

ABB

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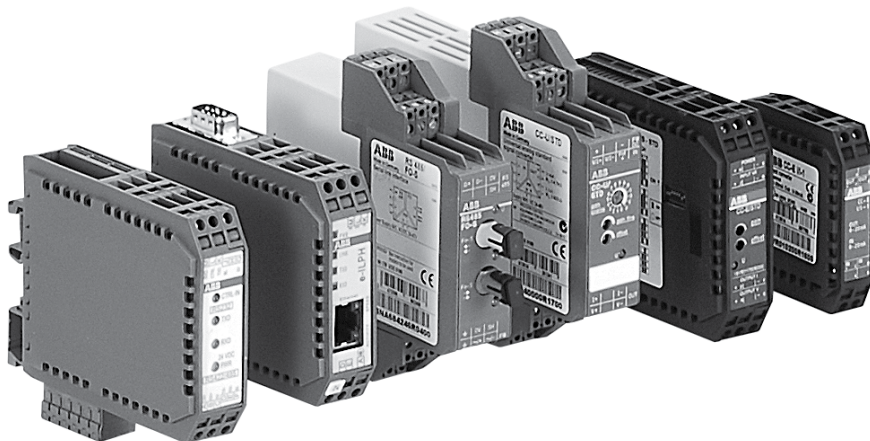
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Notes



Signal and data converters



Signal and data Converters

Nowadays various types of data transmission and interfaces are used in control processes. Nearly every process includes a control system that receives data either by means of analog signals or by data transmission. The data is then evaluated and the appropriate parameters are set. A reliable process control essentially depends on the faultless, untroubled and secure transmission and processing of these analog signals. There may however, arise numerous problems which can disturb or even block an ideal process sequence.

ABB's range of analog signal converters are ideally suited when existing electrical or physical values have to be converted into proportional standard signals or relay threshold signals.

The serial data converters from ABB allow the establishment of a communication between units with different communication standards.

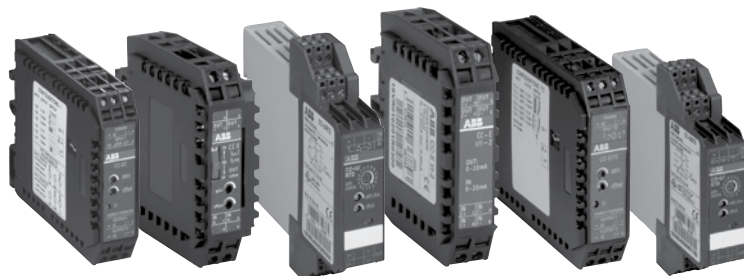
In order to assure the process continuity, existing systems consistently have to be updated or connected to new devices. If the communication standard of the existing system and the connected device are different, serial data converters make the establishment of the communication possible.

Besides the conversion of signals, analog signal converters and serial data converters are suited for the amplification, filtering or separation of analog signals.

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Analog signal converters



Product range for analog signal processing

CC-U range

- 8 different standard signal outputs on one device
- Input and output side universally configurable
- Also available with 2 threshold relay outputs
- Adjustment and operating elements on the front side
- Safe operation by electrical 3-way isolation
- Plug-in connecting terminals, unambiguously and clearly marked

Conversion, measurement and separation of

- Standard signals
- Signals of RTD sensors (PT10, PT100, PT1000)
- Thermocouple signals
- TRMS values of currents and voltages

Characteristics

- The required input and output ranges can be configured for all devices by means of directly accessible DIP switches positioned on the side.
- Due to the wide input range of the gain and offset stages all input signals between the minimum and the maximum input value can be universally converted to all common output signals.
- Devices for DC or AC (50/60 Hz) supply available.

CC-E range

- Universally configurable devices and single-function devices
- Adjustment and operating elements on the front side
- Safe operation by electrical 3-way isolation
- Unambiguous and clear connecting terminal markings

Conversion, measurement and separation of

- Standard signals (0-5 V, 0-10 V, 0-20 mA, 4-20 mA)
- Temperature signals of RTD sensors (PT 100)
- Thermocouple signals (types J and K)
- Current measurement signals (0-5 A, 0-20 A AC/DC)

Characteristics of single-function devices

- No adjustment or balancing necessary.

Characteristics of universal devices

- The required input and output ranges can be configured by means of directly accessible DIP switches positioned on the side
- Gain adjustment of $\pm 5\%$ by means of an adjustment potentiometer on the front-side
- Offset adjustment of $\pm 5\%$ by means of adjustment potentiometers on the front-side

Analog signal Converters

Analog signal converters

Application, approvals and marks

Applications for analog signal processing and correct solution using CC-E and CC-U converters

Nearly every process includes a control system that receives data by means of analog signals and then evaluates the data and sets the respective parameters correspondingly.

When transmitting analog signals numerous problems may arise which can disturb or even block an ideal behavior of the process.

Below we have listed some processing problems together with the respective solutions to solve these problems:

Signal conversion

Sometimes the available signals cannot be processed by the controller or the actuator. In this case, signal converters are required to convert the input signal (or different input signals) to the desired output signal.

Signal amplification

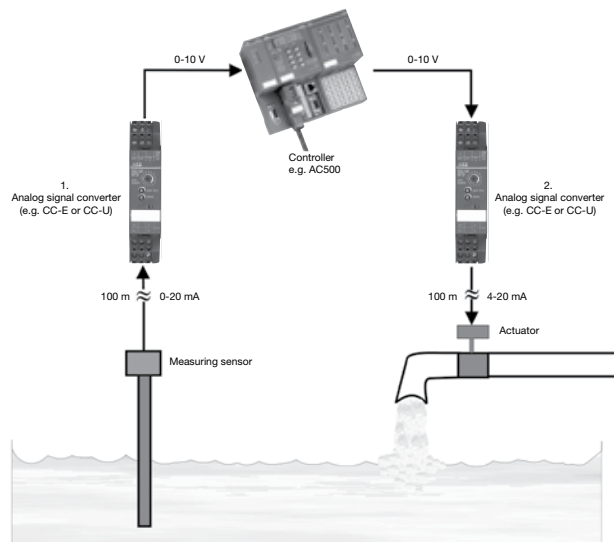
If long lines or high burdens have to be operated, it may be necessary to amplify the signal. CC analog signal converters require only low input power and provide high output power.

Thus, there are no restrictions for the converter's position on the line, i.e. it can be used

- for signal refreshing a at the end of the line (low input power)
- or for signal amplification b at the beginning of the line (high output power).

Signal filtering

Particularly on long lines or in rough industrial environments the signals are exposed to high electromagnetic interferences. The frequency of the coupled interference signals may be in the range of the common mains frequency (50 Hz) or even much higher (in case of frequency converters). According to the specific requirements, analog signal converters are available which provide reliable suppression of those interferences by means of an input low-pass filter.



Signal separation

Protection against overvoltage

The increased use of micro-electronics make controls much more sensitive against overvoltages, resulting from lightning discharges or switching processes. Suppression diodes are incorporated in the input of the CC analog signal converters which enable the converters to arrest overvoltages with low energy level (resulting from switching processes) by themselves. The products furthermore provide electrical isolation between input, output and supply circuit for protection of the controller connected to the output.

Protection against ground loops

If components are used which refer to ground, the measuring signals can be falsified by a so-called ground loop. In this case, certain parts of the signal are transmitted via earth and not via the analog transmission line, thus causing incorrect evaluation of the signal. The electrical isolation between the input and the output disconnects these ground loops and thus enables correct signal transmission.

- existing
- ▲ existing for some devices
- pending

</															

Analog signal converters

Overview

CC-E/STD analog signal converter with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/STD)
- 2x10 single-function devices
- "Plug and Work", no adjustment of single-function devices required

Loop-powered current/current isolator without external power supply for analog current signals of 0-20 mA and 4-20 mA

- Electrical isolation between input and output
- Very low internal voltage drop ≤ 2.5 V
- Available with one or two independent channels
- Width only 18 mm (1 and 2 channels)

CC-U/STD universal signal converter with 3-way electrical isolation

- More than 120 configurations possible
- Configurable output signal response on input voltage signal interruption (low fail safe / high fail safe)
- Adjustment and operating elements on the front
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply
- Very fast signal transmission enables use in control systems

CC-U/STDR universal signal converter for standard signals, with 2 threshold relay outputs and with 3-way electrical isolation

- Standard signal converter with 7 setting ranges
- 2 threshold relay outputs with one c/o contact each (threshold and respective hysteresis can be adjusted independently from each other)
- Open-circuit or closed-circuit principle configurable by means of a DIP switch
- 2 yellow LEDs for clear status indication of the output relays
- Plug-in connecting terminals for inputs, outputs and supply

CC-E/RTD temperature signal converter for RTD sensors, linearized with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/RTD)
- 2x12 single-function devices
- "Plug and Work", no adjustment of single-function devices required
- Temperature signal converter for PT100 sensors
- 2- or 3-wire connection

CC-U/RTD universal signal converter for PT10, PT100, PT1000 temperature sensors (acc. to IEC 751 and JIS C 16041), linearized with 3-way electrical isolation

- Configurable output signal response on input signal interruption (low / high fail safe)
- Adjustment and operating elements on the front-side
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply
- 2- or 3-wire connection

CC-U/RTDR universal signal converter for temperature and resistance signals, with 2 threshold relay outputs and 3-way electrical isolation

- Temperature signal converter for PT100 signals (5 ranges up to 800 °C) and variable resistances from 0-380 Ω
- 2 threshold relay outputs with one c/o contact each (threshold and respective hysteresis can be adjusted independently from each other)
- Open-circuit or closed-circuit principle configurable by means of a DIP switch
- 2 yellow LEDs for clear status indication of the output relays
- Plug-in connecting terminals for inputs, outputs and supply
- 2- or 3-wire connection

Analog signal converters

Overview

CC-E/TC analog signal converter for thermocouple signals of the types J and K with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/TC)
- 2x6 single-function devices
- "Plug and Work", no adjustment of single-function devices required

CC-U/TC universal signal converter for thermocouples with 3-way electrical isolation

- Temperature signal converter for thermo-couples of the types K, J, T, S, E, N, R, B
- Continuously adjustable voltage signal input 0-10 mV and 0-50 mV
- Differential temperature meas. possible ¹⁾
- Configurable output signal response on input signal interruption (low fail safe / high fail safe)
- Adjustment and operating elements on the front-side
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply

CC-U/TCR universal signal converter for thermocouples, with 2 threshold relay outputs and 3-way electrical isolation

- Temperature signal converter for thermocouples of the types K, J, T, S
- 2 threshold relay outputs with one change-over contact each (threshold and respective hysteresis can be adjusted independently from each other)
- Open-circuit or closed-circuit principle configurable by means of a DIP switch
- 2 yellow LEDs for clear status indication of the output relays
- Plug-in connecting terminals for inputs, outputs and supply

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CC-E/I measuring converter for current signals 0-5 A, 0-20 A, AC/DC with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/I)
- 2x6 single-function devices
- "Plug and Work", no adjustment of single-function devices required

CC-E I_{AC}/I_{LPO} measuring converter without auxiliary power for sinusoidal currents 0-1 A, 0-5 A, output 4-20 mA

- Measuring converter for sinusoidal currents (0-1 A, 0-5 A)
- Measuring range selection by front-face sliding switch
- 4-20 mA output current in proportion to input current
- no additional power supply required

CC-U/I universal measuring converter for RMS values of 0-1 A and 0-5 A, with 3-way electrical isolation

- RMS converter for current signals up to 1 A and up to 5 A of any wave form (DC, DC with superimposed AC components, pure sinusoidal, triangular, phase-angle controlled, etc. in a measuring range of 0-600 Hz)
- Adjustment and operating elements on the front
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply

CC-U/V universal measuring converter for RMS values of 0-600 V, with 3-way electrical isolation

- RMS converter for voltage signals up to 600 V of any wave form (DC, DC with superimposed AC components, pure sinusoidal, triangular, phase-angle controlled, etc. in a measuring range of 0-600 Hz)
- Adjustment and operating elements on the front
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply

Standard signal converter

Ordering details

Description

Standard signal converters of the CC-E range are designed to convert all kind of input standard signals (V, mA) into output standard signals (V, mA).

Standard signal converters

Supply voltage range	Input signal	Output signal	Type	Catalog number	Weight (1 pce) kg (lb)
24 V DC	0-5 V, 0-10 V 0-20 mA, 4-20 mA	0-5 V, 0-10 V	CC-E/STD1) 3)	1SVR011700R0000	0.088 (0.194)
		0-10 V	CC-E V/V	1SVR011710R2100	0.083 (0.183)
		0-20 mA	CC-E V/I	1SVR011711R1600	0.084 (0.185)
		4-20 mA	CC-E V/I	1SVR011712R1700	0.084 (0.187)
	0-20 mA	0-10 V	CC-E I/V	1SVR011713R1000	0.082 (0.181)
		0-20 mA	CC-E I/I	1SVR011714R1100	0.084 (0.187)
		4-20 mA	CC-E I/I	1SVR011715R1200	0.084 (0.185)
		0-10 V	CC-E I/V	1SVR011716R1300	0.084 (0.185)
	4-20 mA	0-20 mA	CC-E I/I	1SVR011717R1400	
		4-20 mA	CC-E I/I	1SVR011718R2500	0.084 (0.187)
110-240 V AC	0-5 V, 0-10 V 0-20 mA, 4-20 mA	-10...+10 V	CC-E V/V	1SVR011719R2600	0.082 (0.181)
		0-5 V, 0-10 V	CC-E/STD 3)	1SVR011705R2100	0.090 (0.198)
		0-10 V	CC-E V/V	1SVR011720R2300	0.096 (0.212)
		0-20 mA	CC-E V/I	1SVR011721R1000	0.087 (0.192)
	0-20 mA	4-20 mA	CC-E V/I	1SVR011722R1100	0.091 (0.200)
		0-10 V	CC-E V/V	1SVR011723R1200	0.091 (0.200)
		0-20 mA	CC-E V/I	1SVR011724R1300	0.088 (0.194)
		4-20 mA	CC-E V/I	1SVR011725R1400	
	4-20 mA	0-10 V	CC-E V/V	1SVR011726R1500	0.096 (0.212)
		0-20 mA	CC-E V/I	1SVR011727R1600	0.087 (0.192)
		4-20 mA	CC-E V/I	1SVR011728R2700	0.088 (0.194)
		-10...+10 V	CC-E V/V	1SVR011729R2000	0.086 (0.190)
	loop powered 0-20 mA, 4-20 mA	0-20 mA, 4-20 mA	CC-E I/I-12)	1SVR010200R1600	0.038 (0.084)
			CC-E I/I-22)	1SVR010201R0300	0.044 (0.097)
24-48 V DC, 110-240 V AC, 100-300 V DC, 24 V AC	refer to table	refer to table 2 c/o	CC-U/STD	1SVR040000R1700	0.125 (0.276)
				1SVR040001R0400	0.126 (0.278)
				1SVR040010R0000	0.142 (0.313)
				1SVR040011R2500	



CC-E/I



CC-E V/V



CC-E I/I-2



CC-U/STD

1) 1604 Class I, Div.2 (universal device)

2) CC-E-I/I-1 has 1 channel, CC-E-I/I-1 has 2 channels

3) 3-way electrical isolation

4) with relay output

Temperature signal converters

Ordering details



CC-E/RTD



CC-U/RTD

RTD Converters

Supply voltage range	Input signal	Output signal	Type	Catalog number	Weight (1 pce) kg (lb)
24 V DC	refer to table	0-10 V, 0-20 mA, 4-20 mA	CC-E/RTD ¹⁾	1SVR011701R2500	0.091 (0.200)
		0-10 V	CC-E RTD/V	1SVR011730R2500	0.084 (0.185)
		0-20 mA	CC-E RTD/I	1SVR011731R1200	0.086 (0.190)
		4-20 mA	CC-E RTD/I	1SVR011732R1300	
	PT100 0...100 °C	0-10 V	CC-E RTD/V	1SVR011733R1400	0.083 (0.183)
		0-20 mA	CC-E RTD/I	1SVR011734R1500	0.084 (0.185)
		4-20 mA	CC-E RTD/I	1SVR011735R1600	0.084 (0.187)
		0-10 V	CC-E RTD/V	1SVR011736R1700	0.084 (0.185)
	PT100 0...300 °C	0-20 mA	CC-E RTD/I	1SVR011737R1000	0.084 (0.187)
		4-20 mA	CC-E RTD/I	1SVR011738R2100	0.101
		0-10 V	CC-E RTD/V	1SVR011739R2200	0.084 (0.185)
		0-20 mA	CC-E RTD/I	1SVR011740R0700	0.084 (0.187)
	PT100 -50...+50 °C	4-20 mA	CC-E RTD/I	1SVR011741R2400	
		0-10 V, 0-20 mA, 4-20 mA	CC-E/RTD	1SVR011706R2200	0.093 (0.205)
		0-10 V	CC-E RTD/V	1SVR011788R2400	0.086 (0.190)
		0-20 mA	CC-E RTD/I	1SVR011789R2500	0.088 (0.194)
110-240 V AC	refer to table	4-20 mA	CC-E RTD/I	1SVR011790R2200	0.089 (0.196)
		0-10 V	CC-E RTD/V	1SVR011791R1700	0.087 (0.192)
		0-20 mA	CC-E RTD/I	1SVR011792R1000	0.089 (0.196)
		4-20 mA	CC-E RTD/I	1SVR011793R1100	
	PT100 -50...+50 °C	0-10 V	CC-E RTD/V	1SVR011794R1200	0.087 (0.192)
		0-20 mA	CC-E RTD/I	1SVR011795R1300	0.089 (0.196)
		4-20 mA	CC-E RTD/I	1SVR011796R1400	
		0-10 V	CC-E RTD/V	1SVR011797R1500	0.086 (0.190)
	PT100 0...300 °C	0-20 mA	CC-E RTD/I	1SVR011798R2600	0.089 (0.196)
		4-20 mA	CC-E RTD/I	1SVR011799R2700	0.088 (0.194)
		0-10 V	CC-E RTD/V	1SVR011797R1500	0.086 (0.190)
		0-20 mA	CC-E RTD/I	1SVR011798R2600	0.089 (0.196)
	PT100 -50...+250 °C	4-20 mA	CC-E RTD/I	1SVR011799R2700	0.088 (0.194)
		0-10 V, 0-20 mA, 4-20 mA	CC-E/RTD	1SVR011706R2200	0.093 (0.205)
		0-10 V	CC-E RTD/V	1SVR011788R2400	0.086 (0.190)
		0-20 mA	CC-E RTD/I	1SVR011789R2500	0.088 (0.194)
24-48 V DC, 100-300 V DC, 110-240 V AC, 24 V AC	refer to table	refer to table 2 c/o	CC-U/RTD	1SVR040002R0500	0.126 (0.278)
				1SVR040003R0600	0.128 (0.282)
			CC-U/RTDR ³⁾	1SVR040012R2600	0.146 (0.322)
				1SVR040013R2700	0.148 (0.326)

