

# › Millenium 3 PLC

## Smart Compact CD12/CB12

### With/without display

- › Highly visible blue LCD display with 4 lines of 18 characters, with controllable backlighting
- › Compatible with all the fonctions blocks available on the software
- › Wide temperature range (-20 °C → +70 °C)
- › Analog inputs 0-10 V $\overline{\text{--}}$ , potentiometer, NTC, (0-20mA/Pt100 with adapters)
- › Possibility to set parameters from the front panel



CD12 with display



CB12 without display

Selection guide				
Power supply	Inputs	Outputs	CD12	CB12
12 V $\overline{\text{--}}$	8 digital including 4 analog	4 relays 8A	<b>88974045</b>	
		4 solid state 0.5A including 1 PWM	<b>88974046</b>	-
24 V $\overline{\text{--}}$		4 relays 8A	<b>88974041</b>	<b>88974021</b>
		4 solid state 0.5A including 1 PWM	<b>88974042</b>	-
24 V $\sim$	8 digital	4 relays 8A	<b>88974044</b>	<b>88974024</b>
100 → 240 V $\sim$			<b>88974043</b>	<b>88974023</b>

Accessories, Kits & Digital extensions		
Accessories Types	Description	Code
M3 Soft	Programming Software with a complete fonction library	<b>88970111</b>
Physical Accessories	EEPROM memory cartridge	<b>88970108</b>
	3m serial cable: PC → Millenium 3	<b>88970102</b>
	3m USB cable: PC → Millenium 3	<b>88970109</b>
	Millenium 3 → Bluetooth® interface (class A 10m)	<b>88970104</b>

#### Our Part-Number System

#### Compact Version



Screen D: Whith B: Without		
<b>C</b>	<b>D</b>	<b>12</b>
Version C: Compact X: Expandable		
Inputs 10: 6 digital (including 4 analog) 12: 8 digital (including 4 analog) 26: 16 digital (including 6 analog)		

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#### Description:

#### Millenium3: The reference for more than 15 years

The Millenium3 is a versatile, powerful logic controller designed to meet the needs of a wide range of industrial applications. Its ease of use and flexibility make it ideal for automation professionals.

It offers high reliability and accuracy, making it a trusted choice for your automation needs.

For more information about **Millenium3**: please visit [www.crouzet.com](http://www.crouzet.com)

Accessories, Kits & Digital extensions		
Kit Types	Description	Code
Kit CD12	8 digital (including 4 analog), 4 relays 8 A, 24 V $\overline{\sim}$	88974080
	8 digital, 4 relays 8 A, 100 $\rightarrow$ 240 V $\sim$	88974081
Expansion Modules	Description	Code
Sandwich communication extensions		
<a href="#">XN06</a>	Modbus	88972250
<a href="#">XN05</a>	Ethernet	88970270
Digital sandwich extension		
<a href="#">XE10</a>	24 V $\overline{\sim}$ controller	88970321
	100 $\rightarrow$ 240 V $\sim$	88970323
	24 V $\sim$	88970324
Digital extensions		
<a href="#">XR06</a>	4 digital, 24 V $\overline{\sim}$	88970211
	4 digital, 100 $\rightarrow$ 240 V $\sim$	88970213
	4 digital, 24 V $\sim$	88970214
	4 digital, 12 V $\overline{\sim}$	88970215
<a href="#">XR10</a>	6 digital, 24 V $\overline{\sim}$	88970221
	6 digital, 100 $\rightarrow$ 240 V $\sim$	88970223
	6 digital, 24 V $\sim$	88970224
	6 digital, 12 V $\overline{\sim}$	88970225
<a href="#">XR14</a>	8 digital, 24 V $\overline{\sim}$	88970231
	8 digital, 100 $\rightarrow$ 240 V $\sim$	88970233
	8 digital, 24 V $\sim$	88970234
	8 digital, 12 V $\overline{\sim}$	88970235
Analog extension		
<a href="#">XA03</a>	Analog extension: 3 temperature input	88970800
<a href="#">XA04</a>	Analog extension: 2 inputs/2 outputs	88970241

