

Millenium 3 Smart



→ Bare board version

- Easy and discreet integration into your applications
- Mass-production applications
- Memory: up to 350 "typical" blocks in FBD language and 120 lines in LADDER language
- Compact dimensions
- Range of controllers for use with application specific functions



NB12



NB20

Part numbers

Type	Input	Output	Supply	Code
NB12	8 digital (of which 4 are analog)	4 relays	24 V $\overline{\text{---}}$	88970001
	8 digital	4 relays	100 \rightarrow 240 V \sim	88970003
	8 digital (of which 4 are analog)	4 relays	12 V $\overline{\text{---}}$	88970005
NB20	12 digital (of which 6 are analog)	8 relays	24 V $\overline{\text{---}}$	88970011
	12 digital	8 relays	100 \rightarrow 240 V \sim	88970013
NBxx	In accordance with your requirements	In accordance with your requirements	In accordance with your requirements	

Accessories

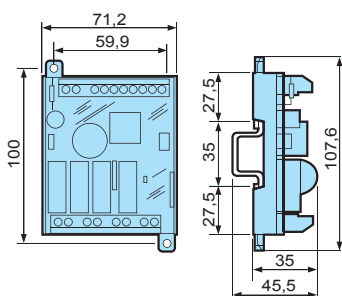
Type	Description	Code
M3 Soft	Multilingual programming software containing specific library functions (CD-ROM)	88970111
PA	EEPROM memory cartridge	88970108
PA	3 m serial link cable: PC \rightarrow Millenium 3	88970102
PA	USB cable 3 m: PC \rightarrow Millenium 3	88970109
PA	Millenium 3 interface \rightarrow Bluetooth® (class A 10 m)	88974104

Specific characteristics*

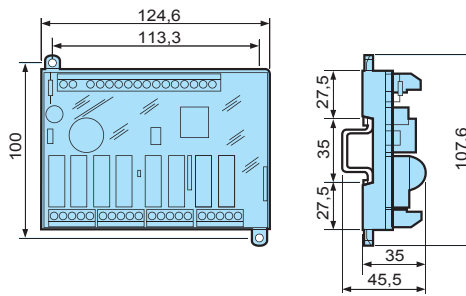
Protection rating IP00

Dimensions (mm)

NB12



NB20



Product adaptations



- Tropicalization
- Spring connectors or removable connectors
- Changing the number of I/O
- Updating power supply

*Also see Millenium 3 Smart and Essential General characteristics

Millenium 3 Smart



→ Resin board version

- Vibration resistant
- Extended temperature range
- Outputs via removable connectors
- IP50 seal (connectors)
- DB 9-pin programming port via standard RS 232 cable
- Designed for application-specific functions
- Supplied without connectors. Connectors available (Ref. 88970313, 88970314, 88970315, 88970316)



NBR12



NBR26



NBRxx

Part numbers

Type	Designation	Input	Output	Supply	Code
NBR12	Relay outputs with connectors	8 digital (including 4 analog)	4 relays	24 V ---	88973001
	Relay outputs with connectors	8 digital (including 4 analog)	4 solid state 0.5 A (including 1 PWM)	24 V ---	88973002
NBR26	Relay outputs with connectors	16 digital (including 6 analog)	10 relays	24 V ---	88973061
	Relay outputs with connectors	16 digital (including 6 analog)	10 solid state 0.5 A (including 4 PWM)	24 V ---	88973062
NBR32	Relay outputs with connectors	20 digital (including 6 analog)	12 relays	24 V ---	88973211
NBR40	Relay outputs with connectors	24 digital (including 6 analog)	16 relays	24 V ---	88973231
NBRxx	Relay or solid state outputs, connectors or wires	In accordance with your requirements	In accordance with your requirements	In accordance with your requirements	•

Accessories

Type	Description	Code
M3 Soft	Multilingual programming software containing specific library functions (CD-ROM)	88970111
PA	1.80 m serial link cable: DB9 M/DB9 F	88970123
PA	PC: USB → DB9 (RS 232) link cable	88950105
MA	Removable connector (spring cage) kit for NBR12, CD12 RBT	88970313
MA	Removable connector kit for NBR26	88970314
MA	Removable connector kit for NBR32	88970315
MA	Removable connector kit for NBR40	88970316

