Momentum Automation Platform

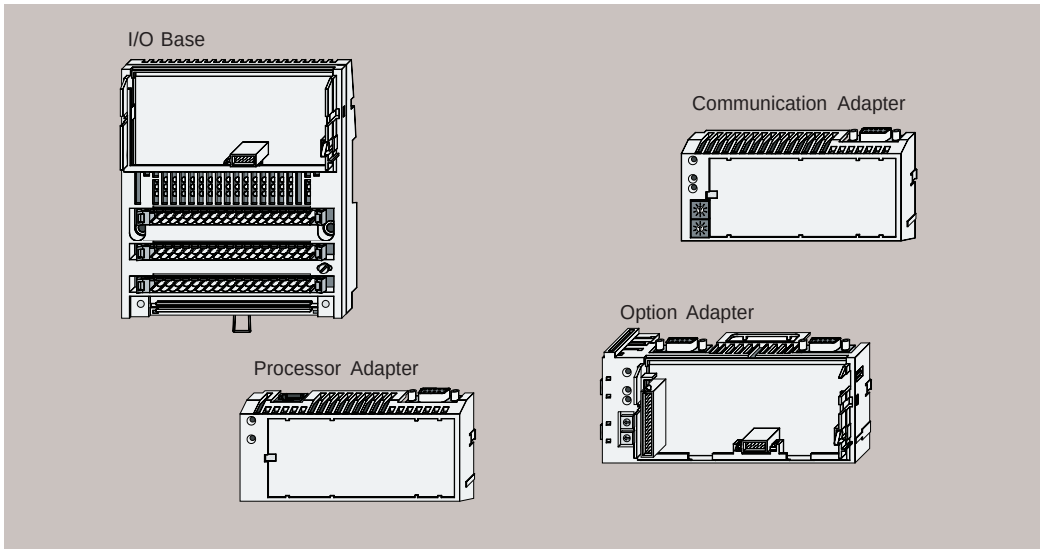
Contents

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.

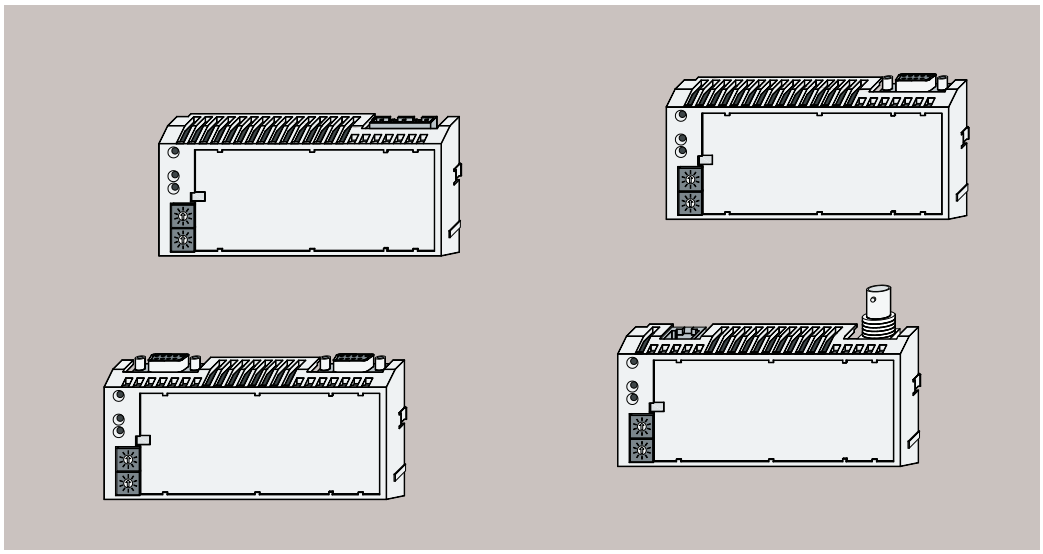
The four pieces are:

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



Momentum Communication Adapters

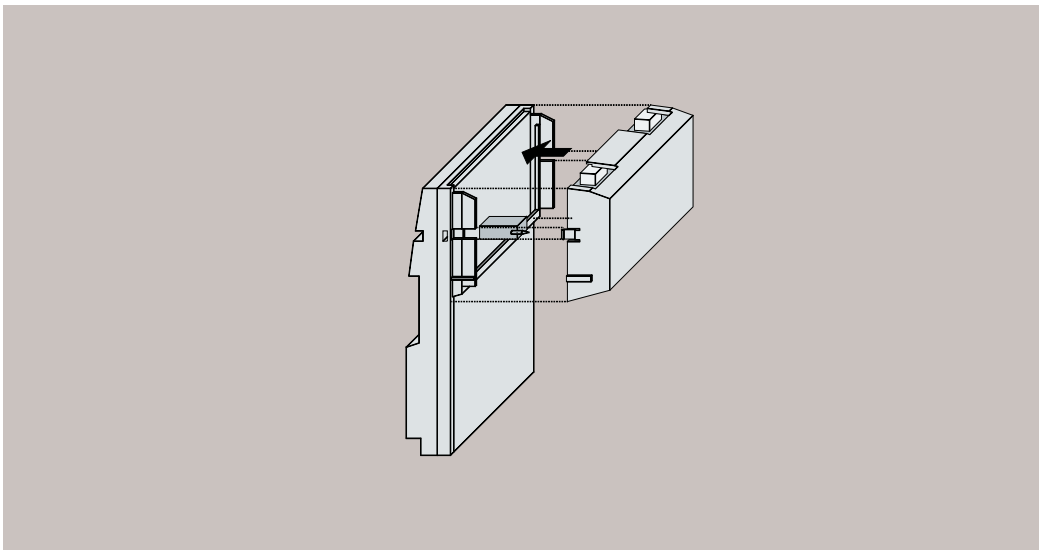
Momentum´s design separates the communications from the I/O base, thus creating a truly open I/O system that can be easily adapted to any fieldbus network. When a Momentum I/O is coupled with a Communication Adapter, the two form a remote I/O drop that connects directly to virtually any standard fieldbus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



Introduction

Momentum I/O Bases

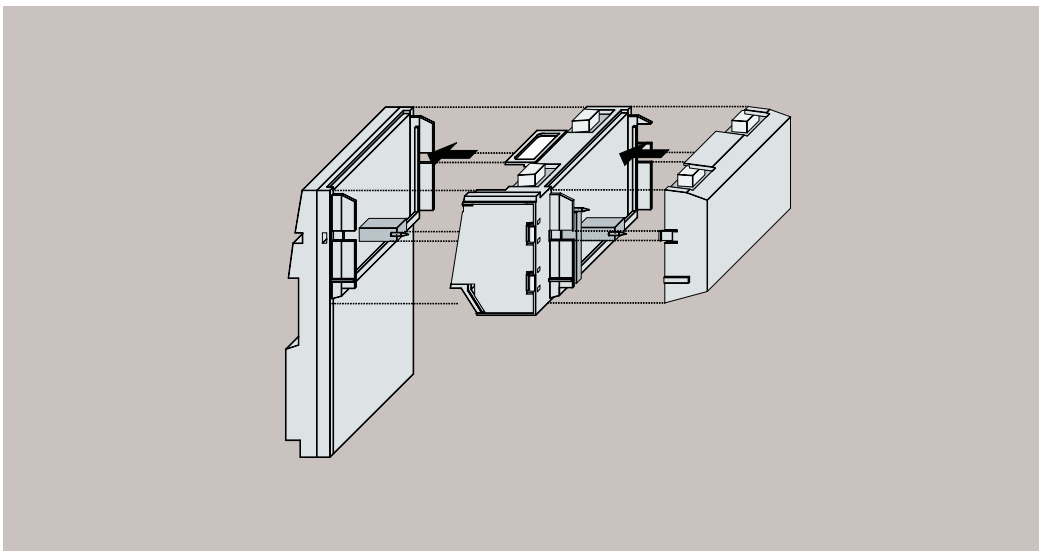
Specialized Momentum I/O Bases support the rest of the control system. The Communication Adapters, Processor Adapters and Option Adapters all snap onto the I/O Bases. A selection of I/O base modules are available, including analog I/O, discrete I/O, multi-function analog and bi-directional discrete bases. 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.



Momentum 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					

Momentum 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.

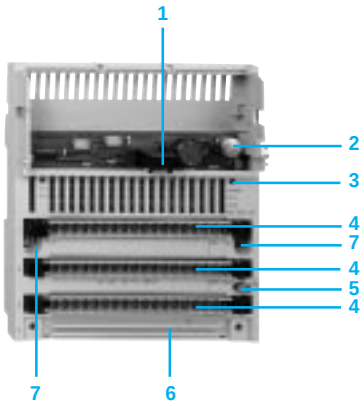
The I/O bases fit into compact standard housings that can be mounted on a DIN rail or on panels in a cabinet. They read information from field sensing devices and control discrete and analog field actuating devices. Terminal blocks and bus bars are available for use with the bases so that they can be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

Momentum 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			

Discrete I/O Bases

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	

Discrete I/O Bases

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	

Discrete I/O Bases

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

Discrete input bases

170 ADI ●●0 ●0

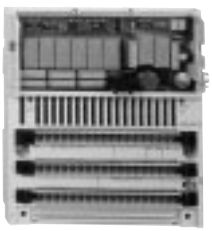
Type of current	Input voltage	Modularity (no. of points)	Conformity IEC 1131-2	Reference	Weight kg
DC	24 V	16 (1 x 16)	Type 1	**170 ADI 340 00**	0.190
		32 (2 x 16)	Type 1	**170 ADI 350 00**	0.200
AC	100…120 V	16 (2 x 8)	Type 2	**170 ADI 540 50**	0.284
	200…240 V	16 (2 x 8)	Type 2	**170 ADI 740 50**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

Discrete output bases

170 ADO ●●0 ●0

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

Discrete I/O bases



170 ADM ●●0 ●●

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

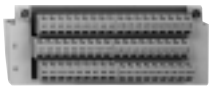
References (continued), dimensions, mounting

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

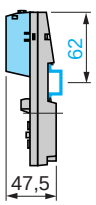
Description	Composition	Type of connection	Reference	Weight kg
Terminal blocks for I/O base connection	Set of 3 connectors 1 row	Screw	**170 XTS 001 00**	–
		Spring	**170 XTS 002 00**	–
Bus Bar	3 rows	Screw	**170 XTS 004 01**	–
		Spring	**170 XTS 003 01**	–
	2 rows	Screw	**170 XTS 005 01**	–
		Spring	**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**	–

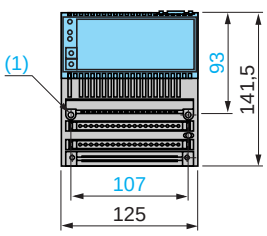
Replacement parts

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**	–

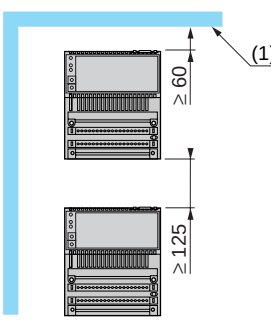
Dimensions, mounting

170 AD●, rail or panel mounting





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



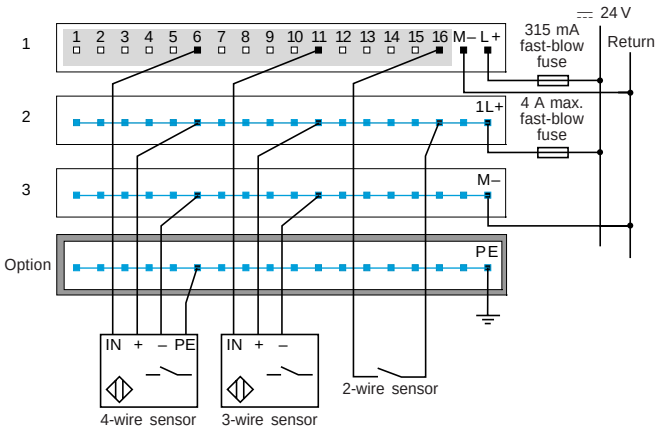
(1) Equipment or enclosure

Discrete I/O Bases

Connections

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

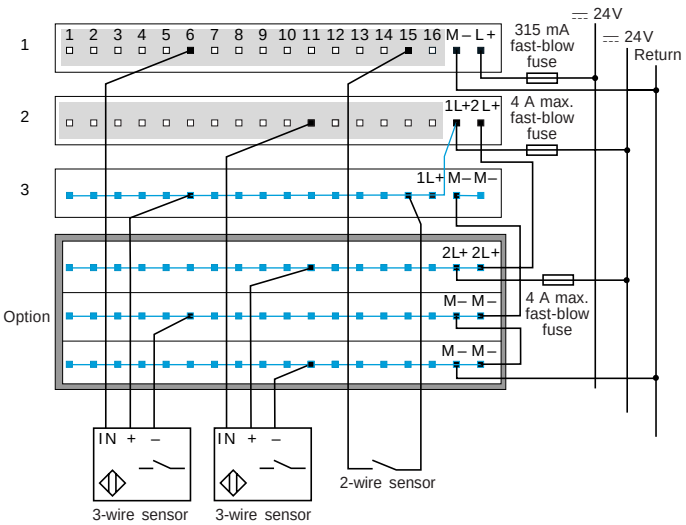
170 ADI 340 00
Example of external wiring of 2, 3 and 4-wire sensors



Group of channels

Internal wiring

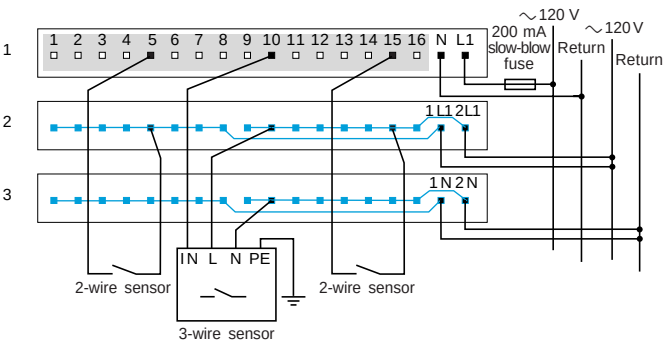
170 ADI 350 00
Example of external wiring of 2 and 3-wire sensors



