

1 XI342204

The analog input terminal XI342204 processes signals in the range from 4 to 20 mA in a ctrlX I/O station. The input signal is digitized with a resolution of 16 bits and transferred galvanically isolated to the system level. The 4 input channels are differential inputs. Error states are shown at the channel LED on the removable peripheral connector and routed to the control via the local bus.

The logic and peripheral voltage supply as well as the EtherCAT-based module communication are routed through the module.

For the integration into the parent system, the respective ESI files are available. For the ESI files, go to <http://www.boschrexroth.com/electrics>.

Ensure that the current documentation is consulted. For the current documentations, go to www.boschrexroth.com/mediadirectory.



Fig. 1: Module XI342204

2 Ordering data

Type	Part number	Description
XI342204	R911406107	Analog input module, current between 4 and 20 mA

For more ordering data (accessories), go to the product catalog under www.boschrexroth.com/electrics.

3 Technical data

3.1 General technical data

XI342204	
Number of inputs	4
Connection method	Push-in terminal

XI342204	
Connection method	2-wire, shielded, twisted in pairs
Signal type	Differential
Input signal	4 mA to 20 mA
Input resistance	<250 Ω
Limit frequency of input filter	15.7 kHz
Conversion time	100 μs
Resolution D/A	16 bits including sign
Accuracy	Typ. ± 0.1 % of the end value of the measured range (MBE) Max. ± 0.3% of MBE
Overload protection	No, max. DC 10.4 V, I _{max} = 46 mA
Common Mode	Max. ±35 V compared to U _P GND
Voltage supply	U _P via jumper contacts
Current consumption U _L	40 mA
Current consumption U _P	21 mA
Bit width, input data in the process data image (including filling bit)	18 bytes in the "Standard" representation 12 bytes in the "compact" representation Can be set channel-granularly
Parameterization	Via ctrlX Works (start parameter)
Configuration	No address or configuration setting required
Dimensions	12 mm × 105 mm × 99 mm (width × height × depth)
Weight	95 g (module including connector)
Electrical isolation	DC 1200 V U _P to U _L , DC 707 V U _P /U _L to FE
EMC resistance	Acc. to EN 61000-6-2 and EN 61000-6-4
Mounting position	Vertical, on a horizontal support rail
Labeling, approvals	CE, UKCA

3.2 Clamping point assignment

Clamping point	Signal	LED	Pusher
1	AI Kanal 1+	Red	Grey
2	AI Kanal 1-	None	Grey
3	AI Kanal 2+	Red	Grey
4	AI Kanal 2-	None	Grey
5	AI Kanal 3+	Red	Grey
6	AI Kanal 3-	None	Grey
7	AI Kanal 4+	Red	Grey
8	AI Kanal 4-	None	Grey

3.3 Internal schematic diagram

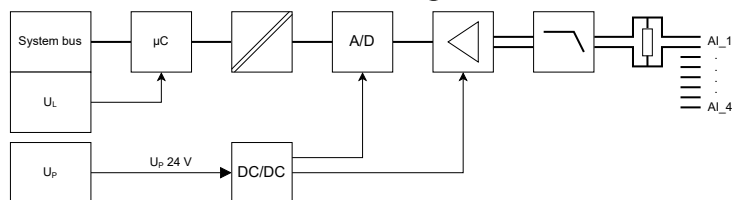


Fig. 2: Internal schematic diagram

3.4 Ambient conditions

XI342204	
Ambient temperature	
Up to 4000 m	-25 to 45 °C
From 4000 m	-25 to 40 °C
Maximum operating altitude	5000 m
Acc. to 60204	
Ambient temperature (Storage and transport)	-40 to 70 °C
Permitted air humidity according to DIN EN 61131-2	
Operation	5-85 %
Storage	10-100 %
Transport	45-95 %
Degree of protection	IP20
Acc. to DIN EN 60 529	(not evaluated by UL)
Protection class	III
Acc. to DIN EN 61010-2-201	
Overtoltage category	2
Acc. to IEC 60664-1	
Contamination level	2, no condensation
Acc. to IEC 61010-1	

NOTICE

Failure of the product due to contaminated air!

- The ambient air must not contain acids, alkaline solutions, corrosive agents, salts, metal vapors and other electrically conductive contaminants in high concentrations.
- The devices to be installed into the housing and installation compartments must at least comply with the degree of protection IP 54 according to DIN EN 60529.
- The device shall be provided in a suitable fire enclosure in the end-use application.