12 V $\overline{\sim}$ 24 V $\overline{\sim}$ 24 V $\sim$ 100  $\rightarrow$  240 V $\sim$ 

General environment characteristics	
Certifications	CE, UL, CSA, GL
Conformity to standards (with the low voltage directive and EMC directive)	IEC/EN 61131-2 (Open equipment) IEC/EN 61131-2 (Zone B) IEC/EN 61000-6-2 IEC/EN 61000-6-3 (*) IEC/EN 61000-6-4 (*) Except configuration (88 970 1X1 or 88 970 1X2) + (88 970 250 or 88 970 270) + 88 970 241 class A (class B in a metal enclosure)
Earthing	Not included
Protection rating	In accordance with IEC/EN 60529: IP40 on front panel IP20 on terminal block
Overvoltage category	3 in accordance with IEC/EN 60664-1
Pollution	Degree: 2 in accordance with IEC/EN 61131-2
Max operating Altitude	Operation: 2000 m Transport: 3048 m
Mechanical resistance	Immunity to vibrations IEC/EN 60068-2-6, test Fc Immunity to shock IEC/EN 60068-2-27, test Ea
Resistance to electrostatic discharge	Immunity to ESD IEC/EN 61000-4-2, level 3

	12 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$	24 V $\sim$	100 $\rightarrow$ 240 V $\sim$
Resistance to HF interference	Immunity to radiated electrostatic fields IEC/EN 61000-4-3 Immunity to fast transients (burst immunity) IEC/EN 61000-4-4, level 3 Immunity to shock waves IEC/EN 61000-4-5 Radio frequency in common mode IEC/EN 61000-4-6, level 3 Voltage dips and breaks (a) IEC/EN 61000-4-11 Immunity to damped oscillatory waves IEC/EN 61000-4-12			
Conducted and radiated emissions	Class B (*) in accordance with EN 55022, EN 55011 (CISPR22, CISPR11) group 1 (*) Except configuration (88 970 1X1 or 88 970 1X2) + (88 970 250 or 88 970 270) + 88 970 241 class A (class B in a metal enclosure)			
Operating temperature Millenium 3 Essential and extensions	-20 $\rightarrow$ +55 °C (+40 °C in a non-ventilated enclosure) in accordance with IEC/EN 60068-2-1 and IEC/EN 60068-2-2			
Operating temperature Millenium 3 Smart	-20 +70 °C except CB and XB versions in VDC: -30 $\rightarrow$ +70 °C (+40 °C in a nonventilated enclosure) in accordance with IEC/EN 60068-2-1 and IEC/EN 60068-2-2			
Storage temperature Millenium 3 Essential and extensions	-40 $\rightarrow$ +70 °C in accordance with IEC/EN 60068-2-1 and IEC/EN 60068-2-2			
Storage temperature Millenium 3 Smart	-40 $\rightarrow$ +80 °C in accordance with IEC/EN 60068-2-1 and IEC/EN 60068-2-2			
Relative humidity	95 % max. (no condensation or dripping water) in accordance with IEC/EN 60068-2-30			
Mounting	On symmetrical DIN rail, 35 x 7.5 mm and 35 x 15 mm, or on panel (2 x Ø 4 mm)			
Screw terminals connection capacity	Flexible wire with ferrule = conductor: 0.25 to 2.5 mm <sup>2</sup> (AWG 24 $\rightarrow$ AWG 14) conductors 0.25 to 0.75 mm <sup>2</sup> (AWG 24 $\rightarrow$ AWG 18) Semi-rigid wire = 1 conductor: 0.2 to 2.5 mm <sup>2</sup> (AWG 25 $\rightarrow$ AWG 14) Rigid wire = conductor: 0.2 to 2.5 mm <sup>2</sup> (AWG 25 $\rightarrow$ AWG 14) conductors 0.2 to 1.5 mm <sup>2</sup> (AWG 25 $\rightarrow$ AWG 16) Tightening torque = 0.5 N.m (4.5 lb-in) (tighten using screwdriver diam. 3.5 mm)			