Group of channels

Internal wiring

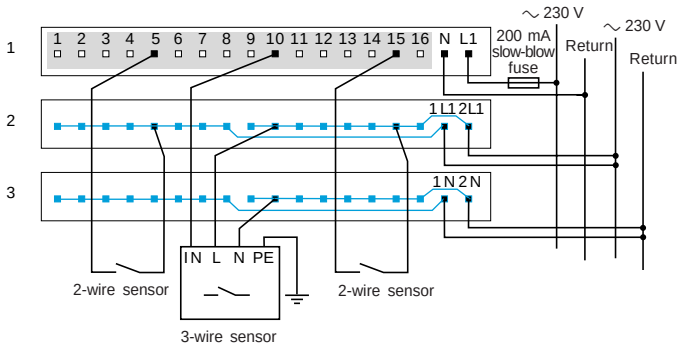
170 ADI 540 50
Example of external wiring of 2 and 3-wire sensors



Group of channels

Internal wiring

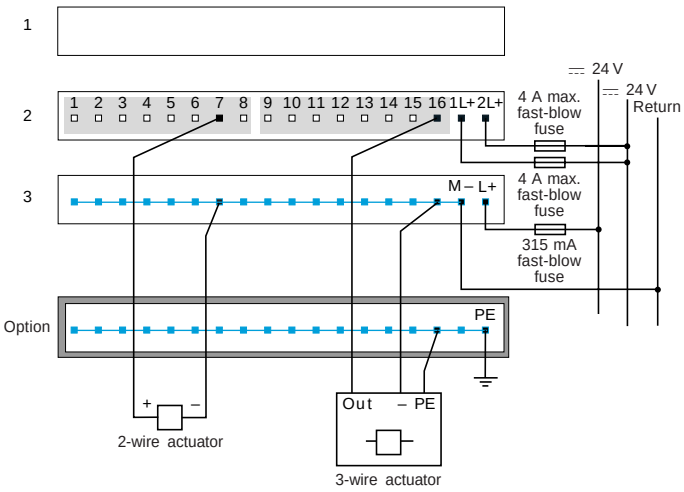
170 ADI 740 50
Example of external wiring of 2 and 3-wire sensors



Connections (continued)

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

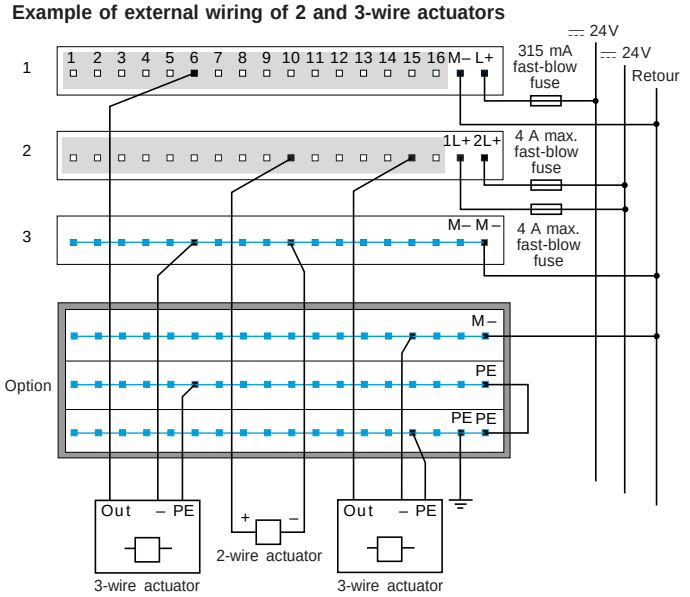
170 ADO 340 00
Example of external wiring of 2 and 3-wire actuators



Group of channels

Internal wiring

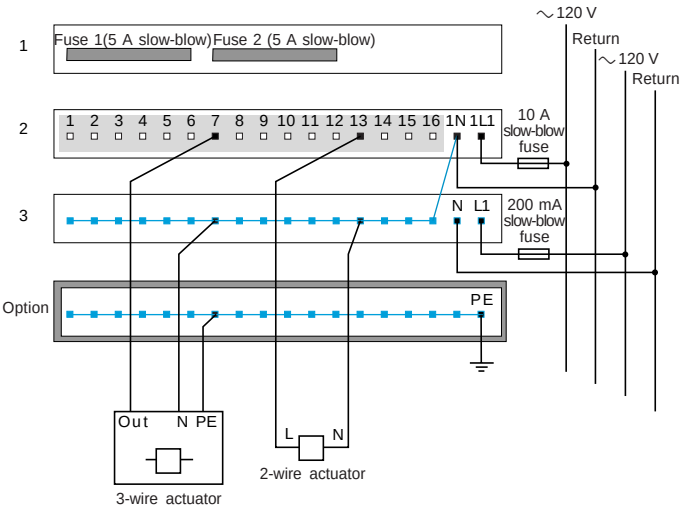
170 ADO 350 00
Example of external wiring of 2 and 3-wire actuators



Group of channels

Internal wiring

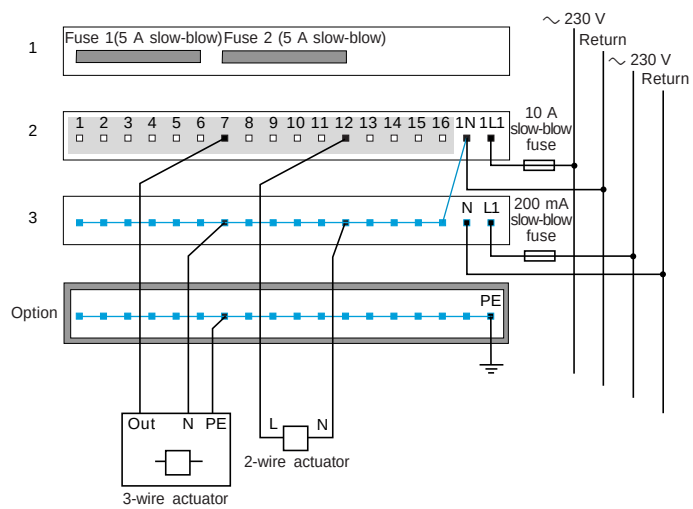
170 ADO 530 50/540 50
Example of external wiring of 2 and 3-wire actuators



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

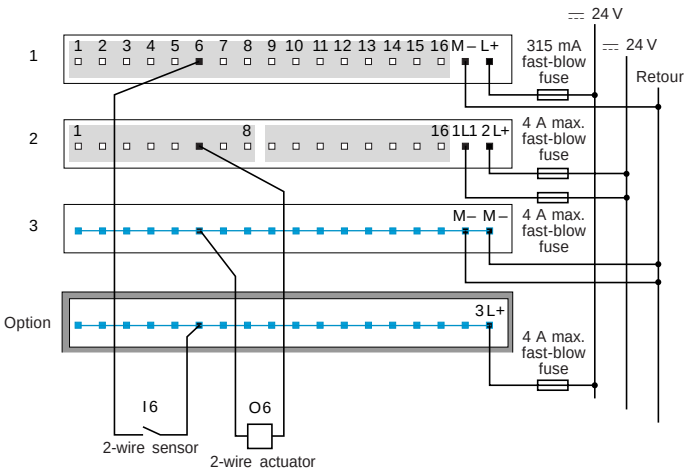
Discrete I/O Bases

Connections (continued)

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

170 ADM 350 10/350 11

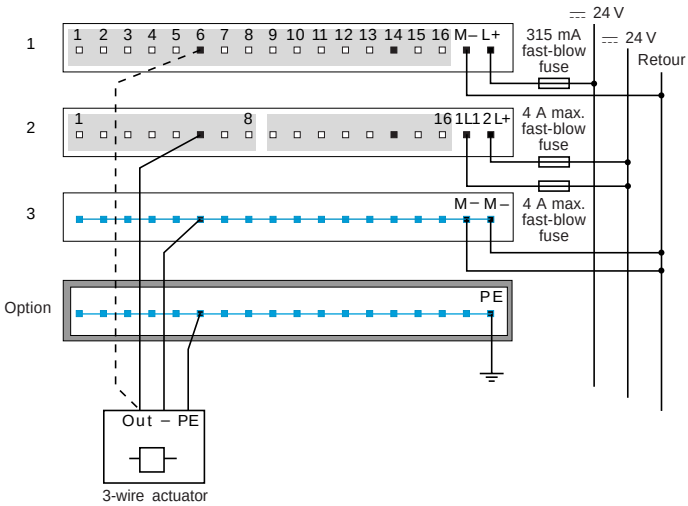
Example of external wiring of a 2-wire sensor/actuator



Group of channels

Internal wiring

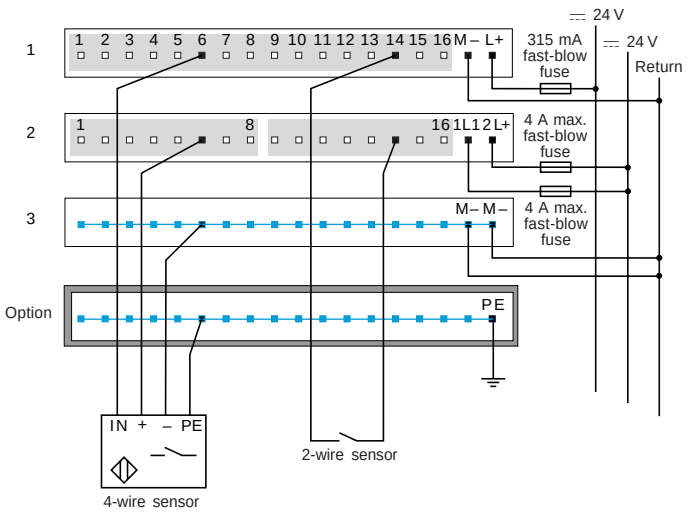
Example of external wiring of a 3-wire actuator with wiring check



Group of channels

Internal wiring

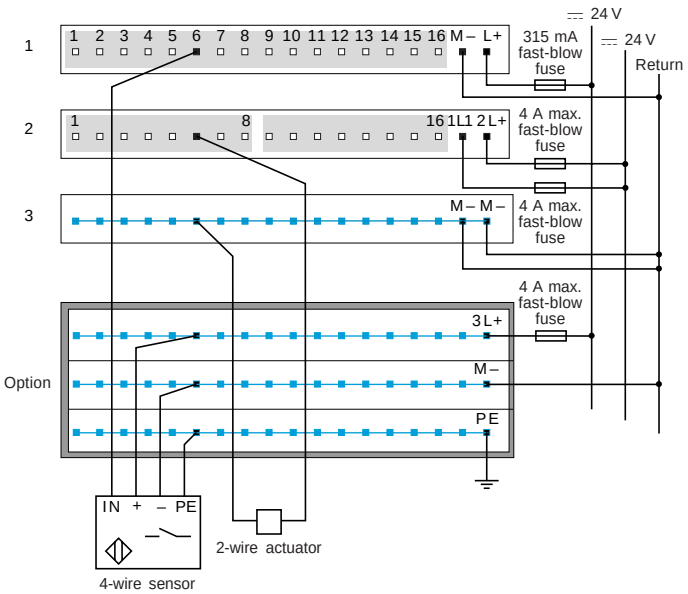
Example of external wiring of a 4-wire sensor activated by an output



Group of channels

Internal wiring

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



Group of channels

Internal wiring

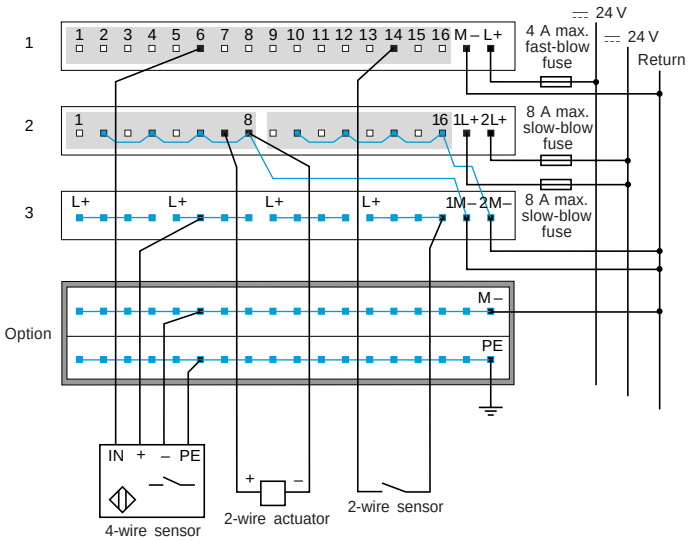
Discrete I/O Bases

Connections (continued)

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

170 ADM 370 10

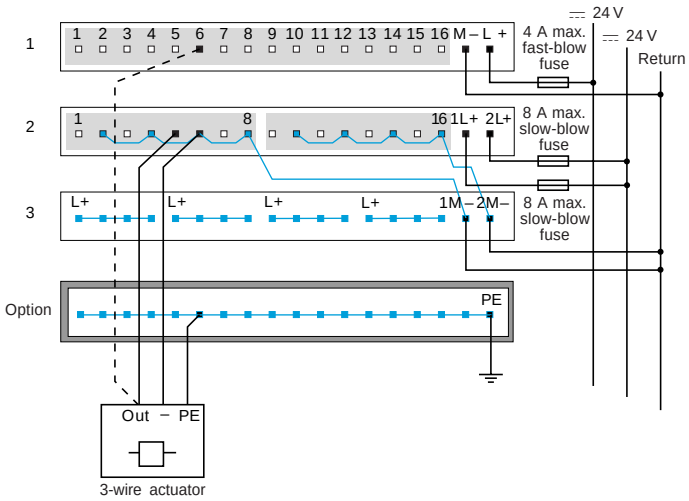
Example of external wiring of 2 and 4-wire sensors/2-wire actuator