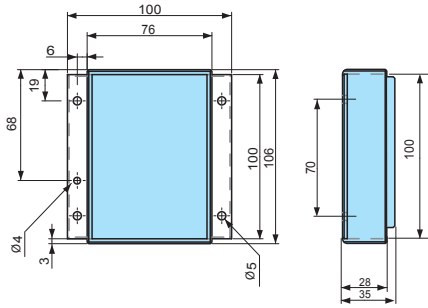
Specific characteristics*

Certifications	CE
Protection index	IP50 (removable connectors)
Mechanical resistance IEC 61373	Railway applications - Rolling stock Category 1 class B stock mounted on car Vibration resistance: 5-150 Hz Random sampling: 10 minutes in each direction (X, Y, Z) Sinusoidal sampling: 5 hours in each direction (X, Y, Z) Shock resistance: 3 shocks 3 g/30 ms per direction Dropping: Total of 26 drops on all sides from a height of 1 metre
Mechanical resistance GAM EG 13	Terrestrial military vehicles Vibration resistance 5-500 Hz 50 m/s ² Sinusoidal sampling 5 hours in each direction (X, Y, Z) Shock resistance: Acceleration: 150 m/s ² , duration: 11 ms, 3 shocks per shaft Acceleration: 300 m/s ² , duration: 11 ms, 3 shocks per shaft Bumps: 1000 half wave sine mechanical bumps 15 g / 6 ms per axe
Operating temperature	-30 → +70 °C (---)
Storage temperature	-40 → +80 °C
Housing	Self-extinguishing UL94V2
Resin	UL approved Self-extinguishing UL94V0 Semi-rigid polyurethane resin Solid black appearance Breakdown voltage: 25 kV/mn Water absorption: 0.2 % (24 hours at 23 °C) Shore D hardness: 50 ±5 Smoke category: F0
Outputs	Removable connectors
Breaking current	6 A relay output

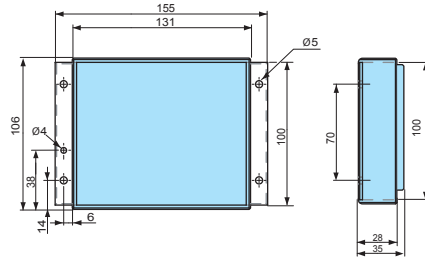
*Also see Millenium 3 Smart and Essential General characteristics

Dimensions (mm)

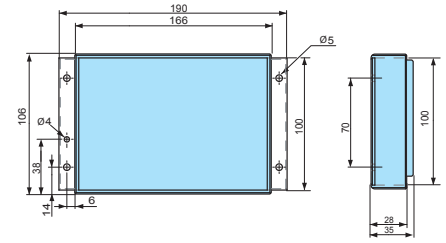
NBR12



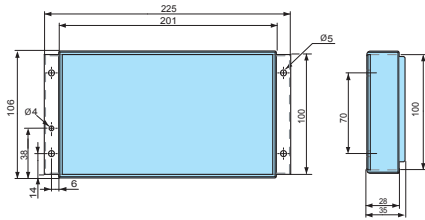
NBR26



NBR32



NBR40



Product adaptations



- 40 cm wire
- Extended power supply range (9 → 18 V $\overline{\text{---}}$), (16 → 36 V $\overline{\text{---}}$)
- Remote polyester keyboard
- UL, CSA, GL certification
- Integration of all available electrical functions in the catalogue (e.g.: Bluetooth® module, Pt100 input, 0-20 mA input, 0-10 V power output, etc)
- Changing the number of I/O

