODER CONFIGURATION] (continued) These parameters can be accessed if a VW3 A3 409 encoder card has been inserted.		
UECP <i>Und</i> <i>End</i> SCHP <i>SC</i> <i>SSI</i> <i>EnSC</i>	<input type="checkbox"/> [Encoder protocol] Type of encoder used. <input type="checkbox"/> [Undefined] (Und): Not defined. <input type="checkbox"/> [EnDat 2.1] (End): EnDat encoder. <input type="checkbox"/> [Hiperface] (SCHP): Hiperface encoder. <input type="checkbox"/> [SinCos] (SC): SinCos encoder. <input type="checkbox"/> [SSI] (SSI): SSI encoder. <input type="checkbox"/> [EndatSincos] (EnSC): EndatSincos encoder.		[Undefined] (Und)
UECU <i>Und</i> <i>SU</i> <i>8U</i> <i>12U</i>	<input type="checkbox"/> [Encoder supply volt.] Rated voltage of encoder used. The parameter can be accessed if [Encoder protocol] (UECP) is not [Undefined] (Und). <input type="checkbox"/> [Undefined] (Und): Not defined. <input type="checkbox"/> [5 volts] (5U): 5 Volts. Only possible value if [Encoder protocol] (UECP) = [EnDat 2.1] (End) or [EndatSincos] (EnSC). <input type="checkbox"/> [8 volts] (8U): 8 Volts. <input type="checkbox"/> [12 volts] (12U): 12 Volts. To make any changes to this parameter with the integrated display terminal, press and hold down the "ENT" key for 2 s for the change to be taken into account. When using the graphic display terminal, confirmation is requested.		[Undefined] (Und)
UELC <i>Und</i> -	<input type="checkbox"/> [Sincos lines count] Number of lines. This parameter can be accessed if [Encoder protocol] (UECP) = [SinCos] (SC) or [EndatSinCos] (End). <input type="checkbox"/> [Undefined] (Und): Not defined. <input type="checkbox"/> 1 to 10000 : 1 to 10,000 lines.		[Undefined] (Und)
SSCP <i>Und</i> <i>nO</i> <i>Odd</i> <i>EUEn</i>	<input type="checkbox"/> [SSI parity] Parity. This parameter can be accessed if [Encoder protocol] (UECP) = [SSI] (SSI). <input type="checkbox"/> [Undefined] (Und): Not defined. <input type="checkbox"/> [No parity] (nO): No parity. <input type="checkbox"/> [Odd parity] (Odd): Odd parity. <input type="checkbox"/> [Even parity] (EUEn): Even parity.		[Undefined] (Und)
SSFS <i>Und</i> -	<input type="checkbox"/> [SSI frame size] Frame length (number of bits). This parameter can be accessed if [Encoder protocol] (UECP) = [SSI] (SSI). <input type="checkbox"/> [Undefined] (Und): Not defined. Only possible value if [SSI parity] (SSCP) = [Undefined] (Und). <input type="checkbox"/> 10 to 27 : 10 to 25 if [SSI parity] (SSCP) = [No parity] (nO). 12 to 27 if [SSI parity] (SSCP) = [Odd parity] (Odd) or [Even parity] (EUEn).		[Undefined] (Und)
EnMr <i>Und</i> -	<input type="checkbox"/> [Nbr of revolution] Format of the number of revolutions (in number of bits). This parameter can be accessed if [Encoder protocol] (UECP) = [SSI] (SSI). <input type="checkbox"/> [Undefined] (Und): Not defined. Only possible value if [SSI frame size] (SSFS) = [Undefined] (Und). <input type="checkbox"/> 0 to 15 : 0 to [SSI frame size] (SSFS) - 10 if [SSI parity] (SSCP) = [No parity] (nO). 0 to [SSI frame size] (SSFS) - 12 if [SSI parity] (SSCP) = [Odd parity] (Odd) or [Even parity] (EUEn).		[Undefined] (Und)
EnMr <i>Und</i> -	<input type="checkbox"/> [Turn bit resolution] Resolution per revolution (in number of bits). This parameter can be accessed if [Encoder protocol] (UECP) = [SSI] (SSI). <input type="checkbox"/> [Undefined] (Und): Not defined. Only value possible if [Nbr of revolution] (EnMr) = [Undefined] (Und). <input type="checkbox"/> 10 to 25 : If [SSI parity] (SSCP) = [No parity] (nO), the maximum value is: [SSI frame size] (SSFS) - [Nbr of revolution] (EnMr). If [SSI parity] (SSCP) = [Odd parity] (Odd) or [Even parity] (EUEn), the maximum value is: [SSI frame size] (SSFS) - [Nbr of revolution] (EnMr) - 2.		[Undefined] (Und)

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
	[ENCODER CONFIGURATION] (continued) These parameters can be accessed if a VW3 A3 409 encoder card has been inserted.		
SSCd	<input type="checkbox"/> [SSI code type] Type of code. This parameter can be accessed if [Encoder protocol] (UECP) = [SSI] (SSI). <input type="checkbox"/> [Undefined] (Und): Not defined. <input type="checkbox"/> [Binary code] (bln): Binary code. <input type="checkbox"/> [Gray code] (GrAY): Gray code.		[Undefined] (Und)
EnSP	<input type="checkbox"/> [Clock frequency] This parameter can be accessed if [ACCESS LEVEL] = [Expert] and if [Encoder protocol] (UECP) = [SSI] (SSI) or [EnDat 2.1] (End) ou [EndatSincos] (EnSC). Clock frequency for Endat encoder, SSI encoder, and Endat Sincos encoder. <input type="checkbox"/> [160 kHz] (160) <input type="checkbox"/> [200 kHz] (200) <input type="checkbox"/> [300 kHz] (300) <input type="checkbox"/> [400 kHz] (400) <input type="checkbox"/> [500 kHz] (500) <input type="checkbox"/> [600 kHz] (600) <input type="checkbox"/> [700 kHz] (700) <input type="checkbox"/> [800 kHz] (800) <input type="checkbox"/> [Auto] (AUtO) : This value appears only if [Encoder protocol] (UECP) = [SSI] (SSI) and if the version of this encoder board is upper or equal to V1.2IE01.		[500 kHz] (500)

Code	Name/Description	Adjustment range	Factory setting
	[ENCODER CONFIGURATION] (continued) These parameters can only be accessed when [ACCESS LEVEL] = [Expert] and an encoder card has been inserted.		
FFR	<input type="checkbox"/> [Encoder filter activ.] Activation of encoder feedback filter. <input type="checkbox"/> [No] (no): Filter deactivated. <input type="checkbox"/> [Yes] (YES): Filter activated.		[No] (nO)
FFr	<input type="checkbox"/> [Encoder filter value] This parameter can be accessed if [Encoder filter activ.] (FFA) = [Yes] (YES). Encoder feedback filter time constant in milliseconds.	0 to 50 ms	Acc. to encoder type



Parameter that can be modified during operation or when stopped.

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
r I -	[R1 CONFIGURATION]		
r I	<input type="checkbox"/> [R1 Assignment]		[No] (nO)
n O	<input type="checkbox"/> [No] (nO) : Not assigned		
FLt	<input type="checkbox"/> [No drive flt] (FLt) : Drive not faulty (relay normally energized, and de-energized if there is a fault)		
r Un	<input type="checkbox"/> [Drv running] (rUn) : Drive running		
FtA	<input type="checkbox"/> [Freq. Th. attain.] (FtA) : Frequency threshold attained ([Freq. threshold] (Ftd) page 135)		
FLA	<input type="checkbox"/> [HSP attain.] (FLA) : High speed attained		
CtA	<input type="checkbox"/> [I attained] (CtA) : Current threshold attained ([Current threshold] (Ctd) page 134)		
SrA	<input type="checkbox"/> [Freq.ref.att] (SrA) : Frequency reference attained		
tSA	<input type="checkbox"/> [Th.mot. att.] (tSA) : Motor 1 thermal state attained		
AP2	<input type="checkbox"/> [AI2 Al. 4-20] (AP2) : Alarm indicating absence of 4-20 mA signal on input AI2		
F2A	<input type="checkbox"/> [Freq. Th. 2 attain.] (F2A) : Frequency threshold 2 attained ([Freq. threshold 2] (F2d) page 135)		
tAd	<input type="checkbox"/> [Th.driv.att.] (tAd) : Drive thermal state attained		
ttHA	<input type="checkbox"/> [High tq. att.] (ttHA) : Motor torque higher than high threshold [High torque thd.] (ttH) page 134.		
ttLA	<input type="checkbox"/> [Low tq. att.] (ttLA) : Motor torque less than low threshold [Low torque thd.] (ttL) page 134.		
MFrd	<input type="checkbox"/> [Forward] (MFrd) : Motor running forward		
MrrS	<input type="checkbox"/> [Reverse] (MrrS) : Motor running in reverse		
tS2	<input type="checkbox"/> [Th.mot2 att.] (tS2) : Motor 2 thermal state attained		
tS3	<input type="checkbox"/> [Th.mot3 att.] (tS3) : Motor 3 thermal state attained		
AtS	<input type="checkbox"/> [Neg Torque] (AtS) : Negative torque (braking)		
CnF0	<input type="checkbox"/> [Cnfg.0 act.] (CnF0) : Configuration 0 active		
CnF1	<input type="checkbox"/> [Cnfg.1 act.] (CnF1) : Configuration 1 active		
CnF2	<input type="checkbox"/> [Cnfg.2 act.] (CnF2) : Configuration 2 active		
CFP1	<input type="checkbox"/> [Set 1 active] (CFP1) : Parameter set 1 active		
CFP2	<input type="checkbox"/> [Set 2 active] (CFP2) : Parameter set 2 active		
CFP3	<input type="checkbox"/> [Set 3 active] (CFP3) : Parameter set 3 active		
dbL	<input type="checkbox"/> [DC charged] (dbL) : DC bus charging		
brS	<input type="checkbox"/> [In braking] (brS) : Drive braking		
PRM	<input type="checkbox"/> [P. removed] (PRM) : Drive locked by "Power removal" input		
FqLA	<input type="checkbox"/> [Fr.met. alar.] (FqLA) : Measured speed threshold attained: [Pulse warning thd.] (FqL) page 135.		
MCP	<input type="checkbox"/> [I present] (MCP) : Motor current present		
LSA	<input type="checkbox"/> [Limit sw. att] (LSA) : Limit switch reached		
AG1	<input type="checkbox"/> [Alarm Grp 1] (AG1) : Alarm group 1		
AG2	<input type="checkbox"/> [Alarm Grp 2] (AG2) : Alarm group 2		
AG3	<input type="checkbox"/> [Alarm Grp 3] (AG3) : Alarm group 3		
P1A	<input type="checkbox"/> [PTC1 alarm] (P1A) : Probe alarm 1		
P2A	<input type="checkbox"/> [PTC2 alarm] (P2A) : Probe alarm 2		
PLA	<input type="checkbox"/> [LI6=PTC al.] (PLA) : LI6 = PTC probe alarm		
EFA	<input type="checkbox"/> [Ext. fault al] (EFA) : External fault alarm		
USA	<input type="checkbox"/> [Under V. al.] (USA) : Undervoltage alarm		
UPA	<input type="checkbox"/> [Uvolt warn] (UPA) : Undervoltage warning		
AnA	<input type="checkbox"/> [slipping al.] (AnA) : Slipping alarm		
tHA	<input type="checkbox"/> [Al. °C drv] (tHA) : Drive overheating		
bSA	<input type="checkbox"/> [Load mvt al] (bSA) : Braking speed alarm		
bCA	<input type="checkbox"/> [Brk cont. al] (bCA) : Brake contact alarm		
SSA	<input type="checkbox"/> [Lim T/I att.] (SSA) : Torque limit alarm		
rtA	<input type="checkbox"/> [Trq. ctrl. al.] (rtA) : Torque control alarm		
tJA	<input type="checkbox"/> [IGBT al.] (tJA) : IGBT alarm		
bOA	<input type="checkbox"/> [Brake R. al.] (bOA) : Braking resistor temperature alarm		
APA	<input type="checkbox"/> [Option al.] (APA) : Alarm generated by the Controller Inside card		
AP3	<input type="checkbox"/> [AI3 Al. 4-20] (AP3) : Alarm indicating absence of 4-20 mA signal on input AI3		
AP4	<input type="checkbox"/> [AI4 Al. 4-20] (AP4) : Alarm indicating absence of 4-20 mA signal on input AI4		
rdY	<input type="checkbox"/> [Ready] (rdY) : Drive ready		

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
	[R1 CONFIGURATION] (continued)		
<i>r 1 d</i>	<input type="checkbox"/> [R1 Delay time] The change in state only takes effect once the configured time has elapsed, when the information becomes true. The delay cannot be set for the [No drive flt] (FLt) assignment, and remains at 0.	0 to 9999 ms	0
<i>r 1 S</i> <i>P O S</i> <i>n E G</i>	<input type="checkbox"/> [R1 Active at] Configuration of the operating logic: <input type="checkbox"/> [1] (POS) : State 1 when the information is true <input type="checkbox"/> [0] (nEG) : State 0 when the information is true Configuration [1] (POS) cannot be modified for the [No drive flt] (FLt) assignment.		[1] (POS)
<i>r 1 H</i>	<input type="checkbox"/> [R1 Holding time] The change in state only takes effect once the configured time has elapsed, when the information becomes false. The holding time cannot be set for the [No drive flt] (FLt) assignment, and remains at 0.	0 to 9999 ms	0
<i>r 2 -</i>	[R2 CONFIGURATION]		
<i>r 2</i> <i>b L C</i> <i>L L C</i> <i>O C C</i> <i>d C O</i>	<input type="checkbox"/> [R2 Assignment] Identical to R1 (see page 182) with the addition of (shown for information only as these selections can only be configured in the [1.7 APPLICATION FUNCT.] (Fun-) menu): <input type="checkbox"/> [Brk control] (bLC) : Brake contactor control <input type="checkbox"/> [Input cont.] (LLC) : Line contactor control <input type="checkbox"/> [Output cont] (OCC) : Output contactor control <input type="checkbox"/> [DC charging] (dCO) : DC bus precharging contactor control.		[Brk control] (bLC)
<i>r 2 d</i>	<input type="checkbox"/> [R2 Delay time] The delay cannot be set for the [No drive flt] (FLt) , [Brk control] (bLC) , [Output cont.] (OCC) , [DC charging] (dCO) , and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.	0 to 9999 ms	0
<i>r 2 S</i> <i>P O S</i> <i>n E G</i>	<input type="checkbox"/> [R2 Active at] Configuration of the operating logic: <input type="checkbox"/> [1] (POS) : State 1 when the information is true <input type="checkbox"/> [0] (nEG) : State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt) , [Brk control] (bLC) , [DC charging] (dCO) , and [Input cont.] (LLC) assignments.		[1] (POS)
<i>r 2 H</i>	<input type="checkbox"/> [R2 Holding time] The holding time cannot be set for the [No drive flt] (FLt) , [Brk control] (bLC) , [DC charging] (dCO) , and [Input cont] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.	0 to 9999 ms	0

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
r 3 -	[R3 CONFIGURATION] Can be accessed if a VW3A3201 option card has been inserted		
r 3	<input type="checkbox"/> [R3 Assignment] Identical to R2		[No] (nO)
r 3 d	<input type="checkbox"/> [R3 Delay time] The delay cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [Output cont.] (OCC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.	0 to 9999 ms	0
r 3 S P O S n E G	<input type="checkbox"/> [R3 Active at] Configuration of the operating logic: <input type="checkbox"/> [1] (POS) : State 1 when the information is true <input type="checkbox"/> [0] (nEG) : State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments.		[1] (POS)
r 3 H	<input type="checkbox"/> [R3 Holding time] The holding time cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.	0 to 9999 ms	0
r 4 -	[R4 CONFIGURATION] Can be accessed if a VW3A3202 or VW3A3203 option card has been inserted		
r 4	<input type="checkbox"/> [R4 Assignment] Identical to R2 (see page 183).		[No] (nO)
r 4 d	<input type="checkbox"/> [R4 Delay time] The delay cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [Output cont.] (OCC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.	0 to 9999 ms	0
r 4 S P O S n E G	<input type="checkbox"/> [R4 Active at] Configuration of the operating logic: <input type="checkbox"/> [1] (POS) : State 1 when the information is true <input type="checkbox"/> [0] (nEG) : State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments.		[1] (POS)
r 4 H	<input type="checkbox"/> [R4 Holding time] The holding time cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.	0 to 9999 ms	0

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
r 5 -	[R5 CONFIGURATION] Can be accessed if a VW3A3203 option card has been inserted		
r 5	<input type="checkbox"/> [R5 Assignment] Identical to R2 (see page 183).		[No] (nO)
r 5 d	<input type="checkbox"/> [R5 Delay time] The delay cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [Output cont.] (OCC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.	0 to 9999 ms	0
r 5 S POS nEG	<input type="checkbox"/> [R5 Active at] Configuration of the operating logic: <input type="checkbox"/> [1] (POS) : State 1 when the information is true <input type="checkbox"/> [0] (nEG) : State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments.		[1] (POS)
r 5 H	<input type="checkbox"/> [R5 Holding time] The holding time cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.	0 to 9999 ms	0

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
LO1-	[LO1 CONFIGURATION] Can be accessed if a VW3A3201 option card has been inserted		
LO1 bLC LLC OCC dCO	<input type="checkbox"/> [LO1 assignment] Identical to R1 (see page 182) with the addition of (shown for information only as these selections can only be configured in the [1.7 APPLICATION FUNCT.] (Fun-) menu): <input type="checkbox"/> [Brk control] (bLC) : Brake contactor control <input type="checkbox"/> [Input cont.] (LLC) : Line contactor control <input type="checkbox"/> [Output cont] (OCC) : Output contactor control <input type="checkbox"/> [DC charging] (dCO) : DC bus precharging contactor control.		[No] (nO)
LO1d	<input type="checkbox"/> [LO1 delay time] The delay cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [Output cont.] (OCC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.	0 to 9999 ms	0
LO1S POS nEG	<input type="checkbox"/> [LO1 active at] Configuration of the operating logic: <input type="checkbox"/> [1] (POS) : State 1 when the information is true <input type="checkbox"/> [0] (nEG) : State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments.		[1] (POS)
LO1H	<input type="checkbox"/> [LO1 holding time] The holding time cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.	0 to 9999 ms	0
LO2-	[LO2 CONFIGURATION] Can be accessed if a VW3A3201 option card has been inserted		
LO2	<input type="checkbox"/> [LO2 assignment] Identical to LO1.		[No] (nO)
LO2d	<input type="checkbox"/> [LO2 delay time] The delay cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [Output cont.] (OCC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.	0 to 9999 ms	0
LO2S POS nEG	<input type="checkbox"/> [LO2 active at] Configuration of the operating logic: <input type="checkbox"/> [1] (POS) : State 1 when the information is true <input type="checkbox"/> [0] (nEG) : State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments.		[1] (POS)
LO2H	<input type="checkbox"/> [LO2 holding time] The holding time cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.	0 to 9999 ms	0

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
L03 -	[LO3 CONFIGURATION] Can be accessed if a VW3A3202 option card has been inserted		
L03	<input type="checkbox"/> [LO3 assignment] Identical to LO1 (see page 186).		[No] (nO)
L03d	<input type="checkbox"/> [LO3 delay time] The delay cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [Output cont.] (OCC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.	0 to 9999 ms	0
L03S POS nEG	<input type="checkbox"/> [LO3 active at] Configuration of the operating logic: <input type="checkbox"/> [1] (POS) : State 1 when the information is true <input type="checkbox"/> [0] (nEG) : State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments.		[1] (POS)
L03H	<input type="checkbox"/> [LO3 holding time] The holding time cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.	0 to 9999 ms	0
L04 -	[LO4 CONFIGURATION] Can be accessed if a VW3A3202 option card has been inserted		
L04	<input type="checkbox"/> [LO4 assignment] Identical to LO1 (see page 186).		[No] (nO)
L04d	<input type="checkbox"/> [LO4 delay time] The delay cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [Output cont.] (OCC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.	0 to 9999 ms	0
L04S POS nEG	<input type="checkbox"/> [LO4 active at] Configuration of the operating logic: <input type="checkbox"/> [1] (POS) : State 1 when the information is true <input type="checkbox"/> [0] (nEG) : State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments.		[1] (POS)
L04H	<input type="checkbox"/> [LO4 holding time] The holding time cannot be set for the [No drive flt] (FLt), [Brk control] (bLC), [DC charging] (dCO), and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.	0 to 9999 ms	0

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Use of analog output AO1 as a logic output

Analog output AO1 can be used as a logic output, by assigning dO1. In this case, state 0 of this output corresponds to the minimum value of AO1 (0 V or 0 mA, for example), and state 1 corresponds to the maximum value of AO1 (10 V or 20 mA, for example).

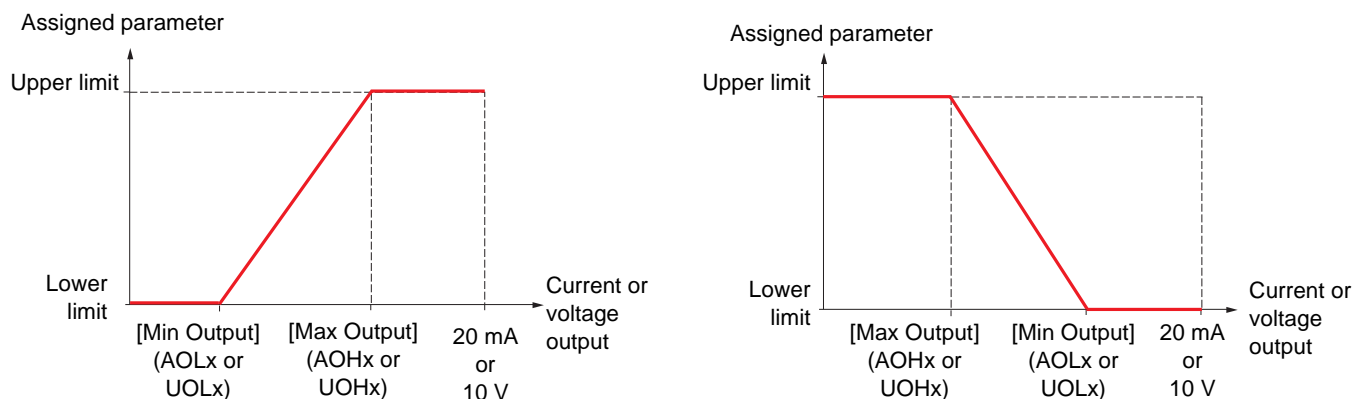
The electrical characteristics of this analog output remain unchanged. As they differ from logic output characteristics, it is important to ensure that they are compatible with the intended application.

Code	Name/Description	Adjustment range	Factory setting
dO1-	[DO1 CONFIGURATION]		
dO1 bLC LLC OCC dCO	<input type="checkbox"/> [DO1 assignment] Identical to R1 (see page 182) with the addition of (shown for information only as these selections can only be configured in the [1.7 APPLICATION FUNCT.] (Fun-) menu): <input type="checkbox"/> [Brk control] (bLC) : Brake contactor control <input type="checkbox"/> [Input cont.] (LLC) : Line contactor control <input type="checkbox"/> [Output cont] (OCC) : Output contactor control <input type="checkbox"/> [DC charging] (dCO) : DC bus precharging contactor control		[Output cont] (OCC)
dO1d	<input type="checkbox"/> [DO1 delay time] The delay cannot be set for the [No drive flt] (FLt) , [Brk control] (bLC) , [Output cont.] (OCC) , [DC charging] (dCO) , and [Input cont.] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.	0 to 9999 ms	0
dO1S POS nEG	<input type="checkbox"/> [DO1 active at] Configuration of the operating logic: <input type="checkbox"/> [1] (POS) : State 1 when the information is true <input type="checkbox"/> [0] (nEG) : State 0 when the information is true The configuration [1] (POS) cannot be modified for the [No drive flt] (FLt) , [Brk control] (bLC) , [DC charging] (dCO) , and [Input cont.] (LLC) assignments.		[1] (POS)
dO1H	<input type="checkbox"/> [DO1 holding time] The holding time cannot be set for the [No drive flt] (FLt) , [Brk control] (bLC) , [DC charging] (dCO) , and [Input cont] (LLC) assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes false.	0 to 9999 ms	0

Configuration of analog outputs

Minimum and maximum values (output values):

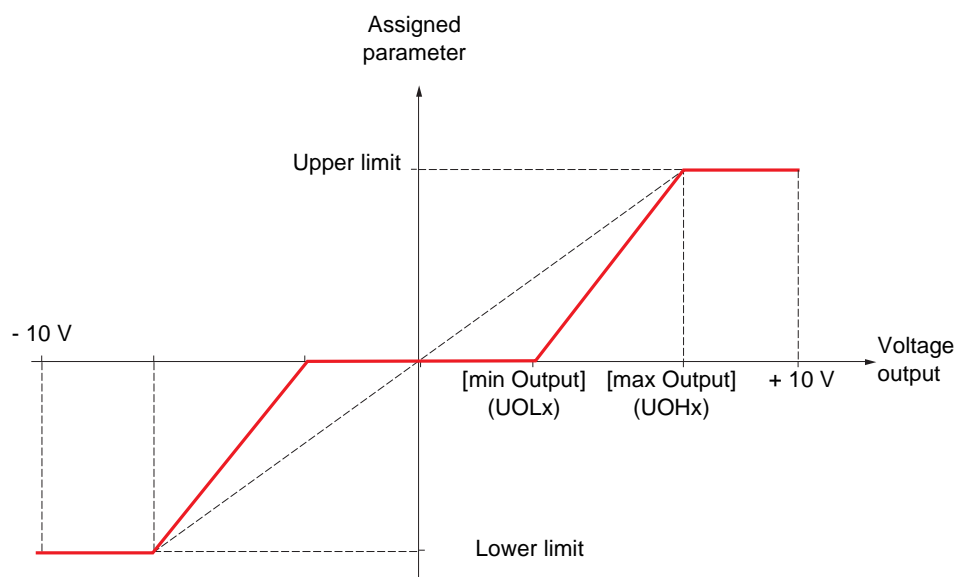
The minimum output value, in volts or mA, corresponds to the lower limit of the assigned parameter and the maximum value corresponds to its upper limit. The minimum value may be greater than the maximum value:



Outputs AO2 and AO3 configured as bipolar outputs (strongly recommended for signed parameters):

The [min Output] (UOLx) and [max Output] (UOHx) parameters are absolute values, although they function symmetrically. In the case of bipolar outputs, always set the maximum value higher than the minimum value.

The [max Output] (UOHx) corresponds to the upper limit of the assigned parameter, and the [min Output] (UOLx) corresponds to an average value between the upper and lower limits (0 for a signed and symmetrical parameter such as in the example below).



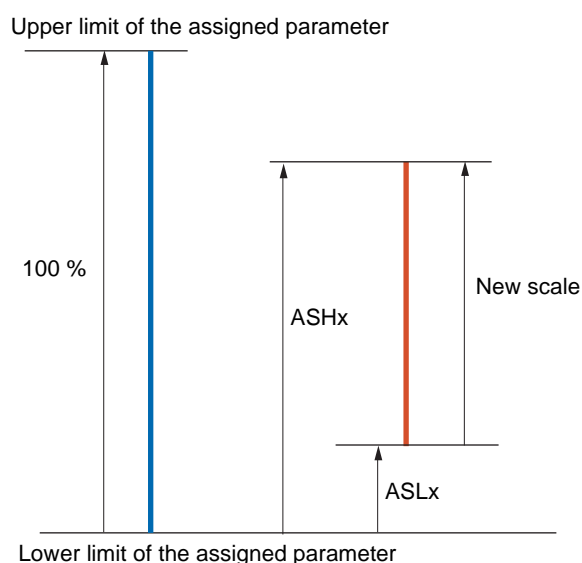
Scaling of the assigned parameter

The scale of the assigned parameter can be adapted in accordance with requirements by modifying the values of the lower and upper limits by means of two parameters for each analog output.

These parameters are given as a %; 100% corresponds to the total variation range of the configured parameter, so:

- $100\% = \text{upper limit} - \text{lower limit}$. For example, for [Sign. torque] (Stq), which varies between -3 and +3 times the rated torque, 100% corresponds to 6 times the rated torque.

- The parameter [Scaling AOx min] (ASLx) modifies the lower limit: $\text{new value} = \text{lower limit} + (\text{range} \times \text{ASLx})$. The value 0% (factory setting) does not modify the lower limit.
- The [Scaling AOx max] (ASHx) parameter modifies the upper limit: $\text{new value} = \text{lower limit} + (\text{range} \times \text{ASHx})$. The value 100% (factory setting) does not modify the upper limit.
- [Scaling AOx min] (ASLx) must always be lower than [Scaling AOx max] (ASHx).



Application example 1

The value of the signed motor torque at the AO2 output is to be transferred with +/- 10 V, with a range of -2 Tr to +2 Tr.

The parameter [Sign. torque.] (Stq) varies between -3 and +3 times the rated torque, or a range of 6 times the rated torque.

[Scaling AO2 min] (ASL2) must modify the lower limit by 1x the rated torque, or $100/6 = 16.7\%$ (new value = lower limit + (range x ASL2)).

[Scaling AO2 max] (ASH2) must modify the upper limit by 1x the rated torque, or $100 - 100/6 = 83.3\%$ (new value = lower limit + (range x ASH2)).

Application example 2

The value of the motor current at the AO2 output is to be transferred with 0 - 20 mA, with a range of 2 In motor, In motor being the equivalent of a 0.8 In drive.

The parameter [I motor] (OCr) varies between 0 and 2 times the rated drive current, or a range of 2.5 times the rated drive current.

[Scaling AO2 min] (ASL2) must not modify the lower limit, which therefore remains at its factory setting of 0%.

[Scaling AO2 max] (ASH2) must modify the upper limit by 0.5x the rated motor torque, or $100 - 100/5 = 80\%$ (new value = lower limit + (range x ASH2)).

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
AO1-	[AO1 CONFIGURATION]		
AO1	<input type="checkbox"/> [AO1 assignment]		[dO1] (dO1)
nO OCr OFr OrP tFr Stq OrS OPr tHr tHd tqMS OFrr OFs tHr2 tHr3 Utr Str tqL UOP dO1	<input type="checkbox"/> [No] (nO) : Not assigned <input type="checkbox"/> [I motor] (OCr) : Current in the motor, between 0 and 2 In (In = rated drive current indicated in the Installation Manual and on the drive nameplate). <input type="checkbox"/> [Motor freq.] (OFr) : Output frequency, between 0 and [Max frequency] (tFr) <input type="checkbox"/> [Ramp out.] (OrP) : Between 0 and [Max frequency] (tFr) <input type="checkbox"/> [Motor torq.] (trq) : Motor torque, between 0 and 3 times the rated motor torque <input type="checkbox"/> [Sign. torque] (Stq) : Signed motor torque, between -3 and +3 times the rated motor torque. The + sign corresponds to motor mode and the - sign to generator mode (braking). <input type="checkbox"/> [sign ramp] (OrS) : Signed ramp output, between - [Max frequency] (tFr) and + [Max frequency] (tFr) <input type="checkbox"/> [Mot. power] (OPr) : Motor power, between 0 and 2.5 times [Rated motor power] (nPr) <input type="checkbox"/> [Mot thermal] (tHr) : Motor thermal state, between 0 and 200% of the rated thermal state <input type="checkbox"/> [Drv thermal] (tHd) : Drive thermal state, between 0 and 200% of the rated thermal state <input type="checkbox"/> [Torque 4Q] (tqMS) : Signed motor torque, between -3 and +3 times the rated motor torque. The + sign and the - sign correspond to the physical direction of the torque, regardless of mode (motor or generator). Example of usage: "master-slave" with the [TORQUE CONTROL] (tOr-) function, page 241. <input type="checkbox"/> [Meas.mot.fr] (OFrr) : Measured motor speed <input type="checkbox"/> [Sig. o/p frq.] (OFs) : Signed output frequency, between - [Max frequency] (tFr) and + [Max frequency] (tFr) <input type="checkbox"/> [Mot therm2] (tHr2) : Thermal state of motor 2, between 0 and 200% of the rated thermal state <input type="checkbox"/> [Mot therm3] (tHr3) : Thermal state of motor 3, between 0 and 200% of the rated thermal state <input type="checkbox"/> [Uns.TrqRef] (Utr) : Torque reference, between 0 and 3 times the rated motor torque <input type="checkbox"/> [Sign trq ref.] (Str) : Signed torque reference, between -3 and +3 times the rated motor torque <input type="checkbox"/> [Torque lim.] (tqL) : Torque limit, between 0 and 3 times the rated motor torque <input type="checkbox"/> [Motor volt.] (UOP) : Voltage applied to the motor, between 0 and [Rated motor volt.] (UnS) <input type="checkbox"/> [dO1] (dO1) : Assigned as logic output. This assignment can only appear if [DO1 assignment] (dO1) page 188 has been assigned. This is the only possible choice in this case, and is displayed for information purposes only.		
AO1t	<input type="checkbox"/> [AO1 Type]		[Current] (0A)
10U 0A	<input type="checkbox"/> [Voltage] (10U) : Voltage output <input type="checkbox"/> [Current] (0A) : Current output		
AO1I	<input type="checkbox"/> [AO1 min Output]	0 to 20.0 mA	0 mA
	This parameter can be accessed if [AO1 Type] (AO1t) = [Current] (0A)		
AO1H	<input type="checkbox"/> [AO1 max Output]	0 to 20.0 mA	20.0 mA
	This parameter can be accessed if [AO1 Type] (AO1t) = [Current] (0A)		
UO1I	<input type="checkbox"/> [AO1 min Output]	0 to 10.0 V	0 V
	This parameter can be accessed if [AO1 Type] (AO1t) = [Voltage] (10U)		
UO1H	<input type="checkbox"/> [AO1 max Output]	0 to 10.0 V	10.0 V
	This parameter can be accessed if [AO1 Type] (AO1t) = [Voltage] (10U)		

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
AO1-	[AO1 CONFIGURATION] (continued)		
ASL1	<input type="checkbox"/> [Scaling AO1 min] Scaling of the lower limit of the assigned parameter, as a % of the maximum possible variation.	0 to 100.0 %	0 %
ASH1	<input type="checkbox"/> [Scaling AO1 max] Scaling of the upper limit of the assigned parameter, as a % of the maximum possible variation.	0 to 100.0 %	100,0 %
AO1F	<input type="checkbox"/> [AO1 Filter] Interference filtering. This parameter is forced to 0 if [AO1 assignment] (AO1) = [dO1] (dO1) .	0 to 10.00 s	0 s

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
AO2 -	[AO2 CONFIGURATION] Can be accessed if a VW3A3202 option card has been inserted		
AO2	<input type="checkbox"/> [AO2 assignment] Same assignments as AO1, without [dO1] (dO1).		[No] (nO)
AO2t 10U 0A n 10U	<input type="checkbox"/> [AO2 Type] <input type="checkbox"/> [Voltage] (10U): Voltage output <input type="checkbox"/> [Current] (0 A): Current output <input type="checkbox"/> [Voltage +/-] (n10U): Bipolar voltage output		[Current] (0A)
AO2L	<input type="checkbox"/> [AO2 min Output] This parameter can be accessed if [AO2 Type] (AO2t) = [Current] (0A)	0 to 20.0 mA	0 mA
AO2H	<input type="checkbox"/> [AO2 max Output] This parameter can be accessed if [AO2 Type] (AO2t) = [Current] (0A)	0 to 20.0 mA	20.0 mA
UO2L	<input type="checkbox"/> [AO2 min Output] This parameter can be accessed if [AO2 Type] (AO2t) = [Voltage] (10U) or [Voltage +/-] (n10U)	0 to 10.0 V	0 V
UO2H	<input type="checkbox"/> [AO2 max Output] This parameter can be accessed if [AO2 Type] (AO2t) = [Voltage] (10U) or [Voltage +/-] (n10U)	0 to 10.0 V	10.0 V
AS2L	<input type="checkbox"/> [Scaling AO2 min] Scaling of the lower limit of the assigned parameter, as a % of the maximum possible variation.	0 to 100.0 %	0 %
AS2H	<input type="checkbox"/> [Scaling AO2 max] Scaling of the upper limit of the assigned parameter, as a % of the maximum possible variation.	0 to 100.0 %	100,0 %
AO2F	<input type="checkbox"/> [AO2 Filter] Interference filtering.	0 to 10.00 s	0 s

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

Code	Name/Description	Adjustment range	Factory setting
AO3 -	[AO3 CONFIGURATION] Can be accessed if a VW3A3202 option card has been inserted		
AO3	<input type="checkbox"/> [AO3 assignment] Same assignments as AO1, without [dO1] (dO1).		[No] (nO)
AO3t 10U 0A n 10U	<input type="checkbox"/> [AO3 Type] <input type="checkbox"/> [Voltage] (10U) : Voltage output <input type="checkbox"/> [Current] (0 A) : Current output <input type="checkbox"/> [Voltage +/-] (n10U) : Bipolar voltage output		[Current] (0A)
AO3L	<input type="checkbox"/> [AO3 min Output] This parameter can be accessed if [AO3 Type] (AO3t) = [Current] (0A)	0 to 20.0 mA	0 mA
AO3H	<input type="checkbox"/> [AO3 max Output] This parameter can be accessed if [AO3 Type] (AO3t) = [Current] (0A)	0 to 20.0 mA	20.0 mA
UO3L	<input type="checkbox"/> [AO3 min Output] This parameter can be accessed if [AO3 Type] (AO3t) = [Voltage] (10U) or [Voltage +/-] (n10U)	0 to 10.0 V	0 V
UO3H	<input type="checkbox"/> [AO3 max Output] This parameter can be accessed if [AO3 Type] (AO3t) = [Voltage] (10U) or [Voltage +/-] (n10U)	0 to 10.0 V	10.0 V
AS3L	<input type="checkbox"/> [Scaling AO3 min] Scaling of the lower limit of the assigned parameter, as a % of the maximum possible variation.	0 to 100.0 %	0 %
AS3H	<input type="checkbox"/> [Scaling AO3 max] Scaling of the upper limit of the assigned parameter, as a % of the maximum possible variation.	0 to 100.0 %	100,0 %
AO3F	<input type="checkbox"/> [AO3 Filter] Interference filtering.	0 to 10.00 s	0 s

[1.5 INPUTS / OUTPUTS CFG] (I-O-)

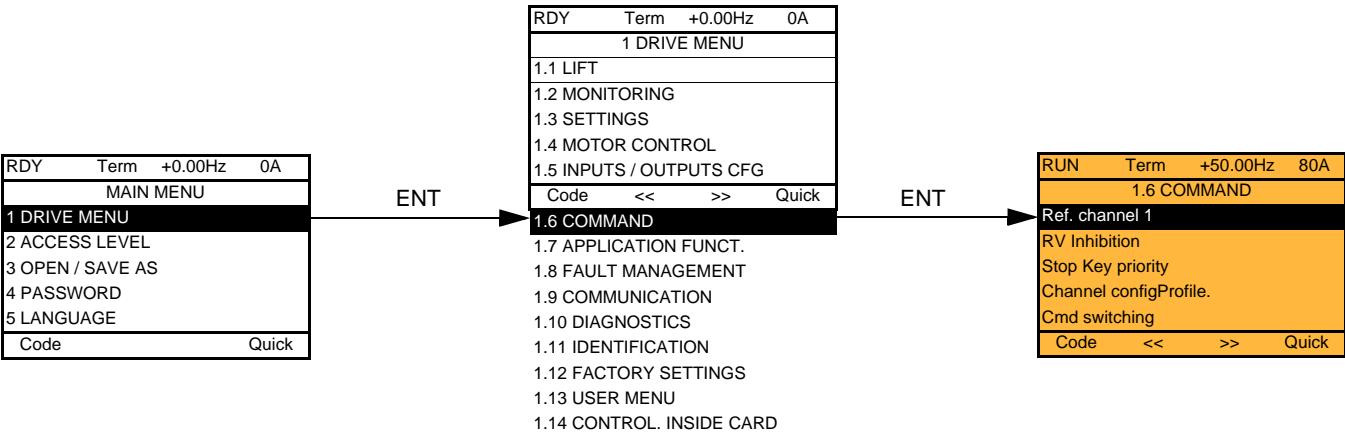
The following submenus group the alarms into 1 to 3 groups, each of which can be assigned to a relay or a logic output for remote signaling. These groups can also be displayed on the graphic display terminal (see [6 MONITORING CONFIG.] menu) and viewed via the [1.2 MONITORING] (SUP) menu.

When one or a number of alarms selected in a group occurs, this alarm group is activated.

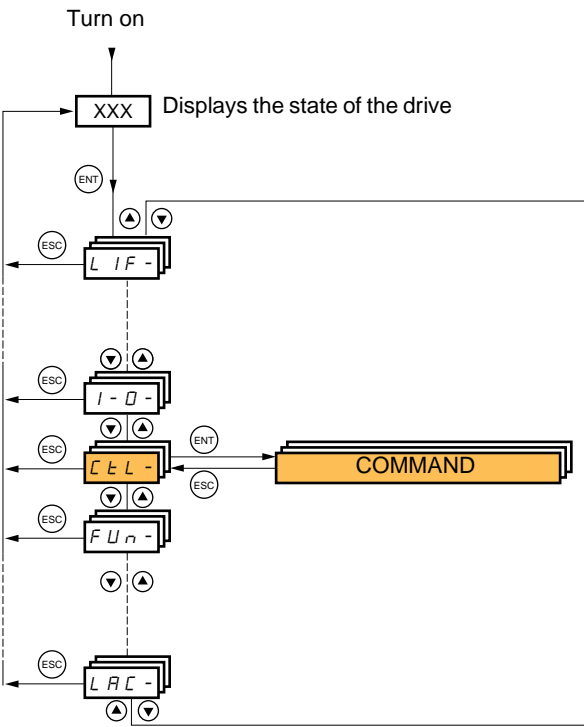
Code	Name/Description	Adjustment range	Factory setting
A1C-	[ALARM GRP1 DEFINITION]		
	Selection to be made from the following list:		
PLA	<input type="checkbox"/> [LI6=PTC al.] (PLA) : LI6 = PTC probe alarm		
P1A	<input type="checkbox"/> [PTC1 alarm] (P1A) : Probe alarm 1		
P2A	<input type="checkbox"/> [PTC2 alarm] (P2A) : Probe alarm 2		
EFA	<input type="checkbox"/> [Ext. fault al.] (EFA) : External fault alarm		
USA	<input type="checkbox"/> [Under V. al.] (USA) : Undervoltage alarm		
AnA	<input type="checkbox"/> [slipping al.] (AnA) : Slipping alarm		
CtA	<input type="checkbox"/> [I attained] (CtA) : Current threshold attained ([Current threshold] (Ctd) page 134)		
FtA	<input type="checkbox"/> [Freq. Th. attain.] (FtA) : Frequency threshold attained ([Freq. threshold] (Ftd) page 135)		
F2A	<input type="checkbox"/> [Freq. Th. 2 attain.] (F2A) : Frequency threshold 2 attained ([Freq. threshold 2] (F2d) page 135)		
SrA	<input type="checkbox"/> [Freq.ref.att.] (SrA) : Frequency reference attained		
tSA	<input type="checkbox"/> [Th.mot. att.] (tSA) : Motor 1 thermal state attained		
tS2	<input type="checkbox"/> [Th.mot2 att.] (tS2) : Motor 2 thermal state attained		
tS3	<input type="checkbox"/> [Th.mot3 att.] (tS3) : Motor 3 thermal state attained		
UPA	<input type="checkbox"/> [Uvolt warn] (UPA) : Undervoltage warning		
FLA	<input type="checkbox"/> [HSP attain.] (FLA) : High speed attained		
tHA	<input type="checkbox"/> [Al. °C drv] (tHA) : Drive overheating		
bSA	<input type="checkbox"/> [Load mvt al] (bSA) : Braking speed alarm		
bCA	<input type="checkbox"/> [Brk cont. al] (bCA) : Brake contact alarm		
AP2	<input type="checkbox"/> [AI2 Al. 4-20] (AP2) : Alarm indicating absence of 4-20 mA signal on input AI2		
AP3	<input type="checkbox"/> [AI3 Al. 4-20] (AP3) : Alarm indicating absence of 4-20 mA signal on input AI3		
AP4	<input type="checkbox"/> [AI4 Al. 4-20] (AP4) : Alarm indicating absence of 4-20 mA signal on input AI4		
SSA	<input type="checkbox"/> [Lim T/I att.] (SSA) : Torque limit alarm		
tAd	<input type="checkbox"/> [Th.drv.att.] (tAd) : Drive thermal state reached		
tJA	<input type="checkbox"/> [IGBT alarm] (tJA) : IGBT alarm		
rtA	<input type="checkbox"/> [Torque Control al.] (rtA) : Torque control alarm		
bOA	<input type="checkbox"/> [Brake R. al.] (bOA) : Braking resistor temperature alarm		
APA	<input type="checkbox"/> [Option alarm] (APA) : Alarm generated by an option card.		
UrA	<input type="checkbox"/> [Regen. underV. al.] (UrA) : Reserved.		
ttHA	<input type="checkbox"/> [High torque alarm] (ttHA) : Motor torque higher than high threshold ([High torque thd.] (ttH) page 134).		
ttLA	<input type="checkbox"/> [Low torque alarm] (ttLA) : Motor torque less than low threshold ([Low torque thd.] (ttL) page 134).		
FqLA	<input type="checkbox"/> [Freq. meter Alarm] (FqLA) : Measured speed threshold attained: ([Pulse warning thd.] (FqL) page 135).		
	See the multiple selection procedure on page 24 for the integrated display terminal, and page 15 for the graphic display terminal.		
A2C-	[ALARM GRP2 DEFINITION]		
	Identical to [ALARM GRP1 DEFINITION] (A1C-)		
A3C-	[ALARM GRP3 DEFINITION]		
	Identical to [ALARM GRP1 DEFINITION] (A1C-)		

[1.6 COMMAND] (CtL-)

With graphic display terminal:



With integrated display terminal:



[1.6 COMMAND] (CtL-)

The parameters in the [1.6 COMMAND] (CtL-) menu can only be modified when the drive is stopped and no run command is present.

