For your automation solutions

Modicon Quantum

Opt for performance

a brand of Schneider Electric

Telemecanique

1 Quantum Automation Platform

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CPUs

Selection guide

Native operating system	984 ladder logic (IEC languages require the 16 bit Concept loadable)	
		
On-board communication ports	1 Modbus 1 Modbus Plus	
On-board math coprocessor	No	
On-board processor clock speed	Intel 186 20 MHz	
984 LL performance (logic solve time)	0.3…1.4 ms/ K ladder logic instructions	
IEC 1131-3 program memory (max)	109 Kbytes	368 Kbytes
Maximum number of option interfaces supported	2	
Total memory **RAM** **Flash** **984 LL user logic** **Available registers** **Extended memory**	256 K bytes 256 K bytes 8 K bytes 10 K None	512 K bytes 256 K bytes 16 K bytes 10 K None
Model	140 CPU 113 02	140 CPU 113 03
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Integrated 984 ladder logic and 32 bit Concept IEC

2 Modbus
1 Modbus Plus

Yes

Intel 486 DX 80 MHz	Intel 586 DX 133 MHz
0.1 ... 0.5 ms/K ladder logic instructions	0.09 ... 0.45 ms/K ladder logic instructions
896 Kbytes	2.5 Mbytes
6	
2 M bytes 1 M bytes 64 Kbytes 57 K 96 Kbytes	4 M bytes 1 M bytes 64 K bytes 57 K 96 Kbytes
140 CPU 434 12A	140 CPU 534 14A

Quantum Automation Platform

Introduction

Performance, solutions

Introduction

The Modicon Telemecanique Quantum Automation Series Platform provides the right solution for your control needs with a full range of high performance, compatible control products. Its architecture is modular and scaleable, so it can be configured to meet the highest performance requirements for mid-size to large control systems.

Quantum systems combine a very small form factor with industrially rugged designs that ensure cost-effective and reliable installation in even the most difficult plant environments. The systems are simple to install and configure, and they cover a wide range of applications.

Performance

With a module depth of only 104 mm (4 inches), including the field wiring, the Quantum Automation Platform represents a major improvement in panel size requirements. It fits in a standard 156 mm (6 inch) electrical cabinet, saving you up to 50% over the cost of traditional control panels. It can be mounted easily on a backplane in an industry-standard panel or rack-mounted in a 500 mm (19 inch) installation.

Within this small form factor, Quantum maintains Schneider's very high standards of product performance and integrity. The Quantum Platform features:

- Increased system output based on very high scan rates with up to 486- and 586-based processors
- Tightly integrated automation technologies including motion, ASCII, communication and process control
- Redundant power supply and I/O cabling options and true Hot Standby capabilities to provide the highest system availability for critical applications
- Configurable output fail states for more predictable performance in critical applications
- High levels of isolation for noise immunity in electrically severe environments
- High-accuracy analog I/O for tighter process monitoring and control
- High-speed on/off circuits and interrupt processing for higher system performance
- Hot swapping (the ability to remove and insert I/O modules under power without disturbing other operating elements) for easier maintenance and increased system availability

A wide range of solutions

Quantum automation solutions can range from a single standalone control system of up to 448 I/O points to a multi-drop, redundantly serviced network with up to 64 000 I/O points. Connectivity to plant-level and fieldbus networks can be achieved with communication options that support over eight industry-standard networks, from Ethernet to ASCII.

With advanced Intel-based CPUs, Quantum logic solve times and I/O throughput rates are fast enough to handle the high-speed demands of machine control and material handling. CPU memory sizes range from 256 K bytes to 4 M bytes. Some CPUs are equipped with floating-point coprocessor chips that solve process algorithms and math calculations at optimal speeds for process integrity and quality.

Introduction (continued)

Programming software

Two popular Schneider Automation programming software packages can be used with Quantum – Concept and Modsoft.

Concept is a Microsoft Windows-based software that complies with all five programming languages specified in the IEC 1131-3 international standard. Concept provides a feature-rich environment where you can rapidly develop structured, re-usable code. Overall design, startup and maintenance costs are significantly reduced. Concept also supports 984 Ladder Logic programming. You can easily import programs previously developed in a Modsoft environment.

Modsoft is a field-proven DOS-based programming software for the 984 Ladder Logic language. Modsoft provides an easy step forward for users who want to step up to the improved performance of Quantum while retaining familiarity with the Ladder Logic environment.

IEC Languages	Software	Features
Function Block Diagram	Concept	Math, bistables, comparators, counters/timers, logic, edge detection, communications, diagnostics
Sequential Function Chart	Concept	State language approach using steps and transitions
Instruction List	Concept	Boolean instruction set
Structured Text	Concept	High-level text language with Pascal-level instructions
Ladder Diagram	Concept	Discrete contacts, coils and function blocks
Non-IEC Language	**Software**	**Features**
984 Ladder Logic	Modsoft or Concept	984 ladder logic instruction set including contacts, coils, function blocks, process control, Equation Editor, and communications

A simple integration path

Ongoing support for our large installed customer base is a commitment we take seriously. The TSX Quantum Automation Series provides a straightforward and cost-effective integration path for existing 984 and Sy/Max users. The Quantum's enhanced 984 instruction set allows any Modsoft or translated Sy/Mate application to be executed. In fact, a 584 or 984 program written for existing Modicon controllers will run in a Quantum CPU without any translation required. Quantum is also backward-compatible with older I/O series that use the Modicon S908 remote I/O network.

Our commitment to simple integration paths can reduce life cycle costs by protecting your investments in software, hardware and training. Integration of field-proven Ethernet, Modbus and Modbus Plus communication networks is available for both Quantum and Sy/Max controllers.

Flexible system architectures

No single control architecture can meet all the demands of today's automation market. Some systems are centralized with local I/O providing the solution. Other systems use a centralized controller with a few drops of remotely mounted I/O. Still others use many smaller distributed I/O drops along with peer-to-peer communications and integration of fieldbus data. Using a single I/O family, Quantum can be configured for all of these architectures. It is suitable for process control, material handling or distributed control.
Quantum is unique in its ability to meet all your automation needs, whatever they may be.

Mecanical characteristics

Weight/module	**kg**	1.0 max.
	lb	2 max
Dimensions (H x D x W)	**mm**	250 x 103.85 x 40.34
	inch	9.84 x 4.09 x 1.59
Wire size	**mm**	0.5...2.0 one wire, 0.5…1.3 two wires
	AWG	14 one wire, 16 two wires, 20 max
Material (chassis and cover)		Flame-retardant polycarbonate
Space in the backplane	**slots**	1/ module typical, 2 /module for the MMS modules

Electrical characteristics

Electrostatic discharge (IEC 801-2)		
air	**kV**	8
contact	**kV**	4
RFI immunity (IEC 801-3)	**MHz**	80…1000, 10 V/m
Ground surge (IEC 801-5)	**kV**	2, shield-to-ground

Environmental characteristics

Temperature		
operating	**°C**	0...+60
storage	**°C**	-40...+85
Relative humidity	**%**	0…95 non-condensing @ 60 °C
Altitude	**m**	up to 2000, full operation
Shock	**G**	+/-15 peak for 11 ms, half sine wave
Flammability	**V-O**	94, connector and module
Free fall	**m**	1
	ft	3
Agency approvals		UL 508
		CSA 22.2-142
		Factory Mutual, Class I, Div 2
		CE

Introduction

Optional conformal coating

If your control system needs to operate in a corrosive environment, Quantum modules can be ordered with a conformal coating applied to the cover and bezel. Conformal coating will extend its life and enhance its environmental performance capabilities.

Mixed flowing gas (power on)

Standard	Pollutant	Parts/billion	Quantum's performance
EIA 364-65 level III	Cl_2	20 (+/-5)	Meets the standard
	NO_2	200 (+/-50)	Exceeds standard (1250 parts/billion)
	H_2S	100 (+/-20)	Meets standard
ISA-S71.04 GX severe	Cl_2	10	Exceeds standard (20 parts/billion)
	NO_2	1250	Meets standard
	H_2S	50	Exceeds standard (100 parts/billion)
	SO_2	300	Meets standard

Humidity(operating)

Standard	Concentration (%)	Quantum's performance
IEC-68-2-3	93 @ 60 ° C	Meets standard

Salt mist (non-operating)

Standard	Concentration (%)	Quantum's performance
IEC 68-2-11	5 (+/-1)	Exceeds standard (5.7%)

Fungus resistance

Standard		Quantum's performance
MIL-I-46058C		Designed to meet standard

Temperature cycling (operating)

Standard	Cycles	Quantum's performance
IEC 68-2-14	100 @ 0 ... 60 ° C	Meets standard

Dust (non-operating)

Standard	Pollutant	Weight (%)	Quantum's performance
EIA 364-TP91 (pending)	silica	36	Meets standard
	calcite	29	Meets standard
	iron oxide	12	Meets standard
	alumina	8	Meets standard
	gypsom	5	Meets standard
	paper fiber	3	Meets standard
	cotton fiber	3	Meets standard
	polyester fiber	2	Meets standard
	carbon black	1	Meets standard
	human hair	0.5	Meets standard
	cigarette ash	0.5	Meets standard

Availability

All Quantum backplanes, power supplies, I/O modules, special-purpose modules and CPUs are available as conformally coated modules. Almost all the Quantum communication adapters are available as conformally coated modules–the only exceptions is the Echelon 140 NOL 911 10 LonWorks option modules.

How to order conformally coated modules

To order a Quantum module or backplane with conformal coating applied, simply append a C to the standard model number. For example, if you want to order a 140 CPS 114 00 Power Supply with conformal coating, the new model number is 140 CPS 114 00C. For more information about conformally coated Quantum modules, contact your distributor or regional sales office.

Backplanes

Presentation, description

Presentation

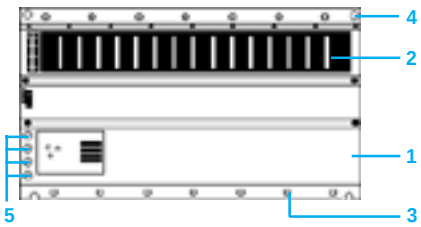
The Modicon TSX Quantum modules mount easily into backplanes in industry-standard electrical cabinets or on19-inch racks. Optional mounting brackets are available for rack-mounting. A backplane provides the control signals and distributes the power necessary operate the installed modules.

Description

Six different backplane models are available (with 2, 3, 4, 6, 10, or 16 slots. Backplane slots are universal) in other words, any module may fit into any slot. Almost all Quantum modules are designed to fit into single slots on a Quantum backplane; the only exception is the MMS SERCOS motion module, which requires two contiguous slots.

There are no slot dependencies in a Quantum system, although we do recommend that power supply modules use the outermost slot position for optimum heat dissipation. The only limits on the backplane are available module power and addressing space. Any backplane may be used in any of the three system architectures supported by Quantum (standalone with local I/O, remote I/O or distributed I/O). Your service inventory can be reduced because there are no special backplanes for different I/O architectures.

In a Quantum system, all module addressing and configuration are handled by panel software. There are no DIP switches or other hardware settings required.



1 Metal frame.

2 Backplane connector.

3 Tapped holes for affixing modules.

4 Mounting holes.

5 Grounding terminals.

Backplane Expander Module

The 140 XBE 100 00 Quantum Backplane Expander module allows I/O in an adjacent, “secondary” backplane to communicate with the CPU or RIO drop adapter in the “primary” backplane over a custom communications cable. A Backplane Expander module must be installed in each backplane. The expander cable provides all the signals required to accomplish data communication between the two backplanes. Only a single Backplane Expander module can be added to each backplane.

The Backplane Expander module features the following flexible characteristics:

- The same 140 XBE 100 00 Backplane Expander modules are used for the primary and secondary backplanes.
- The system can use any type of Quantum power supply. Each backplane can have a different type of power supply.
- Loss of power in the secondary backplane will not shut down the entire drop. Only modules located in the secondary backplane will lose power.
- Backplane Expander modules can be located in any slot in the backplane, and do not have to be placed in corresponding slots in the primary and secondary backplanes.
- The Backplane Expander module will not be recognized by the programming panel software. It appears as an unfilled slot in the I/O map.

Backplanes

References, dimensions

References

Description	Number of slots	Reference	Weight kg (lb)
Racks for: Local I/O modules Remote I/O modules Distributed I/O modules	2	**140 XBP 002 00**	0.230 (0.5)
	3	**140 XBP 003 00**	0.340 (0.75)
	4	**140 XBP 004 00**	0.450 (1.0)
	6	**140 XBP 006 00**	0.640 (1.4)
	10	**140 XBP 010 00**	1.000 (2.2)
	16	**140 XBP 016 00**	1.600 (3.5)

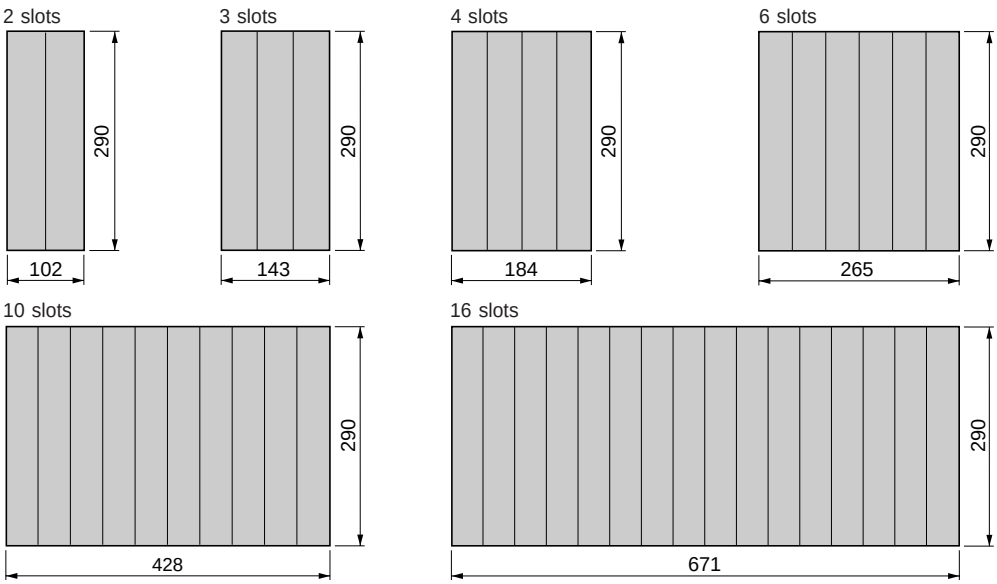
Backplane accessories

Description	Dimensions	Reference	Weight kg (lb)
Backplane expander	–	**140 XBE 100 00**	–
Backplane expander cables	1 m	**140 XCA 717 03**	–
	2 m	**140 XCA 717 06**	–
	3 m	**140 XCA 717 09**	–
19 in front rail mounting bracket for 140 XBP 010 00	125 mm (4.92 in) depth	**140 XCP 401 00**	–
19 in rear rail mounting bracket for 140 XBP 010 00	20 mm (0.79 in) depth	**140 XCP 402 00**	–

Dimensions

140 XBP 0●0 00

Front view



Depth with modules: 104 mm

Presentation

Presentation

The Quantum CPUs are single-slot programmable controllers with built-in executive memory, application memory and communication ports. With all memory components on-board, you do not need extra chips or cartridges for configuration.

Flash-based executive memory

Quantum CPUs use flash memory technology to support the CPU's executive memory and instruction set. Flash is a state-of-the-art, nonvolatile memory technology that enables field upgrades by downloading files over the Modbus or Modbus Plus port as new features and maintenance updates become available.

Memory backup and protection

The CPUs store the application program in battery-backed RAM. The battery is located on the front of the module and can be serviced while the CPU is running. To protect the application program from inadvertent changes during operation, the CPUs feature a memory-protect slide switch. An LED goes on when this switch is activated.

Math coprocessor hardware support

For math-intensive applications, Quantum offers math coprocessor hardware on select CPU models. The coprocessor significantly improves execution times for the 984 Process Control Function Library (PCFL) and Equation Editor as well as math operations in the IEC languages. Improved floating point execution times mean more accurate performance for process algorithms and math calculations.

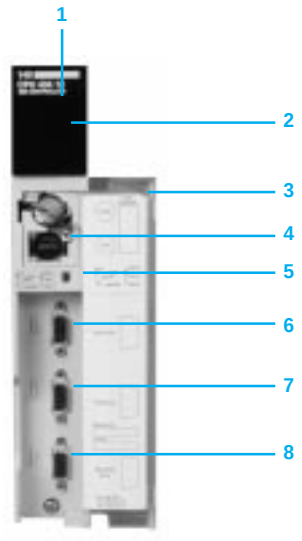
Write protection

Controller write protection minimizes the possibility of a programmer inadvertently writing from a source controller to a memory area in a destination controller that has been reserved for internal operations. The programming software sets up an enabled area in the CPU for coil access and data references from across the network. Whatever data is not enabled is prevented from writing references, both locally and over the network. This data fence option provides excellent security against data transfer errors, creating a simple and effective communications firewall.

Communication ports

All CPUs support Modbus and Modbus Plus networking strategies. Simple rotary switches on the back of the modules are used to set the network address of the Modbus Plus port(s). Each device on a Modbus Plus network must have a unique address in the range 1…64. Modbus port settings include baud, parity, number of data bits, number of stop bits, protocol and drop address. By default, these settings are 9600 baud, even parity, 8 data bits, 1 stop bit, RTU mode and address 1. A slide switch on the front of the CPU can reset the Modbus port parameters to an alternative power-up mode that supports modem communications–2400 baud, even parity, 7 data bits, 1 stop bit, ASCII mode and address 1.

Description

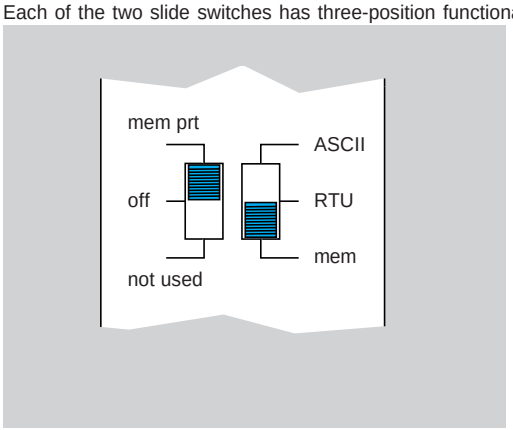


1 Model number and color code
2 LED array
3 Removable, hinged door and customer identification label
4 Battery
5 Micro switches
6 Modbus port A
7 Modbus Plus port B
8 Modbus Plus port

Note:
The 140 CPU 113 0x CPUs have one Modbus and one Modbus Plus communication ports.

Slide switches

Each of the two slide switches has three-position functionality:



The left slide switch activates the memory write-protect. In the upper position, write protection is enabled; in the middle position, write protection is disabled.

The right slide switch determines the startup communication parameters for the Modbus port. The middle position, RTU, is the factory-set default. The upper position, ASCII, is for modem communications. If you need to set special startup parameters for the Modbus port–for example, if your Modbus address is not 1–you can set application-specific parameters in memory and set the slide switch in the bottom position.

Language choices

Advanced IEC 61131-3 Languages

Quantum's 5 IEC 61131-3 languages are:
- Sequential Function Chart: provides overall structure and coordination for batch oriented process of machine control applications.
- Function Block Diagram: particularly well suited for process control applications.
- Ladder Diagram: excellent for discrete control and interlocking logic.
- Structured Text: higher level language which is a terrific solution for complex algorithms and data manipulation.
- Instruction List: low level language for optimized code performance.

984 Ladder Logic

A high performance, low level language whose application source code resides in the controller.
A full set of over 80 instructions are included with every Quantum CPU. The 984 instruction set ensures compatibility and easy integration paths for installed Modicon applications, including:
- Immediate I/O and interrupt servicing to enhance system performance.
- Equation editor for easier match capabilities.

CPUs

Characteristics

Characteristics

Model			**140 CPU 113 02**	**140 CPU 113 03**	**140 CPU 434 12A**	**140 CPU 534 14A**
Processor			80186	80186	80486	80586
Math coprocessor			No	No	Yes	Yes
Clock speed		**MHz**	20	20	66	133
User logic	max. IEC program	**words**	109 K	368 K	896 K	2.5 M
	984 ladder logic	**words**	8 K	16 K	64 K	64 K
Reference capacity						
	discretes	**bits**	8192 in/8192 out	8192 in/8192 out	64 K any mix	64 K any mix
	registers	**words**	9999 max	9999 max	57 K max	57 K max
	extended memory	**words**	–	–	96 K	96 K
Logic solve time (984 LL instructions)		**ms/k**	0.3...1.4	0.3...1.4	0.1...0.5	0.9...0.45
Watchdog timer		**ms**	250 (software-adjustable)			
TOD clock accuracy		**s/day**	+/-8@ 0...60 °C			45°C
Local I/O	Maximum I/O words		64 I/64 O			
Remote I/O (RIO)						
	I/O words/drop		64 I/64 O			
	number of drops		31			
	number of networks		3			
Distributed I/O (DIO)						
	I/O words/drop		30 I/32 O			
	I/O words/network		500 I/500 O			
	drops/networks		63			
	number of networks		1			
Battery	type		lithium			
	service life	**mAh**	1200			
	lifetime	**yrs**	10			
	load current, typical	**µA**	5	7	7	14
	load current, max	**µA**	110	210	210	420
Communication ports						
	Modbus (RS 232)		1	1	2	2
	Modbus Plus		1	1	1	1
Maximum number of NOM, NOE, CRP, MMS modules supported			2	2	6	6
Key switch			No	No	Yes	Yes
Required bus current		**mA**	780	790	1800	1800

CPUs

References

References

Memory	Co-processor	Reference	Weight kg (lb)
256 K bytes	No	**140 CPU 113 02**	0.300 (0.66)
512 K bytes	No	**140 CPU 113 03**	0.300 (0.66)
2 M bytes	integrated	**140 CPU 434 12A**	0.850 (1.87)
4 M bytes	integrated	**140 CPU 534 14A**	0.850 (1.87)

Accessories

Description	Length m (ft)	Reference	Weight kg (lb)
Programming cable for Modbus interface	3.7 (12)	**990 NAA 263 20**	0.300 (0.66)
	15 (50)	**990 NAA 263 50**	1,820 (4.0)
Battery for CPU	–	**990 XCP 980 00**	–
Quantum automation series hardware reference guide	–	**840 USE 100 0X**	–

Quantum Automation Platform

Power supply modules

Selection guide

Type	Standalone			Summable
				
Input voltage	∿ 100…276 V	⎓ 20…30 V	⎓ 100…150 V	∿ 93…138 V or ∿ 170…276 V
Frequency	47…63 Hz	–		47…63 Hz
Input current	0.4 A @ c 115 V 02 A @ ∿ 230 V	1.6 A	0.4 A	1.1 A @ c 115 V 0.6 A @ c 230 V
Output current	3.0 A max. 0.3 A min.			8.0 A @ 60° C
External fusing	1.5 A slow-blow	2.5 A medium time lag	0.75 A slow-blow	2.0 A slow-blow
Maximum power interruption	8 ms	20 ms	1 ms	8 ms
Alarm relay contact	No			
Model	140 CPS 111 00	140 CPS 211 00	140 CPS 511 00	140 CPS 114 10
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Summable		Redundant			
					
⎓ 20…30 V	⎓ 48…60 V	∿ 93…138 V or ∿ 170…276 V	⎓ 20…30 V	⎓ 48…60 V	⎓ 100…150 V
–		47…63 Hz	–		
3.8 A max.		1.1 A @ c 115 V 0.6 A @ c 230 V	3.8 A max.		0.5 A @ ⎓ 125 V
8.0 A		8.0 A @ 60° C	8.0 A		
5.0 A slow-blow	2.0 A medium time lag	2.0 A slow-blow	5.0 A slow-blow	2.0 A medium time lag	2.0 A slow-blow
1 ms	13 ms	8 ms	1 ms	13 ms	1 ms
Yes		No	Yes		No
140 CPS 214 00	140 CPS 414 00	140 CPS 124 00	140 CPS 224 00	140 CPS 424 00	140 CPS 524 00

Power supply modules

Presentation, characteristics

Presentation

Quantum power supply modules serve two purposes–they provide power to the system backplane and protect the system from noise and nominal voltage swings. All power supplies feature over-current and over-voltage protection. They operate in most electrically noisy environments without the need for external isolation transformers. In the event of an unforseen loss of power, the power supplies ensure that the system has adequate time for a safe and orderly shutdown.

A power supply converts the incoming power source to a regulated +5 V d.c. to support the CPU, the local I/O and any communication option modules mounted in the backplane. Power between the field sensors/actuators and the Quantum I/O points is not provided by these power supply modules.

If your Quantum system is being used in a standalone (local I/O) or remote I/O control architecture, three types of power supplies are available:

- Low-power standalone power supplies.
- High-power summable power supplies.
- High-power redundant power supplies.

If your Quantum system is being used in a distributed I/O architecture, special low-power standalone power supplies, which are dedicated to distributed architectures and are integrated into distributed I/O adapter modules, are available. Distributed power supplies are described in the DIO architecture section of this catalog.

Characteristics of the power supply types

Standalone power supplies

A standalone power supply delivers 3 A of power to a Quantum backplane.When your control system has low-power requirements, a standalone power supply is an economical choice. Standalone supplies are available for115/230 V a.c., 24 V d.c.and 125 V d.c. source voltages.

Summable power supplies

A summable power supply delivers 8 A of power to a Quantum backplane. Summable supplies can operate in either a standalone or summable mode. Whenever two summable supplies are combined in the same backplane, they automatically operate in summable mode–delivering 16 A of power to the backplane. In summable mode, the two supplies must be the same model and they should be placed in the left and right edge slots of the backplane for maximum life. If one of the two supplies fails, power is lost to the backplane.

If only one summable power supply is placed in a backplane, it functions in standalone mode–delivering 8 A to the backplane.

Summable power supplies are available for 115/230 V a.c., 24 V d.c. and 48/60 V d.c. source voltages.

Redundant power supplies

A redundant power supply delivers 8 A of power to a Quantum backplane. For high-availability applications, two redundant power supplies in a backplane deliver 8 A of redundant power. In the event that one supply fails, the healthy one maintains the necessary power so that backplane processing and active communications are not affected. Each redundant supply has a status bit that can be monitored by the CPU's application program or by a supervisory system so that you can respond quickly in the event of a power supply failure.

If additional power is required in a redundant power supply configuration, a third redundant supply module can be added to the backplane - increasing the total redundant power capacity to 16 A. Should one of the three supplies fail, the two healthy modules will revert to the standard redundant mode–delivering 16 A of redundant power to the backplane.

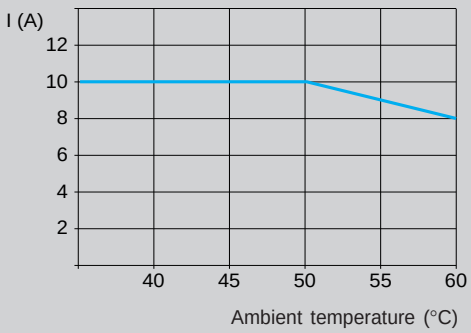
A single redundant power supply module may be used as a standalone supply if you need to reduce your stockroom requirements.

Redundant power supplies are available for 115/230 V a.c., 24 V d.c., 48/60 V d.c. and 125 V d.c. source voltages.

Description

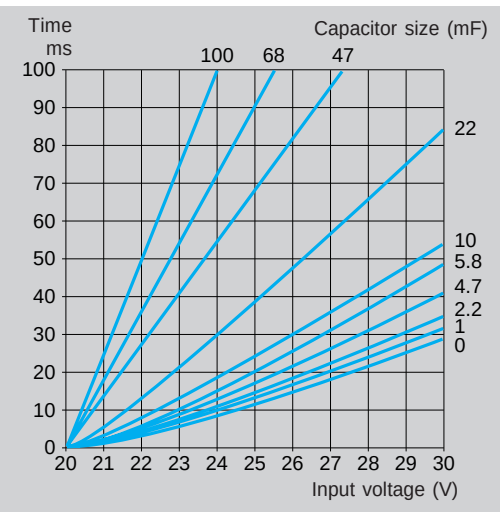
1 Model number and color code
2 LED array
3 Removable, hinged door and customer identification label
4 Terminal block

Temperature range



The bus current has a guaranteed minimum value valid for the entire temperature range (up to 60 °C). This chart, for a 140 CPS 114 10 standalone V a.c. supply, shows that a power supply module can provide significantly more power at lower temperatures.

Maximum power interruption



The buffer processing times for the CPS 214 00, CPS 224 00, CPS 414 00, and the CPS 424 00 power supplies can be increased by adding V d.c. electrolytic capacitors at terminals 5 and 6. Respective capacitor ratings are shown in this diagram.

Power supply modules

Characteristics

Characteristics for V a.c. and V d.c. source voltages

Model			140 CPS 111 00 (1)	140 CPS 114 10 (2)	140 CPS 124 00 (3)
Input Requirements					
	Input voltage	~ V	100…276	93…138 or 170…276	93…138 or 170…276
	Input frequency	Hz	47…63	47…63	47…63
	Input current				
	@ c 230 V	A	0.2	0.6	0.6
	@ c 115 V	A	0.4	1.1	1.1
	Inrush current				
	@ c 230 V	A	20	19	19
	@ c 115 V	A	10	38	38
	Rating	VA	50	130	130
	External fusing	A	1.5 slow-blow	2.0 slow-blow	2.0 slow-blow
	Input power		1/2 cycle @ full load and minimum line voltage/frequency, and		
	Interruption		less than 1 s between interrupts		
	Harmonic distortion	%	Less than 10 of fundamental rms value		
Output-to-bus	Voltage	⎓ V	5.1	5.1	5.1
	Current	A	3 max, 0.3 min	8 @ 60 °C	8 @ 60 °C
	Protection		Over-current, over-range		
General	Internal power dissipation	W	2.0 + (3 x I_{OUT}) where I_{OUT} is in A	6.0 + (1.5 x I_{OUT}) where I_{OUT} is in A	6.0 + (1.5 x I_{OUT}) where I_{OUT} is in A

Module Type			140 CPS 211 00 (1)	140 CPS 214 00 (2)	140 CPS 224 00 (3)
requirements	Input voltage	⎓ V	20…30	20…30	20…30
	Input current	A	1.6	3.8 max	3.8 max
	Inrush current	A	30	25 @ a 24 V, 14 @ a 20 V	25 @ a 24 V, 14 @ a 20 V
	Input ripple	⎓ V	–	94…189 Hz	94…189 Hz
	Input power	ms	1.0 @ a 20 V	1.0 @ a 20 V	1.0 @ a 20 V
	Interruption		20.0 @ a 25 V	100 ms maxi with external condensateur	
	External fusing (recommended)	A	2.5 slow-blow	5.0 slow-blow	
Output-to-bus	Voltage	⎓ V	5.1	5.1	
	Current	A	3 max, 0.3 min	8.0	
	Protection		Over-current, over-range		
General	Surge withstand	⎓ V	–		2.3 x max rated input voltage for 1.3 ms
	Internal power dissipation	W	2 + (3 x I_{OUT}), where I_{OUT} is A	6 + (1.8 x I_{OUT}), where I_{OUT} is A	
	Alarm relay		N	Y	

Module Type			140 CPS 414 00 (2)	140 CPS 424 00 (3)	140 CPS 511 00 (1)	140 CPS 524 00 (3)
Input requirements	Input voltage	⎓ V	48…60	48…60	100…150	100…150
	Input current	A	3.8 max	3.8 max	0.4	0.5 @ a 125 V
	Inrush current	A	14 @ a 40 V	14 @ a 40 V	10	28 @ a 125 V
	Input power interruption	ms	13.0 @ a 48 V	13.0 @ a 48 V	1.0 max	1.0 max
	External fusing (recommended)	A	2.0, medium time lag	2.0, medium time lag	3/4 slow-blow	2 slow-blow
Output-to-bus	Voltage	⎓ V	5.1 V	5.1 V	5.1 V	5.1 V
	Current	A	8.0	8.0	3 max, 0.3 min	8.0
	Protection		Over-current, over-range			
General	Internal power dissipation	W	15.6 @ 8 A	17.2 @ 8 A	2 + (3 x I_{OUT}) where I_{OUT} is A	6 + (1.5 x I_{OUT}) where I_{OUT} is A
	Alarm relay		Y	Y	N	N

Device Type : (1) standalone, (2) summable, (3) redundant.

References

Power supplies

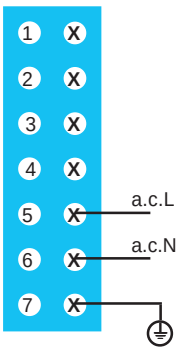
Input Voltage/Power	Type	Reference	Weight kg (lb)
~ 120/230 V, 3 A	Standalone	**140 CPS 111 00**	0.650 (1.43)
~ 120/230 V, 8 A	Summable	**140 CPS 114 10**	0.650 (1.43)
~ 120/230 V, 8 A	Redundant	**140 CPS 124 00**	0.650 (1.43)
⎓ 24 V, 3 A	Standalone	**140 CPS 211 00**	0.650 (1.43)
⎓ 24 V, 8 A	Summable	**140 CPS 214 00**	0.650 (1.43)
⎓ 24 V, 8 A	Redundant	**140 CPS 224 00**	0.650 (1.43)
⎓ 48 ... 60 V, 8 A	Summable	**140 CPS 414 00**	0.650 (1.43)
⎓ 48 ... 60 V, 8 A	Redundant	**140 CPS 424 00**	0.650 (1.43)
⎓ 125 V, 3 A	Standalone	**140 CPS 511 00**	0.650 (1.43)
⎓ 125 V, 8 A	Redundant	**140 CPS 524 00**	0.650 (1.43)

Accessories

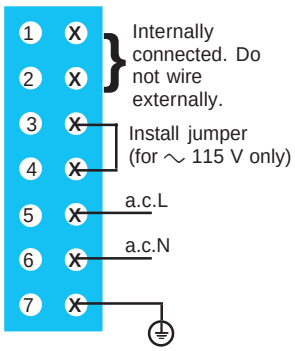
Power connector	IP20 rated	**140 XTS 001 00**	0.150 (0.33)

External wiring

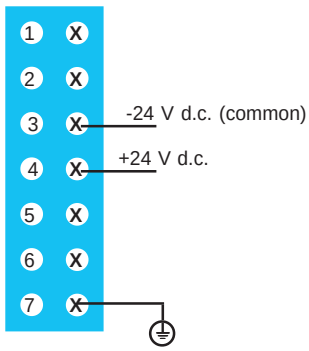
140 CPS 111 00



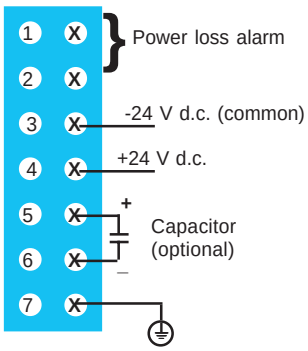
140 CPS 114 10
140 CPS 114/124 00



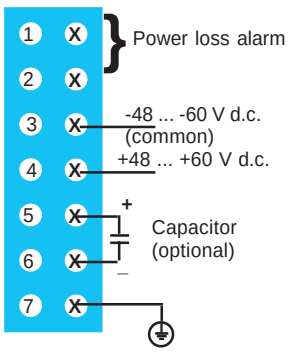
140 CPS 211 00



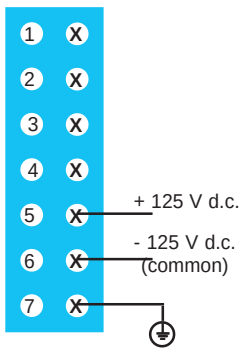
140 CPS 214/224 00



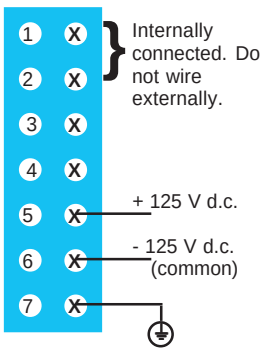
140 CPS 414/424 00



140 CPS 511 00



140 CPS 524 00



2 Discrete I/O

Contents

Quantum Automation Platform

Discrete I/O

V d.c. input modules
Selection guide

Type	⎓		
Input Voltage	5 V/TTL	24 V	
			
Number of Points	32		
Number of Groups	4		
Points/Common	8		
Isolation	by group		
Addressing Requirements	2 input words		
Bus Power Required	170 mA	330 mA	
Logic	Source	Sink	Source
Model	140 DDI 153 10	140 DDI 353 00	140 DDI 353 10
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⎓				
24 V	125 V	10…60 V		20…30 V
				
96	24	16	32	
6	3	8	8	4
16	8	2	4	8
6 input words	2 input words	1 input word	2 input words	4 input words
270 mA	200 mA		300 mA	250 A
Sink				
140 DDI 364 00	140 DDI 673 00	140 DDI 841 00	140 DDI 853 00	140 DSI 353 00

Quantum Automation Platform

Discrete I/O

V a.c. input modules
Selection guide

Type		~			
Input Voltage		24 V		48 V	
					
Number of Points		16	32	16	32
Number of Groups		16	4	16	4
Points/Common		1	8	1	8
Isolation		individual points	by group	individual points	by group
Addressing Requirement		1 input word	2 input words	1 input word	2 input words
Bus Power Required		180 mA	250 mA	180 mA	250 mA
Model		140 DAI 340 00	140 DAI 353 00	140 DAI 440 00	140 DAI 453 00
Page		48204/22			

~

115 V			230 V	
				
16		32	16	32
16	2	4	16	4
1	8		1	8
individual points	by group		individual points	by group
1 input word		2 input words	1 input word	2 input words
180 mA		250 mA	180 mA	250 mA
140 DAI 540 00	140 DAI 543 00	140 DAI 553 00	140 DAI 740 00	140 DAI 753 00

Quantum Automation Platform

Discrete I/O

V d.c. and relay output modules
Selection guide

Type	⎓			
Output voltage/ Relay type	5 V/TTL	24 V		19.2...30 V
				
Number of points	32			96
Number of groups	4			6
Points/common	8			16
Maximum load **Current /point** **Current /group** **Current /module**	25 mA 600 mA 2.4 A			0.25 A
Addressing requirement	2 output words			6 output words
Bus power required	350 mA	330 mA		250 mA
Logic	sink	source	sink	source
Module	140 DDO 153 10	140 DDO 353 0●	140 DDO 353 10	140 DDO 364 00
Page	48204/22			

⎓			Relay	
10 ... 60 V source	24 ... 125 V source	10…30 V	Normally open	Normally open/ Normally closed
				
16	12	32	16	8
2	6	4	16	8
8	2	8	1	
2 A 6 A 12 A	0.75 A 3 A 6 A	0.5 A 4 A 16 A	2 A N/A N/A	5 A N/A N/A
1 output word				0.5 output word
160 mA	375 mA @ 6 points on 650 mA @ 12 points on	500 mA	1100 mA	560 mA
source				
140 DDO 843 00	140 DDO 885 00	140 DVO 853 00	140 DRA 840 00	140 DRC 830 00
	48204/16	48204/16	48204/22	

Quantum Automation Platform

Discrete I/O

V a.c. output modules
Selection guide

Type	~	
Output voltage	24 ... 230 V	24 V ... 115 V
		
Number of points	16	
Number of groups	16	
Points/common	1	
Maximum load **Current /point** **Current /group** **Current /module**	4 A @ 20-132 VAC, 8 A @ 170-253 VAC N/A 16 A	4 A @ 20-132 VAC N/A 16 A
Addressing requirement	1 output word	
Bus power required	350 mA	
Module	140 DAO 840 00	140 DAO 840 10
Page	48204/22	

~		
100 ... 230 V	24 ... 48 V	24 ... 230 V
		
		32
4		
4		8
4 A @ 20-132 VAC, 8 A @ 170-253 VAC 4A 16 A	4 A @ 20-56VAC 4 A 16 A	1 A 4 A 16 A
		2 output words
		320 mA
140 DAO 842 10	140 DAO 842 20	140 DAO 853 00

Quantum Automation Platform

Discrete I/O

V a.c. input/output modules
Selection guide

Output voltage	~ 85...132 V	⎓ 19.2...30 V
Input voltage	~ 132 V	⎓ 30 V
		
Number of points	16 input / 8 output	
Number of groups	Two 8-point inputs Two 4-point outputs	
Maximum load **current/point** **current/group** **current/module**	 4 A 4 A 8 A	 15 A 2 A 4 A
Addressing requirement	1 input word 0.5 output word	
Bus power required	250 mA	330 mA
Model	140 DAM 590 00	140 DDM 390 00
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⎓ 19.2...156.2 V

⎓ 156.2 V

4 input, 4 isolated output

One 4 point inputs
Four output points

4 A
N/A
16 A

1 input word
1 output word

350 mA

140 DDM 690 00

The Modicon TSX Quantum Automation Series supports a full range of discrete I/O modules designed to interface with a wide variety of field devices. All modules meet internationally accepted IEC electrical standards that ensure reliability in harsh operating environments. For even better protection and extended life in extremely harsh environments, you can have your modules conformally coated.

Fully software-configurable

All Quantum I/O modules can be completely configured using Concept or Modsoft. The ability to specify an I/O address for each module in software makes it easy to add or change modules in your configuration without physically changing the application program.

Defining the failure mode of an output module

Quantum gives you the ability to predefine how a discrete output point will respond if for any reason the module stops being serviced. You can configure the module in software so that the outputs:

- Turn off
- Go to a predefined safe state
- Hold the last value they received before the watchdog timer expired

Failure modes can be defined on a point-by-point basis. In the event of a complete module failure, the fail state settings you have specified can be sent to the replacement module.

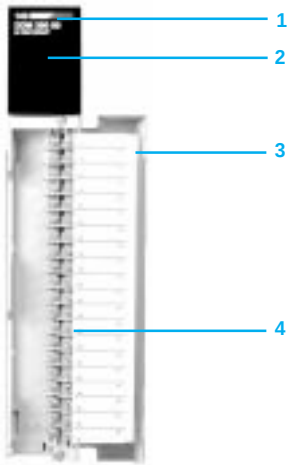
Mechanical keying for added security

Optionally, you can insert mechanical keys between the I/O module and the terminal strip to ensure that the field wiring and the module type are properly matched. Keying codes are unique for each module type. You can also implement mechanical keying for unique slot locations so that a rack full of similar modules with similar keying codes will not be incorrectly connected. Keys are shipped with the I/O modules. They do not need to be ordered separately.

I/O connectors

Each I/O module requires an I/O connector (P/N 140 XTS 002 00), which can be ordered separately. The same connector can be used with all modules.

Description



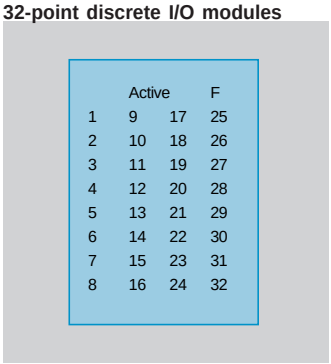
1 Model number and color code.
2 LED indicator panel.
3 Removable, hinged door and customer identification label.
4 Terminal block.

Sample LEDs

Visual status and diagnostic information

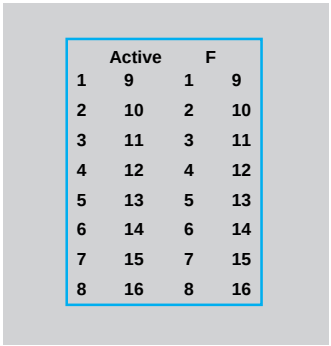
Extensive LED information is available on each module. Information includes activity on the I/O points and specific module features such as field wiring fault indication and blown fuses. Visual indication of comunication health is provided on an Active display, which can be used for troubleshooting.

32-point discrete I/O modules



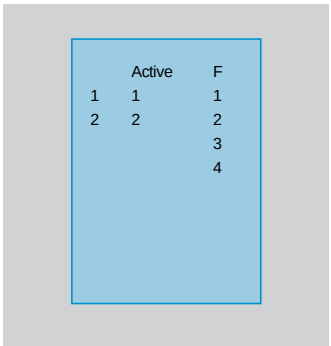
LED	Color	Indication when on
Active	green	Bus communication is present
F	red	External fault detected
1…32	green	The respective input/output is turned on

16-Point discrete I/O modules



LED	Color	Indication when on
Active	green	Bus communication is present been detected
F	red	A fault (external to the module) has been detected
1 ... 16	green	The indicated point or channel is turned on
1 ... 16	red	There is a fault on the indicated point or channel

Discrete Bi-directional modules



LED	Color	Indication when on
Active	green	Bus communication is present
F	red	No voltage supply for outputs or inputs out of tolerance
1 and 2 left row	green	Output is turned on
1 and 2 middle row	red	Fault detected on the output point
1…4 right row	red	Fault detected on the input point

Discrete I/O

Characteristics

V a.c. input specifications

Model			140 DAI 540 00	140 DAI 543 00	140 DAI 553 00	140 DAI 740 00	140 DAI 753 00
Number of inputs			16	16	32	16	32
Number of groups			16	2	4	16	4
Inputs/group			1	8	8	1	8
Input voltage		~	115 V			230 V	
LEDs			Active 1…16 (green)	Active 1…16 (green)	Active 1…32 (green)	Active 1…16 (green)	Active 1…32 (green)
Addressing requirements		**words**	1 input	1 input	2 input	1 input	2 input
Operating input							
50 Hz	on	~	85…132 V			175…264 V	170...264 V
	off		0...20 V			0...40 V	0...40 V
	current	**mA**	11.1 max			9.7 max	2.6 max
	impedance	**kΩ**	14.4 capacitive			31.8 capacitive	32
60 Hz	on	~	79…132 V			165...264 V	158...264 V
	off		0...20 V			0...40 V	0...40 V
	current	**mA**	13.2 max			11.5 max	
	impedance	**kΩ**	12 capacitive			26.5 capacitive	27
Frequency range		**Hz**	47…63				
Maximum leakage current		**mA**	2.1			2.6	
Absolute maximum input							
	continuous	~	132 V			264 V	264 V
	10 s		156 V			300 V	312 V
	one cycle		200V			400 V	400 V
Response time							
Off - on	minimum	**ms**	4.9				
	maximum		0.75 x line cycle				
On - off	minimum		7.3				
	maximum		12.3				
Isolation		~	1780 V for 1 min input-to-input 1780 V for 1 min input-to-bus	1780 V for 1 min group-to-group 1780 V for 1 min group-to-bus	1780 V for 1 min group-to-group 1780 V for 1 min group-to-bus	1780 V for 1 min input-to-input 1780 V for 1 min input-to-bus	1780 V for 1 min group-to-group 1780 V for 1 min group-to-bus
Bus current requirement		**mA**	180	180	250	180	250
Power dissipation		**W**	5.5 max	5.5 max	10.9 max	5.5 max	5 max
Fusing							
	Internal		none				
	External		user discretion				

Discrete I/O

Characteristics (continued)

V d.c. input specifications

Model			140 DDI 364 00	140 DSI 353 00
Number of inputs			96	32
Number of groups			6	4
Points/group			16	8
Input voltage		⎓	24	24
LEDs			Active 32…64 1…32 (green) indicates input state	Active 2green, failure 1 red 1…32 (green) indicates input state
Addressing requirements			96 points or 6 words	4 inputs words
Voltage				
	On voltage	⎓	+ 15…+ 30	11 min
	Off voltage	⎓	– 3…+ 5	5 max
	On curent	**mA**	2.5 min	2.5 min
	Off current	**mA**	0.7 max	1.2 max, 0.3 min
Absolute maximum input				
	Continuous	⎓	30	30
	Surge	⎓	50, dropping pulse	45 Vp for 10 ms @ - 3…30
Response time				
	Off - On	**ms**	2 max	2.2
	On - Off	**ms**	3 max	3.3
Fault sensing			–	Broken wire detection below 0.15 mA Off current
Fault status			–	Broken wire detection for each input
Insulation resistance		∼	500 rms for 1 minute	–
Internal resistance		**k**	6.7	–
Isolation	Point to point	–	No	
	Inputs to backplane		–	Yes
	Group to group		–	Yes
Operating temperature		**C (F)**	–	0 °…60 ° (32 °…140 °)
Bus current requirement		**mA**	< 270	300
Power dissipation		**W**	1.35 + (0.13x nbr of ON inputs)	–
External power supply		⎓	19.2…30	20…30 at 20 mA per group
Agency approvals			–	UL, CSA, CE, FM class 1, div. 2

Discrete I/O

Characteristics (continued)

V d.c. input specifications

Model		140 DDI 841 00		140 DDI 853 00		140 DDI 673 00
Number of inputs		16		32		24
Number of groups		8		4		3
Points/group		2		8		8
Input voltage	⎓ V	10...60				88…150
LEDs		Active 1…16 (green)		Active 1….32 (green)		Active 1….24 (green)
Addressing requirements		1 input word		2 inputs words		1 input word
On state current						
@ ⎓ 12 V	mA	5...10				2.5 mini at ⎓ 125 V
@ ⎓ 24 V	mA	6...30				
@ ⎓ 48 V	mA	2...15				
@ ⎓ 60 V	mA	1...5				
Group supply/tolerance		on state	off state	on state	off state	
⎓ 12 V / + / -5%	V	9...12	0...1.8	9...12	0...1.8	–
⎓ 24 V / -15...+20%	V	11...24	0...5	11...24	0...5	–
⎓ 48 V / -15...+20%	V	34...48	0...10	34...48	0...10	–
⎓ 60 V / -15...+20%	V	45...60	0...9	45...60	0...12.5	–
Absolute maximum input	⎓ V	75				–
Response time						
Off - On	ms	4				0,7 (defaults filter), 1,2 (optional filter)
On - Off		4				0,7 (defaults filter), 1,2 (optional filter)
Switching frequency	Hz	100 max				
Isolation						
Group-to-group	⎓	700 V for 1 min				
Group-to-bus		2500 V for 1 min				
Bus current requirement	mA	200		300		
Power dissipation	W	1 + (0.25 x # of points on)				
External power (U_s)	⎓	10...60 V (group supply)				
Fusing						
Internal		none				
External		user discretion				
Logic		sink				

Characteristics (continued)

V a.c. input specifications

Model			140 DAI 340 00	140 DAI 353 00	140 DAI 440 00	140 DAI 453 00
Number of inputs			16	32	16	32
Number of groups			16	4	16	4
Points/group			1	8	1	8
Input voltage		~	24 V	24 V	48 V	48 V
LEDs			Active 1…16 (green)	Active 1…32 (green)	Active 1…16 (green)	Active 1…32 (green)
Addressing requirements		**words**	1 input	2 input	1 input	2 input
Operating input						
50 Hz	On	~	14…30 V		34…56 V	
	Off		0…5 V		0…10 V	
	Current	**mA**			.8 max	
	Impedance	**kΩ**	3.1 capacitive		6.8 capacitive	
60 Hz	On	~	12…30 V		29…56 V	
	Off		0…5 V		0…10 V	
	Current	**mA**	13.2 max		11.7 max	
	Impedance	**kΩ**	2.6 capacitive		5.6 capacitive	
Frequency range		**Hz**	47…63			
Maximum leakage current		**mA**	1.9		1.7	
Absolute maximum input						
	Continuous	~	30 V		56 V	
	10 s		32 V		63 V	
	One cycle		50 V		100 V	
Response Time						
Off - On	Minimum	**ms**	4.9			
	Maximum		0.75 x line cycle			
On - Off	Minimum		7.3			
	Maximum		12.3			
Isolation		~	1780 V for 1 min input-to-input 1780 V for 1 min input-to-bus	1780 V for 1 min group-to-group 1780 V for 1 min group-to-bus	1780 V for 1 min input-to-input 1780 V for 1 min input-to-bus	1780 V for 1 min group-to-group 1780 V for 1 min group-to-bus
Bus current requirement		**mA**	180	250	180	250
Power dissipation		**W**	5.5 max	10.9 max	5.5 max	10.9 max
Fusing						
	Internal		none			
	External		user discretion			

Characteristics (continued)

V d.c. input specifications

Model		140 DDI 153 10	140 DDI 353 00/140 DDI 353 01	140 DDI 353 10
Number of inputs		32		
Number of groups		4		
Points/group		8		
Input voltage	⎓	5 V TTL	24 V	
LEDs		Active 1…32 (green)		
Addressing requirements		2 input words		
Operating input				
Voltage on	⎓	0.8 V	+ 15...30 V	- 15...30 V (reference from group supply)
Voltage off		4 V min @ U_S= 5.5 V	- 3...+ 5 V 3 V min @ U_S= 4.5 V	0...- 5 V (reference from group supply)
Current on	**mA**	4.0 @ U_S= 5.5 V and U_{IN}=0	2.0 min	2.5 min 14 max
Current off		–	0.5 max	0.5 max
Internal resistance	**kΩ**	7.5	2.5	2.4
Leakage current	**µA**	200 @ U_S= 5.5 V and U_{IN}=4 V	–	
Absolute maximum input				
Continuous	⎓	5.5 V	30 V	30 V
1.0 ms		–	–	50 V decaying pulse
1.3 ms		15 V decaying pulse	56 V decaying pulse	–
Response time				
Off - on	**µs**	250 max	1000 max	
On - off		500 max	1000 max	
Input protection		Resistor limited		
Isolation				
Group-to-group	~	500 V rms for 1 min		
Group-to-bus		1780 V rms for 1 min		
Bus current requirement	**mA**	170	330	
Power dissipation	**W**	5	1.7 + (0.36 x # of points on)	1.5 + (0.26 x # of points on)
External power (U_S)	⎓	4.5...5.5 V	none	19.2...30 V
Fusing				
Internal		none		
External		user discretion		
Logic		source	sink	source

Discrete I/O

Characteristics (continued)

V a.c. output modules specifications

Model			**140 DAO 840 00**	**140 DAO 842 10**	**140 DAO 842 20**
Number of outputs			16	16	
Number of groups			16	4	
Points/group			1	4	
Voltage (rms)					
	Working	~	20...253 V	85...253 V	20...56 V
	Absolute maximum	~	300 V for 10 s 400 V for 1 cycle		63 V for 10 s 100 V for 1 cycle 111 V peak for 1.3 ms
	Frequency	**Hz**	47...63		
	On state drop/point	~	1.5 V		
LEDs			Active 1...16 (green) - indicates point status	Active F 1...16 (green) - indicates point status 1 - 4, 5 - 8, 9 - 12, 13 - 16 (red) - indicates group blew a fuse or no field power	
Addressing requirements			1 output word		
Operating output (rms)		~	20...253 V	85...253 V	20...56 V
	On state drop/point		1.5 V	1.5 V	1.5 V
Frequency range		**Hz**	47...63		
Absolute maximum output		~	300 V for 10 s 400 V for 1 cycle		63 V for 10 s 100 V for 1 cycle 111 V peak for 1.3 ms
Minimum load current (rms)		**mA**	5		
Maximum load current (rms)					
	Per point	**A**	4 continuous, 20...132 V 3 continuous, 170...253 V	4 continuous, 85...132 V 3 continuous, 170...253 V	4 continuous, 20...56 V
	Four contiguous points	**A**	4 continuous	–	
	Per group	**A**	–	4 continuous	
	Per module*	**A**	16 continuous		
	Off state leakage/ point (max)	**mA**	2.5 @ 230 V 2.0 @ 115 V 1.0 @ 48 V 1.0 @ 24 V	2.5 @ 230 V 2.0 @ 115 V	1.0
Maximum surge current (rms)			per point		per group
	One cycle	**A**	30		45
	Two cycles	**A**	20		30
	Three cycles	**A**	10		25
Applied DV/DT		~	400 V/µs		
Response Time					
	Off - on	**ms**	.50 max of one line cycle		
	On - off	**ms**	.50 max of one line cycle		
Output protection (internal)			RC snubber suppression		
Isolation (rms)					
	Group-to-group	~	–	1000 V for 1 min, galvanically isolated	
	Output-to-output	~	1500 V for 1 min	–	
	Output-to-bus	~	1780 V for 1 min	1780 V for 1 min	
Fault detection			–	blown fuse detect, loss of field power	
Bus current requirement		**mA**	350		
Power dissipation		**W**	1.85 W + 1.1 V x total module load current		
External power (rms)		~	not required for this module	85...253 V	20...56 V
Fusing	Internal		none	5 A fuse for each group (Part # 043 502405 or equivalent)	
	External	**A**	5/point recommended	user discretion	

Characteristics (continued)

V a.c. and TTL output modules specifications

Model			140 DAO 840 10	140 DDO 153 10
Number of outputs			16 isolated	32 (four groups of 8)
LEDs			Active 1…16 (green) - indicates point status	Active F 1…32 (green) - indicates point status
Addressing requirements			1 output word	2 output words
Voltage (rms)				
	Working	~	20...132 V	–
	Absolute maximum	~	156 V for 10 s 200 V for 1 cycle	–
	Frequency	**Hz**	47...63	–
	On state drop/point	~	1.5 V	–
Output ratings				
	On level	⎓	–	.2 V (max) @ 75 mA sink
	Off level	⎓	–	^{V}out = ^{U}s - 1.25 V @ 1 mA source ^{V}out = ^{U}s - 3.2 V (min) @ 1 mA, ^{U}s = 4.5 V
Internal pullup resistor		Ω	–	440
Minimum load current (rms)		**A**	5	–
Maximum load current (rms)				
	Each point	**A**	4 continuous, 20...132 V	75 (sink)
	Each group	**A**	–	600
	Any 4 contiguous pts	**A**	4 max continuous for the sum of the four points	–
	per module	**A**	16 continuous	2.4
	Off state leakage/ points	**A**	2 @ 115 V max 1 @ 48 V max 1 @ 24 V max	–
Surge current maximum (rms)			per point	
	One cycle	**A**	30	–
	Two cycles	**A**	20	–
	Three cycles	**A**	10	–
	Each point	**mA**	–	750 @ 500 µs duration (no more than 6 per minute)
Applied DV/DT		~	400 V/µs	–
Response time				
	Off - on		0.50 of one line cycle max	250 µs (max) resistive loads
	On - off		0.50 of one line cycle max	250 µs (max) resistive loads
Output protection (internal)			RC snubber suppression, varistor	transient voltage suppression
Isolation (rms)				
	Output-to-output	~	1500 Vfor 1 minute	–
	Group-to-group	~	–	500 V for 1 minute
	Output-to-bus	~	1780 V for 1 minute	
Fault detection			–	blown fuse detect, loss of field power
Bus current required		**mA**	350	
Power dissipation		**W**	1.85 + 1.1 x total module load current	4
External power (U_S)		⎓	not required for this module	4.5...5.5 V continuous
Absolute voltage (U_S) max		⎓	–	15 V for 1.3 ms decaying voltage pulse
External power supply current		**mA**	–	400 + load current per point
Fusing	Internal		None	(Modicon part # 043508953)
	External		Each output point must be fused with an external fuse. The recommended fuse is a 5 A fuse (part # 043502405 or equivalent) or any other fuse with an I^2T rating of less than 87.	none

Characteristics (continued)

V d.c. output module specifications

Model			140 DDO 364 00	140 DDO 885 00	140 DVO 853 00
Number of outputs			96	12	32
Number of groups			6	2	4
Points/group			16	6	8
LEDs			Active + 32, +64 1…32 (green) - indicates output state	Active failure 1 red 1...12 (green) - indicates point or channel is On 1...12 (red) - indicates output point has an over-current condition	Active 1 green, failure 1 red 1...32 (green) indicates output state
Addressing requirements			96 points or 6 words	1 output word and 1 input word	1 output word
Voltage	Output	⎓	–	24…125	10....30
	Absolute (max)	⎓	–	–	50 for 1.0 ms decaying voltage pulse
	Working	⎓	–	19.2...156.2 including ripple	–
	On state drop/point	⎓	< 0.5 V @ 0.5 A	0.75 @ 0.5 A	0.4 @ 0.5 A
Maximum load current					
	Each point	**A**	0.25	0.75 @ < 40 ° C	0.5
	Each group	**A**	4.0	3.0 @ 0…60 ° C	4.0
	Per module	**A**	24.0	6.0 @ 0...60 ° C	16.0
Surge current maximum					
	Each point	**A**	–	4 @ 1 ms pulse (no more than 6 per minute)	2.5 @ 1 ms pulse (no more than 6 per minute)
Response time (resistive loads)					
	Off - on	**ms**	< 0.1	1	1 typical, 2 max
	On - off	**ms**	< 0.1	1	1 typical, 2 max
Type of output			Electronic, protected against short circuit and overheating	–	–
Type of signal		⎓	24 true high, current source	–	–
Leakage current			1 mA @ ⎓ 24	–	–
Output protection (internal)			–	Group varistor and individual point overcurrent sense	Transient voltage suppression short circuit protection
Load inductance maximum		**Henry**	–	No limit (internal diode protected)	0.5 @ 4 Hz switching frequency
Tungsten load maximum		**W**	–	46 @ ⎓ 130 V	2.5 @ ⎓ 10 V
			–	41 @ ⎓ 115 V	3 @ ⎓ 12 V
			–	8 @ ⎓ 24 V	6 @ ⎓ 24 V
Switching frequency		**Hz**	–	50 maximum	–
Isolation	Field-to-bus	~	–	2500 V rms for 1 minute	–
	Group-to-group	~	–	1200 V rms for 1 minute	500 V for 1 minute
	Group-to-bus	~	–	–	1780 RMS for 1 minute
Fault	Detection		–	Over current	Blown fuse, loss of power incorrect output state
	Sensing		Yes	–	
	Reporting		Yes	–	
Bus current requirement		**mA**	< 250	375 (6 points On) 650 (12 points On)	500
External power		⎓	19.2...30 V	None	10...30 V
Fusing	Internal	**A**	–	4.0 A	5.0 A fuse per group
	External		–	Not required	Not required

Characteristics (continued)

V d.c. output module specifications

Model		140 DDO 353 00	140 DDO 353 10/140 DDO 353 01		140 DDO 843 00
Number of outputs		32 (4 groups of 8)			16 (2 groups of 8)
LEDs		Active F 1…32 (green) indicates point status			Active 1...16 (green) - indicates point status
Addressing requirements		2 output words			1 output word
Voltage					
Operating (max)	⎓	19.2...30 V			10.2...72 V
Absolute (max)	⎓	56 V for 1.3 ms decaying voltage pulse	–		72 V continuous)
1.0 ms	⎓	–	50 V decaying pulse		–
On state drop/point	⎓	0.4 V @ 0.5 A			1 V max @ 2 A
Maximum load current					
Each point	**A**	0.5			2
Each group	**A**	4			6
Per module	**A**	16			12
Off state leakage/point	**mA**	0.4 @ 30 V			1 @ 60 V max
Surge current maximum					
Each point	**A**	5 @ 500 µs duration (no more than 6 per minute)	5 @ 1 ms duration (no more than 6 per minute)		7.5 @ 50 ms duration (no more than 20 per minute)
Response time (resistive loads)					
Off - on	**ms**	1 (max)			
On - off	**ms**	1 (max)			
Output protection (internal)		transient voltage suppression	transient voltage suppression	overload and short-circuit-proof through temperature supervision	over voltage (suppression diode)
Load inductance maximum	**Hz**	0.5 Henry @ 4 switch frequency or $L = \frac{0.5}{I^2 F}$ where:	L = Load Inductance (Henry) I = Load Current (A) F = Switching Frequency (Hz)		–
Load capacitance maximum	**µF**	50	–		–
Tungsten load maximum	**W**	–	12 @ 24 V		–
Isolation					
Group-to-group	⎓	500 V rms for 1 minute			700 V for 1 minute
Output-to-bus	⎓	1780 V rms for 1 minute			–
Group-to-bus	⎓	–	–		2500 V for 1 minute
Fault detection		blown fuse detect, loss of field power			–
Bus current requirement	**mA**	330	330 (max)		160
Power dissipation	**W**	1.75 + 0.4 V x total module load current	2.0 + (0.4 V x total load current)		1 + 1 V x total module load current
External power	⎓	19.2...30 V			10...60 V
Fusing					
Internal	**A**	5.0/group			8/group time-lag
External		5/group The group fuse is not guaranteed to protect each output switch for all possible overload conditions. 3/point recommended, (part #57-0078-000)			8/group Thegroup fuse is not guaranteed to protect each output switch for all possible overload conditions. 2/point recommended (Modicon fuse#: 57-0060-00)
Logic		source	sink		source

Characteristics (continued)

Relay output module specifications

Model		**140 DRA 840 00**	**140 DRC 830 00**
Number of outputs		16 normally open	8 normally open/normally closed pairs
LEDs		Active 1…16 (green) indicates point status	Active 1…8 (green) indicates point status
Addressing requirements		1 output word	0.5 output word
Voltage			
	~	20...250 V	
	⎓	5...30 V	
Working	⎓	30...150 V (reduced load current)	
Maximum load current	**A**		
Each point		2 max, at ~ 250 V or ⎓ 30 V @ 60˚C ambient resistive load 1 tungsten lamp load 1 @ a power factor of 0.4 1/8 hp @ ~ 125/250 V	5 max, at ~ 250 V, ⎓ 30 V @ 60˚C ambient resistive load 2 tungsten lamp load 3 @ a power factor of 0.4 1/4 hp @ ~ 125/250 V
Each point (30...150 V)	⎓	300 mA (resistive load) 100 mA (L/R = 10 msec)	300 mA (resistive 100 mA (L/R = 10 msec)
Maximum module current`	**A**	–	40
Minimum load current	**mA**	50 Note: minimum load current if the contact is used at rated loads of ⎓ 5...30 V or ~ 20...250 V	
Per point	**A**	2 max, at ~ 250 V or ⎓ 30 V @ 60˚C ambient resistive load	–
Maximum frequency (F)	**Hz**	–	30 resistive loads or $F = \frac{0.5}{I^2 L}$ where: L=Load Inductance (Henry) I=Load Current (A)
Surge current maximum			
Per point	**A**	10 capacitive load @ = 10 ms	20 capacitive load @ = 10 ms
Switching capability	**VA**	500 resistive load	1250 resistive load
Response time (resistive loads)			
Off - on	**ms**	10 (max)	
On - off	**ms**	20 (max)	
Relay contact life			
Mechanical operations		10,000,000	
Electrical operations		200,000 (resistive load @ max voltage and current)	100,000 (resistive load @ max voltage and current)
Electrical operations (⎓ 30...150 V)*		100,000, 300 mA (resistive load) 50,000, 500 mA (resistive load) 100,000, 100 mA (L/R = 10 msec) 100,000 Interposing Relay (Westinghouse Style 606B, Westinghouse type SG, Struthers Dunn 21 x 13 x P)	
Relay type		Form A	Form C, NO / NC contacts
Contact protection		Varistor, 275 V (internal)	Over voltage (suppression diode)
Isolation			
Channel-to-channel	~	1780 V rms for 1 minute	
Field-to-bus	~ ⎓	1780 V rms for 1 minute 2500 V for one minute	
Bus current requirement	**mA**	1100	560
Power dissipation	**W**	5.5 + 0.5 x N = Watts (where N = the number of points on)	2.75 W + 0.5 x N = Watts (where N = the number of points on)
External power		Not required for this module	
Fusing Internal		None	
External		User discretion	

Characteristics (continued)

Combo module specifications

Model		140 DAM 590 00	140 DDM 390 00	140 DDM 690 00
Number of inputs		16 (2 groups of 8)		**4 (1 group of 4)**
Number of outputs		8 (2 groups of 4)		4 isolated
LEDs		Active F (red) - no power applied to the group(s) or blown fuse 1…16 (green - right two columns) - indicates input status 1...8 (green - left column) - indicates output status		
Addressing requirements		1 in/0.5 out word		
Inputs				
Operating voltage				
On	⎓	∿ 85...132 V @ 50 Hz ∿ 79...132 V @ 60 Hz	⎓ + 15...+ 30 V	⎓ 88 ... 156.2 V, including ripple
Off	⎓	∿ 0...20 V	⎓ - 3...+ 5 V	⎓ 0 ... + 36 V
Impedance	kΩ	14.4 capacitive	2.5	–
Current				
On	mA	11.1 max @ 50 Hz 13.2 max @ 60 Hz	2.0 min.	2.0 min.
Off	mA	0.5 max.	0.5 max	1.2 max.
Leakage current from an external device recognized as an off condition	mA	2.1	–	–
Absolute maximum input voltage				
Continuous	⎓	∿ 132 V	⎓ 30 V	⎓ 156.2 V, including ripple
10 s	∿	156 V	–	–
1 cycle	∿	200 V	–	–
1.3 ms	⎓	-	56 V decaying pulse	–
Response time				
Off - on	ms	min 4.9 / max 0.75 line cycle	–	0.5 or 1.5 depending on the filter
On - off		min 7.3/ max 12.3 ms	–	0.5 or 1.5 depending on the filter
Outputs				
Voltage				
Operating (max)	⎓	-	19.2...30 V	19.2 ...156.2 V, including ripple
Absolute (max)	⎓	-	56 V for 1.3 ms decaying pulse	–
On state drop/point	⎓	-	0.4 V @ 0.5 A	0.75 V @ 4A
Absolute maximum outputs				
Continuous	∿	85...132 V	–	–
10 s	∿	156	–	–
1 cycle	∿	200	–	–
On state drop/point	∿	1.5 V	–	–
Minimum load current (rms)	mA	5	–	–
Maximum load current (rms)				
Per point	A	4 continuous	0.5	4 continuous
Per group	A	4 continuous	2	16 continuous
Per module	A	8 continuous	4	1.2 @ ⎓ 150 V
Off state leakage/point	mA	2 @ ∿ 115 V (max)	0.4 @ ⎓ 30 V	
Surge current maximum (rms)		/point /group		
One cycle	A	30 45	–	–
Two cycles	A	20 30	–	–
Three cycles	A	10 25	–	–
Per point	A	– –	5 for 500 µs (no more than 6/ min)	30 for 500 ms

Characteristics (continued)

Combo module specifications

Model		140 DAM 590 00	140 DDM 390 00	140 DDM 690 00
Outputs (continued) Load inductance max	**Henry**	–	0.5 @ 4 Hz switch frequency or $L = \frac{0.5}{I^2F}$ where L = load inductance I = load current (A) F = switching frequency (Hz)	For switching intervals ≥ 15 seconds per ANSI/IEEE C37.90-1978/1989): $L \leq \frac{9}{I^2}$ For repetitive switching: $L \leq \frac{0.7}{I^2F}$ where L = load inductance (Henry) I = load current (A) F = switching frequency (Hz)
Load capacitance max	**µf**	–	50	0.1 @ ⎓150 V 0.6 @ ⎓24 V
Applied DV/DT	**V/us**	400	–	–
Output protection		RC snubber suppression (internal)		
Common Frequency	**Hz**	47 ... 63	–	–
I/O response time				
On-off	**ms**	–	1 (max) resistive load output	–
Off-on	**ms**	–	1 (max) resistive load output	–
Module protection				
Inputs		–	resistor-limited	resistor-limited
Outputs		–	transient voltage suppression (internal)	transient voltage suppression (internal)
Isolation				
Group-to-group	∼	1000 V for 1 min	500 V rms for 1 min	–
Point-to-bus	∼	1780 V for 1 min	–	–
Group-to-bus	∼	–	1780 V for 1 min	2500 V RMS for 1 min
Input group-to-output	∼	–	–	1780 V RMS for 1 min
Output-to-output	∼	–	–	1780 V RMS for 1 min
Fault detection				
Input		none		
Output		blown-fuse detect, loss of field power		over current-each point
Bus current required	**mA**	250	330	350
Power dissipation	**W**	5.5 + 1.1 x total module load current	1.75 + 0.36 x input points on + 1.1 V x total output load currents	0.4 W x (1.0) x number of input points ON + (0.75) x total module output current
External power	∼	85…132 V for output groups	–	not required for this module
Fusing				
Input Internal		none		
External		user discretion		
Output Internal	**A**	5 fuse for each group		
External	**A**	user discretion	5 for each group to protect the module from catastrophic failure. Not guaranteed to protect each out-switch for all possible over-load conditions–we recommend that each point be fused with a 1.25 A fuse.	Each output is protected by an electronic shutdown: For current output surges between 4 A and 30 A, the input point will shut down after 0.5 s. For current surges greater than 30 A, the output will shut down immediately.

Discrete I/O

References

Discrete input modules

Voltage	Description	Logic	Reference	Weight kg (lb)
∼ 24 V	16 isolated inputs	–	**140 DAI 340 00**	0,300 (0.66)
	4 groups of 8 inputs	–	**140 DAI 353 00**	0,340 (0.75)
∼ 48 V	16 isolated inputs	–	**140 DAI 440 00**	0,300 (0.66)
	4 groups of 8 inputs	–	**140 DAI 453 00**	0,300 (0.66)
∼ 120 V	16 isolated inputs	–	**140 DAI 540 00**	0,310 (0.68)
	2 groups of 8 inputs	–	**140 DAI 543 00**	0,300 (0.66)
	4 groups of 8 inputs	–	**140 DAI 553 00**	0,330 (0.73)
∼ 230 V	16 isolated inputs	–	**140 DAI 740 00**	0,350 (0.77)
	4 groups of 8 inputs	–	**140 DAI 753 00**	0,300 (0.66)
⎓ 5 V TTL	4 groups of 8 inputs	source	**140 DDI 153 10**	0,450 (0.99)
⎓ 24 V	4 groups of 8 inputs	sink	**140 DDI 353 00**	0,300 (0.66)
		source	**140 DDI 353 10**	0,300 (0.66)
⎓ 24 V	6 groups of 16 inputs	sink	**140 DDI 364 00**	0,300 (0.66)
⎓ 125 V	3 groups of 8 inputs	sink	**140 DDI 673 00**	0,300 (0.66)
⎓ 10…60 V	8 groups of 2 inputs	sink	**140 DDI 841 00**	0,300 (0.66)
	4 groups of 8 inputs	sink	**140 DDI 853 00**	0,295 (0.65)
⎓ 24 V	4 groups of 8 inputs	sink	**140 DSI 353 00**	0,300 (0.66)

Discrete output modules

Voltage	Description	Logic	Reference	Weight kg (lb)
∼ 24…230 V	16 isolated outputs	–	**140 DAO 840 00**	0,485 (1.07)
∼ 24…115 V	16 isolated outputs	–	**140 DAO 840 10**	0,485 (1.07)
∼ 100…230 V	4 groups of 4 outputs	–	**140 DAO 842 10**	0,450 (0.99)
∼ 24…48 V	4 groups of 4 outputs	–	**140 DAO 842 20**	0,450 (0.99)
∼ 24…230 V	4 groups of 4 outputs	–	**140 DAO 853 00**	0,450 (0.99)
⎓ 5 V TTL	4 groups of 4 outputs	sink	**140 DDO 153 10**	0,450 (0.99)
⎓ 24 V	4 groups of 4 outputs	source	**140 DDO 353 00**	0,450 (0.99)
		source	**140 DDO 353 01**	0,450 (0.99)
		sink	**140 DDO 353 10**	0,450 (0.99)
⎓ 19.2…30 V	6 groups of 16 outputs	source	**140 DDO 364 00**	0,450 (0.99)
⎓ 24…125 V	2 groups of 6 outputs	source	**140 DDO 885 00**	0,450 (0.99)
⎓ 10…60 V	1 groups of 16 outputs	source	**140 DDO 843 00**	0,450 (0.99)
⎓ 150 V/∼ 250 V relay	16 relay outputs	normally open	**140 DRA 840 00**	0,410 (0.90)
	8 relay outputs	normally closed/open	**140 DRC 830 00**	0,300 (0.66)
⎓ 10…30 V	4 groups of 8 outputs	source	**140 DVO 853 00**	0,300 (0.66)

Discrete I/O

References (continued)

Discrete combination I/O modules

Number of input/output	Number of input	Number of output	Reference	Weight kg (lb)
24	2 groups of 8 inputs ∿ 125 V	2 groups of 4 output ∿ 125 V	**140 DAM 590 00**	0,450 (0.99)
	2 groups of 8 inputs (1) ⎓ 24 V	2 groups of 4 output (1) ⎓ 24 V	**140 DDM 390 00**	0,300 (0.66)
8	1 group of 4 inputs(1) ⎓ 125 V	1 group of 4 isolated outputs (2) ⎓ 125 V	**140 DDM 690 00**	0,300 (0.66)

Accessories

Description	Quantity	Reference	Weight kg (lb)
Terminal block, 40 points (required for all modules)	–	**140 XTS 002 00**	0,150
Dummy module without terminal block	–	**140 XCP 500 00**	–
Dummy module with cover	–	**140 XCP 510 00**	–
Jumper kit for terminal block	12	**140 XCP 600 00**	–
Discrete input simulator, 16 switches for the DAI 540 00 and DAI 740 00	–	**140 XSM 002 00**	–
Field I/O Power Connector (IP20 rated)	–	**140 XTS 005 00**	0,150 (0.33)

Spare parts

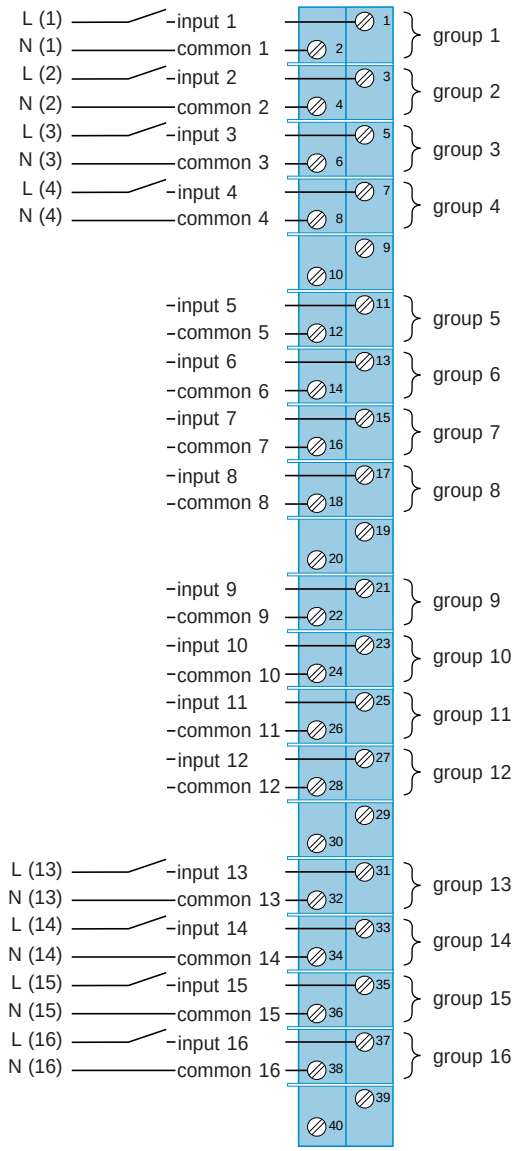
Coding kit for terminal block	60	**140 XCP 200 00**	–

(1) Sink.
(2) Sink or source.