1) 1604 Class I, Div.2 (universal device)

2) CC-E-i/i-1 has 1 channel; CC-E-1/1-1 has 2 channels

3) with relay output

Thermocouple converters

Ordering details



CC-E TC

Thermocouple converters

Supply voltage range	Input signal	Output signal	Type	Catalog number	Weight (1 pce) kg (lb)
24 V DC	thermocouple types J and K type J 0...600 °C	0-10 V, 0-20 mA, 4-20 mA	CC-E/TC ¹⁾	1SVR011702R2600	0.089 (0.196)
		0-10 V	CC-E TC/V	1SVR011750R0100	0.087 (0.192)
		0-20 mA	CC-E TC/I	1SVR011751R2600	0.084 (0.187)
	type K 0...1000 °C	4-20 mA	CC-E TC/I	1SVR011752R2700	0.102
		0-10 V	CC-E TC/V	1SVR011753R2000	0.084 (0.185)
		0-20 mA	CC-E TC/I	1SVR011754R2100	
110-240 V AC	thermocouple types J and K type J 0...600 °C	0-10 V, 0-20 mA, 4-20 mA	CC-E/TC	1SVR011707R2300	0.088 (0.194)
		0-10 V	CC-E TC/V	1SVR011760R0300	0.084 (0.187)
		0-20 mA	CC-E TC/I	1SVR011761R2000	0.088 (0.194)
	type K 0...1000 °C	4-20 mA	CC-E TC/I	1SVR011762R2100	0.1 (0.220)
		0-10 V	CC-E TC/V	1SVR011763R2200	0.086 (0.190)
		0-20 mA	CC-E TC/I	1SVR011764R2300	0.088 (0.194)
24-48 V DC, 100-300 V DC, 110-240 V AC, 24 V AC	refer to table	refer to table 2 c/o	CC-U/TC	1SVR040004R0700	0.130 (0.287)
				1SVR040005R0000	0.128 (0.282)
				1SVR040014R2000	0.145 (0.320)
				1SVR040015R2100	

1) with relay output

Measuring converters

Ordering details

CC-E I_{AC}/ILPO

CC-U/I

Measuring converters

Supply voltage range	Input signal	Output signal	Type	Catalog number	Weight (1 pce) kg (lb)
24 V DC	0-5 A, 0-20 A, AC/DC	0-10 V, 0-20 mA, 4-20 mA	CC-E/I ¹⁾	1SVR011703R2700	0.096 (0.212)
		0-10 V	CC-E I _{AC} /V ¹⁾	1SVR011770R0500	0.090 (0.198)
		0-20 mA	CC-E I _{AC} /I ¹⁾	1SVR011771R2200	0.092 (0.203)
		4-20 mA	CC-E I _{AC} /I ¹⁾	1SVR011772R2300	
		0-10 V	CC-E I _{DC} /V ¹⁾	1SVR011773R2400	0.092 (0.207)
		0-20 mA	CC-E I _{DC} /I ¹⁾	1SVR011774R2500	0.091 (0.200)
		4-20 mA	CC-E I _{DC} /I ¹⁾	1SVR011775R2600	0.093 (0.205)
110-240 V AC	0-5 A, 0-20 A, AC/DC	0-10 V, 0-20 mA, 4-20 mA	CC-E/I ¹⁾	1SVR011708R0400	0.099 (0.218)
		0-10 V	CC-E I _{AC} /V ¹⁾	1SVR011780R1100	0.092 (0.203)
		0-20 mA	CC-E I _{AC} /I ¹⁾	1SVR011781R0600	0.092 (0.207)
		4-20 mA	CC-E I _{AC} /I ¹⁾	1SVR011782R0700	0.095 (0.209)
		0-10 V	CC-E I _{DC} /V ¹⁾	1SVR011783R0000	0.093 (0.205)
		0-20 mA	CC-E I _{DC} /I ¹⁾	1SVR011784R0100	0.095 (0.209)
		4-20 mA	CC-E I _{DC} /I ¹⁾	1SVR011785R1100	
250 V AC	0-1 A, 0-5 A, AC	4-20 mA	CC-E I _{AC} /ILPO ²⁾	1SVR010203R0500	0.052 (0.115)
24-48 V DC, 100-300 V DC, 110-240 V AC, 24 V AC	refer to table	refer to table	CC-U/I ³⁾	1SVR040006R0100	0.128 (0.282)
				1SVR040007R0200	0.127 (0.280)
			CC-U/V ⁴⁾	1SVR040008R1300	0.128 (0.282)
				1SVR040009R1400	

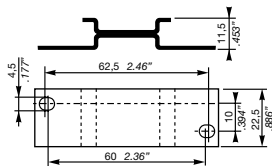
⁵⁾ with relay output
⁶⁾ for sinusoidal currents
⁷⁾ for current RMS values
⁸⁾ for voltage RMS values

Analog signal converters
Accessories
Approximate dimensions

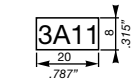
Accessories

For type	Width in mm	Type	Catalog number	Pkg qty	Weight (1 pce) g (oz)
CC-U	22.5	ADP.01	1SVR430029R0100	1	18.4 (0.65)
CC-U		MAR.01	1SVR366017R0100	10	0.19 (0.007)
CC-U	22.5	COV.01	1SVR430005R0100	1	5.2 (0.18)

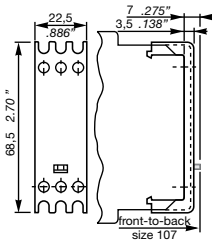
Approximate dimensions



ADP.01



MAR.01



Sealable cover - COV.01

Analog signal converters

Technical data

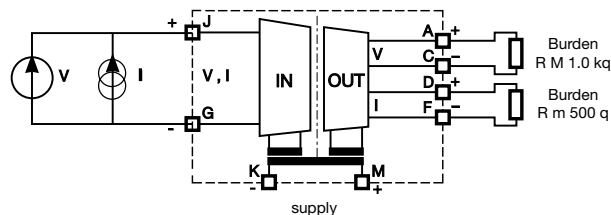
CC-E/STD, CC-E x/x (universal devices)

DIP switch settings

Input	Output	Switch							
		1	2	3	4	5	6	7	8
0...5 V	0...5 V								
	0...10 V								
	0...20 mA								
	4...20 mA								
0...10 V	0...5 V								
	0...10 V								
	0...20 mA								
	4...20 mA								
0...20 mA	0...5 V								
	0...10 V								
	0...20 mA								
	4...20 mA								
4...20 mA	0...5 V								
	0...10 V								
	0...20 mA								
	4...20 mA								

Legend	
■	ON
□	OFF

Wiring instruction



CC-U/STD

DIP switch settings

Input	Switch 1								Gain	Coarse Type
	1	2	3	4	5	6	7	8		
Potentiometer									0	0
0...50 mV									A...D	C
0...100 mV									4...5	5
0...250 mV									0...1	1
0...500 mV									7...9	8
0...1 V									3...4	3
0...2.5 V									0	0
0...5 V									5...7	6
0...10 V									2	2
1...5 V									7...9	8
2...10 V									2...4	3
-10...+10 V									0	0
0...125 mV									3...4	3
0...8 V									3...4	3
-22.5...+22.5 mV									B...F	D
-11...+11 V									0	0
2.5...7.5 V									5...7	6
3.33...9.99 V									3...4	4
10...0 V									2	2
100...0 mV									4...5	5
0...1 mA									A...D	B
0...20 mA									2...4	3
4...20 mA									4...5	4
10...50 mA									0...1	1
20...4 mA									4...5	4
20...0 mA									4...2	3
-0.45...+0.45 mA									B...F	D
-55...+55 mA									4...6	5
High fail safe *)									-	-
Low fail safe *)									-	-
No fail safe *)									-	-

*) Detection of input voltage signal interruptions:

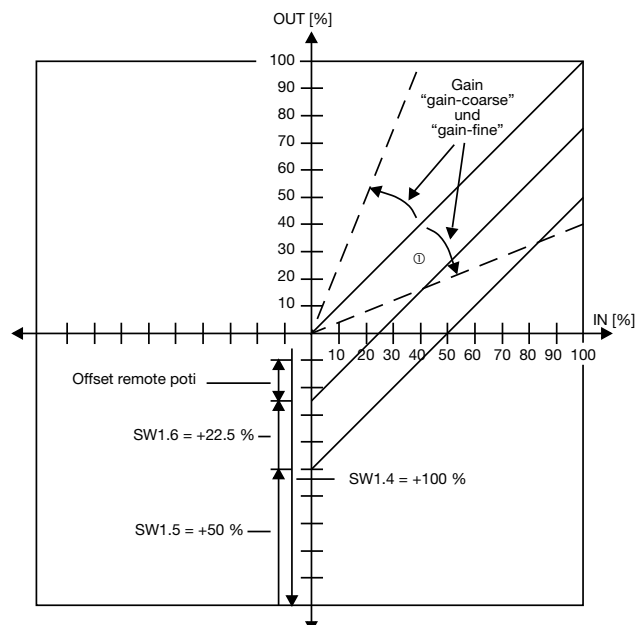
If the input signal circuit is interrupted, the output signal changes to the adjusted minimum value (low fail safe) or maximum value (high fail safe).

If "No fail safe" is configured, input signal interruptions are not detected.

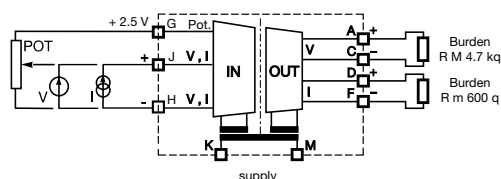
Output	Switch 2					
	1	2	3	4	5	6
0...5 V						
0...10 V						
1...5 V						
2...10 V						
-10...+10 V						
-5...+5 V						
-10...0 V						
-5...0 V						
0...6.66 V						
-10...+3.33 V						
-5...+1.66 V						
0...8 V						
0...4 V						
-10...-2 V						
-5...-1 V						
1.25...6.25 V						
-7.5...+2.5 V						
-3.75...+1.25 V						
1.66...8.33 V						
-6.66...+6.66 V						
-3.33...+3.33 V						
-8...0 V						
-4...0 V						
0...1 mA						
0...20 mA						
4...20 mA						
0...10 mA						
0...0.5 mA						
0...13.33 mA						
0...666 μA						
0...16 mA						
0...800 μA						
0...8 mA						
0...400 μA						
2.5...12.5 mA						
125...625 μA						
3.33...16.66 mA						
166...833 μA						
0.2...1 mA						
2...10 mA						
100...500 μA						

Legend	
■	ON
□	OFF
□	no influence

Adjustment range



Wiring instruction

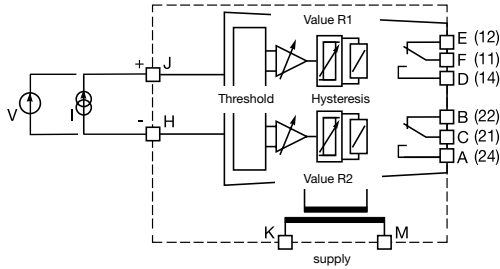


Analog signal converters

Technical data

CC-U/STDR with relay output

Wiring instruction

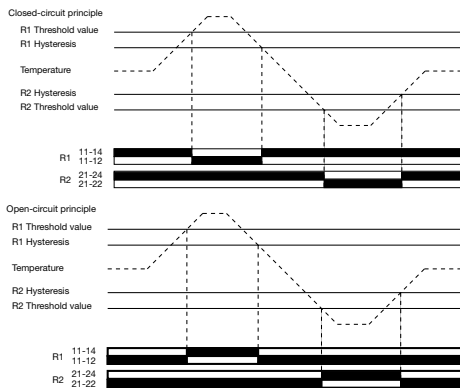


DIP switch settings

Input	Switch					
	1	2	3	4	5	6
0...0 V						
0...5 V						
0...1 V						
-10...+10 V						
1...5 V						
0...20 mA						
4...20 mA						
Output						
Closed-circuit principle						
Open-circuit principle						

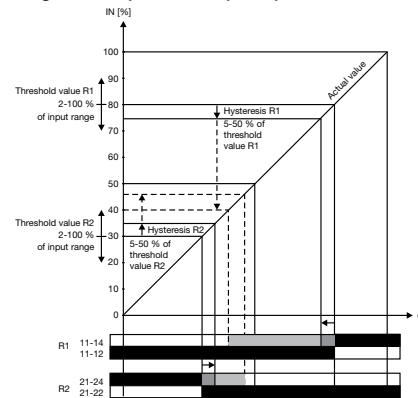
Legend	
■	ON
□	OFF
□	no influence

Function diagrams



Switching points

Switching points of the output relay depending on the input range, configuration open-circuit principle



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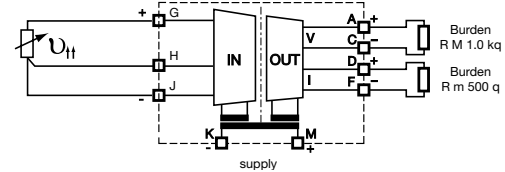
CC-E/RTD

DIP switch settings

Input	Output	Switch					
		1	2	3	4	5	6
0...100 °C	0...10 V						
	0-20 mA						
	4-20 mA						
0...300 °C	0-10 V						
	0-20 mA						
	4-20 mA						
0...500 °C	0-10 V						
	0-20 mA						
	4-20 mA						
-50...+50 °C	0-10 V						
	0-20 mA						
	4-20 mA						
-50...+250 °C	0-10 V						
	0-20 mA						
	4-20 mA						
-50...+450 °C	0-10 V						
	0-20 mA						
	4-20 mA						
High fail safe							
Low fail safe							

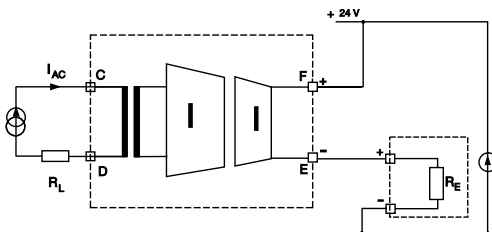
Legend	
■	ON
□	OFF
□	no influence

Wiring instruction



CC-E I_{AC}/ILPO

Wiring instruction



Analog signal converters

Technical data

CC-U/RTD

DIP switch settings

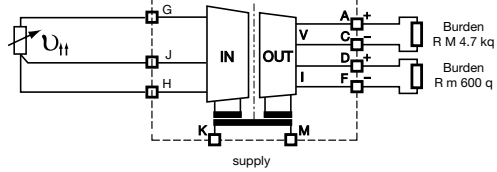
Input		Switch 1						Switch 2						Gain Coarse
Type	Range	1	2	3	4	5	6	1	2	3	4	5	6	
PT10	0...500 °C													F
	0...550 °C													E
	0...600 °C													D
	0...650 °C													C
	0...700 °C													B
	0...750 °C													A
	0...800 °C													9
PT100	0...850 °C													8
	0...50 °C													F
	0...60 °C													E
	0...70 °C													B
	0...80 °C													A
	0...90 °C													9
	0...100 °C													8
PT1000	0...200 °C													3
	0...300 °C													2
	0...400 °C													1
	0...500 °C													0
	0...10 °C													8
	0...20 °C													3
	0...30 °C													2
PT1000	0...40 °C													1
	0...50 °C													0
	0...60 °C													0
Low fail safe *)														-
High fail safe *)														-

Output		Switch 3					
		1	2	3	4	5	6
0...5 V							
0...10 V							
1...5 V							
2...10 V							
-10...+10 V							
-5...+5 V							
-10...0 V							
-5...0 V							
0...6.66 V							
-10...+3.33 V							
-5...+1.66 V							
0...8 V							
0...4 V							
-10...-2 V							
-5...-1 V							
1.25...6.25 V							
-7.5...+2.5 V							
-3.75...+1.25 V							
1.66...8.33 V							
-6.66...+6.66 V							
-3.33...+3.33 V							
-8...0 V							
-4...0 V							
0...1 mA							
0...20 mA							
4...20 mA							
0...10 mA							
0...0.5 mA							
0...13.33 mA							
0...666 µA							
0...16 mA							
0...800 µA							
0...8 mA							
0...400 µA							
2.5...12.5 mA							
125...625 µA							
3.33...16.66 mA							
166...833 µA							
0.2...1 mA							
2...10 mA							
100...500 µA							

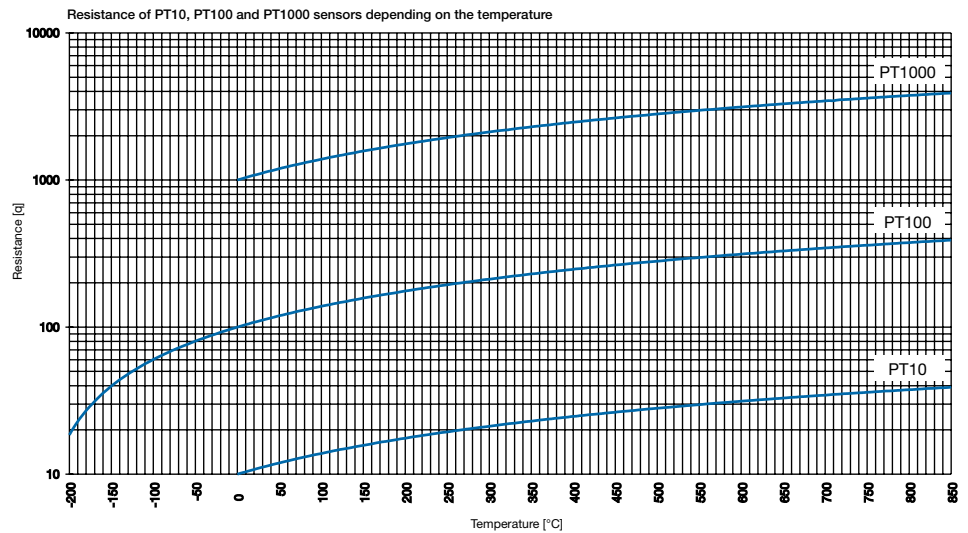
Legend	
■	ON
□	OFF
□	no influence

Wiring instruction

*) Detection of input signal interruptions:
If the input signal circuit is interrupted, the output signal changes to the adjusted minimum value (low fail safe) or maximum value (high fail safe).