Command and reference channels

Run commands (forward, reverse, stop, etc.) and references can be sent using the following channels:

Control	Reference
<ul style="list-style-type: none">• Terminals: Logic inputs LI• Graphic terminal• Integrated Modbus• Integrated CANopen• Communication card• Controller Inside card	<ul style="list-style-type: none">• Terminals: Analog inputs AI, frequency input, encoder• Graphic terminal• Integrated Modbus• Integrated CANopen• Communication card• Controller Inside card• +/- speed via the terminals• +/- speed via the graphic display terminal

The behavior of the Altivar LIFT can be adapted according to requirements:

- [Not separ.] (SIM): Command and reference are sent via the same channel.
- [Separate] (SEP): Command and reference may be sent via different channels.

In these configurations, control via the communication bus is performed in accordance with the DRIVECOM standard with only 5 freely-assignable bits (see Communication Parameters Manual). The application functions cannot be accessed via the communication interface.

- [I/O profile] (IO): Command and reference may be sent via different channels. This configuration both simplifies and extends use via the communication interface.

Commands may be sent via the logic inputs on the terminals or via the communication bus.

When commands are sent via a bus, they are available on a word, which acts as virtual terminals containing only logic inputs.

Application functions can be assigned to the bits in this word. More than one function can be assigned to the same bit.



Note: Stop commands from the terminals remain active even if the terminals are not the active command channel.



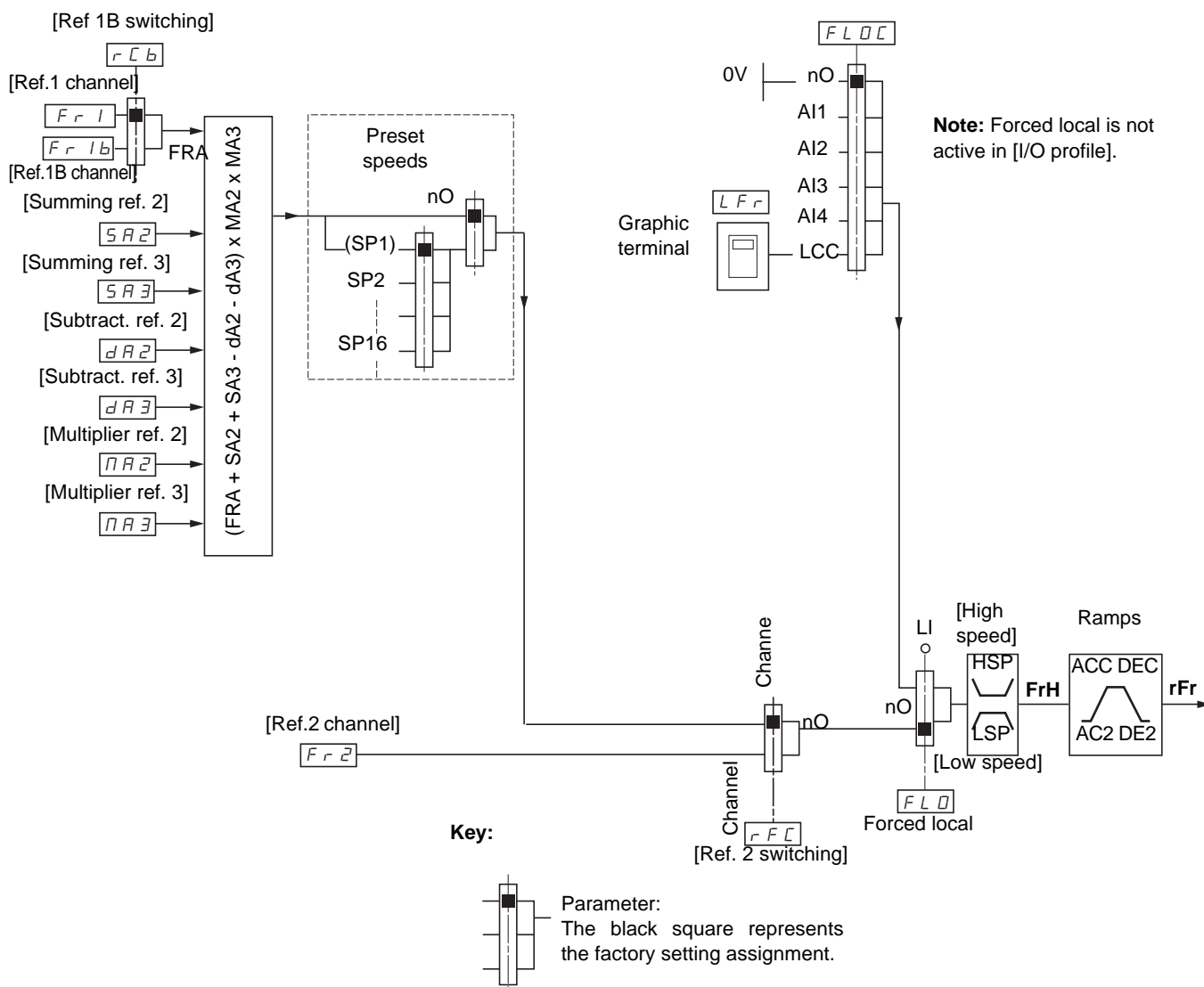
Note: The integrated Modbus channel has two physical communication ports:

- The Modbus network port
- The Modbus HMI port

The drive does not differentiate between these two ports, but recognizes the graphic display terminal irrespective of the port to which it is connected.

[1.6 COMMAND] (CtL-)

Reference channel for [Not separ.] (SIM), [Separate] (SEP) and [I/O profile] (IO) configurations



References

Fr1, SA2, SA3, dA2, dA3, MA2, MA3:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen, communication card, Controller Inside card

Fr1b, for SEP and IO:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen, communication card, Controller Inside card

Fr1b, for SIM:

- Terminals, only accessible if Fr1 = terminals

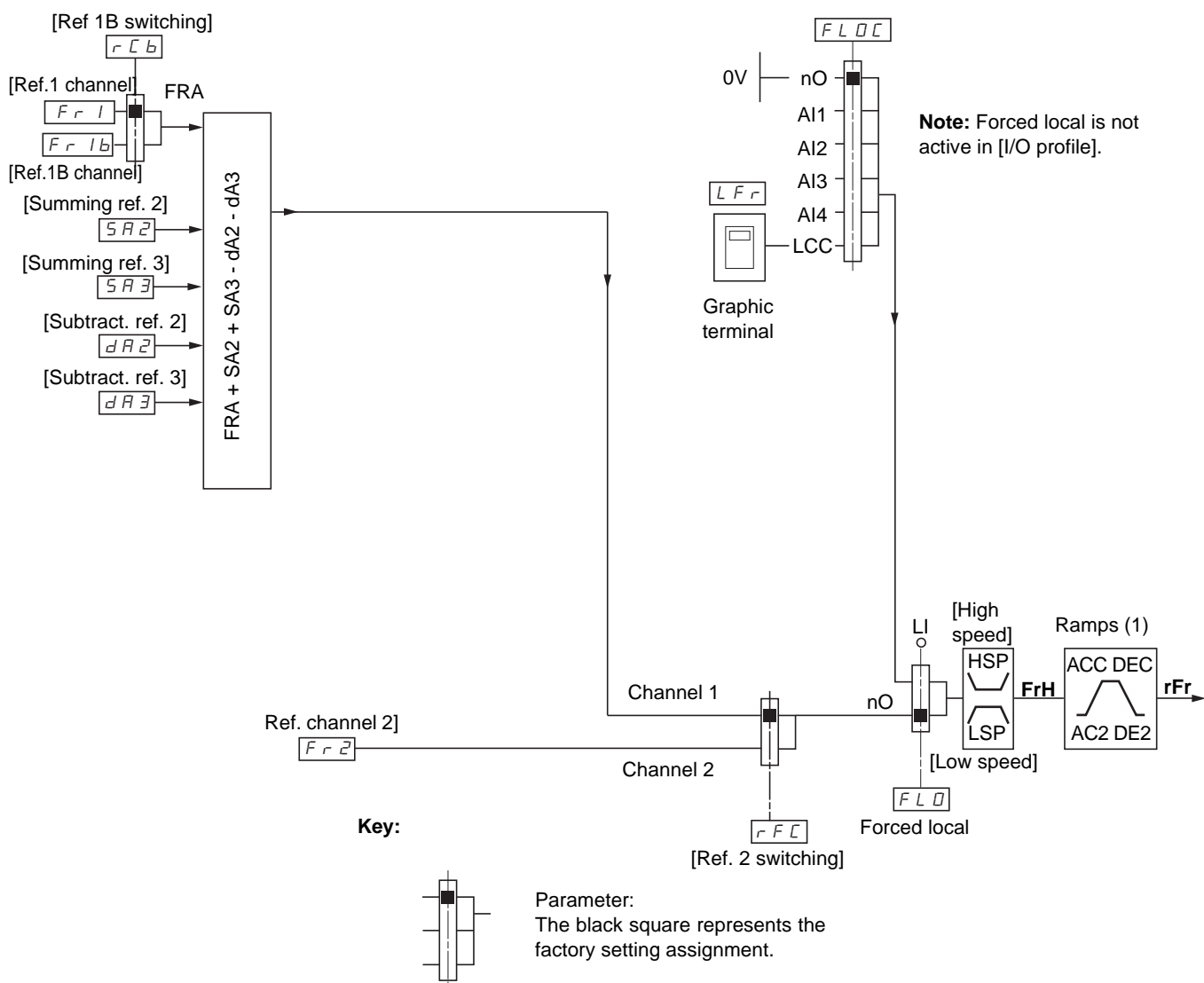
Fr2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen, communication card, Controller Inside card

Note: [Ref.1B channel] (Fr1b) and [Ref 1B switching] (rCb) must be configured in the [1.7 APPLICATION FUNCT.] (Fun-) menu.

[1.6 COMMAND] (CtL-)

Reference channel for [Not separ.] (SIM), [Separate] (SEP) and [I/O profile] (IO) configurations



References

Fr1:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen, communication card, Controller Inside card

Fr1b, for SEP and IO:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen, communication card, Controller Inside card

Fr1b, for SIM:

- Terminals, only accessible if Fr1 = terminals

SA2, SA3, dA2, dA3:

- Terminals only

Fr2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen, communication card, Controller Inside card

(1) Ramps not active if the PID function is active in automatic mode.

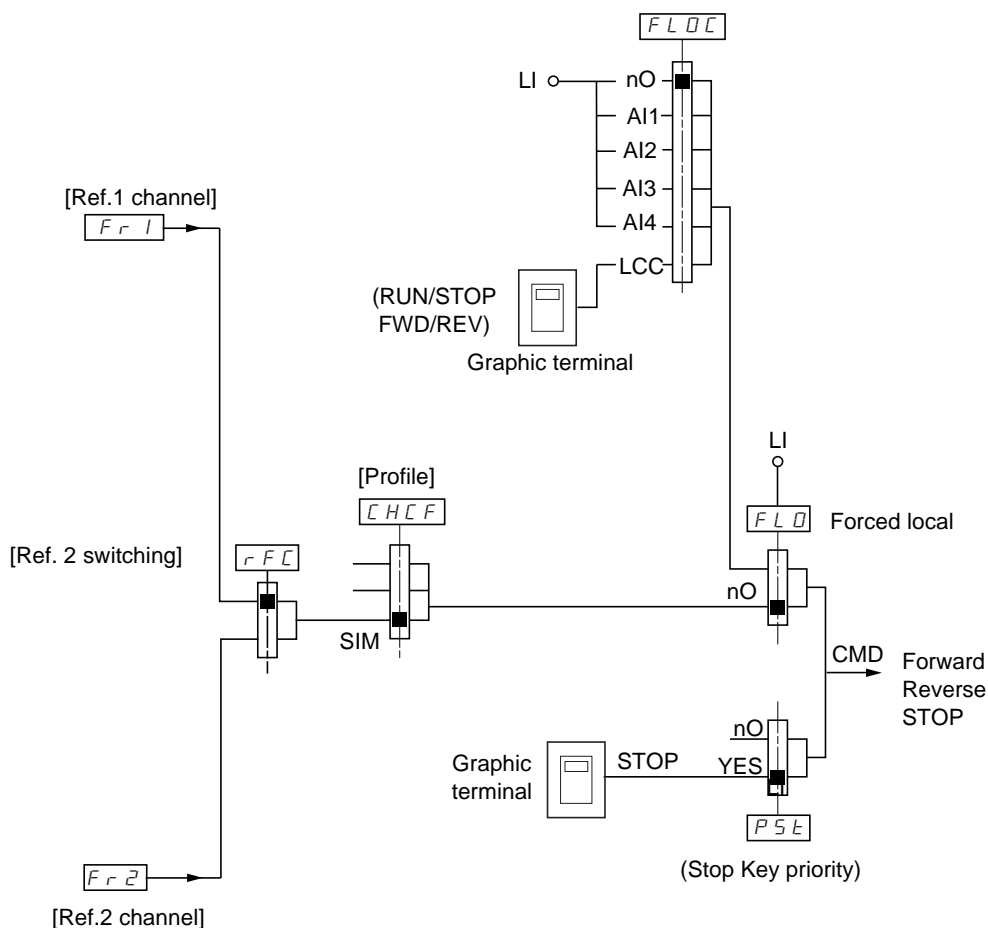
Note: [Ref.1B channel] (Fr1b) and [Ref 1B switching] (rCb) must be configured in the [1.7 APPLICATION FUNCT.] (Fun-) menu.

Command channel for [Not separ.] (SIM) configuration

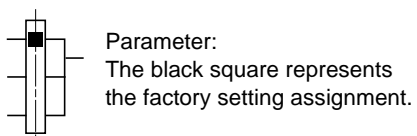
Reference and command, not separate

The command channel is determined by the reference channel. Parameters Fr1, Fr2, rFC, FLO and FLOC are common to reference and command.

For example: If the reference is Fr1 = AI1 (analog input at the terminals), control is via LI (logic input at the terminals).



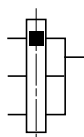
Key:



Separate reference and command

E.g. If the reference is in forced local mode via AI1 (analog input at the terminals), command in forced local mode is via LI (logic input at the terminals).

The command channels Cd1 and Cd2 are independent of the reference channels Fr1, Fr1b and Fr2.



Parameter:
The black rectangle represents the factory setting assignment, except for [Profile].

Cd1, Cd2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen, communication card, Controller Inside card

Command channel for [I/O profile] (IO)

Selection of a command channel:

A command or an action can be assigned:

- To a fixed channel by selecting an LI input or a Cxxx bit:
 - By selecting e.g., LI3, this action will always be triggered by LI3 regardless of which command channel is switched.
 - By selecting e.g., C214, this action will always be triggered by integrated CANopen with bit 14 regardless of which command channel is switched.
- To a switchable channel by selecting a CDxx bit:
 - By selecting, e.g., CD11, this action will be triggered by
 - LI12 if the terminals channel is active
 - C111 if the integrated Modbus channel is active
 - C211 if the integrated CANopen channel is active
 - C311 if the communication card channel is active
 - C411 if the Controller Inside card channel is active

If the active channel is the graphic display terminal, the functions and commands assigned to CDxx switchable internal bits are inactive.

Note:

- CD14 and CD15 can only be used for switching between 2 networks. They do not have equivalent logic inputs.

Terminals	Integrated Modbus	Integrated CANopen	Communication card	Controller Inside card	Internal bit, can be switched
					CD00
LI2 (1)	C101 (1)	C201 (1)	C301 (1)	C401 (1)	CD01
LI3	C102	C202	C302	C402	CD02
LI4	C103	C203	C303	C403	CD03
LI5	C104	C204	C304	C404	CD04
LI6	C105	C205	C305	C405	CD05
LI7	C106	C206	C306	C406	CD06
LI8	C107	C207	C307	C407	CD07
LI9	C108	C208	C308	C408	CD08
LI10	C109	C209	C309	C409	CD09
LI11	C110	C210	C310	C410	CD10
LI12	C111	C211	C311	C411	CD11
LI13	C112	C212	C312	C412	CD12
LI14	C113	C213	C313	C413	CD13
-	C114	C214	C314	C414	CD14
-	C115	C215	C315	C415	CD15

(1) If [2/3 wire control] (tCC) page 166 = [3 wire] (3C), LI2, C101, C201, C301, and C401 cannot be accessed.

[1.6 COMMAND] (CtL-)

Assignment conditions for logic inputs and control bits

The following elements are available for every command or function that can be assigned to a logic input or a control bit:

[LI1] (LI1) to [LI6] (LI6)	Drive with or without option
[LI7] (LI7) to [LI10] (LI10)	With VW3A3201 logic I/O card
[LI11] (LI11) to [LI12] (LI12)	With VW3A3203 ESIM card
[LI11] (LI11) to [LI14] (LI14)	With VW3A3202 extended I/O card
[C101] (C101) to [C110] (C110)	With integrated Modbus in [I/O profile] (IO) configuration
[C111] (C111) to [C115] (C115)	With integrated Modbus regardless of configuration
[C201] (C201) to [C210] (C210)	With integrated CANopen in [I/O profile] (IO) configuration
[C211] (C211) to [C215] (C215)	With integrated CANopen regardless of configuration
[C301] (C301) to [C310] (C310)	With a communication card in [I/O profile] (IO) configuration
[C311] (C311) to [C315] (C315)	With a communication card regardless of configuration
[C401] (C401) to [C410] (C410)	With Controller Inside card in [I/O profile] (IO) configuration
[C411] (C411) to [C415] (C415)	With Controller Inside card regardless of configuration
[CD00] (Cd00) to [CD10] (Cd10)	In [I/O profile] (IO) configuration
[CD11] (Cd11) to [CD15] (Cd15)	Regardless of profile



Note: In [I/O profile] (IO) configuration, LI1 cannot be accessed and if [2/3 wire control] (tCC) page 166 = [3 wire] (3C), LI2, C101, C201, C301, and C401 cannot be accessed either.



WARNING

UNINTENDED EQUIPMENT OPERATION

Inactive communication channels are not monitored (no lock following malfunction in the event of a communication bus failure). Make sure that the commands and functions assigned to bits C101 to C415 will not pose a risk in the event of the failure of the associated communication bus.

Failure to follow this instruction can result in death or serious injury.


[1.6 COMMAND] (Ctl-)

Code	Name/Description	Adjustment range	Factory setting
Fr I A I 1 A I 2 A I 3 A I 4 L C C M d b C A n n E t A P P P I P G	<input type="checkbox"/> [Ref.1 channel] <input type="checkbox"/> [AI1] (AI1): Analog input <input type="checkbox"/> [AI2] (AI2): Analog input <input type="checkbox"/> [AI3] (AI3): Analog input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [AI4] (AI4): Analog input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [HMI] (LCC): Graphic display terminal <input type="checkbox"/> [Modbus] (Mdb): Integrated Modbus <input type="checkbox"/> [CANopen] (CAn): Integrated CANopen <input type="checkbox"/> [Com. card] (nEt): Communication card (if inserted) <input type="checkbox"/> [C.Insid. card] (APP): Controller Inside card (if inserted) <input type="checkbox"/> [RP] (PI): Frequency input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [Encoder] (PG): Encoder input, if encoder card has been inserted		[AI1] (AI1)
r In n O Y E S	<input type="checkbox"/> [RV Inhibition] <input type="checkbox"/> [No] (nO) <input type="checkbox"/> [Yes] (YES) Inhibition of movement in reverse direction, does not apply to direction requests sent by logic inputs. <ul style="list-style-type: none"> - Reverse direction requests sent by logic inputs are taken into account. - Reverse direction requests sent by the graphic display terminal are not taken into account. - Reverse direction requests sent by the line are not taken into account. - Any reverse speed reference originating from the PID, summing input, etc., is interpreted as a zero reference. 		[No] (nO)
P S t n O Y E S	<input type="checkbox"/> [Stop Key priority] <input type="checkbox"/> [No] (nO) <input type="checkbox"/> [Yes] (YES): Gives priority to the STOP key on the graphic display terminal when the graphic display terminal is not enabled as the command channel. Press and hold down ENT for 2 seconds in order for any change in the assignment of [Stop Key priority] (PSt) to be taken into account. This will be a freewheel stop. If the active command channel is the graphic display terminal, the stop will be performed according to the [Type of stop] (Stt) page 221 irrespective of the configuration of [Stop Key priority] (PSt).		[Yes] (YES)
C H C F S I n S E P I O	<input type="checkbox"/> [Profile] <input type="checkbox"/> [Not separ.] (SIM): Reference and command, not separate <input type="checkbox"/> [Separate] (SEP): Separate reference and command This assignment cannot be accessed in [I/O profile] (IO). <input type="checkbox"/> [I/O profile] (IO): I/O profile When [I/O profile] (IO) is deselected, the drive automatically returns to the factory setting (this is mandatory). This factory setting only affects the [1 DRIVE MENU] menu. It does not affect either [1.9 COMMUNICATION] or [1.14 CONTROL INSIDE CARD]. <ul style="list-style-type: none"> - With the graphic display terminal, a screen appears to perform this operation. Follow the instructions on the screen. - With the integrated display terminal, press ENT and hold it down (for 2 s). This will save the selection and return to the factory setting. 		[Not separ.] (SIM)

[1.6 COMMAND] (CtL-)

Code	Name/Description	Adjustment range	Factory setting
CCS CD1 CD2 LI1 - - -	<input type="checkbox"/> [Cmd switching] This parameter can be accessed if [Profile] (CHCF) = [Separate] (SEP) or [I/O profile] (IO) <input type="checkbox"/> [ch1 active] (Cd1) : [Cmd channel 1] (Cd1) active (no switching) <input type="checkbox"/> [ch2 active] (Cd2) : [Cmd channel 2] (Cd2) active (no switching) <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...) : See the assignment conditions on page 204 (not CDOO to CD14). If the assigned input or bit is at inactive state, channel [Cmd channel 1] (Cd1) is active. If the assigned input or bit is at active state, channel [Cmd channel 2] (Cd2) is active.		[ch1 active] (Cd1)
CD1 tEr LCC Mdb CAn nEt APP	<input type="checkbox"/> [Cmd channel 1] <input type="checkbox"/> [Terminals] (tEr) : Terminals <input type="checkbox"/> [HMI] (LCC) : Graphic display terminal <input type="checkbox"/> [Modbus] (Mdb) : Integrated Modbus <input type="checkbox"/> [CANopen] (CAn) : Integrated CANopen <input type="checkbox"/> [Com. card] (nEt) : Communication card (if inserted) <input type="checkbox"/> [C.Insid. card] (APP) : Controller Inside card (if inserted) The parameter is available if [Profile] (CHCF) = [Separate] (SEP) or [I/O profile] (IO).		[Terminals] (tEr)
CD2 tEr LCC Mdb CAn nEt APP	<input type="checkbox"/> [Cmd channel 2] <input type="checkbox"/> [Terminals] (tEr) : Terminals <input type="checkbox"/> [HMI] (LCC) : Graphic display terminal <input type="checkbox"/> [Modbus] (Mdb) : Integrated Modbus <input type="checkbox"/> [CANopen] (CAn) : Integrated CANopen <input type="checkbox"/> [Com. card] (nEt) : Communication card (if inserted) <input type="checkbox"/> [C.Insid. card] (APP) : Controller Inside card (if inserted) The parameter is available if [Profile] (CHCF) = [Separate] (SEP) or [I/O profile] (IO).		[Modbus] (Mdb)
rFC Fr1 Fr2 LI1 - - -	<input type="checkbox"/> [Ref. 2 switching] <input type="checkbox"/> [ch1 active] (Fr1) : No switching, [Ref.1 channel] (Fr1) active <input type="checkbox"/> [ch2 active] (Fr2) : No switching, [Ref.2 channel] (Fr2) active <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...) : See the assignment conditions on page 204 (not CDOO to CD14). If the assigned input or bit is at inactive state, channel [Ref.1 channel] (Fr1) is active. If the assigned bit or input is at active state, channel [Ref. 2 channel] (Fr2) is active.		[ch1 active] (Fr1)
Fr2 nO AI1 AI2 AI3 AI4 UPdt LCC Mdb CAn nEt APP PI PG	<input type="checkbox"/> [Ref.2 channel] <input type="checkbox"/> [No] (nO) : Not assigned If [Profile] (CHCF) = [Not separ.] (SIM), command is at the terminals with a zero reference. If [Profile] (CHCF) = [Separate] (SEP) or [I/O profile] (IO), the reference is zero. <input type="checkbox"/> [AI1] (AI1) : Analog input <input type="checkbox"/> [AI2] (AI2) : Analog input <input type="checkbox"/> [AI3] (AI3) : Analog input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [AI4] (AI4) : Analog input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [+/- Speed] (UPdt) : +/-Speed command <input type="checkbox"/> [HMI] (LCC) : Graphic display terminal <input type="checkbox"/> [Modbus] (Mdb) : Integrated Modbus <input type="checkbox"/> [CANopen] (CAn) : Integrated CANopen <input type="checkbox"/> [Com. card] (nEt) : Communication card (if inserted) <input type="checkbox"/> [C.Insid. card] (APP) : Controller Inside card (if inserted) <input type="checkbox"/> [RP] (PI) : Frequency input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [Encoder] (PG) : Encoder input, if encoder card has been inserted		[No] (nO)

[1.6 COMMAND] (CtL-)

Code	Name/Description	Adjustment range	Factory setting
<p>C O P</p> <p>n O</p> <p>S P</p> <p>C d</p> <p>A L L</p>	<p><input type="checkbox"/> [Copy channel 1 <> 2]</p> <p>Can be used to copy the current reference and/or the command by means of switching, in order to avoid speed surges, for example.</p> <p>If [Profile] (CHCF) page <u>205</u> = [Not separ.] (SIM) or [Separate] (SEP), copying will only be possible from channel 1 to channel 2.</p> <p>If [Profile] (CHCF) = [I/O profile] (IO), copying will be possible in both directions.</p> <p><input type="checkbox"/> [No] (nO): No copy</p> <p><input type="checkbox"/> [Reference] (SP): Copy reference</p> <p><input type="checkbox"/> [Command] (Cd): Copy command</p> <p><input type="checkbox"/> [Cmd + ref.] (ALL): Copy command and reference</p> <ul style="list-style-type: none"> - A reference or a command cannot be copied to a channel on the terminals. - The reference copied is FrH (before ramp) unless the destination channel reference is set via +/- speed. In this case, the reference copied is rFr (after ramp). <div style="border: 1px solid black; padding: 10px; margin-top: 20px;"> <p style="text-align: center;"> WARNING</p> <p>UNINTENDED EQUIPMENT OPERATION</p> <p>Copying the command and/or reference can change the direction of rotation. Check that this is safe.</p> <p>Failure to follow this instruction can result in death or serious injury.</p> </div>		[No] (nO)

[1.6 COMMAND] (CtL-)

As the graphic display terminal may be selected as the command and/or reference channel, its action modes can be configured. The parameters on this page can only be accessed on the graphic display terminal, and not on the integrated display terminal.

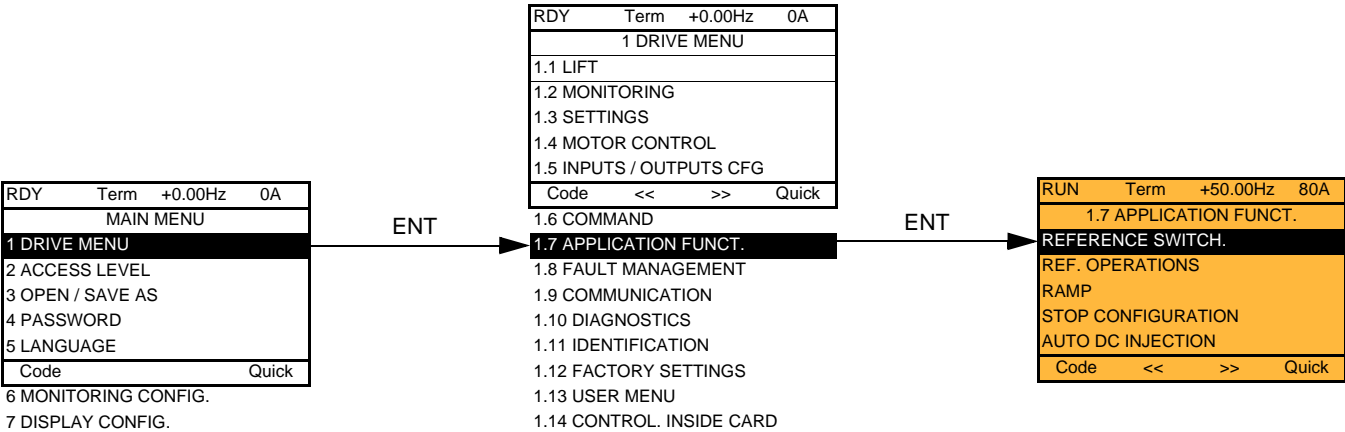
Comments:

- The display terminal command/reference is only active if the command and/or reference channels from the terminal are active with the exception of **[T/K]** (command via the display terminal), which takes priority over these channels. Press **[T/K]** (command via the display terminal) again to revert control to the selected channel.
- Command and reference via the display terminal are impossible if the latter is connected to more than one drive.
- The preset speed function can only be accessed if **[Profile] (CHCF) = [Not separ.] (SIM)**.
- The **[T/K]** function (command via the display terminal) can be accessed regardless of the **[Profile] (CHCF)**.

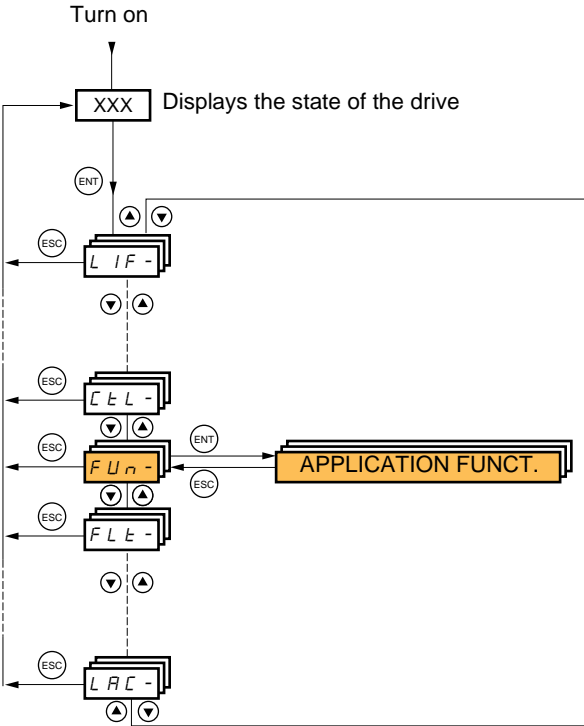
Code	Name/Description	Adjustment range	Factory setting
F P 1 n 0 F P S 1 F P S 2 F E	<input type="checkbox"/> [F1 key assignment] <input type="checkbox"/> [No] : Not assigned, <input type="checkbox"/> [Preset spd2] : Press the key to run the drive at the 2 nd preset speed [Preset speed 2] (SP2) page 226. Press STOP to stop the drive. <input type="checkbox"/> [Preset spd3] : Press the key to run the drive at the 3 rd preset speed [Preset speed 3] (SP3) page 226. Press STOP to stop the drive. <input type="checkbox"/> [T/K] : Control via the display terminal: Takes priority over [Cmd switching] (CCS) and over [Ref. 2 switching] (rFC) .		[No] (nO)
F P 2	<input type="checkbox"/> [F2 key assignment] Identical to [F1 key assignment] .		[No] (nO)
F P 3	<input type="checkbox"/> [F3 key assignment] Identical to [F1 key assignment] .		[No] (nO)
F P 4	<input type="checkbox"/> [F4 key assignment] Identical to [F1 key assignment] .		[No] (nO)
b N P S O P b U N P	<input type="checkbox"/> [HMI cmd.] When the [T/K] function is assigned to a key and that function is active, this parameter defines the behavior at the moment when control returns to the graphic display terminal. <input type="checkbox"/> [Stop] : Stops the drive (although the controlled direction of operation and reference of the previous channel are copied (to be taken into account on the next RUN command)). <input type="checkbox"/> [Bumpless] : Does not stop the drive (the controlled direction of operation and the reference of the previous channel are copied).		[Stop] (StOP)

[1.7 APPLICATION FUNCT.] (FUn-)

With graphic display terminal:




With integrated display terminal:



Summary of functions:

Code	Name	Page
rEF-	[REFERENCE SWITCH.]	215
OR I-	[REF. OPERATIONS]	216
rPe-	[RAMP]	217
Stt-	[STOP CONFIGURATION]	221
AdC-	[AUTO DC INJECTION]	223
PSS-	[PRESET SPEEDS]	225
LSt-	[LIMIT SWITCHES]	228
bLC-	[BRAKE LOGIC CONTROL]	233
rbn-	[ROLLBACK MGT]	238
ELn-	[EXTERNAL WEIGHT MEAS.]	239
tDr-	[TORQUE CONTROL]	241
tDL-	[TORQUE LIMITATION]	244
CL I-	[2nd CURRENT LIMIT.]	246
LLC-	[LINE CONTACTOR COMMAND]	248
QCC-	[OUTPUT CONTACTOR CMD]	250
nLP-	[PARAM. SET SWITCHING]	252
nnC-	[MULTIMOTORS/CONFIG.]	256
ISP-	[INSPECTION MODE]	257
rFe-	[EVACUATION]	258
HFF-	[HALF FLOOR]	258
dCQ-	[DC BUS SUPPLY]	259
tDP-	[TOP Z MANAGEMENT]	260

[1.7 APPLICATION FUNCT.] (FUn-)

The parameters in the [1.7 APPLICATION FUNCT.] (FUn-) menu can only be modified when the drive is stopped and there is no run command, except for parameters with a  symbol in the code column, which can be modified with the drive running or stopped.



Note: Compatibility of functions

The choice of application functions may be limited by the number of I/O and by the fact that some functions are incompatible with one another. Functions that are not listed in the table below are fully compatible.

If there is an incompatibility between functions, the first function configured will prevent the others being configured.

Each of the functions on the following pages can be assigned to one of the inputs or outputs.

A single input can activate several functions at the same time (reverse and 2nd ramp, for example). **The user must therefore ensure that these functions can be used at the same time.** It is only possible to assign one input to several functions at [\[Advanced\] \(AdU\)](#) and [\[Expert\] \(EPr\)](#) level.

Before assigning a command, reference or function to an input or output, the user must make sure that this input or output has not already been assigned and that another input or output has not been assigned to an incompatible or undesirable function.

The drive factory setting or macro configurations automatically configure functions, **which may prevent other functions being assigned.** **It may be necessary to unconfigure one or more functions in order to be able to enable another.** Check the compatibility table below.

Compatibility table

	Reference operations (page 216)	Management of limit switches (page 228)	Preset speeds (page 225)	Brake logic control (page 233)	DC injection stop (page 221)	Fast stop (page 221)	Freewheel stop (page 221)	Stop on TDC (page 260)	Torque control (page 241)	Load sharing (page 162)	Open-loop synchronous motor (page 148)	Closed-loop synchronous motor (page 150)	Measurement of motor/encoder phase shift (page 151)
Reference operations (page 216)			↑						●(1)				
Management of limit switches (page 228)													
Preset speeds (page 225)	←								●(1)				
Brake logic control (page 233)					●				●		●		●(4)
DC injection stop (page 221)				●		●(2)	↑	●(2)			●	●	
Fast stop (page 221)				●(2)			↑	●(2)					
Freewheel stop (page 221)					←	←		←					
Stop on TDC (page 260)				●(2)	●(2)	↑							
Torque control (page 241)	●(1)		●(1)	●						●	●		
Load sharing (page 162)									●				
Open-loop synchronous motor (page 148)				●	●				●				
Closed-loop synchronous motor (page 150)					●								
Measurement of motor/encoder phase shift (page 151)				●(4)									

(1) Torque control and these functions are only incompatible while torque control mode is active.

(2) Priority is given to the first of these two stop modes to be activated.

(3) Excluding special application with reference channel Fr2 (see diagrams on pages [198](#) and [199](#)).

(4) These two functions are incompatible only if **[Angle setting type] (ASt) = [W/o load] (nLd)**.


☒ Incompatible functions
 ☐ Compatible functions
 ☐ Not applicable

Priority functions (functions, which cannot be active at the same time):

☐ ← ☐ ↑ The function indicated by the arrow has priority over the other.

Stop functions have priority over run commands.

Speed references via logic command have priority over analog references.

 **Note:** This compatibility table does not affect commands that can be assigned to the keys of the graphic display terminal (see page [208](#)).

Incompatible functions

The following function will be inaccessible or deactivated in the cases described below:

Automatic restart

This is only possible for control type [2/3 wire control] (tCC) = [2 wire] (2C) and [2 wire type] (tCt) = [Level] (LEL) or [Fwd priority] (PFO). See page 166.

The SUP- monitoring menu (page 115) can be used to display the functions assigned to each input in order to check their compatibility.

When a function is assigned, a ✓ appears on the graphic display terminal, as illustrated in the example below:

RDY	Term	+0.00Hz	0A
1.7 APPLICATION FUNCT.			
REFERENCE SWITCH.			
REF. OPERATIONS			
RAMP			
STOP CONFIGURATION			
AUTO DC INJECTION			
Code	<<	>>	Quick

PSS

If you attempt to assign a function that is incompatible with another function that has already been assigned, an alarm message will appear:

With the graphic display terminal:

RDY	Term	+0.00Hz	0A
INCOMPATIBILITY			
The function can't be assigned			
because an incompatible			
function is already selected. See			
programming book.			
ENT or ESC to continue			

With the integrated display terminal:
COMP flashes until ENT or ESC is pressed.

When you assign a logic input, an analog input, a reference channel or a bit to a function, pressing the HELP button will display the functions that may already have been activated by this input, bit or channel.

[1.7 APPLICATION FUNCT.] (FUn-)

When a logic input, an analog input, a reference channel or a bit that has already been assigned is assigned to another function, the following screens appear:

With the graphic display terminal:

RUN	+50.00Hz	1,250	+50.00Hz
A			
WARNING - ASSIGNED TO			
Ref. 2 switching			
ENT->Continue ESC->Cancel			

If the access level permits this new assignment, pressing ENT confirms the assignment.

If the access level does not permit this new assignment, pressing ENT results in the following display:

RUN	+50.00Hz	1,250	+50.00Hz
A			
ASSIGNMENT FORBIDDEN			
Un-assign the present functions, or select Advanced access level			

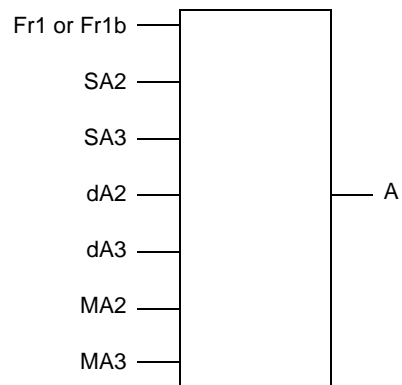
With the integrated display terminal:

The code for the first function, which is already assigned, is displayed flashing.

If the access level permits this new assignment, pressing ENT confirms the assignment.

If the access level does not permit this new assignment, pressing ENT has no effect, and the message continues to flash. It is only possible to exit by pressing ESC.

Summing input/Subtracting input/Multiplier





$$A = (\text{Fr1 or Fr1b} + \text{SA2} + \text{SA3} - \text{dA2} - \text{dA3}) \times \text{MA2} \times \text{MA3}$$

- If SA2, SA3, dA2, dA3 are not assigned, they are set to 0.
- If MA2, MA3 are not assigned, they are set to 1.
- A is limited by the minimum LSP and maximum HSP parameters.
- For multiplication, the signal on MA2 or MA3 is interpreted as a %; 100% corresponds to the maximum value of the corresponding input. If MA2 or MA3 is sent via the communication bus or graphic display terminal, an MFr multiplication variable (see page [121](#)) must be sent via the bus or graphic display terminal.
- Reversal of the direction of operation in the event of a negative result can be inhibited (see page [205](#)).

