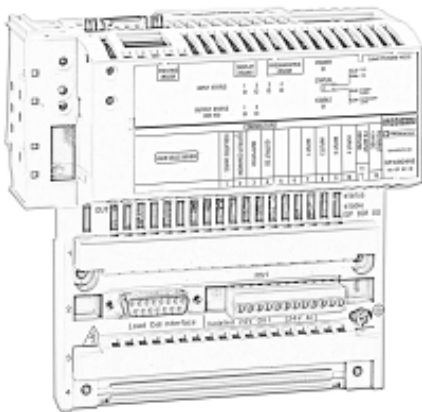


Momentum
the flexibility to adapt
with your business





A modular design...



Momentum is a flexible, modular family of automation products – I/O modules, processors, communication adapters and option adapters – that can be configured for a wide range of control applications. Because of Momentum's flexible architecture, the same modular design that makes it perfect for today also means that it will adapt to your changing needs in the future.



...to meet your needs now and in the future

Momentum: small size and modular design adds up to lower life cycle costs

Momentum products have been designed with every aspect of the cost of ownership in mind. From design to installation to support, Momentum saves you time and money.

Small footprint for lower installation costs

The entire line of Momentum products are based on small block I/O modules that require significantly less control cabinet space than traditional rack based PLC systems. They fit into existing facilities where control cabinet space is at a premium for a lower installed cost.

Minimized wiring saves money

Momentum's small size also allows you to mount them close to field devices for shorter wire runs, significantly reducing wiring and associated costs. Plus they are designed to simplify cabinet layout and wiring with direct connection to 2, 3 and 4 wire field devices.

Flexible architectures are a snap

No matter what controller or network you prefer, standardizing on a common I/O platform means less engineering, reducing overall machine and project cost. Momentum connects to a wide range of fieldbus networks in a snap...literally. Each communication adapter or processor adaptor mounts quickly and easily on an I/O base.

Efficient maintenance and diagnostics

Momentum saves you time and money by simplifying maintenance and diagnostic tasks. Removable terminal strips and snap-on communication adapters and processors allow the I/O base to be replaced without disturbing field wiring to help reduce system downtime. Module diagnostics and intuitive LED displays also streamline maintenance. With just a glance, LED indicators clearly display system status such as power, module readiness, network communications, discrete output health, and I/O point status.



Creating the right system is a snap

The Momentum system includes four fundamental components that easily snap together in various combinations to form versatile control systems or sub-systems.

I/O Bases

The I/O base provides the foundation for the rest of the Momentum control system and serves as the mounting base for communication adapters, processors or option adapters – which all snap onto the I/O module. In addition to providing I/O capability, the base also includes the power supply for module circuits, option adapters, processors, and communication adapters.

There are currently over thirty I/O module types available in the Momentum product line, including analog I/O, discrete I/O, multi-function analog, bi-directional discrete, and specialty modules such as a high-speed counter. Momentum I/O modules utilize simple plug-in terminal blocks for direct wiring to 2, 3, and 4-wire field devices. The I/O bases can be mounted either on a standard 35mm DIN rail or directly in panels for easy installation.

Communication Adapters

The Momentum system offers a wide selection of communication adapters that snap onto any of the I/O modules, thus creating a truly open I/O system that can be easily adapted to many popular fieldbus networks. Communication adapters are available for Modbus TCP/IP, Modbus Plus, FIPIO, INTERBUS, Profibus DP, and DeviceNet.

When a Momentum I/O base is coupled with a communication adapter, they form a distributed I/O drop that connects directly to any of the fieldbus I/O networks mentioned above.