NOTICE

Defective product due to gases jeopardizing functions

Due to the risk of corrosion, avoid sulphurous gases (e.g. sulphur dioxide (SO₂) and hydrogen sulphide (H₂S)). The product is not resistant against these gases.

NOTICE

Failure of the product due to overheating

To avoid overheating and a trouble-free operation of the product, the ambient air has to circulate. Also refer to the section "Installation notes".

3.5 Mechanical tests

Vibration resistance Acc. to DIN EN 60068-2-6	Oscillations, sinusoidal in all three axes, 5 Hz - 8.4 Hz with 3.5 mm amplitude 8.4 Hz -150 Hz with 1 g peak acceleration
Shock test Acc. to DIN EN 60068-2-27	Shock stress: Shock resistance in all three axes 11 ms semi-sinusoidal 15 g
Broadband noise Acc. to DIN EN 60068-2-64	20-500 Hz with 1.22 g RMS, 30 min in all three axes

For the current approvals, go to www.boschrexroth.com/electrics.

4 For your safety

4.1 Intended use

Only use the module as specified in the data sheet.

4.2 User qualification

The product use described in this data sheet is only intended for qualified electricians and staff trained by these qualified electricians. The user has to be familiar with the known safety concepts on automation technology, applicable standards and other guidelines.

4.3 Electric safety

NOTICE

Loss of electric safety

Unintended handling can affect the device safety! Observe the notes in the present data sheet during installation, commissioning and operation.

5 Signal processing

5.1 General information on signal processing

The signal processing of the module consists of several steps shown in this section, i.e. how low-pass filter and oversampling are implemented in hardware components while other steps are implemented as firmware functions.

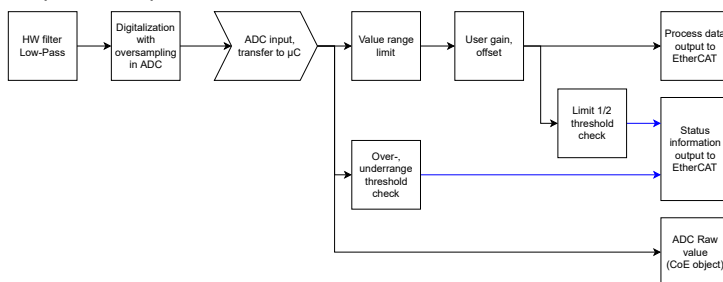


Fig. 3: Overview on signal processing

5.2 Distinctive values and data formats

Input signal	Process data value	Measuring range in percent	Notes
	Current in µA		
21.6 mA	21600	108%	Message "Upper range limit"
21.4 mA	21400	107%	Reset message "Upper range limit"
20 mA	20000	100%	-
4 mA	4000	20.0%	-
3.2 mA	3200	16%	Reset message "Lower range limit"
3.1 mA	3100	15.5%	Message "Lower range limit"
0 mA	0	0%	

Process data is transferred as value normalized to µA in "signed int 16" format. The process data corresponds directly to the values read in at the input. It depends on the gain and offset calculation (gain and offset). Thus, the conversion to an abstract value range is omitted. The value can be directly used as current value in the application.

Note that the input value range of the module from 0 mA up to reaching the upper limit value is specified at 108% of the end value of the measured range (MBE). Normally, higher values are read in and transmitted, but the upper limit of the technically reachable value range depends on the tolerances and can change in future hardware releases.

Values smaller than 0 μA are not transmitted.
A bit at the ADC corresponds to the value 0.673 μA .

5.3 Synchronizing the application

The application is synchronized in the "SM synchronous" mode.

5.4 "Filter" and "Oversampling"

A first order low-pass filter in the hardware limits the frequency range at the input of the analog digital converter (ADC). The filtered signal is present at the analog digital converter.

Depending on the setting of the value "Oversampling factor" in the object "Device settings" (F800:01), the Oversampling of the ADC can be set. If Oversampling is switched on, the ADC samples multiple values and transmits the average of the measured values. A ratio of 0 disables the Oversampling. 2 means for example that two Samples can be read in per transferred process date. Thus, the effective useful signal frequency can be restricted.

5.5 Limit value check of the upper and lower range limit

The ADC input data is used to check whether the values are above or below the valid range. The status bits "Overrange" and "Underrange" or "Wire break" are set accordingly in the process data. There are different values at which the diagnostics is set and reset.

For the limits, go to the chapter "Distinctive values and data formats".

