

TJ

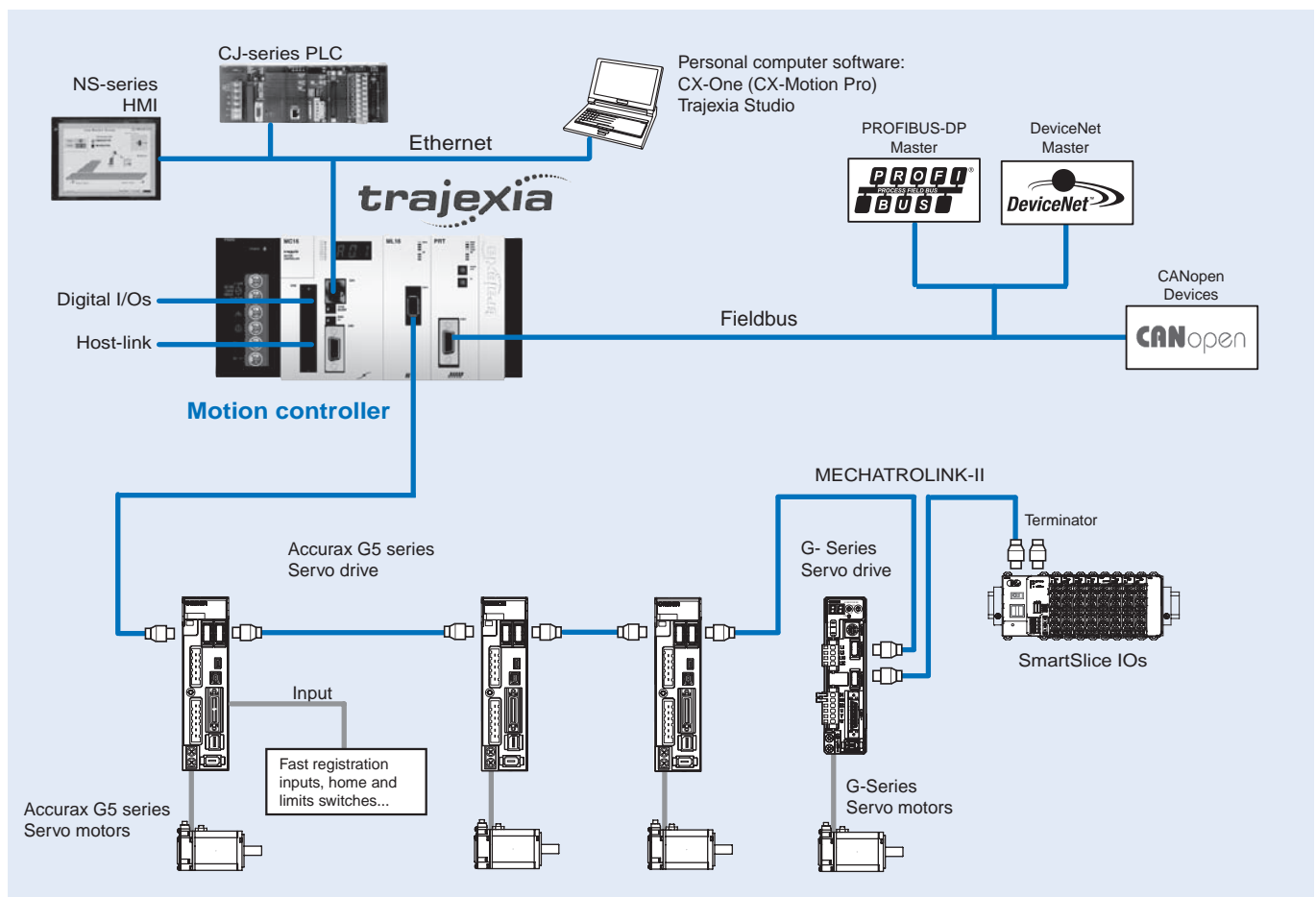
# Trajexia motion controller

## Stand-alone advanced motion controller over MECHATROLINK-II motion bus

- Control of up to 64 axes over a robust and fast motion bus
- Supports position, speed and torque control
- Advanced motion control such as CAM control, registration control, interpolation and axes synchronization via simple motion commands
- Advanced debugging tools including data trace and oscilloscope functions
- Control of servos, inverters and I/Os over a single motion network
- Multi-tasking controller capable of running up to 22 tasks simultaneously
- Open communication: Serial Ethernet built-in, PROFIBUS-DP, DeviceNet and CANopen