Processor Adapters

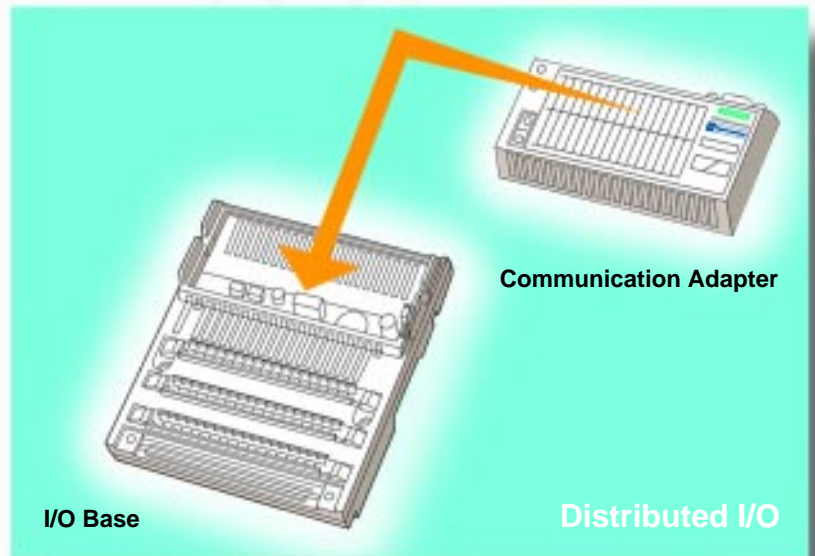
Like the communication adapters, Momentum processors mount onto the I/O module, providing the same compact form-factor. In addition, Momentum processors offer the same high level of control capability as larger rack-based PLCs and provide a cost-effective solution for many midsize control applications.

There are currently 12 Momentum processors, ranging from a processor mounted on a single local I/O module, to models that service up to 8192 I/O points with built-in distributed I/O communication port, Modbus TCP/IP-Ethernet communication, and embedded web pages.

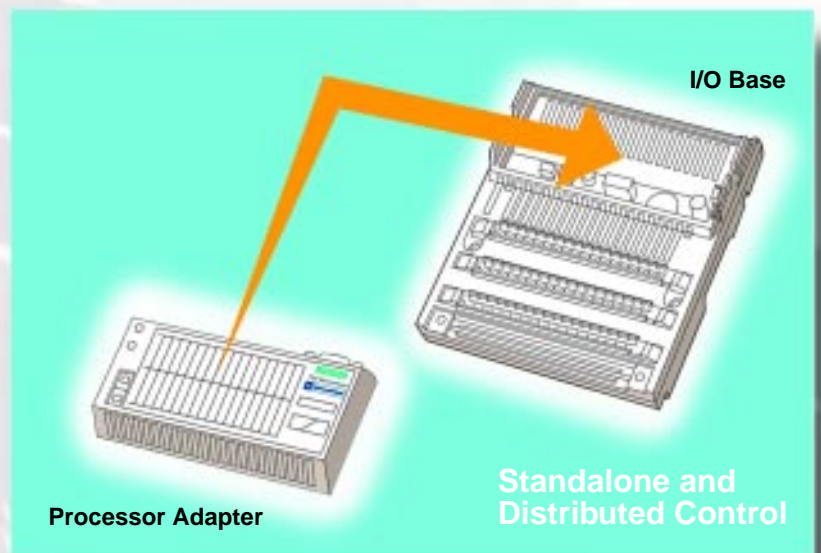
Option Adapters

Option Adapters provide additional networking capabilities to the processors, as well as a time-of-day clock and battery back up. The Option Adapter also snaps onto the I/O base, with a Processor Adapter mounted on top.

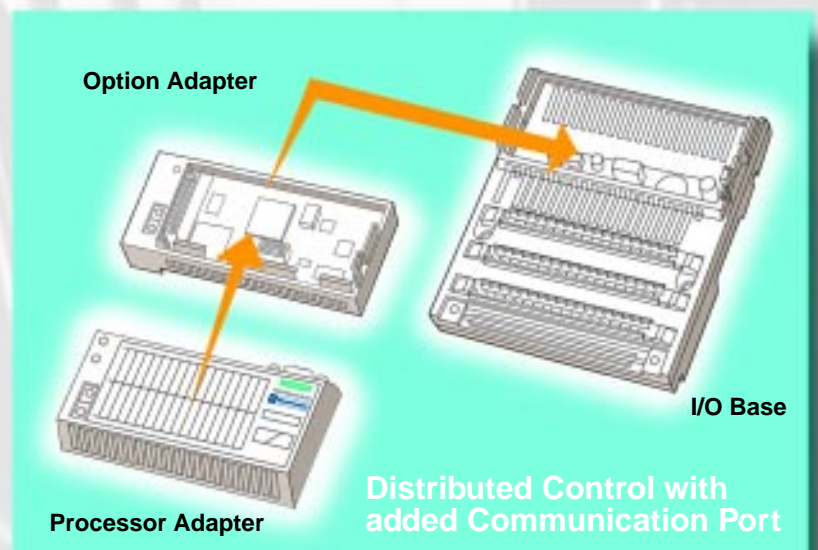
Connect a Momentum Communications Adapter to an I/O base for a versatile and cost-effective distributed I/O solution.