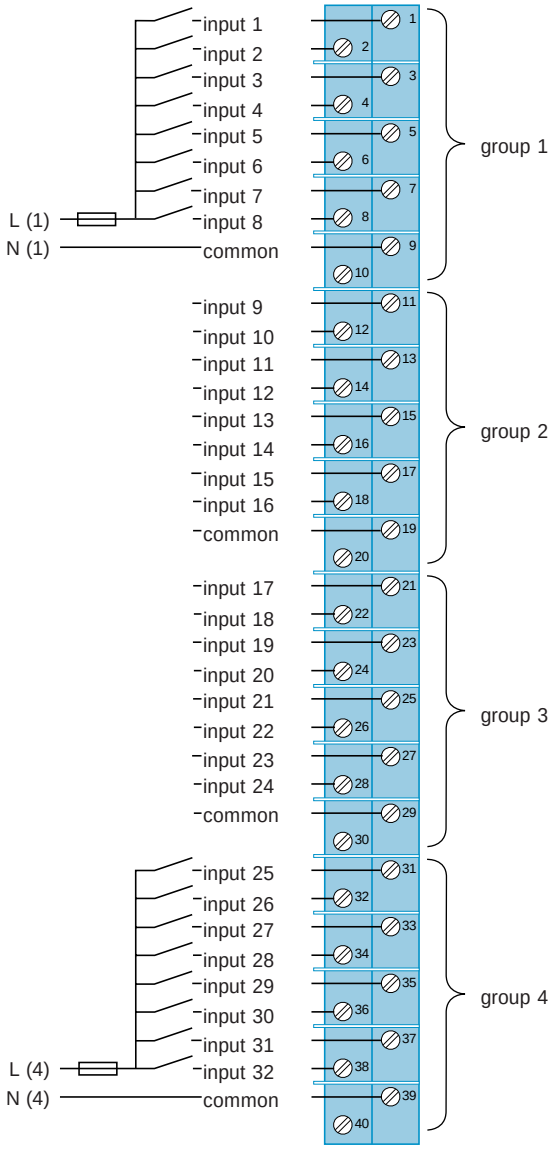
Discrete I/O

Input module wiring diagrams

140 DAI 340 00



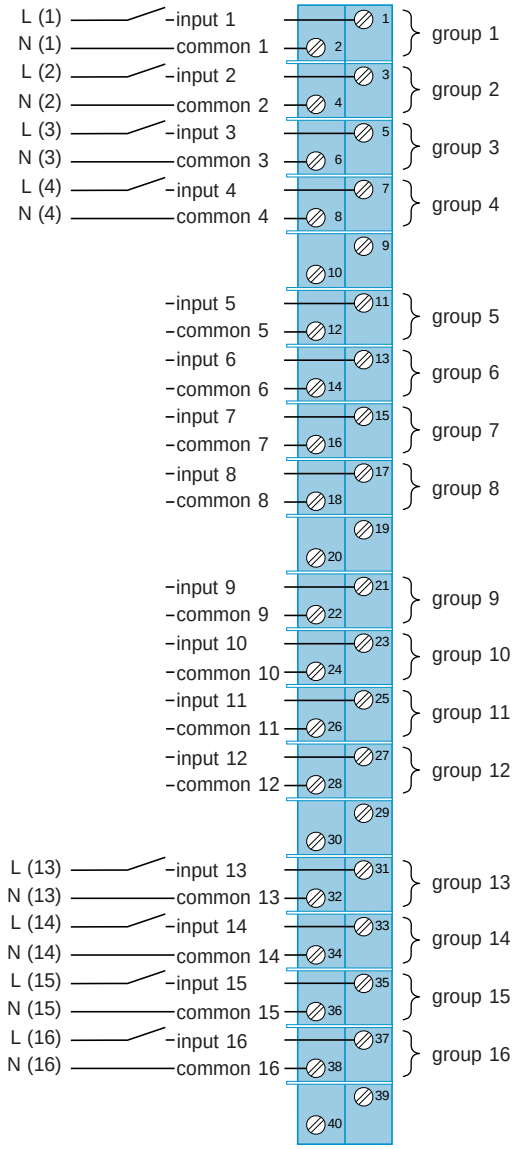
140 DAI 353 00



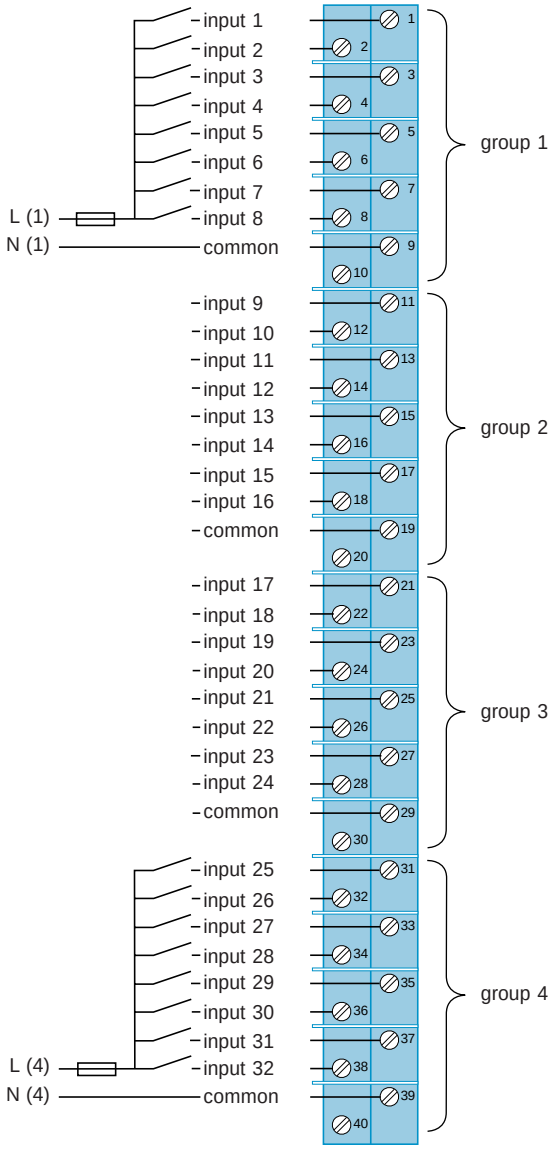
Discrete I/O

Input module wiring diagrams

140 DAI 540 00



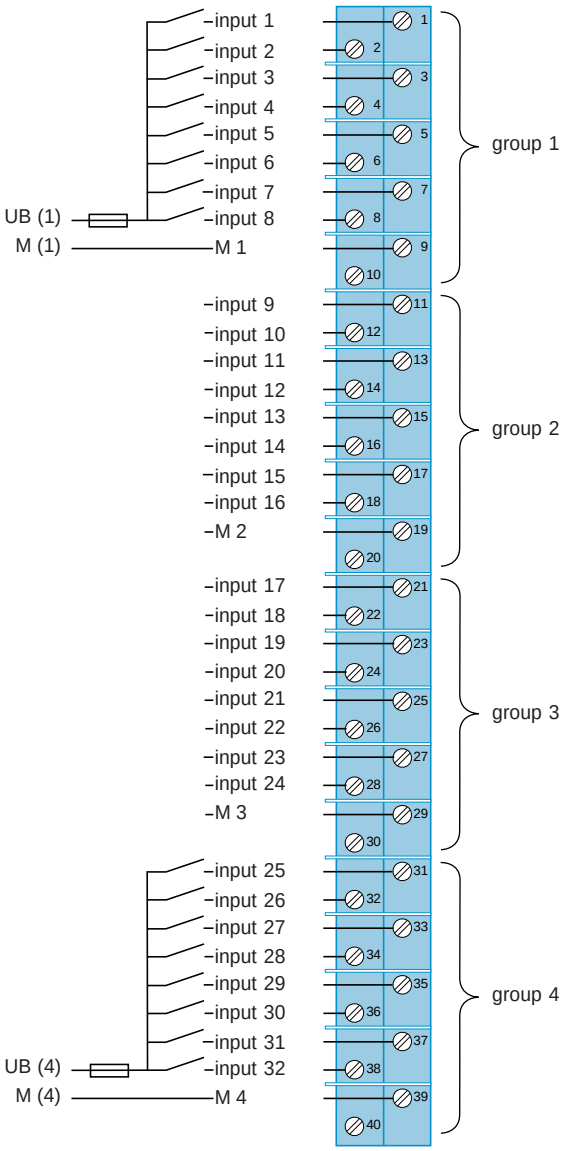
140 DAI 553 00



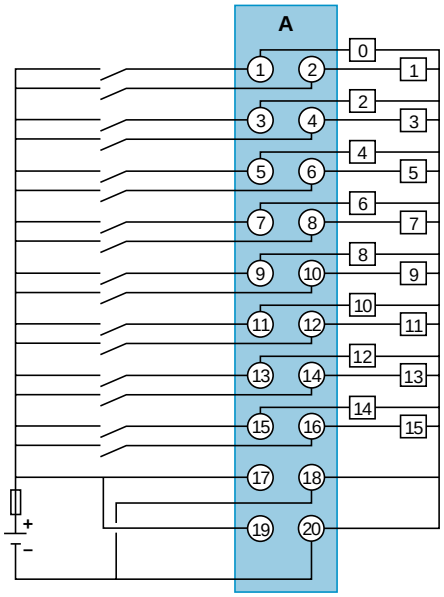
Discrete I/O

Input module wiring diagrams

140 DDI 353 00



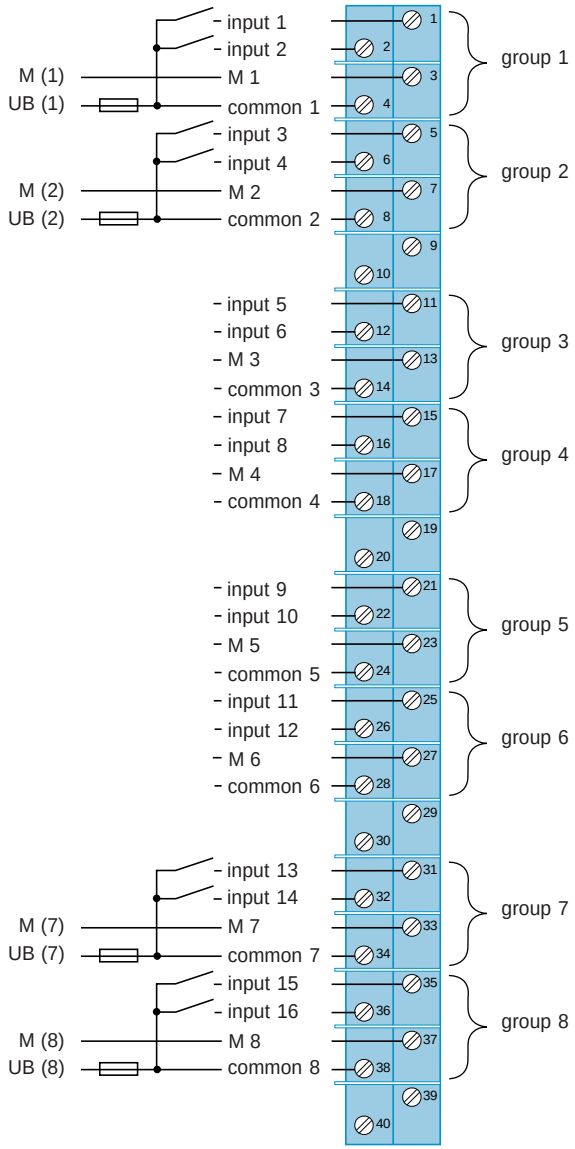
140 DDI 364 00



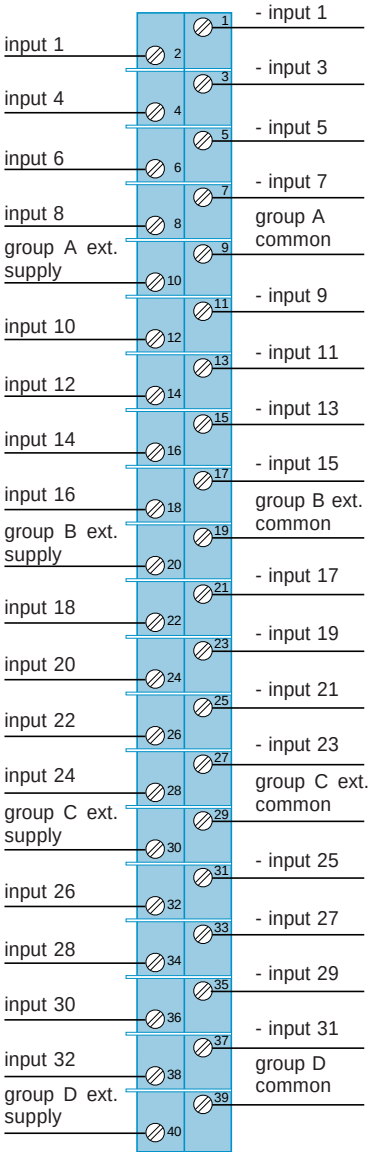
Discrete I/O

Input module wiring diagrams

140 DDI 841 00



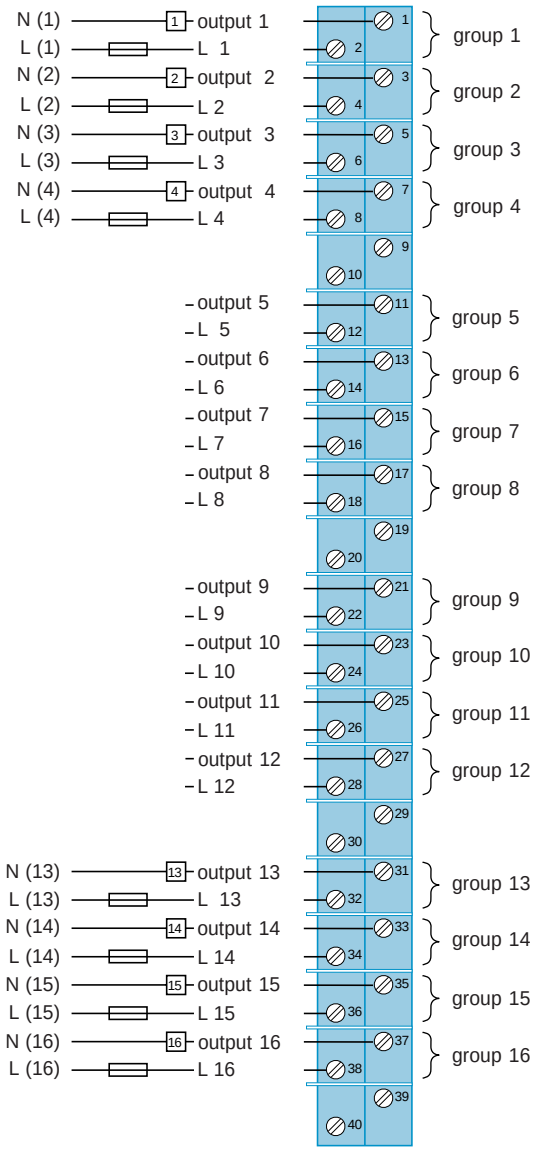
140 DSI 353 00



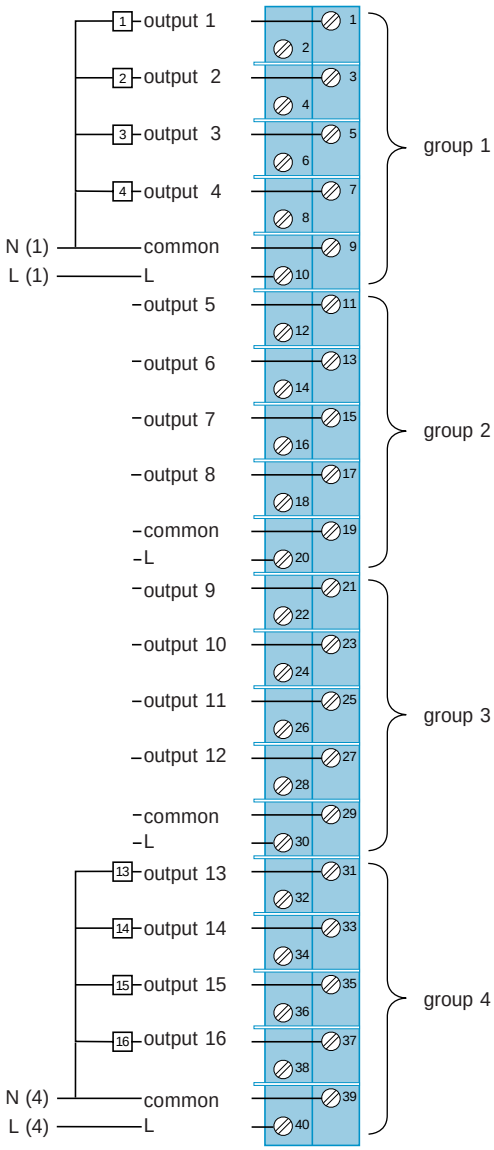
Discrete I/O

Output module wiring diagrams

140 DAO 840 00



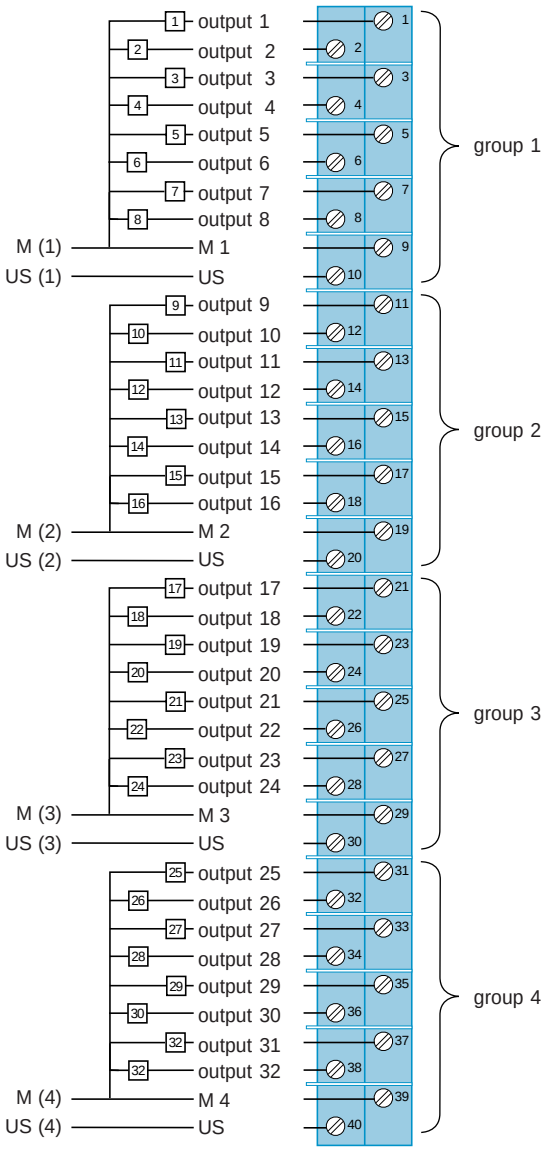
140 DAO 842 10



Discrete I/O

Output module wiring diagrams

140 DDO 353 00



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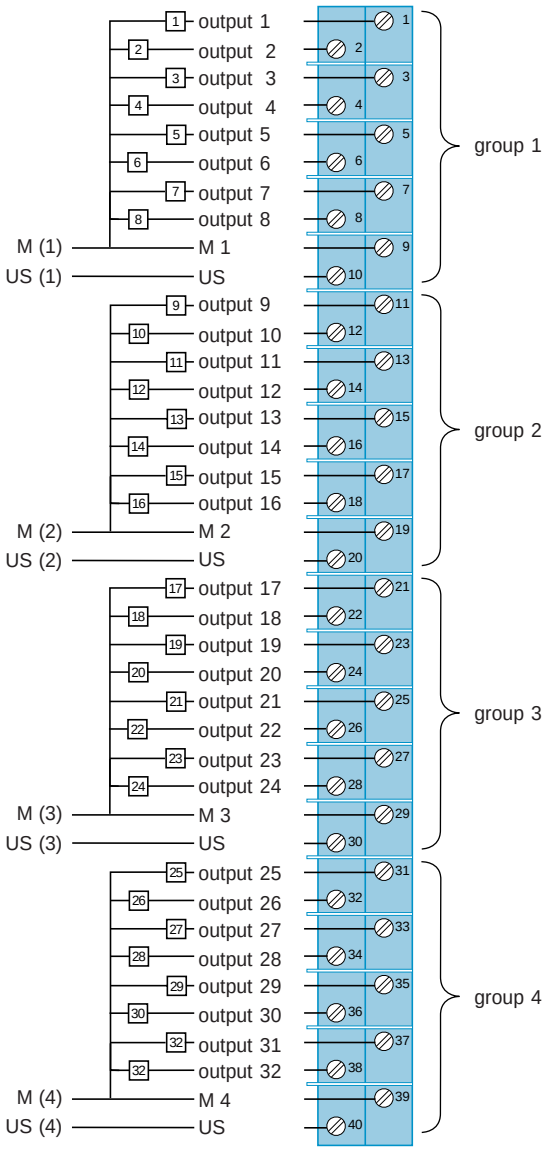
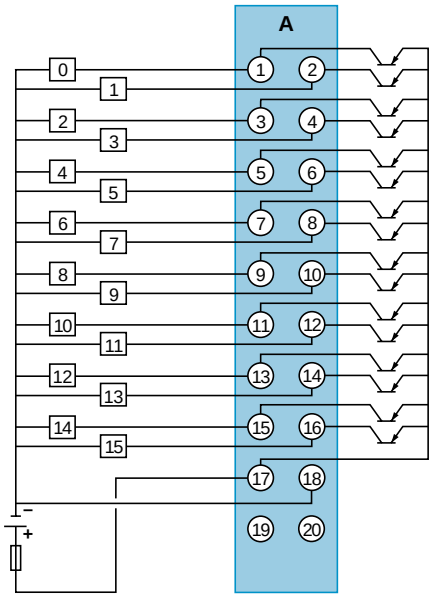


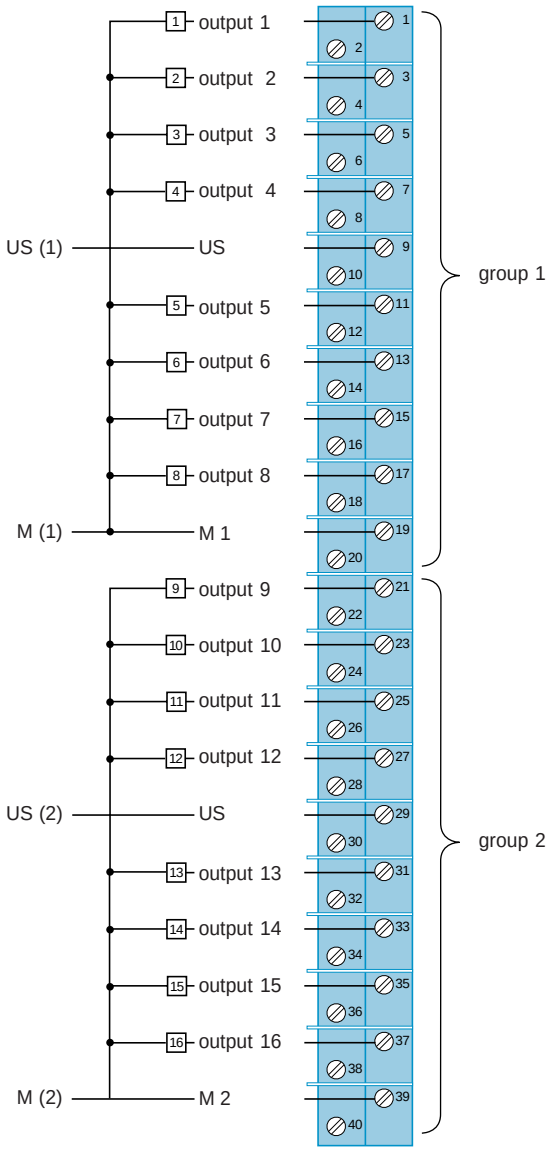
Discrete I/O

Output module wiring diagrams

140 DDO 364 00



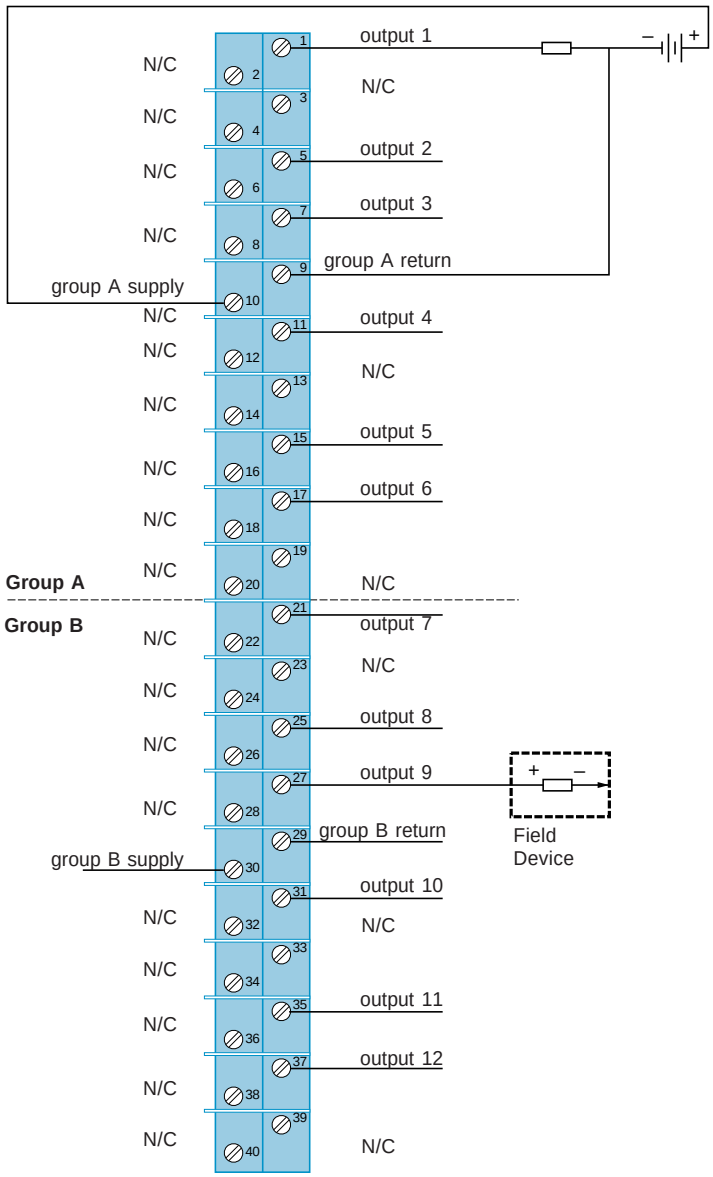
140 DDO 843 00



Discrete I/O

Output module wiring diagrams

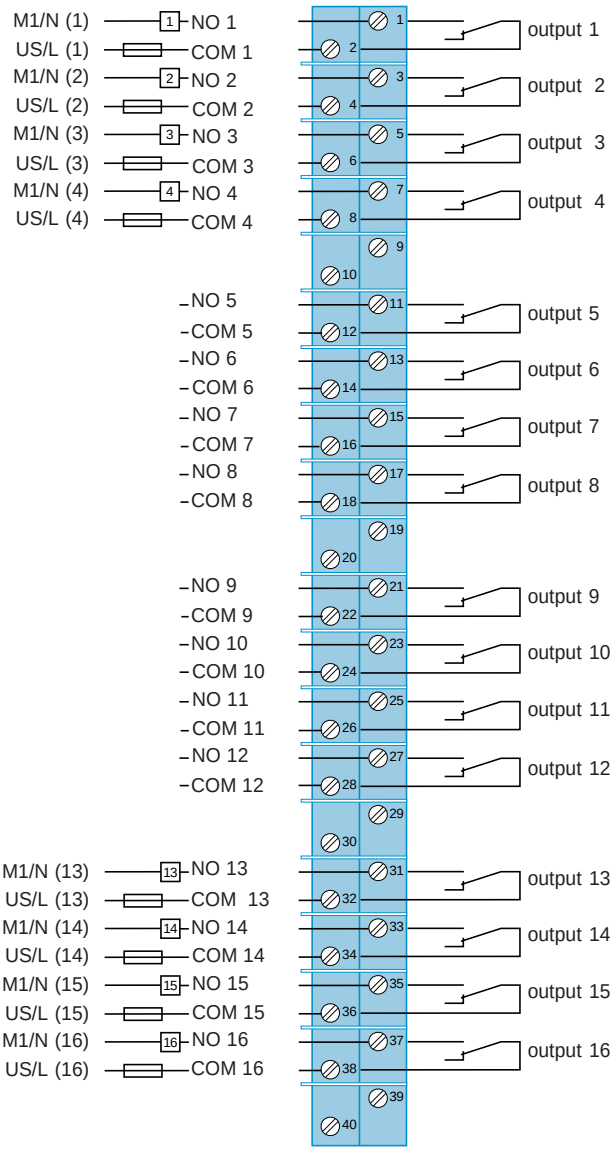
140 DDO 885 00



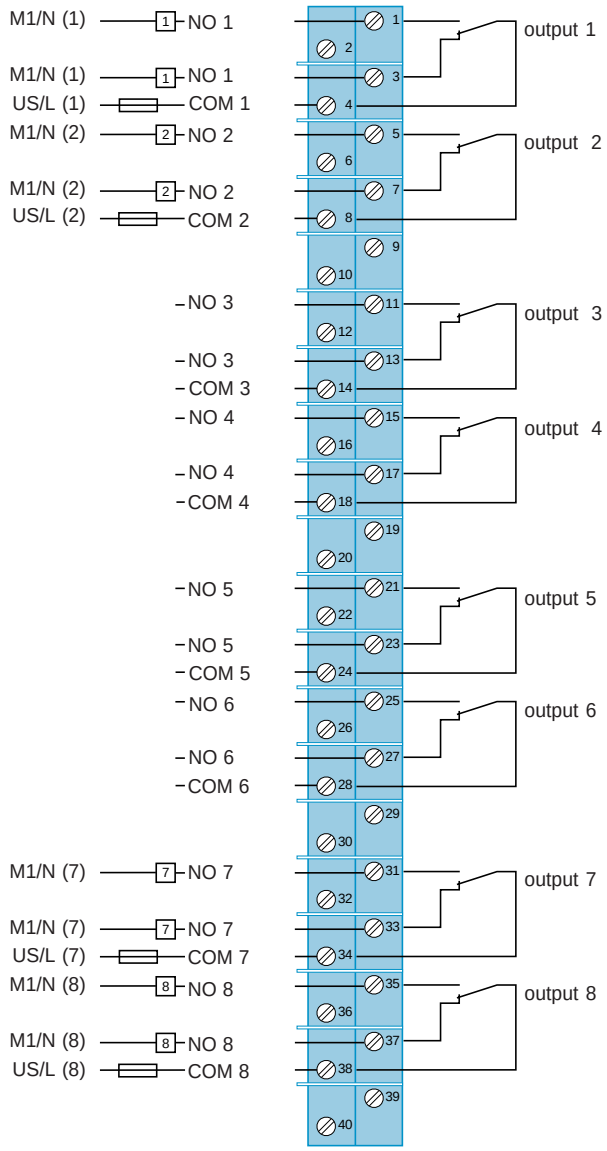
Discrete I/O

Relay output module wiring diagrams

140 DRA 840 00



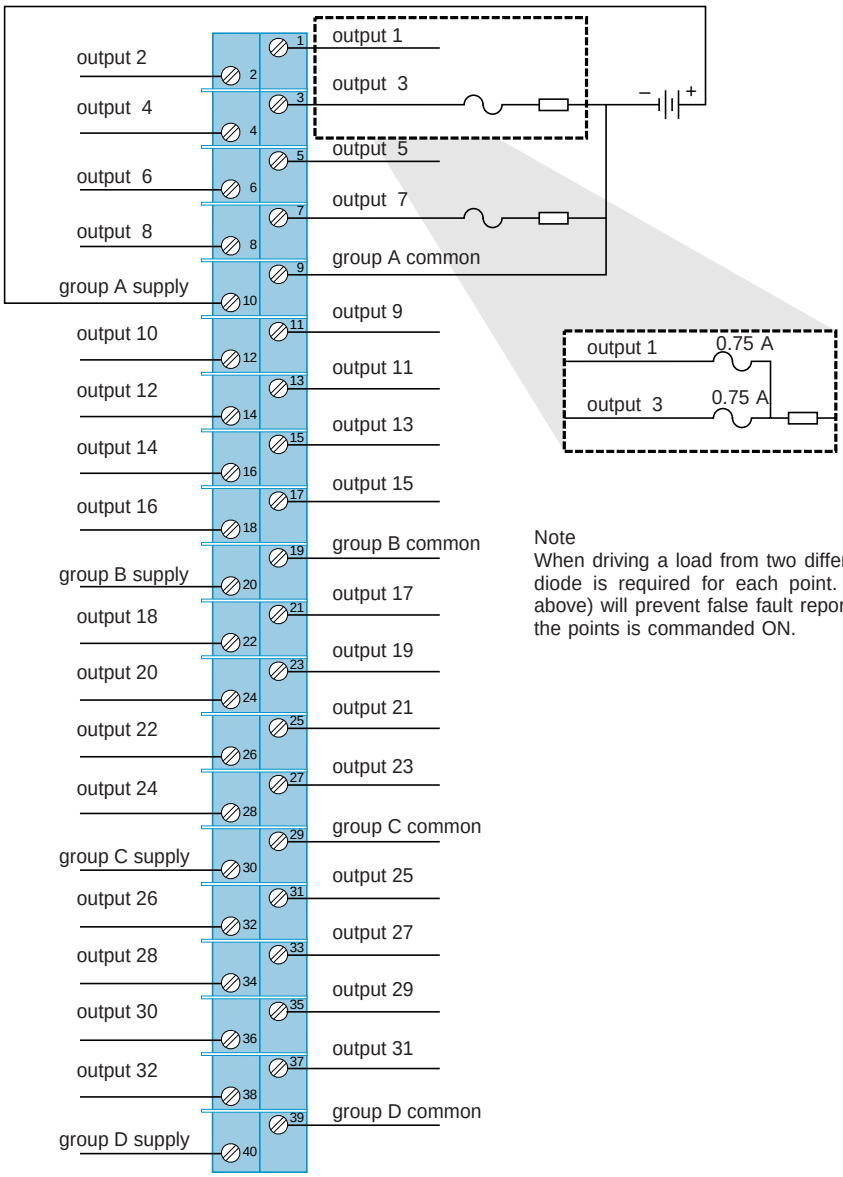
140 DRC 830 00



Discrete I/O

Relay output module wiring diagrams

140 DVO 853 00

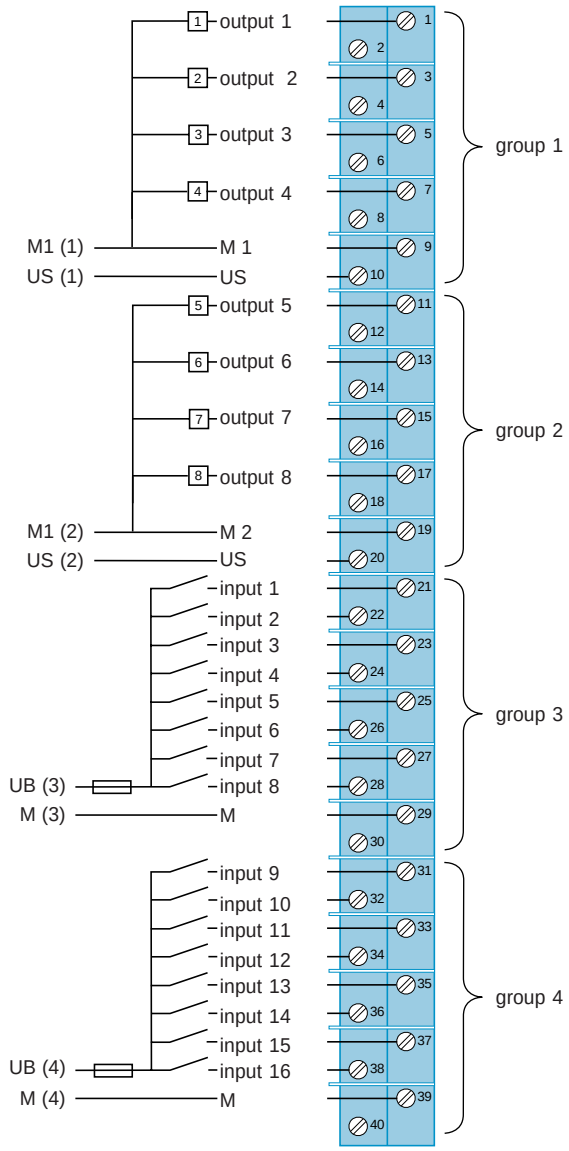


Note
When driving a load from two different points, a blocking diode is required for each point. These diode (shown above) will prevent false fault reporting when only one of the points is commanded ON.

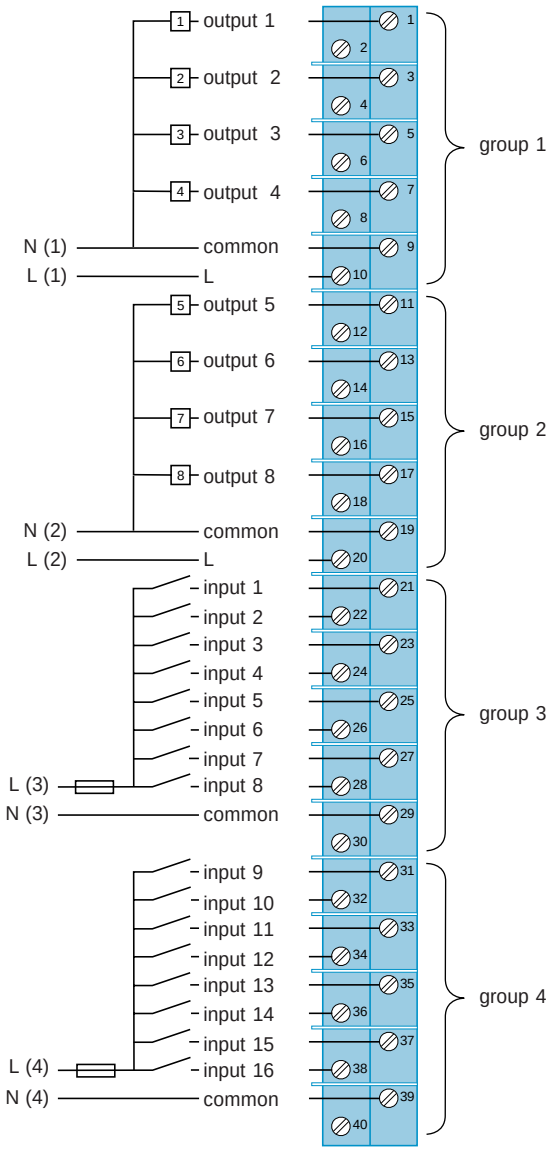
Discrete I/O

Combo module wiring diagrams

140 DDM 390 00



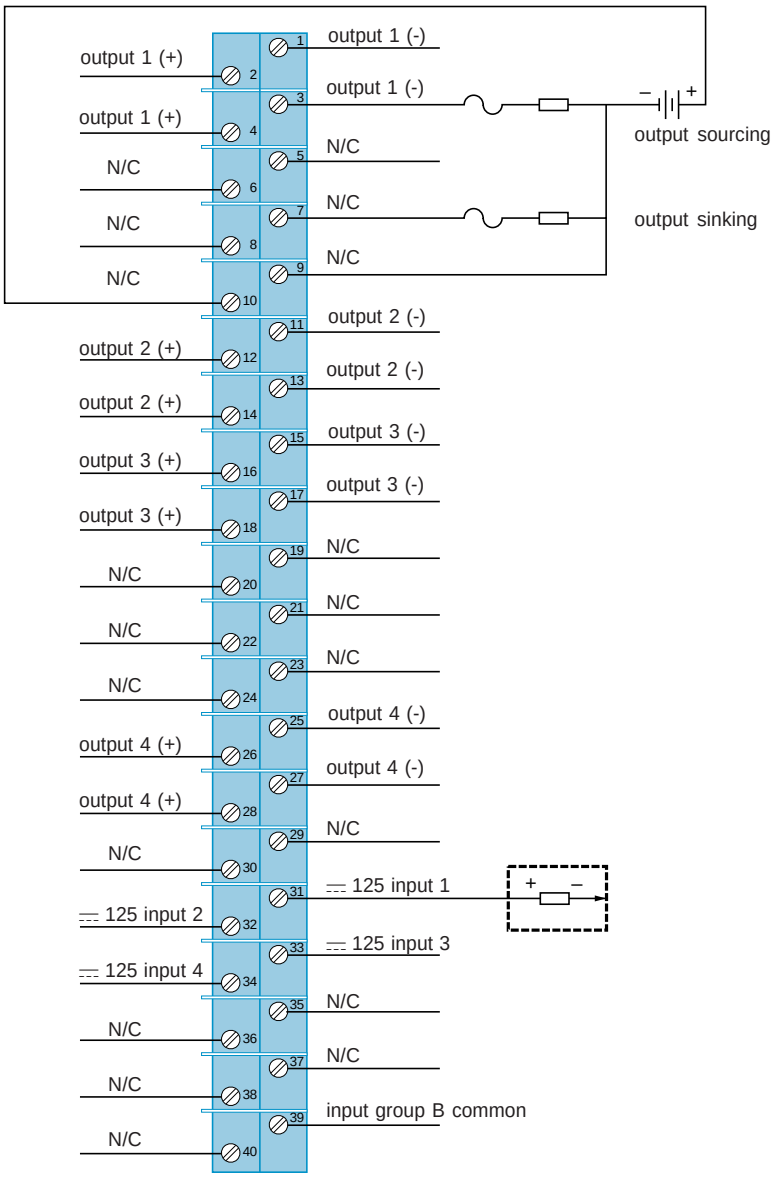
140 DAM 590 00



Discrete I/O

Combo module wiring diagrams

140 DDM 690 00



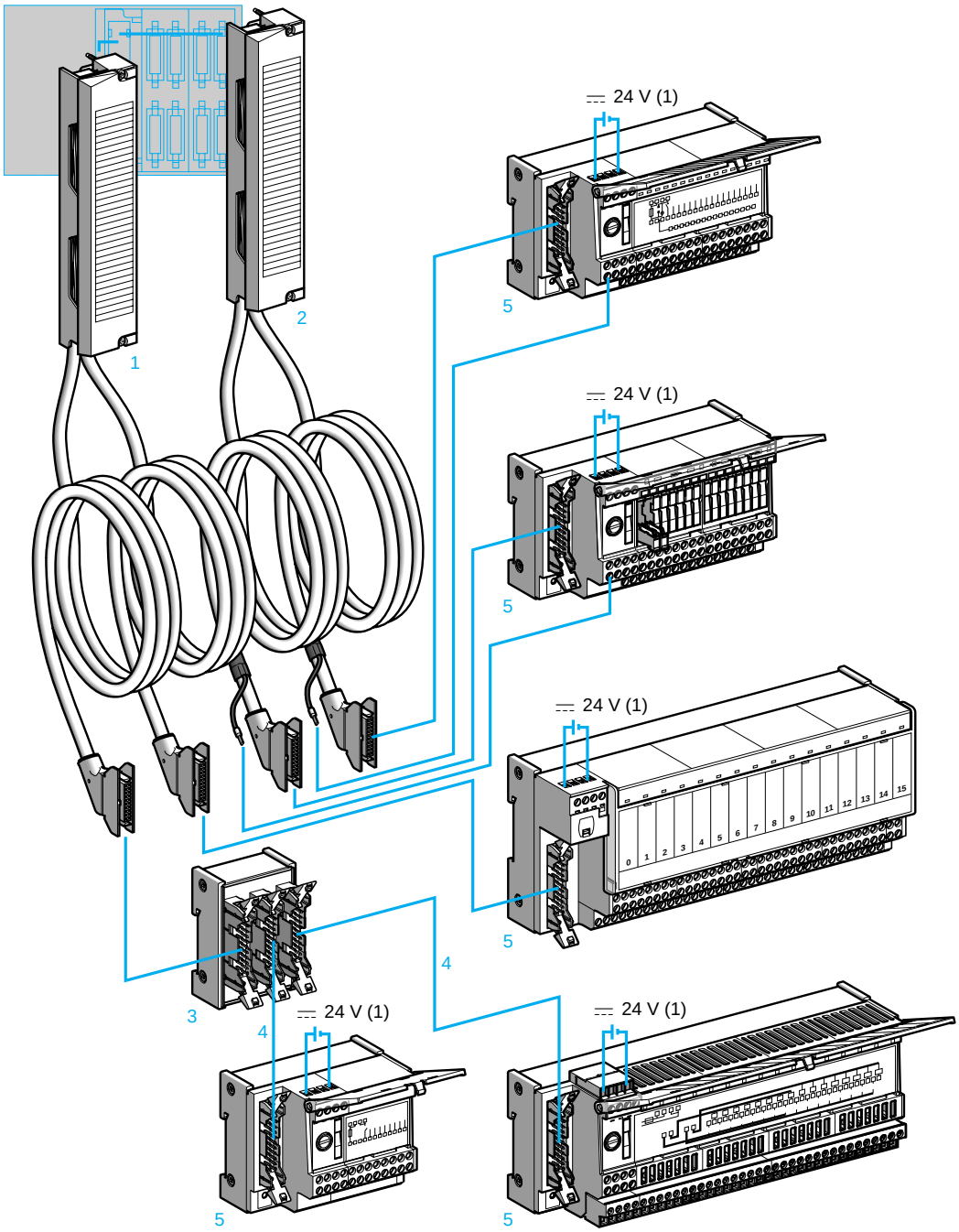
Caution:
The output points are not protected against reverse polarity. Reverse polarity will turn an output point ON.

Note 1:
Each output has terminals for multiple wire connections.

Note 2: N/C = Not Connected.

Telefast® 2 pre-wired system
Connector cables for Modicon PLCs

Presentation



1-2 Cabled connectors combine a standard terminal block equipped with screw terminals, two multicore (AWG 22) cables and two 20-way HE 10 connectors. Two cabled connectors are available for the Quantum range and two others for the 984-A120-Compact range.
The 4 products have the following functions :
- ABF-M32H●●0 **1** for Quantum relay inputs or outputs, with 2 x HE 10 connectors each integrating 16 channels.
- ABF-M32H●●1 **2** for outputs directly connected to the Quantum, with 2 x HE 10 connectors each integrating 16 channels and an external power supply with a direct connection to the output terminal marked 1.
- ABF-M16H●●0 for 984-A120-Compact inputs or relay outputs, with 1 x HE 10 connector each integrating 16 channels.
- ABF-M16H●●1 for 984-A120-Compact directly connected outputs, with 2 x HE 10 connectors each integrating 8 channels.

3 The splitter sub-base ABE-7ACC02 may be used to connect sub-bases with 8-channel modularity.

4 A single type of cable equipped with 20-way HE 10 connectors irrespective of the 8, 12 or 16-channel modularity. The HE 10 connectors may be moulded (TSX-CDP●●●) or self-perforating (ABF-H20H●●●).

5 8 and 16-channel sub-bases from the Telefast 2 range.

(1) The ⎓ 24 V power supply is connected using Telefast 2 sub-bases only. The ⎓ 0 V connections must be equipotential.

Telefast® 2 pre-wired system
Modicon PLC and NUM numeric control I/O modules with interface sub-bases

Compatibility

I/O modules		Modicon PLCs											NUM numerical controls			
		984-A120-Compact					Quantum						NUM 1050/1060		NUM 1020	
		Inputs		Outputs			Discrete Inputs	Discrete Outputs	Analogue Inputs	Analogue Outputs			Inputs/Outputs		Inputs/Outputs	
		16		16			32	32	8	4			64 + 48		32 + 24	
		DEP 220 DEO 216 DEP 216	DEP 217	DAO 216 DAP 216	DAO 216 DAP 216	DAP 217	DDI 353 DDI 853	DDO 353	140 AVI 03000 140 ACI 03000	140 AVO 02000	140 ACO 02000		64 I	48 O	32 I	24 O
Connection terminal blocks		Included											NUM cables not supplied			
Cabled connectors	ABF-	M16 H●●0		M16 H●●1			M32 H●●0	M32 H●●1	M08 S201	M04 S200	M04 S201		– –	– –	– –	– –
Splitter sub-bases	ABE-7	–		–			–	–	–				ACC04	ACC05	ACC04	ACC05
Connection sub-bases																
8 channels	ABE-7H08R●●	(5)	(1) (5)			(1)	(2)						(2)		(2)	
	ABE-7H08S21	(5)											(2)		(2)	
12 channels	ABE-7H12R●●															
	ABE-7H12S21															
16 channels	ABE-7H16R●●		(1)													
	ABE-7H16S21															
	ABE-7H16R23						(4)									
	ABE-7H16F43															
	ABE-7H16S43						(3)									
Input adaptation sub-bases																
16 channels	ABE-7S16E2●●															
	ABE-7P16F3●●															
	ABE-7P08T330							(2)								
Output adaptation sub-bases																
8 channels	ABE-7S08S2●●															
	ABE-7R08S●●●							(2)								
	ABE-7P08T330							(2)								
16 channels	ABE-7R16S●●●															
	ABE-7R16T●●●															
	ABE-7P16T●●●															
	ABE-7S16S●●●															
Sub-bases for analogue/counter I/O																
	ABE-7CPA01															
	ABE-7CPA02															
	ABE-7CPA03															
	ABE-7CPA21															
	ABE-7CPA31															

(1) With Telefast 2 sub-bases with no channel LED.
(2) With the splitter sub-base ABE-7ACC02.
(3) Only with module DDI 853.
(4) Only with module DDI 353
(5) With the splitter sub-base ABE-7ACC02 or with a cabled connector ABF-M16H●●1 directly.
Pre-wired cabled connectors

Telefast® 2 pre-wired system
Passive connection sub-bases

References

Passive connection sub-bases for discrete signals

ABE-7H16R50

ABE-7H16R31

ABE-7H16●43

Function	No. of channels	No. of terminals per channel	No. of terminals on row number	LED per channel	Polarity distribution	Isolator (I) Fuse (F) per channel	Type of connection	Reference	Weight kg
Input or Output	8	1	1	No	No	–	Screw	**ABE-7H08R10**	0.187
				Yes	No	–	Screw	**ABE-7H08R11**	0.187
		2	2	Yes	0 or 24 V	–	Screw	**ABE-7H08R21**	0.218
						I	Screw	**ABE-7H08S21**	0.245
	12	1	1	No	No	–	Screw	**ABE-7H12R10**	0.274
				Yes	No	–	Screw	**ABE-7H12R11**	0.274
			2	No	No	–	Screw	**ABE-7H12R50**	0.196
		2	2	No	0 or 24 V	–	Screw	**ABE-7H12R20**	0.300
				Yes	0 or 24 V	–	Screw	**ABE-7H12R21**	0.300
						I	Screw	**ABE-7H12S21**	0.375
	16	1	1	No	No	–	Screw	**ABE-7H16R10**	0.274
				Yes	No	–	Screw	**ABE-7H16R11**	0.274
							Spring	**ABE-7H16R11E**	0.274
			2	No	No	–	Screw	**ABE-7H16R50**	0.196
							Spring	**ABE-7H16R50E**	0.196
		2	2	No	0 or 24 V	–	Screw	**ABE-7H16R20**	0.300
				Yes	0 or 24 V	–	Screw	**ABE-7H16R21**	0.300
							Spring	**ABE-7H16R21E**	0.300
						I	Screw	**ABE-7H16S21**	0.375
							Spring	**ABE-7H16S21E**	0.375
		3	3	No	0 and 24 V	–	Screw	**ABE-7H16R30**	0.346
				Yes	0 and 24 V	–	Screw	**ABE-7H16R31**	0.346
Type 2 input (1)	16	2	2	Yes	0 and 24 V	–	Screw	**ABE-7H16R23**	0.320
Input	16	2	1	Yes	24 V	I, F (2)	Screw	**ABE-7H16S43**	0.640
Output	16	2	1	Yes	0 V	I, F (2)	Screw	**ABE-7H16F43**	0.640

(1) For Modicon TSX Micro, Premium and Numerical Control NUM 1020/1060.
(2) With LED to indicate blown fuse.

Telefast® 2 pre-wired system
Connection sub-bases with soldered relays and plug-in terminal blocks

References

ABE-7S16E2●●

Sub-bases with soldered solid state inputs, plug-in terminal blocks

Number of channels	No. of terminals per channel	Isolation PLC/application	Voltage **V**	Type of connection	Reference	Weight kg
16	2	Yes	⎓ 24	Screw	**ABE-7S16E2B1**	0.370
				Spring	**ABE-7S16E2B1E**	0.370
			⎓ 48	Screw	**ABE-7S16E2E1**	0.370
				Spring	**ABE-7S16E2E1E**	0.370
			∿ 48	Screw	**ABE-7S16E2E0**	0.386
				Spring	**ABE-7S16E2E0E**	0.386
			∿ 110	Screw	**ABE-7S16E2F0**	0.397
				Spring	**ABE-7S16E2F0E**	0.397
			∿ 230	Screw	**ABE-7S16E2M0**	0.407
				Spring	**ABE-7S16E2M0E**	0.407

Sub-bases with soldered solid state outputs, plug-in terminal blocks

No. of channels	Isolation PLC/ application	Output voltage **V**	Output current **A**	Fault detection signal (1)	Type of connection	Reference	Weight kg
8	No	⎓ 24	0.5	Yes (2)	Screw	**ABE-7S08S2B0**	0.252
					Spring	**ABE-7S08S2B0E**	0.252
			2	Yes (2)	Screw	**ABE-7S08S2B1**	0.448
					Spring	**ABE-7S08S2B1E**	0.448
16	No	⎓ 24	0.5	Yes (2)	Screw	**ABE-7S16S2B0**	0.405
					Spring	**ABE-7S16S2B0E**	0.405
				No	Screw	**ABE-7S16S1B2**	0.400
					Spring	**ABE-7S16S1B2E**	0.400

Sub-bases with soldered electromechanical relays, plug-in terminal blocks

No. of channels	Relay width **mm**	No. of contacts	Output current **A**	Polarity distribution/ application	Type of connection	Reference	Weight kg
8	5	1 “N/O”	2	Contact common per group of 4 channels	Screw	**ABE-7R08S111**	0.244
					Spring	**ABE-7R08S111E**	0.244
	10	1 “N/O”	5	Volt-free	Screw	**ABE-7R08S210**	0.352
					Spring	**ABE-7R08S210E**	0.352
16	5	1 “N/O”	2	Contact common per group pf 8 channels	Screw	**ABE-7R16S111**	0.352
					Spring	**ABE-7R16S111E**	0.352
	10	1 “N/O”	5	Volt-free	Screw	**ABE-7R16S210**	0.547
					Spring	**ABE-7R16S210E**	0.547
				Common per per group of 8 channels on both poles	Screw	**ABE-7R16S212**	0.547
					Spring	**ABE-7R16S212E**	0.547

(1) A fault on a sub-base output Qn will set PLC output Qn to safety mode which will be detected by the PLC.
(2) Can only be used with modules with protected outputs.

Telefast® 2 pre-wired system
Plug-in relay connection sub-bases

References

ABE-7R16T210

Sub-bases for plug-in solid state input relays (1)

No. of channels	Terminals/ channel	For relay type	Isolation PLC/ application	Input connection	Type of connection	Reference	Weight kg
16	2	ABS-7E ABR-7 (2)	Yes	Volt-free	Screw	**ABE-7P16F310**	0.850
					Spring	**ABE-7P16F310E**	0.850
				Polarity distribution	Screw	**ABE-7P16F312**	0.850

Output sub-bases, equipped with plug-in electromechanical relays (3)

No. of channels	Relay width **mm**	Type of relay	No. and type of contacts	Polarity distribution/ application	Reference	Weight kg
16	10	ABR-7S21	1 “N/O”	Volt-free	**ABE-7R16T210**	0.735
				Common on both poles (4)	**ABE-7R16T212**	0.730
		ABR-7S23	1 “C/O”	Contact common (4)	**ABE-7R16T231**	0.730
				Volt-free	**ABE-7R16T230**	0.775
	12	ABR-7S33	1 “C/O”	Volt-free	**ABE-7R16T330**	1.300
				Common on both poles (5)	**ABE-7R16T332**	1.200
		ABR-7S37	2 “C/O”	Volt-free	**ABE-7R16T370**	1.300

ABE-7P16T2●●

Sub-bases for solid state and/or electromechanical output relays, plug-in (1)

No. of channels	Relay width **mm**	For relay type	Isolator per channel	Fuse per channel	Polarity distribution/ application	Type of connection	Reference	Weight kg
16	10	ABR-7S2● ABS-7SA2● ABS-7SC2● ABE-7ACC20	No	No	Volt-free	Screw	**ABE-7P16T210** (4)	0.615
							ABE-7P16T230 (4)	0.655
						Spring	**ABE-7P16T230E** (4)	0.655
				Yes	Volt-free	Screw	**ABE-7P16T214**	0.675
				No	Common on both poles (5)	Screw	**ABE-7P16T212**	0.615
				Yes	Common on both poles (5)	Screw	**ABE-7P16T215**	0.670
8	12	ABR-7S33 ABS-7SA3● ABS-7SC3●● ABE-7ACC21	No	No	Volt-free	Screw	**ABE-7P08T330**	0.450
						Spring	**ABE-7P08T330E**	0.450
16	12	ABR-7S33 ABS-7SA3● ABS-7SC3●● ABE-7ACC21	No	No	Volt-free	Screw	**ABE-7P16T330**	0.900
						Spring	**ABE-7P16T330E**	0.900
					Common on both poles (6)	Screw	**ABE-7P16T332**	0.900
		ABR-7S33 ABS-7SA3M ABS-7SC3E ABE-7ACC21	No	Yes	Volt-free	Screw	**ABE-7P16T334**	0.900
			Yes	Yes	Common on both poles (6)	Screw	**ABE-7P16T318**	1.000
						Spring	**ABE-7P16T318E**	1.000

(1) Not equipped with relays
(2) Sub-bases may be equipped with electromechanical relays (please consult your Regional Sales Office).
(3) Both technologies (electromechanical and solid state) may be combined on the same sub-base.
(4) With relay ABR-7S21 for sub-base ABE-7P16T210, with relay ABR-7S23 for sub-base ABE-7P16T230●.
(5) Per group of 8 channels.
(6) Per group of 4 channels.

Telefast® 2 pre-wired system
Plug-in relays

References

Plug-in solid state relays (Order in multiples of 4)

ABR-7S2●

Relay width	Func-tions	Input circuit Current	Input circuit Nominal voltage	Output circuit Current	Output circuit Nominal voltage	Unit reference	Weight
mm		**A**	**V**	**A**	**V**		kg
12	Input	⎓	5 TTL		⎓ 24	**ABS-7EC3AL**	0.014
			24 Type 2	–	⎓ 24	**ABS-7EC3B2**	0.014
			48 Type 2	–	⎓ 24	**ABS-7EA3E2**	0.014
		∿ 50 Hz	48	–	⎓ 24	**ABS-7EA3E5**	0.014
		60 Hz	110…130	–	⎓ 24	**ABS-7EA3F5**	0.014
			230…240	–	⎓ 24	**ABS-7EA3M5**	0.014
	Output	⎓	24	2 Self-protected	⎓ 24	**ABS-7SC3BA**	0.016
				1.5	⎓ 5…48	**ABS-7SC3E**	0.016
				2	∿ 24…240	**ABS-7SA3M**	0.016

ABR-7S3●

10	Output	⎓	24	0.5	⎓ 5…48	**ABS-7SC2E**	0.016
					∿ 24…240	**ABS-7SA2M**	0.016

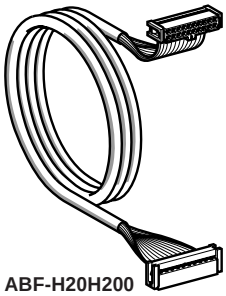
Plug-in electromechanical relays

Relay width	Control voltage	Output current	No. of contacts	Order in multiples of	Unit reference	Weight
mm	**V**	**A**				kg
10	⎓ **24**	5	1 N/O	4	**ABR-7S21**	0.008
			1 C/O	4	**ABR-7S23**	0.008
12	⎓ **24**	10	1 C/O	4	**ABR-7S33**	0.017
		8	2 C/O	4	**ABR-7S37**	0.017
	⎓ **48**	8	1 C/O	4	**ABR-7S33E**	0.017

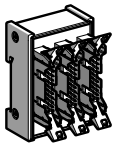
Telefast® 2 pre-wired system
Connection sub-bases and accessories

References

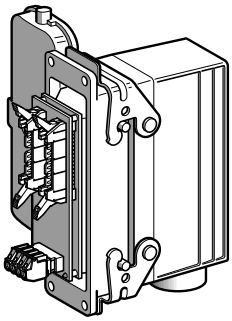
ABE-7CPA02



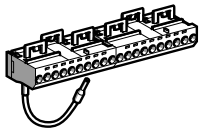
ABF-H20H200



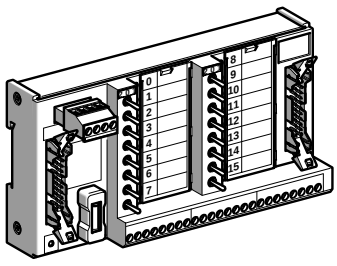
ABE-7ACC02



ABE-7ACC80 + ABE-7ACC81



ABE-7BV20



ABE-7TES160

Connection interfaces for counting and analogue channels

Functions	Sub-base/PLC link	Reference	Weight kg
Analogue input U/I, PT100	25-way SUB-D	**ABE-7CPA02**	0.290
Analogue input with limiter and integrated protection 4-20 mA loop	25-way SUB-D	**ABE-7CPA03**	0.330

Software

Marking software for customer labels	Under Windows version 3.1 or 95	**ABE-7LOGV10**	
Batch of 25 sheets of precut labels (ie. 160 labels)	–	**ABE-7LOGF25**	

Standard cables for connecting 8-channel sub-bases

Description	Gauge	Cross-section	Length	Sold in lots of	Unit reference	Weight
	AWG	**mm²**	**m**			kg
Standard cables (with 2 x 20-way HE 10 connectors)	28	0.08	1	1	**ABF-H20H100**	0.080
			2	1	**ABF-H20H200**	0.140
			3	1	**ABF-H20H300**	0.210
Rolled ribbon cable	28	0.08	20	1	**ABF-C20R200**	1.310
20-way HE 10 connector	–	–	–	2	**ABC-6HE20F**	0.008

Accessories

Description	Characteristics	Sold in lots of	Unit reference	Weight kg
Kit for fixing to solid plate	–	10	**ABE-7ACC01**	0.008
Splitter sub-base	16 in 2 x 8 channels	1	**ABE-7ACC02**	0.075
Removable continuity blocks	10 mm interval	4	**ABE-7ACC20**	0.007
	12 mm interval	4	**ABE-7ACC21**	0.010
Enclosure feedthrough with industrial connector (40-way)	32 channels	1	**ABE-7ACC80**	0.300
Removable plug (40-way) (mounted on ABE-7ACC80)	32 channels	1	**ABE-7ACC81**	0.370
Enclosure feedthrough with CNOMO M23 connector (19-way)	16 channels	1	**ABE-7ACC82**	0.150
	8 and 12 channels	1	**ABE-7ACC83**	0.150
Impedance adaptor for Type 2 coordination	Used with ABE-7ACC82 and ABE-7ACC83	1	**ABE-7ACC85**	0.012
IP 65 cable gland assembly	For 3 cables	1	**ABE-7ACC84**	0.300
Additional snap-on terminal blocks	10 shunted terminals	5	**ABE-7BV10**	0.030
	20 shunted terminals	5	**ABE-7BV20**	0.060
I/O simulation sub-base	16 channels	1	**ABE-7TES160**	0.350
Adhesive label holder	For 6 characters	50	**AR1-SB3**	0.001
Fast-blow fuses 5 x 20, 250 V, UL	0.125 A	10	**ABE-7FU012**	0.010
	0.5 A	10	**ABE-7FU050**	0.010
	1 A	10	**ABE-7FU100**	0.010
	2 A	10	**ABE-7FU200**	0.010
	6.3 A	10	**ABE-7FU630**	0.010

Telefast® 2 pre-wired system
Connection cables for Modicon 984-A120-Compact and Quantum PLCs

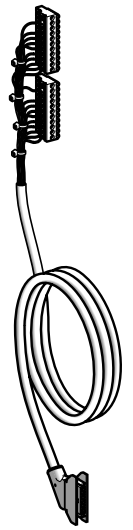
References

Connection cables for Modicon 984-A120-Compact PLCs

Type of signal	Type of connection	Gauge	Cross-section	Length	Modularity	Reference	Weight
		AWG	**mm²**	**m**			kg
Input and relay output	1 x 20-way HE 10	22	0.324	1.5	16	**ABF-M16H150**	0.300
				3	16	**ABF-M16H300**	0.550
0.5 A output	2 x 20-way HE 10	22	0.324	1.5	2 x 8	**ABF-M16H151**	0.500
				3	2 x 8	**ABF-M16H301**	1.000

Connection cables for Modicon Quantum PLCs

Type of signal	Type of connection	Gauge	Cross-section	Length	Modularity	Reference	Weight
		AWG	**mm²**	**m**			kg
Input and relay output	2 x 20-way HE 10	22	0.324	1.5	2 x 16	**ABF-M32H150**	0.650
				3	2 x 16	**ABF-M32H300**	1.150
0.5 A output	2 x 20-way HE 10 + external supply	22	0.324	1.5	2 x 16	**ABF-M32H151**	0.650
				3	2 x 16	**ABF-M32H301**	1.150



ABF-M16H●●0

Correspondence tables

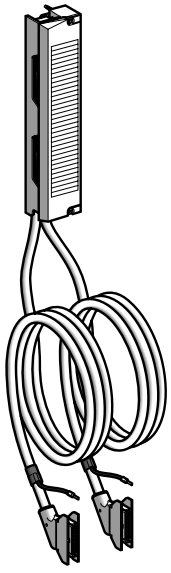
Connection cables for Modicon 984-A120-Compact PLCs

ABF-M16H●●0

20-way HE 10		984-A120 Compact
Terminal no.	Channels	Term. blk.
1	1	3
2	2	4
3	3	5
4	4	6
5	5	7
6	6	8
7	7	9
8	8	10
9	9	14
10	10	15
11	11	16
12	12	17
13	13	18
14	14	19
15	15	20
16	16	21
17	⎓ 24 V	1
18	⎓ 0 V	11
19	⎓ 24 V	12
20	⎓ 0 V	22

ABF-M16H●●1

20-way HE 10 ①		984-A120 Compact		20-way HE 10 ②	
Terminal no.	Channels	Term. blk.		Channels	Terminal no.
1	1	3	14	9	1
2	2	4	15	10	2
3	3	5	16	11	3
4	4	6	17	12	4
5	5	7	18	13	5
6	6	8	19	14	6
7	7	9	20	15	7
8	8	10	21	16	8
9-10-11-12	NC			NC	9-10-11-12
13-15-17	⎓ 24 V	1	12	⎓ 24 V	13-15-17
14-16-19	⎓ 24 V	2	13	⎓ 24 V	14-16-19
18-20	⎓ 0 V	11	22	⎓ 0 V	18-20



ABF-M32H●●1

Connection cables for Modicon Quantum PLCs

ABF-M32H●●0

20-way HE 10 ①		Quantum		20-way HE 10 ②	
Terminal no.	Channels	Term. blk.		Channels	Terminal no.
1	1	1	21	17	1
2	2	2	22	18	2
3	3	3	23	19	3
4	4	4	24	20	4
5	5	5	25	21	5
6	6	6	26	22	6
7	7	7	27	23	7
8	8	8	28	24	8
9	9	11	31	25	9
10	10	12	32	26	10
11	11	13	33	27	11
12	12	14	34	28	12
13	13	15	35	29	13
14	14	16	36	30	14
15	15	17	37	31	15
16	16	18	38	32	16
17	⎓ 24 V	10	30	⎓ 24 V	17
18	⎓ 0 V	9	29	⎓ 0 V	18
19	⎓ 24 V	20	40	⎓ 24 V	19
20	⎓ 0 V	19	39	⎓ 0 V	20

ABF-M32H●●1

20-way HE 10 ①		Quantum		20-way HE 10 ②	
Terminal no.	Channels	Term. blk.		Channels	Terminal no.
1	1	1	21	17	1
2	2	2	22	18	2
3	3	3	23	19	3
4	4	4	24	20	4
5	5	5	25	21	5
6	6	6	26	22	6
7	7	7	27	23	7
8	8	8	28	24	8
9	9	11	31	25	9
10	10	12	32	26	10
11	11	13	33	27	11
12	12	14	34	28	12
13	13	15	35	29	13
14	14	16	36	30	14
15	15	17	37	31	15
16	16	18	38	32	16
17	NC			NC	17
18	⎓ 0 V	9/19 shunt	29/39 shunt	⎓ 0 V	18
19	NC			NC	19
20	NC			NC	20
Power supply cable	⎓ 24 V	10/20 shunt	30/40 shunt	⎓ 24 V	Power supply cable

2

General

The CableFast wiring system eliminates wiring between the I/O module and field wiring terminal blocks. The CableFast system reduces wiring time, lowers installation cost, and eliminates wiring errors.

The CableFast system consists of pre-wired Quantum field wiring terminal strips, available in various cable lengths that are terminated with "D" type connectors. The "D" connectors plug into DIN rail mounted terminal blocks offered in straight through or special application versions. Cables and terminal blocks are ordered separately and all terminal blocks may be used with any cable length. Pigtail cable versions are also available.

- 140 CF**A** 040 00 — The **A** block is a straight through point to point connection on the terminal block. Wiring of this block is identical to wiring the Quantum I/O connector (140 XTS 002 00).
- 140 CF**B** 032 00 — The **B** block is used for individually fused 2-wire digital inputs. This terminal block is designed to prevent a single point failure from affecting the remaining inputs. It is not recommended for sourced 1-wire inputs (powered from the field).
- 140 CF**C** 032 00 — The **C** block provides connection for 32 group fused input or output points. The block may be used for 1- or 2-wire inputs or outputs, and features a fuse per group, four groups total. Users select input or output mode via four switches located on the module. (The default is input mode.)
- 140 CF**D** 032 00 — The **D** block is used for sensors requiring either 2- or 3-wire electrical interface. A fuse per group is supplied to accomodate the I/O module (4) groups.
- 140 CF**E** 032 00 — The **E** block provides connection for 32 individually fused 24 Vdc outputs. 1- and 2-wire interfacing may be selected. Field power must be supplied to the four groups.
- 140 CF**G** 016 00 — The **G** block is a high power output block used on both AC and DC circuits requiring up to 2 A. Individual fusing is provided and may be used in both 1- and 2-wire installations. It is also used for isolated AC modules.
- 140 CF**H** 008 00 — The **H** block is used for analog inputs, with individual fusing provided per channel. This interface provides plus, minus, shield, and power supply interface for both field and loop power configurations.
- 140 CF**I** 008 00 — The **I** block is used for analog inputs. This interface provides plus, minus, shield, and power supply interface for both field and loop power configurations.
- 140 CF**J** 004 00 — The **J** block is used for analog outputs, with individual fusing provided per channel. This interface provides plus, minus, shield, and power supply interface for both field and loop power configurations.
- 140 CF**K** 004 00 — The **K** block is used for analog outputs. This interface provides plus, minus, shield, and power supply interface for both field and loop power configurations.

Association

Use this table to select valid combinations of Quantum I/O modules and CableFast terminal blocks.

Terminal Blocks

Quantum Modules	140 CFA 040 00	140 CFB 032 00	140 CFC 032 00	140 CFD 032 00	140 CFE 032 00	140 CFG 016 00	140 CFH 008 00	140 CFI 008 00	140 CFJ 004 00	140 CFK 004 00
140 ACI 030 00	✔						✔	✔		
140 ACO 020 00	✔								✔	✔
140 ARI 030 10	✔									
140 AMM 090 00	✔									
140 AVI 030 00	✔						✔	✔		
140 AVO 020 00	✔									✔
140 DAI 340 00	✔					✔				
140 DAI 353 00	✔	✔	✔	✔						
140 DAI 440 00	✔					✔				
140 DAI 453 00	✔	✔	✔	✔						
140 DAI 540 00	✔					✔				
140 DAI 543 00	✔									
140 DAI 553 00	✔	✔	✔	✔						
140 DAM 590 00	✔									
140 DDI 153 10	✔		✔							
140 DDI 353 00	✔	✔	✔							
140 DDI 353 10	✔									
140 DDI 673 00	✔									
140 DDI 841 00	✔									
140 DDI 853 00	✔	✔	✔	✔						
140 DDM 390 00	✔									
140 DDO 153 10	✔									
140 DDO 353 00	✔		✔		✔					
140 DDO 353 10	✔									
140 DDO 885 00	0									
140 DAO 840 00	0					✔				
140 DAO 840 10										
140 DAO 842 10	0					✔				
140 DAO 842 20	0					✔				
140 DDO 843 00	0					✔				
140 DAO 853 00	0									
140 DRA 840 00	❊									
140 DRC 830 00	❊									

✔ = Valid Selections

0 = Limited to 0.5 A per point

❊ = Limited to 0.5 A per point, ∿ 150V/ ⎓ 150V maximum

WARNING: The shaded rows indicate the following:

1. When using the 140 CFA 040 00 terminal block, the indicated module outputs are limited to 0.5 A per point, ∿150V maximum.
2. When using the 140 CFG 016 00 terminal block and the 140 XTS 012 xx high power cable, the indicated module output ratings are 2 A per point, ∿150V maximum and 2 A per point, ⎓150V maximum.