5.6 User Scale: Gains and offset adjustment

The "User Scale" functionality allows an individual correction of the gain (User Gain) and the offset (User Offset) for each channel.

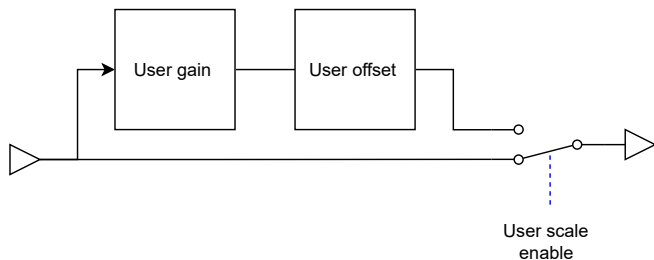


Fig. 4: User Gain and Offset

Enable the functionality "User Scale" to apply the correction. Therefore, set the parameter "80x0:05 User scale enable" to 1.

Enable the "User Scale" functionality to apply the correction. You have to set the parameter "80x0:05 User scale enable" to 1.

Output values to calculate the gain and the offset:

Value_Range:	The value range at the input of the "User Scale" calculation
Scaled_Value_Range:	The desired value range at the output of the User Scale calculation
Lower_Range_End_Value:	The value at the lower end of the input value range
Scaled_Lower_Range_End_Value:	The desired value at the lower end of the output value range

The values for gain and offset are calculated as follows:

Gain_Factor	= Scaled_Value_Range ÷ Value_Range
User_gain	= (Gain_Factor × 10000) - 10000

Enter the value "User_gain" into the parameter "80x0:01 User gain".

Offset	= (Scaled_Lower_Range_End_Value) - (Lower_Range_End_Value × Gain_Factor)
User_offset	= Offset × 1000

Enter the value "User_offset" into the parameter "80x0:02 User offset".

Note that possible limitations of the value range also remain after the "User scale" limitation. For more detailed information, refer to Chapter 5.2 "Distinctive values and data formats" on page 2.

The settings can only be made in the "Pre-Op" state and should be written upon each start of the EtherCAT bus via the start parameter.

Example 1:

Module is XI422204, analog output with $\pm 10\text{ V}$. The target is to reduce the value range to values between -3 V and $+8\text{ V}$. The values of the application still uses the value range from -10 V to $+10\text{ V}$.

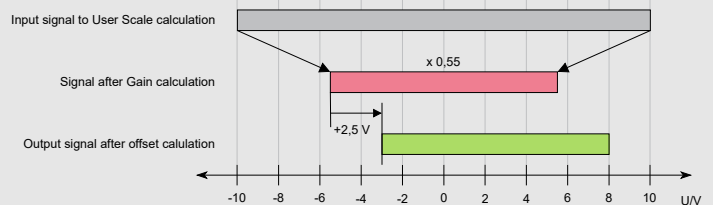


Fig. 5: Value range offset from -10 V ... $+10\text{ V}$ to -3 V ... $+8\text{ V}$

Value_Range	= $10\text{ V} - (-10\text{ V}) = 20\text{ V}$
Scaled_Value_Range	= $8\text{ V} - (-3\text{ V}) = 11\text{ V}$
Lower_Range_End_Value	= -10 V
Scaled_Lower_Range_End_Value	= -3 V
Gain_Factor	= $11\text{ V} \div 20\text{ V} = 0.55$
User_gain	= $(0.55 \times 10000) - 10000 = -4500$
Offset	= $(-3\text{ V}) - (-10\text{ V} \times 0.55) = 2.5\text{ V}$
User_offset	= $2.5 \times 1000 = 2500$

Example 2

Module is XI342204, analog input from 4 to 20 mA. The connected system specified 4.5 mA as minimum value and 18.5 mA as maximum value. The values should be mapped to a value range from 4 to 20 mA.

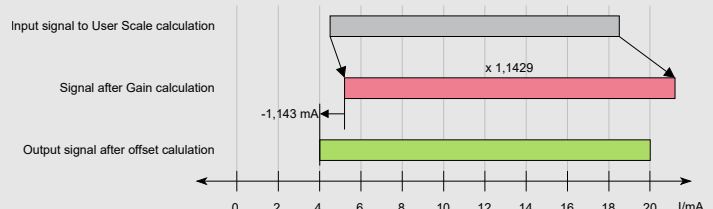


Fig. 6: Value range offset from 4.5 mA to 18.5 mA to from 4 mA to 20 mA

Value_Range	= $18.5\text{ mA} - (4.5\text{ mA}) = 14\text{ mA}$
Scaled_Value_Range	= $20\text{ mA} - (4\text{ mA}) = 16\text{ mA}$
Lower_Range_End_Value	= 4.5 mA
Scaled_Lower_Range_End_Value	= 4 mA
Gain_Factor	= $16\text{ mA} \div 14\text{ mA} = 1.1429$
User_gain	= $(1.1429 \times 10000) - 10000 = 1429$
Offset	= $4\text{ mA} - (4\text{ mA} \times 1.1429) = -1.143$
User_offset	= $-1.143 \times 1000 = -1143$

