

› 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 the whole of the specific function blocks library of the software workshop
- › Extended temperature range (-20 °C → +70 °C)
- › Analogue inputs 0-10 V_{DC}, potentiometer, NTC, (0-20mA/Pt100 with adapters)
- › Optional parameter settings: selected parameters settable from the front panel



CD12 with display



CB12 without display

Selection guide				
Power supply	Inputs	Outputs	CD12	CB12
12 V _{DC}	8 digital of which 4 analogue	4 relays 8A	88974045	-
12 V _{DC}	8 digital of which 4 analogue	4 solid state 0.5A of which 1 is PWM	88974046	-
24 V _{DC}	8 digital of which 4 analogue	4 relays 8A	88974041	88974021
24 V _{DC}	8 digital of which 4 analogue	4 solid state 0.5A of which 1 is PWM	88974042	-
24 V _{AC}	8 digital	4 relays 8A	88974044	88974024
100 → 240 V _{AC}	8 digital	4 relays 8A	88974043	88974023

Accessories & Kit selection		
Accessories	Description	Code
M3 Soft	Multilingual programming software with the specific functions library	88970111
PA	EEPROM memory cartridge	88970108
	3m serial cable: PC → Millenium 3	88970102
	3m USB cable: PC → Millenium 3	88970109
	Millenium 3 → Bluetooth® interface (class A 10m)	88970104

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Compact Version



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

Accessories & Kit selection		
Kit	Description	Code
Kit 12	8 digital (including 4 analog), 4 relays 8 A, 24 V $\overline{\sim}$	88974080
	8 digital, 4 relays 8 A, 100 \square 240 V \sim	88974081

12 V $\overline{\sim}$	24 V $\overline{\sim}$	24 V \sim	100 \rightarrow 240 V \sim
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General characteristics	
Product certifications (according to IEC/EN 60529)	UL, CSA, GL (*) (*) GL: except for 88 970 xxx
Conforms to the Low Voltage directive (according to 73/23/EEC)	EN (IEC) 61131-2 (Open equipment)
Conforms to the EMC directive (according to 89/336/EEC)	EN (IEC) 61131-2 (Zone B) EN (IEC) 61000-6-2, EN (IEC) 61000-6-3 (*), EN (IEC) 61000-6-4 (*) Except for configurations (88 970 1x1 or 88 970 1x2) + (88 970 250 or 88 970 270) + 88 970 241 class A (class B: work in progress)
Grounding	None
Degree of protection (according to IEC/EN 60529)	IP 40 for front panel IP 20 for terminal block
Over-voltage category (according to IEC/EN 60664-1)	3
Degree of interference (according to IEC/EN 61131-2)	2
Maximum allowable altitude	For operation: 2000m For transport: 3048m
Mechanical strength	Vibration resistance IEC/EN 60068-2-6, test Fc Shock resistance IEC/EN 60068-2-27, test Ea
Electrostatic discharge withstand	Electrostatic discharge immunity IEC/EN 61000-4-2, level3
HF interference withstand (immunity)	Radiated electromagnetic field immunity IEC/EN 61000-4-3, level 3 Fast transient/burst immunity IEC/EN 61000-4-4, level 3 Surge immunity IEC/EN 61000-4-5 Common mode radio frequency IEC/EN 61000-4-6, level 3 Voltage dips and interruptions (~) IEC/EN 61000-4-11 Damped oscillatory wave immunity IEC/EN 61000-4-18
Conducted and radiated interference (according to EN 55022/11 group 1)	Class B(*) (*) Except for configurations (88 970 1x1 or 88 970 1x2) + (88 970 250 or 88 970 270) + 88 970 241 class A (class B: work in progress)
Operating temperature	-20 \rightarrow +70 °C (+40 °C in unventilated cabinet) according to IEC/EN 60068-2-1 and IEC 60068-2-2 Duty cycle 100% (6A relay) Duty cycle 66% (8A relay)
Storage temperature	-40 \rightarrow +80 °C
Relative humidity	95 % max. (non-condensing)
Connection capacity to screw terminal (Tightened by screwdriver of 3.5mm diameter)	Flexible wire with single conductor terminal end: 0.25 to 2.5 mm ² 2 conductors 0.25 to 0.75 mm ² Semi-rigid single conductor wire: 0.2 to 2.5 mm ² Rigid single conductor wire: 0.2 to 2.5 mm ² 2 conductors 0.2 to 1.5 mm ² Tightening torque 0.5 Nm
Processing characteristics	
LCD display	CD: display with 4 lines of 18 characters
Programming method	Ladder or function blocks / SFC (Grafcet)
Program Size	Ladder: 120 lines Function blocks: 350 typical blocks
Program memory	Flash EEPROM

