Technical Guide - Hardware

MiNexx Indicator

NICL

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Foreword

Must be followed!

Any information in this document is subject to change without notice and does not represent a commitment on the part of Minebea Intec unless legally prescribed. The product must only be operated by trained operating personnel. Installation and commissioning must only be performed by trained specialist personnel. In correspondence concerning this product, the type, name, and release number/serial number as well as all license numbers relating to the product must be cited.

Note

Table of contents

1 Introduction

1.1 Documentation overview

The full documentation can be found on the Minebea Intec website https://manuals.minebea-intec.com:

- Technical manual – Hardware for Minebea Intec indicator
- Technical manual – Firmware for Minebea Intec indicator
- Operating instructions for the application software

Technical manual – Hardware

The document describes the hardware for the Minebea Intec indicator in detail.

Technical manual – Firmware

The document describes the operation of the Minebea Intec indicator in detail.

Operating instructions for the application software

The document provides a detailed description of the operation of the currently installed application.

1.2 Read the safety instructions and the documentation

The following documents are included with the Minebea Intec product in printed form:

– Safety instructions

Please read the safety instructions and the documentation before using the product.
These are part of the product. Keep the safety instructions in a safe and easily accessible location.

1.3 This is what instructions look like

1. - n. are placed before steps that must be done in sequence.

▶ is placed before a step.

▷ describes the result of a step.

1.4 This is what lists look like

– indicates an item in a list.

1.5 This is what warnings look like

Signal words indicate the severity of the danger involved if measures for preventing hazards are not followed.

⚠ DANGER

Warning of personal injury
DANGER indicates that death or severe, irreversible personal injury will occur if appropriate safety measures are not observed.

▶ Take appropriate safety measures.

⚠ WARNING

Warning of hazardous area and/or personal injury
WARNING indicates that death or severe, irreversible injury may occur if appropriate safety measures are not observed.

▶ Take appropriate safety measures.

⚠ CAUTION

Warning of personal injury.
CAUTION indicates that minor, reversible injury may occur if appropriate safety measures are not observed.

▶ Take appropriate safety measures.

NOTICE

Warning of damage to property and/or the environment.
NOTICE indicates that damage to property and/or the environment may occur if appropriate safety measures are not observed.

▶ Take appropriate safety measures.

Note: User tips, useful information, and notes.

1.6 Support

Telephone Bovenden: +49.551.30983.111
Telephone Hamburg: +49.40.67960.444
Email: help@minebea-intec.com

2 Safety instructions

2.1 General instructions

The device complies with the directives and standards on electrical equipment, electromagnetic compatibility, and the prescribed safety requirements. However, improper use can cause injury to persons and damage to property.

The device was in perfect condition with regard to safety features when it left the factory.

– To maintain this condition and to ensure safe operation, the user must follow the instructions and observe the warnings in this manual.

2.2 Intended use

The device is exclusively intended for use in weighing and dosing systems, and is particularly suitable for tank and vessel scales, truck scales, platform scales, crane scales, dosing systems and as a weight indicator in intelligent control systems.
Installation must only be performed by trained electricians.
Device maintenance and commissioning must only be performed by trained specialists.

2.3 Non-intended use

The indicator must only be used as intended in order to prevent malfunctions and faults.

2.4 Exclusion of liability

The device reflects the state of the art.

No warranty is given that the device is free of faults, especially not in conjunction with third-party software and hardware components required for operation.

The manufacturer does not accept any liability for damage caused by third-party system components and/or due to incorrect use of the device. The use of this device signifies recognition of the stipulations listed above.

2.5 Target groups

Trained specialists

Employees that perform the commissioning and maintenance of the weighing technology and have received comprehensive training therein.

Trained electricians

Employees that perform the installation of the weighing technology and have received comprehensive training therein.

2.6 Initial inspection

Check the contents of the consignment for completeness. Inspect the contents visually to determine whether any damage has occurred during transport.
If there are grounds for rejection of the goods, a claim must be filed with the carrier immediately. A Minebea Intec sales or service organization must also be notified.

2.7 Before commissioning

Before commissioning, as well as after storage or transport, inspect the device visually for signs of mechanical damage.

- The device should not be put into operation if it displays signs of visible damage and/or is defective.

2.7.1 Installation

The device must be installed in an EMC-compliant manner.

To ensure proper cooling of the device, make sure air circulation around the device is not blocked. Always maintain a distance of at least 10 cm. Avoid exposing the instrument to excessive heat, e.g., from direct sunlight and vibrations. The ambient conditions specified under Ambient conditions must be taken into account at all times.

2.7.2 Use in hazardous areas

The NICL indicator must not be used in hazardous areas.

2.7.3 Failure and excessive stress

If safe operation of the device no longer appears to be possible, shut it down and make sure it cannot be used.

Safe operation is no longer ensured if any of the following is true:

- The device is physically damaged.
- The device has been incorrectly connected.
- The device has been operated with the incorrect supply voltage.
- The device has been subjected to stresses beyond the tolerance limits (e.g., during storage or transport).

2.7.4 For special attention

All inputs and outputs (with the exception of supply voltage) must be supplied via SELV/PELV – Limited Energy of UL-CSA-IEC EN 61010-1or Limited Power Source of UL-CSA-EN IEC 62368-1.
Make sure that the construction of the device is not altered to the detriment of safety. In particular, the leakage paths, safety distances (parts leading from the supply voltage) and clearances must not be impaired in any way.
Minebea Intec cannot be held responsible for personal injury or property damage caused by a device being repaired incorrectly by an operator or installer.

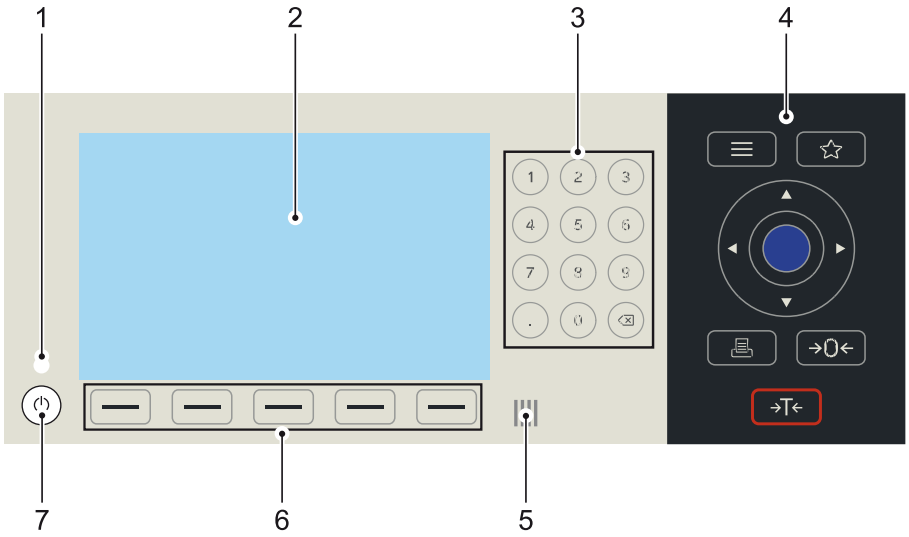
3 Device description

3.1 General description

MiNexx NICL is a weight indicator in a table-top housing.
A maximum of three scales can be connected.
The device is equipped with a TFT color display for the display, and a keypad (membrane keypad) for operation.
The keypad and the display form one unit with the front.
The cables for the supply voltage, interfaces, etc. are connected at the back of the housing via M12 connectors or through cable glands.
There are various option cards available, which can be integrated into the device (maximum of 5) as required. The type of option card installed determines the connections available and their assignment.

3.2 Hardware construction

3.2.1 Device front

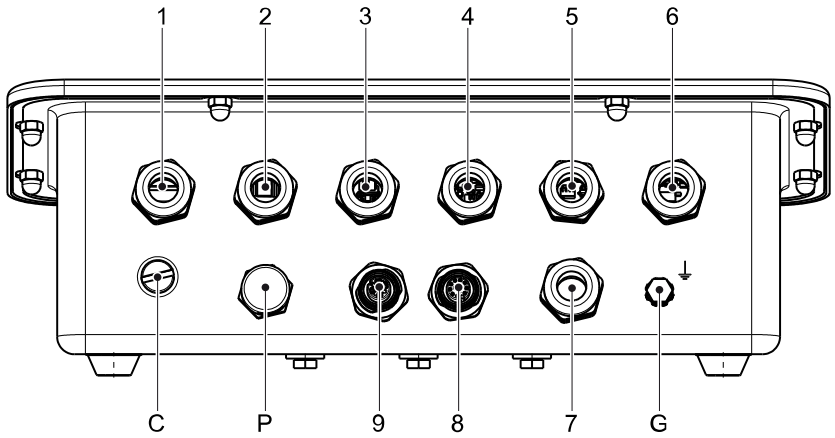


Pos.	Name
	Display elements
1	Power LED
2	TFT color display 5.0"
	Operating elements
3	Numpad
4	Keypad
6	Soft keys
7	On/off button
	Other
5	NFC

Note:
The device front can be installed in two directions. For wall mounting, the underside of the display points in the direction of the cable glands. When using as a table-top device, it is rotated 180°.

3.2.2 Overview of connections

The following connection options are located on the back of the device:



Pos.	Cable gland	Function	Connection
1	M16 or M20 (bored)	Analog weighing electronics board (in slot 1)	Open cable ends or cable according to ordering option
2	M16 or M20 (bored)	Analog weighing electronics board or digital weighing electronics board or option card in slot 2	Open cable ends or cable according to ordering option
3	M16	Analog weighing electronics board or digital weighing electronics board or option card in slot 3	M12 or cable according to ordering option
4	M16	Option card in slot 4	M12 or cable according to ordering option
5	M16	Ethernet	M12 or cable according to ordering option
6	M16	Power supply	Open cable ends
7	M16	Fieldbus 1	M12 or cable according to ordering option
8	M16	Fieldbus 2 or USB 2	M12 or cable according to ordering option
9	M16	USB 1	M12 or cable according to ordering option
C		Menu lock switch (CAL-1)	
P		Pressure compensation element	
G		Functional ground	

If there is no option available for a connection position, the position is sealed at the factory with a blanking plug.

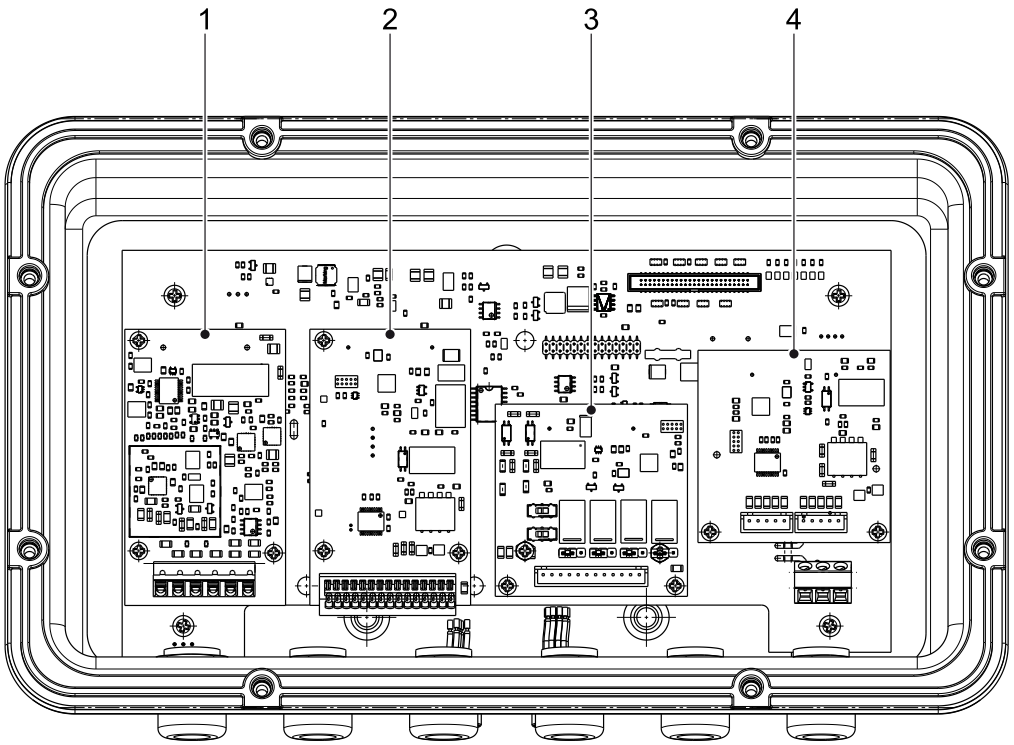
> **Note:**
>
> When using cable glands, the cables can be run through cable glands that correspond to the relevant cable diameter.