Group of channels

Internal wiring

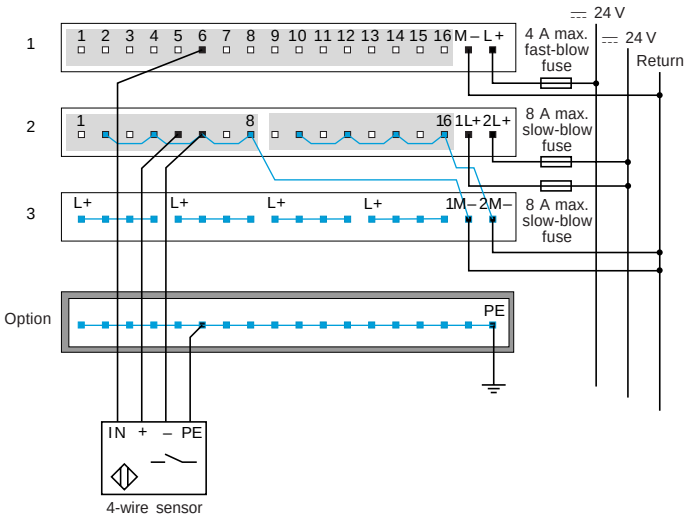
Example of external wiring of 3-wire actuator with wiring check



Group of channels

Internal wiring

Special external wiring, the output activates the sensor



Group of channels

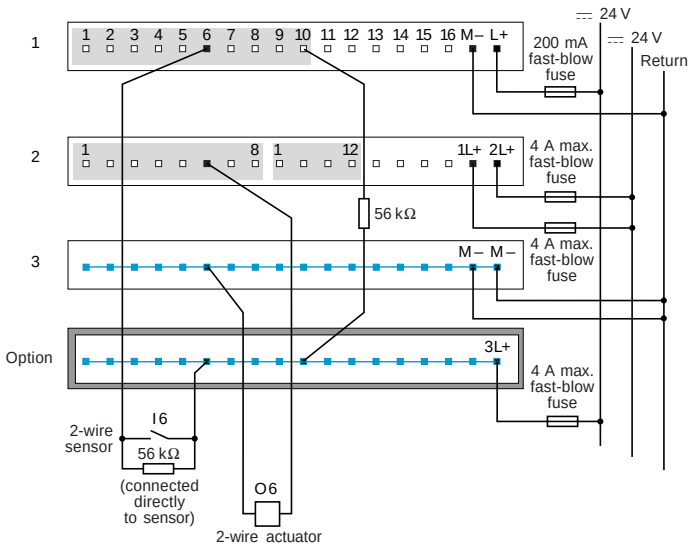
Internal wiring

Discrete I/O Bases

Connections (continued)

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

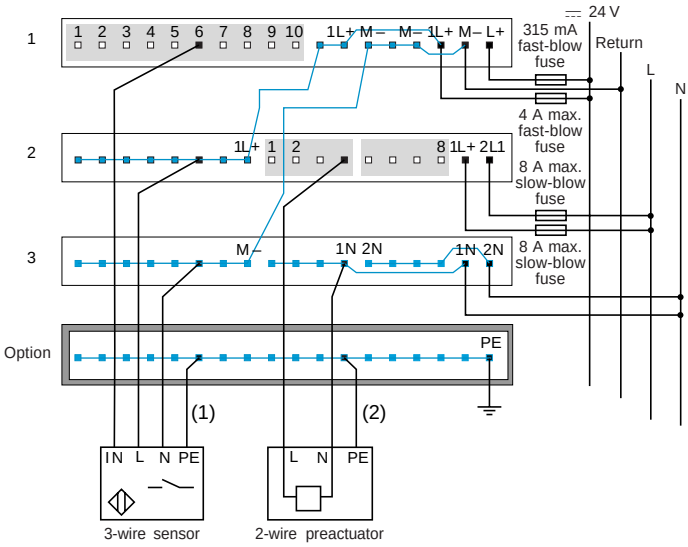
170 ADM 390 10
Example of external wiring of 2-wire sensor/actuator



Group of channels

Internal wiring

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

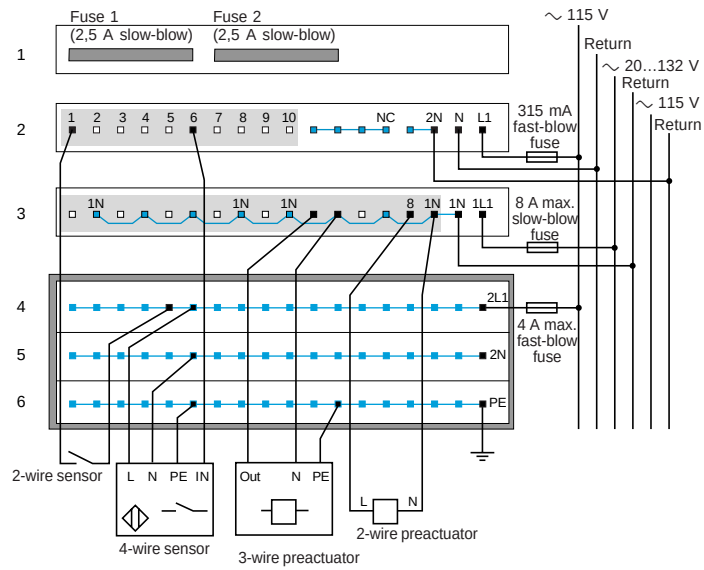


Group of channels

Internal wiring

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

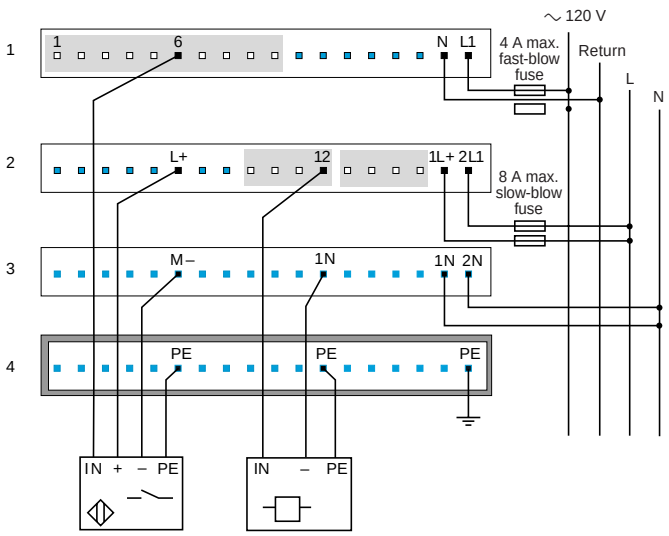
170 ADM 690 51
Example of external wiring of 4-wire sensor/2 and 3-wire preactuators



Group of channels

Internal wiring

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



Group of channels

Momentum 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:

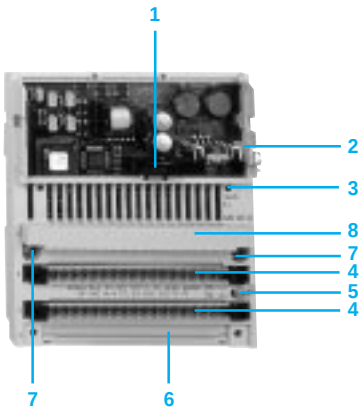
- Standard high level (1-5 V, 4-20 mA, ± 5 V, ±10 V, ± 20 mA)
- Low level (± 25 mV, ± 100 mV)
- Thermocouples (B, E, J, ...)
- Temperature probes (Ni ..., Pt ...)

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			

Analog I/O Bases

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

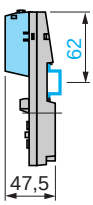
Description	Composition	Type of connection	Reference	Weight kg
Terminal blocks	Set of 3 connectors 1 row	Screw	**170 XTS 001 00**	–
		Spring	**170 XTS 002 00**	–
Bus Bar	3 rows	Screw	**170 XTS 004 01**	–
		Spring	**170 XTS 003 01**	–
	2 rows	Screw	**170 XTS 005 01**	–
		Spring	**170 XTS 008 01**	–
	1 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**	–

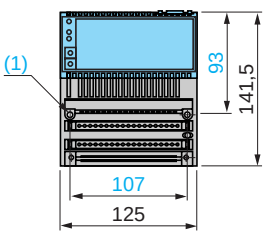
Replacement parts

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**	–

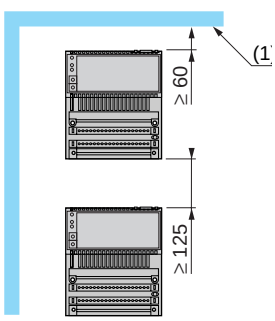
Dimensions, mounting

170 A●●
Rail or panel mounting





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



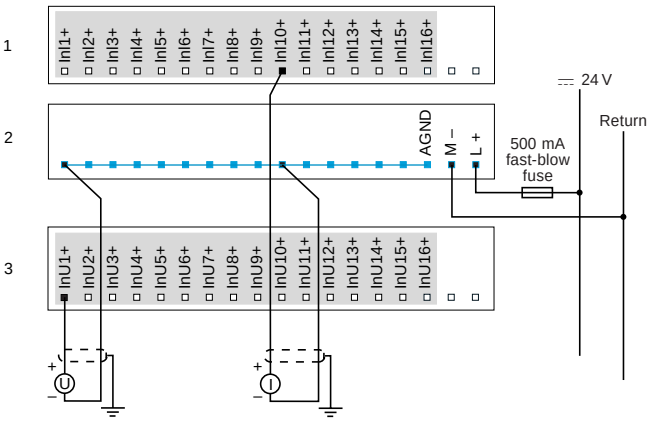
(1) Equipment or enclosure

Analog I/O Bases

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

Connections

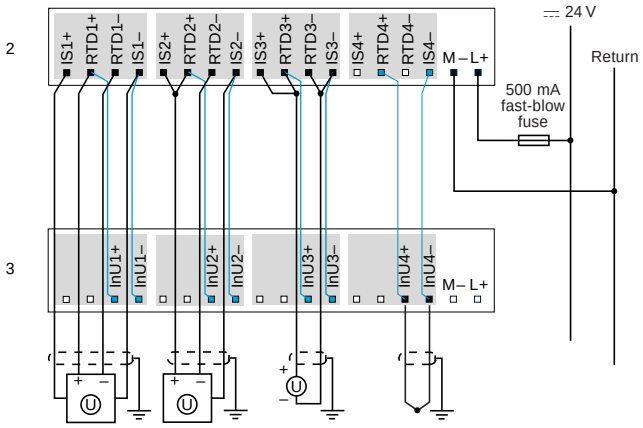
170 AAI 140 00
Example of external wiring of 2-wire sensor



Group of channels

Internal wiring

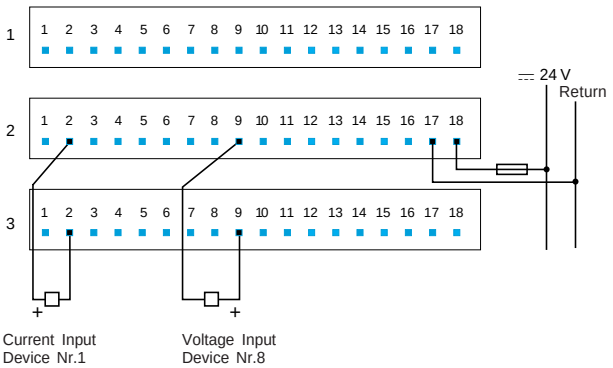
170 AAI 520 40
Example of external wiring of sensor



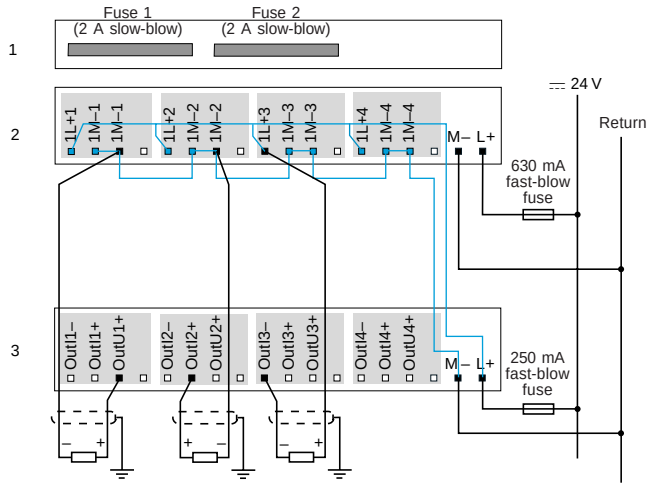
Group of channels

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

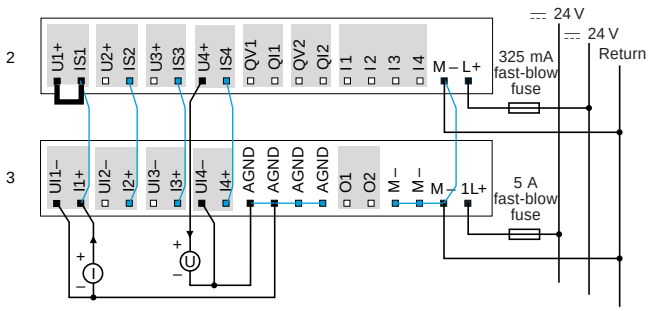
Analog I/O Bases

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

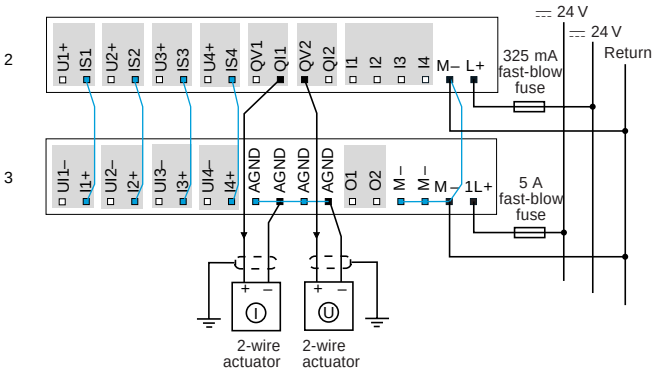


External bridge

Group of channels

Internal wiring

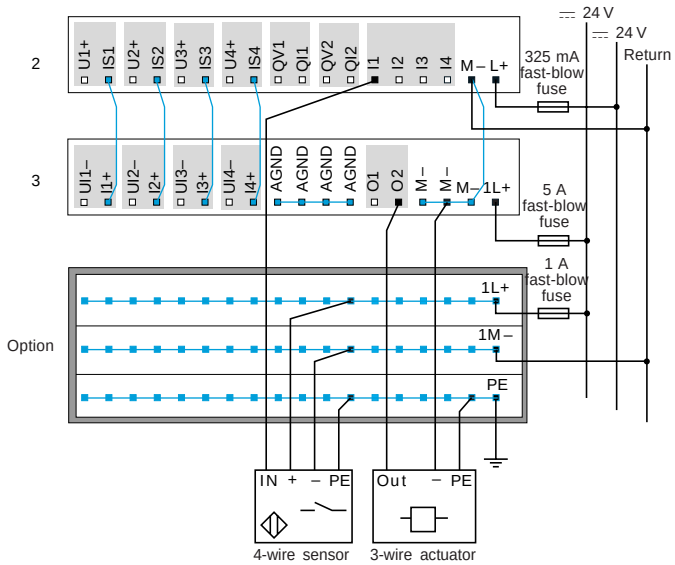
Example of external wiring of 2-wire actuator