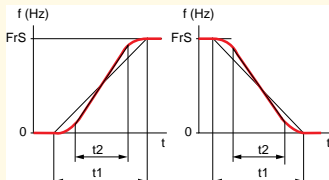
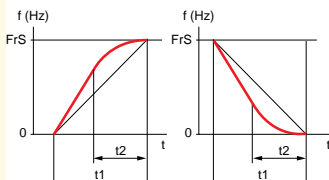
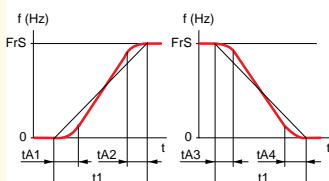
[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
rEF -	[REFERENCE SWITCH.]		
rCb	<input type="checkbox"/> [Ref 1B switching] See the diagrams on pages 198 and 199 .		[ch1 active] (Fr1)
Fr1	<input type="checkbox"/> [ch1 active] (Fr1) : No switching, [Ref.1 channel] (Fr1) active <input type="checkbox"/> [ch1B active] (Fr1b) : No switching, [Ref.1B channel] (Fr1b) active		
Fr1b			
L11	<input type="checkbox"/> [LI1] (LI1) : : :		
-	<input type="checkbox"/> [...] (...) : See the assignment conditions on page 204 (not CDOO to CD14).		
-	<ul style="list-style-type: none"> If the assigned input or bit is at inactive state, [Ref.1 channel] (Fr1) is active (see page 205). If the assigned input or bit is at active state, [Ref.1B channel] (Fr1b) is active. 		
	[Ref 1B switching] (rCb) is forced to [ch1 active] (Fr1) if [Profile] (CHCF) = [Not separ.] (SIM) with [Ref.1 channel] (Fr1) assigned via the terminals (analog inputs, encoder, pulse input); see page 205 .		
Fr1b	<input type="checkbox"/> [Ref.1B channel]		[No] (nO)
nO	<input type="checkbox"/> [No] (nO) : Not assigned <input type="checkbox"/> [AI1] (AI1) : Analog input <input type="checkbox"/> [AI2] (AI2) : Analog input <input type="checkbox"/> [AI3] (AI3) : Analog input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [AI4] (AI4) : Analog input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [HMI] (LCC) : Graphic display terminal <input type="checkbox"/> [Modbus] (Mdb) : Integrated Modbus <input type="checkbox"/> [CANopen] (CAn) : Integrated CANopen <input type="checkbox"/> [Com. card] (nEt) : Communication card (if inserted) <input type="checkbox"/> [C.Insid. card] (APP) : Controller Inside card (if inserted) <input type="checkbox"/> [RP] (PI) : Frequency input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [Encoder] (PG) : Encoder input, if encoder card has been inserted		
AI1	Note: In the following instances, only assignments via the terminals are possible: <ul style="list-style-type: none"> [Profile] (CHCF) = [Not separ.] (SIM) with [Ref.1 channel] (Fr1) assigned via the terminals (analog inputs, encoder, pulse input); see page 205. PID configured with PID references via the terminals 		
AI2			
AI3			
AI4			
LCC			
Mdb			
CAn			
nEt			
APP			
PI			
PG			

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
0A1-	[REF. OPERATIONS] Reference = (Fr1 or Fr1b + SA2 + SA3 - dA2 - dA3) x MA2 x MA3. See the diagrams on pages 198 and 199.  Note: This function cannot be used with certain other functions. Follow the instructions on page 210.		
SA2	<input type="checkbox"/> [Summing ref. 2] Selection of a reference to be added to [Ref.1 channel] (Fr1) or [Ref.1B channel] (Fr1b). <input type="checkbox"/> [No] (nO): No source assigned <input type="checkbox"/> [AI1] (AI1): Analog input <input type="checkbox"/> [AI2] (AI2): Analog input <input type="checkbox"/> [AI3] (AI3): Analog input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [AI4] (AI4): Analog input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [HMI] (LCC): Graphic display terminal <input type="checkbox"/> [Modbus] (Mdb): Integrated Modbus <input type="checkbox"/> [CANopen] (CAn): Integrated CANopen <input type="checkbox"/> [Com. card] (nEt): Communication card (if inserted) <input type="checkbox"/> [C.Insid. card] (APP): Controller Inside card (if inserted) <input type="checkbox"/> [RP] (PI): Frequency input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [Encoder] (PG): Encoder input, if encoder card has been inserted <input type="checkbox"/> [Network AI] (AIU1): Virtual input via communication bus, to be configured via [AI net. channel] (AIC1) page 175.		[No] (nO)
SA2 SA3 SA2 SA3 MA2 MA3	<div style="text-align: center;">  WARNING </div> UNINTENDED EQUIPMENT OPERATION If the equipment switches to forced local mode (see page 286), the virtual input remains frozen at the last value transmitted. Do not use the virtual input and forced local mode in the same configuration. Failure to follow this instruction can result in death or serious injury.		
	<input type="checkbox"/> [Summing ref. 3] Selection of a reference to be added to [Ref.1 channel] (Fr1) or [Ref.1B channel] (Fr1b). • Possible assignments are identical to [Summing ref. 2] (SA2) above.		[No] (nO)
	<input type="checkbox"/> [Subtract. ref. 2] Selection of a reference to be subtracted from [Ref.1 channel] (Fr1) or [Ref.1B channel] (Fr1b). • Possible assignments are identical to [Summing ref. 2] (SA2) above.		[No] (nO)
	<input type="checkbox"/> [Subtract. ref. 3] Selection of a reference to be subtracted from [Ref.1 channel] (Fr1) or [Ref.1B channel] (Fr1b). • Possible assignments are identical to [Summing ref. 2] (SA2) above.		[No] (nO)
	<input type="checkbox"/> [Multiplier ref. 2] Selection of a multiplier reference [Ref.1 channel] (Fr1) or [Ref.1B channel] (Fr1b). • Possible assignments are identical to [Summing ref. 2] (SA2) above.		[No] (nO)
	<input type="checkbox"/> [Multiplier ref. 3] Selection of a multiplier reference [Ref.1 channel] (Fr1) or [Ref.1B channel] (Fr1b). • Possible assignments are identical to [Summing ref. 2] (SA2) above.		[No] (nO)

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
rPt-	[RAMP]		
rPt LIn S U CUS	<input type="checkbox"/> [Ramp type] <input type="checkbox"/> [Linear] (LIn) <input type="checkbox"/> [S ramp] (S) <input type="checkbox"/> [U ramp] (U) <input type="checkbox"/> [Customized] (CUS) <p>S ramps</p>  <p>The rounding coefficient is fixed, where $t2 = 0.6 \times t1$ and $t1$ = set ramp time.</p> <p>U ramps</p>  <p>The rounding coefficient is fixed, where $t2 = 0.5 \times t1$ and $t1$ = set ramp time.</p> <p>Customized ramps</p>  <p>tA1: adjustable from 0 to 100% tA2: adjustable from 0 to (100% - tA1) tA3: adjustable from 0 to 100% tA4: adjustable from 0 to (100% - tA3) As a % of $t1$, where $t1$ = set ramp time</p>		[Linear] (LIn)
Inr () 0.01 0.1 1	<input type="checkbox"/> [Ramp increment] <input type="checkbox"/> [0.01] : Ramp up to 99.99 seconds <input type="checkbox"/> [0.1] : Ramp up to 999.9 seconds <input type="checkbox"/> [1] : Ramp up to 6000 seconds This parameter is valid for [Acceleration] (ACC) , [Deceleration] (dEC) , [Acceleration 2] (AC2) and [Deceleration 2] (dE2) .	(1)	[0.1] (0.1)
ACC ()	<input type="checkbox"/> [Acceleration] Time to accelerate from 0 to the [Rated motor freq.] (FrS) (page 143) or [Nominal freq sync.] (FrSS) page 149. Make sure that this value is compatible with the inertia being driven.	(1) 0.01 to 6000 s (2)	3.0 s
dEC ()	<input type="checkbox"/> [Deceleration] Time to decelerate from the [Rated motor freq.] (FrS) (page 143) or [Nominal freq sync.] (FrSS) page 149 to 0. Make sure that this value is compatible with the inertia being driven.	(1) 0.01 to 6000 s (2)	3.0 s

(1) Parameter can also be accessed in the **[1.3 SETTINGS] (SEt-)** menu.

(2) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to **[Ramp increment] (Inr)**.

() Parameter that can be modified during operation or when stopped.

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
	[RAMP] (continued)		
LA1 ()	[Begin Acc round] (1) - Rounding of start of acceleration ramp as a % of the [Acceleration] (ACC) or [Acceleration 2] (AC2) ramp time. - Can be set between 0 and 100% - This parameter can be accessed if the [Ramp type] (rPt) is [Customized] (CUS) .	0 to 100%	10%
LA2 ()	[End Acc round] (1) - Rounding of end of acceleration ramp as a % of the [Acceleration] (ACC) or [Acceleration 2] (AC2) ramp time. - Can be set between 0 and (100% - [Begin Acc round] (tA1)). - This parameter can be accessed if the [Ramp type] (rPt) is [Customized] (CUS) .		10%
LA3 ()	[Begin Dec round] (1) - Rounding of start of deceleration ramp as a % of the [Deceleration] (dEC) or [Deceleration 2] (dE2) ramp time. - Can be set between 0 and 100%. - This parameter can be accessed if the [Ramp type] (rPt) is [Customized] (CUS) .	0 to 100%	10%
LA4 ()	[End Dec round] (1) - Rounding of end of deceleration ramp as a % of the [Deceleration] (dEC) or [Deceleration 2] (dE2) ramp time. - Can be set between 0 and (100% - [Begin Dec round] (tA3)). - This parameter can be accessed if the [Ramp type] (rPt) is [Customized] (CUS) .		10%

(1) Parameter can also be accessed in the **[1.3 SETTINGS] (SEt-)** menu.

() Parameter that can be modified during operation or when stopped.

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting															
	[RAMP] (continued)																	
F r t	<div><input type="checkbox"/> [Ramp 2 threshold]</div> <div>Ramp switching threshold The 2nd ramp is switched if the value of Frt is not 0 (0 deactivates the function) and the output frequency is greater than Frt. Threshold ramp switching can be combined with [Ramp switch ass.] (rPS) switching as follows:</div> <table><tr><th>LI or bit</th><th>Frequency</th><th>Ramp</th></tr><tr><td>0</td><td><Frt</td><td>ACC, dEC</td></tr><tr><td>0</td><td>>Frt</td><td>AC2, dE2</td></tr><tr><td>1</td><td><Frt</td><td>AC2, dE2</td></tr><tr><td>1</td><td>>Frt</td><td>AC2, dE2</td></tr></table>	LI or bit	Frequency	Ramp	0	<Frt	ACC, dEC	0	>Frt	AC2, dE2	1	<Frt	AC2, dE2	1	>Frt	AC2, dE2	0 to 500 or 1,600 Hz according to rating	0 Hz
LI or bit	Frequency	Ramp																
0	<Frt	ACC, dEC																
0	>Frt	AC2, dE2																
1	<Frt	AC2, dE2																
1	>Frt	AC2, dE2																
r P S n O L I I - - -	<div><input type="checkbox"/> [Ramp switch ass.]</div> <div><input type="checkbox"/> [No] (nO): Not assigned. <input type="checkbox"/> [LI1] (LI1) : <input type="checkbox"/> [...] (...): See the assignment conditions on page 204.<ul style="list-style-type: none">- ACC and dEC are enabled when the assigned input or bit is at inactive state.- AC2 and dE2 are enabled when the assigned input or bit is at active state.</div>		[No] (nO)															
AC 2 ()	<div><input type="checkbox"/> [Acceleration 2] (1)</div> <div>Time to accelerate from 0 to [Rated motor freq.] (FrS) or [Nominal freq sync.] (FrSS) page 149. Make sure that this value is compatible with the inertia being driven. The parameter can be accessed if [Ramp 2 threshold] (Frt) > 0 or if [Ramp switch ass.] (rPS) is assigned.</div>	0.01 to 6000 s (2)	5.0 s															
d E 2 ()	<div><input type="checkbox"/> [Deceleration 2] (1)</div> <div>Time to decelerate from [Rated motor freq.] (FrS) or [Nominal freq sync.] (FrSS) page 149 to 0. Make sure that this value is compatible with the inertia being driven. This parameter can be accessed if [Ramp 2 threshold] (Frt) > 0 or if [Ramp switch ass.] (rPS) assigned.</div>	0.01 to 6000 s (2)	5.0 s															

(1) Parameter can also be accessed in the **[1.3 SETTINGS] (SEt-)** and **[1.1 LIFT] (LIF-)** menus.






(2) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to **[Ramp increment] (Inr)** page 217.

() Parameter that can be modified during operation or when stopped.


[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
	[RAMP] (continued)		
brA	<input type="checkbox"/> [Dec ramp adapt.]		[Yes] (YES)
nO YES	<p>Activating this function automatically adapts the deceleration ramp, if this has been set at too low a value for the inertia of the load, which can cause an overvoltage fault.</p> <p><input type="checkbox"/> [No] (nO): Function inactive.</p> <p><input type="checkbox"/> [Yes] (YES): Function active, for applications that do not require strong deceleration.</p> <p>The following selections appear depending on the rating of the drive and [Motor control type] (Ctt) page 137. They enable stronger deceleration to be obtained than with [Yes] (YES). Use comparative testing to determine your selection.</p> <p><input type="checkbox"/> [High torq. A] (dYnA)</p> <p><input type="checkbox"/> [High torq. B] (dYnb)</p> <p><input type="checkbox"/> [High torq. C] (dYnC)</p> <p>[Dec ramp adapt.] (brA) is forced to [No] (nO) if brake control [Brake assignment] (bLC) is assigned (page 233), or if [Braking balance] (bbA) page 162 = [Yes] (YES). The factory setting changes to [High torq. A] (dYnA) with certain ratings if [Sinus filter] (OFI) page 139 = [Yes] (YES).</p> <p>The function is incompatible with applications requiring:</p> <ul style="list-style-type: none"> - Positioning on a ramp - The use of a braking resistor (the resistor would not operate correctly) 		
dYnA dYnb dYnC			
<p style="text-align: center;">CAUTION</p> <p>Do not use [High torqu. B] (dYnB) or [High torq. C] (dYnC) if the motor is a permanent magnet synchronous motor, as it will be demagnetized.</p> <p>Failure to follow this instruction can result in equipment damage.</p>			





[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
Stt -	[STOP CONFIGURATION]  Note: Some types of stop cannot be used with all other functions. Follow the instructions on page 210.		
Stt r n P F St n St d C I	<input type="checkbox"/> [Type of stop] [Ramp stop] (rMP) Stop mode on disappearance of the run command or appearance of a stop command. <input type="checkbox"/> [Ramp stop] (rMP) : On ramp <input type="checkbox"/> [Fast stop] (FSt) : Fast stop <input type="checkbox"/> [Freewheel] (nSt) : Freewheel stop <input type="checkbox"/> [DC injection] (dCI) : DC injection stop  Note: If the "brake logic function" on page 233 has been enabled, or if [Lift Speed Mgt] (LSM) page 36 is different from [No] (nO) , only ramp type stops may be configured.		
F F t 	<input type="checkbox"/> [Freewheel stop Thd] (1)	0.0 to 1,600 Hz	0.0
This parameter supports switching from a ramp stop or a fast stop to a freewheel stop below a low speed threshold. It can be accessed if [Type of stop] (Stt) = [Fast stop] (FSt) or [Ramp stop] (rMP) . <input type="checkbox"/> 0.0: Does not switch to freewheel stop <input type="checkbox"/> 0.1 to 1,600 Hz: Speed threshold below which the motor will switch to freewheel stop			
n St n O L I I - - - C I O I - - - C d O O -	<input type="checkbox"/> [Freewheel stop ass.] [No] (nO) <input type="checkbox"/> [No] (nO) : Not assigned <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10) : If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12) : If VW3A3203 ESIM card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14) : If VW3A3202 extended I/O card has been inserted <input type="checkbox"/> [C101] (C101) to [C115] (C115) : With integrated Modbus in [I/O profile] (IO) <input type="checkbox"/> [C201] (C201) to [C215] (C215) : With integrated CANopen in [I/O profile] (IO) <input type="checkbox"/> [C301] (C301) to [C315] (C315) : With a communication card in [I/O profile] (IO) <input type="checkbox"/> [C401] (C401) to [C415] (C415) : With a Controller Inside card in [I/O profile] (IO) <input type="checkbox"/> [CD00] (Cd00) to [CD13] (Cd13) : In [I/O profile] (IO) can be switched with possible logic inputs <input type="checkbox"/> [CD14] (Cd14) to [CD15] (Cd15) : In [I/O profile] (IO) can be switched without logic inputs The stop is activated when the input or bit is at inactive state. If the input returns to active state and the run command is still active, the motor will only restart if [2/3 wire control] (tCC) page 166 = [2 wire] (2C) and [2 wire type] (tCt) = [Level] (LEL) or [Fwd priority] (PFO) . If not, a new run command must be sent.		
F St n O L I I -	<input type="checkbox"/> [Fast stop assign.] [No] (nO)  Note: This function cannot be used with certain other functions. Follow the instructions on page 210. <input type="checkbox"/> [No] (nO) : Not assigned <input type="checkbox"/> [LI1] (LI1) <input type="checkbox"/> [...] (...) : See the assignment conditions on page 204. The stop is activated when the input changes to inactive state or the bit changes to active state (bit in [I/O profile] (IO) at 0). If the input returns to active state and the run command is still active, the motor will only restart if [2/3 wire control] (tCC) page 166 = [2 wire] (2C) and [2 wire type] (tCt) = [Level] (LEL) or [Fwd priority] (PFO) . If not, a new run command must be sent.		
d C F 	<input type="checkbox"/> [Ramp divider] (1)	0 to 10	4
The parameter can be accessed if [Type of stop] (Stt) = [Fast stop] (FSt) and if [Fast stop assign.] (FSt) is not [No] (nO) . The ramp that is enabled (dEC or dE2) is then divided by this coefficient when stop requests are sent. Value 0 corresponds to a minimum ramp time.			

(1)Parameter can also be accessed in the **[1.3 SETTINGS] (SEt-)** menu.

 Parameter that can be modified during operation or when stopped.


[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
	[STOP CONFIGURATION] (continued)		
dC 1	<input type="checkbox"/> [DC injection assign.] <div> <p> Note: This function cannot be used with certain other functions. Follow the instructions on page 210.</p> <p><input type="checkbox"/> [No] (nO): Not assigned</p> <p><input type="checkbox"/> [LI1] (LI1)</p> <p>...</p> <p><input type="checkbox"/> [...] (...): See the assignment conditions on page 204.</p> <p>DC injection braking is initiated when the assigned input or bit changes to state 1. If the input returns to state 1 and the run command is still active, the motor will only restart if [2/3 wire control] (tCC) page 166 = [2 wire] (2C) and [2 wire type] (tCt) = [Level] (LEL) or [Fwd priority] (PFO). If not, a new run command must be sent.</p> </div>		[No] (nO)
IdC ()	<input type="checkbox"/> [DC inject. level 1]	(1) (3) 0.1 to 1.41 In (2)	0.64 In (2)
	<p>Level of DC injection braking current activated via logic input or selected as stop mode. This parameter can be accessed if [Type of stop] (Stt) = [DC injection] (dCI) or if [DC injection assign.] (dCI) is not [No] (nO).</p> <div> <p>CAUTION</p> <p>Check that the motor will withstand this current without overheating. Failure to follow this instruction can result in equipment damage.</p> </div>		
IdC 1 ()	<input type="checkbox"/> [DC injection time 1]	(1) (3) 0.1 to 30 s	0.5 s
	<p>Maximum current injection time [DC inject. level 1] (IdC). After this time the injection current becomes [DC inject. level 2] (IdC2). This parameter can be accessed if [Type of stop] (Stt) = [DC injection] (dCI) or if [DC injection assign.] (dCI) is not [No] (nO).</p>		
IdC 2 ()	<input type="checkbox"/> [DC inject. level 2]	(1) (3) 0.1 In (2) to [DC inject. level 1] (IdC)	0.5 In (2)
	<p>Injection current activated by logic input or selected as stop mode, once period of time [DC injection time 1] (tdI) has elapsed. This parameter can be accessed if [Type of stop] (Stt) = [DC injection] (dCI) or if [DC injection assign.] (dCI) is not [No] (nO).</p> <div> <p>CAUTION</p> <p>Check that the motor will withstand this current without overheating. Failure to follow this instruction can result in equipment damage.</p> </div>		
IdC ()	<input type="checkbox"/> [DC injection time 2]	(1) (3) 0.1 to 30 s	0.5 s
	<p>Maximum injection time [DC inject. level 2] (IdC2) for injection, selected as stop mode only. This parameter can be accessed if [Type of stop] (Stt) = [DC injection] (dCI).</p>		


(1) Parameter can also be accessed in the **[1.3 SETTINGS]** (SEt-) menu.

(2) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

(3) Note: These settings are independent of the **[AUTO DC INJECTION]** (AdC-) function.

 Parameter that can be modified during operation or when stopped.

[1.7 APPLICATION FUNCT.] (FUn-)

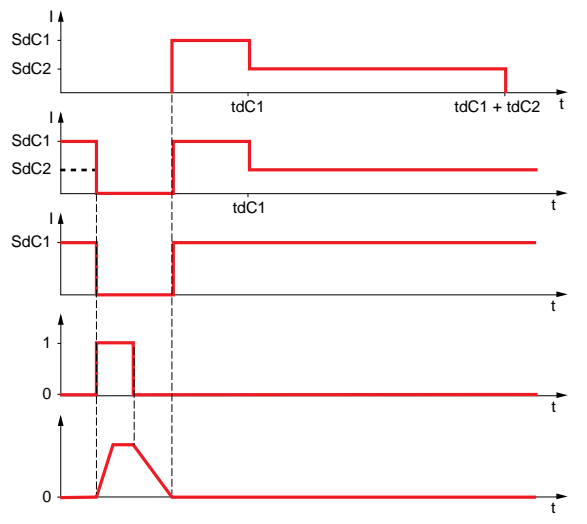
Code	Name/Description	Adjustment range	Factory setting
AdC -	[AUTO DC INJECTION]		
AdC () nO YES CE	<input type="checkbox"/> [Auto DC injection] Automatic current injection on stopping (at the end of the ramp). <input type="checkbox"/> [No] (nO) : No injection <input type="checkbox"/> [Yes] (YES) : Adjustable injection time <input type="checkbox"/> [Continuous] (Ct) : Continuous standstill injection Warning: There is an interlock between this function and [Motor fluxing] (FLU) page 153. If [Motor fluxing] (FLU) = [Continuous] (Ct) , [Auto DC injection] (AdC) must be [No] (nO) .  Note: This parameter gives rise to the injection of current even if a run command has not been sent. It can be accessed with the drive running.		[Yes] (YES)
SdC 1 ()	<input type="checkbox"/> [Auto DC inj. level 1] (1) Level of standstill DC injection current. This parameter can be accessed if [Auto DC injection] (AdC) is not [No] (nO) and cannot be accessed if [Motor control type] (Ctt) page 137 = [FVC] (FUC) or [Sync.CL] (FSY) . This parameter is forced to 0 if [Motor control type] (Ctt) page 137 = [Sync. mot.] (SYn) .	0 to 1.2 In (2)	0.7 In (2)
EdC 1 ()	<input type="checkbox"/> [Auto DC inj. time 1] (1) Standstill injection time. This parameter can be accessed if [Auto DC injection] (AdC) is not [No] (nO) . If [Motor control type] (Ctt) page 137 = [FVC] (FUC) or [Sync. mot.] (SYn) or [Sync.CL] (FSY) this time corresponds to the zero speed maintenance time.	0.1 to 30 s	0.5 s
SdC 2 ()	<input type="checkbox"/> [Auto DC inj. level 2] (1) 2 nd level of standstill DC injection current. This parameter can be accessed if [Auto DC injection] (AdC) is not [No] (nO) and cannot be accessed if [Motor control type] (Ctt) page 137 = [FVC] (FUC) or [Sync.CL] (FSY) . This parameter is forced to 0 if [Motor control type] (Ctt) page 137 = [Sync. mot.] (SYn) .	0 to 1.2 In (2)	0.5 In (2)

(1) Parameter can also be accessed in the **[1.3 SETTINGS] (SEt-)** menu.

(2) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

() Parameter that can be modified during operation or when stopped.

[1.7 APPLICATION FUNCT.] (FUn-)


Code	Name/Description	Adjustment range	Factory setting
[AUTO DC INJECTION] (continued)			
<div>tdC2</div> <div>()</div>	<div><div><input type="checkbox"/> [Auto DC inj. time 2]</div><div>(1)</div></div> <div>2nd standstill injection time. This parameter can be accessed if [Auto DC injection] (AdC) = [Yes] (YES.)</div>	0 to 30 s	0 s
AdC	SdC2	<div>Operation</div> <div></div>	
YES	x		
Ct	≠ 0		
Ct	= 0		
Run command			
speed			
<div>Note: When [Motor control type] (Ctt) page 137 = [FVC] (FUC) or [Sync.CL] (FSY), [Auto DC inj. level 1] (SdC1), [Auto DC inj. level 2] (SdC2) and [Auto DC inj. time 2] (tdC2) cannot be accessed, and only [Auto DC inj. time 1] (tdC1) can be accessed. This then corresponds to a zero speed maintenance time.</div>			

(1)Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

()

Parameter that can be modified during operation or when stopped.

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
P55 -	[PRESET SPEEDS]  Note: This function cannot be used with certain other functions. Follow the instructions on page 210 . For details of this function, see page 107 .		
P52 nD L I I -	<input type="checkbox"/> [2 preset speeds] <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [LI1] (LI1) <input type="checkbox"/> [...] (...): See the assignment conditions on page 204 .		[No] (nO)
P54 nD L I I -	<input type="checkbox"/> [4 preset speeds] <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [LI1] (LI1) <input type="checkbox"/> [...] (...): See the assignment conditions on page 204 . To obtain 4 speeds you must also configure 2 speeds.		[No] (nO)
P58 nD L I I -	<input type="checkbox"/> [8 preset speeds] <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [LI1] (LI1) <input type="checkbox"/> [...] (...): See the assignment conditions on page 204 . To obtain 8 speeds you must also configure 2 and 4 speeds.		[No] (nO)
P516 nD L I I -	<input type="checkbox"/> [16 preset speeds] <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [LI1] (LI1) <input type="checkbox"/> [...] (...): See the assignment conditions on page 204 . To obtain 16 speeds you must also configure 2, 4 and 8 speeds.		[No] (nO)

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
	[PRESET SPEEDS] (continued)		
SP 2 ()	<input type="checkbox"/> [Preset speed 2] (1)	0 to 1600 Hz	10 Hz
SP 3 ()	<input type="checkbox"/> [Preset speed 3] (1)		15 Hz
SP 4 ()	<input type="checkbox"/> [Preset speed 4] (1)		20 Hz
SP 5 ()	<input type="checkbox"/> [Preset speed 5] (1)		25 Hz
SP 6 ()	<input type="checkbox"/> [Preset speed 6] (1)		30 Hz
SP 7 ()	<input type="checkbox"/> [Preset speed 7] (1)		35 Hz
SP 8 ()	<input type="checkbox"/> [Preset speed 8] (1)		40 Hz
SP 9 ()	<input type="checkbox"/> [Preset speed 9] (1)		45 Hz
SP 10 ()	<input type="checkbox"/> [Preset speed 10] (1)		50 Hz
SP 11 ()	<input type="checkbox"/> [Preset speed 11] (1)		55 Hz
SP 12 ()	<input type="checkbox"/> [Preset speed 12] (1)		60 Hz
SP 13 ()	<input type="checkbox"/> [Preset speed 13] (1)		70 Hz
SP 14 ()	<input type="checkbox"/> [Preset speed 14] (1)		80 Hz
SP 15 ()	<input type="checkbox"/> [Preset speed 15] (1)		90 Hz
SP 16 ()	<input type="checkbox"/> [Preset speed 16] (1)		100 Hz
The appearance of these [Preset speed x] (SPx) parameters is determined by the number of speeds configured.			

(1) Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

() Parameter that can be modified during operation or when stopped.

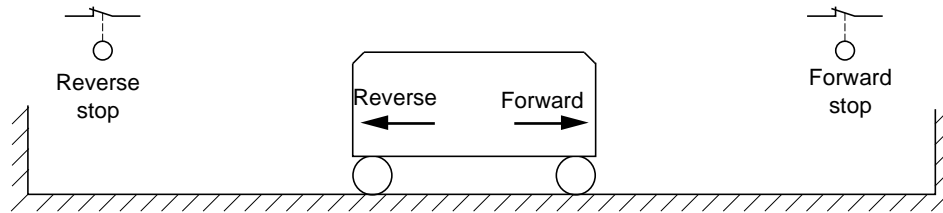
Limit switch management

This function can be used to manage trajectory limits using limit switches.

The stop mode is configurable.


When the stop contact is activated, startup in the other direction is authorized.

E.g.



The stop is activated when the input is at inactive state (contact open).

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
LSE -	[LIMIT SWITCHES]  Note: This function cannot be used with certain other functions. Follow the instructions on page 210 .		
LAF nO LI1 - - - C101 - - - CD00 -	<input type="checkbox"/> [Stop FW limit sw.] <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12): If VW3A3203 ESIM card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted <input type="checkbox"/> [C101] (C101) to [C115] (C115): With integrated Modbus in [I/O profile] (IO) <input type="checkbox"/> [C201] (C201) to [C215] (C215): With integrated CANopen in [I/O profile] (IO) <input type="checkbox"/> [C301] (C301) to [C315] (C315): With a communication card in [I/O profile] (IO) <input type="checkbox"/> [C401] (C401) to [C415] (C415): With a Controller Inside card in [I/O profile] (IO) <input type="checkbox"/> [CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] (IO) can be switched with possible logic inputs <input type="checkbox"/> [CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] (IO) can be switched without logic inputs		[No] (nO)
LAr	<input type="checkbox"/> [Stop RV limit sw.] Same assignments possible as for [Stop FW limit sw.] (LAF) below.		[No] (nO)
LAS rMP FSt nSt	<input type="checkbox"/> [Stop type] <input type="checkbox"/> [Ramp stop] (rMP) <input type="checkbox"/> [Fast stop] (FSt) <input type="checkbox"/> [Freewheel] (nSt) When the assigned input changes to 0, the stop is controlled in accordance with the selected type. Restarting is only authorized for the other operating direction once the motor has stopped. If the two inputs [Stop FW limit sw.] (LAF) and [Stop RV limit sw.] (LAr) are assigned and at state 0, restarting will be impossible. This parameter can be accessed if [Stop FW limit sw.] (LAF) or [Stop RV limit sw.] (LAr) is assigned.		[Freewheel] (nSt)

Brake logic control

Used to control an electromagnetic brake by the drive, for horizontal and vertical hoisting applications, and for unbalanced machines.

Principle:


Vertical hoisting movement:

Maintain motor torque in the driving load holding direction during brake opening and closing, in order to hold the load, start smoothly when the brake is released and stop smoothly when the brake is engaged.

Horizontal hoisting movement:

Synchronize brake release with the build-up of torque during startup and brake engage at zero speed on stopping, to prevent jolting.

Recommended settings for brake logic control for a vertical hoisting application:

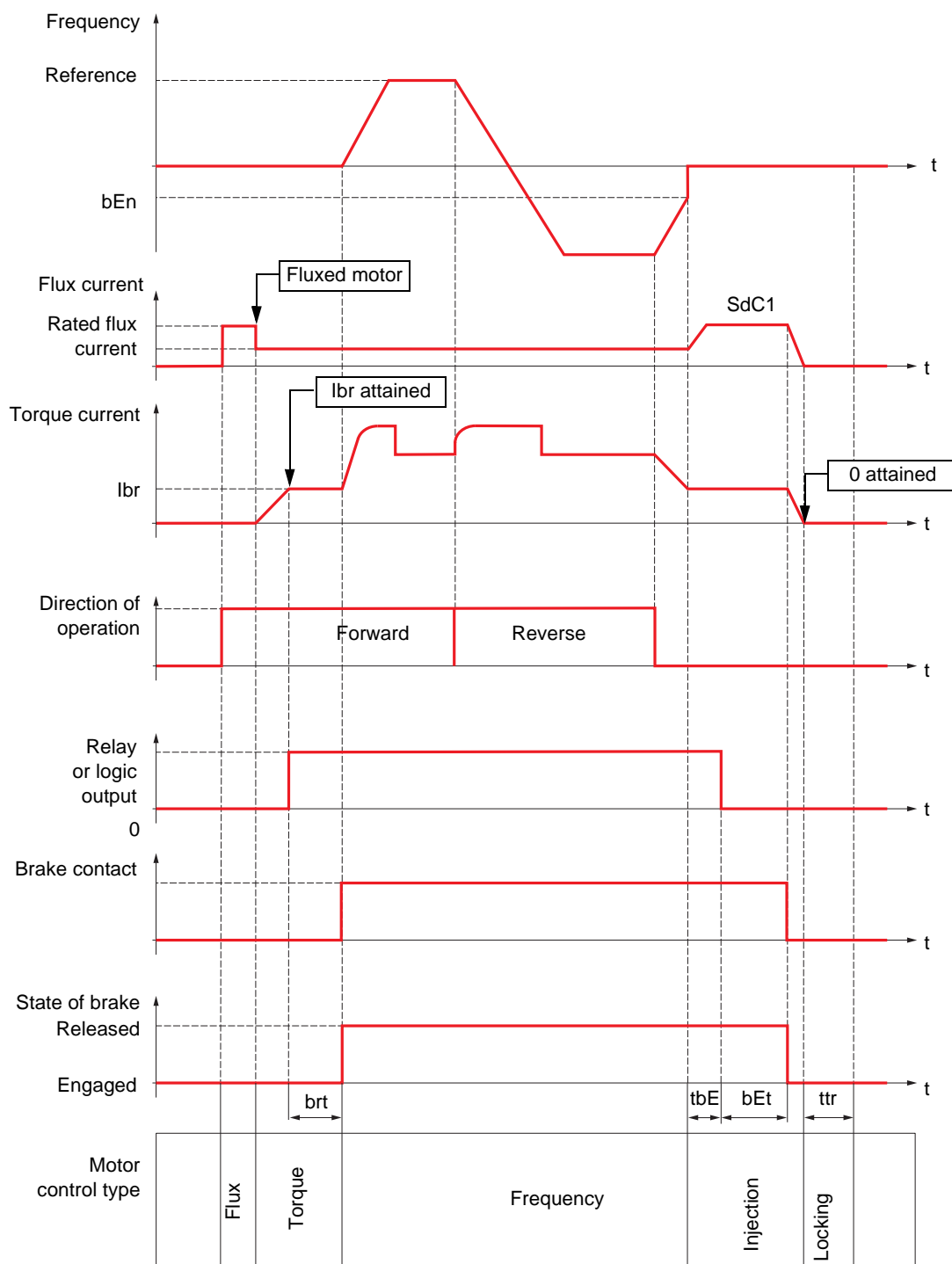
 WARNING
UNINTENDED EQUIPMENT OPERATION
Check that the selected settings and configurations will not result in the dropping or loss of control of the load being lifted.
Failure to follow this instruction can result in death or serious injury.

1. Brake impulse (bIP): YES. Ensure that the direction of rotation FW corresponds to lifting the load.
For applications in which the load being lowered is very different from the load being lifted, set BIP = 2 lbr (e.g., ascent always with a load and descent always without a load).
2. Brake release current (lbr and lrd if BIP = 2 lbr): Adjust the brake release current to the rated current indicated on the motor.
During testing, adjust the brake release current in order to hold the load smoothly.
3. Acceleration time: For hoisting applications it is advisable to set the acceleration ramps to more than 0.5 seconds. Ensure that the drive does not exceed the current limit.
The same recommendation applies for deceleration.
Reminder: For a hoisting movement, a braking resistor should be used.
4. Brake release time (brt): Set according to the type of brake. It is the time required for the mechanical brake to release.
5. Brake release frequency (blr), in open-loop mode only: Leave in [Auto], adjust if necessary.
6. Brake engage frequency (bEn): Leave in [Auto], adjust if necessary.
7. Brake engage time (bEt): Set according to the type of brake. It is the time required for the mechanical brake to engage.

Recommended settings for brake logic control for a horizontal hoisting application:

1. Brake impulse (bIP): No
2. Brake release current (lbr): Set to 0.
3. Brake release time (brt): Set according to the type of brake. It is the time required for the mechanical brake to release.
4. Brake engage frequency (bEn), in open-loop mode only: Leave in [Auto], adjust if necessary.
5. Brake engage time (bEt): Set according to the type of brake. It is the time required for the mechanical brake to engage.

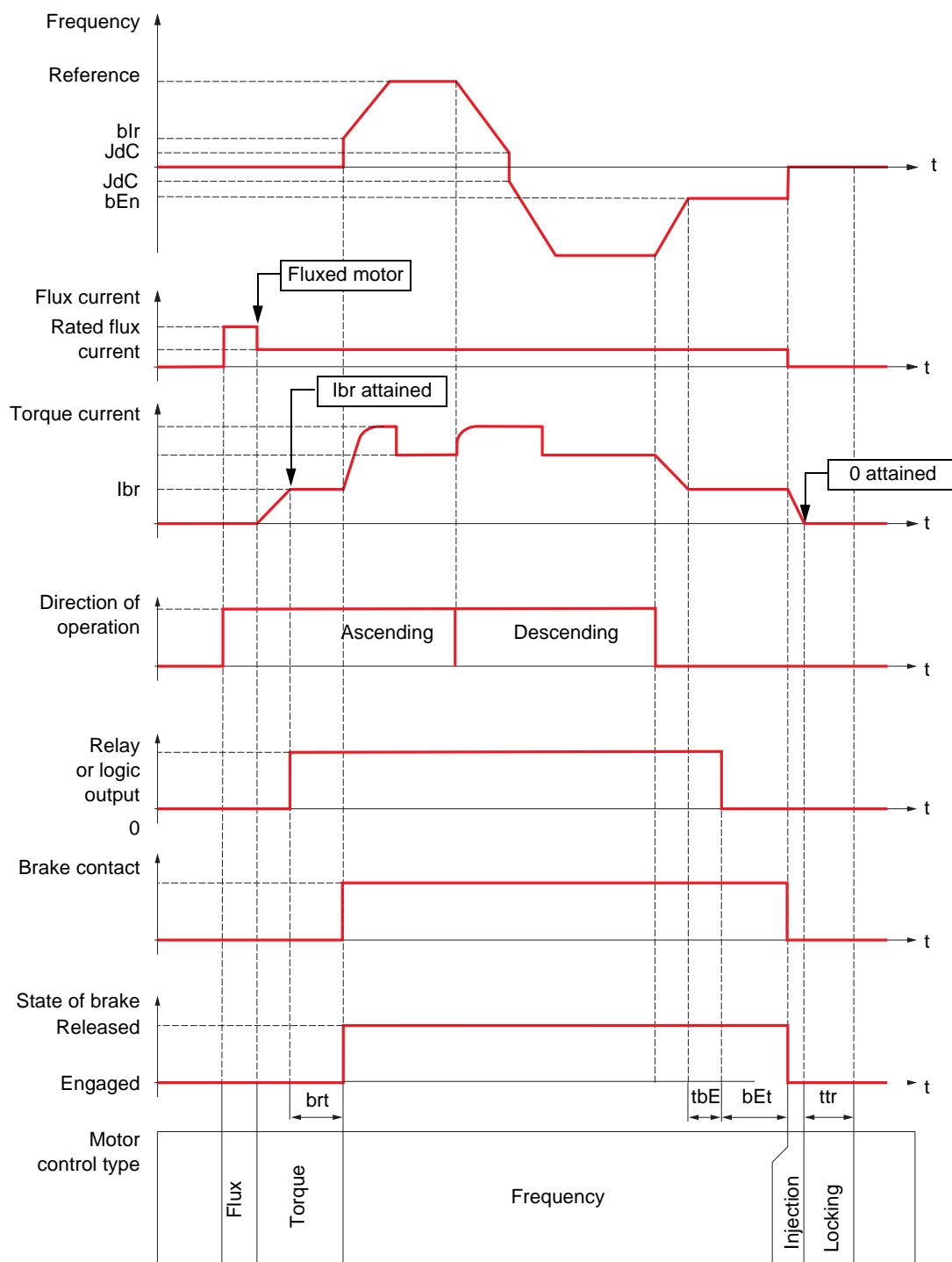
Brake logic control, horizontal movement in open-loop mode



Key:

- (bEn): [Brake engage freq]
- (bEt): [Brake engage time]
- (brt): [Brake Release time]
- (lbr): [Brake release I FW]
- (SdC1): [Auto DC inj. level 1]
- (tbE): [Brake engage delay]
- (ttr): [Time to restart]

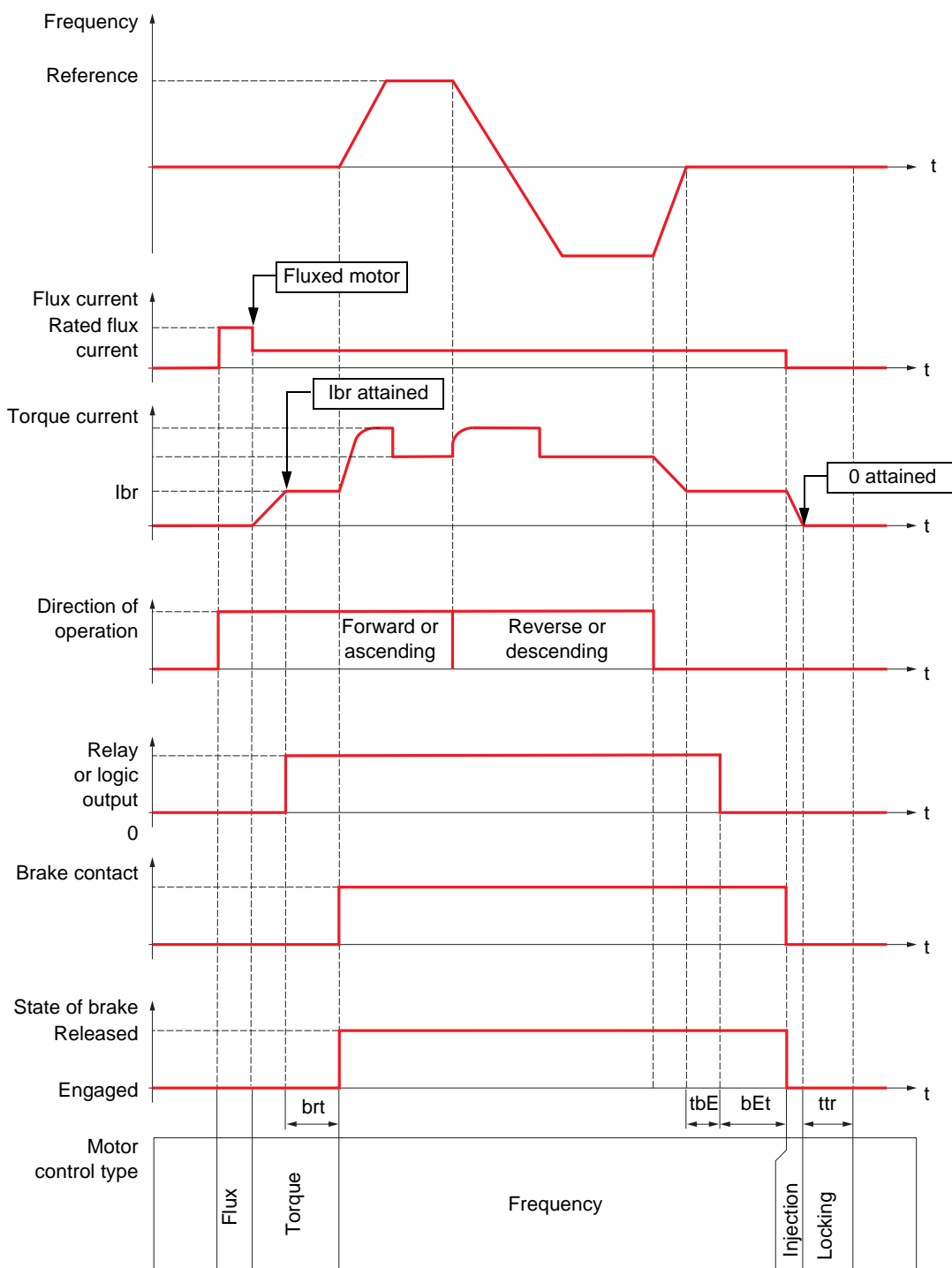
Brake logic control, vertical movement in open-loop mode



Key:

- (bEn): [Brake engage freq]
- (bEt): [Brake engage time]
- (blr): [Brake release freq]
- (brt): [Brake Release time]
- (lbr): [Brake release I FW]
- (JdC): [Jump at reversal]
- (tbE): [Brake engage delay]
- (ttr): [Time to restart]



Brake logic control, vertical or horizontal movement in closed-loop mode



Key:

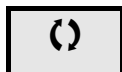
- (bEt): [Brake engage time]
- (brt): [Brake Release time]
- (lbr): [Brake release I FW]
- (tbE): [Brake engage delay]
- (ttr): [Time to restart]

[1.7 APPLICATION FUNCT.] (FU_n-)

Code	Name/Description	Adjustment range	Factory setting
b L C -	[BRAKE LOGIC CONTROL]  Note: This function cannot be used with certain other functions. Follow the instructions on page 210 .		
b L C	<input type="checkbox"/> [Brake assignment]  Note: If the brake is assigned, only a ramp stop is possible. Check the [Type of stop] (Stt) page 221 . Brake logic control can only be assigned if [Motor control type] (Ctt) page 137 = [SVC V] (UUC), [SVC I] (CUC), [FVC] (FUC) or [Sync.CL] (FSY). Logic output or control relay <input type="checkbox"/> [No] (nO): Function not assigned (in this case, none of the function's parameters can be accessed) <input type="checkbox"/> [R2] (r2) to [R5] (r5): Relay (selection extended to R3, R4 or R5 if I/O or ESIM cards have been inserted) <input type="checkbox"/> [LO1] (LO1) to [LO4] (LO4): Logic output (if one or two I/O cards have been inserted, LO1 to LO2 or LO4 can be selected) <input type="checkbox"/> [dO1] (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1) page 191 = [No] (nO).	[R2] (R2)	
b St HOr UEr	<input type="checkbox"/> [Movement type] <input type="checkbox"/> [Traveling] (HOr): Resistive-load movement (translational motion of overhead crane, for example). <input type="checkbox"/> [Hoisting] (UEr): Driving-load movement (hoisting winch, for example). If [Weight sensor ass.] (PES) page 239 is not [No] (nO) [Movement type] (bSt) is forced to [Hoisting] (UEr).	[Hoisting] (UEr)	
b C I nO L I I - - -	<input type="checkbox"/> [Brake contact] If the brake has a monitoring contact (closed for released brake). <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [LI1] (LI1) : : : <input type="checkbox"/> [...] (...): See the assignment conditions on page 204 .	[No] (nO)	
b IP () nO YES 2 lbr	<input type="checkbox"/> [Brake impulse] This parameter can be accessed if [Weight sensor ass.] (PES) = [No] (nO) (see page 239) and if [Movement type] (bSt) = [Hoisting] (UEr). <input type="checkbox"/> [No] (nO): The motor torque is given in the required operating direction, at current lbr. <input type="checkbox"/> [Yes] (YES): The motor torque is always Forward (check that this direction corresponds to ascending), at current lbr. <input type="checkbox"/> [2 lBR] (2lbr): The torque is in the required direction, at current lbr for Forward and lrd for Reverse, for certain specific applications.	[Yes] (YES)	
lbr ()	<input type="checkbox"/> [Brake release l FW] (1) Brake release current threshold for Ascending or Forward movement. This parameter can be accessed if [Weight sensor ass.] (PES) = [No] (nO) (see page 239).	-1.32 ln to 1.32 ln (2)	0
lrd ()	<input type="checkbox"/> [Brake release l Rev] (1) Brake release current threshold for descending or reverse movement This parameter can be accessed if [Brake impulse] (bIP) = [2 lBR] (2lbr).	0 to 1.32 ln (2)	0


(1) Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) menu.