5.7 Limit 1/2 Threshold Check

There are two individual and independent limit value checks per channel specifying whether the process data value is lower, equal to or higher than the limit value set.

The limit value to be checked is set in the parameter "Limit 1" or in the parameter "Limit 2" of the object "Channel x settings". The format is identical to the value in the process data, a standardized value.

Each individual limit check is enabled using the parameter "Limit y enable" in the object "Channel x settings".

The result of the check is output in the process data "Ch. x Limit y". Alternatively, it can be retrieved either via the CoE object 60x0:04 ("Channel x Limit 1") or the CoE object 60x0:06 ("Channel x Limit 2"). Meaning of the bits:

Bit	Meaning
0	1 if the value is lower than or equal to the set date.
1	1 if the value is higher than or equal to the set date.

6 Object directory

6.1 CoE standard objects

The object directory of the module contains objects that can be triggered via SDO services. These are defined in the ETG standards:

Index (hex)	Name
1000	Device type
1001	Error register
1008	Device name
1009	Hardware version
100A	Software version
1018	Identify
10F1	Error settings
10F3	Diagnosis history
10F8	Timestamp object
1Ann	PDO mapping TxPDO
1C00	Sync manager type
1C12	Sync manager 2 assignment
1C13	Sync manager 3 assignment
1C32	SM output parameter
1C33	SM input parameter
F000	Modular device profile
F100	Device state
F800	Device settings

6.2 Module-specific CoE objects

Objects with a module-specific design are described in the following table.

Index (hex)	Object name	Data type	Direction	Error, warning, information	Diagnostic number, description	Unit
6000	Channel 1, 2, 3, 4					
6010						
6020						
6030						
60x0:01	Value	Int16	IN	–	–	µA
60x0:02	Wire break	Bit	IN	W	0x2360	–
60x0:03	Overrange	Bit	IN	W	0x8910	–
60x0:04	Limit 1	2Bit	IN	–	Bit0: Value ≤ Limit 1 Bit1: Value ≥ Limit 1	–
60x0:06	Limit 2	2Bit	IN	–	Bit0: Value ≤ Limit 2 Bit1: Value ≥ Limit 2	–
A000:0	Material number	String(20)	IN	–	–	–
A010:0	Full serial number	String(20)	IN	–	–	–
F100:01	Periphery voltage ok	Bit	IN	I	0x3400	–
F100:02	Error	Bit	IN	E	0x1000	–

6.3 COE objects for parameterization

The module can be parameterized using these objects. Each channel can be freely parameterized. The initial value for the objects is "0" or "false".

⚠ The module does not permanently save the parameter values. To automatically apply the settings required upon each bus start, set the values in the start parameters of the engineering.

Index (hex)	Object name	Data type	Access	Unit	Description
8000	Channel 1, 2, 3, 4 settings				
8010					
8020					
8030					
80x0:01	User gain	Int32	RW	–	–
80x0:02	User offset	Int16	RW	–	–
80x0:03	Limit 1	Int16	RW	µA	–
80x0:04	Limit 2	Int16	RW	µA	–
80x0:05	User scale enable	Bit	RW	–	Enabling the User Scale calculation
80x0:06	Limit 1 enable	Bit	RW	–	Enabling of limit value check "Limit 1"
80x0:07	Limit 2 enable	Bit	RW	–	Enabling of limit value check "Limit 2"
80xE:01	ADC Raw value	Int16	RO	–	–
F800	Device Settings				
F800:01	Oversampling factor	3Bit	RW	–	Oversampling Rate (0, 2, 4, 8, 16, 32, 64)

7 Process data of the module

The module has data that is inserted into the cyclic process data image. Depending on the setting "Standard" or "compact", the module is represented as shown in the following tables.

Diagnostic information can also be retrieved via acyclic services using CoE. They are shown as indices 80x0 (hex) (see → Chapter 6.2 "Module-specific CoE objects" on page 4). The current values as well as the diagnostic data can be shown and hidden in the Engineering. This allows to reduce the amount of data in the application.