Specifications

Power ratings		150 Vac/Vdc @ 0.5 A per point 150 Vac/Vdc @ 2.0 A per point *Requires the 140 CFG 016 00 terminal block and the 140 XTS 012 XX cable
Dielectric withstanding voltage		∿1060 V and ⎓1500 V
Creepage and clearance		per IEC 1131, UL 508, CSA 22.2 #142-1987
Terminal block wire Sizes per terminal		One wire - #12 AWG (2.5 mm^2) Two wires - #16 AWG (1.0 mm^2) and above (See below for the maximum number of wires allowed per terminal.) **Note:** It is recommended that no more than two wires be used at one time. **Wire Size** — **Number of Wires** #24 — 4 #22 — 4 #18 — 3 #16 — 2 #14 — 1 #12 — 1
Terminal screw		
	size	M3
	Screwdriver head size	0.13" (3.3 mm) flat head min
	type	captive
	finish	tin plate (197 µin min)
	tightening torque	7.2 lb-in (0.8 Nm)
System flammability rating		94 V-2
Temperature		
	operating	0 ... 60 ºC (32 ... 140 ºF)
	storage	-40 ... +65 ºC (-40 ... +149 ºF)
Humidity		0 ... 95% RH noncondensing
Altitude		6,666 ft (2000 m) full operation
Shock		+/- 15 g peak, 11 ms, half sine wave
Vibration		10 ... 57 Hz @ 0.075 mm displacement 57 ... 150 Hz @ 1 g, total 10 sweeps
Mounting configuration		DIN rail mount, NS35/7.5 and NS32
Standard power		
	cable diameter	0.43 in nominal (10.9 mm)
	number of conductors	8-#20 AWG (0.8 mm), 7/28 tinned annealed copper; semi rigid PVC 32-#26 AWG (0.4 mm), 7/34 tinned annealed copper; semi rigid PVC
	bend radius (I.D.)	0.75 in min (19.0 mm)
High power		
	cable diameter	0.55 in nominal (14.0 mm)
	number of conductors	8-#18 AWG (1.0 mm), 16/30 tinned annealed copper; semi rigid PVC 32-#20 AWG (0.8 mm), 10/30 tinned annealed copper; semi rigid PVC
	bend radius (I.D.)	1.50 in min (38.1 mm)
Common specifications		
	cable jacket	jacket color: black, 0.040 in wall min, flexible PVC
	wire strip length	0.32 in (8 mm)
	wire marking	See the wire color coding table
	wire rating	300 V, 105ºC UL rated 2517, CSA Type AWM 1/2 FT 1
	cable rating	300 V, 105 ºC rated
	shielding	Aluminum/polyester tape (aluminum side out) attached at connector body (360º) #22 AWG, 7/30 drain wire Shield resistance 16.55 Ohms/Mft nominal
	agency approval	UL-758; AWM style 2517 VW-1 and CSA C22:210.2; AWM I/II A/B FT1

References

Description	Power type	Connector type	Cable type	Length	Order No.	Weight kg (lb)
System cable	Standard	I/O, SUB-D	Terminated	0.9 m (3 ft)	**140 XTS 002 03**	–
				1.8 m (6 ft)	**140 XTS 002 06**	–
				2.7 m (9 ft)	**140 XTS 002 09**	–
				3.7 m (12 ft)	**140 XTS 002 12**	–
	High	I/O, SUB-D	Terminated	0.9 m (3 ft)	**140 XTS 012 03**	–
				1.8 m (6 ft)	**140 XTS 012 06**	–
				2.7 m (9 ft)	**140 XTS 012 09**	–
				3.7 m (12 ft)	**140 XTS 012 12**	–
		SUB-D	Pigtail	1.8 m (6 ft)	**140 XCA 102 06**	–
				4.6 m (15 ft)	**140 XCA 102 15**	–
		I/O	Pigtail	1.8 m (6 ft)	**140 XTS 102 06**	–
				4.6 m (15 ft)	**140 XTS 102 15**	–

Accessories

Description	Type	Quantity	Order No.	Weight kg (lb)
Fuse kit	Wickmann 4 A	10	**140 CFU 400 00**	–
	Wickmann 0.8 A	10	**140 CFU 080 00**	–
	Wickmann 0.063 A	10	**140 CFU 006 00**	–
Terminal block	10-position common stip	10	**140 CFX 001 10**	–
Jumper	–	10	**140 CFX 002 10**	–

Terminal blocks

Description	Characteristics	I/O type	Fuse	Order No.	Weight kg (lb)
Terminal blocks	Point-to-point connection	All	None	**140 CFA 040 00**	–
	Used for 2-wire inputs	Digital inputs	Individually fuse	**140 CFB 032 00**	–
	1- or 2- wire inputs or outputs	Input/output	1 fuse per group	**140 CFC 032 00**	–
	2- or 3- wire electrical interfaces	Sensors	1 fuse per group	**140 CFD 032 00**	–
	Connection for 32 outputs	24 VDC outputs	Individually fuse	**140 CFE 032 00**	–
	1- or 2- wire installations	High power output AC isolation	Individually fuse	**140 CFG 016 00**	–
	Provides plus, minus, shield and power supply interfaces	Analog inputs	Individually fuse	**140 CFH 008 00**	–
			None	**140 CFI 008 00**	–
		Analog ouputs	Individually fuse	**140 CFJ 004 00**	–
			None	**140 CFK 004 00**	–

4 I/O architectures, Hot standby solution and Momentum I/O

Contents

3

Quantum Automation Platform

I/O architectures

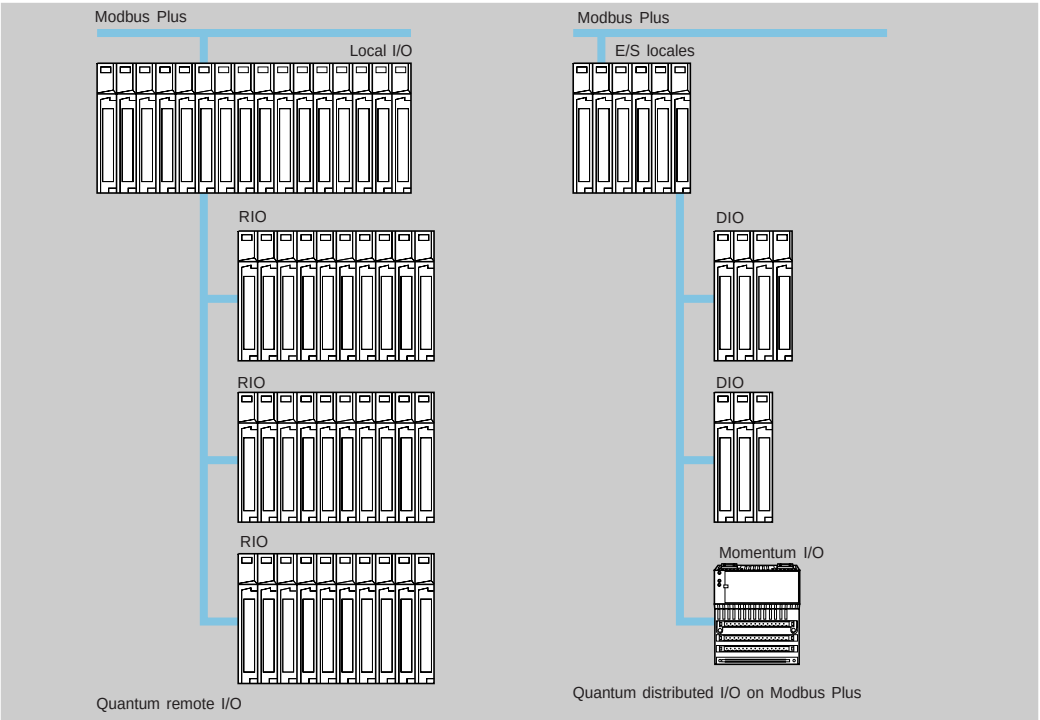
Overview

Overview

The Modicon Quantum Automation Series provides a highly flexible architecture that ensures a cost-effective and high performance control solution, regardless of the configuration. From centralized systems to highly distributed systems to networked distributed control schemes, Quantum provides the right solution.
Quantum I/O can be used in three major architectures to meet control system requirements:

- local I/O
- remote I/O (RIO)
- distributed I/O (DIO)

Whether your requirments are for improved space utilization, reduced installation costs, high performance, or connectivity to HMIs and host computers, Quantum I/O has an architecture that fits. Combining these different I/O architectures with Quantum's wide range of communication options, an optimal control system can be configured and installed to meet the most challenging control requirements.



I/O architecture selection	**Local I/O**	**Remote I/O**	**Distributed I/O**
Media	–	Coax	Twisted pair
Maximum distance without repeaters	–	15,000 ft (4,572 m)	1,500 ft (457 m)
Speed	–	1.5 MHz	1 MHz
Scan synched I/O servicing	–	Yes	No
Hot standby support	No	Yes	No
Momentum I/O support	–	No	Yes
Modbus Plus compatible	–	No	Yes
Maximum			
drops per network	–	31	63
I/O words per network	–	1,984 in / 1,984 out	500 in / 500 out
I/O words per drop	64 in / 64 out	64 in / 64 out	30 in / 32 out
discretes per network	–	31,744 in / 31,744 out	7,840 in / 7,840 out
discretes per drop	1024 / any mix	1024	480 in / 512 out
analogs per network	–	1,736 in / 868 out	500 in / 500 out
analogs per drop	64 in / 64 out	64 in / 64 out	30 in / 32 out
Networks per controller	–	1	3
Typical backplanes	6, 10, 16 slots	10, 16 slots	2, 3, 4 slots

Local I/O

The Quantum Automation Platform provides local I/O support for control systems where the wiring is most effectively brought from the field to the main control cabinet. Local I/O can comprise as few as one I/O module or as many as 14 modules along with a programmable logic controller (a Quantum CPU) and a power supply module in a single backplane. Local I/O can support up to 1344 I/O points in a 1845 cm^2 (286 in^2) panel space. Local I/O can also be expanded to a second backplane with the use of a Backplane Expander.

If required for the application, system option modules can also be installed in the local backplane. Available system option modules include RIO processors (one/CPU supported) or Modbus Plus network interfaces (two/CPU supported). All other available modules are considered and configured as I/O modules.

Selection of the appropriate backplane depends on the required number of modules for the system. Backplanes are available in 2-, 3-, 4-, 6-, 10-, and 16-slot versions.

If required, communications and networking modules can also be installed in the local backplane. Most communication and networking modules require the local CPU to be present; the exception is the 141 MMS 425 01 multi-axis SERCOS motion module, which can operate as a standalone. Available Quantum communications and network modules include:

- Modbus Plus and Modbus modules
- Ethernet modules for TCP/IP, SY/MAX and MMS
- Remote I/O modules
- Hot Standby modules
- SERCOS multi-axis servo motion control modules
- InterBus modules
- Lonworks modules
- ProfiBus modules
- As-iBus modules

High performance interrupt functions

In certain applications, I/O needs to be updated faster than the normally scheduled scan time. Quantum provides interrupt I/O services for high-speed applications. These services include time interrupt processing, interrupt input, and immediate I/O updates that support high-speed throughput of critical I/O located in the local backplane. The services are driven by instructions embedded in Quantum's 984 ladder logic language. The instructions can be programmed via Modsoft or Concept programming software; they update the I/O immediately within the CPU. Utilizing a subroutine section in the CPU, the updated I/O table can be used to update logic only, or write to any local output module. Interrupt services increase machine productivity, yielding higher throughput and better utilization of capital equipment.

Local I/O configuration rules

When you configure a local I/O sytstem, consider the following four characteristics:

- Available backplane slots for modules
- Available power for the installed modules
- Available addressing words to configure the modules
- Available option module slots

A local I/O system can support up to 14 slots for option processors and I/O modules in a 16-slot backplane. If fewer I/O modules are required, smaller backplanes can be used. For applications requiring more than14 slots, a backplane expander can be used, and RIO and/or DIO can be added to the system. Empty modules (140 XCP 500 00) are available to occupy unused slots.

Every CPU, option module and I/O module requires power from the backplane. This power is provided by the system power supply. To ensure a valid configuration, simply add up the required backplane current (in mA) for all modules in the local backplane, and ensure that the total current is less than that provided by the selected power supply.

A Quantum CPU in a local I/O drop can handle up to 64 input words and 64 output words of I/O addressing. A 16-bit input or output module is equal to one word. Simply add up the addressing requirements for each module to ensure that the limit is not exceeded.

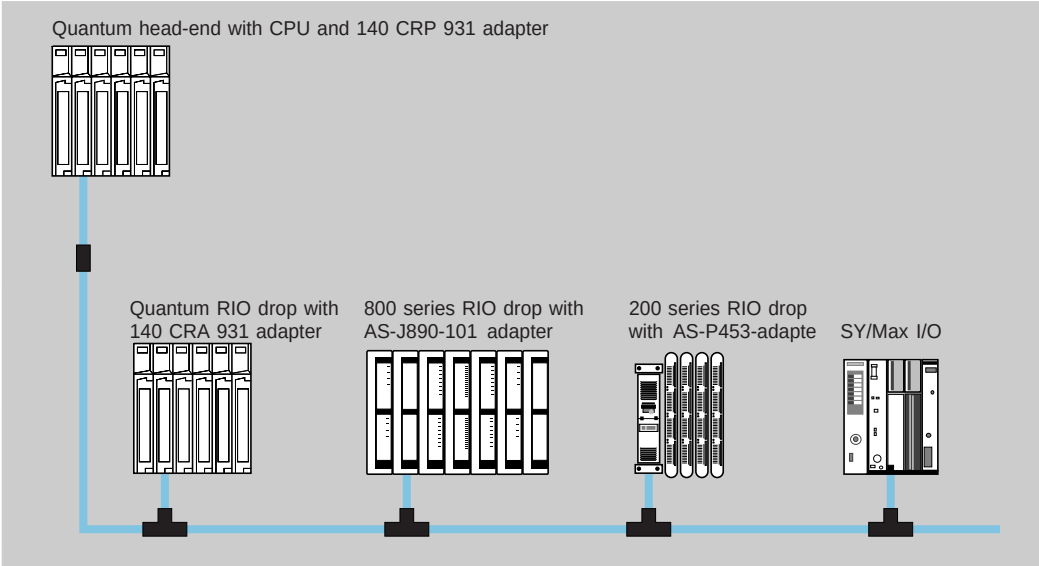
I/O architectures

Remote I/O
Presentation

Presentation

For applications that require large I/O drops remotely mounted, highest I/O performance, and/or connectivity to existing Modicon remote I/O installations, the Quantum Automation Series provides a remote I/O (RIO) architecture solution.

Based on the S908 remote I/O network technology, this network is compatible with existing installations of Modicon I/O products, including the 800 and 200 Series I/O modules and Sy/Max I/O. New installations can incorporate an installed base of these devices for reduced installation costs.



RIO is based on a coaxial cabling scheme that provides long-distance capability, up to 5 km (16 400 ft) with CATV cable or longer with optional fiber optic cable. It is a high-performance network operating at 1.544 Mbits/s for high I/O data throughput.
The RIO cable system consists of a linear trunk line, with line taps and drop cables running to each remote drop. Up to 31 remote drops are configurable. Each drop can support up to 128 I/O words (64 words in/64 words out).

Modicon segment scheduler

The Modicon segment scheduler complements the high performance of the RIO network by interleaving I/O servicing and logic solving to create the fastest system throughput available.
The segment scheduler breaks application programs into logical segments, then schedules I/O servicing to occur in conjunction with the segment's associated logic solving. Inputs are read prior to logic being solved and outputs are written after logic is solved. This eliminates the need to wait for an entire scan before outputs are set, giving a faster system response than comparable control systems. As a result, there is no performance penalty for using RIO–it is as fast as local I/O.
For most systems, throughput of local or remote I/O can be estimated at no less than two times scan (assumes measurement of input and output times through 24 V d.c. modules). In addition, all analog and register values are updated automatically, as fast as discrete I/O, without user programming.

Compatibility with the 800 and 200 Series I/O products

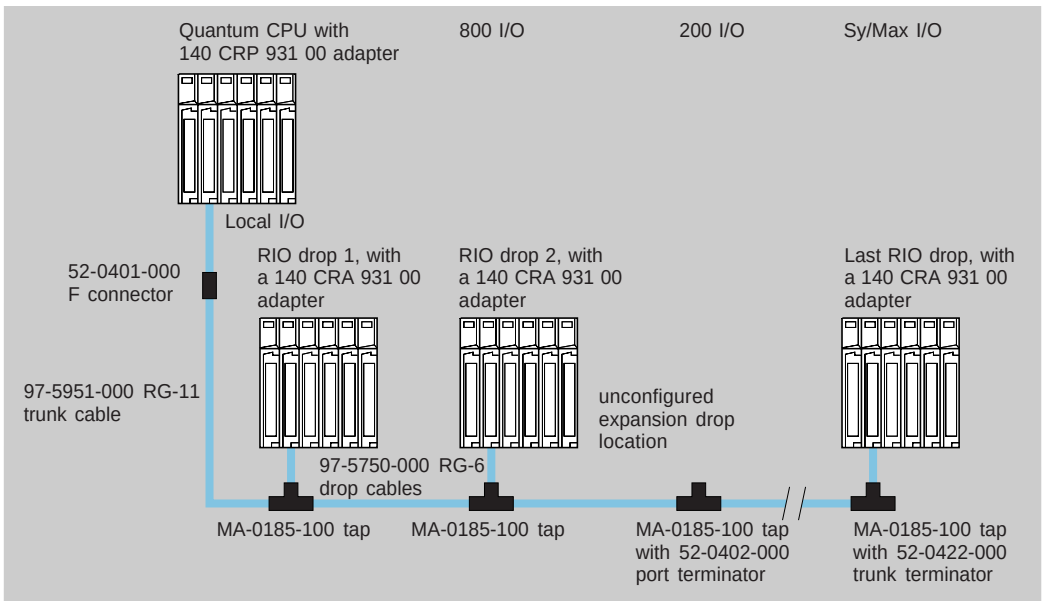
For forward integration from existing Modicon systems, the Quantum Automation Series is compatible with the 800 and 200 Series I/O products. Using the same RIO head end interface, it connects to 800 Series I/O via the J890, J892, P890, or P892 RIO adapters, and to 200 Series I/O via the P453/J290 and P451/J291 RIO adapters.
Other standard Modicon components are also compatible with this system, including network taps (MA-0185-100) and splitters (MA-0186-100). Quantum remote I/O also supports drops of Sy/Max I/O.

Rules of configuration

To ensure a valid configuration, add up the required backplane current (in mA) for all modules at each I/O remote location, and ensure the total is less than the available power in the selected power supply.

RIO cable topologies

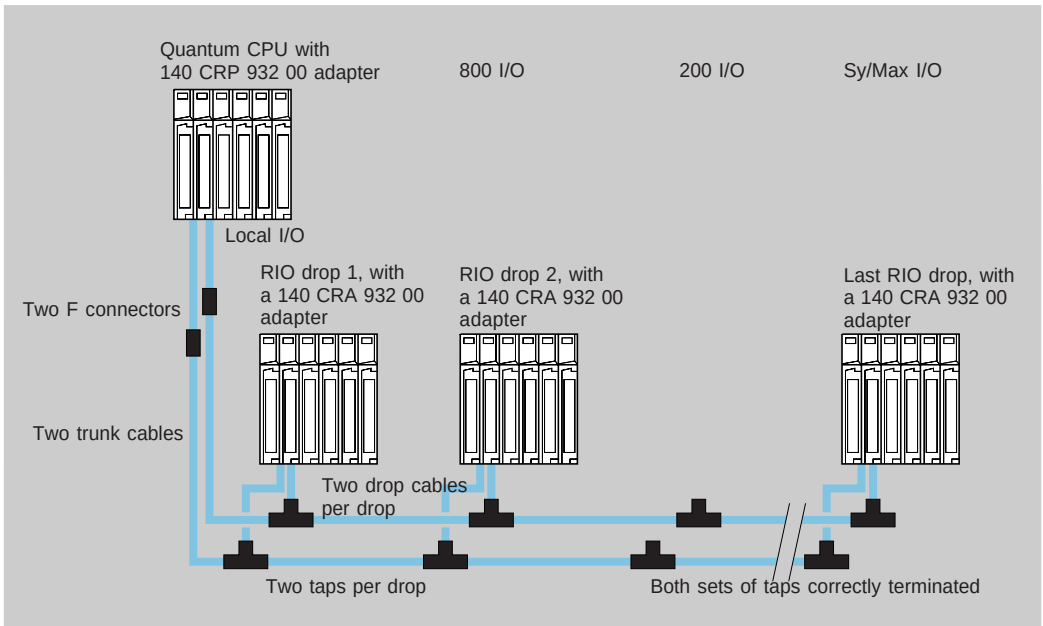
A single-cable RIO topology



An MA-0185-100 tap is required for every drop on the system to electrically isolate the drop from the trunk and protect the system from impedance mismatches and cable disconnections. A minimum signal strength of 14dB is required between the trunk and each drop to ensure correct operation. The signal loss on the trunk cable as it crosses the tap is less than 1dB. A total of 35 dB is available from the head-end RIO processor. The entire cabling architecture must not exceed this system limit.

For systems that require high availability, a redundant-cable option is available to protect the system from cable breaks and damaged connectors. With two cables connected between the host and each drop, a single cable break does not disrupt communications. If a cable break occurs, a health bit is set to indicate the problem node and faulty cable. For preventative maintenance, the system also provides retry counters for all communication transactions to all nodes. High retry counts on a cable in a specific node could indicate connection problems that can be scheduled and corrected prior to unwanted downtime.

A redundant-cable RIO topology

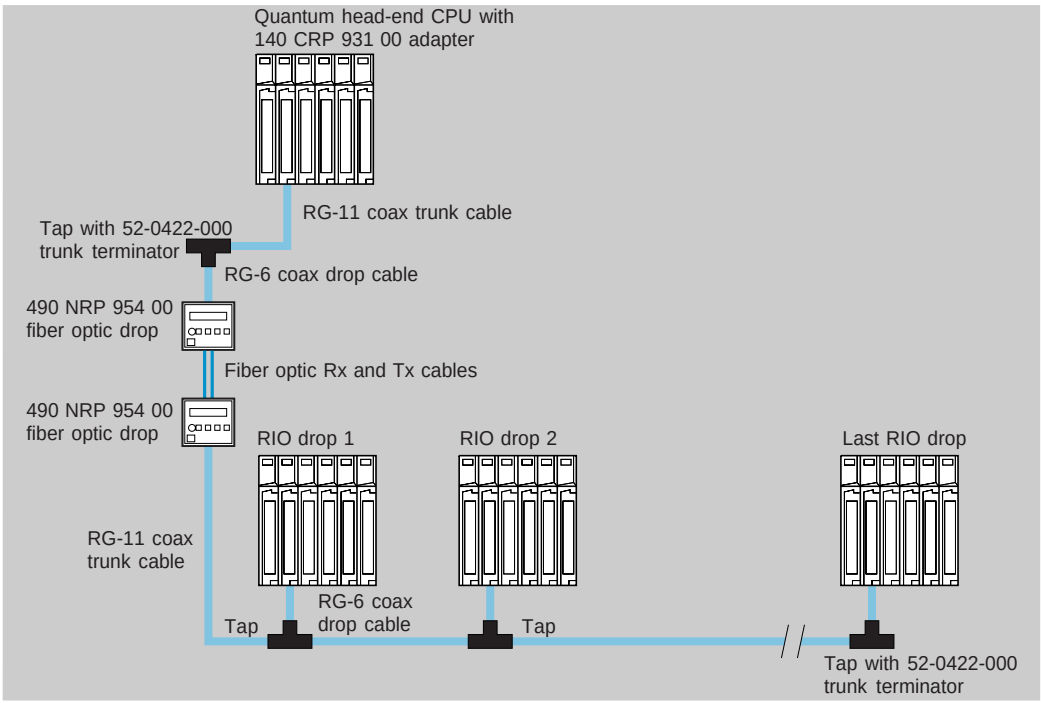


I/O architectures

Remote I/O
Fiber optic repeaters

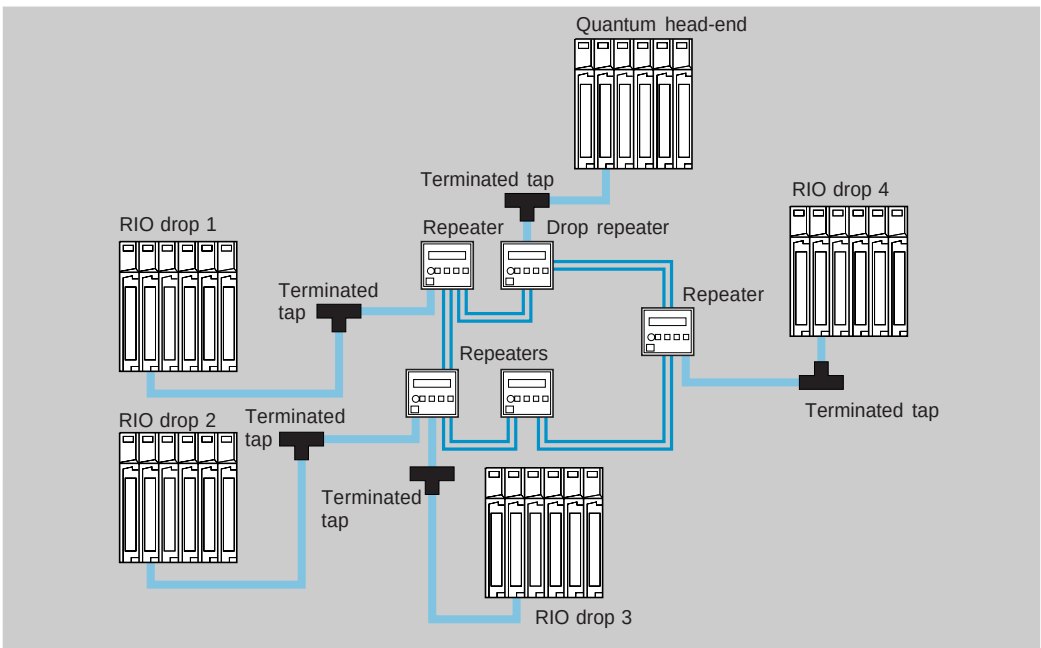
Point-to-point RIO communications with fiber optic repeaters

Fiber optic repeaters are available to enhance network noise immunity and increase cable distance to as much as 15 km (9.3 miles). Repeaters convert the twisted-pair cable to standard 62.5/125 mm fiber while maintaining the full dynamic range of the network.



A self-healing ring topology

Multiple 490 NRP 954 00 fiber optic repeaters can be interconnected in a closed loop ring so that if a break occurs anywhere in the ring the network can reconfigure itself. The RIO signal is sent down both legs of the ring by the drop repeater to the head repeaters. When a signal is received on one Rx line, the other Rx channel is blanked–this prevents the same signal from being transmitted twice in the ring. The maximum length of fiber cable allowed in a self-healing ring is 10 km (32 000 ft).



I/O architectures

Remote I/O
Characteristics

Head-end adapter and drop adapter characteristics

Model			140 CRP 931 00	140 CRP 932 00	140 CRA 931 00	140 CRA 932 00
Drop type			Quantum, 200 series, 500 series, 800 series, or Symax (any mix)		–	
I/O type			–		Quantum	
Modules/drop			31 max		28 max	
Words/drop			64 in /64 out words			
ASCII			2 ports per drop, 32 ports (16 drops), max. (Requires use of AS-P892-000, AS-J892-101/102, or AS-J290-0X0 at the RIO drops).		–	
Coax termination		Ω	Internal 75			
Coax shield			Tied to chassis ground		Capacitor to ground	
Data transfer rate		**mb**	1.544			
Dynamic range		**dB**	35			
Isolation		⎓	500 V coaxial cable, center conductor to ground			
Cable connections	Single cable		One "F" type female connector with a right angle adapter			
	Redundant cable		Two "F" type female connectors with a right angle adapter			
General	Holdup time		–		Software configurable NOTE: In the event of a communication loss with the remote processor, output modules during this time will retain their last operating state. Input module data will be held in the system controlling CPU. After this time, output modules will assume their predefined timeout states and inputs will be zeroed by the CPU.	
	Diagnostics		**Power Up** Dual port memory check LAN controller check		**Power Up and Runtime** Executive checksum RAM address/data	
	Maximum number of CRPs supported by the controller		1		–	
	Bus current requirement	**mA** **mA**	Single channel: 600 Dual channel: 750			
	Power dissipation	**W** **W**	Single channel: 3 Dual channel: 3.8			

Fiber optic cable considerations

If you are using a fiber optic link in your RIO network, consider the following when selecting fiber optic cable from a vendor:

For most applications, 62.5/125 mm cable is recommended because of its relatively low loss and low signal distortion. However, in high optical power applications, such as those that use splitters or star couplers, the 100/140 mm cable should be used.

Wherever possible, select a multiconductor cable. It is inexpensive; it provides a backup path in case a cable gets cut in the process of pulling it; and you can use the extra path for voice, video, or other communications.

Modules

Description	Cable	Reference	Weight kg (lb)
Quantum RIO head-end adapter	Single-cable	**140 CRP 931 00**	–
	Redundant-cable	**140 CRP 932 00**	–
Quantum RIO drop adapter	Single-cable	**140 CRA 931 00**	–
	Redundant-cable	**140 CRA 932 00**	–
RIO fiber optic repeater	–	**490 NRP 254 00**	–
RIO fiber optic drop	–	**490 NRP 954 00**	–

Cables

Description	Length	Reference	Weight kg (lb)
RG-6 coaxial quad shield cable sold by the roll	320 m (1000 ft)/roll	**97 5750 000**	–
RG-11 coaxial quad shield cable sold by the roll	320 m (1000 ft)/roll	**97 5951 000**	–
Preassembled drop cable (with F connectors, self-terminating F adapter, and quad shield RG-6 cable	15 m (50 ft)	**AS MBII 003**	–
	42 m (140 ft)	**AS MBII 004**	–

Accessories

Description		Length	Reference	Weight kg (lb)
Backplane expander		—	**140 XBE 100 00**	–
Expander cables		1 m	**140 XCA 717 03**	–
		2 m	**140 XCA 717 06**	–
		3 m	**140 XCA 717 09**	–

Description		Quantity	Reference	Weight kg (lb)
Tap (connects a drop cables to the trunk cable)		1 tap	**MA 0185 100**	–
Splitter (splits a signal from a single cable for two-cable use)		–	**MA 0186 100**	–
Tap terminator (for unused drop locations)		1 terminator	**52 0402 000**	–
Trunk terminator (for last tap on the network)		1 terminator	**52 0422 000**	–
F connector cassette	for RG-6 quad-shield cable	10 connectors	**MA 0329 001**	–
	for RG-6 cable, with silicon rubber boots	12 connectors	**52 0400 000**	–
	for RG-11 cable	6 connectors	**52 0401 000**	–
Right-angle F adapter for semi-rigid cable		1 adapter	**52 0480 000**	–
BNC connector for RG-6 quad-shield cable		1 connector	**52 0488 000**	–
F-to-BNC adapter for RG-11 cable		1 adapter	**52 0614 000**	–
BNC jack to male F connector (with J890/J892 drop adapters)		1 jack	**52 0724 000**	–
BNC angle adapter		1 adapter	**MA 9002 780**	–
BNC in-line terminator		1 terminator	**60 0513 000**	–
Wire stripper	RG-6	1 tool	**60 0528 000**	–
	RG-11	1 tool	**60 0530 000**	–
Replacement blade pack	RG-6	2 blades	**60 0529 000**	–
	RG-11	2 blades	**60 0531 000**	–
Ground block		1 block	**60 0545 000**	–
Crimping tools	F connector on RG-6	1 tool	**60 0544 000**	–
	BNC connector on RG-6	1 tool	**043509432**	–
Cable cutter		1 tool	**60 0558 000**	–

I/O architectures

Distributed I/O
Presentation

Presentation

The Modicon TSX Quantum Automation Series delivers a distributed I/O (DIO) architecture that provides cost-effective and flexible solutions for controling and monitoring I/O signals over a wide area. The Quantum DIO architecture uses the same I/O modules as a local or remote I/O (RIO) subsystem, and reduces installation costs by using low-cost, twisted-pair cables. A special DIO drop adapter with a built-in power supply is used at each drop.

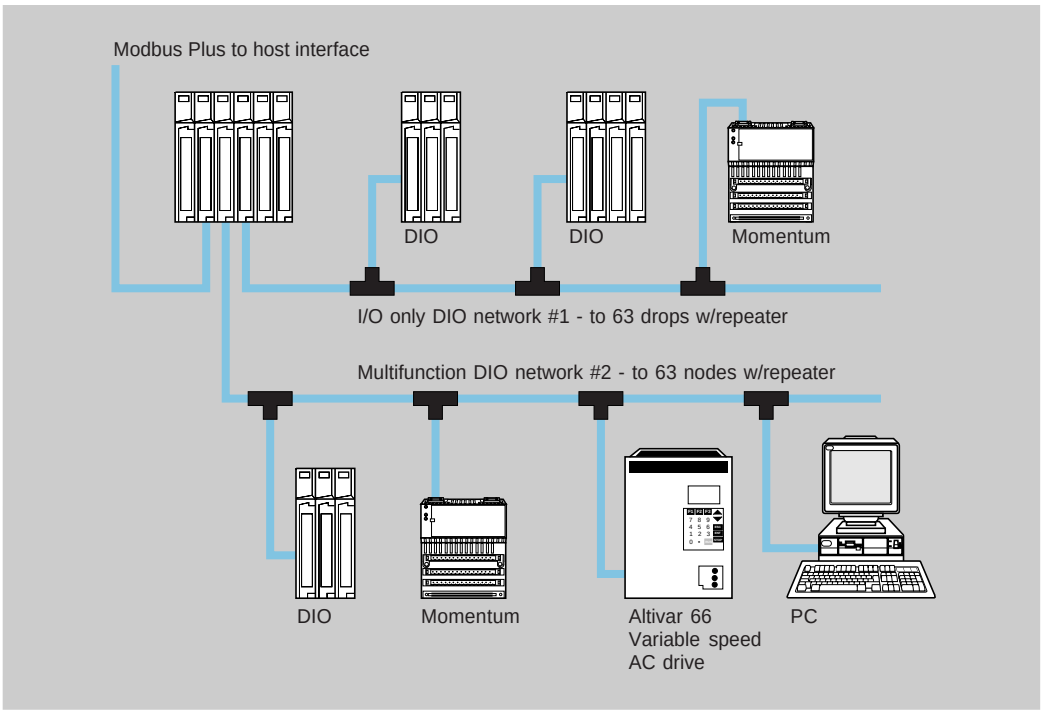
Quantum DIO drop adapters are specifically designed to link Quantum I/O modules to the head via twisted-pair shielded cable. A drop adapter also provides the I/O with power (maximum 3A) from a 24 V d.c. or 115/230 V a.c. source. DIO drops may also be powered by standard Quantum 8 A power supply modules, in which case the 3 A supply built into the drop adapter is not used.

A DIO drop is smaller than an RIO drop, but more drops can be supported and they can be spread over a wider area than an RIO network. RIO supports a linear configuration up to 4500 m (15 000 ft) long, while the DIO architecture supports up to three network heads per CPU and up to 1800 m (6000 ft) per network (using RR85 repeaters). Even greater distances can be achieved using fiber optic repeaters.

The DIO architecture is based on Modbus Plus technology. A DIO network can support 32 nodes over 500 m (1500 ft); by using repeaters, the DIO network length can be extended to 2000 m (6000 ft) and can support up to 64 nodes. Up to three DIO networks are supported – one is native to the CPU itself, and the other two are available by adding optional 140 NOM 211 x0 or 140 NOM 212 x0 network interface modules into the Quantum backplane. With three DIO networks, a single CPU can support 189 drops of I/O. DIO can be combined with RIO in the same CPU system for significantly larger I/O counts.

All products that currently support Modbus Plus can coexist on the DIO network. For example, a programming panel can be connected to the DIO network to monitor and troubleshoot an operating control system from the remote site, without running a separate communication link. In addition, HMI devices like a PanelMate Plus or FactoryMate Plus can participate on the network to reduce the number of networks required for a system. Distributed systems can have HMI devices at remote stations without either a separate communications link or a local controller present, which significantly reduces hardware and installation costs.

Typical Multi-Network Distributed I/O System



Distributed I/O, Modbus Plus
Description

Using Modbus Plus for distributed I/O

Modbus Plus can be used as the fieldbus for a distributed I/O network under the control of a TSX Quantum CPU. A Modbus Plus master needs to reside at the head end of the network (as either a 140 NOM 21● module or Quantum CPU with a built-in Modbus Plus interface). A 140 CRA 211 ●● module must reside in each distributed I/O drop on the network. A CRA module acts as both a distributed I/O adapter and a power supply for the drop; no additional power supply modules are required. Each DIO drop can address up to 30 input words and 32 output words.

A single or redundant cable topology may be employed in the distributed I/O system. Depending on your system's requirements, one of the following module combinations can be used to set up a Modbus Plus-based DIO system:

At the head	At the drop	Type of system
CPU with MBP or 140 NOM 211 00	140 CRA 211 10	single cable with ~ 115/230 V power source at the drop
CPU with MBP or 140 NOM 211 00	140 CRA 211 20	single cable with ⎓ 24 V power source at the drop
140 NOM 212 00	140 CRA 211 10	redundant cable with ~ 115/230 V power source at the drop
140 NOM 212 00	140 CRA 211 20	redundant cable with ⎓ 24 V power source at the drop

Description

The Modbus Plus 140 NOM 2●● 00 modules at the head end of the network comprise on the front panel:

1 Model number and color code
2 LED Status indicators comprising::
- Ready (green)
- Fault (red)
- Pwr ok (green)
- Modbus + (green)
- Error A (red)
- Error B (red)

3 Removable, hinged door with customer identification label
4 Microswitch
5 Modbus port
6 Modbus Plus

I/O architectures

Distributed I/O
Characteristics

Drop interface characteristics

Model			**140 CRA 211 10**	**140 CRA 212 10**	**140 CRA 211 20**	**140 CRA 212 20**
Function			DIO drop interface ∿ source voltage	DIO drop interface ∿ source voltage	DIO drop interface ⎓ source voltage	DIO drop interface ⎓ source voltage
Cable connections			single	redundant	single	redundant
Input voltage			∿ 85 ... 276 V	∿ 85 ... 276 V	⎓ 20...30 V	
Frequency range		**Hz**	47...63	47...63	–	
Input current		**A**	0.4 @ ∿ 115 V 0.2 @ ∿ 230 V	0.4 @ ∿ 115 V 0.2 @ ∿ 230 V	1.6	
Startup current		**A**	10 @ ∿ 115 V 20 @ ∿ 230 V	10 @ ∿ 115 V 20 @ ∿ 230 V	30	
Power input		**VA**	50	50	–	
Buffer time		**cycle**	0.5 @ full load and minimum line voltage/ frequency and less than 1 s between interrupts		max. 1.0 ms	
Fusing		**A**	1.5 external	1.5 external	2.5 external	
Bus output	Voltage	⎓	5.1 V			
	Current	**A**	3			
	Minimum load	**A**	0			
	Protection		over-current, over-voltage			
Words			30 I / 32 O (two additional input words are reserved for I/O drop status)			
Diagnostics startup	RAM		yes			
	RAM Address		yes			
	Checksum		yes			
	Processor		–			
Run time	RAM		yes			
	RAM Address		yes			
	Checksum		yes			
	Processor		–			
Field wiring			terminal block, 7-pole			
Power dissipation		**W**	11			

Characteristics (continued)

DIO drop adapters/power supplies/cables characteristics

Model			140 CRA 211 10	140 CRA 212 10	140 CRA 211 20	140 CRA 212 20
Input requirements						
	Voltage	⏦	∿ 85...276 V		⎓ 20...30 V	
	Frequency	**Hz**	47...63		–	
	Voltage total harmonic		less than 10% of the fundamental rms value		–	
	Current	**A**	0.4 @ ∿ 115 V 0.2 @ ∿ 230 V		1.6	
	Inrush current	**A**	10 @ ∿ 115 V 20 @ ∿ 230 V		30	
	VA rating	**VA**	50		–	
	Power interruption	**s**	1/2 cycle @ full load & minimum rated line voltage/frequency. no less than 1 between interruptions.		1.0 ms max	
	Fusing (external)	**A**	1.5 (Part # 043502515 or equivalent)		2.5 (Part # 04350348 or equivalent)	
	Operating mode		standalone or not powered		standalone	
Output-to-bus						
	Voltage	⎓	5.1 V			
	Current	**A**	3			
	Minimum load	**A**	0			
	Protection		over current, over voltage			
Communication						
	Modbus Plus		1 port (single cable) 2 ports (dual cable)			
General	Specifications		I/O type: Quantum modules/drop: depends on bus current loading and word count words: 30 in / 32 out (two additional input words are reserved for drop status)			
	Diagnostics		power-up runtime RAM data/address executive checksum			
Field wiring connector			7-point terminal strip (Part # 043506326)		7-point terminal strip (Part # 043503328)	
Internal power dissipation			2.0 V + 3.0 V x I_{BUS} = Watts, where I_{BUS} is in A)			

Distributed I/O Characteristics (continued)

Head-end module characteristics

Model			140 NOM 211 00	140 NOM 212 00	140 NOM 252 00
Function			DIO head-end interface for twisted-pair cable	DIO head-end interface for twisted-pair cable	DIO head-end interface for fiber optic cable
Cable connections			single	redundant	2 (transmit and receive pairs)
Communication ports			1 Modbus (RS 232) 1 Modbus Plus (RS 485)	1 Modbus (RS 232) 2 Modbus Plus (RS 485)	1 Modbus (RJ 45) 2 Modbus Plus (fiber optic cable)
Words			30 I / 32 O (two additional input words are reserved for I/O drop status)		
Diagnostics startup	RAM		yes		
	RAM Address		yes		
	Checksum		yes		
	Processor		yes		
Run time	RAM		yes		
	RAM Address		yes		
	Checksum		yes		
	Processor		yes		
Bus current required		**mA**	780	780	750
Power dissipation		**W**	4	4	4
Data rate		**MBPS**	1	1	1
Pulse width distortion/jitter		**ns**	–	–	5 or better
Wavelength		**nm**	–	–	820
Power loss budget (including 3 dB margin)	50/125 mm fiber	**dB**	–	–	6.5
	62.5/125 mm fiber	**dB**	–	–	11
	100/140 mm fiber	**dB**	–	–	16.5
Optical transmission	50/125 mm fiber	**dBm**	–	–	-12.8 ... -19.8
	62.5/125 mm fiber	**dBm**	–	–	- 9...- 16
	100/140 mm fiber	**dBm**	–	–	- 3.5...110.5
Rise/fall time		**ns**	–	–	20 or better
Optical receiver	Sensitivity	**dBm**	–	–	30 or better
	Dynamic range	**dB**	–	–	20
	Detected silence	**dBm**	–	–	- 36

References

Distributed I/O references

Description	Support	Power/Type	Reference	Weight kg (lb)
DIO drop interface	Single-cable	∼ 115/230 V	**140 CRA 211 10**	–
		⎓ 24 V	**140 CRA 211 20**	–
	Redundant	∼ 115/230 V	**140 CRA 212 10**	–
		⎓ 24 V	**140 CRA 212 20**	–
DIO head-end interface	Single-cable	Twisted pair cable	**140 NOM 211 00**	–
	Redundant	Twisted pair cable	**140 NOM 212 00**	–
	Single-cable	Fiber optic cable	**140 NOM 252 00**	–

Modbus Plus Bridges and Repeaters

Description	Support	No and Type of Ports	Reference	Weight kg (lb)
Bridge/Mux	Redundant	4 Modbus Plus	**NW-BM85C002**	–
Programmable Bridge/Mux		4 RS-232	**NW-BM85S232**	–
		4 RS-485	**NW-BM85S485**	–
Bridge Plus		4 Modbus Plus	**NW-BP85-002**	–
Modbus Plus repeater	Coaxial		**NW-RR85-001**	–
Modbus Plus repeater, point-to-point	Fiber optic		**490 NRP 253 00**	–
Modbus Plus repeater, line/drop	Fiber optic		**490 NRP 254 00**	–
Modbus Plus repeater, Remote I/O	Fiber optic to coax		**490 NRP 954 00**	–

Cables and accessories

Description	Support	Length m (ft)	Reference	Weight kg (lb)
IBM PC Modbus Plus adapter kit	Redundant		**AM-SA85-030**	–
IBM PC Modbus Plus Dual adapter kit	Redundant		**AM-SA85-032**	–
Modbus Plus adapter kit for PCMCIA Type II			**416 NHM 212 30**	–
Modbus Plus cable		30.5 (100)	**490 NAA 271 01**	–
		152.5 (500)	**490 NAA 271 02**	–
		305 (1000)	**490 NAA 271 03**	–
		457 (1500)	**490 NAA 271 04**	–
		1525 (5000)	**490 NAA 271 06**	–
Modbus Plus programming cable		3.7 (12)	**990 NAA 263 20**	–
		15 (50)	**990 NAA 263 50**	–
Modbus Plus DIO drop cable		2.4 (8)	**990 NAD 211 10**	–
		6 (20)	**990 NAD 211 30**	–
Modbus Plus Tap			**990 NAD 230 00**	–
Modbus Plus ruggedized tap			**990 NAD 230 10**	–
Terminator for Modbus Plus ruggedized tap			**990 NAD 230 11**	–
Field I/O power connector		Base unit	**140 XTS 002 00**	0.15 (0.33)
Field I/O power connector		IP 20 rated	**140 XTS 005 00**	0.15 (0.33)

Hot standby modules

Presentation, description

Presentation

The hot standby option provides Quantum series CPUs with the high availability that security-critical applications demand. Central to the system is a standby controller–a second Quantum system configured identically with the primary control system with special hot standby modules mounted in both backplanes. The standby controller uses a high-speed fiber optic link to constantly maintain the current system status of the primary controller. In the event of an unexpected failure in the primary controller, system control automatically switches over to the standby controller. Critical processes running on a remote I/O network remain intact, unaffected by controller hardware failures. The result is higher productivity with reduced down-time.

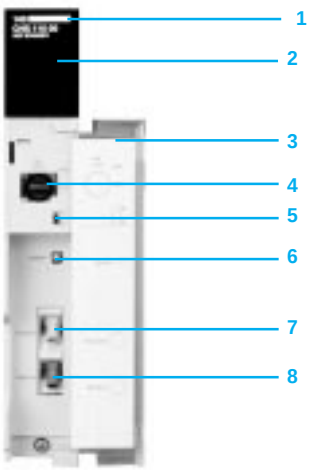
At the beginning of every primary controller scan, the current register and I/O state table is transferred to the standby controller across a secure, high-speed fiber optic link. If switchover is triggered, the standby controller takes control of the system with up-to-date I/O and register status for a bumpless, controlled transfer with minimal process impact. At switchover, the standby controller becomes the primary controller and, when the downed controller is restored to good health, it becomes the standby.

Most applications demand that identical logic programs reside in the two controllers. User logic comparisons between the two controllers are performed at startup and during runtime. By default, the standby controller is taken offline if a logic mismatch is detected. You have the option to allow logic mismatches to coexist for high availability during maintenance periods. If minor process changes are required, you can make them without disturbing standby operations.

In the event that the standby controller does not have the application program, it can be copied from the primary controller. Copying the program is a simple two-step procedure that uses the keyswitch and update button on the front of the standby controller. This task can be accomplished by a maintenance person without the use of a programming panel.

Description

The Hot Standby module 140 CHS 110 00 comprises in front panel:



1 Model number and color code.

2 LED array:
Ready (green) module has completed startup diagnostics blinks to indicate transmission errors
Com Act (green) Communicating with I/O bus blinks to indicate transmission errors
Primary (green) module controls the process
Com Err (red) indicates transmission errors, or connection interrupted
Standby (amber) module in standby mode, blinks during the update process.

3 Removable, hinged door and sutomer identification label.

4 Selector switches.

5 Micro switch.

6 Update pushbutton.

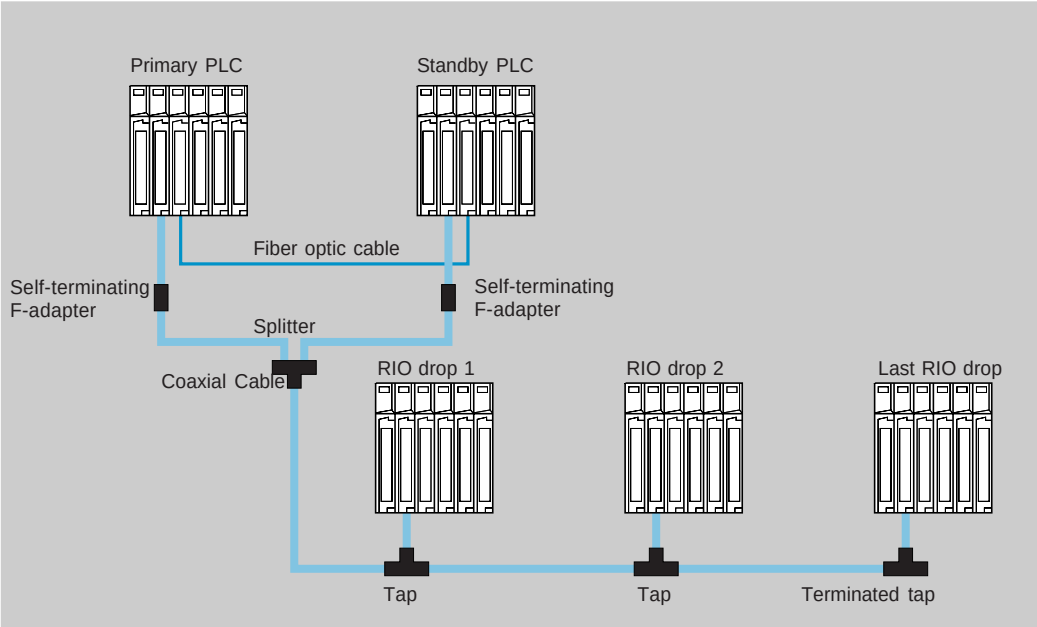
7 Fiber optic transfer cable connector.

8 Fiber optic receive cable connector.

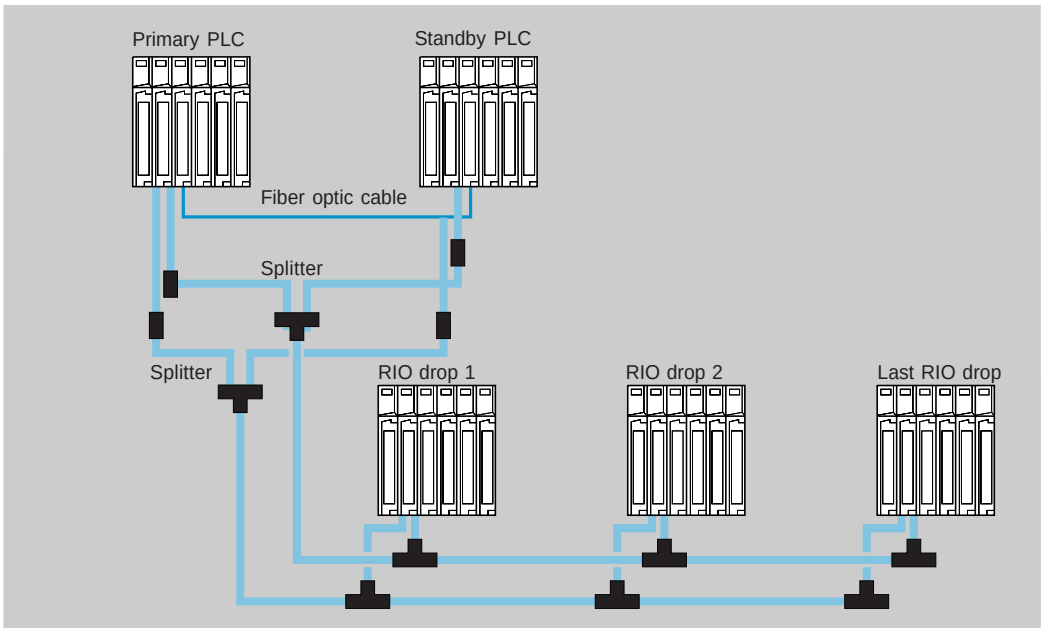
Hot standby cable topologies

A hot standby system controls the I/O drops on a remote I/O (RIO) network. The local backplanes for the primary and standby controllers each require a Quantum CPU, an RIO head-end adapter module and a 140 CHS 110 00 Hot Standby module. Critical I/O should never be used in the local backplane because it will not be switched over when primary control shifts from one controller to the other.

The two 140 CHS 110 00 Hot Standby modules are connected to each other by a special fiber optic cable. This link allows the standby controller to maintain the current system status of the primary controller. The two RIO head-end adapter modules connect to the RIO trunk cable via an MA-0186-100 splitter.



A hot standby system can also support a redundant RIO cable topology. The coaxial cables running from the two cable ports on the 140 CRP 932 00 head-end adapters in the two controllers are connected to the redundant RIO cable by separate MA-0186-100 splitters.



Characteristics

Model		**140 CHS 110 00**
Comm ports		2 connectors (transmit and receive) for fiber optic link
RFI immunity (per IEC 801-3)	**MHz**	27…1000, 10 V/m
Bus current	**mA**	700 (typical)
Electrostatic discharge (per IEC 801-2)	**kV**	8 air, 4 contact
Compatibility		
Software		ProWORX NxT 2.0 or Concept Version 2.0 and higher
Quantum CPUs		Version 2.0 or higher
Input/output type		Quantum, 800 Series, and Sy/Max (remote I/O only)
Fiber optic ports		1 Transmit 1 Receive
Programming software		Concept V2.0 or ProWORX NxT 2.0
Quantum controllers		All, 984 ladder logic; IEC, 140 CPU 434 12A and 140 CPU 534 14A
CHS loadable software requirements		Version 2.0 minimum
Loadable function block performance		CHS block (Included with kit)
Switchover time	**ms**	13 to 48 for hot standby to assume control after primary fault detected
Scan impact communications	**ms**	3 + 6 per kB of configured state RAM
CHS communications rate		10 megabaud
Cable between Quantum systems	**m**	3 fiber optic
Current requirements	**mA**	700

Hot standby modules

References

References

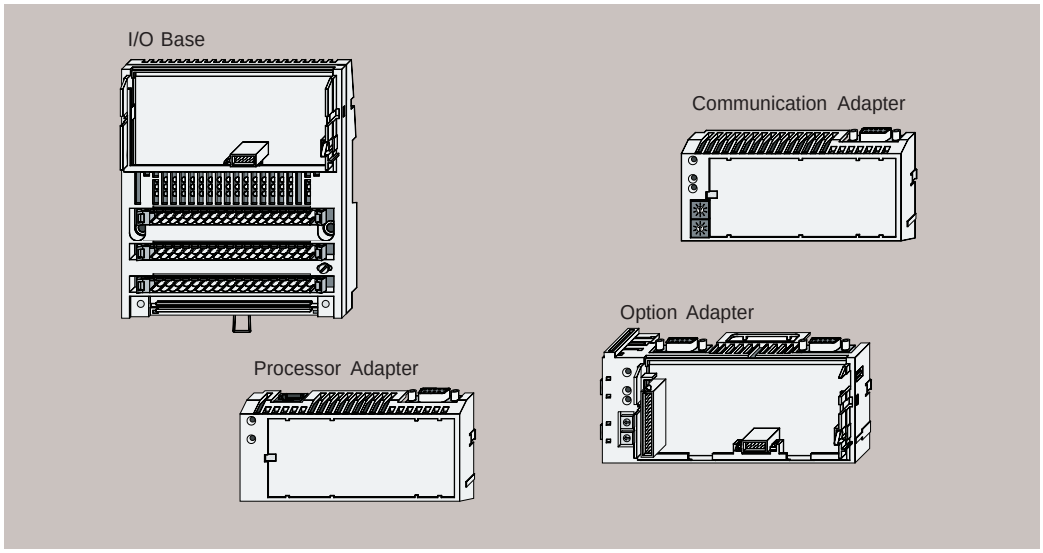
Description	Components	Reference	Weight kg (lb)
Hot Standby module	–	**140 CHS 110 00**	1.06 (2.33)
Hot Standby kit	2 CHS hot standby processors 1 fiber optic (3m) hot standby cable 1 CHS loadable software package 1 S908 terminator kit CHS installation manual	**140 CHS 210 00**	–
Quantum Hot Standby	System Planning and Installation Guide	**840 USE 106 00**	–

Introduction

A Modular Concept with Four Easy Pieces
The Momentum system comprises 4 fundamental components that easily snap together in various combinations to form versatile control systems or sub-systems.

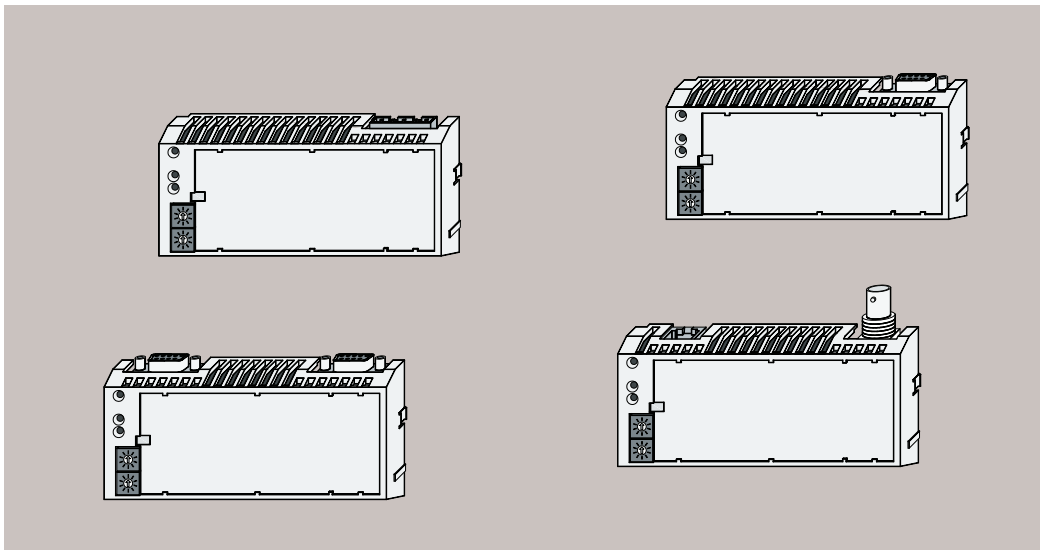
The four pieces are:

- Communication Adapters
- I/O Bases
- Processor Adapters
- Option Adapters



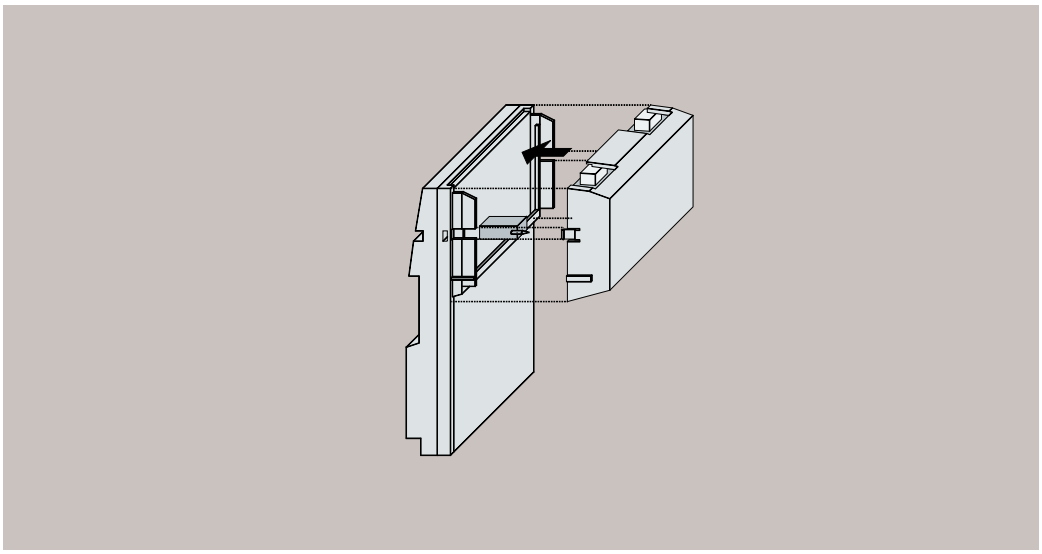
Momentum Communication Adapters

Momentum´s design separates the communications from the I/O base, thus creating a truly open I/O system that can be easily adapted to any fieldbus network. When a Momentum I/O is coupled with a Communication Adapter, the two form a remote I/O drop that connects directly to virtually any standard fieldbus I/O network. Together, Momentum I/O supports control systems based on personal computers, distributed control systems, programmable controllers and Momentum processors.



Momentum I/O Bases

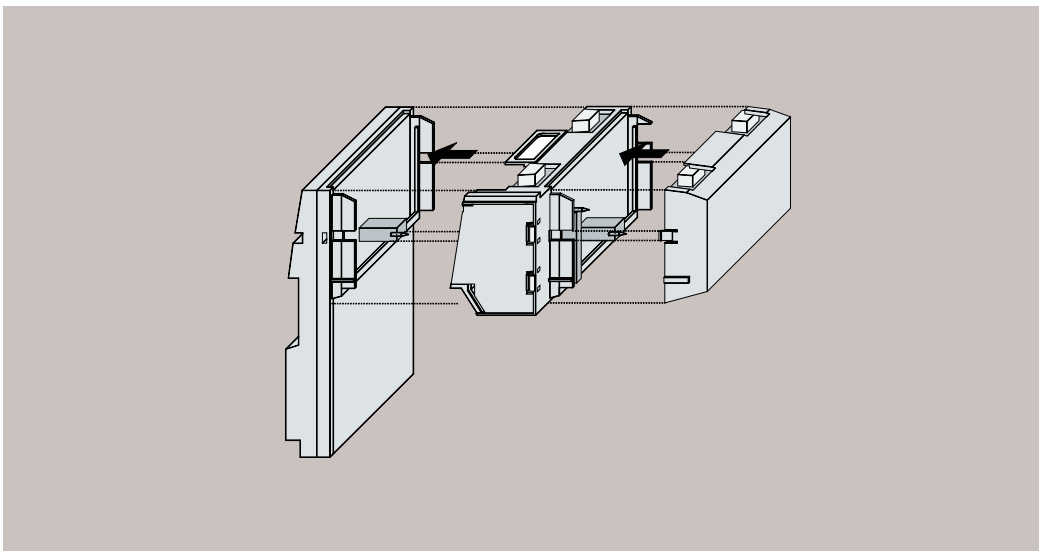
Specialized Momentum I/O Bases support the rest of the control system. The Communication Adapters, Processor Adapters and Option Adapters all snap onto the I/O Bases. A selection of I/O base modules are available, including analog I/O, discrete I/O, multi-function analog and bi-directional discrete bases. In addition, Momentum I/O bases offer simple plug-in terminal strips, as well as standard 35 mm DIN rail or panel mounting for ease of maintenance and installation.



Momentum Processors and Option Adapters

When local distributed intelligence is required at the point of control, Momentum has the answer. Momentum M1 processor Adapters are full fledged PLCs containing a CPU, RAM and Flash memory. They are based on the popular Modicon family of PLCs (i.e., directly compatible with Quantum, Compact and 984 PLCs), and snap onto the Momentum I/O Bases, just like the communication adapters.

The Option Adapter provides the Processor Adapters with additional networking capabilities, a time-of-day clock, and a battery back-up. The Option Adapters also snap onto the I/O Base; in the figure below,the Processor Adapter is stacked on top.



Quantum Automation Platform

Discrete I/O Bases

Selection Guide

Configuration	Input Modules for Direct Current		Input Modules for Alternating Current	
				
Operating Voltage	24 VDC		120 VAC	230 VAC
Current Consumption	max. 250 mA		max. 125 mA	
Input Voltage	24 VDC		120 VAC	230 VAC
Input Type	IEC 1131 Type 1+		IEC 1131 Type 2	IEC 1131 Type 1+
Output Voltage	-			
Output Type	-			
Number of points	1 x 16 In	2 x 16 In	2 x 8 In	
Potential Isolation **Point to point** **Group to group** **Field to adapter**	None None 1780 VAC		None 1780 VAC 1780 VAC	
Current capacity **Per output** **Per group** **Per module**	- - -			
Response Time **OFF - ON** **ON - OFF**	2.2 ms 3.3 ms		10 ms @ 60 Hz 35 ms @ 60 Hz	13.3 ms @ 60 Hz 13.3 ms @ 60 Hz
Protection against Short Circuit and Overload	-			
Fault Reporting **Output fault** **I/O error** **Blown fuse**	- - -			
Model No.	170 ADI 340 00	170 ADI 350 00	170 ADI 540 50	170 ADI 740 50
Page	48237/7			

Output Modules for Direct Current		Output Modules for Alternating Current			
					
24 VDC		120 VAC		230 VAC	
max. 250 mA		max. 125 mA		max. 65 mA	
-		-			
-		-			
24 VDC		120 VAC		230 VAC	
Solid state switch		Triac			
2 x 8 Out	2 x 16 Out	2 x 4 Out	2 x 8 Out	2 x 4 Out	2 x 8 Out
None None 1780 VAC		None None 1780 VAC			
0.5 A 4 A 8 A	0.5 A 8 A 16 A	2 A 4 A 8 A	0.5 A 4 A 8 A	2 A 4 A 8 A	0.5 A 4 A 8 A
< 0.1 ms < 0.1 ms		max. 1/2 x 1/f max. 1/2 x 1/f			
Electronically safeguarded		1 fuse per group			
1 LED/Out to Adapter -	1 LED/4 Out to Adapter -	None None 1 LED			
170 ADO 340 00	170 ADO 350 00	170 ADO 530 50	170 ADO 540 50	170 ADO 730 50	170 ADO 740 50
48237/7					

Quantum Automation Platform

Discrete I/O Bases

Selection Guide (continued)

Configuration	I/O Modules for Direct Current		
			
Operating and Input Voltage	24 VDC		
Current Consumption	max. 250 mA		max. 250 mA + sensor current
Input Type	IEC 1131 Type 1+		
Output Voltage	24 VDC		
Output Type	Solid state switch		
Number of points	1 x 16 In, 2 x 8 Out		1 x 16 In, 2 x 4 Out
Potential Isolation **Point to point** **Group to group** **Field to adapter**	None None 1780 VAC		500 VAC 500 VAC 1780 VAC
Current capacity **Per output** **Per group** **Per module**	0.5 A 4 A 8 A		2 A 8 A 16 A
Response Time **OFF - ON** **ON - OFF**	2.2 ms In, <1 ms Out 3.3 ms In, <1 ms Out	60 µs In, <1 ms Out 80 µs In, <1 ms Out	2.2 ms In, <1 ms Out 3.3 ms In, <1 ms Out
Protection against Short Circuit and Overload	Electrically safeguarded outputs		Electronically safeguarded outputs and 4 electronically safeguarded sensor supply groups
Fault Reporting **Output fault** **I/O error** **Blown fuse**	1 LED/Out to Adapter -		
Model No.	170 ADM 350 10	170 ADM 350 11	170 ADM 370 10
Page	48237/7		

	I/O Modules for Alternating Current		
			
	120 VAC		120 VAC
max. 180 mA	max. 250 mA		max. 160 mA
IEC 1131 Type 1+, monitored	IEC 1131 Type 1+		IEC 11331 Type 2
	24…230 VAC or 20…115 VDC		120…132 VAC
	Relay (normally open)		Triac
1 x 16 In, 1 x 8 Out and 1 x 4 Out	1 x 10 In, 2 x 4 Out		1 x 10 In, 1 x 8 Out
None None 1780 VAC	1780 VAC 1780 VAC 500 VAC		1780 VAC 1780 VAC, Input to Input 1780 VAC
0.5 A 4 A group1, 2 A group 2 6 A	2 A ohmic load 8 A ohmic load 16 A ohmic load		0.5 A 4 A 4 A
	2.2 ms In, <10 ms Out 3.3 ms In, <10 ms Out		max 1/2 x 1/f max 1/2 x 1/f
Electronically safeguarded outputs	None	Varistor in parallel with each contact	1 internal fuse per group (not against overload)
1 LED/In, 1 LED/Out, to Adapter -	None None -		None None 1 LED/fuse
170 ADM 390 10	170 ADM 390 30	170 ARM 370 30	170 ADM 690 51
48237/7			

Discrete I/O Bases

Characteristics :
pages 48237/3 to 48237/6
References :
pages 48237/7 and 48237/8
Connections :
pages 48237/9 to 48237/13

Presentation, description

Presentation

The Momentum Automation Platform products are modular. Communication Adapters and Processor Adapters are designed to work as functional modules when they are snapped onto a Momentum I/O base. An I/O base requires some type of Momentum Adapter assembled on it before it can be functional.

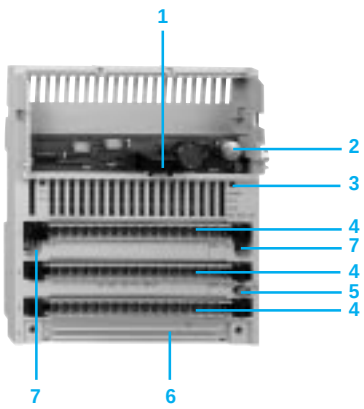
The I/O bases fit into compact standard housings that can be mounted on a DIN rail or on panels in a cabinet. They read information from field sensing devices and control discrete and analog field actuating devices. Terminal blocks and bus bars are available for use with the bases so that they can be used to support 2-, 3-, and 4-wire field devices.

The I/O field devices and the power supply to the module are connected via three 18-pin terminal blocks and an optional 1-, 2-, or 3-row busbar. The terminal connectors are electrically connected to the module; the optional busbars not.

Busbars provide a common connection for the field devices and serve as protective distribution connectors. Depending on the I/O base and the type and number of field devices to which it is connected, a 1-, 2-, or 3-row busbar may be used.

Terminal blocks and busbars are ordered separately, and are not shipped with the Momentum I/O bases. They are available in either screw-in or spring-clip versions.

Description



170 AD● discrete I/O base units comprise on the front panel :

1 An internal interface connector for the communication module or processor module
2 A locking and earth contact for the communication module or processor module
3 LED status indicators (the number of indicators will depend on the number of channels)
4 Three connectors for the removable terminal blocks
5 An earthing screw
6 A slot for the power strip
7 Two holes for panel mounting

Connectors to be ordered separately :
- removable screw or spring terminals **170 XTS 00● 00**
- 1 to 3-row screw or spring power strips **170 XTS 00● 01**.