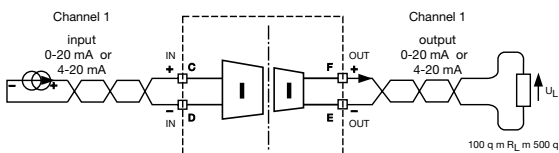
Characteristic curves



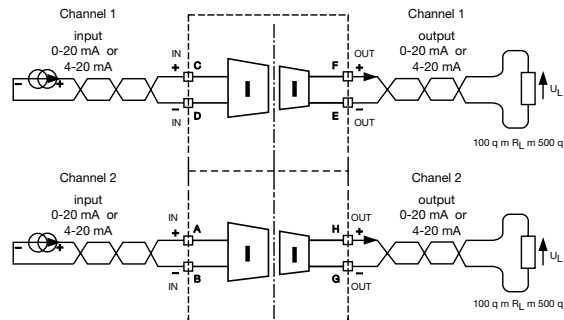
CC-E I/I-1 and CC-E I/I-2

Wiring instruction

CC-E I/I-1



CC-E I/I-2



Analog signal converters

Technical data

Signal converters

CC-U/RTDR with relay output

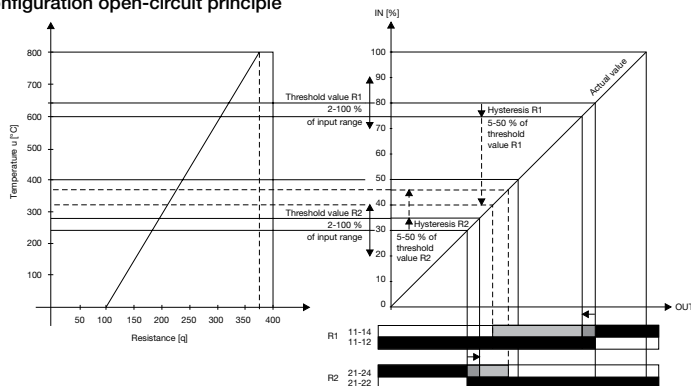
DIP switch settings

Input PT100	Switch					
0...100 °C	1	2	3	4	5	6
0...200 °C						
0...400 °C						
0...600 °C						
0...800 °C						
Output						
Closed-circuit principle						
Open-circuit principle						

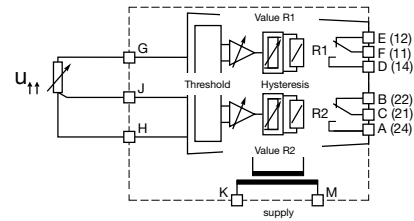
Legend	
■	ON
□	OFF
■	no influence

Switching points

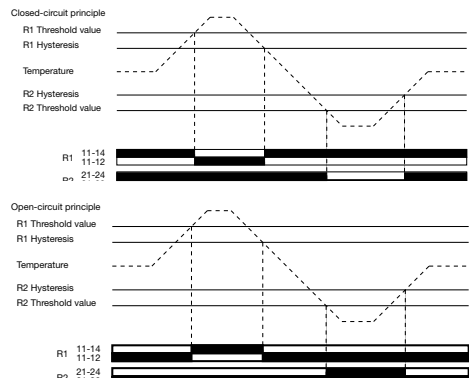
Switching points of the output relay depending on the input range, configuration open-circuit principle



Wiring instruction



Function diagrams



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CC-E/TC, CC-E/I

DIP switch settings CC-E/TC

Input	Output	Switch					
TC-J:	0...10 V	1	2	3	4	5	6
0...600 °C	0...20 mA						
	4...20 mA						
TC-K:	0...10 V						
0...1000 °C	0...20 mA						
	4...20 mA						
High fail safe							
Low fail safe							

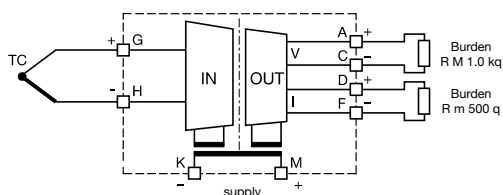
Legend	
■	ON
□	OFF
■	no influence

DIP switch settings CC-E/I

Input	Output	Switch					
I - DC	0...10 V	1	2	3	4	5	6
I - AC							
I - DC	0...20 mA						
I - AC							
I - DC	4...20 mA						
I - AC							

Legend	
■	ON
□	OFF

Wiring instruction CC-E/TC and CC-E/I



Input range selection - CC-E/I

Select input range by terminals			
Input range 5 A			
Connected lines	5 A	20 A	C
Used terminals			
Terminal marking			
Input range 20 A			
Connected lines	5 A	20 A	C
Used terminals			
Terminal marking			

Analog signal converters

Technical data

CC-U/V

DIP switch settings

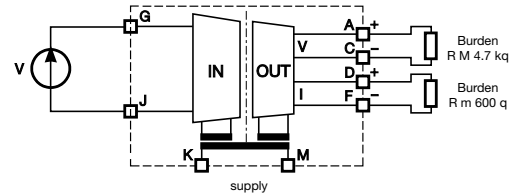
Output	Switch
0...5 V	1 2 3 4 5 6
0...10 V	
1...5 V	
2...10 V	
-10...+10 V	
-5...+5 V	
-10...0 V	
-5...0 V	
0...6.66 V	
-10...+3.33 V	
-5...+1.66 V	
0...8 V	
0...4 V	
-10...-2 V	
-5...-1 V	
1.25...6.25 V	
-7.5...+2.5 V	
-3.75...+1.25 V	
1.66...8.33 V	
-6.66...+6.66 V	
-3.33...+3.33 V	
-8...0 V	
-4...0 V	
0...1 mA	
0...20 mA	
4...20 mA	
0...10 mA	
0...0.5 mA	
0...13.33 mA	
0...666 μ A	
0...16 mA	
0...800 μ A	
0...8 mA	
0...400 μ A	
2.5...12.5 mA	
125...625 μ A	
3.33...16.66 mA	
166...833 μ A	
0.2...1 mA	
2...10 mA	
100...500 μ A	

Legend
ON
OFF
no influence

Input range selection

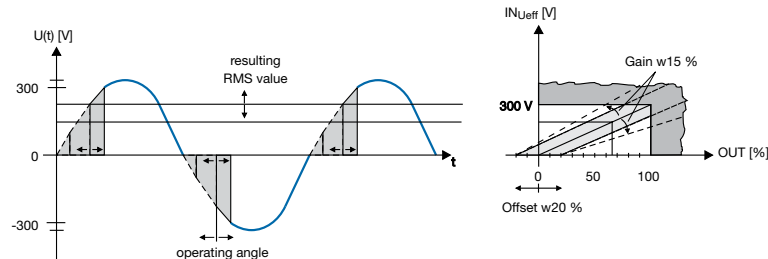
Selecting input range by front-face rotary switch	Switch position
0...100 V	1
0...150 V	2
0...250 V	3
0...300 V	4
0...400 V	5
0...450 V	6
0...550 V	7
0...600 V	8

Wiring instruction



Example of application

RMS measurement and conversion of a phase-angle controlled voltage signal $L1 = 230$ V



CC-U/I

DIP switch settings

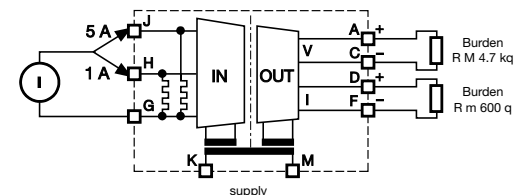
Output	Switch
0...5 V	1 2 3 4 5 6
0...10 V	
1...5 V	
2...10 V	
-10...+10 V	
-5...+5 V	
-10...0 V	
-5...0 V	
0...6.66 V	
-10...+3.33 V	
-5...+1.66 V	
0...8 V	
0...4 V	
-10...-2 V	
-5...-1 V	
1.25...6.25 V	
-7.5...+2.5 V	
-3.75...+1.25 V	
1.66...8.33 V	
-6.66...+6.66 V	
-3.33...+3.33 V	
-8...0 V	
-4...0 V	
0...1 mA	
0...20 mA	
4...20 mA	
0...10 mA	
0...0.5 mA	
0...13.33 mA	
0...666 μ A	
0...16 mA	
0...800 μ A	
0...8 mA	
0...400 μ A	
2.5...12.5 mA	
125...625 μ A	
3.33...16.66 mA	
166...833 μ A	
0.2...1 mA	
2...10 mA	
100...500 μ A	

Legend
ON
OFF
no influence

Input range selection

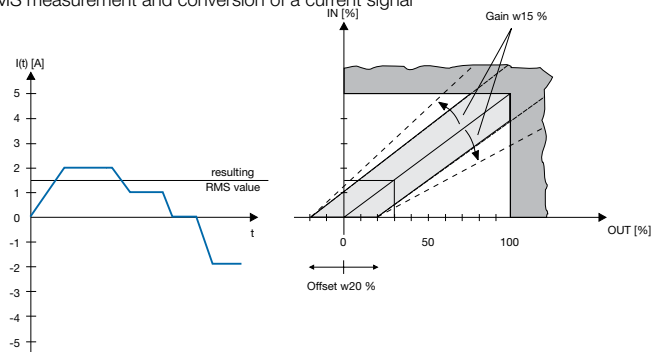
Select input range by terminals
Input range 1 A
Connected lines
Used terminals
Terminal marking
5 A 1 A C
Input range 5 A
Connected lines
Used terminals
Terminal marking
5 A 1 A C

Wiring instruction



Example of application

RMS measurement and conversion of a current signal



Analog signal converters

Technical data

CC-U/TC

DIP switch settings

Output	Switch 3
0...5 V	1 2 3 4 5 6
0...10 V	
1...5 V	
2...10 V	
-10...+10 V	
-5...+5 V	
-10...0 V	
-5...0 V	
0...6.66 V	
-10...+3.33 V	
-5...+1.66 V	
0...8 V	
0...4 V	
-10...-2 V	
-5...-1 V	
125...625 V	
-75...+25 V	
-3.75...+1.25 V	
1.66...8.33 V	
-6.66...+6.66 V	
-3.33...+3.33 V	
-8...0 V	
-4...0 V	
0...1 mA	
0...20 mA	
4...20 mA	
0...10 mA	
0...0.5 mA	
0...13.33 mA	
0...666 μ A	
0...16 mA	
0...800 μ A	
0...8 mA	
0...400 μ A	
2.5...12.5 mA	
125...625 μ A	
3.33...16.66 mA	
166...833 μ A	
0.2...1 mA	
2...10 mA	
100...500 μ A	

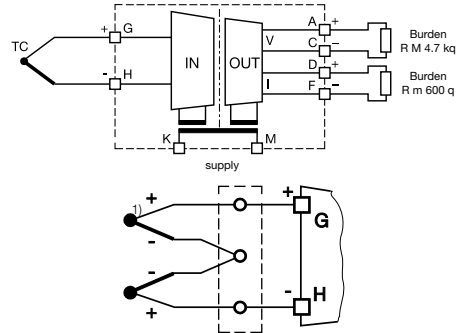
Input	Switch 1	Switch 2
Type	1 2 3 4 5 6	1 2 3 4 5 6
K	0-100...900 °C	
J	0-250...1350 °C	
T	0-100...750 °C	
S	0-100...400 °C	
E	0-250...1550 °C	
N	0-100...700 °C	
R	0-200...1000 °C	
B	0-100...650 °C	
mV	0-250...1300 °C	
9-2...10 mV		
0-10...50 mV		
Low fail safe *)		
High fail safe *)		

*) Detection of input signal interruptions:

If the input signal circuit is interrupted, the output signal changes to the adjusted minimum value (low fail safe) or maximum value (high fail safe).

Legend
ON
OFF
no influence

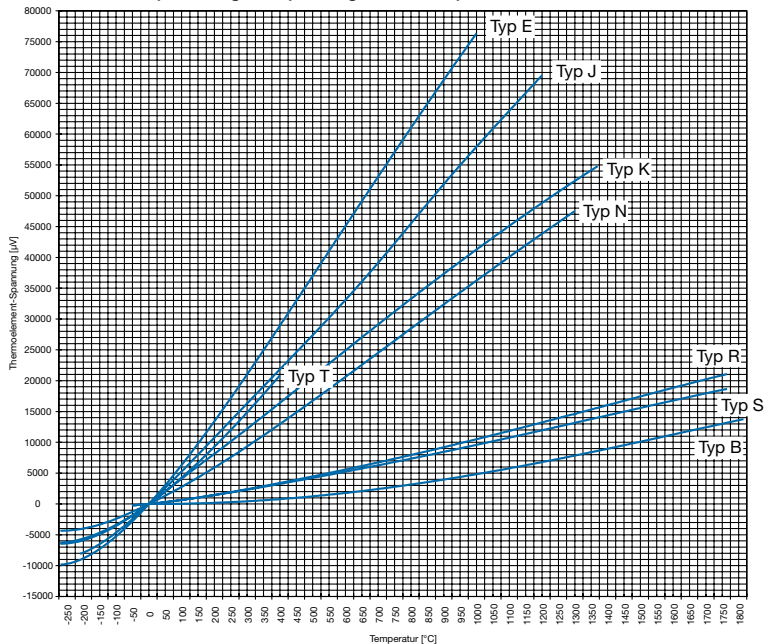
Wiring instruction



without cold-junction compensation:
switch SW2.2 = OFF

Characteristic curve

Thermocouple voltages depending on the temperature



Analog signal converters

Technical data

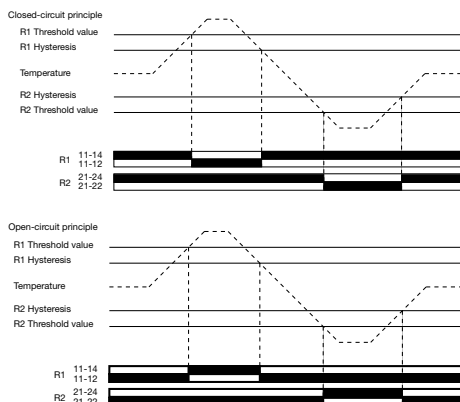
CC-U/TCR with relay output

DIP switch settings

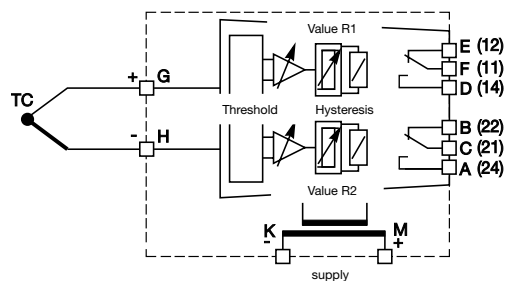
Type	Input		Switch					
	Range		1	2	3	4	5	6
J	0...240 °C							
	0...480 °C							
	0...1200 °C							
K	0...250 °C							
	0...500 °C							
	0...1350 °C							
T	-150...+120 °C							
	0...220 °C							
	0...400 °C							
S	0...210 °C							
	0...380 °C							
	0...860 °C							
Output								
Closed-circuit principle								
Open-circuit principle								

Legend	
■	ON
□	OFF
□	no influence

Function diagrams

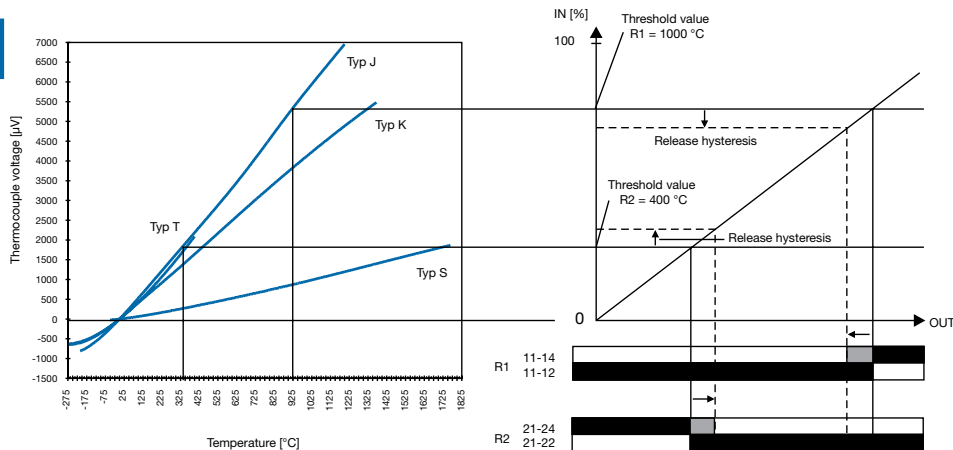


Wiring instruction



Switching points

Switching points of the output relay depending on the input range, configuration open-circuit principle