Process data consists of the value and the diagnostic data in the standard representation:

Word 1	IN	Channel 1 Value
Word 2	IN	
Byte 1	IN	
Bit 0	IN	Channel 1 Wire break
Bit 1	IN	Channel 1 Overrange
Bit 2-3	IN	Channel 1 Limit 1
Bit 4-5	IN	Channel 1 Limit 2
Word 3	IN	Channel 2 Value
Word 4	IN	
Byte 1	IN	
Bit 0	IN	Channel 2 Wire break
Bit 1	IN	Channel 2 Overrange
Bit 2-3	IN	Channel 2 Limit 1
Bit 4-5	IN	Channel 2 Limit 2
Word 5	IN	Channel 3 Value
Word 6	IN	
Byte 1	IN	
Bit 0	IN	Channel 3 Wire break
Bit 1	IN	Channel 3 Overrange
Bit 2-3	IN	Channel 3 Limit 1
Bit 4-5	IN	Channel 3 Limit 2
Word 7	IN	Channel 4 Value
Word 8	IN	
Byte 1	IN	
Bit 0	IN	Channel 4 Wire break
Bit 1	IN	Channel 4 Overrange
Bit 2-3	IN	Channel 4 Limit 1
Bit 4-5	IN	Channel 4 Limit 2
Word 9	IN	
Byte 1	IN	
Bit 0	IN	Periphery voltage ok
Bit 1	IN	Error

Table 1: Standard representation

To directly arrange the status bits one after another and thus to reduce the amount of filling bites, select "Channel x compact" as well as "Device state compact" in the Engineering.

Process data consists of the input value and the diagnostic data in the "Compact" representation:

Word 1	IN	Channel 1 Value
Word 2	IN	Channel 2 Value
Word 3	IN	Channel 3 Value
Word 4	IN	Channel 4 Value
Word 5	IN	
Byte 1	IN	
Bit 0	IN	Periphery voltage ok
Bit 1	IN	Error
Bit 2	IN	Channel 1 Wire break
Bit 3	IN	Channel 1 Overrange
Bit 4-5	IN	Channel 1 Limit 1
Bit 6-7	IN	Channel 1 Limit 2
Byte 2	IN	
Bit 2	IN	Channel 2 Wire break
Bit 3	IN	Channel 2 Overrange
Bit 4-5	IN	Channel 2 Limit 1
Bit 6-7	IN	Channel 2 Limit 2
Word 6	IN	
Byte 1	IN	
Bit 2	IN	Channel 3 Wire break
Bit 3	IN	Channel 3 Overrange
Bit 4-5	IN	Channel 3 Limit 1
Bit 6-7	IN	Channel 3 Limit 2
Byte 2	IN	
Bit 2	IN	Channel 4 Wire break
Bit 3	IN	Channel 4 Overrange
Bit 4-5	IN	Channel 4 Limit 1
Bit 6-7	IN	Channel 4 Limit 2

Table 2: "Comact" figure

8 Diagnostic strategy

8.1 Mechanisms

Different mechanisms are used for the diagnostics of the module.

Mechanism	Diagnostics
EtherCAT state machine	EtherCAT system diagnostics
EtherCAT hardware watchdog	
Diagnostic objects in the CoE object directory	Extended diagnostics, e.g. peripheral errors
10F1	Error settings
Diagnosis history object	20 diagnostic messages can be stored
10F3	Diagnosis history
Module status LED	Shows the general module status
Channel status LED	Signals the channel status or the error states

8.2 Diagnosis history 10F3_{hex}

The object 10F3_{hex} is implemented as ring memory into the "Overwrite mode". The latest 20 diagnostic messages are stored. Older messages are deleted.

The following table shows the structure of a diagnostic message of the bus coupler for EtherCAT.

Index (hex)	Sub-index	Object name	Data type	Length	Rights	Meaning
10F3		Diagnosis history				Diagnostic statistics
	01	Maximum messages	UINT8	1	R	Maximum number of messages
	02	Newest message	UINT8	1	R	Latest message
	03	Newest acknowledged message	UINT8	1	R/W	Latest confirmed message. Writing "0" deletes the messages in the ring memory.
	04	New messages available	Boolean	0.1	R	New message available
	05	Flags	UINT8	2	R/W	Setting of the object response. Refer to ETG.1020

8.3 Status codes

EtherCAT transfers diagnostic messages via the "Diagnostic History" functionality.