Quantum Automation Platform

Discrete I/O Bases

Characteristics

References :
pages 48237/7 and 48237/8
Connections :
pages 48237/9 to 48237/13

Characteristics of discrete input bases

Type of input base unit			**170 ADI 340 00**	**170 ADI 350 00**	**170 ADI 540 50**	**170 ADI 740 50**
Number of inputs			1 x 16	2 x 16	2 x 8	
Input voltage		**V**	24 DC		120 AC	230 AC
Operating voltage		**V**	24 DC		85…132 AC (@ 47…63 Hz)	164…253 AC (@ 47…63 Hz)
Internal current		**mA**	250 (@ 24 VDC)		125 (@ 120 VAC)	–
Input voltage range		**V**	- 3…30 DC		0…132 AC	163…253 AC
	ON Voltage	**V**	+ 11…30 DC		74 AC minimum	164 AC minimum
	OFF Voltage	**V**	- 3…+ 5 DC		20 AC maximum	40 AC maximum
Input current						
	ON	**mA**	2.5 minimum		10.0 minimum	3…15
	OFF	**mA**	1.2 maximum		2.0 maximum	0…15
Input resistance		**kΩ**	4		9.5 @ 50 Hz, 7.5 @ 60 Hz	9 @ 50 Hz, 7.5 @ 60 Hz
Type of signal			True High			
Response time						
On-Off	maximum	**ms**	3.3		35.0 @ 60 Hz	13.3 @ 60 Hz
Off-On	maximum	**ms**	2.2		10.0 @ 60 Hz	13.3 @ 60 Hz
Potential Isolation	Group to Group	**V**	–		1780 AC	
	Field to communication interface	**V**	1780 AC			
Power dissipation		**W**	3 typical, 5 maximum	5.5 typical, 8.5 maximum	–	

Characteristics of discrete output bases

Type of output base unit			**170 ADO 340 00**	**170 ADO 350 00**	**170 ADO 530 50**	**170 ADO 540 50**	**170 ADO 730 50**	**170 ADO 740 50**
Number of outputs			2 x 8	2 x 16	2 x 4	2 x 8	2 x 4	2 x 8
Type of output			Solid state switch		Triac			
Output voltage		**V**	24 DC		120 AC		230 AC	
Operating voltage		**V**	24 DC		120 AC (300 for 10 s, 400 for 1 cycle)		230 AC (300 for 10 s, 400 for 1 cycle)	
Internal current		**mA**	250 (@ 24 VDC)		125		65	
Current	Point Maximum	**A**	0.5		2	0.5	2	0.5
	Group	**A**	4		4			
	Module	**A**	8		8			
Min. output current		**mA**	–		5	30	5	30
Leakage current		**mA**	< 1 @ 24 VDC		1.9 @ 120 VAC		2.5 @ 230 VAC	2.4 @ 230 VAC
Surge current		**A**	5 for 1 ms		Point: 15 (1 cycle), 10 (2 cycles), 5 (3 cycles)			
On StateVoltage drop		**V**	< 0.5 DC @ 0.5 A		< 1.5 AC @ 2 A	< 1.5 AC @ 0.5 A	< 1.5 AC @ 2 A	< 1.5 AC
Protection (short-circuits, overloads)			Outputs electronically protected		Via internal 5 A slow-blow fuse			
Response time								
On-Off	maximum	**ms**	< 0.1		1/2 x 1/f (= 0,5 of one line cycle)			
Off-On	maximum	**ms**	< 0.1		1/2 x 1/f (= 0,5 of one line cycle)			
Potential Isolation	Output Group to Output Group		None		None			
	Field to communication interface	**V**	Defined by Communication Adapter type		1780 AC			
Power dissipation		**W**	3.5 typical 4.5 maximum	6.0 typical 7.5 maximum	6.0 typical 7.5 maximum			

Characteristics (continued)

References :
pages 48237/7 and 48237/8
Connections :
pages 48237/9 to 48237/13

Characteristics of discrete I/O bases

Type of base unit			**170 ADM 350 10**	**170 ADM 350 11**	**170 ADM 370 10**	**170 ADM 390 10**
Number of inputs			1 x 16	1 x 16	4 x 4	1 x 16
Number of outputs			2 x 8	2 x 8	2 x 4	1 x 8 and 1 x 4
Operating voltage		**VDC**	24			
Internal current		**mA**	250 @ 24 VDC		250 @ 24 VDC (plus current for sensors)	180 @ 24 VDC
Inputs	Voltage	**VDC**	24			
	Type of signal		True High			
	Voltage at 1	**VDC**	+ 11...+ 30			
	Voltage at 0	**VDC**	- 3...+ 5			
	Input current	**mA**	2.5 min. at state 1 (6 mA at ⎓ 24 V), 1.2 max. at state 0			
	Input voltage range	**VDC**	- 3...+ 30			
	Input resistance	**kΩ**	4			
	Response time	**ms**	2.2 Off to On 3.3 On to Off	0.06 Off to On 0.08 On to Off	2.2 Off to On 3.3 On to Off	
	Fault sensing		–	–	–	Broken wire detection
Outputs	Voltage	**VDC**	24, 30 maximum			
	Type		Solid state switch			
	Type of signal		True High			
	Current capacity	**A**	0.5 per point 4 per group 8 per module		2 per point 8 per group 16 per module	0.5 per point 4 per group 1, 2 group 2 6 per module
	Leakage current	**mA**	< 1 @ 24 VDC		< 1 @ 24 VDC	< 1 @ 24 VDC
	Peak current	**A**	5 for 1 ms		2.8 for 1 ms	–
	On State Voltage drop	**VDC**	< 0.5 @ 0.5 A		–	–
	Error indication		Output overload for at least one output to communication adapter		Output overload for at least one output or short-circuit or overload on one of the 4 encoder supply groups, to communication adapter	Output overload for at least one output to communication adapter
	Response time	**ms**	< 0.1 Off to On, < 0.1 On to Off			
Potential Isolation	Input to input		None			
	Output to Output Group	**V**	None		500 AC	
	Input to Output Group	**V**	None		500 AC	
	Field to communication interface		Defined by Communication Adapter type			
Power dissipation	Typical	**W**	6.0		6.5	
	Maximum	**W**	8.0		10.0	

Characteristics (continued)

References :
pages 48237/7 and 48237/8
Connections :
pages 48237/9 to 48237/13

Characteristics of discrete I/O bases (continued)

Type of base unit			**170 ADM 390 30**	**170 ARM 370 30**
Number of inputs			1 x 10	
Number of outputs			2 x 4	
Operating voltage		**V**	24 DC	120 AC (47…63Hz)
Internal current		**mA**	250 (@ 24 VDC)	5 minimum load current
Inputs	Voltage	**VDC**	24	
	Signal type		True High	
	On Voltage minimum	**VDC**	+ 11...+ 30	
	Off Voltage maximum	**VDC**	- 3...+ 5	
	Input Current	**mA**	2.5 minimum On, 1.2 maximum Off	
	Input Voltage Range	**VDC**	- 3...+ 30	
	Input resistance	**kΩ**	4	–
	Response time	**ms**	2.2 Off to On, 3.3 On to Off	
Outputs	Voltage	**V**	24 …230 AC, 20…120 DC	24…230 AC
	Type		Relay normally open	
	Current capacity 24 VDC	**A**	> 0.005 (new contacts), ohmic load 2 A maximum, inductive load 1 A maximum (LR ≤ 40 ms)	–
	Current capacity 115 VDC	**A**	Ohmic load 0.5 A maxi. (switching current ≤ 1.5 A) inductive load 0.15 A maximum (LR ≤ 40 ms)	–
	Current capacity VAC	**A**	2 A maximum (switching current ≤ 1.5 A) cosφ = 1 1 A maximum cosφ = 0.5	2 A per point, 8 A per group, 16 A per module
	Leakage current	**mA**	< 1 @ 230 VAC	–
	Error indication		None	
	Response time	**ms**	10 @ 60 Hz Off to On, 10 @ 60 Hz On to Off	
	Max. number of switching circuits		> 30 x 10^6 (mechanical), > 1 x 10^5 (inductive load with external protection circuit)	
	Protection against short circuit and overload		None	Varistor in parallel with each contact
Potential Isolation	Input to Input		None	
	Output Group to Output Group	**V rms**	1780 AC	
	Input to Output Group	**V rms**	1780 AC	
	Field to communication interface	**V rms**	1780 AC	500 AC
Fusing	Internal		None	
	External Operating Voltage		315 mA fast-blow	4 A fast blow
	External Input Voltage		max. 4 A fast-blow	None
	External Output Voltage		According to the supply of the connected actuators not to exceed 8 A slow-blow/group	None
Power dissipation				
	Typical	**W**	5.5	
	Maximum	**W**	8.5	

Characteristics (continued)

References :
pages 48237/7 and 48237/8
Connections :
pages 48237/9 to 48237/13

Characteristics of discrete I/O bases (continued)

Type of base unit			**170 ADM 690 51**
Number of inputs			1 x 10
Number of outputs			1 x 8
Operating voltage		**VAC**	120 (47…63 Hz)
Internal current		**mA**	160 (@ 120 VAC)
Inputs	Voltage	**VAC**	120
	Signal Type	**VAC**	120
	On Voltage minimum	**VAC**	74
	Off Voltage maximum	**VAC**	20
	Input current	**mA**	6.0 minimum at state 1, 2.6 maximum at state 0
	Input Voltage Range	**VAC**	74...132
	Input resistance	**kΩ**	4
	Response time	**ms**	Maximum 1/2 x 1/f Off to On, maximum 1/2 x 1/f On to Off
Outputs	Voltage	**VAC**	120...132 (@ 47…63 Hz)
	Type		Triac
	Current capacity		0.5 A per point maximum, 30 mA per point minimum, 2 A per group, 4 A per module
	Leakage current	**mA**	< 1.3 (@ 120 VAC)
	Signal Type		True High
	On State Voltage drop	**VAC**	< 1.5 (@ 0.5 A)
	Error indication		None
	Response time	**ms**	1/2 x 1/f maximum from state 0 to state 1, 1/2 x 1/f maximum from state 1 to state 0
	Maximum switching cycles		3000/hr for 0.5 A inductive load
Potential Isolation	Input to Input		None
	Output group to output group		None
	Input to output group	**VAC**	125, tested with 1780
	Field to communication interface	**VAC**	125, tested with 1780
Power dissipation			
	Typical	**W**	6
	Maximum	**W**	8
Protection	Internal fuses	**A**	2 x 2.5 slow-blow fuses

Discrete I/O Bases

References

Characteristics :
pages 48237/3 to 48237/6
Connections :
pages 48237/9 to 48237/13

170 ADI ●●0 ●0

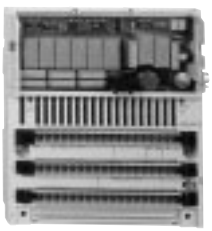
Discrete input bases

Type of current	Input voltage	Modularity (no. of points)	Conformity IEC 1131-2	Reference	Weight kg
DC	24 V	16 (1 x 16)	Type 1	**170 ADI 340 00**	0.190
		32 (2 x 16)	Type 1	**170 ADI 350 00**	0.200
AC	100…120 V	16 (2 x 8)	Type 2	**170 ADI 540 50**	0.284
	200…240 V	16 (2 x 8)	Type 2	**170 ADI 740 50**	0.284

170 ADO ●●0 ●0

Discrete output bases

Type of current	Output voltage	Modularity (no. of points)	Current per output	Reference	Weight kg
DC solid state, protected	24 V	16 (2 x 8)	0.5 A	**170 ADO 340 00**	0.210
		32 (2 x 16)	0.5 A	**170 ADO 350 00**	0.210
AC triac, protected, 1 fuse per group	100…120 V	8 (2 x 4)	2 A	**170 ADO 530 50**	0.320
		16 (2 x 8)	0.5 A	**170 ADO 540 50**	0.284
	200…240 V	8 (2 x 4)	2 A	**170 ADO 730 50**	0.320
		16 (2 x 8)	0.5 A	**170 ADO 740 50**	0.284



170 ADM ●●0 ●●

Discrete I/O bases

Type of current	Input voltage	Output voltage	Modularity Inputs	Outputs, current		Reference	Weight kg
DC solid state	24 VDC Type 1	24 VDC protected	16 I (1 x 16)	16 O (2 x 8) 0.5 A		**170 ADM 350 10**	0.200
			16 I, fast	16 O (2 x 8) 0.5 A		**170 ADM 350 11**	0.200
			16 I (4 x 4)	8 O (2 x 4) 2 A		**170 ADM 370 10**	0.220
			16 I, wiring check (1 x 16)	12 O (1 x 8 and 1 x 4) 0.5 A		**170 ADM 390 10**	0.260
AC or DC relay	24 VDC Type 1	24/240 VAC 20/115 VDC	10 I (1 x 10)	8 O (2 x 4) 2 A	(1)	**170 ADM 390 30**	0.260
					(2)	**170 ARM 370 30**	0.260
AC triac	100…120 VAC Type 2	120 VAC	10 I (1 x 10)	8 O 0.5 A protected by 1 fuse		**170 ADM 690 51**	0.220

(1) Operating voltage 24 VDC
(2) Operating voltage 120 VAC

Discrete I/O Bases

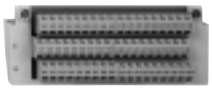
References (continued), dimensions, mounting

Characteristics :
pages 48237/3 to 48237/6
Connections :
pages 48237/9 to 48237/13

References

170 XTS 001 00

170 XTS 002 00



170 XTS 004 01

170 XTS 005 01

170 XTS 008 01

170 XTS 006 01

CER 001

170 BSM 016 00

Accessories

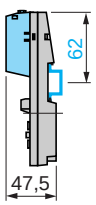
Description	Composition	Type of connection	Reference	Weight kg
Terminal blocks for I/O base connection	Set of 3 connectors 1 row	Screw	**170 XTS 001 00**	–
		Spring	**170 XTS 002 00**	–
Bus Bar	3 rows	Screw	**170 XTS 004 01**	–
		Spring	**170 XTS 003 01**	–
	2 rows	Screw	**170 XTS 005 01**	–
		Spring	**170 XTS 008 01**	–
	1 row	Screw	**170 XTS 006 01**	–
		Spring	**170 XTS 007 01**	–
Cable grounding rail	Used to connect the cable shielding	–	**CER 001**	–
Dummy base unit	Used to prewire the I/O base units. Requires screw or spring connection terminals	–	**170 BDM 090 00**	–
Discrete input simulator, 16 channels, 24 VDC	–	–	**170 BSM 016 00**	–

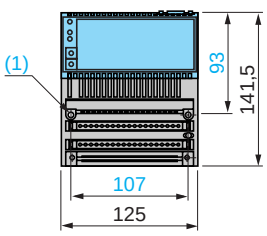
Replacement parts

Description	Use	Reference	Weight kg
Sheets of labels	10 front labels for Momentum modules	**170 XTS 100 00**	–
Cable coding part kit	For screw or spring connection terminals	**170 XCP 200 00**	–

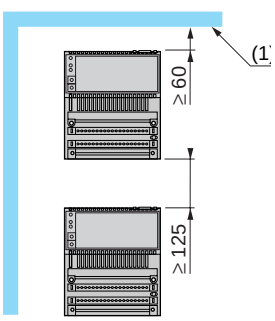
Dimensions, mounting

170 AD●, rail or panel mounting





(1) 2 holes for M4 screws, for panel mounting



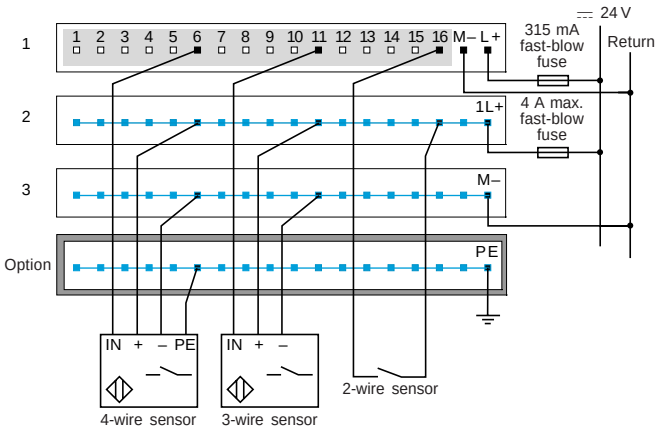
(1) Equipment or enclosure

Discrete I/O Bases

Connections

Characteristics :
pages 48237/3 to 48237/6
References :
pages 48237/7 and 48237/8

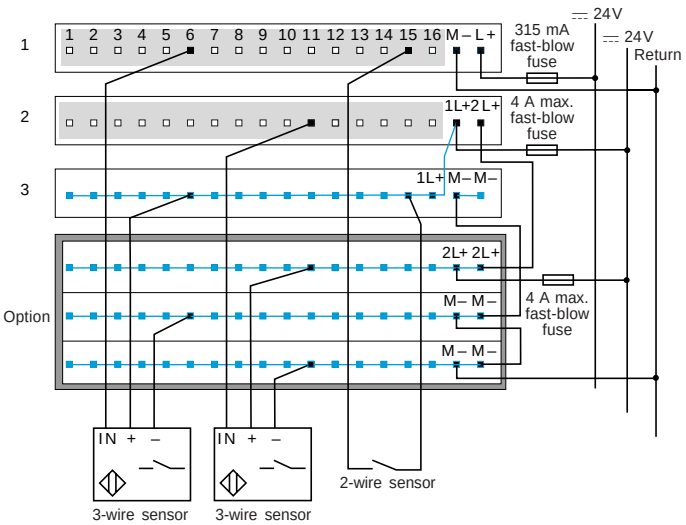
170 ADI 340 00
Example of external wiring of 2, 3 and 4-wire sensors



Group of channels

Internal wiring

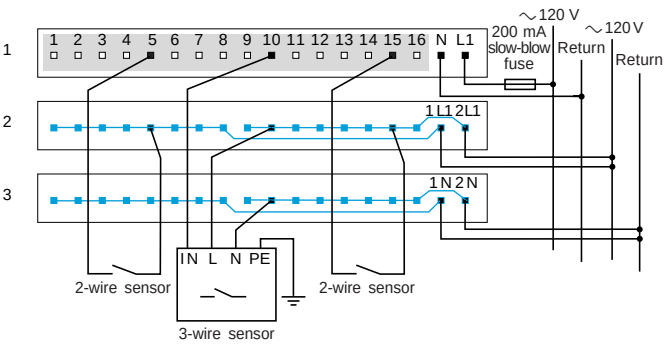
170 ADI 350 00
Example of external wiring of 2 and 3-wire sensors



Group of channels

Internal wiring

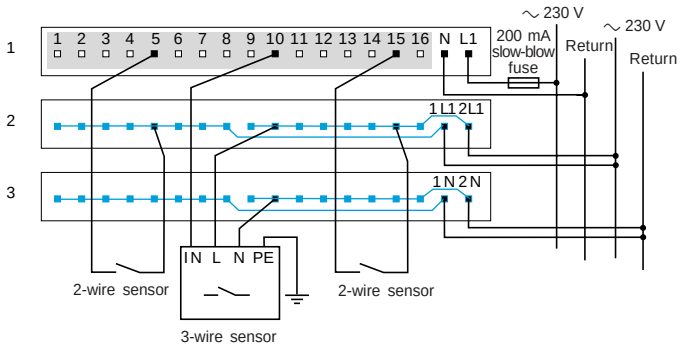
170 ADI 540 50
Example of external wiring of 2 and 3-wire sensors



Group of channels

Internal wiring

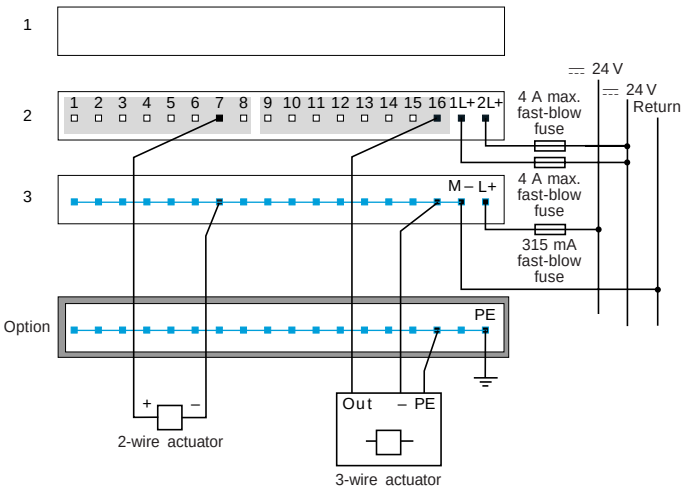
170 ADI 740 50
Example of external wiring of 2 and 3-wire sensors



Connections (continued)

Characteristics :
pages 48237/3 to 48237/6
References :
pages 48237/7 and 48237/8

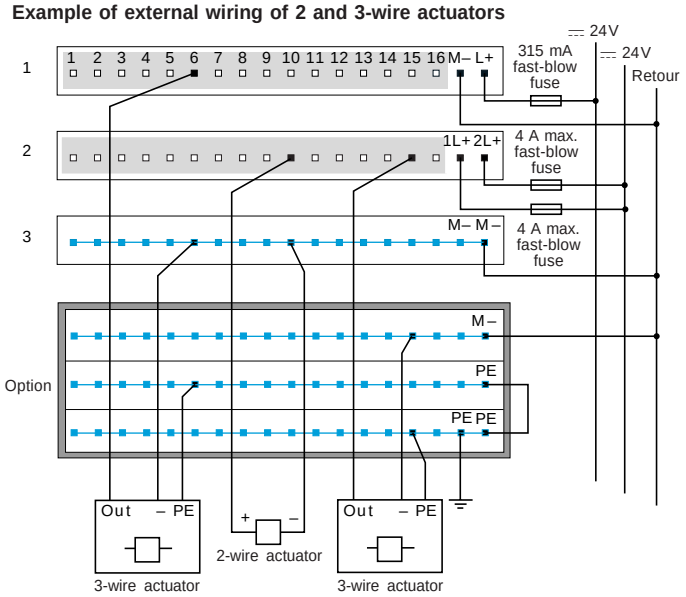
170 ADO 340 00
Example of external wiring of 2 and 3-wire actuators



Group of channels

Internal wiring

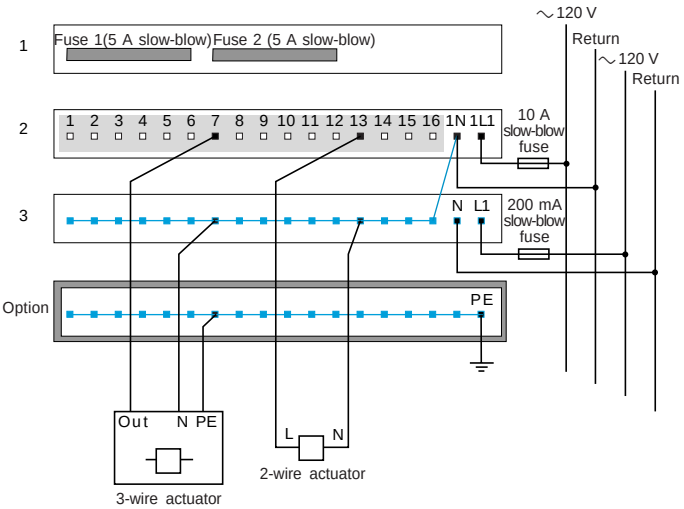
170 ADO 350 00
Example of external wiring of 2 and 3-wire actuators



Group of channels

Internal wiring

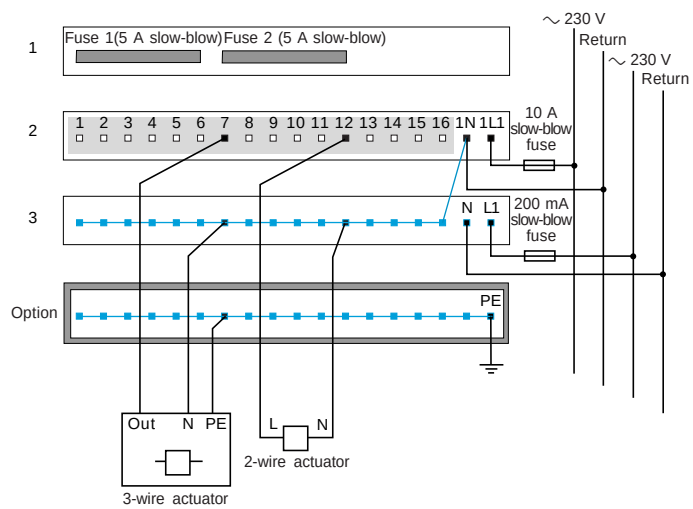
170 ADO 530 50/540 50
Example of external wiring of 2 and 3-wire actuators



Group of channels

Internal wiring

170 ADO 730 50/740 50
Example of external wiring of 2 and 3-wire actuators



Group of channels

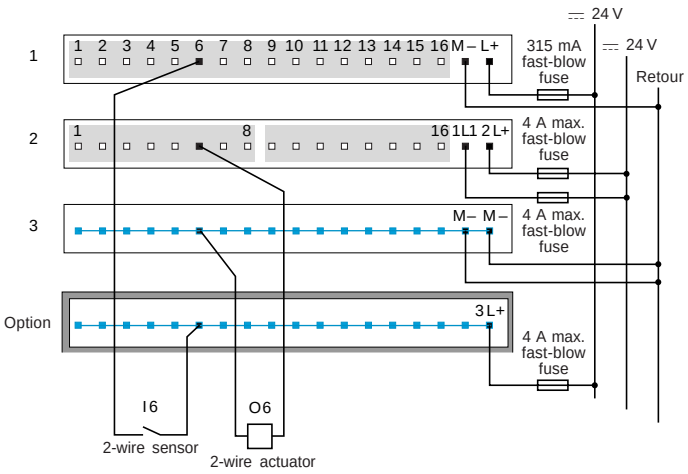
Internal wiring

Connections (continued)

Characteristics :
pages 48237/3 to 48237/6
References :
pages 48237/7 and 48237/8

170 ADM 350 10/350 11

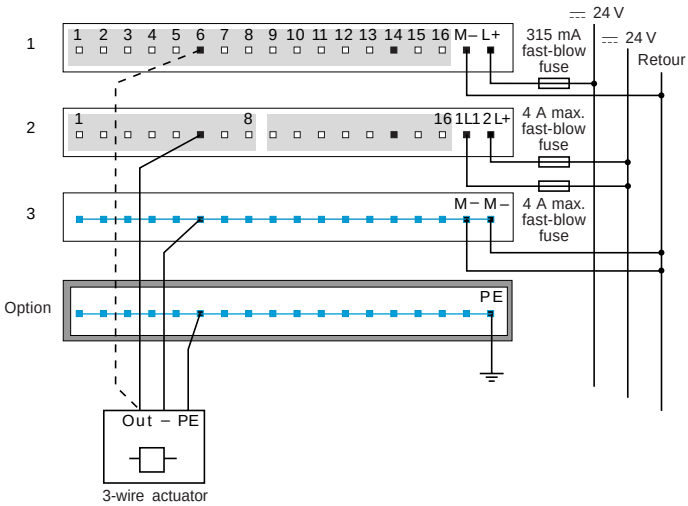
Example of external wiring of a 2-wire sensor/actuator



Group of channels

Internal wiring

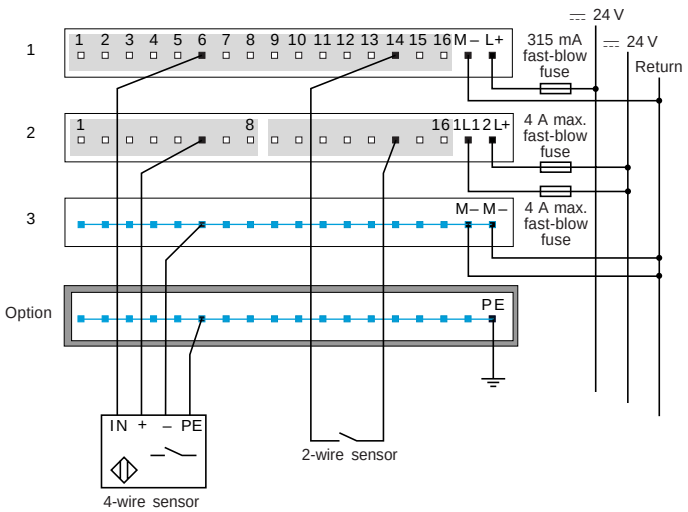
Example of external wiring of a 3-wire actuator with wiring check



Group of channels

Internal wiring

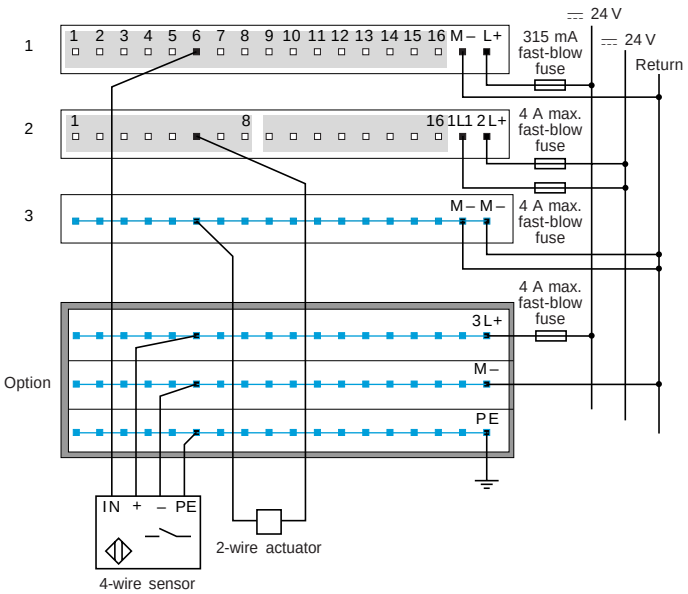
Example of external wiring of a 4-wire sensor activated by an output



Group of channels

Internal wiring

Example of external wiring of a 4-wire sensor/2-wire actuator



Group of channels

Internal wiring

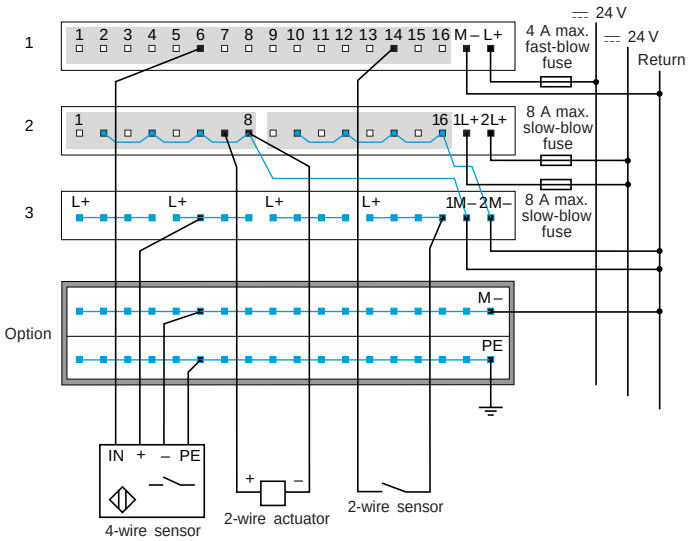
Discrete I/O Bases

Connections (continued)

Characteristics :
pages 48237/3 to 48237/6
References :
pages 48237/7 and 48237/8

170 ADM 370 10

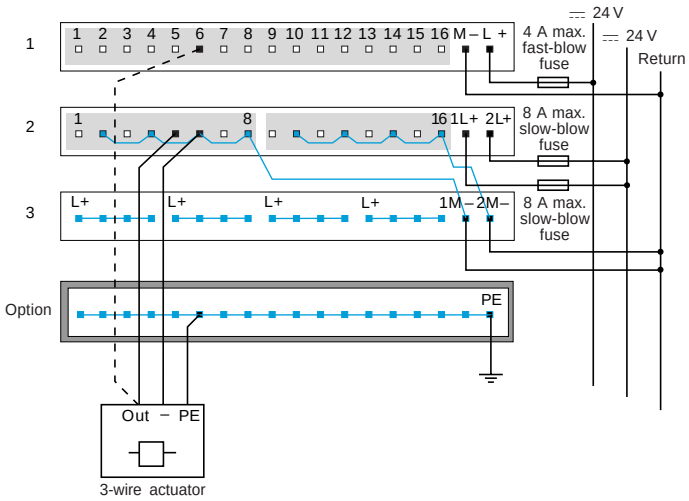
Example of external wiring of 2 and 4-wire sensors/2-wire actuator



Group of channels

Internal wiring

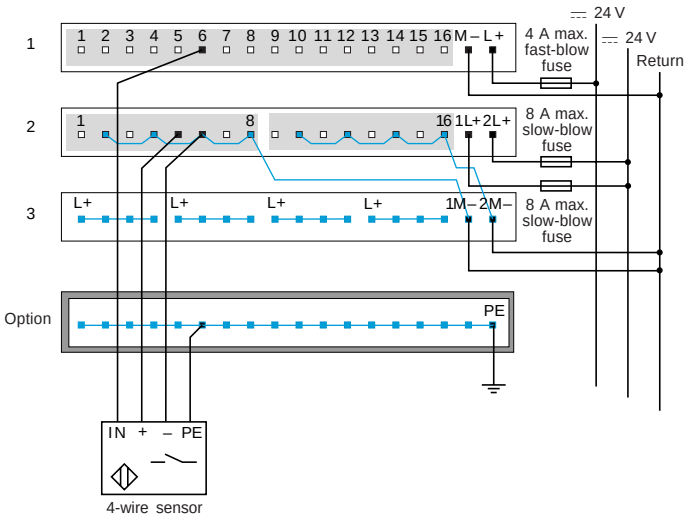
Example of external wiring of 3-wire actuator with wiring check



Group of channels

Internal wiring

Special external wiring, the output activates the sensor



Group of channels

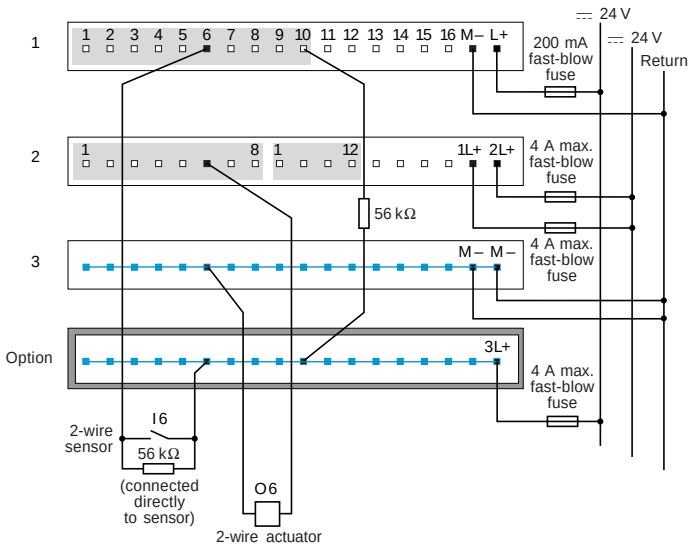
Internal wiring

Discrete I/O Bases

Connections (continued)

Characteristics :
pages 48237/3 to 48237/6
References :
pages 48237/7 and 48237/8

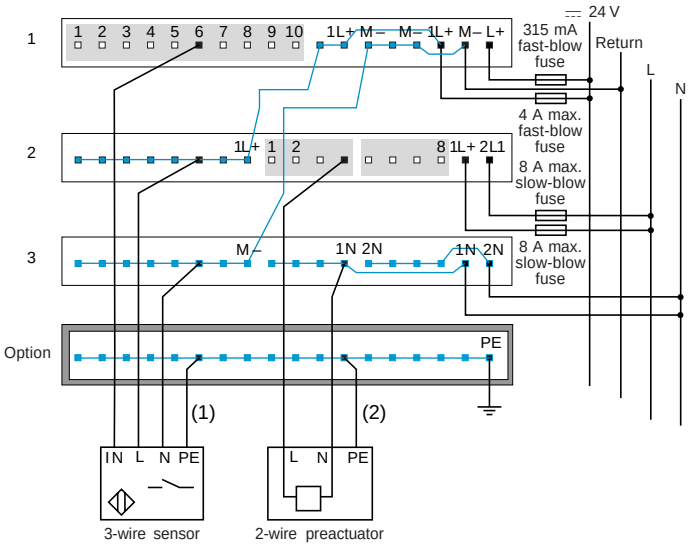
170 ADM 390 10
Example of external wiring of 2-wire sensor/actuator



Group of channels

Internal wiring

170 ADM 390 30
Example of external wiring of 3 or 4-wire sensor/3-wire preactuator

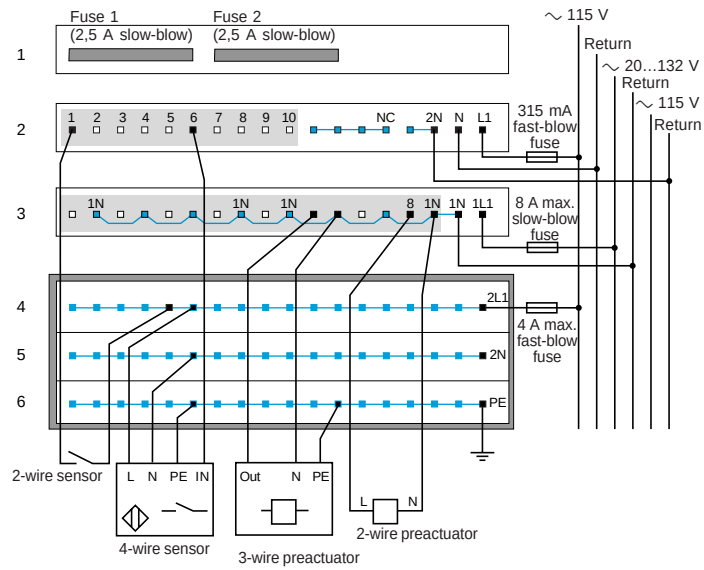


Group of channels

Internal wiring

(1) For 4-wire sensor
(2) For 3-wire preactuator

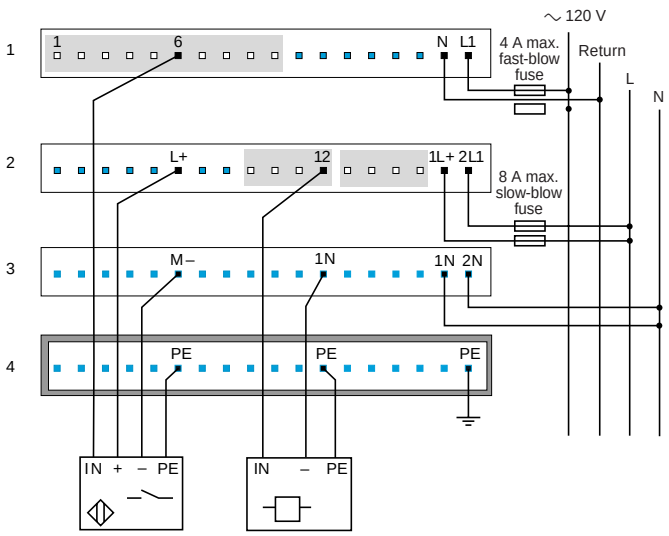
170 ADM 690 51
Example of external wiring of 4-wire sensor/2 and 3-wire preactuators



Group of channels

Internal wiring

170 ARM 370 30
Example of external wiring of 4-wire sensor/3-wire preactuator



Group of channels

Quantum Automation Platform

Analog I/O Bases

Selection Guide

Application	Analog input bases		
			
Measurement range	Inputs ± 5 V, ± 10 V, ± 20 mA 1-5 V, 4-20 mA	Inputs ± 5 V, ± 10 V, 4-20 mA	Inputs ± 25 mV, ± 100 mV, Temperature probe Pt 100, Pt 1000, Ni 100, Ni 1000 Thermocouple B, E, J, K, N, R, S, T
Modularity			
Input channels	8 differential inputs	16 single ended inputs	4 differential inputs
Output channels	–	–	–
Discrete I/O	–	–	–
Resolution	14 bits + sign bipolar 15 bits unipolar	12 bits + sign	15 bits + sign
Update time	1.33 + 1.33 x no. of declared channels (ms)	1 + 1.5 x no. of declared channels (ms)	500 ms
Potential isolation			
Between channels	200 VDC, 1 min	None	400 VDC
Base and ground	500 VDC, 1 min	500 VDC, 1 min	500 VDC, 1 min
Channels and ground	500 VDC, 1 min	1780 VAC, 1 min	1780 VAC, 1 min
Protection	Polarity inversion		
Number of words			
In	8 words in	16 words in	4 words in
Out	2 words out	4 words out	4 words out
Fail states	–		
Module ID	170 AAI 030 00	170 AAI 140 00	170 AAI 520 40
Page	48238/8		

Analog output bases		Mixed I/O bases (analog/discrete)	
			
Outputs ± 10 V, 0-20 mA	Outputs ± 10 V, 4-20 mA	Inputs ± 5 V, ± 10 V, ± 20 mA 1-5 V, 4-20 mA Outputs ± 10 V, 0-20 mA	Inputs 0…10 V Outputs 0…10 V
– 4 outputs –		4 differential inputs 2 outputs 4 inputs 24 VDC 2 outputs 24 VDC/0.5 A	6 inputs with common point 4 outputs with common point 4 inputs 24 VDC 8 outputs 24 VDC/0.25 A
12 bits + sign		Inputs: 12…14 bits (dep. on range) Outputs: 12 bits	Inputs: 14 bits Outputs: 14 bits
2 ms		Inputs: 10 ms; outputs: 1 ms	Inputs: 0.75 ms (for 6 inputs) Outputs: 1.2 ms (for 4 outputs)
No 500 VDC, 1 min 1780 VAC, 1 min		No 500 VAC for 1 minute 500 VAC for 1 minute	
		Short-circuits and overloads (for discrete outputs)	
– 5 words out		4 words in 4 words out	12 words in 12 words out
Hold, reset to zero, reset to full scale		Hold or reset to zero	
170 AAO 120 00	170 AAO 921 00	170 AMM 090 00	170 ANR 120 90
48238/8			

Characteristics :
pages 48238/3 to 48238/7
References :
pages 48238/8 and 48238/9
Dimensions :
page 48238/9
Connections :
pages 48238/10 and 48238/11

Analog I/O Bases

Presentation, description

Presentation

The Momentum analog input bases enable acquisition of various analog values encountered in industrial applications, including:

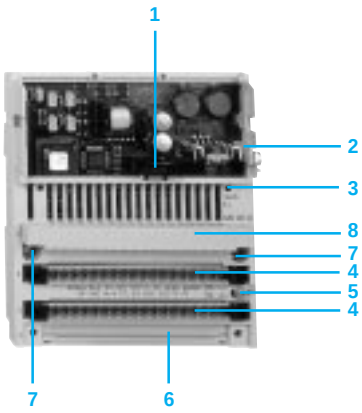
- Standard high level (1-5 V, 4-20 mA, ± 5 V, ±10 V, ± 20 mA)
- Low level (± 25 mV, ± 100 mV)
- Thermocouples (B, E, J, ...)
- Temperature probes (Ni ..., Pt ...)

The analog output bases are used to control analog field devices such as various speed drives, proportional control valves, etc. The current or the voltage is proportional to the digital value defined by the user program. The outputs can be configured so that when the program stops the outputs either reset to zero or hold the last value received. This feature is useful during debugging since, if the outputs are set to "Hold", the operation of the analog field devices is not disturbed every time the program stops.

In order to cover a wide range of applications, Momentum I/O bases offer the following functions in addition to A/D or D/A conversion:

- Choice of input/output ranges (voltage, current, thermocouple, temperature probes)
- Selection of number of channels used
- Cold junction compensation for thermocouple modules
- Broken wire detection (170 AAI 030 00, 170 AAI 140 00, 170 AAI 520 40)

Description



170 A●● analog I/O base units comprise on the front panel:

1 Internal interface connector for the communication module or processor module
2 A locking and earth contact for the communication module or processor module
3 LED status indicators (the number of indicators will depend on the number of channels)
4 Two connectors for the removable terminal blocks
5 An earthing screw
6 A slot for the power strip
7 Two screw holes for panel mounting
8 A protective cover

Connectors to be ordered separately :
- removable screw or spring terminal blocks **170 XTS 00● 00**
- 1 to 3-row screw or spring power strips **170 XTS 00● 01**.

Analog I/O Bases

References :
pages 48238/8 and 48238/9
Dimensions :
page 48238/9
Connections :
pages 48238/10 and 48238/11

Characteristics

Characteristics of analog input bases

Type of base units			**170 AAI 030 00**				
Number of Inputs			1 x 8				
LEDs			Ready (green)				
Format of Data			Full 16 bits signed (two's complement)				
Input type			Differential				
Ranges			**± 10 VDC**	**± 5 VDC**	**4...20 mA**	**± 20 mA**	**1 to 5 VDC**
	Input impedance	**kΩ**	> .1000	> .1000	250	250	>.1000
	Error at 25 °C		0.27 %	0.21 %	0.27 %	0.32 %	0.13 %
	Error at 60 °C		0.32 %	0.26 %	0.38 %	0.41 %	0.19 %
	Resolution		15 bits				
Conversion Times		**ms**	12 ms max. for 8 input channels (1.33 ms per input channel + 1.33 ms)				
Error Indication			None				
Isolation	Channel to channel	**VDC**	± 200				
	Field to ground	**VDC**	500				
	Comm adapter to ground	**VAC**	500				
Common mode rejection							
	Channel to ground		250 VAC @ 47…63 Hz or 100 VDC				
Crosstalk between Channels		**dB**	≥ 80				
External Power Requirement		**VDC**	24				
	Range		20.4 to 28.8 VDC				
	Current		<382 mA @ 24 VDC				
EMC for Industrial Environment							
	Immunity		IEC 1131 surge on auxiliary power supply 2 kV				
	Emissions		EN 50081-2				
	Approvals		UL, CSA, CE, FM class 1, div. 2				

References :
pages 48238/8 and 48238/9
Dimensions :
page 48238/9
Connections :
pages 48238/10 and 48238/11

Characteristics (continued)

Characteristics of analog input bases (continued)

Type of base units			**170 AAI 140 00**			**170 AAI 520 40**	
Number of outputs			1 x 16			1 x 4 differential inputs	
Format of Data			Full 16 bits signed (2's complement)			Full 16 bits signed (2's complement)	
Protection	Base and actuators		Polarity inversion			Polarity inversion	
Error indication			None			–	
Ranges			**± 10 V**	**± 5 V**	**4...20 mA**	**± 25mV**	**± 100mV**
	Input impedance	**kΩ**	> 2200	> 2200	< 0.250	> 10000	> 10000
	Error at 25 °C		0.15 % FS	0.15 % FS	0.25 % FS	± 21 µV	± 27 µV
	Error at 60 °C		0.25 % FS	0.25 % FS	0.45 % FS	± 46 µV	± 94 µV
	Temperature drift (60 °C)	‰	30 PE / °C	30 PE / °C	60 PE / °C	–	–
	PE (Full scale)		10 V	5 V	16 mA	–	–
	Resolution		12 bits + sign	12 bits + sign	12 bits	15 bits + sign	15 bits + sign
	Filtering		Low pass with cut-off frequency 10 kHz			–	–
Current source							
	Pt100	**mA**	–			–	0.125
	Ni100	**mA**	–			–	0.125
	Pt1000	**mA**	–			0.125	–
	Ni1000	**mA**	–			0.125	–
Update time		**ms**	1 + 1.5 x n n = number of declared channels			500	
Error indication			None			–	
Potential Isolation	Channel to Channel	**VDC**	None			400	
	Base Power Supply and Ground	**VDC**	500, 1 min			500, 1 min	
	Channels to Ground	**VAC**	1780, 1 min			1780, 1 min	
	Base Power	**V**	± 30 (voltage or current output)			± 30 (voltage or current output)	
	Common Mode Channel to Ground	**V**	–			± 100 VDC, 250 VAC	
	Common Mode Voltage betw.channels	**V**	–			200 VDC, 115 VAC single phase or 3-phase or 250 VAC single phase	
Common Mode Rejection							
	Channel to Ground		250 VAC at 47...63 Hz or 100 VDC			135 dB DC, 145 dB AC 50 Hz, 155 dB AC 60 Hz	
	Between Channels		–			120 dB DC, 130 dB AC 50 Hz, 140 dB AC 60 Hz	
Serial Mode Rejection			–			35 dB AC 50 Hz, 45 dB AC 60 Hz	
Input protection			Polarity inversion			Polarity inversion	
Operating Voltage		**VDC**	24			24	
Internal Current		**mA**	305 @ 24 VDC			330 @ 24 VDC	
Power Dissipation							
	Typical	**W**	4.95			3.5	
	Maximum	**W**	5.55			5.5	
Fusing	Internal		2 A slow-blow			2 A slow-blow	
	External		500 mA fast-blow			500 mA fast-blow	

References :
pages 48238/8 and 48238/9
Dimensions :
page 48238/9
Connections :
pages 48238/10 and 48238/11

Characteristics (continued)

Characteristics of analog output bases

Type of base units			**170 AAO 120 00**		**170 AAO 921 00**	
Number of outputs			1 x 4		1 x 4	
Format of Data			Full 16 bits signed (2's complement)		Full 16 bits signed (2's complement)	
Protection	Base and actuators		Polarity inversion		Polarity inversion	
Ranges			**± 10 V**	**0...20 mA**	**± 10 V**	**4...20 mA**
	Load impedance	**kΩ**	1 minimum	0.6 maximum	1 minimum	0.6 maximum
	Capacitive load	**µF**	< 1	< 1	< 1	< 1
	Error at 25 °C	**%**	0.2 PE	0.3 PE	0.2 PE	0.4 PE
	Error at 60 °C	**%**	0.25 PE	0.4 PE	0.25 PE	0.5 PE
	Temperature drift (60 °C)	**‰**	10 PE / °C	30 PE / °C	10 PE / °C	30 PE / °C
	Resolution		12 bits + sign	12 bits + sign	12 bits + sign	12 bits
	Update time	**ms**	< 2	< 2	< 2	< 2
PE = 10 V Output eg. 20 mA Output						
Potential Isolation						
	Channel to channel		None			
	Base Power Supply and Ground	**V**	500 VDC, 1 min			
	Channels to Ground	**V**	1780 VAC, 1 min			
	Output Protections		Short-circuits in the voltage circuits, open in current polarity inversion			
	Base Power	**V**	± 30 (voltage or current output)			
Common Mode Rejection			250 VAC @ 47...63 Hz or 250 VDC channel to ground			
Operating Voltage		**VDC**	24			
Internal Current						
	Base	**mA**	530 @ 24 VDC			
	Actuators	**mA**	150 @ 24 VDC			
Power Dissipation						
	Typical	**W**	5.6			
	Maximum	**W**	8.5			

References :
pages 48238/8 and 48238/9
Dimensions :
page 48238/9
Connections :
pages 48238/10 and 48238/11

Characteristics (continued)

Characteristics of discrete and analog I/O bases

Type of base unit			**170 AMM 090 00**				
Number of inputs and outputs			1 x 4 differential inputs 1 x 4 discrete inputs 1 x 2 analog outputs 1 x 2 discrete outputs				
Operating voltage		**VDC**	24				
Internal current		**mA**	200 typical (at 24 VDC), 350 maximum (at 24 VDC)				
Differential inputs	Conversion time		10 ms for all channels				
	Conversion error		**± 10 V**	**± 5 V**	**1…5 V**	**± 20 mA**	**4…20 mA**
	25 °C	**%**	0.08	0.16	0.16	0.16	0.16
	60 °C	**%**	0.15	0.3	0.3	0.3	0.3
	Resolution		14 bits	13 bits	12 bits	13 bits	12 bits
	Conversion consistency	**%**	± 0.02	± 0.04	± 0.04	± 0.04	± 0.04
	Common mode voltage		Input voltage starting at Ag ± 11 V				
	Common mode suppression	**dB**	> 54				
	Overvoltage voltage ranges	**V**	± 30 solid state if voltage is 24 V ± 50 dynamic max. 100 ms				
	Overvoltage current ranges	**mA**	Input current > 48				
	Input resistance	Ω	Voltage ranges > 1M, current ranges 250				
Discrete inputs	Voltage	**VDC**	24 typical, 30 maximum				
	Signal Type		True high				
	On Voltage	**VDC**	+ 11…+ 30				
	Off Voltage	**VDC**	- 3…+ 5				
	Input current	**mA**	2.5 minimum at state 1 (6 mA at 24 VDC), 1.2 maximum at state 0				
	Input resistance	**kΩ**	4				
	Response time	**ms**	2.2 from 0 to state 1 3.3 from 1 to state 0				
Analog outputs	Resolution		12 bits for single-phase measuring range 0…20 mA, 12 bits for 2-phase measuring range ± 10 V				
	Conversion time	**ms**	1 for all channels				
	Conversion error						
	25 °C		max. ± 0.35 % of upper measuring range value				
	60 °C		max. ± 0.70 % of upper measuring range value				
	Output load		≥ 3 kΩ on voltage output, ≤ 6 Ω on current output				
Discrete outputs	Voltage	**VDC**	24 typical, 30 maximum				
	Type		Semiconductor				
	Signal Type		High level				
	Current capacity	**A**	1 per channel, 2 / group, 2 / module				
	Leakage current	**mA**	< 1 @ 24 VDC				
	On State Voltage drop	**VDC**	< 0.5 @ 1 A				
	Response time	**ms**	< 0.1 Off to On < 0.1 On to Off				
	Output protection		The outputs are protected against overload and short-circuit-circuiting				
	Output indicator		1 red LED per “On”output in the event of an overload or short-circuit-circuiting				
	Error message		Message “I/O Error” on bus adapter if module is defective				
	Max. Switching cycles		1000/hr (inductive load 1 A), 100/s (resistive load 1 A), 8/s (filament load 2.4 W)				
Potential Isolation	Discrete input and output		None				
	Analog input to output		None				
	Analog input and output and to operating voltage	**VAC**	500 for 1 min				
	Operating voltage and all inputs and outputs from ground	**VAC**	500 for 1 min				
Power dissipation							
	Typical	**W**	4.0				
	Maximum	**W**	6.0				

References :
pages 48238/8 and 48238/9
Dimensions :
page 48238/9
Connections :
pages 48238/10 and 48238/11

Characteristics (continued)

Characteristics of discrete and analog I/O bases (continued)

Type of base unit			**170 ANR 120 90**
Number of inputs and outputs			1 x 6 analog inputs 2 x 4 discrete inputs 1 x 4 analog outputs 1 x 8 discrete outputs
Operating voltage		**VDC**	24, range 19.2 to 30 VDC
Internal Current		**mA**	400 @ 24 VDC
Analog Inputs	Resolution		14 bit
	Input Range		0 - 10 VDC
	Input Type		Single-ended
	Conversion Time		0.75 ms maximum for 6 input channels
	Conversion Error		0.2 % @ 25 °C for 0 - 10 VDC inputs
	Max Input Signal		15 VDC for voltage input
	Max Temperature Drift		10 VDC inputs
	Input Resistance	Ω	>1M for voltage inputs
Discrete Inputs			
	Voltage	**VDC**	24
	Configuration		2 groups of 4 inputs
	Signal Type		True High
	Minimum On Voltage	**VDC**	> 11
	Maximum Off Voltage	**VDC**	< 5
	Input Current	**mA**	6 minimum On, 2 maximum Off
	Input Voltage Range		- 3 to +32 VDC
	Surge		45 Volt peak for 10 ms
	Response Time	**ms**	1.2 Off to On, 1.2 On to Off
Analog Outputs			
	Resolution		14 bit
	Output Range	**VDC**	0 to 10
	Conversion Time	**ms**	1.20 for all four channels
	Conversion Error		max. ± 0.4 % of upper measuring range value @ 25 °C
	Output Load		> 2 kOhm minimum @ 0 to 10 VDC
Discrete Out	Voltage	**VDC**	10-30 operating, 50 for 1 ms maximum
	Type		Solid State Switch
	Signal Type		True high
	Current Capacity	**A**	0.25 per point, 2 per group, 2 per module
	Leakage Current	**mA**	0.4 @ 30 VDC
	Surge Current	**A**	2.5 for 1 ms
	On State Voltage Drop	**VDC**	< 0.4 @ 0.25 amp current
	Response Time	**ms**	1.2 Off to On, 1.05 On to Off
	Output Protection		The Outputs are protected against overload and short-circuiting
	Output Indicator		1 LED per point
Potential Isolation			
	Discrete In. to Output		None
	Analog In. to Output		None
	Analog In. and Out. to Operating Voltage		500 VAC for 1 min.
	Operating Voltage and all Inputs and Outputs from Ground		500 VAC for 1 min.
Power Dissipation			
	typical	**W**	4.0
	maximum	**W**	6.0

Analog I/O Bases

References

Characteristics :
pages 48238/3 to 48238/7
Dimensions :
page 48238/9
Connections :
pages 48238/10 and 48238/11

Analog input bases

170 AAI ●●0 ●0

Type of inputs	Number of channels	Ranges	Reference	Weight kg
12 bits + sign	16	± 5 V, ± 10 V, 4-20 mA	**170 AAI 140 00**	0.215
15 bits + sign	4, differential	Pt 100, Pt 1000, NI 100, Ni 1000, thermocouples B, E, J, K, N, R, S, T	**170 AAI 520 40**	0.215
15 bits + sign	8, differential	± 5 V, ± 10 V, 1-5 V ± 20 mA, 4-20 mA	**170 AAI 030 00**	0.215

Analog output bases

170 AAO ●2● 00

Type of inputs/outputs	Number of channels	Ranges	Reference	Weight kg
12 bits + sign	4	± 10 V, 0-20 mA	**170 AAO 120 00**	0.215
		± 10 V, 4-20 mA	**170 AAO 921 00**	0.215

Discrete and analog I/O bases

170 AAM 090 00

Type		Ranges		Reference	Weight kg
Inputs	Outputs	Inputs	Outputs		
4 differential analog 13 bits + sign	**2 analog 12 bits**	± 5 V, ± 10 V, 1-5 V, ± 20 mA, 4-20 mA	0-20 mA, ± 10 V	**170 AMM 090 00**	0.240
4 discretes	**2 discretes 0.5 A**	24 VDC	24 VDC		
6 analog 14 bits	**4 analogs 14 bits**	0-10 V	0-10 V	**170 ANR 120 90**	0.240
8 discretes	**8 discretes 0.25 A**	24 VDC	24 VDC		

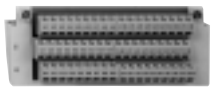
Analog I/O Bases

References (continued), dimensions, mounting

Characteristics :
pages 48238/3 to 48238/7
Connections :
pages 48238/10 and 48238/11

170 XTS 001 00

170 XTS 002 00



170 XTS 004 01

170 XTS 005 01

170 XTS 008 01

170 XTS 006 01

CER 001

Accessories

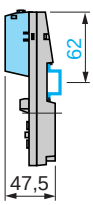
Description	Composition	Type of connection	Reference	Weight kg
Terminal blocks	Set of 3 connectors 1 row	Screw	**170 XTS 001 00**	–
		Spring	**170 XTS 002 00**	–
Bus Bar	3 rows	Screw	**170 XTS 004 01**	–
		Spring	**170 XTS 003 01**	–
	2 rows	Screw	**170 XTS 005 01**	–
		Spring	**170 XTS 008 01**	–
	1 row	Screw	**170 XTS 006 01**	–
		Spring	**170 XTS 007 01**	–
Cable Grounding Rail	Used to connect the cable shielding	–	**CER 001**	–
Dummy base unit	Used to prewire the I/O base units. Requires screw or spring connection terminals	–	**170 BDM 090 00**	–

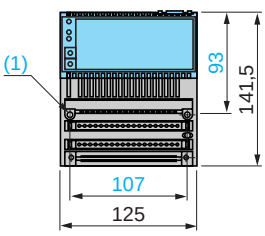
Replacement parts

Description	Use	Reference	Weight kg
Sheets of labels	10 front labels for Momentum modules	**170 XTS 100 00**	–
Set of coding and locating devices	For screw or spring connection terminals	**170 XCP 200 00**	–

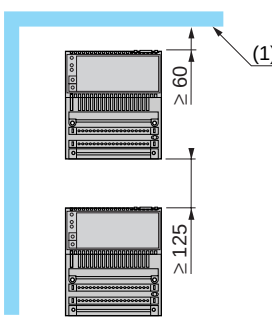
Dimensions, mounting

170 A●●
Rail or panel mounting





(1) 2 holes for M4 screws, for panel mounting



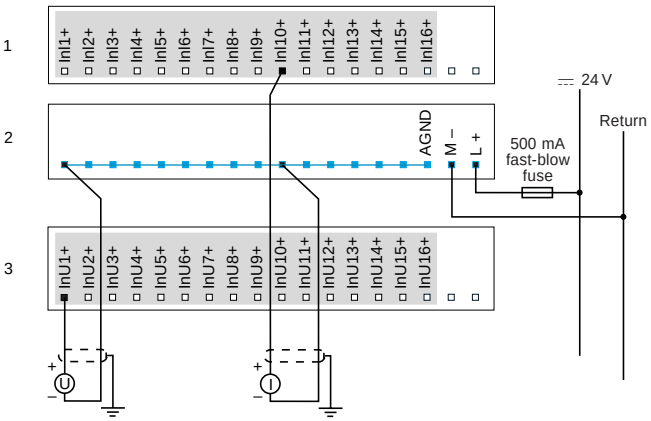
(1) Equipment or enclosure

Analog I/O Bases

Characteristics :
pages 48238/3 to 48238/7
References :
pages 48238/8 and 48238/9
Dimensions :
page 48238/9

Connections

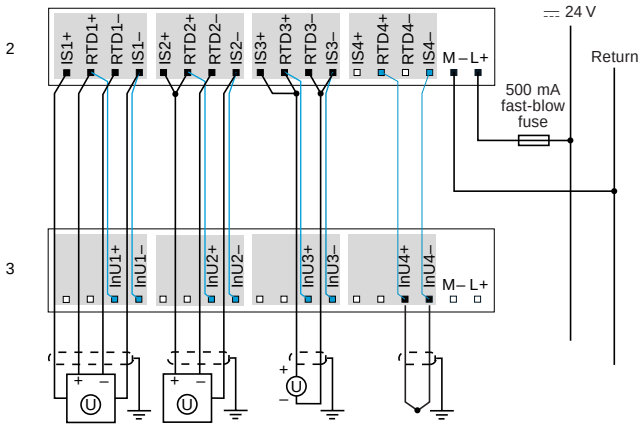
170 AAI 140 00
Example of external wiring of 2-wire sensor



Group of channels

Internal wiring

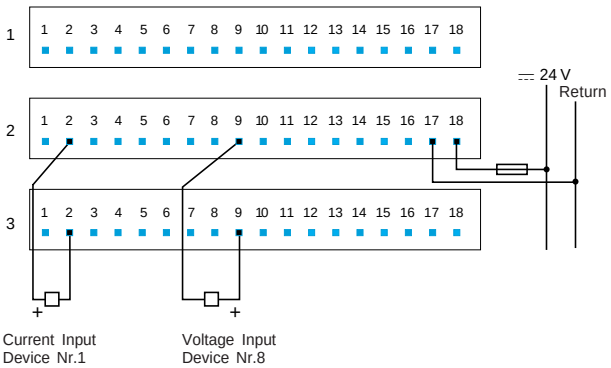
170 AAI 520 40
Example of external wiring of sensor



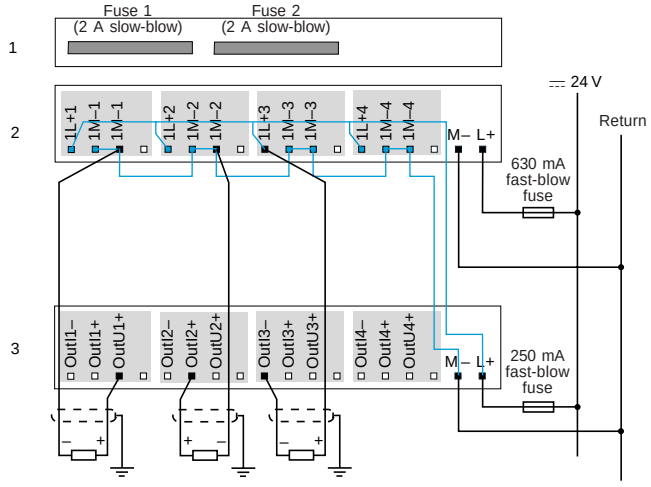
Group of channels

Internal wiring

170 AAI 030 00
Example of external wiring of 2-wire actuator



170 AAO 120 00/921 00
Example of external wiring of 2-wire actuator



Group of channels

Internal wiring

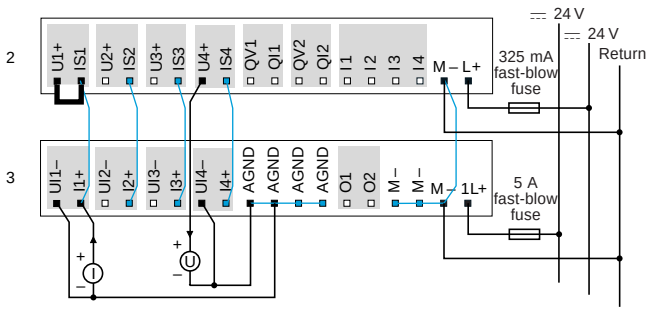
Analog I/O Bases

Characteristics :
pages 48238/3 to 48238/7
References :
pages 48238/8 and 48238/9
Dimensions :
page 48238/9

Connections (continued)

170 AMM 090 00

Example of external wiring of 2-wire sensor

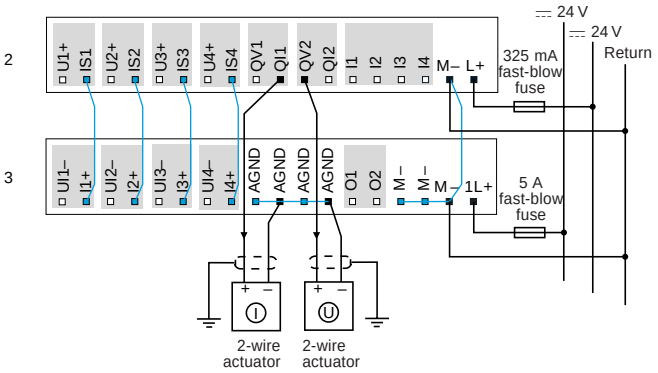


External bridge

Group of channels

Internal wiring

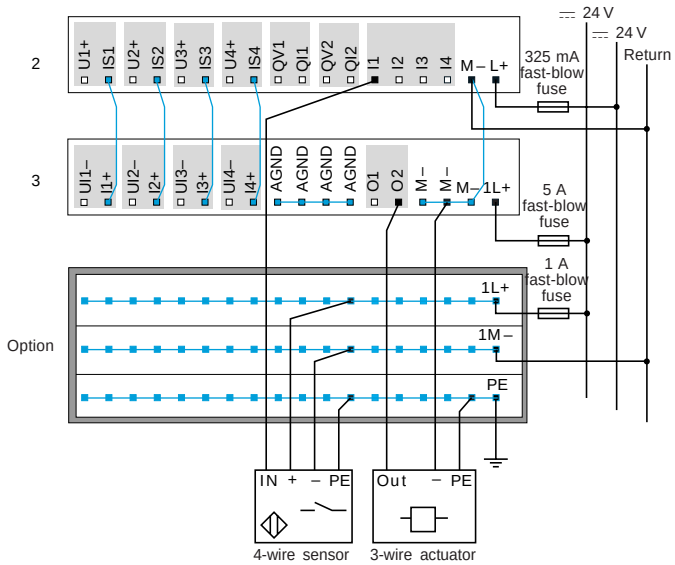
Example of external wiring of 2-wire actuator



Group of channels

Internal wiring

Example of external wiring of digital sensor/actuator

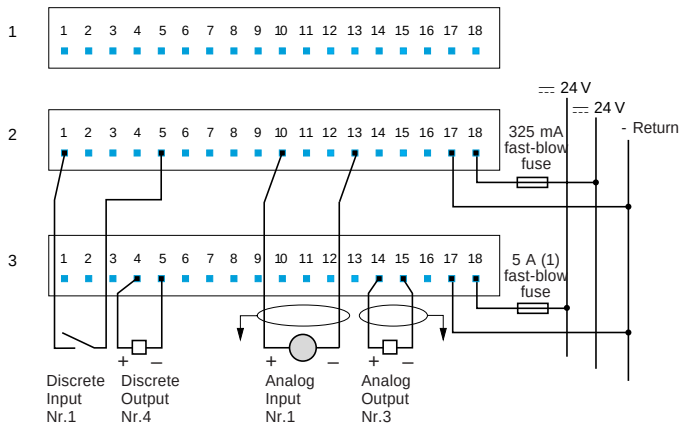


Group of channels

Internal wiring

170 ANR 120 90

Example of mixed discrete and analog I/O sensor/actuator field wiring



(1) Depending on application, max 5A

Quantum Automation Platform

Specialty Module I/O Bases

Selection Guide

Application	High-Speed Counter

Operating Voltage	24 VDC
Unique features	2 independent, high-speed (10 kHz-200 kHz) counters
Modularity	
Input channels	6 (3 per counter) True High Inputs
Output channels	4 (2 per counter) True High Outputs
Input characteristics	
Counter inputs	5 VDC differential input, 200 kHz counter; 24 VDC single-end input, 10 kHz counter
Discrete inputs	6 (2 x 3) 24 VDC inputs: - voltage range, - 3 to + 30 VDC - response time, 3 ms Off to On or On to Off
Output characteristics	
Counter outputs	Two 5 VDC differential outputs min 20 mA @ 24 VDC
Discrete outputs	4 (2 per counter) 24 VDC outputs: - on current, 0.5 A per point, 1 A per counter - response time, < 0.1 ms Off to On; < 0.1 ms On to Off
Protection	
Surge	
Input Voltage	45 V peak for 10 ms
Output Current	5 A for 1 ms
Type of module	170 AEC 920 00
Page	48248/4

I/O with Modbus Master Base	SERIPLEX Bus Interface
	
120 VAC	24 VDC
RS 485 2- or 4-wire Modbus port	SERIPLEX bus connection
6 True High Inputs 3 True High Outputs	Interface to bus input Interface to bus output
– 1 group of 6 inputs (120 VAC @47 to 63 Hz): - voltage range, 0 to 132 VAC - response time, < 12.3 ms @ 60 Hz On to Off, < 12.5 ms @ 60 Hz Off to On	– SERIPLEX version 2 bus input devices supported @ 24 VDC bus voltage
– 3 solid state switching outputs: - on current, 0.5 A continuous per point, 1.5 A continuous per module - response time, < 12.3 ms @ 60 Hz On to Off < 12.5 ms @ 60 Hz Off to On	– SERIPLEX version 2 bus output devices supported @ 24 VDC bus voltage
	Short circuit and overload for discrete outputs
	500 V @ 2Ω , power to common –
170 ADM 540 80	170 ANM 050 10
48248/4	

Specialty Module I/O Bases

Characteristics :
pages 48248/3 and 48248/4
References :
page 48248/4
Connections :
page 48248/5

Presentation, description

Presentation

The Momentum specialty module I/O bases provide support for unique applications that broaden the range of the Momentum offering. The specialty modules are:

- a 2-channel, High-Speed Counter Module Base - 170 AEC 920 00
- a 120 VAC, 6-point Input/3-point Output Module Base with a Modbus Communication Port - 170 ADM 540 80
- a Base Module that provides an interface between Momentum and the SERIPLEX Component Network - 170 ANM 050 10

High-Speed Counter

The 170 AEC 920 00 High-Speed Counter Module Base features 2 independent counters, along with 6 discrete inputs and 4 discrete outputs.This base can connect directly to either 5 VDC differential or 24 VDC single-ended encoders. The base supports two operating modes: incremental (up counter, down counter, and quadrature); and absolute (SSI up/down counter). The high-speed counter module can be connected directly to many standard communication networks, for communicating with programmable controllers, industrial computers, and other controllers, by installing one of the snap-on Momentum Comm Adapters onto the base.

Input-Output Module with Modbus Comm Port

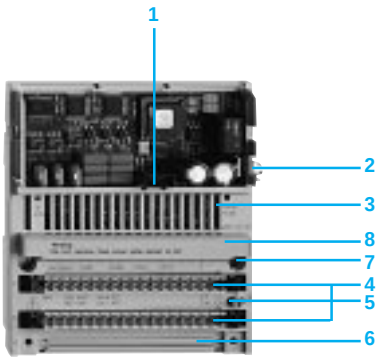
The 170 ADM 540 80 input/output module base has 6 discrete inputs and 3 discrete outputs for direct connection to 2- and 3-wire sensors and actuators, plus a Modbus Communication Port for connection to serial devices. This module can also be used as the I/O base for a programmable controller, in either a standalone or distributed I/O configuration, by installing one of the snap-on Momentum M1 Processor Adapters.

SERIPLEX Module

The 170 ANM 050 10 SERIPLEX interface for Momentum controllers allows the exchange of I/O data over the SERIPLEX Component Network. SERIPLEX, from Square D, is a device-level control network with over 3 million installed I/O points worldwide. The interface acts as a slave to its host controller, and as a master for the SERIPLEX bus. The SERIPLEX base unit may have a Momentum processor adapter or communications adapter mounted on it, thus supporting three powerful control architectures:

- Standalone Momentum controllers with SERIPLEX I/O devices;
- Networked, distributed Momentum controllers, some or all of which may connect to SERIPLEX I/O devices;
- A centralized control processor connecting to SERIPLEX bus devices and/or other types of I/O devices through a higher-level control network, such as Ethernet, Modbus Plus, DeviceNet, Interbus, or Profibus.

Description



A specialty module I/O bases consists of the following components:

1 Internal interface connectorfor the communication module
2 Locking and earth contact for the adapter
3 LED status display
4 Two connectors for the removable terminal blocks
5 Earthing screw
6 Grounding busbar mounting slot
7 Mounting holes for a panel mount
8 Protective cover for fuses (170 ADM 54080) or connector for the removable terminal block

Specialty Module I/O Bases

Characteristics

References :
page 48248/4
Connections :
page 48248/5

Characteristics

Model No.			**170 AEC 920 00**	**170 ADM 540 80**
Number of I/O	Counter		2 independant	–
	Inputs		2 x 3 discrete	1 x 6 discrete
	Outputs		2 x 2 discrete	1 x 3 discrete
Discrete Inputs	Operating Voltage	**V**	24 DC	120 AC @ 47 to 63 Hz
	Input Range	**V**	- 3 to +30 DC	0-132 AC
	Input Surge	**V**	45 peak for 10 ms	200 AC for 1 cycle
	Input Current On	**mA**	2.5 minimum	5.5 minimum
	Off	**mA**	1.2 maximum	1.9 maximum
	Switching Level	**V**	11 DC minimum On voltage 5 DC maximum Off voltage	79 AC minimum On voltage 20 AC maximum Off voltage
	Response Time	**ms**	3 Off to On 3 On to Off	< 12.5 at 60 Hz Off to On < 12.3 at 60 Hz On to Off
	Signal Type		True High	
Discrete Outputs				
	Operating Voltage	**V**	24 DC	120 AC at 47 to 63 Hz
	Signal Type		True High	
	On State Voltage Drop	**V**	< 0.5 DC at 0.5 amp current	< 1.5 AC at 0.5 amp current
	Fault Sensing		Overload and short circuit	1 fuse, 2.5 amps at 250 VAC
	Current Capacity	**A**	0.5 per point	0.5 continuous per point
			1 per counter	–
			2 per module	1.5 continuous per module
	Current Leakage	**mA**	< 1 @ 24 VDC	1.9 @ 120 VAC
	Surge	**mA**	5 A for 1 ms	30 minimum
	Response Time Off to On	**ms**	< 0.1	< 12.5 @ 60 Hz
	On to Off	**ms**	< 0.1	< 12.3 @ 60 Hz
Counter Inputs				
	Incremental Counters		Up counter, down counter, quadrature	–
	Absolute SSI Counter		Up/down counter with 4 sub-modes	–
	Input Signals	**VDC**	5 differential input	–
			24 single-ended input	–
	Counter Speed (max)	**kHz**	200, differential inputs	–
			10, single-ended inputs	–
	Counter Capacity		24 bits plus sign per counter	–
	Counter Configuration		Via comm adapter (8 input words, 8 output words)	–
	Differential Outputs		Two 5 VDC differential (RS-422) for clock SSI	–
Modbus Port				
	Type		–	RS-485, 2- or 4-wire
	Communication rates	**bits/s**	–	19,200 and 9600
	Format		–	8-bit RTU / 7-bit ASCII
	Modbus address range		–	0 to 247
	Timeout	**ms**	–	150 after transmission
Current consumption		**mA**	280	125 @ 120 VAC

Specialty Module I/O Bases

Characteristics (continued), references

Connections :
page 48248/5

Characteristics

Model No.		**170 ANM 050 10**
Communication type		SERIPLEX bus connection
Operating voltage	**VDC**	24
Modularity		Interfaces to bus input and bus output
Input characteristic		SERIPLEX version 2 bus input devices supported at 24 VDC bus voltage
Output characteristic		SERIPLEX version 2 bus output devices supported at 24 VDC bus voltage
Input voltage surge	**V**	500 at 2 Ohms, power to common
Current consumption	**mA**	Max. 450 @ 24 VDC
Protection		Short circuit and overload for discrete outputs

References

170 AEC 920 00

170 ADM 540 80

Modules

Description	Characteristics	Reference	Weight kg
High-Speed Counter Module Base	2 independent counters	**170 AEC 920 00**	0.070
I/O Module Base with Modbus Comm Port	6 inputs, 3 outputs	**170 ADM 540 80**	0.070
SERIPLEX Bus Interface	Interfaces to bus input and bus output	**170 ANM 050 10**	0.070

Replacements parts

Description	Use	Reference	Weight kg
Sheets of Labels	10 front labels for Momentum modules	**170 XTS 100 00**	–

Documentation

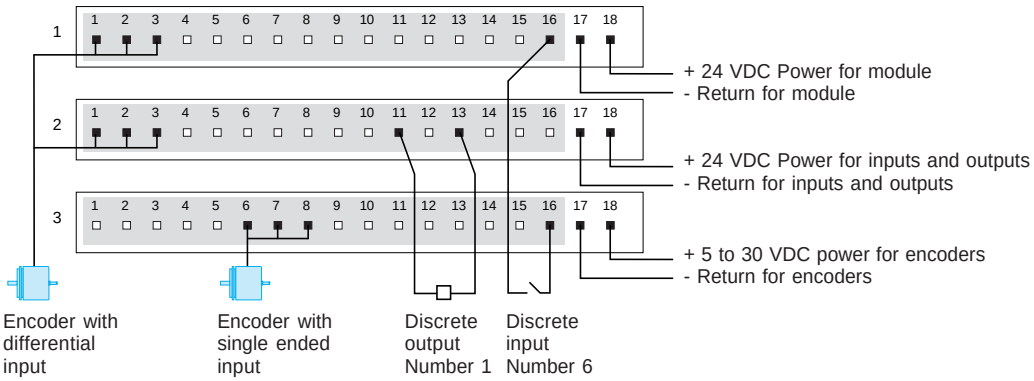
Description	Use	Reference	Weight kg
Momentum I/O Bases	User Guide for 170 AEC 920 00 and 170 ADM 540 80	**870 USE 002 00**	–
SERIPLEX	Module Instruction Bulletin	**30298 086 01**	–
	Module Installation "Mini-book"	**30298 085 01**	–
	Installation and Troubleshooting Guide	**30298 035 01A**	–

Specialty Module I/O Bases

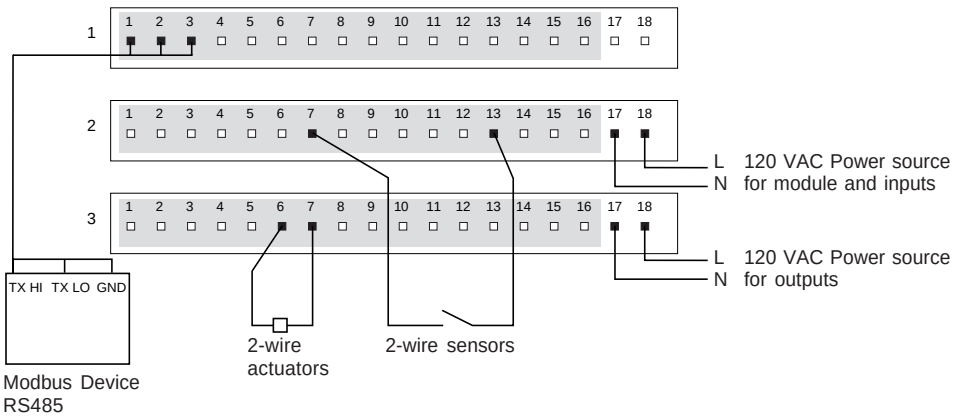
Connections

Characteristics :
pages 48248/3 and 48248/4
References :
page 48248/4

170 AEC 920 00
A 2-encoder and input/output field wiring example



170 ADM 540 80
A Modbus device and input/output field wiring example



Quantum Automation Platform

Communication Adapters

Selection Guide

Applications	Communication Adapter for Modbus Plus		
			
Bus and network type	Modbus Plus		
Topology			
Physical interface	Modbus Plus standard		
Method of access	Rotating token		
Bit rate	1 M bps		
Medium			
Type	Twisted pair		
Topology	Multidrop		
Redundancy	No	Yes	No
Maximum number of Momentum devices			
Per segment	32		
Overall	64 (without repeater)		
Maximum length	5000 m with repeaters		
Type of communicating module	170 PNT 110 20	170 PNT 160 20	170 NEF 110 21
Pages	48232/5		

	Momentum distributed I/O modules on Fipio bus for TSX Series 7 and April 5000 PLCs	Momentum distributed I/O modules on Fipio bus for Premium PLCs
		
	Fipio	
	Fip standard	
	Bus managed by bus arbitrator	
	1 M bps	
	Twisted pair	
	Multidrop	
Yes	No	
		32
		128
	Up to 5000 m with repeater	Up to 15 000 m with repeaters
170 NEF 160 21	170 FNT 110 00	170 FNT 110 01
	48236/3	

Quantum Automation Platform

Communication Adapters

Selection Guide (continued)

Applications	Communication Adapter for Ethernet	Communication Adapter for InterBus
		 
Bus and network type	Ethernet	InterBus-S
Topology		
Physical interface	IEEE 802.3 standard	DIN 19 258 standard
Method of access	CSMA-CD	Master/Slave
Bit rate	10 M bps	500 K bps
Medium		
Type	Twisted pair CAT5	Twisted pair / Fibre optic
Topology	Star	Ring
Redundancy	No	No
Maximum number of Momentum devices	–	40 per installation remote bus module (up to 256 bus terminal modules)
Maximum length	1000 m per segment	Up to 12800 m
Type of communicating module	170 ENT 110 00	170 INT 110 0● / 170 INT 120 00
Pages	48249/3	48230/3

Momentum I/O modules on Profibus DP bus	Momentum I/O modules on DeviceNet network	Momentum I/O modules on ControlNet network
		
Profibus DP	DeviceNet	ControlNet
EN 50170 standard	–	ControlNet standard
Master/Slave	CSMA-CD	CTDMA
12 M bps...9.6 K bps depending on length	500 K bps	5 M bps
Twisted pair	Multidrop	Coaxial cable
Multidrop, ring	Multidrop	Line, tree, star
No	No	No
32 without repeater 126 with repeaters	64	48 without repeater 99 with repeaters
1200 m	500 m with repeaters	Up to 1000 m (depending on number of connection points)
170 DNT 110 00	170 LNT 710 00	170 LNT 810 00
48231/3	48233/3	48235/3

Quantum Automation Platform

Ethernet TCP/IP Communication Adapter

Presentation, description

Presentation

The Model 170 ENT 110 00 Ethernet Communication Adapter for the Momentum I/O product line provides a direct connection to Ethernet-based networks for the entire family of Momentum I/O modules. This connectivity enables communications with a full range of Ethernet TCP/IP compatible control products that includes programmable controllers, industrial computers, motion controllers, operator control stations, host computers, and other controls. This communication network provides a flexible, cost-effective solution for communicating factory floor information to various layers of an integrated manufacturing facility.

The 10Based-T Ethernet Communication Adapter is a single package that is designed to plug on to any of the Momentum Input/Output module bases, and conforms to the requirements of the Ethernet Communication Network.

The Ethernet IP addressing scheme allows an unlimited number of Momentum I/O modules or connections on the network. Using standard Ethernet hubs, routers, and bridges, the performance and distance capability of the Ethernet network can be tailored to meet the requirements of almost any control application.

The Ethernet Communication Adapter uses the standard Modbus message structure and control commands over the TCP/IP protocol, which simplifies implementation by control engineers while providing information that can be communicated over standard network media to all enterprise applications.

Since Modbus on TCP/IP over Ethernet is supported by Schneider's Quantum and Premium controller families, Momentum I/O can be added to existing control systems where additional I/O capacity of a distributed I/O sub-network is needed.

