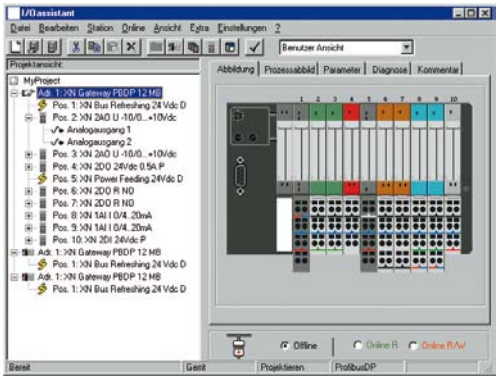
Remote I/O Systems

Whether controlling motion, temperature or speed measurement, current and tension recording – the fields of usage for remote I/Os are so wide ranging as are the different types of applications. They are everywhere in usage where decentral signal processing is the beginning and end of the automation concept.
Eaton Automation offers for every application the suiting I/O system. Whether fine granular graded with XI/ON or compact with WINbloc – naturally also in mix operation in on bus thread.
The result: a modular concept with easy to use handling – adaptable to any application, intelligent and future proof.

System configuration XI/ON

Design your XI/ON station simply with the "I/O Assistant" software, which can be downloaded for free from our Website: www.eaton-automation.com -> Downloads -> Software -> I/Oassistant.



Benefits of the I/Oassistant:

- A complete parts list is generated automatically for your order
- Menu item [Station] > [Verify] allows an easy verification tof the configurated station

A XI/ON station can consist of the gateway and a maximum of 74 modules in slice design (corresponds to a 1 m mounting rail length, including end brackets and end plate). When modules in block design are used, the maximum number of modules is reduced accordingly (1 module in block design is equivalent to about 8 modules in slice design).

For the maximum system configuration, the use of a sufficient number of bus refreshing and power feeding modules must be taken into account.

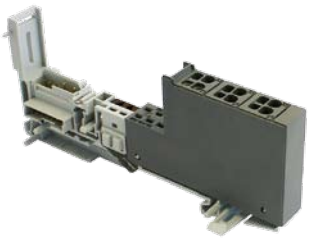
Maximum system configuration

	XNE-GWBR-PBDP		XNE-GWBR-CANOPEN		XNE-GWBR-2ETH-IP		XNE-GWBR-2ETH-MP		XN-GWBR-PBDP		XN-GWBR-DPV1	
Module	Channels	Modules	Channels	Modules	Channels	Modules	Channels	Modules	Channels	Modules	Channels	Modules
XN-4DI-24VDC-P	136	34	244	61	288	72	288	72	288	72	256	64
XN-4DI-24VDC-N	136	34	244	61	288	72	288	72	288	72	256	64
XN-16DI-24VDC-P	128	8	128	8	128	8	128	8	128	8	128	8
XN-32DI-24VDC-P	256	8	256	8	256	8	256	8	256	8	256	8
XNE-8DI-24VDC-P	384	48	512	64	512	64	512	64	592	74	512	64
XNE-16DI-24VDC-P	768	48	512	32	512	32	512	32	1184	74	1024	64
XN-4DO-24VDC-0.5A-P	132	33	244	61	288	72	288	72	288	72	256	64
XN-16DO-24VDC-0.5A-P	128	8	128	8	128	8	128	8	128	8	128	8
XN-32DO-24VDC-0.5A-P	256	8	256	8	256	8	256	8	256	8	256	8
XNE-8DO-24VDC-0.5A-P	384	48	488	61	512	64	512	64	592	74	512	64
XNE-16DO-24VDC-0.5A-P	640	40	512	32	512	32	512	32	1168	73	1024	64
XN-2DO-R-...	70	35	122	61	144	72	144	72	144	72	128	64
XN-2AI-I(0/4...20MA)	56	28	100	50	126	63	144	72	78	39	78	39
XN-2AI-U(-10/0...+10VDC)	56	28	100	50	126	63	144	72	78	39	78	39
XN-2AI-PT/NI-2/3	44	22	98	49	126	63	144	72	46	23	44	22
XN-2AI-THERMO-PI	44	22	98	49	126	63	144	72	58 (76)	29 (38)	58 (76)	29 (38)
XN-4AI-U/I	64 (132)	16 (33)	108	27	124	31	144	36	112	28	64 (132)	16 (33)
XNE-8AI-U/I-4PT/NI	72 (120)	9 (15)	144	18	128	16	144	18			72 (120)	9 (15)
XN-2AO-I(0/4...20MA)	50	25	70	35	126	63	144	72	38	19	38	19
XN-2AO-U(-10/0...+10VDC)	46	23	70	35	126	63	144	72	38	19	38	19
XNE-4AO-U/I	64 (76)	16 (19)	108	27	64	16	284	71	36	9	64 (76)	16 (19)
XN-1CNT-24VDC	13	13	27	27	31	31	72	72	7	7	13	13
XNE-2CNT-2PWM	16 (20)	8 (10)	72	36	32	16	32	16			16 (20)	8 (10)
XN-1RS232	7	7	27	27	31	31	68	68	22	22	22	22
XN-1RS485/422	16	16	27	27	31	31	72	72	22	22	22	22
XN-1SSI	20	20	27	27	31	31	72	72	22	22	22	22

Remarks: Numeric values in brackets: max. number when diagnostic alarm disabled.
The supply module XN-BR-24VDC-D must be mounted immediately next to the gateway XN-GW-... to provide power for the gateways.

Maximum system configuration (continuation)

XN-GWBR-CANOPEN		XN-GWBR-DNET		XN-GWBR-MODBUS-TCP		XN-GW-PBDP-1.5MB		XN-GW-PBDP-12MB		XN-GW-CANOPEN		XN-GW-DNET		XN-PLC-CANOPEN	
Channels	Modules	Channels	Modules	Channels	Modules	Channels	Modules	Channels	Modules	Channels	Modules	Channels	Modules	Channels	Modules
288	72	288	72	288	72	288	72	288	72	288	72	288	72	288	72
288	72	288	72	288	72	288	72	288	72	288	72	288	72	288	72
128	8	128	8	128	8	128	8	128	8	128	8	128	8	128	8
256	8	256	8	256	8	256	8	256	8	256	8	256	8	256	8
512	64	576	72	512	64									576	72
512	32	1152	72	512	32									1008	63
288	72	128	32	288	72	288	72	288	72	288	72	288	72	288	72
128	8	128	8	128	8	128	8	128	8	128	8	128	8	128	8
256	8	256	8	256	8	256	8	256	8	256	8	256	8	256	8
512	64	256	32	512	64									576	72
512	32	512	32	512	32									1008	63
144	72	64	32	144	72	144	72	144	72	144	72	144	72	144	72
144	72	32	16	144	72	78	39	78	39	144	72	126	63	144	72
144	72	32	16	144	72	78	39	78	39	144	72	126	63	144	72
144	72	32	16	144	72	46	23	46	23	142	71	126	63	142	71
144	72	32	16	144	72	58 (76)	29 (38)	58 (76)	29 (38)	142	71	126	63	142	71
144	36	64	16	144	36	112	28	112	28	144	36	124	31	288	72
144	18	128	16	144	18										
144	72	32	16	144	72	38	19	38	19	142	71	126	63	144	72
144	72	32	16	144	72	38	19	38	19	142	71	126	63	144	72
144	36	64	16	124	31									260	65
72	72	16	16	72	72	7	7	7	7	71	71	31	31	71	71
72	36	32	16	32	16	t									
68	68	8	8	68	68	22	22	22	22	67	67	31	31	68	68
72	72	8	8	72	72	22	22	22	22	70	70	31	31	72	72
72	72	8	8	72	72	22	22	22	22	71	71	31	31	72	72