Error, warning, information	Text ID (hex)	Text
E	0x1000	Module error (internal error, temperature, sum error bit is set)
W	0x2360	Wire break at channel x (channel number is transferred)
I	0x3400	Peripheral supply voltage (U _P) missing
W	0x8910	Range exceedance at channel x (channel number is transferred)
W	0x8920	Range at channel x too low (channel number is transferred)

The diagnostics "Wire break" is run channel-granularly. Individual channels can be switched off. Then, no diagnostics is run.

If an error is not present anymore, a respective "Info" message was sent with identical text and note "[OK]".

8.4 Module status LED

Device state	LED flashing pattern
Booting	BU BU BU BU BU -- -- -- -- -- ↷
Initialization	BU BU BU BU BU BU BU BU BU BU BU ↷
It is currently configured. Module not yet ready.	GN GN GN GN GN -- -- -- -- -- ↷
Process data transmission, outputs inactive.	GN GN GN GN GN GN GN GN GN GN -- -- -- -- -- ↷
Module in "Run" state	GN GN GN GN GN GN GN GN GN GN GN ↷
Error and warning states	
Logic or peripheral voltage error	RD RD RD RD RD RD RD RD RD RD RD ↷
Communication or configuration error	RD RD RD RD RD -- -- -- -- -- ↷

Table 3: Module status LED (diagnostic and device status)

8.5 Channel status LED

Each input channel of the module is provided via a channel status LED at the plug. Refer to Chapter 3.2 "Clamping point assignment" on page 1.

Meaning of the channel LED

LED	Meaning
Red	Signal error: Overrange or underrange or wire break

LED	Meaning
off	No signal error

Table 4: Channel status LED

9 Installation

9.1 Connection instructions

Differential input and potential reference

For analog inputs, there are differential inputs without a reference to an external mass. Thus, note that the "Common Mode" - the average value of the signals at the + and - input is not higher compared to the internal mass U_P GND than the values specified in the technical data.

For the single-ended connection of 2- or 3-conductor sensors, connect the "-" input with U_P GND.

Cable and shielding

NOTICE

Electronic damages and measuring errors

Unshielded cables can cause that tolerance limits are easily exceeded in an environment prone to interferences.

Always connect the analog sensors with shielded cables twisted in pairs.

Connect the cable shielding to the functional earth immediately after entering the control cabinet. Route the cable with its shielding up to the module. The signal cables should be routed the shortest possible without shielding.

For the best connection directly in front of the module, the shield connection set (R911173030) is provided together with the busbar (R911173283).

9.2 Connection examples

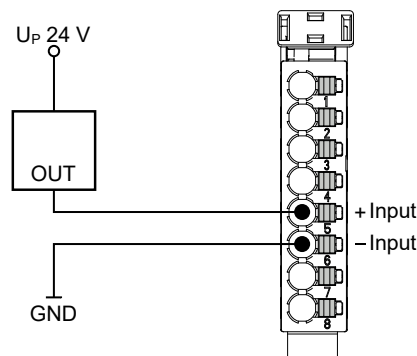


Fig. 7: 2-wire sensor

Connect "-" Input" of the module to GND.

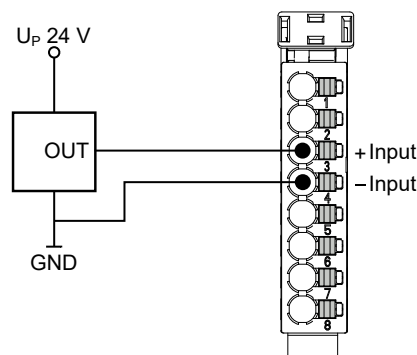


Fig. 8: 3-wire sensor

Connect "-" Input" of the module to the sensor GND.

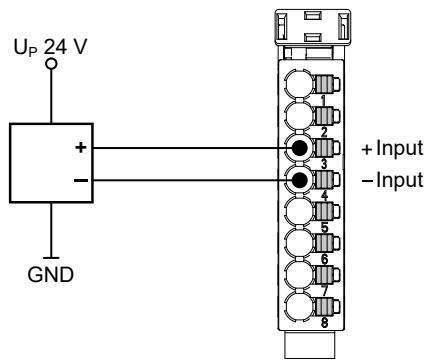


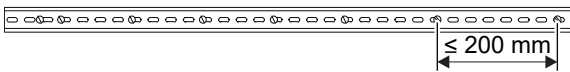
Fig. 9: 4-wire sensor

It is recommended to use the same supply for the voltage supply of the sensor as for U_p of the module. The connection via the potential distribution terminals XI821116, XI822116 or XI824116 is the recommended connection.