## System configuration



## Specifications

### Trajexia general specifications

Item	Details
Model	TJ□
Ambient operating temperature	0 to 55°C
Ambient operating humidity	10 to 90%RH
Ambient storage temperature	-20 to 70°C
Ambient storage humidity	90% max. (with no condensation)
Atmosphere	No corrosive gases
Vibration resistance	10 to 57 Hz: (0.075 mm amplitude), 57 to 100 Hz Acceleration: 9.8 m/s <sup>2</sup> , in X, Y and Z directions for 80 minutes.
Shock resistance	143 m/s <sup>2</sup> , 3 times each X, Y and Z directions.
Insulation resistance	20 MOhm
Dielectric strength	500 Volt
Protective structure	IP20
International standards	CE, EN 61131-2, cULus, Lloyds, RoHS compliant

### Trajexia motion control units

Item		Details		
Model		TJ2-MC64	TJ1-MC16	TJ1-MC04
Number of axes		64	16	4 (+1 using TJ1-FL02 unit)
Number of inverters and I/O modules		Up to 64 (Inverters in position, speed or torque mode)	8 maximum (Inverters in position, speed or torque mode)	
Number of MECHATROLINK-II master units		Up to 4 MECHATROLINK-II master units (see below TJ1-ML16/ML04) can be connected		
Cycle time		Selectable 0.25 ms, 0.5 ms, 1 ms or 2 ms	Selectable 0.5 ms, 1 ms or 2 ms	
Programming language		BASIC-like motion language		
Multi-tasking		Up to 22 tasks running simultaneously	Up to 14 tasks running simultaneously	
Built-in digital I/O		16 inputs and 8 outputs, for general purpose		
Measurement units		User definable		
Available memory for user programs		8 MB	500 KB	
Data storage capacity		Up to 32 MB Flash data storage	Up to 2 MB Flash data storage	
Saving program data, motion controller		Flash-ROM	SRAM with battery backup and Flash-ROM	
Saving program data, personal computer		Via CX-Motion Pro/Trajexia Studio software		
Communication ports		1 Ethernet port and 2 serial ports		
Firmware update		Via CX-Motion Pro/Trajexia Studio software		
Ethernet port	Electrical characteristics		Conform to IEEE 802.3 (100BaseT)	
	Connector		RJ45 Ethernet connector	
	Transmission protocol		Modbus TCP slave	
Serial port	Electrical characteristics		Conform 1 port to RS232C and 1 port to RS485/RS422A (selectable by switch)	
	Connector		SUB-D9 connector (Counterpart included in the package)	
	Synchronization		Start-stop synchronization (asynchronous)	
	Baud rate		1200 / 2400 / 4800 / 9600 / 19200 / 38400 bps	
	Transmission format		Databit length	7 or 8 bit
			Stop bit	1 or 2 bit
			Parity bit	Even/Odd/None
	Transmission mode		Point-to-multipoint (1:N)	
	Transmission protocol	RS-232C (1:1)	Host Link master protocol, Host Link slave protocol, ASCII general-purpose, Modbus TCP slave	
		RS-485 (1:N) RS-422A (1:N)	Host Link master protocol, Host Link slave protocol, ASCII general-purpose, Modbus TCP slave	
	Galvanic isolation		RS422A port	
	Communication buffers		254 bytes	
	Flow control		None	
	Terminator		Yes, selectable by switch	
	Cable length		15 m for RS232 and 500 meter for RS422/485	

### Trajexia MECHATROLINK-II master units

Item	Specifications
Model	TJ1-ML16 TJ1-ML04
Controlled devices with MECHATROLINK-II interface	Accurax G5 and G-Series servo drives ML-II built-in and SmartSlice IOs
Electrical characteristics	Conforms to MECHATROLINK standard
Communication ports	1 MECHATROLINK-II master
Transmission speed	10 Mbps
Communication cycle	0.5 ms, 1 ms or 2 ms
Stations slave types	Axes or servo drives
	Frequency inverters
	I/O modules

Item	Specifications	
Number of stations per master / Cycle time	Max. 16 Stations/2 ms	Max. 4 Stations/2 ms
	Max. 8 Stations/1 ms	Max. 4 Stations/1 ms
Transmission distance	Max. 50 meters without using repeater	