3.2.3 Internal slots

The device has 5 internal slots:

- Slots 1...4 on the top
- FB slot for fieldbus on the bottom

Slots 1...4 are shown in the following diagram:



The slots can be used for Option cards as follows:

Option card/slot	1	2	3	4	FB
Analog weighing electronics board	✗	✗			
Digital weighing electronics board	✗	✗	✗		
Interface RS-232/485		✗	✗	✗	
Analog inputs and outputs		✗	✗	✗	
Digital inputs and outputs (2 IN/4 OUT)		✗	✗	✗	
Digital inputs and outputs (4 IN/6 OUT)		✗	✗	✗	
Fieldbus module					✗

> **Note:**
> xBPI scales are connected to the digital weighing electronics board.
> It is not possible to connect to the option card RS-232/485 (option C2/C3/C4 for RS-232, DA2/DA3/DA4 or DB2/DB3/DB4 for RS-485).

3.3 Power supply and protective grounding conductor

3.3.1 Power supply version 100–240 V AC

Inside the device, the 100–240 V AC power supply is connected via a 3-pin terminal strip, which is located on the device's mainboard. According to the selected ordering option, a cable is connected for this purpose and routed out of the device through position 6 (see Overview of connections).
The device is protected (primary side) via two fuses and is equipped with a wide range power supply.
The power supply is protected against short circuits and overloads, and disconnects automatically in case of a fault.

> **Note:**
> For technical data, see Supply voltage version 100–240 V AC.

Protective grounding conductor

The protective grounding conductor PE is connected to the device in the housing.

Option: open cable ends (L10)

Pin assignment

Wire color	Code	Name	Description
Blue	bu	N	Neutral conductor
Yel-low-green	ye-gn	PE	Protective grounding con-ductor/functional ground
Brown	bn	L	Live conductor

Note:

- An external disconnecting device (power switch) must be provided and easy to reach.
- The disconnecting device must be rated for the input current of the device.
- A back-up fuse with maximum 16 A is required.

Option: power plug (EU, GB, US, CH, DK, IT)

Note:

- The power plug must be easy to reach.
- To disconnect the device from the power supply, remove the plug con-nector.

3.3.2 Power supply version 24 V DC

The 24 V DC power supply is connected inside the device via a 3-pin terminal strip, which is located on the device's mainboard. According to the selected ordering option, a cable is connected for this purpose and routed out of the device through position 6 (see Overview of connections).
The device is protected (primary side) via two fuses and against incorrect polarity.

> **Note:**
>
> The device may only be operated with a 24 V power supply that meets the following requirements:
>
> "Class 2 of NEC or SELV/PELV – Limited Energy of UL-CSA-IEC EN 61010-1or Limited Power Source of UL-CSA-EN IEC 62368-1"

> **Note:**
> For technical data, see Supply voltage version 24 V DC.

Protective grounding conductor

The protective grounding conductor PE is connected to the device in the housing.

Option: open cable ends (L20)

Pin assignment

Wire color	Code	Name	Description
Blue	bu	+	+24 V DC
Yel-low-green	ye-gn	PE	Protective grounding con-ductor/functional ground
Brown	bn	GND	GND

> **Note:**
>
> - An external disconnecting device (power switch) must be provided and easy to reach.
> - The disconnecting device must be rated for the input current of the device.

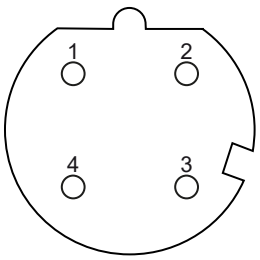
3.4 Network connection

The device contains an Ethernet interface, which can be optionally routed out of the device through position 5 (see Overview of connections).

Technical data

Name	Data
Connection Position 5	M12 plug connector, female (B10) M16 cable gland: – Cable to RJ45 plug connector (B11)
Transfer rate (baud rate)	Auto-detection: 10 Mbps or 100 Mbps, full or half duplex
Electrical isolation	Yes
Cable type	Minimum CAT 5, screened
Max. cable length	100 m

Pin assignment M12 plug connector, female (option B10)

Plug connector, female D-coded	Pin	Signal
	1	TD+
	2	RD+
	3	TD-
	4	RD-

NOTICE

IT operations halted due to corrupted data.

Protect the network against unauthorized access.

▶ Always observe the Chapter “Network security” in the Technical manual – Firmware.

> **Note:**
> For information on setting up the network, see “Network settings” in the Technical manual – Firmware.

3.5 USB port

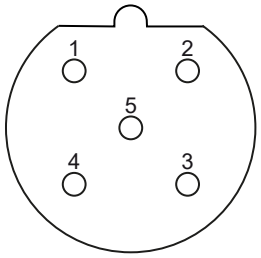
The device contains two USB interfaces, which can be optionally routed out of the device through position 8 and 9 (see Overview of connections). Furthermore, the function of the USB interfaces is determined by the selected ordering option.

Interface	Host function		Device function
USB 1	U1H	U2H	U1D
USB 2	–	U2H	–

Technical data

Name	Data
Connection USB 1 Position 9	M12 plug connector, female (U10) M16 cable gland: – Cable to USB-A plug connector, female (U11)
Connection USB 2 Position 8	**Host function only** M12 plug connector, female (U20) M16 cable gland: – Cable to USB-A plug connector, female (U21)
Max. current	I_{max} = 200 mA; protected against short circuit
Max. cable length	2 m

Pin assignment M12 plug connector, female (option U10, U20)

Plug connector, female B-coded	Pin	Signal	Name
	1	D+	Data +
	2	D-	Data -
	3	VBUS	+5 V DC
	4	GND	Ground
	5	–	–

Note:
The suspend function (see Chapter “Operating & display” in the Technical manual – Firmware) cannot be guaranteed if a load that requires a current of >200 mA is connected by USB.
Furthermore, exceeding the maximum current may damage the device and cause it to malfunction.

3.6 Option cards

3.6.1 General instructions

The options must only be operated with SELV/PELV energy/power limitation.

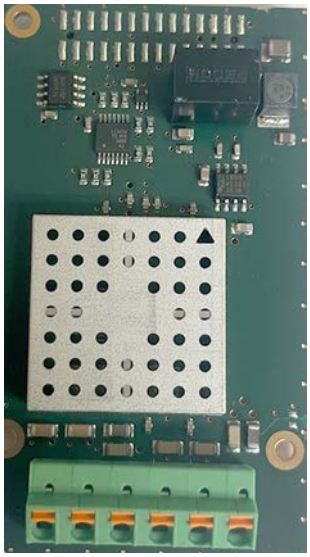
> **Note:**
>
> The device may only be operated with a 24 V power supply that meets the following requirements:
>
> “Class 2 of NEC or SELV/PELV – Limited Energy of UL-CSA-IEC EN 61010-1or Limited Power Source of UL-CSA-EN IEC 62368-1”

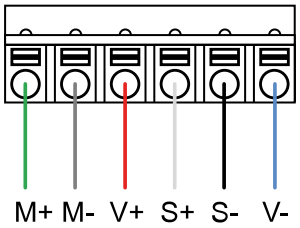
3.6.2 “Efficiency” analog weighing electronics board

The analog weighing electronics board is required to connect a scale to DMS load cells.
The connection to the “Efficiency” weighing electronics board can be made using a cable of max. 10 m length.
For this purpose, software is used to set up a weighing point in the device.
The calibration data and parameters for the weighing point are permanently stored in the EAROM (non-volatile memory).

> **Note:**
> The load cells can be powered externally. In this case, only the sense and measurement lines are connected to the plug connector.

> **Note:** For information on setting up the weighing point, see Chapter “Analog weighing point” in the Technical manual – Firmware.





Technical data

Name	Data
Load cell supply	U_{DC} = ±5 V
Measuring input signal range	0 mV...30 mV
Smallest permissible input signal per verification scale interval*	0.44 µV/e (class 3); 1 µV/e (class 4)
Max. quantity of verification scale intervals*	10,000 (class 3); 1000 (class 4)
Load cell impedance range	75...1200 Ω
Fraction of the error limit	0.5
Cable length in relation to cable cross section*	≤110 m/mm^2 (class 3) ≤1000 m/mm^2 (class 4)
Max. voltage at sense input	U_{DC} = 5 V with monitoring
Electrical isolation	no
*Class relevant for verification requirements	

Connections	
Connection Position 1	M16 cable gland: – Internal terminal strip (WA12) – Cable to 12-pin round socket (WA11)

Name	Data
	M20 cable gland: – Internal terminal strip (WA13) Screen connection in the cable gland
Connection Position 2	M16 cable gland: – Internal terminal strip (WA22) – Cable to 12-pin round socket (WA21) M20 cable gland: – Internal terminal strip (WA23) Screen connection in the cable gland
Connection of connection/load cell cable	6-wire or 4-wire (with additional bridges)
Cable(s)	See accessory documentation

Absolute maximum ratings	
Sense voltage	±10 V

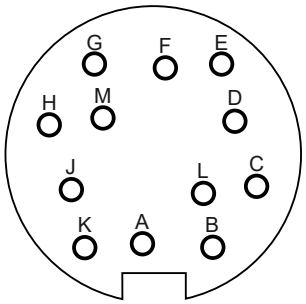
Note:
Loads that exceed the values specified under “absolute maximum ratings,” can cause permanent damage to the device. The function and reliability of the device cannot be guaranteed if it is used under different conditions than those specified under “Technical data.”

Pin assignment terminal strip (option WA12/WA13, WA22, WA23)

Terminal	Signal	Connection	Description	Wire color Minebea Intec
1	M+	+ Meas.	+ Signal/LC output	green
2	M-	– Meas.	– Signal/LC output	gray
3	V+	+ Supply	+ Supply/excitation	red
4	S+	+ Sense	+ Sense	white
5	S-	– Sense	– Sense	black
6	V-	– Supply	– Supply/excitation	blue

Note:
Do not shorten the load cell cable. Connect the prepared cable end and roll up the remaining cable.

Pin assignment 12-pin round socket (option WA11, WA21)

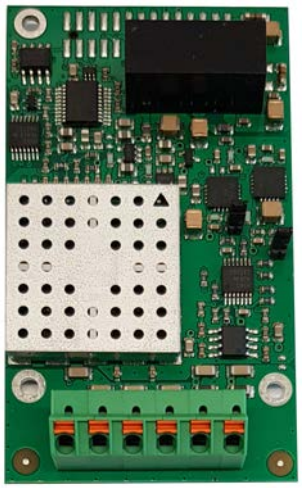
Plug connector, female	Pin	Signal	Connection
	B	S+	+ Sense
	C	V+	+ Supply
	D	V-	– Supply
	E	S-	– Sense
	H	M-	– Meas.
	J	M+	+ Meas.

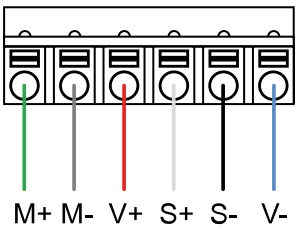
3.6.3 “Performance” analog weighing electronics board

The analog weighing electronics board is required to connect a scale to DMS load cells.
The connection to the “Performance” weighing electronics board can be made using long cables, see Technical data.
For this purpose, software is used to set up a weighing point in the device.
The calibration data and parameters for the weighing point are permanently stored in the EAROM (non-volatile memory).

> **Note:**
> The load cells can be powered externally. In this case, only the sense and measurement lines are connected to the plug connector.

> **Note:** For information on setting up the weighing point, see also Chapter “Analog weighing point” in the Technical manual – Firmware.