9.3 Installation notes

NOTICE
Device destruction due to electrostatic discharge
 The device contains components that can be damaged or destroyed by electrostatic discharge. Comply with the required safety measures against electrostatic discharge (ESD) acc. to EN 61340-5-1 when operating the module.

- Mounting location
 The module has the degree of protection IP 20 and is thus intended for use in a closed control cabinet or control box (terminal box) with the degree of protection IP 54 or higher. The control cabinet has to be provided with sufficient stability and rigidity (acc. to UL 61010-1, 61010-2-201).
- End clamps
 Fasten end clamps of the type SUP-M01-ENDHALTER (R911170685) on both sides of the station. End clamps ensure the correct fastening on the support rail and are used as lateral end elements. Always fasten one end clamp of the station before mounting the station. This ensures the following:
 - It impedes the shifting of the modules
 - The installation place for the end clamps is secured.
- Support rail
 Mount the module on a 35 mm standard support rail. Use only a TH 35-7.5 support rail acc. to EN 60715. The fastening distance of the support rails may not exceed 200 mm. This distance is required to ensure stability while mounting and dismantling the module.



- Provide the following minimum distances for sufficient cooling:

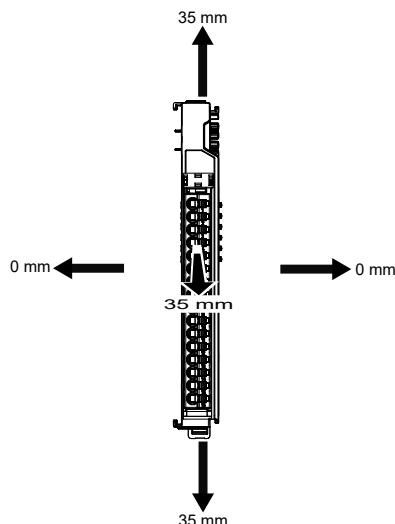


Fig. 10: Ventilation distance

- Additionally, provide sufficient distance for mounting, dismounting, plugs and cables.
- If more devices are connected in series to the station on the left or right, the surface temperature may not exceed 60°C
- In case of a several line design, the supply air has to be measured under each line and its limit value may not be exceeded. For the permitted ambient temperatures, refer to the chapter "Ambient conditions".

9.4 Mounting the ctrlX I/O module

NOTICE
Damage of the device by plug mounting under voltage!
 Disconnect the module and all connected module components from voltage before mounting or dismantling.

NOTICE
Possible damage to property due to unintended mounting of the support rail

- Connect the support rail to a functional ground.
- Mount the module on a support rail.
- Install the module in a control cabinet or an appropriate housing.

NOTICE
Module is not fixed correctly due to engaged support arm mounting!
 Before mounting, ensure that the support arm mounting of the control is not in open position. If required, release the clamping of the open position using the locking lever, refer to the following figure 11.

NOTICE
Damage of the device by short circuit of patch connectors
 There is an endcover on the right of the bus coupler upon delivery. Remove this endcover to connect the modules in series at the bus coupler. Position the endcover on the last module of the station to protect it against short circuit and contamination.

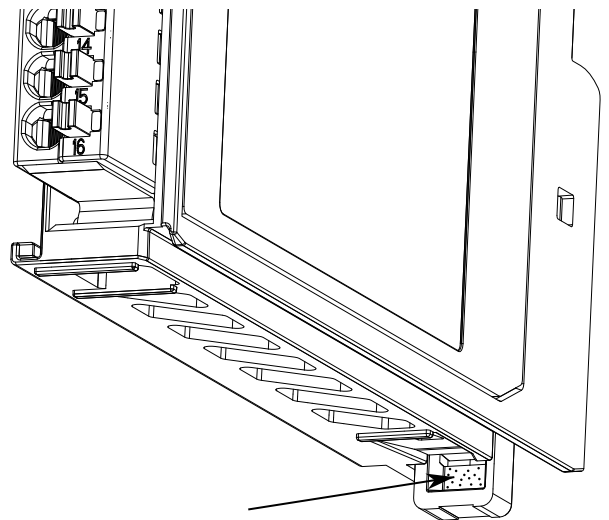


Fig. 11: Locking lever to release the clamping of the open position

Each module has to be snapped separately.

