



## "Expandable" range with display XD26 Part number 88970165



- "High-performance" expandable solution with display
- Extended memory: 120 lines in LADDER language and up to 700 "typical" blocks in FBD language
- LCD with 4 lines of 18 characters and configurable backlighting
- Selective parameter setting: You can choose the parameters that can be adjusted on the front panel
- Analogue inputs 0-10 V DC or 0-20 mA/Pt 100 with converters (see page 50)
- Open to XN network communication extensions and digital I/O or analogue extensions

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

|   |   |
|---|---|
| Certifications                            | UL, CSA? GL: except for 88 970 32x (pending)  |
| Conformity with the low voltage directive | In accordance with 73/23/EEC: ? EN (IEC) 61131-2 (Open equipment)   |
| Conformity with the EMC directive         | In accordance with 89/336/EEC: ? EN (IEC) 61131-2 (Zone B) ? EN (IEC) 61000-6-2, ? EN (IEC) 61000-6-3 (*) ? EN (IEC) 61000-6-4 (*)<br>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: using in metallic cabinet)  |
| Earthing                                  | None  |
| 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: 3,048 m   |
| Mechanical resistance                     | Immunity to vibrations IEC/EN 60068-2-6, Fc test? Immunity to shock IEC/EN 60068-2-27, Fa test  |
| 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?<br>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 (AC) ? 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 55022/11 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 metallic cabinet)   |
| Operating temperature                     | -20? +55? C (+40? C in a non-ventilated enclosure) in accordance with IEC/EN 60068-2-1 and IEC/EN 60068-2-2   |
| Storage temperature                       | -40? +70? 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 profile, 35 x 7.5 mm and 35 mm x 15 mm or panel (2 x 4 mm? )   |
| Screw terminals connection capacity       | Flexible wire with ferrule =? 1 conductor: 0.25 to 2.5 mm <sup>2</sup> (AWG 24...AWG 14) ? 2 conductors 0.25 to 0.75 mm <sup>2</sup> (AWG 24...AWG 18) ? Semi-rigid wire =? 1 conductor: 0.2 to 2.5 mm <sup>2</sup> (AWG 25...AWG 14) ? Rigid wire =? 1 conductor: 0.2 to 2.5 mm <sup>2</sup> (AWG 25...AWG 14) ? 2 conductors 0.2 to 1.5 mm <sup>2</sup> (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

|  |   |
|--|---|
| LCD display                                | CD, XD: Display with 4 lines of 18 characters   |
| Programming method                         | Ladder or function blocks/SFC (Grafset)   |
| Program size                               | Ladder: 120 lines? Function blocks: ? CB, CD: typically 350 blocks? XB, XD: typically 700 blocks                              |
| Program memory                             | Flash EEPROM  |
| Removable memory                           | EEPROM  |
| Data memory                                | 368 bits/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                                 | Ladder: typically 20 ms? Function blocks: 6? 90 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

|                                |  |   |
|--------------------------------|--|---|
| Nominal voltage                | 24 V AC  | 100? 240 V AC   |
| Operating limits               | -15% / +20%? or 20.4 VAC? 28.8 VAC   | -15% / +10%? or 85 VAC? 264 VAC   |
| 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 with extension - 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-XD26-XB26: 12 VA? XD26-XB26 with extension: 17 VA |
| Isolation voltage              | 1780 V AC  | 1780 V AC   |

#### Inputs

|                                 |  |   |
|---------------------------------|--|---|
| Input voltage                   | 24 V AC (-15% / +20%)                                      | 100? 240 V AC (-15% / +10%)                   |
| Input current                   | 4,4 mA @ 20,4 V AC? 5,2 mA @ 24,0 V AC? 6,3 mA @ 28,8 V AC | 0,24 mA @ 85 V AC? 0,75 mA @ 264 V AC         |
| Input impedance                 | 4.6 k?   | 350 k?  |
| Logic 1 voltage threshold       | ≥ 14 V AC  | ≥ 79 V AC                                     |
| Making current at logic state 1 | >2 mA  | >0.17 mA                                      |
| Logic 0 voltage threshold       | ≤ 5 V AC   | ≤ 20 V AC (≤ 28 V AC: XE10, XR06, XR10, XR14) |