Technical data

Name	Data
Load cell supply voltage	U_{DC} = 10 V (±5 V)
Measuring input signal range	0 mV...30 mV
Smallest permissible input signal per verification scale interval	0.5 µV/e
Max. quantity of verification scale intervals	10,000 (class 3); 1000 (class 4) (Class relevant for verification requirements)

Name	Data
Load cell impedance range	75...1200 Ω
Fraction of the error limit	0.5 (relevant for verification requirements)
Cable length in relation to cable cross section	≤1000 m/mm^2
Max. voltage at sense input	U_{DC} = ±6 V
Electrical isolation	Yes
Connections	
Connection Position 1	M16 cable gland: – Internal terminal strip (WA12) – Cable to 12-pin round socket (WA11) M20 cable gland: – Internal terminal strip (WA13) Screen connection in the cable gland
Connection Position 2	M16 cable gland: – Internal terminal strip (WA22) – Cable to 12-pin round socket (WA21) M20 cable gland: – Internal terminal strip (WA23) Screen connection in the cable gland
Connection of connection/load cell cable	6-wire or 4-wire (with additional bridges)
Cable(s)	See accessory documentation
Absolute maximum ratings	
Sense voltage	±10 V

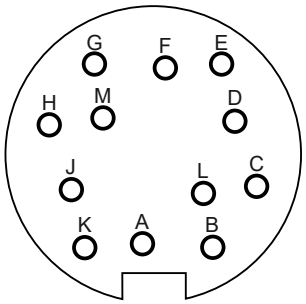
Note:
Loads that exceed the values specified under “absolute maximum ratings,” can cause permanent damage to the device. The function and reliability of the device cannot be guaranteed if it is used under different conditions than those specified under “Technical data.”

Pin assignment terminal strip (option WA12/WA13, WA22, WA23)

Terminal	Signal	Connection	Description	Wire color Minebea Intec
1	M+	+ Meas.	+ Signal/LC output	green
2	M-	– Meas.	– Signal/LC output	gray
3	V+	+ Supply	+ Supply/excitation	red
4	S+	+ Sense	+ Sense	white
5	S-	– Sense	– Sense	black
6	V-	– Supply	– Supply/excitation	blue

Note:
Do not shorten the load cell cable. Connect the prepared cable end and roll up the remaining cable.

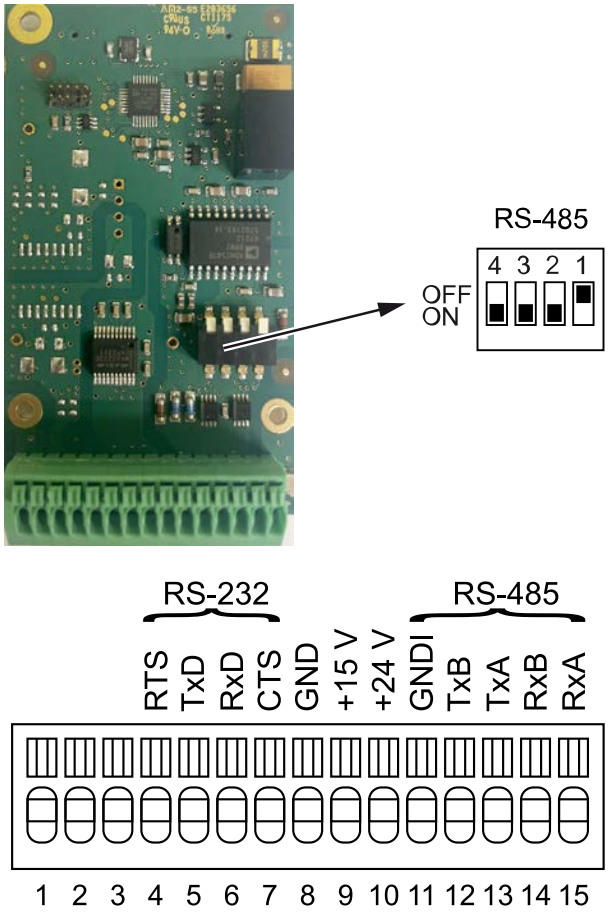
Pin assignment 12-pin round socket (option WA11, WA21)

Plug connector, female	Pin	Signal	Connection
	B	S+	+ Sense
	C	V+	+ Supply
	D	V-	– Supply
	E	S-	– Sense
	H	M-	– Meas.
	J	M+	+ Meas.

3.6.4 Digital weighing electronics board

The digital weighing electronics board is required to connect a digital weighing platform with xBPI protocol.
For this purpose, software is used to set up a weighing point in the device.
The digital weighing electronics board must only be connected using cables that remain within the building and are less than 30 m long.
The weighing platform is connected via RS-232 or RS-485.
Furthermore, the digital weighing electronics board provides a 15 V and 24 V power supply for the weighing platform.

> **Note:** See also, Chapter “Digital weighing point (xBPI)” in the Technical manual – Firmware



Technical data

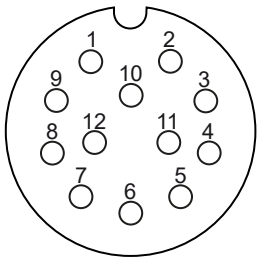
Name	Data
RS-232	
Number of channels	1
Signals	Input: RxD, CTS Output: TxD, RTS
Reference potential	GND
Electrical isolation	no
Configuration	Full duplex
Transfer rate (baud rate)	1200...115.200 bit/s
Input signal level	Logic 1 (high) -3... -15 V Logic 0 (low) +3 to... +15 V
Output signal level	±5.4 V typ.
RS-485	
Number of channels	1
Signals	TxA, RxA, TxB, RxB
Reference potential	GNDI
Electrical isolation	Yes
Configuration	Half duplex (2-wire)
Terminating resistor	The bus is terminated.
Transfer rate (baud rate)	1200...115.200 bit/s
Signal level	Logic 1 (high) 2.4... 3.3 V Logic 0 (low) 0... 0.9 V
Power supply	
Voltage	15 V, 24 V, Selv/Pelv
Current	0.2 A @ 15 V 0.125 A @ 24 V
Reference potential	GND

Name	Data
Connections	
Connection Position 1	M12 plug connector, female (WDI11) M16 cable gland: – Cable to 12-pin round socket RS-232/RS-485 (WDI14/WDI15) Screen connection in the cable gland
Connection Position 2	M12 plug connector, female (WDI21) M16 cable gland: – Cable to 12-pin round socket RS-232/RS-485 (WDI24/WDI25) Screen connection in the cable gland
Connection Position 3	M12 plug connector, female (WDI31) M16 cable gland: – Cable to 12-pin round socket RS-232/RS-485 (WDI34/WDI35) Screen connection in the cable gland

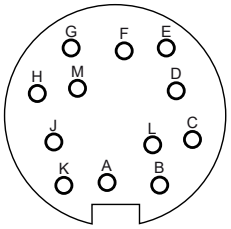
Name	Data
Absolute maximum ratings	
Current @ 24 V	0.5 A
Current @ 15 V	0.5 A
Input signal RS-232	±25 V
Signals RS-485	-9 V...+14 V

Note:
Loads that exceed the values specified under “absolute maximum ratings,” can cause permanent damage to the device. The function and reliability of the device cannot be guaranteed if it is used under different conditions than those specified under “Technical data.”

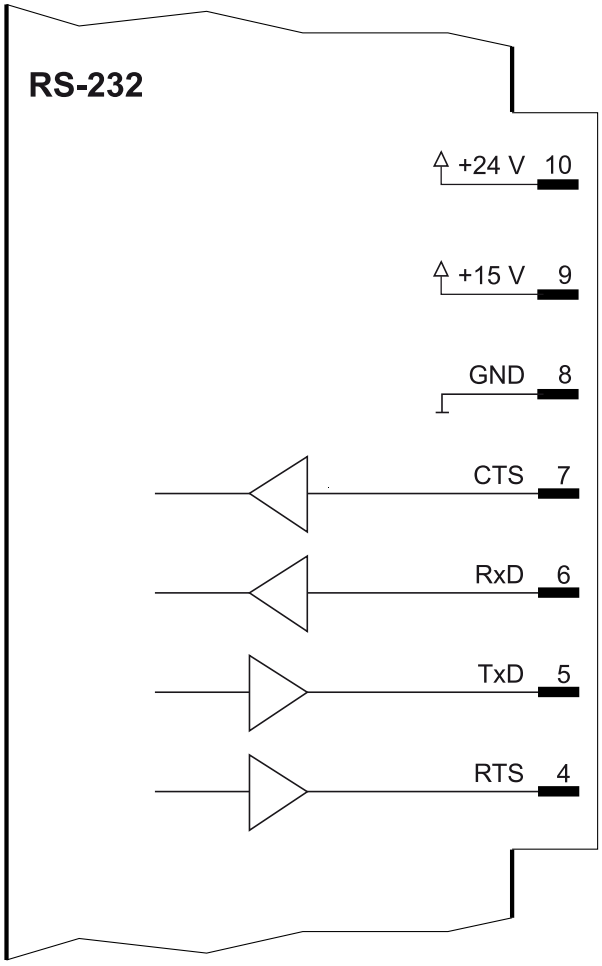
Pin assignment M12 plug connector, female (option WDI11, WDI21, WDI31)

Plug connector, female A-coded	Pin	RS-232	RS-485	IS scale
	1	–	TxA	RxD-TxD-N
	2	RxD	–	–
	3	TxD	–	–
	4	CTS	–	–
	5	RTS		–
	6	–	–	–
	7	GND	GND	GND line
	8	GNDI	GNDI	GND-ISO
	9	15 V	15 V	15 V DC supply
	10	–	TxB	RxD-TxD-P
	11	–	–	–
	12	–	–	–

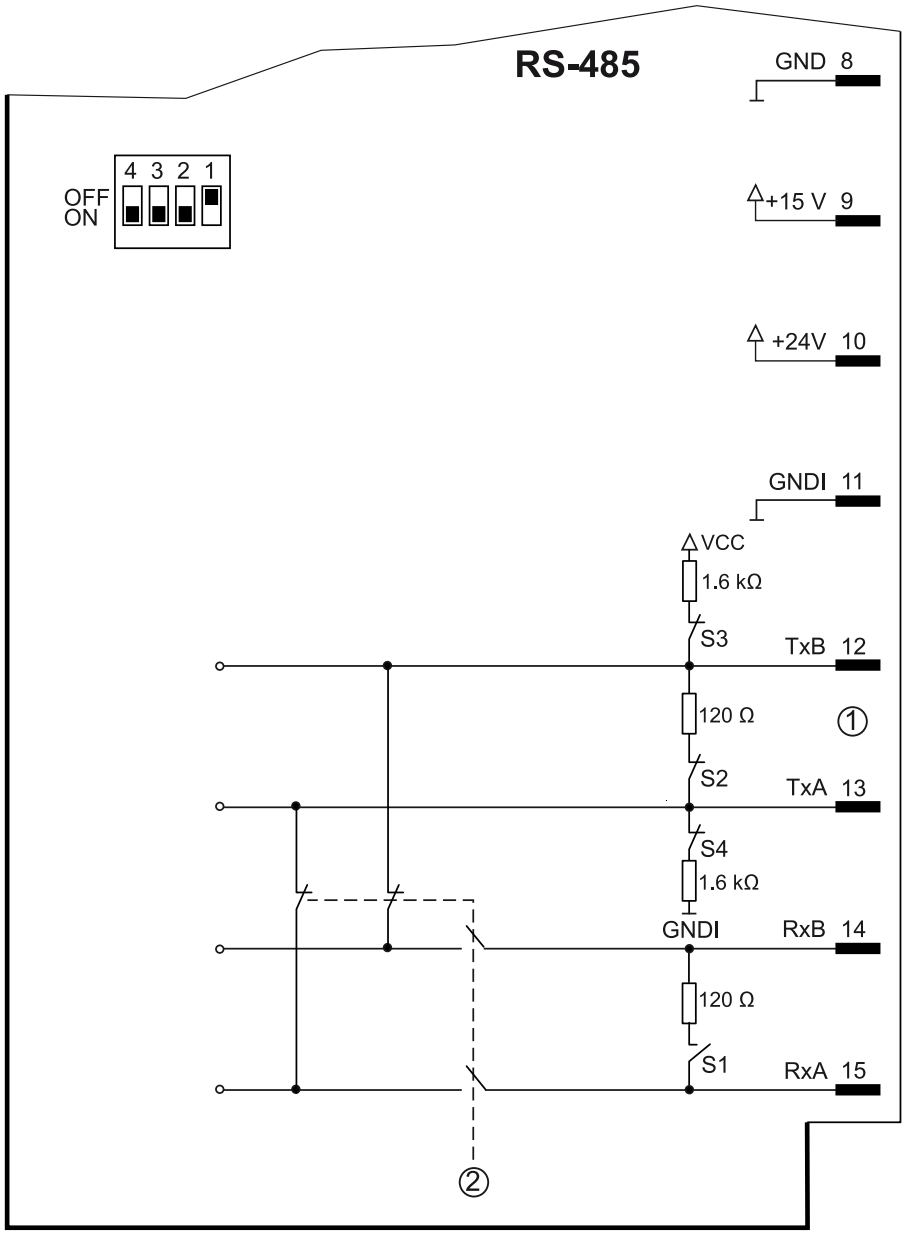
Pin assignment 12-pin round socket option (WDI14/WDI15, WDI24/ WDI25, WDI34/WDI35)