(2) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.



Parameter that can be modified during operation or when stopped.

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
	[BRAKE LOGIC CONTROL] (continued)		
b r t ()	<input type="checkbox"/> [Brake Release time] (1) Brake release time delay	0.00 to 5.00 s	0.50 s
b l r () A U t O -	<input type="checkbox"/> [Brake release freq] (1) Brake release frequency threshold (initialization of acceleration ramp). This parameter can be accessed if [Motor control type] (Ctt) page 137 is not [FVC] (FUC) or [Sync.CL] (FSY) and if [Movement type] (bSt) page 233 is [Hoisting] (UEr). <input type="checkbox"/> [Auto] (AUtO): The drive takes a value equal to the nominal motor slip, calculated using the drive parameters. <input type="checkbox"/> 0 to 10 Hz : Manual setting		[Auto] (AUtO)
b E n () A U t O -	<input type="checkbox"/> [Brake engage freq] (1) Brake engage frequency threshold This parameter can be accessed if [Motor control type] (Ctt) page 137 is not [FVC] (FUC) or [Sync.CL] (FSY). <input type="checkbox"/> [Auto] (AUtO): The drive takes a value equal to the nominal motor slip, calculated using the drive parameters. <input type="checkbox"/> 0 to 10 Hz : Manual setting		[Auto] (AUtO)
b E C d n O -	<input type="checkbox"/> [Brake engage at 0] Brake engages at regulated zero speed. This parameter can be accessed if [Motor control type] (Ctt) page 137 = [FVC] (FUC) or [Sync.CL] (FSY). Can be used to engage the brake at zero speed in closed-loop mode with speed regulation. This parameter can be used to adjust the brake engage delay once zero speed has been reached. If a speed other than zero is then required, the command to release the brake is sent following torque application. <input type="checkbox"/> [No] (nO): Brake does not engage at regulated zero speed. <input type="checkbox"/> 0.0 to 30.0 s : Brake engage delay once zero speed is reached.		[No] (nO)
t b E ()	<input type="checkbox"/> [Brake engage delay] (1) Time delay before request to engage brake. To delay brake engagement, if you wish the brake to be engaged when the drive comes to a complete stop.	0 to 5.00 s	0
b E t ()	<input type="checkbox"/> [Brake engage time] (1) Brake engage time (brake response time)	0.00 to 5.00 s	0.30 s
S d C I ()	<input type="checkbox"/> [Auto DC inj. level 1] (1) Level of standstill DC injection current.  Note: This parameter can be accessed if [Motor control type] (Ctt) page 137 is not [FVC] (FUC) or [Sync.CL] (FSY) and if [Movement type] (bSt) page 233 is [Traveling] (HOr). <div style="border: 1px solid black; padding: 10px; text-align: center;">CAUTION Check that the motor will withstand this current without overheating. Failure to follow this instruction can result in equipment damage.</div>	0 to 1.2 In (2)	0.7 In (2)

(1) Parameter can also be accessed in the **[1.3 SETTINGS] (SEt-)** menu.

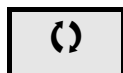
(2) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

() Parameter that can be modified during operation or when stopped.

[1.7 APPLICATION FUNCT.] (FUn-)

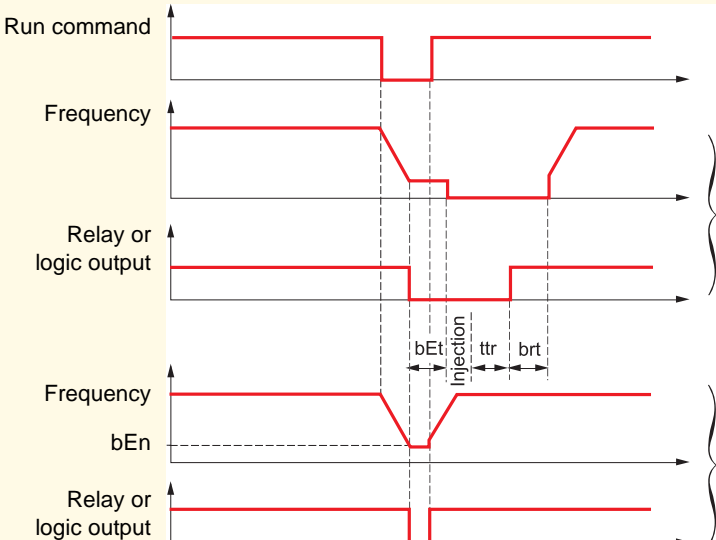
Code	Name/Description	Adjustment range	Factory setting
	[BRAKE LOGIC CONTROL] (continued)		
bEd () nO YES	<input type="checkbox"/> [Engage at reversal] <input type="checkbox"/> [No] (nO): The brake does not engage. <input type="checkbox"/> [Yes] (YES): The brake engages. Can be used to select whether or not the brake engages on transition to zero speed when the operating direction is reversed.		[No] (nO)
JdC () AUtO -	<input type="checkbox"/> [Jump at reversal] (1) This parameter can be accessed if [Motor control type] (Ctt) page 137 is not [FVC] (FUC) or [Sync.CL] (FSY) and if [Movement type] (bSt) page 233 is [Hoisting] (UEr). <input type="checkbox"/> [Auto] (AUtO): The drive takes a value equal to the nominal motor slip, calculated using the drive parameters. <input type="checkbox"/> 0 to 10 Hz : Manual setting When the reference direction is reversed, this parameter can be used to avoid loss of torque (and consequential release of load) on transition to zero speed. Parameter is not applicable if [Engage at reversal] (bEd) = [Yes] (YES).	0 to 10.0 Hz	[Auto] (AUtO)
tEr ()	<input type="checkbox"/> [Time to restart] (1) Time between the end of a brake engage sequence and the start of a brake release sequence.	0 to 5.00 s	0

(1) Parameter can also be accessed in the **[1.3 SETTINGS]** (SEt-) menu.



Parameter that can be modified during operation or when stopped.

Brake control logic expert parameters

Code	Name/Description	Adjustment range	Factory setting
<div>brH0</div> <div>0</div> <div>1</div>	<div><input type="checkbox"/> [BRH_b0]</div> <div>Selection of the brake restart sequence if a run command is repeated while the brake is engaging.</div> <div><input type="checkbox"/> [0] (0): The engage/release sequence is executed in full.</div> <div><input type="checkbox"/> [1] (1): The brake is released immediately.</div> <div>Use in open-loop and closed-loop mode.</div> <div><div>A run command may be requested during the brake engagement phase. Whether or not the brake release sequence is executed depends on the value selected for [BRH b0] (brH0).</div></div> <div></div> <div>Note: If a run command is requested during the "ttr" phase, the complete brake control sequence is initialized.</div>		0
<div>brH1</div> <div>0</div> <div>1</div>	<div><input type="checkbox"/> [BRH_b1]</div> <div>Deactivation of the brake contact in steady state fault.</div> <div><input type="checkbox"/> [0] (0): The brake contact in steady state fault is active (fault if the contact is open during operation). The brF brake contact fault is monitored in all operating phases.</div> <div><input type="checkbox"/> [1] (1): The brake contact in steady state fault is inactive. The brF brake contact fault is only monitored during the brake release and engage phases.</div>		0

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
brH2 0 1	<input type="checkbox"/> [BRH_b2] Taking the brake contact into account for the brake control sequence. <input type="checkbox"/> [0] (0): The brake contact is not taken into account. <input type="checkbox"/> [1] (1): The brake contact is taken into account. Use in open-loop and closed-loop mode. • If a logic input is assigned to the brake contact. [BRH b2] (brH2) = 0 : During the brake release sequence, the reference is enabled at the end of the time [Brake Release time] (brt) . During the brake engage sequence, the current changes to 0 according to the ramp [Current ramp time] (brr) at the end of the [Brake engage time] (bEt) . [BRH b2] (brH2) = 1 : When the brake is released, the reference is enabled when the logic input changes to 1. When the brake is engaged, the current changes to 0 according to the ramp [Current ramp time] (brr) when the logic input changes to 0.		0
brH3 0 1	<input type="checkbox"/> [BRH_b3] In closed-loop mode only. Management of the absence of brake contact response, if it is assigned. <input type="checkbox"/> [0] (0): During the brake engage sequence, the brake contact must be open before the end of [Brake engage time] (bEt) , otherwise the drive locks in a brF brake contact fault. <input type="checkbox"/> [1] (1): During the brake engage sequence, the brake contact must be open before the end of [Brake engage time] (bEt) , otherwise a bCA brake contact alarm is triggered and zero speed is maintained.		0
brH4 0 1	<input type="checkbox"/> [BRH_b4] In closed-loop mode only. Activation of the speed loop at zero if a movement for which no command has been given occurs (measurement of a speed greater than a fixed min. threshold). <input type="checkbox"/> [0] (0): No action in the event of a movement for which no command has been given. <input type="checkbox"/> [1] (1): If a movement occurs for which no command has been given, the drive switches to zero speed regulation, with no brake release command, and a bSA alarm is triggered.		0
brr ()	<input type="checkbox"/> [Current ramp time] Torque current ramp time (increase and decrease) for a current variation equal to [Brake release I FW] (lbr) .	0 to 5.00 s	0.3 s



Parameter that can be modified during operation or when stopped.

[1.7 APPLICATION FUNCT.] (FUn-)



See page 88 for the details of this function.

Code	Name/Description	Adjustment range	Factory setting
rbn -	[ROLLBACK MGT] Menu accessible: - If [Motor control type] (Ctt) page 137 = [Sync.CL] (FSY) or [FVC] (FUC) - If brake logic control [Brake assignment] (bLC) page 233 has been assigned.		
rbn no YES	<input type="checkbox"/> [Rollback MGT] Activation of Rollback MGT function <input type="checkbox"/> [No] (nO) <input type="checkbox"/> [Yes] (YES)		[No] (nO)
rbC 	<input type="checkbox"/> [Rbk Compensation] This parameter can be accessed if [Rollback MGT] (rbM) = [Yes] (YES) Rollback compensation gain.	0 to 1,000 %	20 %
rbd 	<input type="checkbox"/> [Rbk Damping] This parameter can only be accessed when [ACCESS LEVEL] = [Expert] and if [Rollback MGT] (rbM) = [Yes] (YES). Rollback coefficient damping.	0 to 1,000 %	50 %

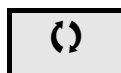
Parameter that can be modified during operation or when stopped.

[1.7 APPLICATION FUNCT.] (FUn-)

See page 92 for more details of this function.

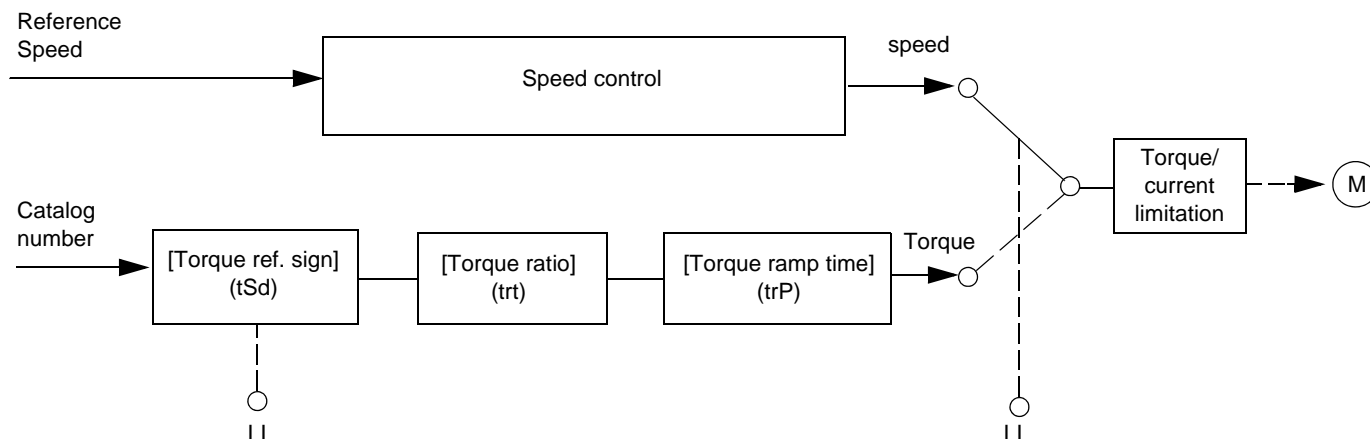
Code	Name/Description	Adjustment range	Factory setting
ELN -	[EXTERNAL WEIGHT MEAS.]		
PES	<input type="checkbox"/> [Weight sensor ass.] This function can be accessed if brake logic control has been assigned (see page 233). If [Weight sensor ass.] (PES) is not [No] (nO), [Movement type] (bSt) page 233 is forced to [Hoisting] (UEr). <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [AI1] (AI1): Analog input <input type="checkbox"/> [AI2] (AI2): Analog input <input type="checkbox"/> [AI3] (AI3): Analog input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [AI4] (AI4): Analog input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [RP] (PI): Frequency input, if VW3A3202 extension card has been inserted <input type="checkbox"/> [Encoder] (PG): Encoder input, if encoder card has been inserted <input type="checkbox"/> [Network AI] (AIU1): Virtual input via communication bus, to be configured via [AI net channel] (AIC1) page 175.		[No] (nO)
nO			
AI1			
AI2			
AI3			
AI4			
PI			
PG			
AIU1			
	<div style="text-align: center;">  WARNING </div> <div> UNINTENDED EQUIPMENT OPERATION If the equipment switches to forced local mode (see page 286), the virtual input remains frozen at the last value transmitted. Do not use the virtual input and forced local mode in the same configuration. Failure to follow this instruction can result in death or serious injury. </div>		
LP1	<input type="checkbox"/> [Point 1 X] 0 to 99.99% of signal on the assigned input. [Point 1x] (LP1) must be less than [Point 2x] (LP2). This parameter can be accessed if [Weight sensor ass.] (PES) has been assigned.	0 to 99.99 %	0
CP1	<input type="checkbox"/> [Point 1Y] Current corresponding to the load [Point 1 X] (LP1), in A. This parameter can be accessed if [Weight sensor ass.] (PES) has been assigned.	-1.36 to +1.36 In (1)	- In
LP2	<input type="checkbox"/> [Point 2X] 0.01 to 100 % of signal on the assigned input. [Point 2x] (LP2) must be greater than [Point 1x] (LP1). This parameter can be accessed if [Weight sensor ass.] (PES) has been assigned.	0.01 to 100 %	50 %
CP2	<input type="checkbox"/> [Point 2Y] Current corresponding to the load [Point 2x] (LP2), in A. This parameter can be accessed if [Weight sensor ass.] (PES) has been assigned.	-1.36 to +1.36 In (1)	0
lbrA 	<input type="checkbox"/> [lbr 4-20 mA loss] Brake release current in the event of the loss of the weight sensor information. This parameter can be accessed if the weight sensor has been assigned to an analog current input and the 4-20 mA loss fault is deactivated. Recommended settings: - 0 for lifts - Rated motor current for a hoisting application	0 to 1.36 In (1)	0

(1) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.



Parameter that can be modified during operation or when stopped.

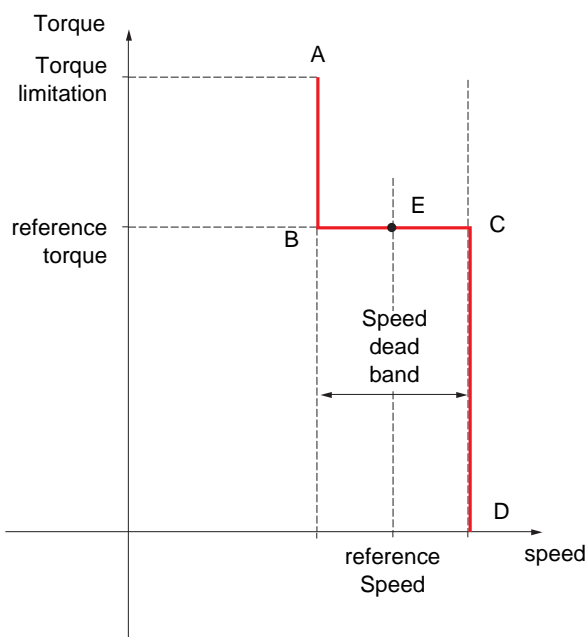
Torque regulation



The function can be used to switch between operation in speed regulation mode and operation in torque control mode. In torque control mode, the speed may vary within a configurable "deadband". When it reaches a lower or upper limit, the drive automatically reverts to speed regulation mode (fallback) and remains at this limit speed. The regulated torque is therefore no longer maintained and two scenarios may occur.

- If the torque returns to the required value, the drive will return to torque control mode.
- If the torque does not return to the required value at the end of a configurable period of time, the drive will switch to fault or alarm mode.




⚠ WARNING
UNINTENDED EQUIPMENT OPERATION Check that the changes in the behavior of the motor do not present any danger. Failure to follow this instruction can result in death or serious injury.



- AB and CD: "Fallback" to speed regulation
- BC: Torque control zone
- E: Ideal operating point

The torque sign and value can be transmitted via a logic output and an analog output.

[1.7 APPLICATION FUNCT.] (FUn-)


Code	Name/Description	Adjustment range	Factory setting
Er -	[TORQUE CONTROL] This function can only be accessed for [Motor control type] (Ctt) = [SVC I] (CUC), [FVC] (FUC) or [Sync.CL] (FSY).  Note: This function cannot be used with certain other functions. Follow the instructions on page 210.		
ES5 nD YES LI1 - - -	<input type="checkbox"/> [Trq/spd switching] <input type="checkbox"/> [No] (nO) : Function inactive, thereby preventing access to other parameters. <input type="checkbox"/> [Yes] (YES) : Permanent torque control <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...) : See the assignment conditions on page 204. If the assigned input or bit is at active state: Torque control If the assigned input or bit is at inactive state: Speed regulation		[No] (nO)
Er I nD AI1 AI2 AI3 AI4 LCC Mdb CAN nEt APP PI PG	<input type="checkbox"/> [Torque ref. channel] <input type="checkbox"/> [No] (nO) : Not assigned (zero torque reference). <input type="checkbox"/> [AI1] (AI1) : Analog input <input type="checkbox"/> [AI2] (AI2) : Analog input <input type="checkbox"/> [AI3] (AI3) : Analog input, if VW3A3202 I/O card has been inserted <input type="checkbox"/> [AI4] (AI4) : Analog input, if VW3A3202 I/O card has been inserted <input type="checkbox"/> [HMI] (LCC) : Graphic display terminal <input type="checkbox"/> [Modbus] (Mdb) : Integrated Modbus <input type="checkbox"/> [CANopen] (CAN) : Integrated CANopen <input type="checkbox"/> [Com. card] (nEt) : Communication card (if inserted) <input type="checkbox"/> [C.insid. card] (APP) : Controller Inside card (if inserted) <input type="checkbox"/> [RP] (PI) : Frequency input, if VW3A3202 I/O card has been inserted <input type="checkbox"/> [Encoder] (PG) : Encoder input, if encoder card has been inserted 100% of the reference corresponds to 300% of the rated torque.		[No] (nO)
ESd nD LI1 - - -	<input type="checkbox"/> [Torque ref. sign] <input type="checkbox"/> [No] (nO) : Function inactive <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...) : See the assignment conditions on page 204. If the assigned input or bit is at inactive state, the torque sign is the same as the reference. If the assigned input or bit is at active state, the torque sign is the opposite of the reference.		[No] (nO)
Er t 	<input type="checkbox"/> [Torque ratio] Coefficient applied to [Torque reference] (tr1).	0 to 1,000 %	100 %
Er P 	<input type="checkbox"/> [Torque ramp time] Rise and fall time for a variation of 100% of the rated torque.	0 to 99.99 s	3 s
ES t SPd YES SPn	<input type="checkbox"/> [Torque control stop] <input type="checkbox"/> [Speed] (SPd) : Speed regulation stop, in accordance with the type of stop configuration (see page 221). <input type="checkbox"/> [Freewheel] (YES) : Freewheel stop <input type="checkbox"/> [Spin] (SPn) : Zero torque stop, but maintaining the flux in the motor. This type of operation is only possible if [Motor control type] (Ctt) = [FVC] (FUC) or [Sync.CL] (FSY).		[Speed] (SPd)

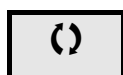


Parameter that can be modified during operation or when stopped.

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
	[TORQUE CONTROL] (continued)		
SPt ()	<input type="checkbox"/> [Spin time] This parameter can be accessed if [Torque control stop] (tSt) = [Spin] (SPn) Spin time following stop, in order to remain ready to restart quickly.	0 to 3600 s	1
dbP ()	<input type="checkbox"/> [Positive deadband] Positive deadband. Value added algebraically to the speed reference. Example for dbP = 10: • If reference = +50 Hz: + 50 + 10 = 60 • If reference = - 50 Hz: - 50 + 10 = - 40	0 to 2 x [Max frequency] (tFr)	10 Hz
dbn ()	<input type="checkbox"/> [Negative deadband] Negative deadband. Value subtracted algebraically from the speed reference. Example for dbn = 10: • If reference = +50 Hz: + 50 - 10 = 40 • If reference = - 50 Hz: - 50 - 10 = - 60	0 to 2 x [Max frequency] (tFr)	10 Hz
rtO	<input type="checkbox"/> [Torque ctrl time out] Time following automatic exit of torque control mode in the event of a fault or alarm.	0 to 999.9 s	60
tOb ALrM FLt	<input type="checkbox"/> [Torq. ctrl fault mgt] Response of drive once time [Torque ctrl time out] (rtO) has elapsed. <input type="checkbox"/> [Alarm] (ALrM) <input type="checkbox"/> [Fault] (FLt) : Fault with freewheel stop		[Alarm] (ALrM)

-  **Note:** If the motor is equipped with an encoder assigned to speed feedback, the "torque control" function will trigger a **[Load slipping] (AnF)** fault. One of the following solutions should be applied:
- Set **[Load slip detection] (Sdd)** page 277 = **[No] (nO)**.
 - Set both **[Positive deadband] (dbP)** and **[Negative deadband] (dbn)** to a value less than 10% of the rated motor frequency.

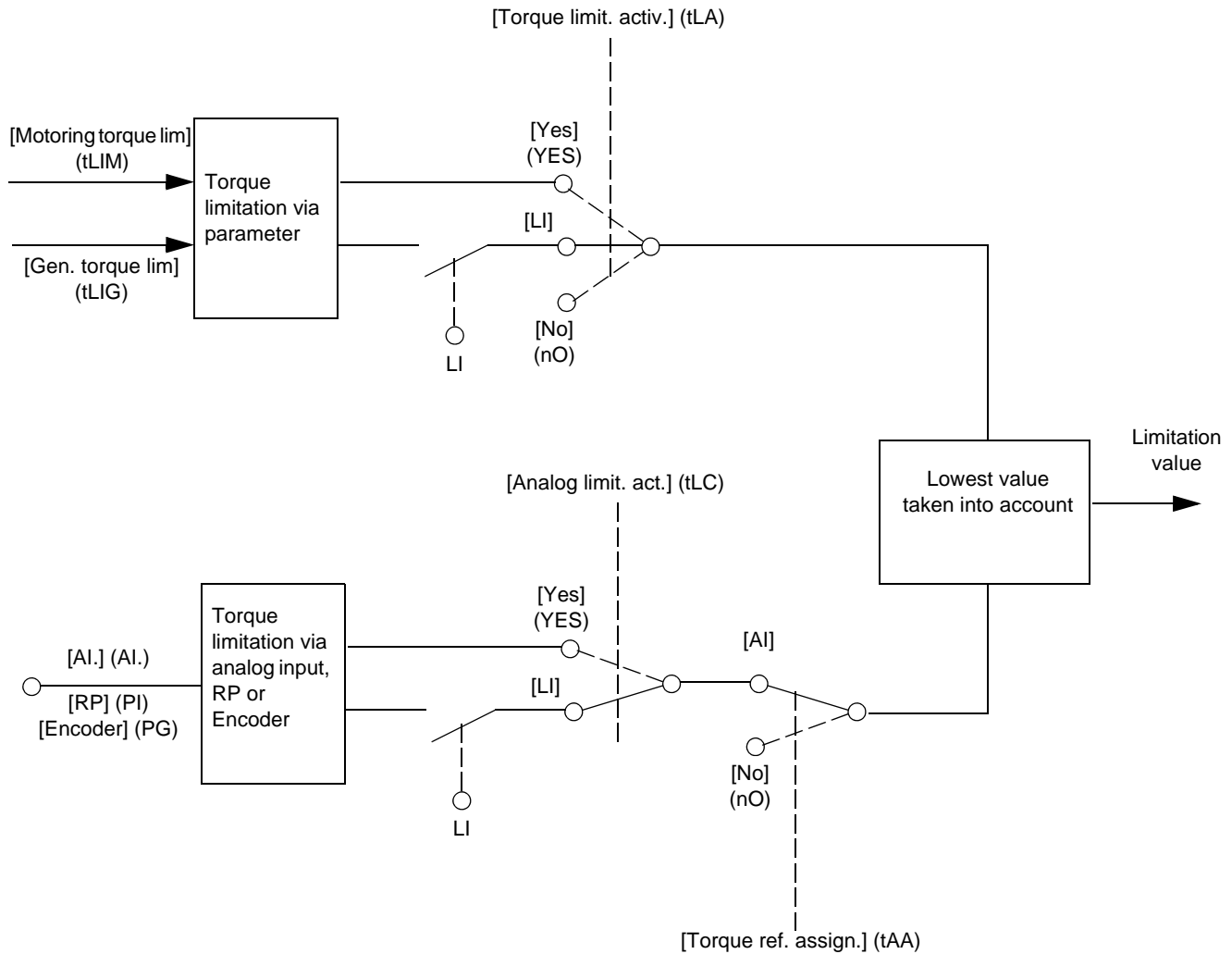
 Parameter that can be modified during operation or when stopped.

Torque limitation


There are two types of torque limitation:

- With a value that is fixed by a parameter
- With a value that is set by an analog input (AI, pulse or encoder)

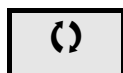
If both types are enabled, the lowest value is taken into account. The two types of limitation can be configured or switched remotely using a logic input or via the communication bus.



[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
EL -	[TORQUE LIMITATION] This function cannot be accessed in V/F profile mode.		
ELR nD YES LI1 - - -	<input type="checkbox"/> [Torque limit. activ.] <input type="checkbox"/> [No] (nO) : Function inactive <input type="checkbox"/> [Yes] (YES) : Function always active <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...) : See the assignment conditions on page 204. If the assigned input or bit is at inactive state, the function is inactive. If the assigned input or bit is at active state, the function is active.		[No] (nO)
IntP 0.1 1	<input type="checkbox"/> [Torque increment] The parameter cannot be accessed if [Torque limit. activ.] (tLA) = [No] (nO) . Selection of units for the [Motoring torque lim] (tLIM) and [Gen. torque lim] (tLIG) parameters. <input type="checkbox"/> [0.1%] (0.1) : 0.1% unit <input type="checkbox"/> [1%] (1) : 1% unit		[1 %] (1)
ELIN (C)	<input type="checkbox"/> [Motoring torque lim] (1) The parameter cannot be accessed if [Torque limit. activ.] (tLA) = [No] (nO) . Torque limitation in motor mode, as a whole % or in 0.1% increments of the rated torque in accordance with the [Torque increment] (IntP) parameter.	0 to 300 %	100 %
ELIG (C)	<input type="checkbox"/> [Gen. torque lim] (1) The parameter cannot be accessed if [Torque limit. activ.] (tLA) = [No] (nO) . Torque limitation in generator mode, as a whole % or in 0.1% increments of the rated torque in accordance with the [Torque increment] (IntP) parameter.	0 to 300 %	100 %
ELR nD AI1 - AI4 PI PG AIU1	<input type="checkbox"/> [Torque ref. assign.] If the function is assigned, the limitation varies between 0% and 300% of the rated torque on the basis of the 0% to 100% signal applied to the assigned input. Examples include: - 12 mA on a 4-20 mA input results in limitation to 150% of the rated torque. - 2.5 V on a 10 V input results in 75% of the rated torque. <input type="checkbox"/> [No] (nO) : Not assigned (function inactive) <input type="checkbox"/> [AI1] (AI1) to <input type="checkbox"/> [AI4] (AI4) : Analog input, if VW3A3202 I/O card has been inserted <input type="checkbox"/> [RP] (PI) : Frequency input, if VW3A3202 I/O card has been inserted <input type="checkbox"/> [Encoder] (PG) : Encoder input, if encoder card has been inserted <input type="checkbox"/> [Network AI] (AIU1) : Virtual input via communication bus, to be configured via [AI net channel] (AIC1) page 175.		[No] (nO)
<div style="text-align: center;">  WARNING </div> <div> UNINTENDED EQUIPMENT OPERATION If the equipment switches to forced local mode (see page 286), the virtual input remains frozen at the last value transmitted. Do not use the virtual input and forced local mode in the same configuration. Failure to follow this instruction can result in death or serious injury. </div>			

(1) Parameter can also be accessed in the **[1.3 SETTINGS] (SEt-)** menu.





Parameter that can be modified during operation or when stopped.

[1.7 APPLICATION FUNCT.] (FUn-)


Code	Name/Description	Adjustment range	Factory setting
	[TORQUE LIMITATION] (continued)		
ELC	<input type="checkbox"/> [Analog limit. act.]		[Yes] (YES)
YES	<p>This parameter can be accessed if [Torque ref. assign.] (tAA) is not [No] (nO).</p> <p><input type="checkbox"/> [Yes] (YES): The limitation depends on the input assigned by [Torque ref. assign.] (tAA).</p> <p><input type="checkbox"/> [LI1] (LI1)</p> <p>...</p> <p><input type="checkbox"/> [...] (...): See the assignment conditions on page 204.</p> <p>If the assigned input or bit is at inactive state:</p> <ul style="list-style-type: none"> The limitation is specified by the [Motoring torque lim] (tLIM) and [Gen. torque lim] (tLIG) parameters if [Torque limit. activ.] (tLA) is not [No] (nO). No limitation if [Torque limit. activ.] (tLA) = [No] (nO). <p>If the assigned input or bit is at active state:</p> <ul style="list-style-type: none"> The limitation depends on the input assigned by [Torque ref. assign.] (tAA). <p>Note: If [Torque limitation] (tLA) and [Torque ref. assign.] (tAA) are enabled at the same time, the lowest value will be taken into account.</p>		
L I I			
-			
-			
-			

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
CL 1-	[2nd CURRENT LIMIT.]		
LC2 nO LI1 - - -	<input type="checkbox"/> [Current limit 2] <input type="checkbox"/> [No] (nO) : Function inactive <input type="checkbox"/> [LI1] (LI1) ... <input type="checkbox"/> [...] (...) : See the assignment conditions on page 204. If the assigned input or bit is at inactive state, the first current limitation is active. If the assigned input or bit is at active state, the second current limitation is active.		[No] (nO)
LC2 ()	<input type="checkbox"/> [I Limit. 2 value] (1) Second current limitation This parameter can be accessed if [Current limit 2] (LC2) is not [No] (nO) .  Note: If the setting is less than 0.25 In, the drive may lock in [Output Phase Loss] (OPF) fault mode if this has been enabled (see page 268). If it is less than the no-load motor current, the limitation no longer has any effect.	0 to 1.36 In (2)	1.36 In (2)
<div style="text-align: center;">CAUTION</div> <p>Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization. Failure to follow this instruction can result in equipment damage.</p>			
CL1 ()	<input type="checkbox"/> [Current Limitation] (1) First current limitation The adjustment range is limited to 1.36 In if [Switching freq.] (SFr) page 106 is less than 2.5 kHz.  Note: If the setting is less than 0.25 In, the drive may lock in [Output Phase Loss] (OPF) fault mode if this has been enabled (see page 268). If it is less than the no-load motor current, the limitation no longer has any effect.	0 to 1.36 In (2)	1.36 In (2)
<div style="text-align: center;">CAUTION</div> <p>Check that the motor will withstand this current, particularly in the case of permanent magnet synchronous motors, which are susceptible to demagnetization. Failure to follow this instruction can result in equipment damage.</p>			

(1) Parameter can also be accessed in the **[1.3 SETTINGS] (SEt-)** menu.

(2) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

 Parameter that can be modified during operation or when stopped.

[1.7 APPLICATION FUNCT.] (FUn-)

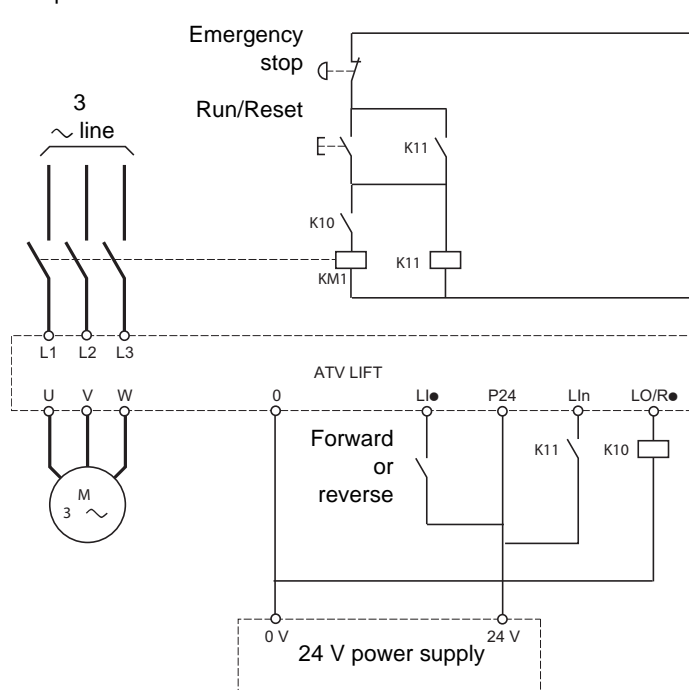
Line contactor command

The line contactor closes every time a run command (forward or reverse) is sent and opens after every stop, as soon as the drive is locked. For example, if the stop mode is stop on ramp, the contactor will open when the motor reaches zero speed.



Note: The drive control power supply must be provided via an external 24 V source.

Example circuit:



Note: The "Run/Reset" button must be pressed once the "Emergency stop" button has been released.

LI● = Run command [Forward] or [Reverse]
LO/R● □ [Line contactor ass.] (LLC)
LIn = [Drive lock] (LES)

CAUTION

This function can only be used for a small number of consecutive operations with a cycle time longer than 60 s (in order to avoid premature aging of the filter capacitor charging circuit).

Failure to follow this instruction can result in equipment damage.

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
LLC -	[LINE CONTACTOR COMMAND]		
LLC	<input type="checkbox"/> [Line contactor ass.] Logic output or control relay <input type="checkbox"/> [No] (nO): Function not assigned (in this case, none of the function parameters can be accessed). <input type="checkbox"/> [LO1] (LO1) to [LO4] (LO4): Logic output (if one or two I/O cards have been inserted, LO1 to LO2 or LO4 can be selected). [R2] (r2) to [R5] (r5): Relay (selection of R2 extended to R3, R4 or R5 if I/O or ESIM cards have been inserted). <input type="checkbox"/> [dO1] (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1) page 191 = [No] (nO).		[No] (nO)
LES	<input type="checkbox"/> [Drive lock] <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...): See the assignment conditions on page 204 . The drive locks when the assigned input or bit changes to 0.		[No] (nO)
LCE	<input type="checkbox"/> [Mains V. time out] Monitoring time for closing of line contactor. If, once this time has elapsed, there is no voltage on the drive power circuit, the drive will lock with a "Line contactor" fault (LCF).	5 to 999 s	5 s

Output contactor command

This allows the drive to control a contactor located between the drive and the motor. The request for the contactor to close is made when a run command is sent. The request for the contactor to open is made when there is no longer any current in the motor.

CAUTION

If a DC injection braking function has been configured it should not be left operating too long in stop mode, as the contactor only opens at the end of braking.

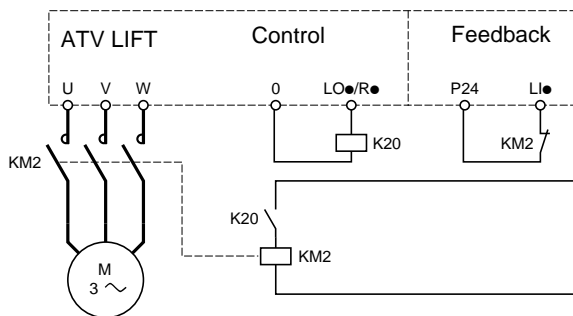
Failure to follow this instruction can result in equipment damage.

Output contactor feedback

The corresponding logic input should be at active state when there is no run command and at inactive state during operation.



In the event of an inconsistency, the drive trips on an FCF2 fault if the output contactor fails to close (Llx at 1) and on an FCF1 fault if it is stuck (Llx at 0).

The parameter [\[Delay to motor run\] \(dbS\)](#) can be used to delay tripping in fault mode when a run command is sent and the [\[Delay to open cont.\] \(dAS\)](#) parameter delays the fault when a stop command is set.



The [\[Out. contactor ass.\] \(OCC\)](#) and [\[Output contact. fdbk\] \(rCA\)](#) functions can be used individually or together.

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
0CC -	[OUTPUT CONTACTOR CMD]		
0CC	<input type="checkbox"/> [Out. contactor ass.] Logic output or control relay <input type="checkbox"/> [No] (nO): Function not assigned (in this case, none of the function's parameters can be accessed) <input type="checkbox"/> [LO1] (LO1) to [LO4] (LO4): Logic output (if one or two I/O cards have been inserted, LO1 to LO2 or LO4 can be selected) [R1] (r1) to [R5] (r5): Relay (selection of R1 extended to R3, R4 or R5 if I/O or ESIM cards have been inserted) <input type="checkbox"/> [dO1] (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1) page 191 = [No] (nO).		[dO1] (dO1)
rCA	<input type="checkbox"/> [Output contact. fdbk] <input type="checkbox"/> [No] (nO): Function inactive. <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...): See the assignment conditions on page 204 . The motor starts up when the assigned input or bit changes to inactive state.		[No] (nO)
dbS 	<input type="checkbox"/> [Delay to motor run] Time delay for: <ul style="list-style-type: none"> Motor control following the sending of a run command. Output contactor fault monitoring, if the feedback has been assigned. If the contactor fails to close at the end of the set time, the drive will lock in FCF2 fault mode. This parameter can be accessed if [Out. contactor ass.] (0CC) has been assigned or if [Output contact. fdbk] (rCA) has been assigned. The time delay must be greater than the closing time of the output contactor.	0.05 to 60 s	0.15
dAS 	<input type="checkbox"/> [Delay to open cont.] Time delay for output contactor opening command following motor stop. This parameter can be accessed if [Output contact. fdbk] (rCA) has been assigned. The time delay must be greater than the opening time of the output contactor. If it is set to 0, the fault will not be monitored. If the contactor fails to open at the end of the set time, the drive will lock in FCF1 fault mode.	0 to 5.00 s	0.10



Parameter that can be modified during operation or when stopped.

Parameter set switching [PARAM. SET SWITCHING]

A set of 1 to 15 parameters from the [1.3 SETTINGS] (SEt-) menu on page 124 can be selected and 2 or 3 different values assigned. These 2 or 3 sets of values can then be switched using 1 or 2 logic inputs or control word bits. This switching can be performed during operation (motor running).

It can also be controlled on the basis of one or two frequency thresholds, whereby each threshold acts as a logic input (0 = threshold not attained, 1 = threshold attained).

	Values 1	Values 2	Values 3
Parameter 1	Parameter 1	Parameter 1	Parameter 1
Parameter 2	Parameter 2	Parameter 2	Parameter 2
Parameter 3	Parameter 3	Parameter 3	Parameter 3
Parameter 4	Parameter 4	Parameter 4	Parameter 4
Parameter 5	Parameter 5	Parameter 5	Parameter 5
Parameter 6	Parameter 6	Parameter 6	Parameter 6
Parameter 7	Parameter 7	Parameter 7	Parameter 7
Parameter 8	Parameter 8	Parameter 8	Parameter 8
Parameter 9	Parameter 9	Parameter 9	Parameter 9
Parameter 10	Parameter 10	Parameter 10	Parameter 10
Parameter 11	Parameter 11	Parameter 11	Parameter 11
Parameter 12	Parameter 12	Parameter 12	Parameter 12
Parameter 13	Parameter 13	Parameter 13	Parameter 13
Parameter 14	Parameter 14	Parameter 14	Parameter 14
Parameter 15	Parameter 15	Parameter 15	Parameter 15
Input LI or bit or frequency threshold 2 values	0	1	0 or 1
Input LI or bit or frequency threshold 3 values	0	0	1



Note: Do not modify the parameters in the [1.3 SETTINGS] (SEt-) menu, because any modifications made in this menu [1.3 SETTINGS] (SEt-) will be lost on the next power-up. The parameters can be adjusted during operation in the [PARAM. SET SWITCHING] (MLP-) menu, on the active configuration.

Note: Parameter set switching cannot be configured from the integrated display terminal.

Parameters can only be adjusted on the integrated display terminal if the function has been configured previously via the graphic display terminal, by PowerSuite or via the bus or communication network. If the function has not been configured, the **MLP-** menu and the **PS1-**, **PS2-**, **PS3-** submenus will not appear.

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
NLP -	[PARAM. SET SWITCHING]		
CHAR1	<input type="checkbox"/> [2 Parameter sets]		[No] (nO)
nO FEA F2A tAP	<input type="checkbox"/> [No] (nO): Function inactive. <input type="checkbox"/> [Freq.Th.att.] (FtA): Switching via [Freq. threshold] (Ftd) page 135. <input type="checkbox"/> [Freq. Th. 2 attain.] (F2A): Switching via [Freq. threshold 2] (Ftd) page 135. <input type="checkbox"/> [Ramp Mode] (tAP): Switching during the brake sequence. This new assignment can be used, for example, to set high gains on brake release before starting the ramp (useful in lift applications).		
	<p>Frequency</p> <p>Reference</p> <p>[Brake engage freq] (bEN)</p> <p>Motor control type</p> <p>Flux Torque Frequency Injection</p> <p>Parameter set 2 Parameter set 1</p>		
L11	<input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...): See the assignment conditions on page 204. Switching 2 parameter sets		
CHAR2	<input type="checkbox"/> [3 Parameter sets]		[No] (nO)
nO FEA F2A tAP	<input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [Freq.Th.att.] (FtA): Switching via [Freq. threshold] (Ftd) page 135 <input type="checkbox"/> [Freq. Th. 2 attain.] (F2A): Switching via [Freq. threshold 2] (Ftd) page 135 <input type="checkbox"/> [Ramp Mode] (tAP): Switching during the brake sequence. This new assignment can be used, for example, to set high gains on brake release before starting the ramp (useful in lift applications).		
	<p>Frequency</p> <p>Reference</p> <p>[Brake engage freq] (bEN)</p> <p>Motor control type</p> <p>Flux Torque Frequency Injection</p> <p>Parameter set 2 Parameter set 3</p>		
L11	<input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...): See the assignment conditions on page 204. Switching 3 parameter sets Note: In order to obtain 3 parameter sets, [2 parameter sets] must also be configured.		