	Base Modules																		
	XN-P4x-SBBC-B	XN-P4x-SBBC	XN-P3x-SBB-B	XN-P3x-SBB		XN-B6x-SBCSBC	XN-B6x-SBBSBB	XN-B4x-SBBC	XN-B3x-SBC	XN-B3x-SBB		XN-S6x-SBCSBC	XN-S4x-SBBS-CJ	XN-S6x-SBBSBB	XN-S4x-SBCS	XN-S4x-SBBS	XN-S4x-SBBC	XN-S3x-SBC	XN-S3x-SBB
ECO Gateways																			
XNE-GWBR-PBDP	no base modules required																		
XNE-GWBR-CANOPEN																			
XNE-GWBR-2ETH-IP																			
XNE-GWBR-2ETH-MB																			
ECO Digital Inputs																			
XNE-8DI-24VDC-D	no base modules required																		
XNE-16DI-24VDC-P																			
ECO Digital Outputs																			
XNE-8DO-24VDC-0.5A-P	no base modules required																		
XNE-16DO-24VDC-0.5A-P																			
ECO Multi Function Modules																			
XNE-8AI-U/I-4PT/NI	no base modules required																		
XNE-4AO-U/I																			
ECO Technology Modules																			
XNE-2CNT-2PWM	no base modules required																		
XNE-1SWIRE	no base modules required																		
Gateways																			
XN-GWBR-PBDP	no base modules required																		
XN-GWBR-DPV1																			
XN-GWBR-CANOPEN																			
XN-GWBR-DNET																			
XN-PLC-CANOPEN																			
Digital Inputs																			
XN-2DI-24VDC-P																	■		■
XN-2DI-24VDC-N																	■		■
XN-2DI-120/230VAC-P																	■		■
XN-4DI-24VDC-P														■		■			
XN-4DI-24VDC-N														■		■			
XN-16DI-24VDC-P								■		■									
XN-32DI-24VDC-P						■	■												
Digital Outputs																			
XN-2DO-24VDC-2A-P															■			■	
XN-2DO-24VDC-0,5A-P															■			■	
XN-2DO-120/230VAC-0,5A-P															■			■	
XN-2DO-24VDC-0,5A-N															■			■	
XN-4DO-24VDC-0,5A-P												■			■				
XN-16DO-24VDC-0,5A-P									■										
XN-32DO-24VDC-0,5A-P						■													
Relay Modules																			
XN-2DO-R-NC															■	■			
XN-2DO-R-NO															■	■			
XN-2DO-R-CO																■			
Analog Inputs																			
XN-1AI-I(0/4...20MA)																	■		■
XN-2AI-I(0/4...20MA)																	■		■
XN-1AI-U(-10/0...+10VDC)																	■		■
XN-2AI-U(-10/0...+10VDC)																	■		■
XN-4AI-U/I												■							
XN-2AI-PT/NI-2/3																	■		■
XN-2AI-THERMO-PI													■						
Analog Outputs																			
XN-1AO-I(0/4...20MA)																			■
XN-2AO-I(0/4...20MA)																			■
XN-2AO-U(-10/0...+10V)																			■
Technology Modules																			
XN-1CNT-24VDC																■			
XN-1RS232																■			
XN-1RS485/422																■			
XN-1SSI																■			
Power Supply Modules																			
XN-BR-24VDC-D	2)	1)	2)	1)															
XN-PF-24VDC-D		■		■															
XN-PF-120/240VAC-D		■		■															

1) Base modules for gateway power supply
2) Base modules for bus refreshing within the station

General technical data	
Standards	DIN 19245 EN 61131 DIN IEC 68-2 EN 50082-2
Supported fieldbus systems	PROFIBUS-DP, CANopen, DeviceNet
Potential isolation	Yes, via optocouplers
Ambient temperature	0...55°C
Ambient temperature, storage	-25...85°C
Relative air humidity	5...95% (indoor), Level RH-2, no condensation (at 45°C for storage)
Harmful gas	
SO_2	10ppm (relative humidity < 75%, no condensation)
H_2S	1.0ppm (relative humidity < 75%, no condensation)
Vibration resistance, operating conditions	To IEC/EN 61131
Shock resistance	To IEC 60068-2-27
Repetitive shock resistance	To IEC 60068-2-29
Tipping and falling	To IEC 60068-2-31, free fall to IEC 60068-2-32
Protection type	IP20
Electromagnetic compatibility (EMC)	
ESD	EN 61131-2
Electromagnetic fields	EN 61131-2
Burst	EN 61131-2
Surge	EN 61000-6-2
HF asymmetric	EN 61000-6-2
Radiated interference / conducted interference	EN 61000-6-4
Radiated interference (radiated, high frequency)	EN 61000-6-4
Type Test	To EN 61131-2
Base modules	
Rated data	To VDE 0611 Part 1/8.92 / IEC 947-7-1/1989
Connections in TOP direction	Spring-loaded/screw terminal
Stripping length	8 mm
Terminal capacity	
Singe conductor H07V-U	1.5mm²
Singe conductor H07V-K	0.5...2.5mm²
Flexible with ferrule	0.5...1.5mm²
Plug gauge IEC/EN 60947-1	A1
Approvals	CE, UL and CSA

XI/ON ECO Gateways

- Modbus TCP
- Ethernet IP
- CANopen
- Profibus DP

XI/ON ECO Modules

- High channel density
  (up to 16 DI/DO on 12,5 mm)
- „Push-In" tension clamps
- Multi function module with 8x AI
  - Free combinable to max. 4x PT/NI
  - Every channel parameterable in current respectively tension ranges
  - Wire breakage signalization for every input
- Multi function module for 4 analog outputs
  - Every channel parameterable in current respectively tension ranges
- Multi function technology modules for:
  - 2 Counter signals and
  - 2 PWM signals

ECO Gateways			XNE-GWBR-PBDP	XNE-GWBR-CANOPEN	XNE-GWBR-2ETH-IP	XNE-GWBR-2ETH-MB
Fieldbus			PROFIBUS-DP	CANopen	Ethernet	
Protocol			DPV0 / DPV1	CANopen	Ethernet IP	Modbus-TCP
System supply	U_{sys}	V DC	24 V DC			
permissible range 24 V DC	U_{sys}	V DC	18...30			
Field voltage	U_L		24			
Permissible range		V DC	18...30			
Ripple		%	< 5 (EN 61131-2)			
Service interface			PS/2 socket		Mini USB	
Connections, fieldbus			Push-In tension clamp terminal			
Data transmission rate		kBit/s	9.6...12000	20...1000	10'000 / 100'000	
Selecting the data transmission rate			automatic	via DIP switch or automatic	automatic	
Addressing			über DIP-Schalter		via DIP switch, DHCO, BootP or PGM	
Address range			0...125	1...63	1...254	
Fieldbus termination			via DIP switch		-	
Number of parameter bytes			Max. 235 Byte	-		
Number of diagnostics bytes			DPV0: Max. 64 Byte (61 for module diagnostics + 3 Byte gateway diagnostics) DPV1: Max. 240 Byte	-		
Article no.			**140045**	**140044**	**140047**	