Plug connector, female	Pin	RS-232	RS-485	IS scale
	A	–	TxA	RxD-TxD-N
	B	RxD	–	–
	C	TxD	–	–
	D	CTS	–	–
	E	GNDI	GNDI	GND-ISO
	F	–	–	
	G	15 V	15 V	15 V DC supply
	H	RTS	–	–
	J	GND	GND	GND line
	K	GND	GND	GND line
	L	–	TxB	RxD-TxD-P
	M	15 V	15 V	15 V DC supply

Block diagram RS-232



Block diagram RS-485

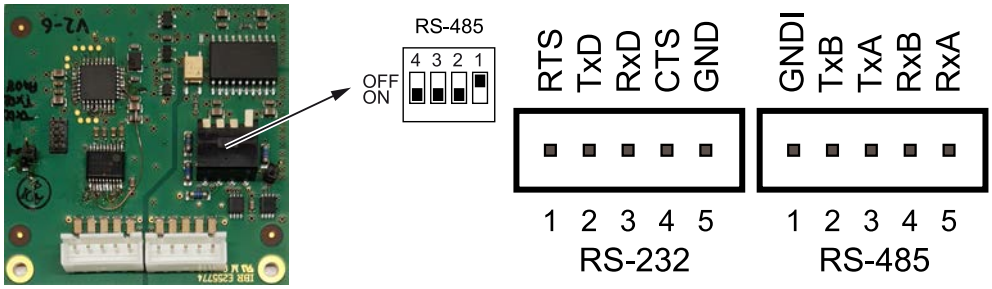


S	Function	Settings for RS-485 switch
1	Rx bus termination (4-wire)	OFF (switch up)
2	Tx bus termination	ON (switch down)
3	TxB pull-up resistor	ON (switch down)
4	TxA pull-down resistor	ON (switch down)

3.6.5 RS-232/485 interface

The option card has one RS-232 and RS-485 interface that can be used at the same time. It is not possible to connect digital weighing platforms or load cells.

> **Note:** See also Chapter “Interfaces” in the Technical manual – Firmware.



Technical data

Name	Data
RS-232	
Number of channels	1
Signals	Input: RxD, CTS Output: TxD, RTS
Electrical isolation	no
Configuration	Full duplex
Transfer rate (baud rate)	1200...115.200 bit/s
Input signal level	Logic 1 (high) -3... -15 V Logic 0 (low) +3 to... +15 V
Output signal level	±5.4 V typ.

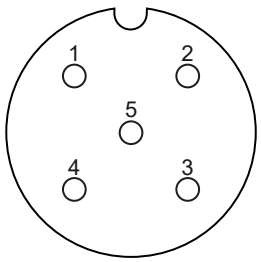
Name	Data
RS-485	
Number of channels	1
Signals	TxA, RxA, TxB, RxB
Electrical isolation	Yes
Configuration	Full duplex (4-wire) Half duplex (2-wire)
Terminating resistor	Can be set via DIP switch, see block diagrams.
Transfer rate (baud rate)	1200...115.200 bit/s
Signal level	Logic 1 (high) 2.4... 3.3 V Logic 0 (low) 0... 0.9 V
Connections	
Connection Position 2	M12 plug connector, female (C20, D20) M16 cable gland: – Cable to D-sub plug connector, 9-pin (C21, D21) – Cable to D-sub plug connector, female, 9-pin (C22, D22) – Open cable ends (C23, D23) Screen connection in the cable gland
Connection Position 3	M12 plug connector, female (C30, D30) M16 cable gland: – Cable to D-sub plug connector, 9-pin (C31, D31) – Cable to D-sub plug connector, female, 9-pin (C32, D32) – Open cable ends (C33, D33) Screen connection in the cable gland

Name	Data
Connection Position 4	M12 plug connector, female (C40, D40) M16 cable gland: – Cable to D-sub plug connector, 9-pin (C41, D41) – Cable to D-sub plug connector, female, 9-pin (C42, D42) – Open cable ends (C43, D43) Screen connection in the cable gland
Max. cable length	RS-485: according to EIA RS-232: according to EIA
Cable(s)	See accessory documentation

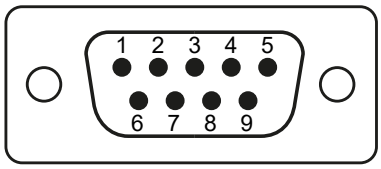
Absolute maximum ratings	
Input signal RS-232	±25 V
Signals RS-485	-9 V...+14 V

Note:
Loads that exceed the values specified under “absolute maximum ratings,” can cause permanent damage to the device. The function and reliability of the device cannot be guaranteed if it is used under different conditions than those specified under “Technical data.”

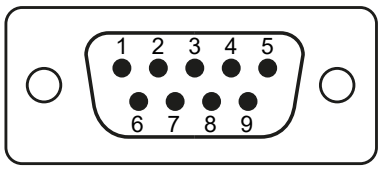
Pin assignment M12 plug connector, female (option C20/D20, C30/D30, C40/D40)

Plug connector, female A-coded	Pin	RS-232	RS-485
	1	RTS	GNDI
	2	CTS	RxB
	3	GND	RxA
	4	TxD	TxB
	5	RxD	TxA

Pin assignment D-sub 9-pin plug connector, female (option C22/D22, C32/D32, C42/D42)

Plug connection	Pin	RS-232	RS-485
	1	–	–
	2	TxD	TxB
	3	RxD	TxA
	4	–	–
	5	GND	RxA
	6	–	–
	7	CTS	RxB
	8	RTS	GNDI
	9	–	–

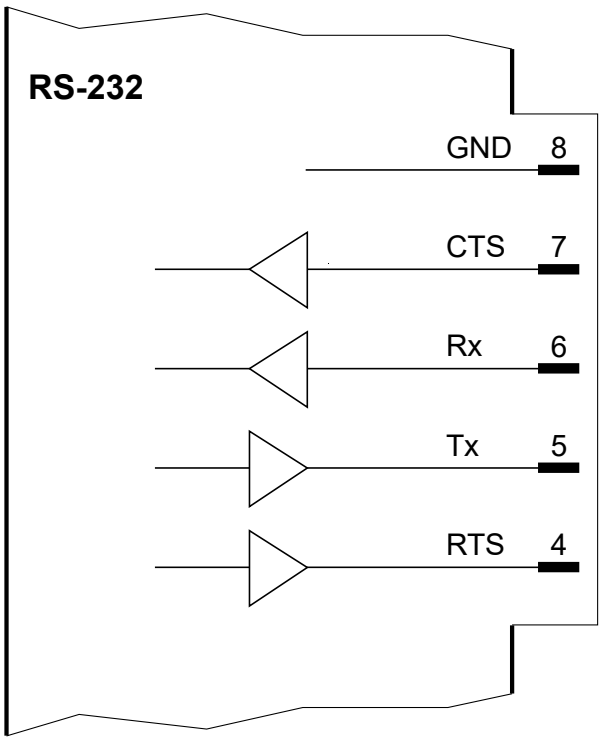
Pin assignment D-sub 9-pin plug connector (option C21/D21, C31/D31, C41/D41)

Plug connection	Pin	RS-232	RS-485
	1	–	–
	2	RxD	RxB
	3	TxD	RxA
	4	–	–
	5	GND	TxA
	6	–	–
	7	RTS	TxB
	8	CTS	GNDI
	9	–	–

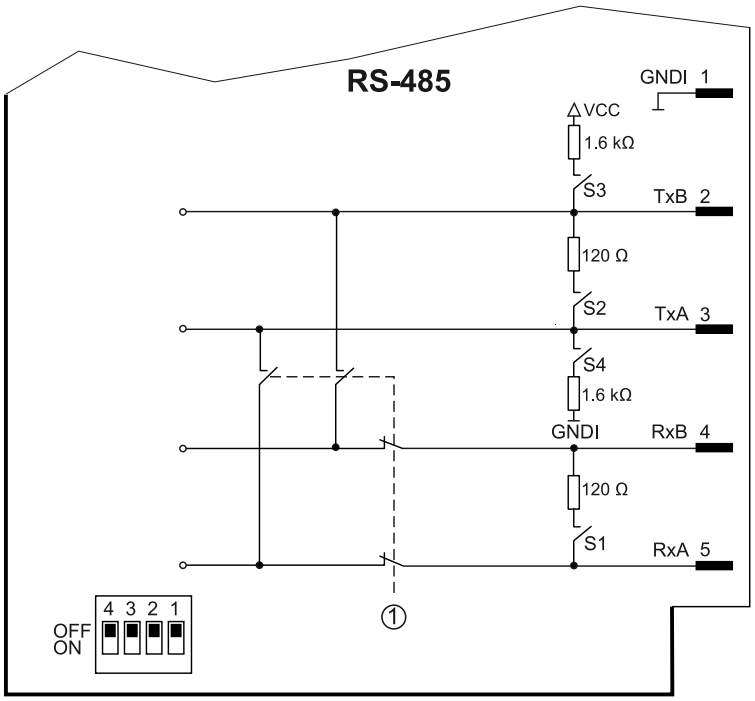
Pin assignment, open cable ends (option C23/D23, C33/D33, C43/D43)

Color	Code	RS-232	RS-485
Brown	bn	RTS	GNDI
Black	bk	TxD	TxB
Gray	gy	RxD	TxA
White	wh	CTS	RxB
Blue	bu	GND	RxA

Block diagram RS-232



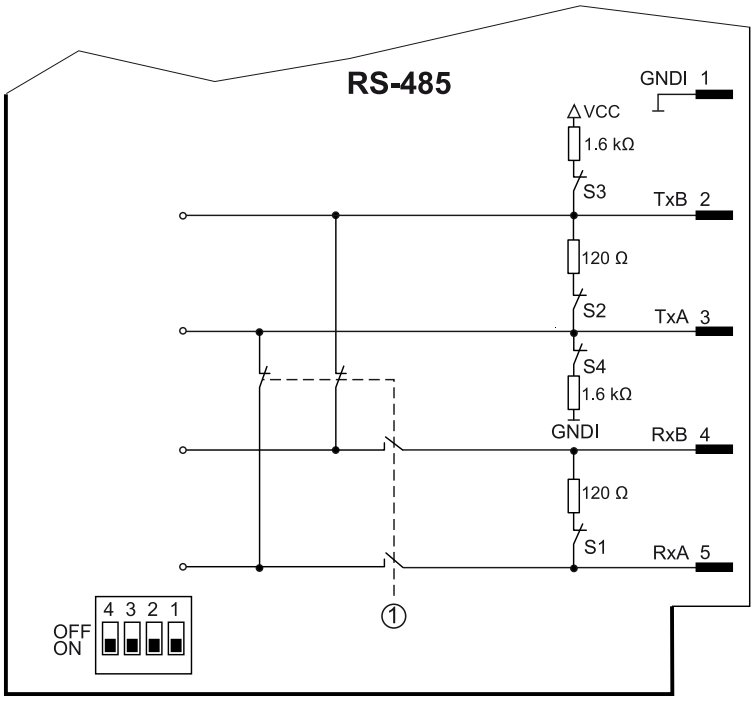
Block diagram RS-485 without terminating resistors (CA2/CA3/CA4)



① 2-wire/4-wire switching via software

S	Function	Settings for RS-485 switch
1	Rx bus termination (4-wire)	OFF (switch up)
2	Tx bus termination	OFF (switch up)
3	TxB pull-up resistor	OFF (switch up)
4	TxA pull-down resistor	OFF (switch up)

Block diagram RS-485 with terminating resistors (CB2/CB3/CB4)



① 2-wire/4-wire switching via software

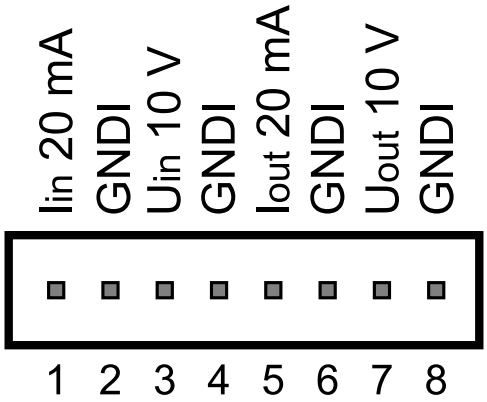
S	Function	Settings for RS-485 switch
1	Rx bus termination (4-wire)	ON (switch down)
2	Tx bus termination	ON (switch down)
3	TxB pull-up resistor	ON (switch down)
4	TxA pull-down resistor	ON (switch down)

3.6.6 Analog inputs and outputs

The option card has
- 1 analog current input
- 1 analog voltage input
- 1 analog current output or analog voltage output

Both inputs can be used at the same time.
Only one output can be used.