	12 V _{DC}	24 V _{DC}	24 V _{AC}	100 → 240 V _{AC}
Removable memory	EEPROM			
Data memory	368 bits / 200 words			
Backup time (in the event of a power failure)	Program and settings in PLC 10 years Program and settings on removable memory 10 years Data memory 10 years			
Cycle time	Ladder: 20 ms typically Function blocks: 6 to 90 ms			
Response time	Input data acquisition time 1 to 2 cycles			
Clock running time	10 years (lithium battery) at 25 °C			
Clock drift	Drift < 12 min/year (at 25 °C) 6 s/month (at 25 °C and calibrated)			
Accuracy of delay blocks	1% ± 2 cycles	1% ± 2 cycles		

Power supply

Nominal voltage	12 V _{DC}	24 V _{DC}	24 V _{AC}	100 - 240 V _{AC}
Operating limits	(-13 % / +20 %) 10.4 → 14.4 V _{DC}	(-20 % / +25 %) 19.2 → 30 V _{DC}	(-15 % / +20 %) 20.4 V _{AC} → 28.8 V _{AC}	(-15 % / +10 %) 85 - 264 V _{AC}
Operating frequency	N/A		50/60 Hz (+4 % / -6 %) 47 to 53 Hz / 57 to 63 Hz	
Startup time from power on	< 1.2s			
Micro-break immunity	≤ 1 ms (repeated 20 times)		10 ms (repeated 20 times)	
Maximum power draw	CD12 - CB12: 1.5 W CD12 - CB12 with solid state output: 1.5 W	CD12 - CB12: 4 W CD12 - CB12 with solid state output - 3 W	CD12 - CB12: 4 VA	CD12 - CB12: 7 VA
Inverted polarity protection	Yes		N/A	
Effective insulation voltage	N/A		1780 V (50-60 Hz)	

Digital inputs

Digital inputs				
Position of the inputs	4 inputs from I1 to I4		8 inputs from I1 to IE	
Input voltage	12 V $\overline{\sim}$ (-13 % / +20 %)	24 V $\overline{\sim}$ (-20 % / +25 %)	24 V \sim (-15% / +20 %)	100 \rightarrow 240 V \sim (-15 % / +10 %)
Input current	3.9 mA @ 10.44 V $\overline{\sim}$ 4.4 mA @ 12.0 V $\overline{\sim}$ 5.3 mA @ 14.4 V $\overline{\sim}$	2.6 mA @ 19.2 V $\overline{\sim}$ 3.2 mA @ 24.0 V $\overline{\sim}$ 4.0 mA @ 30.0 V $\overline{\sim}$	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	6.45 k Ω	7.4 k Ω	4.6 k Ω	350 k Ω
Logic state 1 triggering voltage	≥ 7 V $\overline{\sim}$	≥ 15 V $\overline{\sim}$	≥ 14 V \sim	≥ 79 V \sim
Logic state 1 triggering current	≥ 2 mA	≥ 2.2 mA	> 2 mA	> 0.17 mA
Logic state 0 triggering voltage	≤ 3 V $\overline{\sim}$	≤ 5 V $\overline{\sim}$	≤ 5 V \sim	≤ 40 V \sim
Logic state 0 triggering current	< 0.9 mA	< 0.75 mA	< 0.5 mA	
Response time	1 \rightarrow 2 cycles + 6 ms		50 ms	
Sensor type	Contact or 3 wire PNP			
Galvanic isolation	No			
Status indication	On the LCD screen for CD and XD			