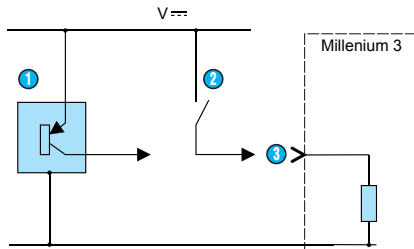
Millenium 3 Smart and Essential

→ I/O wiring

Inputs 12 V $\overline{\text{---}}$, 24 V $\overline{\text{---}}$

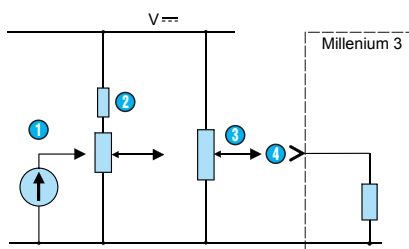
Bases: CD12, CD20, CB12, CB20, XD10, XD26, XB10, XB26

Extensions: XE10, XR06, XR10, XR14



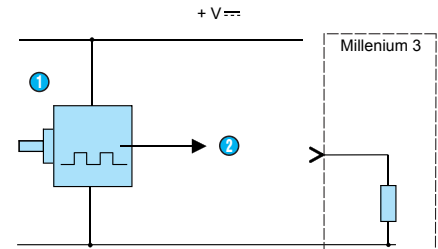
- ① 3-wire PNP sensor
- ② Contact
- ③ Digital input

Bases: CD12, CD20, CB12, CB20, XD10, XD26, XB10, XB26



- ① 0-10 V (input set to 0-10 V)
- ② Potentiometer type mounting (input set to 0-10 V)
- ③ Potentiometer (input set as a potentiometer)
- ④ Analog input

Bases: CD12, CD20, CB12, CB20, XD10, XD26, XB10, XB26

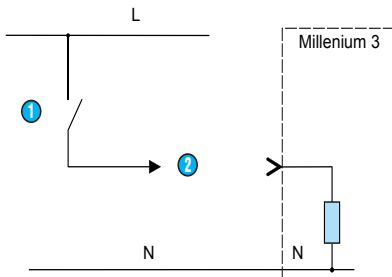


- ① Encoder
- ② High-speed digital input

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

Bases: CD12, CD20, CB12, CB20, XD10, XD26, XB10, XB26

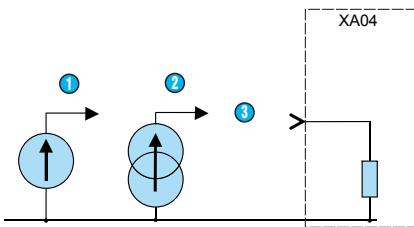
Extensions: XE10, XR06, XR10, XR14



- ① Contact
- ② Digital input

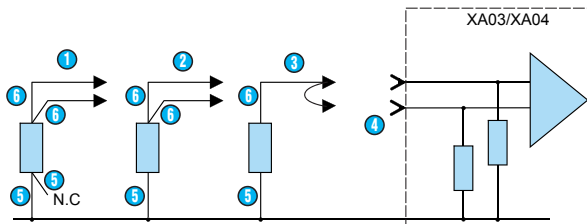
Analog inputs

Extension: XA04



- ① 0-10 V
- ② 0-20 mA
- ③ Analog input

Extensions: XA03, XA04



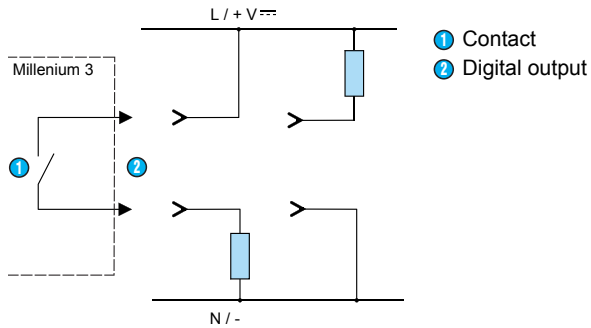
- ① Pt100 4-wire
- ② Pt100 3-wire
- ③ Pt100 2-wire
- ④ Analog inputs
- ⑤ White
- ⑥ Red