Group of channels

Internal wiring

Example of external wiring of digital sensor/actuator

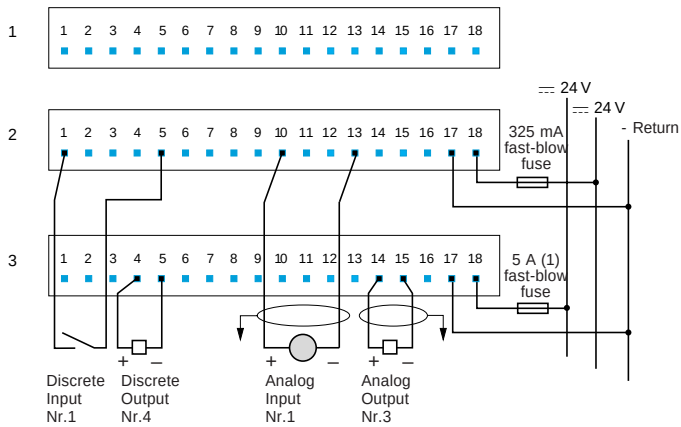


Group of channels

Internal wiring

170 ANR 120 90

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



(1) Depending on application, max 5A

Momentum 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

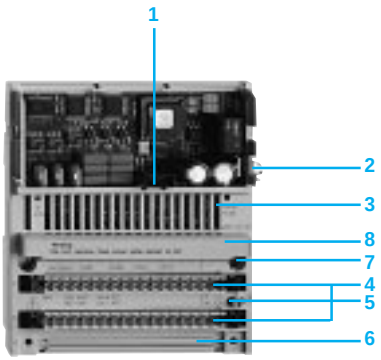
The 170 ADM 540 80 input/output module base has 6 discrete inputs and 3 discrete outputs for direct connection to 2- and 3-wire sensors and actuators, plus a Modbus Communication Port for connection to serial devices. This module can also be used as the I/O base for a programmable controller, in either 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

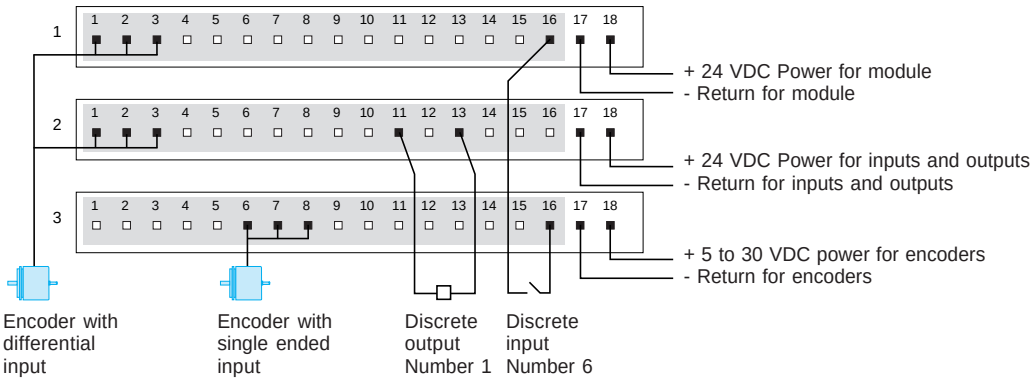
Description	Use	Reference	Weight kg
Momentum I/O Bases	User Guide for 170 AEC 920 00 and 170 ADM 540 80	**870 USE 002 00**	–
SERIPLEX	Module Instruction Bulletin	**30298 086 01**	–
	Module Installation "Mini-book"	**30298 085 01**	–
	Installation and Troubleshooting Guide	**30298 035 01A**	–

Specialty Module I/O Bases

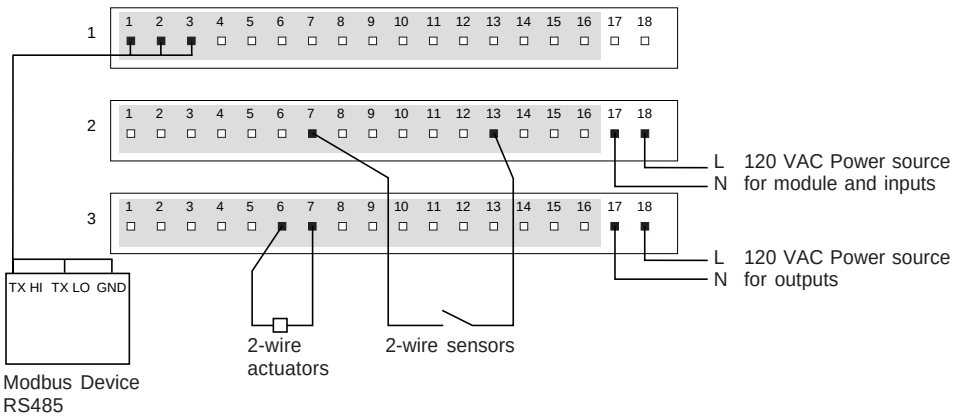
Connections

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



Momentum 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	

Momentum 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

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.

Momentum 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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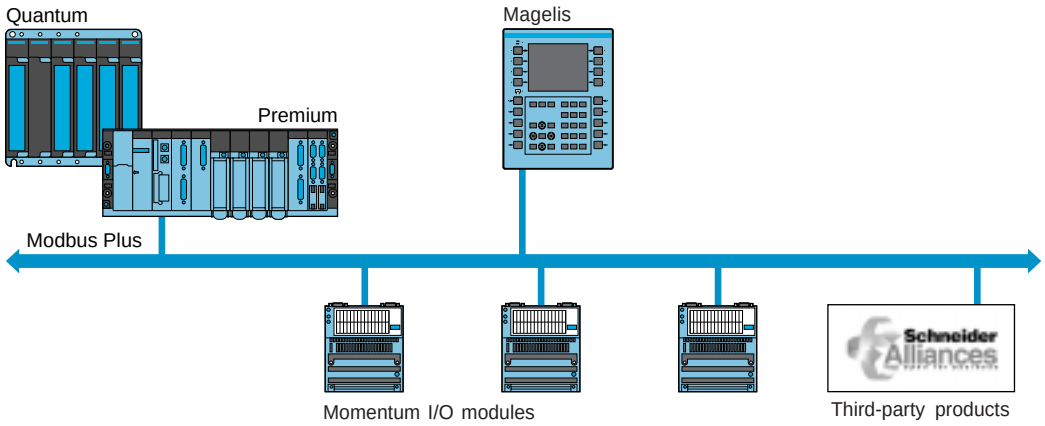
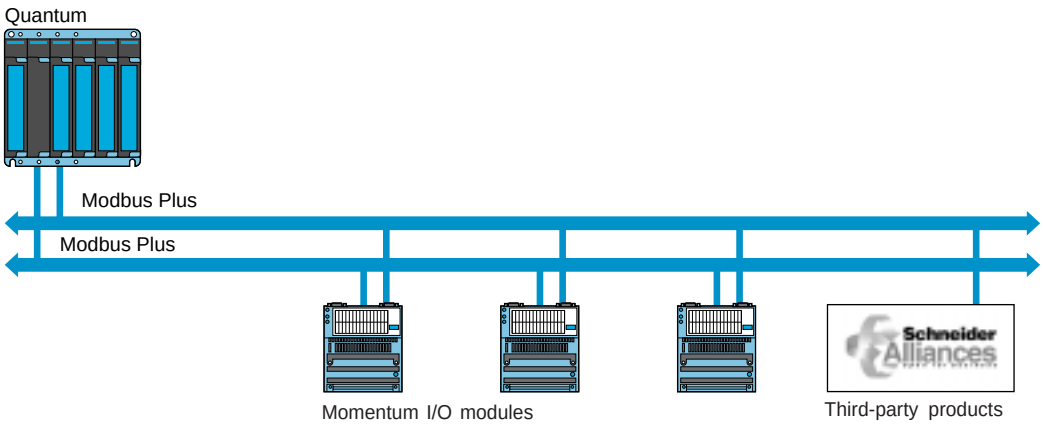
Network topology

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



Momentum Automation Platform

Modbus Plus Communication Adapters

Description, characteristics

References :
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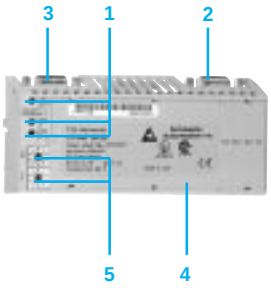
Description



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	–

Fipio Communication Adapters

Presentation, description

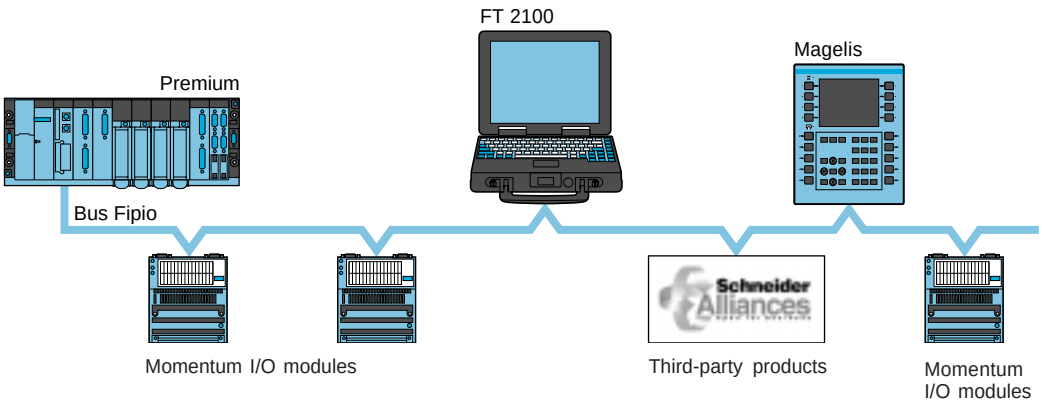
Presentation

The FIPIO communication adapter can be plugged into any Momentum I/O base to create a functional I/O unit on the FIPIO bus, and to provide a direct connection to the FIPIO Network for the full family of Momentum I/O modules. This connectivity enables the Momentum I/O to be used along with other FIPIO compatible control devices, including industrial computers, operator control stations, drive systems, and other controls, to provide a flexible, time-critical, cost-effective solution for distributing I/O modules throughout a large area.

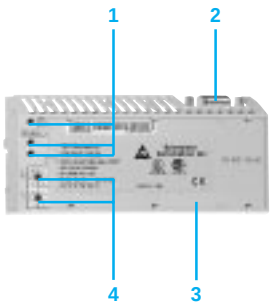
There are two types of Communication Adapters available:

- 170 FNT 110 00 for a FIPIO bus connected to TSX 7 series CPUs or APRIL 5030 and 5130 CPUs
- 170 FNT 110 01 for a FIPIO bus connected to a TSX Premium PLC

Each Momentum I/O module is an individual node or device on the FIPIO network with its address set by the user on the dual rotary switch on the front of the communication adapter. FIPIO is a network that can have up to 128 slave devices. The FIPIO network's distance and communication capabilities range from 1000 meters (3330 ft.) to 15000 meters (45000 ft) with repeaters over twisted pair cable at a data rate of 1 M baud.



Description



The 170 FNT 110 0● communication module comprises :

1 Three indicator lights (LEDs) :
- Ready indicator light (green) : module powered up or in service
- COM indicator light (yellow) : data being sent or received
- ERR indicator light (red) : faulty device

2 A 9-way male SUB-D connector for connecting to the Fipio bus

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

4 Two switches for coding the slave address on the bus

Momentum Automation Platform

Fipio Communication Adapters

Characteristics, references

Characteristics

Type of module		**170 FNT 110 00**	**170 FNT 110 01**
Bus manager PLC		TSX Series 7, model 40 or April 5000	Premium
Structure	Type	Open industrial, conforming to the WorldFip standard	
	Topology	Devices connected using extension cable or tap-off cable	
	Length meters	1,000 to 5,000 depending on the medium used	1,000 to 15,000 depending on the medium used
	Access method	Producer/consumer principle, managed by a bus arbiter	
Transmission	Bit rate	1 Mbps	
	Media	Shielded twisted pair cable 150 Ω. Fibre optic 62.5/125 or 50/125 with electrical/optical repeaters	
Number of Momentum devices			
	Per segment	31 connection points per segment (without repeater)	31 connection points per segment (without repeater)
	Maximum	63 on all segments	97 on all segments
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)	

Other characteristics, consult our catalog Nr. 78745.