The Ethernet Communication Adapter requires connection to a BOOTP server for setting the module's IP parameters, including its own unique IP address, default gateway, and sub-net mask, all of which is stored in the communication adapter's flash memory. Schneider Electric's automation business offers BOOTP Lite Ethernet software (part number 174 SMA 269 00) as a free download from the automation Internet web site, **www.schneiderautomation.com.**

Description

The 170 ENT 110 00 Ethernet Communication Adapter comprises on the front panel:

1 Ethernet connector for 10base-T interface (RJ45),

2 Area for Label (label shipped with I/O base),

3 LED Status Indicators comprising:
- Run (green), module health,
- LAN Active (green), Ethernet network status.

Quantum Automation Platform

Ethernet TCP/IP Communication Adapter

Characteristics, References

Characteristics

Model No.		**170 ENT 110 00**
Communication network		Ethernet TCP/IP
Communication rate	**M bits/s**	10
Number of Nodes (devices)		Unlimited with hubs and routers; 32 units point-to-point
Media		Twisted pair cable, 10Base T
Flash Memory		128 K for IP parameter storage
Distance	**m (ft)**	1000 (328) twisted pair cable without repeaters; unlimited distance with repeaters
Connectors		RJ-45 10base-T
Error Checking		CRC-32 error check
Error and Fail States		Fail safe
Addressing		Unique IEEE global address, IP address user assigned
Adapter Configuration		BOOTP server to assign IP parameters
Mode of Operation		Master Slave, Peer-to-Peer
Topology		Multi-Drop bus, star
Packaging		Standard Momentum Communications Adapter Enclosure - IP20 environment
Indicator Lights		Run and Communication lights
Power Source		Power Supply on-board the I/O base
Hot Swapping of Modules		Yes

References

170 ENT 110 00

Module

Description	Reference	Weight kg
Ethernet TCP/IP Communication Adapter	**170 ENT 110 00**	0.070

Accessories

BOOTP Lite Ethernet Software	**174 SMA 269 00**	–
Ethernet TCP/IP Communication Adapter User Guide	**870 USE 112 00**	–

Modbus Plus Communication Adapters

Presentation

Characteristics :
page 48232/4
References :
page 48232/5

Presentation

Modbus Plus Communication Adapters for the Momentum I/O product line can be plugged into any Momentum I/O base to create a functional I/O unit on the Modbus Plus bus, and to provide a direct connection to the Modbus Plus Network for the full family of Momentum I/O modules. This connectivity enables communications with all of the Modbus Plus compatible control products - including programmable controllers, industrial computers, operator control stations, drive systems, and other controls - to provide a flexible, cost-effective solution for distributing I/O modules throughout a large area. To expand the capabilities of the Modbus Plus Network for distributed I/O applications, the communication adapters have been designed to permit up to 64 Momentum I/O modules to be connected to the network without the need for signal repeaters.

Each Momentum I/O module is an individual node on the Modbus Plus network with its address user-selected on the dual rotary switch on the front of the communication adapter. The Momentum I/O modules can be configured for the network, and assigned program reference numbers, by using either the Peer Cop function or the MSTR function block instruction in the programmable controller or the Modbus Plus configuration in an industrial computer.

There are four types of Communication Adapters available:

- 170 PNT 110 20, Single Port, IEC Data Format
- 170 PNT 160 20, Redundant Port, IEC Data Format
- 170 NEF 110 21, Single Port, 984 Data Format
- 170 NEF 160 21, Redundant Port, 984 Data Format

IEC Data Format

This version of the Momentum Modbus Plus Communication Adapter communicates I/O data to the programmable controller in the IEC data format, which has bit numbering 0 through 15, right to left, within the data word (i.e., input or output number 1 is bit number 0).

984 Data Format

This version of the Momentum Modbus Plus Communication Adapter communicates I/O data to the programmable controller in the traditional 984 data format, which has bit numbering 1 through 16, left to right, within the register (i.e., input or output number 1 is bit number 1).

Since Modbus Plus is supported by the Quantum and 984 controller families, Momentum I/O can be added to existing control systems where additional I/O capacity or a distributed I/O sub-network is needed, because of requirements for the control system. The figures below illustrate typical control systems using Momentum I/O modules on the Modbus Plus network with programmable controllers and industrial computer systems.

Modbus Plus Communication Adapters

Presentation (continued)

Characteristics :
page 48232/4
References :
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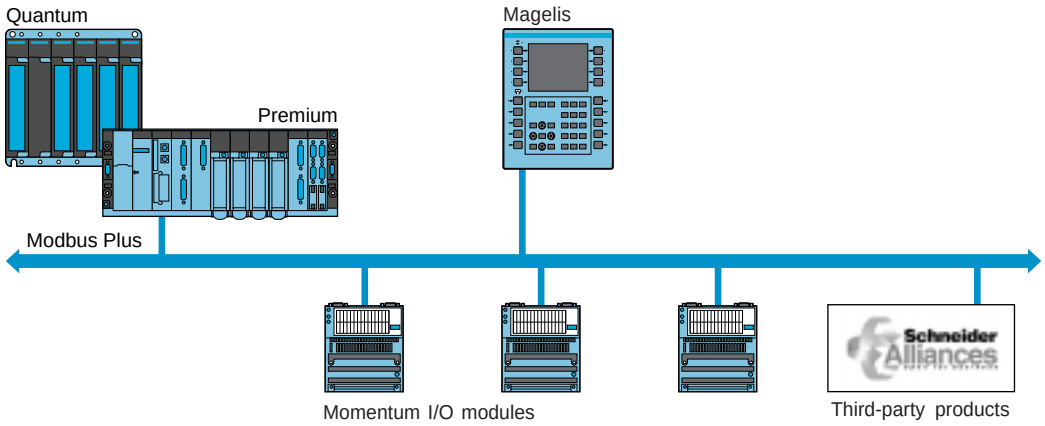
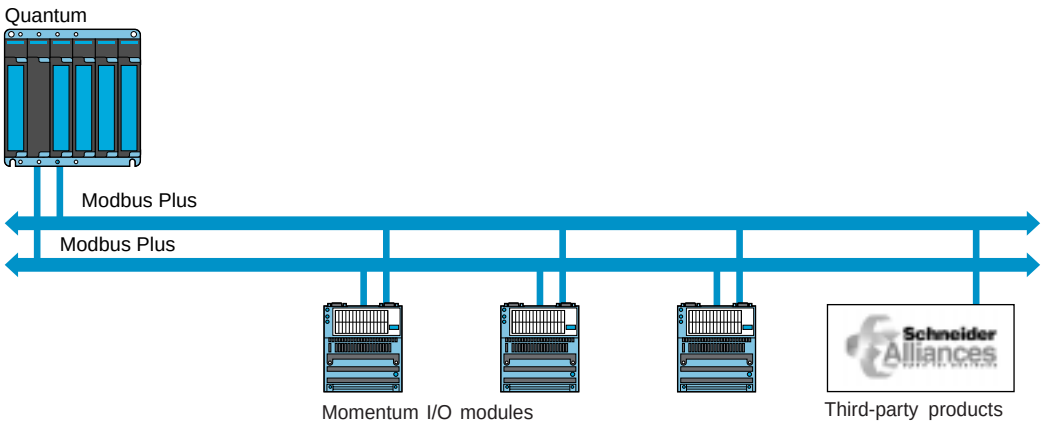
Network topology

Momentum I/O modules in a distributed control system



Momentum I/O modules with Modbus Plus double cable in a distributed and redundant control system

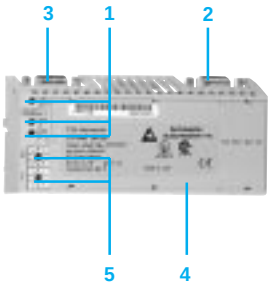


Modbus Plus Communication Adapters

Description, characteristics

References :
page 48232/5

Description



Each 170 PNT/NEF communication module comprises :

1 Three indicator lights (LEDs) :
- MB + ACT indicator light (green) : module powered up or communicating
- ERR A indicator light (red) : communication error network A
- ERR B indicator light (red) : communication error network B (for redundant model)

2 A 9-way male SUB-D connector for connecting to the Modbus Plus network

3 A 9-way male SUB-D connector for a redundant Modbus Plus network

4 A slot for an identification label (supplied with all I/O sub-bases)

5 Two switches for coding the slave address on the bus

Characteristics

Type of module		**170 PNT 110 20/160 20**	**170 NEF 110 21/160 21**
Master PLC on the network		Quantum, Premium	Compact 984
Structure	Type	Industrial	
	Topology	Multi-drop, devices connected using extension cable or tap-off cable	
	Length	5,000 m (6000 ft) maximum with repeater	
	Access method	Token bus	
Transmission	Bit rate	1 Mbps	
	Medium	Twisted pairs	
Data Format		IEC Data format	984 Data Format
Number of Momentum devices			
	Per segment	31 connection points per segment	31 connection points per segment
	Maximum	63 for all segments	97 for all segments
Power source		Power supply on-board the I/O base	
Behaviour in the event of a communication error		Discrete I/O : forcing to state 0 Analogue I/O : configurable (maintain value, fallback to 0 or full scale value)	
Services		Configuration : Peer Cop and MSTR function block, “peer-to-peer” mode	

Modbus Plus Communication Adapters

References

Characteristics :
page 48232/4

170 PNT 110 20/NEF 110 21

170 PNT 160 20/NEF 160 21

AS MBKT 085

References

Description	Connection	Bus master PLC	Reference	Weight kg
Communication modules for Momentum I/O sub-bases	Non-redundant Modbus Plus network	Premium, Quantum	**170 PNT 110 20**	–
		Compact 984	**170 NEF 110 21**	–
	Redundant Modbus Plus network	Quantum	**170 PNT 160 20**	–
		Compact 984	**170 NEF 160 21**	–

Description	Use	Reference	Weight kg
Modbus Plus tap	IP 20 junction box for tap-off connection (T)	**990 NAD 230 00**	0.230
9-way female SUB-D connector	Communication module connection	**AS MBKT 085**	–
Terminator connector kit (set of 2)	2 impedance adaptors for box (IP 20) 990 NAD 230 00	**AS MBKT 185**	–

Connection cables

Description	Use		Length	Reference	Weight kg
	From	To			
Standard Modbus Plus cables	T-junction box	T-junction box	30 m	**490 NAA 271 01**	–
			150 m	**490 NAA 271 02**	–
			300 m	**490 NAA 271 03**	–
			450 m	**490 NAA 271 04**	–
			1500 m	**490 NAA 271 06**	–
Modbus Plus Drop cables	Communication modules for Momentum I/O sub-bases	T-junction box 990 NAD 230 00	2.4 m	**990 NAD 211 10**	0.530
			6 m	**990 NAD 211 30**	0.530
Other connection accessories				See page 48247/5	–

Quantum Automation Platform

M1 Processor Adapters

Selection Guide

Type	M1 Processor Adapters			
				
RAM Memory	64 K			256 K
Flash Memory	256 K			
User Logic Memory	2.4 K			12 K
Data Memory	2 K			4 K
Scan Time	1 ms/K	0.63 ms/K	1 ms/K	
Clock Speed	20 MHz	32 MHz	20 MHz	
I/O Points	2048			4096
I/O Drops	Up to 2048 I/O points with Modbus Plus Option Adapter			80 with Modsoft 128 with Concept
Power Source	Power supply on-board the I/O bases			
Communication Ports	1 RS 232 Modbus		1 RS 232 Modbus 1 RS 485 Modbus	1 RS 232 Modbus 1 I/O bus
IEC Executive				Compatible
Model No.	171 CCS 700 00	171 CCS 700 10	171 CCS 780 00	171 CCS 760 00
Page	48245/8			




512 K			
512 K	512 K for 171 CCC 980 20 1 MB for 171 CCC 980 30	512K	512 K for 171 CCC 960 20 1 MB for 171 CCC 960 30
18 K			
24 K			
1 ms/K	.3 ms/K	1 ms/K	.3 ms/K
32 MHz	50 MHz	32 MHz	50 MHz
8192			
Up to 2048 I/O points with Modbus Plus Option Adapter		80 with Modsoft 128 with Concept	
1 RS 232 Modbus 1 RS 485 Modbus	1 Ethernet 1 RS 485 Modbus	1 RS 232 Modbus 1 I/O bus	1 Ethernet 1 I/O bus
	Supplied with 171 CCC 980 30	Compatible	Supplied with 171 CCC 960 30
171 CCC 780 10	**171 CCC 980 20/30**	**171 CCC 760 10**	**171 CCC 960 20/30**

Quantum Automation Platform

Option Adapters

Selection Guide

Configuration	Modbus Plus Option Adapters	
		
Communication Network	Modbus Plus	
Communication Port(s)	One Modbus Plus	Two redundant Modbus Plus
Comm Port Connector	9- pin D-shell	
Time-of-day Clock	On-board , ± 13 sec/day accuracy	
Back-up Batteries	Two user-replaceable AAA alkaline	
Voltage	5 VDC supplied by I/O base	
Operating Temperature	0 ... 60˚C	
Humidity	5 ... 95%, relative noncondensing	
Shock	± 15 g peak, 11 ms, half-sine wave	
Vibration	10 ... 57 Hz @ 0.075 mm d.a.	
Model No.	172 PNN 210 22	172 PNN 260 22
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Serial Option Adapter

General-purpose serial communications

One software-selectable RS232/RS485 serial port

172 JNN 210 32

5 Communication

Contents

Quantum Automation Platform

Communications modules

Selection guide

Types	TCP/IP Modbus Ethernet			MMS Ethernet
				
Module function	I/O scanner	Embedded web server		
Cable Port	One RJ45 port for twisted-pair cable One ST port for fiber optic cable	One ST for fiber optic cable		One RJ45 for twisted-pair cable
Quantum CPU types	All Quantum CPUs, controller, executive 2.0 or greater			
Data transfer frequency	10/100 M bits/s base T: twisted pair cable 100 M bits/s base FX: fiber optic cable	10 M bits/s		
Bus current required	1000 mA			
Compatibility	Concept version 2.0 or higher ProWORX NxT version 2.0 or higher			ProWORX NxT version 2.0 or higher
Model	140 NOE 771 00	140 NOE 771 10	140 NOE 251 ●0	140 NOE 511 00
Page	48216/3			48214/3

	Interbus	Profibus-DP
			
Two ST for fiber optic cable	One RS-232C One RS-485 for Interbus	One RS-232C One RS-485 for Profibus PCMCIA card interface
	140 CPU 113 03 140 CPU 213 04 version 2.0 or higher	All Quantum CPUs, controller executive 2.0 or greater
	500 K bits/s	19.2 K bits/s
	700 mA	–
	Concept version 2.0 or higher ProWORX NxT version 2.0 or higher	
140 NOE 551 00	140 NOA 611 10	140 CRP 811 00
48214/3	48213/3	48213/5

Communications

TCP/IP Modbus Ethernet modules
Presentation

Presentation

The Quantum TCP/IP Modbus Ethernet modules combine three open networking standards–Ethernet, TCP/IP and Modbus. Ethernet is a worldwide standard with a wide variety of third-party products and services. TCP/IP is the de facto standard protocol for Ethernet and the underlying protocol for the ongoing Internet technology revolution. Ethernet combined with the widely accepted Modbus protocol provides unparalleled openness, flexibility and performance. There are no proprietary chip sets or licensing fees for developing a product that conforms to this standard. The standard is available free to the public at our web site, www.modicon.com. A TCP/IP Ethernet network system can:

- Perform peer-to-peer communications between controllers
- Enable standard PC servers to be used for simple, centralized program archiving
- Allow you the freedom and convenience to go to your local computer superstore for components
- Allow you to communicate to your controllers over your in-house Intranet, your corporate WAN, or even the Internet
- Program your Quantum controller
- Integrate communications between controllers and host systems
- Allow the use of a standard PC Web browser to obtain system status and diagnostic information
- Communicate over media that can be supported by either the Control or IT/MIS department, or both

Many TCP/IP Ethernet models are available, as MT-RJ twisted-pair with RJ-45 connectors and as fiber optic with ST connectors. They are pre-loaded with TCP/IP stack and Modbus protocol application support in upgradeable Flash memory. These modules use the option module interface and are supported only in the local CPU backplane. Up to two TCP/IP Ethernet modules are supported by the 186 CPUs; up to six modules are supported by the 486/586 CPUs. Because the TCP/IP Ethernet modules have on-board processors, there is negligible impact on the CPU scan. Actual data exchange with the CPU takes place at the end of scan. The TCP/IP Ethernet modules have standard diagnostic LEDs to aid in troubleshooting, and they are hot-swappable to minimize control system downtime.

These modules allow the user to program a Quantum automation controller over TCP/IP Ethernet. TCP/IP makes it easy to support network drives on PCs or hosts, and to use standard servers to centralize the archiving of your application programs.

If an Ethernet network is already installed in your plant or facility, you can reduce costs by taking advantage of existing spare parts, expertise and pre-existing cabling. You can use commercially available products such as cabling, hubs, switches, routers, media converters and PC cards to construct your network. Schneider Automation recommends the use of Category 5 shielded twisted-pair cable for noise immunity in 10BaseT installations. Popular operating systems such as Windows95 and WindowsNT currently provide TCP/IP drivers, further reducing costs and simplifying support efforts.

The modules support both Ethernet II and IEEE 802.3 framing. IP addressing can be generated either automatically from the module's MAC address or assigned by the TCP/IP network administrator, depending on the type of network you are using (public or private).

To provide the required determinism on Ethernet, it is recommended that the control network and normal IT/MIS traffic be segragated from one another. The best segmentation to use is separate networks for control purposes. However, standard Ethernet routers or switches can be used to either isolate or improve network performance.

Quantum Ethernet modules are connected via twisted pair or fiber optic cabling to hubs. Hubs may be free-standing or connected to one another via 10Base2, 10Base5, 10BaseT, or 100 Base FX backbones to form a network. Network distances can be extended by repeaters; different networks can be connected within a facility over bridges. Facilities can be connected to other facilities by routers into wide area networks (WANs). Quantum CPUs can also be connected as nodes to the worldwide web. The Quantum Ethernet modules can plug-and-play in all of these network architectures.

You can establish peer-to-peer communications between two Quantum CPUs over TCP/IP Modbus Ethernet by:

- Plugging the Ethernet modules into a local Quantum backplane with a CPU and a power supply
- Configuring the TCP/IP Ethernet modules with an IP address and associated parameters
- Connecting the TCP/IP Ethernet modules together by means of a 10/100BaseT or 10/100BaseFX Ethernet hub
- Programming an MSTR ladder logic instruction to read or write controller information

Peer-to-peer messages can be sent from CPU to CPU or from CPU to a host. TCP/IP communication uses the same MSTR communication instruction as Modbus Plus. The MSTR instruction allows the CPU to support report-by-exception, polled-read or continual-write messaging. Up to four MSTR instructions per scan can be serviced for each NOE module.

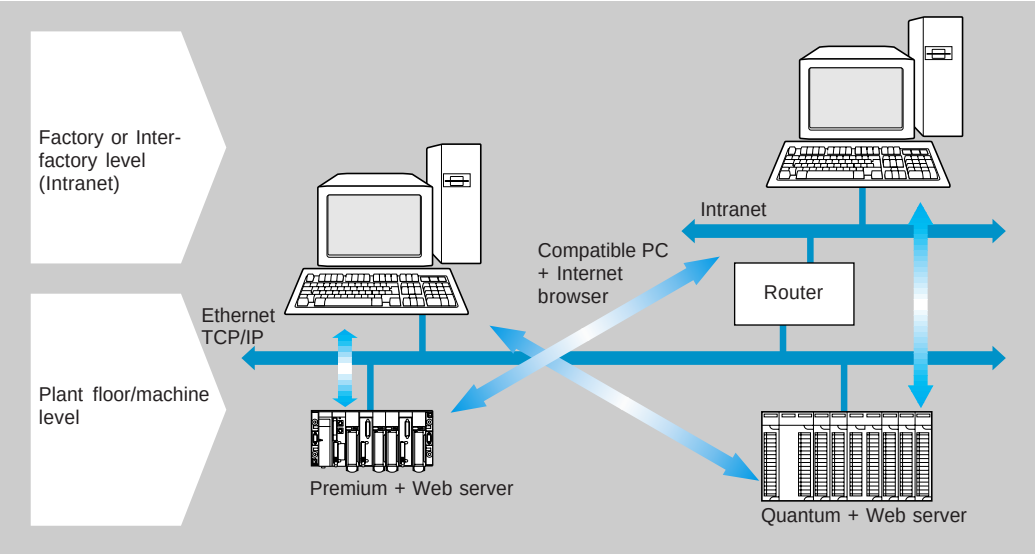
A TCP/IP Ethernet module has a built-in, predefined web server that allows you to view specific troubleshooting oriented pages with a browser such as Netscape Navigator 4 or Microsoft Internet Explorer 4 or greater. You can:

- View the Ethernet module's network statistics
- View the Quantum CPU's configuration
- Read 4*x* registers
- Read the CPU's personality
- Check remote I/O status
- View configured drops
- View configured DIO

Schneider Automation's FactoryLink ECS graphical interface software supports communications to the TCP/IP Ethernet modules. Other industry packages with drivers under include Wonderware's InTouch and Intellution's FIX.

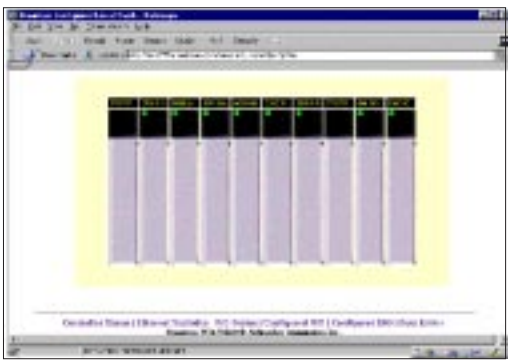
TCP/IP Modbus Ethernet modules
General (continued)

Embedded Web Server and I/O Scanner



The Quantum TCP/IP Ethernet modules are the 140 NOE 771 00 (an I/O Scanning module) and the 140 NOE 77110 (the Embedded Web Server module). Both modules contain an RJ45 and an ST cable port, and can be used with both twisted pair and fiber optic cable.
The 140 NOE 771 00 provides real-time control services using peer-to-peer messaging and I/O Scanning. The peer-to-peer function uses the existing Modbus Peer Cop configuration extension. The Ethernet I/O Scanner supports 4000 words in and out, along with the full IP address settings.
The 140 NOE 77110 Embedded Web Server is a real-time PLC data server. All the supported data in the Quantum processor are presented by the 140 N0E 77110 module as standard Web pages in HTML format, and thus are accessible using all standard Internet web browsers enabling Java code (e.g., Internet Explorer 4 or Netscape Navigator 4.0.5). All the functions of this Web Server do not require any particular configuration or programming, either at the PLC or Internet browser level. This module can also be used in an existing configuration without any modification of the PLC program.

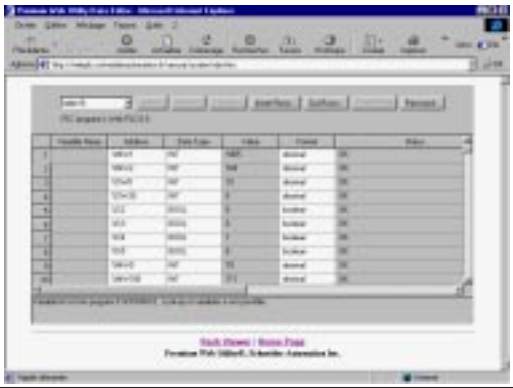
System diagnostic function



The hardware PLC system diagnostic function is a predefined, password-protected function. Through the use of any commercially available Internet browser, this function enables the real-time display of such data as:

- PLC configuration.
- Detailed diagnostic information about each module included in the configuration, whether the modules are local or remote.
- The state of all inputs and outputs.

PLC variables access



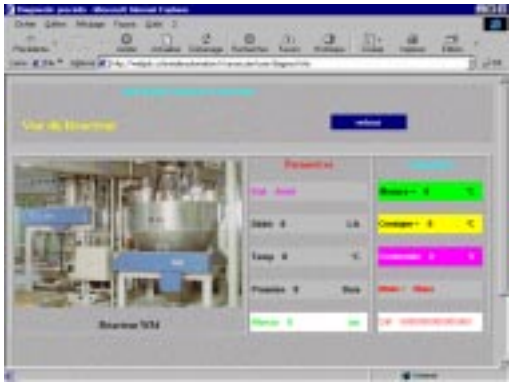
The access to PLC variables is a predefined, password-protected function, which enables realtime read/write access to all PLC data.

These variables can be effectively entered and displayed in symbolic or physical reference formats. It is also possible to access to unlocated variables (Quantum). To be able to be modified, these variables have to be declared «authorized» by the configuration software included with the Web Server module (Web Utility). To modify the values of these authorized variables, you have to enter an additional password.

Dynamic animation tables, containing the variables of the application to be monitored or modified, can be created by the user and saved in the module.

TCP/IP Modbus Ethernet modules
General (continued)

User defined Web pages display



The Quantum 140 NOE 771 10 Ethernet Embedded Web Server module includes RAM flash accessible memory space (like on a hard disk), in order to store user defined Web pages.

These Web pages can be created with any standard tool designed to create HTML pages (FrontPage, Word 97, PowerPoint, etc.). Web pages created in this manner allow the user to :

- Display all PLC variables in real time.
- Create hyperlinks with external servers (documentation creators, suppliers, etc.).

This feature is particularly suited to the creation of graphics and pictures for the eventual purposes of :

- Display, control, and diagnosis.
- Development of production reports in real time.
- Maintenance or operator guides.
- ...

Embedded Web Server configuration tools : Web Utility

The software supplied on CD-ROM with the 140 NOE 771 10 module is the tool that enables the configuration and administration of the Embedded Web server in the module. It is common to both Quantum and Premium PLC platforms, and is compatible with both Windows 95/98 and Windows NT.

This tool offers the following features:

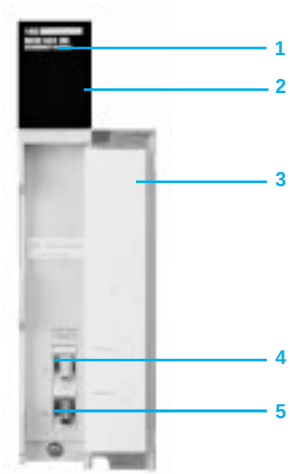
- Definition of user names and associated passwords.
- Definition of the variables to be modified by the user.
- Save/restore of the whole Web site.
- Transfer of user defined Web pages from a compatible PC to the 140 NOE 771 10 module.

Communications

TCP/IP Modbus Ethernet modules
Description, characteristics, references

Description

The module 140 NOE 771 10 is comprised of:



1 Model number and color code.

2 LED array.

3 Removable, hinged door and customer identification label.

4 Fiber optic transmit cable port.

5 Fiber optic receive cable port.

Characteristics

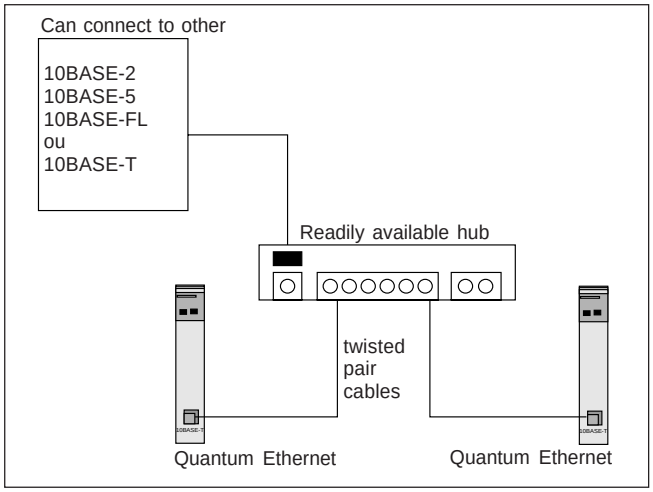
Model		**140 N0E 771 00**	**140 N0E 771 10**
Module Type		I/O Scanner	Embedded Web Server
Cable ports		1 RJ 45 for twisted pair cable; 1 ST for fiber optic cable	
Data transfer		10/100 M bits/s base T (twisted pair); 100 M bits/s base FX (fiber optic)	
Bus current required	**mA**	1000	
Power dissipation	**W**	5	
Compatibility		Concept version 2.0 or higher; ProW0RX NxT version 2.0 or higher	

References

Description	Module Type	Reference	Weight kg (lb)
Communications I/O Scanner Module, Ethernet TCP/IP		**140 N0E 771 00**	0.345 (0.76)
Communications Module, Ethernet TCP/IP	Embedded Web Server	**140 NOE 771 10**	0.345 (0.76)
Ethernet TCP/IP User Guide		**840 USE 116 00**	–

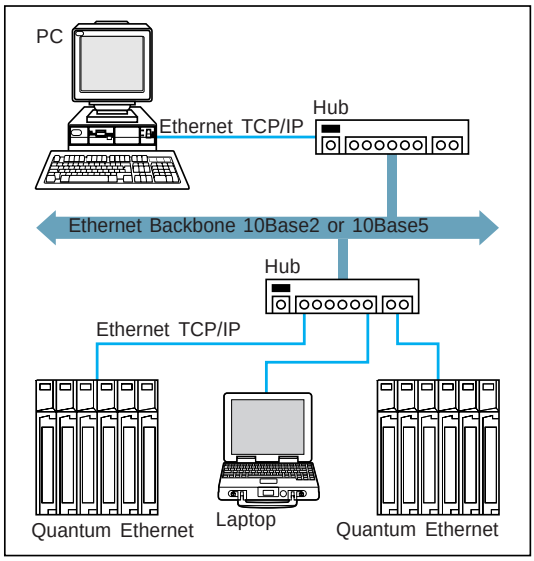
Topologies

Minimum configuration



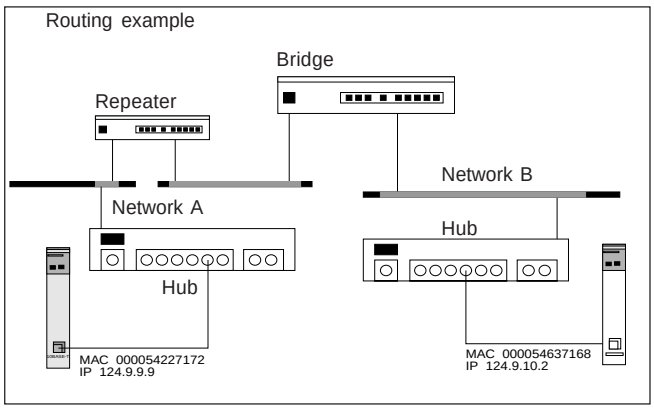
- Connection made through an Ethernet hub.
- The hub provides star connections.
- Twisted pair hubs and fiber hubs are readily available with between 4 to 24 connections.
- Fiber and twisted pair topology is identical.

Ethernet topology example



- A more typical configuration.
- Ethernet nodes are connected via Ethernet hubs to the backbone.
- Backbone is typically coax or fiber covering the larger distance.

Ethernet multiple backbone example



- Use within plants or plant-to-plant.

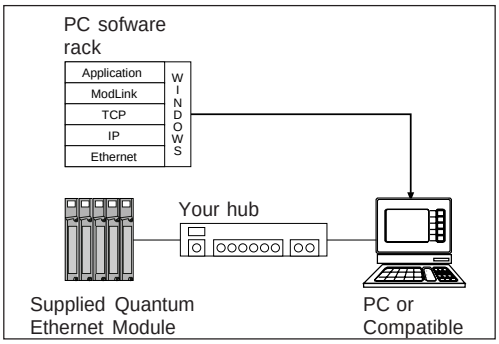
Communications

TCP/IP Modbus Ethernet modules, developers kit (EDK)
Topologies (continued), characteristics, references

Topologies (continued)

Designed for professional Ethernet application developers. Here is the tool kit that allows connectivity to the world's most popular high end controller, the Quantum Automation Platform from Schneider Automation. Now you can quickly build applications that harness the power of Quantum using standard TCP/IP Ethernet. And with the industry standard Modbus protocol, users get the benefits of a proven, easy to understand technology. For little more than the price of a Quantum Ethernet module, you get lots of valuable information and tools in one easy to use development kit.

What's included:



- One Quantum 140 NOE 771 10 Ethernet module for connection to your Ethernet network.
- One Quantum Ethernet user guide with programming reference, error code sections, and developer's guide section.
- One Modbus protocol reference manual with detailed reference information.
- One Quantum automation hardware reference guide.
- Sample language source code for a Windows Winsoc TCP/IP Ethernet driver utilizing ModBus protocol.
- Error log software tool.
- ModLink DDE Server, Windows 3.11 host application and documentation.

Characteristics

Part number	**140 EDK 771 10**
Hardware	802.3 10BaseT networks via RJ45 twisted pair connection (Quantum power supplies and backplanes sold separately)
Compatibility	All Quantum controllers; controller executive required is version 2.0. (Not compatible with existing Modicon Decnet bridge)
Modbus services supported	Identical Modbus services from 984 controllers
Host application software	ModLink version 2.2 P/N 352SMD49300
Development software	Sample source code for Windows Ethernet driver utilizing Modbus protocol
Disk format supported	3 1/2" diskette (1.44 Mb)
Programming panel software compatibility	ProWORX Nxt 2.0 Concept version 2.0 [Panel software sold separately]

References

Description		Reference	Weight kg (lb)
Developers kit TCP/IP Ethernet	Supports operation on IEEE	**140 EDK 771 10**	–

Communications

MMS Ethernet modules
Presentation, description

Presentation

The Quantum MMS Ethernet modules make it possible for a Quantum Automation CPU to communicate with MMS devices on an Ethernet network. MMS is a standard protocol. The MMS Ethernet network is supported worldwide with a variety of third-party products and services.

Two MMS Ethernet models are available–the140 NOE 511 00 twisted-pair 10BaseT model with RJ-45 connectors and the140 NOE 551 00 fiber optic 10BaseFL model with ST connectors. Both modules use the option module interface and are supported only in the local CPU backplane. Because the MMS Ethernet modules have an on-board processor, there is negligible impact on the CPU's scan time. Actual data exchange with the CPU takes place at the end-of-scan. The MMS Ethernet modules have standard diagnostic LEDs to aid in troubleshooting, and they are hot-swappable to minimize control system downtime.

Live Data Quantum

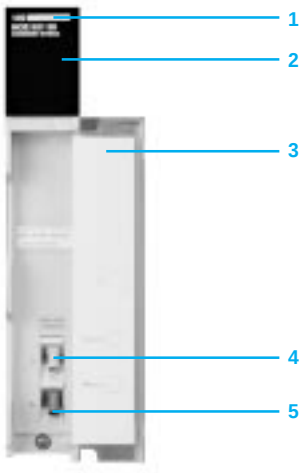
The Quantum Ethernet communication products are the result of a partnership between Schneider Automation and ModConnect Partner Cycle Software. The two hardware modules are manufactured and supported by Schneider Automation. Cycle Software's LiveData Quantum server software stack can be purchased separately from Cycle Software; Cycle Software is also responsible for all software support.

Live Data Quantum is Cycle Software's LiveData Server embedded in a Quantum controller. Live Data Quantum natively supports the Manufacturing Message Specification (MMS) over either twisted pair or fiber Ethernet; it supports Modicon Modbus or Modbus Plus communications; and it interfaces to other protocols. LiveData Quantum creates active data flows to other PLCs and to corporate production and information systems.

Contact Cycle Software, Inc. by phone ((617) 576-6900), fax ((617) 576-6501), email (cycle@livedata.com), or visit their web site: www.livedata.com.

Description

The Quantum MMS Ethernet module comprises in front panel:



1 Model number and color code.

2 LED array.

3 Removable, hinged door and customer identification label.

4 Fiber optic transmit cable port.

5 Fiber optic receive cable port.

Communications

MMS Ethernet modules
Characteristics, references

Characteristics

Model		**140 NOE 511 00**	**140 NOE 551 00**
Cable ports		one RJ-45 for twisted pair cable	two ST for fiber optic cables
Data transfer frequency	**MBPS**	10	
Network speed	**MHz**	10	
Bus current required	**mA**	1000	
Compatibility			
Software		ProWORX Nxt version 2.0 or higher	
Quantum CPU		all, version 2.0 or higher	

References

Description	Cable type	Reference	Weight kg (lb)
Communications module, MMS Ethernet	Twisted-pair cable	**140 NOE 511 00**	1.06 (2.33)
Communications module, MMS Ethernet	Fiber optic cable	**140 NOE 551 00**	1.06 (2.33)
MMS Ethernet user guide	–	**840 USE 453 00**	–

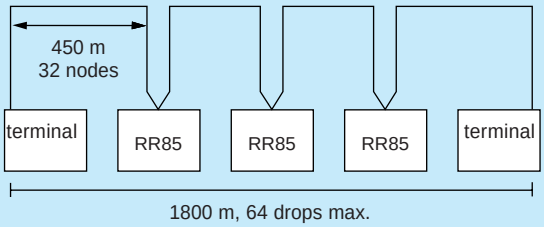
Communications

Modbus Plus
Programming

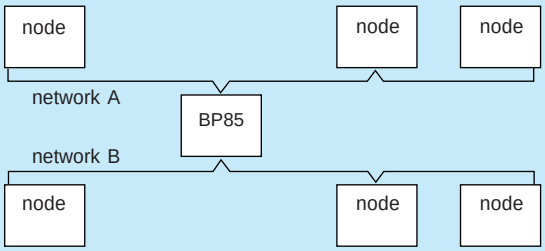
Communication programming

Your application program can initiate event-driven communications and integrate network diagnostics using either the MSTR ladder logic instruction or an equivalent IEC 1131 function. A host computer can implement Modbus Plus with NetBios-compatible software libraries that are called from the host application program. Appropriate libraries are provided for each host computer interface, which are offered for all major platforms and operating systems.

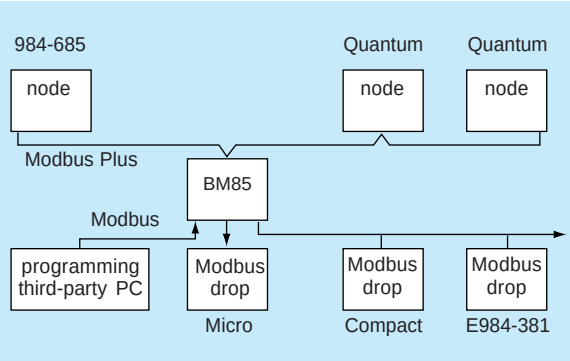
A standard Modbus Plus network based on twisted-pair cable supports up to 32 peer processors and can communicate over distances up to 450 m. If an applications requires more drops or longer distances, an RR85 Modbus Plus Repeater between network links allows 64 addresses and a distances up to 900 m. As many as three repeaters can be used, supporting distances of up to 1800 m. The maximum number of network addresses support is 64.



If an application requires more than 64 drops, a BP85 Modbus Plus Bridge can be used to connect two Modbus Plus networks. Bridge devices allow many small networks to be connected in order to achieve maximum performance.



If your application requires that a Modbus device, such as a programming panel, operator interface or third-party computer, needs access to data from a Modbus Plus network, you can accomplish this with a BM85 Modbus Plus bridge/MUX. The BM85 offers four Modbus-compatible serial RS-232 ports, which allow Modbus master or Modbus slave devices to tie into a Modbus Plus network. The bridge/MUX connections enable data exchange between the Modbus devices as well as over the Modbus Plus network.



Communications

Modbus Plus
Installation, redundant cables

All Quantum CPUs contain a Modbus Plus port. Modbus Plus combines high-speed peer-to-peer communication with easy implementation to simplify data sharing by nodes across a network. It is a local area network that facilitates communications between CPUs, host computers and other data sources via twisted-pair cable or optional fiber optic cable. Communications happen at up to 1 Mbaud.

Typical applications include interlocking on control networks, data acquisition, uploading/downloading software, remote on-line programming, connecting to operator interfaces and host computer data collection. Modbus Plus is able to handle communications for real-time control devices like I/O and drives, and its performance is not degraded due to loading or traffic.

Installation

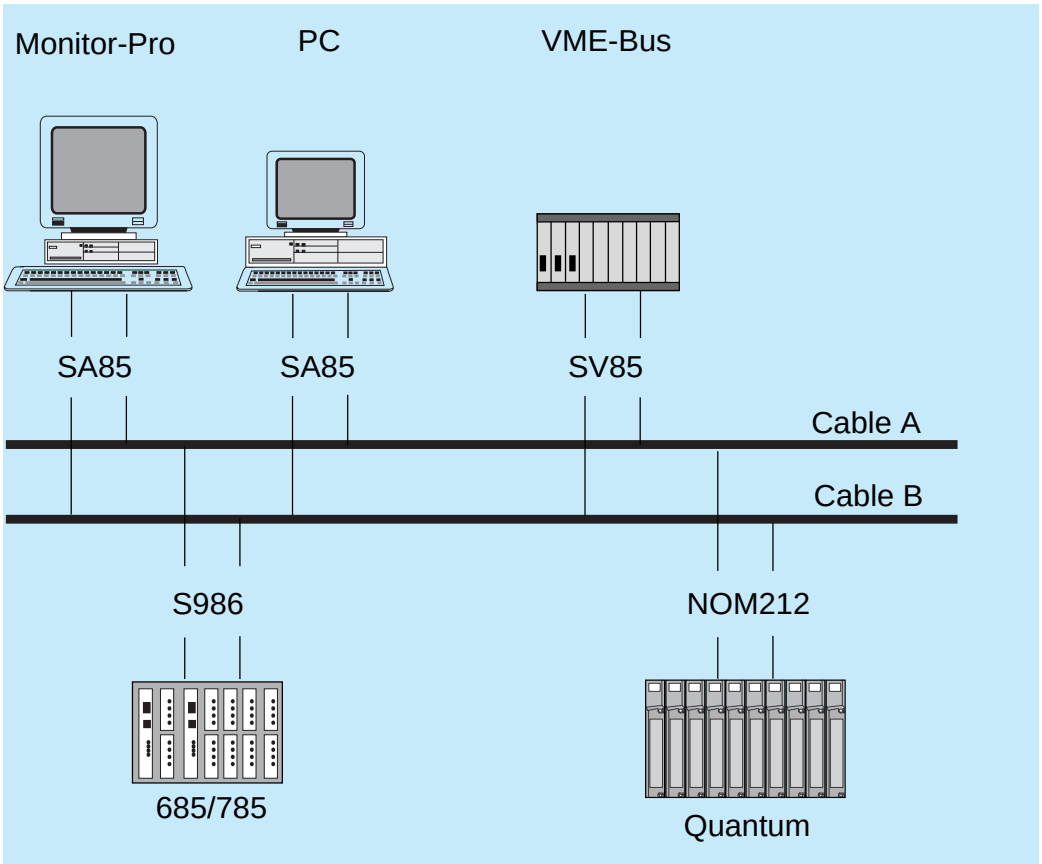
Modbus Plus is a self-establishing network that establishes communication over inexpensive twisted-pair cables. It is a genuinely plug-and-play network. Modbus Plus connectivity is available across many Modicon controlller families, with additional connectivity provided through our ModConnect Partners program.

Modbus Plus delivers up to 20 000 registers/second in a predictable, deterministic manner. Special features include global data and a peer-to-peer data table for easy setup and initialization.

Diagnostic programs and visual LED indicators help you troubleshoot the network.

Redundant cables

For high-availability applications, Schneider Automation offers a series of Modbus Plus network components and options for redundant operation. Redundant cabling enables Modbus Plus communication over two independent cable systems, with cable health being checked and validated on every message transfer. If one cable fails, the system automatically switches to the other cable. The defective cable is identified in the network statistics. If, for any reason, a cable stops functioning, the network continues operation on the second cable while the defective cable is being repaired.

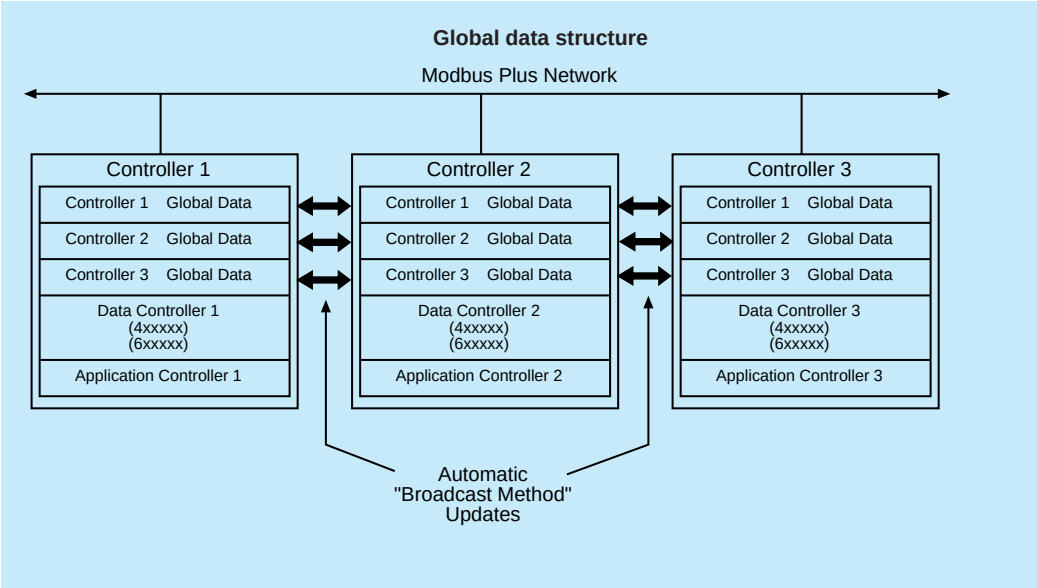


Global data

Global data allows you to share global variables across a Modbus Plus network of programmable logic controllers. It is an easy way for CPUs to keep track of process-sensitive information, and because the global database is broadcast, updating of global information happens extremely fast.

Each CPU has as many as 32 registers of global data; Modbus Plus nodes can support 2048 registers (32 registers x 64 CPUs) of global data. Each of up to 64 CPUs on the network is responsible for updating its own 32 registers of global data using an MSTR instruction. Each CPU also has the ability to read the 32 global registers from all the other CPUs on the network. When a CPU updates its global data, this information is broadcast automatically to all other CPUs on the network. Each receiving controller collects the new global data and stores it in its network interface memory. A CPU looking to read another peer's global data is actually pulling the information out of its own network interface.

Global data works only within a single layer of the Modbus Plus network. It cannot be transmitted through a BM85 bridge MUX or BP85 bridge plus device.



Peer cop

Peer cop is a software utility in Modsoft and Concept that enables you to define point-to-point data transactions between a CPU and other nodes across a Modbus Plus network. Peer cop uses defined data references (such as discretes or registers) as sources and destinations. A block of registers could constitute the data source for the transmitting node, and another block of registers could be the destination for the receiving device. A maximum of 32 words can be addressed in a CPU via peer cop, where a 16-point discrete module equals one word.

Peer cop offers two methods of data transaction–global and specific. Because all Modbus Plus nodes monitor the network, any one device can extract the data addressed specifically to it. Likewise, all nodes can extract global data. Peer cop enables the Modbus Plus device currently holding the token to direct specific data to individual nodes and broadcast global data to all nodes as part of its token frame. Each sending node can specify unique references as data sources, and each receiving node can specify the same or different references as data definitions. When nodes receive global data, each node can index to specific locations in the incoming data and extract specific lengths of data from those points. Data transactions can therefore happen quickly as part of the token rotation and can be directly mapped between data references in the sending and receiving nodes.

Network and data security are obtained with the CPU's write-protect feature. You can configure sections of references within the CPU as read-only so that those references cannot be corrupted over the network.

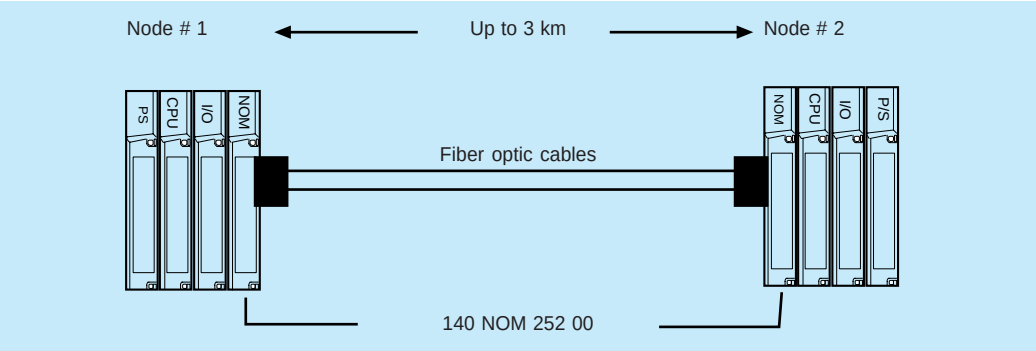
Peer cop, like global data, works only within a single layer of the Modbus Plus network. It cannot be configured to operate through a BM85 bridge MUX or BP85 bridge plus device.

Fiber optic network

Optional fiber optic cabling is available for a Modbus Plus network. With fiber optics, the total length of the network can be increased to as much as 3 km. The fiber optic medium provides intrinsically safe links, which may be required in certain hazardous environments. Fiber cabling is not susceptible to the effects of electromagnetic interference, RF interference or lightning. It also provides total isolation between terminal points on the link.

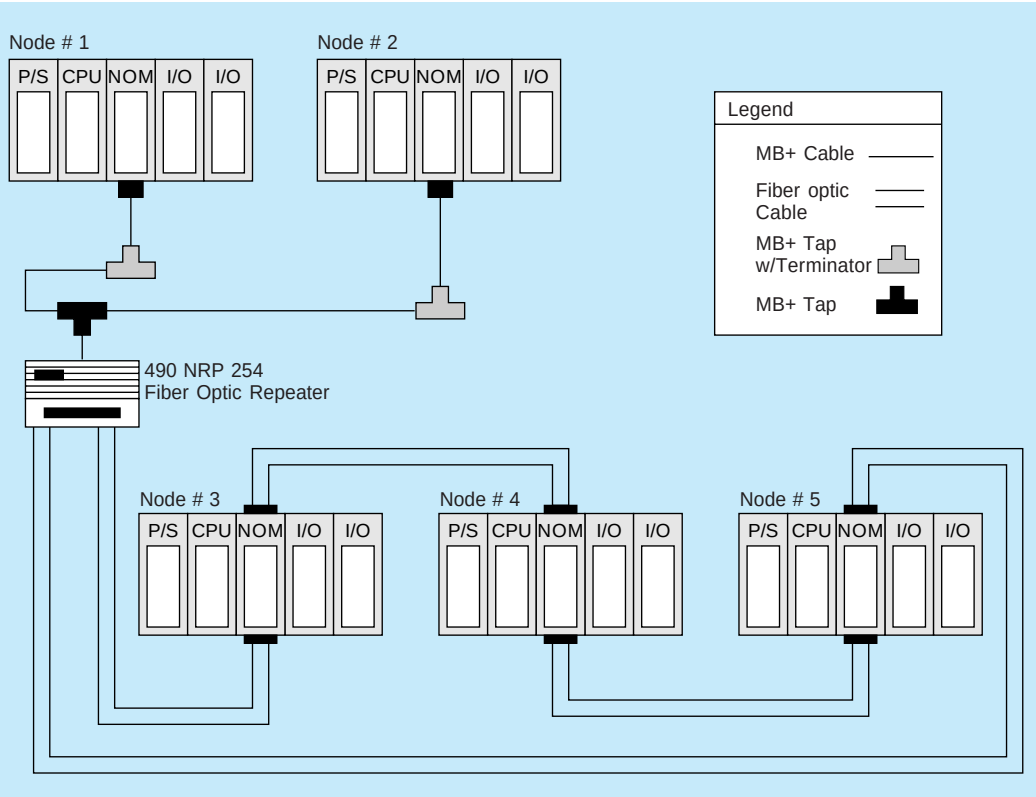
A point-to-point configuration

A point-to-point link between CPUs on a Modbus Plus network allows safe communications in a harsh environment over distances up to 3 km.



A self-healing ring

You can create a self-healing ring in a mixed fiber/twisted pair network by connecting the unused fiber optic ports of the first and last 140 NOM 252 00 modules, either directly or through the fiber optic repeater. This type of configuration maintains all the advantages previously described including built-in redundancy. A broken connection between any two Quantum modules in the ring will automatically reconfigure the network to the bus configuration and continue communicating.



Communications

InterBus-S master module
Presentation, description

Presentation

InterBus is a field bus designed for distributing sensor and actuator devices in a master/slave topology. The I/O slaves are serviced in a deterministic manner over a twisted-pair network. InterBus is best suited for talking to groups of I/O rather than individual I/O points. As such, InterBus slaves are typically available in 8-, 16- or 32-point blocks.

Modicon provides InterBus slave I/O as part of its Momentum product offering. In the TSX Quantum Automation Series, a 140 NOA 611 10 InterBus master module is available. The Quantum InterBus master can control Momentum and TIO slave devices as well as third-party products designed to operate on the filedbus. Over 300 industrial vendors provide InterBus-compatible products, assuring open, cost-effective and wide-ranging connectivity.

The 140 NOA 611 10 InterBus master module interfaces with up to 4096 input and output points distributed over as many as 256 slave devices on the fieldbus. The InterBus data rate is 500 kbits/s, with data transferred to the Quantum CPU for logic processing on every scan. Up to three InterBus master modules can be supported in a local Quantum backplane.

All of Modicon's InterBus products use the remote bus technique, which enables data transfers over 13 km (8 mi) across all 256 devices. The local bus technique, which is generally used to pass power and control signals, is not supported by Modicon's InterBus master devices.

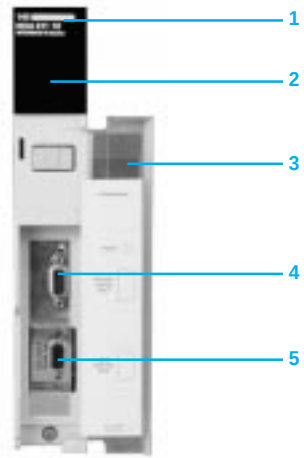
Electrical voltage levels on the Quantum remote bus are RS-485, with full-duplex mode communications. InterBus command words are pre-programmed in the 140 NOA 611 00 InterBus master module. This is an InterBus standard that supports 16-function programmability. Three pre-programmed bits are defined:

- Startup with configuration check.
- Start network.
- Stop network.

An additional InterBus feature provided in the Quantum master is the peripheral communications protocol (PCP), which supports limited data communications to intelligent devices. PCP version 1.5 allows word communications to intelligent slaves for advanced functions such as drive setup, parameterization or non-I/O data transfer. Many third-party slave devices available today do not support PCP capability, but it is supported in the Quantum master module.

Description

The Interbus module comprises in front panel:



1 Model number and color code.

2 LED array
R (green) Ready. The firmware is running correctly and the module is ready for service.
Active (green) Communication with the Quantum CPU is active.
F (red) A fault occurred on the module.
IB-S Run (green) The InterBus is functioning normally and carrying data.
BS Off (yellow) One or more bus segments are shut down.
Master (red) Processor fault. Fault on the InterBus processor or the communications processor has failed.
RBUS (red) Remote bus fault. The remote bus has been diagnosed as defective.
LBUS (red) Peripheral bus fault. The peripheral bus has been diagnosed as defective.
Slave (red) An InterBus node has reported a (module) fault.
DEA202 (red) Initialization fault with the DEA 202.
Memoryred Memory fault.
Start Up (red) The InterBus master is not operational.

3 Removable, hinged door and customer identification label.

4 RS232C port.

5 InterBus port.

Communications

InterBus master module
Software, characteristics, references

Special software considerations

Systems that do not use full-feature InterBus require nothing more than the module and a driver loadable called ULEX. ULEX is a ladder logic loadable instruction and an intelligent module driver that provides 256 input data registers and 256 output data registers per logic scan. One ULEX instruction can support up to three 140 NOA 611 10 modules. The instruction is provided with the Quantum InterBus user manual (840 USE 418 00).

The Quantum InterBus master can take advantage of various software packages for full-feature performance. PCP communications utilize two other ladder logic loadable instructions–ICNT and ICOM. ICNT establisheds a connection link to the slave device; ICOM communicates with the slave device. These instructions are also provided with the 840 USE 418 00 manual.

An InterBus development tool, available from the InterBus club (and not from Schneider Automation), can be used to implement several advanced features such as logical addressing on the fieldbus, network monitoring, changing the start-up behavior of any of the 16 command bits, or utilizing branches over InterBus.

Characteristics

Model			**140 NOA 611 10**
Data interface			
	InterBus		RS-485, isolated (500 V test voltage)
	RS 232C		per DIN 66 020, non-isolated
	Cable length	**m (ft)**	20 (65) max. (shielded)
	Data transfer frequency	**bits**	500 M
Memory	RAM	**bytes**	256 K + 32 for data 2 K dual-port RAM 64 K multi-port RAM
	EPROM	**bytes**	128 K + 256 K firmware
	EEPROM	**bytes**	64 K InterBus command sequence storage
Bus current required		**mA**	700
Max number of InterBus modules/local backplane			3
Power dissipation			
	Typical	**W**	2.5
	Max.	**W**	3.7
Compatibility			
	CPUs		All CPUs, version 2.0 or higher
	Software		Concept 2.0 or higher, ProWORX NxT version 2.0 or higher

References

Description	Reference	Weight kg (lb)
InterBus master module	**140 NOA 611 10**	0.9 (2.0)

Accessories

Description	Length m (ft)	Reference	Weight kg
Interbus cable, preconnected	0.25 (0.8)	**170 MCI 025 00**	–
	0.8 (2.6)	**170 MCI 008 00**	–
	1.0 (3.3)	**170 MCI 100 01**	–
Interbus connector set, female/pin 9-pin, D-shell, cut clamping technology		**170 XTS 009 00**	–
140 NOA 611 10 user guide		**840 USE 418 00**	–

Communications Module for Profibus

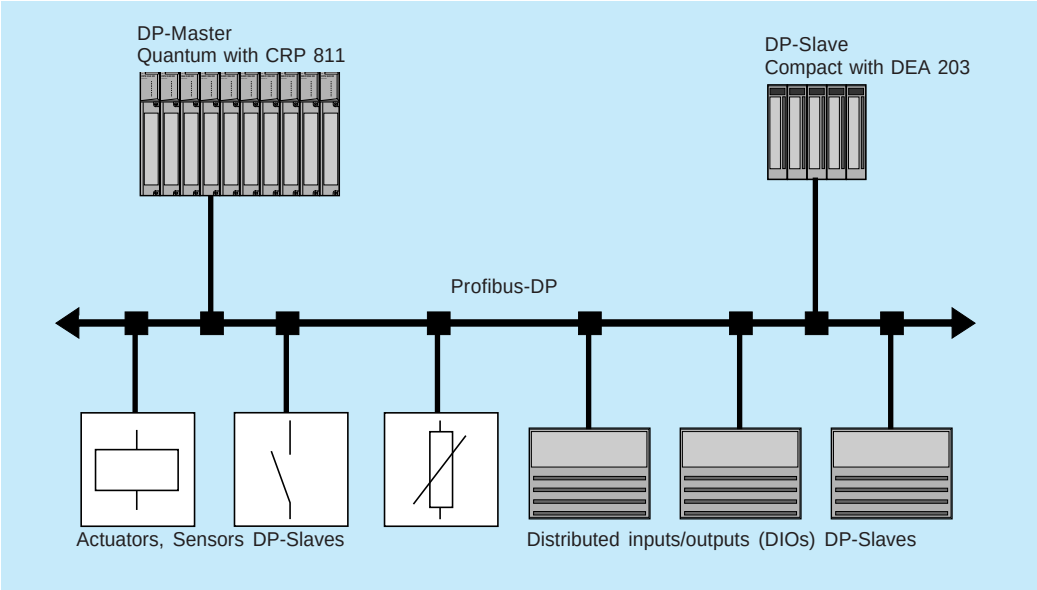
Presentation, description

Presentation

Profibus-DP (CRP 811 00)

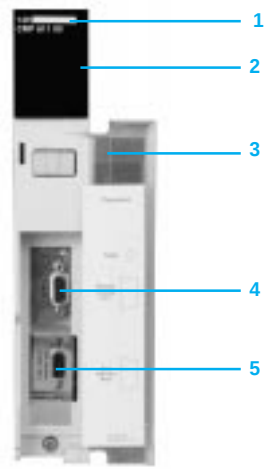
The Profibus-DP bus (Distributed Process Periphery) is an enhanced, high-speed fieldbus which conforms to industrial communication requirements. It is a linear bus with a centralized access procedure of the Master/Slave type. Only Master stations, called „active stations," have access rights to the bus. The Slave, or „passive stations," can only respond to prompts. Dialogue between Masters is also possible from some stations by means of a token bus protocol.

Profibus-DP is an optimum alternative for cost-intensive parallel signal transfers at 24 V and measurement value transfers in 4 (0) ... 20 mA technology. It is designed for a fast data exchange on the sensor/actuator level. The physical connection is single-shielded twisted pair cable, but fiber optic interfaces are available to create tree, star, or ring structures.



Description

The Profibus-DP module is comprised of:



1 Model Number and Color Code.

2 LED Indicator Panel.

3 Removable, hinged door and customer identification label.

4 RS-232C Port.

5 PCMCIA Card (467 NHP 811).

The Profibus modules include a TAP connection. The TAP can be positioned at distances of up to 20 cm on a DIN-rail.

Quantum Automation Platform

Communication Modules for Profibus

Characteristics, references

Characteristics

Module Type		**140 CRP 811 00**
PROFIBUS		DP
LEDs		Active (green) Ready (green) Fault (red) Backplane (green) PROFIBUS (green) DP S/R (green) FMS S/R (green) - not used) Load (yellow)
Suitable CPU Types		all CPUs
Number of Quantum CRP		dependent on CPU design and other communication modules (see CPU)
Update Time with 32 Slaves (per 16 bit inputs, 16 bit outputs)	**ms**	12
Configuration Software		332 SPU 833 01, PROFIBUS-DP
Data Interface		
PROFIBUS		RS 485 at bus tap up to 12 MBit/s
RS 232C		per DIN 66020, non-isolated
Baud Rate		19.2 kBit/s
Max. Cable Length	**m**	3 (shielded)
Power Output	**W**	6.5

References

Modules for Profibus

Description	Reference	Weight kg
Communication Modules, Profibus DP, including TAP (490 NAE 911 00) and PCMCIA Card (467 NHP 811 00)	**140 CRP 811 00**	–

Accessories

Description	Reference	Weight kg
Configuration package for 140 CRP 811 00 for Profibus DP Network Configuration Single-user license, runs on Windows in combination with Modsoft 2.6 or greater	**332 SPU 833 01**	–
Configuration package for 140 CRP 811 00 for Profibus DP Network Configuration Single-user license, for Concept 2.2 or greater	**TLX FBC M**	–
Profibus cable, O2Y(ST)CY 2 x 0.64 mm	**KAB PROFIB**	–
Programming Cable, 3 m, 9-pin male/female	**990 NAM 263 30**	–

Description	Type	Color	Reference	Weight kg
Profibus connector	Terminated end connector	Yellow	**490 NAD 911 03**	–
	Inline connector	Gray	**490 NAD 911 04**	–
	Inline connector with service port	Gray	**490 NAD 911 05**	–
Profibus tap (1)			**490 NAE 911 00**	–
PCMCIA card (1)			**467 NHP 811 00**	–

(1) Spare part only; this product is included with the 140 CRP 811 00.

Special-purpose modules

ASCII interface module
Presentation, description

Presentation

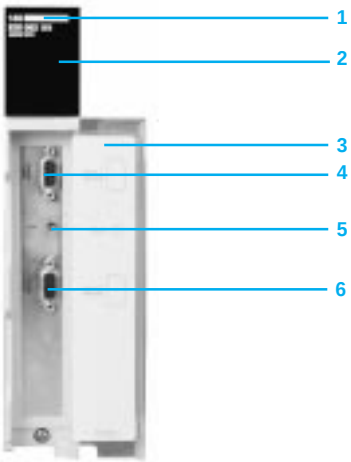
The Quantum 140 ESI 062 10 ASCII module is a general purpose ASCII interface that provides the ability to communicate and exchange data with third party devices. These devices are typically found in industries which do not utilize a standard communication. The majority of these applications are for communicating directly to printers, bar code readers and scanners, along with serial devices such as weigh scales, meters and other measurement devices. This module is designed for relatively simple point to point ASCII communications, with ASCII messages contained within the ESI module triggered by the logic within the Quantum controller. Messages are developed off-line and downloaded to the ESI module, with the message itself being able to communicate to an ASCII compatible serial device.

The optional 984 ladder logic ESI loadable function block, greatly simplifies the command/response data communications with the ESI module. This instruction can be used in either Modsoft or Concept 984 Ladder Logic environments.
The development environment for this module consists of a PC running Modsoft or Concept connected to the Quantum controller, with or without the optional ESI loadable function block, along with a PC running a terminal emulation program for development of the ASCII messages within the ESI module.

The module provides interfaces for report generation (printers & terminals); time stamping of messages; supports printer and device control codes; interface to serial devices; data storage; two (2) RS232C Ports - 9 Pin D Sub; ASCII messages stored in non-volatile flash for data integrity; flash based ESI module firmware for simple field upgrades; no limit on installed units to capacity of I/O system; better-performance from separate ESI processor, supports up to 19.2Kbaud; bi-directional register transfer, (12) input and (12) output registers; uses command register instructions, supports leading spaces or zero's, ASCII, octal, hex, decimal, integer binary, fixed decimal point, time and date formats for data; repeat, new-line, control code, space and nested formats available for text messages;_monitor and flush buffer commands for monitoring port performance; Get and Put commands for data transfer between controller and module.

Description

The Quantum 140 ESI 062 10 ASCII module comprises in front panel:



1 Model number and color code.

2 LED array.

3 Removable, hinged door and customer identification label.

4 RS-232 comm port 1.

5 Reset button.

6 RS-232 comm port 2.

Special-purpose modules

ASCII interface module
Characteristics, references

Characteristics

Model			**140 ESI 062 10**
Data interface	serial ports		two RS232 per DIN 66 020, 9-pin D-shell, nonisolated
	burst speed	**kbaud**	19.2 each port
	continuous speed		application-dependent
	cable	**m (ft)**	20 (65.6) shielded
Firmware	message nesting		8 levels
	buffer size		255 in / 255 out
	number of messages		255
	message length		127 characters + 1 checksum max.
Memory	RAM	**kbyte**	256 for data and program +2 for dual-port RAM
	flash	**kbyte**	128 for program and firmware
Power dissipation		**W**	2 max
Bus current required		**mA**	300
Addressing requirement		**words**	12 in/12 out
Fusing	internal		none
	external		user discretion
Compatibility	software		ProWORX NxT version 2.0 or Concept 2.0 minimum
	Quantum CPU		all, V2.0 minimum

References

Description	Lenght	Reference	Weight kg (lb)
Intelligent ASCII interface with 2 RS232 ports	–	**140 ESI 062 10**	0.30 (0.66)
Programming cable for Modbus interface	3.7 (12)	**990 NAA 263 20**	0.30 (0.66)
	15 (50)	**990 NAA 263 50**	1.82 (4.0)
140 ESI 062 10 User Guide (including 984 ladder logic ESI loadable)	–	**840 USE 108 00**	–

Quantum Automation Platform

ConneXium Ethernet cabling system

Selection Guide

Product Type	Hubs		
			
Technology	Ethernet 10 Mbit/s		Ethernet 100 Mbit/s
Interfaces	4 10BASE-T ports	3 10BASE-T ports 2 10BASE-FL ports	4 100BASE-TX ports
Connection Type	Twisted pair cable	Twisted pair cable and redundant fiber optic ring	Twisted pair cable
Type of connector	Shielded RJ45	Shielded RJ45 for 10BASE-T BFOC for 10BASE-FL	Shielded RJ45
Terminal block	1 x 5-pin pluggable		
Operating voltage	18 to 32 VDC safety low voltage		9.6 to 57.6 VDC safety low voltage
Power Consumption	80 mA typical, 130 mA max at 24 VDC	160 mA typical, 350 mA max at 24 VDC	200 mA typical, 270 mA max at 24 VDC
Range	Twisted pair line length maximum 100 m	Fiber optic maximum 3100 m Twisted pair maximum 100 m	Twisted pair line length maximum 100 m
Model No.	499 NEH 004 10	499 NOH 005 10	499 NEH 041 00
Pages	48190/3		

Switches		Transceivers	
			
Ethernet 10 Mbit/s and Fast Ethernet 100 Mbit/s		Ethernet 10 Mbit/s	Ethernet 100 Mbit/s
5 10BASE-T/100BASE-TX and 2 100BASE-TX ports	5 10BASE-T/100BASE-TX and 2 100BASE-FX ports	1 10BASE-T port and 1 10BASE-FL port	1 100BASE-TX port and 1 100BASE-FX port
Twisted pair cable	Twisted pair cable and redundant fiber optic ring	Twisted pair cable and fiber optic Ethernet cable	
Shielded RJ45	Shielded RJ45 for 10BASE-T and 100BASE-TX; SC for 100BASE-FX	Shielded RJ45 for 10BASE-T BFOC for 10BASE-FL	Shielded RJ45 for 100BASE-TX SC for 100BASE-FX
18 to 32 VDC, safety low voltage			9.6 to 57.6 VDC safety low voltage
800 mA maximum at 24 VDC		80 mA typical, 100 mA maximum at 24 VDC	160 mA typical, 190 mA maximum at 24 VDC
Twisted pair line length maximum 100 m	Fiber optic maximum 3100 m Twisted pair maximum 100 m	Twisted pair line length 100 m; 62.5/125µm fiber, 3100 m	
499 NES 071 00	**499 NOS 071 00**	**499 NTR 000 10**	**499 NTR 001 00**
48190/4		48190/5	

Quantum Automation Platform

ConneXium Ethernet cabling system

Selection Guide

Product Type	Optical Cables		
			
Cable type	Standard glass fiber optic		
Pre-assembled connector type	MT/RJ-SC duplex	MT/RJ-ST	MT/RJ-MT/RJ
Cable length(s)	5 m (16.4 ft)		
Radiation susceptibility	No radiation along the cable		
Agency approvals	Category 5 of cabling standard EIA/TIA-568; Class D of IEC 11801 / EN50173		
Networks link	--		
Operating power	--		
Ports	--		
Model No.	490 NOC 000 05	490 NOT 000 05	490 NOR 000 05
Pages	48190/6		

Electrical Cables		Bridges	
			
Shielded and foil twisted pair cord	Shielded and foil twisted pair crossed cord	--	
RJ45 (two per cable)		--	
2, 5, 12, 40, 80 m 6.5, 16.4, 39.4, 131.2, 262.4 ft	5, 15, 40, 80 m 16.4, 49.2, 131.2, 262.4 ft	--	
--			
UL and CSA (22.1) approval indicated by "U" after part number (example: 490 NTW 000 40U)		UL, CSA, CE	
		Modbus Plus to Ethernet	Modbus to Ethernet
		110 / 220 VAC, auto sensing	9 ... 30 VDC range; 12 or 24 VDC, nominal
		1Ethernet 10BASE-T, 10BASE-2, 10BASE-5 port; 1 dual / single cable Modbus Plus port	1 RJ45 port for 10BASE-T cable
490 NTW 000 ••	490 NTC 000 ••	174 CEV 200 30	174 CEV 300 10

ConneXium Ethernet cabling system

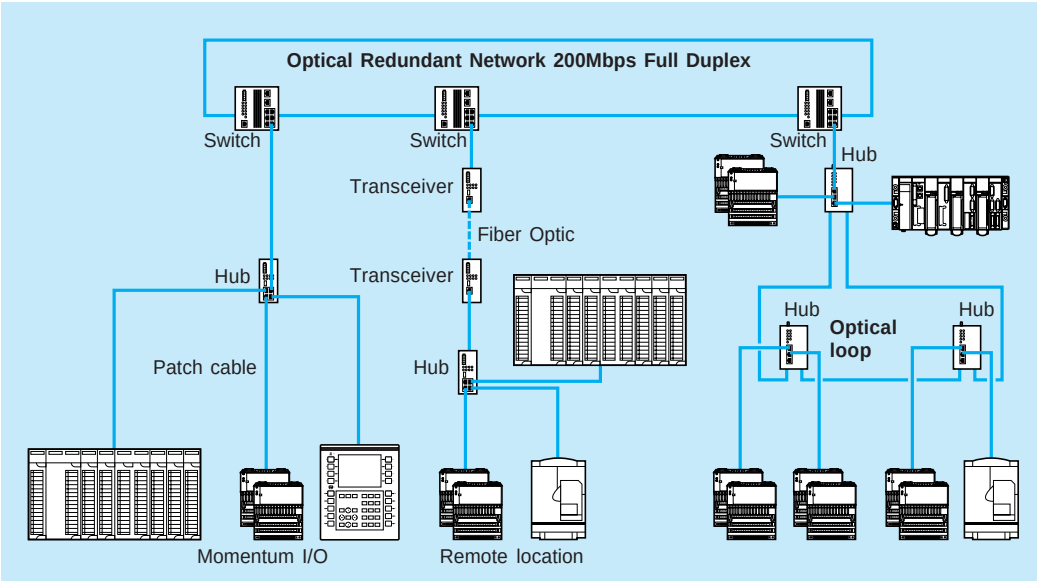
Presentation

Presentation

As part of its Transparent Factory family of products, Schneider Electric offers ConneXium - industrially hardened hubs, hubs, switches, transceivers, bridges, and cables. These Ethernet-standard communication components enable you to integrate Ethernet solutions from the device level to the control network, and beyond to the corporate intranet. Each product in the Ethernet cabling system is designed with compliance to Ethernet standards, and with third-party compatibility in mind.

- **ConneXium** Hubs connect segments to supply shared communication among PLCs. TF Hubs are low-cost solutions which enable communications with devices, such as Momentum I/O, to Ethernet networks.
- **ConneXium Switches** segment the application in different zones, groups, or cells/machines. The proper placement of switches can increase network performance by relieving network congestion. TF switches implement SNMP protocol, allowing standard network management tools to monitor and diagnose the network, and thus are a key architectural component for real-time and deterministic network communication.
- **ConneXium Transceivers** provide connections to fiber optic networks in order to secure transmissions in areas of high electromagnetic interference. The use of multiple transceivers enables long distances between islands.
- **ConneXium Bridges** enable Modbus to Ethernet and Modbus Plus to Ethernet communications, with multiple ports allowing flexibility among network components.
- **ConneXium Cables** connect each device (such as PLC, I/O, PC, etc.) to the attached hub, switch, transceiver, patch panel, or to cascade hubs and switches. TF cables are available in fiber optic and twisted pair options, with a wide variety of connectors and cable lengths.

All Ethernet cabling system components are built to exacting standards, and are designed to perform in harsh environments. TF Switches and Hubs incorporate mechanisms to support a high level of resilience. With their scalable redundant features - from single to double ring structure - it is easy to build the kind of fault-tolerant network that fits the specific requirements of your environment.