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting																																																								
	[PARAM. SET SWITCHING] (continued)																																																										
SPS	<div><div><div><div><div></div><div>[PARAMETER SELECTION]</div></div></div><div><p>This parameter can only be accessed on the graphic display terminal if [2 parameter sets] is not [No]. Making an entry in this parameter opens a window containing all the adjustment parameters that can be accessed.</p><p>Select 1 to 15 parameters using ENT (a tick then appears next to the parameter). Parameter(s) can also be deselected using ENT.</p><p>E.g.</p><div><table><tr><th colspan="2">PARAMETER SELECTION</th></tr><tr><th colspan="2">1.3 SETTINGS</th></tr><tr><td>Ramp increment</td><td><input checked="" type="checkbox"/></td></tr><tr><td>-----</td><td><input type="checkbox"/></td></tr><tr><td>-----</td><td><input type="checkbox"/></td></tr><tr><td>-----</td><td><input checked="" type="checkbox"/></td></tr></table></div></div></div></div>			PARAMETER SELECTION		1.3 SETTINGS		Ramp increment	<input checked="" type="checkbox"/>	-----	<input type="checkbox"/>	-----	<input type="checkbox"/>	-----	<input checked="" type="checkbox"/>																																												
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-----	<input checked="" type="checkbox"/>																																																										
PS1-	<div><div><div><div><div></div><div>[SET 1]</div></div></div><div><p>This parameter can be accessed if at least 1 parameter has been selected in [PARAMETER SELECTION]. Making an entry in this parameter opens a settings window containing the selected parameters in the order in which they were selected.</p><p>With the graphic display terminal: :</p><div><div><table><tr><td>RDY</td><td>Term</td><td>+0.00Hz</td><td>0A</td></tr><tr><td colspan="4">SET1</td></tr><tr><td>Acceleration:</td><td></td><td>9.51 s</td><td></td></tr><tr><td>Deceleration:</td><td></td><td>9.67 s</td><td></td></tr><tr><td>Acceleration 2:</td><td></td><td>12.58 s</td><td></td></tr><tr><td>Deceleration 2 :</td><td></td><td>13.45 s</td><td></td></tr><tr><td>Begin Acc round:</td><td></td><td>2.3 s</td><td></td></tr><tr><td>Code</td><td></td><td>Quick</td><td></td></tr></table></div><div>ENT →</div><div><table><tr><td>RDY</td><td>Term</td><td>+0.00Hz</td><td>0A</td></tr><tr><td colspan="4">Acceleration</td></tr><tr><td colspan="4">9.51 s</td></tr><tr><td colspan="2">Min = 0.1</td><td colspan="2">Max = 999.9</td></tr><tr><td colspan="2"><<</td><td colspan="2">>></td></tr><tr><td colspan="4">Quick</td></tr></table></div></div></div></div></div>			RDY	Term	+0.00Hz	0A	SET1				Acceleration:		9.51 s		Deceleration:		9.67 s		Acceleration 2:		12.58 s		Deceleration 2 :		13.45 s		Begin Acc round:		2.3 s		Code		Quick		RDY	Term	+0.00Hz	0A	Acceleration				9.51 s				Min = 0.1		Max = 999.9		<<		>>		Quick			
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PS2-	<div><div><div><div><div></div><div>[SET 2]</div></div></div><div><p>This parameter can be accessed if at least 1 parameter has been selected in [PARAMETER SELECTION]. Procedure identical to [SET 1] (PS1-).</p></div></div></div>																																																										
PS3-	<div><div><div><div><div></div><div>[SET 3]</div></div></div><div><p>This parameter can be accessed if [3 parameter sets] is not [No] and if at least 1 parameter has been selected in [PARAMETER SELECTION]. Procedure identical to [SET 1] (PS1-).</p></div></div></div>																																																										



Note: We recommend that a parameter set switching test is carried out while stopped and a check is made to ensure that it has been performed correctly.

Some parameters are interdependent and in this case may be restricted at the time of switching.

Interdependencies between parameters must be respected, even between different sets.

For example: The highest [Low speed] (LSP) must be below the lowest [High speed] (HSP).

Motor or configuration switching [MULTIMOTORS/CONFIG.]

The drive may contain up to 3 configurations, which can be saved using the [1.12 FACTORY SETTINGS] (FCS-) menu, page 291. Each of these configurations can be activated remotely, enabling adaptation to:

- 2 or 3 different motors or mechanisms (multimotor mode)
- 2 or 3 different configurations for a single motor (multiconfiguration mode)

The two switching modes cannot be combined.



Note: The following conditions MUST be observed:

- Switching may only take place when stopped (drive locked). If a switching request is sent during operation, it will not be executed until the next stop.
- In the event of motor switching, the following additional conditions apply:
 - When the motors are switched, the power and control terminals concerned must also be switched as appropriate.
 - The maximum power of the drive must not be exceeded by any of the motors.
- All the configurations to be switched must be set and saved in advance in the same hardware configuration, this being the definitive configuration (option and communication cards). Failure to follow this instruction can cause the drive to lock on an [Incorrect config.] (CFF) fault.

Menu and parameters switched in multimotor mode

- [1.3 SETTINGS] (SEt-)
- [1.4 MOTOR CONTROL] (drC-)
- [1.5 INPUTS / OUTPUTS CFG] (I-O-)
- [1.6 COMMAND] (CtL-)
- [1.7 APPLICATION FUNCT.] (FUn-) with the exception of the [MULTIMOTORS/CONFIG.] function (to be configured once only)
- [1.8 FAULT MANAGEMENT] (FLt)
- [1.13 USER MENU]
- [USER CONFIG.]: The name of the configuration specified by the user in the [1.12 FACTORY SETTINGS] (FCS-) menu

Menu and parameters switched in multiconfiguration mode

As in multimotor mode, except for the motor parameters that are common to the three configurations:

- Rated current
- Thermal current
- Rated voltage
- Rated frequency
- Rated speed
- Rated power
- IR compensation
- Slip compensation
- Synchronous motor parameters
- Type of thermal protection
- Thermal state
- The auto-tuning parameters and motor parameters that can be accessed in Expert mode
- Type of motor control



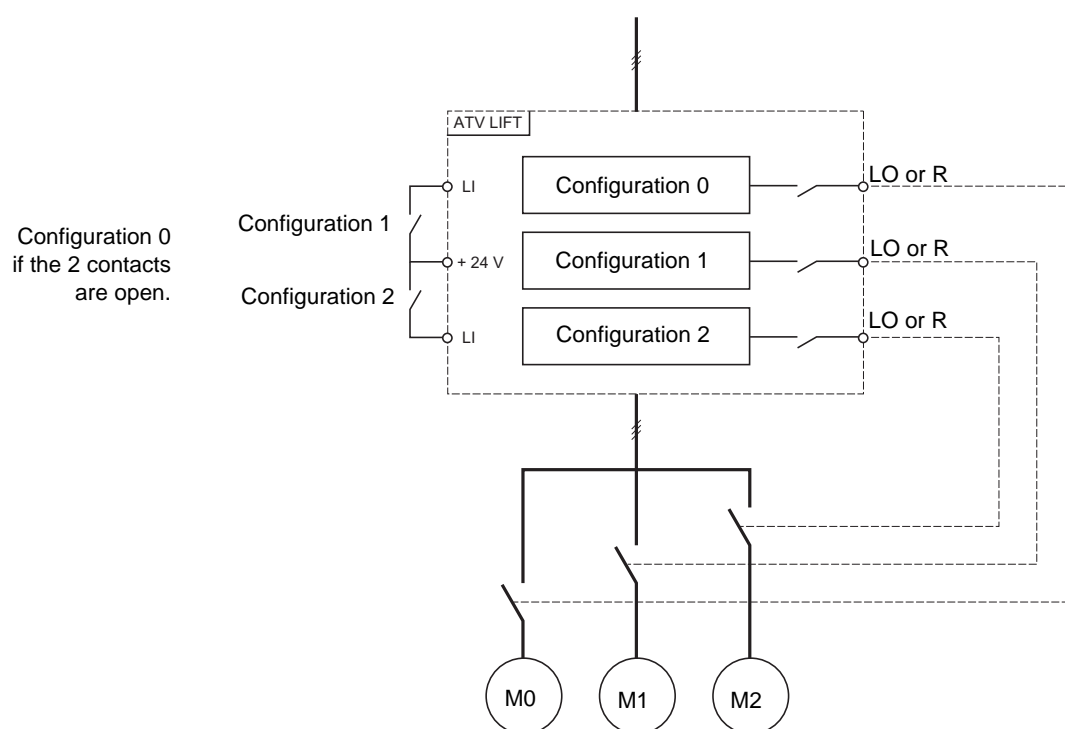
Note: No other menus or parameters can be switched.

Switching command

Depending on the number of motors or selected configuration (2 or 3), the switching command is sent using one or two logic inputs. The table below lists the possible combinations.

LI 2 motors or configurations	LI 3 motors or configurations	Number of configuration or active motor
0	0	0
1	0	1
0	1	2
1	1	2

Schematic diagram for multimotor mode



Auto-tuning in multimotor mode

This auto-tuning can be performed:

- Manually using a logic input when the motor changes
- Automatically each time the motor is activated for the 1st time after turning on the drive, if the [Automatic autotune] (AUt) parameter on page 154 = [Yes] (YES).

Motor thermal states in multimotor mode:

The drive protects the three motors individually. Each thermal state takes into account all stop times, including drive shutdowns. It is, therefore, not necessary to perform auto-tuning every time the power is turned on. It is sufficient to auto-tune each motor at least once.


Configuration information output

In the [1.5 INPUTS / OUTPUTS CFG] (I-O-) menu, a logic output can be assigned to each configuration or motor (2 or 3) for remote information transmission.



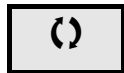
Note: As the [1.5 INPUTS / OUTPUTS CFG] (I-O-) menu is switched, these outputs must be assigned in all configurations in which information is required.

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
nnc -	[MULTIMOTORS/CONFIG.]		
CnF	<input type="checkbox"/> [Multimotors]		[No] (nO)
nO YES	<input type="checkbox"/> [No] (nO): Multiconfiguration possible <input type="checkbox"/> [Yes] (YES): Multimotor possible		
	 Note: At each multi-motor configuration switching, the drive performs an automatic measurement of the phase-shift angle at next run order.		
CnF1	<input type="checkbox"/> [2 Configurations]		[No] (nO)
nO LI1 - - - C111 - - -	<input type="checkbox"/> [No] (nO): No switching. <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12): If VW3A3203 ESIM card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted <input type="checkbox"/> [C111] (C111) to [C115] (C115): With integrated Modbus <input type="checkbox"/> [C211] (C211) to [C215] (C215): With integrated CANopen <input type="checkbox"/> [C311] (C311) to [C315] (C315): With a communication card <input type="checkbox"/> [C411] (C411) to [C415] (C415): With a Controller Inside card		
	Switching of 2 motors or 2 configurations		
CnF2	<input type="checkbox"/> [3 Configurations]		[No] (nO)
nO LI1 - - - C111 - - -	<input type="checkbox"/> [No] (nO): No switching <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12): If VW3A3203 ESIM card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted <input type="checkbox"/> [C111] (C111) to [C115] (C115): With integrated Modbus <input type="checkbox"/> [C211] (C211) to [C215] (C215): With integrated CANopen <input type="checkbox"/> [C311] (C311) to [C315] (C315): With a communication card <input type="checkbox"/> [C411] (C411) to [C415] (C415): With a Controller Inside card		
	Switching of 3 motors or 3 configurations		
	Note: In order to obtain 3 motors or 3 configurations, [2 Configurations] (CnF1) must also be configured.		

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
ISP -	[INSPECTION MODE] See details page 95		
ISP	<input type="checkbox"/> [Inspection] This parameter can be accessed if brake logic control [Brake assignment] (bLC) page 233 has been assigned. <input type="checkbox"/> [No] (nO) : Function not assigned <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10) : If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI11) : If VW3A3203 ESIM card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14) : If VW3A3202 extended I/O card has been inserted. Inspection mode is activated when the assigned input changes to active state.		[LI5] (LI5)
ISrF	<input type="checkbox"/> [Inspection speed] Value of the "inspection" mode frequency reference. This parameter can be accessed if [Inspection] (ISP) is not [No] (nO) .	0 to 25 Hz	According to drive rating



Parameter that can be modified during operation or when stopped.

[1.7 APPLICATION FUNCT.] (FUn-)

Code	Name/Description	Adjustment range	Factory setting
rFt -	[EVACUATION] For details of this function, see page 97.		
rFt - nO L I I - - L I I 4	<input type="checkbox"/> [Evacuation assign.] <input type="checkbox"/> [No] (nO) : Function not assigned <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10) : If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12) : If VW3A3203 ESIM card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14) : If VW3A3202 extended I/O card has been inserted Evacuation is activated when the assigned input is at active state, if the drive is stationary. Evacuation is activated when the assigned input is at inactive state, as soon as the drive stops.		[No] (nO)
rSU	<input type="checkbox"/> [Evacuation Input V.] Minimum permissible AC voltage value of the emergency power supply. This parameter can be accessed if [Evacuation assign.] (rFt) is not [No] (nO) .	220 to 320 V	220 V
rSP ()	<input type="checkbox"/> [Evacuation freq.] Value of the "evacuation" mode frequency reference. This parameter can be accessed if [Evacuation assign.] (rFt) is not [No] (nO) . The adjustment range is determined by the [Low speed] (LSP) (page 126), [Rated motor freq.] (FrS) page 143 for an asynchronous motor or [Nominal freq sync.] (FrSS) page 149 for a synchronous motor and [Rated motor volt.] (UnS) (page 143) parameters and by [Evacuation Input V.] (rSU) above. Example with an asynchronous motor: • If $LSP < (FrS \times rSU/UnS)$: $rSP \text{ min.} = LSP$, $rSP \text{ max.} = (FrS \times rSU/UnS)$ • If $LSP \geq (FrS \times rSU/UnS)$: $rSP = (FrS \times rSU/UnS)$ With a synchronous motor: Same formula using FrSS in place of FrS and 400 V in place of UnS.		5 Hz



Parameter that can be modified during operation or when stopped.

Code	Name/Description	Adjustment range	Factory setting
HFF -	[HALF FLOOR] For details of this function, see page 99.		
HLS nO -	<input type="checkbox"/> [Half-floor speed] Activation and adjustment of the "half floor" function. This function has priority over all speed reference functions (preset speeds, for example) with the exception of those generated via fault monitoring (fallback speed, for example). <input type="checkbox"/> [No] (nO) : Function inactive. <input type="checkbox"/> 0.1 Hz to 500.0 Hz : Activation of the function by adjusting the motor frequency to be reached prior to slowing down.		[No] (nO)

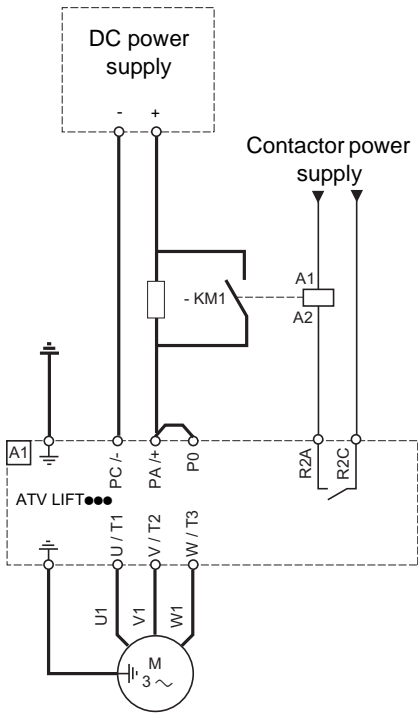
Direct power supply via DC bus

This function is only accessible for ATV71LD48N4Z drives.

Direct power supply via the DC bus requires a protected direct current source with adequate power and voltage as well as a suitably dimensioned resistor and capacitor precharging contactor. Consult Schneider Electric for information about specifying these components.

The "direct power supply via DC bus" function can be used to control the precharging contactor via a relay or a logic input on the drive.

Example circuit using R2 relay:




Code	Name/Description	Adjustment range	Factory setting
dC0 -	[DC BUS SUPPLY] This function is only accessible for ATV71LD48N4Z drives.		
dC0	<input type="checkbox"/> [Precharge cont. ass.]		[No] (nO)
nO	Logic output or control relay		
LO1	<input type="checkbox"/> [No] (nO): Function not assigned		
-	<input type="checkbox"/> [LO1] (LO1)		
LO4	to		
r1	[LO4] (LO4): Logic output (if one or two I/O cards have been inserted, LO1 to LO2 or LO4 can be selected).		
-	[R1] (r1)		
r5	to		
dO1	[R5] (r5): Relay (selection of R1 extended to R3, R4 or R5 if I/O or ESIM cards have been inserted).		
	<input type="checkbox"/> [dO1] (dO1): Analog output AO1 functioning as a logic output. Selection can be made if [AO1 assignment] (AO1) page 191 = [No] (nO).		

[1.7 APPLICATION FUNCT.] (FUn-)

Top Z management

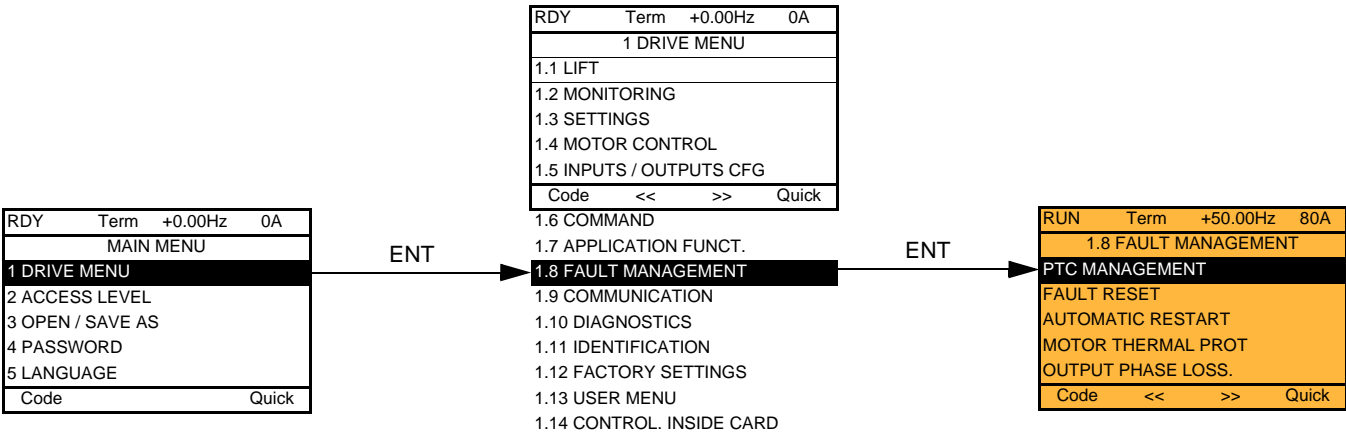
This function can be accessed only if a VW3 A3 411 card has been inserted and if [Encoder type] (EnS) = [AABB] (AAbb).

This function can be used for homing, but the leveling speed must be low, or the drive will trigger an overbraking fault [Overbraking] (ObF).

Code	Name/Description	Adjustment range	Factory setting
↳ DP -	[TOP Z MANAGEMENT] This function can be accessed only if a VW3 A3 411 card has been inserted and if [Encoder type] (EnS) = [AABB] (AAbb).		
↳ DS L	<input type="checkbox"/> [Stop on top Z]		[No] (nO)
nO L I I - -	 Note: This function cannot be used with certain other functions. Follow the instructions on page 210. <input type="checkbox"/> [No] (nO): Not assigned <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...): See the assignment conditions on page 204. The fast stop is activated when the input changes to 1 or the bit changes to 1 and after the detection of the next Top Z. If the input returns to state 0 and the run command is still active, the motor will only restart if [2/3 wire control] (tCC) page 166 = [2 wire] (2C) and the [2 wire type] (tCt) = [Level] (LEL) or [Fwd priority] (PFO). If not, a new run command must be sent.		

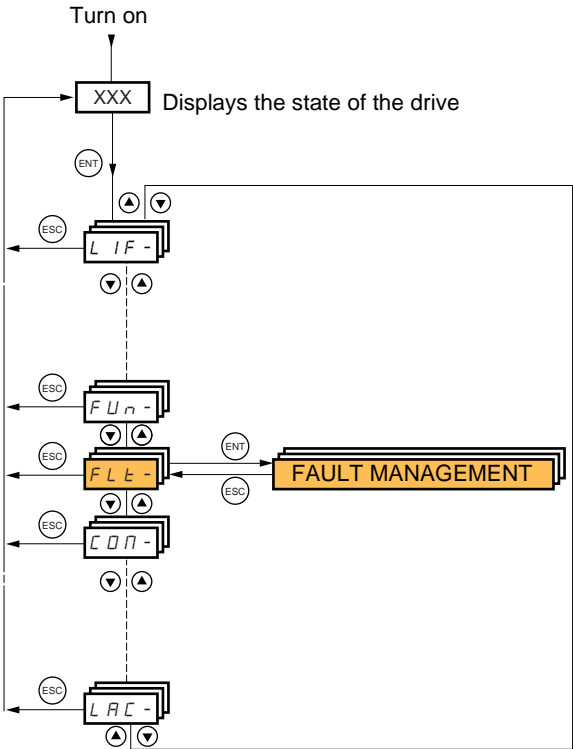
[1.8 FAULT MANAGEMENT] (FLt-)

With graphic display terminal:




With integrated display terminal:

Contents



Code	Name	Page
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[1.8 FAULT MANAGEMENT] (FLt-)

The parameters in the [1.8 FAULT MANAGEMENT] (FLt-) menu can only be modified when the drive is stopped and there is no run command, except for parameters with a  symbol in the code column, which can be modified with the drive running or stopped.

PTC probes

3 sets of PTC probes can be managed by the drive in order to protect the motors:

- 1 on logic input LI6 converted for this use by switch "SW2" on the control card.
- 1 on each of the 2 option cards VW3A3201 and VW3A3202.

Each of these sets of PTC probes is monitored for the following faults:

- Motor overheating.
- Sensor break fault.
- Sensor short-circuit fault.

Protection via PTC probes does not disable protection via I^2t calculation performed by the drive (the two types of protection can be combined).


[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
PTC -	[PTC MANAGEMENT]		
PTCL	<input type="checkbox"/> [LI6 = PTC probe] Can be accessed if switch SW2 on the control card is set to PTC. <input type="checkbox"/> [No] (nO) : Not used <input type="checkbox"/> [Always] (AS) : "PTC probe" faults are monitored permanently, even if the power supply is not connected (as long as the control remains connected to the power supply). <input type="checkbox"/> [Power ON] (rdS) : "PTC probe" faults are monitored while the drive power supply is connected. <input type="checkbox"/> [Motor ON] (rS) : "PTC probe" faults are monitored while the motor power supply is connected.		[No] (nO)
PTC1	<input type="checkbox"/> [PTC1 probe] Can be accessed if a VW3A3201 option card has been inserted. <input type="checkbox"/> [No] (nO) : Not used <input type="checkbox"/> [Always] (AS) : "PTC probe" faults are monitored permanently, even if the power supply is not connected (as long as the control remains connected to the power supply). <input type="checkbox"/> [Power ON] (rdS) : "PTC probe" faults are monitored while the drive power supply is connected. <input type="checkbox"/> [Motor ON] (rS) : "PTC probe" faults are monitored while the motor power supply is connected.		[No] (nO)
PTC2	<input type="checkbox"/> [PTC2 probe] Can be accessed if a VW3A3202 option card has been inserted. <input type="checkbox"/> [No] (nO) : Not used <input type="checkbox"/> [Always] (AS) : "PTC probe" faults are monitored permanently, even if the power supply is not connected (as long as the control remains connected to the power supply). <input type="checkbox"/> [Power ON] (rdS) : "PTC probe" faults are monitored while the drive power supply is connected. <input type="checkbox"/> [Motor ON] (rS) : "PTC probe" faults are monitored while the motor power supply is connected.		[No] (nO)

[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
r St -	[FAULT RESET]		
r SF	<p><input type="checkbox"/> [Fault reset]</p> <p>Manual fault reset</p> <ul style="list-style-type: none"> <input type="checkbox"/> [No] (nO): Function inactive. <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12): If VW3A3203 ESIM card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted <input type="checkbox"/> [C101] (C101) to [C115] (C115): With integrated Modbus in [I/O profile] (IO) <input type="checkbox"/> [C201] (C201) to [C215] (C215): With integrated CANopen in [I/O profile] (IO) <input type="checkbox"/> [C301] (C301) to [C315] (C315): With a communication card in [I/O profile] (IO) <input type="checkbox"/> [C401] (C401) to [C415] (C415): With a Controller Inside card in [I/O profile] (IO) <input type="checkbox"/> [CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] (IO) can be switched with possible logic inputs <input type="checkbox"/> [CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] (IO) can be switched without logic inputs <p>Faults are reset when the assigned input or bit changes to active state, if the cause of the fault has disappeared.</p> <p>The STOP/RESET button on the graphic display terminal performs the same function.</p> <p>See pages 311 to 315 for a list of faults that can be reset manually.</p>		[No] (nO)
r P	<p><input type="checkbox"/> [Product reset]</p> <p>Parameter can only be accessed in [ACCESS LEVEL] = [Expert] mode.</p> <p>Drive reinitialization. Can be used to reset all faults without having to disconnect the drive from the power supply.</p> <ul style="list-style-type: none"> <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [Yes] (YES): Reinitialization. Press and hold down the "ENT" key for 2 s. The parameter changes back to [No] (nO) automatically as soon as the operation is complete. The drive can only be reinitialized when locked. <div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>CAUTION</p> <p>Make sure that the cause of the fault that led to the drive locking has been removed before reinitializing.</p> <p>Failure to follow this instruction can result in equipment damage.</p> </div>		[No] (nO)
r PA	<p><input type="checkbox"/> [Product reset assig.]</p> <p>Parameter can only be modified in [ACCESS LEVEL] = [Expert] mode.</p> <p>Drive reinitialization via logic input. Can be used to reset all faults without having to disconnect the drive from the power supply. The drive is reinitialized on a rising edge (change from 0 to 1) of the assigned input. The drive can only be reinitialized when locked.</p> <ul style="list-style-type: none"> <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12): If VW3A3203 ESIM card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted <p>To assign reinitialization, press and hold down the "ENT" key for 2 s.</p> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>CAUTION</p> <p>Make sure that the cause of the fault that led to the drive locking has been removed before reinitializing.</p> <p>Failure to follow this instruction can result in equipment damage.</p> </div>		[No] (nO)

[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
Atr -	[AUTOMATIC RESTART]		
Atr nO YES	<input type="checkbox"/> [Automatic restart] <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [Yes] (YES): Automatic restart, after locking on a fault, if the fault has disappeared and the other operating conditions permit the restart. The restart is performed by a series of automatic attempts separated by increasingly longer waiting periods: 1 s, 5 s, 10 s, then 1 minute for the following attempts. The drive fault relay remains activated if this function is active. The speed reference and the operating direction must be maintained. Use 2-wire control ([2/3 wire control] (tCC) = [2 wire] (2C) and [2 wire type] (tCt) = [Level] (LEL) see page 166).		[No] (nO)
	<div style="text-align: center;">  WARNING UNINTENDED EQUIPMENT OPERATION Check that an automatic restart will not endanger personnel or equipment in any way. Failure to follow this instruction can result in death or serious injury. </div> <p>If the restart has not taken place once the configurable time tAr has elapsed, the procedure is aborted and the drive remains locked until it is turned off and then on again. The faults, which permit this function, are listed on page 314:</p>		
tAr 5 10 30 1h 2h 3h Ct	<input type="checkbox"/> [Max. restart time] <input type="checkbox"/> [5 min] (5): 5 minutes <input type="checkbox"/> [10 min] (10): 10 minutes <input type="checkbox"/> [30 min] (30): 30 minutes <input type="checkbox"/> [1 hour] (1h): 1 hour <input type="checkbox"/> [2 hours] (2h): 2 hours <input type="checkbox"/> [3 hours] (3h): 3 hours <input type="checkbox"/> [Unlimited] (Ct): Unlimited This parameter appears if [Automatic restart] (Atr) = [Yes] (YES). It can be used to limit the number of consecutive restarts on a recurrent fault.		[5 min] (5)

Motor thermal protection

Function:

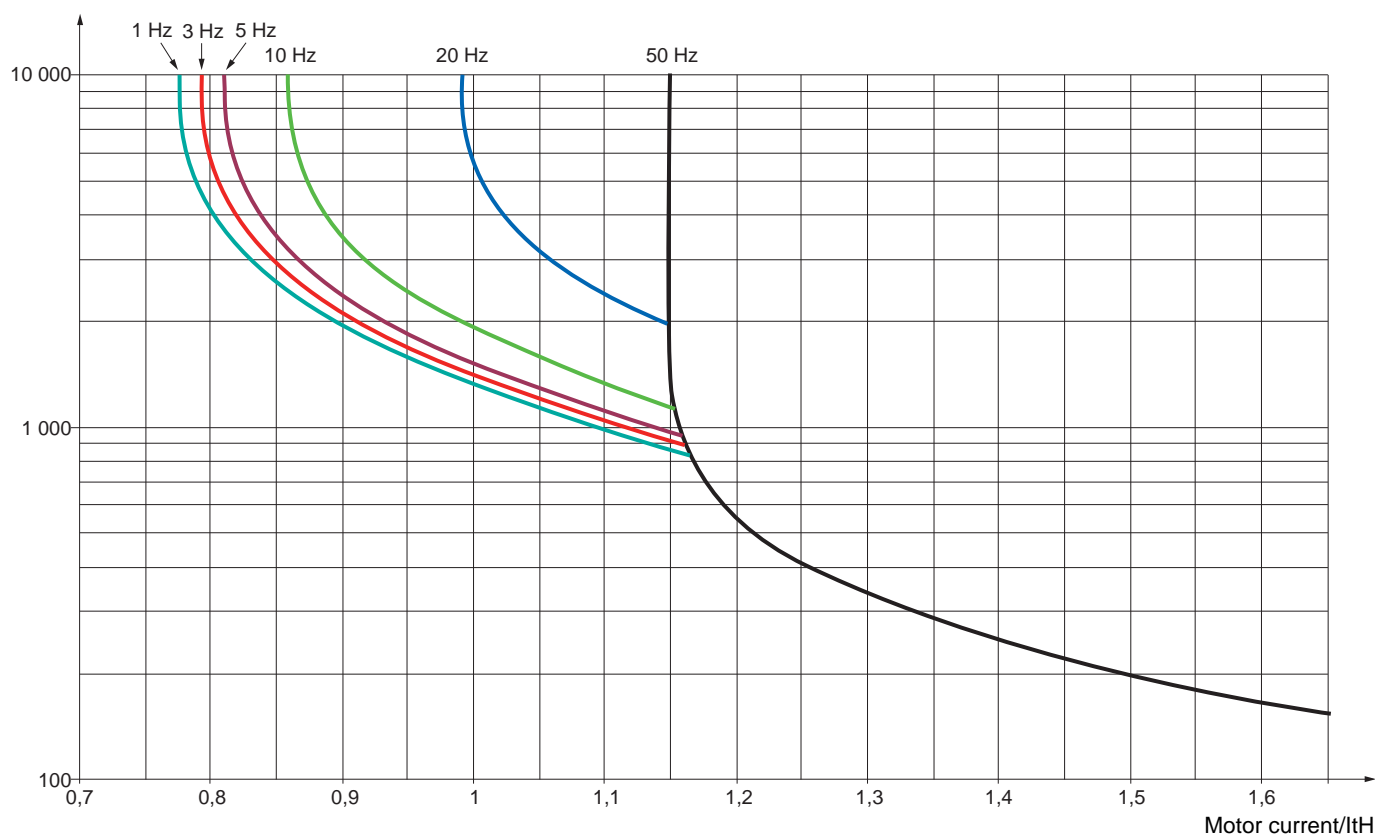
Thermal protection by calculating the I^2t .



Note: The memory of the motor thermal state is saved when the drive is switched off. The power-off time is used to recalculate the thermal state the next time the drive is turned on.

- Naturally-cooled motors:
The tripping curves depend on the motor frequency.
- Force-cooled motors:
Only the 50 Hz tripping curve needs to be considered, regardless of the motor frequency.

Trip time in seconds



[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
EHt -	[MOTOR THERMAL PROT.]		
EHt (nO) ACL FCL	<input type="checkbox"/> [Motor protect. type] <input type="checkbox"/> [No] (nO): No protection. <input type="checkbox"/> [Self cooled] (ACL): For self-cooled motors <input type="checkbox"/> [Force-cool] (FCL): For force-cooled motors Note: A fault trip will occur when the thermal state reaches 118% of the rated state and reactivation will occur when the state falls back below 100 %.		[Self cooled] (ACL)
EtEd (C)	<input type="checkbox"/> [Motor therm. level] (1) Trip threshold for motor thermal alarm (logic output or relay)	0 to 118 %	100 %
EtEd2 (C)	<input type="checkbox"/> [Motor2 therm. level] Trip threshold for motor 2 thermal alarm (logic output or relay)	0 to 118 %	100 %
EtEd3 (C)	<input type="checkbox"/> [Motor3 therm. level] Trip threshold for motor 3 thermal alarm (logic output or relay)	0 to 118 %	100 %
OLL (nO) YES SEt LFF rLS rNP FSt dCI	<input type="checkbox"/> [Overload fault mgt] Type of stop in the event of a motor thermal fault. <input type="checkbox"/> [Ignore] (nO): Fault ignored. <input type="checkbox"/> [Freewheel] (YES): Freewheel stop <input type="checkbox"/> [Per STT] (Stt): Stop according to configuration of [Type of stop] (Stt) page 221, without fault tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g. according to [2/3 wire control] (tCC) and [2 wire type] (tCt) page 166 if control is via the terminals). It is advisable to configure an alarm for this fault (assigned to a logic output, for example) in order to indicate the cause of the stop. <input type="checkbox"/> [fallback spd] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (2). <input type="checkbox"/> [Spd maint.] (rLS): The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (2). <input type="checkbox"/> [Ramp stop] (rMP): Stop on ramp. <input type="checkbox"/> [Fast stop] (FSt): Fast stop <input type="checkbox"/> [DC injection] (dCI): DC injection stop. This type of stop cannot be used with certain other functions. See table on page 210.		[Freewheel] (YES)

(1) Parameter can also be accessed in the **[1.3 SETTINGS] (SEt-)** menu.

(2) Because, in this case, the fault does not trigger a stop, it is essential to assign a relay or logic output to its indication.

(C) Parameter that can be modified during operation or when stopped.

[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
OPL -	[OUTPUT PHASE LOSS]		
OPL nO YES OAC	<input type="checkbox"/> [Output Phase Loss] <input type="checkbox"/> [No] (nO) : Function inactive. <input type="checkbox"/> [Yes] (YES) : Tripping on OPF fault with freewheel stop. <input type="checkbox"/> [Output cut] (OAC) : No fault triggered, but management of the output voltage in order to avoid an overcurrent when the link with the motor is re-established. Note: [Output Phase Loss] (OPL) is forced to [No] (nO) if [Motor control type] (Ctt) page 137 = [Sync. mot.] (SYn) or [Sync.CL] (FSY).		[Yes] (YES)
OutPh (↻)	<input type="checkbox"/> [OutPh time detect] Time delay for taking the [Output Phase Loss] (OPL) fault into account.	0.5 to 10 s	0.5 s
IPL -	[INPUT PHASE LOSS]		
IPL nO YES	<input type="checkbox"/> [Input phase loss] <input type="checkbox"/> [Ignore] (nO) : Fault ignored, to be used when the drive is supplied via a single-phase supply or by the DC bus. <input type="checkbox"/> [Freewheel] (YES) : Fault, with freewheel stop. If one phase disappears, the drive switches to fault mode [Input phase loss] (IPL), but if 2 or 3 phases disappear, the drive continues to operate until it trips on an undervoltage fault.		[Freewheel] (YES)



Parameter that can be modified during operation or when stopped.

[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
DHL -	[DRIVE OVERHEAT]		
DHL	<input type="checkbox"/> [Overtemp fault mgt] Behavior in the event of the drive overheating <input type="checkbox"/> [Ignore] (nO): Fault ignored.		[Freewheel] (YES)
nO			
YES			
Stt			
LFF			
rLS			
rMP			
FSt			
dCI			
LHA	<input type="checkbox"/> [Drv therm. state al] Trip threshold for drive thermal alarm (logic output or relay)	0 to 118 %	100 %
()			



Parameter that can be modified during operation or when stopped.

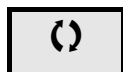
(1) Because, in this case, the fault does not trigger a stop, it is essential to assign a relay or logic output to its indication.

[1.8 FAULT MANAGEMENT] (FLt-)

Deferred stop on thermal alarm

This function is designed in particular for elevator applications. It prevents the elevator stopping between two floors if the drive or motor overheats, by authorizing operation until the next stop. At the next stop, the drive is locked until the thermal state falls back to a value, which undershoots the set threshold by 20%. E.g. A trip threshold set at 80% enables reactivation at 60%. One thermal state threshold must be defined for the drive, and one thermal state threshold for the motor(s), which will trip the deferred stop.

Code	Name/Description	Adjustment range	Factory setting
SAL -	[THERMAL ALARM STOP]		
SAL nO YES	<input type="checkbox"/> [Thermal alarm stop] <input type="checkbox"/> [No] (nO) : Function inactive (in this case, the following parameters cannot be accessed) <input type="checkbox"/> [Yes] (YES) : Freewheel stop on drive or motor thermal alarm		[No] (nO)
	<div style="text-align: center;">CAUTION</div> <p>The drive and motor are no longer protected in the event of thermal alarm stops. This invalidates the warranty. Check that the possible consequences do not present any risk. Failure to follow this instruction can result in equipment damage.</p>		
LHA ()	<input type="checkbox"/> [Drv therm. state al] Thermal state threshold of the drive tripping the deferred stop.	0 to 118 %	100 %
Ltd ()	<input type="checkbox"/> [Motor therm. level] Thermal state threshold of the motor tripping the deferred stop.	0 to 118 %	100 %
Ltd2 ()	<input type="checkbox"/> [Motor2 therm. level] Thermal state threshold of the motor 2 tripping the deferred stop.	0 to 118 %	100 %
Ltd3 ()	<input type="checkbox"/> [Motor3 therm. level] Thermal state threshold of the motor 3 tripping the deferred stop.	0 to 118 %	100 %



Parameter that can be modified during operation or when stopped.

[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
E L F -	[EXTERNAL FAULT]		
E L F n O L I I - - -	<input type="checkbox"/> [External fault ass.] <input type="checkbox"/> [No] (nO) : Function inactive. <input type="checkbox"/> [LI1] (LI1) : : <input type="checkbox"/> [...] (...) : See the assignment conditions on page 204. If the assigned bit is at inactive state, there is no external fault. If the assigned bit is at active state, there is an external fault. Logic can be configured via [External fault config] (LEt) if a logic input has been assigned.		[No] (nO)
L E E L O H I G	<input type="checkbox"/> [External fault config] Parameter can be accessed if the external fault has been assigned to a logic input. It defines the positive or negative logic of the input assigned to the fault. <input type="checkbox"/> [Active low] (LO) : Fault on falling edge (change from 1 to 0) of the assigned input <input type="checkbox"/> [Active high] (HIG) : Fault on rising edge (change from 0 to 1) of the assigned input		[Active high] (HIG)
E P L n O Y E S S e t L F F r L S r M P F S t d C I	<input type="checkbox"/> [External fault mgt] Type of stop in the event of an external fault <input type="checkbox"/> [Ignore] (nO) : Fault ignored. <input type="checkbox"/> [Freewheel] (YES) : Freewheel stop <input type="checkbox"/> [Per STT] (Stt) : Stop according to configuration of [Type of stop] (Stt) page 221, without fault tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g. according to [2/3 wire control] (tCC) and [2 wire type] (tCt) page 166 if control is via the terminals). It is advisable to configure an alarm for this fault (assigned to a logic output, for example) in order to indicate the cause of the stop. <input type="checkbox"/> [fallback spd] (LFF) : Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1). <input type="checkbox"/> [Spd maint.] (rLS) : The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1). <input type="checkbox"/> [Ramp stop] (rMP) : Stop on ramp. <input type="checkbox"/> [Fast stop] (FSt) : Fast stop <input type="checkbox"/> [DC injection] (dCI) : DC injection stop. This type of stop cannot be used with certain other functions. See table on page 210.		[Freewheel] (YES)

(1) Because, in this case, the fault does not trigger a stop, it is essential to assign a relay or logic output to its indication.

[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
U5b -	[UNDERVOLTAGE MGT]		
U5b	<input type="checkbox"/> [UnderV. fault mgt]		[Flt&R1open] (0)
0 1 2	Behavior of the drive in the event of an undervoltage <input type="checkbox"/> [Flt&R1open] (0): Fault and fault relay open. <input type="checkbox"/> [Flt&R1close] (1): Fault and fault relay closed. <input type="checkbox"/> [Alarm] (2): Alarm and fault relay remains closed. The alarm can be assigned to a logic output or a relay.		
UrES	<input type="checkbox"/> [Mains voltage]	According to drive voltage rating	According to drive voltage rating
200 220 240 260 380 400 440 460 480	Rated voltage of the line supply in V. For ATV71L...M3Z: <input type="checkbox"/> [200V ac] (200): 200 Volts AC <input type="checkbox"/> [220V ac] (220): 220 Volts AC <input type="checkbox"/> [240V ac] (240): 240 Volts AC <input type="checkbox"/> [260V ac] (260): 260 Volts AC (factory setting) For ATV71L...N4Z: <input type="checkbox"/> [380V ac] (380): 380 Volts AC <input type="checkbox"/> [400V ac] (400): 400 Volts AC <input type="checkbox"/> [440V ac] (440): 440 Volts AC <input type="checkbox"/> [460V ac] (460): 460 Volts AC <input type="checkbox"/> [480V ac] (480): 480 Volts AC (factory setting)		
USL	<input type="checkbox"/> [Undervoltage level]		
	Undervoltage fault trip level setting in V. The adjustment range and factory setting are determined by the drive voltage rating and the [Mains voltage] (UrES) value.		
USt	<input type="checkbox"/> [Undervolt. time out]	0.2 s to 999.9 s	0.2 s
	Time delay for taking undervoltage fault into account		
StP	<input type="checkbox"/> [UnderV. prevention]		[No] (nO)
nO MMS rMP LnF	Behavior in the event of the undervoltage fault prevention level being reached <input type="checkbox"/> [No] (nO): No action <input type="checkbox"/> [DC Maintain] (MMS): This stop mode uses the inertia to maintain the DC bus voltage as long as possible. <input type="checkbox"/> [Ramp stop] (rMP): Stop following an adjustable ramp [Max stop time] (StM). <input type="checkbox"/> [Lock-out] (LnF): Lock (freewheel stop) without fault		
Est	<input type="checkbox"/> [UnderV. restart tm]	1.0 s to 999.9 s	1.0 s
	Time delay before authorizing the restart after a complete stop for [UnderV. prevention] (StP) = [Ramp stop] (rMP), if the voltage has returned to normal.		
UPL	<input type="checkbox"/> [Prevention level]		
	Undervoltage fault prevention level setting in V, which can be accessed if [UnderV. prevention] (StP) is not [No] (nO). The adjustment range and factory setting are determined by the drive voltage rating and the [Mains voltage] (UrES) value.		
StM ()	<input type="checkbox"/> [Max stop time]	0.01 to 60.00 s	1.00 s
	Ramp time if [UnderV. prevention] (StP) = [Ramp stop] (rMP).		
Est ()	<input type="checkbox"/> [DC bus maintain tm]	1 to 9999 s	9999 s
	DC bus maintain time if [UnderV. prevention] (StP) = [DC Maintain] (MMS).		



Parameter that can be modified during operation or when stopped.

[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
FLt-	[IGBT TESTS]		
FLt- nO YES	<input type="checkbox"/> [IGBT test]		[No] (nO)
	<input type="checkbox"/> [No] (nO): No test <input type="checkbox"/> [Yes] (YES): The IGBTs are tested on power up and every time a run command is sent. These tests cause a slight delay (a few ms). In the event of a fault, the drive will lock. The following faults can be detected: <ul style="list-style-type: none">- Drive output short-circuit (terminals U-V-W): SCF display.- IGBT faulty: xtF, where x indicates the number of the IGBT concerned.- IGBT short-circuited: x2F, where x indicates the number of the IGBT concerned.		