References

170 FNT 110 01/00

Description	Connection	Bus manager PLC	Reference	Weight kg
Communication modules for Momentum I/O sub-bases	Fipio fieldbus on Momentum I/O sub-bases	Premium	**170 FNT 110 01**	0.110
		TSX Series 7 Model 40 April 5000	**170 FNT 110 00**	0.110

TSX FP ACC 12

Description	Connection	Characteristics	Reference	Weight kg
Female connectors (9-way SUB-D)	On 170 FNT 110 0● communication module	Black polycarbonate IP 20	**TSX FP ACC 12**	0.040
		Zamac	**TSX FP ACC 2**	0.080

TSX FP ACC 14

Bus connection boxes	Main tap-off cable	Black polycarbonate IP 20	**TSX FP ACC 14**	0.120
		Zamac IP 65	**TSX FP ACC 4**	0.660

TSX FP ACC 4

Tap-link cables	8 mm, 2 shielded twisted pair 150 Ω	100 m	**TSX FP CC 100**	5.680
		200 m	**TSX FP CC 200**	10.920
		500 m	**TSX FP CC 500**	30.000
Other connection accessories	–	–	Consult our catalog Nr.78745	–

Momentum Automation Platform

InterBus-S Communication Adapters

Presentation, description

Presentation

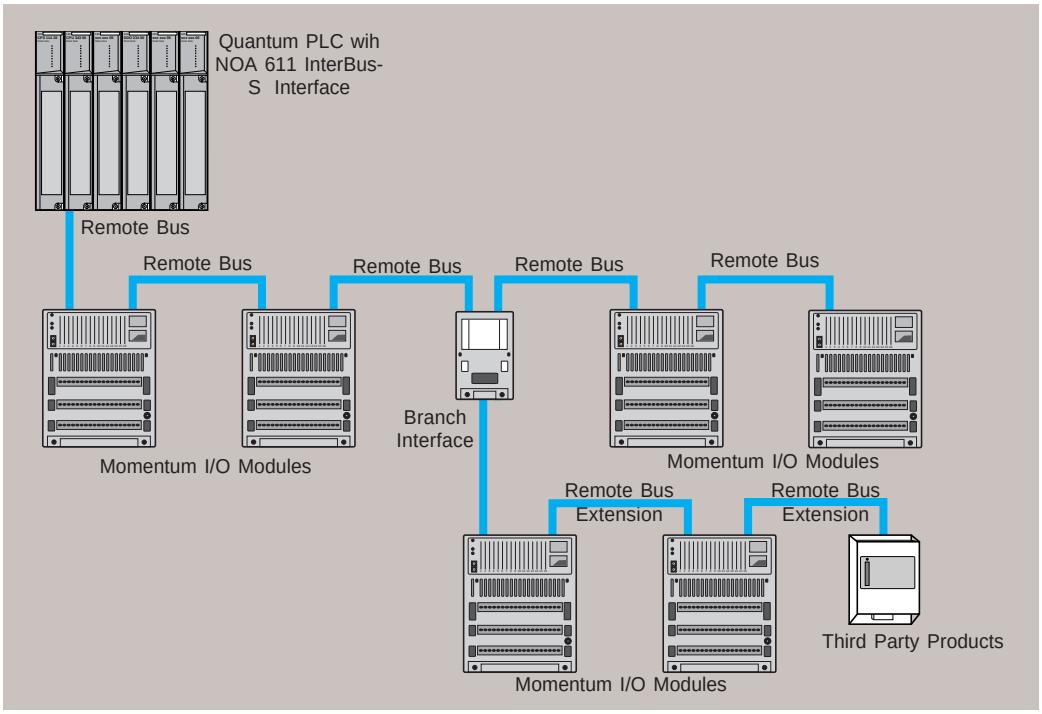
The Momentum InterBus-S Communication Adapter provides a direct connection to the InterBus-S Network for the full family of Momentum I/O modules. This connectivity enables Momentum I/O to be used in open architecture control systems that utilize either a programmable controller or industrial computer as the network master. In these applications, InterBus-S serves as the communication network that connects Momentum I/O modules, along with other InterBus-S-compatible control devices, for the communication of input and output information with a single master controller.

There are three types of InterBus-S adapters available:

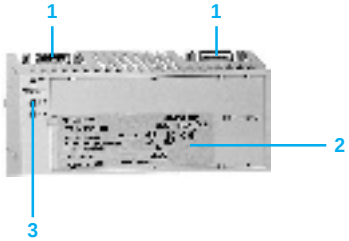
- 170 INT 110 00, twisted pair media, SUPI 2 chip set;
- 170 INT 110 01, twisted pair media, SUPI 3 chip set;
- 170 INT 120 00, fiber optic media.

The InterBus-S communication adapter is designed to plug on to any of the Momentum Input/Output module bases, thus allowing the I/O module to be accessed over the InterBus-S Communication Network. Each Momentum I/O module is an individual node or device on the InterBus-S network with its address set either by its physical location on the network, or by menu-driven software that is available with some InterBus-S master devices. InterBus-S is a cost-effective method of distributing I/O modules throughout large plant areas. The figure below illustrates a typical control system using Momentum I/O modules on the InterBus-S network, with a Quantum PLC programmable controller as the network master.

Network Topology



Description



The 170 INT 110 0● InterBus-S Communication Adapters comprise on the front panel:

1 Two 9-Pin SUB-D connectors for connection to the InterBus-S bus
2 Area for Label (label shipped with I/O base)
3 LED Status Indicators comprising:
- BA (green), bus enabled
- RC (green), remote bus check
- RD (red), remote bus disabled

Momentum Automation Platform

InterBus-S Communication Adapters

Characteristics, references

Characteristics

Model No.		**170 INT 110 00**	**170 INT 110 01**	**170 INT 120 00**
Communication rate	**Kbits/s**	500		
Number of Nodes (devices)		Up to 256 devices		
Media		Twisted Pair		Fiber Optic
Distance	**m (ft)**	Up to 12 800 (41 984), 400 (1312) between two nodes		
Connectors		2-9 Pin "D" connectors		
Error checking		CRC-16 error check		
Error and Fail States		Fail safe		
Addressing		Physical location or software		
Mode of Operation		Master-Slave, continuous shift register		
Topology		Ring		
Chip Set		SUPI 2	SUPI 3	–
Packaging		Standard Momentum communication adapter enclosure - IP20 environment		
Indicator Lights		Diagnostic and status light standard		
Power Source		Power supply on board the I/O base		

References

170 INT 110 0●

Modules

Description	Reference	Weight kg
InterBus-S Communication Adapter, Twisted Pair, SUPI 2	**170 INT 110 00**	0.070
InterBus-S Communication Adapter, Twisted Pair, SUPI 3	**170 INT 110 01**	0.070
InterBus-S Communication Adapter, Fiber Optic	**170 INT 120 00**	0.070

170 INT 120 00

Accessories

Description	Length	Reference	Weight kg
Branch Interface, Twisted Pair	–	**170 BNO 671 00**	–
Branch Interface with Fiber Optic Interface for Remote Bus	–	**170 BNO 681 00**	–
Remote Bus Cable	(1)	**KAB 3225 L●**	–
InterBus-S Connector Kit, sockets/pins, 9-pin	–	**170 XTS 009 00**	–
InterBus-S Cable (with small connectors)	11 cm (0.36 ft)	**170 MCI 007 00**	–
InterBus-S Cable	8 cm (0.26 ft)	**170 MCI 008 00**	–
	25 cm (0.8 ft)	**170 MCI 025 00**	–
InterBus-S Cable low-profile connector	100 cm (3.3 ft)	**170 MCI 100 01**	–
InterBus-S Twisted Pair Comm Adapter User Guide (in english)		**870 USE 003 00**	–
InterBus-S Fiber Optic Comm Adapter User Guide (in english)		**870 USE 006 00**	–
Momentum front label replacement (set of 10)	–	**170 XTS 100 00**	–

(1) Order by the meter, at the end of a reference, add the suffix for number of meter.

Profibus Communication Adapter

Presentation, description

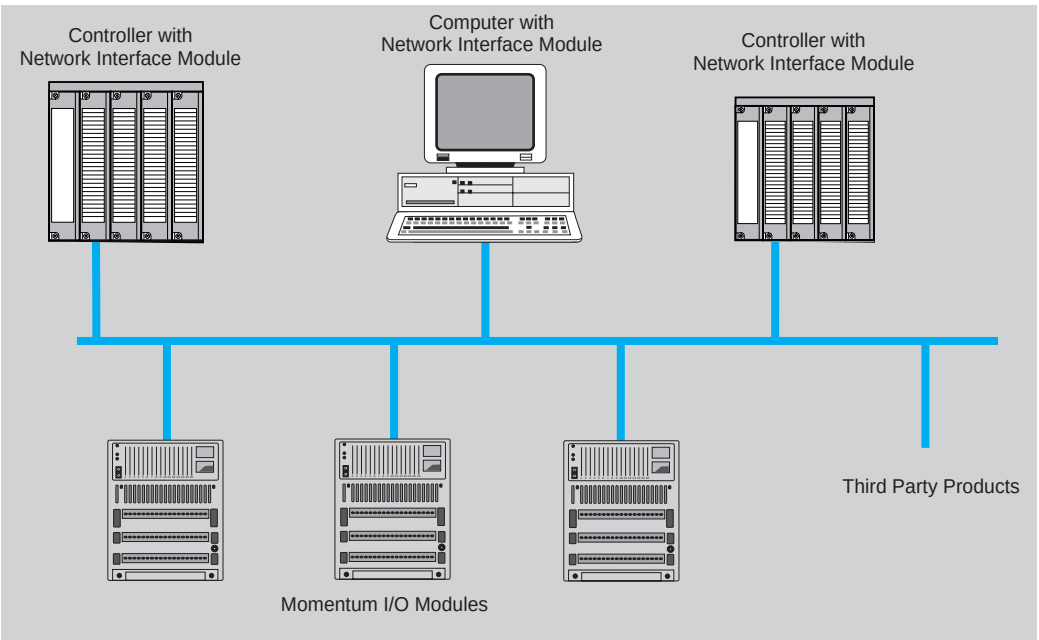
Presentation

The Model 170 DNT 110 00 Profibus DP Communication Adapter for the Momentum I/O product line provides a direct connection to the Profibus DP Communication Network for the full family of Momentum I/O modules. This connectivity enables the Momentum I/O to be used in open architecture control systems with other Profibus DP 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.

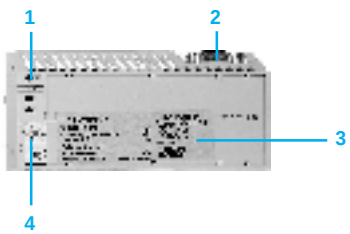
The Profibus DP communication adapter is a single package that is designed to plug on to any of the Momentum Input/ Output modules base, thus allowing the I/O module full access to the Profibus DP Communication Network. Each Momentum I/O module is an individual node on the network, with its address user-selected on the dual rotary switch on the front of the communication adapter. The figure below illustrates a typical control system using Momentum I/O modules on the Profibus DP network with programmable controllers and industrial computer systems.

The Profibus Configuration File (part number 381 SWA 000 00) is required for the configuration of the Momentum I/O Modules on the Profibus network. This file contain the Profibus PNO Identnumber for all of the Momentum I/O modules, and is available at no charge to all users as a download over the Internet from the Schneider Electric web page.

Network Topology



Description



The 170 DNT 110 00 Profibus DP Communication Adapter comprises on the front panel:

1 LED Status Indicators comprising:
BF (green), bus fault,
2 A 9-Pin SUB-D connector for connection to the Profibus DP Network,
3 Area for Label (label shipped with I/O base),
4 Rotary switches for slave addresses.

Momentum Automation Platform

Profibus Communication Adapter

Characteristics, references

Characteristics

Model No.		**170 DNT 110 00**
Communication rate		9.6 K Bit/s…12 M Bit/s
Number of Nodes (devices)		Up to 126 devices (32 without repeater)
Media		Twisted Pair
Distance	**m (ft)**	Up to 1 200 (4 000)
Connectors		9 Pin "D" connectors
Error checking		CRC-16 error check
Error and Fail States		Fail safe
Addressing		Switch selectable
Mode of Operation		Master-Slave
Topology		Multi-Drop, Ring
Packaging		Standard Momentum commmunications adapter enclosure - IP20 environment
Indicator Lights		Diagnostic and status light standard
Power Source		Power supply on-board the I/O base

References

170 DNT 110 00

Module

Description	Reference	Weight kg
Profibus DP Communication Adapter	**170 DNT 110 00**	0.070

Accessories

Description	Length	Reference	Weight kg
Device Master File	–	**381 SWA 000 00**	–
Profibus Cable O2Y(ST)CY 2 x 0.64 mm^2	by the meter	**KAB PROFIB**	–
Profibus Connector with Terminator	–	**490 NAD 911 03**	–
Profibus In-Line Connector	–	**490 NAD 911 04**	–
Profibus Connector with Programming Port	–	**490 NAD 911 05**	–
Momentum front label replacement (set of 10)	–	**170 XTS 100 00**	–

Momentum Automation Platform

DeviceNet Communication Adapter

Presentation, description

Presentation

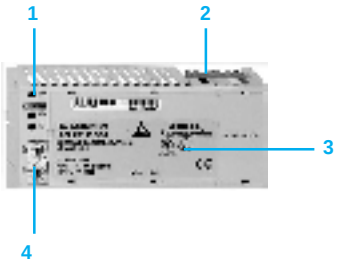
The Model 170 LNT 710 00 DeviceNet Communication Adapter for the Momentum I/O product line provides a direct connection to the DeviceNet Communication Network for the full family of Momentum I/O modules. This connectivity enables the Momentum I/O to be used in open architecture control systems with other DeviceNet 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.

The DeviceNet communication adapter is a single package that is designed to plug on to any of the Momentum Input/Output modules bases, thus allowing the I/O module full access to the DeviceNet Communication Network. Each Momentum I/O module is an individual node on the network with its address user-selected on the dual rotary switch on the front of the communication adapter.

The adapter complies with the Open DeviceNet Vendor Association (ODVA) specification Release 2.0 for network communication protocol and data transfer. Current information about the ODVA specification can be obtained at the ODVA Web site: **http://www.odva.org**.