Millenium 3 Smart and Essential

Relay outputs

Bases: CD12, CD20, CB12, CB20, XD10, XD26, XB10, XB26

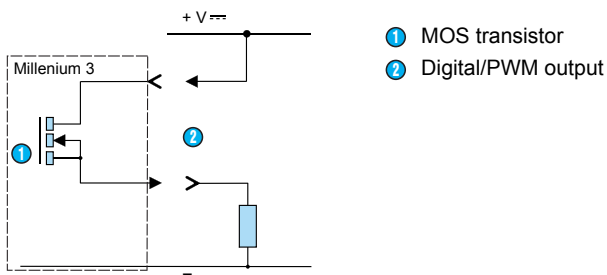
Extensions: XE10, XR06, XR10, XR14



Solid state outputs

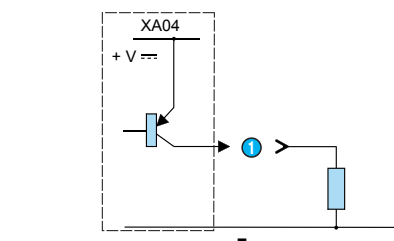
Bases: CD12, CD20, CB12, CB20, XD10, XD26, XB10, XB26

Extension: XA04

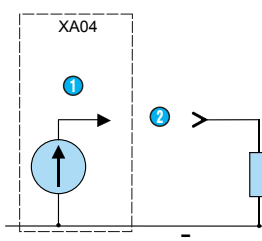


Analog outputs

Extension: XA04



Extension: XA04



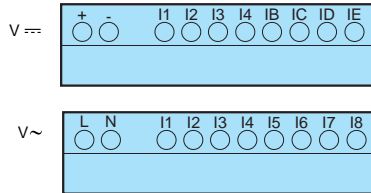
Millenium 3 Smart

→ Input/output installations

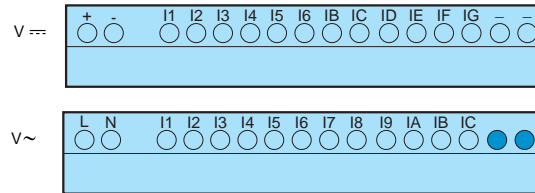
Bare boards (NB12, NB20) & resin boards (NBR12, NBR26, NBR32, NBR40)