ECO Digital inputs			XNE-8DI-24VDC-P	XNE-16DI-24VDC-P
Channels		No.	8	16
Nominal voltage on supply terminal	U_L		24 V DC	
Nominal current drawn from supply terminal	I_L	mA	1.5 mA	13mA
Nominal current drawn from module bus	I_{MB}	mA	15 mA	
Insulation test voltage	U_i	V AC	-	
Power loss		W	< 1.5	< 2.5
Input voltage				
Input voltage nominal value		V DC	24 V DC	
Low signal	U_L		$-U_L$...+5 V	
High signal	U_H		11 V...U_L	
Frequency range		Hz	-	
Input current				
Low signal / active signal	I_L		-1 mA...1.5mA	
High signal / active signal	I_H		2 mA...5 mA	
Input delay				
$t_{rising\ edge}$		µs	< 100	< 150
$t_{falling\ edge}$		µs	< 200	< 300
Max. permissible cable capacitance			-	
Article no.			**140035**	**140040**

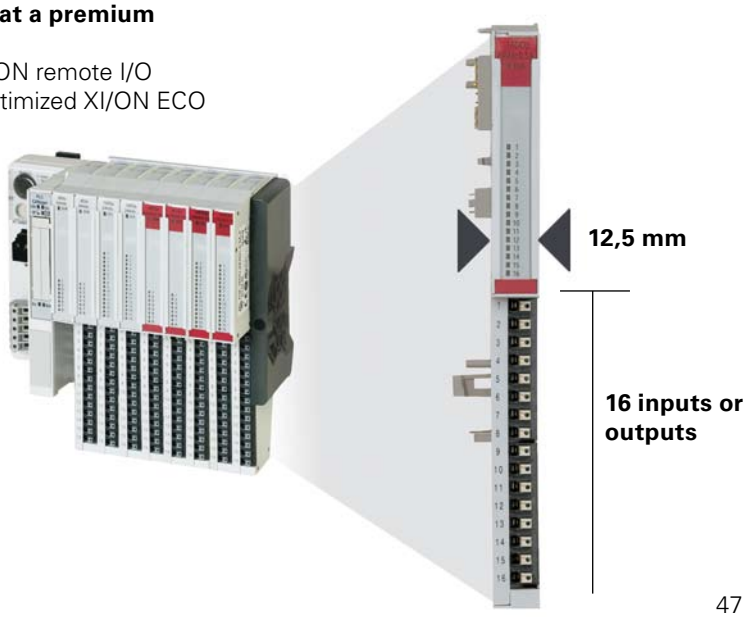
ECO Digital Outputs			XNE-8DO-24VDC-0.5A-P	XNE-16DO-24VDC-0.5A-P
Channels		No.	8	16
Nominal voltage on supply terminal	U_L		24 VCD	
Nominal current drawn from the supply terminal (at load current = 0 mA)	I_L	mA	3 mA	
Nominal current drawn from module bus	I_{MB}	mA	15 mA	25 mA
Insulation test voltage			-	
Power loss		W	normally 1.5	normally 2.5
Output voltage				
High signal	U_H / U_A		U_L ...1 V DC	
Output current				
High signal (nominal value)	I_H		0.5 A	
High signal (permissible range)	I_H	A	1.0	
Low signal	I_A	mA	-	
Delay on signal change and resistive load				
from Low to High		µs	< 300	
from High to Low		µs	< 300	
Load resistance range			-	
Utilization factor	g	%	100	50%, max. 4
Connectable equipment			resistive loads, inductive loads, lamp loads	
Resistive load		O	≥ 48	
Inductive load		H	to DC13 in accordance with IEC 60947-5-1	
Lamp load	R_{LL}	W	≤ 6	
Switching frequency				
With resistive load	f	Hz	< 100	
With inductive load		Hz	to DC13 in accordance with IEC 60947-5-1	
With lamp load		Hz	< 10	
Number of diagnostics bits			-	
Diagnostics			-	
Short-circuit proof to EN 61131-2			yes	
Restart after short-circuit rectified	I_i		automatic	
Article not.			**140036**	**140039**

XI/ON ECO Modules - More information where space is at a premium

Save space and costs with XI/ON ECO I/O modules. The XI/ON remote I/O system has been expanded with the new price and space optimized XI/ON ECO I/O modules. Depending on type, 8 or 16 inputs and outputs can be connected over a width of only 12.5 mm. The high connection density reduces the mounting width for typical applications. All modules are implemented with an integrated connection level.

Key benefits of the XI/ON ECO modules at a glance:

- Space saving with 16 channels on 12.5 mm width
- Cost saving with electronic unit with integrated connention level
- Connention via "Push in" tension clamp terminal saves time required for mounting
- Can be combined with existing XI/ON modules