Analog signal converters

Technical data

Signal converters

Type	CC-E/STD		CC-E/RTD ³⁾	CC-E/TC
Input circuits - Analog inputs	J-G-H		Current	Voltage
Input signal	Standard signals		Temperature sensors	
Rated input range	0...20 mA / 4...20 mA		PT100	
	+55 mA		-50...+500 °C	
Limitation of input signals	0...5 V / 0...10 V / -10...+10 V		TC.K: 0...1000 °C, TC.J: 0...600 °C	
Influence of line resistance	± 5 % (universal devices)		< 0.01 %/Ω	
Gain adjustment range	± 5 % (universal devices)		< 0.5 % / 100 Ω	
Offset adjustment range	50 Ω		1 MΩ	
Input impedance	-		-	
Suppression at 50 Hz	-		-	
Common-mode rejection	-		100 dB	
Output circuits - Analog outputs	D-F, A-C		Current	Voltage
Output signal	0-20 mA, 4-20 mA		0-5 V, 0-10 V	
Output burden	≤ 500 Ω		≥ 1.0 kΩ	
Accuracy ¹⁾	± 0.5 % of full-scale			
Residual ripple	< 0.5 %			
Response time	200 μs		10 ms	
Transmission frequency	2 kHz		80 Hz	
Reaction to input circuit interruption			2 Hz (up to -3 dB)	
			High fail safe: Output voltage > 115 % of measuring range ²⁾	
			Low fail safe: Output voltage < -0.6 V, output current = 0 mA	
Supply circuits	K-M		DC versions	AC versions
Supply voltage	24 V DC		110-240 V AC - 50/60 Hz	
Supply voltage tolerance	-15...+15 %		-15...+10 %	
Power consumption	1.5 W typ.		1.5 VA typ.	
Indication of operational states			U: green LED	
General data				
Ambient temperature range operation / storage	0...+60 °C / -20...+80 °C			
Temperature coefficient	± 500 ppm/°C			
Degree of protection (DIN 40050)	IP20			
Mounting position	ventilation slots on top and bottom			
Mounting	DIN rail (IEC/EN 60715), snap-on mounting			
Electrical connection				
Wire size rigid	0.2-4 mm ² (24-12 AWG)			
fine-strand with(out) wire end ferrule	0.2-2.5 mm ² (24-14 AWG)			
Stripping length	7 mm (0.28 inch)			
Tightening torque	0.5 Nm (4.4 lb.in)			
Electromagnetic compatibility				
Interference immunity	EN 61000-6-2			
electrostatic discharge (ESD)	IEC/EN 61000-4-2		Level 3 (±6 kV / ±8 kV)	
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3		10 V/m	
fast transients (Burst)	IEC/EN 61000-4-4		Level 3 (±2 kV / 5 kHz)	
powerful impulses (Surge)	IEC/EN 61000-4-5		±2 kV / ±1 kV	
HF line emission	IEC/EN 61000-4-6		10 V	
Interference emission	EN 61000-6-4		Class B	
Isolation data				
Test voltage between all isolated circuits	2.5 kV AC			
Rated insulation voltage	-		-	

¹⁾ Includes non-linearity and factory setting, influenced by supply voltage and output load.

²⁾ Only -/RTD and -/TC: Single-function devices respond with Low fail safe to input signal interruptions.

³⁾ When connecting a 2-wire sensor, the terminals J and H have to be jumpered.

Analog signal converters

Technical data

Type		CC-E I/I
Input circuits - Analog inputs		Current
Input current I_{IN}		0-20 mA, 4-20 mA
Min. input current		< 100 μ A
Max. input current		50 mA ¹⁾ ($V_{IN} < 18$ V)
Input voltage U_{IN}		< 2.5 V + ($I_{IN} \times R_L$)
Input voltage drop U_i		< 2.5 V (20 mA, $R_L = 0 \Omega$)
Max. input voltage		18 V ¹⁾ ($I_{IN} < 50$ mA)
Output circuits		
Output current I_{OUT}		0-20 mA, 4-20 mA
Output load R_L		0-500 Ω
Output voltage U_{OUT}		$I_{OUT} \times R_L$
Residual ripple		< 20 mV _{pp} (500 Ω , 20 mA)
Response time (0-100 %)		< 15 ms (0-500 Ω , 20 mA), < 5 ms (500 Ω , 20 mA, 25 °C)
Accuracy		≤ 0.1 % of full-scale (20 mA)
Load influence (0-500 Ω)		$\leq \pm 0.05$ % / 100 Ω , ≤ -0.1 % / 100 Ω (25 °C)
General data		
Width of the enclosure		18 mm
Weight	1 channel	approx. 0.037 kg (0.082 (0.181) lb)
	2 channel	approx. 0.044 (0.097) kg (0.097 lb)
Mounting position		any
Degree of protection	enclosure / terminals	IP20 / IP20
Ambient temperature range	operation / storage	-25...+60 °C / -40...+85 °C
Temperature coefficient		< ± 50 ppm / °C
Mounting		DIN rail (IEC/EN 60715)
Electrical connection		
Wire size	rigid	0.2-4 mm ² (24-12 AWG)
	fine-strand with(out) wire end ferrule	0.2-2.5 mm ² (24-14 AWG)
Stripping length		7 mm (0.28 inch)
Tightening torque		0.5 Nm (4.4 lb.in)
Standards		
Product standard		EN 50178
Low Voltage Directive		2006/95/EC
EMC Directive		2004/108/EC
Electromagnetic compatibility		
Interference immunity		EN 61000-6-2
electrostatic discharge (ESD)	EN 61000-4-2	Level 3 (± 6 kV / ± 8 kV)
electromagnetic field (HF radiation resistance)	EN 61000-4-3	10 V/m
fast transients (Burst)	EN 61000-4-4	Level 3 (± 2 kV / 5 kH)
powerful impulses (Surge)	EN 61000-4-5	± 2 kV / ± 1 kV
HF line emission	EN 61000-4-6	10 V
magnetisches Feld	EN 61000-4-8	30 A/m
Interference emission		EN 61000-6-4
Radiated noise	EN 55011	Class B
Operational reliability (EN 68-2-6)		4 g
Mechanical resistance (EN 68-2-6)		10 g
Environmental testing (IEC 68-2-30 Db)		24 h cycle, 55 °C, 93 % rel., 96 h
Isolation data		
Insulation voltage input / output		500 V _{eff} / 50 Hz
Insulation voltage between channels		5 kV _{eff} / 50 Hz (device with 2 channels)
Pollution category		2
Overvoltage category		II

¹⁾ The input parameters have to be limited to the indicated maximum values.

Analog signal converters

Technical data

Signal converters

Type	CC-U/STD			CC-U/RTD ³⁾		CC-U/TC	
Input circuits - Analog inputs	J-G-H	Current	Voltage	Po- tentio- meter	Temperature sensors	Thermocouples (IEC 584-1 and 2)	
Input signal		0-20 mA 4-20 mA 10-50 mA 0-1 mA	0-100 mV 0-1 V 0-5 V 1-5 V 0-10 V 2-10 V ± 10 V	470 Ω - 1 MΩ ²⁾	PT10, PT100, PT1000 (IEL 751 and JICC 1604)	TC.K TC.T TC.E TC.R	TC.J TC.S TC.N TC.B
Limitation of input signals		± 55 mA	± 11 V		-	-	
Rated input range		-	-	-	Max. temperature adjust- able: 6-60 °C for PT1000 50-500 °C for PT100 500-850 °C for PT10	refer to temperature specs. of individual thermocouples	
Influence of line resistance		-	-	-	0.015 °C/Ω	< 0.01 % / 100 Ω	
Gain adjustment range (universal devices)		0.9- 110 mA	45 mV - 22 V	-	see DIP switch settings		
Offset adjustment range (universal devices)		-137.5...+62.5 %			± 5 %	± 10 %	
Input impedance		for different ranges			-	-	
without detection of input signal interruption		51 Ω	6 MΩ	3 GΩ	-	-	
with detection of input signal interruption		51 Ω	3.5 MΩ	9.5 GΩ	-	-	
Suppression at 50 Hz		-	-	-	-	> 40 dB	
Common-mode rejection		-	-	-	120 dB	105 dB	
Output circuits - Analog outputs	D-F, A-C	Current			Voltage		
Output signal		0-20 mA, 4-20 mA			0-5 V, 1-5 V, 0-10 V, 2-10 V, ± 10 V		
Output burden		≤ 600 Ω ≥			4.7 kΩ		
Accuracy ¹⁾		±0.1 % of full-scale			±0.2 % of full-scale	±0.1 % of full-scale	
Residual ripple		-			< 0.15 %	-	
Response time		200 μs			10 ms	200 ms	
Transmission frequency		1 kHz			80 Hz	2 Hz (to -3 dB)	
Supply circuits	K-M						
Rated supply voltage		24-48 V DC			110-240 V AC		
Supply voltage range		24-48 V DC / 24 V AC			110-240 V AC / 100-300 V DC		
Supply voltage tolerance		DC: -15...+15 %			AC: -15...+10 %		
Rated frequency		0 Hz or 50/60 Hz					
Power consumption		2 W at 24 V DC			4.5 VA at 230 V AC		
Indication of operational states							
Supply voltage		U: green LED					
General data							
Ambient temperature range		operation / storage					
Temperature coefficient		-20...+60 °C / -40...+80 °C					
		±150 ppm/°C			±250 ppm/°C	±200 ppm/°C at min. offset ±400 ppm/°C at max. offset	
Mounting position		any					
Mounting		DIN rail (IEC/EN 60715), snap-on mounting / screw mounting with adapter					
Electrical connection							
Wire size		rigid					
		fine-strand with(out) wire end ferrule					
Stripping length		7 mm (0.28 inch)					
Tightening torque		0.4 Nm (3.5 lb.in)					
Electromagnetic compatibility							
Interference immunity		EN 61000-6-2					
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (±6 kV / ±8 kV)					
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m					
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (±2 kV / 5 kV)					
powerful impulses (Surge)	IEC/EN 61000-4-5	±2 kV / ±1 kV					
HF line emission	IEC/EN 61000-4-6	10 V					
Interference emission	EN 61000-6-4	Class B					
Isolation data							
Isolation test (between all isolated circuits)		1.5 kV					
Test voltage (between all isolated circuits)		1.5 kV / 50 Hz					

¹⁾ Includes non-linearity and factory setting, influenced by supply voltage and output load.

²⁾ Detection of an input signal break (fail safe) and resistance > 10 kΩ results in a linearity of ±0.2 %.

³⁾ When connecting a 2-wire sensor, the terminals J and H have to be jumpered.

Analog signal converters

Technical data

Type	CC-U/STDR		CC-U/RTDR 1)	CC-U/TCR		
Input circuits - Analog inputs		J-H	Current	Voltage	Temperature sensors	Thermocouples (IEC 584-1 and 2)
Measuring signal / input range			0-20 mA 4-20 mA	0-1 V / 1-5 V 0-10 / ±10 V	PT100	TC.K, TC.J TC.T, TC.S
Input resistance			approx. 50 Ω	approx. 1,5 MΩ		
Adjustable threshold		2-100 % of selected input range				
Adjustable hysteresis		5-50 % of threshold				
Repeat accuracy (constant parameters)		±0.5 % of full-scale				
Output circuits - Relay outputs		E-D-F, B-C-A	Relay, 2 c/o contacts			
Rated switching voltage			250 V AC			
Rated switching current		AC12 (resistive) 230 V	4 A			
		AC15 (inductive) 230 V	3 A			
		DC12 (resistive) 24 V	4 A			
		DC13 (inductive) 24 V	2 A			
AC rating		Utilization category (Control Circuit Rating Code)	B 300			
(UL 508)		max. rated operational voltage	300 V AC			
		max. continuous thermal current at B 300	5 A			
		max. making/breaking apparent power at B 300	3600/360 VA			
Minimum switching voltage			12 V			
Minimum switching current / power			10 mA / 0.6 VA (W)			
Response time			10 ms			
Mechanical lifetime			30 x 10 ⁶ switching cycles			
Electrical lifetime		at AC12, 230 V, 4 A	0.1 Mio. switching cycles			
Supply circuits		K-M				
Rated supply voltage			24-48 V DC		110-240 V AC	
Supply voltage range			24-48 V DC / 24 V AC		110-240 V AC / 100-300 V DC	
Supply voltage tolerance			DC: -15...+15 %		AC: -15...+10 %	
Rated frequency			0 Hz or 50/60 Hz			
Power consumption			2 W at 24 V DC		4.5 VA at 230 V AC	
Indication of operational states						
Supply voltage		U: green LED				
1st / 2nd output relay energized		R1: yellow LED / R2: yellow LED				
General data						
Ambient temperature range		operation / storage		-20...+60 °C / -40...+80 °C		
Temperature coefficient		±300 ppm/°C				
Mounting position		any				
Mounting		DIN rail (IEC/EN 60715), snap-on mounting / screw mounting with adapter				
Electrical connection						
Wire size		rigid	plug-connector with screw terminals 0.2-2.5 mm ² (24-12 AWG)			
		fine-strand with(out) wire end ferrule	plug-connector with screw terminals 0.2-2.5 mm ² (24-12 AWG)			
Stripping length		7 mm (0.28 inch)				
Tightening torque		0.4 Nm (3.5 lb.in)				
Electromagnetic compatibility						
Interference immunity		EN 61000-6-2				
electrostatic discharge (ESD)		IEC/EN 61000-4-2	Level 3 (±6 kV / ±8 kV)			
electromagnetic field (HF radiation resistance)		IEC/EN 61000-4-3	10 V/m			
fast transients (Burst)		IEC/EN 61000-4-4	Level 3 (±2 kV / 5 kHz)			
powerful impulses (Surge)		IEC/EN 61000-4-5	±2 kV / ±1 kV			
HF line emission		IEC/EN 61000-4-6	10 V			
Interference emission		EN 61000-6-4	Class B			
Isolation data						
Insulation voltage (between all isolated circuits)		2.5 kV				
Test voltage (between all isolated circuits)		2.5 kV				

1) When connecting a 2-wire sensor, the terminals J and H have to be jumpered.

Analog signal converters

Technical data

Signal converters

Type	CC-E/I		CC-E I _{AC} /ILPO	
Input circuits - Analog inputs	J-G-H		C-D	
	AC current	DC current	2 meas. ranges selectable	
	0-5 A / 0-20 A		0-1 A / 0-5 A / sinusoidal	
			50/60 Hz	
	input range 1	10 x I _{Nom} (50 A) for max. 1 s	10 x I _{Nom} (50 A) for max. 2 s	
		input range 2	10 x I _{Nom} (200 A) for max. 1 s	10 x I _{Nom} (200 A) for max. 2 s
	Gain adjustment range	±5 % (universal devices)		-
Offset adjustment range	±5 % (universal devices)		-	
Input impedance / resistance	5A : 65 mΩ	20 A : 2.5 mΩ	5 mΩ	
Output circuits - Analog outputs	D-F Current	A-C Voltage	F-E passive current output in proportion to input current	
Output signal	0-20 mA / 4-20 mA	0-10 V	4-20 mA	
Output burden / load	≤ 500 Ω	≥ 1.0 Ω	12 V DC: 150 Ω 24 V DC: 750 Ω 30 V DC: 1050 Ω	
Accuracy ¹⁾	± 2 % of full-scale			
Offset adjustment range	±5 % (universal device)		± 5 %	
Gain adjustment range	±5 % (universal device)		± 20 %	
Residual ripple	< 0.5 %			
Response time	0.5 s		0.6 s	
Transmission frequency	DC or 50/60 Hz		AC: 50/60 Hz	
Reaction to input circuit interruption	Low fail safe: output voltage < 200 mA, output current < 400 μA		-	
Supply circuits	K-M	DC versions	AC versions	
Supply voltage		24 V DC	110-240 V AC 50/60 Hz	12-30 V DC
Supply voltage tolerance		-15...+15 %	-15...+10 %	-
Power consumption		typ 1.5 W	typ 1.5 VA	-
Indication of operational states				
Supply voltage	U: green LED			-
General data				
Ambient temperature range	operation / storage	0...+60 °C / -20...+80 °C		-20...+60 °C / -40...+80 °C
Temperature coefficient		± 500 ppm/°C		300 ppm/°C
Degree of protection (DIN 40050)		IP20		
Mounting position		ventilation slots on top and bottom		
Mounting		DIN rail (IEC/EN 60715), snap-on mounting		
Electrical connection				
Wire size	rigid	0.2-4 mm² (24-12 AWG)		
	fine-strand with(out) wire end ferrule	0.2-2.5 mm² (24-14 AWG)		
Stripping length		7 mm (0.28 inch)		
Tightening torque		0.5 Nm (4.4 lb.in)		
Electromagnetic compatibility				
Interference immunity		EN 61000-6-2		
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (±6 kV / ±8 kV)		
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m		
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (±2 kV / 5 kHz)		
powerful impulses (Surge)	IEC/EN 61000-4-5	±2 kV / ±1 kV		
HF line emission	IEC/EN 61000-4-6	10 V		
Interference emission	EN 61000-6-4	Class B		
Isolation data				
Test voltage (between all isolated circuits)		2.5 kV AC		
Rated insulation voltage		-	250 V AC	

¹⁾ Includes non-linearity and factory setting, influenced by supply voltage and output load.