Electronic Data Sheet Disk
An Electronic Data Sheet (EDC) disk is included with the DeviceNet Adapter´s user guide (part number 870 USE 104 00). It supplies the application software parameters for setup of each I/O base. Each file´s format on the disk complies with the ODVA specification for DeviceNet I/O module EDS parameters. Updated EDS files are available for downloading from the Customer Support areas of the Schneider Automation Web Site and Bulletin Board service.

Description



The 170 LNT 710 00 DeviceNet Communication Adapter comprises on the front panel:

1 LED Status Indicators comprising:
- PWR (green), power is present from I/O base,
- MNS (green/red), adapter is communicating on network,
- IO (green/red), I/O is active, no faults.

2 DeviceNet Connector.
3 Area for Label (label shipped with I/O base).
4 Rotary switches for slave addresses.

Momentum Automation Platform

DeviceNet Communication Adapter

Characteristics, references

Characteristics

Model No.		**170 LNT 710 00**
ODVA compliance		With ODVA Specification Release 2.0
Communication Rates	**Kbits/s**	Supports 125/250/500 standard DeviceNet baud rates
Network Power Loading		Operational from 11…25 VDC, 110 mA maximum, 75 mA typical
Number of Nodes (devices)		Up to 99 devices (64 without repeater)
Media		Twisted Pair
Distance	**m (ft)**	Up to 500 (1640), depending on communication rate
Connectors		5-pin male connector with 5 mm pin-to-pin spacing
Error checking		CRC-16 error check
Error and Fail States		Fail safe
Addressing		Switch selectable
Mode of Operation		CSMA/CA, master-slave, peer-to-peer
Topology		Multi-Drop Trunk
Packaging		Standard Momentum communication adapter enclosure - IP20 environment
Indicator Lights		Diagnostic and status light standard
Power Source		Power supply on board the I/O base

References

170 LNT 710 00

Module

Description	Reference	Weight kg
DeviceNet Communication Adapter	**170 LNT 710 00**	0.070

Accessories

Description	Quantity	Reference	Weight kg
DeviceNet Connector	–	**170 XTS 060 00**	–
Momentum front label replacement	Set of 10	**170 XTS 100 00**	–
DeviceNet Communication Adapter User Guide	–	**840 USE 104 00**	–

Momentum Automation Platform

ControlNet Communication Adapter

Presentation, description

Presentation

The Model 170 LNT 810 00 ControlNet Communication Adapter for the Momentum I/O product line provides a direct connection to the ControlNet Communication Network for the full family of Momentum I/O modules. This connectivity enables the Momentum I/O to be used in open architecture control systems with other ControlNet 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.

The ControlNet communication adapter is a single package that is designed to plug on to any of the Momentum Input/ Output modules bases, thus allowing the I/O module full access to the ControlNet Communication Network. Each Momentum I/O module is an individual node on the network, with its address user-selected on the dual rotary switch on the front of the communication adapter.

The adapter complies with the Open ControlNet Specification Release 1.03 for network communication protocol and data transfer. Current information about the ControlNet specification can be obtained at the ControlNet Web site: **http://www.controlnet.org.**

Description

The 170 LNT 810 00 ControlNet Communication Adapter comprises on the front panel:

1 LED Status Indicators comprising:
- CY (green), unrecoverable fault or adapter is not receiving power from I/O base,
- RY (green), adapter is communicating on network,
- BF (red), I/O has unrecoverable fault or I/O has fault.

2 BNC connector for connection to the ControlNet Network.
3 Area for Label (label shipped with I/O base)
4 Rotary switches for slave addresses

Momentum Automation Platform

ControlNet Communication Adapter

Characteristics, references

Characteristics

Model No.		**170 LNT 810 00**
Communication Rates		5 MBit/s
Number of Nodes (devices)		Up to 99 devices (48 without repeater)
Media		Coaxial cable
Distance (without repeater)	**m (ft)**	Up to 250 m (820 ft) with 48 nodes, up to 1000 m (3280 ft) with 2 nodes (per network segment, max. 6 segments) Formula: 1000 m - 16.3 m x (# of taps - 2) 3280 ft - 53.4 ft x (# of taps - 2)
Connectors		BNC connector, supplied with the TAP
Error checking		CRC-16 error check
Error and Fail States		Fail safe
Addressing		Switch selectable
Mode of Operation		CTDMA
Topology		Bus, Tree, Star
Packaging		Standard Momentum Comm. Adapter Enclosure - IP20 environment
Indicator Lights		Diagnostic and status light standard
Power Source		Power Supply on board the I/O base

References

170 LNT 810 00

Module

Description	Reference	Weight kg
ControlNet Communication Adapter	**170 LNT 810 00**	0.070

Accessories

Description	Quantity	Reference	Weight kg
Momentum front label replacement	Set of 10	**170 XTS 100 00**	–
ControlNet Communication Adapter User Guide	–	**870 USE 007 00**	–

Momentum 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**

M1 Processor Adapters

Presentation

Characteristics :
pages 48245/4 to 48245/7
References :
page 48245/8

Presentation

The Momentum M1 Processor Adapters are based on the Modicon 984 family of products. You can mount these Adapters on Momentum I/O Bases to provide intelligence to the I/O. The Processor Adapter can quickly and independently solve logic, control its own local I/O (discrete or analog), and communicate to other control entities through one of a number of Momentum communication options. The Processor Adapter can turn an ordinary I/O Base into a PID controller or high-speed logic solver.

You can create your own controller from a number of different bases, and with other Momentum options, network your local logic solvers together into an intelligent subsystem as part of a larger Modicon application, or into a standalone, integrally networked system with local controllers with extended I/O. A controller can be added to the different bases and combined with other Momentum options, which can then be networked together in an intelligent subsystem as part of a larger Modicon application. The Momentum I/O Base can be made a standalone, integrally networked system using local controllers with extended I/O.

The Momentum M1 Processor Adapters are meant to stand alone, be mounted on a single Momentum I/O Base (with its own extended Momentum I/O connected to the I/O Bus Port on Model Number 171 CCS 760 00), or be mounted together with one of a variety of Momentum Option Adapters, providing different network capabilities, a time-of-day clock, and a battery back-up system. The built-in flash memory is used to store the Modicon 984 Executive, allowing for convenient field upgrades of the operating system. The flash memory can also be used to back up your applications, creating a local copy of your program to be loaded back into RAM, thus providing original program file integrity. On Model Number 171 CCS 780 00, the RS485 port can be used to connect to dedicated devices such as an operator interface panel or a marquee, or used in a Master/Slave RS485 network to connect to multiple devices.

The Processor Adapters can be programmed with Modsoft version 2.5 or greater, or with Concept version 2.1 or greater.

The following table describes the characteristics of the Momentum M1 Processor Adapters.

Processor Adapter	RAM Memory	Flash Memory	Scan Time	Modbus Port	I/O Bus Port	IEC Executive
171 CCS 700 00	64 K	256 K	1 ms/K	1 x RS 232C	–	–
171 CCS 700 10	64 K	256 K	0.63 ms/K	1 x RS 232C	–	–
171 CCS 760 00	256 K	256 K	1 ms/K	1 x RS 232C	1 x I/O Bus	Compatible
171 CCS 780 00	64 K	256 K	1 ms/K	1 x RS 232C 1 x RS 485	–	–
171 CCC 760 10	512 K	512 K	1 ms/K	1 x RS 232C	1 x I/O Bus	Compatible
171 CCC 780 10	64 K	256 K	1 ms/K	1 x RS 232C 1 x RS 485	–	Compatible
171 CCC 960 20	512 K	512 K	.3 ms/K	1 x Ethernet	1 x I/O Bus	–
171 CCC 960 30	544 K	1 Mb	.3 ms/K	1 x Ethernet	1 x I/O Bus	Supplied
171 CCC 980 20	512 K	512 K	.3 ms/K	1 x RS 485 1 x Ethernet	–	–
171 CCC 980 30	544 K	1 Mb	.3 ms/K	1 x RS 485 1 x Ethernet	–	Supplied

Programming Software for Momentum

Momentum Processor Adapters have a number of PC programming software options available. You can program your Processor Adapter via the Modbus RS232 serial port, or if using a Modbus Plus Option Adapter in conjunction with a Processor Adapter, via an SA85 card installed in a PC and connected to the same Modbus Plus network. For more specific information, see the appropriate Momentum, ProWORX, Concept, or Modsoft programming software literature and documentation.

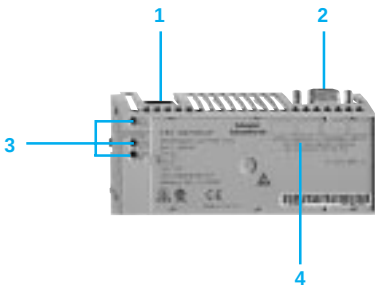
M1 Processor Adapters

Description

Characteristics :
pages 48245/4 to 48245/7
References :
page 48245/8

Description

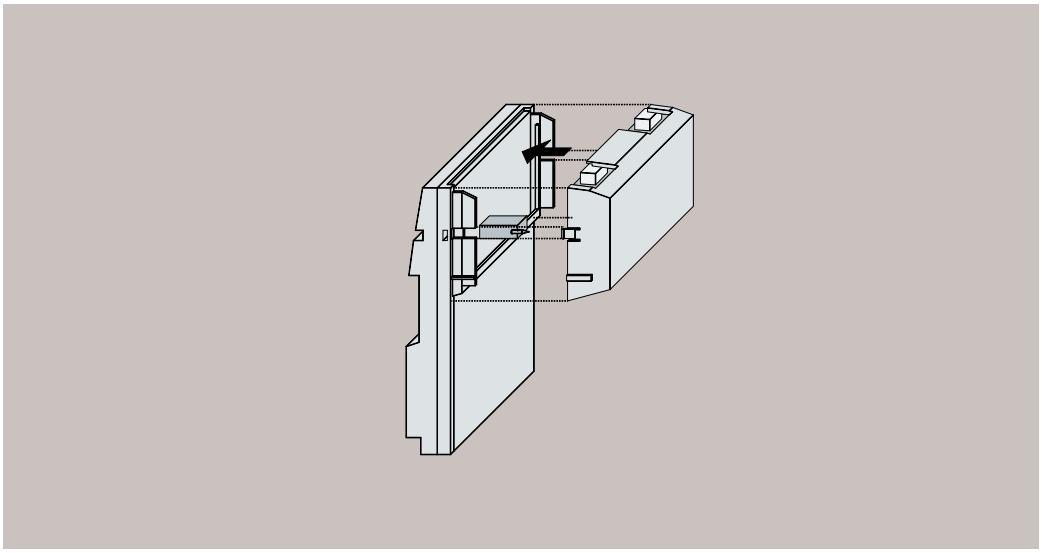
A typical Momentum M1 Processor Adapter consists of the following components.



1 Modbus or Ethernet Port connector
2 Optional second port (Modbus or I/O bus)
3 LED indicators
4 Fill-in Label

Mounting

A typical system, showing a model 171 CCS 760 00 Momentum M1 Processor Adapter mounted on top of a Momentum I/O Base. The Processor Adapter controls the I/O it is mounted on, the local I/O, and can control externally configured I/O. You can also use a Modbus Plus Option Adapter with the Processor Adapter to extend the system's I/O capacity.



Momentum Automation Platform

M1 Processor Adapters

Characteristics

References :
page 48245/8

Environment

Type of processor		171 CCS 700 00	171 CCS 700 10	171 CCS 780 00	171 CCS 760 00
Temperature					
operating	°C	0...60			
storage	°C	- 40...85			
Relative humidity		5...96% (non-condensing)			
Altitude	m	2000 (6,500 ft.)			
Mechanical withstand (immunity)					
to vibrations		57...150 Hz @ 1 G 10...57 Hz @ 0.075 mm d.a.			
to shocks		± 15 G peak, 11 ms, half sine wave			
Designed to meet		UL, CE, CUL, FM Class 1 Div. 2, NEMA 250 Type 1, and IP20 conforming to IEC529 (certifications pending)			

Characteristics

Central processing unit (CPU)		x 86 based (Intel or AMD)			
Word length	bit	16			
Material		Lexan			
Voltage	VDC	5.0 V (supplied by I/O Base)			
Voltage tolerance		± 5% (as supplied by I/O Base)			
RFI immunity/EMI susceptibility/ Electrostatic discharge		Meets CE mark for open equipment. Open equipment should be installed in an industry standard enclosure, with access restricted to qualified service personnel			
Di-electric strength		RS 232 is non-isolated from logic common			
Indicator lights		Diagnostic and status lights, standard			
Power source		Power supply on-board the Momentum I/O Base			
Clock speed	MHz	20	32	20	
Comm Ports					
1		Dedicated RS 232C Modbus			
2		N/A		Dedicated RS 485 Modbus	I/O Bus (derivative of Interbus)
Capacity					
user memory	K	2.4			12
data memory	K	2			4
discrete I/O		2048 In/2048 Out (A total of 2048 bits can be configured for discrete and analog I/O, any mix up to the stated limits.)			2048 In/2048 Out
register I/O		2048 In/2048 Out (A total of 2048 words can be configured for discrete and analog I/O, any mix up to the stated limits.)			4096 words total
scan time	ms/K	1	0.63	1	
I/O bus addressing		–			80 I/O drops with Modsoft 128 I/O drops with Concept

M1 Processor Adapters

Characteristics (continued)

References :
page 48245/8

Environment

Type of processor			171 CCC 760 10	171 CCC 780 10
Temperature	operating	˚C	0...60	
	storage	˚C	- 40...85	
Relative humidity			5...96% (non-condensing)	
Altitude		m	2000 (6,500 ft.)	
Mechanical withstand (immunity)	to vibrations		57...150 Hz @ 1 G 10...57 Hz @ 0.075 mm d.a.	
	to shocks		± 15 G peak, 11 ms, half sine wave	
Designed to meet			UL, CE, CUL, FM Class 1 Div. 2, NEMA 250 Type 1, and IP20 conforming to IEC52 (certifications pending)	