|  |   |   |
|--|---|---|
| Release current at logic state 0               | <0.5 mA   | <0.5 mA   |
| Response time with LADDER programming          | 50 ms? State 0? 1 (50/60 Hz)  | 50 ms? State 0 < 1 (50/60 Hz)   |
| Response time with function blocks programming | Configurable in increments of 10 ms? 50 ms min. up to 255 ms?<br>State 0? 1 (50/60 Hz)      | Configurable in increments of 10 ms? 50 ms min. up to 255 ms?<br>State 0? 1 (50/60 Hz)      |
| Maximum counting frequency                     | In accordance with cycle time (Tc) and input response time (Tr) : ?<br>1 / ( (2 x Tc) + Tr) | In accordance with cycle time (Tc) and input response time (Tr) : ?<br>1 / ( (2 x 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? ? 24? 250 V AC  |
| Breaking current                                   | CB-CD-XB10-XD10-XR06-XR10: 8 A? XD26-XB26: 8 x 8 A relays, 2 x 5 A relays? XE10: 4 x 5 A relays? XR14: 4 x 8 A relays, 2 x 5 A relays                      |
| Electrical durability for 500 000 operating cycles | 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 |
| Max. Output Common Current                         | 12A 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 (cycles)   |
| 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

|  |   |   |
|--|---|---|
| Nominal voltage                        | 12 V?   | 24 V?   |
| Operating limits                       | -13% / +20%? or 10.4 V? < 14.4 V? (including ripple)  | -20% / +25%? or 19.2 V? < 30 V? (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-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)

|   |   |   |
|---|---|---|
| Input voltage                             | 12 V? (-13% / +20%)   | 24 V? (-20% / +25%)   |
| Input current                             | 3,9 mA @ 10,44 V? ? 4,4 mA @ 12,0 V? ? 5,3 mA @ 14,4 V?   | 2,6 mA @ 19,2 V? ? 3,2 mA @ 24 V? ? 4,0 mA @ 30,0 V?  |
| Input impedance                           | 2.7 k?  | 7.4 k?  |
| Logic 1 voltage threshold                 | ≥ 7 V?  | ≥ 15 V?   |
| Making current at logic state 1           | ≥ 2 mA  | ≥ 2.2 mA  |
| Logic 0 voltage threshold                 | ≤ 3 V?  | ≤ 5 V?  |
| 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                | I1 & I2: Ladder (1 kHz) & FBD (Up to 6 kHz) ? I3 to IA & IH to IY: in accordance with cycle time (Tc) and input response time (Tr) : 1 / ( (2 x Tc) + Tr) | I1 & I2: Ladder (1 kHz) & FBD (Up to 6 kHz) ? 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   | 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   |

##### Analogue or digital inputs (IB to IG)

|                     |                 |                 |
|---------------------|-----------------|-----------------|
| CB12-CD12-XD10-XB10 | 4 inputs IB? IE | 4 inputs IB? IE |
| CB20-CD20-XB26-XD26 | 6 inputs IB? IG | 6 inputs IB? IG |

##### Inputs used as analogue inputs

|   |   |   |
|---|---|---|
| Measurement range                                   | (0? 10 V) or (0? V power supply)                        | (0? 10 V) or (0? V power supply)                        |
| Input impedance                                     | 14 k?   | 12 k?   |
| Input voltage                                       | 14.4 V? max   | 30 V? max   |
| Value of LSB  | 14 mV   | 29 mV   |
| Input type  | Common mode   | Common mode   |
| Resolution  | 10 bit at maximum input voltage                         | 10 bit at maximum input voltage                         |
| Conversion time                                     | Controller cycle time                                   | Controller cycle time                                   |
| Accuracy at 25? C                                   | ? 5%  | ? 5%  |
| Accuracy at 55? C                                   | ? 6.2%  | ? 6.2%  |
| Repeat accuracy at 55? C                            | ? 2%  | ? 2%  |
| Isolation between analogue 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? /0.5 W (recommended) ? 10 k? max.                | 2.2 k? /0.5 W (recommended) ? 10 k? max.                |