Analog signal converters

Technical data

Type		CC-U/I	CC-U/V
Input circuits - Analog inputs	J-G-H	any current signals, RMS measurement	any voltage signals, RMS measurement
Rated input range		0-1 A 0-5 A	0-100 V, 0-200 V 0-300 V, 0-400 V 0-500 V, 0-600 V
Measuring frequency		0-600 Hz	
Overload capacity of inputs	input range 1 input range 2	10 x I _{Nom} (10 A) for max. 2 s 10 x I _{Nom} (50 A) for max. 2 s	- -
Gain adjustment range		±15 %	
Offset adjustment range		±20 %	
Input impedance / resistance		1A: 60 mΩ, 5 A: 12 mΩ	> 800 kΩ
Output circuits - Analog outputs	D-F, A-C	Current	Voltage
Output signal		0-20 mA, 4-20 mA	0-5 V, 1-5 V, 0-10 V, 2-10 V, ±10 V
Output load		≤ 600 Ω	≥ 4.7 kΩ
Accuracy ¹⁾		±0.5 % of full-scale	
Temperature coefficient		±250 ppm/°C max.	±300 ppm/°C max.
Residual ripple		< 0.15 %	
Response time		150 ms	
Supply circuits	K-M		
Rated supply voltage		24-48 V DC	110-240 V AC
Supply voltage range		24-48 V DC, 24 V AC	110-240 V AC, 100-300 V DC
Supply voltage tolerance		DC: -15...+15 %	AC: -15...+10 %
Rated frequency		0 Hz or 50/60 Hz	
Power consumption		2 W at 24 V DC	4.5 VA at 230 V AC
12 Indication of operational states			
Supply voltage		U: green LED	
General data			
Ambient temperature range	operation / storage	-20...+60 °C / -40...+80 °C	
Mounting position		any	
Mounting		DIN rail (IEC/EN 60715), snap-on mounting / screw mounting with adapter	
Electrical connection			
Wire size	rigid fine-strand with(out) wire end ferrule	plug-connector with screw terminals 0.2-2.5 mm ² (24-12 AWG) plug-connector with screw terminals 0.2-2.5 mm ² (24-12 AWG)	
Stripping length		7 mm (0.28 inch)	
Tightening torque		0.4 Nm (3.5 lb.in)	
Standards			
Product standard		-	
Low Voltage directive		2006/95/EG	
EMC directive		2004/108/EG	
RoHS directive		2002/95/EG	
Electromagnetic compatibility			
Interference immunity		EN 61000-6-2	
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (±6 kV / ±8 kV)	
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m	
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (±2 kV / 5 kHz)	
powerful impulses (Surge)	IEC/EN 61000-4-5	±2 kV / ±1 kV	
HF line emission	IEC/EN 61000-4-6	10 V	
Interference emission	EN 61000-6-4	Class B	
Isolation data			
Insulation voltage (between all isolated circuits)		1.5 kV	
Test voltage (between all isolated circuits)		1.5 kV / 50 Hz	

¹⁾ Includes non-linearity and factory setting, influenced by supply voltage and output load.

Analog signal converters

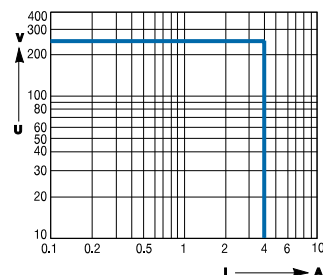
Technical diagrams, connection diagrams

Approximate dimensions

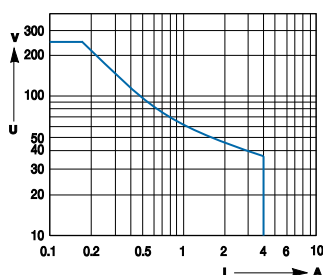
Technical diagrams

Load limit curves CC-U/xxR

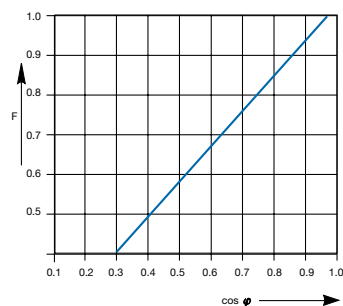
Resistive AC load



Resistive DC load



Derating curve



Connection diagram CC-U/x

Width 22.5 mm (0.89 in)

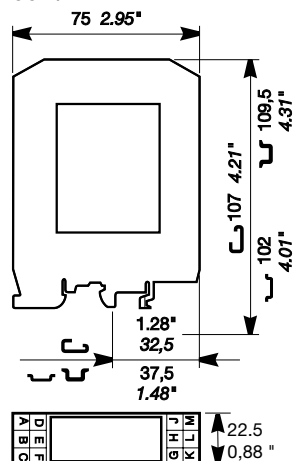


12

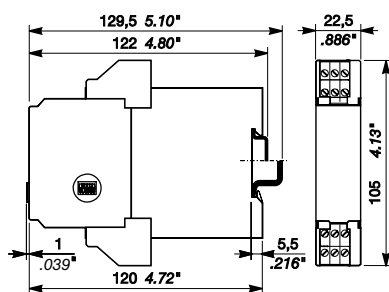
Dimensional drawings

Dimensions in mm and inches

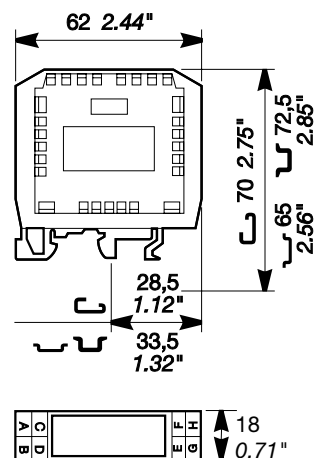
CC-E/x



CC-U/x, CC-U/xR



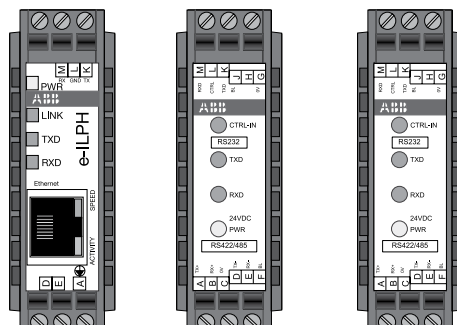
CC-E I_{AC}/ILPO, CC-E I/I



Notes



Serial data converters



In the field of industrial data transmission, various processes of data transmission and interfaces are used today. Already existing systems need to be updated or connected to new devices for continuity of process. When new communication functions are not build-in, ABB propose a range of converters to be able to use from the standard RS232 or RS485, to the Ethernet open products or the Optical Fiber.

Ethernet communication is now one of the main features need in open communication, ABB propose the e-ILPH to connect the serial devices to the web world.

Serial data Converters

Serial data converters

Overview

Uses

Adaptation

The use of converters allows the connection of two devices using different interfaces.

To add new equipment to existing installations.

Galvanic Isolation

To protect sensitive equipment it is sometimes necessary to use converters which allow galvanic isolation.

To cross a disturbed environment

Some interfaces are more sensitive to noise. Electrically, it is preferable, in some cases, to change the interface or support.

Type of connection Immunity to noise

RS232	Low
RS422	High
RS485	High
CL	High
OF	Very high
Ethernet	High

Multipoint connections

Some equipment is only designed to communicate in RS232 point to point connection. To communicate with several devices it is then necessary to use converters RS232 to RS422, RS485, CL or OF to reach multipoint mode.

Type of connection	Connection
RS232	Point to point
RS422	12 points
RS485	32 points
CL	5-6 points
OF	32 points
Ethernet	Point to point or multipoint

Increase in the transmission and amplification distances of the signals

Every connection has its own limits, to increase the communication distances you only have to change the type of link (converter) or amplify the signal (Repeater) using an ILPH.

Type of connection	Max. distances *
RS232	15m
RS422	1.2km
RS485	1.2km
CL	300-500m
OF	4km
Ethernet	100 m with CAT5 cable

* Depending on transmission speed.

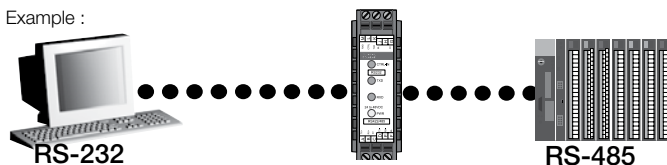
"World Wide" communication

Communication is more and more used with Ethernet support. The interests are to have a distant access, to use an already existing network and to upload information and data on a supervisor or a computer. The conversions from serial to Ethernet protocol are used to connect local network to Ethernet.

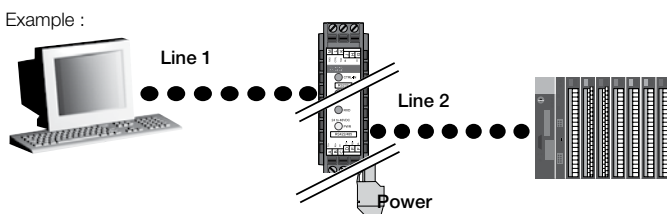
Protocol conversion

Modbus is one of the main protocols used in the industrial networks. The creation of Modbus/TCP allows an adapted access to the Ethernet network. So, the conversion between these 2 protocols is necessary.

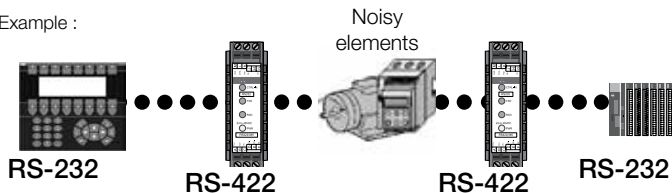
Example :



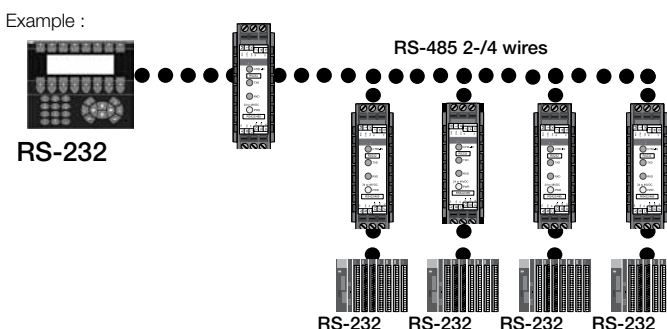
Example :



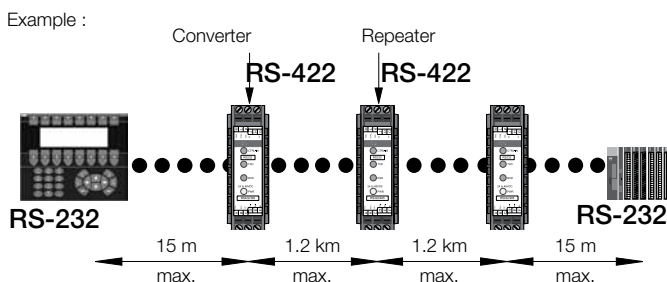
Example :



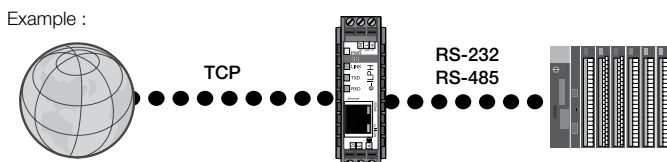
Example :



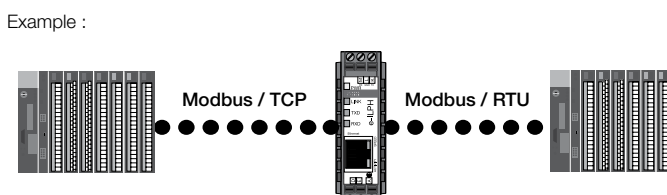
Example :



Example :



Example :



Serial data converters

Selection table

Signal converters

	RS232	RS422 / RS485	CL	OF-S	OF-P	Ethernet	24 V DC	24-48 V DC	110-240 V AC	24-42 V AC/DC	10-34 VDC, 10-24 VAC	Insulation *	Catalog number
RS232	■							■				In-Ps-Out	1SNA684234R2000
	■								■			In-Ps-Out	1SNA684244R0200
		■					■					Wi	1SNA684231R2500
		■					■					In-Out	1SNA684233R2700
		■						■				In-Ps-Out	1SNA684333R2300
		■							■			In-Ps-Out	1SNA684334R2400
			■				■					In-Out	1SNA684202R0100
				■						■		In-Ps-Out	1SNA684236R2200
				■					■			In-Ps-Out	1SNA684237R2300
					■					■		In-Ps-Out	1SNA684238R0400
					■				■			In-Ps-Out	1SNA684239R0500
		■					■					In-Out	1SNA684212R2200
RS422 / RS485			■				■					In-Out	1SNA684232R2600
RS485				■					■			In-Ps-Out	1SNA684246R0400
				■					■			In-Ps-Out	1SNA684247R0500
					■					■		In-Ps-Out	1SNA684248R1600
					■				■			In-Ps-Out	1SNA684249R1700
RS232 / RS485						■					■	In-Ps-Out	1SNA684252R0200

* In=Input, Ps=Power supply, Out=Output, Wi=Without insulation

● RS 232 - EIA-232 / V.24 / V.28

Point-to-point connection
 Max. 15 m transmission distance
 Rate up to 19.2 kbit/s
 Full-duplex

● RS 422 - EIA-422 / V.11

Point-to-point connection
 (1 Transmitter - 10 Receivers)
 Differential voltage transmission
 Full-duplex
 Up to 1200 m / 10Mbit/s
 Good EMC characteristics

● Current loop(TTY)

Point-to-point / multi-point connection
 Active or passive current loop
 Full-duplex
 Up to 1200 m/19.2 kBit/s
 Good EMC characteristics

● RS 485 - ISO/IEC/EIA-485

Multi-point connection up to 32 units
 Differential voltage transmission
 Half-duplex on 1 pair
 Full-duplex on 2 pairs
 Up to 1200 m / 10Mbit/s
 Good EMC characteristics

● Optical fiber interface

Point-to-point connection
 Full-duplex
 From 40m up to 4km transmission distance
 according to optical fiber material (plastic / glass)
 and wavelength used up to 10 Mbit/s
 Excellent EMC characteristics

● Ethernet Interface

Point to point connexion or multipoint connection.
 Up to 100m using CAT5 cable without Hub or Switch
 10/100 Mbit/s
 Good EMC characteristics

Serial data converters

Benefits and advantages

ILPH RS 232 - 485 / Ethernet

Isolated RS232 or/and RS485 to Ethernet converter

- Triple galvanic isolation
- RS232 on SUBD 9 points or screw connectors
- RS485 on removable screw connectors
- Ethernet 10/100 Mbit/s, RJ45 connector
- Power supply 10-34 VDC et 10-24 VAC
- Possible to have a redundant 10-34 VDC power supply
- Economic with low consumption
- Up to 100m with CAT5 cable without Hub or Switch
- Good EMC characteristics
- Up to 2 Modbus®/TCP Masters

Available modes:

- Modbus®/TCP to Modbus® RTU conversion
- Transparent Client or Server mode
- SMTP mode (Mail send)

Standards: TPC/IP, TELNET, DHCP, FTP

- Specifics functions in Modbus® protocol:
- Concentrator (Asynchronous mode) up to 1200 words
- AC31 programming
- Modbus® Easy Net mode : this mode could be used to exchange data without a Modbus®/TCP master. The data are logged in a table and could be distributed to one or all the others e-ILPH participants on Ethernet.

ILPH RS 232 / RS 422 - 485

- 3 way galvanic isolated converter for RS 232 to RS 422-485 serial links.
- 3 way galvanic isolation between power supply and input/output
- RS 485 switch on 2 or 4 wires
- Baudrate up to 38.4 kbit/s
- Transmission distance up to 1200 m
- RS 485 1 or 2 pair handling
- Usable in "noisy" environments
- 24...48 V DC and 115...230 V AC power supply
- CE marking

ILPH RS 422 - 485 / RS 422 - 485

Galvanic isolated connection between an RS 422-485 (1 or 2 pairs) and an RS 422 485 (1 or 2 pairs) serial link. It amplifies the signal beyond the 1200 m limit distance of the RS 422-485 and only needs a minimum of 1.5 character delay time to switch off the RS 485 drivers.

- Galvanic isolation between power supply/output and input/output
- Baudrate up to 500 kbit/s (up to 200 m)
- Transmission distance up to 1200m at 38.4 kbit/s
- Usable in "noisy" environments
- 2/4 wires automatic handling
- 24 V DC power supply
- CE mark

ILPH RS 485 / FO

3 way galvanic isolated converter for RS 485 (1 pair) to optical fiber serial link glass (S) or plastic (P).

- 3 way galvanic isolation between power supply and input/output
- Baud rate up to 1.5 Mbit/s
- Available for glass fiber or plastic fiber
- Transmission distance up to 4 km
- Usable in "very noisy" environments
- 20...42 V AC/DC and 110...240 V AC/DC power supply
- CE marked

ILPH RS 232 / RS 422 - 485

RS 232 to RS 422-485 serial link without isolation

- Economic version without isolation
- Baudrate up to 38.4 kbit/s
- Transmission distance up to 1200 m
- RS 485 1 or 2 pair handling
- Usable in "noisy" environments
- 24 V DC power supply
- CE mark

ILPH RS 232 / RS 422 - 485

Galvanic isolated converter for RS 232 to RS 422-485 serial links.

- Galvanic isolation between input/output and output/power supply
- Baudrate up to 38.4 kbit/s
- Transmission distance up to 1200 m
- RS 485 1 or 2 pair handling
- Usable in "noisy" environments
- 24 V DC power supply
- CE mark

ILPH RS 232 / CL

Galvanic isolated Converter for RS 232 to current loop serial link.