For a flexible distributed control system, simply attach a Momentum Processor Adapter to an I/O base.



Additional controller features such as TOD clock, battery backup, and additional networking capabilities are easily achieved by using a Momentum Option Adapter, Processor Adapter, and I/O base.



Momentum Processors and Control Capability

Momentum processors fit onto any of the Momentum I/O modules and include up to two communication ports, enabling them to be utilized in standalone, distributed, and integrated control system configurations.

The right solution, the right size

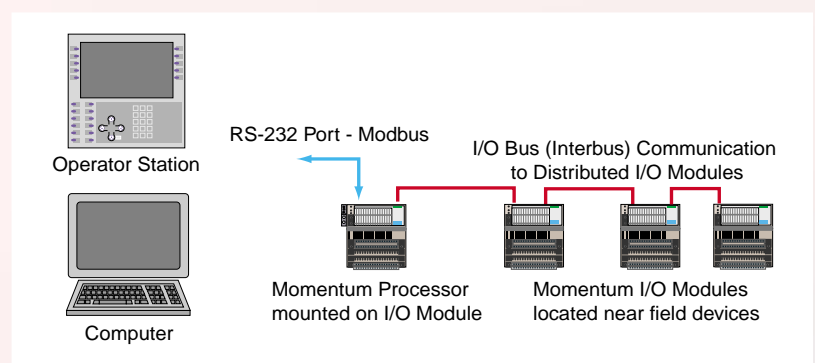
Standalone Control

The key to the success of the Momentum system is its modularity and versatility. Depending on your needs, you can choose the number of I/O modules and processor size to control for a wide variety of system configurations and then simply snap it together with an I/O base for a complete solution.

A standalone control system utilizes a single Momentum processor with dedicated local and/or distributed I/O. Momentum is ideally suited for standalone control system applications where I/O requirements do not exceed 32 Discrete or 16 Analog points in a single location. When your I/O requirements exceed these levels, or when there is more than one I/O location, there are other Momentum processors that include an integrated distributed I/O communication port (I/O Bus) that support up to 128 I/O modules for a total of 4096 I/O points. This enables the I/O modules to be placed close to the field devices that they connect to, reducing wire run length, which in turn reduces the total system cost.

One of the many applications for a standalone Momentum control system independent or high-speed processing. Rather than putting a communication adapter on the I/O base, a processor can be used. The result is a simple, small controller that can perform PID control when mounted on an analog I/O module or provide high speed response when used with a digital I/O module.

Standalone Control with Distributed I/O



Distributed Control Capability

Distributed control allows you to split the control function between multiple controllers as opposed to having a single centralized controller. With the Momentum system, the control of an application can be divided between multiple Momentum processors, each dedicated to control an operation or section of a process. Momentum processors can use either Modbus Plus or Ethernet communication networks to connect all of the processors, providing a high-speed link to exchange interlocks, statuses, and operational data.

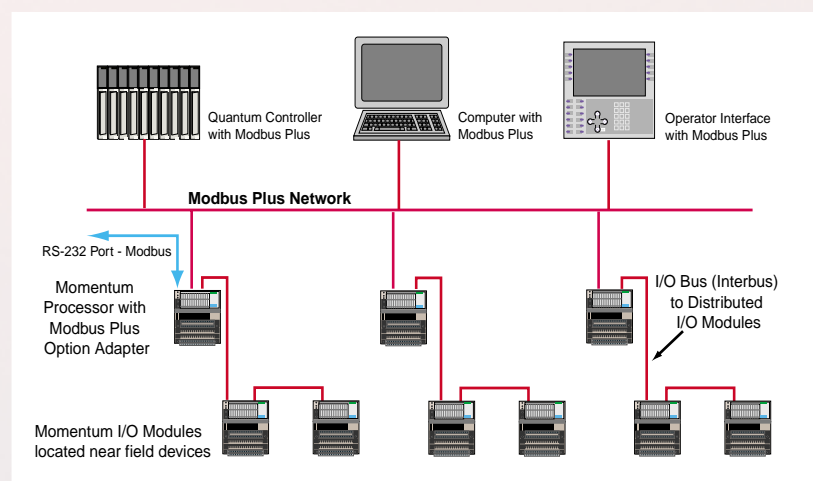
Other benefits of distributing control with Momentum:

- Simplifies system integration, programming, and maintenance, all contributing to a lower life cycle cost of the control system.
- As new operations or processes are added to the overall system, additional Momentum processors can be added and connected to the network, providing easier system expansion.
- Momentum distributed control is ideally suited for flexible manufacturing operations where machines or processes are added and/or removed as needed to manufacture a wide range of products.
- The Modbus Plus and Ethernet networks that are used to network distributed controllers also have the ability to download complete controller programs, enabling new programs to be easily changed or added as the process or operation changes.

Integrated Control

Momentum processors can be used as part of an integrated control system architecture with other models of Schneider controllers. In these applications, Momentum processors can perform local control, or off-load some of the fast response control from larger processors. This capability is also ideal in existing systems where the control and/or I/O capacity has been maximized and there are additional requirements for additional I/O or control capability. In such cases the Momentum processor and I/O can easily be integrated into the total system with minimal downtime at a fraction of the cost of a new control system.

Momentum Distributed Control with distributed I/O integrated in a Quantum control system



Momentum Distributed I/O

Versatile distributed I/O solutions

The wide range of Momentum I/O modules and communication adapters enable them to be used with a number of head end devices in distributed I/O applications. These head end devices can include any of the existing Schneider Automation PLCs, competitive PLCs, and open control systems that use a PC or proprietary controller.

Momentum I/O modules provide a compact, cost effective solution for both discrete and analog I/O in a compact block style form factor, and can operate on networks with other network compliant devices.

Cost effective

Wiring from field devices to terminals in central panels and from terminal blocks to I/O modules in large racks requires significant time and material to install.

Momentum eliminates the terminal blocks and long device-wire runs by bringing the I/O modules closer to sensors and actuators.



Ethernet

There are 2 Modbus/ TCP/IP communication adapters available. One provides 10M baud communication capability along with read, write and diagnostic capability. The second provides 10/100 M baud communications with auto-sensing, embedded web pages for configuration, auto-detect framing, SNMP, Web Server, and Faulty Device Replacement.

Modbus Plus

Modbus Plus is a real time peer-to-peer network running at 1Mbit/sec linking up to 64 Momentum devices over twisted pair cable. A raw data speed of 1 Mbit ensures real time performance even when distributed remotely up to 2 km (using repeaters) or 10 km (using fiber optic modems). Modbus Plus adapters are available with either single or redundant communication ports.



FIPIO

FIPIO is a real time industrial communication network that enables up to 128 devices to be connected over 15 km and is built into the Schneider Premium and Series 7 controller families.

INTERBUS

The INTERBUS network is a master-slave network capable of high speed I/O data communications (up to 256 control devices).

Profibus DP

Profibus DP is a communication network that will operate at communication rates as fast as 12 Mbaud with the ability to automatically adjust the communication rate to run at slower speeds based on the network master and the number of devices on the network.

DeviceNet

The DeviceNet communication network can connect up to 64 devices on a twisted pair cable for distances up to 1640 feet at communication rates of 125 and 500k baud.

Transparent Factory and distributed control

Momentum M1E Processor Adapters for real time control over Ethernet

Using Ethernet as its communications backbone, Momentum M1E Processor Adapters deliver all the performance benefits of real-time control. Momentum M1E processors also offer users the option of programming with traditional 984 Ladder Logic or the full five IEC program editors with Concept software.