#### Millenium 3 Essential versions CB, CD

Program size function blocks (FBD)	180 typical bloc 64 macros maximum 256 blocks maximum per macro
Memory size function blocks (FBD)	4 K
Number of lines in Ladder	120 lines
LCD display	XD: Display with 4 lines of 18 characters
Programming method	Function blocks / SCF (Grafcet) or Ladder
Program memory	Flash EEPROM
Removable memory	EEPROM
Data memory	368 bit / 200 words
Back-up time in the event of power failure	Program and settings in the controller: 10 years Program and settings in the plug-in memory: 10 years Data memory: 10 years
Cycle time	FBD: 6 $\rightarrow$ 90 ms (typically 20 ms) Ladder: typically 20 ms
Response time	Input acquisition time: + 1 to 2 cycle times
Clock data retention	10 years (lithium battery) at 25 °C
Clock drift	Drift < 12 min/year (at 25 °C) 6 s/month (at 25 °C with user-definable correction of drift)
Timer block accuracy	1 % $\pm$ 2 cycle times
Start up time on power up	< 1.2 s

	12 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$	24 V $\sim$	100 $\rightarrow$ 240 V $\sim$
<b>Characteristics of products with AC power supplied</b>				
<b>Supply</b>				
Nominal voltage	-		24 V $\sim$	100 $\rightarrow$ 240 V $\sim$
Operating limits	-		-15 % / +20 % or 20.4 $\rightarrow$ 28.8 V $\sim$	-15 % / +10 % or 85 $\rightarrow$ 264 V $\sim$
Supply frequency range	-		50/60 Hz (+4 % / -6 %) or 47 $\rightarrow$ 53 Hz / 57 $\rightarrow$ 63 Hz	
Immunity from micro power cuts	-		10 ms (repetition 20 times)	
Max. absorbed power	-		CB12-CD12: 4 VA	CB12-CD12: 7 VA
Isolation voltage	-		1780 V $\sim$	
<b>Inputs</b>				
Input voltage	-		24 V $\sim$ (-15 % / +20 %)	100 $\rightarrow$ 240 V $\sim$ (-15 % / +10 %)
Input current	-		4.4 mA @ 20.4 V $\sim$ 5.2 mA @ 24.0 V $\sim$ 6.3 mA @ 28.8 V $\sim$	0.24 mA @ 85 V $\sim$ 0.75 mA @ 264 V $\sim$
Input impedance	-		4.6 k $\Omega$	350 k $\Omega$
Logic 1 voltage threshold	-		$\geq 14$ V $\sim$	$\geq 79$ V $\sim$
Making current at logic state 1	-		> 2 mA	> 0.17 mA
Logic 0 voltage threshold	-		$\leq 5$ V $\sim$	$\leq 20$ V $\sim$ ( $\leq 28$ V $\sim$ : XE10, XR06, XR10, XR14)
Release current at logic state 0	-		< 0.5 mA	
Response time with function blocks programming	-		Configurable in increments of 10 ms 50 ms min. up to 255 ms State 0 $\rightarrow$ 1 (50/60 Hz)	
Response time with Ladder programming	-		50 ms State 0 $\rightarrow$ 1 (50/60 Hz)	
Maximum counting frequency	-		In accordance with cycle time (Tc) and input response time (Tr): $1 / (2 \times Tc) + Tr$	
Sensor type	-		Contact or 3-wire PNP	
Input type	-		Resistive	
Isolation between power supply and inputs	-		None	
Isolation between inputs	-		None	
Protection against polarity inversions	-		Yes	
Status indicator	-		On LCD screen for CD	
<b>Characteristics of relay outputs common to the entire range</b>				
Max. breaking voltage	5 $\rightarrow$ 30 V $\overline{\text{---}}$ 24 $\rightarrow$ 250 V $\sim$			
Breaking current	CB-CD: 8 A			
Electrical durability for 500 000 operating cycles	Utilization category DC-12: 24 V, 1.5 A Utilization category DC-13: 24 V (L/R = 10 ms), 0.6 A Utilization category AC-12: 230 V, 1.5 A Utilization category AC-15: 230 V, 0.9 A			
Max. Output Common Current	12 A for O8, O9, OA			
Minimum switching capacity	10 mA (at minimum voltage of 12 V)			
Minimum load	12 V, 10 mA			
Maximum rate	Off load: 10 Hz At operating current: 0.1 Hz			
Mechanical life	10.000.000 (operations)			
Voltage for withstanding shocks	In accordance with IEC/EN 60947-1 and IEC/EN 60664-1: 4 kV			
Response time	Make 10 ms Release 5 ms			