### Trajexia PROFIBUS slave unit

Items	Specifications
Model	TJ1-PRT
PROFIBUS standard	Conforms to PROFIBUS-DP standard EN50170 (DP-V0)
Communication ports	1 PROFIBUS-DP slave
Transmission speed	9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000 and 12000 kbps
Node numbers	0 to 99
I/O size	0 to 122 words (16 bit), configurable, for both directions
Galvanic isolation	Yes

### Trajexia DeviceNet slave unit

Items	Specifications
Model	TJ1-DRT
PROFIBUS standard	Conforms to DeviceNet standard of CIP edition 1
Communication ports	1 DeviceNet slave
Transmission speed	125, 250 and 500 Kbps, auto-detect
Node numbers	0 to 63
I/O size	0 to 32 words (16 bit), configurable, for both directions
Galvanic isolation	Yes

### Trajexia CANopen unit

Items	Specifications
Model	TJ1-CORT
Electrical Characteristics	Conforms to CAN 2.0 B
Communication ports	1 CANopen
Transmission speed	20, 50, 125 and 500 Kbps
Implemented CiA Standards	DS301, DS302
PDO Support	8 TPDO and 8 RPDO
PDO Mapping	Each PDO can be mapped into TJ1-MC16/04 VR, table, analogue and digital IO. BASIC commands assign mapping and start address <sup>*1</sup>
CANopen slave configuration	Any SDO message can be sent using BASIC during start-up and operation
CANopen network states	CANopen network can be set to pre-operational and operational using BASIC
CANopen slave emergencies	Available using BASIC command
Galvanic isolation	Yes

\*1. TJ2-MC64 and TJ1-MC16/04 CPUs support a total of 256 digital IO points and 36 analogue IO points.

### Trajexia flexible axis unit

Items		Specifications
Model		TJ1-FL02
Number of axes		2. Every axis has 1 analog output, 1 encoder in/out -software configurable - and several digital I/O
Control methods (independent per axis)		±10 V analogue output + encoder input (closed loop) Line driver AB output Stepper pulse output in closed loop or pulse train output in open loop
Encoder	Encoder protocols	Abs SSI 200 kHz, Abs EnDat 1 MHz, Abs Tamagawa and Incremental Line driver AB
	Encoder Input maximum frequency	6 MHz
	Encoder/pulse output max. frequency	2 MHz
Auxiliary I/Os		2 fast registration inputs, 2 definable inputs, 2 enable output, 4 position switch outputs or axes reset
Galvanic isolation		Yes

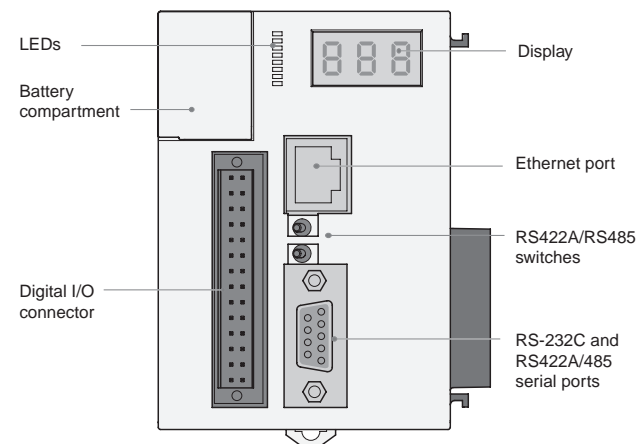
### SmartSlice MECHATROLINK-II interface unit

Item	Specifications
Model	GRT1-ML2
Electrical characteristics	Conform to MECHATROLINK standard
Communication cycle	0.5, 1 or 2 ms
Power supply	24 VDC
Number of connectable Slices	Up to 64 slices with a maximum amount of 128 bytes <sup>*1</sup>
IO mapping	Automatic analogue and digital IO mapping into TJ1-MC16/04 CPU
Slice unit configuration	Not supported
Supported slice units	See ordering information section