The power of web technologies right in your PLC

- The integrated Ethernet Modbus/ TCP/IP communication port enables communications over a single network (Ethernet) plant-wide, so you don't need any proprietary networks or an expert to configure and maintain them.
- M1E processors include embedded web pages that are preconfigured and ready to use, getting you up and running in record time.
- Web pages are accessible using standard web browsers, making them easy to access and navigate.
- Embedded web pages provide real-time production information from anywhere on the network, delivering data and information where and when it is needed to ensure your operation is running at peak efficiency.
- The modularity of the Momentum platform and compatibility of PLC programs across the full line of Momentum processors enable you to maximize your programming and wiring investment.
- The M1E processor is available in 4 configurations to match your system requirements and your programming preferences. Choose a module with either (1) Ethernet and (1) I/O Bus port (Interbus master), or one with (1) Ethernet and (1) RS-485 Modbus port. Then select which programming environment you prefer: IEC or 984 LL.

Transparent[®]
Factory

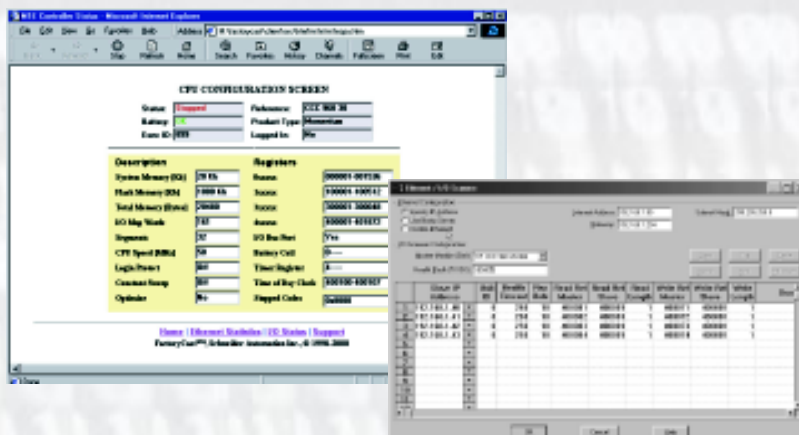
Embedded Ethernet for real-time control

The Ethernet communications port on the Momentum M1E makes real time control over Ethernet a reality. The Ethernet communication port is a standard 10BaseT connection and supports Modbus TCP/IP communications - a standard registered Ethernet protocol. Functionality includes reading and writing of discrete data, diagnostics, and registers, along with full program upload/download capability.

This functionality makes the M1E processors right for control applications that include data acquisition, peer-to-peer communications between multiple M1E's, and I/O scanning. All communications are faster and simpler because they happen on the same Ethernet backbone used by your business-level systems.

Embedded web pages for easy data access

Momentum M1E processors include an embedded web server with five preconfigured web pages that provide information on the control system's configuration and operation. The web pages also enable direct access to detailed product information through a direct link to the product technical support web site. These embedded web pages report real time information on processor status and local I/O module points and are easily accessible via any standard web browser. You can also load custom web pages into the M1E processor using the available Web Loader Utility. No custom configured message displays are needed! The only requirement is to have the PC-based browsers connected via Ethernet to any M1E on the network.



ConneXium, for all your Ethernet networking needs

With the ConneXium family of industrially hardened network hubs, transceivers, bridges, switches and cables, Schneider can provide you with integrated Ethernet solutions to unite everything from the device level to the control network, and even on through to the corporate intranet.

Hubs

Switches

Transceivers

Bridges

Cables



Flexible programming software choices

Choose the programming environment that is right for you

Momentum processors utilize the same programming tools, ProWORX and Concept, as other Schneider PLCs, reducing training cost and simplifying system integration.

Award winning Concept™ programming software



Concept is an advanced Microsoft® Windows based programming tool set which provides a multi-language development environment for control system programming. Using familiar, standardized editors bundled in a single application, users can create and integrate Momentum control, communication and diagnostic logic.