##### Inputs used as digital inputs

|               |                     |                     |
|---------------|---------------------|---------------------|
| Input voltage | 12 V? (-13% / +20%) | 24 V? (-20% / +25%) |
|---------------|---------------------|---------------------|

|   |  |  |
|---|--|--|
| Input current                             | 0,7 mA @ 10,44 V? ? 0,9 mA @ 12,0 V? ? 1,0 mA @ 14,4V?                               | 1,6 mA @ 19,2 V? ? 2,0 mA @ 24,0 V? ? 2,5 mA @ 30,0 V?                               |
| Input impedance                           | 14 k?  | 12 k?  |
| Logic 1 voltage threshold                 | ≥ 7 V?   | ≥ 15 V?  |
| Making current at logic state 1           | ≥0.5 mA  | ≥1.2 mA  |
| Logic 0 voltage threshold                 | ≤ 3 V?   | ≤ 5 V?   |
| Release current at logic state 0          | ≤0.2 mA  | ≤0.5 mA  |
| Response time                             | 1? 2 cycle times   | 1? 2 cycle times   |
| Maximum counting frequency                | In accordance with cycle time (Tc) and input response time (Tr) : 1/ ((2 x Tc) + Tr) | In accordance with cycle time (Tc) and input response time (Tr) : 1/ ((2 x 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? 30 V? ? 24? 250 V AC  |
| Max. Output Common Current                         | 12A (10A UL) for O8,O9,OA  |
| Breaking current                                   | CB-CD-XD10-XB10-XR06-XR10: 8 A? XD26-XB26: 8 x 8 A relays, 2 x 5 A relays? XE10: 4 x 5 A relays? XR14: 4 x 8 A relays, 2 x 5 A relays                      |
| Electrical durability for 500 000 operating cycles | 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 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 (cycles)   |
| 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  |

#### Digital / PWM solid state output

|  |   |   |
|--|---|---|
| PWM solid state output*                          | CB12: O4? XD26: O4? O7  | CD12-XD10-XB10: O4? CD20-XD26-XB26: O4? O7  |
| * Only available with "FBD" programming language | * Only available with "FBD" programming language  |   |
| Breaking voltage                                 | 10.4? 30 V?   | 19.2? 30 V?   |
| Nominal voltage                                  | 12-24 V?  | 24 V?   |
| 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   |
| Built-in protections                             | Against overloads and short-circuits: Yes? Against overvoltages (*) : Yes? Against inversions of power supply: Yes? (*) In the absence of a volt-free contact between the output of the logic controller and the load | Against overloads and short-circuits: Yes? Against overvoltages (*) : Yes? Against inversions of power supply: Yes? (*) In the absence of a volt-free contact between the output of the logic controller and the load |
| Min. load  | 1 mA  | 1 mA  |
| Maximum incandescent load                        | 0,2 A / 12 V? ? 0,1 A / 24 V?   | 0,1 A / 24 V?   |
| 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? 100% (256 steps for CD, XD and 1024 for XA)  | 0? 100% (256 steps for CD, XD and 1024 for XA)  |
| PWM accuracy at 120 Hz                           | < 5% (20%? 80%) load at 10 mA   | < 5% (20%? 80%) load at 10 mA   |
| PWM accuracy at 500 Hz                           | < 10% (20%? 80%) load at 10 mA  | < 10% (20%? 80%) load at 10 mA  |
| Status indicator                                 | On LCD screen for CD and XD   | On LCD screen for CD and XD   |

| 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? Millenium 3   | 88970102 |
| PA      | 3 m USB link cable: PC? Millenium 3  | 88970109 |
| PA      | Millenium 3? Bluetooth interface (class A 10 m)                                  | 88970104 |

#### Comments

\* to be marketed 1<sup>st</sup> quarter 2006

#### Dimension Diagram : XD26