[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
LFL -	[4-20mA LOSS]		
LFL2	<input type="checkbox"/> [AI2 4-20mA loss]		[Ignore] (nO)
nO	<input type="checkbox"/> [Ignore] (nO) : Fault ignored. This configuration is the only one possible if [AI2 min. value] (CrL2) page 172 is not greater than 3 mA or if [AI2 Type] (AI2t) page 172 = [Voltage] (10U) .		
YES	<input type="checkbox"/> [Freewheel] (YES) : Freewheel stop		
Stt	<input type="checkbox"/> [Per STT] (Stt) : Stop according to configuration of [Type of stop] (Stt) page 221, without fault tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g. according to [2/3 wire control] (tCC) and [2 wire type] (tCt) page 166 if control is via the terminals). It is advisable to configure an alarm for this fault (assigned to a logic output, for example) in order to indicate the cause of the stop.		
LFF	<input type="checkbox"/> [fallback spd] (LFF) : Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1).		
rLS	<input type="checkbox"/> [Spd maint.] (rLS) : The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1).		
rMP	<input type="checkbox"/> [Ramp stop] (rMP) : Stop on ramp.		
FSt	<input type="checkbox"/> [Fast stop] (FSt) : Fast stop		
dCI	<input type="checkbox"/> [DC injection] (dCI) : DC injection stop. This type of stop cannot be used with certain other functions. See table on page 210.		
LFL3	<input type="checkbox"/> [AI3 4-20mA loss]		[Ignore] (nO)
nO	<input type="checkbox"/> [Ignore] (nO) : Fault ignored. This configuration is the only one possible if [AI3 min. value] (CrL3) page 173 is not greater than 3 mA.		
YES	<input type="checkbox"/> [Freewheel] (YES) : Freewheel stop		
Stt	<input type="checkbox"/> [Per STT] (Stt) : Stop according to configuration of [Type of stop] (Stt) page 221, without fault tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g. according to [2/3 wire control] (tCC) and [2 wire type] (tCt) page 166 if control is via the terminals). It is advisable to configure an alarm for this fault (assigned to a logic output, for example) in order to indicate the cause of the stop.		
LFF	<input type="checkbox"/> [fallback spd] (LFF) : Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1).		
rLS	<input type="checkbox"/> [Spd maint.] (rLS) : The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1).		
rMP	<input type="checkbox"/> [Ramp stop] (rMP) : Stop on ramp.		
FSt	<input type="checkbox"/> [Fast stop] (FSt) : Fast stop		
dCI	<input type="checkbox"/> [DC injection] (dCI) : DC injection stop. This type of stop cannot be used with certain other functions. See table on page 210.		
LFL4	<input type="checkbox"/> [AI4 4-20mA loss]		[Ignore] (nO)
nO	<input type="checkbox"/> [Ignore] (nO) : Fault ignored. This configuration is the only one possible if [AI4 min. value] (CrL4) page 174 is not greater than 3 mA or if [AI4 Type] (AI4t) page 174 = [Voltage] (10U) .		
YES	<input type="checkbox"/> [Freewheel] (YES) : Freewheel stop		
Stt	<input type="checkbox"/> [Per STT] (Stt) : Stop according to configuration of [Type of stop] (Stt) page 221, without fault tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g. according to [2/3 wire control] (tCC) and [2 wire type] (tCt) page 166 if control is via the terminals). It is advisable to configure an alarm for this fault (assigned to a logic output, for example) in order to indicate the cause of the stop.		
LFF	<input type="checkbox"/> [fallback spd] (LFF) : Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1).		
rLS	<input type="checkbox"/> [Spd maint.] (rLS) : The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1).		
rMP	<input type="checkbox"/> [Ramp stop] (rMP) : Stop on ramp.		
FSt	<input type="checkbox"/> [Fast stop] (FSt) : Fast stop		
dCI	<input type="checkbox"/> [DC injection] (dCI) : DC injection stop. This type of stop cannot be used with certain other functions. See table on page 210.		

(1) Because, in this case, the fault does not trigger a stop, it is essential to assign a relay or logic output to its indication.

[1.8 FAULT MANAGEMENT] (FLt-)

Parameter can be accessed in [Expert] mode.

Code	Name/Description	Adjustment range	Factory setting
InH -	[FAULT INHIBITION]		
InH	<div><input type="checkbox"/> [Fault inhibit assign.]</div> <div>To assign fault inhibit, press and hold down the "ENT" key for 2 s.</div> <div><div>CAUTION</div><div>Inhibiting faults results in the drive not being protected. This invalidates the warranty. Check that the possible consequences do not present any risk. Failure to follow this instruction can result in equipment damage.</div></div> <div><div><input type="checkbox"/> [No] (nO): Function inactive</div><div><input type="checkbox"/> [LI1] (LI1)</div><div>:</div><div>:</div><div><input type="checkbox"/> [...] (...): See the assignment conditions on page 204.</div><div>If the assigned input or bit is at inactive state, fault monitoring is active. If the assigned input or bit is at active state, fault monitoring is inactive. Active faults are reset on a rising edge (change from 0 to 1) of the assigned input or bit.</div><div>Note: The "Power Removal" function and any faults that prevent any form of operation are not affected by this function. A list of faults affected by this function appears on pages 311 to 316.</div></div>		[No] (nO)

[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
CLL -	[COM. FAULT MANAGEMENT]		
CLL	<input type="checkbox"/> [Network fault mgt] Behavior of the drive in the event of a communication fault with a communication card. <input type="checkbox"/> [Ignore] (nO): Fault ignored. <input type="checkbox"/> [Freewheel] (YES): Freewheel stop <input type="checkbox"/> [Per STT] (Stt): Stop according to configuration of [Type of stop] (Stt) page 221, without fault tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g. according to [2/3 wire control] (tCC) and [2 wire type] (tCt) page 166 if control is via the terminals). It is advisable to configure an alarm for this fault (assigned to a logic output, for example) in order to indicate the cause of the stop. <input type="checkbox"/> [fallback spd] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1). <input type="checkbox"/> [Spd maint.] (rLS): The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1). <input type="checkbox"/> [Ramp stop] (rMP): Stop on ramp. <input type="checkbox"/> [Fast stop] (FSt): Fast stop <input type="checkbox"/> [DC injection] (dCI): DC injection stop. This type of stop cannot be used with certain other functions. See table on page 210.		[Freewheel] (YES)
COL	<input type="checkbox"/> [CANopen fault mgt] Behavior of the drive in the event of a communication fault with integrated CANopen. <input type="checkbox"/> [Ignore] (nO): Fault ignored. <input type="checkbox"/> [Freewheel] (YES): Freewheel stop <input type="checkbox"/> [Per STT] (Stt): Stop according to configuration of [Type of stop] (Stt) page 221, without fault tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g. according to [2/3 wire control] (tCC) and [2 wire type] (tCt) page 166 if control is via the terminals). It is advisable to configure an alarm for this fault (assigned to a logic output, for example) in order to indicate the cause of the stop. <input type="checkbox"/> [fallback spd] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1). <input type="checkbox"/> [Spd maint.] (rLS): The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1). <input type="checkbox"/> [Ramp stop] (rMP): Stop on ramp. <input type="checkbox"/> [Fast stop] (FSt): Fast stop <input type="checkbox"/> [DC injection] (dCI): DC injection stop. This type of stop cannot be used with certain other functions. See table on page 210.		[Freewheel] (YES)
SLL	<input type="checkbox"/> [Modbus fault mgt] Behavior of the drive in the event of a communication fault with integrated Modbus <input type="checkbox"/> [Ignore] (nO): Fault ignored. <input type="checkbox"/> [Freewheel] (YES): Freewheel stop <input type="checkbox"/> [Per STT] (Stt): Stop according to configuration of [Type of stop] (Stt) page 221, without fault tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g. according to [2/3 wire control] (tCC) and [2 wire type] (tCt) page 166 if control is via the terminals). It is advisable to configure an alarm for this fault (assigned to a logic output, for example) in order to indicate the cause of the stop. <input type="checkbox"/> [fallback spd] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1). <input type="checkbox"/> [Spd maint.] (rLS): The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1). <input type="checkbox"/> [Ramp stop] (rMP): Stop on ramp. <input type="checkbox"/> [Fast stop] (FSt): Fast stop <input type="checkbox"/> [DC injection] (dCI): DC injection stop. This type of stop cannot be used with certain other functions. See table on page 210.		[Freewheel] (YES)

(1) Because, in this case, the fault does not trigger a stop, it is essential to assign a relay or logic output to its indication.

[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
Sdd -	[ENCODER FAULT] Can be accessed if the encoder option card has been inserted and the encoder is used for speed feedback (see page 142).		
Sdd nO YES	<input type="checkbox"/> [Load slip detection] <input type="checkbox"/> [No] (nO) : Fault not monitored. Only the alarm may be assigned to a logic output or a relay. <input type="checkbox"/> [Yes] (YES) : Fault monitored. [Load slip detection] (Sdd) is forced to [Yes] (YES) if [Motor control type] (Ctt) page 137 = [FVC] (FUC) or [Sync.CL] (FSY) . The fault is triggered by comparison with the ramp output and the speed feedback, and is only effective for speeds greater than 10% of the [Rated motor freq.] (FrS) , see page 143. In the event of a fault, the drive will switch to a freewheel stop, and if the brake logic control function has been configured, the brake command will be set to 0.		[No] (nO)
ECC nO YES	<input type="checkbox"/> [Encoder coupling] <input type="checkbox"/> [No] (nO) : Fault not monitored. <input type="checkbox"/> [Yes] (YES) : Fault monitored. If the brake logic control function has been configured, the factory setting changes to [Yes] (YES) . [Encoder coupling] (ECC) = [Yes] (YES) is only possible if [Load slip detection] (Sdd) = [Yes] (YES) and [Motor control type] (Ctt) page 137 = [FVC] (FUC) or [Sync.CL] (FSY) and [Brake assignment] (bLC) page 233 is not [No] (nO) . The fault monitored is the break in the mechanical coupling of the encoder. In the event of a fault, the drive will switch to a freewheel stop, and if the brake logic control function has been configured, the brake command will be set to 0.		[No] (nO)
ECC	<input type="checkbox"/> [Encoder check time] Encoder faults filtering time. This parameter can be accessed if [Encoder coupling] (ECC) = [Yes] (YES)	2 to 10 s	2 s
tl d -	[TORQUE OR I LIM. DETECT]		
SSb nO YES Stt LFF rLS rMP FSt dCI	<input type="checkbox"/> [Trq/I limit. stop] Behavior in the event of switching to torque or current limitation <input type="checkbox"/> [Ignore] (nO) : Fault ignored. <input type="checkbox"/> [Freewheel] (YES) : Freewheel stop <input type="checkbox"/> [Per STT] (Stt) : Stop according to configuration of [Type of stop] (Stt) page 221, without fault tripping. In this case the fault relay does not open and the drive is ready to restart as soon as the fault disappears, according to the restart conditions of the active command channel (e.g. according to [2/3 wire control] (tCC) and [2 wire type] (tCt) page 166 if control is via the terminals). It is advisable to configure an alarm for this fault (assigned to a logic output, for example) in order to indicate the cause of the stop. <input type="checkbox"/> [fallback spd] (LFF) : Change to fallback speed, maintained as long as the fault persists and the run command has not been removed (1). <input type="checkbox"/> [Spd maint.] (rLS) : The drive maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed (1). <input type="checkbox"/> [Ramp stop] (rMP) : Stop on ramp. <input type="checkbox"/> [Fast stop] (FSt) : Fast stop <input type="checkbox"/> [DC injection] (dCI) : DC injection stop. This type of stop cannot be used with certain other functions. See table on page 210.		[Ignore] (nO)
StO ()	<input type="checkbox"/> [Trq/I limit. time out] (If fault has been configured). Time delay for taking SSF "Limitation" fault into account.	0 to 9999 ms	1000 ms



Parameter that can be modified during operation or when stopped.

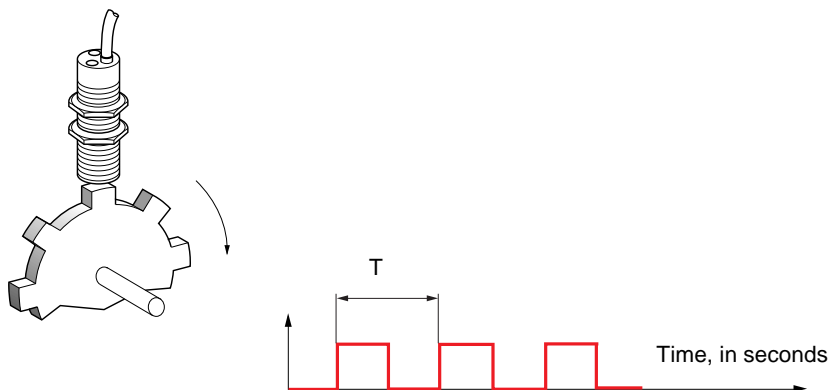
(1) Because, in this case, the fault does not trigger a stop, it is essential to assign a relay or logic output to its indication.

Use of the "Pulse input" to measure the speed of rotation of the motor

This function uses the "Pulse input" from the VW3A3202 extension card and can, therefore, only be used if this card has been inserted and if the "Pulse input" is not being used for another function.

Example of use

A notched disc driven by the motor and connected to a proximity sensor can be used to generate a frequency signal that is proportional to the speed of rotation of the motor.






When applied to the "Pulse input", this signal supports:


- Measurement and display of the motor speed: signal frequency = $1/T$. This frequency is displayed by means of the [\[Pulse in. work. freq.\] \(FqS\)](#) parameter, page [121](#) or [123](#).
- Overspeed detection (if the measured speed exceeds a preset threshold, the drive will trip on a fault).
- Brake failure detection, if brake logic control has been configured: If the speed does not drop sufficiently quickly following a command to engage the brake, the drive will trip on a fault. This function can be used to detect worn brake linings.
- Detection of a speed threshold that can be adjusted using [\[Pulse warning thd.\] \(FqL\)](#) page [135](#) and is assignable to a relay or logic output, see page [182](#).

[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
F 9 F -	[FREQUENCY METER] Can be accessed if a VW3A3202 option card has been inserted		
F 9 F n O Y E S	<input type="checkbox"/> [Frequency meter] Activation of the speed measurement function. <input type="checkbox"/> [No] (nO) : Function inactive, In this case, none of the function parameters can be accessed. <input type="checkbox"/> [Yes] (YES) : Function active, assignment only possible if no other functions have been assigned to the "Pulse input".		[No] (nO)
F 9 C	<input type="checkbox"/> [Pulse scal. divisor] • Scaling factor for the "Pulse input" (divisor). The frequency measured is displayed by means of the [Pulse in. work. freq.] (FqS) parameter, page 121 or 123.	1.0 to 100.0	1.0
F 9 A n O -	<input type="checkbox"/> [Overspd. pulse thd.] Activation and adjustment of overspeed monitoring: [Overspeed] (SOF) fault. <input type="checkbox"/> [No] (nO) : No overspeed monitoring <input type="checkbox"/> 1 Hz to 30.00 Hz : Adjustment of the frequency tripping threshold on the "Pulse input" divided by [Pulse scal. divisor] (FqC)		[No] (nO)
E 9 S	<input type="checkbox"/> [Pulse overspd delay] Time delay for taking overspeed fault into account	0.0 s to 10.0 s	0.0 s
F d E n O -	<input type="checkbox"/> [Level fr. pulse ctrl] Activation and adjustment of monitoring for the Pulse input (speed feedback): [Speed fdbck loss] (SPF) fault <input type="checkbox"/> [No] (nO) : No monitoring of speed feedback <input type="checkbox"/> 0.1 Hz to 500.0 Hz : Adjustment of the motor frequency threshold for tripping a speed feedback fault (difference between the estimated frequency and the measured speed)		[No] (nO)
F 9 E n O -	<input type="checkbox"/> [Pulse thd. wo Run] Activation and adjustment of brake failure monitoring: [Brake feedback] (brF). If brake logic control [Brake assignment] (bLC) page 233 is not configured, this parameter is forced to [No] (nO). <input type="checkbox"/> [No] (nO) : No brake monitoring <input type="checkbox"/> 1 Hz to 1000 Hz : Adjustment of the motor frequency threshold for tripping a brake failure fault (detection of speeds other than zero).		[No] (nO)
E 9 b	<input type="checkbox"/> [Pulse thd. wo Run] Time delay for taking brake failure fault into account.	0.0 s to 10.0 s	0.0 s

[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
brP -	[DB RES. PROTECTION]		
brO <i>nO</i> <i>YES</i> <i>FLt</i>	<input type="checkbox"/> [DB res. protection] <input type="checkbox"/> [No] (nO) : No braking resistor protection (thereby preventing access to the other function parameters). <input type="checkbox"/> [Alarm] (YES) : Alarm. The alarm may be assigned to a logic output or a relay (see page 182). <input type="checkbox"/> [Fault] (FLt) : Switch to fault (bOF) with locking of drive (freewheel stop).  Note: The thermal state of the resistor can be displayed on the graphic display terminal. It is calculated for as long as the drive control remains connected to the power supply.		[No] (nO)
brP 	<input type="checkbox"/> [DB Resistor Power] This parameter can be accessed if [DB res. protection] (brO) is not [No] (nO) . Rated power of the resistor used.	0.1 kW (0.13 HP) to 1000 kW (1333 HP)	0.1 kW (0.5 HP)
brU 	<input type="checkbox"/> [DB Resistor value] This parameter can be accessed if [DB res. protection] (brO) is not [No] (nO) . Rated value of the braking resistor in ohms.	0.1 to 200 ohms	0.1 ohms
EnF -	[AUTO TUNING FAULT]		
EnL <i>nO</i> <i>YES</i> <i>Stt</i> <i>LFF</i> <i>rLS</i> <i>rMP</i> <i>FSt</i> <i>dCI</i>	<input type="checkbox"/> [Autotune fault mgt] <input type="checkbox"/> [Ignore] (nO) : Fault ignored. <input type="checkbox"/> [Freewheel] (YES) : Freewheel stop <input type="checkbox"/> [Per STT] (Stt) : Stop according to the type of stop selected by [Type of stop] (Stt) page 221. <input type="checkbox"/> [fallback spd] (LFF) : Fallback speed <input type="checkbox"/> [Spd maint.] (rLS) : Maintain speed <input type="checkbox"/> [Ramp stop] (rMP) : Stop on ramp. <input type="checkbox"/> [Fast stop] (FSt) : Fast stop. <input type="checkbox"/> [DC injection] (dCI) : DC injection stop		[Freewheel] (YES)

 Parameter that can be modified during operation or when stopped.

[1.8 FAULT MANAGEMENT] (FLt-)

Card pairing

Function can only be accessed in [Expert] mode.

This function is used to detect whenever a card has been replaced or the software has been modified in any way.

When a pairing password is entered, the parameters of the cards currently inserted are stored. On every subsequent power-up these parameters are verified and in the event of a discrepancy the drive locks in HCF fault mode. Before the drive can be restarted you must revert to the original situation or re-enter the pairing password.

The following parameters are verified:

- The type of card for: all cards.
- The software version for: the two control cards, the VW3A3202 extension card, the Controller Inside card and the communication cards.
- The serial number for: both control cards.

Code	Name/Description	Adjustment range	Factory setting
PP I -	[CARDS PAIRING]		
PP I	<input type="checkbox"/> [Pairing password]	OFF to 9999	[OFF] (OFF)
	<p>The [OFF] (OFF) value signifies that the card pairing function is inactive. The [ON] (On) value signifies that card pairing is active and that an access code must be entered in order to start the drive in the event of a card pairing fault. As soon as the code has been entered the drive is unlocked and the code changes to [ON] (On). - The PPI code is an unlock code known only to Schneider Electric Product Support.</p>		

[1.8 FAULT MANAGEMENT] (FLt-)

Code	Name/Description	Adjustment range	Factory setting
LFF -	[FALLBACK SPEED]		
LFF	<input type="checkbox"/> [Fallback speed] Selection of the fallback speed.	0 to 1,600 Hz	0 Hz
FSE -	[RAMP DIVIDER]		
dCF ()	<input type="checkbox"/> [Ramp divider] (1) The ramp that is enabled (dEC or dE2) is then divided by this coefficient when stop requests are sent. Value 0 corresponds to a minimum ramp time.	0 to 10	4
dCI -	[DC INJECTION]		
IdC ()	<input type="checkbox"/> [DC inject. level 1] (1) (3) Level of DC injection braking current activated via logic input or selected as stop mode.	0.1 to 1.41 In (2)	0.64 In (2)
<div style="text-align: center;">CAUTION</div> Check that the motor will withstand this current without overheating. Failure to follow this instruction can result in equipment damage.			
tdI ()	<input type="checkbox"/> [DC injection time 1] (1) (3) Maximum current injection time [DC inject. level 1] (IdC). After this time the injection current becomes [DC inject. level 2] (IdC2).	0.1 to 30 s	0.5 s
IdC2 ()	<input type="checkbox"/> [DC inject. level 2] (1) (3) Injection current activated by logic input or selected as stop mode, once period of time [DC injection time 1] (tdI) has elapsed.	0.1 In (2) to [DC inject. level 1] (IdC)	0.5 In (2)
<div style="text-align: center;">CAUTION</div> Check that the motor will withstand this current without overheating. Failure to follow this instruction can result in equipment damage.			
tdC ()	<input type="checkbox"/> [DC injection time 2] (1) (3) Maximum injection time [DC inject. level 2] (IdC2) for injection, selected as stop mode only. (Can be accessed if [Type of stop] (Stt) = [DC injection] (dCI)).	0.1 to 30 s	0.5 s

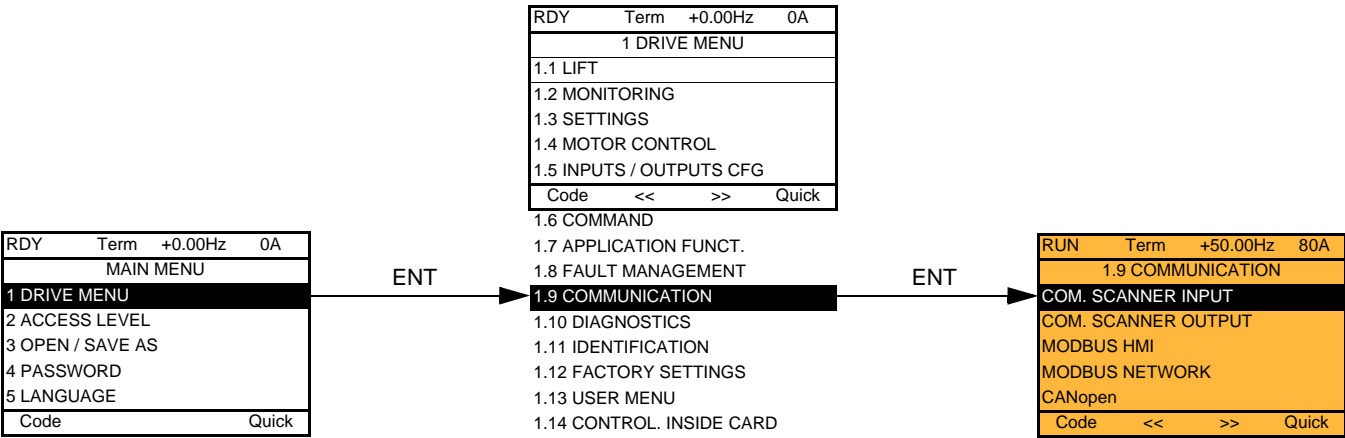
(1) Parameter can also be accessed in the [1.3 SETTINGS] (SEt-) and [1.7 APPLICATION FUNCT.] (FUn-) menus.

(2) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.

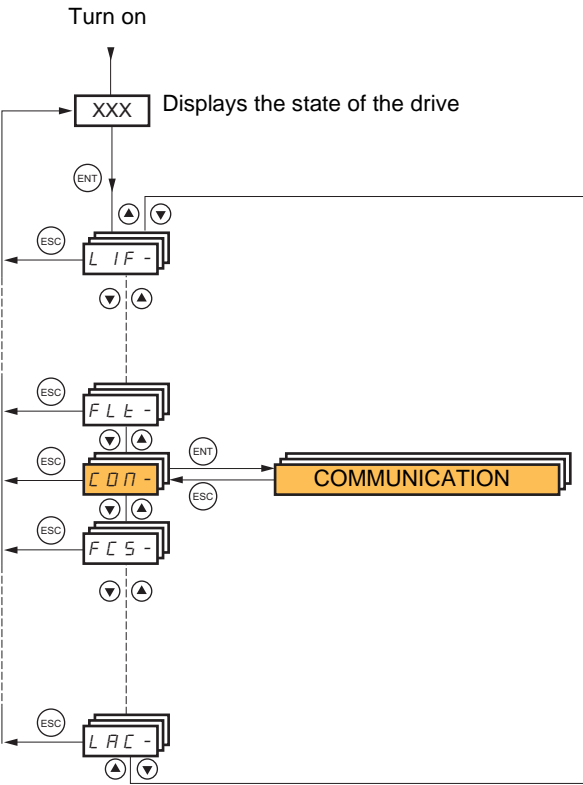
(3) Note: These settings are independent of the [AUTO DC INJECTION] (AdC-) function.

() Parameter that can be modified during operation or when stopped.

With graphic display terminal:



With integrated display terminal:



[1.9 COMMUNICATION] (COM-)

Code	Name/Description	Adjustment range	Factory setting
	[COM. SCANNER INPUT] Only accessible via graphic display terminal		
nPAR1	<input type="checkbox"/> [Scan. IN1 address] Address of the 1 st input word		3201
nPAR2	<input type="checkbox"/> [Scan. IN2 address] Address of the 2 nd input word.		8604
nPAR3	<input type="checkbox"/> [Scan. IN3 address] Address of the 3 rd input word.		0
nPAR4	<input type="checkbox"/> [Scan. IN4 address] Address of the 4 th input word.		0
nPAR5	<input type="checkbox"/> [Scan. IN5 address] Address of the 5 th input word.		0
nPAR6	<input type="checkbox"/> [Scan. IN6 address] Address of the 6 th input word.		0
nPAR7	<input type="checkbox"/> [Scan. IN7 address] Address of the 7 th input word.		0
nPAR8	<input type="checkbox"/> [Scan. IN8 address] Address of the 8 th input word.		0
	[COM. SCANNER OUTPUT] Only accessible via graphic display terminal		
nCAR1	<input type="checkbox"/> [Scan.Out1 address] Address of the 1 st output word		8501
nCAR2	<input type="checkbox"/> [Scan.Out2 address] Address of the 2 nd output word.		8602
nCAR3	<input type="checkbox"/> [Scan.Out3 address] Address of the 3 rd output word.		0
nCAR4	<input type="checkbox"/> [Scan.Out4 address] Address of the 4 th output word.		0
nCAR5	<input type="checkbox"/> [Scan.Out5 address] Address of the 5 th output word.		0
nCAR6	<input type="checkbox"/> [Scan.Out6 address] Address of the 6 th output word.		0
nCAR7	<input type="checkbox"/> [Scan.Out7 address] Address of the 7 th output word.		0
nCAR8	<input type="checkbox"/> [Scan.Out8 address] Address of the 8 th output word.		0

[1.9 COMMUNICATION] (COM-)

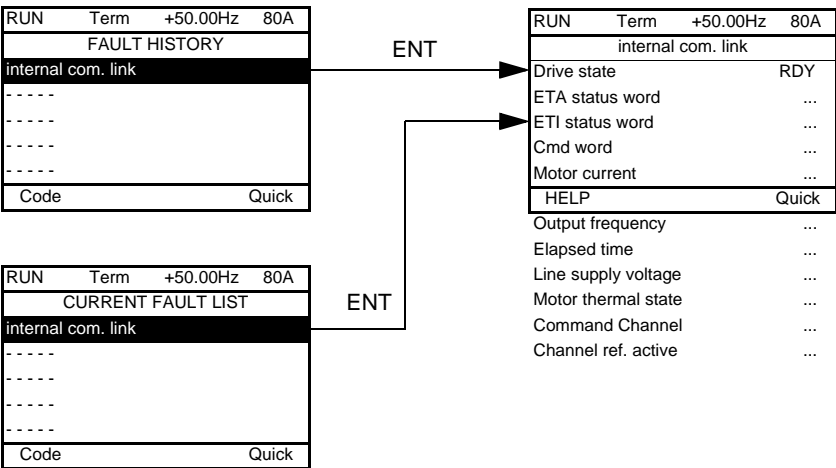
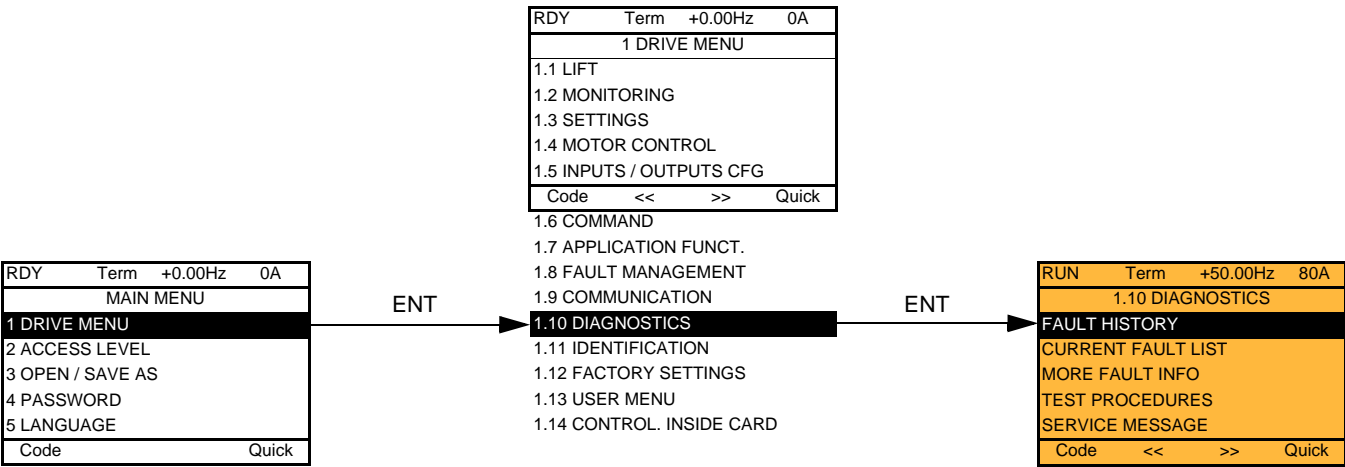
Code	Name/Description	Adjustment range	Factory setting
nd2 -	[MODBUS HMI] Communication with the graphic display terminal		
tbr2	<input type="checkbox"/> [HMI baud rate] 9.6 or 19.2 kbps via the integrated display terminal. 9600 or 19200 bauds via the graphic display terminal. The graphic display terminal only operates if [HMI baud rate] (tbr2) = 19200 bauds (19.2 kbps). In order for any change in the assignment of [HMI baud rate] (tbr2) to be taken into account you must: - Provide confirmation in a confirmation window if using the graphic display terminal - Press the ENT key for 2 s if using the integrated display terminal		19.2 kbps
LF02	<input type="checkbox"/> [HMI format] Read-only parameter, cannot be modified.		8E1
nd1 -	[MODBUS NETWORK]		
Ad d	<input type="checkbox"/> [Modbus Address] OFF to 247		OFF
AND A	<input type="checkbox"/> [Modbus add Prg C.] Modbus address of the Controller Inside card OFF at 247 This parameter can be accessed if the Controller Inside card has been inserted and depending on its configuration (please consult the specific documentation).		OFF
AND C	<input type="checkbox"/> [Modbus add Com.C.] Modbus address of the communication card OFF to 247 This parameter can be accessed if a communication card has been inserted and depending on its configuration (please consult the specific documentation).		OFF
tbr	<input type="checkbox"/> [Modbus baud rate] 4.8 - 9.6 - 19.2 - 38.4 kbps on the integrated display terminal. 4800, 9600, 19200 or 38400 bauds on the graphic display terminal.		19.2 kbps
LF0	<input type="checkbox"/> [Modbus format] 801 - 8E1 - 8n1, 8n2		8E1
tt0	<input type="checkbox"/> [Modbus time out] 0.1 to 30 s		10.0 s
cn0 -	[CANopen]		
AdC0	<input type="checkbox"/> [CANopen address] 0 to 127		0
bdC0	<input type="checkbox"/> [CANopen bit rate] 50 - 125 - 250 - 500 kbps - 1 Mbps		125 kbps
ErC0	<input type="checkbox"/> [Error code] Read-only parameter, cannot be modified.		

[1.9 COMMUNICATION] (COM-)

-	[COMMUNICATION CARD]	
	See the specific documentation for the card used.	
L C F -	[FORCED LOCAL]	
F L O n O L I 1 - - L I 1 4	<input type="checkbox"/> [Forced local assign.] <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [LI1] (LI1) to [LI6] (LI6) <input type="checkbox"/> [LI7] (LI7) to [LI10] (LI10): If VW3A3201 logic I/O card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI12] (LI12): If VW3A3203 ESIM card has been inserted <input type="checkbox"/> [LI11] (LI11) to [LI14] (LI14): If VW3A3202 extended I/O card has been inserted Forced local mode is active when the input is at active state. [Forced local assign.] (FLO) is forced to [No] (nO) if [Profile] (CHCF) page 205 = [I/O profile] (IO).	[No] (nO)
F L O C n O A I 1 A I 2 A I 3 A I 4 L C C P I P G	<input type="checkbox"/> [Forced local Ref.] <input type="checkbox"/> [No] (nO): Not assigned (control via the terminals with zero reference). <input type="checkbox"/> [AI1] (AI1): Analog input <input type="checkbox"/> [AI2] (AI2): Analog input <input type="checkbox"/> [AI3] (AI3): Analog input, if VW3A3202 extension card has been inserted. <input type="checkbox"/> [AI4] (AI4): Analog input, if VW3A3202 extension card has been inserted. <input type="checkbox"/> [HMI] (LCC): Assignment of the reference and command to the graphic display terminal. Reference: [HMI Frequency ref.] (LFr), page 121, control: RUN/STOP/FWD/REV buttons. <input type="checkbox"/> [RP] (PI): Frequency input, if VW3A3202 card has been inserted. <input type="checkbox"/> [Encoder] (PG): Encoder input, if encoder card has been inserted. If the reference is assigned to an analog input, [RP] (PI) or [Encoder] (PG) the command is automatically assigned to the terminals as well (logic inputs).	[No] (nO)
F L O t	<input type="checkbox"/> [Time-out forc. local] 0.1 to 30 s This parameter can be accessed if [Forced local assign.] (FLO) is not [No] (nO). Time delay before communication monitoring is resumed on leaving forced local mode.	10.0 s

[1.10 DIAGNOSTICS]

This menu can only be accessed with the graphic display terminal.



This screen indicates the state of the drive at the moment the selected fault occurred.

RUN	Term	+50.00Hz	80A
MORE FAULT INFO			
Network fault	0		
Application fault	0		
Internal link fault 1	0		
Internal link fault 2	0		
Encoder Fault	0		
Code	Quick		

This screen indicates the number of communication faults, for example, with the option cards.
Number: from 0 to 65535

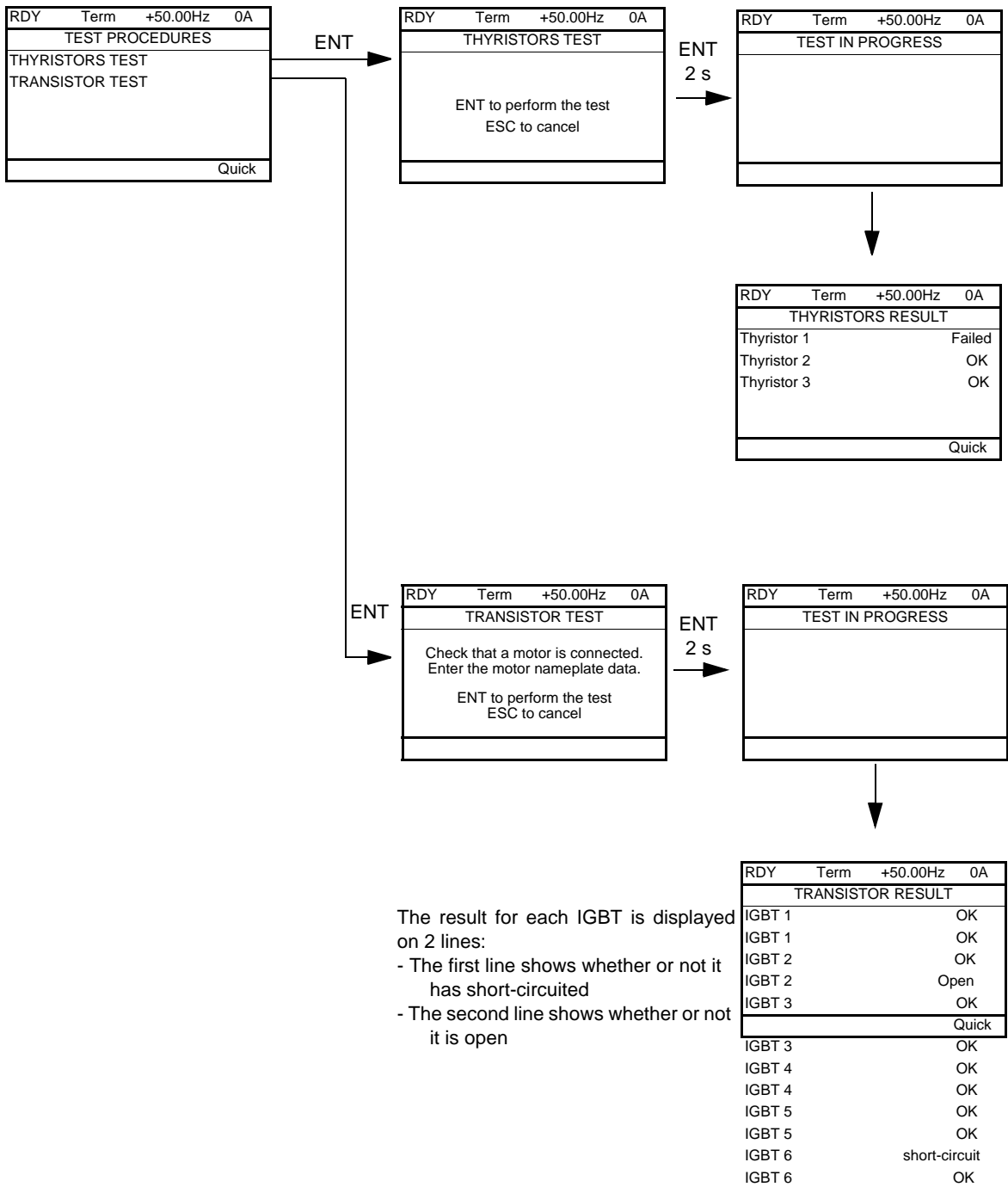
For [Encoder Fault], which is only visible if a VW3 A3 408, VW3 A3 409, VW3 A3 410 or VW3 A3 411 card has been inserted, the figure displayed is one of the fault codes summarized in the table on the next page.

Summary table of types of [Encoder Fault]

Code	Description of the error
0	No error, except if the control section has a separate power supply, in which case the power section must be turned on to display the actual code.
1	Internal UE/MC communication fault (CRC fault).
2	Internal UE/MC communication fault (time out).
16	Synchronization error (PLL error).
17	Encoder signal cut or short-circuited.
18	PUC emulation fault.
19	Resolver: Unstable feedback signal.
20	Internal card communication fault.
21	Resolver: Feedback signal too weak.
22	Resolver: Feedback signal too strong.
23	Encoder overcurrent.
32	EnDAT: CRC error.
33	EnDAT: Start bit not detected.
34	EnDAT: EEPROM access error.
35	EnDAT: Incorrect EEPROM value.
48	Hiperface: Incoherent SinCos signal.
49	Hiperface: Time out.
50	Hiperface: Unknown encoder.
51	Hiperface: CRC error.
64	SinCos: Incoherent SinCos signal.
80	SSI: Parity error.
81	SSI: Invalid data.
96	The position is not available.
4096	ABZ Esim: Top Z error.

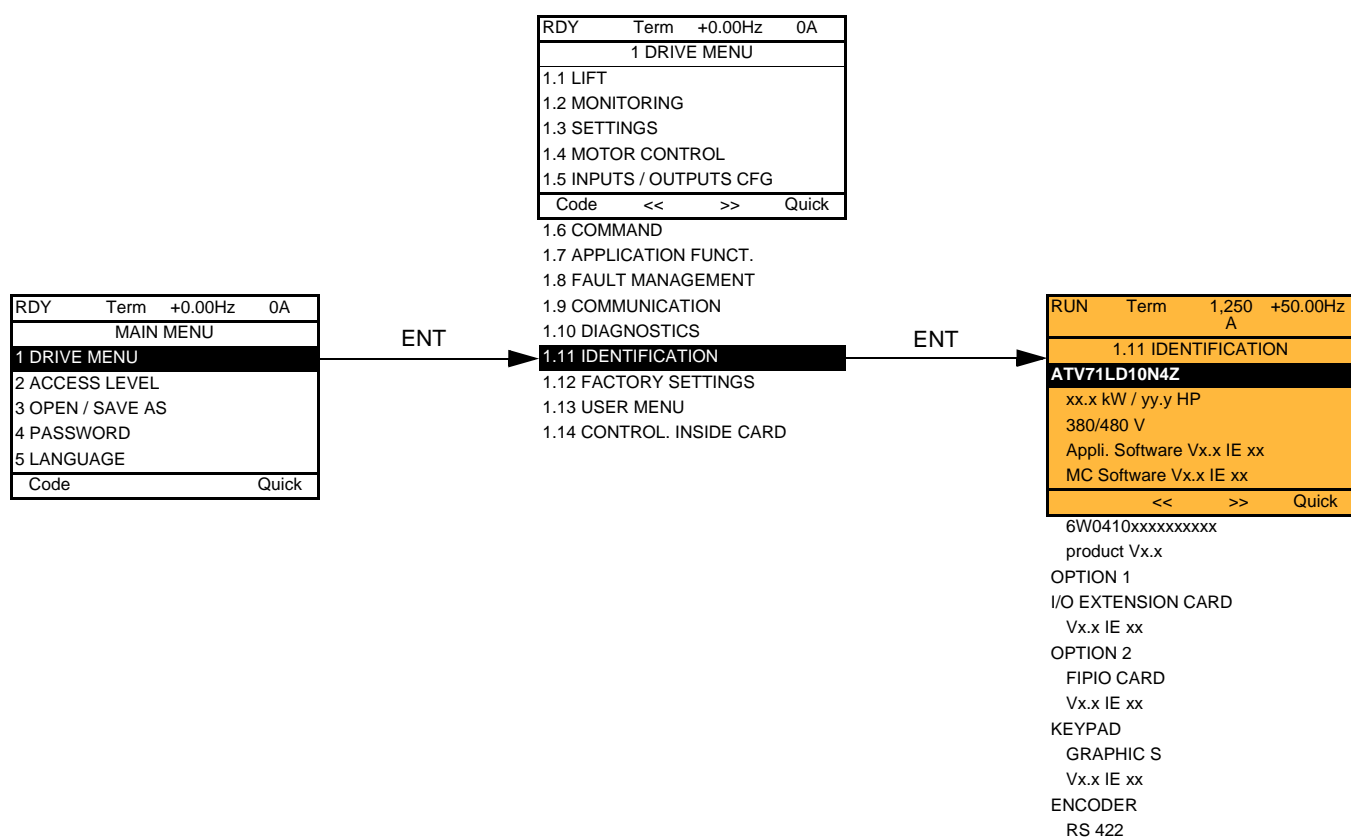
[1.10 DIAGNOSTICS]

[THYRISTORS TEST] is only accessible for ATV71LD48N4Z drives.



Note: To start the tests, press and hold down (2 s) the ENT key.