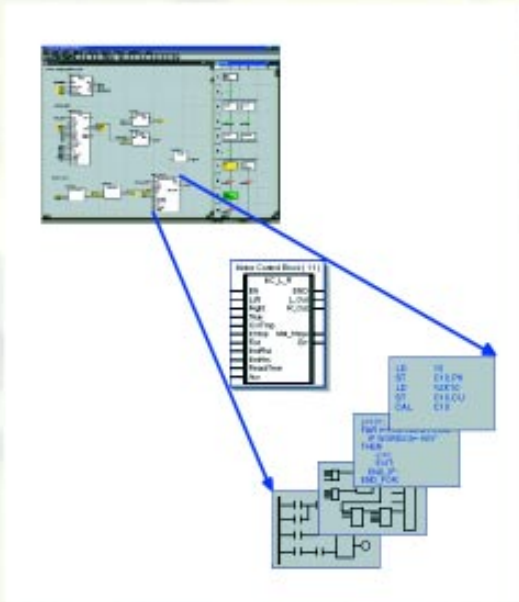
- Easy-to-use interfaces, re-usable programs, powerful search functions, industry leading free-form graphics editors, and on-line help that simplifies programming, documenting and maintaining your Momentum system
- Powerful search functions that allow you to search for variables, discover errors, and identify unused variables
- For the most demanding algorithms and applications, Concept supports the creation of Elementary Function Blocks, or EFBs in C language application program
- Concept also supports 984 Ladder Logic and includes a program converter that makes it easy to import a Modsoft program
- Concept's 984 Ladder Logic editor supports Modsoft compatible Quick Keys for easy insertion of ladder logic instructions

ProWORX 32 for 984 LL programming

ProWORX³²

ProWORX 32 is a Windows® based programming package that makes 984 Ladder Logic programming quick and easy.

- Off-line program development
- On-line program maintenance
- Allows projects to be developed in a collaborative environment without sacrificing control and security by utilizing the ProWORX 32 server as the central repository for projects, the center for security, and the hub for communications
- The project emulator is a very powerful tool that will help save considerable time in the design and testing of your system. It provides the ability to test projects prior to running them in the PLC run-time environment to ensure your system will run at peak efficiency immediately upon commissioning.
- I/O module configuration
- I/O module specifications and wiring diagrams
- Function Block configuration
- I/O module health and status monitoring
- Quick key support for easy insertion of ladder logic instructions



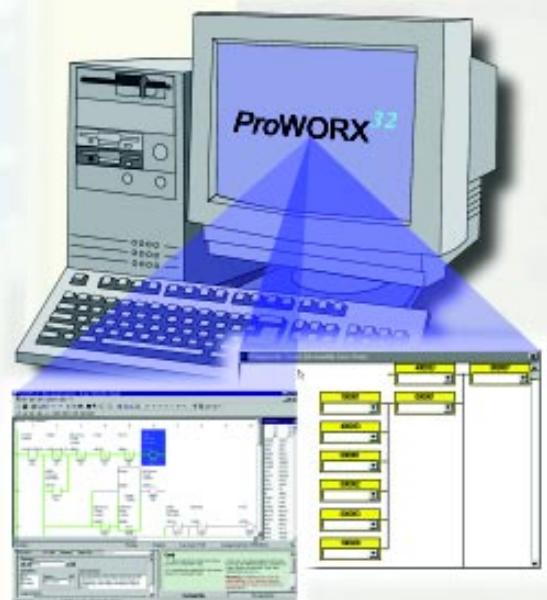
Concept deferred function blocks make reusing code easier

Concept provides the programmer with the ability to create standard libraries of Derived Function Blocks, or DFBs, which can be instantiated multiple times from within an application program. These DFBs can be written in Ladder Diagram, Function Block Diagram, Structured Text or Instruction List languages. If a particular algorithm or standard piece of control logic needs to be frequently changed, such as a motor starter circuit, the programmer only needs to make the change once.

	Concept	PW 32
IEC 61131-3 Languages	Yes	No
<ul style="list-style-type: none"> Sequential Function Chart Function Block Diagram Structured Text Instruction List Ladder Logic 		
984 Ladder Logic Language	Yes	Yes
Programming over	Yes	Yes
<ul style="list-style-type: none"> TCP/IP Ethernet Modbus Plus Modbus 		
Operating system	Windows	Windows

Test multiple projects and multiple connections with ProWORX 32

Imagine the time and effort you could save by testing a new project with an existing project while it is running live. Now you can with the Multiple Projects function of ProWORX 32 - even with up to eight PLC's running simultaneously! Perform diagnostic checks to validate interdependencies between your emulated project and your live applications - all in real time - so you can go live with total confidence.