Inputs

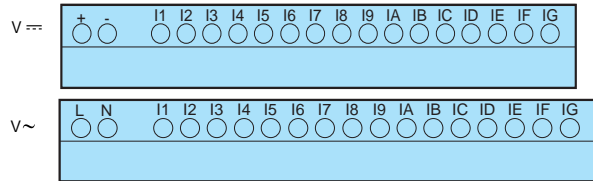
NB12, NBR12



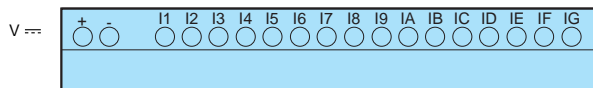
NB20



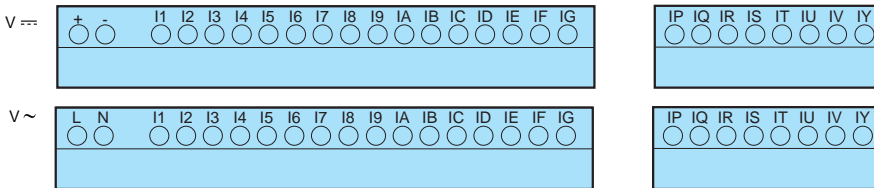
NBR26



NBR32

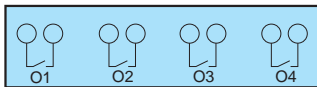


NBR40

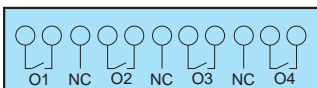


Relay outputs

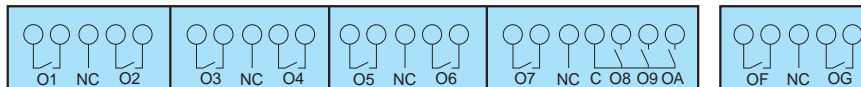
NB12



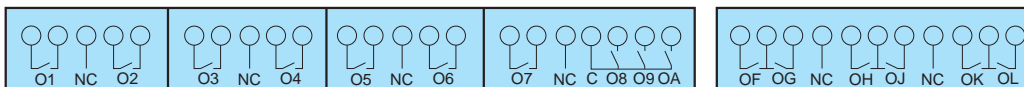
NBR12



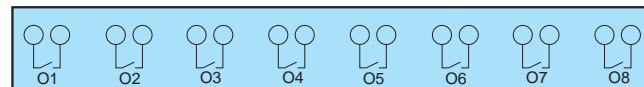
NBR32



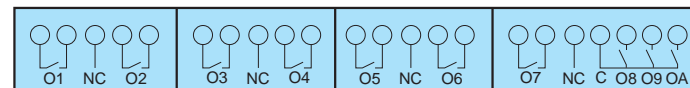
NBR40



NB20

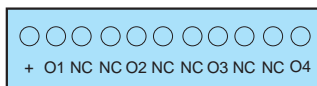


NBR26

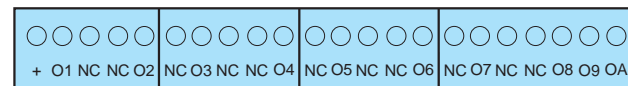


Solid state outputs

NBR12



NBR26



Millenium 3 Smart and Essential

→ General characteristics



- Millenium 3 compact range
- Millenium 3 expandable range



General environment characteristics for CB, CD, XD, XB, XR and XE product types

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 1.1 or 88 970 1.2) + (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
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 (~) 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 1.1 or 88 970 1.2) + (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 → +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 V ~: -30 → +70 °C (+40 °C in a non-ventilated enclosure) in accordance with IEC/EN 60068-2-1 and IEC/EN 60068-2-2
Storage temperature Millenium 3 Essential and extensions	-40 → +70 °C in accordance with IEC/EN 60068-2-1 and IEC/EN 60068-2-2
Storage temperature Millenium 3 Smart	-40 → +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 = 1 conductor: 0.25 to 2.5 mm ² (AWG 24 → AWG 14) 2 conductors 0.25 to 0.75 mm ² (AWG 24 → AWG 18) Semi-rigid wire = 1 conductor: 0.2 to 2.5 mm ² (AWG 25 → AWG 14) Rigid wire = 1 conductor: 0.2 to 2.5 mm ² (AWG 25 → AWG 14) 2 conductors 0.2 to 1.5 mm ² (AWG 25 → AWG 16) Tightening torque = 0.5 N.m (4.5 lb-in) (tighten using screwdriver diam. 3.5 mm)

Processing characteristics of CB, CD, XD & XB product types

	Millenium 3 Smart and Essential versions XD, XB	Millenium 3 Essential versions CB, CD
Program size function blocks (FBD)	350 typical blocks 64 macros maximum 256 blocks maximum per macro	180 typical blocks 64 macros maximum 256 blocks maximum per macro
Memory size function blocks (FBD)	8 K	4 K
Number of lines in Ladder	120 lines	120 lines
LCD display	CD, XD: Display with 4 lines of 18 characters	
Programming method	Function blocks / SCF (Grafctet) 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 → 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 % ± 2 cycle times	
Start up time on power up	< 1.2 s	