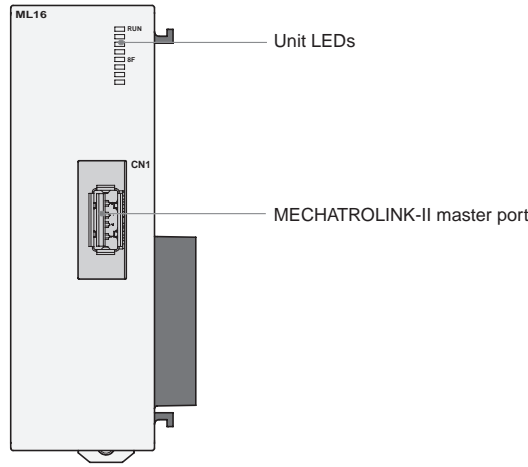
\*1. TJ2-MC64 and TJ1-MC16/04 CPUs support a total of 256 digital IO points and 36 analogue IO points.

Nomenclature

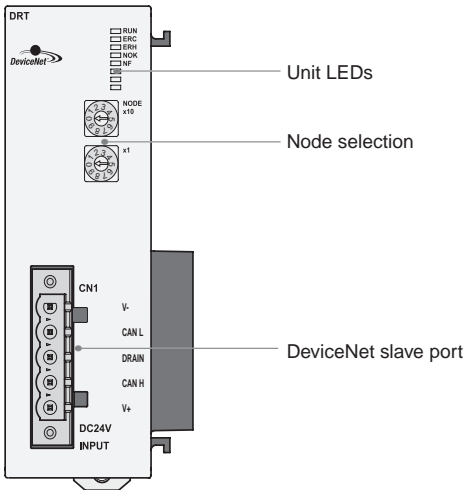
Trajexia motion controller unit - TJ2-MC64, TJ1MC-16/04



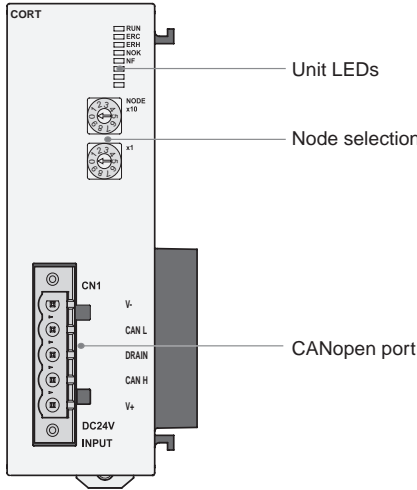
Trajexia MECHATROLINK-II master unit - TJ1-ML16/04