[1.11 IDENTIFICATION]



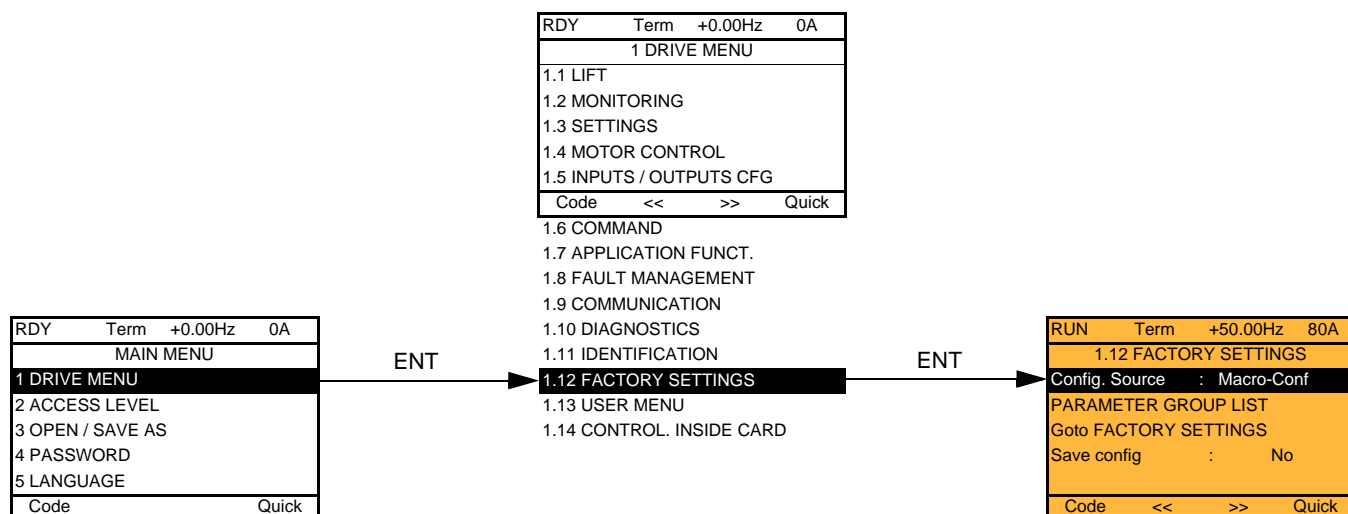
The [\[1.11 IDENTIFICATION\]](#) menu can only be accessed on the graphic display terminal.

This is a read-only menu that cannot be configured. It enables the following information to be displayed:

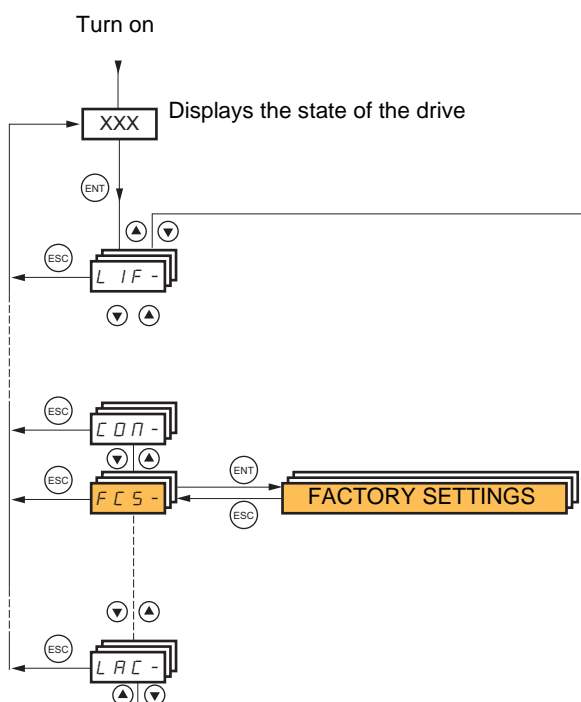
- Drive reference, power rating and voltage
- Drive software version
- Drive serial number
- Type of options present, with their software version.

[1.12 FACTORY SETTINGS] (FCS-)

With graphic display terminal:



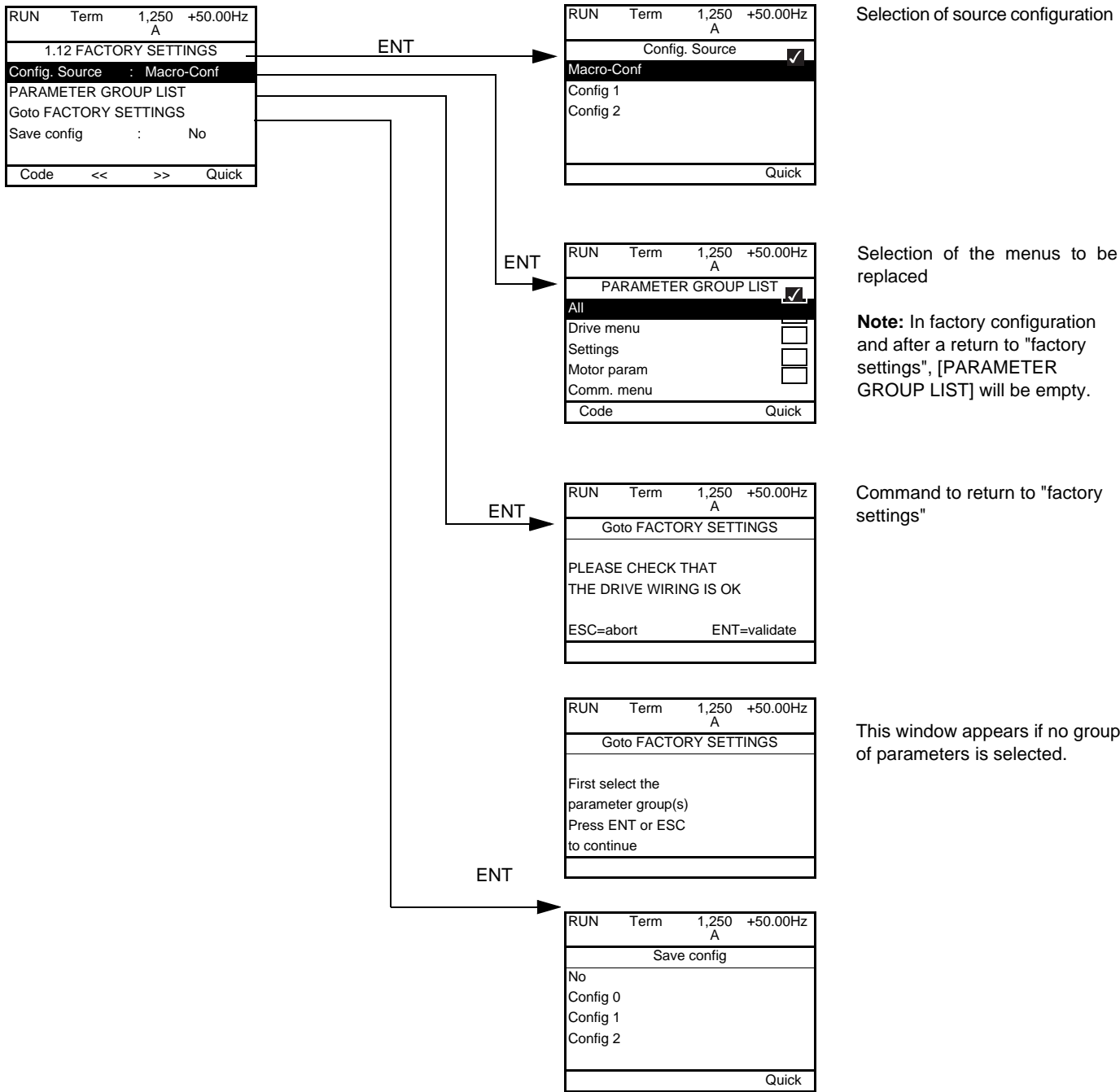
With integrated display terminal:




The [1.12 FACTORY SETTINGS] (FCS-) menu is used to:

- Replace the current configuration with the factory configuration or a configuration saved previously.
All or part of the current configuration can be replaced: Select a group of parameters in order to select the menus you wish to load with the selected source configuration.
- Save the current configuration to a file.

[1.12 FACTORY SETTINGS] (FCS-)



[1.12 FACTORY SETTINGS] (FCS-)

Code	Name/Description
FCS I In I CFG 1 CFG 2	<input type="checkbox"/> [Config. Source] Choice of source configuration. <input type="checkbox"/> [Macro-Conf] (InI) Factory configuration, return to selected macro configuration. <input type="checkbox"/> [Config 1] (CFG1) <input type="checkbox"/> [Config 2] (CFG2) If the configuration switching function is configured, it will not be possible to access [Config 1] (CFG1) and [Config 2] (CFG2) .
FrY- ALL drM SEt MOt COM PLC MON dIS	<input type="checkbox"/> [PARAMETER GROUP LIST] Selection of menus to be loaded <input type="checkbox"/> [All] (ALL) : All parameters <input type="checkbox"/> [Drive menu] (drM) : The [1 DRIVE MENU] menu without [1.9 COMMUNICATION] and [1.14 CONTROL INSIDE MENU]. In the [7 DISPLAY CONFIG.] menu, [Return std name] page 305 returns to [No] . <input type="checkbox"/> [Settings] (SEt) : The [1.3 SETTINGS] menu without the [IR compensation] (UFr) , [Slip compensation] (SLP) and [Mot. therm. current] (ItH) parameters. <input type="checkbox"/> [Motor param] (MOt) : Motor parameters, see list below. The following options can only be accessed if [Config. Source] (FCSI) = [Macro-Conf] (InI) : <input type="checkbox"/> [Comm. menu] (COM) : The [1.9 COMMUNICATION] menu without either [Scan. IN1 address] (nMA1) to [Scan. IN8 address] (nMA8) or [Scan.Out1 address] (nCA1) to [Scan.Out8 address] (nCA8) . <input type="checkbox"/> [Control inside menu] (PLC) : The [1.14 CONTROL INSIDE MENU] menu. <input type="checkbox"/> [Monitor config.] (MON) : The [6 MONITORING CONFIG.] menu. <input type="checkbox"/> [Display config.] (dIS) : the [7 DISPLAY CONFIG.] menu. See the multiple selection procedure on page 24 for the integrated display terminal and page 15 for the graphic display terminal.  Note: In factory configuration and after a return to "factory settings", [PARAMETER GROUP LIST] will be empty.
GFS nO YES	<input type="checkbox"/> [Goto FACTORY SETTINGS] It is only possible to revert to the factory settings if at least one group of parameters has previously been selected. With the integrated display terminal: - No - Yes: The parameter changes back to nO automatically as soon as the operation is complete. With the graphic display terminal: See the previous page.
SCS I nO Str0 Str1 Str2	<input type="checkbox"/> [Save config] <input type="checkbox"/> [No] (nO) : <input type="checkbox"/> [Config 0] (Str0) : Press the "ENT" key for 2 s. <input type="checkbox"/> [Config 1] (Str1) : Press the "ENT" key for 2 s. <input type="checkbox"/> [Config 2] (Str2) : Press the "ENT" key for 2 s. The active configuration to be saved does not appear for selection. For example, if the active configuration is [Config 0] (Str0) , only [Config 1] (Str1) and [Config 2] (Str2) appear. The parameter changes back to [No] (nO) automatically as soon as the operation is complete.

List of motor parameters

[1.4 MOTOR CONTROL] (drC-) menu:

[Rated motor power] (nPr) - **[Rated motor volt.] (UnS)** - **[Rated mot. current] (nCr)** - **[Rated motor freq.] (FrS)** - **[Rated motor speed] (nSP)** - **[Auto-tuning] (tUn)** - **[Auto tuning status] (tUS)** - **[Angle auto-test] (ASA)** - **[Angle offset value] (ASU)** - **[U0] (U0)** à **[U5] (U5)** - **[Freq pt 1 on 5pt V/F] (F1)** to **[F5] (F5)** - **[V. constant power] (UCP)** - **[Freq. Const. Power] (FCP)** - **[Nominal I sync.] (nCrS)** - **[Nom motor spdsync] (nSPS)** - **[Pole pairs] (PPnS)** - **[Syn. EMF constant] (PHS)** - **[Autotune L d-axis] (LdS)** - **[Autotune L q-axis] (LqS)** - **[Cust. stator R syn] (rSAS)** - **[IR compensation] (UFr)** - **[Slip compensation] (SLP)** - motor parameters that can be accessed in **[Expert]** mode, pages **146**, **147** and **149**.

[1.3 SETTINGS] (SEt-) menu:

[Mot. therm. current] (ItH)

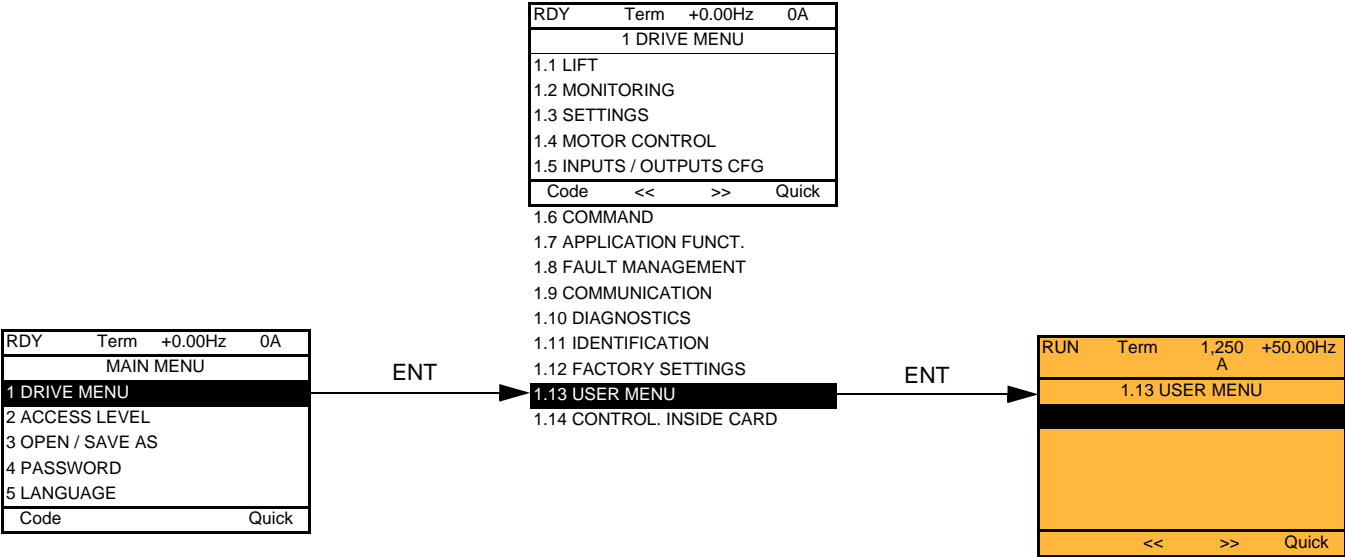
Example of total return to factory settings

- [Config. Source] (FCSI) = [Macro-conf] (InI)**
- [PARAMETER GROUP LIST] (FrY-) = [All] (ALL)**
- [Goto FACTORY SETTINGS] (GFS = YES)**

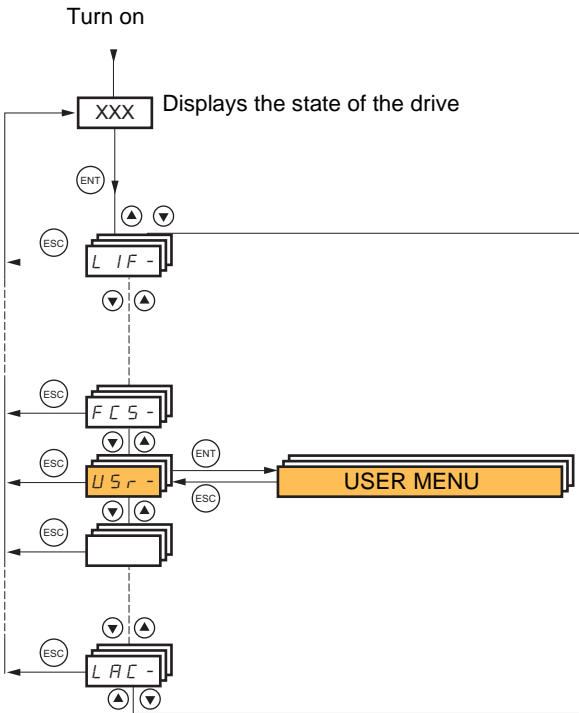
[1.13 USER MENU] (USr-)

This menu contains the parameters selected in the [7 DISPLAY CONFIG.] menu on page 304.

With graphic display terminal:



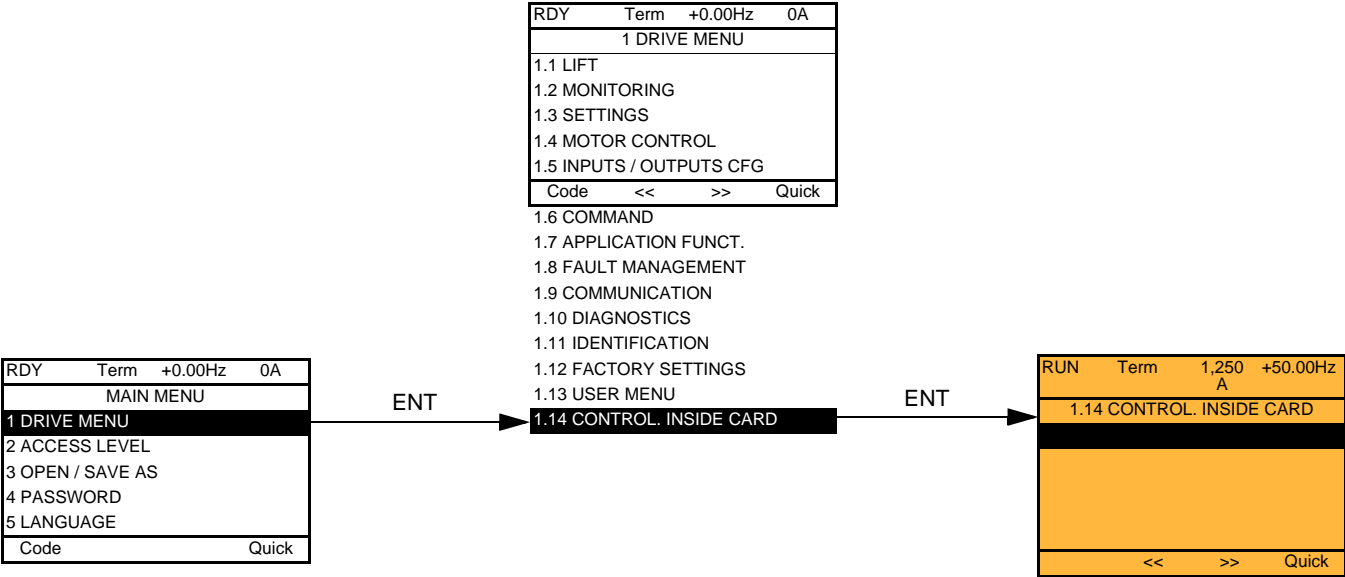
With integrated display terminal:



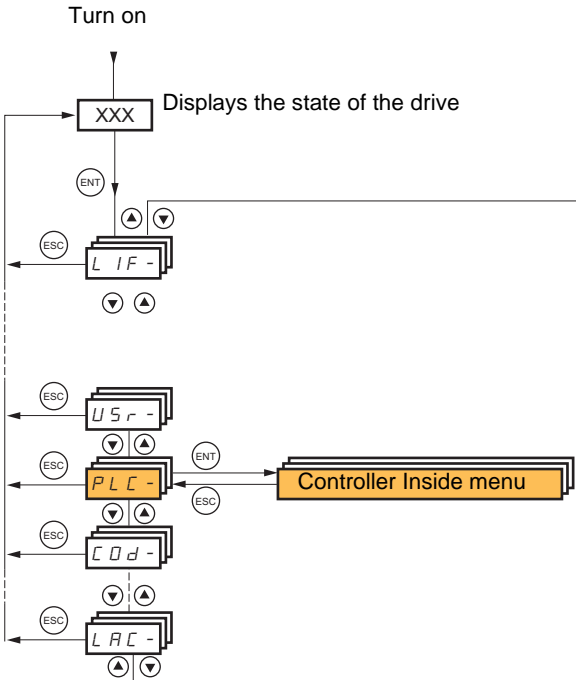
[1.14 CONTROL. INSIDE CARD] (PLC-)

This menu can only be accessed if a Controller Inside card has been inserted. Refer to the documentation specific to this card.

With graphic display terminal:

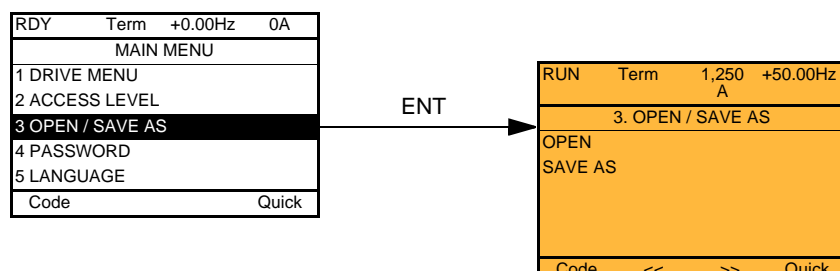


With integrated display terminal:



[3 OPEN/SAVE AS]

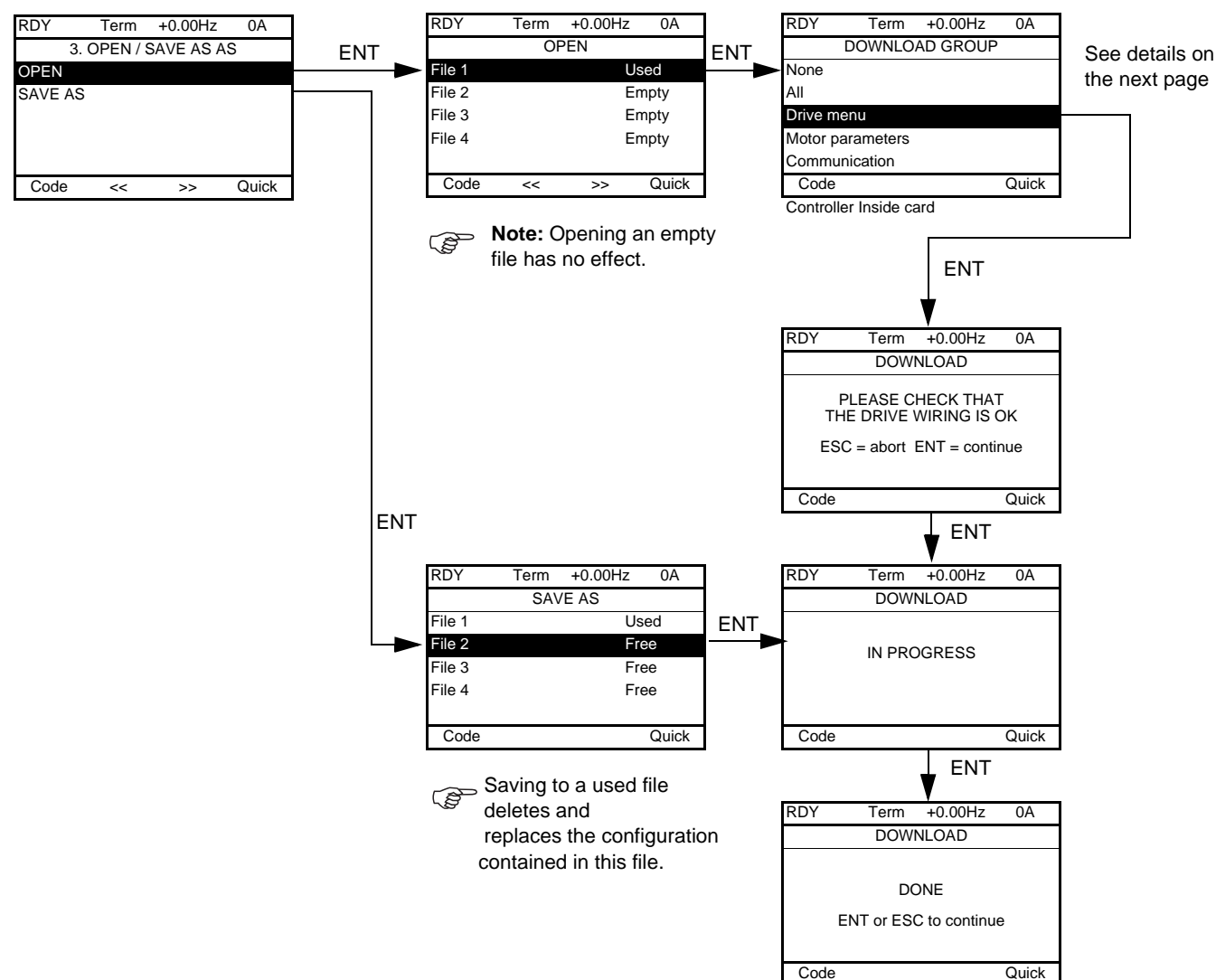
This menu can only be accessed with the graphic display terminal.



[OPEN]: To download one of the 4 files from the graphic display terminal to the drive.

[SAVE AS]: To download the current drive configuration to the graphic display terminal.

Note: The transfer from the graphic display terminal to the drive (and vice versa) can only be carried out while the motor is stopped.



Various messages may appear when the download is requested:

- **[IN PROGRESS]**
- **[DONE]**
- Error messages if download not possible
- **[Motor parameters are NOT COMPATIBLE. Do you want to continue?]**: In this case the download is possible, but the parameters will be restricted.

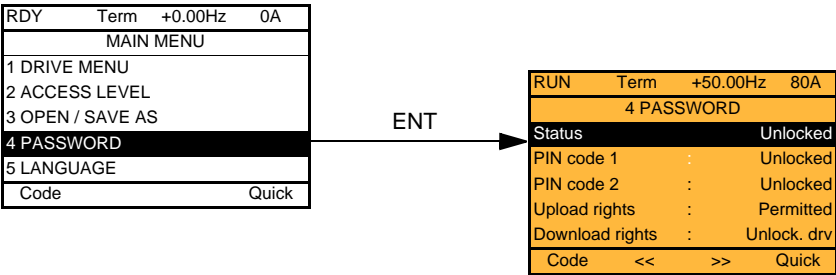
[3 OPEN/SAVE AS]

[DOWNLOAD GROUP]

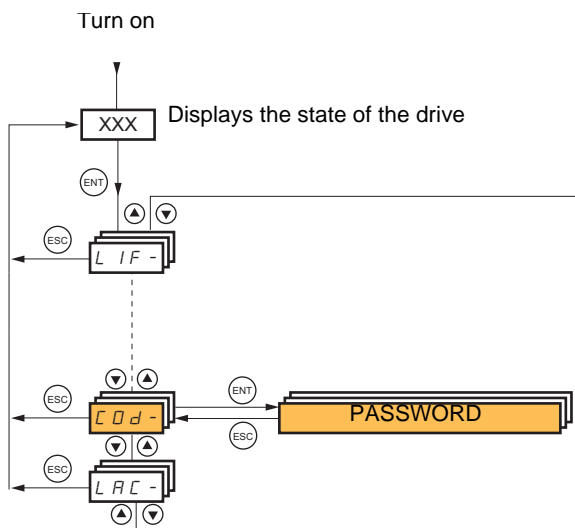
[None]:		No parameters
[All]:		All parameters in all menus
[Drive menu]:		The entire [1 DRIVE MENU] without [1.9 COMMUNICATION] and [1.14 CONTROL. INSIDE CARD].
[Motor parameters]:	[Rated motor power] (nPr)	In the [1.4 MOTOR CONTROL] (drC-) menu
	[Rated motor volt.] (UnS)	
	[Rated mot. current] (nCr)	
	[Rated motor freq.] (FrS)	
	[Rated motor speed] (nSP)	
	[Auto tuning] (tUn)	
	[Auto tuning status] (tUS)	
	[Angle auto-test] (ASA)	
	[Angle offset value] (ASU)	
	[U0] (U0) to [U5] (U5)	
	[F1] (F1) to [F5] (F5)	
	[V. constant power] (UCP)	
	[Freq. Const Power] (FCP)	
	[Nominal I sync.] (nCrS)	
	[Nom motor spdsync] (nSPS)	
	[Pole pairs] (PPnS)	
	[Syn. EMF constant] (PHS)	
	[Autotune L d-axis] (LdS)	
	[Autotune L q-axis] (LqS)	
	[Cust. stator R syn] (rSAS)	
	[Motor torque] (tqS)	
	[Measured Ld-axis] (LdMS)	
	[Measured Lq-axis] (LqMS)	
	[IR compensation] (UFr)	
[Slip compensation] (SLP)		
The motor parameters that can be accessed in [Expert] mode, pages 146, 147 and 149.		
[Mot. therm. current] (ItH)	In the [1.3 SETTINGS] (SEt-) menu	
[Communication]:		All the parameters in the [1.9 COMMUNICATION] menu
[Control Inside card]:		All the parameters in the [1.14 CONTROL. INSIDE CARD] menu

[4. PASSWORD] (COd-)

With graphic display terminal:

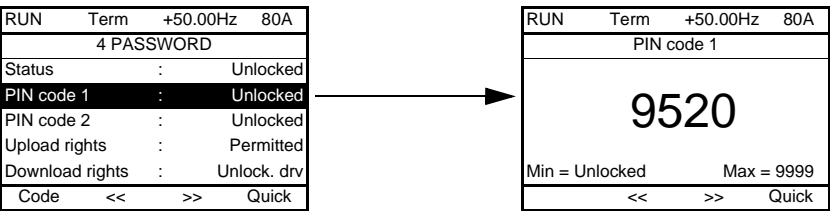


With integrated display terminal:



Enables the configuration to be protected with an access code or a password to be entered in order to access a protected configuration.

Example with graphic display terminal:



- The drive is unlocked when the PIN codes are set to **[unlocked] (OFF)** (no password) or when the correct code has been entered.
- Before protecting the configuration with an access code, you must:
 - Define the **[Upload rights] (ULr)** and **[Download rights] (dLr)**.
 - Make a careful note of the code and keep it in a safe place where you will always be able to find it.
- The drive has 2 access codes, enabling 2 access levels to be set up.
 - PIN code 1 is a public unlock code: 6969.
 - PIN code 2 is an unlock code known only to Schneider Electric Product Support. It can only be accessed in **[Expert]** mode.
 - Only one PIN1 or PIN2 code can be used - the other must remain set to **[OFF] (OFF)**.

Note: When the unlock code is entered, the user access code appears.

The following items are access-protected:

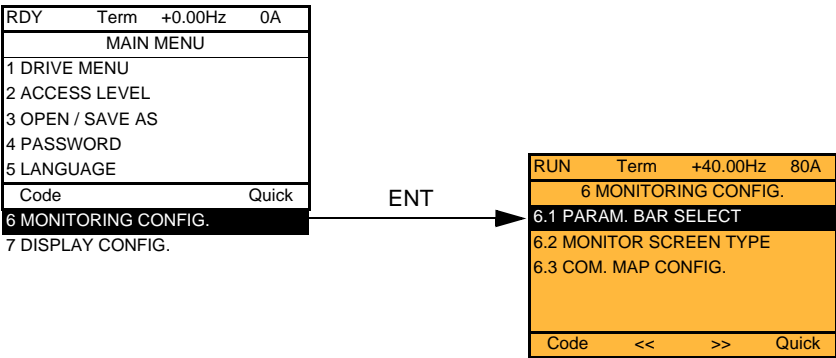
- Return to factory settings (**[1.12 FACTORY SETTINGS] (FCS-)** menu).
- The channels and parameters protected by the **[1.13 USER MENU]** as well as the menu itself.
- The custom display settings (**[7 DISPLAY CONFIG.]** menu).

[4. PASSWORD] (COd-)

Code	Name/Description	Adjustment range	Factory setting
CSL LC ULC	<input type="checkbox"/> [Status] Information parameter, cannot be modified. <input type="checkbox"/> [Locked] (LC) : The drive is locked by a password. <input type="checkbox"/> [Unlocked] (ULC) : The drive is not locked by a password.		[Unlocked] (ULC)
COd	<input type="checkbox"/> [PIN code 1] 1 st access code. The value [OFF] (OFF) indicates that no password has been set [Unlocked] . The value [ON] (On) indicates that the drive is protected and an access code must be entered in order to unlock it. Once the correct code has been entered, it remains on the display and the drive is unlocked until the next time the power supply is disconnected. - PIN code 1 is a public unlock code: 6969.	OFF to 9999	[OFF] (OFF)
COd2	<input type="checkbox"/> [PIN code 2] Parameter can only be accessed in [Expert] mode. 2 nd access code. The value [OFF] (OFF) indicates that no password has been set [Unlocked] . The value [ON] (On) indicates that the drive is protected and an access code must be entered in order to unlock it. Once the correct code has been entered, it remains on the display and the drive is unlocked until the next time the power supply is disconnected. - PIN code 2 is an unlock code known only to Schneider Electric Product Support.	OFF to 9999	[OFF] (OFF)
ULr ULr0 ULr1	<input type="checkbox"/> [Upload rights] Read or copy the current configuration to the drive. <input type="checkbox"/> [Permitted] (ULr0) : The current drive configuration can always be uploaded to the graphic display terminal or PowerSuite. <input type="checkbox"/> [Not allowed] (ULr1) : The current drive configuration can only be uploaded to the graphic display terminal or PowerSuite if the drive is not protected by an access code or if the correct code has been entered.		[Permitted] (ULr0)
dLr dLr0 dLr1 dLr2 dLr3	<input type="checkbox"/> [Download rights] Writes the current configuration to the drive or downloads a configuration to the drive <input type="checkbox"/> [Locked drv] (dLr0) : A configuration file can only be downloaded to the drive if the drive is protected by an access code, which is the same as the access code for the configuration to be downloaded. <input type="checkbox"/> [Unlock. drv] (dLr1) : A configuration file can be downloaded to the drive or a configuration in the drive can be modified if the drive is unlocked (access code entered) or is not protected by an access code. <input type="checkbox"/> [not allowed] (dLr2) : Download not authorized. <input type="checkbox"/> [Lock/unlock] (dLr3) : Combination of [Locked drv] (dLr0) and [Unlock. drv] (dLr1) .		[Unlock. drv] (dLr1)

[6 MONITORING CONFIG.]

This menu can only be accessed with the graphic display terminal.



This can be used to configure the information displayed on the graphic display screen during operation.



- [6.1. PARAM. BAR SELECT]: Selection of 1 to 2 parameters displayed on the top line (the first 2 cannot be modified).
- [6.2. MONITOR SCREEN TYPE]: Selection of parameters displayed in the centre of the screen and the display mode (digital values or bar graph format).
- [6.3. COM. MAP CONFIG.]: Selection of the words displayed and their format.

Name/Description

[6.1 PARAM. BAR SELECT]

☐ [Alarm groups]

☐ [Frequency ref.]

☐ [Torque reference]

☐ [Output frequency]

☐ [Motor current]

☐ [ENA avg speed]

☐ [Vitesse ascenseur]

☐ [Motor speed]

☐ [Motor voltage]

☐ [Motor power]

☐ [Motor torque]

☐ [Mains voltage]

☐ [Travel distance]

☐ [Number of travels]

☐ [Motor thermal state]

☐ [Drv. thermal state]

☐ [DBR thermal state]

☐ [Consumption]

☐ [Run time]

☐ [Power on time]

☐ [IGBT alarm counter]

☐ [- - - - 02]

☐ [- - - - 06]

☐ [Config. active]

☐ [Utilised param. set]

in Hz: parameter displayed in factory configuration.

as a %

in Hz

in A: parameter displayed in factory configuration.

in Hz

in m/s

in rpm

in V

in W

as a %

in V

as a %

as a %

as a %

in Wh or kWh depending on drive rating

in hours (length of time the motor has been switched on)

in hours (length of time the drive has been switched on)

in seconds (total time of IGBT overheating alarms)

Word generated by the Controller Inside card (can be accessed if the card has been inserted)

Word generated by the Controller Inside card (can be accessed if the card has been inserted)

CNFO, 1 or 2 (see page 254)

SET1, 2 or 3 (see page 105)

Select the parameter using ENT (a ☒ then appears next to the parameter). Parameter(s) can also be deselected using ENT. 1 or 2 parameters can be selected.

E.g.

PARAM. BAR SELECT

MONITORING

☒

☐

☐

☒

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Name/Description

[6.2. MONITOR SCREEN TYPE]

[Display value type]

- [Digital]: Display of one or two digital values on the screen (factory configuration).
- [Bar graph]: Display of one or two bar graphs on the screen.
- [List]: Display a list of between one and five values on the screen.

[PARAMETER SELECTION]

- [Alarm groups] can only be accessed if [Display value type] = [List]
- [Frequency ref.] in Hz: parameter displayed in factory configuration.
- [Torque reference] as a %
- [Output frequency] in Hz
- [Motor current] in A
- [ENA avg speed] in Hz
- [Vitesse ascenseur] in m/s
- [Motor speed] in rpm
- [Motor voltage] in V
- [Motor power] in W
- [Motor torque] as a %
- [Mains voltage] in V
- [Travel distance]
- [Number of travels]
- [Motor thermal state] as a %
- [Drv. thermal state] as a %
- [DBR thermal state] as a %
- [Consumption] in Wh or kWh depending on drive rating
- [Run time] in hours (length of time the motor has been switched on)
- [Power on time] in hours (length of time the drive has been switched on)
- [IGBT alarm counter] in seconds (total time of IGBT overheating alarms)
- [- - - - 02] Word generated by the Controller Inside card (can be accessed if the card has been inserted)
- to
- [- - - - 06] Word generated by the Controller Inside card (can be accessed if the card has been inserted)
- [Config. active] CNFO, 1 or 2 (see page 254), can only be accessed if [Display value type] = [List]
- [Utilised param. set] SET1, 2 or 3 (see page 105), can only be accessed if [Display value type] = [List]

Select the parameter(s) using ENT (a ☒ then appears next to the parameter). Parameter(s) can also be deselected using ENT.

PARAMETER SELECTION	
MONITORING	
-----	✓

-----	✓

Examples include

Display of 2 digital values

RUN	Term	+35.00Hz	80A
Motor speed			
1250 rpm			
Motor current			
80 A			
Quick			

Display of 2 bar graphs

RUN	Term	+35.00Hz	80A
Min Motor speed max			
0	1250 rpm		1500
Min Motor current max			
0	80 A		150
Quick			

Display of a list of 5 values

RUN	Term	+35.00Hz	80A
MONITORING			
Frequency ref.	:	50.1 Hz	
Motor current	:	80 A	
Motor speed	:	1250 rpm	
Motor thermal state	:	80%	
Drv thermal state	:	80%	
Quick			

Name/Description

[6.3. COM. MAP CONFIG.]

☐ [Word 1 add. select.]

Select the address of the word to be displayed by pressing the <<, >> (F2 and F3) keys and rotating the navigation button.

☐ [Format word 1]

Format of word 1.

☐ [Hex]: Hexadecimal

☐ [Signed]: Decimal with sign

☐ [Unsigned]: Decimal without sign

☐ [Word 2 add. select.]

Select the address of the word to be displayed by pressing the <<, >> (F2 and F3) keys and rotating the navigation button.

☐ [Format word 2]

Format of word 2.

☐ [Hex]: Hexadecimal

☐ [Signed]: Decimal with sign

☐ [Unsigned]: Decimal without sign

☐ [Word 3 add. select.]

Select the address of the word to be displayed by pressing the <<, >> (F2 and F3) keys and rotating the navigation button.

☐ [Format word 3]

Format of word 3.

☐ [Hex]: Hexadecimal

☐ [Signed]: Decimal with sign

☐ [Unsigned]: Decimal without sign

☐ [Word 4 add. select.]

Select the address of the word to be displayed by pressing the <<, >> (F2 and F3) keys and rotating the navigation button.

☐ [Format word 4]

Format of word 4.

☐ [Hex]: Hexadecimal

☐ [Signed]: Decimal with sign

☐ [Unsigned]: Decimal without sign

It will then be possible to view the selected words in the [COMMUNICATION MAP] submenu of the [1.2 MONITORING] menu.
Example:

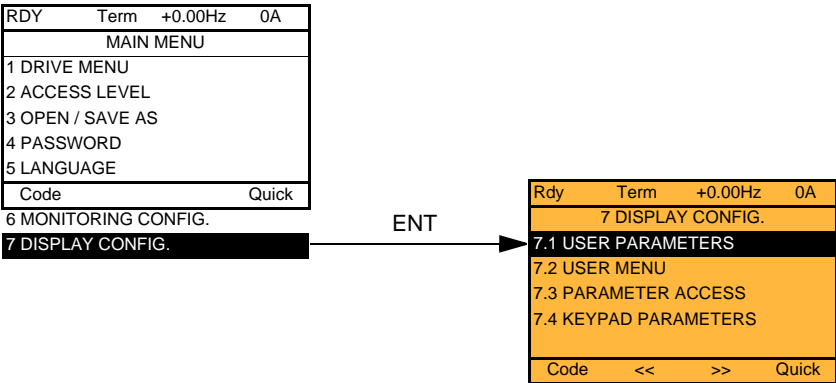
RUN	Term	+35.00Hz	80A
COMMUNICATION MAP			

W3141 : F230 Hex			

<<		>> Quick	

[7 DISPLAY CONFIG.]

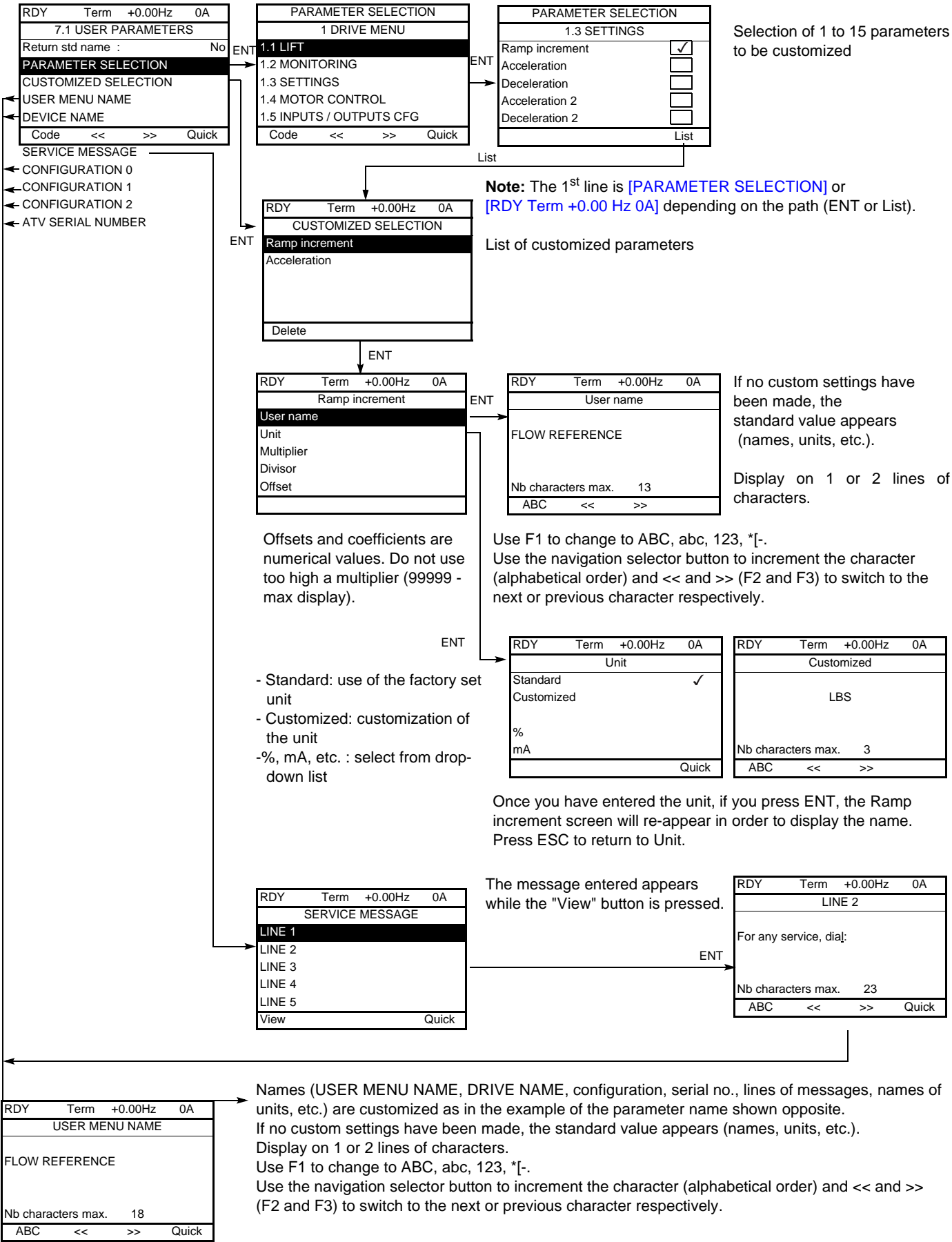
This menu can only be accessed with the graphic display terminal. It can be used to customize parameters or a menu and to access parameters.