ConneXium Ethernet cabling system
Hubs

Characteristics

Mechanical construction

Model		499 NEH 004 10	499 NEH 041 00	499 NOH 005 10
Operating temperature	°C (F)	0 to 60 (32 to 140)		
Relative humidity		10...90% (non-condensing)		
Dimensions W x H x D	mm (in)	40 x 125 x 80 (1.58 x 4.92 x 3.15)		80 x 140 x 80 (3.15 x 5.51 x 3.15)
Weight	g (lb)	520 (1.2)		900 (2)
Enclosure		IP 30		
Agency approvals and compliance		UL, CE, CUL 1950, FCC part B, CSA 22-2.142, CSA 22-2.213M Class 1 Div. 2 (certifications pending)		

Characteristics

Technology		Ethernet 10 Mbit/s	Ethernet 100 Mbit/s	Ethernet 10 Mbit/s
Interfaces		4 10BASE-T ports with shielded RJ45 connectors	4 100BASE-TX ports with shielded RJ45 connectors.	3 10BASE-T ports with shielded RJ45 connectors; 2 10BASE-FL ports with BFOC connectors
Connection type		Twisted pair cable		Twisted pair cable and redundant fiber optic ring
Terminal block		1 x 5-pin, pluggable		
Operating voltage	VDC	18 to 32, safety low voltage	9.6 to 57.6, safety low voltage	18 to 32, safety low voltage
Redundancy		Power supply		Power supply and optical ring
Power consumption at 24 VDC	mA	80 typical, 130 maximum	200 typical, 270 maximum	160 typical, 350 maximum
Maximum range	m (ft)	Twisted pair line length, max 100 (max 330)		Fiber optic, max 3100 (max 10,000) Twisted pair, max 100 (max 330)
Number of cascaded hubs		4 max		11 max
Number of hubs in a ring		–		11 max
Fault indicator		Wire contact to indicate power, network, or port failure (rated 1 A maximum at 24 VDC)		
LED indicators		Power, Data, Collision, and Link status per port		

Quantum Automation Platform

ConneXium Ethernet cabling system
Switches

Characteristics

Mechanical construction

Model		499 NES 071 00	499 NOS 071 00
Operating temperature	˚C (F)	0 to 50 (32 to 122)	
Relative humidity		10...90% (non-condensing)	
Dimensions W x H x D	mm (in)	105 x 130 x 105 (4.1 x 5.1 x 4.1)	
Weight	g (lb)	1450 (3.2)	
Enclosure		IP 20	
Agency approvals and compliance		UL, CE, CUL 1950, FCC part B, CSA 22-2.142, CSA 22-2.213M Class 1 Div. 2 (certifications pending)	

Characteristics

Technology		Ethernet 10 Mbit/s and Fast Ethernet 100 Mbit/s	
Interfaces		5 10BASE-T/100BASE-TX ports with shielded RJ45 connectors 2 100BASE-TX ports with RJ45 connectors	5 10BASE-T/100BASE-TX ports with shielded RJ45 connectors 2 100BASE-FX ports with SC connectors
Connection type		Twisted pair cable	Twisted pair cable and redundant fiber optic ring
Terminal block		1 x 5-pin, pluggable	
Operating voltage	VDC	18 to 32, safety low voltage	
Redundancy		Power supply; optical and/or copper ring structure; fast media redundancy (< 0.3s); redundant manager	
Power consumption at 24 VDC	mA	800 maximum	
Maximum range	m (ft)	Twisted pair line length, max 100 (max 330)	Fiber optic, max 3100 (max 10,000) Twisted pair, max 100 (max 330)
Number of switches in a ring		Maximum 4 at 10 Mbit/s; maximum 50 at 100 Mbit/s	
Number of cascaded switches		50 max	
Fault indicator		Wire contact to indicate power, network, or port failure (rated 1 A maximum at 24 VDC)	
LED indicators		Power, Data, Collision, and Link status per port	

Quantum Automation Platform

ConneXium Ethernet cabling system
Transceivers

Characteristics

Mechanical construction

Model		499 NTR 000 10	499 NTR 001 00
Operating temperature	°C (F)	0 to 60 (32 to 140)	
Relative humidity		10...90% (non-condensing)	
Dimensions W x H x D	mm (in)	40 x 140 x 80 (1.58 x 5.51 x 3.15)	
Weight	g (lb)	520 (1.2)	
Enclosure		IP 30	
Agency approvals and compliance		UL, CE, CUL 1950, FCC part B, CSA 22-2.142, CSA 22-2.213M Class 1 Div. 2 (certifications pending)	

Characteristics

Technology		Ethernet 10 Mbit/s	Ethernet 100 Mbit/s
Interfaces		1 10BASE-T port with shielded RJ45 connector 1 10BASE-FL port with BFOC connector	1 100BASE-TX port with shielded RJ45 connector 1 100BASE-FX ports with SC connector
Connection type		Twisted pair cable and fiber optic Ethernet cable	
Terminal block		1 x 5-pin, pluggable	
Operating voltage	VDC	18 to 32 safety low voltage	9.6 to 57.6 safety low voltage
Redundancy		Power supply	
Power consumption at 24 VDC	mA	80 typical, 100 maximum	160 typical, 190 maximum
Maximum range	m (ft)	Twisted pair line length, 100 (330); 62.5/125µm fiber, 3100 (10 000)	
Link budget		> 11 dB for 50/125µm fiber cable; > 14 dB for 62.5/125µm fiber cable	
LED indicators		Power, Data, Collision, and Link status per port	

Quantum Automation Platform

ConneXium Ethernet cabling system
Cables, Bridges

Characteristics

Electrical cables

Model		490 NTW 000 xx	490 NTC 000 xx
Cable type		Shielded and foil twisted pair cord	Shielded and foil twisted pair crossed cord
Available cable lengths	m (ft)	2, 5, 12, 40, 80 (6.5,16.4, 39.4,131.2, 262.4)	5, 15, 40, 80 (16.4, 49.2,131.2, 262.4)
Pre-assembled connector type		RJ45 (two per cable)	
Agency approvals and compliance		UL, CSA 22.1 and NFPA 70 approval indicated by "U" after part number (example: 490 NTW 000 40U); Category 5 of international cabling standard EIA/TIA-568; Class D of IEC 11801 / EN50173; Low Smoke Zero Halogen (LSZH); flame retardant of NFC32 070 #1 (C2) and CEI 322/1	

Optical cables

Model		490 NOC 000 05	490 NOT 000 05	490 NOR 000 05
Pre-assembled connector type		MT/RJ-SC duplex	MT/RJ-ST	MT/RJ-MT/RJ
Cable type		Standard glass fiber optic		
Cable length	m (ft)	5 (16.4)		
Radiation susceptibility		No radiation along the cable		

Bridges

Model		174 CEV 200 30	174 CEV 300 10
Networks link		Modbus Plus to Ethernet	Modbus to Ethernet
Operating power		110 / 220 VAC, auto sensing	9 ... 30 VDC range; 12 or 24 VDC, nominal
Ports		1 Ethernet 10BASE-T (RJ45), 10BASE-2 (BNC), 10BASE-5 (AUI); 1 dual / single cable Modbus Plus	1 RJ45 port for 10BASE-T cable
Mounting		Vertical panel or horizontal shelf	DIN rail
Dimensions (W x H x D)	mm (in)	122 x 229 x 248 (4.8 x 9 x 9.8)	35 x 95 x 60 (1.4 x 3.7 x 2.4)

ConneXium Ethernet cabling system

References

499 NEH 004 10

499 NES 071 00

499 NTR 000 10

174 CEV 300 10

490 NTW 000 ••

490 NOC 000 0•

Hubs

Description	Reference	Weight kg (lb)
Ethernet Hub 10 Mbps, 4 10BASE-T ports	**499 NEH 004 10**	0.520 (1.2)
Ethernet Hub 10 Mbps, 3 10BASE-T ports, 2 10BASE-FL ports	**499 NOH 005 10**	0.900 (2)
Ethernet Hub 100 Mbps, 4 100BASE-TX ports	**499 NEH 041 00**	0.520 (1.2)

Switches

Ethernet Switch 10/100 Mbps, 7 100BASE-TX ports	**499 NES 071 00**	1.450 (3.2)
Ethernet Switch 10/100 Mbps, 5 100BASE-TX ports, 2 100BASE-FX ports	**499 NOS 071 00**	1.450 (3.2)

Transceivers

Ethernet Transceiver 10 Mbps, 1 10BASE-T port, 1 10BASE-FL port	**499 NTR 000 10**	0.520 (1.2)
Ethernet Transceiver 100 Mbps, 1 100BASE-TX port, 1 100BASE-FX port	**499 NTR 001 00**	0.520 (1.2)

Bridges

Modbus Plus to Ethernet Bridge	**174 CEV 200 30**	4.263 (9.4)
Modbus to Ethernet Bridge	**174 CEV 300 10**	0.500 (1.0)

Cables

Description	Length m/ft	Reference	Weight kg (lb)
Shielded and foil twisted pair cord cable	2/6.5	**490 NTW 000 02**	–
	5/16.4	**490 NTW 000 05**	–
	12/39.4	**490 NTW 000 12**	–
	40/131.2	**490 NTW 000 40**	–
	80/262.4	**490 NTW 000 80**	–
Shielded and foil twisted pair crossed cord cable	5/16.4	**490 NTC 000 05**	–
	15/49.2	**490 NTC 000 15**	–
	40/131.2	**490 NTC 000 40**	–
	80/262.4	**490 NTC 000 80**	–
Fiber optic cable, MT/RJ-SC duplex connectors	5/16.4	**490 NOC 000 05**	–
Fiber optic cable, MT/RJ-ST connectors	5/16.4	**490 NOT 000 05**	–
Fiber optic cable, MT/RJ-MT/RJ connectors	5/16.4	**490 NOR 000 05**	–

Ethernet PLC Products

Description	Platform	Reference	Weight kg (lb)
Ethernet CPU with Ethernet and Modbus ports	Momentum	**171 CCC 980 20**	–
Ethernet CPU with Ethernet and I/O bus ports		**171 CCC 960 20**	–
Ethernet Communication Adapter		**170 ENT 110 00**	–
MMS Ethernet CPU for twisted pair cable	Quantum	**140 NOE 511 00**	–
MMS Ethernet CPU for fiber optic cable		**140 NOE 551 00**	–
TCP/IP Ethernet CPU with I/O scanner		**140 NOE 771 00**	–
TCP/IP Ethernet CPU with Embedded Web Server		**140 NOE 771 10**	–
Ethernet CPU	Premium	**TSX ETY 110 00**	–
Ethernet CPU with Embedded Web Server		**TSX ETY 110 WS**	–

6 Concept, ProWORX software and Industrial terminals

Contents

Programming software
Concept

Presentation, PLC hardware configuration

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Presentation

Concept is a software configuration and application programming tool for the Momentum Automation Platform. It is a Windows-based software that can be run on a standard personal computer. The configuration task can be carried out online (with the PC connected to the Momentum CPU) or offline (PC only). Concept supports the configuration by recommending only permissible combinations, thereby preventing misconfiguration. During online operation, the configured hardware is checked immediately for validity, and illegal statements are rejected.

When the connection between programming unit (PC) and Momentum CPU is established, the configured values (e.g., from the variables editor) are checked and compared with actual hardware resources. If a mismatch is detected, an error message is issued.

Concept editors support five IEC programming languages:

- Function block diagram (FBD)
- Ladder diagram (LD)
- Sequential function chart (SFC)
- Instruction list (IL)
- Structured text (ST)

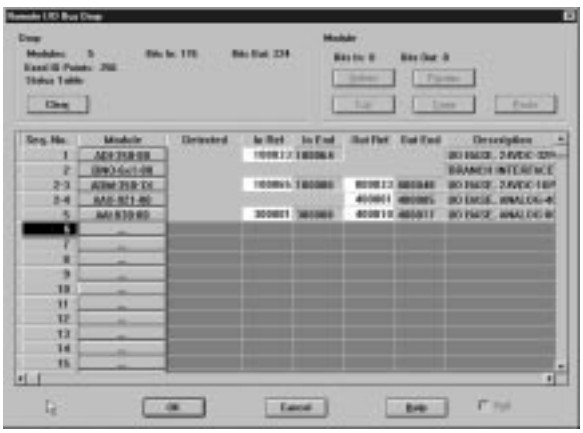
as well as Modsoft-compatible ladder logic (LL984). IEC 1131-3 compliant data types are also available. With the data type editor, custom data types can be converted to and from the IEC data types.

The basic elements of the FBD programming language are functions and function blocks that can be combined to create a logical unit. The same basic elements are used in the LD programming language; additionally, LD provides contact and coil elements. The SFC programming language uses basic step, transition, connection, branch, join and jump elements. The IL and ST text programming languages use instructions, expressions, and key words. The LL984 programming language uses an instruction set and contact and coil elements.

You can write your control program in logical segments. A segment can be a functional unit, such as conveyor belt control. Only one programming language is used within a given segment. You build the control program, which the automation device uses to control the process, by combining segments within one program. Within the program, IEC segments (written in FBD, LD, SFC, IL and ST) can be merged. The LL984 segments are always processed as a block by the IEC segments. Concept's sophisticated user interface uses windows and menus for easy navigation. Commands can be selected and executed quickly and easily using a mouse. Context-sensitive help is available at each editing step.

PLC hardware configuration

Variables for linking basic objects within one section are not required by the graphic programming languages (FBD, LD, SFC and LL984) since these links are created by connections. These connections are managed by the system, which eliminates any configuration effort. Other variables, such as variables for data transfers between different sections, are configured with the variables editor. With the data type editor, custom data types can be derived from existing data types.



Programming software Concept

Languages

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Concept provides an editor for each programming language. These editors contain custom menus and tool bars. You can select the editor to be used as you create each program segment.

In addition to the language editors, Concept provides a data type editor, a variables editor and a reference data editor.

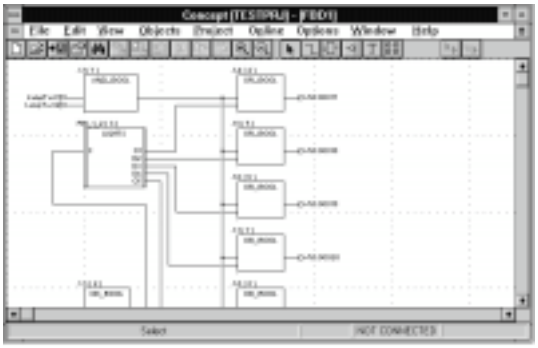
Function block diagram (FBD)

With the IEC 1131-3 function block diagram language, you can combine elementary functions, elementary function blocks (EFBs) and derived function blocks (all three of which are known as FFBs) with variables in an FBD. FFBs and variables can be commented. Text can be freely placed within the graphic. Many FFBs offer an option for input extensions.

Concept provides various block libraries with predefined EFBs for programming an FBD. EFBs are grouped in the libraries according to application types to facilitate the search.

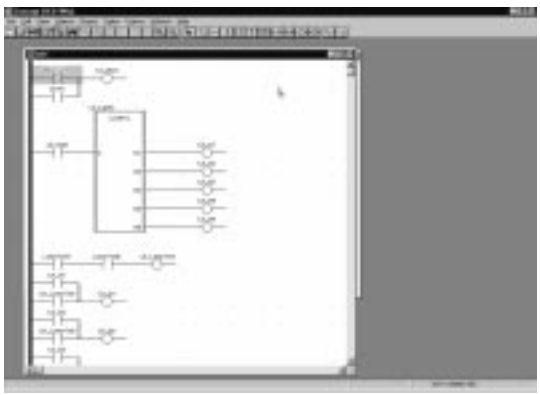
In the FBD editor, you can display, modify and load initial values; current values can be displayed. The CLC and CLC_PRO libraries allow you to display animated diagrams of the FFBs and a graph of the current values.

For custom function blocks (DFBs), the Concept-DFB editor is used. In this editor, you can create your own function blocks from EFBs or existing DFBs. DFBs created in the FBD editor can be recalled in the LD, IL and ST editors, and DFBs created in the LD, IL and ST editors can be used in the FBD editor.



Ladder diagram (LD)

With the IEC 1131-3 ladder diagram language, you can build an LD program with elementary functions, function blocks and derived function blocks (all of which are known as FFBs), along with contacts, coils and variables. FFBs, contacts, coils and variables can be commented. Text can be placed freely within the graphics. Many FFBs offer an option for input extensions.
The structure of an LD segment corresponds to that of a current path for relay circuits. On its left side is a left bus bar, which corresponds to the phase (L conductor) of a current path. As with a current path, only the LD objects (contacts, coils) connected to a power supply (i.e., connected to the left bus bar) are processed in LD programming. The right bus bar, which corresponds to the neutral conductor, is not visible. However, all coils and FFB outputs are internally connected to it in order to create a current flow.
The same EFB block libraries available for the FBD editor can be used in the LD editor to program a ladder diagram.



In the LD editor, inital values can be displayed, modified and loaded; current values can be displayed. For the EFBs in libraries CLC and CLC_PRO, animated diagrams of the FFBs and a graph of the current values can be displayed.

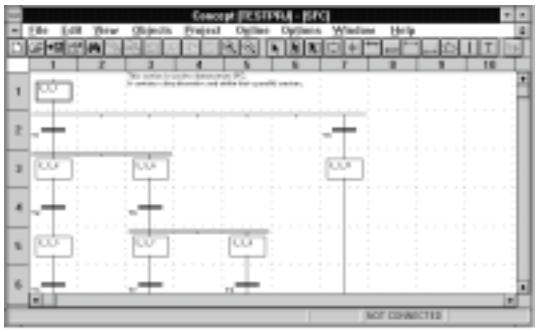
For custom function blocks (DFBs), the Concept-DFB editor is used. With this editor, you can create your own function blocks from EFBs or existing DFBs. DFBs created in the LD editor can be recalled in the FBD, IL and ST editors, and DFBs created in the FBD, IL and ST editors can be used in the LD editor.

Languages (continued)

References :
page 48251/7

Sequential function chart (SFC)

With the IEC 1131-3 sequential function chart (SFC) language, you can define a series of SFC objects that comprise a control sequence. Steps, transitions and jumps in the sequence can be commented. You can place text freely within graphics. You can assign any number of actions to every step. A series of monitoring functions–e.g., maximum and minimum monitoring time–can be integrated into each step's characteristics. The actions can be assiged an attribute symbol (as required by IEC) to control the action's performance after it has been activated–e.g., a variable can be set to remain active after exiting.



Instruction list (IL)

With the IEC 1131-3 IL language, you can call entire functions and function blocks conditionally or unconditionally, execute assignments and make conditional and unconditional jumps within a program segment.

IL is a text-based language, and standard Windows word processing tools can be used to generate code. The IL editor also provides several word processing commands. Keywords, separators and comments are spell-checked automatically as they are entered. Errors are highlighted in color.

For custom function blocks (DFBs), the Concept-DFB editor is used. In this editor, you can create your own function blocks from EFBs or existing DFBs. DFBs created in the IL editor can be recalled in the ST, LD and FBD editors, and DFBs created in the ST, LD and FBD editors can be used in the IL editor.

Structured text (ST)

With the IEC 1131-3 ST language, you can call function blocks, exectute functions and assignments and conditionally execute and repeat instructions. The ST programming environment is similar to Pascal. It is a text-based language, and Windows word processing functions can be used to enter code. The ST editor itself also provides several word processing commands. Keywords, separators, and comments are spell-checked automatically as they are entered. Errors are highlighted in color.

Custom function blocks (DFBs) created with the ST editor can be called in the IL, LD and FBD editors; DFBs created in the IL, LD and FBD editors can be used in the ST editor.

Data and variable editors, libraries

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Data type editor

The data type editor defines new derived data types. Any elementary data types and derived data types already existing in a project can be used for defining new data types. With derived data types, various block parameters can be transferred as one set. Within the program, this set is divided again into single parameters, processed, then output as either a parameter set or individual parameters. Derived data types are defined in text format, and standard Windows word processing tools can be used. The data type editor also provides several word processing commands.

Variables editor

The variables editor contains input options for:
- The variable type (located variable, unlocated variable, constant)
- The symbolic name
- The data type
- Direct address (explicit, if desired)
- Comments
- Identification as human-machine interface (HMI) variable for data exchange

Reference data editor

In online mode, the reference data editor displays, forces and controls variables. The editor contains the following options:
- Default values for the variable
- Status display for the variable
- Various format definitions
- The ability to isolate the variable from the process

Libraries

- **IEC Library**
The IEC library contains the EFBs defined in IEC 1131-3 (calculations, counters, timers, etc).

- **Extended Library**
The extended library contains useful supplements to various libraries. It provides EFBs for mean value creation, maximum value selection, negation, triggering, converting, building a traverse with interpolation of the first order, edge detection and determination of the neutral range for process variables.

- **System Library**
The system library contains EFBs in support of system functions. It provides EFBs for cycle time detection, utilization of various system clocks, control of SFC sections and system status display.

- **CLC and CLC_PRO Library**
The CLC library is used for defining process-specific control loops. It contains control, differentiation, integration and polygon graph EFBs. The CLC_PRO library contains the same EFBs as the CLC library along with data structures.

- **Communication Library**
The communication libraries of built-in function blocks provide easy integration of programs which allow communication between PLCs or HMI devices from within the PLC's application program. Like other function blocks, these EFBs can be used in all languages to share data, or provide data to the HMI device for display to the operator.

- **Diagnostics Library**
The diagnostics library is used for troubleshooting the control program. It contains EFBs for action, reaction,interlocking, and process prerequisite diagnostics, along with signal monitoring.

- **LIB984 Library**
The LIB984 library provides common function blocks used in both the 984 ladder logic editor and the IEC languages. This allows for easy transition of portions of application code from the 984LL environment to the IEC environment.

- **Fuzzy Logic Library**
The fuzzy library contains EFBs for fuzzy logic.

- **Analog I/O Library**
The ANA_IO library is used to process analog values.

Programming software
ProWORX, Concept

General features references

References :
pages 48251/6 et 48251/7

The ProWORX programming software is a full-featured, Modicon PLC programming software that is compatible with any Windows platform - 3.1/95/98/NT. A few of the new ProWORX features follow:

- **Windows environment**

The familiar Windows-based programming environment means you spend less time learning how to do things, and more time being productive. ProWORX uses familiar Windows features like user-defined screens, drag-and-drop, cut and paste, search, and global replace.

- **Intuitive Register Editor**

A powerful analysis tool, the Data Watch Window shows you information from your plant in real-time, or logs it to disk for in-depth historical analysis later on. Easily get the data you need to make informed, effective production decisions. View and edit data in full page display, see trends and track data points against time in a spreadsheet, and monitor any combinations of discretes and analogs.

- **I/O drawing generator**

Save hours of painstaking effort with ProWORX NxT's I/O Drawing Generator, which automatically creates wiring diagrams for the I/O cards defined in the Traffic Cop. Generate necessary drawings all at once or just one card at a time – simply select an address the I/O card uses with the Network Editor, then click the drawing button on the Hardware Back Referencing panel. NxT displays the diagram, and if desired, saves it as an AUTOCAD-compatible .DXF file or prints it

- **Network editor**

With the Network Editor, ProWORX NxT reduces development time by using the same commands and instructions for every controller. Simply cut, copy, and paste networks from one platform to any other.

- **Real-time network status**

Find the controller you need fast and simplify network diagnostics with ProWORX NxT's powerful Network Scan feature. Network Scan searches your Modbus or Modbus Plus networks, then identifies and graphically displays each device found and shows its status.

- **Advanced I/O management**

Ensure that the I/O card you are configuring in the software matches the one on your plant floor with Pro WORX NxT's graphical Traffic Cop. It displays I/O cards on your screen the same way they look in real life, eliminating all confusion. To place a card, just select it from the convenient drop down menu and then drag it into the controller slot you want. To save even more time, the Traffic Cop automatically associates the card's I/O points with with a block of free addresses in your controller. Once configured, manage your I/O with NxT's complete documentation tools, with references for each head, drop, rack, slot and address. And the Traffic Cop's graphical display shows you at a glance that your I/O is healthy.

References

Concept softwares

Description	License type	Reference (1)	Weight kg
Concept Packages			
Concept S Version 2.2	single-user license	**372 SPU 471 0● V22**	–
Concept M Version 2.2	single-user license	**372 SPU 472 0● V22**	–
Concept XL Version 2.2	single-user license	**372 SPU 474 0● V22**	–
	three-user license	**372 SPU 474 1● V22**	–
	10-user license	**372 SPU 474 2● V22**	–
	network license	**372 SPU 474 3● V22**	–
Concept EFB Toolkit Version 2.2		**372 SPU 470 01 V22**	–

(1) ● = **1** in this position indicates English language, **2** indicates German language

Programming software
Concept and ProWORX

References (continued)

Concept Upgrades

Description	License type	Reference (1)	Weight kg
Concept V x.x to Concept XL V. 2.2	single-user license	**372 SPU 474 5● V22**	–
	three-user license	**372 SPU 474 6● V22**	–
	10-user license	**372 SPU 474 7● V22**	–
	network license	**372 SPU 474 8● V22**	–
Concept S/XS to Concept S Version 2.2	single-user license	**372 SPU 471 5● V22**	–
Concept M to Concept M Version 2.2	single-user license	**372 SPU 472 5● V22**	–
Modsoft V x.xx to Concept XL Version 2.2	single-user license	**372 SPU 485 5● V22**	–
Concept EFB Toolkit V x.x to V 2.2	single-user license	**332 SPU 470 51 V22**	–

Documentation

Description	Number of volumes	Reference	Weight kg
Concept Installation Instructions	1	**840 USE 482 00**	–
Concept User Manual	2	**840 USE 483 00**	–
Concept IEC Block Library User Manual	3	**840 USE 484 00**	–
Concept LL984 Block Library User Manual	2	**840 USE 486 00**	–
Concept EFB User Manual	1	**840 USE 463 00**	–

ProWORX software

Description	License type	Reference	Weight kg
ProWORX Packages			
ProWORX NxT Online	single-user license	**372 SPU 681 01 NONL**	–
ProWORX NxT Offline/Online	single-user license	**372 SPU 680 01 NDEV**	–
	3-user license	**372 SPU 680 01 NSTH**	–
	10-user license	**372 SPU 680 01 NSTE**	–
	20-user license	**372 SPU 680 01 NSTW**	–
ProWORX NxT Lite Offline/Online	single-user license	**372 SPU 610 01 NLDV**	–
	3-user license	**372 SPU 610 01 NLTH**	–
	10-user license	**372 SPU 610 01 NLTE**	–
	20-user license	**372 SPU 610 01 NLTW**	–
ProWORX Upgrades Modsoft Upgrade to ProWORX NDEV	single-user license	**372 SPU 684 01 NXUP**	–
	3-user license	**372 SPU 684 01 MSTH**	–
	10-user license	**372 SPU 684 01 MSTE**	–
	20-user license	**372 SPU 684 01 MSTW**	–
ProWORX Plus Upgrade to NxT NDEV	single-user license	**372 SPU 684 01 NXPW**	–
	3-user license	**372 SPU 684 01 NPTH**	–
	10-user license	**372 SPU 684 01 NPTE**	–
	20-user license	**372 SPU 684 01 NPTW**	–
ProWORX NxT Lite	single-user license	**372 SPU 610 01 NMDV**	–
ProWORX NxT Online	single-user license	**372 SPU 610 01 NONE**	–
ProWORX NxT Online/Offline Development	single-user license	**372 SPU 610 01 DEV**	–

Documentation

Description	Reference	Weight kg
ProWORX NxT Programming Software User Manual	**372 SPU 680 01 NMAN**	–

(1) ● = **1** in this position indicates English language, **2** indicates German language.

Quantum Automation Platform

Programming and maintenance terminals

Description

FT 21•0 •• series programming and maintenance terminals are portable industrial microcomputers. They are built around a Pentium processor (300 MHz) and are compatible with the Windows 98, Windows NT or OS/2 operating systems. Pre-installed software packages are available for programming and maintaining Nano, Micro, Premium, Quantum and Series 7 PLCs.

Front view

The front panel of **FT 21•0 ••** programming and maintenance terminals comprises :

1 A 12.1" LCD color screen (800 x 600 pixels) with back-lit, anti-glare, active matrix TFT. This screen is protected against shock, dirt, splashing water, and dust. Its brightness and contrast are particularly suited to lighting conditions in industrial environments.

2 A hermetically sealed mechanical keyboard, protected against splashing water. It integrates :
- a touch-sensitive printing system
- 87 or 88 keys (depending on model)
- software adjustment of screen brightness (function keys)

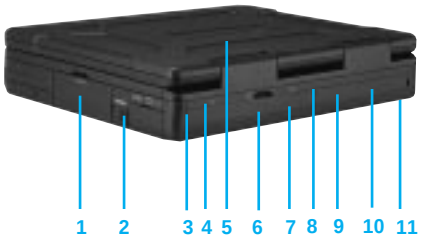
3 A removable carrying handle

4 A multimedia slot for :
- disk drive
- CD-ROM drive

5 Eight indicator lights (LEDs) :
- run-stop
- battery
- hard disk
- disk or CD-ROM drive
- numeric keypad
- scrolling
- shift
- caps lock

Rear view

The right side and rear of the **FT 21•0 ••** programming and maintenance terminals provides the following :



1 A slot for combining PCMCIA cards (2 of type II or 1 of type III)

2 A DC input mini-jack connector for connecting the main cable

3 A 6-pin mini DIN connector for IBM PS/2 standard mouse or keyboard port

4 A USB Interface port for connection to external devices

5 A product identification label which the user can write on with details of the terminal and its pre-installed software

6 A jack to connect headphones or external speakers

7 A mini-jack to connect a monaural microphone

8 An expansion bus connector (located on the back of the terminal) for connection to the desktop port replicator

9 A 15-pin female SUB-D connector for the external monitor output

10 A 25-pin female SUB-D connector for IBM PS/2 standard bidirectional parallel port

11 A 9-pin male SUB-D connector for IBM PS/2 standard RS 232 C serial link

Quantum Automation Platform

Programming and maintenance terminals

Characteristics

The programming and maintenance terminals have been developed to conform with the main national, European (CE marking) and international standards concerning electronic equipment for industrial control systems.

- Special PLC requirements : operating characteristics, immunity, robustness, safety, etc, NF C 63-850, IEC 1131, CSA 22.2 No.142, UL 508
- Immunity to electrostatic discharges : IEC 801.2 level 4
- Insulation coordination : air distance and leakage lines UL 508, NF C 20-040, IEC 664, VDE 110b
- Dielectric and self-extinguishing qualities of insulating materials : UL 746C, UL 94

The terminals have been checked and meet the requirements for Class A digital equipment, conforming to paragraph 15 of the FCC rules.

Note : Memory, hard disk and processor sizes are subject to change at any time to take advantage of technological developments.

Characteristics

Type of programming terminal	**FT 21•0 ••**			
Processor	Pentium MMX at 300 MHz			
Cache memory	512 K bytes			
RAM memory	32 M bytes DRAM standard, expandable to 160 M bytes			
Video memory	2 M bytes VRAM			
Internal hard disk	4 G bytes			
Operating systems and pre-installed	Compatible with Windows 98, Windows NT or OS/2. Product supplied with Windows 98 or other system (see **software** page x/x). Pre-installed software to be ordered with terminal (**FT 21 •••**), see page x/x			
Screen	12.1" back-lit anti-glare TFT active matrix color LCD (800 x 600 pixels), 262,144 colors			
Readers	CD-ROM and 3"1/2 disks (1.44 Mb and 720 Kb)			
Keyboard	Mechanical, with 87 keys for US (AT 101 keyboard compatible) or 88 keys for Europe (AT 102 keyboard compatible)			
Pointing device	Integrated touch pad (pressure-sensitive)			
Operation indicator lamps	8 LEDs (Power/Battery/Hard disk drive/Multimedia drive/NumLock/Keypad/ScrollLock/CapsLock)			
I/O ports				
Standard	RS 232 C serial link, 9-pin male SUB-D connector			
	Bidirectional parallel port, 25-pin female SUB-D connector			
Mouse	For external keyboard/mouse, 6-pin mini DIN connector			
Video output	For external monitor, 15-pin female SUB-D connector			
USB interface	For connection to external devices, 4-pin connector			
Sound	For microphone or headphones, mini-jack connector (diameter 3.5, stereo output)			
Infrared	For infrared communication, conforms to IrDA V. 1.1. Speed : 4 Mbp/s			
Internal ports	- Possible combination of PC Card (PCMCIA) ports : 2 of type II or 1 of type III - Multimedia slot : disk drive, CD-ROM reader - Connector for port replicator - Optional RAM memory extension slot			
Power supply				
AC adapter	With ∿ 100...240 V, 50/60 Hz adapter, auto sensing/switching DC 15.6 V, 3.85 A			
Internal	From rechargeable Lithium Ion 10.8 V battery for 3 hours (typical)			
Operating security	Access by 3-level password (supervisor, user, coffee break)			
Dimensions H x W x D	58 mm (2.3 in) x 301 mm (11.8 in) x 241 mm (9.5 in)			
Weight	3.5 kg (7.7 lb)			
Environment	Equipment designed for industrial environments (shock, vibration, temperature, water splashes, dust, electromagnetic interference)			
Climatic environment				
Normal temperature conditions	Operating temperature		**°C**	0...35
	Storage temperature		**°C**	- 25...+ 70
Normal relative humidity and altitude conditions	Relative humidity (without condensation)			30...90 % in storage, 30...80 % in operating
	Altitude		**m**	2000
Dust, dirt, dampness protection	Sealed keyboard and screen			IP X1, IP 5X, and IP 51
Supply voltage	Nominal voltage with AC adaptor		**V**	∿ 100...220
	Operating range with AC adaptor		**V**	∿ 100...240
	Limit frequencies with AC adaptor		**Hz**	47...63
	Power		**W**	42
	Micro-break	Length	**ms**	20
		Repetition	**Hz**	1
	Total harmonic distortion			10 %

Quantum Automation Platform

Programming and maintenance terminals

References

To order a product consisting of a terminal and a software package, choose from the references below :
- A programming and maintenance terminal
- A software package (not sold separately) in the same language as that of the chosen terminal
- One or more separate parts, if required

Example : **FT 2120E** + **FT 2120E10P00** (for programming Nano/Micro/Premium PLCs) + **FT 21 RA 7164** (64 Mb RAM memory extension). Order all items together. The supplied product will be pre-installed with the requested software and ready for use.

The programming and maintenance terminals are equipped with :
- Pentium MMX 300 MHz processor
- 512 Kb cache memory
- Back-lit 12.1" color LCD screen with active TFT matrix
- Qwerty, Qwertz, or Azerty mechanical keyboard (depending on model) and a touch-sensitive pointing device
- CD-ROM reader
- 3.5" disk drive (1.44 Mb/720 Kb) with cable for external connection
- A combination of PC Card (PCMCIA) ports: 2 of type II and 1 of type III
- ∿100/220 V 50/60 Hz power adaptor with power cord.

FT 21●0●

Programming and maintenance terminals

Hard disk	RAM memory	Operating system	Keyboard	Language	Reference	Weight kg
4 Gb	64 Mb	Windows NT	Azerty	French	**FT 2110F20000**	3.700
		Windows NT&OS/2	Azerty	French	**FT 2110F40000**	3.700
		Windows 98	Qwerty UK	English	**FT 2120E●●●●●**	3.700
		Windows 98	Qwertz	German	**FT 2130G●●●●●**	3.700
		Windows 98	Qwerty SP	English	**FT 2150E●●●●●**	3.700
		Windows 98	Qwerty NC	English	**FT 2160E●●●●●**	3.700
		Windows 98	Qwerty	US English	**FT 2170E●●●●●**	3.700

Programming software packages

These software packages are supplied installed on the FT 21●0 ●● terminal hard disk. They are provided with a CD-ROM, documentation and cable(s) for connection to PLCs.

TSX FPP K 200M

Description	Software composition	PLC connection	Operating system	Reference	Weight kg
Software packages for Nano/Micro/ Premium PLCs in French	PL7-07, PL7 Pro MMI 17, XBT-L1003	Terminal socket	Windows NT	**FT 2110F20P00**	–
	PL7-07, PL7 Pro MMI 17, XBT-L1003 XTEL (1)	Terminal socket	Windows NT		–
			OS/2	**FT 2110F40G00**	–
Software packages for Nano/Micro/ Premium PLCs in English	PL7-07, PL7 Pro MMI 17, XBTL1003	Terminal socket	Windows 98	**FT 2120E10P00**	–
	PL7-07, PL7 Pro MMI 17, XBTL1003 XTEL (1)	Terminal socket	Windows 98		–
			OS/2	**FT 2120E30G00**	–
Software packages for Nano/Micro/ Premium PLCs in German	PL7-07, PL7 Pro MMI 17, XBT-L1003	Terminal socket	Windows 98	**FT 2130G10P00**	–
	PL7-07, PL7 Pro MMI 17, XBT-L1003 XTEL (1)	Terminal socket	Windows 98		–
			OS/2	**FT 2130G30G00**	–

Elements for connecting FT 2100 to buses and the network

TSX FP CG 010/030

Description	Use	Composition	Reference	Weight kg
PC module for Fipio/Fipway	Fipio/Fipway connection via TSX FP ACC 3/4 tap	1 type III PCMCIA card 1 set of 3" 1/2 disks (DOS, OS/2, Windows 95 and Windows NT 4 drivers)	**TSX FPP K 200M**	0.130
Connection cables for Fipio/Fipway	For connecting TSX FPP K 200M module to TSX FP ACC 3/4 tap	Cable length 1 m	**TSX FP CG 010**	0.210
		Cable length 3 m	**TSX FP CG 030**	0.410

(1) Installed with Dual Boot Manager.

Programming and maintenance terminals

References (continued), dimensions

Fipio bus/Fipway network connection accessories (for TSX FP CG 010/030 cable)

Description	Use	Reference	Weight kg
Insulated junction block for bus connection (polycarbonate, IP 20)	Tap off trunk cable, supports two 9-way female SUB-D connectors; used to connect 24 VDC power supply for TBX dust/damp-proof modules	**TSX FP ACC 3**	0.090
Dust/damp-proof tap for bus connection (Zamac, IP 65)	Tap off trunk cable, supports 1 9-way female SUB-D connector	**TSX FP ACC 4**	0.660

Uni-Telway bus connection accessory

Description	Use	Reference	Weight kg
Cable connector for terminal port (TER) on Premium, 1m link cable	Isolation of Uni-Telway signals for bus > 10 m in length, line termination, tap off bus cable	**TSX P ACC 01**	0.690

Separate parts

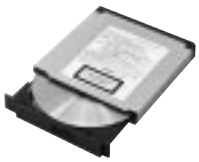
Description	Use	Reference	Weight kg
RAM memory extensions	64 Mb	**FT 21 RA 7164**	–
	128 Mb	**FT 21 RA 71128**	–
Desktop port replicator	Consolidates desktop cable connections	**FT 21 VEB 272W**	–

FT 20 VEB 272W

Spare parts

Description	Use	Reference	Weight kg
CD-ROM reader	For programming/maintenance terminals	**FT 21 VCD 271W**	–
Disk drive	3.5" disks (1.44 Mb/720 Kb)	**FT 21 FDD**	–
Micro/Premium PLC connection cable	RS 232 D port, 9-way SUB-D (length 3 m)	**TSX PCU 1030**	0.140
Series 7 PLC connection cable	RS 232/CL adaptor	**FT 20 CB CL030 or FT 21 CB CL030**	–
Connection cable	Between disk drive and terminal	**FT 21 VCF 271W**	–
Adaptor	AC to DC power converter	**FT 21 ADC**	–
Spare battery	Lithium Ion	**FT 21 BAT**	–
Battery charger	Restores power to **FT 21 BAT** for 3 hours	**FT 21 CHG**	–
Documentation	Included with the terminals	**FT 21 DOC ●** (1)	–

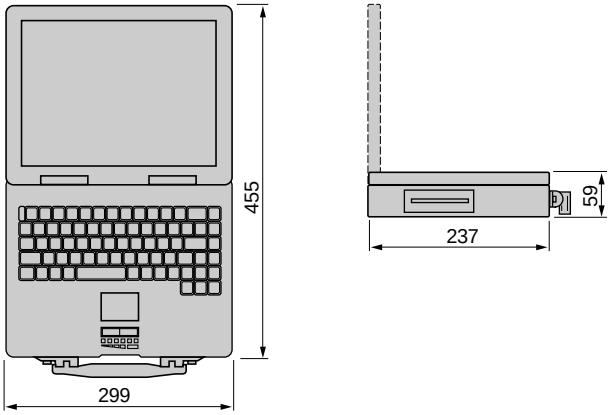
(1) At end of reference add **E** for English, **F** for French, **G** for German.



FT 20 VCD 271W

Dimensions

FT 21●0 ●●



7 Operator dialogue terminals

Contents

Selection guide

Terminals	Display units with alphanumeric screen	Terminals with alphanumeric screen		Display units with matrix screen
				
Display Type	Fluorescent green matrix (5 x 7 pixels), height 5 mm or Back-lit LCD (5 x 7 pixels), height 9 mm		Fluorescent green matrix (5 x 7 pixels), height 5 mm or Back-lit LCD (5 x 7 pixels), height 5 mm	Back-lit monochrome matrix LCD (240 x 64 pixels) height 5.3 or 10.6 mm
Capacity	2 lines of 20 characters		2 or 4 lines of 40 characters	4 to 8 lines of 20 to 40 characters
Data entry	Display only **or** keypad with 4 function keys + 1 service key **or** 5 service keys	Keypad with 8 function keys + 9 service keys **or** keypad with 12 function keys + 10 service keys + 12 numeric keys	Keypad with 24 function keys + 10 service keys + 12 alphanumeric keys	Display only **or** Keypad with 4 function keys + 1 service key **or** 5 service keys
Memory capacity Application	128 Kb/256 Kb Flash EPROM	256 Kb Flash EPROM	384 Kb Flash EPROM	384 Kb Flash EPROM
Extension using PCMCIA type II	–	–	–	–
Functions Maximum number of pages	100/200 application pages 128/256 alarm pages 256 printout form pages (1)	400 application pages 256 alarm pages 256 printout form pages (1)	800 application pages 256 alarm pages 256 printout form pages (1)	600 application pages 256 alarm pages 256 printout form pages (1)
Variables per page	40	50	50	50
Representation of variables	Alphanumeric	Alphanumeric	Alphanumeric	Alphanumeric bargraph, gauge
Recipes	–	–	–	–
Curves	–	–	–	–
Alarm logs	Depending on model	Depending on model	Depending on model	Depending on model
Realtime clock	Access to the PLC realtime clock		Built-in	Access to the PLC realtime clock
Alarm relay	No		Yes	No
Communication Asynchronous serial link	RS 232 C/RS 485/RS 422			
Downloadable protocols	Uni-Telway, Modbus, AEG and protocols for Allen Bradley, GE Fanuc, Omron and Siemens brand PLCs			
Buses and networks	AS-i with module at 22.5 intervals		–	AS-i with module at 22.5 intervals
Printer link	RS 232 C asynchronous serial link (depending on model)			
Development software	XBT-L1000/L1003/L1004			XBT-L1003/L1004 (under Windows 95 and
Operating systems	Magelis			Magelis
Type of terminal	XBT-H	XBT-P	XBT-E	XBT-HM
Pages	6/9	6/11	6/13	6/15

(1) Depending on model

Terminals with graphic screen				Graphic stations for operator dialogue applications with combined processing
 		 		
Back-lit monochrome LCD (320 x 240 pixels) or Colour LCD STN with touch-sensitive screen (320 x 240 pixels)		Back-lit monochrome LCD (640 x 480 pixels) or Back-lit colour TFT LCD (640 x 480 pixels)		Back-lit colour TFT LCD (640 x 480 pixels)
5.7"		9.5" (monochrome) 10.4" (colour)		10.4" (colour)
Via touch-sensitive screen	Via keypad	Via touch-sensitive screen	Via keypad	Via keypad
–	10 static function keys 8 dynamic function keys 12 service keys 12 alphanumeric keys	–	12 static function keys 10 dynamic function keys 12 service keys 12 alphanumeric keys	12 static function keys 10 dynamic function keys 14 service keys 12 alphanumeric keys Pointing device External keypad connection
4 Mb Flash EPROM (using PCMCIA type II card)				1.6 Gb (hard disk)
8 Mb or 10 Mb				4 Mb, 8 Mb or 10 Mb
50 to 450 application, alarm, help and printout form pages depending on the memory card used (maximum 512 alarms)		30 to 300 application, alarm, help and printout form pages depending on the memory card used (maximum 512 alarms)		Limited by hard disk capacity (maximum 1024 alarm pages)
64		64		128
Alphanumeric, bitmap, bar chart, gauge, potentiometer, selector		Alphanumeric, bitmap, bar chart, gauge, potentiometer, selector		Alphanumeric, bitmap, bar chart, gauge, potentiometer, selector
Maximum 125 records with maximum 5000 values				–
16		16		32
Yes				Yes
Access to the PLC realtime clock				Built-in
Yes				Yes
RS 232 C/RS 485/RS 422				RS 232 C/RS 485/RS 422
Uni-Telway, Modbus, AEG and protocols for Allen Bradley, GE Fanuc, Omron and Siemens brand PLCs				Uni-Telway (2), Modbus
Modbus Plus, Fipio/Fipway with optional PCMCIA type III card				Modbus Plus, Fipio/Fipway with optional PCMCIA type III card
RS 232 C asynchronous serial link				Parallel link
Windows NT 4.●)				Windows 95
XBT-F01/F03		XBT-F02/F03		TXBT-F02
6/21		6/21		6/23

(2) Uni-Telway version V2 for Nano/Micro/Premium PLCs.

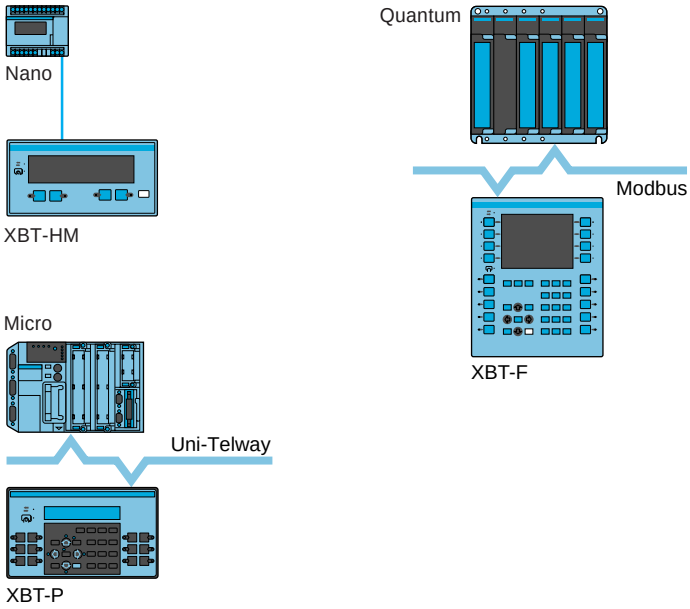
Architectures, connections to control systems

Architectures, connections to control systems

Magelis operator dialogue terminals communicate with control system equipment :

- Via serial link
- Via fieldbus
- In network architectures
- By integration of the PLC coprocessor

Point-to-point or multidrop connection with the PLC via serial link

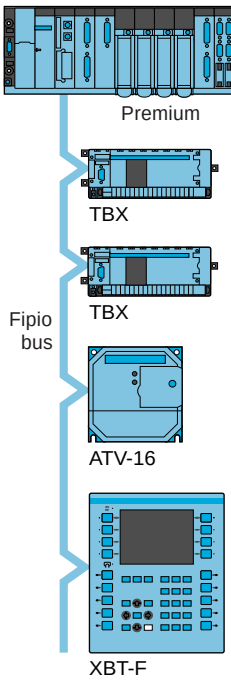


All terminals integrate an RS 232 C, RS 422/485 asynchronous serial link as standard.
The use of Uni-TE, Modbus, or KS protocol means that communication can be set up easily with Schneider PLCs : TSX, Modicon, April or A-Line.

Third-party protocols provide connection to PLCs offered by the main market suppliers :

- DF1, DH485 for Allen Bradley PLC5/SLC500 PLCs
- SNPX for General Electric Series 90 PLCs
- Sysway for Omron C200 PLCs
- AS511/3964R, MPI/PPi for Siemens Simatic S5/S7 PLCs

Connection to PLCs via fieldbus



The addition of a type III PCMCIA communication card to XBT-F and TXBT-F terminals with graphic screen enables connection to various industrial buses :

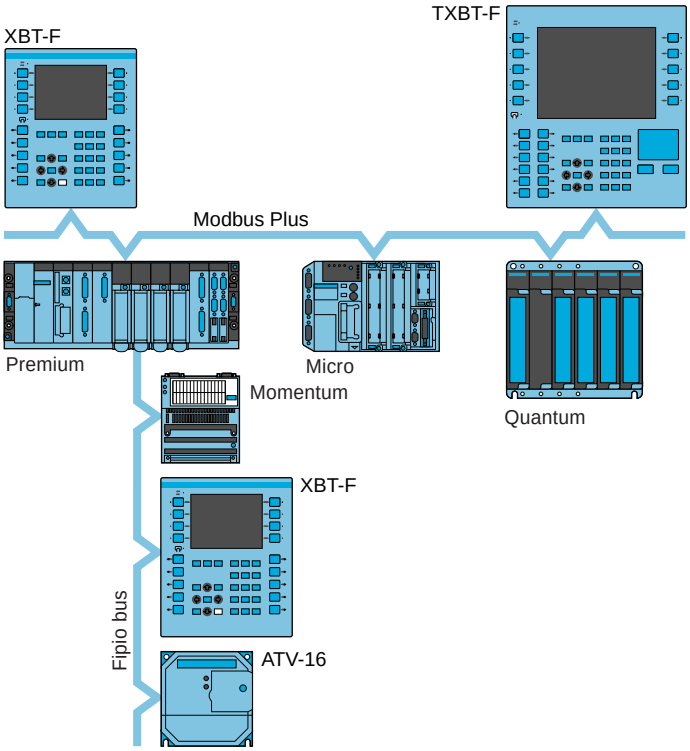
- Fipio bus
- Modbus Plus bus

XBT-F/TXBT-F terminals with graphic screen use the bus master PLC to provide operator dialogue and interactive control of various devices connected on the bus.

Several terminals with graphic screen can be connected on the same bus.

Architectures, connections to control systems

Connection to network architectures



The addition of a type III PCMCIA communication card (or a PC ISA bus card for a TXBT-F graphic - station) to XBT-F and TXBT-F terminals with graphic screen means that they can be integrated in single or multi network architectures :

- Fipway network
- Modbus Plus network
- Ethernet TCP/IP network

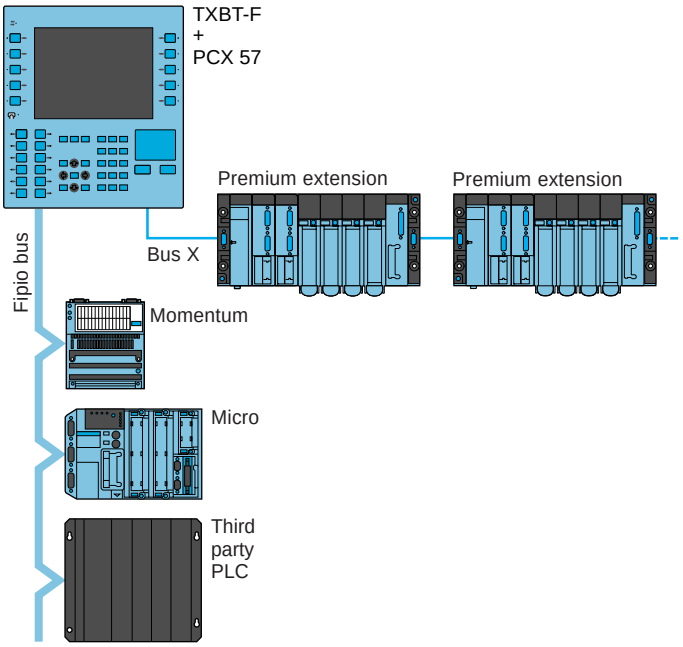
This last network type requires the use of TXBT-F graphic stations (network module on ISA bus or type III PCMCIA card).
Depending on application requirements, the following can be connected on the same network :

- One XBT-F or TXBT-F terminal with graphic screen, which has a multistation PLC view
- Several XBT-F and TXBT-F terminals, which are totally independent
  Each terminal is assigned to controlling specific network stations.

Open access to Web architectures

TXBT-F graphic stations can be configured on the Intranet network, using the Monitor Client Web Supervision software option, as Client stations of a Monitor PRO supervisor.

Integration of the Premium PLC coprocessor in TXBT-F graphic stations



TXBT-F graphic stations have two slots for the ISA bus and can receive the PCX 57 PLC coprocessor.

This compact, cost-effective solution provides the following as standard :

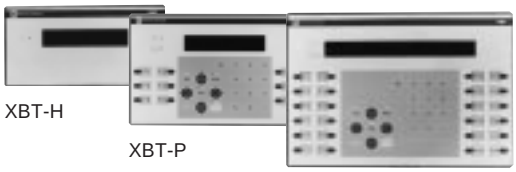
- PLC Bus (X Bus) for the connection of Premium PLC distributed I/O racks
- Integrated Fipio bus link
- Slot for type III PCMCIA communication card (serial link, Modbus bus, Fipway or Modbus Plus network, etc).

Specifications :
pages 6/8, 6/10, 6/12 and 6/14
References :
pages 6/9, 6/11, 6/13 and 6/15
Dimensions :
page 6/30

Magelis XBT-H/P/E/HM display units and terminals

General

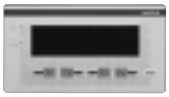
Presentation



XBT-H

XBT-P

XBT-E



XBT-HM

XBT-H/P/E display units and terminals with alphanumeric screen are used to represent messages and variables. Various keys can be used to modify variables, control the device or browse in a dialogue application.
For models which have a printer output, the display units and terminals can also be used to print alarm messages and printout form pages.

XBT-HM terminals with matrix screen can also be used to display bitmap images and animated bar chart and gauge objects.

Operation

All the Magelis display units and terminals with alphanumeric and matrix screens have the same user interface : function keys, service keys, numeric or alphanumeric keys.

Configuration

Magelis display units and terminals can be configured using the same XBT-L100● software in a Windows environment.

For terminals with an alphanumeric screen, XBT-L100● software uses the concept of pages : each page can be viewed in its entirety. A 2 or 4-line window, depending on the model, visualises what will appear on the product screen.

For XBT-HM terminals with a matrix screen, XBT-L100● software offers up to 8 lines of 40 characters, and animated bar chart and gauge objects.

Communication

XBT-HM

PLC

XBT-H/P/E/HM terminals communicate with PLCs via an integrated point-to-point or multidrop serial link.

The communication protocols used are those of Schneider PLCs as well as those of the other main market suppliers.

XBT-H/P/HM terminals also communicate on the AS-i bus using a module at 22.5 intervals.

Specifications :
pages 6/8, 6/10, 6/12 and 6/14
References :
pages 6/9, 6/11, 6/13 and 6/15
Dimensions :
page 6/30

Magelis XBT-H/P/E/HM display units and terminals

Functions, description

Functions

XBT-H/P/E/HM display units and terminals have (depending on the model) function keys and service keys on the front panel.

Function keys

Function keys are defined for the whole application. They can be used for :
- accessing a page, setting PLC memory bits (toggle ON/OFF or latch).

Service keys

Service keys are the “arrow” keys and the control keys combined, and are used for modifying the parameters of the control system.

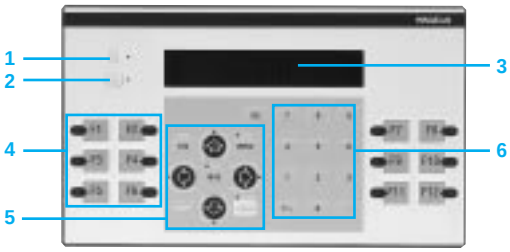
The control keys are used to perform the following actions :

ENTER	Confirm a selection or entry, acknowledge an alarm
MOD	Change to the mode for entering pages, passwords, fields or graphic objects
ESC	Cancel an entry, suspend or stop a current action
SHIFT	Access the second of the dual key functions
MENU	Access a menu containing the operating functions
HOME	Return to the entry point of the current menu. Example : return to the first page of the application
SYST	Access the confidential mode which contains the setup functions
ALARM	View the alarms.
PRINT	Print

The “arrow” keys are used to :
- Change page within a menu
- Move within a page
- Increment a digit variable
- Select a value from a list of choices
- Increment or decrement the value of a variable field, when used with the **SHIFT** key

Description

XBT-H/P/E/HM display units and terminals comprise :



On the front panel :

1 A communication monitoring indicator lamp
2 A keypad activity indicator lamp (depending on the model)
3 Fluorescent or LCD back-lit display
4 Function keys with indicator lamp and re-usable labels
5 Service keys with indicator lamp
6 Twelve numeric keys (for XBT-P02●●●●)
Twelve alphanumeric keys (0…9, +/-, .) associated with 3 alphabetical access keys (A…Z) for XBT-E

On the rear :

1 A plug-in terminal block for ⎓ 24 V power supply and a connection for the alarm relay (depending on the model)
2 A 25-way female SUB-D connector for connection to PLCs, FTX configuration terminals or PC compatibles
3 A 9-way male SUB-D connector for the printer connection (depending on the model)

Magelis display units with 2-line alphanumeric screen

Specifications

References :
page 6/9
Dimensions, mounting :
page 6/30

Type of display unit		**XBT-H0●2●10 (fluorescent)**			**XBT-H811050 (LCD)**	**XBT-H0●1010 (back-lit LCD)**		
Environment								
Conforming to standards		IEC 1131-2, IEC 68-2-6, IEC 68-2-27, EN 61131-2, UL 508, CSA C22-2 no. 14						
Product certifications		CE, UL, CSA						
Temperature	Operation	0…+ 50 °C						
	Storage	- 40…+ 70 °C			- 20…+ 60 °C			
Degree of protection		IP 65, conforming to IEC 529, Nema 4						
Mechanical specifications								
Mounting and fixing		Flush-mounted, fixed with 4 or 6 screws (supplied) pressure-mounted (on a 1 to 6 mm thick panel)						
Material	Enclosure	Polyphenyl oxide, 10 % glass fibre (PPO GFN1 SE1)						
	Keypad	Anti-UV treated toughened polyester (Autoflex EB AG)						
Keys	**XBT-H**	**002010**	**022010**	**012●10**	**811050**	**001010**	**021010**	**011010**
		No key	4 function keys + 1 service key	5 service keys	5 service keys	No key	4 function keys + 1 service key	5 service keys
Electrical specifications								
Display unit		Fluorescent green matrix characters (5 x 7 pixels) - 2 lines of 20 characters, height 5 mm			LCD (5 x 7 pixels) - 2 lines of 20 characters, height 9 mm	Back-lit LCD (5 x 7 pixels) - 2 lines of 20 characters, height 9 mm		
Power supply	Voltage	⎓ 24 V not isolated			⎓ 24 V not isolated (during configuration) ⎓ 5 V via Nano/Micro/Premium PLC terminal port (during operation)	⎓ 24 V not isolated		
	Voltage limits	18…30 V						
	Ripple	5 % maximum						
Consumption		10 W			1.5 W	10 W		
Operating specifications								
	XBT-H	**002010**	**022010**	**012●10**	**811050**	**001010**	**021010**	**011010**
Signalling		1 LED	6 LEDs	4 LEDs	–	1 LED	6 LEDs	4 LEDs
Memory		- 128 Kb Flash EPROM, (256 Kb for **XBT-H012●10**) - 200 application pages approximately (maximum 2 lines per page) - 256 available alarm pages (maximum 2 lines per page) - 256 printout form pages for **XBT-H012110**			- 128 Kb Flash EPROM - 100 application pages approximately (maximum 2 lines per page) - 128 available alarm pages (maximum 2 lines per page)	- 128 Kb Flash EPROM, (256 Kb for **XBT-H011010**) - 200 application pages approximately (maximum 2 lines per page) - 256 available alarm pages (maximum 2 lines per page)		
Log function		Possibility of storing alarm pages (**XBT-H012110**)			–	–		
Transmission (asynchronous serial link)		RS 232 C/RS 485/RS 422			RS 232 C/RS 485	RS 232 C/RS 485/RS 422		
Downloadable protocol		Multiple (see pages 6/6 and 6/27)			Uni-Telway (see pages 6/6 and 6/27)	Multiple (see pages 6/6 and 6/27)		
Realtime clock		Access to the PLC realtime clock						
Printer link (asynchronous serial link)		RS 232 C (**XBT-H012110**)			–	–		
Connection	Power supply	Plug-in terminal block 3 screw terminals (at intervals of 5.08 mm) Max. clamping capacity : 1.5 mm^2						
	Serial port	25-way female SUB-D connector						
	Printer port	9-way male SUB-D connector			–	–		

Magelis display units with 2-line alphanumeric screen

References

Specifications :
page 6/8
Dimensions, mounting :
page 6/30

Display units with 2 lines of 20 characters (fluorescent)

XBT-H02●010

XBT-H01●●10

Downloadable exchange protocol	Number of keys Funct.	Service	Num.	Supply voltage V ⎓	Language version	Reference	Weight kg
No printer port, no log							
See page 6/27	–	–	–	24	Multilingual	**XBT-H002010**	0.600
	4	1	–	24	Multilingual	**XBT-H022010**	0.600
	–	5	–	24	Multilingual	**XBT-H012010**	0.600
With printer port, with log							
See page 6/27	–	5	–	24	Multilingual	**XBT-H012110**	0.600

Display unit with 2 lines of 20 characters (LCD)

XBT-H00●010

No printer port, no log							
Uni-Telway See page 6/27	–	5	–	24 and 5 via terminal socket on the Nano/ Micro/ Premium PLC	Multilingual	**XBT-H811050**	0.600

Display units with 2 lines of 20 characters (back-lit LCD)

No printer port, no log							
See page 6/27	–	–	–	24	Multilingual	**XBT-H001010**	0.600
	4	1	–	24	Multilingual	**XBT-H021010**	0.600
	–	5	–	24	Multilingual	**XBT-H011010**	0.600

Separate parts

Description	Use	Reference	Weight kg
Development software	Under Windows 3.1 or 95, for downloading the application and protocols	See page 6/27	–
Connecting cables	Connection to PLCs, configuration terminals, etc	See page 6/27	–

Documentation

Description	Format	Included in the product	Reference (1)	Weight kg
Magelis user's manual	A5 bound	XBT-L1003● and XBT-L1004●	**XBT-X000●●**	0.200

(1) Add the following suffixes **EN** : English, **FR** : French, **DE** : German, **ES** : Spanish, **1T** : Italian.

Magelis terminals with 2-line alphanumeric screen

Specifications

References :
page 6/11
Dimensions, mounting :
page 6/30

Type of terminal		**XBT-P0●2●10 (fluorescent)**		**XBT-P0●1●10 (back-lit LCD)**	

Environment

Conforming to standards		IEC 1131-2, IEC 68-2-6, IEC 68-2-27, EN 61131-2, UL 508, CSA C22-2 no. 14	
Product certifications		CE, UL, CSA	
Temperature	Operation	0…+ 50 °C	
	Storage	- 40…+ 70 °C	- 20…+ 60 °C
Degree of protection		IP 65, conforming to IEC 529, Nema 4	

Mechanical specifications

Mounting and fixing		Flush-mounted, fixed with 4 or 6 screws (supplied) pressure-mounted (on a 1 to 6 mm thick panel)			
Material	Enclosure	Polyphenyl oxyde, 10% glass fibre (PPO GFN1 SE1)			
	Keypad	Anti-UV treated toughened polyester (Autoflex EB AG)			
		XBT-P012010	**XBT-P022●10**	**XBT-P011010**	**XBT-P021●10**
Keys		8 function keys + 9 service keys	12 function keys + 10 service keys + 12 numeric keys	8 function keys + 9 service keys	12 function keys + 10 service keys + 12 numeric keys

Electrical specifications

Display unit		Fluorescent green matrix characters (5 x 7 pixels), 2 lines of 20 characters, height 5 mm	Back-lit LCD (5 x 7 pixels), 2 lines of 20 characters, height 9 mm
Power supply	Voltage	⎓ 24 V not isolated	
	Voltage limits	18…30 V	
	Ripple	5 % maximum	
Consumption		10 W	

Operating specifications

		XBT-P012010	**XBT-P022●10**	**XBT-P011010**	**XBT-P021●10**
Signalling		17 LEDs	21 LEDs	17 LEDs	21 LEDs
Memory		- 256 Kb Flash EPROM - 400 application pages approximately (maximum 25 lines per page) - 256 available alarm pages (maximum 25 lines per page) - 256 printout form pages (**XBT-P02●110** only)			
Log function		Possibility of storing alarm pages (**XBT-P022110**)		Possibility of storing alarm pages (**XBT-P021110**)	
Transmission (asynchronous serial link)		RS 232 C/RS 485/RS 422			
Downloadable protocol		Multiple (see pages 6/6 and 6/27)			
Realtime clock		Access to the PLC real-time clock			
Printer link (asynchronous serial link)		RS 232 C (**XBT-P022110**)		RS 232 C (**XBT-P021110**)	
Connection	Power supply	Plug-in terminal block 3 screw terminals (at intervals of 5.08 mm) Max. clamping capacity : 1.5 mm^2			
	Serial port	25-way female SUB-D connector			
	Printer port	9-way male SUB-D connector			

Magelis terminals with 2-line alphanumeric screen

References

Specifications :
page 6/10
Dimensions, mounting :
page 6/30

Terminals with 2-line display of 20 characters (fluorescent)

XBT-P01●010

XBT-P02●●10

Downloadable exchange protocol	Number of keys Funct.	Service	Num.	Supply voltage V ⎓	Language version	Reference	Weight kg
No printer port, no log							
See page 6/27	8	9	–	24	Multilingual	**XBT-P012010**	0.800
	12	10	12	24	Multilingual	**XBT-P022010**	0.800
With printer port and log							
See page 6/27	12	10	12	24	Multilingual	**XBT-P022110**	0.800

Terminals with 2-line display of 20 characters (back-lit LCD)

No printer port, no log							
See page 6/27	8	9	–	24	Multilingual	**XBT-P011010**	0.800
	12	10	12	24	Multilingual	**XBT-P021010**	0.800
With printer port and log							
See page 6/27	12	10	12	24	Multilingual	**XBT-P021110**	0.800

Separate parts

Description	Use	Reference	Weight kg
Development software	Under Windows 3.1 or 95, for downloading the application and protocols	See page 6/27	–
Connecting cables	Connection to PLCs, configuration terminals, etc	See page 6/27	–

Documentation

Description	Format	Included in the product	Reference (1)	Weight kg
Magelis user's manual	A5 bound	XBT-L1003● and XBT-L1004●	**XBT-X000●●**	0.200

(1) Add the following suffixes **EN** : English, **FR** : French, **DE** : German, **ES** : Spanish, **1T** : Italian.

Magelis terminals with 2 or 4 line alphanumeric screen

Specifications

References :
page 6/13
Dimensions, mounting :
page 6/30

Type of terminal		**XBT-E014●10/XBT-E016●10 (fluorescent)**	**XBT-E013●10/XBT-E015●10 (back-lit LCD)**

Environment

Conforming to standards		IEC 1131-2, IEC 68-2-6, IEC 68-2-27, EN 61131-2, UL 508, CSA C22-2 no. 14	
Product certifications		CE, UL, CSA	
Temperature	Operation	0…+ 50 °C	
	Storage	- 40…+ 70 °C	- 20…+ 60 °C
Degree of protection		IP 65, conforming to IEC 529, Nema 4	

Mechanical specifications

Mounting and fixing		Flush-mounted, fixed with 4 or 6 screws (supplied) pressure-mounted (on a 1 to 6 mm thick panel)	
Material	Enclosure	Polyphenyl oxyde, 10% glass fibre (PPO GFN1 SE1)	
	Keypad	Anti-UV treated toughened polyester (Autoflex EB AG)	
Keys	Function	24	
	Service	10	
	Alphanumeric	12	

Electrical specifications

Display unit		Fluorescent green matrix characters (5 x 7 pixels)		Back-lit LCD (5 x 7 pixels)	
		XBT-E014●10	**XBT-E016●10**	**XBT-E013●10**	**XBT-E015●10**
		2 lines of 40 characters, height 5 mm	4 lines of 40 characters, height 5 mm	2 lines of 40 characters, height 5 mm	4 lines of 40 characters, height 5 mm
Power supply	Voltage	⎓ 24 V not isolated			
	Voltage limits	18…30 V			
	Ripple	5 % maximum			
Consumption		20 W		10 W	

Operating specifications

Signalling		33 LEDs + 1 buzzer	
Memory		- 384 Kb Flash EPROM - 800 application pages approximately (maximum 25 lines per page) - 256 available alarm pages (maximum 25 lines per page) - 256 printout form pages (**XBT-E01●110** only)	
Log function		Possibility of storing alarm pages	
Transmission (asynchronous serial link)		RS 232 C/RS 485/RS 422	
Downloadable protocol		Multiple (see pages 6/6 and 6/27)	
Real-time clock		Built-in	
Printer port (asynchronous serial link)		RS 232 C (**XBT-E014110/XBT-E016110**)	RS 232 C (**XBT-E013110/XBT-E015110**)
Alarm relay		1 N/O contact (min 1 mA/⎓ 5 V, max 0.5 A/⎓ 24 V)	
Connection	Power supply and alarm relay	Plug-in terminal block 5 screw terminals (at intervals of 5.08 mm) Max. clamping capacity : 1.5 mm^2	
	Serial port	25-way female SUB-D connector	
	Printer port	9-way male SUB-D connector	

Magelis terminals with 2 or 4 line alphanumeric screen

Specifications

References :
page 6/13
Dimensions, mounting :
page 6/30

Type of terminal		**XBT-E014●10/XBT-E016●10 (fluorescent)**	**XBT-E013●10/XBT-E015●10 (back-lit LCD)**

Environment

Conforming to standards		IEC 1131-2, IEC 68-2-6, IEC 68-2-27, EN 61131-2, UL 508, CSA C22-2 no. 14	
Product certifications		CE, UL, CSA	
Temperature	Operation	0…+ 50 °C	
	Storage	- 40…+ 70 °C	- 20…+ 60 °C
Degree of protection		IP 65, conforming to IEC 529, Nema 4	

Mechanical specifications

Mounting and fixing		Flush-mounted, fixed with 4 or 6 screws (supplied) pressure-mounted (on a 1 to 6 mm thick panel)	
Material	Enclosure	Polyphenyl oxyde, 10% glass fibre (PPO GFN1 SE1)	
	Keypad	Anti-UV treated toughened polyester (Autoflex EB AG)	
Keys	Function	24	
	Service	10	
	Alphanumeric	12	

Electrical specifications

Display unit		Fluorescent green matrix characters (5 x 7 pixels)		Back-lit LCD (5 x 7 pixels)	
		XBT-E014●10	**XBT-E016●10**	**XBT-E013●10**	**XBT-E015●10**
		2 lines of 40 characters, height 5 mm	4 lines of 40 characters, height 5 mm	2 lines of 40 characters, height 5 mm	4 lines of 40 characters, height 5 mm
Power supply	Voltage	⎓ 24 V not isolated			
	Voltage limits	18…30 V			
	Ripple	5 % maximum			
Consumption		20 W		10 W	

Operating specifications

Signalling		33 LEDs + 1 buzzer	
Memory		- 384 Kb Flash EPROM - 800 application pages approximately (maximum 25 lines per page) - 256 available alarm pages (maximum 25 lines per page) - 256 printout form pages (**XBT-E01●110** only)	
Log function		Possibility of storing alarm pages	
Transmission (asynchronous serial link)		RS 232 C/RS 485/RS 422	
Downloadable protocol		Multiple (see pages 6/6 and 6/27)	
Real-time clock		Built-in	
Printer port (asynchronous serial link)		RS 232 C (**XBT-E014110/XBT-E016110**)	RS 232 C (**XBT-E013110/XBT-E015110**)
Alarm relay		1 N/O contact (min 1 mA/⎓ 5 V, max 0.5 A/⎓ 24 V)	
Connection	Power supply and alarm relay	Plug-in terminal block 5 screw terminals (at intervals of 5.08 mm) Max. clamping capacity : 1.5 mm^2	
	Serial port	25-way female SUB-D connector	
	Printer port	9-way male SUB-D connector	

Magelis display units with 8-line matrix screen

Specifications

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Dimensions, mounting :
page 6/30

Type of display unit		**XBT-HM0●7●10 (back-lit LCD)**

Environment

Conforming to standards		IEC 1131-2, IEC 68-2-6, IEC 68-2-27, EN 61131-2, UL 508, CSA C22-2 no. 14
Product certifications		CE, UL, CSA
Temperature	Operation	0…+ 45 °C
	Storage	- 20…+ 60 °C
Degree of protection		IP 65, conforming to IEC 529, Nema 4

Mechanical specifications

Mounting and fixing		Flush-mounted, fixed with spring clips (supplied) pressure-mounted (on a 1.6 to 6 mm thick panel)
Material	Enclosure	Polyphenyl oxide, 10 % glass fibre (PPO GFN1 SE1)
	Keypad	Anti-UV treated toughened polyester (Autoflex EB AG)

	XBT-HM007010	**XBT-HM027010**	**XBT-HM017●10**
Keys	No keys	4 function keys + 1 service key	5 service keys

Electrical specifications

Display unit		Back-lit LCD (240 x 64 pixels) - 8 lines of 40 characters (height 5.3 mm) single size, - 4 lines of 20 characters (height 10.6 mm) double height, double width
Power supply	Voltage	⎓ 24 V not isolated
	Voltage limits	18…30 V
	Ripple	5 % maximum
Consumption		15 W

Operating specifications

	XBT-HM007010	**XBT-HM027010**	**XBT-HM017●10**
Signalling	1 LED	6 LEDs	4 LEDs

Memory		- 384 Kb Flash EPROM - 600 application pages approximately (maximum 8 lines per page) - 256 available alarm pages (maximum 8 lines per page) - 256 printout form pages (**XBT-HM017110** only)
Transmission (asynchronous serial link)		RS 232 C/RS 485/RS 422
Downloadable protocol		Multiple (see pages 6/6 and 6/27)
Realtime clock		Access to the PLC realtime clock
Printer link (asynchronous serial link)		RS 232 C (**XBT-HM017110**)
Connection	Power supply	Plug-in terminal block 3 screw terminals (at intervals of 5.08 mm) Max clamping capacity : 1.5 mm^2
	Serial port	25-way female SUB-D connector
	Printer port	9-way male SUB-D connector

Magelis display units with 8-line matrix screen

References

Specifications :
page 6/14
Dimensions, mounting :
page 6/30

Display units with 8-line matrix screen of 40 characters (back-lit LCD)

XBT-HM007010

XBT-HM027010

XBT-HM017●10

Downloadable exchange protocol	Number of keys Funct.	Service	Num.	Supply voltage V ⎓	Language version	Reference	Weight kg
No printer port, no log							
See page 6/27	–	–	–	24	Multilingual	**XBT-HM007010**	0.600
	4	1	–	24	Multilingual	**XBT-HM027010**	0.600
	–	5	–	24	Multilingual	**XBT-HM017010**	0.600
With printer port, with log							
See page 6/27	–	5	–	24	Multilingual	**XBT-HM017110**	0.600

Separate parts

Description	Use	Reference	Weight kg
Development software	Under Windows 95 or NT 4.●, for downloading the application and protocols	See page 6/27	–
Connecting cables	Connection to PLCs, configuration terminals, etc	See page 6/27	–

Documentation

Description	Format	Included in the product	Reference (1)	Weight kg
Magelis user's manual	A5 bound	XBT-L1003● and XBT-L1004●	**XBT-X000●●**	0.200

(1) Add the following suffixes **EN** :English, **FR** : French, **DE** : German, **ES** : Spanish, **1T** : Italian.

Magelis terminals with graphic screen

Specifications :
pages 6/20 and 6/22
References :
pages 6/21 and 6/23
Dimensions :
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General

Presentation

XBT-F01/F03

XBT-F02/F03

TXBT-F02/F03

Graphic screen operator dialogue terminals are available with 5" or 10" screens, in monochrome or colour, with a keypad or a touch-sensitive screen.

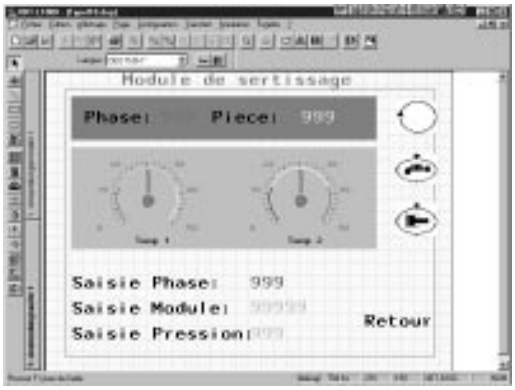
XBT-F graphic screen terminals are specially designed for operator dialogue graphic functions.

TXBT-F graphic stations operate under Windows 95, enabling them to access other control system functions.

Operation

All Magelis graphic screen terminals have the same user interface : static and dynamic function keys, service keys, alphanumeric keys.

Configuration



Magelis graphic screen terminals can be configured using the same XBT-L100● software in a Windows environment.

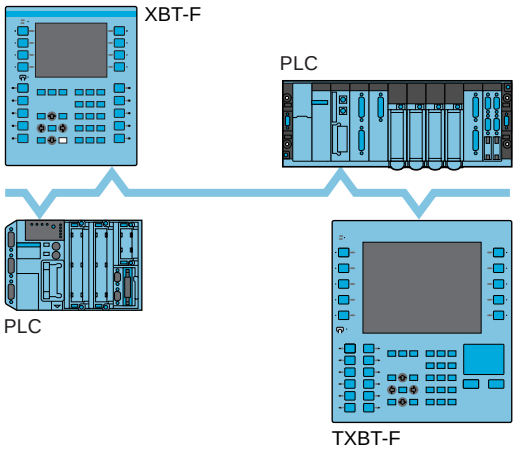
XBT-L100● software provides graphic screen terminals with a library of animated graphic objects such as bar charts, gauges, selectors, potentiometers and trending curves.

A library of bitmap symbols is also available with XBT-L100● software.

The variable for animating an object can be selected directly from a list of symbols given by the PL7 or Concept software.

The application program for the graphic terminals is stored on a PCMCIA memory card.

Communication



XBT-F and TXBT-F graphic screen terminals communicate with PLCs via an integrated point-to-point or multidrop serial link, or via a fieldbus with a type III PCMCIA card.

The communication protocols are those used by Schneider Group PLCs as well as those of the other main market suppliers.

Specifications :
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References :
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Dimensions :
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Functions

Functions

XBT-F and TXBT-F graphic screen operator dialogue terminals have the following functions :
- Display of animated synoptic screens, control, modification of numeric and alphanumeric variables
- Display of a service line (status and alarm bar) with the current time
- Dynamic visualisation of operating data (setpoints, measurements, recipes, maintenance messages) and process errors
- Control via dynamic or static function keys
- Scaling of analogue variables
- Realtime and trending curves
- Alarm log and management of alarm groups
- Management of help pages, form pages, recipe pages
- Pages can be called by the user or by the PLC
- Three levels of password
- Printing of form pages, date-stamped log and alarms
- Communication protocol application support in the type II PCMCIA application memory card

The role of the function keys is defined using the XBT-L100●● software. Modifications cannot be made during operation. Each function key can be associated with an internal bit of the PLC application.

Static function keys

Static function keys are defined for the whole application.
They can be used for :
- Access to a page
- Latching memory bits
- Taggling memory bits (ON/OFF)

Static keys can be marked with re-usable labels.

Dynamic function keys

Dynamic function keys are associated with a page. Their role can differ from one page to another.
They can perform the following functions :
- Access to a page
- Latching memory bits
- Taggling memory bits (ON/OFF)
- Access to the modification of a value

Each dynamic key can be assigned a label or icon displaying its function.
On touch-sensitive terminals, the touch-sensitive zones function in a similar way to the dynamic keys on keypad terminals.

Service keys

Service keys are the “arrow” keys and the control keys combined, and are used for modifying the parameters of the control system.