Characteristics of products with AC power supplied

Supply	24 V ~	100 → 240 V ~
Nominal voltage	24 V ~	100 → 240 V ~
Operating limits	-15 % / +20 % or 20.4 V ~ → 28.8 V ~	-15 % / +10 % or 85 V ~ → 264 V ~
Supply frequency range	50/60 Hz (+4 % / -6 %) or 47 → 53 Hz / 57 → 63 Hz	50/60 Hz (+4 % / -6 %) or 47 → 53 Hz / 57 → 63 Hz
Immunity from micro power cuts	10 ms (repetition 20 times)	10 ms (repetition 20 times)
Max. absorbed power	CB12-CD12-XD10-XB10: 4 VA CB20-CD20: 6 VA XD10-XB10 with extension: 7.5 VA XD26-XB26: 7.5 VA XD26-XB26 with extension: 10 VA	CB12-CD12-XD10-XB10: 7 VA CB20-CD20: 11 VA XD10-XB10 with extension: 12 VA XD26-XB26: 12 VA XD26-XB26 with extension: 17 VA
Isolation voltage	1780 V ~	1780 V ~
Inputs	24 V ~	100 → 240 V ~
Input voltage	24 V ~ (-15 % / +20 %)	100 → 240 V ~ (-15 % / +10 %)
Input current	4.4 mA @ 20.4 V ~ 5.2 mA @ 24.0 V ~ 6.3 mA @ 28.8 V ~	0.24 mA @ 85 V ~ 0.75 mA @ 264 V ~
Input impedance	4.6 kΩ	350 kΩ
Logic 1 voltage threshold	≥ 14 V ~	≥ 79 V ~
Making current at logic state 1	> 2 mA	> 0.17 mA
Logic 0 voltage threshold	≤ 5 V ~	≤ 20 V ~ (≤ 28 V ~ : XE10, XR06, XR10, XR14)
Release current at logic state 0	< 0.5 mA	< 0.5 mA
Response time with function blocks programming	Configurable in increments of 10 ms 50 ms min. up to 255 ms State 0 → 1 (50/60 Hz)	Configurable in increments of 10 ms 50 ms min. up to 255 ms State 0 → 1 (50/60 Hz)
Response time with Ladder programming	50 ms State 0 → 1 (50/60 Hz)	50 ms State 0 → 1 (50/60 Hz)
Maximum counting frequency	In accordance with cycle time (Tc) and input response time (Tr): $1 / ((2 \times Tc) + Tr)$	In accordance with cycle time (Tc) and input response time (Tr): $1 / ((2 \times Tc) + Tr)$
Sensor type	Contact or 3-wire PNP	Contact or 3-wire PNP
Input type	Resistive	Resistive
Isolation between power supply and inputs	None	None
Isolation between inputs	None	None
Protection against polarity inversions	Yes	Yes
Status indicator	On LCD screen for CD and XD	On LCD screen for CD and XD

Characteristics of relay outputs common to the entire range

Max. breaking voltage	5 → 30 V $\overline{\text{DC}}$ 24 → 250 V \sim
Breaking current	CB-CD-XD10-XB10-XR06-XR10: 8 A XD26-XB26: 8 x 8 A relay, 2 x 5 A relay XE10: 4 x 5 A relay XR14: 4 x 8 A relay, 2 x 5 A relay
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
Built-in protections	Against short-circuits: None Against overvoltages and overloads: None
Status indicator	On LCD screen for CD and XD