- Galvanic isolation between power supply/current loop and RS 232/current loop
- Active/Passive 0...20 mA / 4...20 mA selectable
- Positive or negative logic selectable
- Baudrate up to 38.4 kbit/s
- Transmission distance up to 1200 m
- Usable in "noisy" environments
- 24 V DC power supply
- CE marking

ILPH RS 232 / RS 232

3 way galvanic isolator between RS 232 serial interface and another RS 232 serial interface.

- Ensures triple insulation between the 2 serial interfaces and between each and power supply
- Baudrate up to 19.2 kbit/s (up to 64 kbit/s depending on cable)
- Transmission distance up to 15 m
- Can be used in "noisy" environments
- Power supply from 24...48 V DC and 115...230 V AC CE marking

ILPH RS 232 / FO

- 3 way galvanic isolated Converter for RS 232 to optical fiber serial link glass (S) or plastic (P).
- 3 way galvanic isolation between power supply and input/output
- Baud rate up to 115.2 kbit/s
- Available for glass or plastic fiber
- Transmission distance up to 4 km
- Usable in "very noisy" environments
- 20...42 V AC/DC and 110...240 V AC/DC power supply
- CE marked

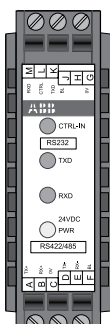
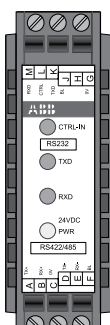
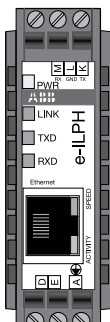
ILPH CL / RS 422 - 485

Galvanic isolated converter for current loop to RS 422-485 (1 or 2 pairs) serial link.

- Galvanic isolation between power supply/current loop and RS 422-485/current loop
- Active/passive 0...20 mA / 4...20 mA selectable
- Positive or negative logic selectable
- Baudrate up to 38.4 kbit/s (up to 2400 m)
- Transmission distance up to 2400 m (1200 m RS 485 and 1200 m current loop)
- Usable in "noisy" environments
- 24 V DC power supply
- CE marking

Serial data converters

Ordering details



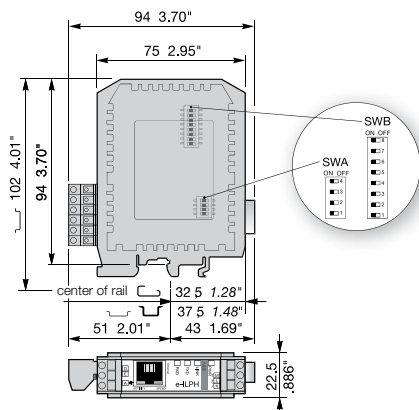
Description	Type	Catalog number	Weight (1 pce) kg (lb)
Serial data converter e-ILPH	ILPH RS 232-RS 485 / Ethernet	1SNA684252R0200	0.12 (0.265)
Serial link interface without galvanic isolation	ILPH RS 232 / RS 422-485	1SNA684231R2500	0.1 (0.220)
Serial link interface with galvanic isolation	ILPH RS 232 / RS 422-485	1SNA684233R2700	0.1 (0.220)
Serial link interface 3 way galvanic isolation	ILPH RS 232 / RS 422-485 (24-48 V DC power supply)	1SNA684333R2300	0.1 (0.220)
	ILPH RS 232 / RS 422-485 (115-230 V DC power supply)	1SNA684334R2400	
Serial link interface 3 way galvanic isolation	ILPH RS 232 / RS 232 (24-48 V DC power supply)	1SNA684234R2000	0.1 (0.220)
	ILPH RS 232 / RS 232 (115-230 V DC power supply)	1SNA684234R0200	
Serial link interface with galvanic isolation	ILPH RS 422 - 485 / RS 422 - 485 (24 V DC power supply)	1SNA684212R2200	0.1 (0.220)
Serial link interface 3 way galvanic isolation	ILPH RS 232 / FO-S (24...42 V AC/DC power supply)	1SNA684236R2200	0.15 (0.331)
	ILPH RS 232 / FO-S (110...240 V AC/DC power supply)	1SNA684237R2300	
	ILPH RS 232 / FO-P (24...42 V AC/DC power supply)	1SNA684238R0400	
	ILPH RS 232 / FO-P (110...240 V AC/DC power supply)	1SNA684239R0500	
Serial link interface 3 way galvanic isolation	ILPH RS 485 / FO-S (24...42 V AC/DC power supply)	1SNA684246R0400	0.15 (0.331)
	ILPH RS 485 / FO-S (110...240 V AC/DC power supply)	1SNA684247R0500	
	ILPH RS 485 / FO-P (24...42 V AC/DC power supply)	1SNA684248R1600	
	ILPH RS 485 / FO-P (110...240 V AC/DC power supply)	1SNA684249R1700	
Serial link interface with galvanic isolation	ILPH BdC / RS 422 - 485 (24 V DC power supply)	1SNA684232R2600	0.1 (0.220)
Serial link interface with galvanic isolation	ILPH RS 232 BdC (24 V DC power supply)	1SNA684202R0100	0.1 (0.220)

Serial data converters

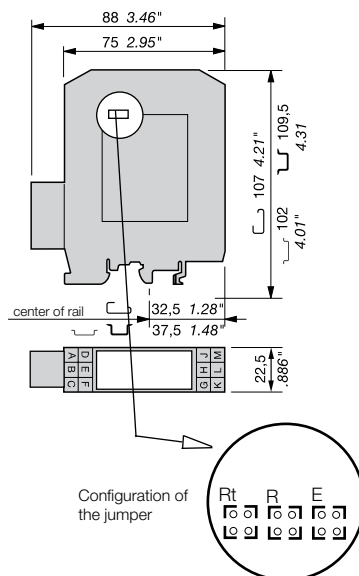
Jumper

Approximate dimensions

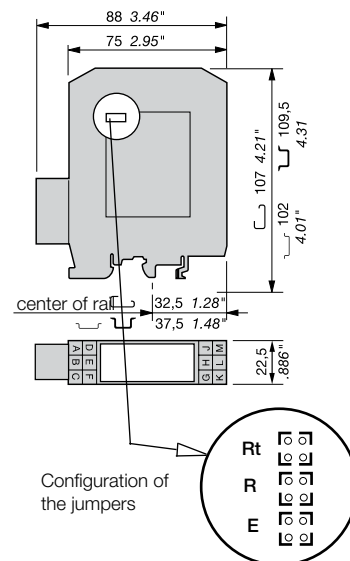
ILPH RS 232 - 485 Ethernet



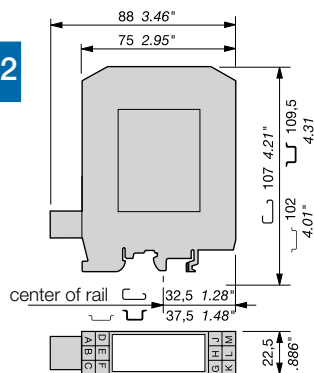
ILPH RS 232 - 485 Ethernet (without isolation)



ILPH RS 232 - 485 Ethernet (isolated)



ILPH RS 232 / RS 232



RS 485 LINK ON ONE PAIR

R		R ON/OFF	Jumper R in position	R ON/OFF
E		E ON/OFF	Jumper E in position	E ON/OFF

The Receiver and the Transmitter are activated alternately (never at the same time) depending on the status of the CTRL IN signal.

CTRL IN STATUS

CTRL IN STATUS	ACTION ON RS 485
0 logic (+3V ≤ U ≤ +25V)	Transmitter active / Receiver inactive
1 logic (-25V ≤ U ≤ -3V)	Transmitter inactive / Receiver active
High impedance	Transmitter inactive / Receiver active

NOTE : For RS 232 products running the RTS (REQUEST TO SEND) signal, connect RTS to CTRL IN. Otherwise, connect M (Rx/D ILPH) to L (CTRL IN).

RS 485 LINK ON 2 PAIRS

R		R ON	Jumper R in position	R ON
E		E ON/OFF	Jumper E in position	E ON/OFF

Receiver permanently active

Transmitter controlled by the signal CTRL IN (see table for Transmitter operation as a function of CTRL IN)

RS 422 LINK ON TWO PAIRS

R		R ON	Jumper R in position	R ON
E		E ON	Jumper E in position	E ON

The Transmitter and Receiver are both permanently active.

POLARIZATION OF THE RS 422 - RS 485 LINE

The line must always be polarized.

The ILPH is used to polarize the reception channel :

Connection by 1 wire	P+ (J1.1)	with 5V (J1.4)
Connection by 1 wire	P- (J1.2)	with 0V (J1.3)

ADAPTING THE RS 422 - RS 485 LINE

The line must always be adapted to the level of the reception channel of each subscriber forming the end of the bus. The ILPH is used to adapt the reception channel by setting the jumper Rt correctly :

Rt		* Line adaptation, Rt = 120 Ω (general case)
Rt		* Line adaptation, Rt = 220 Ω
Rt		* No line adaptation, Rt = ∞

RS 485 LINK ON ONE PAIR

R		R ON/OFF	Jumper R in position	R ON/OFF
E		E ON/OFF	Jumper E in position	E ON/OFF

The Receiver and the Transmitter are activated alternately (never at the same time) depending on the status of the CTRL IN signal.

CTRL IN STATUS

CTRL IN STATUS	ACTION ON RS 485
0 logic (+3V ≤ U ≤ +25V)	Transmitter active / Receiver inactive
1 logic (-25V ≤ U ≤ -3V)	Transmitter inactive / Receiver active
High impedance	Transmitter inactive / Receiver active

CAUTION : For RS 232 products running the RTS (REQUEST TO SEND) signal, connect RTS to CTRL IN. Otherwise, connect M (Rx/D ILPH) to L (CTRL IN).

RS 485 LINK ON 2 PAIRS

R		R ON	Jumper R in position	R ON
E		E ON/OFF	Jumper E in position	E ON/OFF

Receiver permanently active

Transmitter controlled by the signal CTRL IN (see table for Transmitter operation as a function of CTRL IN)

RS 422 LINK ON TWO PAIRS

R		R ON	Jumper R in position	R ON
E		E ON	Jumper E in position	E ON

The Transmitter and Receiver are both permanently active.

POLARIZATION OF THE RS 422 - RS 485 LINE

The line must always be polarized. The ILPH is used to polarize the reception channel :

Connection by 1 wire	P+ (J1.1)	with 5V (J1.4)
Connection by 1 wire	P- (J1.2)	with 0V (J1.3)

ADAPTING THE RS 422 - RS 485 LINE

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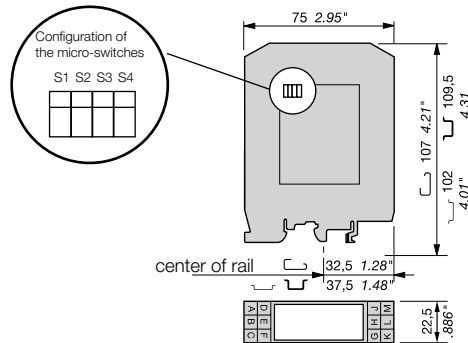
Rt		* Line adaptation, Rt = 120 Ω (general case)
Rt		* Line adaptation, Rt = 220 Ω
Rt		* No line adaptation, Rt = ∞

Serial data converters

Jumper, micro-switch

Approximate dimensions

ILPH RS 232 / CL



CONFIGURATION

The various configurations can be selected using the 4 micro-switches located inside the box.

OPERATING MODE ACTIVE OR PASSIVE

The Current Loop's Transmission and Reception can be independently in active or passive mode.

Select operating mode using **S1** and **S2**.

ON **S1** Transmission (Tx) ON = Active / OFF = Passive
OFF **S2** Reception (Rx) ON = Active / OFF = Passive

SIGNAL LEVEL

Select signal level 4-20 mA or 0-20 mA.

This selection is made using micro-switch **S3**

ON **S3** ON = 4-20 mA / OFF = 0-20 mA
OFF

Caution :

It is not possible to select a 4-20 mA signal when the Reception is in active mode.

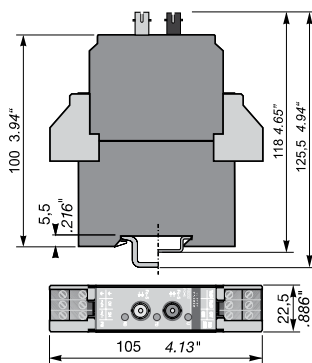
LOGIC LEVEL

Configuration : Positive logic (0 Logic = 20 mA)
or negative logic (1 Logic = 20 mA)

using micro-switch **S4**

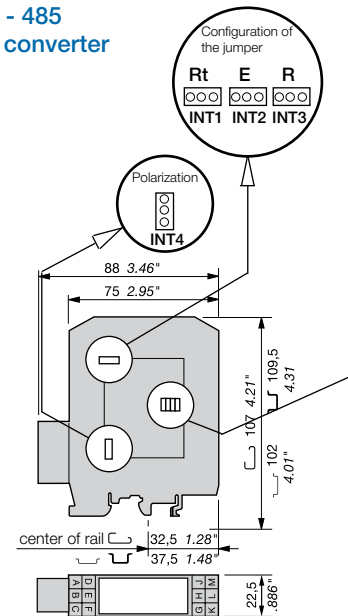
ON **S4** ON = (1 = 20 mA) / OFF = (0 = 20 mA)
OFF

ILPH RS 485 / FO



ILPH CL / RS 422 - 485

Galvanic isolated converter
for current loop



LINE AMPLIFIER CONFIGURATION

Configuration of amplifiers of the RS 422 - RS 485 (Receiver, Transmitter) line provides greater flexibility of use.

The various configurations can be selected using the 2 jumpers

(R INT2, E INT1) located inside the box.

RS 485 LINK ON ONE PAIR

R **INT2** R ON/OFF Jumper R in position R ON/OFF
E **INT3** E ON/OFF Jumper E in position E ON/OFF

The Receiver and the Transmitter are activated alternately (never at the same time) depending on the status of the Current Loop Reception signal.

RS 485 LINK ON TWO PAIRS

R **INT2** R ON Jumper R in position R ON
E **INT3** E ON/OFF Jumper E in position E ON/OFF

Receiver permanently active. Transmitter controlled by the Current Loop Reception signal.

RS 422 LINK ON TWO PAIRS

E **INT3** E ON Jumper E in position E ON
R **INT2** R ON Jumper R in position R ON

The Receiver and the Transmitter are both permanently active.

POLARIZATION OF THE RS 422 - RS 485 LINE

The line must always be polarized. The ILPH is used to polarize the reception channel :

Connection by 1 wire P+ (J1.1) with 5 Viso (J1.4)
Connection by 1 wire P- (J1.2) with 0 Viso (J1.3)

ADAPTING THE RS 422 - RS 485 LINE

The line must always be adapted to the level of the reception channel of each subscriber forming the end of the bus. The ILPH is used to adapt the reception channel by setting the jumper **Rt** correctly :

Rt **INT1** * Line adaptation, Rt = 120 Ω (Standard)

Rt **INT1** * No line adaptation, Rt = ∞

ON **S1** Transmission (Tx) active
OFF **S2** Transmission (Tx) passive
 S3 Reception (Rx) active
 S4 Reception (Rx) passive
Legend:
On
Off

4...20 mA Signal
0...20 mA Signal
Signal logic 1 = 20 mA
Signal logic 0 = 20 mA

S1	S2	S3	S4
On	Off	On	Off
Off	On	Off	On
On	On	On	On
Off	Off	Off	Off

POLARIZATION

The polarization can be configured using the **INT4** jumper.

INT4 Protection ON

INT4 Protection OFF, used if power supply at minimum value (21.6 V).

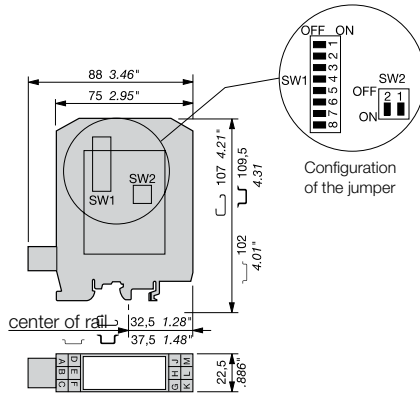
Signal converters

Serial data converters

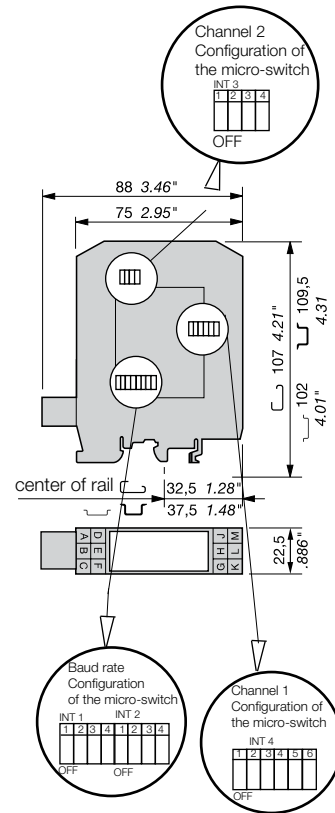
Jumper, micro-switch

Approximate dimensions

ILPH RS 232 - 485 Ethernet (3 way galvanic isolated)



ILPH RS 422 - 485 / RS 422 / - 485



RS 485 LINK ON ONE PAIR

Set SW1-1, SW1-3, SW1-6, SW1-7 and SW1-8 to position ON.

The receiver and the transmitter are activated alternately (never at the same time), depending on the status of the CTRL IN signal.

CTRL IN STATUS	Action on RS 485
0 Logic ($3V \leq U \leq +25V$)	Transmitter active / Receiver inactive
1 Logic ($-25V \leq U \leq -3V$)	Transmitter inactive / Receiver active
High impedance	Transmitter inactive / Receiver active

CAUTION : For RS 232 products running the RTS signal (REQUEST TO SEND), connect RTS to CTRL IN. Otherwise, set SW2-1 to position ON.