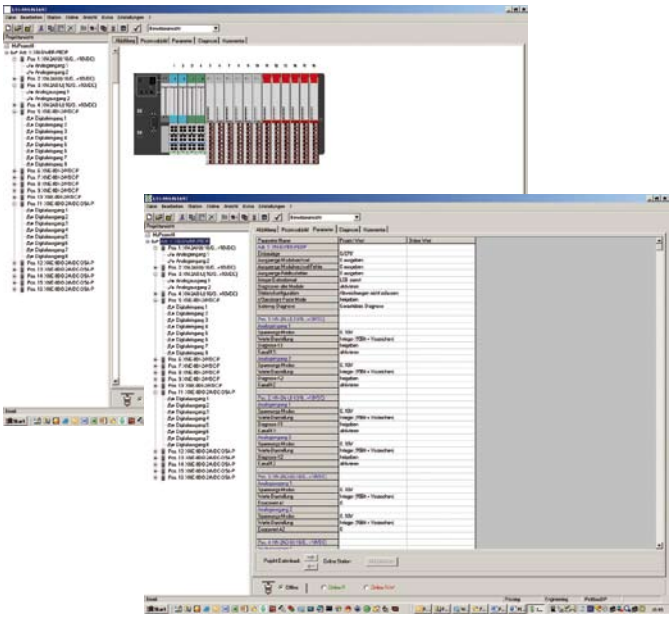


ECO Multi Function Module			XNE-8AI-U/I-4PT/NI
Channels		No.	8 (U/I) / 4 (PT/NI/R)
Nominal voltage on supply terminal	U_L		24 V DC
Nominal current drawn from the supply terminal	I_L	mA	normally 35
Nominal current drawn from module bus	I_{MB}	mA	< 30
Power loss		W	normally < 1.5 W
Adjustable measured variable			voltage, current, PT, NI, R
Voltage metering			
Measuring ranges			-10…10 VDC / 0…10 V DC
Measured value representation			Standard, 16 Bit / 12 Bit (flush-left) Extended Range, 16 Bit / 12 Bit (flush-left) PA (NE43), 16 Bit / 12 Bit (flush-left)
Capability of connecting			2-wire
Maximum input voltage	U_{max}	V DC	±20
Input resistance (burden)	R_L	kΩ	> 200
Limit frequency	f_G	Hz	1.5
Basic error limit at 23° C		%	0.2
Temperature coefficient			200 ppm/°C
Current measuring			
Measuring ranges			0…20 mA / 4…20 mA
Measured value representation			Standard, 16 Bit / 12 Bit (flush-left) Extended Range, 16 Bit / 12 Bit (flush-left) PA (NE43), 16 Bit / 12 Bit (flush-left)
Capability of connecting			2-wire
Maximum input current	Imax	mA	40
Maximum input voltage	U_{max}	V DC	< 17
Input resistance (burden)	R_L	Ω	< 52
Limit frequency	f_G	Hz	1.5
Basic error limit at 23° C		%	0.2
Temperature coefficient			200 ppm/°C
Temperature measuring			
Platin sensors (EN 60751)			PT100, PT200, PT500, PT1000
Nickel sensors			NI100, NI1000 (DIN 4343760), NI1000TK5000
Measuring ranges PT100, PT200, PT500, PT1000 (2-/3-wire)			-200…850 °C / -200…150 °C
Measuring ranges NI100, NI1000, NI1000TK5000 (2-/3-wire)			-60…250 °C / -60…150 °C
Measured value representation			Standard, 16 Bit / 12 Bit (flush-left)
Capability of connecting			2-/3-wire
Measurement current	I_{mess}		< 0.5 mA (Integral)
Limit frequency	f_G	Hz	1.5
Basic error limit		%	PT100, NI100: 0.5% PT200, PT500, PT1000, NI1000, NI1000TK5000: 0.2%
Temperature coefficient			200 ppm/°C
R (resistance measurement)			
Measuring ranges			0…250 W, 0…400 W, 0…800 W, 0…2000 W, 0…4000 W
Measured value representation			Standard, 16 Bit / 12 Bit (flush-left)
Capability of connecting			2 Leiter
Limit frequency	f_G	Hz	1.5
Basic error limit at 23° C		%	0.2
Temperature coefficient			200 ppm/°C
Number of diagnostics bytes			4
Number of parameter bytes			8
Article no.			**140037**

ECO Multi Function Modules			XNE-4AO-U/I
Channels		No.	4 (U/I)
Nominal voltage on supply terminal	U_L		24 V DC (18...30 V DC)
Nominal current drawn from the supply terminal			
without signal output	I_L	mA	< 40
with signal output	I_L	mA	< 150
Nominal current drawn from module bus	I_{MB}	mA	< 40
Power loss		W	normally < 3 W
Adjustable measured variable			voltage, current
Output parameter, voltage			
Output voltage			-10…10 VDC / 0…10 V DC
Measured value representation			Standard, 16 Bit / 12 Bit (flush-left) Extended Range, 16 Bit / 12 Bit (flush-left) PA (NE43), 16 Bit / 12 Bit (flush-left)
Capability of connecting			2-wire
Load resistance			
Resistive load		Ω	> 1000
Capacitive load		µF	< 1
Transmission frequency		Hz	< 20
Recovery time			
Resistive load		ms	< 1
Inductive load		ms	< 2
Capacitive load		ms	< 2
Short-circuit current		mA	< 40
Basic error limit at 23° C		%	0.2
Temperature coefficient			200 ppm/°C
Output parameter, current			
Output current			0…20 mA / 4…20 mA
Measured value representation			Standard, 16 Bit / 12 Bit (flush-left) Extended Range, 16 Bit / 12 Bit (flush-left) PA (NE43), 16 Bit / 12 Bit (flush-left)
Capability of connecting			2-wire
Load resistance			
Resistive load		Ω	< 450
Capacitive load		µF	< 1
Transmission frequency		Hz	< 20
Recovery time			
Resistive load		ms	< 1
Inductive load		ms	< 2
Capacitive load		ms	< 2
Short-circuit current		mA	< 40
Basic error limit at 23° C		%	0.2
Temperature coefficient			200 ppm/°C
Number of parameter bytes			12 Byte
Article no.			**140034**

ECO Technology Module			XNE-2CNT-2PWM
Counter module			
Channels		No.	2
Nominal voltage on supply terminal	U_L		24 V DC
Nominal current drawn from the supply terminal	I_L	mA	≤ 50
Nominal current drawn from module bus	I_{MB}	mA	≤ 50
Power loss		W	< 3
Power supply of encoders			Output voltage U_L + (-0.8 V) / GND_L
Digital input			
Input voltage			
Input voltage nominal value		V DC	24
Low signal	U_L		-30 V DC...5 V DC
High signal	U_H		11 V DC...30 V DC
Input current			
Low signal	I_L		-8 mA...1.5 mA
High signal	I_H		2 mA...10 mA
Minimum pulse width		µs	Filter on: > 25 ms (20 kHz) Filter off: < 2.5 ms (200 kHz)
Digital output			
Channels		No.	4
Output voltage			
Output voltage nominal value		V DC	24
Low signal	U_L		≤ 3 V DC
High signal			≥ L+ (-1 V)
Output current			
High signal (permissible range)	I_H		5 mA...0.6 A
High signal (nominal value)	I_H		≤ 0.5 A (55° C)
Switching frequency			
2 PWM			20 kHz
2 DO			100 Hz
Output delay PWM			25 µs (resistive load)
Short-circuit proof			yes
Measuring ranges			
Frequency			0.1 Hz...200 kHz
Period duration			5 ms...120 s
Counter modes			
Signal evaluation A, B			Pulse and direction, rotary encoder single/double/quadruple
Mode			endless, once only, periodic count
Synchronisation			once only / periodic
Count limits			Upper count limit: 0...7FFF FFFF Lower count limit: 8000 0000...FFFF FFFF
Number of diagnostics bytes			4
Number of parameter bytes			16
Article no.			**140038**

Instantly online, instantly viewed, instantly tested!
The I/Oassistant provides you with a universal tool that supports you interactively throughout the planning and implementation stage of your XI/ON system. First of all, you need to create and structure a project on screen. To do this, you select gateways, electronics/base modules and the appropriate accessories. Then you configure the individual stations either offline or online. Once everything is set to your satisfaction, you can put the complete system into operation.



Commissioning without a fieldbus master

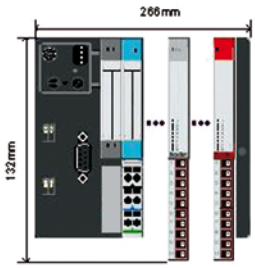
The I/Oassistant checks the station, reads in process data, outputs values and visualizes the diagnostics data of the channels. In this way you can commission your station without a higher-level controller and ensure that sections of the system are operating correctly.
You set the outputs and modify values directly from the PC. By forcing the values you can instantly view the behavior of your application. You can thus check the field wiring, for example, without having a fully installed control system.