> **Note:** See also, Chapter “Analog inputs and outputs” in the Technical manual – Firmware



Technical data for current and voltage input

Name	Data	
Type	**Current input**	**Voltage input**
Quantity	1 (I_{in})	1 (V_{in})
Range	0...25 mA	0...12 V
Input impedance	200 Ω	150 kΩ
Reference potential	GNDI	GNDI
Electrical isolation	Yes	Yes
Resolution	14 bits	14 bits
Max. error	Offset error: ±0.009 % @ 20 mA	Offset error: ±0.001 % @ 10 V
	Gain error: ±0.300 % @ 20 mA	Gain error: ±0.300 % @ 10 V
	Linearity error: ±0.054 % @ 20 mA	Linearity error: ±0.029 % @ 10 V
Max. cable length	150 m	10 m

Technical data for current and voltage output

Name	Data	
Type	**Current output**	**Voltage output**
Quantity	1 (I_{out})	1 (V_{out})
Range	0...24 mA	0...10 V
Load	Max. 500 Ω	Min. 1 kΩ
Reference potential	GNDI	GNDI
Electrical isolation	Yes	Yes
Resolution	16 bits	16 bits

Name	Data	
Type	**Current output**	**Voltage output**
Max. error	Offset error: ±0.008 % @ 20 mA	Offset error: ±0.005 % @ 10 V
	Gain error: ±0.720 % @ 20 mA	Gain error: ±0.081 % @ 10 V
	Linearity error: ±0.030 % @ 20 mA	Linearity error: ±0.020 % @ 10 V
Max. cable length	150 m	10 m
Cable(s)	See accessory documentation	

Connections

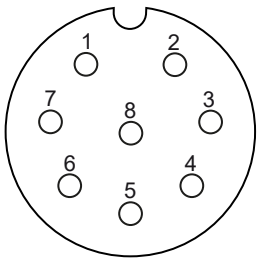
Name	Data
Connection Position 2	M12 plug connector, female (E20) M16 cable gland: – Open cable ends (E21) Screen connection in the cable gland
Connection Position 3	M12 plug connector, female (E30) M16 cable gland: – Open cable ends (E31) Screen connection in the cable gland
Connection Position 4	M12 plug connector, female (E40) M16 cable gland: – Open cable ends (E41) Screen connection in the cable gland

Absolute maximum ratings

Name	Data
Current input	Voltage: -0.5 V...+15.5 V Current: 30 mA
Voltage input	Voltage: -0.5 V...+15.5 V Current: 80 µA
Current output	Max. load: 6000 Ω

Note:
Loads that exceed the values specified under “absolute maximum ratings,” can cause permanent damage to the device. The function and reliability of the device cannot be guaranteed if it is used under different conditions than those specified under “Technical data.”

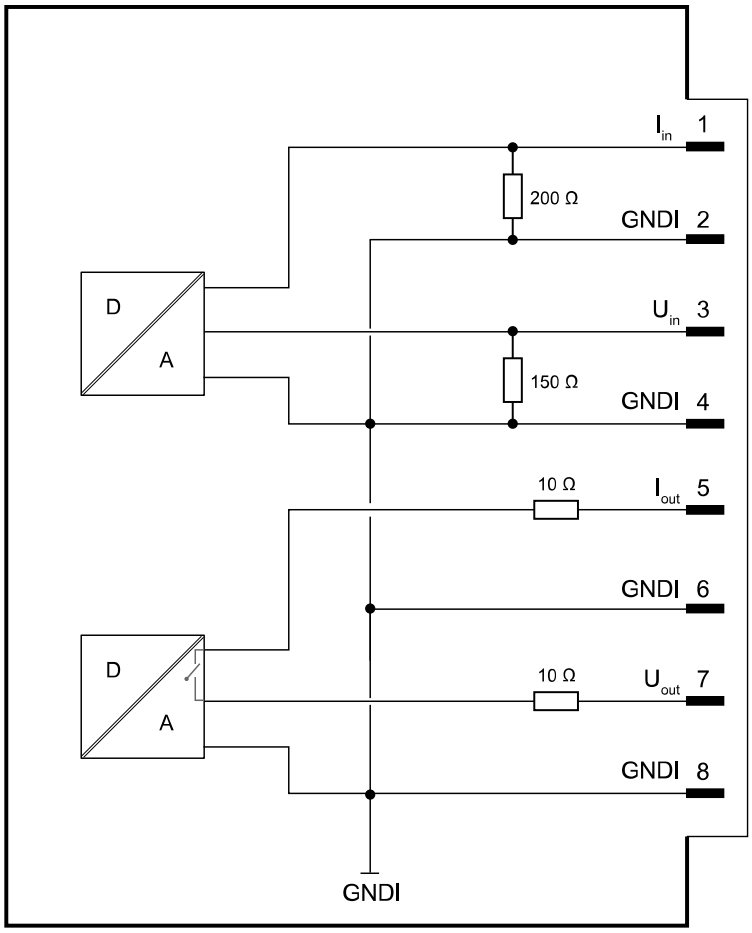
Pin assignment M12 plug connector, female (option E20, E30, E40)

Plug connector, female A-coded	Pin	Signal
	1	I_{in} (current 20 mA)
	2	GNDI
	3	V_{in} (voltage 10 V)
	4	GNDI
	5	I_{out} (current 20 mA)
	6	GNDI
	7	V_{out} (voltage 10 V)
	8	GNDI

Pin assignment, open cable ends (option E21, E31, E41)

Color	Code	Signal
White	wh	I_{in} (current 20 mA)
Brown	bn	GNDI
Green	gn	V_{in} (voltage 10 V)
Yellow	ye	GNDI
Gray	gy	I_{out} (current 20 mA)
Pink	pk	GNDI
Blue	bu	V_{out} (voltage 10 V)
Red	rd	GNDI

Block diagram



3.6.7 Digital inputs and outputs (2 IN/4 OUT)

On the option card, there are two opto-decoupled inputs (IN 1, IN 2) and 4 passive outputs decoupled by relays (OUT 1, OUT 2, OUT 3, OUT 4).

The two opto-decoupled inputs are active for the following options:
- FA2/FC2
- FA3/FC3

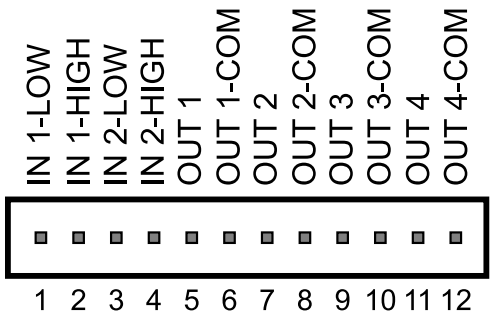
The two opto-decoupled inputs are passive for the following options:
- FB2/FD2
- FB3/FD3

The 4 relay outputs are NO for the following options:
- FA2/FB2
- FA3/FB3

The 4 relay outputs are NC for the following options:
- FC2/FD2
- FC3/FD3

> **Note:**
>
> The following can only be carried out by trained specialists:
> - The respective input can be set to active or passive via two switches.
> - The respective output can be set to “normally closed” or “normally open” via four jumpers.
>
> The option card needs to be removed to change the switch/jumper setting.

> **Note:**
> See also, Chapter “Digital inputs and outputs” in the Technical manual – Firmware



Technical data

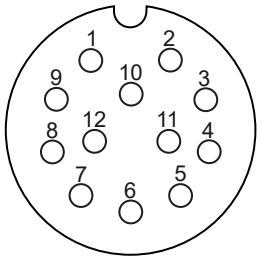
Name	Data
Inputs, active (A)	
Quantity	2 (IN 1-LOW, IN 1-HIGH; IN 2-LOW, IN 2-HIGH)
Configuration	active
Current	Max. 3 mA
Voltage	12 V
Logic level	LOW: open HIGH: closed
Reference potential	GNDI
Electrical isolation	Yes, via optocoupler

Name	Data
Inputs, passive (P)	
Quantity	2 (IN 1-LOW, IN 1-HIGH; IN 2-LOW, IN 2-HIGH)
Configuration	passive
Current	Max. 7 mA @ 24 V Max. 3 mA @ 12 V
Voltage	10...28 V
Logic level	LOW: 0...5 V HIGH: 10...28 V
Reference potential	IN1-LOW, IN2-LOW
Electrical isolation	Yes, via optocoupler
Outputs	
Quantity	4 (OUT 1, OUT 2, OUT 3, OUT 4)
Configuration	Passive, NO or NC
Voltage	U_{DC} = 30 V/U_{AC} = 30 V
Current	0.5 A
Reference potential	OUT 1-COM, OUT 2-COM, OUT 3-COM, OUT 4-COM
Electrical isolation	Yes, via relay
Connections	
Connection Position 2	M12 plug connector, female (F20) M16 cable gland: – Open cable ends (F21) Screen connection in the cable gland
Connection Position 3	M12 plug connector, female (F30) M16 cable gland: – Open cable ends (F31) Screen connection in the cable gland
Connection Position 4	M12 plug connector, female (F40)

Name	Data
	M16 cable gland: – Open cable ends (F41) Screen connection in the cable gland
Max. cable length	50 m
Cable(s)	See accessory documentation
Absolute maximum ratings	
Inputs	Current: 50 mA Voltage: 30 V
Outputs	Current: 1 A Voltage: U_{DC} = 60 V, U_{AC} = 125 V Switching processes: min. 100,000, max. 1800/ hour

Note:
Loads that exceed the values specified under “absolute maximum ratings,” can cause permanent damage to the device. The function and reliability of the device cannot be guaranteed if it is used under different conditions than those specified under “Technical data.”