Momentum : Selection Guide

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Power Supply		Power Supply	
Power Supply		170 CPS 111 00	120 or 230 Vac (Jumper selector) to 24 Vdc
		Programming Software	
ProWORX 32		372 SPU 78001PDEV	P32 Client online/offline
		372 SPU 78001PONLP32	Client online
		372 SPU 71001PLDV	P32 Client online/offline
Concept v 2.6		372 SPU 471 01V26	Concept S, Version 2.6
		372 SPU 472 01V26	Concept M, Version 2.6
		372 SPU 474 01V26	Concept XL, Version 2.6
		Processor Accessories	
Programming cables and connectors		110 XCA 282 01	RS232 Communication Cable - 3 ft. (1m), RJ45 - RJ45
		110 XCA 282 02	RS232 Communication Cable - 10 ft. (3m), RJ45 - RJ45
		110 XCA 282 03	RS232 Communication Cable - 20 ft. (6m), RJ45 - RJ45
		110 XCA 203 00	RJ45 - 9 pin D shell Adapter for AT serial port
		110 XCA 204 00	RJ45 - 25 pin D shell Adapter for XT serial port
		Communication Accessories	
Modbus Plus		990 NAD 211 10	Modbus Plus Drop Cable 2,4 m
		990 NAD 211 30	Modbus Plus Drop Cable 6,0 m
		990 NAD 230 00	Modbus Plus Tap
FIPIO		TSX FP ACC 7	Line Terminator
		TSX FP ACC 2	Fipio Connector
		TSX FP ACC 12	Fipio Connector
INTERBUS		170 MCI 007 00	Interbus (I/O Bus) Cable - 11 cm. Long
		170 MCI 100 01	Interbus (I/O Bus) Cable - 100 cm. Long
		170 XTS 009 00	Interbus (I/O Bus) Connector Kit
		170 BNO 671 00	Branch Interface for Interbus
		170 BNO 681 00	Fiber Optic Branch Interface for Interbus
Profibus DP		490 NAD 911 03	Profibus Connector - with Terminator
		490 NAD 911 04	Profibus In-line Connector
		490 NAD 911 05	Profibus Connector with Programming Port
		Miscellaneous Accessories	
I/O Base accessories		170 XTS 001 00	Connector Set, Screw-type
		170 XTS 006 01	Bus Bar - Single Row, Screw-type
		170 XTS 005 01	Bus Bar - 2 Row, Screw-type
		170 XTS 004 01	Bus Bar - 3 Row, Screw-type
		170 XTS 002 00	Connector Set, Spring-type
		170 XTS 007 01	Bus Bar - Single Row, Spring-type
		170 XTS 008 01	Bus Bar - 2 Row, Spring-type
		170 XTS 003 01	Bus Bar - 3 Row, Spring-type
		170 BSM 016 00	24 Vdc Input Simulator - Switches
		CER 001	Ground Clamp
		ConneXium Modules	
Hubs		499 NEH 104 01	4x10BaseT, 10Mbps, RJ45
		499 NEH 141 00	4x100BaseT, 100Mbps, RJ45
		499 NOH 105 01	3x10BaseT, 2x10BaseFL, 10Mbps, RJ45, ST
Switches		499 NES 171 00	5x10BaseT/100BaseTX, 2x100BaseTX, 10Mbps, 100Mbps, RJ45
		499 NOS 171 00	5x10BaseT/100BaseTX, 2x100BaseFX, 10Mbps, 100Mbps, RJ45, SC
		499 NES 181 00	5x10BaseT/100BaseTX, 10Mbps, 100Mbps, RJ45
Transceivers		499 NTR 100 10	1x10BaseT, 1x100BaseFL, 10Mbps, RJ45, ST
		499 NTR 101 00	1x100BaseTX, 1x100BaseFX, 100Mbps, RJ45, SC
Bridges		174 CEV 300 10	Modbus to Modbus TCP/IP, 10Mbps, RJ45
		174 CEV 200 30	Modbus Plus to Modbus TCP/IP, 10Mbps, RJ45