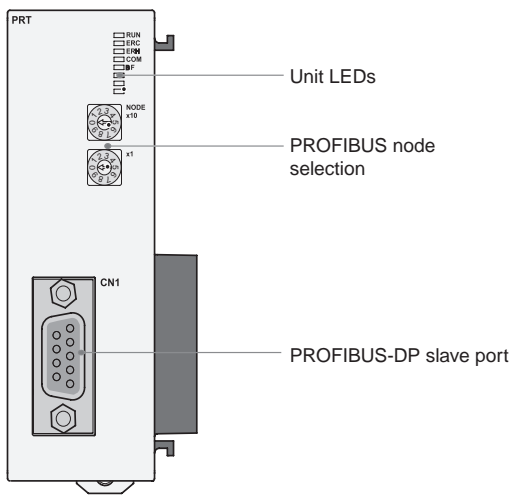
Trajexia DeviceNet slave unit - TJ1-DRT



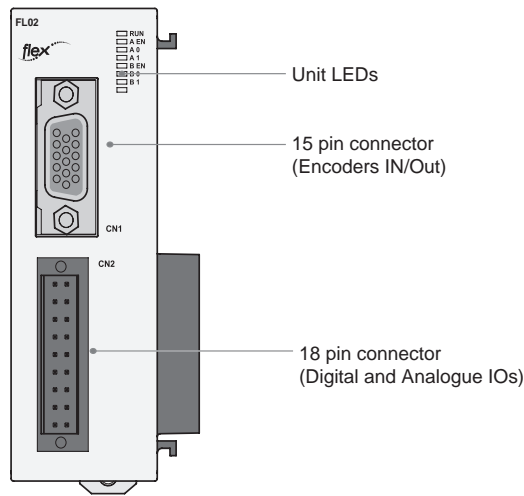
Trajexia CANopen unit - TJ1-CORT



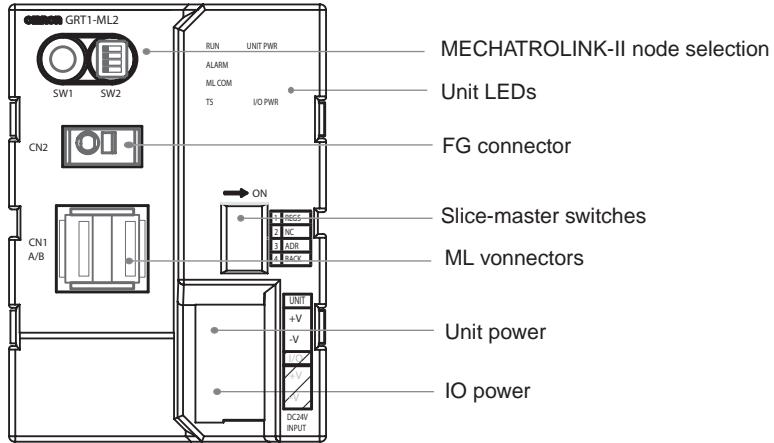
Trajexia PROFIBUS-DP unit - TJ1-PRT



Trajexia Flex axis unit - TJ1-FL02



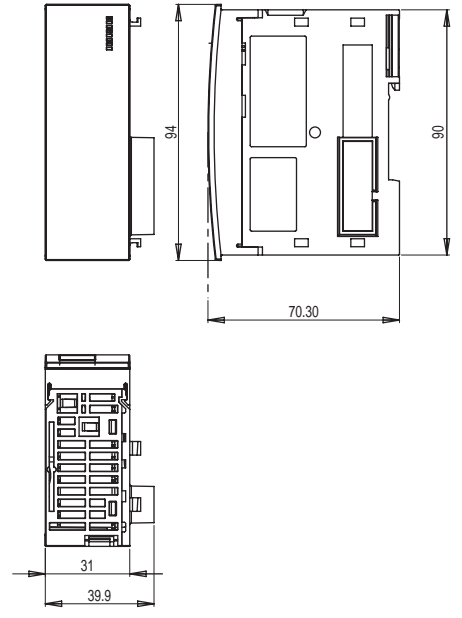
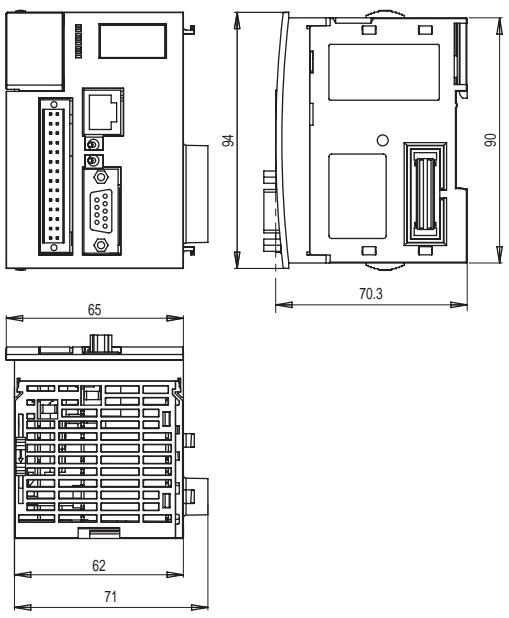
SmartSlice MECHATROLINK-II interface unit - GRT1-ML2