Pin assignment M12 plug connector, female (option F20, F30, F40)

Plug connector, female A-coded	Pin	Signal
	1	IN 1-LOW
	2	IN 1-HIGH
	3	IN 2-LOW
	4	IN 2-HIGH
	5	OUT 1
	6	OUT 1-COM
	7	OUT 2
	8	OUT 2-COM
	9	OUT 3
	10	OUT 3-COM
	11	OUT 4
	12	OUT 4-COM

Pin assignment, open cable ends (option F21, F31, F41)

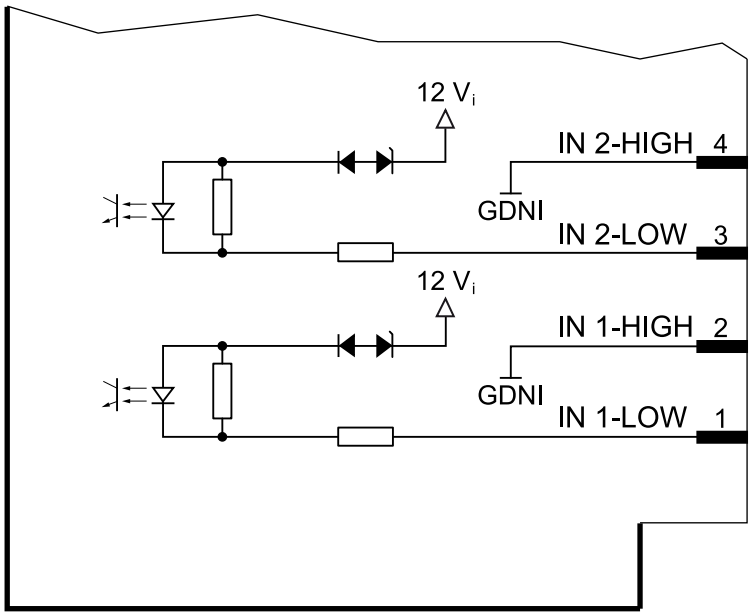
Color	Code	Signal
Brown	bn	IN 1-LOW
Blue	bu	IN 1-HIGH
White	wh	IN 2-LOW
Green	gn	IN 2-HIGH
Pink	pk	OUT 1
Yellow	ye	OUT 1-COM
Black	bk	OUT 2
Gray	gy	OUT 2-COM
Red	rd	OUT 3
Yellow-violet	ye-vt	OUT 3-COM
Grey-pink	gy-pk	OUT 4
Pink-blue	pk-bu	OUT 4-COM

3.6.7.1 Digital inputs (2 IN)

Block diagram for active inputs

Option:

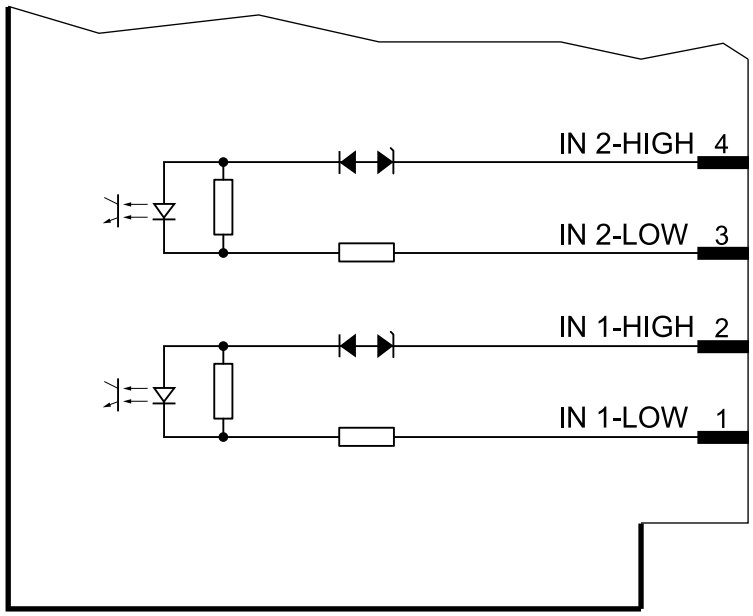
- FA2/FC2
- FA3/FC3
- FA4/FC4



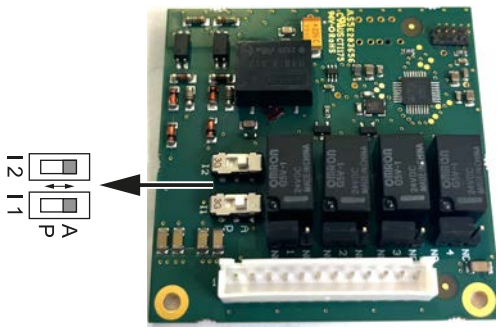
Block diagram for passive inputs

Option:

- FB2/FD2
- FB3/FD3
- FB4/FD4



There is one switch (I 1, I 2) for each of the 2 inputs (IN 1, IN 2).



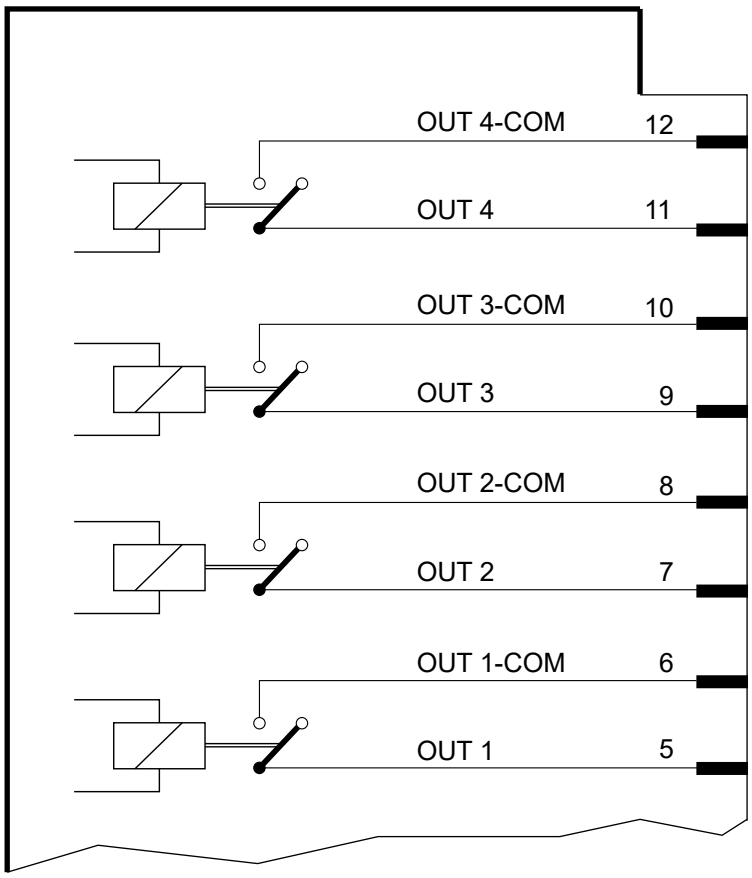
Each channel can be switched actively (A) or passively (P) independently of one another.
The delivery condition depends on the option.

3.6.7.2 Digital outputs (4 relays OUT)

Block diagram for outputs as normally open (NO) contacts

Option:

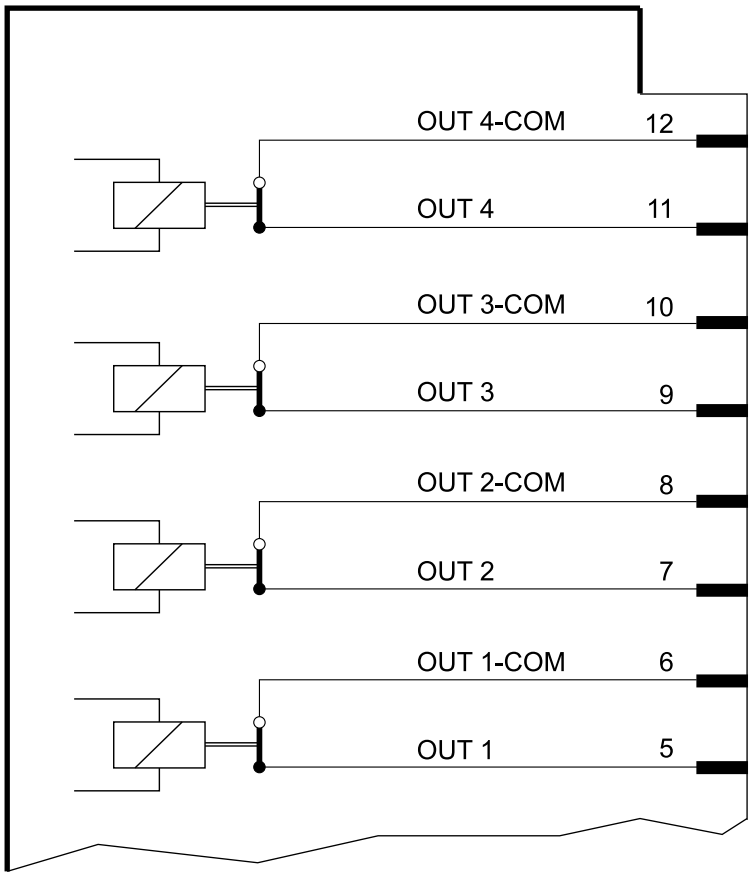
- FA2/FB2
- FA3/FB3
- FA4/FB4



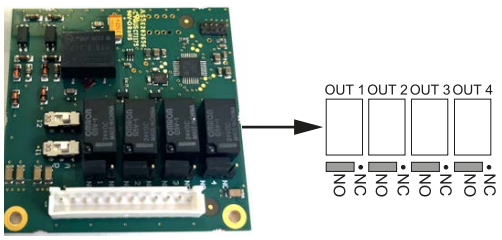
Block diagram for outputs as normally closed (NC) contacts

Option:

- FC2/FD2
- FC3/FD3
- FC4/FD4



There is a jumper for each of the four relay outputs (OUT 1, OUT 2, OUT 3, OUT 4).

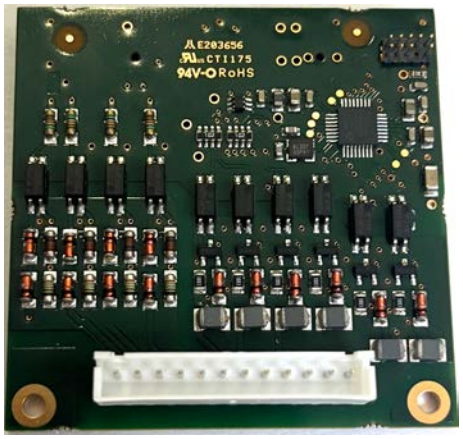


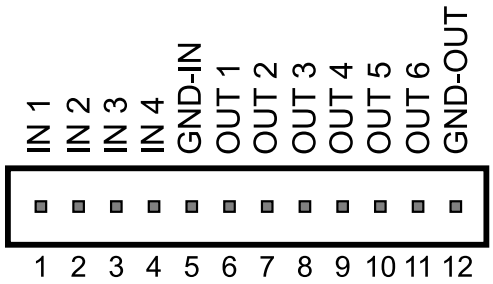
NO: normally open
NC: normally closed
The delivery condition depends on the option.

3.6.8 Digital inputs and outputs (4 IN/6 OUT)

The option card has 4 passive opto-decoupled inputs and 6 passive opto-decoupled outputs.

> **Note:** See also, Chapter “Digital inputs and outputs” in the Technical manual – Firmware





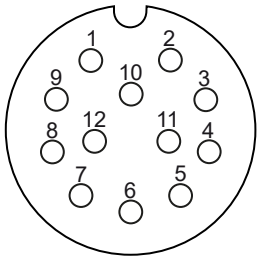
Technical data

Name	Data
Inputs	
Quantity	4 (IN 1, IN 2, IN 3, IN 4)
Configuration	Passive
Current	Max. 7 mA @ 24 V Max. 3 mA @ 12 V
Voltage	10...28 V
Logic level	LOW: 0...5 V HIGH: 10...28 V
Reference potential	GND-IN (signal GNDI)
Electrical isolation	Yes, via optocoupler
Outputs	
Quantity	6 (OUT 1, OUT 2, OUT 3, OUT 4, OUT 5, OUT 6)
Configuration	Passive
Current	30 mA
Voltage	24 V
Reference potential	GND-OUT (signal GNDO)
Electrical isolation	Yes, via optocoupler
Connections	
Connection Position 2	M12 plug connector, female (G20) M16 cable gland: – Open cable ends (G21) Screen connection in the cable gland
Connection Position 3	M12 plug connector, female (G30) M16 cable gland: – Open cable ends (G31) Screen connection in the cable gland

Name	Data
Connection Position 4	M12 plug connector, female (G40) M16 cable gland: – Open cable ends (G41) Screen connection in the cable gland
Max. cable length	50 m
Cable(s)	See accessory documentation
Absolute maximum ratings	
Inputs	Current: 50 mA Voltage: 30 V
Outputs	Current: 70 mA Voltage: 30 V

Note:
Loads that exceed the values specified under “absolute maximum ratings,” can cause permanent damage to the device. The function and reliability of the device cannot be guaranteed if it is used under different conditions than those specified under “Technical data.”