Analogue or digital inputs

Inputs used in analogue mode

Position of the inputs	4 inputs from IB to IE		-
Measurement range	(0 → 10 V) or (0 → V _{supply})	0 → 10 V or 0 → V _{supply}	N/A
Input impedance	14 kΩ	12 kΩ	N/A
Maximum input voltage	14.4 V _{DC}	30 V _{DC}	N/A
LSB value	14 mV	29 mV	N/A
Input type	Common mode		N/A
Resolution	10 bits		N/A
Conversion time	PLC cycle time		N/A

	12 V _{DC}	24 V _{DC}	24 V _{AC}	100 → 240 V _{AC}
Precision at 25 °C	± 5 %		N/A	
Precision at 55 °C	± 6.2 %		N/A	
Repeatability at 55 °C	± 2 %		N/A	
Analogue channel to power supply isolation	None		N/A	
Cabling distance	10 m maximum, with shielded cable (sensor not isolated)		N/A	
Inverted polarity protection	Yes		N/A	
Potentiometer control	2.2 kΩ / 0.5 W (Preset) 10 kΩ max.		N/A	

Inputs in digital mode

Position of the inputs	4 inputs from IB to IE	-
Input voltage	12 V _{DC} (-13 % / +20 %)	24 V _{DC} (-20 % / +25 %)
Input current	0.7 mA @ 10.44 V _{DC} 0.9 mA @ 12.0 V _{DC} 1.0 mA @ 14.4 V _{DC}	1.6 mA @ 19.2 V _{DC} 2.0 mA @ 24.0 V _{DC} 2.5 mA @ 30.0 V _{DC}
Input impedance	14 kΩ	7.4 kΩ
Logic state 1 triggering voltage	≥ 7 V _{DC}	≥ 15 V _{DC}
Logic state 0 triggering voltage	≤ 3 V _{DC}	≤ 5 V _{DC}
Response time	Input Acquisition time + 1 to 2 cycle times (6ms)	
Sensor type	Contact or 3 wire PNP	
Galvanic isolation	No	
Status indication	On the LCD screen for CD and XD	

Relay outputs

Maximum breaking voltage	5 to 150 V _{DC} 24 to 250 V _{AC}
Cut-off current / thermal	CB-CD: 8 A
Electrical lifetime of 500.000 operations	Usage category DC-12: 24 V, 1.5 A Usage category DC-13: 24 V (L/R = 10 ms), 0.6 A Usage category AC-12: 230 V, 1.5 A Usage category AC-15: 230 V, 0.9 A
Minimum switching current (with minimum voltage of 12 V)	10 mA
Contact reliability at low levels	12 V, 10 mA
Maximum operating frequency	Unloaded: 10 Hz At rated current: 0.1 Hz
Mechanical lifetime	10.000.000 operating cycles
Rated impulse withstand voltage (according to IEC/EN 60947-1 and et IEC/EN 60664-1)	4 kV
Response time	Make 10 ms Break 5 ms
Built-in protections	Against short-circuits: None Against over-voltages and over-currents: None
Status indication	On the LCD screen for CD and XD

Solid state digital/PWM outputs (Only on VDC model)

Solid state PWM outputs	O4	-
Cut-off voltage / operating limit	19.2-30 V _{DC}	-
Nominal voltage	24 V _{DC}	-
Nominal current	0.5 A	-
Maximum breaking current	0.625 A	-