Characteristics of product with DC power supplied

Supply	12 V $\overline{\text{DC}}$	24 V $\overline{\text{DC}}$
Nominal voltage	12 V $\overline{\text{DC}}$	24 V $\overline{\text{DC}}$
Operating limits	-13 % / +20 % or 10.4 V $\overline{\text{DC}}$ → 14.4 V $\overline{\text{DC}}$ (including ripple)	-20 % / +25 % or 19.2 V $\overline{\text{DC}}$ → 30 V $\overline{\text{DC}}$ (including ripple)
Immunity from micro power cuts	≤ 1 ms (repetition 20 times)	≤ 1 ms (repetition 20 times)
Max. absorbed power	CB12 with solid state outputs: 1.5 W CD12: 1.5 W CD20: 2.5 W XD26-XB26: 3 W XD26-XB26 with extension: 5 W XD26 with solid state outputs: 2.5 W	CB12-CD12-CD20 with solid state outputs - XD10-XB10 with solid state outputs: 3 W XD10-XB10 with relay outputs: 4 W XD26-XB26 with solid state outputs: 5 W CB20-CD20 with relay outputs: 6 W XD26 with relay outputs: 6 W XD10-XB10 with extension: 8 W XD26-XB26 with extension: 10 W
Protection against polarity inversions	Yes	Yes
Digital inputs (I1 to IA and IH to IY)	12 V $\overline{\text{DC}}$	24 V $\overline{\text{DC}}$
Input voltage	12 V $\overline{\text{DC}}$ (-13 % / +20 %)	24 V $\overline{\text{DC}}$ (-20 % / +25 %)
Input current	3.9 mA @ 10.44 V $\overline{\text{DC}}$ 4.4 mA @ 12.0 V $\overline{\text{DC}}$ 5.3 mA @ 14.4 V $\overline{\text{DC}}$	2.6 mA @ 19.2 V $\overline{\text{DC}}$ 3.2 mA @ 24 V $\overline{\text{DC}}$ 4.0 mA @ 30.0 V $\overline{\text{DC}}$
Input impedance	2.7 k Ω	7.4 k Ω
Logic 1 voltage threshold	≥ 7 V $\overline{\text{DC}}$	≥ 15 V $\overline{\text{DC}}$
Making current at logic state 1	≥ 2 mA	≥ 2.2 mA
Logic 0 voltage threshold	≤ 3 V $\overline{\text{DC}}$	≤ 5 V $\overline{\text{DC}}$
Release current at logic state 0	< 0.9 mA	< 0.75 mA
Response time	1 → 2 cycle times + 6 ms	1 → 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): $1 / ((2 \times Tc) + Tr)$	- 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): $1 / ((2 \times Tc) + Tr)$
Sensor type	Contact or 3-wire PNP	Contact or 3-wire PNP
Conforming to IEC/EN 61131-2	Type 1	Type 1
Input type	Resistive	Resistive
Isolation between power supply and inputs	None	None
Isolation between inputs	None	None
Protection against polarity inversions	Yes	Yes
Status indicator	On LCD screen for CD and XD	On LCD screen for CD and XD

Analog or digital inputs (IB to IG)	12 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$
CB12-CD12-XD10-XB10	4 inputs IB \rightarrow IE	4 inputs IB \rightarrow IE
CB20-CD20-XB26-XD26	6 inputs IB \rightarrow IG	6 inputs IB \rightarrow IG
Inputs used as analog inputs only in FBD		
Measurement range	(0 \rightarrow 10 V) or (0 \rightarrow V power supply)	(0 \rightarrow 10 V) ou (0 \rightarrow V power supply)
Input impedance	14 k Ω	12 k Ω
Input voltage	14.4 V $\overline{\text{---}}$ max.	30 V $\overline{\text{---}}$ max.
Value of LSB	14 mV	29 mV
Input type	Common mode	Common mode
Resolution	10 bit at max. input voltage	10 bit at max. input voltage
Conversion time	Controller cycle time	Controller cycle time
Accuracy at 25 °C	\pm 5 %	\pm 5 %
Accuracy at 55 °C	\pm 6.2 %	\pm 6.2 %
Repeat accuracy at 55 °C	\pm 2 %	\pm 2 %
Isolation between analog channel and power supply	None	None
Cable length	10 m maximum, with shielded cable (sensor not isolated)	10 m maximum, with shielded cable (sensor not isolated)
Protection against polarity inversions	Yes	Yes
Potentiometer control	2.2 k Ω / 0.5 W (recommended) 10 k Ω max.	2.2 k Ω / 0.5 W (recommended) 10 k Ω 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 @ 12.0 V $\overline{\text{---}}$ 1.0 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 Ω	12 k Ω
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	1 \rightarrow 2 cycle times
Maximum counting frequency in FBD	In accordance with cycle time (Tc) and input response time (Tr): $1 / ((2 \times Tc) + Tr)$	In accordance with cycle time (Tc) and input response time (Tr): $1 / ((2 \times Tc) + Tr)$
Sensor type	Contact or 3-wire PNP	Contact or 3-wire PNP
Conforming to IEC/EN 61131-2	Type 1	Type 1
Input type	Resistive	Resistive
Isolation between power supply and inputs	None	None
Isolation between inputs	None	None
Protection against polarity inversions	Yes	Yes
Status indicator	On LCD screen for CD and XD	On LCD screen for CD and XD
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-XD10-XB10-XR06-XR10: 8 A XD26-XB26: 8 x 8 A relay, 2 x 5 A relay XE10: 4 x 5 A relay XR14: 4 x 8 A relay, 2 x 5 A relay	
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 and XD	