Pin assignment M12 plug connector, female (option G20, G30, G40)

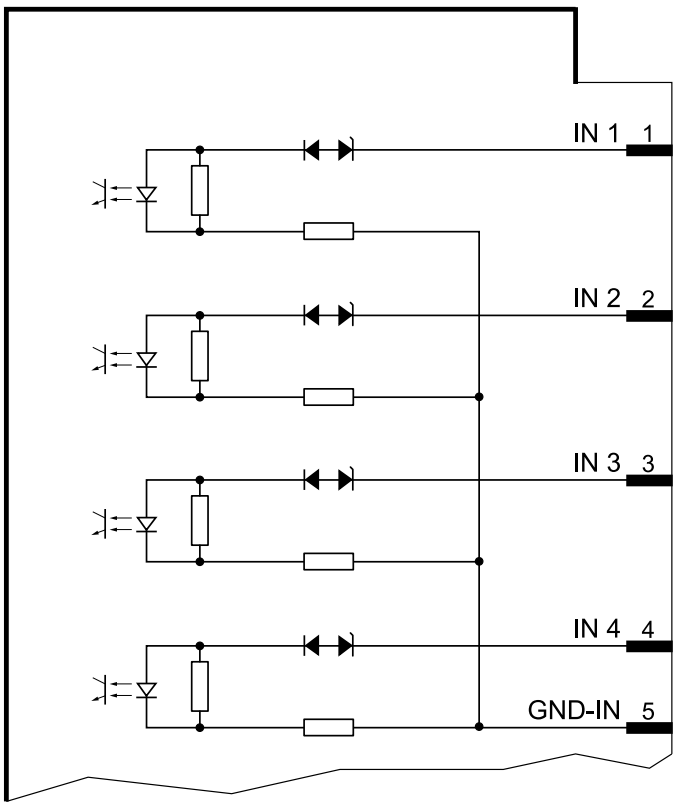
Plug connector, female A-coded	Pin	Signal
	1	IN 1
	2	IN 2
	3	IN 3
	4	IN 4
	5	GND-IN
	6	OUT 1
	7	OUT 2
	8	OUT 3
	9	OUT 4
	10	OUT 5
	11	OUT 6
	12	GND-OUT

Pin assignment, open cable ends (option G21, G31, G41)

Color	Code	Signal
Brown	bn	IN 1
Blue	bu	IN 2
White	wh	IN 3
Green	gn	IN 4
Pink	pk	GND-IN
Yellow	ye	OUT 1
Black	bk	OUT 2
Gray	gy	OUT 3
Red	rd	OUT 4
Yellow-violet	ye-vt	OUT 5
Grey-pink	gy-pk	OUT 6
Pink-blue	pk-bu	GND-OUT

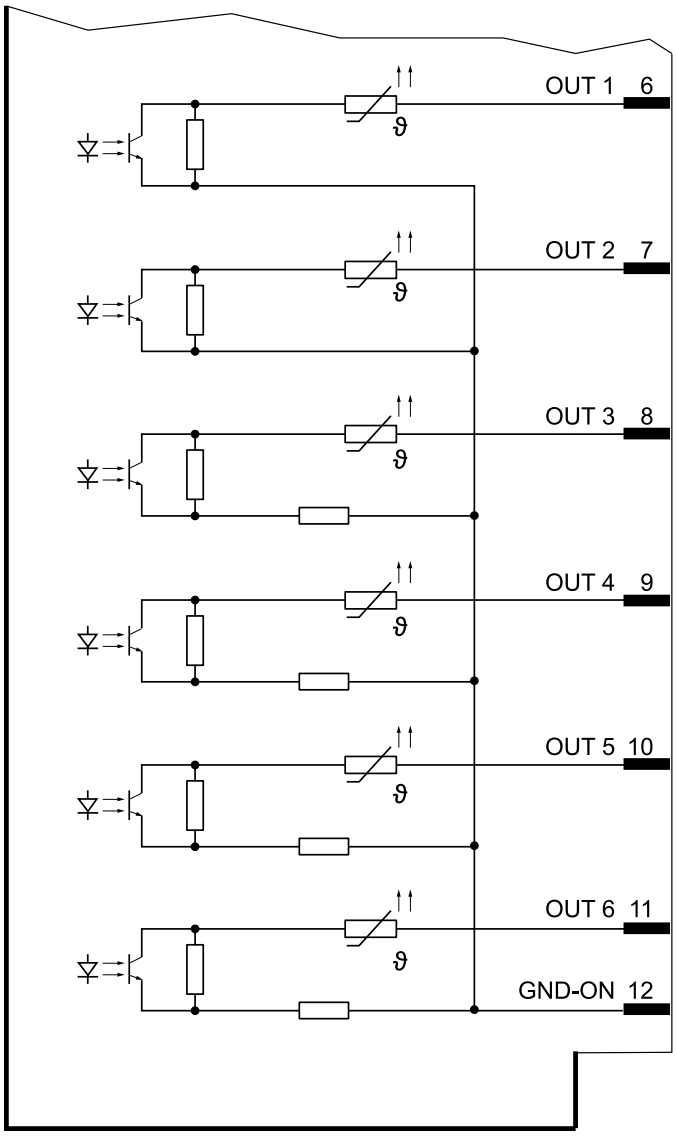
3.6.8.1 Digital inputs (4 IN)

Block diagram for digital inputs



3.6.8.2 Digital outputs (6 optocoupler OUT)

Block diagram for digital outputs



3.6.9 Fieldbus modules

3.6.9.1 ProfiBus DP interface

Communication protocol and syntax comply with the ProfiBus DP bus standard according to IEC 61158.

> **Note:**
> See also Chapter “Fieldbus settings” in the Technical manual – Firmware.

> **Note:**
> The configuration file can be downloaded at https://controller-software.minebea-intec.com/.

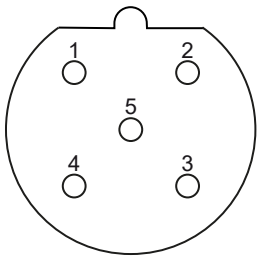
The communication interface “Anybus® CompactCom™ 40 Brick PROFIBUS” (item number AB6670) from HMS is integrated into the fieldbus module. Technical data can be found on the HMS website.

Connection data

Option	Connec-tion	Data
HDP01	Position 7	M12 plug connector
	Position 8	M12 plug connector, female
HDP02	Position 7	M16 cable gland including cable to M12 plug connec-tor

Option	Connection	Data
	Position 8	M16 cable gland including cable to M12 plug connector, female

Pin assignment M12 plug connector, female and plug connector (option HDP01, HDP02)

B-coded	Pin	Signal to plug connector, female	Signal to plug connector
	1	ISO 5V	–
	2	PB A	PB A
	3	ISO GND	–
	4	PB B	PB B
	5	–	–

3.6.9.2 DeviceNet interface

> **Note:**
> See also Chapter “Fieldbus settings” in the Technical manual – Firmware.

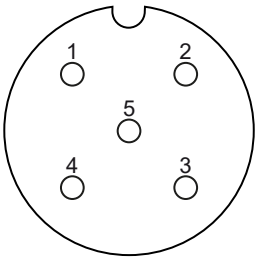
> **Note:**
> The configuration file can be downloaded at https://controller-software.minebea-intec.com/.

The communication interface “Anybus® CompactCom™ 40 Brick DeviceNet” (item number AB6671) from HMS is integrated into the fieldbus module. Technical data can be found on the HMS website.

Connection data

Option	Connection	Data
HDN01	Position 7	M12 plug connector
	Position 8	M12 plug connector, female
HDN02	Position 7	M16 cable gland including cable to M12 plug connector
	Position 8	M16 cable gland including cable to M12 plug connector, female

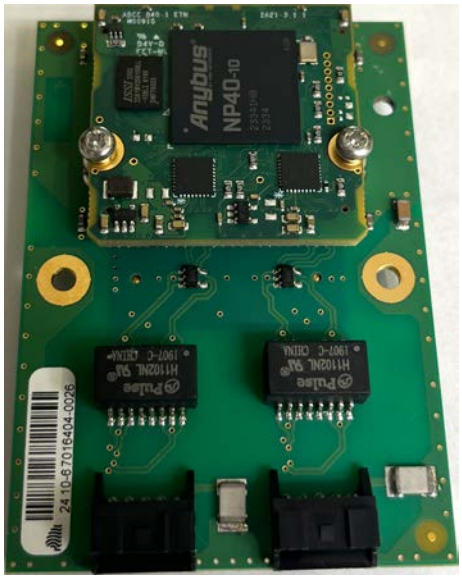
Pin assignment M12 plug connector, female and plug connector (option HDN01, HDN02)

A-coded	Pin	Signal to plug connector, female	Signal to plug connector
	1	Screen	Screen
	2	V+	V+
	3	V-	V-
	4	CAN_H	CAN_H
	5	CAN_L	CAN_L

3.6.9.3 ProfiNet interface

> **Note:**
> See also Chapter “Fieldbus settings” in the Technical manual – Firmware.

> **Note:**
> The configuration file can be downloaded at https://controller-software.minebea-intec.com/.

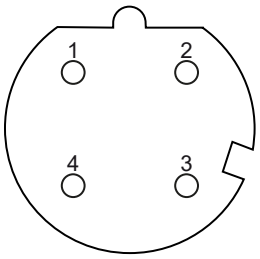


The communication interface “Anybus® CompactCom™ 40 Brick PROFINET IRT” (item number AB6675) from HMS is integrated into the fieldbus module. Technical data can be found on the HMS website.

Connection data

Option	Connection	Data
HPN01	Position 7	M12 plug connector, female
	Position 8	M12 plug connector, female
HPN02	Position 7	M16 cable gland including cable to RJ45 plug connector
	Position 8	M16 cable gland including cable to RJ45 plug connector

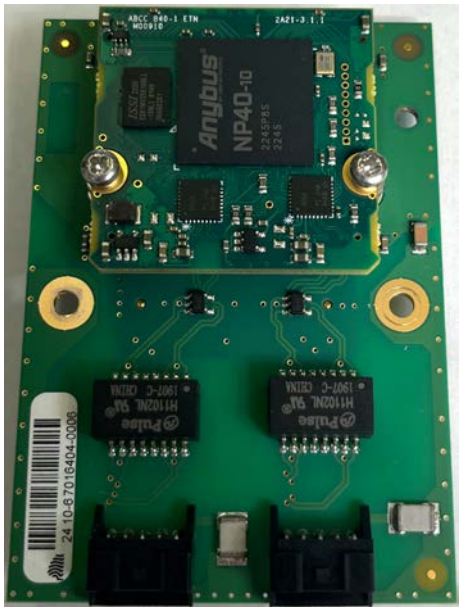
Pin assignment M12 plug connector, female (option HPN01)

D-coded	Pin	Signal
	1	TD+
	2	RD+
	3	TD-
	4	RD-

3.6.9.4 EtherNet/IP interface

> **Note:**
> See also Chapter “Fieldbus settings” in the Technical manual – Firmware.

> **Note:**
> The configuration file can be downloaded at https://controller-software.minebea-intec.com/.

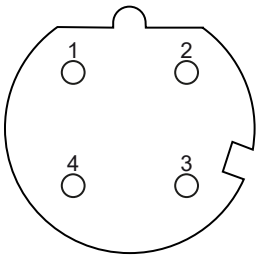


The communication interface “Anybus® CompactCom™ 40 Brick EtherNet/IP” (item number AB6674) from HMS is integrated into the fieldbus module. Technical data can be found on the HMS website.