Characteristics

Central processing unit (CPU)			x 86 based (Intel or AMD)	
Word length		bit	16	
Material			Lexan	
Voltage		VDC	5.0 V (supplied by I/O Base)	
Voltage tolerance			± 5% (as supplied by I/O Base)	
RFI immunity/EMI susceptibility/ Electrostatic discharge			Meets CE mark for open equipment. Open equipment should be installed in an industry standard enclosure, with access restricted to qualified service personnel	
Di-electric strength			RS 232 is non-isolated from logic common	
Indicator lights			Diagnostic and status lights, standard	
Power source			Power supply on-board the Momentum I/O Base	
Clock speed		MHz	32	
Comm Ports	1		Dedicated RS 232C Modbus	
	2		I/O Bus (derivative of Interbus)	Dedicated RS 485 Modbus
Capacity	user memory	K	18	
	data memory	K	24	
	discrete I/O		8192 In/8192 Out (A total of 8192 bits can be configured for discrete and analog I/O, any mix up to the stated limits.)	
	register I/O		26048 In/26048 Out (A total of 26048 words can be configured for discrete and analog I/O, any mix up to the stated limits.)	
	I/O limit		8192 bits (4096 In/4096 Out; I/O can be extended using a Modbus Plus option Adapter and Peer Cop.)	<local> (No I/O bus port; I/O can be extended using a Modbus Plus option Adapter (2048 10 pts) and Peer Cop.)
	scan time	ms/K	1	

M1 Processor Adapters

Characteristics (continued)

References :
page 48245/8

Environment

Type of processor			**171 CCC 960 20**	**171 CCC 980 20**
Temperature				
	operating	**˚C**	0...60	
	storage	**˚C**	- 40...85	
Relative humidity			5...96% (non-condensing)	
Altitude		**m**	2000 (6,500 ft.)	
Mechanical withstand (immunity)				
	to vibrations		57...150 Hz @ 1 G 10...57 Hz @ 0.075 mm d.a.	
	to shocks		± 15 G peak, 11 ms, half sine wave	
Designed to meet			UL, CE, CUL, FM Class 1 Div. 2, NEMA 250 Type 1, and IP20 conforming to IEC52 (certifications pending)	

Characteristics

Central processing unit (CPU)			x 86 based (Intel or AMD)	
Word length		**bit**	16	
Material			Lexan	
Voltage		**VDC**	5.0 V (supplied by I/O Base)	
Voltage tolerance			± 5% (as supplied by I/O Base)	
RFI immunity/EMI susceptibility/ Electrostatic discharge			Meets CE mark for open equipment. Open equipment should be installed in an industry standard enclosure, with access restricted to qualified service personnel	
Di-electric strength			Comm port is non-isolated from logic common	
Indicator lights			Diagnostic and status lights, standard	
Power source			Power supply on-board the Momentum I/O Base	
Flash memory		**K**	512	
Clock speed		**MHz**	50	
Comm Ports				
	1		Ethernet	
	2		I/O Bus (derivative of Interbus)	Dedicated RS 485 Modbus
Capacity				
	user memory	**K**	18	
	data memory	**K**	24	
	discrete I/O		8192 In/8192 Out (A total of 8192 bits can be configured for discrete and analog I/O, any mix up to the stated limits.)	
	register I/O		26048 In/26048 Out (A total of 26048 words can be configured for discrete and analog I/O, any mix up to the stated limits.)	
	I/O limit		<local> (No I/O bus port; I/O can be extended using a Modbus Plus option Adapter 2048 10 pts, and Peer Cop.)	8192 bits (4096 In/4096 Out; I/O can be extended using a Modbus Plus option Adapter and Peer Cop.)
	scan time	**ms/K**	.3	

M1 Processor Adapters

Characteristics (continued)

References :
page 48245/8

Environment

Type of processor		**171 CCC 960 30**	**171 CCC 980 30**
Temperature			
operating	**˚C**	0...60	
storage	**˚C**	- 40...85	
Relative humidity		5...96% (non-condensing)	
Altitude	**m**	2000 (6,500 ft.)	
Mechanical withstand (immunity)			
to vibrations		57...150 Hz @ 1 G 10...57 Hz @ 0.075 mm d.a.	
to shocks		± 15 G peak, 11 ms, half sine wave	
Designed to meet		UL, CE, CUL, FM Class 1 Div. 2, NEMA 250 Type 1, and IP20 conforming to IEC52 (certifications pending)	

Characteristics

Central processing unit (CPU)		x 86 based (Intel or AMD) IEC Executive	
Word length	**bit**	16	
Material		Lexan	
Voltage	**VDC**	5.0 V (supplied by I/O Base)	
Voltage tolerance		± 5% (as supplied by I/O Base)	
RFI immunity/EMI susceptibility/ Electrostatic discharge		Meets CE mark for open equipment. Open equipment should be installed in an industry standard enclosure, with access restricted to qualified service personnel	
Di-electric strength		Comm port is non-isolated from logic common	
Indicator lights		Diagnostic and status lights, standard	
Power source		Power supply on-board the Momentum I/O Base	
Flash memory	**Mb**	1	
Clock speed	**MHz**	50	
Comm Ports			
1		Ethernet	
2		I/O Bus (derivative of Interbus)	Dedicated RS 485 Modbus
Capacity			
user memory	**K**	18	
data memory	**K**	24	
discrete I/O		8192 In/8192 Out (A total of 8192 bits can be configured for discrete and analog I/O, any mix up to the stated limits.)	
register I/O		26048 In/26048 Out (A total of 26048 words can be configured for discrete and analog I/O, any mix up to the stated limits.)	
I/O limit		<local> (No I/O bus port; I/O can be extended using a Modbus Plus option Adapter 2048 10 pts, and Peer Cop.)	8192 bits (4096 In/4096 Out; I/O can be extended using a Modbus Plus option Adapter and Peer Cop.)
scan time	**ms/K**	.3	

M1 Processor Adapters

References

Characteristics :
pages 48245/4 to 48245/7

171 CCS 7●0 ●0

171 CCC ●●0 ●0

M1 Processor Adapters

RAM Memory	Comm Port(s)	Clock Speed	Reference	Weight kg (oz)
64 K	1 Modbus	20 MHz	**171 CCS 700 00**	0.042 (1.5)
64 K	1 Modbus	32 MHz	**171 CCS 700 10**	0.042 (1.5)
64 K	2 Modbus	20 MHz	**171 CCS 780 00**	0.042 (1.5)
256 K	1 Modbus, 1 I/O Bus	20 MHz	**171 CCS 760 00**	0.042 (1.5)
512 K	2 Modbus	32 MHz	**171 CCC 780 10**	0.042 (1.5)
512 K	1 Modbus, 1 Ethernet	50 MHz	**171 CCC 980 20**	0.042 (1.5)
512 K, IEC Exec	1 Modbus, 1 Ethernet	50 MHz	**171 CCC 980 30**	0.042 (1.5)
512 K	1 Modbus, 1 I/O Bus	32 MHz	**171 CCC 760 10**	0.042 (1.5)
512 K	1 Ethernet, 1 I/O Bus	50 MHz	**171 CCC 960 20**	0.042 (1.5)
512 K, IEC Exec	1 Ethernet,1 I/O Bus	50 MHz	**171 CCC 960 30**	0.042 (1.5)

Connection accessories and documentation

Description	Type	Quantity	Reference	Weight kg
RS 232 communication cable RJ45 to RJ45	1 m (3 ft)	–	**110 XCA 282 01**	–
	3 m (10 ft)	–	**110 XCA 282 02**	–
	6 m (20 ft)	–	**110 XCA 282 03**	–
RS 485 cable connector T for RJ45	–	–	**170 XTS 040 00**	–
RJ45 shielded connectors	–	Set of 20	**170 XTS 022 00**	–
RS 485 terminating (RJ45 resistor plugs)	–	Set of 2	**170 XTS 021 00**	–
D-shell adapters	RJ45 to 9-pin (for AT serial port)	–	**110 XCA 203 00**	–
	RJ45 to 12-pin (for XT serial port)	–	**110 XCA 204 00**	–
Ground clamp	–	–	**424 244 739**	–
RJ crimping tool	–	–	**170 XTS 023 00**	–
Concept software	–	–	see page 48251/7	–
ProWORX software	–	–	see page 48251/7	–
Momentum M1 Processor adapters user guide (in english)	–	–	**870 USE 101 00**	–

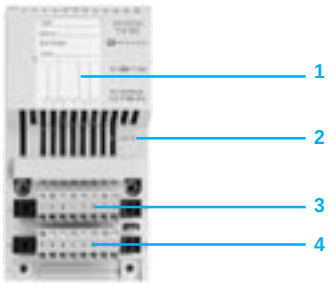
Momentum Automation Platform

M1 Processor Adapters
Power supply

Description, characteristics, references

An optional power supply, the 170 CPS 111 00, is available for the Momentum product family. Normally, power for controller, option, and communication modules is obtained from the power supply built into the I/O bases modules. However, the 170 CPS 111 00 provides a power solution for applications requiring conversion from 230 or 120 VAC to 24 VDC. The supply mounts alongside the other Momentum components on the DIN rail. The jumper-selectable, 230/120 VAC. power is input to the power supply with the use of a spring- or screw-type terminal strip; the 24 VDC power is output to the system in the same manner.

Description



A power supply consists of the following components:

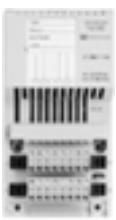
1 Fill-in identifying label
2 LED status display
3 Input voltage (AC) terminal strip connector mounting slot
4 Output voltage (DC) terminal strip connector mounting slot

Characteristics

Model		**170 CPS 111 00**
Input voltage	**VAC**	120 or 230 (jumper selectable)
Output voltage	**VDC**	24
Maximum output	**A**	0.7
External fuses		
120 VAC input voltage	**A**	0.63, time lag
230 VAC input voltage	**A**	0.315, time lag

References

Designation	Description	Reference	Weight kg (oz)
Power supply	230 or 120 VAC.	**170 CPS 111 00**	0.284 (10)
Terminal strips	With spring terminals	**170 XTS 012 00**	–
	With screw terminals	**170 XTS 011 00**	–



170 CPS 111 00

Momentum 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
Page	48247/5	

Serial Option Adapter

General-purpose serial communications

One software-selectable RS232/RS485 serial port

172 JNN 210 32

Option Adapters

Presentation

Characteristics :
page 48247/4
References :
page 48247/5

Presentation

The Momentum Option Adapters, mounted on Momentum I/O Bases, can be used to enhance the capabilities of the Momentum Processor Adapters that mount on top of the Option Adapter, to fulfill a variety of roles. The option adapters allow you to network your local logic solvers together into an intelligent subsystem as part of a larger Schneider application, or into a standalone, integrally networked system with local controllers with extended I/O.

The Momentum Option Adapters are:

- **172 PNN 210 22** - one Modbus Plus communication port
- **172 PNN 260 22** - two redundant Modbus Plus communication ports
- **172 JNN 210 32** - one general-purpose serial communication port, RS232/RS485 selectable

Each of these Option Adapters provides an on-board, time-of-day (TOD) clock that is available to the application residing in the Processor Adapter. The clock is useful for the scheduling of events, time-stamping operations and operator interface requirements. In addition, each Option Adapter contains a battery-backup system that maintains the application and its variables in the event of a power outage to the Processor Adapter. The Option Adapter's convenient side-door access allows for quick replacement of the two AAA batteries.

In addition to the TOD clock and battery backup features, the 172 PNN 210 22 adapter allows you to add networking to the intelligent I/O Base. Model 172 PNN 260 22 allows you to add redundantly-cabled networking to the I/O Base. This opens the Momentum product line to a broad spectrum of applications. You can use the port to connect to other processors, such as other Momentum Processor/Option Adapters, other PLCs enabled with Modbus Plus, Momentum Modbus Plus Communication Adapters and I/O Bases, and other third party devices using Modbus Plus to communicate.

Model 172 JNN 210 32 allows you to add a second, defacto-industry standard Modbus port (selectable RS232/485) to the I/O Base. You can use the port to connect to other processors, such as other Momentum Processor/Option Adapters, and other devices, such as operator interface panels and display marquees.

Programming Software for Momentum

Momentum Processor Adapters have a number of PC programming software options available. You can program your Processor Adapter via the Modbus RS232 serial port, or if using a Modbus Plus Option Adapter in conjunction with a Processor Adapter, via an SA85 card installed in a PC and connected to the same Modbus Plus network. For more specific information, see the appropriate Momentum, ProWORX, and Concept programming software documentation.

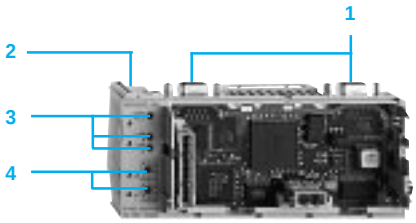
Option Adapters

Description

Characteristics :
page 48247/4
References :
page 48247/5

Description

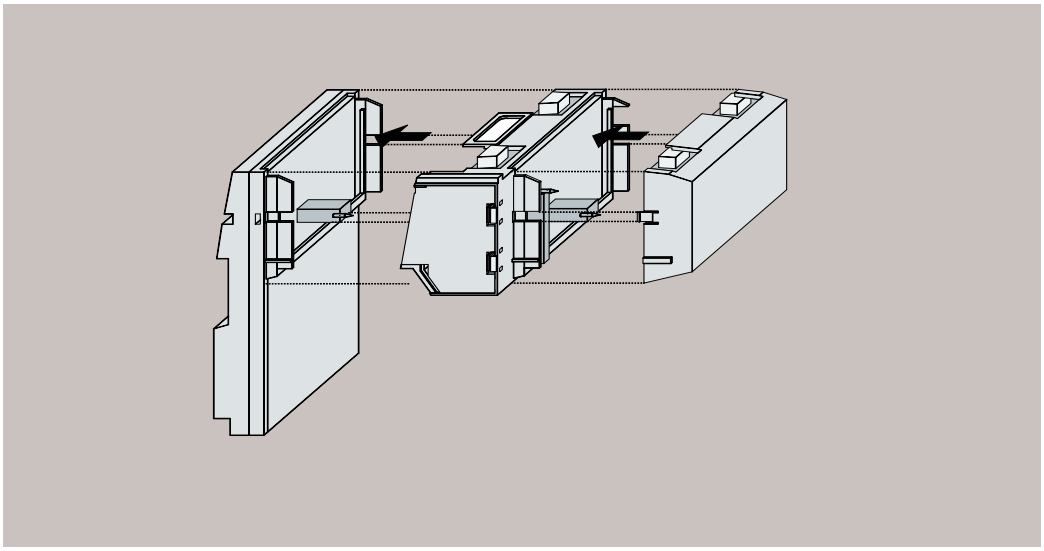
A typical Momentum Option Adapter consists of the following components:



1 9-pin D-shell connector(s) for Modbus Plus communications
2 Battery compartment
3 LED indicators
4 Address switches for Modbus Plus

Mounting

The Momentum Option Adapters provide 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 this figure, the Processor Adapter stacks on top. Here, the Option Adapter is used in conjunction with the Processor Adapter to extend the system's I/O capacity.