RS 485 LINK ON TWO PAIRS

Set SW1-1, SW1-3, SW1-7 in position OFF.
Set SW1-6, SW1-8 in position ON.

The receiver is permanently active.

The transmitter is controlled by the signal CTRL IN (see table for transmitter operation as a function of CTRL IN).

RS 422 LINK ON TWO PAIRS

Set SW1-1, SW1-3, SW1-7 and SW1-8 in position OFF.

Set SW1-6 in position ON.

Transmitter and receiver are both permanently active.

POLARIZATION OF THE RS 422 - RS 485 LINE

The ILPH is used to polarize the reception channel :
Set SW1-4 and SW1-5 in position ON.

ADAPTING THE RS 422 - RS 485 LINE

The line must always be adapted to the level of the reception channel of each subscriber forming the end of the bus.

The ILPH is used to adapt the reception channel by setting the jumper SW1-2 correctly :

SW1-2 in position ON $\Rightarrow$ line adaptation, $R_t = 120 \Omega$ (standard)

SW1-2 in position OFF $\Rightarrow$ no line adaptation, $R_t = \infty$

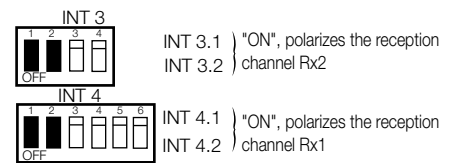
RS 422 - RS 485 DRIVERS CONTROL

The RS 422 - RS 485 Drivers Control (transmitters and receivers) makes the ILPH easy to use. The control of the 2 channels is completely automatic ; you only have to configure the baud rate needed.

The minimum turn off delay is about 1.5 character/ time from 27 μ s to 10 ms depending on the baud rate selected.

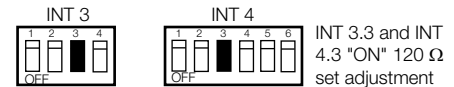
POLARIZATION OF THE RS 422 - RS 485 CONNECTIONS

The connections must always be polarized. The ILPH is used to polarize the reception channels :



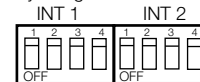
ADAPTING THE RS 422 - RS 485 CONNECTIONS

The connections must always be adjusted to the level of the reception channel of each subscriber forming the end of the bus. The ILPH is used to adjust the reception channel by setting the micro-switch INT 3.3 and INT 4.3.



BAUD RATE

By using the 8 micro-switches inside the box.



Permits to define up to 8 transmission speeds and to select the Full

Duplex operation mode (RS 422 / RS 422) in addition with the INT 3.4 INT 4.4 and INT 4.5 micro switches.

BAUD RATE	INT 1	INT 2	INT 3	INT 4
FULL DUPLEX	0 0 0 0	0 0 0 0	X X X 1	X X X 1 0 1
500 Kb/s	1 1 1 1	1 1 1 1	X X X 0	X X X 0 0 0
187.5 Kb/s	1 1 1 1	1 1 1 0	X X X 0	X X X 0 0 0
93.75 Kb/s	1 1 1 1	1 1 0 0	X X X 0	X X X 0 0 0
38.4 Kb/s	1 1 1 1	1 0 0 0	X X X 0	X X X 0 0 0
19.2 Kb/s	1 1 1 1	0 0 0 0	X X X 0	X X X 0 0 0
9.6 Kb/s	1 1 1 0	0 0 0 0	X X X 0	X X X 0 0 0
4.8 Kb/s	1 1 0 0	0 0 0 0	X X X 0	X X X 0 0 0
2.4 Kb/s	1 0 0 0	0 0 0 0	X X X 0	X X X 0 0 0
1.2 Kb/s	0 0 0 0	0 0 0 0	X X X 0	X X X 0 0 0

N_U = not used 1 = contact closed
X = zero 0 = contact open (aus) (off)

Serial data converters

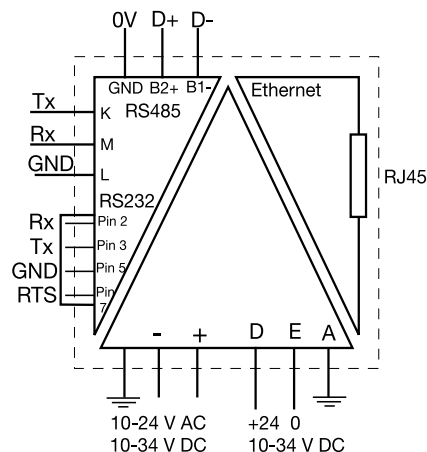
Technical data

Technical data

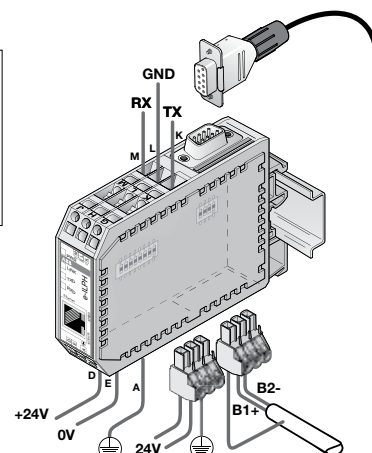
Data at $T_a = 25^\circ\text{C}$ and rated values, unless otherwise indicated

ILPH RS 232 - 485 / Ethernet	
Power supply 1	
Voltage	10...34 V DC, 10...24 V AC
Voltage tolerance	-10%, +10%
Consumption	2 W max
Connections	coding screw removable connector 0 to 2.5 mm ² (22-14 AWG)
Power supply 2	
Voltage	10...34 V DC
Voltage tolerance	-10%, +10%
Consumption	2 W max
Connections	screw connector (AWG 20)
Serial link 1: RS 232	
Overvoltage protection	EIA RS 232
Baud rate / Transmission distance	integrated
Connections	max. 115.2 kbits/s / max. 15 m 2.5 mm ² screw connector (AWG 20) or male SubD 9 points
Serial link 2: RS 485	
Voltage	EIA RS 485
Line polarization	integrated
End line resistance	integrated
Baud rate / Transmission distance	integrated
Connections	max. 115.2 kbits/s / max. 1200 m coding screw removable connector 0 to 2.5 mm ² (22-14 AWG)
Ethernet link	
Overvoltage protection	integrated
Baud rate / Transmission distance	10-100 Mbits/s / max. 100 m without Hub or Switch with CAT5 cable
Connections	RJ45 connector
Traffic indication	
Voltage	1 yellow LED
Status of signal	3 green LED (RxD, TxD, LINK), 2 amber or green LED (Speed, Activity)
EMC behavior	
Electrostatic discharge	EN 61000-4-2
Radiated electromagnetic field	EN 61000-4-3
Burst	EN 61000-4-4
Surge	EN 61000-4-5
Electromagnetic compatibility	EN 55022
Other characteristics	
Galvanic isolation between serial link / power supply / Ethernet link	750 VDC / 1500 VAC
Configuration of the operating mode	using internal switches or/and software (TELNET or HYPERTERMINAL)
Operating temperature	0°C ... +60°C
Storage temperature	-20°C ... +70°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm ² / stranded with ferrule, 4 mm ² solid
Dimensions (WxDxH)	94 x 22.5 x 100 mm
Weight	120 g

12



SubD9 connector
pin 2 = RX
pin 3 = TX
pin 5 = GND
pin 7 = RTS



Serial data converters

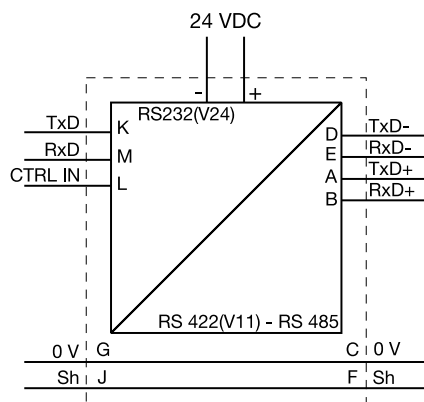
Technical data

Technical data

Data at $T_a = 25^\circ\text{C}$ and rated values, unless otherwise indicated

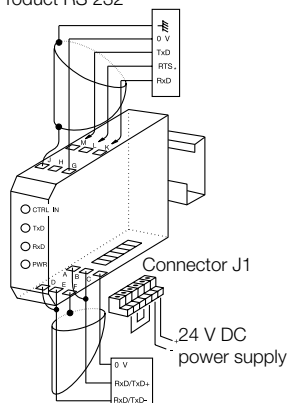
	ILPH RS 232 / RS 422 - 485 (without isolation)
Power supply	polarized
Voltage	24 V DC
Voltage tolerance	8.5...28 V DC
Supply current	100 mA max
Connections	removable screw connectors (AWG 20)
Serial link 1: RS 232	EIA RS 232 C / CCITT V24 V28
Overvoltage protection	integrated (transil 8 kV 1.2/50 μs)
Baud rate / Transmission distance	max. 38.4 kbits/s / max. 1200 m
Connections	2.5 mm ² screw connectors (AWG 20)
Serial link 2: RS 422-485	EIA RS 485 and EIA RS 422 / CCITT V11
Overvoltage protection	integrated (transil 8 kV 1.2/50 μs)
Baud rate / Transmission distance	max. 38.4 kbits / max. 1200 m
Connections	2.5 mm ² screw connectors (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Connections	2 green LED (Rx/D, Tx/D)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 310 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between serial link / power supply / Ethernet link	no
Configuration of the operating mode	using internal jumper
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm ² / stranded with ferrule, 4 mm ² solid
Dimensions (WxDxH)	88 x 22.5 x 100 mm
Weight	100 g

12



RS 422 - RS 485
SERIAL LINK (2 wires)

Product RS 232



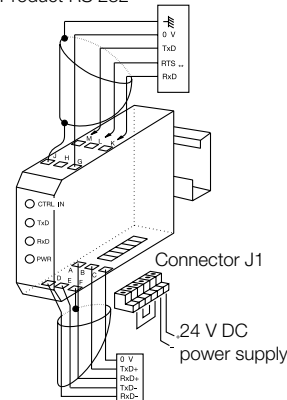
Product RS 422-RS 485

***CAUTION :**

When the RTS Signal is not activated, M terminal (Rx/D ILPH) has to be connected to L terminal (CTRL IN).

RS 422 - RS 485
SERIAL LINK (4 wires)

Product RS 232



Product RS 422-RS 485

**** CAUTION :**

To be connected to 2 wired RS 485 only (not possible for 4 wired RS 422).

When the RTS Signal is not activated, M terminal (Rx/D ILPH) has to be connected to L terminal (CTRL IN).

Serial data converters

Technical data

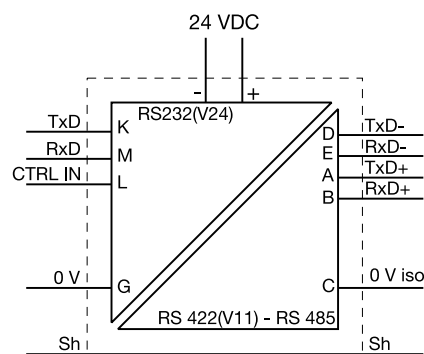
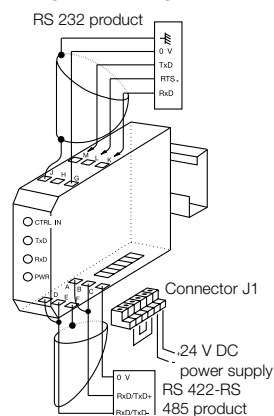
Signal converters

Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

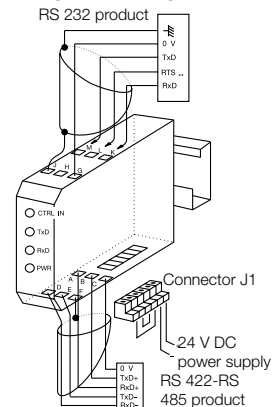
	ILPH RS 232 / RS 422 - 485 (isolated)
Power supply	polarized
Voltage	24 V DC
Voltage tolerance	8.5...28 V DC
Supply current	100 mA max
Connections	Removable screw connectors (Omnicontact)
Serial link 1: RS 232	EIA RS 232 C / CCITT V24 V28
Overvoltage protection	integrated (transil 8 kV 1.2/50µs)
Baud rate / Transmission distance	max. 38.4 kbits/s / max. 15 m
Connections	2.5 mm ² screw connectors (AWG 20)
Serial link 2: RS 422-485	EIA RS 485 and EIA RS 422 / CCITT V11
Overvoltage protection	integrated (transil 8 kV 1.2/50 µs)
Baud rate / Transmission distance	max. 38.4 kbits / max. 1200 m
Connections	2.5 mm ² screw connectors (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Connections	3 green LED (Rx/D, Tx/D and CTRL-IN)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 310 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between serial link / power supply / Ethernet link	500 V DC
Configuration of the operating mode	using internal jumper
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm ² / stranded with ferrule, 4 mm ² solid
Dimensions (WxDxH)	88 x 22.5 x 100 mm
Weight	100 g

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RS 422 - RS 485
2 WIRE SERIAL LINKS

* CAUTION :

If the RTS signal is not generated, connect M (Rx/D ILPH) to L (CTRL IN).

RS 422 - RS 485
4 WIRE SERIAL LINKS

** CAUTION :

Only to be connected for RS 485 two pairs (of no use for RS 422 two pairs). If the RTS signal is not generated, connect M (Rx/D ILPH) to L (CTRL IN).

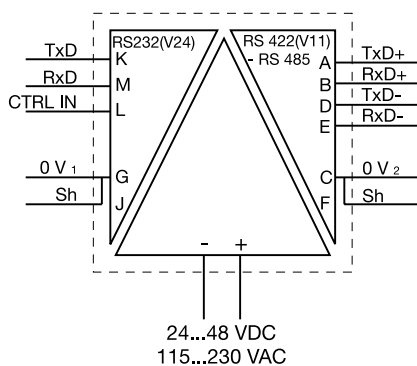
Serial data converters

Technical data

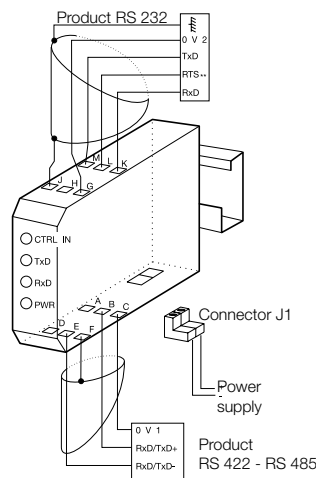
Technical dataData at $T_a = 25^\circ\text{C}$ and rated values, unless otherwise indicated

ILPH RS 232 / RS 422 - 485 (3 way galvanic isolated)	
Power supply	Polarization for DC model
Voltage	24...48 V DC
Voltage tolerance	-15% ... +20%
Supply current	24 V DC < 110 mA, 48 V DC < 55 mA, 115 V AC < 40 mA, 230 V DC < 26 mA
Supply power	~ 3 W
Connections	Removable screw connector (Omnicontact)
Serial link 1: RS 232	EA / TIA RS 232 new revision / CCITT V24 V28
Overvoltage protection	integrated (transil 8 kV 1.2/50 μs)
Baud rate / Transmission distance	max. 19,2 kbits/s / max. 15 m / 2500 pF
Connections	2.5 mm ² screw (AWG 20)
Serial link 2: RS 422-485	EIA / TIA RS 232 new revision / CCITT V24 V28
Overvoltage protection	integrated (transil 8 kV 1.2/50 μs)
Baud rate / Transmission distance	max. 19,2 kbits/s / max. 15 m
Connections	2.5 mm ² screw (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Connections	4 green LED (Rx/D, Rx/C/D, Tx/D, Tx/C/D)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 3 10 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between RS 232 / Power supply / RS 422-RS 485	1,5 kV
Configuration of the operating mode	No
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm ² / stranded with ferrule, 4 mm ² solid
Dimensions (WxDxH)	88 x 22,5 x 100 mm
Weight	100 g

12

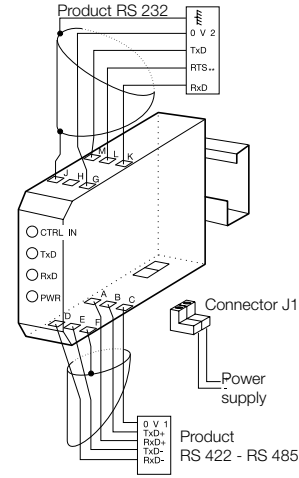


**RS 422 - RS 485
2 WIRE SERIAL LINK**

***CAUTION :**

When the RTS signal is not generated, set SW2-1 in position ON.

**RS 422 - RS 485
4 WIRE SERIAL LINKS**

****CAUTION :**

Only to be connected for RS 485 two pairs (of no use for RS 422 two pairs). If the RTS signal is not generated, set SW2-1 in position ON.