Connection data

Option	Connection	Data
HIP01	Position 7	M12 plug connector, female
	Position 8	M12 plug connector, female
HIP02	Position 7	M16 cable gland including cable to RJ45 plug connector
	Position 8	M16 cable gland including cable to RJ45 plug connector

Pin assignment M12 plug connector, female (option HIP01)

D-coded	Pin	Signal
	1	TD+
	2	RD+
	3	TD-
	4	RD-

4 Device installation

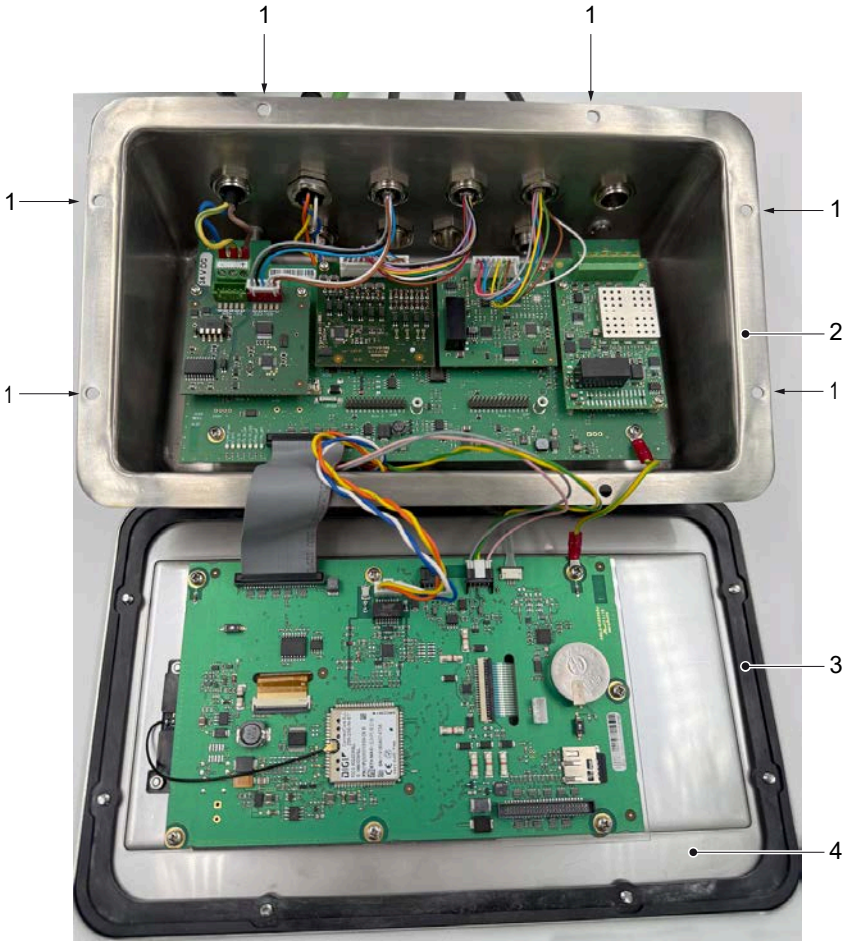
4.1 Opening/closing the device

⚠ WARNING

Performing electrical work on a device that is connected and/or switched on can have life-threatening consequences.

When removing covers or parts using tools, live parts may be exposed. Please note that capacitors in the device may still be charged even after disconnecting the device from all voltage sources.

- ▶ The device must not be opened by the operating personnel.
- ▶ The device must only be opened by trained specialists according to specifications.
- ▶ Disconnect the device from the power supply and wait at least 10 s (the LED must have gone out) before opening.



1. Loosen the 8 M4 cap nuts (1) using a 7 mm socket wrench, carefully remove the cover (4) and set aside.

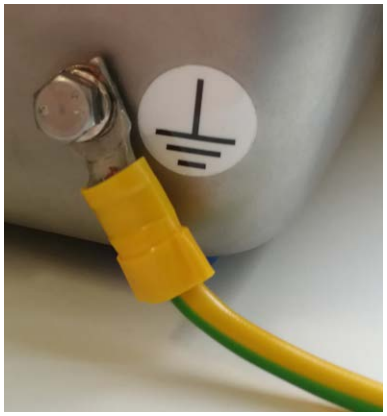
   Notice: The connections cables must not be disconnected.
   The seal (3) remains in the cover (4).

2. After completing work, place the cover (4) carefully onto the lower part (2).

   The seal (3) must not be crushed. The drill holes in the seal must be aligned with the drill holes in the lower part (2).

3. Tighten the 8 M4 cap nuts (1) with a torque of 1.5 Nm.

4.2 Connecting the functional ground



The functional ground must be connected as shown , see position G in Overview of connections.

4.3 Establishing connections for option cards

The connections for the installed option cards can be found in the descriptions under Option cards.

4.4 Switching on the device

- Connect the device to a power supply.
- The device switches on.
- For further steps, see the Technical manual – Firmware.

5 Cleaning

5.1 Instructions for cleaning

The device must be cleaned of contaminants on a regular basis.

⚠ WARNING

Performing electrical work on a device that is switched on can have life-threatening consequences.

- ▶ Disconnect the device from the power supply before cleaning (disconnect the power plug from the electrical outlet).
- ▶ Do not open the device for cleaning.

NOTICE

Property damage caused by the use of unsuitable cleaning utensils/ products.

Damage to the device.

- ▶ Prevent moisture from penetrating the interior.
- ▶ Do not use aggressive cleaning agents (solvents or similar agents), see Cleaning agents.
- ▶ For use in the food industry, use a cleaning agent suitable for that particular working environment.
- ▶ Use soft sponges, brushes, and cloths.
- ▶ Spraying with water or blowing off with compressed air is not permissible.

1. Unplug device from mains supply, disconnect any data cables.
2. Clean the device, referring to the information provided by the manufacturer.
3. Wipe down the device with a soft, dry cloth after cleaning.

5.2 Cleaning agents

NOTICE

Some cleaning agents may not be compatible with the product material.

- Only use disinfectants and cleaning agents in line with the manufacturer’s instructions.
- Do not use any abrasive sponges containing iron, steel brushes, or cleaning sponges made of steel wool.
- Always test cleaning agents and materials in non-critical areas first before using them.

6 Disposal

Our products and their packaging must not be disposed of in municipal waste (e.g., garbage can for recyclable packaging, garbage can for paper packaging, etc.). They can either be recycled by the customer themselves, providing this complies with requirements set out by electrical or electronic waste or packaging waste laws, or sent back to Minebea Intec at a charge.

This option of returning the product is intended to provide proper recycling or reuse in a manner that is collected separately from municipal waste.

Before disposing of or scrapping the old products, any single-use or rechargeable batteries should be removed and taken to a suitable collection point. The type of battery used is specified in the technical data.

Please see our General Terms and Conditions for further information.

Service addresses for repair acceptance and collection points can be found in the product information enclosed with the product as well as on our website (www.minebea-intec.com).

Minebea Intec Bovenden GmbH & Co. KG
Leinetal 2
37120 Bovenden

WEEE Reg. no. DE58091735

Should you have any further questions, please contact your local service representative or our service center.

Minebea Intec Bovenden GmbH & Co. KG
Repair center
Leinetal 2
37120 Bovenden, Germany
Phone: +49.551.30983.333
service.bov@minebea-intec.com

We reserve the right not to accept products that are contaminated with hazardous substances (ABC contamination).

7 Specification

7.1 General technical data

The following characteristics are valid after a warm-up time of at least 2 hours (reference temperature: 23°C).

7.1.1 display

Type	Size	Display
TFT color display	5.0"	800 x 480 pixels

7.1.2 Supply voltage version 100–240 V AC

Supply voltage	U_{AC} = 100...240 V	+10 %/-15 %; 50/60 Hz
Max. power consumption	30 VA	
Primary fuse	T1AL 250 UAC 5×20 mm	

7.1.3 Supply voltage version 24 V DC

Supply voltage	U_{DC} = 24 V SELV/PELV Energy/power limitation	±10 %
Max. power consumption	20 W	
Primary fuse	T2AL 125UDC; 3×10.1 mm	
Connection conditions	Only for low-voltage DC power supply networks without transient over-voltages on secondary circuits	

7.1.4 Buffering of the date/time module

The lithium battery for buffering of the date/time module is already activated upon delivery and is not intended to be replaced by the customer.

Service life	Device continuously connected to mains voltage	up to 10 years
	Device not connected to mains voltage for some time (e.g., in storage)	up to 7 years

7.1.5 Backup batteries (for outages)

Type	NIMH AAA Max. 1.2 V; 600 mAh
Quantity	3 pcs
Manufacturer	GP

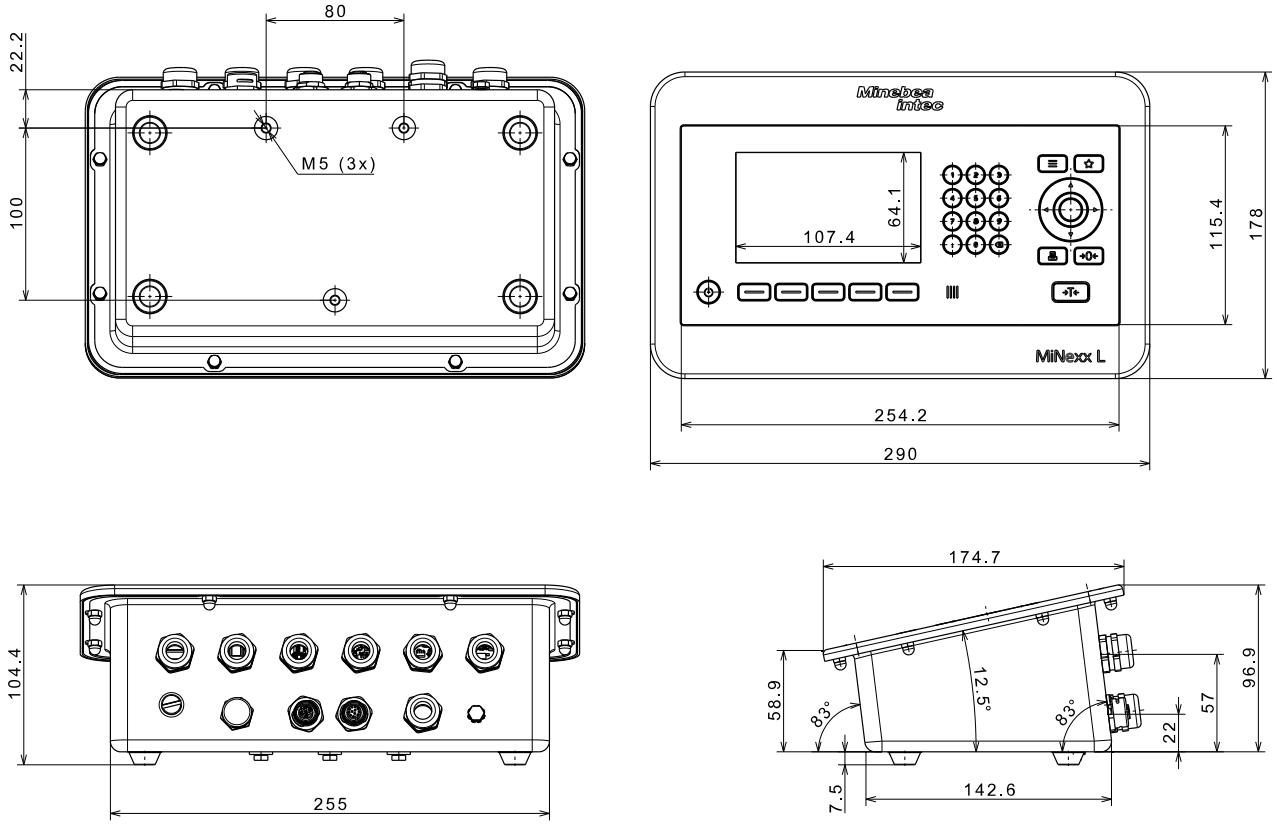
> **Note:**
> See also Chapter “Operating & display” in the Technical manual – Firmware.

7.1.6 NFC

Data from NFC tags can be read by NFC if this is supported by the device configuration. This function can be used for user identification (see Chapter “Add/edit user” in the Technical manual – Firmware) or on an application-specific basis.
The antenna is positioned on the back of the front membrane (see Device front).

7.2 Housing

7.2.1 Housing dimensions



All dimensions in mm

7.2.2 Materials

Component	Material
Housing	1.4301/AISI 304
Gasket	EPDM
Membrane keyboard	PET
Rubber feet	EPDM

7.2.3 IP protection

- The device only has IP67, IP69 and NEMA 4X indoor protection with a rubber seal installed and secure connection (fastened plugs + cable gland or M12 plug connector and connected cable).
- The installation of devices with fastened plugs/cable glands must be carried out and checked by trained electricians.

7.3 Ambient conditions

The ambient conditions only apply for indoor use.

Temperature range	
Ambient temperature for operation*	-10...+40°C
Power-on temperature	> 0°C
Ambient temperature for storage/transport	-20...+60°C
Humidity *	< 95%, no condensation (in accordance with IEC 60068-2) at 40 °C
Protection grade	IP69; IP69K and NEMA 4X indoor
Operating altitude	<2000 m above sea level (according to EN 61010)
Vibrations	The device must not be exposed to strong vibrations.
Degree of contamination	2

Note: *
The indicator can be operated in a humid environment.
A combination of very high humidity and very high temperature at the installation location of the indicator should be avoided.
Always avoid aggressive chemical vapors.

7.4 Electromagnetic Compatibility (EMC)

All data in compliance with EN IEC 61326 industrial section.

8 Appendix

8.1 Certificates

Ser. no.	Name	Document no.
1	EU Declaration of Conformity	

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