	12 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$	24 V $\sim$	100 $\rightarrow$ 240 V $\sim$
Built-in protections	Against short-circuits: None Against overvoltages and overloads: None			
Status indicator	On LCD screen for CD			
Characteristics of product with DC power supplied				
Supply				
Nominal voltage	12 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$	-	
Operating limits	-13 % / +20 % or 10.4 $\rightarrow$ 14.4 V $\overline{\text{---}}$ (including ripple)	-20 % / +25 % or 19.2 $\rightarrow$ 30 V $\overline{\text{---}}$ (including ripple)	-	
Immunity from micro power cuts	$\leq$ 1 ms (repetition 20 times)		-	
Max. absorbed power	CB12 with solid state outputs: 1.5 W CD12: 1.5 W	CB12-CD12 with solid state outputs: 3 W	-	
Protection against polarity inversions	Yes		-	
Digital inputs (I1 to IA and IH to IY)				
Input voltage	12 V $\overline{\text{---}}$ (-13 % / +20 %)	24 V $\overline{\text{---}}$ (-20 % / +25 %)	-	
Input current	3.9 mA @ 10.44 V $\overline{\text{---}}$ 4.4 mA @ 12 V $\overline{\text{---}}$ 5.3 mA @ 14.4 V $\overline{\text{---}}$	2.6 mA @ 19.2 V $\overline{\text{---}}$ 3.2 mA @ 24 V $\overline{\text{---}}$ 4.0 mA @ 30.0 V $\overline{\text{---}}$	-	
Input impedance	2.7 k $\Omega$	7.4 k $\Omega$	-	
Logic 1 voltage threshold	$\geq$ 7 V $\overline{\text{---}}$	$\geq$ 15 V $\overline{\text{---}}$	-	
Making current at logic state 1	$\geq$ 2 mA	$\geq$ 2.2 mA	-	
Logic 0 voltage threshold	$\leq$ 3 V $\overline{\text{---}}$	$\leq$ 5 V $\overline{\text{---}}$	-	
Release current at logic state 0	< 0.9 mA	< 0.75 mA	-	
Response time	1 $\rightarrow$ 2 cycle times + 6 ms		-	
Maximum counting frequency	Inputs I1 & I2: FBD (up to 6 kHz) & Ladder (1 kHz)  Inputs I3 to IA & IH to IY: In accordance with cycle time (Tc) and input response time (Tr): 1/ ( (2 x Tc) + Tr)		-	
Sensor type	Contact or 3-wire PNP		-	
Conforming to IEC/EN 61131-2	Type 1		-	
Input type	Resistive		-	
Isolation between power supply and inputs	None		-	
Isolation between inputs	None		-	
Protection against polarity inversions	Yes		-	
Status indicator	On LCD screen for CD		-	
Analog or digital inputs (IB to IG)				
CB12-CD12-XD10-XB10	4 inputs IB $\rightarrow$ IE		-	
	-		-	
Inputs used as analog inputs only in FBD				
Measurement range	(0 $\rightarrow$ 10 V) ou (0 $\rightarrow$ V power supply)		-	
Input impedance	14 k $\Omega$	12 k $\Omega$	-	
Input voltage	14.4 V $\overline{\text{---}}$ max.	30 V $\overline{\text{---}}$ max.	-	
Value of LSB	14 mV	29 mV	-	
Input type	Common mode		-	
Resolution	10 bit at max. input voltage		-	
Conversion time	Controller cycle time		-	
Accuracy at 25 °C	$\pm$ 5 %		-	
Accuracy at 55 °C	$\pm$ 6.2 %		-	
Repeat accuracy at 55 °C	$\pm$ 2 %		-	
Isolation between analog channel and power supply	None		-	