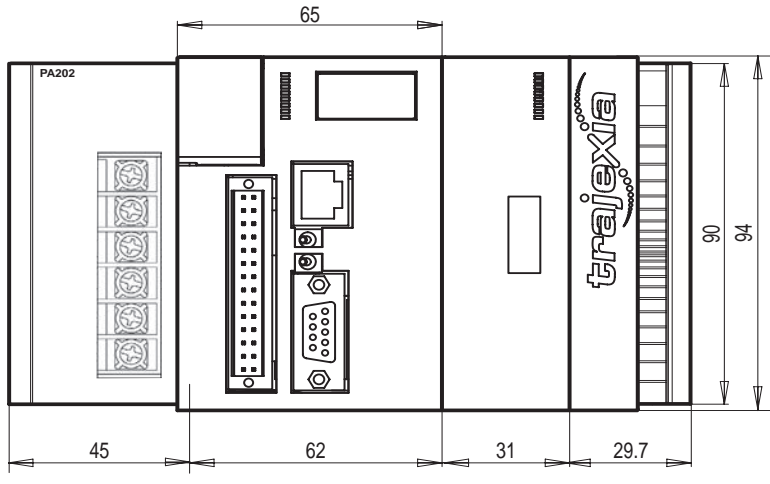
Dimensions

Trajexia motion controller - TJ2-MC64, TJ1-MC16/04

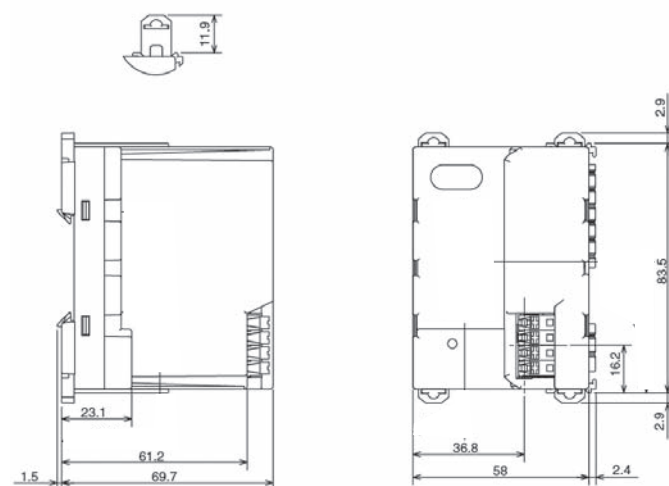
Trajexia modules - TJ1-ML16/04, -PRT, -DRT, -CORT, -FL02



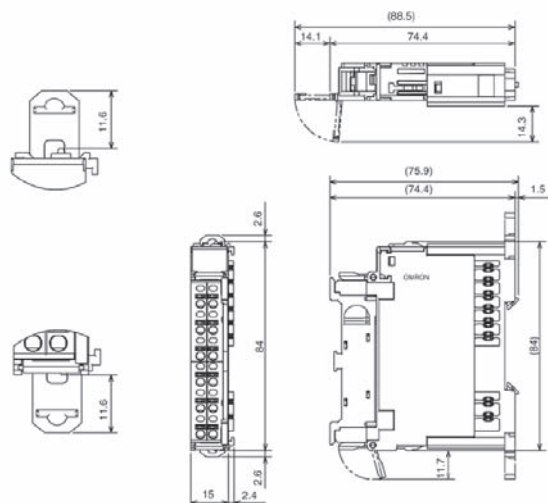
Trajexia system - CJ1W-PA202 + TJ1-MC16 + one module + TJ1-TER



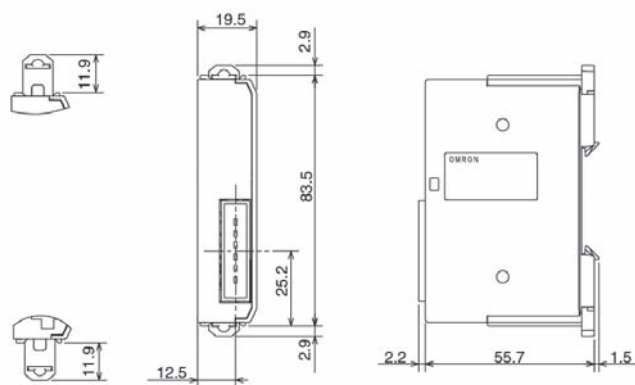
SmartSlice communication unit - GRT1-ML2



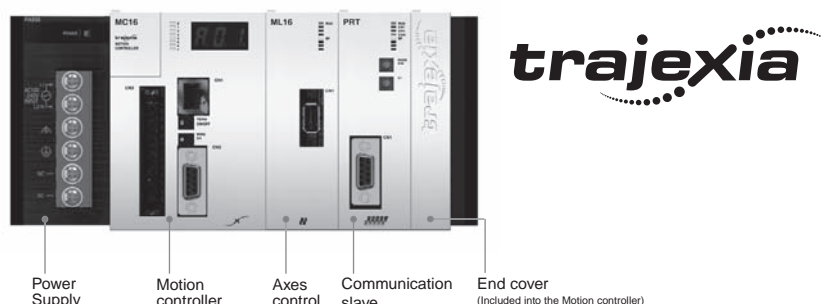
SmartSlice I/O units - GRT1-\_



SmartSlice end unit - GRT1-END



## Ordering information



## Trajexia motion controller

Name	Model
Trajexia motion controller unit, up to 4 axes. (Trajexia end cover unit TJ1-TER is included)	TJ1-MC04
Trajexia motion controller unit, up to 16 axes. (Trajexia end cover unit TJ1-TER is included)	TJ1-MC16
Trajexia motion controller Unit, up to 64 axes. (Trajexia end cover unit TJ1-TER is included)	TJ2-MC64
Power supply for Trajexia system, 100-240 VAC	CJ1W-PA202
Power supply for Trajexia system, 24 VDC	CJ1W-PD022