Integration in XSoft-CoDeSys-2

The I/Oassistant integrated XSoft-CoDeSys-2 is the special configuration tool for XI/ON and can also be accessed from within XSoft-CoDeSys-2.
You can therefore make full use of all I/Oassistant functions for interactive planning and implementation of your remote XI/ON station without having to exit XSoft-CoDeSys-2.

Design plan and parts list generation

Once the planning has been completed, the software can generate a detailed project documentation that includes overview picture and parts lists.



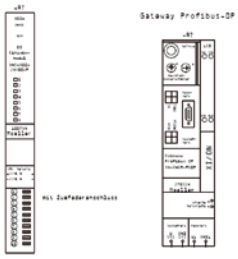
Stationshöhe :74,4mm

5. Stock list of station

Piece	Article	Order nr
1	XN-GWBR-PBDP	270324
2	XN-2AI-U(-10/0...+10VDC)	230870
6	XNE-8DI-24VDC-P	100794
6	XNE-8DO-24VDC-0.5A-P	100795
2	XN-2AO-U(-10/0...+10VDC)	225180
4	XN-S3T-SBB	225193

EPLAN support

EPLAN macros are available for the XI/ON modular I/O system. This saves the time required for configuring and helps to prevent configuration errors.



CoDeSys Automation Alliance

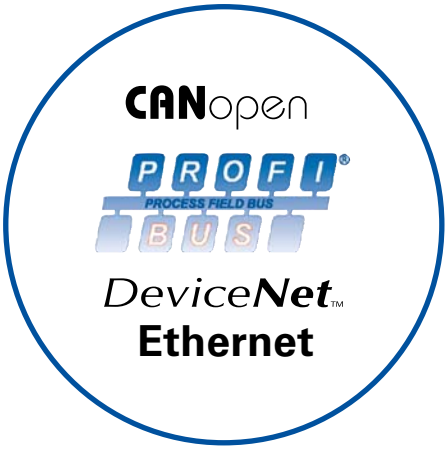
Gateways with busrefresh			XN-GWBR-PBDP	XN-GWBR-DPV1	XN-GWBR-CANOPEN	XN-GWBR-DNET	XN-GWBR-MODBUS-TCP	XN-PLC-CANOPEN
Fieldbus			PROFIBUS-DP	PROFIBUS-DP	CANopen	DeviceNet	Modbus TCP	CANopen
Protocol			PROFIBUS-DPV0	PROFIBUS-DPV0, DPV1	CANopen	Device-Net	Modbus-TCP	CANopen
System supply	U_{sys}	V DC	24 V DC/5 V DC					
Permissible range 24 V DC	U_{sys}	V DC	18...30					
Field voltage	U_L		24					
Permissible range		V DC	18...30					
Ripple		%	< 5 (EN 61131-2)					
Connections fieldbus			1 x SUB-D connector, 9-pin		Open Style Connector	Open Style Connector	RJ45	Open Style Connector
Data transmission rate		kBit/s	9.6...12000		20, 50, 125, 250, 500, 800, 1000	125, 250, 500	10/100 MBit/s	20, 50, 125, 250, 500, 800, 1000
Addressing			2 rotary coding switches				Coding switch, BootIP, DHCP	Software
Fieldbus termination			external				automatic	external
Number of parameter bytes			5 Bytes		-			
Number of diag-nostics bytes			3 Bytes		-			
Address range			1...99 dec.			1...63 dec.	1...4'162'314'256	1...127 dec.
Program code / Pro-gram data		kByte	-					128 / 128
Cycle time 1k inst-ruction		ms	-					0.5
Real-time clock			-					Yes
Article no.			**140154**	**148561**	**140155**	**140156**	**140162**	**140157**

Gateways			XN-GW-PBDP-1.5MB	XN-GW-PBDP-12MB	XN-GW-PBDP-12MB-STD	XN-GW-CANOPEN	XN-GW-DNET
Fieldbus			PROFIBUS-DP			CANopen	DeviceNet
Protocol			PROFIBUS-DPV0			CANopen	DeviceNet
Operating voltage		V DC	5 (from bus refreshing module)				
Permissible range		V DC	4.7...5.3				
Ripple		%	< 5 (nach EN 61131-2)				
Nominal current drawn from module bus	I_{MB}	mA	≤ 430		≤ 410	≤ 350	≤ 250
Connections fieldbus			2 x SUB-D con-nectors, 9-pin; 2 x spring-loaded terminal strips for direct wiring	1 x SUB-D connector, 9-pin		1 x SUB-D con-nector, 9-pin; 1 x SUB-D con-nector, 9-pin; 2 x direct wiring, 5-pin, spring-loaded	Open Style Connector
Data transmission rate		kBit/s	9.6...1500	9.6...1200	9.6...1500	20, 50, 125, 250, 500, 800, 1000	125, 250, 500
Addressing			2 hex rotary coding plugs		2 rotary coding switches		2 dec. coding switches
Fieldbus termination			via SUB-D connector				via DIP switch
Number of parameter bytes			5 Bytes			-	
Number of diagnostics bytes			3 Bytes			-	
Address range			1...125 dec.			1...127 dec.	0...63 dec.
Article no.			**140049**	**140048**	**140143**	**140050**	**140051**

Digital Inputs			XN-2DI-24VDC-P	XN-2DI-24VDC-N	XN-2DI-120/230VAC
Channel		No.	2		
Nominal voltage on supply terminal	U_L		24 V DC		120/230 V AC
Nominal current drawn from supply terminal	I_L	mA	≤ 20		
Nominal current drawn from module bus	I_{MB}	mA	≤ 28		
Insulatin test voltage	U_i	V AC	-		1780
Power loss		W	0.7		1
Input voltage					
Input voltage nominal value		V DC	24 V DC		120/230 V AC
Low signal	U_L		-30...5 V	0...5 V	0...20 V AC
High signal	U_H		11...30 V	> (U_{PF} -11 V)	79...265 V AC
Frequency range		Hz	-		48...63
Input current					
Low signal / active signal	I_L		0...1.5mA	1.8...10mA	0...1mA
High signal / active signal	I_H		2...10 mA	0...1.7 mA	3...8 mA
Input delay					
$t_{rising\ edge}$		µs	< 200		< 20000
$t_{falling\ edge}$		µs	< 200		< 20000
Maximum permissible cable capacitance			-		141 nF at 79 V AC/50 Hz; 23 nF at 265 V AC/50 Hz
Base modules					
without C connection			2- / 3-wire XN-S3x-SBB 2-wire proximity switches (Bero®) can be attached, with a permissible quiescent current up to 1.5mA		2- / 3-wire XN-S3x-SBB
with C connection			4-wire XN-S4x-SBBC		
Article no.			**140056**	**140057**	**140058**

Openness

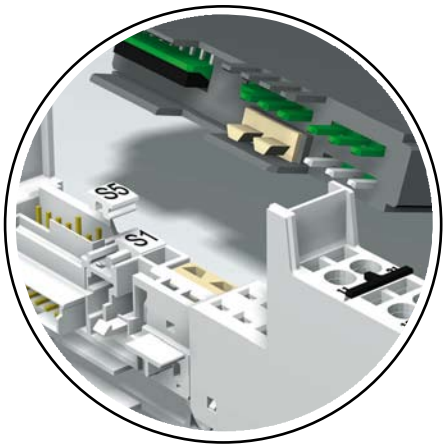
- The gateway product range supports the CANopen, Profibus-DP, DeviceNet and Ethernet fieldbus systems
- The modules can be used for any bus