	12 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$	24 V $\sim$	100 $\rightarrow$ 240 V $\sim$
Cable length	10 m maximum, with shielded cable (sensor not isolated)		-	
Protection against polarity inversions	Yes		-	
Potentiometer control	2.2 k $\Omega$ / 0.5 W (recommended) 10 k $\Omega$ max		-	
Inputs used as digital inputs				
Input voltage	12 V $\overline{\text{---}}$ (-13 % / +20 %)	24 V $\overline{\text{---}}$ (-20 % / +25 %)	-	
Input current	0.7 mA @ 10.44 V $\overline{\text{---}}$ 0.9 mA @ 12 V $\overline{\text{---}}$ 1 mA @ 14.4 V $\overline{\text{---}}$	1.6 mA @ 19.2 V $\overline{\text{---}}$ 2.0 mA @ 24.0 V $\overline{\text{---}}$ 2.5 mA @ 30.0 V $\overline{\text{---}}$	-	
Input impedance	14 k $\Omega$	12 k $\Omega$	-	
Logic 1 voltage threshold	$\geq 7$ V $\overline{\text{---}}$	$\geq 15$ V $\overline{\text{---}}$	-	
Making current at logic state 1	$\geq 0.5$ mA	$\geq 1.2$ mA	-	
Logic 0 voltage threshold	$\leq 3$ V $\overline{\text{---}}$	$\leq 5$ V $\overline{\text{---}}$	-	
Release current at logic state 0	$\leq 0.2$ mA	$\leq 0.5$ mA	-	
Response time	1 $\rightarrow$ 2 cycle times		-	
Maximum counting frequency in FBD	In accordance with cycle time (Tc) and input response time (Tr): 1/ ( 2 x Tc) + Tr		-	
Sensor type	Contact or 3-wire PNP		-	
Conforming to IEC/EN 61131-2	Type 1		-	
Input type	Resistive		-	
Isolation between power supply and inputs	None		-	
Isolation between inputs	None		-	
Protection against polarity inversions	Yes		-	
Status indicator	On LCD screen for CD		-	
Characteristics of relay outputs common to the entire range				
Max. breaking voltage	5 $\rightarrow$ 30 V $\overline{\text{---}}$ 24 $\rightarrow$ 250 V $\sim$			
Max. Output Common Current	12 A (10 A UL) for O8, O9, OA			
Breaking current	CB-CD: 8 A			
Electrical durability for 500 000 operating cycles	Utilization category DC-12: 24 V, 1.5 A Utilization category DC-13: 24 V (L/R = 10 ms), 0.6 A Utilization category AC-12: 230 V, 1.5 A Utilization category AC-15: 230 V, 0.9 A			
Minimum switching capacity	10 mA (at minimum voltage of 12 V)			
Minimum load	12 V, 10 mA			
Maximum rate	Off load: 10 Hz At operating current: 0.1 Hz			
Mechanical life	10.000.000 (operations)			
Voltage for withstanding shocks	In accordance with IEC/EN 60947-1 and IEC/EN 60664-1: 4 kV			
Off-cycle response time	Make 10 ms Release 5 ms			
Built-in protections	Against short-circuits: None Against overvoltages and overloads: None			
Status indicator	On LCD screen for CD			
	-			
Digital / PWM solid state outputs				
PWM solid state outputs*	CB12: O4	CD12: O4	-	
* Only available with "FBD" programming language	-			
Breaking voltage	10.4 $\rightarrow$ 30 V $\overline{\text{---}}$	19.2 $\rightarrow$ 30 V $\overline{\text{---}}$	-	
Nominal voltage	12-24 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$	-	
Nominal current	0.5 A		-	

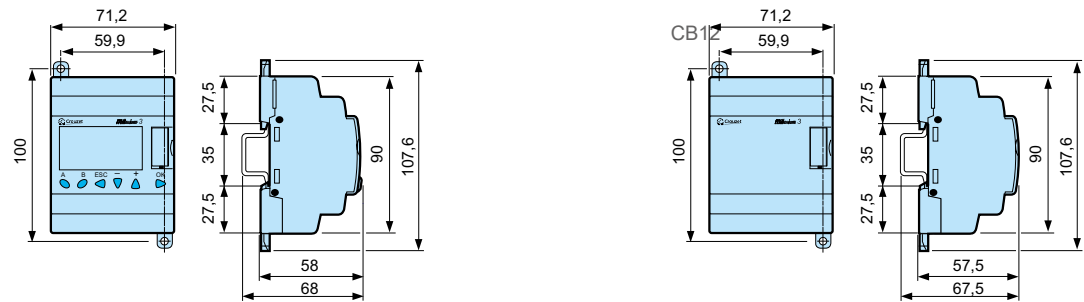
	12 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$	24 V $\sim$	100 $\rightarrow$ 240 V $\sim$
Max. breaking current	0.625 A		-	
Voltage drop	$\leq 2$ V for I = 0.5 A (at state 1)		-	
Response time	Make $\leq 1$ ms Release $\leq 1$ ms		-	
Frequency (Hz)	1 Maximum on inductive load		-	
Built-in protections	Against overloads and short-circuits: Yes Against overvoltages (*): Yes Against inversions of power supply: Yes (* ) In the absence of a voltfree contact between the logic controller output and the load		-	
Min. load	1 mA		-	
Maximum incandescent load	0.2 A / 12 V $\overline{\text{---}}$ 0.1 A / 24 V $\overline{\text{---}}$		-	
Galvanic isolation	No		-	
PWM frequency	14.11 Hz 56.45 Hz 112.90 Hz 225.80 Hz 451.59 Hz 1806.37 Hz		-	
PWM cyclic ratio	0 $\rightarrow$ 100 % (256 steps for XD)		-	
PWM accuracy at 120 Hz	< 5 % (20 % $\rightarrow$ 80 %) load at 10 mA		-	
Max. Breaking current PWM	50 mA		-	
Max. cable length PWM	20 m		-	
PWM accuracy at 500 Hz	< 10 % (20 % $\rightarrow$ 80 %) load at 10 mA		-	
Status indicator	On LCD screen for XD		-	
	-		-	