## Trajexia - axes control modules

Name	Model
Trajexia MECHATROLINK-II master unit (up to 4 stations)	TJ1-ML04
Trajexia MECHATROLINK-II master unit (up to 16 stations)	TJ1-ML16
Trajexia flexible axis unit (for 2 axes)	TJ1-FL02

**Note:** The TJ1-ML04 and TJ1-ML16 supported by the TJ2-MC64 motion controller are V2 (Version 2) and lot number equal or above Lot No.091019 (YYMMDD).

## Trajexia - communication modules

Name	Model
Trajexia DevicNet slave unit	TJ1-DRT
Trajexia PROFIBUS-DP slave unit	TJ1-PRT
Trajexia CANopen unit	TJ1-CORT

## MECHATROLINK-II - related devices

## Servo system &amp; frequency inverters

Name	Model
Accurax G5 servo drive ML-II built-in	R88D-KN□□□-ML2
G-Series servo drive ML-II built-in	R88D-GN□□□H-ML2

**Note:** Refer to servo systems section for detailed specs and ordering information

## SmartSlice IOs system

Function	Specification	Model
SmartSlice Interface unit	SmartSlice MECHATROLINK-II interface unit	GRT1-ML2
End plate, one unit required per bus interface		GRT1-END
4 NPN inputs	24 VDC, 6 mA, 3-wire connection	GRT1-ID4
4 PNP inputs	24 VDC, 6 mA, 3-wire connection	GRT1-ID4-1
8 NPN inputs	24 VDC, 4 mA, 1-wire connection + 4xG	GRT1-ID8
8 PNP inputs	24 VDC, 4 mA, 1-wire connection + 4xV	GRT1-ID8-1
4 NPN outputs	24 VDC, 500 mA, 2-wire connection	GRT1-OD4
4 PNP outputs	24 VDC, 500 mA, 2-wire connection	GRT1-OD4-1
4 PNP outputs with short-circuit protection	24 VDC, 500 mA, 3-wire connection	GRT1-OD4G-1
8 NPN outputs	24 VDC, 500 mA, 1-wire connection + 4xV	GRT1-OD8
8 PNP outputs	24 VDC, 500 mA, 1-wire connection + 4xG	GRT1-OD8-1
8 PNP outputs with short-circuit protection	24 VDC, 500 mA, 1-wire connection + 4xG	GRT1-OD8G-1
2 relay outputs	240 VAC, 2 A, normally-open contacts	GRT1-ROS2
2 analogue inputs, current/voltage	±10 V, 0-10 V, 0-5 V, 1-5 V, 0-20 mA, 4-20 mA	GRT1-AD2
2 analogue outputs, voltage	± 10 V, 0-10 V, 0-5 V, 1-5 V	GRT1-DA2V
2 analogue outputs, current	0-20 mA, 4-20 mA	GRT1-DA2C

**Note:** Refer to Automation systems catalogue for detailed specs and accessories information

## MECHATROLINK-II cables

Name	Remarks	Model
MECHATROLINK-II cables	0.5 meter	JEPMC-W6003-A5
	1 meter	JEPMC-W6003-01
	3 meters	JEPMC-W6003-03
	5 meters	JEPMC-W6003-05
	10 meters	JEPMC-W6003-10
	20 meters	JEPMC-W6003-20
	30 meters	JEPMC-W6003-30
MECHATROLINK-II terminator	Terminating resistor	JEPMC-W6022
MECHATROLINK-II repeater	Network repeater	JEPMC-REP2000

## Computer software

Specifications	Model
CX-Motion Pro V1.22 or higher	CX-One
Trajexia Studio <sup>*1</sup> V1.22 or higher	TJ1-Studio

\*1. When the Trajexia Studio software is included in CX-One, then it is called CX-Motion Pro.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.