9.5 Positioning connector

1. Position the connector on the connector holder, see ①.
2. Engage the connector, see ②.

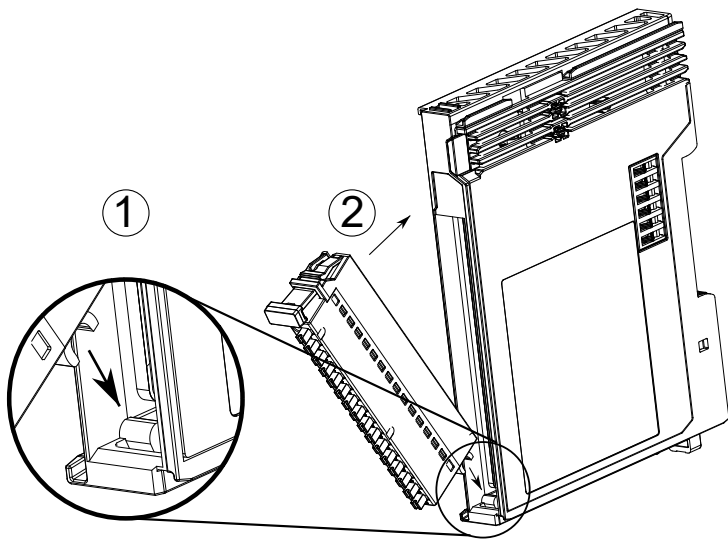


Fig. 12: Positioning connector

9.6 Notes on the electrical connection

- For the front connector, one-wire cables and stranded cables can be used with or without wire end ferrule (acc. to DIN 46228). These wire end ferrules can be with or without plastic collar. The contact surface has to be 8 mm.
- The wire ends may not have any burrs.
- The cable cross-section allowed is between 0.25 mm² and 1.5 mm² (AWG 24 to 16).
- The stripping length is 8 mm.
- To use stranded cables without wire end ferrules, twist the strand between 180° and 360°. The stripped area has to be 8 mm after twisting. If stranded cables are introduced, keep the pushbutton of the push-in terminal pressed.
- To remove the cables, press the pushbutton of the push-in terminal.
- To guarantee an UL/CSA-compliant operation, the following conditions have to be met:
 - Use only insulated copper wires suitable for at least 60 °C

9.7 Dismounting module

⚠ For dismounting, use a common tool such as a slotted screwdriver with a 2.5 mm blade.

NOTICE

Destruction of components and devices due to mounting and dismounting under voltage!

Disconnect the module and all connected module components from voltage before mounting or dismounting.

Removing module from support rail

1. ➤ Use a suitable tool (e.g. slotted screwdriver) and put it into the lower disengaging mechanism (base latch) of the module and disengage the module (see (A) in the following figure). The base latch is locked in the open position.
2. ➤ Remove the module vertically to the support rail [see (B) in the following figure].

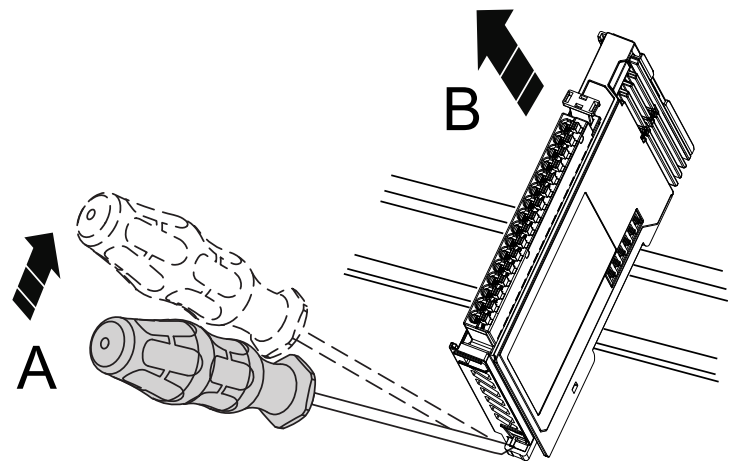


Fig. 13: Removing module from support rail

⚠ Before mounting the module on the support rail again, release the clamping of the open position again. Press the locking lever, refer to the figure 11.

10 EtherCAT®



The ctrlX I/O modules use EtherCAT® technology. "EtherCAT®" is a registered trademark and patented technology licensed by the Beckhoff Automation GmbH, Germany. EtherCAT is an open, internationally standardized standard and developed further by the "EtherCAT Technology Group" (ETG).