The control keys are used to perform the following actions :

ENTER	Confirm a selection or entry, acknowledge an alarm
MOD	Change to the mode for entering pages, passwords, fields or graphic objects
ESC	Cancel an entry, suspend or stop a current action. Display previous pages in succession. Quit the alarm display
SHIFT	Access the second of the dual key functions
MENU	Access a menu containing the operating functions which do not have direct access keys
HOME	Return to the entry point of the current menu. Example : return to the first page of the application
SYST	Access confidential mode which contains the implementation functions protected by a password
ALARM	View the alarms
PRINT	Print

The “arrow” keys can be used to :
- Change page within a menu
- Change fields on a page
- Select an object on a page
- Move within a page
- Increment a digit variable
- Select a value from a list of choices
- Increment or decrement the value of a variable field, when used with the **SHIFT** key

Magelis terminals with graphic screen

Specifications :
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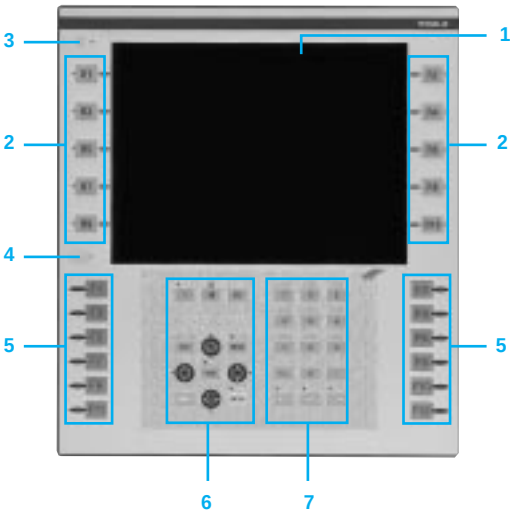
Description

Front panel of XBT-F01/F02 keypad terminals



XBT-F01/F02 keypad terminals comprise on the front panel :

1 A monochrome or colour screen (5.7", 9.5" or 10.4" depending on the model)

2 2 x 4 or 2 x 5 (depending on the model) dynamic function keys with indicator lamps

3 A communication monitoring indicator lamp

4 A keypad activity indicator lamp

5 2 x 5 or 2 x 6 (depending on the model) static function keys with indicator lamps and re-usable labels

6 Twelve service keys with indicator lamps

7 Twelve alphanumeric keys (0…9, +/-, .) associated with 3 alphabetical access keys (A…Z)

Front panel of XBT-F03 touch-sensitive screen terminals

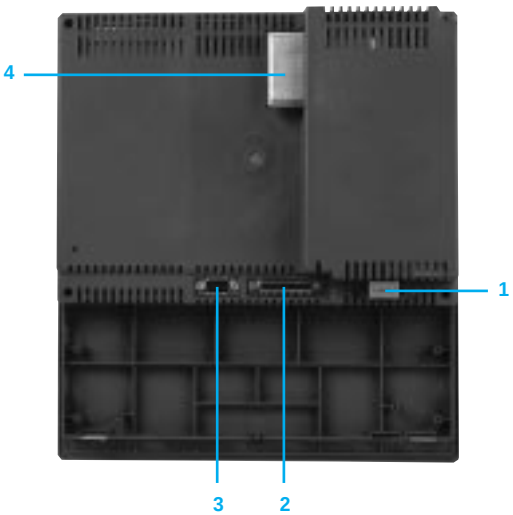
XBT-F03 touch-sensitive screen terminals comprise on the front panel :

1 A touch-sensitive colour screen (5.7" or 10.4" depending on the model)

2 A communication monitoring indicator lamp

3 A tactile feedback activity indicator lamp

Rear panel of XBT-F graphic screen terminals



XBT-F graphic screen terminals comprise on the rear panel :

1 A plug-in screw terminal for ⎓ 24 V power supply, and alarm relay connection

2 A 25-way female SUB-D connector for connection to PLCs

3 A 9-way male SUB-D connector for printer connection and for transferring applications from an FTX terminal or PC compatibles

4 Two slots for PCMCIA card :
- one type II for application memory,
- one type III for connection to the communication architecture (bus or network)

Magelis graphic stations

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References :
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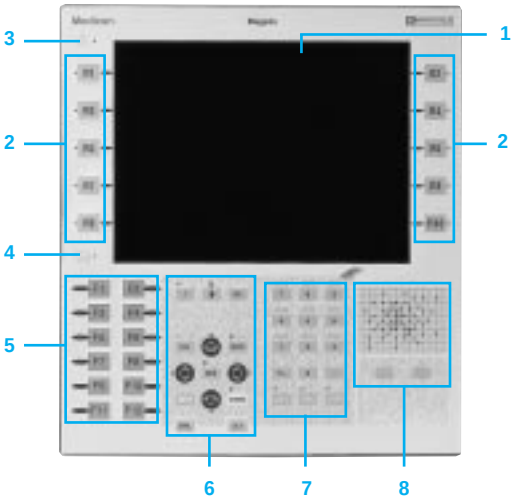
Description

Front panel of TXBT-F02 graphic keypad stations



TXBT-F02 graphic keypad stations comprise on the front panel :

1 A colour screen 10.4"

2 2 x 5 dynamic function keys with indicator lamps

3 A communication monitoring indicator lamp

4 A keypad activity indicator lamp

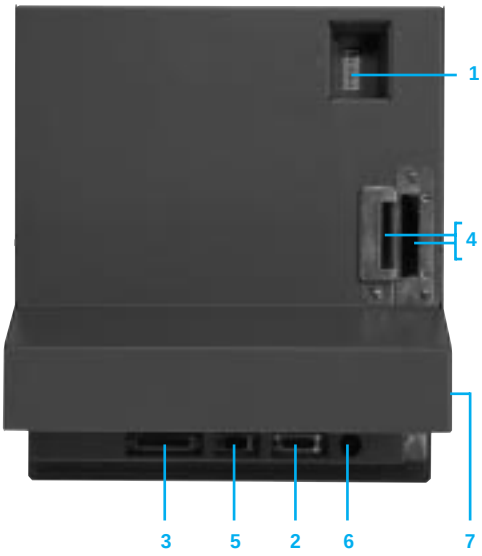
5 Twelve static function keys with indicator lamps and re-usable labels

6 Fourteen service keys with indicator lamps

7 Twelve alphanumeric keys (0…9, +/-, .) associated with 3 alphabetical access keys (A…Z)

8 A touch-sensitive pointing device

Rear panel of TXBT-F graphic stations



TXBT-F graphic stations comprise on the rear panel:

1 A plug-in screw terminal for ⎓ 24 V power supply, and alarm relay connection.

2 A 26-way female SUB-D high-density connector for PLC connection, with a T CCX CB 10 cable (length 0.2 m) supplied, fitted with one 26-way male SUB-D high-density connector and one 25-way female SUB-D connector.

3 A 25-way female SUB-D connector for parallel printer connection or external CD drive.

4 Two slots for PCMCIA card:
- one type II (1)
- one type III

5 A 9-way male SUB-D connector for connecting an FTX configuration terminal or PC compatible

6 An 8-way mini-DIN socket for connecting a PS/2 compatible external keyboard

7 Two standard IBM PC slots (ISA bus), 2/3 format (depending on the model)

(1) The operator dialogue application memory can be supported by a type II PCMCIA card (10 Mb maximum) or by the internal hard disk (2.1 Gb).

Magelis terminals with graphic screen

Specifications

References :
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Dimensions :
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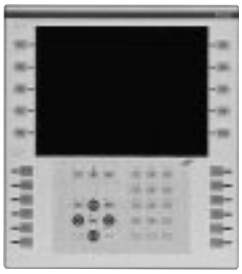
Type of terminal		XBT-F011	XBT-F032	XBT-F023/F024	XBT-F034
Environment					
Conforming to standards		IEC 1131-2, IEC 801-2 level 3, IEC 801-3 and IEC 801-4 level 3, IEC 68-2-6, IEC 68-2-27, UL 508, CSA			
Product certifications		CE, UL, CSA			
Temperature	Operation	0…+ 45 °C			
	Storage	- 20…+ 60 °C			
Relative humidity		0…85 % (no condensation)			
Degree of protection					
	Front panel	IP 65, conforming to IEC 529, Nema 4			
	Rear panel	IP 20, conforming to IEC 529			
Shock resistance		Conforming to IEC 68-2-27 ; semi-sinusoidal pulse 11 ms, 15 gn in the 3 axes			
Mechanical specifications					
Mounting and fixing		Flush-mounted, fixed with spring clips (supplied) pressure-mounted (on a 1.6 to 6 mm thick panel)			
		10 spring clips	8 spring clips	12 spring clips	10 spring clips
Material	Front section	Polyphenyl oxide, 10 % glass fibre (PPO GFN1 SE 1)			
	Keypad	Anti-UV treated toughened polyester (Autoflex EB AG)			
	Enclosure	Polyphenyl oxide, 10 % glass fibre (PPO GFN1 SE 1)			
Keys	Dynamic keys	8 (with LED)	–	10 (with LED)	–
	Static keys	10 (with LED and re-usable labels)	–	12 (with LED and re-usable labels)	–
	Service keys	12	–	12	–
	Alphanumeric keys	12 + 3 for alphabetical access	–	12 + 3 for alphabetical access	–
Electrical specifications					
LCD screen	Type	5.7" monochrome, back-lit with 16 levels of grey	5.7" STN 256 colours, back-lit with resistive matrix tactile feedback (8 x 6 cells)	**XBT-F023** : 9.5" monochrome, back-lit with 16 levels of grey **XBT-F024** : 10.4" TFT 256 colours	10.4" TFT 256 colours with resistive matrix tactile feedback (13 x 10 cells)
	Resolution	320 x 240 pixels		640 x 480 pixels	
Power supply	Voltage	⎓ 24 V not isolated			
	Limits	18…30 V, maximum ripple 5 %, maximum microbreaks 1 ms			
	Protection	Against polarity inversion and overloads			
Consumption		35 W			
Operating specifications					
Signalling		1 communication monitoring LED and 1 keypad activity (or tactile feedback activity) LED and 11 LEDs associated with service and alphanumeric keys			
Operating system		Magelis			
Dynamic RAM memory		2.5 Mb			
Application memory		On 4 Mb type II PCMCIA card (supplied), 8 or 10 Mb			
Dialogue application					
	Maximum no. of pages	50 to 450 application, alarm, help, form and recipe pages depending on the memory card used (maximum 512 alarm, maximum 256 forms)		30 to 300 application, alarm, help, form and recipe pages depending on the memory card used (maximum 512 alarm, maximum 256 forms)	
	Curves	16 realtime curves		16 real-time curves	
	Recipes	Maximum 5000 parameter values in a maximum of 125 recipe records			
Connections	PLC/ configuration PC	RS 232 C/RS 422/485 isolated serial link, downloadable communication protocols (see page 6/16 and page 6/27)			
	Printer	RS 232 C serial link			
	Bus or network	Slot for type III PCMCIA communication card depending on the model, communication protocols (see page 6/27)			
Realtime clock		Access to the PLC realtime clock			
Alarm relay		1 volt-free N/O contact, max 0.5 A ⎓/∿ 24 V			
Connection	Power supply and alarm relay	Plug-in terminal, 5 screw terminals (at intervals of 5.08 mm) Max clamping capacity : 1.5 mm²			
	PLC	25-way female SUB-D connector			
	Printer/ configuration PC	9-way male SUB-D connector			

Magelis terminals with graphic screen

References

Specifications :
page 6/20
Dimensions:
page 6/31

Terminals with keypad



XBT-F024●10

Downloadable exchange protocol	Type and size of screen	Supply voltage V ⎓	Type III slot for PCMCIA communication card	Reference	Weight kg
See page 6/27	Monochrome 5.7"	24	No	**XBT-F011110**	1.800
			Yes	**XBT-F011310**	1.800
	Monochrome 9.5"	24	No	**XBT-F023110**	2.700
			Yes	**XBT-F023310**	2.700
	Colour 10.4"	24	No	**XBT-F024110**	2.700
			Yes	**XBT-F024310**	2.700

XBT-F034●10

Terminals with touch-sensitive screens

See page 6/27	Colour 5.7"	24	No	**XBT-F032110**	1.600
			Yes	**XBT-F032310**	1.600
	Colour 10.4"	24	No	**XBT-F034110**	2.400
			Yes	**XBT-F034310**	2.400

Separate parts

Description	Use	Reference	Weight kg
Development software	Under Windows 95 or NT 4.●, for downloading the application and protocols	See page 6/27	–
Type II PCMCIA memory cards	Application memory	See page 6/27	–
Type III PCMCIA communication cards	Connection to buses and industrial networks	See page 6/27	–
Connecting cables	Serial link, Uni-Telway bus, configuration terminal, printer connection	See page 6/27	–
Sheets of labels	Labels for function keys	See page 6/27	–

XBT-MEM04

Replacement part

Description	Use	Memory size	Reference	Weight kg
Type II PCMCIA memory card	XBT-F terminals	4 Mb	**XBT-MEM04**	0.100

Magelis graphic stations

Specifications

References :
page 6/23
Dimensions :
page 6/31

Type of graphic station		**TXBT-F024**

Environment

Conforming to standards		IEC 1131-2, IEC 801-2 level 3, IEC 801-3 and IEC 801-4 level 3, IEC 68-2-6, IEC 68-2-27, UL 508, CSA
Product certifications		CE , UL, CSA
Temperature	Operation	0...+ 45 °C
	Storage	- 20...+ 60 °C
Relative humidity		0...85 % (without condensation)
Degree of protection		
	Front panel	IP 65, conforming to IEC 529, Nema 4
	Rear panel	IP 20, conforming to IEC 529
Shock resistance		Conforming to IEC 68-2-27 ; semi-sinusoidal pulse 11 ms, 15 gn in the 3 axes

Mechanical specifications

Mounting and fixing		Flush-mounted, fixed with spring clips (supplied) pressure-mounted (on a 1.6 to 6 mm thick panel)
		12 spring clips
Material	Front section	Polyphenyl oxide, 10 % glass fibre (PPO GFN1 SE 1)
	Keypad	Anti-UV treated toughened polyester (Autoflex EB AG)
	Rear enclosure	Zinc-coated steel
Keys	Soft keys	10 (with LED)
	Static keys	12 (with LED and re-usable labels)
	Service keys	14
	Alphanumeric keys	12 + 3 for alphabetical access
Pointing device		Yes, tactile keypad

Electrical specifications

LCD screen	Type	10.4" TFT 256 colours, back-lit
	Resolution	640 x 480 pixels
Power supply	Voltage	⎓ 24 V not isolated
	Limits	18...30 V, maximum ripple 5 %, maximum microbreaks 1 ms
	Protection	Against polarity inversion and overloads
	ISA bus extension	Maximum available at 12 V : 1.2 A, at 5 V : 2 A
Consumption		80 W

Operating specifications

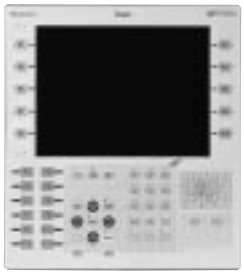
Signalling		1 communication monitoring LED and 1 keypad activity LED and 11 LEDs associated with service and alphanumeric keys
Processor		80486 DX4, 100 MHz
Internal hard disk		1.6 Gb
Operating system		Windows 95 installed on the hard disk
Dynamic RAM memory		16 Mb as standard and up to 32 Mb with extension
Application memory		On hard disk or type II PCMCIA card of 4, 8 or 10 Mb
Dialogue application		
	Maximum no. of pages	Application, alarm, help, and recipe pages limited by hard disk capacity Maximum 1024 alarm pages
	Curves	16 realtime curves, 16 trending curves
	Adjustment	General screens with 4 front corrector panels, supervision and adjustment screens
	OLE server	Interface with third-party software (Visual Basic, Excel, etc.)
Software extension		
	PL7 Pro Dyn	PLC diagnostic functions, dynamic display of programs, etc
	Supervision	Web Client Monitor via Intranet/Ethernet TCP/IP
Connections	PLC	RS 232 C/RS 422/485 isolated serial link, downloadable communication protocols (see page 6/27)
	Configuration PC	Non isolated RS 232 C serial link
	Printer	Parallel link
	External keyboard	PS/2 compatible link
	Bus or network	Slot for type II or III PCMCIA communication card, communication protocols (see Schneider Electric Software Pack, page 6/27)
	ISA bus cards	Depending on the model, two 2/3 format slots (network connection, Premium coprocessor, etc)
Realtime clock		Built-in and protected
Alarm relay		1 volt-free N/O contact, max. 0.5 A ⎓/∿ 24 V
Connection	Power supply and alarm relay	Plug-in terminal, 5 screw terminals (at intervals of 5.08 mm) Max. clamping capacity : 1.5 mm^2
	PLC	High-density 26-way female SUB-D connector and **T CCX CB 10** cable with 25-way female SUB-D connector (PLC side)
	Configuration PC	9-way male SUB-D connector
	Printer	25-way female SUB-D connector
	External keyboard	8-way mini-DIN connector

Magelis graphic stations

References

Specifications :
page 6/22
Dimensions :
page 6/31

Graphic station with keypad



T XBT F024●10●

Downloadable exchange protocol	Type and size of screen	Supply voltage V ⎓	Number of ISA bus slots	Reference (1)	Weight kg
See page 6/27	Colour 10.4"	24	–	**T XBT F024310●**	5.100
			2 (2/3 format)	**T XBT F024410●**	5.500

Separate parts

Description	Use	Reference	Weight kg
XBT-L development software	Under Windows 95 or NT 4.●, for downloading the application and protocols	Please consult our specialist catalogue	–
PL7 Prodyn runtime software	Under Windows 95 or NT 4.●, for Premium application adjustments, diagnostics and operation	Please consult our specialist catalogue	–
Web Client Monitor supervision software extension	Under Windows 95 or NT 4.●, for using graphic stations as Client stations of a Monitor Pro supervisor	Please consult our specialist catalogue	–
Type II PCMCIA memory cards	Application memory	See page 6/27	–
Type III PCMCIA communication cards	Connection to buses and industrial networks	See page 6/27	–
16 Mb dynamic RAM memory extension	On system card, 1 slot available for memory extension	**T FTX RAM 516**	0.160
PCX 57 PLC coprocessor	Integrates a Premium processor with Bus X output, Fipio link, X-way communication	Please consult our specialist catalogue	–
TCP/IP Ethernet network connection module	For connecting graphic stations to the TCP/IP Ethernet network	Please consult our specialist catalogue	–
Connecting cables	Serial link, Uni-Telway bus, configuration terminal, printer, etc	See page 6/27	–
102-key keyboard with cable	PS/2 compatible keyboard	Please consult our specialist catalogue	–
Sheets of labels	Labels for function keys	See page 6/27	–

Documentation

Description	Format	Included with product	Language	Reference	Weight kg
User's manual for TXBT graphic stations (2)	A5 bound	T XBT F0●●●10E	English	**T XBT DM00E**	0.500
		T XBT F0●●●10F	French	**T XBT DM00F**	0.500

(1) The T CCX CB 10 cable (length 0.2 m, fitted with one 25-way and one 26-way SUB-D connector) is included as standard.
Add the suffix **E** for an English version of Windows 95 and English documentation.
Add the suffix **F** for a French version of Windows 95 and French documentation.
(2) For documentation in German, Spanish or Italian, please consult your Regional Sales Office.

Development software

Presentation of XBT-L1003/L1004 software

References :
page 6/27

XBT-L1003/L1004 development software is used with the whole range of Magelis terminals to create operator dialogue applications designed for controlling automated systems.

XBT-L1003/L1004 software runs on PC compatibles equipped with Windows 95 or NT 4.● operating software.
Applications created using XBT-L1003/L1004 software are independent of the protocol used; it is possible to use the same operator dialogue application with all the different PLCs offered by the main market suppliers.

Configuration

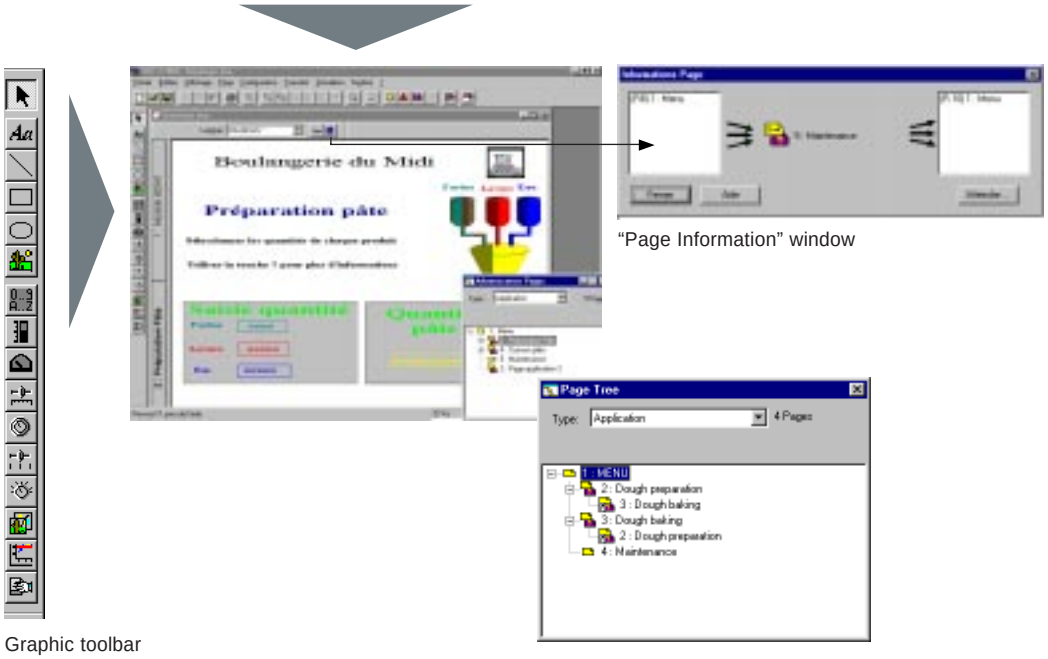
XBT-L1003/L1004 software is the only configuration software package for the Magelis range.

It is used to create various types of page easily :
- Application pages (can be interlinked)
- Alarm pages
- Help pages
- Recipe pages
- Etc

They can contain all sorts of variables and graphic objects, which are either predefined in the XBT-L1003/L1004 software, or created using other applications and then imported (bitmap format, etc). Various properties can be assigned to them : min-max limits, colour, movement, weighting, etc.

XBT-L1003/L1004 software can be used to configure the function keys to activate commands on the machine or call application pages. It can also be used on the graphic terminals to import the PL7 or Concept PLC symbols database. Sophisticated diagnostic functions are available on the TXBT-F graphic stations.

Main toolbar



Graphic toolbar

"Page Information" window

"Page Tree Structure" window

Development software

XBT-L1003/L1004 software functions

References :
page 6/27

Simulation on PC compatible

XBT-L1003/L1004 software offers the option of controlling all your operator dialogue applications from the design office without the use of graphic terminals and PLCs.

The following can be tested using the simulation program and the keyboard on a PC compatible :

- Navigation between pages
- Entry of variables
- Display of variables
- Simulation of an alarm

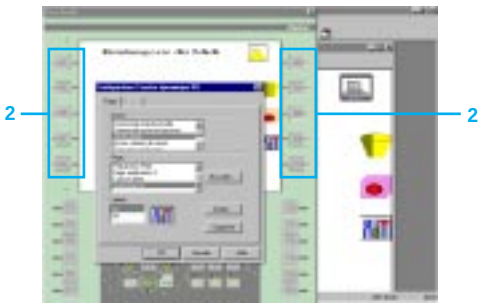
Using the function keys

The operator terminals and graphic stations have two types of function key : static keys and soft keys.

1 Static keys

These are defined for the whole application.

They may have the following functions :
- page access
- latching memory bits
- toggling memory bits (ON/OFF)



2 Dynamic keys

These are associated with one page. Their role can be reassigned or changed from one page to another.

They may have the following functions :
- page access
- latching memory bits
- toggling memory bits (ON/OFF)
- positioning on a data entry field

A label (bitmap image) is assigned to each key which may vary from page to page.

On touch-sensitive terminals, the touch-sensitive zones access the same functions as dynamic keys on keypad terminals.

XBT-L1003/L1004 software functions (continued)

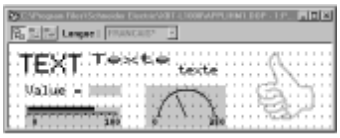
References :
page 6/27

Screen windows

XBT-L1003/L1004 software is used to design page contents in WYSIWYG format (What You See Is What You Get) : anything created using the software is displayed in exactly the same way on the operator dialogue terminal screen. To assist the designer, the software offers a display unit or a virtual screen depending on the type of terminal.

XBT-H/P

XBT-E



XBT-HM

XBT-F and **TXBT-F**

Model pages (1)

Model pages, created by the designer, are pages whose graphic format (text, images or static objects) applies to all other pages in the same family.

There are three types of model page :
- Application
- Alarm
- Help

Alarm pages

Alarm pages indicate any faults in the process.
The advantage of alarm pages lies in their event-triggered display :
- **During operation**
  - When a fault occurs, it is often the consequence of other faults. The priority levels enable the terminal to display the most important fault, the one presenting the highest risk to the process.
  - The occurrence of any fault is time and date stamped.
- **During maintenance operations**
  - The terminal memorises the faults in sequence (log) making it easy to find the cause of the fault.

Help pages and help windows (1)

Help pages and windows can be associated with application or alarm pages. Help windows can be associated with any variable field.

(1) Available with XBT-F and TXBT-F graphic terminals.

Development software

References

Multilingual software packages designed for FT 2000/FTX 517 terminals or PC compatibles (with a minimum of a 486 processor, 66 MHz, 30 Mb free space on the hard disk and 8 Mb RAM memory with Windows 95 operating system or 16 Mb RAM memory with Windows NT 4.● operating system). They are supplied with documentation for alphanumeric and graphic terminals, the **XBT-Z915** cable, **XBT-Z962** 25-way/9-way connection interface and the following Schneider Electric communication protocols : Uni-TE, Fipio, Fipway, Modbus, Jbus, Modbus Plus, KS.

Description	Compatibility	Operating system	Support	Documentation	Reference	Weight kg
Alphanumeric and graphic configuration	XBT-H/P/E/HM XBT-F TXBT-F	Windows 95 or NT	CD-ROM	English	**XBT-L1003E**	1.500

XBT-L1003F

Downloadable protocols (onto diskettes) (1)

PLC brand	Compatibility	Name of protocol	Reference	Weight kg
Schneider Electric	XBT-H/P/E (only for XBT-L1000 software)	Uni-TE V1.0 Uni-TE V2.0	**XBT-L1UTW01**	0.650
		Modbus Jbus	**XBT-L1MOD01**	0.650

Type III PCMCIA communication cards

Type of protocol	Compatibility	Reference	Weight kg
Modbus Plus	XBT-F/TXBT-F	**TSX MBP 100**	0.110
Fipio	XBT-F	**TSX FPP 10**	0.110
Fipio/Fipway	XBT-F/TXBT-F	**TSX FPP 20**	0.110

Type II PCMCIA memory card

Size	Compatibility	Maximum no. of pages XBT-F01	Maximum no. of pages XBT-F02/F03 TXBT-F	Reference	Weight kg
4 Mb	XBT-F/TXBT-F	150	100	**XBT-MEM04**	0.100
8 Mb	XBT-F/TXBT-F	350	230	**XBT-MEM08**	0.100
10 Mb	XBT-F/TXBT-F	450	300	**XBT-MEM10**	0.100

XBT-MEM04

Magelis terminal connecting cables (1)

Type of PLC to be connected	Type of connector	Physical link	Protocol	Length	Reference	Weight kg
Nano, Micro, Premium	8-way female mini-DIN terminal port	RS 485	Uni-Telway (V1/V2)	2.5 m	**XBT-Z968**	0.180
				5 m	**XBT-Z9681**	0.340
Premium with TSX SCY 2160●	25-way female SUB-D	RS 485	Uni-Telway (V1/V2)	2.5 m	**XBT-Z918**	0.230

Bus and network connection (1)

Type of bus/ networks	Tap-off unit	Type of connector	Length	Reference	Weight) kg
Uni-Telway	TSX SCA 62 subscriber socket	9-way female SUB-D	1.8 m	**XBT-Z908**	0.240
	TSX P ACC 01 cable connector	8-way female mini-DIN	2.5 m	**XBT-Z968**	0.180
			5 m	**XBT-Z9681**	0.340
Fipio/Fipway	TSX FP ACC 4 junction box	9-way female SUB-D	1 m	**TSX FP CG 010**	0.210
			3 m	**TSX FP CG 030**	0.410

Magelis terminal accessories (1)

Description	Number of sheets	Use	Reference	Weight kg
Sheets of grey/blue re-usable labels	1	XBT-H02●010	**XBL-YH4**	0.100
		XBT-P01●010	**XBL-YP8**	0.100
		XBT-P02●●10	**XBL-YP12**	0.100
		XBT-E	**XBL-YE24**	0.100
		XBT-HM	**XBL-YHM4**	0.100
		XBT-F01	**XBL-YF10**	0.100
		XBT-F02/TXBT-F02	**XBL-YF12**	0.100

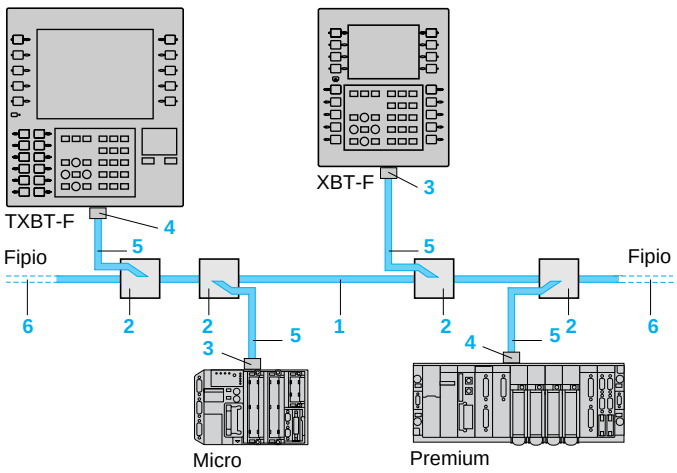
(1) For other accessories, please consult our specialist catalogue.
(2) 4 Mb PCMCIA card supplied with the XBT-F terminal.

Magelis terminals with graphic screen and Magelis graphic stations

Connections to Fipio bus, Fipway and Modbus Plus networks

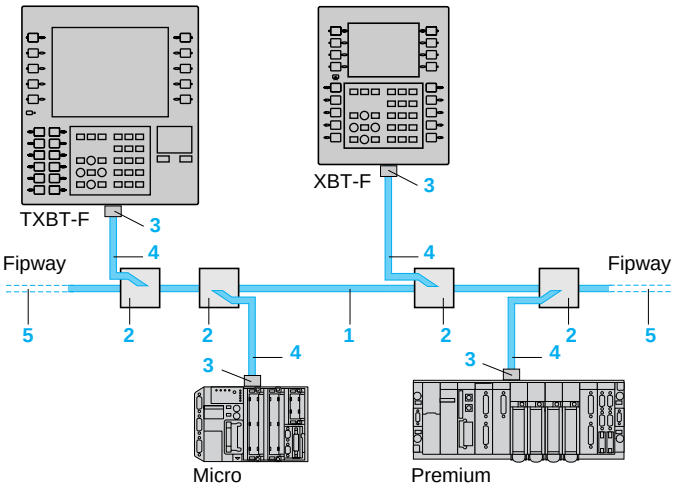
References :
page 6/29

Connection to Fipio bus



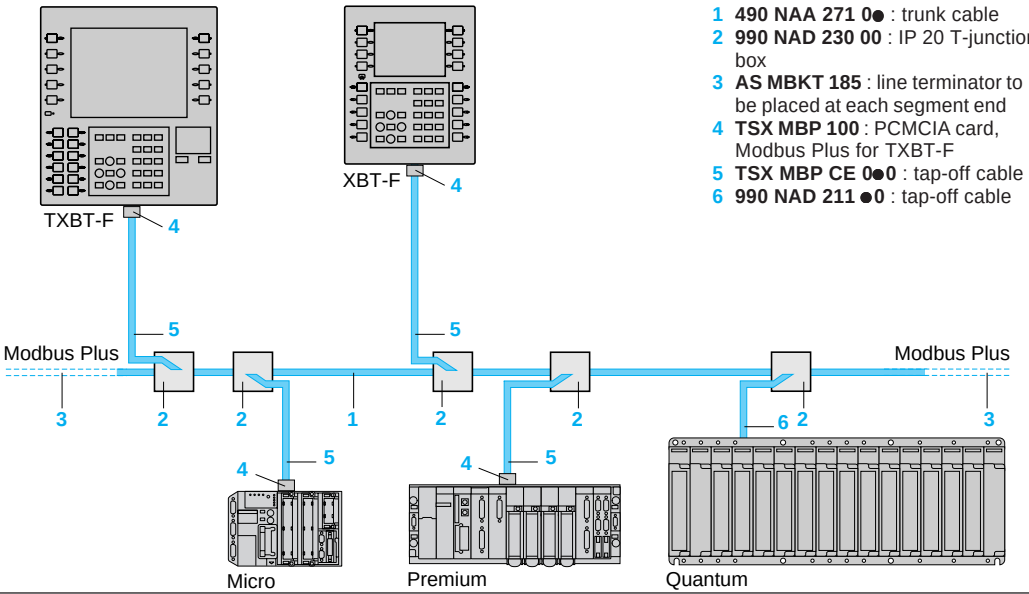
1 **TSX FP CA ●00** : shielded twisted pair trunk cable, 150 Ω (diameter 8 mm) for normal environment or inside buildings
or
TSX FP CR ●00 : shielded twisted pair trunk cable, 150 Ω (diameter 8 mm) for harsh environment or outside buildings
2 **TSX FP ACC 4** : IP 65 T-junction box
3 **TSX FPP 10** : PCMCIA card, Fipio agent function
4 **TSX FPP 20** : PCMCIA card, Fipio/ Fipway
5 **TSX FP CG 0●0** : tap-off connecting cable for PCMCIA TSX FPP 10/20 module card
6 **TSX FP ACC 7** : line terminator to be placed at each segment end

Connection to Fipway network



1 **TSX FP CA ●00** : shielded twisted pair trunk cable, 150 Ω (diameter 8 mm) for normal environment or inside buildings
or
TSX FP CR ●00 : shielded twisted pair trunk cable, 150 Ω (diameter 8 mm) for harsh environment or outside buildings
2 **TSX FP ACC 4** : IP 65 T-junction box
3 **TSX FPP 20** : PCMCIA card, Fipio/ Fipway
4 **TSX FP CG 0●0** : tap-off connecting cable for PCMCIA TSX FPP 10/20 module card
5 **TSX FP ACC 7** : line terminator to be placed at each segment end

Connection to Modbus Plus network



1 **490 NAA 271 0●** : trunk cable
2 **990 NAD 230 00** : IP 20 T-junction box
3 **AS MBKT 185** : line terminator to be placed at each segment end
4 **TSX MBP 100** : PCMCIA card, Modbus Plus for TXBT-F
5 **TSX MBP CE 0●0** : tap-off cable
6 **990 NAD 211 ●0** : tap-off cable

Magelis terminals with graphic screen and Magelis graphic stations

References

Connections -:
page 6/28

TSX FPP ●0

TSX FP ACC 4

TSX FP ACC 7

TSX FP CG 0●0

TSX MBP 100

TSX MBP CE 0●0

Fipway network/Fipio bus connection cables and accessories (1)

Description	Type	Condition of use	Length m	Reference	Weight kg
Fipio PCMCIA card	Agent function	Fipio on XBT-F	–	**TSX FPP 10**	0.110
Fipio/Fipway PCMCIA card	–	Fipway on XBT-F Fipio/Fipway on TXBT-F	–	**TSX FPP 20**	0.110
Trunk cables	8 mm, 1 shielded twisted pair 150 Ω	In normal environment (2) and inside building	100	**TSX FP CA 100**	5.680
			200	**TSX FP CA 200**	10.920
			500	**TSX FP CA 500**	30.000
	8 mm, 1 shielded twisted pair 150 Ω	In harsh environment (3) outside building or in a daisy-chain (3)	100	**TSX FP CR 100**	7.680
			200	**TSX FP CR 200**	14.920
			500	**TSX FP CR 500**	40.000
Dust and damp-proof junction box	Zamac, IP 65	Trunk cable tap link	–	**TSX FP ACC 4**	0.660
Line terminators (sold in lots of 2)	–	–	–	**TSX FP ACC 7**	0.020

Tap-off connection cables

Description	Use From	Use To	Length m	Reference	Weight kg
Cables for PCMCIA card	TSX FPP 10/20 card	TSX FP ACC 4 junction box	1	**TSX FP CG 010**	0.210
			3	**TSX FP CG 030**	0.410

Modbus Plus network connection cables and accessories

Description	Use	Reference	Weight kg
Modbus Plus PCMCIA card	XBT-F, TXBT-F	**TSX MBP 100**	0.110
Modbus Plus junction box	IP 20 T-junction box	**990 NAD 230 00**	0.230
Line terminators (sold in lots of 2)	–	**AS MBKT 185**	–

Connection cables

Description	Use From	Use To	Length m	Reference	Weight kg
Modbus Plus trunk cables	Junction box	Junction box	30	**490 NAA 271 01**	–
			150	**490 NAA 271 02**	–
			300	**490 NAA 271 03**	–
			450	**490 NAA 271 04**	–
			1500	**490 NAA 271 06**	–
Tap-off cables	TSX MBP 100 PCMCIA card	990 NAD 230 00 junction box	3	**TSX MBP CE 030**	0.340
			6	**TSX MBP CE 060**	0.530
	Quantum PLC	990 NAD 230 00 junction box	2.4	**990 NAD 211 10**	0.530
			6	**990 NAD 211 30**	0.530

(1) The specifications and performance of the Fipio bus or Fipway network are dependent on the above TSX FP accessories being used.
(2) Normal environment :
- without special environmental constraint
- operating temperature between + 5 °C and + 60 °C
- fixed installations

(3) Harsh environment :
- resistance to hydrocarbons, industrial oils, detergents and solder chips
- relative humidity up to 100%
- saline environment
- extreme variations in temperatures
- operating temperature between - 10 °C and + 70 °C
- mobile installations

Use in a daisy-chain : radius of curvature = 10 x cable diameter (either 80 or 95 mm).
For other special restrictions, please consult your Regional Sales Office.

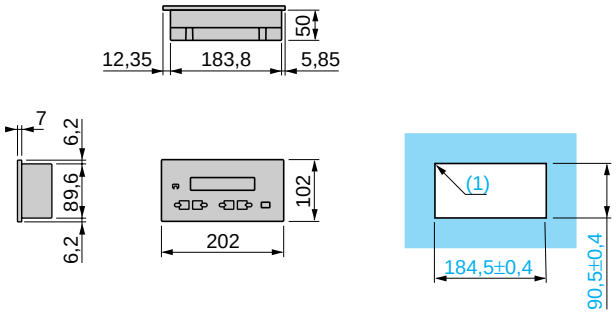
Specifications :
pages 6/8, 6/10, 6/12
and 6/14
References :
pages 6/9, 6/11, 6/13
and 6/15

Dimensions, mounting

Display unit and terminals

XBT-H

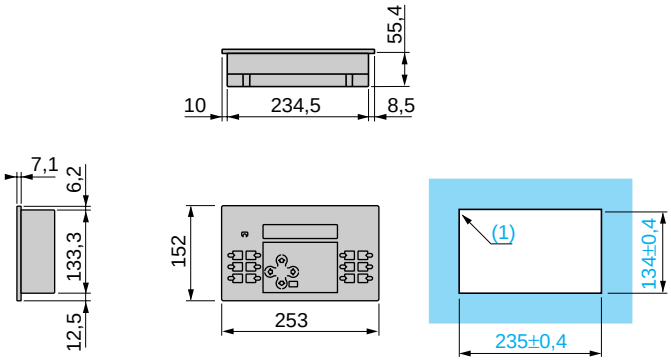
Cut-out



(1) r : 3.5 max, 2 min

XBT-P

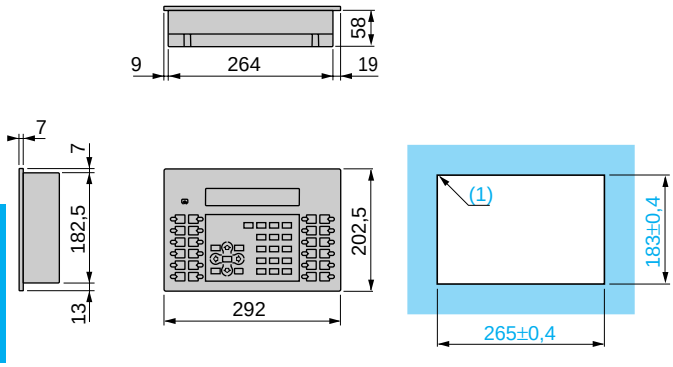
Cut-out



(1) r : 3.5 max, 2 min

XBT-E

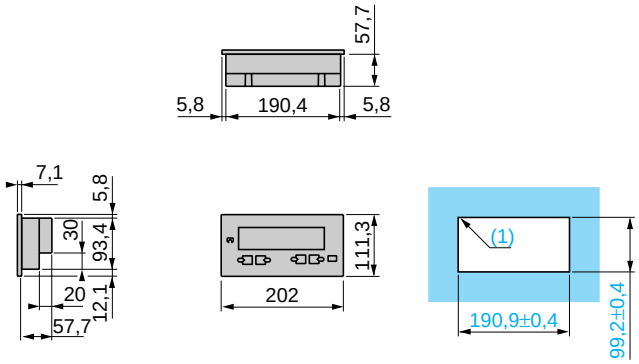
Cut-out



(1) r : 3.5 max, 2 min

XBT-HM

Cut-out



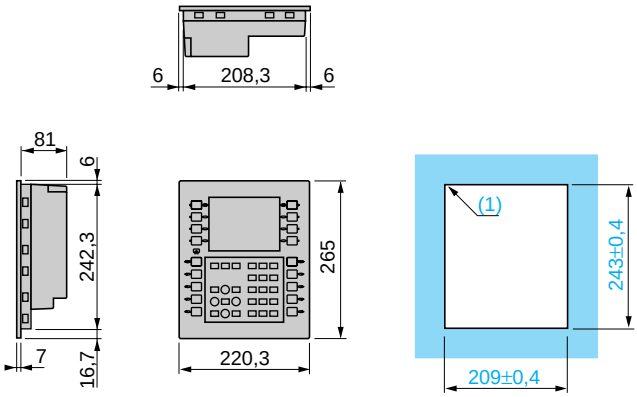
(1) r : 3.5 max, 2 min

Dimensions, mounting

Specifications :
pages 6/20 and 6/22
References:
pages 6/21 and 6/23

Terminals with graphic screen
XBT-F011●10

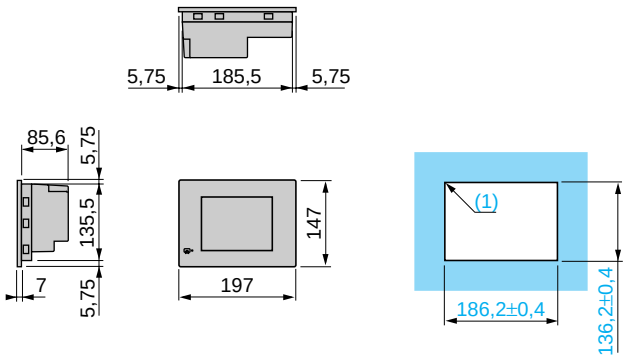
Cut-out



(1) r : 3.5 max, 2 min

XBT-F032●10

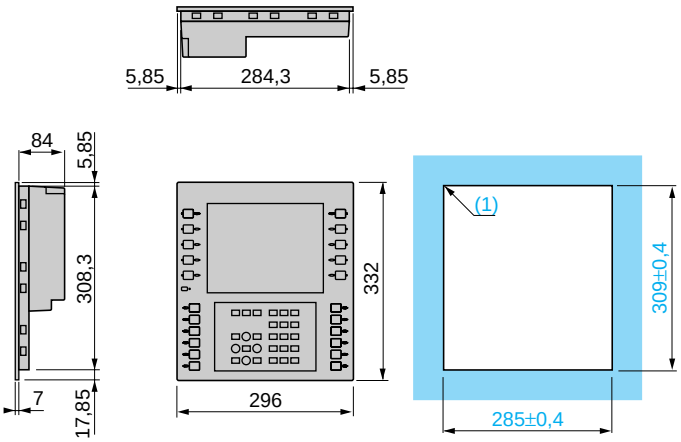
Cut-out



(1) r : 3.5 max, 2 min

XBT-F023/F024

Cut-out



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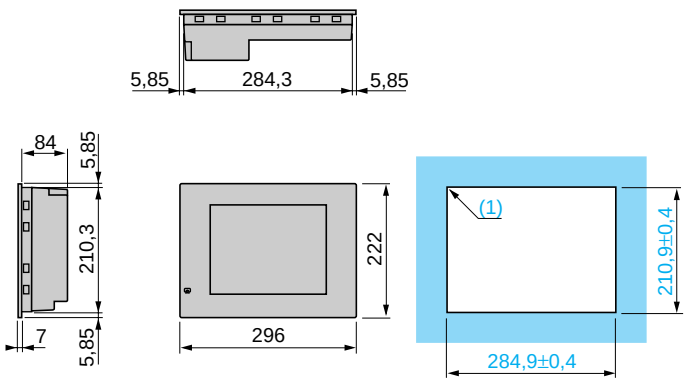
XBT-F034

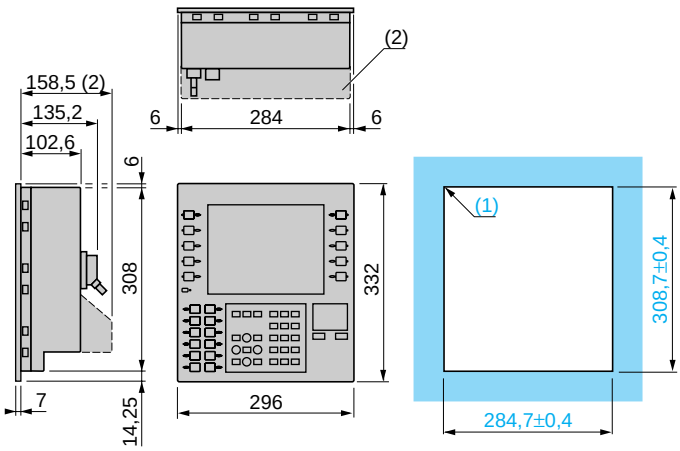
Cut-out



(1) r : 3.5 max. 2 min

Graphic stations
TXBT-F0243/F0244

Cut-out



(1) r : 3.5 max, 2 min.
(2) TXBT-F0244 (ISA model) only

6

CCX 87 communication and control stations

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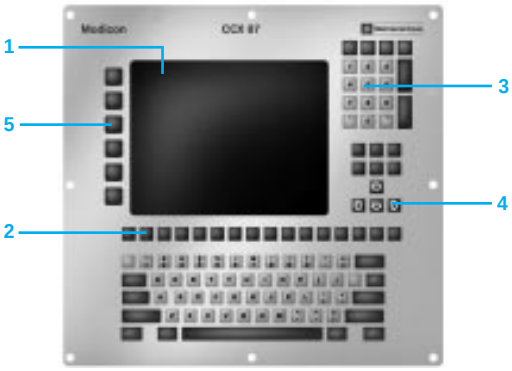
Presentation, description

Presentation

CCX 87 communication, control and supervision stations comprise :
- A graphic terminal with a 10"1/4 flat colour screen which may or may not be touch sensitive. It is based on a PC compatible with 133 MHz Pentium processor.
- Communication, control and supervision software under Windows 95 which manages up to 1000 variables.

These stations are used to display and control any industrial process managed by a PLC.
Monitor Pro software also performs control and supervision functions in architectures which incorporate several PLCs, in Fipway networks. Monitor Pro software provides the following main functions :
- Animated graphics
- Time management
- Alarm management
- Interpreted and compiled math and logic
- Printer management
- Recipes
- Dynamic trending
- Reporting
- Safety control
- Programmable counters

Description



CCX 87 stations comprise :
On the front panel :
1 A 10"1/4 TFT high resolution VGA colour screen (640 x 480 pixels). The screen may be touch-sensitive, depending on the version

A tactile feedback membrane keypad, resistant to shock and common solvents, has all the functions of the extended 101-key Qwerty keyboard with :

2 12 function keys

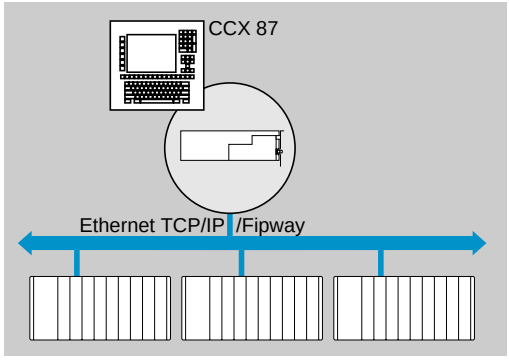
3 Full numeric keypad

4 Four cursor control keys

5 Six control keys which can be dynamically redefined

On the rear panel :
- An output for a VGA/SVGA compatible monitor
- A 3"1/2 1.44 Mb disk drive
- A two-way parallel port
- One or two RS 232 D serial links depending on version
- An external keypad port
- Two or three (depending on the version) standard PC ISA bus slots for extension cards
- A power cable port and a power-up switch

Connection to control system devices



CCX 87 communication and control stations have 2 or 3 slots for ISA bus compatible cards (2/3 format). These slots can also receive cards for connecting to the following networks :
- Fipway using the TSX FPC 10M card
- Ethernet TCP/IP using the TSX ETH PC 101M card

Connection of CCX 87 stations to the Uni-Telway bus requires a TSX SCA 72 RS 232 C/RS 485 adaptor to be connected to one of the two RS 232 D serial ports (via TSX CTC 01 cable). Connection on the Uni-Telway bus is made using a TSX SCA 50 adaptor.

The direct link to the Micro/Premium PLC terminal port is established using the TSX PCU 1030 cable supplied with each CCX 87 station.

CCX 87 communication and control stations

Specifications, references, dimensions, mounting

Description :
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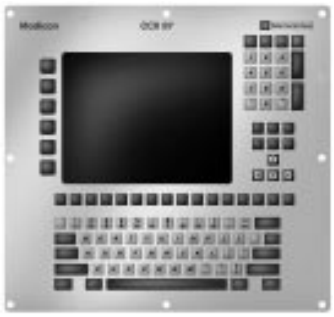
Specifications

Type of station		T CCX 87 1456 F●●●	T CCX 87 1556 F●●●
Processor		Pentium 133 MHz	
Internal hard disk		1.2 G bytes minimum	
RAM memory		32 M bytes, can be extended to 64 M bytes	
Disk drive		3"1/2 1.44 M bytes with side access	
Integrated screen	Type	10"1/4 VGA 256 colours, high resolution TFT active matrix (640 x 480 pixels)	
	Touch-sensitive	No	Yes
Integrated keyboard		Qwerty membrane, 101 keys with tactile feedback	
Control keys		6 control keys with dynamic assignment	
Extension slots	Number	3 slots for PC compatible ISA bus cards	2 slots for PC compatible ISA bus cards
	Format	2/3	
I/O ports	Standard	2 RS 232 D serial ports (9-way SUB-D type connector)	1 RS 232 D serial port (25-way SUB-D type connector)
		Two-way parallel port (9-way SUB-D type connector)	
		Remote SVGA video monitor port, VGA compatible	
		External keyboard connection	
Connection	TSX 7 PLCs	Use 1 standard RS 232 D port with **TSX TAC 03** conversion kit (not included)	
	UNI-Telway	**TSX SCA 72** active RS 232/RS 485 adaptor (not included)	
	Fipway	**TSX FPC 10M** Fipio bus/Fipway network connection card (not included)	
	Ethway	**TSX ETH PC 101M** Ethernet network connection card (not included). See page 43601/6	
Pre-installed software	Depending on vers.	Microsoft Windows 95 operating system	
		Monitor Pro communication, control and supervision software (1000 supervision variables max)	
Temperature		Operation : 0…40 °C, storage : - 20…+ 50 °C	
Relative humidity		85 % maximum (without condensation)	
Dust and damp protection		Front panel : IP 65, rear panel : IP 20	
Power supply	Voltage	Nominal values ∿ 115/230 V, limit values ∿ 90…135 V/180…260 V	
	Frequency	Limit values 47…63 Hz	
	Consumption	50 W	

References



T CCX 87 1●56 F●●●

Description	Monitor Pro software	Touch sens. screen	Reference	Weight kg
Communication, control and supervision hardware and software packages (1)	None	No	**T CCX 87 1456 F10**	8.600
		Yes	**T CCX 87 1556 F10**	8.600
	Run-time	No	**T CCX 87 1456 FMRT**	8.600
		Yes	**T CCX 87 1556 FMRT**	8.600
	Development	No	**T CCX 87 1456 FMBT**	8.600
		Yes	**T CCX 87 1556 FMBT**	8.600

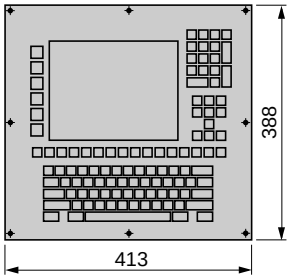
PLC, bus and network connection components

Description	Use	Format/length	Reference	Weight kg
Fipway network card	Extension slot	Short format	**TSX FPC 10M**	0.140
Ethernet network card	Extension slot	Short format	**TSX ETH PC 101M**	0.120
Active RS 232 C/RS 485 adaptor	Signal adaptation and isolation	–	**TSX SCA 72**	0.520
9-way/25-way RS 232 D cable	Link between CCX 87 and TSX SCA 72	2 m long	**TSX CTC 01**	0.180

(1) Includes a European power cable and cable for direct connection to the Micro/Premium terminal port. The pre-installed software and associated documentation are in English.

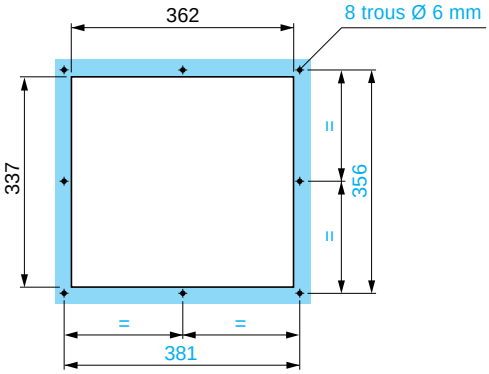
Dimensions, mounting

T CCX 87 1●●6 F●●●



Depth : 147 mm (163 mm overall)

Flush-mounted



8 Supervision

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Quantum Automation Platform

Monitor Pro supervision software

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Monitor Pro Version 7 is a multi-user real-time SCADA (Supervisory Control and Data Acquisition) software solution for manufacturing and process automation. It allows valuable data to be collected from a wide variety of plant floor devices, and then distributed throughout the entire organization. Monitor Pro is based on a highly reliable, scalable architecture that can function as a standalone MMI as well as an enterprise-wide monitoring and control system. Monitor Pro v7 provides communication protocols for all Schneider Electric devices as standard, in addition to integrating technologies such as DCOM and OPC which enable it to act as both an OPC data server and a multi-station client on TCP/IP, Intranet and Internet networks. Monitor Pro offers a whole range of new functions which simplify setup and can increase application design productivity.

Composition of the range

MonitorPro 7 is a true multi-tier SCADA application built exclusively for Microsoft platforms. As a result of this new architecture, client and server functionality have been separated. The server component performs data collection, data processing ,and data logging - all of the operations of a traditional SCADA system. The client provides the user interface for engineering and operational activities. Client systems represent concurrent users on the network and can access any and all servers on the network. In addition, there are modules that support applications and options which enhance the functions of the base product to include, but are not limited to, integration with databases of both PL7 and Concept and statistical process control.

With the release of v7, the concept of development/runtime and runtime systems no longer exist.

There are three different server products, depending on the number of process I/O tags. The functional outline of the various servers is identical, simplifying the migration of applications from one server to another. MonitorPro 7 is available on both Windows NT and Windows 2000 operating systems.

MonitorPro offers:
- Server Systems - execution, data processing functions
- Client Systems - development and graphical user interface
- Server Options - additional functionality to enhance the operation of the base server
- Client Options - additional functionality to enhance the operation of the base client

Structure of the range

Basic packages

Servers

- **256 I/O Server -** enables the execution of a supervision application with 256 process I/O and 1096 internal tag database
- **1024 I/O Server -** enables the execution of a supervision application with a 1024 process I/O and 16,384 internal tag database
- **Enterprise Unlimited I/O and tags -** enables the execution of a supervision application with an unlimited number of process I/O and internal tag database

Clients

- **V7 client graphics -** implementing Client Builder and Configuration Explorer, as well as maintaining Application Editor, WebClient and Graphic functionality provided in the ECS Client.
- **ECS client graphics -** maintains existing ECS functionality, and does not support Client Builder or Configuration Explorer. In v7, this functionality has been incorporated into the Configuration Explorer.

Extensions

(unless otherwise indicated, all options are Server-based)

- **"OFS Linker" -** Using Schneider Automation's OFS, integration of the PL7and Concept databases with the MonitorPro database resulting in single tag configuration.
- **"Power SPC" -** Statistical process control.
- **"CML" (Compiled Math and Logic) -** Compiled math and logic.
- **"PAK" (Program Access Kit) -** Kit for developing tasks and additional drivers.
- **"ORACLE interface" -** Oracle database interface.
- **"SYBASE interface" -** Sybase database interface.
- **"Third-Party Drivers" -** Communication with third-party devices.
- **"Enhanced Communication Interface" -** an I/O translator that provides an interface between ECI drivers and the real-time database. A superset of the IOXlator and the scaling and deadbanding tasks are also included.
- **"Event Time Manager"-** a flexible tool used for configuring time-based events.
- **"Database Terminal Server" -** an on-line, real-time browser of the tag database to enhance debugging capabilities. Supports ECS graphics only.
- **"Virtual Real-Time Network" -** Provides enhanced networking capability similar to FL-LAN and PowerNet, supported in the base system with the advantage of increased responsiveness.
- **"Virtual Real-Time Network Redundancy" -** Facilitates the creation of redundant MonitorPro applications. VRN must be installed in order to implement this functionality.
- **"Man-Machine Interface" -** Client Side Option, providing a number of default parameters and graphic options for developing an application quickly. Supports ECS graphics only.

Monitor Pro supervision software

Architectures

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Connection to control systems

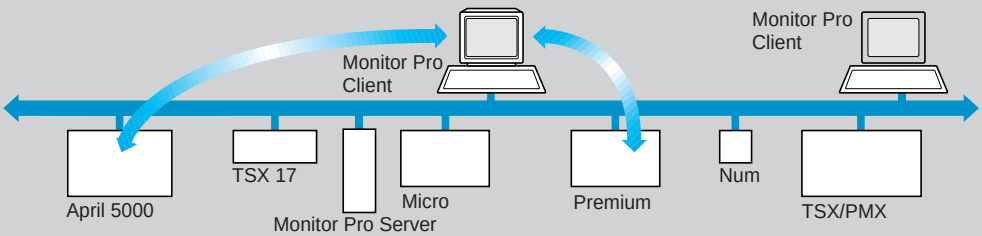
Monitor Pro supervision software is an organizer for all Schneider Electric control systems. It can be integrated into communication architectures which bear Modicon, Series A, SY/MAX and Telemecanique brand names.

Since Monitor Pro supports several protocols simultaneously, it is suitable for mixed configurations.

These connections enable the use of serial links and local area networks for exchanges with the control system level. The client / server architecture in MonitorPro v7 can support both the client and server functionality running on the same computer or on separate computers, depending on the application requirements.

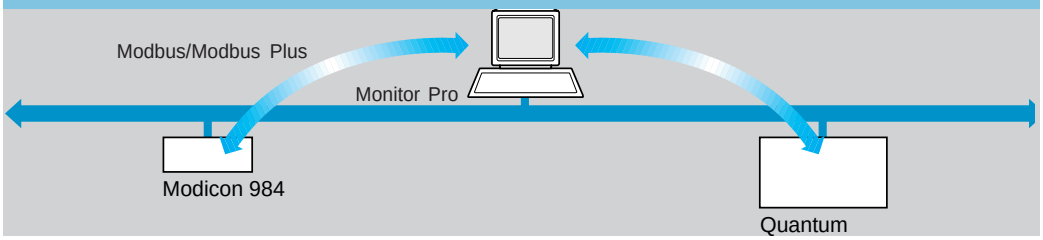
Telemecanique control systems

Monitor Pro offers Ethway, Fipway and Uni-Telway connections as standard so that it can be integrated into Telemecanique X-Way architectures (TSX and April) as well as the Uni-TE connection on TCP/IP



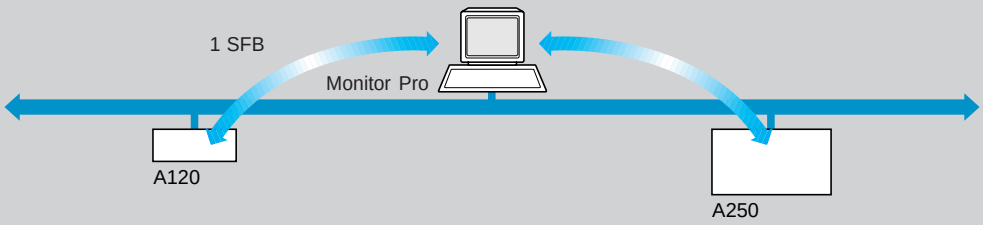
Modicon control systems

Monitor Pro offers Modbus, Modbus Plus and Modbus TCP/IP connections as standard so that it can be integrated into Modicon control system architectures.



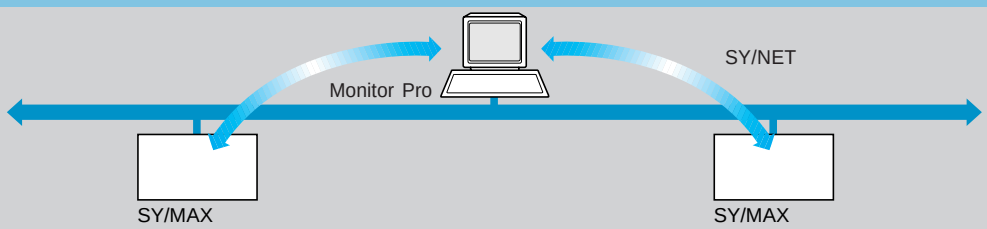
Series A control systems

Monitor Pro offers 1 SFB connection as standard so that it can be integrated into Series A control system architectures.



Square D control systems

Monitor Pro offers SY/MAX and SY/NET connections as standard so that it can be integrated into Square D control system architectures.



Architectures (continued)

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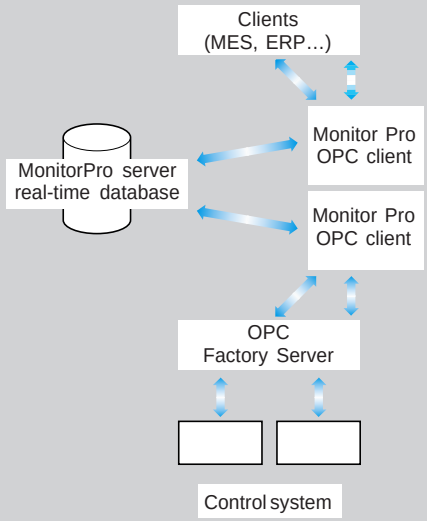
Third-party control systems

Monitor Pro is also an open supervision software package. It can be connected to all major control systems on the market and is compatible with numerous serial or network protocols. Please consult your Regional Sales Office.

New drivers can be developed using a standard product interface : PAK. This tool can be used to design any driver while respecting the rules for integration within Monitor Pro, thus assuring long useful life of the developments over time.

OPC Client/Server connection (OLE for process control)

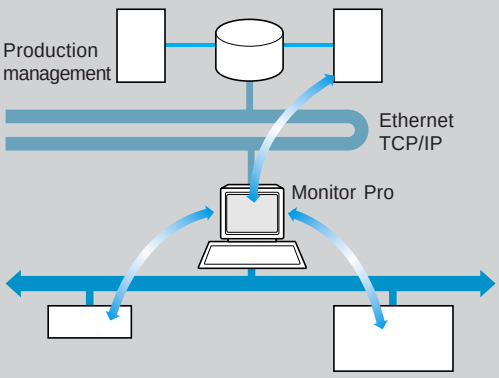


Monitor Pro integrates OPC, the multi-Client/Server interface standard, permitting local or remote exchanges in real-time by using COM/DCOM technology.

Monitor Pro offers an OPC Client functionality that allows connection to all control systems with an OPC object server. This is particularly the case for OPC Factory Server (OFS), which enables access to Schneider Electric control systems.

Monitor Pro has an additional standardized means of openness : an OPC object server. This server gives direct access to the Monitor Pro real-time database. All local or remote applications (MES, ERP, etc.) have an OPC client and therefore have direct access to Monitor Pro real-time objects.

Connection and openness to MES (Manufacturing Execution System)



The connectivity of Monitor Pro in the world of MES is due to OLE and ActiveX technology and native databases.

SQL, dBase IV, ORACLE and SYBASE native connections, as well as access to ODBC standard databases, provide the highest-performance links. The “Power SQL” module enhances Monitor Pro and gives two-way access, without any specific configuration, to external databases in read/write (with the possibility of SQL commands).
All configuration data and archives are accessible via external databases.
SQL v7 now ships with MonitorPro as the standard tool for database logging.

Architectures (continued)

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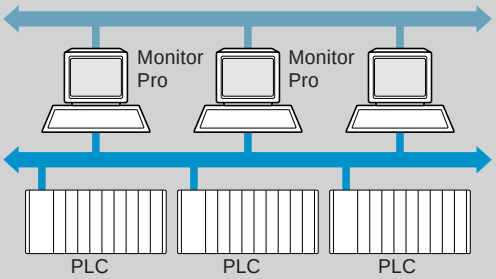
Distributed architectures

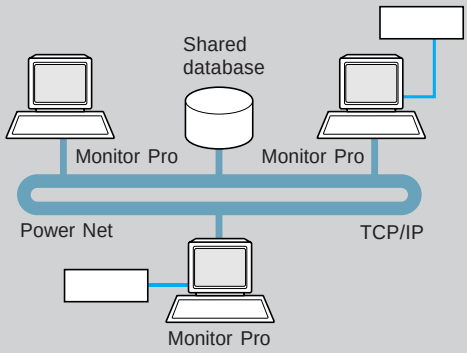
Monitor Pro offers a number of solutions for the distribution of data between supervision stations, providing several operators with access to the same application.

TCP/IP data exchanges



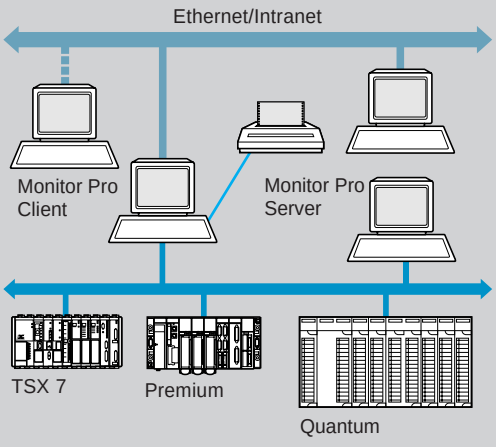
Multi-station equal access
The Monitor Pro FLLAN function enables several supervision stations to exchange files and data on a TCP/IP network.
A server can also be used on the network for all archive functions or for sharing network resources (printers, databases, etc.).

Multi-station Client/Server



Monitor Pro has an integrated Client/Server multi-station function : PowerNet. This enables an application to be designed where data is shared between several supervision stations. Each station can be declared as a Server and as a Client for the other stations on the network.
Alarms and their acknowledgement are distributed between the various stations on the network. Alarms can be acknowledged equally on one or other stations on the network.

Client : operator access distribution and application development



The client architecture enables secure, distributed, and remote access to the server via OPC on a TCP/IP network as well as through the Internet. Clients can access and manage multiple applications in the system. Client stations are independent from each other, so local graphics can easily be modified without change to the application residing on the server or other clients.

Monitor Pro supervision software

Functions

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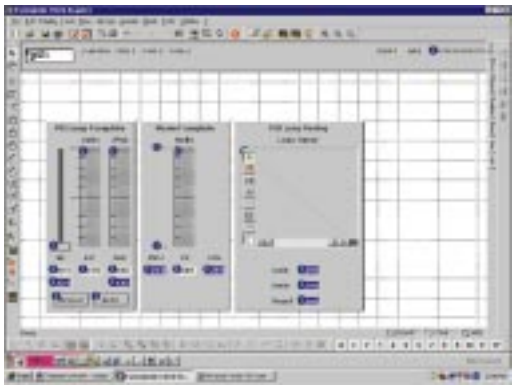
Application design

[Using the v7 client - application development remains unchanged if using the existing ECS environment.] A supervision application is developed on a client system using the Client Builder and the Configuration Explorer. Configuration Explorer is used to develop server side functionality, and the Client builder is used to develop the graphic interface.

Client builder - Graphic Screen Development

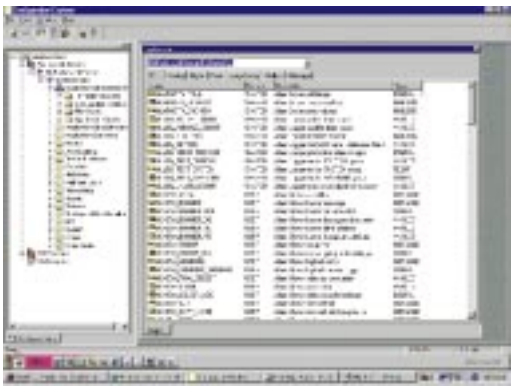


Client Builder is an integrated engineering and operational environment that allows for dynamic switching between engineering and test modes to speed application development. Client Builder provides a rich set of tools to decrease application development time:

- Pan and Zoom
- Object Oriented Graphics
- Standard Object Library
- Alarming, Trending and Data Browsing Interfaces
- Layering
- ActiveX Container
- OPCClient

Object-oriented graphics - The properties of the graphic objects in Monitor Pro 7 have been exposed so that you can programmatically change the properties of an object in a window or of the window itself through VBA scripting.
VBA Compatible Scripting - Client Builder uses VBA compatible scripting which allows you to write custom code for your application.
You can also create **templates**. A template is a mimic (graphic screen) containing drawing elements and properties common to other screens. Mimics created using templates inherit the drawing elements and properties of the template.

Configuration explorer



Configuration Explorer provides an explorer-like hierarchical view for navigating and configuring Monitor Pro Server side functions. The new Windows-based editors will greatly simplify the configuration of MonitorPro modules.

One of the new features of Configuration Explorer is the Tag Explorer. The Tag Explorer shows all tags in the system including those accessible through OPC and supports user defined filters. Tags can be dragged from the Tag Explorer to any of the editors in the system, minimizing typing and increasing engineering productivity. Configuration Explorer supports concurrent application development over a network, allowing a single user to access multiple Monitor Pro servers, or for multiple users to concurrently configure a single Monitor Pro server.

Monitor Pro 7 also introduces the concept of **object-based configuration**. Object-based configuration brings about unprecedented levels in productivity when creating applications. Repetition in configuration is completely eliminated; errors are reduced; application development times are reduced; and application maintenance is lessened.

Application Objects allow you to build applications using a comprehensive set of predefined objects provided with Monitor Pro 7. These objects model real-world components (for example a pump or circuit breaker), and include the various SCADA functionality's available within the system, such as alarming, data logging and communications. A Monitor Pro application is built simply by dragging the desired objects into the application. When an object is added to an application, it can be configured in two ways. You can enter configuration information (for example alarm limits and I/O points) via an intuitive user interface. Alternatively, configuration information can be loaded from a variety of external data sources including text files, Excel spreadsheets, or any ODBC compliant database. This allows data already available in other places to be re-used. When using data from external sources, many objects can be created with a single action, allowing large application to be created automatically.

Monitor Pro supervision software

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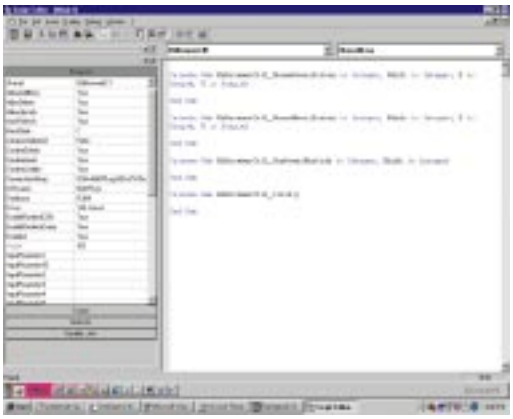
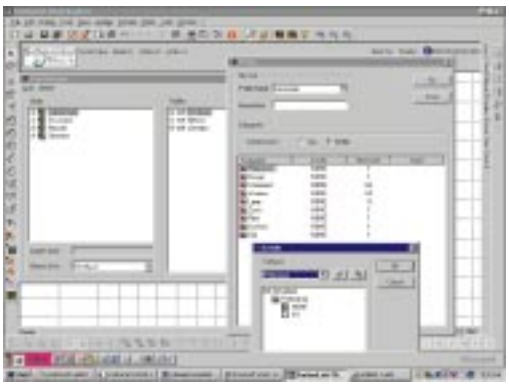
Using Visual Basic



In Monitor Pro, it is possible to assign an animation to any graphic object (movement, rotation, modification of the size, link with another object, etc.) written in Visual Basic compatible language. Pre-programmed functions (mouse actions, external event, synoptic loading, etc.), are available in the Visual Basic editor, which makes it easier to use this module for making graphic objects behave dynamically.

Security management



There are some applications which require security access management. MonitorPro allows security to be assigned at multiple levels, based on user designation. Access can also be restricted with user login / logout functions.

Monitor Pro offers the following security management services:

- User class definition tools (32 possible classes)
- Assignment of access rights to the various user classes
- Assignment of users to the various classes
- Security administration
- “Login and Logout” of operators, while application is running

When the supervision application is configured, a decision is made either to use the security system offered by Monitor Pro or to rely on the security management system offered by the operating system on the machine (as with Windows NT).

The application can also be configured so that it stores all operator interventions on a database.

The following actions can be controlled by a password :

- Pressing buttons
- Function keys
- Text entry

Monitor Pro supervision software

Functions (continued)

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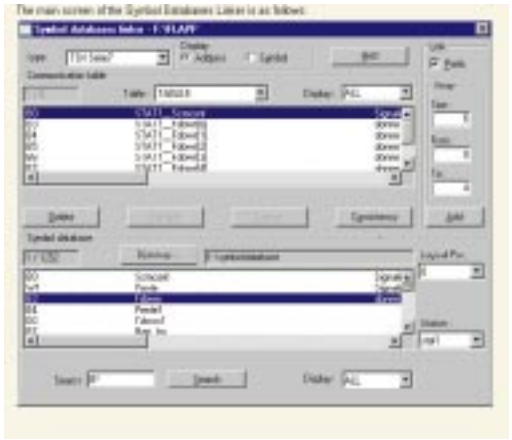
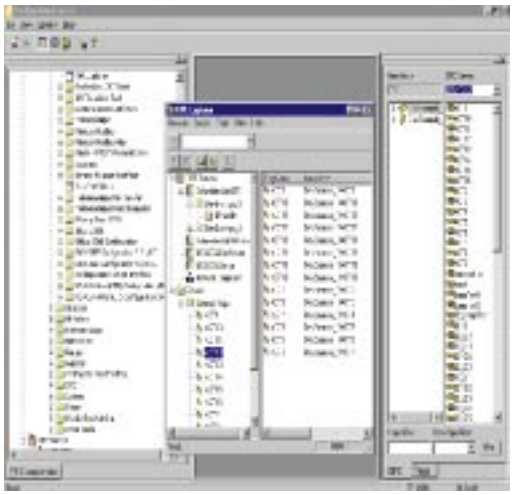
Single point tag declaration





In order to increase application development productivity, MonitorPro offers database integration.

This function is used to provide information to the Monitor Pro real-time database from the PLC databases without re-entering tags and their attributes.

The tool is used to ensure consistency of the PLC and supervisor databases. If modifications are made to the application, either to the PLC or to the supervisor, a consistency test command is used to uncover inconsistencies between the PLC and supervision databases.

This function is available on various types of PLCs: TSX Series 7, Micro/Premium/Quantum and their respective programming tools (PL7-3, PL7, Concept), via Symbol Database Linker or OFS (OPC Factory Server).

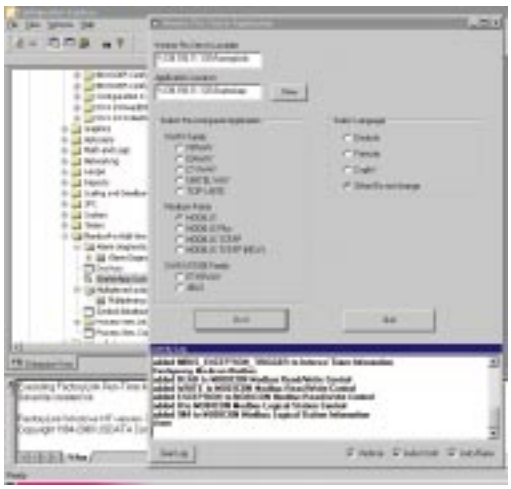
The supervision real-time database can be created from several PLC databases. The imported tags are prefixed with the name of the PLC station when using symbol databse linker.

