

## Analogue extension XA04 Part number 88970241



- Direct connection of analogue 0-10 V or 0-20 mA or Pt100 inputs (10 bit) can be configured using the M3 Soft software
- 2 analogue 0-10 V or PWM outputs (10 bit) can be configured using the M3 Soft software
- Ramp can be parameterised for outputs used as 0-10 V outputs
- Power supply via the controller

### Part numbers

	Type	Inputs	Outputs	Supply
88970241	XA04	1 analogue (0-10 V / 0-20 mA), 1 analogue (0-10 V / 0-20 mA / Pt100)	2 analogue (0-10 V / PWM)	Via the 24 V DC controller

### Specifications

#### 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 (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, 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	-20 → +70 °C except CB and XB versions in VDC : -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	-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 <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) Also valid for spring cage connectors (ref 88 970 313 and 88 970 317 for the RBT range)

#### Characteristics of analogue extension 88970241

General characteristics	
Certifications	IEC/EN 60751
Earthing	Yes, refer to the quick reference guide supplied with the product
Analogue input	

#### Inputs used as analogue inputs

Inputs	IP and IQ	IP and IQ	IQ
Input range	0 →10 V DC	0 →20 mA	-25 →125 °C
Input impedance	≥ 18 kΩ	246 Ω	-
Maximum non destructive current/voltage	30 V	30 mA	-
Value of LSB	9,8 mV	20 μA	0,15 °C
Input type	Common mode	Common mode	Pt100 probe - IEC 751 - 3-wire
Resolution	10 bit	10 bit	10 bit
Conversion time	Module cycle time	Module cycle time	Module cycle time
Accuracy at 25 °C	± 2 %	± 2 %	±1.5 °C
Accuracy at 55 °C	± 2 %	± 2 %	±1.5 °C
Isolation between analogue channel and power supply	None	None	None
Cable length	10 m maximum, with shielded cable (sensor not isolated)	10 m maximum, with shielded cable (sensor not isolated)	10 m maximum, with shielded cable (sensor not isolated)
Protection against polarity inversions	Command ignored	Command ignored	Command ignored

Analogue outputs	
Range output	0 →10 V
Input type	Resistive
Max. load	10 mA
Value of LSB	10 mV
Resolution	10 bit
Conversion time	Controller cycle time
Accuracy at 25 °C	±1 % of full scale
Accuracy at 55 °C	±1 % of full scale
Repeat accuracy at 55 °C	± 1 %
Isolation between analogue channel and power supply	None
Cable length	10 metres maximum, with shielded cable (sensor not isolated)
Protection against polarity inversions	Yes

PWM	
Range output	V power supply
Max. load	≥ 1.2 kΩ (I ≤ 20 mA)
PWM cyclic ratio	1024 steps (0 - 100 %)
Frequency	78 Hz, 312,5 Hz, 666,6 Hz, 1000 Hz, 1250 Hz, 1428 Hz, 1666 Hz, 2000 Hz
Accuracy	1 % across the entire temperature range for PWM ratios from 5 % to 95 %
Built-in protections	Against overvoltages : Yes

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

LCD display	CD, XD : Display with 4 lines of 18 characters
Programming method	Function blocks / SCF (Grafset) or Ladder
Program size	8 Kb : 350 typical blocks, 64 macros maximum, 256 blocks maximum per macro or 120 lines in 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		
Nominal voltage	24 V AC	100 →240 V AC
Operating limits	-15 % / +20 % or 20.4 V AC →28.8 V AC	-15 % / +10 % or 85 V AC →264 V AC
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 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 kΩ	350 kΩ
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 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)
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 DC 24 →250 V AC
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 RBT (Removable Terminal Blocks) versions : verify the maximum current according to the type of connection used
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
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

#### Characteristics of product with DC power supplied

Supply		
Nominal voltage	12 V DC	24 V DC
Operating limits	-13 % / +20 % or 10.4 V DC →14.4 V DC (including ripple)	-20 % / +25 % or 19.2 V DC →30 V 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)

Input voltage	12 V DC (-13 % / +20 %)	24 V DC (-20 % / +25 %)
Input current	3.9 mA @ 10.44 V DC 4.4 mA @ 12.0 V DC 5.3 mA @ 14.4 VDC	2.6 mA @ 19.2 V DC 3.2 mA @ 24 V DC 4.0 mA @ 30.0 VDC
Input impedance	2.7 kΩ	7.4 kΩ
Logic 1 voltage threshold	≥ 7 V DC	≥ 15 V DC
Making current at logic state 1	≥ 2 mA	≥ 2.2 mA
Logic 0 voltage threshold	≤ 3 V DC	≤ 5 V 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 k Hz) & Ladder (1 k Hz) 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 k Hz) & Ladder (1 k Hz) 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

#### 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 input only in FBD**

Measurement range	(0 → 10 V) or (0 → V power supply)	(0 → 10 V) or (0 → V power supply)
Input impedance	14 kΩ	12 kΩ
Input voltage	14.4 V DC max.	30 V DC 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	± 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 kΩ/0.5 W (recommended) 10 kΩ max.	2.2 kΩ/0.5 W (recommended) 10 kΩ max.

**Inputs used as digital inputs**

Input voltage	12 V DC (-13 % / +20 %)	24 V DC (-20 % / +25 %)
Input current	0.7 mA @ 10.44 VDC 0.9 mA @ 12.0 VDC 1.0 mA @ 14.4VDC	1.6 mA @ 19.2 VDC 2.0 mA @ 24.0 V DC 2.5 mA @ 30.0 VDC
Input impedance	14 kΩ	12 kΩ
Logic 1 voltage threshold	≥ 7 V DC	≥ 15 VDC
Making current at logic state 1	≥ 0.5 mA	≥ 1.2 mA
Logic 0 voltage threshold	≤ 3 V DC	≤ 5 V DC
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 FBD	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 DC 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	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 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 DC	19.2 → 30 V DC
Nominal voltage	12-24 VDC	24 V DC
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
Operating frequency	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 volt-free 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 volt-free contact between the logic controller output and the load
Min. load	1 mA	1 mA
Maximum incandescent load	0,2 A / 12 V DC 0,1 A / 24 V DC	0,1 A / 24 V DC
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 steps for XA)	0 → 100 % (256 steps for CD, XD and 1024 steps for XA)
Max. Breaking current PWM	50 mA	50 mA
Max. cable length PWM	20 m	20 m
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 XD	On LCD screen for CD and XD

### Dimensions (mm)

XA04