Digital / PWM solid state outputs	12 V $\overline{\text{---}}$	24 V $\overline{\text{---}}$
PWM solid state outputs*	CB12: O4 XD26: O4 \rightarrow O7	CD12-XD10-XB10: O4 CD20-XD26-XB26: O4 \rightarrow O7
* 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	0.5 A
Max. breaking current	0.625 A	0.625 A
Voltage drop	≤ 2 V for $I = 0.5$ A (at state 1)	≤ 2 V for $I = 0.5$ A (at state 1)
Response time	Make ≤ 1 ms Release ≤ 1 ms	Make ≤ 1 ms Release ≤ 1 ms
Frequency (Hz)	1 Maximum on inductive load	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	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	1 mA
Maximum incandescent load	0.2 A / 12 V $\overline{\text{---}}$ 0.1 A / 24 V $\overline{\text{---}}$	0.1 A / 24 V $\overline{\text{---}}$
Galvanic isolation	No	No
PWM frequency	14.11 Hz 56.45 Hz 112.90 Hz 225.80 Hz 451.59 Hz 1806.37 Hz	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 CD, XD and 1024 steps for XA)	0 \rightarrow 100 % (256 steps for CD, XD and 1024 steps for XA)
PWM accuracy at 120 Hz	< 5 % (20 % \rightarrow 80 %) load at 10 mA	< 5 % (20 % \rightarrow 80 %) load at 10 mA
Max. Breaking current PWM	50 mA	50 mA
Max. cable length PWM	20 m	20 m
PWM accuracy at 500 Hz	< 10 % (20 % \rightarrow 80 %) load at 10 mA	< 10 % (20 % \rightarrow 80 %) load at 10 mA
Status indicator	On LCD screen for CD and XD	On LCD screen for CD and XD

Differences between Millenium 3 Smart and Millenium 3 Essential



Millenium 3 Smart	
Display	Blue, backlit with white text
Supply versions	24 V $\overline{\text{---}}$, 12 V $\overline{\text{---}}$, 100 \rightarrow 240 V \sim , 24 V \sim
Operating Temperature	-20 \rightarrow +70 °C/-4 \rightarrow +158 °F (+40 °C/104 °F in non-ventilated enclosure), except CB, XB in $\overline{\text{---}}$: -30 \rightarrow +70 °C/-22 \rightarrow +158 °F (+40 °C/104 °F in non-ventilated enclosure) in accordance with IEC/EN 60068-2-1 and IEC/EN 60068-2-2
Storage temperature	-40 \rightarrow +80 °C (-40 \rightarrow +176 °F) in accordance with IEC/EN 60068-2-1 and IEC/EN 60068-2-2
More extensions	- XN07 extension for inter-Millenium 3 communication (up to 7 Millenium) - XA03 extension (3 analog inputs for Pt100 temperature probes)
More sensors	Direct connection of NTC temperature probes and LDR luminosity sensors
More functions	Additional application specific functions: Autotuning PID, Astronomical clock, Transfer function $y=f(x)$, 2 axis solar tracking, ...
Number of function blocks in the library	125

Millenium 3 Essential	
Display	Green, backlit with black text
Supply versions	24 V $\overline{\text{---}}$, 12 V $\overline{\text{---}}$
Operating Temperature	-20 \rightarrow +55 °C/-4 \rightarrow +131 °F (+40 °C/104 °F in non-ventilated enclosure) in accordance with IEC/EN 60068-2-1 and IEC/EN 60068-2-2
Storage temperature	-40 \rightarrow +70 °C (-40 \rightarrow +158 °F) in accordance with IEC/EN 60068-2-1 and IEC/EN 60068-2-2
More extensions	
More sensors	
More functions	
Number of function blocks in the library	105