The software workshop and the supervision software can be installed on the same station or on separate stations. Import can be carried out either via an interstation network for exchanging files, or by disk transfer.

The single point tag declaration tool is used to optimize communication by selecting the communication tables which will receive the imported PLC tags.
A search and filter function for the various types of variable makes it easier to select the tags to import.
The tool can also create complete tables in the Monitor Pro database by means of a single command. Tags created using either of these tools are available via the Tag Browser

.

Starter applications



Monitor Pro offers a Starter Application Generator for configuring Schneider Electric communication protocols within the configuration explorer. In addition, the sample StarterApp that is provided with the product provides sample templates and mimics to provide a starting point for application development.

Monitor Pro supervision software

Functions (continued)

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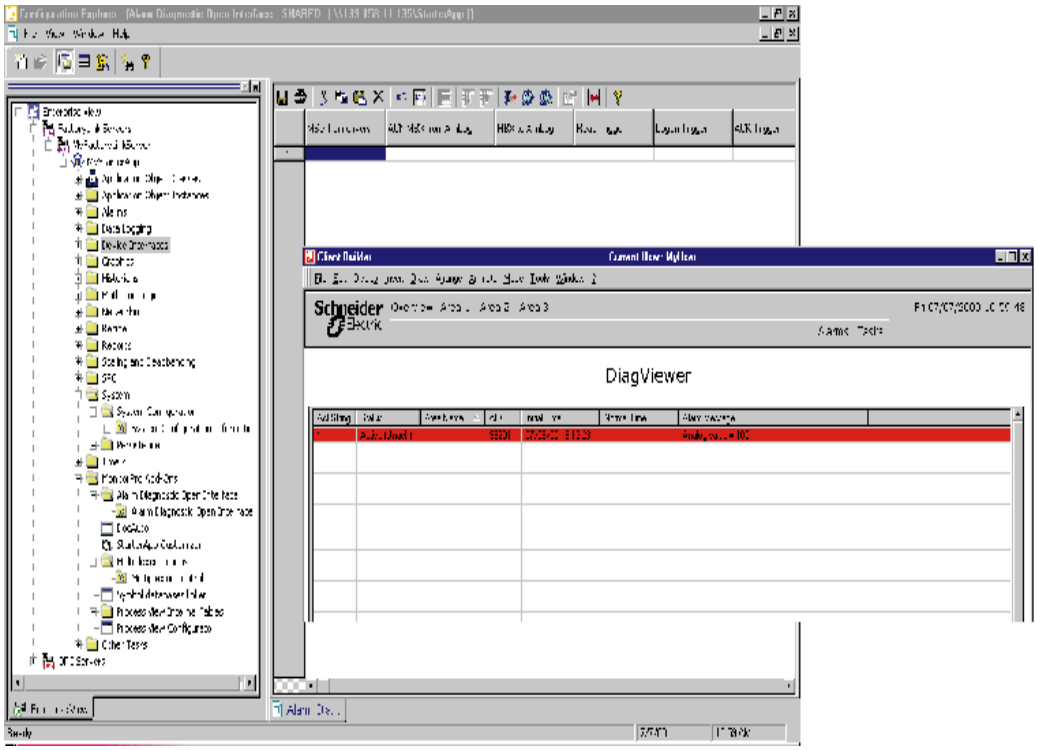
Application support tools

Diag viewer



The Diag viewer allows alarm information generated by the Diag Function Block within the PLC and stored in the Diag Buffer to be displayed within the SCADA system. The information from the diag function blocks can be both pre-programmed and user-defined. Diag Viewer will allow the same alarm information to be viewed regardless of the view device - SCADA, CCX17, PL7 Pro, Magelis ,etc.- thus providing the operator with a consistent view of the system status.

Functions (continued)

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Run-time environment

The MonitorPro runtime environment performs various operations which are grouped into three main areas:

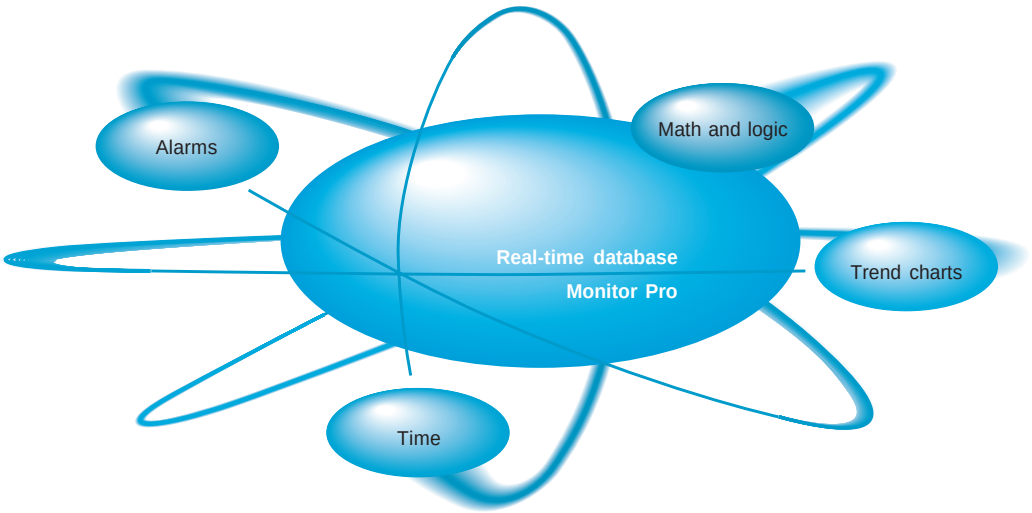
- Data collection
- Data processing
- Data presentation

The primary aspect of the system is that all of the data is stored in the real time database, and the database therefore represents what is happening from moment to moment during normal operation. The real-time database is central to all tasks that run during run time. The real-time database resides in memory on the server and acts as both a storage device and an inter-process communication mechanism. All tasks share information in the real-time database by reading from or writing to the real-time database.
Data is never passed directly between two tasks. Configuration data directs the specific run-time operations of the system. This semi-permanent data created during the development process effectively describes the plant floor equipment and the processes it implements.
Lastly, the run-time process also performs some operations automatically, such as with alarm logging, where critical values are monitored and alarms generated. In addition, MonitorPro supports archiving of data from the real-time database to a disk-based, historical database management system on a regular basis.

Real-time database

The real-time database stored in the fast access RAM memory is the heart of the Monitor Pro supervision system. It contains all data coming from or going to the process and is available for supervision processing. The size of the database depends on the Monitor Pro runtime software used.

This application image consists of objects defined as symbols, representing binary data, single length words (16 bits), double length words (32 signed bits), floating point values (64 bits) and messages (up to 256 bytes).
Each task can access the whole real-time database and uses this means of exchanging data with other tasks. This means of communication reinforces the independence of the various tasks from one another.



All data in the database can be identified in symbolic form, that is by names of objects such as VALVE, PUMP, MOTOR, FAULT, etc. Each change in the state of a variable is monitored, indicated and processed, if required.

Monitor Pro supervision software

Functions (continued)

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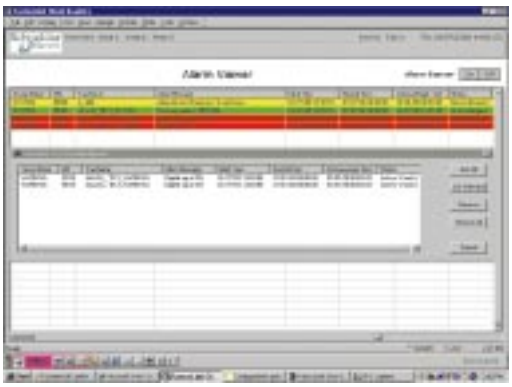
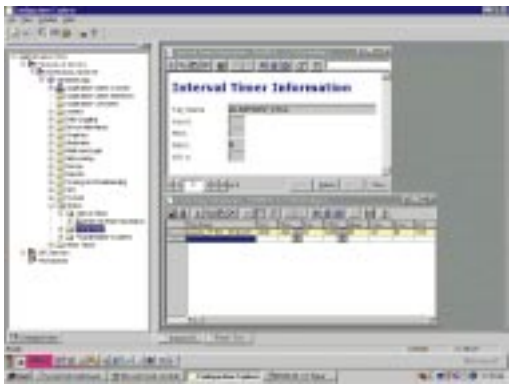
Alarms

Alarms are generated based on any specified data elements in the real-time database. The Alarming function offers the following benefits:



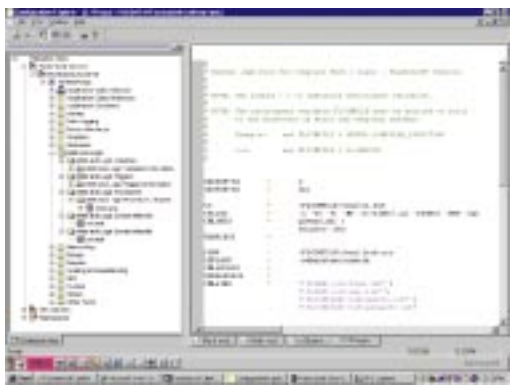
- Criteria can be based on digital or analog values or messages.
- User comments can be appended to an alarm and become part of the log
- Alarms can be acknowledged individually or as a group
- Tag name, message, acknowledge status, time, group, etc., can be displayed in the alarm viewer
- Filter and sorting based on the user criteria
- Alarms can be grouped by user-defined parameters, such as types, area, priority, etc.,
- Supports parent / child relationship to avoid nuisance alarms.

Timing event and intervals



Event and Interval timing is used to schedule events in terms of absolute date/time, or in terms of time intervals following a previous event. Event and Interval timing is used to define timed events and time intervals that can be used to initiate and control any system function in run-time mode. Event and Interval timing links timed events and intervals to real-time database elements used as triggers. There is no limit to the number of events and interval timers that can be defined except the amount of available memory. In addition, event and interval timing also updates global information used by the system such as current date and time, day of week and month, and is stored as reserved elements.

Interpreted or compiled math and logic functions



MonitorPro can perform various operations of a mathematical or logical nature on a combination of data elements in the real-time database. Each operation is a controlled by a procedure that resembles BASIC, is based on a user-defined variable, and is triggered by changing values in the real time database or by other procedures.

Complied mode involves several MonitorPro utilities and a third party ANSI C-language compiler working together to generate the ANSI C code from the user-created file.

Interpreted mode is a subset of complied mode so that when the values of trigger elements associated with one or more procedures change in the real-time database, interpreted mode determines the procedures affected. Every line of the instruction is then interpreted an executed for each triggered change.

Monitor Pro supervision software

Functions (continued)

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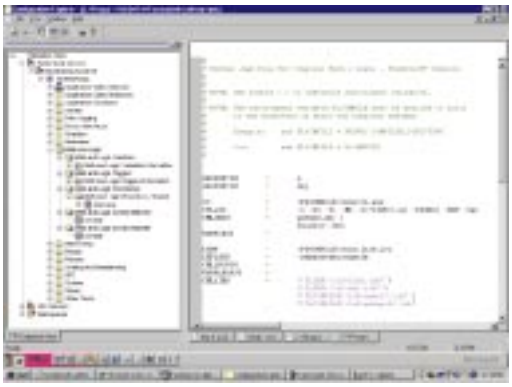
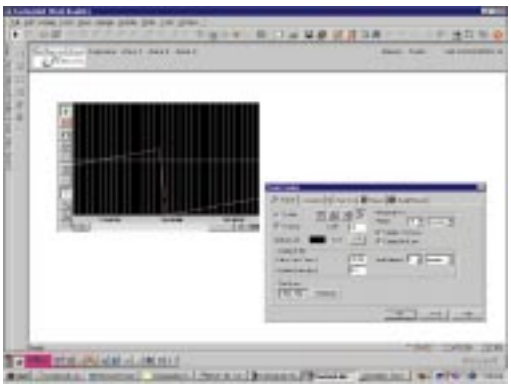
Counting events



Programmable counters provide count per unit of time measurements and event delays. A programmable counter is a group of elements with the values that work together to perform a count. Outputs from programmable counters can be used to provide inputs to other processes or to trigger events.

Trending - standard



Standard trending consists of both real-time and historical trend capabilities.

Real-time trending lets you chart data from any database. The frequency to update the chart is configured and the value is displayed on the chart.

Historical trending lets you chart data from the relational database historically or in real-time. Both time-based and event-based chart types are available. In addition, the following features can be applied to a chart in run time:

- Pan
- Zoom
- Toggle between real-time and historic data
- Dynamic change of tag information and presentation on the chart.

Trending - advanced

- **Historical and real-time trend curves**
  Both types of dynamic and real-time trend chart can be displayed simultaneously in the same window. An unlimited number of elements can be used for each type of curve.

- **Diagrams per window**
  An unlimited number of diagrams and trends can be represented in the same window.

- **Scrolling direction**
  The trend curves can be configured to scroll in four directions, from left to right, from right to left, from top to bottom or from bottom to top.
  The X axis can be divided into time intervals or samples.
  The Y axis scale can be modified dynamically.

- **Limit values**
  Sixteen limit values can be set for each variable represented by a curve. Colours can be associated with these limits, so that the drawing changes colour each time limit values are exceeded.

- **Interaction between operator and trending**
  The zoom and panoramic functions provide detailed analyses or overviews of all the various curves.
  A grid can be added and a cross hair (vertical axis moving horizontally) ascertains the coordinates for the points.

Monitor Pro supervision software

Functions (continued)

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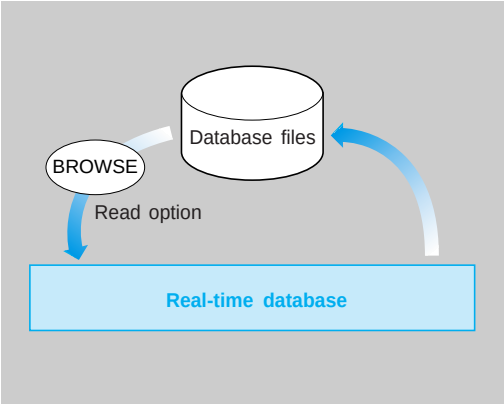
Database interface



The dBase IV, ORACLE, DB2, SYBASE, SQL, and ODBC database functions enable data transfer between the Monitor Pro real-time database and a compatible dBASE IV, ORACLE, DB2, SYBASE, SQL, and ODBC relational database.

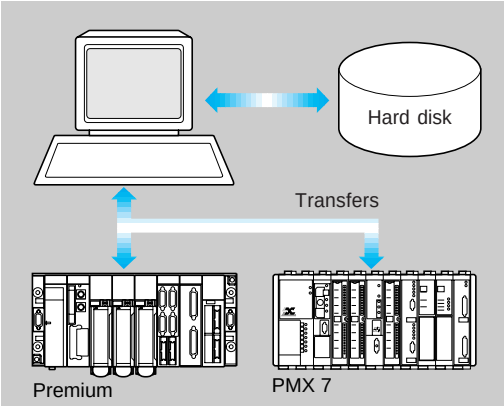
These functions provide the following options :

- Operation, viewing and editing of relational databases
- Addition, deletion and modification of records
- Authorisation of data acceptance by other supervision functions. The trending function can therefore use data stored in a relational database

The database “Browse” read function is used to restore data from databases.

MonitorPro 7 now uses Microsoft SQL as its standard data logging tool.

Recipe management



The recipe management function enables the user to create production recipes, to store them on hard disk and to perform two-way data exchanges of a set of data between the database and the hard disk (production recipe for example). The flexibility in handling data ensures fast, straightforward changes of production settings.

Any recipe can be created using non-machine dialogue, internal data and/or data from connected PLCs.

Up to 8000 different types of recipe can be defined and each type has an unlimited number of associated files. Up to 8000 database elements can be specified for each type of recipe.

Monitor Pro supervision software

Functions (continued)

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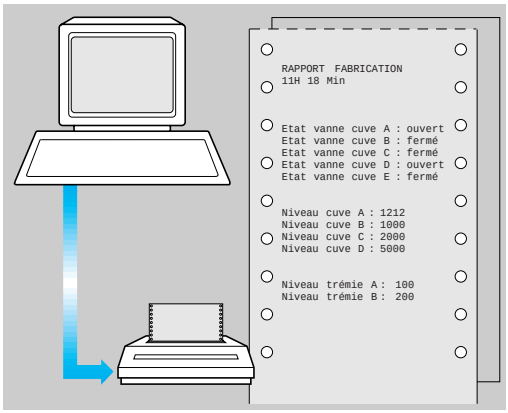
Report generator



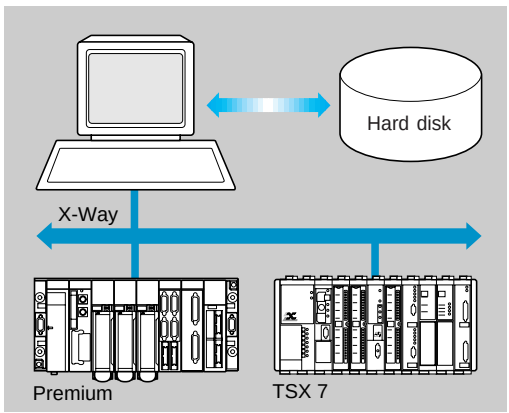
Any supervision or production monitoring tool should not only record variations and production status, and monitor the application, but also provide a hard copy summary of this data.

The report generator is used to print any data in the database in any format selected at the development stage. It is therefore possible, using a form defined by the user, to print up to 2000 types of document with different page layouts.

The reports can also be transmitted via the network or stored on disk in ASCII format.

Combined with the recipe management function, this function means that it is easy to keep a written record of all new recipes which can be read by any user.

Uploading and downloading programs and data



This function is essential in a flexible manufacturing process for the installation and startup of a production line.
The ability to integrate Monitor Pro into the X-Way communication structure enables application programs to be uploaded, downloaded and compared on different modular PLCs programmed in PL7-3 and PL7 language.
It is also used for uploading, downloading and comparing internal data.

The function can be executed either in the foreground with a man-machine interface, or in the background controlled by the application program.

Characteristics

- PLCs which can be uploaded : TSX 7/PMX 7 modular PLCs which can be programmed in PL7-3 language (versions V4 and V5) and Micro and Premium PLCs.
- Number of programs which can be stored : unlimited (only limited by the space available on the hard disk).

Monitor Pro supervision software

Functions (continued)

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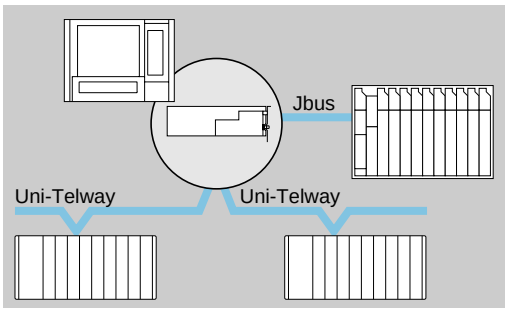
Uni-TE/Jbus/Modbus/Modbus Plus communication

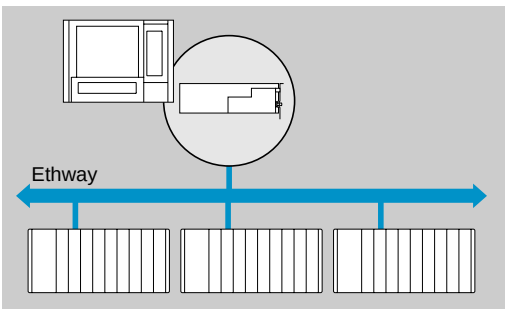
Connection via asynchronous serial link



A Uni-TE or Jbus/Modbus connection via the serial port is included in all standard configurations.

Direct connection to the Modbus Plus network requires the AM-SA85 network card and the associated communication drivers : SW-LNET-I95/INT and SW-WVVD-I95/INT.
Please consult your Regional Sales Office.

Connection to X-Way networks



Direct connection to the Ethway network uses the ISA bus network card :
TSX ETH PC 101M (2 cards maximum).

Similarly, direct connection to the Fipway network uses the ISA bus network card :
TSX FPC 10M (2 cards maximum).

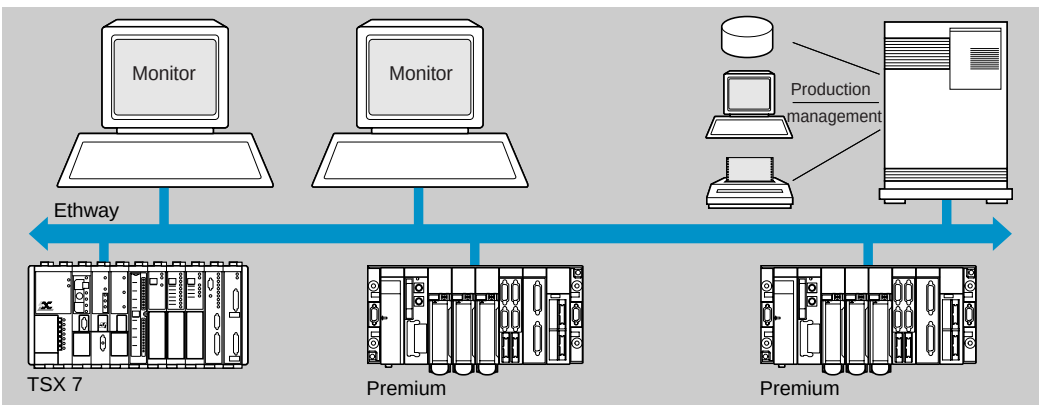
Connection can also be made on the Premium PLC via the Ethernet TCP/IP network.

The supervision station then becomes a station on the network.

Network connection

Several Monitor Pro, Monitor 77/2 and/or Monitor OCS supervisors can be installed in the same cell. The network connection function provides point to point network services between one or more Monitor systems on TCP/IP networks.

This function is used to exchange data between the various databases.
In the same way, any Monitor station can use the resources of a server connected on the network, such as the hard disk (for example : a single disk for storing all the recipes) and printer.



The main services of the network function are as follows :
- Exchanges between real-time databases : reports, commands, summary data, etc.
- Use of a server's resources (hard disk, printer, etc.)
- File transfer between stations (without server)
- File management services (copy, delete, rename directory, type and print)
- Triggering of any transfer of real-time database elements by any event (alarm, time, math and logic functions, etc.)

These services are available on Ethernet TCP/IP networks. A maximum of 16 Monitor stations can be connected together on the same segment.

Monitor Pro supervision software

References

Monitor Pro software base packages

The Monitor Pro v7 software base packages consist of 3 CD-ROMs which include software functions in three languages (English, French and German) and user manuals (English, French and German). They include paper versions of installation guides, and software registration forms (in English, French and German).

Software base functions include : real-time database, trend and real-time charts, animated graphics, alarm management, database navigator, dBase IV and ODBC data interfaces, local networks interface, PowerNet and driver interfaces for Schneider Electric PLCs.

All base servers include the following communication protocols : Schneider Device Interface (Ethway, Fipway, Unitelway, Isaway, Ethernet XIP), Modbus Ethernet (includes IOXLator), Modicon Modbus Plus and Modbus, Square D Serial/ Ethernet SyMax, IOXLator (RAPD bit only for third-party driver development), Schneider OFS (OPC server).

Package	Description	Database	Reference	Weight kg
Base servers	Monitor Pro 256	256 I/O 4096 tags	**MP SVR 256**	1.040
	Monitor Pro 1024	1024 I/O 16,384 tags	**MP SVR 1024**	1.040
	Monitor Pro Enterprise	Unlimited I/O and tags	**MP SVR ENT**	1.040
Clients	Monitor Pro Client seat, v7 Graphics		**MP CAL**	1.040
Server options	Compiled math and logic		**MP CML**	–
	Power statistical process control		**MP SPC**	–
	Native ORACLE database interface		**MP ORC**	–
	Native SYBASE database interface		**MP SYB**	–
	Power SQL advanced browser		**MP PSQ**	–
	Programmer's access kit library (PAK, EDIPAK, CFGPAK)		**MP PAK**	–
Value-added products	Enhanced communication interface - server		**MP ECI**	–
	Event time manager - server		**MP ETM**	–
	Database terminal - server		**MP DBT**	–
	Virtual real-time network - server		**MP VRN**	–
	Virtual real-time network, redundant (requires **MP VRN**) - server		**MP VRR**	–
	Man-Machine interface (requires **MP CAL**) - client		**MP MMI**	–
Communication protocols	OPC client, including ECI		**MP ODX**	–
	Allen-Bradley Async		**MP ABA**	–
	Allen-Bradley Device interface (supports ControlNet, NetDTL, KTDTL, Async, IOXIator). RSLinx 2.00.97.30 software and RSLinx master key included		**MP ABR**	–
	Allen-Bradley Device interface (supports ControlNet, NetDTL, KTDTL, Async, IOXIator). Requires RSLinx 2.00.97.30 software (not included)		**MP ABT**	–
	Allen-Bradley Device interface (supports ControlNet, NetDTL, KTDTL, Async, IOXIator). Upgrade to RSLinx 2.00.97.30 software included		**MP ABR**	–

References (continued)

References

Package	Description	Reference	Weight kg
Communication protocols (continued)	Allen-Bradley NetDTL	**MP ADT**	–
	Allen-Bradley KTDTL	**MP AKT**	–
	Bailey DTS	**MP BNT**	–
	Opto Mistic Brick	**MP BRK**	–
	Bristol Babcock	**MP BRS**	–
	Daniels 2500	**MP DAN**	–
	Eagle Signal	**MP ESG**	–
	FL GEM semiconductor interface	**MP FLG**	–
	General Electric Fanuc	**MP GEF**	–
	GEM 80	**MP GEM**	–
	Eurotherm International	**MP IBI**	–
	Moore ICI	**MP ICI**	–
	Leeds and Northrup	**MP LDN**	–
	Mitsubishi MECOM Serial and Ethernet	**MP MEE**	–
	Mitsubishi MECOM Serial Driver	**MP MES**	–
	Moore APACS (requires Moore API 4.0 or higher)	**MP MOR**	–
	Omron Hostlink	**MP OMR**	–
	Omron V600	**MP OMV**	–
	Opto 22 Optomux	**MP OPT**	–
	ProfiBus (includes IOXIator)	**MP PRO**	–
	Reliance Automate	**MP REL**	–
	Fisher Controls ROC	**MP ROC**	–
	SECS with GW libraries RS232/serial	**MP SGS**	–
	SECS with GW libraries HSMS/Ethernet	**MP SGW**	–
	Texas Instruments 305/405	**MP TI4**	–
	Texas Instruments TIWAY	**MP TIW**	–
	Siemens H1S5	**MP SH5**	–
	Siemens H1S5/S7 (includes IOXIator)	**MP SH7**	–
	Siemens CP525	**MP SIE**	–
	Siemens 396R (includes IOXIator)	**MP SIR**	–
	Siemens S7 Driver (includes Enhanced Communications Interface - supports Industrial Ethernet TCP/IP or ISO stack, ProfiBus, Multi-point Interface Protocols)	**MP S7D**	

References (continued)

References

Description	Function	Reference	Weight kg
Functional upgrades	Upgrade 64 I/O to 256 I/O	**MP FUPG 1**	–
	Upgrade 64 I/O to 1024 I/O	**MP FUPG 2**	–
	Upgrade 64 I/O to Enterprise	**MP FUPG 3**	–
	Upgrade 256 I/O to 1024 I/O	**MP FUPG 4**	–
	Upgrade 256 I/O to Enterprise	**MP FUPG 5**	–
	Upgrade 1024 or 4096 I/O to Enterprise	**MP FUPG 6**	–
	Upgrade ECS Client to v7 Client	**MP FUPG 7**	–
System integrator and demonstration packages	System integrators package	**MP SYX**	1.040
	Demonstration software system	**MP DEMO**	1.040
	Customer evaluation software	**MP C DEMO**	1.040
Support services	Support services for Modicon FactoryLink v4.x	**MP CSS FL4**	–
	Support services for Modicon FactoryLink ECS	**MP CSS M ECS**	–
	Support services for Monitor OCS	**MP CSS OCS**	–
	Support services for Monitor 77	**MP CSS M77**	–

Subscription services

Subscription service programs cover the currently shipping version and one previous major release. With the release of MonitorPro v7, subscription service programs will cover MonitorPro v7, MonitorPro v2.0 and MonitorPro v2.1. For any legacy products, such as MonitorPro OCS, Monitor 77/2, Modicon FactoryLink ECS or Modicon FactoryLink v4.x, an expired subscription service program must be purchased corresponding to the configuration of the original system in order to upgrade to the current shipping version.

Description	Function	Reference	Weight kg
	Subscription service membership for all server sizes. Includes one v7 Client Builder Client for customers who have maintained subscription	**MP CSP CB**	–
	Subscription service membership for all server sizes. Includes one v7 Client Builder Client for customers whose subscription service has expired	**MP CSP CB EXP**	–
	Subscription service membership for all server sizes. Includes one ECS Client for customers who have maintained subscription	**MP CSP ECS**	–
	Subscription service membership for all server sizes. Includes one ECS Client for customers whose subscription service has expired	**MP CSP ECS EXP**	–
	Subscription service membership for v7 Client Builder Client Graphics	**MP CSP CB CAL**	–
	Subscription service membership for ECS Client Graphics	**MP CSP ECS CAL**	–
	Subscription service membership for non-Schneider communication protocols (per license)	**MP CSP DRV**	–
	Subscription service membership for value-added products (per module)	**MP CSP VAP**	–

References (continued)

Hardware and software recommendations

The following guidelines will help you select the "best estimate" of system requirements for your MonitorPro application. Although it is impossible to define the exact hardware and software requirements for each system due to the flexibility and scalability of Monitor Pro and the other layered software involved, these guidelines provide a baseline for system configuration.

Type of system	Typical number of clients	CPU	RAM	Hard drive	Additional notes
MP SVR 256 server	1	400 MHz Pentium or faster	128 MB	2 GB or larger	Add 2MB RAM for each additional Client Builder Add 10 MB RAM for each additional MonitorPro ECS
MP SVR 1024 server	5	600 MHz Pentium or faster	192 MB	2 GB or larger	Add 2MB RAM for each additional Client Builder Add 10 MB RAM for each additional MonitorPro ECS
MP SVR ENT server (unlimited I/O)	10 or more	750 MHz Pentium or faster for up to 5 clients, Dual for 5-15 clients, and Quad for more than 15 clients	256 MB up to 15 clients and 320 MB for more than 15 clients	2 GB or larger	Add 2MB RAM for each additional Client Builder Add 10 MB RAM for each additional MonitorPro ECS; more than one server is recommended if more than 40 clients are needed.
MP CAL client (for development)	1	500 MHz Pentium or faster	192 MB	1 GB or larger	–
MP CAL client used for View only; operator interface terminal)	1	400 MHz	128 MB Pentium	1 GB or larger	–

Additional requirements

In addition to the general recommendations in the above table, you will need the following hardware on all MonitorPro 7 clients and servers:

- CD-ROM drive for installation
- XVGA monitor and graphics processor (1024 x 768, with at least 65K colors)
- Keyboard
- Microsoft-compatible mouse or pointing device

Likewise, the following software is recommended for all MonitorPro 7 clients and servers:

- Microsoft NT 4.0, service pack 4 to 6a, OR
- Microsoft Windows 2000
- Internet Explorer 4.x or 5.x
- TCP/IP network protocol and NTFS file system

Documentation

Documentation in book format is to be ordered separately. This documentation is supplied as standard on CD-ROM with Monitor Pro software packages.

Description	Composition	Language	Manual format	Reference	Weight kg
User documentation	3 volumes	(1)	228 x 190	**MP DOC ●**	3.900

(1) At the end of a reference, add **E** for English, **F** for French, **G** for German.

9 Services

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Quantum Automation Platform

Control System Product Certifications

Product certifications and marine classification authorities

In some countries, certification of certain electrical components is enforced by law. A standard conformity certificate is then issued by the official organization. Each certified product must carry approval symbols when enforced.
Use on board merchant navy vessels generally requires prior approval (= certification) of an electrical device by certain marine classification authorities.

Key	Certification body	Country
CSA	Canadian Standards Association	Canada
C-Tick	Australian Communication Authority	Australia
UL	Underwriters Laboratories	USA

Key	Classification authority	Country
BV	Bureau Veritas	France
DNV	Det Norske Veritas	Norway
GL	Germanischer Lloyd	Germany
GOST	Institut de recherche Scientifique Gost Standardt	C.I.S.
LR	Lloyd's Register	United Kingdom
RINA	Registro Italiano Navale	Italy
RRS	Register of Shipping	C.I.S.

The table below shows the situation as of the 01.01.2000 for certifications obtained or pending from organizations for base PLCs. Further information regarding certified modules can be obtained from your Regional Sales Office.

Normal execution
Certified
Pending certification

	Certifications			Marine classification authorities						
	CSA	C-Tick ACA	UL	BV	DNV	GL	GOST	LR	RINA	RRS
	Canada	Australia	USA	France	Norway	Germany	CIS	Great Britain	Italy	CIS
ABE-7	■		■	■	■	■		■		
CCX 17	■		■							
FT 2000	■		■							
Lexium MHD servodrives	■		■							
Lexium BPH motors	■		■							
Micro	■	■	■	■	■	■		■	■	■
Momentum	■	■	■							
Nano	■	■	■	■	■	■		■		
Premium	■	■	■	■	■	■		■	■	
Quantum	■	■	■		■	■		■	■	
TBX	■	■	■	■	■	■				
TSX/PMX 47 to 107	■		■	■	■	■	■		■	
TSX PRG LDR	■		■							
TXBT-F	■	■	■							
XBT-F	■	■	■							
XBT-H/P/E/HM	■		■							

Community regulations

European directives

The opening of European markets implies a harmonization of the regulations in the various European Union member states. European directives are documents which can be used to remove obstacles to the free movement of goods and their application is compulsory in all states of the European Union.
Member states are obliged to transcribe each directive into their national legislation and, at the same time to withdraw any conflicting regulations.
The directives, particularly those of a technical nature with which we are concerned, only set objectives, called, “general requirements”.
The manufacturer must take all necessary measures to ensure that his products conform to the requirements of each Directive relating to his equipment.
As a general rule, the manufacturer affirms that his products conform to the requirements of the Directive(s) by applying the CE label to his product.
CE is applied to our products where relevant.

The significance of the CE marking

- CE on a product means that the manufacturer certifies that the product conforms to the relevant European Directives; it is a necessary condition for a product which is subject to a Directive(s) to be marketed and moved freely within the European Union.
- CE marking is intended solely for the national authorities responsible for market regulation.

For electrical equipment, only conformity of the product to standards indicates that it is suitable for use. Only a guarantee from a recognized manufacturer can ensure a high level of quality.
One or more Directives, as appropriate, may apply to our products, in particular :

- The Low Voltage Directive 72/23/EEC amended by Directive 93/68/EEC : CE marking under the terms of this Directive could not be applied before 1 January 1995 and has been compulsory since 1 January 1997.
- The Electromagnetic Compatibility Directive 89/336/EEC, amended by Directives 92/31/EEC and 93/68/EEC : CE marking on the products covered by this Directive has been compulsory since 1 January 1996.

Protective treatment of equipment

Premium and Quantum PLCs meet the requirements of “TC” treatment (1).
For installations in industrial production workshops or in an environment which corresponds to “TH” treatment (2), Premium PLCs should be enclosed in casings with a minimum of IP 54 protection as prescribed by standards IEC 664 and NF C 20 040.
Premium and Quantum PLCs are supplied with an IP 20 protection index. They can therefore be installed without enclosure in locations with restricted access which do not exceed pollution degree 2 (the control room which does not contain a machine or dust-producing activity).

(1) “TC” treatment : all climate treatment
(2) “TH” treatment : treatment for hot and humid environments

Quantum Automation Platform

User documentation

References

References

Description	Language	Reference
Total Automation Documentation CD	English	**TSX CDD MTE10E**
Quantum Automation Series Documentation Library (contains 840 USE 100 00, 840 USE 101 00 890 USE 100 00, 890 USE 101 00)	English	**840 USE 500 00**
Motion Single-axis Software System User Guide	English	**GM-MOTN-001**
Quantum Automation Series Hardware Reference Guide	English	**840 USE 100 00**
	French	**840 USE 100 01**
	German	**840 USE 100 02**
	Spanish	**840 USE 100 03**
Quantum Automation Series Master Index/Getting Started Guide	English	**840 USE 102 00**
Modbus Plus Network I/O Servicing Planning Guide	English	**840 USE 104 00**
	French	**840 USE 104 01**
Motion 140 MSx 101 Single-axis MSB/MSC User Guide	English	**840 USE 105 00**
140 CHS 110 Hot Standby User Guide	English	**840 USE 106 00**
	French	**840 USE 106 01**
	Spanish	**840 USE 106 03**
140 NOE 211/251 Ethernet TCP/IP User Guide	English	**840 USE 107 00**
	French	**840 USE 107 01**
	German	**840 USE 107 02**
	Spanish	**840 USE 107 03**
140 ESI 062 10 ASCII 2-channel Interface User Guide	English	**840 USE 108 00**
140 NOL 911 x0 Echelon LON Works User Guide	English	**840 USE 109 00**
Modbus Plus to Sy/Max Gateway Programmable Bridge Mux User Guide	English	**840 USE 110 00**
140 NOE 3x1 Quantum-Sy/Max-Ethernet Network Option Module Guide	English	**840 USE 111 00**
140 HLI 340 00 High-Speed Interrupt Module User Guide	English	**840 USE 112 00**
Quantum/Compact Transmit Loadable Function Block User Guide	English	**840 USE 113 00**
140 NOE 211 Quantum Web Embedded Server User Guide	English	**840 USE 115 00**
140 NOE 771 10 Embedded Web Server User Guide	English	**840 USE 116 00**
140 EIA 921 00 Quantum AS-i Module User Guide	English	**840 USE 117 00**
140 EHC 105 High-Speed Counter User Guide	English	**840 USE 443 00**

Schneider Alliances

Program overview

www.schneideralliances.com

The **Schneider Alliances** partnership program is an answer to the many customers which are expecting from their preferred vendors much more than simple products : complete integrated and validated automation solutions. **Schneider Alliances** is both an industrial and commercial program between Schneider and its partners providing hardware or software automation products, system integration or services complementary to the Schneider offering.

The **Schneider Alliances** partnership program is comprised of :

- Products vendors :
  Design and distribute hardware or software automation products complementary to the Schneider offering and well integrated in Schneider solutions and architectures. This **Schneider Alliances** product offering includes industrial devices, communication hardware and software, HMI and supervisory software, application software packages, development and test tools, ...
  The design and manufacturing of these products may require a transfer of technology from Schneider.

- System integrators :
  Provide custom automation solutions for a specific project bringing together Schneider products and third party devices and equipment. They deploy their industry and application expertise to the implementation, installation and management of complete automation projects.

Thanks to **Schneider Alliances**, customers are able to choose among the best in class products with a assurance of proper integration within Schneider architectures. They also have access to a network of system integrators specialized in their industry and able to achieve their automation project in the best conditions of time and cost.

The **Schneider Alliances** partners network is a win-win association which brings to everyone, products vendor or system integrator, more business and turnover.

Schneider Alliances

Partnership directory

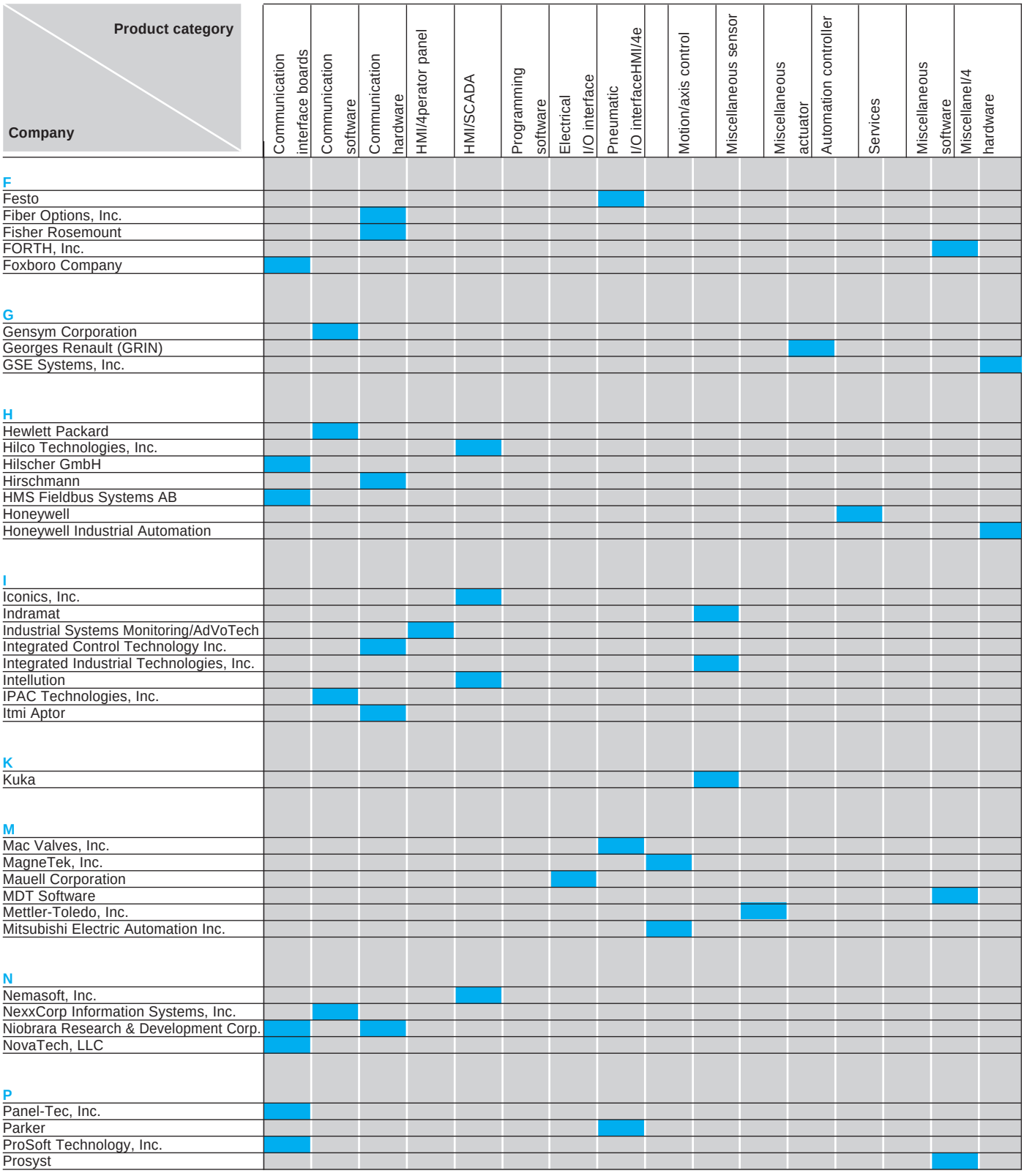
Products partnership

Company \ Product category	Communication interface boards	Communication software	Communication hardware	HMI/3perator panel	HMI/SCADA	Programming software	Electrical I/O interface	Pneumatic I/O interfaceHMI/3e		Motion/axis control	Miscellaneous sensor	Miscellaneous actuator	Automation controller	Services	Miscellaneous software	Miscellanel/3 hardware
A																
ABB Industrial Systems									■							■
ABB Power T&D Co.,					■											■
ABB Robotic										■						
ACC Systemes					■											
Acuity Imaging, Inc.											■					
AFCON					■											
Applicom International	■															
Arc Informatique					■											
Areal					■											
Aro												■				
ARORA Software		■			■											
ARTEC Systems		■														
Asco Joucomatic								■								
AspenTech					■											
Atlas Copco									■							
Automated Mining Systems			■													
Automated Solutions, Inc.		■														
Automation & Control Technologies, Inc.															■	
Automation & Systèmes	■															
Automation Science, Inc.					■											
AVG Automation	■										■					
B																
Beckwood Services, Inc.																■
Bihl & Wiedemann			■													
Bitronics, Inc.											■					
BLH Electronics, Inc.											■					
C																
Cape Software															■	
Ci Technologies Pty Ltd.					■											
CimQuest, Inc.- Products Group		■														
Cimtech					■											
Codra					■											
Commercial Timesharing, Inc.		■														
Control Techniques Drives, Inc.									■							
ControlSoft, Inc.															■	
Curry Controls Company			■													
Cutler-Hammer, Inc.				■												
CyberLogic Technologies, Inc.		■														
Cycle Software, Inc.		■														
D																
Danfoss Electronic Drives									■							
Data-Linc Group			■													
Delta Computer Systems, Inc.										■						
DLRA Projects (Pty) Ltd.					■											
Doble Engineering															■	
E																
ELECTRO Industries / Gaugetech											■					
Endress + Hauser			■													
Escort Memory Systems			■													
Etic			■													
ExperTune, Inc.		■														

I/3

9

Products partnership



Products partnership

Company \ Product category	Communication interface boards	Communication software	Communication hardware	HMI/Sperator panel	HMI/SCADA	Programming software	Electrical I/O interface	Pneumatic I/O interfaceHMI/5e		Motion/axis control	Miscellaneous sensor	Miscellaneous actuator	Automation controller	Services	Miscellaneous software	Miscellanel/5 hardware
R																
RACO Manufacturing & Engineering				■												
Robicon									■							
S																
SAF Drive Systems Ltd.													■			
Schweitzer Engineering Lab., Inc.	■															
Sciaky												■				
Secheron Ltd.	■															
Silicomp														■		
Simulation Sciences					■											
SISCO, Inc.															■	
Sofrel Telecontrol					■											
Spectrum Controls, Inc.				■			■									
S-S Technologies Inc.	■	■													■	
Steeplechase Software															■	
SWAC				■												
T																
TA Engineering Co., Inc.					■											
Tasnet, Inc.	■															
Toshiba									■							
TR Electronic												■				
TURCK, Inc.	■															
W																
Weed Instrument			■													
Wonderware					■											
X																
Xycom, Inc.				■												

Partnership products Schneider Alliances

Products directory

Company	Tel../Fax/URL	Reference	Category	Technology
ABB Industrial Systems, Inc. 16250 W. Glendale New Berlin, WI 53151 United States	Tel. +1 414-785-3416 Fax +1 414-785-0397 URL www.abb.com	CDI 300 Advant OCS	Drive Miscellaneous hardware	Modbus Plus Modbus Plus
ABB Industrial Systems, Inc. 16250 W. Glendale New Berlin, WI 53151 United States	Tel. +1 614-261-2000 Fax +1 614-261-2172 URL www.abb.com	ABB DCS 500 Advant OCS	Miscellaneous hardware Miscellaneous hardware	Modbus Modbus Plus
ABB Power T&D Co., Inc. 7036 Snowdrift Road Allentown, PA 18106 United States	Tel. +1 610-395-7333 Fax +1 610-395-1055 URL www.abb.com/papd	2000, 2000R series product family REL 512/506 REL 356 REL 350/352 PRICOMT	Miscellaneous hardware Miscellaneous hardware Miscellaneous hardware Miscellaneous hardware HMI/SCADA	Modbus Plus Modbus Plus Modbus Plus Modbus Plus Modbus Plus
ABB Robotic 5, chemin de l'Equerre ZI des Bethunes F-95310 Saint Ouen L'Aumône France	Tel. +33 (0)1 34 40 23 49 Fax +33 (0)1 34 40 23 80 URL www.abb.se/flexible	S4C Robot controller	Motion/axis control	Fipio
ACC Systemes 5 rue des aTel.iers-BP 203 F- 60 202 Compiegne Cedex France	Tel. +33 (0)3 44 38 66 66 Fax +33 (0)3 44 38 66 67 URL www.acc.fr	CEASAR	HMI/SCADA	Ethway Uni-Tel.way Modbus
Acuity Imaging, Inc. 9 Townsend West Nashua, NH 03063 United States	Tel. +1 603-598-8400 Fax +1 603-598-4684 URL www.acuityimaging.com	InTel.ligent Visual Sensor (IVS)	Miscellaneous sensor	Modbus Plus
AFCON 1014 East Algonquin Road Schaumburg, IL 60173 United States	Tel. +1 847-397-6900 Fax +1 847-397-6987 URL www.afcon-inc.com	P-CIM	HMI/SCADA	Ethway Fipway Uni-Tel.way Modbus Plus
Applicom International 43 Rue Mazagran F-76320 Caudebec-les-Elbeufs France	Tel. +33 (0)2 32 96 04 20 Fax +33 (0)2 32 96 04 21 URL www.applicom-int.com	PC1000, PCI1000, PC2000, PC4000 and PCI4000	Communication interface boards	Modbus Uni-Tel.way Fipway Ethway
Arc Informatique 2 Avenue de la cristallerie F-92310 Sèvres France	Tel. +33 (0)1 41 14 36 00 Fax +33 (0)1 46 23 86 02 URL www.arcinfo.com	PCVUE 32, FRONTVUE, DATAVUE	HMI/SCADA	Modbus, Modbus Plus, Fipway, Ethway, Uni-Tel.way, Symax/Synet, Autres
Areal 16 Avenue Jean Moulin F-77167 Savigny le Temple France	Tel. +33 (0)1 60 63 07 52 Fax +33 (0)1 64 41 90 15	Topkapi	HMI/SCADA	Ethway Fipway Uni-Tel.way Modbus
Aro 1 Avenue de Tours F-72500 Château du Loir France	Tel. +33 (0)2 43 44 74 00 Fax +33 (0)2 43 44 74 01 URL www.aronet.com	Micro 2x16 III welding controller	Miscellaneous actuator	Fipio Uni-Tel.way Modbus
ARORA Software 1755 East Plumb Lane, Suite 159, Reno, NV 89502 United States	Tel. +1 702-348-1816 Fax +1 702-348-7336 URL www.arora@sierra.net	System 816 Dialer2000	HMI/SCADA Communication software	Modbus, Modbus Plus Modbus
ARTEC Systems 5530 NE 33rd Avenue Fort Lauderdale, FL 33308 United States	Tel. +1 954-771-9007 Fax +1 954-771-9524 URL www.artec-systems.com	Drivers	Communication software	Modbus Plus
Asco Joucomatic 32 Avenue Albert 1°-BP 312 F-92506 Rueil Malmaison France	Tel. +33 (0)1 47 14 32 00 Fax +33 (0)1 47 08 53 85 URL www.ascojoucomatic.fr	BUSLINK and BUSLINK ISO pneumatic valves	Pneumatic I/O interface	Fipio
AspenTech 14701 St Mary's Lane Houston, TX 77079-2995 United States	Tel. +1 281-584-1000 Fax +1 281-584-4329 URL www.aspentech.com	SetCim	HMI/SCADA	Modbus Plus
Atlas Copco En Montillier,4 CH-1303 Penthaz Switzerland	Tel. +41 (0)21 863 63 63 Fax +41 (0)21 863 63 99 URL www.atlascopco.com/controls	Socapel PAM	Drive	Fipio
Automated Mining Systems 16 Mary Street, Unit 3 Aurora, Ontario L4G 1G2 Canada	Tel. +1 905-713-3700 Fax +1 905-713-3708 URL www.robominer.co	Broadband Gateway	Communication hardware	Modbus Plus
Automated Solutions, Inc. 1415 Fulton Road, #205 Santa Rosa, CA 95403 United States	Tel. +1 707-578-5882 Fax +1 707-579-5756 URL www.automatedsolutions.com	ASMBPLUS.OCX ASMBSERIAL	Communication software	Modbus Plus Modbus
Automation & Control Technologies, Inc. 11838 Borman Dr., Suite 200 St. Louis, MO 63146-4113 United States	Tel. +1 314-993-4080 Fax +1 314-993-7183 URL www.act/stl.com	GEMINI	Miscellaneous software	S800, Quantum
Automation & Systèmes Domaine de l'Etoile Hameau Topaze F-06610 La Gaude France	Tel. +33 (0)4 93 07 51 07 Fax +33 (0)4 93 07 52 09	IN'COM Software development	Communication interface boards Services	Ethway, Fipway, Uni-Tel.way, Modbus, Modbus Plus Ethway, Fipway, Uni-Tel.way, Modbus, Modbus Plus

Partnership products Schneider Alliances

Products directory

Company	Tel./Fax/URL	Reference	Category	Technology
Automation Science, Inc. 150 Buckskin Drive Weston, MA 02193 United States	Tel. +1 508-358-4186 Fax +1 508-358-4186	OMNIRAMA	HMI/SCADA	Modbus Modbus Plus
AVG Automation	Tel. +1 630-668-3900	Resolver	Motion/axis control	Modbus Plus
343 St. Paul Boulevard	Fax +1 630-668-4676	Interface-DeviceNet Scanner	Communication interface boards	Quantum
Carol Stream, IL 60188 United States	URL www.AVG.net	Module		
Beckwood Services, Inc. P.O. Box 985, 27 Hale Spring Road - Plaistow, NH 03865 United States	Tel. +1 603-382-3840 Fax +1 603-382-3852 URL www.beckwood.com	DeviceNet interface	Miscellaneous hardware	Autres
Bihl & Wiedemann Kaefertaler Str. 164 Mannheim, D-68167 Germany	Tel. +49-621-339-2723 Fax +49-621-339-2239 URL www.bihl-wiedemann.de	AS-i/Modbus Plus Gateway 1090/1091	Communication hardware	Modbus Plus
Bitronics Inc. P.O. Box 22290 261 Brodhead Road Lehigh Valley, PA 18002 United States	Tel. +1 610-865-2444 Fax +1 610-865-2743 URL www.bitronics.com	MultiComm Power Meter & Power Plex Digital Transducer	Miscellaneous sensor	Modbus
BLH Electronics, Inc. 75 Shawmut Road Canton, MA 02021 United States	Tel. +1 781-821-2000 Fax +1 781-828-1451 URL www.blh.com	LCp-100, LCp-200, DXp-40 Weight indicator controllers	Miscellaneous sensor	Modbus Modbus Plus
Cape Software 333 N. Sam Houston Pkwy, Suite 290, Houston, TX 77060 United States	Tel. +1 281-448-5177 Fax +1 281-448-2607 URL www.capesoftware.com	VP Link	Miscellaneous software	Modbus Plus
Ci Technologies Pty Ltd. Pymble NSW 2088 Australia	Tel. + 61 2-9855-1000 Fax + 61 2-9488-9164 URL www.cit.com.au	Citect	HMI/SCADA	Modbus Plus
CimQuest, Inc.- Products Group 518 Kimberton Road, Suite 325 Phoenixville, PA 19460 United States	Tel. +1 610-935-8282 Fax +1 610-935-1902 URL www.cimquest.com	IN-GEAR ActiveX	Communication software	Modbus Modbus Plus
Cimtech 20 rue de l'industrie B-1400 Nivelles Belgium	Tel. +32 (0) 67 88 36 66 Fax +32 (0) 67 88 36 88 URL www.cimview.com	CIMVIEW	HMI/SCADA	Ethway Fipway Uni-Telway Modbus
Codra 10 Avenue de Norvège, Narvik F-91953 Courtaboeuf Cedex France	Tel. +33 (0)1 60 92 34 34 Fax +33 (0)1 60 92 34 35 URL www.codra.fr	Panorama	HMI/SCADA	Ethway Fipway Uni-Telway Modbus, Modbus Plus Autres
Commercial Timesharing, Inc. 2650 South Arlington Road Akron, OH 44319 United States	Tel. +1 330-644-3059 Fax +1 330-644-8110 URL www.comtime.com	SA85 for Windows NT/Unix	Communication software	Modbus Plus
Control Techniques Drives, Inc. 359 Lang Boulevard Grand Island, NY 14072 United States	Tel. +1 716-773-2321 Fax +1 716-774-8327 URL www.ctdrives.com	Unidrive, Mentor II/ Quantum III	Drive	Modbus Plus
ControlSoft, Inc.	Tel. +1 216-397-3900	INTUNE V4	Miscellaneous software	Modbus
14077 Cedar Avenue, Suite 200 Cleveland, OH 44118 United States	Fax +1 216-381-5001 URL www.controlsoftinc.com	MANTRA NT	Miscellaneous software	Modbus Modbus Plus
Curry Controls Company P.O. Box 5408 1019 Pipkin Road Lakeland, FL 33811 United States	Tel. +1 941-646-5781 Fax +1 941-646-3899 URL www.currycontrols.com	Modpac Plus RF Modem	Communication hardware	Modbus Modbus Plus
Cutler-Hammer, Inc.	Tel. +1 614-882-3282	PanelMate 500	HMI/operator panel	Modbus Plus
P.O. Box 6166 173 Heatherdown Drive Westerville, OH 43081 United States	Fax +1 614-895-7111 URL www.cutlerhammer.com	AMI 6000	HMI/operator panel	Modbus Plus
CyberLogic Technologies, Inc.	Tel. +1 248-740-9842	MBX Driver	Communication software	Modbus, Modbus Plus
340 East Big Beaver Rd	Fax +1 248-740-9821	Remote MBX Driver	Communication software	Modbus, Modbus Plus
Suite 208	URL www.cyberlogictech.com	Virtual MBX Driver	Communication software	Modbus, Modbus Plus
United States		MBX Bridge	Communication software	Modbus, Modbus Plus
Cycle Software, Inc.	Tel. +1 617-576-6900	Live Data	Communication software	Modbus, Modbus Plus
130 Prospect Street, Suite 202 Cambridge, MA 02139 United States	Fax +1 617-576-6501 URL www.livedata.com	Live Data Quantum	Communication software	Quantum
Danfoss Electronic Drives 2995 Eastrock Drive Rockford, IL 61109 United States	Tel. +1 815-398-2770 Fax +1 815-398-2869 URL www.danfoss.com	VTL Series 5000	Drive	Modbus Plus

Partnership products Schneider Alliances

Products directory

Company	Tel./Fax/URL	Reference	Category	Technology
Data-Linc Group 2635 151st PL. NE Redmond, WA 98052 United States	Tel. +1 425-882-2206 Fax +1 425-867-0865 URL www.data-linc.com	FDM7000, MDL500 FSK, LCM100 FSK, SRM6000, DLM4000-DL, DLM4000-LL, CCS9000, LLM1 100 Bell 202 FSK,	Communication hardware	Modbus
		SRM6200E	Communication hardware	Ethway
Delta Computer Systems, Inc.	Tel. +1 360-254-8688	MMC120 00 2 axis	Motion/axis control	Quantum
11719 Northeast 95th Street,	Fax +1 360-254-5435	MMC188/40/41 4 axis	Motion/axis control	S800
Suite D Vancouver, WA 98682 United States	URL www.deltacompsys.com	RMC100 2/8 axis	Motion/axis control	Modbus Plus
DLRA Projects (Pty) Ltd. P.O. Box 483 - 108 Hendrick Verwoerd Dr., Randburg Pinegowrie 2123 South Africa	Tel. +27 11-886-4704 Fax +27 11-886-5739 URL www.dlra.co.za	Adroit	HMI/SCADA	Modbus Plus
Doble Engineering 85 Walnut Street Watertown, MA 02473 United States	Tel. +1 617-926-4900 Fax +1 617-926-0528 URL www.doble.com	INSITE	Miscellaneous software	Modbus Plus
ELECTRO Industries/Gaugetech	Tel. +1 516-334-0870	Futura+ Series	Miscellaneous sensor	Modbus, Modbus Plus
1800 Shames Drive	Fax +1 516-338-4741	DWVA 300	Miscellaneous sensor	Modbus
Westbury, NY 11590 United States	URL www.electroind.com	DMMS 300+	Miscellaneous sensor	Modbus, Modbus Plus
Endress + Hauser 3 rue du Rhin F-68330 Huningue France	Tel. +33 (0)3 89 69 67 68 Fax +33 (0)3 89 69 48 02 URL www.endress.com	ZA 674 gateway	Communication hardware	Fipio
Escort Memory Systems	Tel. +1 831-438-7000	CM900	Communication hardware	Compact
3 Victor Square	Fax +1 831-438-5768	CM1000	Communication hardware	S800
Scotts Valley, CA 95066 United States	URL www.ems-rfid.com	CM41/CM42	Communication hardware	Modbus Plus
Etic 13, Chemin du Vieux Chêne ZIRST 4201 38942 Meylan Cedex France	Tel. +33 (0)4 76 04 20 00 Fax +33 (0)4 76 04 20 01	FT300 UTW remote control front end	Communication hardware	Uni-Telway
ExperTune, Inc. 4734 Sonseeahray Drive Hubertus, WI 53033 United States	Tel. +1 414-628-0088 Fax +1 414-628-0087 URL www.expertune.com	PID analyser tuner	Communication software	Modbus
Festo	Tel. +33 (0)1 49 35 23 23	type 02, 03 and 04B (ISO),	Pneumatic I/O interface	Fipio
5 Rue Montgolfier	Fax +33 (0)1 49 35 23 33	type 10 (CPV) and 12 (CPA)	Pneumatic I/O interface	Fipio
F-93116 Rosny sous Bois France	URL www.festo.com			
Fiber Options, Inc.	Tel. +1 516-567-8320	2291M	Communication hardware	Modbus Plus
80 Orville Drive, Suite 102 Bohemia, NY 11716 United States	Fax +1 516-567-8322 URL www.fiberoptions.com	2281M	Communication hardware	Autres
Fisher Rosemount 1 Rue Traversière, Silic 125 F-94523 Rungis Cedex France	Tel. +33 (0)1 49 79 73 00 Fax +33 (0)1 49 79 73 99 URL www.frco.com	MG-HRT-WF-002-FR Hart / Fipio gateway	Communication hardware	Fipio
FORTH, Inc. 111 N. Sepulveda Blvd., Suite 300 Manhattan Beach, CA 90266 United States	Tel. +1 310-372-8493 Fax +1 310-318-7130 URL www.forth.com	Express	Miscellaneous software	Modbus Plus
Foxboro Company 33 Commercial Street Foxboro, MA 02035 United States	Tel. +1 508-543-8750 Fax +1 508-549-4800 URL www.foxboro.com	Intelligent Automation Series	Communication interface boards	Modbus Modbus Plus
Gensym Corporation 125 Cambridge Park Drive Cambridge, MA 02140 Etats-Unis	Tel. +1 617-547-2500 Fax +1 617-547-1962 URL www.gensym.com	G2 Real-time Expert System	Communication software	Modbus Plus
Georges Renault (GRIN) 99 Route de Clisson F-44230 Sebastien sur Loire France	Tel. +33 (0)2 40 80 20 00 Fax +33 (0)2 40 33 27 07	SMA 68000 screwing controller	Miscellaneous actuator	Uni-Telway
GSE Systems, Inc. 9189 Red Branch Road Columbia, MD 02145 United States	Tel. +1 410-772-3500 Fax +1 410-772-3611 URL www.gses.com	SNCC D/3	Miscellaneous hardware	Modbus Plus S800
Hewlett Packard 2, avenue du Lac F- 91040 Evry France	Tel. +33 (0)1 69 82 60 60 Fax +33 (0)1 69 91 84 32 URL www.hp.com	Driver HP UX	Communication software	Ethway
Hilco Technologies, Inc. 3300 Rider Trail South Suite 300 Earth City, MO 63045-1338 United States	Tel. +1 314-298-9100 Fax +1 314-298-1729 URL www.hilco.com	Monitrol	HMI/SCADA	Modbus Plus

Partnership products Schneider Alliances

Products directory

Company	Tel./Fax/URL	Reference	Category	Technology
Hilscher GmbH Rheinstrabe 78 Hattersheim, D-65796 Germany	Tel. +49 6190 9907 0 Fax +49 6190 9907 50 URL www.hilscher.com	KPO 104-MBP, PVK 20-MBP CIF 30-MBP, SCA-MBP	Communication interface boards	Modbus Plus
Hirschmann PO Box 1649 D-72606 Nürtingen Germany	Tel. +49 7127 14 1479 Fax +49 7127 14 1495 URL www.hirschmann.com	OZD FIP	Communication hardware	Fipio, Fipway
HMS Fieldbus Systems AB	Tel. +46 (0)35 168 200	AnyBus AB64	Communication interface boards	Fipio
Pilefeltsgatan 73	Fax +46 (0)35 168 210	AnyBus Data Transfer	Communication interface boards	Modbus
S-302 50 Halmstad Sweden	URL www.hms.se			Modbus Plus
Honeywell Parc Technologique Bât. Mercury BP 87 F-91193 Gif sur Yvette France	Tel. +33 (0)1 60 19 80 00 Fax +33 (0)1 60 19 81 81 URL www.honeywell.com	Excel 500	Automation controller	Fipway
Honeywell Industrial Automation 16404 N. Black Canyon Highway Phoenix, AZ 85053 United States	Tel. +1 602-313-5000 Fax +1 602-313-4990 URL www.iac.honeywell.com	SCAN 3000	Miscellaneous hardware	Modbus Modbus Plus
Iconics, Inc. 100 Foxborough Boulevard Foxborough, MA 02035 United States	Tel. +1 508-543-8600 Fax +1 508-543-1503 URL www.iconics.com	GENISIS-32	HMI/SCADA	Modbus Plus
Indramat Dr Nebel strasse, 2 D-97816 Lohr am Main Germany	Tel. +49 (0)93 5240 0 Fax +49 (0)93 5240 4885 URL www.indramat.com	MTC 200 CNC	Motion/axis control	Fipway
Industrial Systems	Tel. +1 205-824-0222	Voice MMI	HMI/operator panel	Modbus, Modbus Plus
Monitoring/AdVoTech 3201 Lorna Road Birmingham, AL 35216 United States	Fax +1 205-824-0291 URL www.voicemmi.com	ISM communicator	HMI/operator panel	Modbus
Integrated Control Technology Inc. 871 Turnpike Street, Suite 208 North Andover, MA 01845 United States	Tel. +1 978-557-5882 Fax +1 978-557-5884 URL www.ictglobal.com	IBS-802 gateway Interbus-S	Communication hardware	Modbus Plus
Integrated Industrial Technologies, Inc.	Tel. +1 412-828-1200 Fax +1 412-828-0320	IFC 020 2-Axis resolver	Motion/axis control	Quantum
221 Seventh Street, Suite 200 Pittsburgh, PA 15238 United States	URL www.i2t-inmotion.com	SCM 020/120 Stepper Motor Control	Motion/axis control	Quantum Compact
Intellution 1 Edgewater Drive Norwood, MA 02062 United States	Tel. +1 781-769-8878 Fax +1 781-769-1990 URL www.intellution.com	Fix Dmacs	HMI/SCADA	Modbus Plus
IPAC Technologies, Inc.	Tel. +1 219-464-7212	IPACT SA85 Device Driver	Communication software	Modbus Plus
260 South Campbell Valparaiso, IN 46385 United States	Fax +1 219-462-5387 URL www.ipact.com	IPACT Communication Library	Communication software	Modbus Plus
Itmi Aptor 61 Chemin du Vieux Chêne F-38244 Meylan France	Tel. +33 (0)4 76 41 40 00 Fax +33 (0)4 76 41 28 05	CIU communicator	Communication hardware	Ethway Fipway
Kuka 1 Rue Blaise Pascal F-91380 Chilly Mazarin France	Tel. +33 (0)1 69 79 80 00 Fax +33 (0)1 69 79 80 01 URL www.kuka.com	KR C1 robot controller	Motion/axis control	Fipio
Mac Valves, Inc. 30569 Beck Road Wixom, MI 48393-7011 United States	Tel. +1 248-624-7700 Fax +1 248-624-0549 URL www.macvalves.com	Air Valve Interface	Pneumatic I/O interface	Modbus Plus
MagneTek, Inc.	Tel. +1 414-782-0200	GPD 515	Drive	Modbus Plus
16555 W Ryerson Road New Berlin, WI 53151 United States	Fax +1 414-782-1283 URL www.magnetek.com	GPD333AC	Drive	Modbus Plus
Mauell Corporation	Tel. +1 717-432-8686	DI64 Plus 99-61-886	Electrical I/O interface	Modbus Plus
31 Old Cabin Hollow Road	Fax +1 717-432-8688	DO128 Plus 99-61-P91N	Electrical I/O interface	Modbus Plus
Dillsburg, PA 17019-8815 United States	URL www.mauell-us.com			
MDT Software	Tel. +1 678-297-1050	Mass Autosave	Miscellaneous software	Modbus
2520 NorthWinds Parkway	Fax +1 678-297-1003			Modbus Plus
Suite 100 Alpharetta GA678/297-1000 United States	URL www.mdtsoft.com			
Mettler-Toledo, Inc. 350 West Wilson Bridge Road Worthington, OH 43085 United States	Tel. +1 614-438-4511 Fax +1 614-438-4770 URL www.mt.com	Jaguar Weigh Scale	Miscellaneous sensor	Modbus Plus
Mitsubishi Electric Automation, Inc. 500 Corporate Woods Parkway Vermon Hills IL60061 United States	Tel. +1 847-478-2000 Fax +1 847-478-0327 URL www.meau.ea.com	FR-A500	Drive	Modbus Plus

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Nemasoft, Inc. 124 Washington St., Suite 201 Foxboro, MA 02035 United States	Tel. +1 508-698-3611 Fax +1 508-698-3782 URL www.nemasoft.com	Paragon 500/550, AutoNet, PowerVIEW	HMI/SCADA	Modbus Modbus Plus
NexxCorp Information Systems, Inc. 235 Beatty Avenue Oshawa, Ontario L1H 3B4 Canada	Tel. +1 905-433-7566 Fax +1 905-579-5699	ModLINX	Communication software	Modbus Modbus Plus
Niobrara Research &	Tel. +1 417-624-8918	MEB-TCP	Communication hardware	Modbus Plus
Development Corp. P.O. Box 3418	Fax +1 417-624-8920 URL www.niobrara.com	Bridge PMN Modbus Plus to POWERLOGIC	Communication hardware	Modbus Plus
2400 Tanyard Road		QSPXM Seriplex Master	Communication interface boards	Quantum
Joplin, MO 64803		QUCM Universal Communications	Communication interface boards	Quantum
United States		MUCM-B	Communication interface boards	Momentum
NovaTech, LLC 13604 West 107th Street Lenexa, KS 66215 United States	Tel. +1 913-451-1880 Fax +1 913-451-2845 URL www.novatech-llc.com	Modem Micro PLC	Communication interface boards	Autres
Panel-Tec, Inc.	Tel. +1 256-534-8132	BG-3500	Communication interface boards	Modbus Plus
P.O. Box 23942607 Leeman Ferry Road, Suite 7 Huntsville, AL 35804 United States	Fax +1 256-534-4769 URL www.panel-tec.com	MD-3000	Communication interface boards	Modbus Plus
Parker Rue Henri Becquerel F-27031 Evreux France	Tel. +33 (0)2 32 23 34 00 Fax +33 (0)2 32 28 98 07 URL www.parker.com	Valvetronic 164	Pneumatic I/O interface	Fipio
ProSoft Technology, Inc. 9801 Camino Media, # 105 Bakersfield, CA 93311 United States	Tel. +1 805-664-7208 Fax +1 805-664-7233 URL www.prosoft-technology.com	SCANport Communication Adapter 1560-MBP	Communication hardware	Modbus Plus
Prosyst 70 Rue Jean Jaures 59770 - Marly France	Tel. +33 (0)3 20 90 43 33 Fax +33 (0)3 20 90 43 34 URL www.prosyst.fr	SIMAC	Miscellaneous software	Modbus Plus
RACO Manufacturing & Engineering 1400 62nd Street Emeryville, CA 94608 United States	Tel. +1 510-658-6713 Fax +1 510-658-3153 URL www.racoman.com	Verbatim Gateway	HMI/operator panel	Modbus Plus
Robicon 500 Hunt Valley Drive New Kensington, PA 15068 United States	Tel. +1 724-339-9500 Fax +1 724-339-8100 URL www.robicon.com	Clean Power, 454, Perfect Harmony	Drive	Modbus Modbus Plus
SAF Drive Systems Ltd. 88 Ardelt Avenue Kitchener, Ontario N2C 2C9 Canada	Tel. +1 519-743-5491 Fax +1 519-743-3610 URL www.safdrives.com	SAFphire - Programmable Linear Controller	Automation controller	Modbus Modbus Plus Symax/Synet
Schweitzer Engineering Laboratories, Inc. 2350 NE Hopkins Court Pullman, WA 99163-5603 United States	Tel. +1 509-332-1890 Fax +1 509-332-6187 URL www.seline.com	SEL-2711	Communication interface boards	Modbus Plus
Sciaky 119 Quai Jules Guesde, BP 43 F-94401 Vitry sur Seine France	Tel. +33 (0)1 45 73 43 00 Fax +33 (0)1 46 82 58 80 URL www.sciaky.com	CPS2000 RL2	Miscellaneous actuator	Fipio
Secheron Ltd. 14 Avenue de Secheron Geneva 21 Switzerland	Tel. +41 22 739 4111 Fax +41 22 738 7305 URL www.secheron.com	VMB OZ	Communication interface boards	Modbus Plus
Silicomp 195 Rue Lavoisier F-38330 Montbonnot St Martin France	Tel. +33 (0)4 76 41 66 66 Fax +33 (0)4 76 41 66 67 URL www.silicomp.com	Software development	Services	Fipio Fipway
Simulation Sciences 2500 City West Boulevard, Ste. 1200, Houston, TX 77042 United States	Tel. +1 713-683-1710 Fax +1 713-683-6613 URL www.simsci.com	AIM AIM\AT	HMI/SCADA	Modbus Modbus Plus
SISCO, Inc. 6605 19 1/2 Mile Road Sterling Heights, MI 48314-1408 United States	Tel. +1 810-254-0020 Fax +1 810-254-0053 URL www.sisconet.com	AX-S4 MMS	Miscellaneous software	Modbus Modbus Plus
Sofrel Telecontrol 2 rue du Plessis	Tel. +33 (0)2 99 04 89 00 Fax +33 (0)2 99 04 89 01	SOFREL S50, RTU for technical facilities	HMI/SCADA	Uni-Telway Modbus
F-35770 Vern sur Seiche France		SOFREL S50 Thermix, RTU for HVAC applications	HMI/SCADA	Uni-Telway Modbus
Spectrum Controls, Inc.	Tel. +1 425-746-9481	140 ACI 051 : 32-Ch analog input	Electrical I/O interface	Quantum
P.O. Box 5533 2700 Richards Road, Suite 200 Bellevue, WA 98005 United States	Fax +1 425-641-9473 URL www.spectrumctls.com	SOI-260	HMI/operator panel	S800

Partnership products Schneider Alliances

Products directory

Company	Tel./Fax/URL	Reference	Category	Technology
S-S Technologies Inc. 50 Northland Road Waterloo, Ontario N2V 1N3 Canada	Tel. +1 519-725-5136 Fax +1 519-725-1515 URL www.sstech.on.ca	Universal Communication System Modicon RIO Interface Card QNX 4.X Device Administrator PICS Simulation software X-Link	Communication interface boards Communication interface boards Communication software Miscellaneous software Communication software	Modbus S800 Modbus Plus Autres Modbus, Modbus Plus
Steeplechase Software 1330 Eisenhower Place Ann Arbor, MI 48108 United States	Tel. +1 734-975-8100 Fax +1 734-975-8123 URL www.steeplechase.com	Visual Logic Controller - VLC-PDK	Miscellaneous software	Autres
SWAC Odenpullach 1 82041 Oberhaching Germany	Tel. +49 89 316 8660 Fax +49 89 316 866 80 URL www.swac.de	BTK 16, 32, 64, BT.GDA	HMI/operator panel	Modbus Plus
TA Engineering Co., Inc. 1150 Moraga Way Moraga, CA 94556 United States	Tel. +1 925-376-8500 Fax +1 925-376-4977 URL www.ta-eng.com	AIMAX for Windows	HMI/SCADA	Modbus Modbus Plus
Tasnet, Inc. 5271 102nd Ave. North Pinellas Park, FL 33782 United States	Tel. +1 727-544-1555 Fax +1 727-545-8975 URL www.tasnet.com	Substation Automation and Communication Software Systems	Communication interface boards	Modbus
Toshiba 13131 West Little York Rd Houston, TX 77041 United States	Tel. +1 713-466-0277 Fax +1 713-466-8773 URL www.toshiba.com	G3 Inverter	Drive	Modbus Plus
TR Electronic Eglishalde, 6 D-78647 Trossingen Germany	Tel. +49 (0) 7425 228 0 Fax +49 (0) 7425 228 33 URL www.trelectronic.com	CE65 absolute rotary encoders LA 68K linear absolute coders	Miscellaneous sensor Miscellaneous sensor	Fipio Fipio
TURCK, Inc. 3000 Campus Drive Plymouth, MN 55441 United States	Tel. +1 612-553-7300 Fax +1 612-553-0708 URL www.turck.com	Sensoplex MC	Communication interface boards	Modbus Plus
Weed Instrument P.O. Box 300 707 Jeffrey Way Round Rock, TX 78680-0300 United States	Tel. +1 512-434-2844 Fax +1 512-434-2851 URL www.weed instrument.com	Fiber Optic Modem 6000 EoTec	Communication hardware	Modbus Modbus Plus S800
Wonderware 100 Technology Drive Irvine, CA 92718 United States	Tel. +1 949-727-3200 Fax +1 949-727-3270 URL www.wonderware.com	Intouch	HMI/SCADA	Ethway Fipway Uni-Telway Modbus Plus
Xycom, Inc. 750 North Maple Road Saline Michigan MI 48176 United States	Tel. +1 734-429-4971 Fax +1 734-429-1010 URL www.xycom.com	34XX	HMI/operator panel	Uni-Telway Modbus Modbus Plus

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