Service interface

- Commissioning of station also without head-end controller
- Station diagnostics
- Programming interface

Digital Inputs			XN-4DI-24VDC-P	XN-4DI-24VDC-N	XN-16DI-24VDC-P	XN-32DI-24VDC-P
Channel		No.	4		16	32
Nominal voltage on supply terminal	U_L		24 V DC			
Nominal current drawn from supply terminal	I_L	mA	≤ 40			≤ 30
Nominal current drawn from module bus	I_{MB}	mA	≤ 28		≤ 45	≤ 30
Insulatin test voltage	U_i	V AC	-			
Power loss		W	1		2.5	4.2
Input voltage						
Input voltage nominal value		V DC	24 V DC			
Low signal	U_L		-30...5 V	0...5 V	-30...5 V	
High signal	U_H		15...30 V	> (U_{PF} -11 V)	15...30 V	
Frequency range		Hz	-			
Input current						
Low signal / active signal	I_L		0...1.5 mA	1.3...6 mA	0...1.5 mA	< 1.5 mA
High signal / active signal	I_H		2...10 mA	0...1.2 mA	2...10 mA	2...10 mA
Input delay						
$t_{rising\ edge}$		µs	< 200			
$t_{falling\ edge}$		µs	< 200			
Maximum permissible cable capacitance			-			
Base modules						
without C connection			2- / 3-wire XN-S4x-SBBS 4-wire XN-S6x-SBBSBB		2- / 3-wire XN-B3x-SBB	2- / 3-wire XN-B6x-SBBSBB
with C connection			-		4-wire XN-B4x-SBBC	-
Article no.			**140052**	**140059**	**140142**	**140147**



XI/ON standard modules

- Pluggable modules
- Fast modules change (hot swappable)
- Wiring on base module
- Screw or tension clamp terminal
- Mechanial coding of module

Digital Outputs			**XN-2DO-24VDC-0.5A-P**	**XN-2DO-24VDC-0.5A-N**	**XN-2DO-24VDC-2A-P**	**XN-2DO-120/230VAC-0.5A**
Channels		No.	2			
Nominal voltage on supply terminal	U_L		24 VCD			120/230 V AC
Nominal current drawn from the supply terminal (at load current = 0 mA)	I_L	mA	≤ 20		≤ 50	≤ 20
Nominal current drawn from module bus	I_{MB}	mA	≤ 32		≤ 33	≤ 35
Insulation test voltage			-			
Power loss		W	normally 1			
Output voltage						
High signal	U_H / U_A		min. L+ (-1 V)	max. GND (+1 V)	min. L+ (-1 V)	> U_L (-2 V)
Output current						
High signal (nominal value)	I_H		0.5 A		2	0.5 A
High signal (permissible range)	I_H	A	< 0.6		< 2.4	0.02...0.5
Low signal	I_A	mA	-			< 1.5
Backup fuse			-			500 mA FF
Surge current	I_S	A	-			8 (1 period at 60 Hz)
Number of outputs that can be switched in parallel	max.		-			
Total module current		A	-			
Delay on signal change and resistive load						
from Low to High		µs	< 100			< T/2 +1 ms
from High to Low		µs	< 100			< T/2 +1 ms
Load resistance range			48 Ω...1 kΩ	-	12 Ω...1 kΩ	at 120 VAC: 240 Ω...6 kΩ at 230 VAC: 460 Ω..11.5 kΩ
Utilization factor	g	%	100			
Connectable equipment			Resistive loads, inductive loads, lamp loads			
Resistive load		O	≥ 48		≥ 12	≥ 48
Inductive load		H	≤ 1.2			
Lamp load	R_{LL}	W	≤ 3	≤ 12	≤ 6	-
Switching frequency						
With resistive load	f	Hz	5000 (R_{LO} < 1kΩ)	100 (R_{LO} < 1kΩ)	5000 (R_{LO} < 1kΩ)	-
With inductive load		Hz	2			-
With lamp load		Hz	≤ 10			
Number of diagnostics bits			2			0
Diagnostics			-			
Short-circuit proof to EN 61131-2			-			
Restart after short-circuit rectified	I_i		-			
Base modules						
with C connection			2- / 3-wire XN-S3x-SBC 4-wire XN-S4x-SBCS			
Article no.			**140053**	**140060**	**140055**	**140150**

Digital Outputs			XN-4DO-24VDC-0.5A-P	XN-16DO-24VDC-0.5A-P	XN-32DO-24VDC-0.5A-P
Channels		No.	4	16	32
Nominal voltage on supply terminal	U_L		24 VCD		
Nominal current drawn from the supply terminal (at load current = 0 mA)	I_L	mA	≤ 25	≤ 30	
Nominal current drawn from module bus	I_{MB}	mA	≤ 30	≤ 45	≤ 50
Insulation test voltage			-		
Power loss		W	normally 1	normally 4	normally 5
Output voltage					
High signal	U_H / U_A		min. L+ (-1 V)		
Output current					
High signal (nominal value)	I_H		0.5 A		
High signal (permissible range)	I_H	A	1.0 A for max. 5 minutes	< 0.6	1.0
Low signal	I_A	mA	-		
Backup fuse			-		
Surge current	I_S	A	-		
Number of outputs that can be switched in parallel	max.		-		2
Total module current		A	-		10
Delay on signal change and resitive load					
from Low to High		µs	< 250	< 100	< 300
from High to Low		µs	< 250	< 100	< 300
Load resistance range			48 Ω...1 kΩ	-	48 Ω...1 kΩ
Utilization factor	g	%	100		see Total module current
Connectable equipment			Resistive loads, inductive loads, lamp loads		
Resistive load		O	≥ 48		
Inductive load		H	≤ 1.2	Category DC 13 to EN 60947-5-1	≤ 1.2
Lamp load	R_{LL}	W	≤ 6	≤ 3	≤ 6
Switching frequency					
With resistive load	f	Hz	5000 (R_{LO} < 1kΩ)	100 (R_{LO} < 1kΩ)	100 (R_{LO} < 1kΩ)
With inductive load		Hz	2	-	
With lamp load		Hz	≤ 10		
Number of diagnostics bits			1	4	8
Diagnostics			-		ja
Short-circuit proof to EN 61131-2			-		ja
Restart after short-circuit rectified	I_i		-		automatic
Basemodules					
with C connection			4-wire XN-S4x-SBCS 4 x 2- / 3-wire XN-S4x-SBCSBC	2- / 3-wire XN-B3x-SBC	2- / 3-wire XN-B6x-SBCSBC
Article no.			**140148**	**140141**	**140161**