Option Adapters

Characteristics

References :
page 48247/5

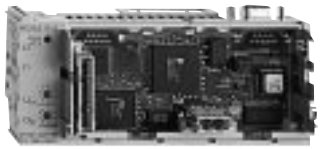
Characteristics

Model No.		172 PNN 210 22	172 PNN 260 22	172 JNN 210 32
Time-of-day clock		On-board, ± 13 s/day accuracy		
Batteries				
type		Two user-replaceable AAA alkaline		
service life		< 30 days from the time a battery-low indication is received, to actual battery failure @ 40˚C maximum ambient temperature with the system continuously powered down.		
shelf life		In excess of 5 years at room temperature		
Communication port(s)		One Modbus Plus port Drop address range 1...64	Two redundant Modbus Plus ports	General-purpose serial port RS232 or RS485 selectable
Comm port connector (s)		9-pin D-shell		
Operating temperature	**˚C**	0...60		
Storage temperature	**˚C**	- 40...85		
Relative humidity		5...95% (non-condensing)		
Altitude	**m (ft)**	2000 (6,562)		
Shock		± 15 g peak, 11 ms, half sine wave		
Vibration	**Hz**	57...150 @ 1 g 10...57 @ 0.075 mm d.a.		
Height		1.01 in (25. mm) [2.10 in (58.3 mm) on battery side]		
Width		5.57 in (143.1 mm)		
Depth		2.36 in (60.06 mm)		
Weight		3.00 oz (85.05 g)		
Material		Lexan		
Voltage	**VDC**	5.0 (supplied by I/O Base)		
Voltage tolerance		± 5% (as supplied by I/O Base)		
RFI immunity/EMI susceptibility/ Electrostatic discharge		Meets CE mark for open equipment. Open equipment should be installed in an industry standard enclosure, with access restricted to qualified service personnel.		
Di-electric strength	**VDC**	500		
Designed to meet: (certifications pending)		UL, CE, CUL, FM Class 1 Div. 2, NEMA 250 Type 1, and IP20 conforming to IEC529		
Packaging		Standard momentum top-hat enclosure		
Indicator lights		Diagnostic and status lights, standard		
Power source		Power supply on-board the Momentum I/O Base		

Option Adapters

References

Characteristics :
page 48247/4



172 PNN 210 22

172 PNN 260 22

172 JNN 210 32

Modules

Description	Reference	Weight kg (oz)
Modbus Plus Option Adapter, Single Port	**172 PNN 210 22**	0.070 (2.5)
Modbus Plus Option Adapter, Dual Redundant Ports	**172 PNN 260 22**	0.070 (2.5)
Serial Option Adapter, Single Serial Port	**172 JNN 210 32**	0.070 (2.5)

Accessories

Description	Use From	Use To	Length	Reference	Weight kg
Standard Modbus Plus cables	T-junction box	T-junction box	30 m (100 ft)	**490 NAA 271 01**	–
			150 m (500 ft)	**490 NAA 271 02**	–
			300 m (1000 ft)	**490 NAA 271 03**	–
			450 m (1500 ft)	**490 NAA 271 04**	–
			1500 m (5000 ft)	**490 NAA 271 06**	–
Modbus Plus Drop cables	Communication modules for Momentum I/O bases	T-junction box 990 NAD 230 00	2.4 m (8ft)	**990 NAD 211 10**	0.530
			6 m (20 ft)	**990 NAD 211 30**	0.530
Modbus Plus RS 485 cable	–	–	25 m (10.0 in)	**170 MCI 020 10**	–
			1 m (3 ft)	**170 MCI 020 36**	–
RS 485 master communication cable (RJ45/RJ45)	–	–	0,3 m (1 ft)	**170 MCI 041 10**	–
Modbus Plus RJ45 cable		–	3 m (10 ft)	**170 MCI 021 20**	–
Modbus Plus RJ45 cable double-ended		–	3 m (10 ft)	**170 MCI 021 80**	–
			10 m (30 ft)	**170 MCI 020 80**	–
RS 232 communication cable (RJ45-RJ45)	–	–	1 m (3 ft)	**110 XCA 282 01**	–
			3 m (10 ft)	**110 XCA 282 02**	–
			6 m (20 ft)	**110 XCA 282 03**	–
Modbus Plus tap	IP20 junction box for tap-off connection (T)	–	–	**990 NAD 230 00**	0.230
Modbus Plus line connector (9-Pin Sub-D)	Communication module connection	–	–	**AS MBKT 085**	–
Modbus Plus terminator connector kit (set of 2)	2 impedance adaptors for box (IP20) 990 NAD 230 00		–	**AS MBKT 185**	–
D-shell adapters	RJ45 to 9-pin (for AT serial port)			**110 XCA 203 00**	–
	RJ45 to 12-pin (for XT serial port)			**110 XCA 204 00**	–

Description	Reference	Weight kg
RS 485 (9-Pin Sub-D) cable connector T for RJ45	**170 XTS 040 00**	–
RJ45 shielded connectors (set of 20)	**170 XTS 022 00**	–
Modbus Plus terminating RJ 45 resistor plugs (set of 2)	**170 XTS 021 00**	–
RS 485 (RJ45) cable connector T for RJ45	**170 XTS 041 00**	–
RS 485 Multi-Master RJ45 shunt plugs (set of 2)	**170 XTS 042 00**	–
Modbus Plus (9-Pin Sub-D) cable connector T for RJ 45	**170 XTS 020 00**	–
Ground clamp	**424 244 739**	–
RJ crimping tool	**170 XTS 023 00**	–

Programming softwares
Concept

Presentation, PLC hardware configuration

References :
page 48251/7

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)

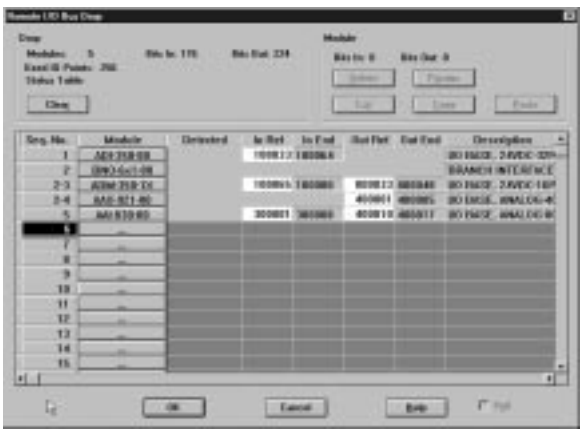
as well as Modsoft-compatible ladder logic (LL984). IEC 1131-3 compliant data types are also available. With the data type editor, custom data types can be converted to and from the IEC data types.

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 softwares
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.

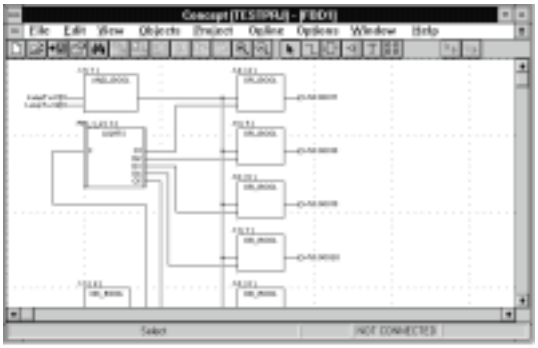
Function block diagram (FBD)

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.

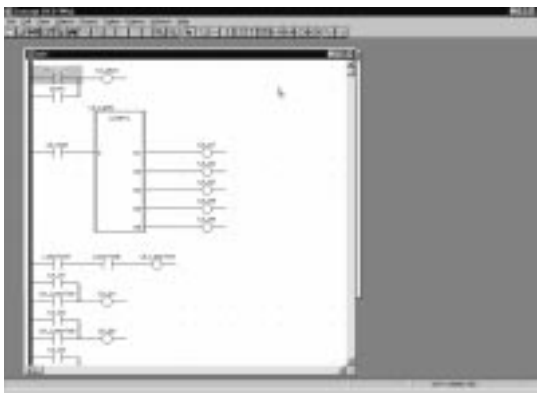


Ladder diagram (LD)

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.



Programming softwares
Concept

Languages

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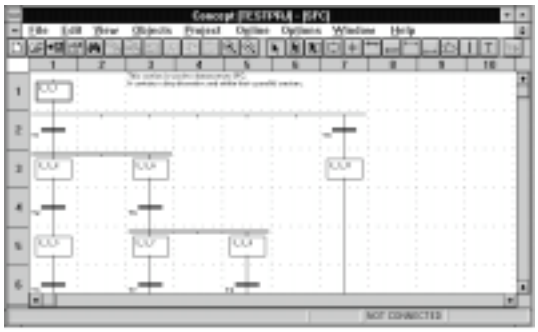
Sequential function chart (SFC)

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.

Programming softwares
Concept

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 softwares
ProWORX

General features

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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.

Programming Softwares
Concept and ProWORX

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**	–
Concept Upgrades			
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 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

Momentum Automation Platform

User Documentation

References

References

Description	Language	Reference	Weight kg
Momentum I/O Bases User Guide	English	**870 USE 002 00**	–
	French	**870 USE 002 01**	–
	German	**870 USE 002 02**	–
	Italian	**870 USE 002 04**	–
	Spanish	**870 USE 002 03**	–
M1 Processor Adapter and Option Adapter User Guide	English	**870 USE 101 00**	–
	French	**870 USE 101 01**	–
	German	**870 USE 101 02**	–
	Italian	**870 USE 101 04**	–
	Spanish	**870 USE 101 03**	–
InterBus Communication Adapter User Guide	English	**870 USE 003 00**	–
	French	**870 USE 003 01**	–
	German	**870 USE 003 02**	–
	Italian	**870 USE 003 04**	–
	Spanish	**870 USE 003 03**	–
InterBus-S Fiber Optic Communication Adapter User Guide	English	**870 USE 006 00**	–
	French	**870 USE 006 01**	–
	German	**870 USE 006 02**	–
	Italian	**870 USE 006 04**	–
	Spanish	**870 USE 006 03**	–
Profibus Communication Adapter User Guide	English	**870 USE 004 00**	–
	French	**870 USE 004 01**	–
	German	**870 USE 004 02**	–
	Italian	**870 USE 004 04**	–
	Spanish	**870 USE 004 03**	–
Fipio Communication Adapter (170 FNT 110 00) User Guide	English	**870 USE 005 00**	–
	French	**870 USE 005 01**	–
	German	**870 USE 005 02**	–
	Italian	**870 USE 005 04**	–
	Spanish	**870 USE 005 03**	–
Fipio Communication Adapter (170 FNT 110 01) User Guide	English	**870 USE 105 00**	–
	French	**870 USE 105 01**	–
	German	**870 USE 105 02**	–
	Italian	**870 USE 105 04**	–
	Spanish	**870 USE 105 03**	–
High-Speed Counter Module Base (170 AEC 920 00) User Guide	English	**840 USE 008 00**	–
	French	**840 USE 008 01**	–
	German	**840 USE 008 02**	–
	Italian	**840 USE 008 04**	–
	Spanish	**840 USE 008 03**	–

References (continued)

References

Description	Language	Reference	Weight kg
Fipio Bus / Fipway Networking Reference Manual	English	**TSX DR FPW E**	–
	French	**TSX DR FPW F**	–
	German	**TSX DR FPW G**	–
	Spanish	**TSX DR FPW S**	–
170 PNT Series Modbus Plus Communication Adapter User Guide	English	**870 USE 103 00**	–
	French	**870 USE 103 01**	–
	German	**870 USE 103 02**	–
	Italian	**870 USE 103 04**	–
	Spanish	**870 USE 103 03**	–
170 NEF Series Modbus Plus Communication Adapter User Guide	English	**870 USE 111 00**	–
	French	**870 USE 111 01**	–
	German	**870 USE 111 02**	–
	Italian	**870 USE 111 04**	–
	Spanish	**870 USE 111 03**	–
Modbus Plus Network Planning and Installation Guide	English	**890 USE 100 00**	–
	French	**890 USE 100 01**	–
	German	**890 USE 100 02**	–
Modbus Plus Network BM85 Bridge Multiplexer User Guide	English	**890 USE 103 00**	–
DeviceNet Communication Adapter User Guide	English	**870 USE 104 00**	–
	French	**870 USE 104 01**	–
	German	**870 USE 104 02**	–
	Italian	**870 USE 104 04**	–
	Spanish	**870 USE 104 03**	–
ControlNet Communication Adapter User Guide	English	**870 USE 007 00**	–
	French	**870 USE 007 01**	–
	German	**870 USE 007 02**	–
	Italian	**870 USE 007 04**	–
	Spanish	**870 USE 007 03**	–
Modbus Plus Ethernet Communication Adapter User Guide	English	**870 USE 112 00**	–
	French	**870 USE 112 01**	–
	German	**870 USE 112 02**	–
	Italian	**870 USE 112 04**	–
	Spanish	**870 USE 112 03**	–
XMIT Function Block Version 3.0 User Guide	English	**840 USE 113 00**	–
	French	**840 USE 113 01**	–
	German	**840 USE 113 02**	–

Momentum 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