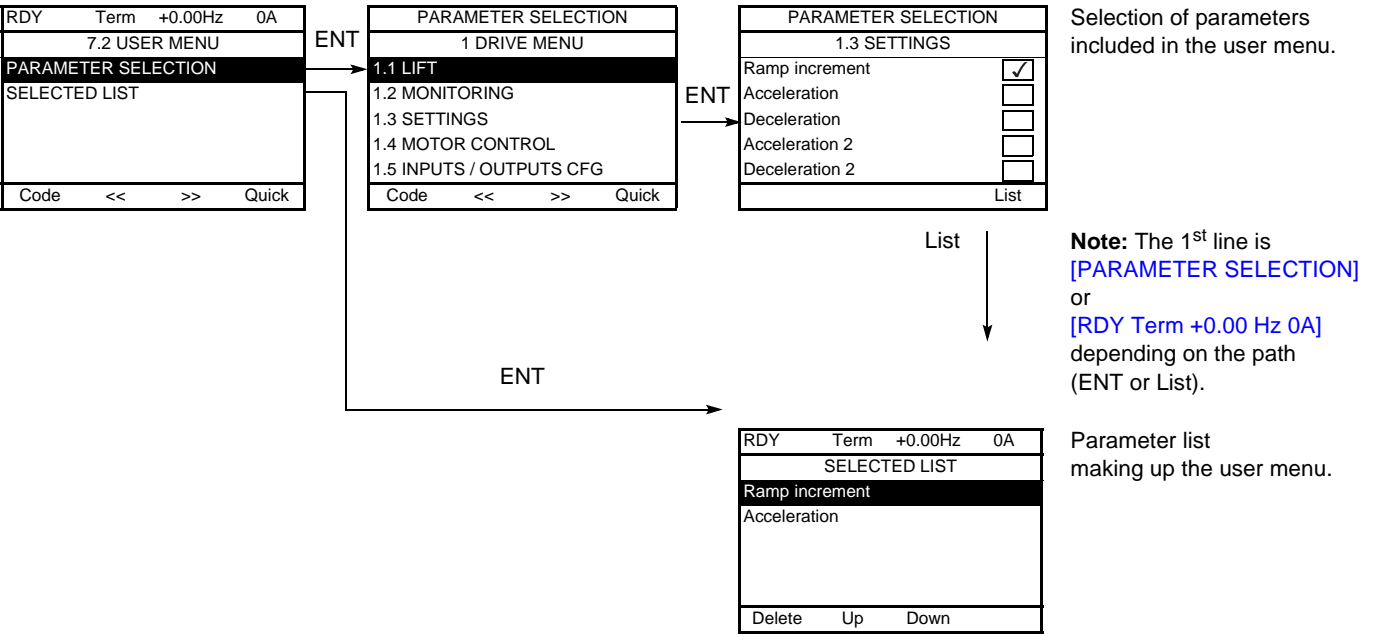
- 7.1 USER PARAMETERS: Customization of 1 to 15 parameters.
- 7.2 USER MENU: Creation of a customized menu.
- 7.3 PARAMETER ACCESS: Customization of the visibility and protection mechanisms of menus and parameters.
- 7.4 KEYPAD PARAMETERS: Adjustment of the contrast and stand-by mode of the graphic display terminal (parameters stored in the terminal rather than in the drive).

[7 DISPLAY CONFIG.]

If [Return std name] = [Yes] the display reverts to standard but the custom settings remain stored.



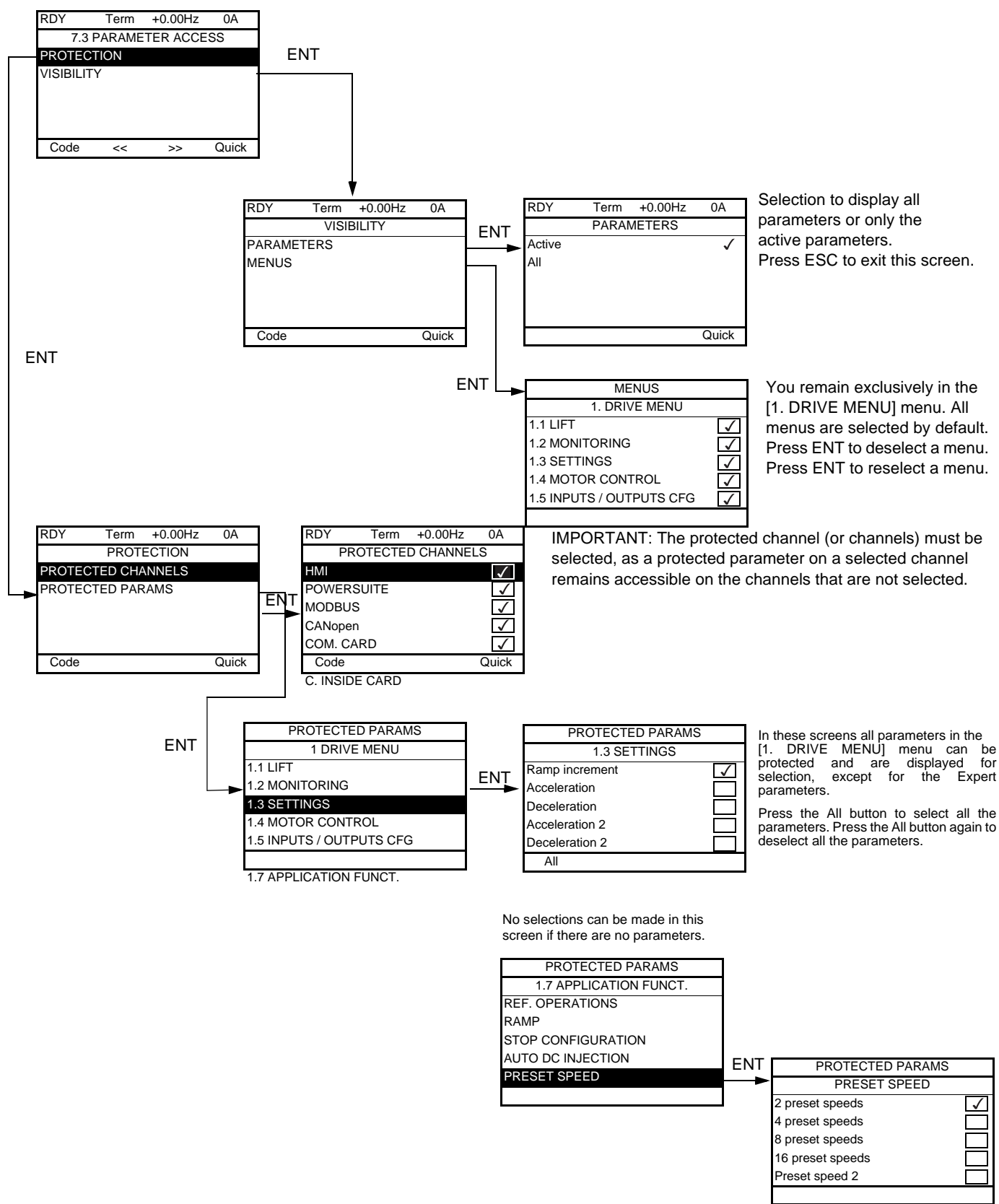
[7 DISPLAY CONFIG.]



Use the F2 and F3 keys to arrange the parameters in the list (example below using F3).

RDY	Term	+0.00Hz	0A
SELECTED LIST			
Acceleration			
Ramp increment			
Delete	Up	Down	

[7 DISPLAY CONFIG.]



Note: The protected parameters are no longer accessible and are not, therefore, displayed for the selected channels.

[7 DISPLAY CONFIG.]

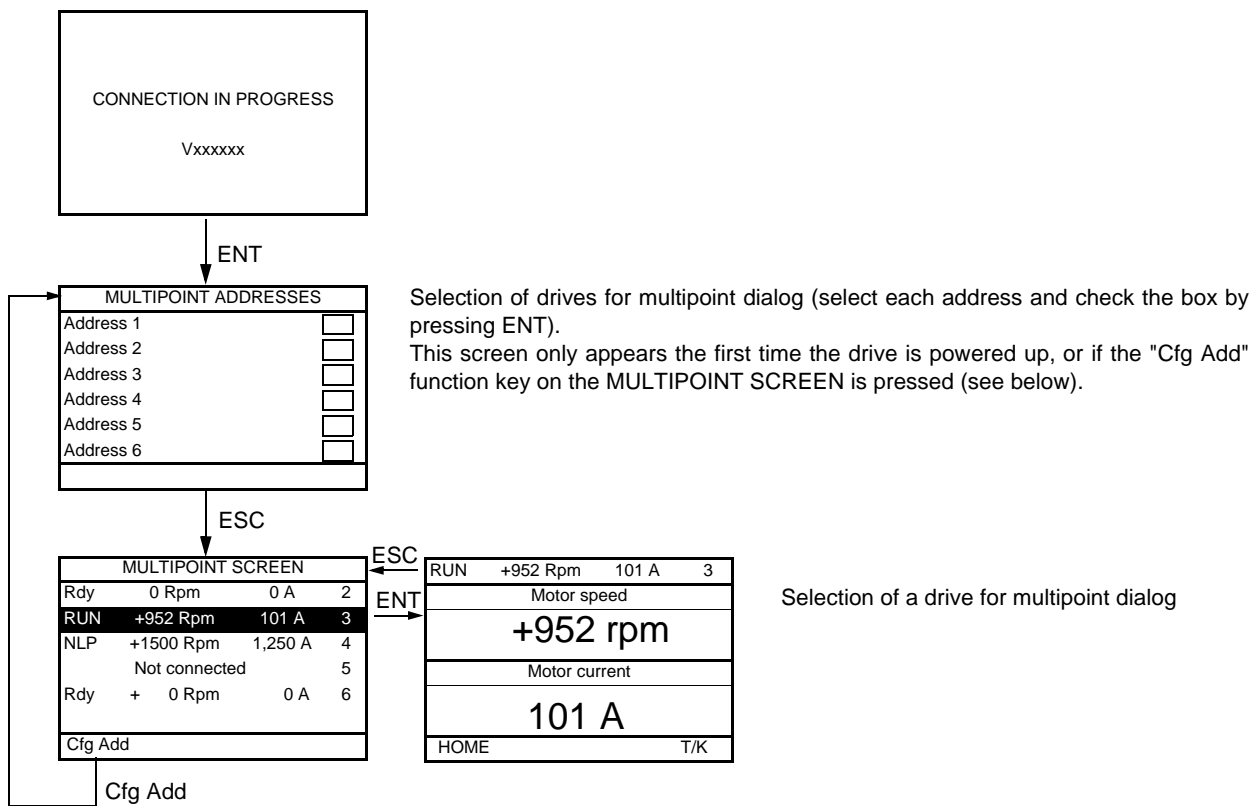
RDY	Term	+0.00Hz	0A
7.4 KEYPAD PARAMETERS			
Keypad contrast			
Keypad stand-by			
Code	<<	>>	Quick

Name/Description	Adjustment range	Factory setting
<input type="checkbox"/> [Keypad contrast] Adjustment of contrast on the graphic display unit.	0 to 100 %	50 %
<input type="checkbox"/> [Keypad stand-by] Configuration and adjustment of the graphic display unit's stand-by mode. <ul style="list-style-type: none"><input type="checkbox"/> [No]: No stand-by mode<input type="checkbox"/> [1] to [10]: Number of minutes during which the terminal is to remain idle before stand-by mode is triggered. After this idle time, the display backlight turns off and the contrast is reduced. The screen returns to normal operation when a key or the navigation button is pressed. It also returns to normal operation if the terminal exits the normal display mode, for example, if a fault occurs.		[5]

[MULTIPOINT SCREEN]

Communication is possible between a graphic display terminal and a number of drives connected on the same bus. The addresses of the drives must be configured in advance in the [1.9 COMMUNICATION] menu using the [Modbus Address] (Add) parameter, page 285.

When a number of drives are connected to the same display terminal, the terminal automatically displays the following screens:



In multipoint mode, the command channel is not displayed. From left to right, the state, then the 2 selected parameters and finally the drive address appear.

All menus can be accessed in multipoint mode. Only drive control via the graphic display terminal is not authorized, apart from the Stop key, which locks all the drives.
If there is a fault on a drive, this drive is displayed.

Maintenance

Servicing

The Altivar LIFT does not require any preventive maintenance. It is nevertheless advisable to perform the following regularly:

- Check the condition and tightness of the connections.
- Ensure that the temperature around the unit remains at an acceptable level and that ventilation is effective (average service life of fans: 3 to 5 years depending on the operating conditions).
- Remove any dust from the drive.

Assistance with maintenance, fault display

If a problem arises during setup or operation, first check that the recommendations relating to the environment, mounting and connections have been observed.

The first fault detected is saved and displayed, and the drive locks.

The drive switching to fault mode can be indicated remotely via a logic output or a relay, which can be configured in the [\[1.5 INPUTS / OUTPUTS CFG\] \(I-O-\)](#) menu, see, for example, [\[R1 CONFIGURATION\] \(r1-\)](#) page [182](#).

Menu [\[1.10 DIAGNOSTICS\]](#)

This menu can only be accessed with the graphic display terminal. It displays faults and their cause in plain text and can be used to carry out tests, see page [287](#).

Clearing the fault

Disconnect the drive power supply in the event of a non-resettable fault.

Wait for the display to disappear completely.

Find the cause of the fault in order to correct it.

The drive is unlocked after a fault:

- By turning off the drive until the display disappears completely, then turning it back on again
- Automatically in the scenarios described for the [\[AUTOMATIC RESTART\] \(Atr-\)](#) function, page [265](#)
- By means of a logic input or control bit assigned to the [\[FAULT RESET\] \(rSt-\)](#) function, page [264](#)
- By pressing the STOP/RESET button on the graphic display terminal

Menu [\[1.2 MONITORING\] \(SUP-\)](#):

This is used to prevent and find the causes of faults by displaying the drive state and its current values.

It can be accessed with the integrated display terminal.

Spares and repairs:

Consult Schneider Electric product support.

Faults - Causes - Remedies

Drive does not start, no fault displayed

- If the display does not light up, check the power supply to the drive.
- The assignment of the "Fast stop" or "Freewheel stop" functions will prevent the drive from starting if the corresponding logic inputs are not powered up. The ATV LIFT then displays [\[Freewheel\] \(nSt\)](#) in freewheel stop and [\[Fast stop\] \(FSt\)](#) in fast stop. This is normal since these functions are active at zero so that the drive will be stopped safely if there is a wire break.
- Make sure that the run command input or inputs are activated in accordance with the selected control mode ([\[2/3 wire control\] \(tCC\)](#) and [\[2 wire type\] \(tCt\)](#) [parameters](#), page [166](#)).
- If the reference channel or command channel is assigned to a communication bus, when the power supply is connected, the drive will display [\[Freewheel\] \(nSt\)](#) and remain in stop mode until the communication bus sends a command.
- When an encoder is used with a VW3 A3 409 card, if the encoder is not fully configured, the drive remains locked in stop mode (displays [\[NST\] \(nSt\)](#) or [\[NLP\] \(nLP\)](#)).

Faults, which cannot be reset automatically

The cause of the fault must be removed before resetting by turning off and then back on.

AnF, ASF, brF, ECF, EnF, SOF, SPF and tnF faults can also be reset remotely by means of a logic input or control bit ([\[Fault reset\] \(rSF\)](#) parameter, page [264](#)).

AnF, EnF, InFA, InFb, SOF, SPF, and tnF faults can be inhibited and cleared remotely by means of a logic input or control bit ([\[Fault inhibit assign.\] \(InH\)](#) [parameter](#), page [275](#)).

Fault	Name	Probable cause	Remedy
A I 2 F	[AI2 input]	<ul style="list-style-type: none"> • Non-conforming signal on analog input AI2 	<ul style="list-style-type: none"> • Check the wiring of analog input AI2 and the value of the signal.
A n F	[Load slipping]	<ul style="list-style-type: none"> • The encoder speed feedback does not match the reference 	<ul style="list-style-type: none"> • Check the motor, gain and stability parameters • Add a braking resistor • Check the size of the motor/drive/load. • Increase [Acceleration time] (ACt) and decrease [Lift leveling time] (LLt) • Check the encoder's mechanical coupling and its wiring. • If the "torque control" function is used, see "Note" on page 242.
A S F	[Angle Error]	<ul style="list-style-type: none"> • A modification has changed the phase-shift angle between the motor and the encoder. • The "Procedure for measuring the phase-shift angle between the motor and the encoder" page 150 has failed or has not been performed • In [Sync. mot. (SYn)] mode, inappropriate settings of the speed loop, when the speed reference switches to 0 	<ul style="list-style-type: none"> • See comments on page 150. • Repeat the "Procedure for measuring the phase-shift angle between the motor and the encoder" page 150. • Check the speed loop parameters
b D F	[DBR overload]	<ul style="list-style-type: none"> • The braking resistor is under excessive stress 	<ul style="list-style-type: none"> • Check the size of the resistor and wait for it to cool down • Check the [DB Resistor Power] (brP) and [DB Resistor value] (brU) parameters, page 280.
b r F	[Brake feedback]	<ul style="list-style-type: none"> • The brake feedback contact does not match the brake logic control • The brake does not stop the motor quickly enough (detected by measuring the speed on the "Pulse input"). 	<ul style="list-style-type: none"> • Check the feedback circuit and the brake logic control circuit. • Check the mechanical state of the brake. • Check the brake linings
C r F 1	[Precharge]	<ul style="list-style-type: none"> • Precharge relay control fault or damaged precharge resistor 	<ul style="list-style-type: none"> • Turn the drive off and then back on again. • Check the internal connections. • Inspect/repair the drive.
C r F 2	[Thyr. soft charge]	<ul style="list-style-type: none"> • DC bus charging fault (thyristors) 	
E C F	[Encoder coupling]	<ul style="list-style-type: none"> • Break in encoder's mechanical coupling 	<ul style="list-style-type: none"> • Check the encoder's mechanical coupling.

Faults - Causes - Remedies

Faults, which cannot be reset automatically (continued)

Fault	Name	Probable cause	Remedy
EEF1	[Control Eeprom]	<ul style="list-style-type: none"> Internal memory fault, control card 	<ul style="list-style-type: none"> Check the environment (electromagnetic compatibility). Turn off, reset, return to factory settings Inspect/repair the drive.
EEF2	[Power Eeprom]	<ul style="list-style-type: none"> Internal memory fault, power card 	
ENF	[Encoder]	<ul style="list-style-type: none"> Encoder feedback fault 	<ul style="list-style-type: none"> Check all the configuration parameters for the encoder used. Refer to the [1.10 DIAGNOSTICS] menu for the value of parameter RESE. Check that the encoder's mechanical and electrical operation, its power supply and connections are all correct. If necessary, reverse the direction of rotation of the motor ([Output Ph rotation] (PHr) parameter, page 138) or the encoder signals.
FCF1	[Out. contact. stuck]	<ul style="list-style-type: none"> The output contactor remains closed while open conditions are OK 	<ul style="list-style-type: none"> Check the contactor and its wiring. Check the feedback circuit.
HdF	[IGBT desaturation]	<ul style="list-style-type: none"> Short-circuit or grounding at the drive output 	<ul style="list-style-type: none"> Check the cables connecting the drive to the motor, and the motor insulation. Perform the diagnostic tests via the [1.10 DIAGNOSTICS] menu.
ILF	[internal com. link]	<ul style="list-style-type: none"> Communication fault between option card and drive 	<ul style="list-style-type: none"> Check the environment (electromagnetic compatibility) Check the connections. Check that no more than two option cards (max. permitted) have been installed on the drive Replace the option card Inspect/repair the drive.
INF1	[Rating error]	<ul style="list-style-type: none"> The power card is different from the card stored 	<ul style="list-style-type: none"> Check the power card's catalog number.
INF2	[Incompatible PB]	<ul style="list-style-type: none"> The power card is incompatible with the control card 	<ul style="list-style-type: none"> Check the power card's part number and compatibility.
INF3	[Internal serial link]	<ul style="list-style-type: none"> Communication fault between the internal cards 	<ul style="list-style-type: none"> Check the internal connections. Inspect/repair the drive.
INF4	[Internal-mftg zone]	<ul style="list-style-type: none"> Internal data inconsistent 	<ul style="list-style-type: none"> Recalibrate the drive (performed by Schneider Electric Product Support).
INF5	[Internal - fault option]	<ul style="list-style-type: none"> The option installed in the drive is not recognized 	<ul style="list-style-type: none"> Check the reference and compatibility of the option.
INF7	[Internal-hard init.]	<ul style="list-style-type: none"> Initialization of the drive is incomplete 	<ul style="list-style-type: none"> Remove and restore power to reset the fault.
INF8	[Internal-ctrl supply]	<ul style="list-style-type: none"> The control power supply is incorrect 	<ul style="list-style-type: none"> Check the control section power supply.
INF9	[Internal- I measure]	<ul style="list-style-type: none"> The current measurements are incorrect 	<ul style="list-style-type: none"> Replace the current sensors, or the power card. Inspect/repair the drive.
INFa	[Internal-mains circuit]	<ul style="list-style-type: none"> The input stage is not operating correctly 	<ul style="list-style-type: none"> Perform the diagnostic tests via the [1.10 DIAGNOSTICS] menu. Inspect/repair the drive.
INFb	[Internal-Th. sensor]	<ul style="list-style-type: none"> The drive temperature sensor is not operating correctly The braking unit's temperature sensor is not operating correctly 	<ul style="list-style-type: none"> Replace the drive temperature sensor Inspect/repair the drive. Replace the braking unit's temperature sensor Inspect/repair the braking unit
INFc	[Internal-time meas.]	<ul style="list-style-type: none"> Fault on the electronic time measurement component 	<ul style="list-style-type: none"> Inspect/repair the drive.
INF E	[internal- CPU]	<ul style="list-style-type: none"> Internal microprocessor fault 	<ul style="list-style-type: none"> Turn off and reset. Inspect/repair the drive

Faults - Causes - Remedies

Faults which cannot be reset automatically (continued)

Fault	Name	Probable cause	Remedy
O C F	[Overcurrent]	<ul style="list-style-type: none"> Parameters in the [SETTINGS] (SEt-) and [1.4 MOTOR CONTROL] (drC-) menus are not correct. Inertia or load too high Mechanical locking 	<ul style="list-style-type: none"> Check the parameters Check the size of the motor/drive/load. Check the state of the mechanism.
P r F	[Power removal]	<ul style="list-style-type: none"> Fault with the drive's "Power removal" safety function 	<ul style="list-style-type: none"> Inspect/repair the drive.
S C F 1	[Motor short circuit]	<ul style="list-style-type: none"> Short-circuit or grounding at the drive output Significant earth leakage current at the drive output if several motors are connected in parallel 	<ul style="list-style-type: none"> Check the cables connecting the drive to the motor, and the motor insulation. Perform the diagnostic tests via the [1.10 DIAGNOSTICS] menu. Reduce the switching frequency. Connect chokes in series with the motor. Check the speed loop and brake settings.
S C F 2	[Impedant sh. circuit]		
S C F 3	[Ground short circuit]		
S O F	[Overspeed]	<ul style="list-style-type: none"> Instability or driving load too high 	<ul style="list-style-type: none"> Check the motor, gain and stability parameters Add a braking resistor Check the size of the motor/drive/load. Check the parameter settings for the [FREQUENCY METER] (FqF-) function, page 279, if it is configured.
S P F	[Speed fdback loss]	<ul style="list-style-type: none"> Encoder feedback signal missing No Top Z signal after activation of the Top Z function and 2 rotations. No signal on "Pulse input", if the input is used for speed measurement 	<ul style="list-style-type: none"> Check the wiring between the encoder and the drive. Check the encoder. Check all the configuration parameters for the encoder used. Refer to the [1.10 DIAGNOSTICS] menu for the value of parameter RESE. Check the wiring of the input and the detector used
E n F	[Auto-tuning]	<ul style="list-style-type: none"> Special motor or motor whose power is not suitable for the drive Motor not connected to the drive 	<ul style="list-style-type: none"> Check that the motor/drive are compatible. Check that the motor is present during auto-tuning. If an output contactor is being used, close it during auto-tuning.

Faults - Causes - Remedies

Faults that can be reset with the automatic restart function, after the cause has disappeared

These faults can also be reset by turning on and off or by means of a logic input or control bit ([[Fault reset](#)] (rSF) parameter, page 264). APF, CnF, COF, EPF1, EPF2, FCF2, LFF2, LFF3, LFF4, ObF, OHF, OLF, OPF1, OPF2, OSF, OtF1, OtF2, OtFL, PHF, PtF1, PtF2, PtFL, SLF1, SLF2, SLF3, SrF, SSF and tJF faults can be inhibited and cleared remotely by means of a logic input or control bit ([[Fault inhibit assign](#)] (InH) parameter, page 275).

Fault	Name	Probable cause	Remedy
A P F	[Application fault]	<ul style="list-style-type: none"> Controller Inside card fault 	<ul style="list-style-type: none"> Please refer to the card documentation
b L F	[Brake control]	<ul style="list-style-type: none"> Brake release current not reached Brake engage frequency threshold [Brake engage freq] (bEn) only regulated when brake logic control is assigned 	<ul style="list-style-type: none"> Check the drive/motor connection. Check the motor windings. Check the [Brake release I FW] (lbr) and [Brake release I Rev] (lrd) settings, page 233 Apply the recommended settings for [Brake engage freq] (bEn).
C n F	[Com. network]	<ul style="list-style-type: none"> Communication fault on communication card 	<ul style="list-style-type: none"> Check the environment (electromagnetic compatibility) Check the wiring. Check the time-out. Replace the option card Inspect/repair the drive.
C D F	[CANopen com.]	<ul style="list-style-type: none"> Interruption in communication on the CANopen bus 	<ul style="list-style-type: none"> Check the communication bus. Check the time-out. Refer to the CANopen User's Manual.
E P F 1	[External flt-LI/Bit]	<ul style="list-style-type: none"> Fault triggered by an external device, depending on user 	<ul style="list-style-type: none"> Check the device which caused the fault, and reset.
E P F 2	[External fault com.]	<ul style="list-style-type: none"> Fault triggered by a communication network 	<ul style="list-style-type: none"> Check for the cause of the fault and reset.
F C F 2	[Out. contact. open.]	<ul style="list-style-type: none"> The output contactor remains open although the closing conditions have been met 	<ul style="list-style-type: none"> Check the contactor and its wiring. Check the feedback circuit.
L C F	[Input contactor]	<ul style="list-style-type: none"> The drive is not turned on even though [Mains V. time out] (LCt) has elapsed. 	<ul style="list-style-type: none"> Check the contactor and its wiring. Check the time-out. Check the AC supply/contactor/drive connection.
L F F 2 L F F 3 L F F 4	[AI2 4-20mA loss] [AI3 4-20mA loss] [AI4 4-20mA loss]	<ul style="list-style-type: none"> Loss of the 4-20 mA reference on analog input AI2, AI3 or AI4 	<ul style="list-style-type: none"> Check the connection on the analog inputs.
O b F	[Overbraking]	<ul style="list-style-type: none"> Braking too sudden or driving load 	<ul style="list-style-type: none"> Increase the deceleration time. Add a braking resistor if necessary. Activate the [Dec ramp adapt.] (brA) function, page 220, if it is compatible with the application.
O H F	[Drive overheat]	<ul style="list-style-type: none"> Drive temperature too high 	<ul style="list-style-type: none"> Check the motor load, the drive ventilation and the ambient temperature. Wait for the drive to cool down before restarting.
O L F	[Motor overload]	<ul style="list-style-type: none"> Triggered by excessive motor current 	<ul style="list-style-type: none"> Check the setting of the motor thermal protection, check the motor load. Wait for the drive to cool down before restarting.
O P F 1	[1 motor phase loss]	<ul style="list-style-type: none"> Loss of one phase at drive output 	<ul style="list-style-type: none"> Check the connections from the drive to the motor.

Faults - Causes - Remedies

Faults that can be reset with the automatic restart function, after the cause has disappeared (continued)

Fault	Name	Probable cause	Remedy
OPF2	[3 motor phase loss]	<ul style="list-style-type: none"> Motor not connected or motor power too low Output contactor open Instantaneous instability in the motor current 	<ul style="list-style-type: none"> Check the connections from the drive to the motor. If an output contactor is being used, parameterize [Output Phase Loss] (OPL) = [Output cut] (OAC), page 268. Test on a low power motor or without a motor: In factory settings mode, motor output phase loss detection is active [Output Phase Loss] (OPL) = [Yes] (YES). To check the drive in a test or maintenance environment, without having to use a motor with the same rating as the drive (in particular for high power drives), deactivate output phase loss detection [Output Phase Loss] (OPL) = [No] (nO). Check and optimize the following parameters: [IR compensation] (UFR), page 160, [Rated motor volt.] (UnS) and [Rated mot. current] (nCr), page 143, and perform [Auto tuning] (tUn), page 154
OSF	[Mains overvoltage]	<ul style="list-style-type: none"> Mains supply is too high Disturbed mains supply 	<ul style="list-style-type: none"> Check the line voltage.
OTF1	[PTC1 overheat]	<ul style="list-style-type: none"> Overheating of the PTC1 probes detected 	<ul style="list-style-type: none"> Check the motor load and motor size. Check the motor ventilation. Wait for the motor to cool before restarting. Check the type and state of the PTC probes.
OTF2	[PTC2 overheat]	<ul style="list-style-type: none"> Overheating of the PTC2 probes detected 	
OTFL	[LI6=PTC overheat]	<ul style="list-style-type: none"> Overheating of PTC probes detected on input LI6 	
PTF1	[PTC1 probe]	<ul style="list-style-type: none"> PTC1 probes open or short-circuited 	<ul style="list-style-type: none"> Check the PTC probes and the wiring between them and the motor/drive.
PTF2	[PTC2 probe]	<ul style="list-style-type: none"> PTC2 probes open or short-circuited 	
PTFL	[LI6=PTC probe]	<ul style="list-style-type: none"> PTC probes on input LI6 open or short-circuited 	
SCF4	[IGBT short circuit]	<ul style="list-style-type: none"> Power component fault 	<ul style="list-style-type: none"> Perform a test via the [1.10 DIAGNOSTICS] menu. Inspect/repair the drive.
SCF5	[Motor short circuit]	<ul style="list-style-type: none"> Short-circuit at drive output 	<ul style="list-style-type: none"> Check the cables connecting the drive to the motor and the motor insulation. Perform tests via the [1.10 DIAGNOSTICS] menu. Inspect/repair the drive.
SLF1	[Modbus com.]	<ul style="list-style-type: none"> Interruption in communication on the Modbus bus 	<ul style="list-style-type: none"> Check the communication bus. Check the time-out. Refer to the Modbus User's Manual.
SLF2	[PowerSuite com.]	<ul style="list-style-type: none"> Fault communicating with PowerSuite 	<ul style="list-style-type: none"> Check the PowerSuite connecting cable. Check the time-out.
SLF3	[HMI com.]	<ul style="list-style-type: none"> Fault communicating with the graphic display terminal 	<ul style="list-style-type: none"> Check the terminal connection. Check the time-out.
STF	[Torque time-out]	<ul style="list-style-type: none"> The time-out of the torque control function is attained 	<ul style="list-style-type: none"> Check the function's settings. Check the state of the mechanism.
SSF	[Torque/current lim]	<ul style="list-style-type: none"> Switch to torque limitation 	<ul style="list-style-type: none"> Check if there are any mechanical problems. Check the parameters of [TORQUE LIMITATION] (tLA-) page 244 and the parameters of the [TORQUE OR I LIM. DETECT.] (tId-) fault, page 277).
UJF	[IGBT overheat]	<ul style="list-style-type: none"> Drive overload 	<ul style="list-style-type: none"> Check the size of the load/motor/drive. Decrease the switching frequency. Wait for the motor to cool before restarting

Faults - Causes - Remedies

Faults that can be reset as soon as their causes disappear

The USF fault can be inhibited and cleared remotely by means of a logic input or control bit ([Fault inhibit assign.] (InH) parameter, page 275).

Fault	Name	Probable cause	Remedy
CFF	[Incorrect config.]	<ul style="list-style-type: none"> Option card changed or removed Control card replaced by a control card configured on a drive with a different rating The current configuration is inconsistent 	<ul style="list-style-type: none"> Check that there are no card errors. In the event of the option card being changed/removed deliberately, see the remarks below. Check that there are no card errors. In the event of the control card being changed deliberately, see the remarks below. Return to factory settings or retrieve the backup configuration, if it is valid (see page 293).
CFI	[Invalid config.]	<ul style="list-style-type: none"> Invalid configuration The configuration loaded in the drive via the bus or communication network is inconsistent. 	<ul style="list-style-type: none"> Check the configuration loaded previously. Load a compatible configuration.
DLF	[Dynamic load fault]	<ul style="list-style-type: none"> Abnormal load variation 	<ul style="list-style-type: none"> Check that the load is not blocked by an obstacle Removal of a run command causes a reset.
HCF	[Cards pairing]	<ul style="list-style-type: none"> The [CARDS PAIRING] (PPI-) function, page 281, has been configured and a drive card has been changed 	<ul style="list-style-type: none"> In the event of a card error, reinsert the original card. Confirm the configuration by entering the [Pairing password] (PPI) if the card was changed deliberately.
PHF	[Input phase loss]	<ul style="list-style-type: none"> Drive incorrectly supplied or a fuse blown Failure of one phase Three-phase ATV LIFT used on a single-phase line supply Unbalanced load <p>This protection only operates with the drive on load.</p>	<ul style="list-style-type: none"> Check the power connection and the fuses. Use a three-phase line supply. Disable the fault by setting [Input phase loss] (IPL) = [No] (nO). (page 268).
USF	[Undervoltage]	<ul style="list-style-type: none"> Line supply is too low Transient voltage dip 	<ul style="list-style-type: none"> Check the voltage and the parameters of [UNDERVOLTAGE MGT] (USb-), page 272.

Option card changed or removed

When an option card is removed or replaced by another, the drive locks in [Incorrect config.] (CFF) fault mode on power-up. If the card has been deliberately changed or removed, the fault can be cleared by pressing the ENT key twice, which **causes the factory settings to be restored** (see page 293) for the parameter groups affected by the card. These are as follows:

Card replaced by a card of the same type

- I/O cards: [Drive menu] (drM)
- Encoder cards: [Drive menu] (drM)
- Communication cards: Only the parameters that are specific to communication cards
- Controller Inside cards: [Control Inside menu] (PLC)

Card removed (or replaced by a different type of card)

- I/O card: [Drive menu] (drM)
- Encoder card: [Drive menu] (drM)
- Communication card: [Drive menu] (drM) and parameters specific to communication cards
- Controller Inside card: [Drive menu] (drM) and [Control. insid. menu] (PLC)

Control card changed

When a control card is replaced by a control card configured on a drive with a different rating, the drive locks in [Incorrect config.] (CFF) fault mode on power-up. If the card has been deliberately changed, the fault can be cleared by pressing the ENT key twice, which **causes all the factory settings to be restored**.

User settings tables

Functions assigned to I/O

Inputs Outputs	Functions assigned
LI1	
LI2	
LI3	
LI4	
LI5	
LI6	
LI7	
LI8	
LI9	
LI10	
LI11	
LI12	
LI13	
LI14	

Inputs Outputs	Functions assigned
LO1	
LO2	
LO3	
LO4	
AI1	
AI2	
AI3	
AI4	
R1	
R2	
R3	
R4	
R5	
RP	
Encoder	

User settings tables

Other parameters (table to be created by the user)

[illegible][illegible]

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[RAMP]	217
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A C 0	56										
A C 6	59										
A d C							223				
A d C 0									285		
A d d									285		
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A 1 1 E					171						
A 1 1 F					171						
A 1 1 S					171						
A 1 1 L					171						
A 1 2 A		122			172						
A 1 2 E					172						
A 1 2 F					172						
A 1 2 L					172						
A 1 2 S					172						
A 1 2 L					172						
A 1 3 A		122			173						
A 1 3 E					173						
A 1 3 F					173						
A 1 3 L					173						
A 1 3 S					173						
A 1 3 L					173						
A 1 4 A		122			174						
A 1 4 E					174						
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b O D	67			160							
b P P						208					
b r A							220				
b r H D							236				
b r H I							236				
b r H 2							237				
b r H 3							237				
b r H 4							237				
b r D								280			
b r P								280			
b r r							237				
b r 5 -	87										
b r t	87		133				234				
b r U								280			
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d b n							<u>242</u>				
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F F r	47, 82				181						
F F L			135				221				
F F U	82			157							
F L G	81		126	156							
F L O									286		
F L O C									286		
F L O L									286		
F L U			130	153							
F n 1						208					
F n 2						208					
F n 3						208					
F n 4						208					
F L d -	100										
F L d	100		135								
F F L			135								
F 9 A								279			
F 9 C								279			
F 9 F								279			
F 9 L			135								
F 9 S		121. 123									
F 9 L								279			
F r 1	37					205					
F r 1 b							215				
F r 2						206					
F r E S	45				179						
F r H		121. 123									
F r S	50		143								
F r S S				149							
F r L	63						219				
F r Y -										293	
F S L							221				
F L d			135								
G F S										293	
G I E			127	159							

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G P E			127	159							
H F F -	99						258				
H L S	99						258				
H S P			126								
I b r	87		133				233				
I b r A	93						239				
I d A	65			147							
I d C			127				222	282			
I d C 2			127				222	282			
I d M	65			146							
I n H								275			
I n P -	34										
I n r	62		125				217				
I n S P				143							
I n t P							244				
I P H S	66			148							
I P L								268			
I r d			133				233				
I S P	96						257				
I S P S	40										
I S r F	96						257				
I t H	52		126								
J A P L	81										
J A r 1	61										
J A r 2	61										
J A r 3	61										
J A r 4	61										
J A r 5	61										
J A r 6	61										
J C A L	81										
J d C			134				235				
J n O t	81										
L I A to L I 4 A		122			167						
L I d to L I 4 d					167						
L A F							228				
L A r							228				

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L R S							228				
L b R				162							
L b C			135	162							
L b C 1				164							
L b C 2				164							
L b C 3				164							
L b F				164							
L C 2							246				
L C R	56										
L C O -	34										
L C r		121. 123									
L C t							248				
L d R -	55										
L d n S	66										
L d S	66			148							
L E S							248				
L E t								271			
L F R	65			147							
L F F								282			
L F L 2 L F L 3 L F L 4								274			
L F n	65			146							
L F n -	96										
L I O -	34										
L I S 1		122									
L I S 2		122									
L L C							248				
L L S	60										
L L S L	110										
L L S S	40										
L L t	60										
L n O -	110										
L O 1					186						
L O 1 d					186						
L O 1 H					186						

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L D 1 S					186						
L D 2					186						
L D 2 d					186						
L D 2 H					186						
L D 2 S					186						
L D 3					187						
L D 3 d					187						
L D 3 H					187						
L D 3 S					187						
L D 4					187						
L D 4 d					187						
L D 4 H					187						
L D 4 S					187						
L F n -	96										
L O P -	65										
L P 1	93						239				
L P 2	93						239				
L 9 n S	66										
L 9 S	66			148							
L S n	36										
L S P			126								
L t S	59										
L t S S	40										
n A 2							216				
n A 3							216				
n C O -	65										
n F r		121 , 123	132								
n n F		121 , 123									
n O t -	51										
n C A 1									284		
n C A 2									284		
n C A 3									284		
n C A 4									284		
n C A 5									284		
n C A 6									284		

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n C A 1									284		
n C A B									284		
n C r	50		143								
n C r 5	51			148							
n P A 1									284		
n P A 2									284		
n P A 3									284		
n P A 4									284		
n P A 5									284		
n P A 6									284		
n P A 7									284		
n P A B									284		
n O t	110	121, 123									
n P r	50		143								
n r d	106			160							
n S L				146							
n S P	50		143								
n S P 5	51			148							
n S t	34						221				
o D 2		121, 123									
o D 3		121, 123									
o D 4		121, 123									
o D 5		121, 123									
o D 6		121, 123									
O C C	41, 98						250				
O d t	102							268			
O F I				139							
O H L								269			
O L L								267			
O P L	102							268			
O P r		121, 123									

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D U E -	41										
P E S	37, 93						239				
P F I					176						
P F r					176						
P G R	44				179						
P G I	44			179	179						
P H S	66			148							
P H r				138							
P I R					176						
P I L					176						
P P I								281			
P P n				146							
P P n S	51			148							
P S 1 -	105						253				
P S 2 -	105						253				
P S 3 -	105						253				
P S 2	108						225				
P S 4	108						225				
P S B	108						225				
P S 16	108						225				
P S t						205					
P t C 1								263			
P t C 2								263			
P t C L								263			
P t H		121, 123									
r 1	42				182						
r 1 d					183						
r 1 H					183						
r 1 S					183						
r 2	43				183						
r 2 d					183						
r 2 H					183						
r 2 S					183						
r 3					184						
r 3 d					184						

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r 3 H					184						
r 3 S					184						
r 4					184						
r 4 d					184						
r 4 H					184						
r 4 S					184						
r 5					185						
r 5 d					185						
r 5 S					185						
r 5 H					185						
r A P				159							
r b n	89						238				
r b C	89						238				
r b d	89						238				
r C A	36, 98						250				
r C b							215				
r E q P	49			149							
r E t P	49			149							
r F C						206					
r F r		121, 123									
r F t -	97						258				
r F t	36, 97						258				
r I n						205					
r D P -	61										
r P								264			
r P A								264			
r P P n	45				179						
r P S	63						219				
r P t	62						217				
r r S	34				166						
r S A	65			147							
r S A S	66			148							
r S F								264			
r S n	65			146							
r S n S	66			149							

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r S P	97						258				
r S U	97						258				
r t H		121. 123									
r t O							242				
S R 2							216				
S R 3							216				
S R t	101							270			
S C S I										293	
S d C I			128				223. 234				
S d C 2			128				223				
S d d								277			
S F C	82		126	156							
S F r	106		129	139							
S L L								276			
S L P	67		127	145							
S O P				161							
S P 2	109		131				226				
S P 3	109		131				226				
S P 4	109		131				226				
S P 5	109		131				226				
S P 6	109		131				226				
S P 7	109		131				226				
S P 8	109		131				226				
S P 9	109		131				226				
S P 10	109		131				226				
S P 11	109		131				226				
S P 12	109		131				226				
S P 13	109		131				226				
S P 14	109		131				226				
S P 15	109		132				226				
S P 16	109		132				226				
S P d		121. 123									
S P L -	81										
S P 5	105						253				

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SPSA	40										
SPSB	40										
SPt							242				
SSb								277			
SSCd	46				181						
SSCP	45				180						
SSFS	46				180						
StA -	87										
StA	81		126	156							
StL	59										
StN								272			
StO -	94										
StO								277			
StP								272			
StPS	40										
Strt								273			
Stt							221				
SUL				161							
tA1	63		125				218				
tA2	63		125				218				
tA3	63		125				218				
tA4	63		126				218				
tAA							244				
tAC		121. 123									
tAr								265			
tBE	94		133				234				
tbr									285		
tbr2									285		
tB5								272			
tCC					166						
tCt					166						
tcl			127				222	282			
tcl			127				222	282			
tcl1			128				223				
tcl2			128				224				

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t d S								279			
t F D									285		
t F D 2									285		
t F r			138								
t H A	101							269. 270			
t H d		121. 123									
t H r		121. 123									
t H t								267			
t L A							244				
t L C							245				
t L I G			134				244				
t L I n			134				244				
t L S			130								
t n L								280			
t O b							242				
t O S t							260				
t 9 b								279			
t 9 S	51										
t r I							241				
t r A	65			147							
t r n	65			146							
t r P							241				
t r r		121. 123									
t r t							241				
t S d							241				
t S n								272			
t S S							241				
t S t							241				
t t d	101		135					267. 270			
t t d 2	101							267. 270			
t t d 3	101							267. 270			

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t t H			134								
t t L			134								
t t O								285			
t t r			134				235				
t U L				154			154				
t U n	53			154							
t U S	65			155							
U O				144							
U 1				144							
U 2				144							
U 3				144							
U 4				144							
U 5				144							
U b r				162							
U C 2				145							
U C P				145							
U E C P	45				180						
U E C U	45				180						
U E L C	45				180						
U F r			127	160							
U I H 1					171						
U I H 2					172						
U I H 4					174						
U I L 1					171						
U I L 2					172						
U I L 4					174						
U L n		121 , 123									
U L r											299
U n 5	50		143								
U O H 1					191						
U O H 2					193						
U O H 3					194						
U O L 1					191						
U O L 2					193						
U O L 3					194						

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UDP		<u>121</u> <u>123</u>									
UPL								<u>272</u>			
U r E S								<u>272</u>			
U S b								<u>272</u>			
U S L								<u>272</u>			
U S t								<u>272</u>			