Relay Modules			XN-2DO-R-NC	XN-2DO-R-NO	XN-2DO-R-CO
Contact type			2 break contacts	2 make contacts	2 changeover contacts, isolated
Nominal voltage on supply terminal	U_L		24 V DC		
Nominal current drawn from supply terminal	I_L	mA	≤ 20		
Nominal current drawn from module bus	I_{MB}	mA	≤ 28		
Insulation test voltage	U_i	V AC	1780		
Power loss		W	Normally 1		
Connectable equipment			Resistive loads, inductive loads, lamp loads		
Nominal load voltage			230 V AC, 30 V DC		
Output current per channel/230 V AC					
max. continuous current		A	2		
max. continuous current, resistive load			5 A, load-dependent		
Minimum load current		mA	10 mA at ≥ 12 V DC		
Output current for DC voltage (resistive)			Load limit curve		
Utilization factor	g	%	100		
Lifespan at 230 V AC					
at 5 A	Operations	x 10^6	> 0.1		
at 0.5 A	Operations	x 10^6	> 1		
Base modules					
without C connection			4-wire XN-S4x-SBBS		
with C connection			4-wire XN-S4x-SBCS		-
Article no.			**140061**	**140062**	**140054**

Programmable CANopen gateway

The programmable CANopen gateway brings PLC performance directly to the fieldbus terminal.
The device is ideal for decentralized automation concepts and for relieving the processing load on the higher-level PLC.
Programming or online commissioning can be carried out via the integrated service interface or with networked systems via the CANopen fieldbus.
The device can also be used as a stand-alone space-optimized PLC and connected to remote XI/ON stations.

Analog Inputs			**XN-1AI-I (0/4...20MA)**	**XN-2AI-I (0/4...20MA)**	**XN-1AI-U (-10/0...+10VDC)**	**XN-2AI-U (-10/0...+10VDC)**
Channels		No.	1	2	1	2
Nominal voltage on supply terminal	U_L		24 V DC			
Nominal current drawn from supply terminal	I_L	mA	≤ 50	≤ 12	≤ 50	≤ 12
Nominal current drawn from module bus	I_{MB}	mA	≤ 41	≤ 35	≤ 41	≤ 35
Power loss		W	< 1			
Inpurt current		mA	0/4...20		-	
Maximum input current		mA	50		-	
Input voltage			-		-10/0...+10 VDC	
Maximum input voltage		V DC	-		35 V continuous	
Input resistance			< 125 Ω		≥ 98.5 kΩ	
Limit frequency (-3 db)		Hz	200	> 50	200	> 50
Offset error		%	≤ 0.1			
Linearity		%	0.03	-	0.03	-
Basic error limit at 23 °C		%	< 0.2			
Repetition accuracy (deviation)		%	0.09	0.05		
Temperature coefficient			300 ppm/°C of full scale value			150 ppm/°C of full scale value
Resolution of A/D converter			14 Bit (signed integer)	16 Bit	14 Bit (signed integer)	16 Bit
Measuring principle			successive approximation	Delta Sigma	successive approximation	Delta Sigma
Measured value representation			16 Bit signed integer 12 Bit full range, flush-left		16 Bit signed integer 12 Bit signed integer flush-left 12 Bit full range flush-left	16 Bit signed integer 12 Bit full range flush-left
Transmitter supply			linked to L+ and L- of the supply; not short-circuit proof	≤ 250 mA; linked to L+ and L- of the supply; not short-circuit proof	linked to L+ and L- of the supply; not short-circuit proof	≤ 250 mA; linked to L+ and L- of the supply; not short-circuit proof
Cycle time		ms	-			
Connectable sensors			-			
Number of diagnostics bits			2 Bit		1 Bit	2 Bit
Number of parameter bits			3 Bit	1 Byte (per channel)	3 Bit	2 Byte
Base modules						
without C connection			2- / 3-wire XN-S3x-SBB			
without C connection, for transmitter supply			4-wire XN-S4x-SBBS			
Article no.			**140063**	**140144**	**140064**	**140145**

Analog Inputs			XN-4AI-U/I	XN-2AI-PT/NI-2/3	XN-2AI-THERMO-PI
Channels		No.	4	2	
Nominal voltage on supply terminal	U_L		24 V DC		
Nominal current drawn from supply terminal	I_L	mA	≤ 20	≤ 30	
Nominal current drawn from module bus	I_{MB}	mA	≤ 50	≤ 45	
Power loss		W	< 1		
Inpurt current		mA	0/4...20	-	
Maximum input current		mA	50	-	
Input voltage			-10/0...+10 V DC	-	
Maximum input voltage		V DC	35 V continuous	-	
Input resistance			< 62 Ω / > 98.5 Ω	-	
Limit frequency (-3 db)		Hz	20	-	
Offset error		%	≤ 0.1		
Linearity		%	0.05	< 0.1	0.1
Basic error limit at 23 °C		%	< 0.3	< 0.2	
Repetition accuracy (deviation)		%	0.05		
Temperature coefficient			300 ppm/°C of full scale value		
Resolution of A/D converter			16 Bit	-	
Measuring principle			Delta Sigma	-	
Measured value representation			16 Bit signed integer 12 Bit full range flush-left		
Transmitter supply			-		
Cycle time		ms	-	< 130 per channel	60 per channel + 100
Connectable sensors			-	Platinum sensors: PT100, PT500, PT1000 (to DIN IEC 751) Nickel sensors: Ni100, Ni1000 (to DIN 43760)	Thermocouple types B, E, J, K, N, R, S, T to DIN IEC 584, class 1, 2, 3
Number of diagnostics bits			-	2 Byte (1 Byte pro Kanal)	
Diagnostics			yes		
Number of parameter bits			-	4 Bytes (2 Bytes per channel)	2 Bytes (1 Byte per channel)
Base modules					
without C connection			2- / 3-wire XN-S6x-SBCSBC	2- / 3-wire XN-S3x-SBB	-
without C connection, for transmitter supply			-	4-wire XN-S4x-SBBS	4-wire with integrated cold junction compensation XN-S4x-SBBS-CJ
Article no.			**140158**	**140067**	**140068**

Analog Outputs			XN-1AO-I(0/4...20MA)	XN-2AO-I(0/4...20MA)	XN-2AO-U(-10/0...+10VDC)
Channels		No.	1	2	
Nominal voltage on supply terminal	U_L		24 V DC		
Nominal current drawn from supply terminal	I_L	mA	≤ 50		
Nominal current drawn from module bus	I_{MB}	mA	≤ 39	≤ 40	≤ 43
Power loss		W	normally 1		
Output voltage		V DC	-		-10/0...+10
Output current		mA	0/4...20		-
Load resistance					
Resistive load		O	< 450		> 1000
Inductive load		H	< 0.001		-
Capacitive load		µF	-		> 1
Short-circuit current		mA	-		≤ 40
Transmission frequency		Hz	≤ 200	≤ 200	≤ 100
Offset error		%	≤ 0.1		
Linearity		%	0.02	-	0.1
Basic error limit at 23 °C		%	< 0.2		
Repetition accurancy (deviation)		%	0.05	-	0.5
Output ripple		%	0.02	-	0.02
Temperature coefficient			300 ppm/°C of full scale value	150 ppm/°C of full scale value	300 ppm/°C of full scale value
Recovery time					
Resistive load		ms	0.1	2	0.1
Inductive load		ms	0.5	2	0.5
Capacitive load		ms	0.5		
RFI suppression			-		Common mode > 90 dB Differential mode > 70 dB Cross talk between channels > -50 dB
Measured value representation			16 Bit signed integer 12 Bit full range flush-left		16 Bit signed integer 12 Bit signed integer flush-left 12 Bit full range flush-left
Number of parameter bytes			3	3 (per channel)	
Base modules					
without C connection			2- / 3-wire XN-S3x-SBB		
Article no.			**140065**	**140146**	**140066**