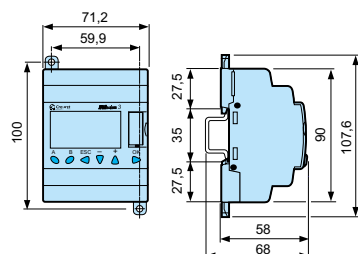
	12 V _{DC}	24 V _{DC}	24 V _{AC}	100 → 240 V _{AC}
State 1 output voltage drop	≤ 2 V at I = 0.5 A		-	
Response time	Make ≤ 1 ms Break ≤ 1 ms		-	
Frequency	1 Hz maximum for inductive load		-	
Built-in protections	Against over-voltages and short-circuits: Yes Against over-voltages (*): Yes Against power supply reversal: Yes		-	
Minimum load	0.1 A		-	
Maximum incandescent load	0.1 mA / 24 V _{DC}		-	
Galvanic isolation	No		-	
PWM frequency	14.11 Hz 56.45 Hz 112.90 Hz 225.80 Hz 451.59 Hz 1.806.37 Hz		-	
PWM duty cycle	0 → 100 % (256 steps for CD,XD and 1024 steps for XA)		-	
PWM accuracy at 120 Hz	< 5% (from 20% → 80%) load at 10 mA		-	
PWM accuracy at 500 Hz	< 10% (from 20% → 80%) load at 10 mA		-	
PWM maximum breaking current	50 mA		-	
Maximum cable length for PWM	20 m		-	
Status indication	On the LCD screen for CD and XD		-	

Schematics

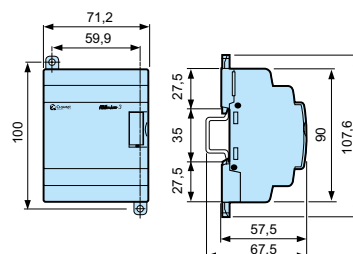
Footprint

Version

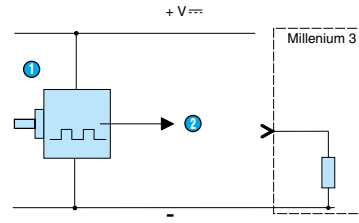
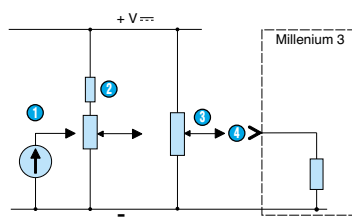
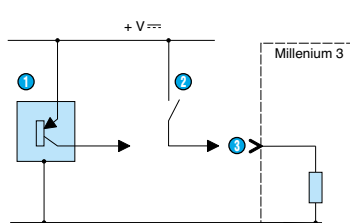
CD12



CB12

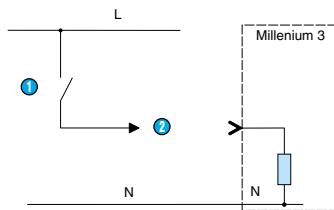


Input/output wiring

Inputs 12 V_{DC}, 24 V_{DC}

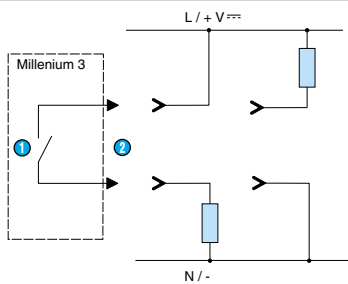
①	3 wire PNP detector	0-10 V (input set to 0-10 V)	Encoder
②	Contact	Potentiometer attachment (input set to 0-10 V)	Fast digital input
③	Digital input	Potentiometer (input set to potentiometer)	-
④	-	Analogue input	-

Inputs 100-240 V~, 24 V~



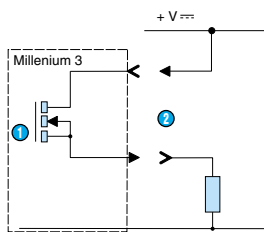
1	Contact	-
2	Digital input	-

Relay outputs



1	Contact	-
2	Digital input	-

Solid state outputs

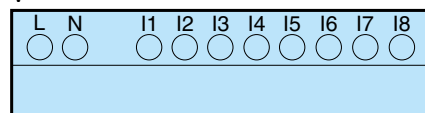


1	MOS transistor	-
2	Digital/PWM output	-

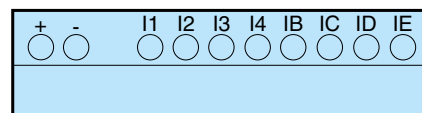
Implementation of Inputs/outputs

Inputs

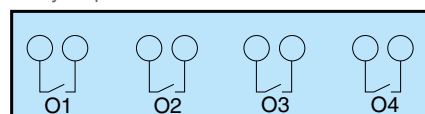
V~



V~



Relay outputs



Solid state outputs