Schematics

Footprint

Version

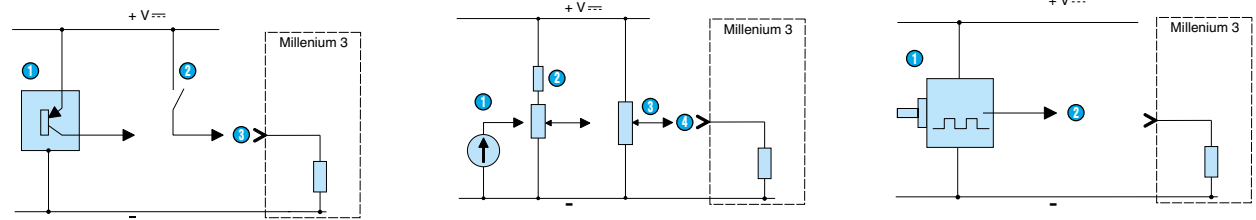
CD12



Input/output wiring

Inputs 12 V $\sim$ , 24 V $\sim$

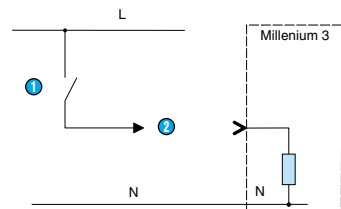
Extensions : XN06, XN05, XE10, XR06, XR10, XR14



1	3 wire PNP detector	0-10 V (input set to 0-10 V)	Encoder
2	Contact	Potentiometer attachment (input set to 0-10 V)	Fast digital input
3	Digital input	Potentiometer (input set to potentiometer)	-
4	-	Analogue input	-

Inputs 100-240 V $\sim$ , 24 V $\sim$

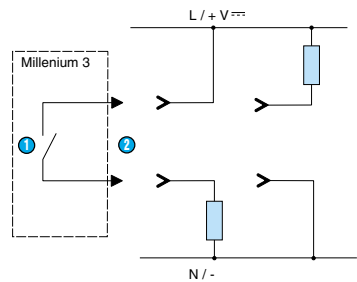
Extensions: XN06, XN05, XE10, XR06, XR10, XR14



1	Contact	-
2	Digital input	-

Relay outputs

Extensions: XE10, XR06, XR10, XR14

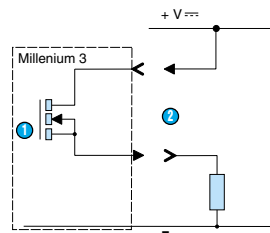


1	Contact	-
2	Digital input	-



Solid state outputs

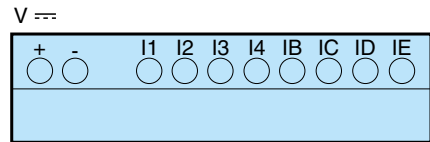
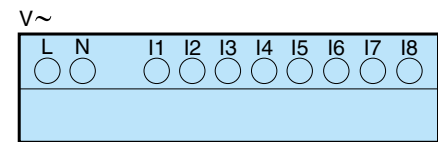
Extensions: XA04



1	MOS transistor	-
2	Digital/PWM output	-

Input/output installations: Bases

Inputs



Relay outputs