I/Oassistant

- Project design/configuration
- Parameterization/monitoring
- Commissioning

XSoft-CoDeSys-2 – IEC 61131-3

- Programming of the XN-PLC-CANopen

Technology Modules			XN-1CNT-24VDC
Counter module			
Channels		No.	1
Nominal voltage on supply terminal	U_L		24 V DC
Nominal current drawn from supply terminal	I_L	mA	≤ 50
Nominal current drawn from module bus	I_{MB}	mA	≤ 40
Power loss		W	< 1.3
Power supply of encoders			Output voltage L+ (-0.8 V) Output current ≤ 0.5 A, short-circuit proof
Digital inputs			
Input voltage			
Input voltage nominal value		V DC	24
Low signal	U_L		-30 V DC...5 V DC
High signal	U_H		11 V DC...30 V DC
Input current			
Low signal	I_L		-8 mA...1.5 mA
High signal	I_H		2 mA...10 mA
Minimum pulse width		µs	Filter on: > 25 ms (20 kHz), Filter off: < 2.5 ms (200 kHz)
Digital Outputs			
Output voltage			
Output voltage nominal value		V DC	24
Low signal	U_L		≤ 3 V DC
High signal			≥ L+ (-1 V)
Output current			
High signal (permissible range)	I_H	A	5 mA...2 A
High signal (nominal value)	I_H		≤ 0.5 A (55° C)
Switching frequency			
With resistive load		Hz	100
With inductive load		Hz	2
with lamp load		Hz	≤ 10
Lamp load	R_{LL}	W	≤ 10
Output delay			100 µs (resistive load)
Short-circuit proof			yes
Response threshold		V	2.6...4 A
Inductive quenching			L+ (-50...-60 V)
Measuring ranges			
Frequency			0.1 Hz...200 kHz
Speed			1 rpm...25000 rpm
Period duration			5 ms...120 s
Counter modes			
Signal evaluation A, B			Pulse and direction, rotary encoder single/double/quadruple
Mode			Endless, once only or periodic count
Hysteresis		mm	0...255
Pulse durations			0...255
Synchronisation			Once only / periodic
Count limits			Upper count limit: 0...7FFF FFFF Lower count limit: 8000 0000...FFFF FFFF
Measuring modes			
Signal evaluation A, B			Pulse and direction, rotary encoder single
Temperature coefficient			≤ 100 ppm/°C of full scale value
Number of diagnostics bits			1
Number of parameter bits			15
Base module			
without C connection, for transmitter supply			4-wire XN-S4x-SBBS
Article no.			**140069**

Technology Modules			XN-1RS232	XN-1RS485/422	XN-1SSI
Type			RS 232	RS 484 / RS 422	SSI
Nominal voltage on supply terminal	U_L		24 V DC		
Nominal current drawn from supply terminal	I_L	mA	≤ 25		
Nominal current drawn from module bus	I_{MB}	mA	≤ 140	≤ 90	≤ 50
Power loss		W	normally 1		
Transmission channels			RxD, TxD, RTS, CTS	RxD, TxD	CL, D
Data buffer					
Receive		Byte	128		-
Transmit		Byte	64		-
Connection type					
RS 232			full-duplex	-	
RS 485			-	2-wire half-duplex	-
RS 422			-	2-wire half-duplex or 4-wire full-duplex	4-wire full-duplex (clock output/signal input)
Bit transmission rate			max. 115200 Bit/s (adjustable), default setting: 9600 Bit/s, 7 data bits, odd parity and 2 stop bits		max. 1 MHz (adjustable), default setting: 500 kBit/s
Insulation voltage					
Between interface and module bus / system voltage		V_{rms}	500		
Between interface and field voltage		V_{rms}	500		
Common mode range		V DC	-7...12	-	
Cable impedance		O	-	120	
Bus termination			-	120 Ω (external)	internal
Cable length RS 232		m	max. 15	max. 1000	max. 30
Number of diagnostics bits			1		
Number of parameter bits			4		
Base modules					
without C connection			4-wire XN-S4x-SBBS		
Article no.			**140151**	**140152**	**140153**

XI/ON technology modules:
Interfaces and counters

The serial interface modules of the XI/ON range enable them to transfer serial data streams via the XI/ON system. This enables the connection of different devices such as printers, scanners or barcode readers with a serial RS232, RS485 or RS422 interface.

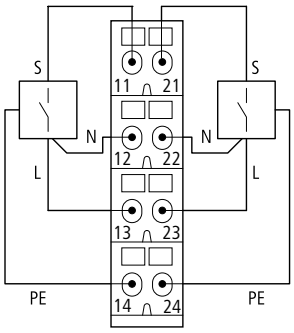
The XN-1SSI module allows the connection of encoders with an SSI interface, a supply voltage of 24 V DC (500 mA), a word length of up to 32 bits and a transmission rate of max. 1 MHz.

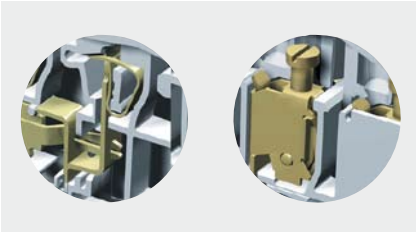
The XN-1CNT counter module detects normalized signals up to 200 kHz.

Power Supply Modules			XN-BR-24VDC-D	XN-PF-24VDC-D	XN-PF-120/230VAC-D
Operating voltage		V DC	24		120 / 230 AC
System supply	U_{SYS}	V DC	24/5	-	
Permissible range 24 V DC	U_{SYS}	V DC	18...30	-	
Permissible range 5 V DC	U_{SYS}	V DC	4.7...5.3	-	
Field voltage	U_L		24 V DC		
Permissible range			-		nach EN 61131-2
Permissible range		V DC	18...30		-
Nominal current drawn from module bus	I_{MB}	mA	-	≤ 28	≤ 25
Insulation test voltage	U_i	V AC	-		1780
Ripple		%	< 5 (to EN 61131-2)		
Maxmium operating current	I_{EI}	A	10		
Maximum system supply current	I_{MB}	A	1.5	-	
Number of diagnostics bits			4		
Base modules without gateway supply					
without C connection			-	2-/3-wire XN-P3x-SBB	
with C connection			4-wire XN-P4x-SBBC-B	4-wire XN-P4x-SBBC	
Article no.			**140071**	**140070**	**140072**

Safety through coding

The pluggable design of the modules enable them to be exchanged quickly and without tools, even under live conditions (hot swappable).
The mechanical coding prevents modules from being plugged incorrectly.





The base modules of the XI/ON standard systems are available with 2, 3 or 4-wire circuits and tension clamp or screw terminals. An additional terminal strip is unnecessary.