Serial data converters

Technical data

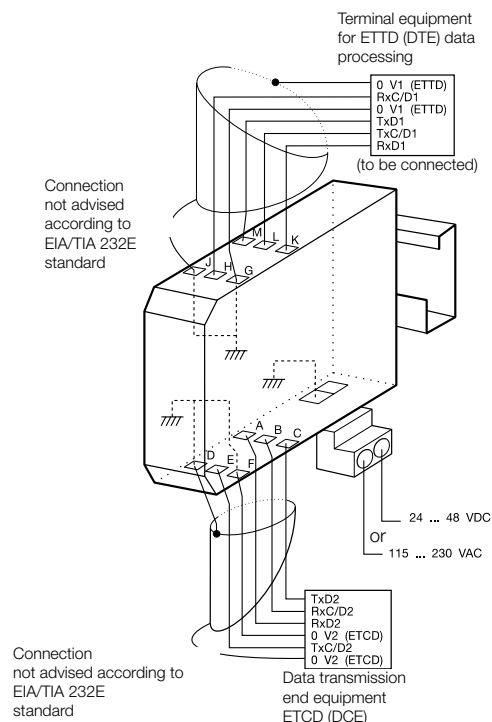
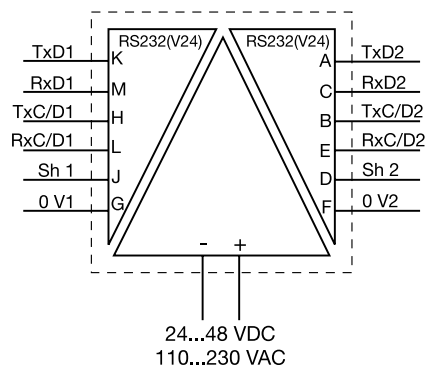
Signal converters

Technical data

Data at $T_a = 25^\circ\text{C}$ and rated values, unless otherwise indicated

ILPH RS 232 / RS 232	
Power supply	DC model polarized
Voltage	24...48 V DC
Voltage tolerance	-15%...+20%
Supply current	24 V DC < 155 mA; 48 V DC < 77 mA; 110 V AC < 40 mA; 230 V DC < 26 mA
Supply power	~ 3.15 W
Connections	Removable screw connector (Omnicontact)
Interface 1: RS 232	EIA / TIA RS 232 new revision / CCITT V24 V28
Overvoltage protection	integrated (transil 8 kV 1.2/50 μs)
Transmission capacity / Transmission distance	max. 19.2 kbits/s / max. 15 m / 2500 pF
Connections	2.5 mm ² screw (AWG 20)
Interface 2: RS 232	EIA / TIA RS 232 new revision / CCITT V24 V28
Overvoltage protection	integrated (transil 8 kV 1.2/50 μs)
Transmission capacity / Transmission distance	max. 19.2 kbits/s / max. 15 m
Connections	2.5 mm ² screw (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Connections	4 green LED (Rx/D, Rx/C/D, Tx/D, Tx/C/D)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 3 10 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between serial link / power supply / Ethernet link	1.5 kV
Configuration of the operating mode	No
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm ² / stranded with ferrule, 4 mm ² solid
Dimensions (WxDxH)	88 x 22.5 x 100 mm
Weight	100 g

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Serial data converters

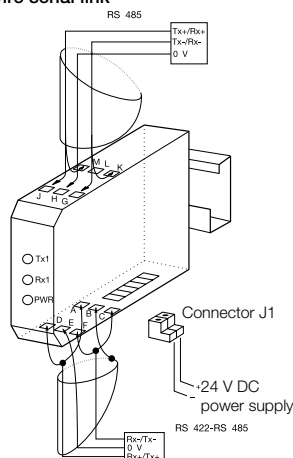
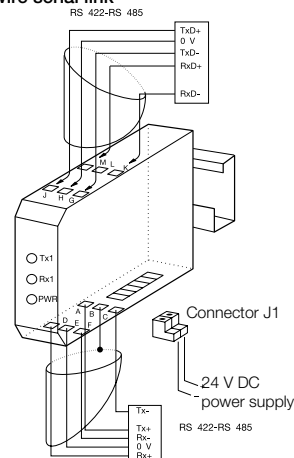
Technical data

Technical data

Data at $T_a = 25^\circ\text{C}$ and rated values, unless otherwise indicated

ILPH RS 422 - 485 / RS 422 - 485	
Power supply	DC model polarized
Voltage	24 V DC
Voltage tolerance	+/- 15%
Supply current	120 mA max.
Connections	Removable screw connector (Omnicontact)
Interface 1: RS 422-485	EIA / RS 485 and EIA RS 422 / CCITT V11
Overvoltage protection	integrated (transil 8 kV 1.2/50 μs)
RS 485 data switching	Time switching / Time delay transmission/reception 27 μs ... 10 ms
Baud rate / Transmission distance	from 1.2 to 500 kbits/s / max. 1200 m up to 38.4 kbit/s
Connections	2.5 mm ² screw (AWG 20)
Interface 2: RS 422-485	EIA / RS 485 and EIA RS 422 / CCITT V11
Overvoltage protection	integrated (transil 8 kV 1.2/50 μs)
RS 485 data switching	Time switching / Time delay transmission/reception 27 μs ... 10 ms
Baud rate / Transmission distance	from 1.2 to 500 kbits/s / max. 1200 m up to 38.4 kbit/s
Connections	2.5 mm ² screw (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Connections	2 green LED (Rx/D, Tx/D,)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 3 10 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between RS 232 / Power supply / RSS 422-RS 485	500 V DC
Configuration of the operating mode	using internal DIP switches
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm ² / stranded with ferrule, 4 mm ² solid
Dimensions (WxDxH)	88 x 22.5 x 100 mm
Weight	100 g

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RS 422 - RS 485
2 wire serial linkRS 422 - RS 485
4 wire serial link

Caution :
The transmission channels of both RS 422 - RS 485 serial link interfaces always have to be independently polarized.

Serial data converters

Technical data

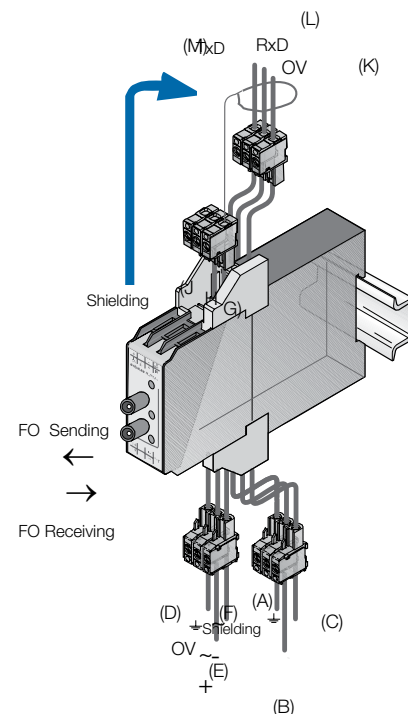
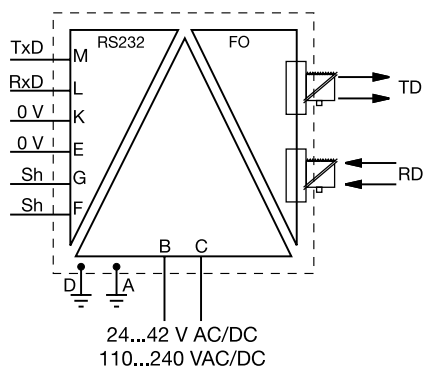
Signal converters

Technical data

Data at $T_a = 25^\circ\text{C}$ and rated values, unless otherwise indicated

ILPH RS 232 / FO	
Power supplies	
Supply voltage	24...42 V AC/DC (50/60 Hz)
Voltage tolerance	-15% ... +10%
Connections	Omniconnect pluggable connector
Interface 1: RS 232	
Protection	Integrated (transil 8 kV 1.2/50 μ s)
Max. speed / max. distance	Max. 115.2 kbits/s / max. 15 m / 2500 pF
Connections	Omniconnect pluggable connector
Fiber optic interface 2	
Type of fiber / Connections	DIN VDE 0888-1 Multimode fiber
Wave length	Glass : ST connector; Plastic : FSMA screw connector Glass : 820 nm; Plastic : 655 nm
Max. transmission power	Glass : 50/125 μ m : -14.4 db/m; Glass : 62.5/125 μ m : -14 db/m; Plastic : 980/1000 μ m : -8 db/m
Max. reception power	Glass : -28 db/m; Plastic : -20 db/m
Max. speed	Max. 115.2 kbits/s
Max. distance	Glass : 50/125 μ m : 3 km; Glass : 62.5/125 μ m : 4 km; Plastic : 980/1000 μ m : 40 m
Status indication	
Power supply / Data exchange	1 green LED / 2 green LEDs (Rx/D, Tx/D)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 Level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 Level 3 10 V/m
Burst	EN 61000-4-4 Level 3 1 kV
Electromagnetic compatibility	EN 55022 Class B
Other characteristics	
Galvanic isolation input / power supply / output	2.5 kV
Operating temperature	-20°C ... +60°C
Storage temperature	-40°C ... +85°C
Mounting	Onto DIN Rail (EN 50002)
Connections	14 AWG (2.5 mm ²) fine stranded / 12 AWG (4 mm ²) rigid
Dimensions (WxDxH)	105 x 22.5 x 112 mm / 4.13 x 0.89 x 4.41"
Weight	150 g / 0.33 lb

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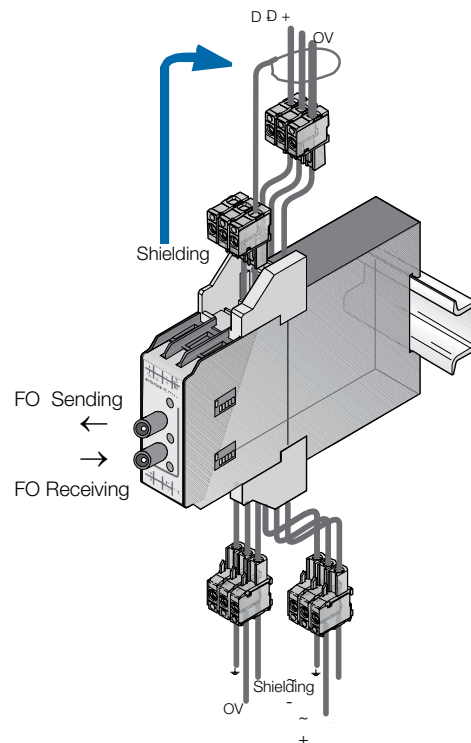
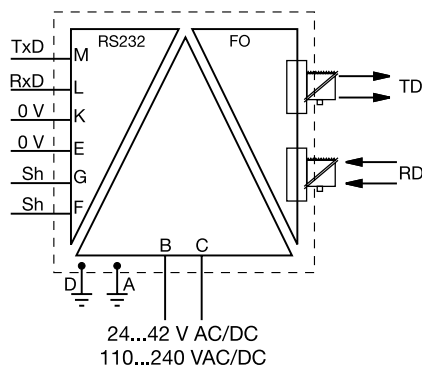
Serial data converters

Technical data

Technical data

Data at $T_a = 25^\circ\text{C}$ and rated values, unless otherwise indicated

		ILPH RS 485 / FO	
Power supplies			
Supply voltage	24...42 V AC/DC (50/60 Hz)		110...240 V AC/DC (50/60 Hz)
Voltage tolerance	-15% ... +10%		-15% ... +10%
Connections	Omniconnect pluggable connector		
Interface 1: RS 232	ISO / IEC 8482 / DIN 66 259-4; EIA 485		
Protection	Integrated (transil 8 kV 1.2/50µs)		
Max. speed / max. distance	Max. 1.5 Mbits/s / max. 1200 m (38.4 kbit/s)		
Connections	Omniconnect pluggable connector		
Fiber optic interface 2	DIN VDE 0888-1		
Type of fiber / Connections	Multimode fiber		
Wave length	Glass : ST connector; Plastic : FSMA screw connector		
Max. transmission power	Glass : 820 nm; Plastic : 655 nm		
Max. reception power	Glass : 50/125 µm : -14.4 db/m; Glass : 62.5/125 µm : -14 db/m; Plastic : 980/1000 µm : -8 db/m		
Max. speed	Glass : -28 db/m; Plastic : -20 db/m		
Max. distance	Max. 1.5 Mbits/s		
	Glass : 50/125 µm : 3 km; Glass : 62.5/125 µm : 4 km; Plastic : 980/1000 µm : 40 m		
Status indication			
Power supply / Data exchange	1 green LED / 2 green LEDs (Rx/D, Tx/D)		
EMC behavior			
Electrostatic discharge	EN 61000-4-2 Level 3 6/8 kV		
Radiated electromagnetic field	EN 61000-4-3 Level 3 10 V/m		
Burst	EN 61000-4-4 Level 3 1 kV		
Electromagnetic compatibility	EN 55022 Class B		
Other characteristics			
Galvanic isolation input / power supply / output	2.5 kV		
Operating temperature	-20°C ... +60°C		
Storage temperature	-40°C ... +85°C		
Mounting	Onto DIN Rail		
Connections	14 AWG (2.5mm²) / fine stranded, 12 AWG (4 mm²) rigid		
Dimensions (WxDxH)	105 x 22.5 x 112 mm / 4.13 x 0.89 x 4.41"		
Weight	150 g / 0.33 lb		



Serial data converters

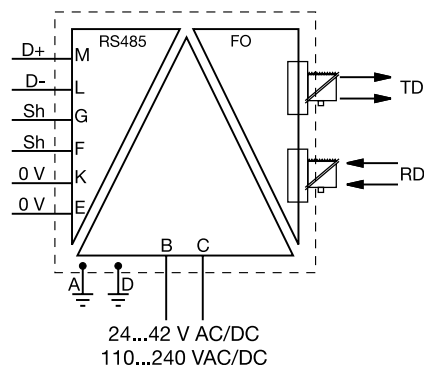
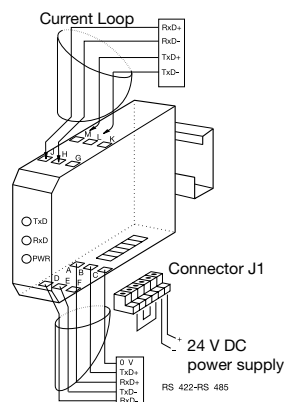
Technical data

Signal converters

Technical dataData at $T_a = 25^\circ\text{C}$ and rated values, unless otherwise indicated

	ILPH RS 422 - 485 (for current loop)
Power supply	DC model polarized
Voltage	24 V DC
Voltage tolerance	+/-10%
Supply current	120 mA max.
Connections	Removable screw connector (Omnicontact)
Interface 1: Current loop	active/passive 0...20 mA / 4...20 mA, mode is settable
Logic level	0 = 20 mA or 1 = 20 mA, settable
Baud rate / Transmission distance	max. 38.4 kbit/s / max. 1200 m
Connections	2.5 mm ² screw (AWG 20)
Serial link 2: RS 422/485	EIA RS 485 and EIA RS 422 / CCITT V 11
Overvoltage protection	integrated (transil 8 kV 1.2/50 μs)
Baud rate / Transmission distance	max. 38.4 kbit/s / max. 1200 m
Connections	2.5 mm ² screw (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Status of signal	2 green LED (RxD, TxD)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 2 4/4 kV
Radiated electromagnetic field	EN 61000-4-3 level 3 10 V/m
Burst	EN 61000-4-4 level 1 0.5 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between input / output and power supply / output	depending on Current Loop (active/passive); 500 V DC (active) / 2000 V DC (passive)
RS 422-485 power supply	500 V DC
Configuration of the operating mode	using internal DIP switches
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm ² / stranded with ferrule, 4 mm ² solid
Dimensions (WxDxH)	88 x 22.5 x 100 mm
Weight	100 g

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RS 422 - RS 485
4 wire serial link
**Note :**

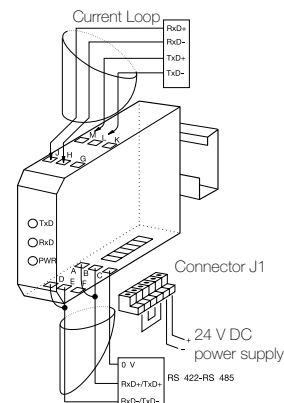
The TxD channel of the RS 422 - RS 485 link must be polarized independently too.

RS 422 - RS 485
2 wire serial link
CONNECTIONS

Example of connection with a CL (current Loop) product, Transmission (TxD) in active mode and Reception (RxD) in passive mode.

Then, the ILPH must be configured and connected Reception (RxD) in passive mode and Transmission (TxD) in active mode.

Note : For any other configuration, see schematic diagram or front sticker of the product.



Serial data converters

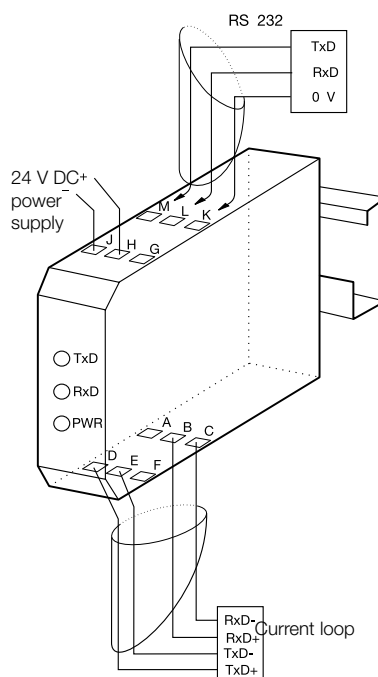
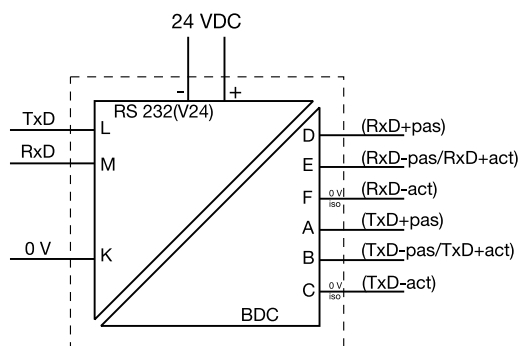
Technical data

Technical data

Data at $T_a = 25^\circ\text{C}$ and rated values, unless otherwise indicated

	ILPH RS 223 / CL
Power supply	DC model polarized
Voltage	24 V DC
Voltage tolerance	+/-10%
Supply current	120 mA max.
Connections	Removable screw connector (Omnicontact)
Serial link 2: RS 232	EIA RS 232 C / CCITT V 24 V 28
Logic level	integrated (transil 8 kV 1.2/50 μs)
Baud rate / Transmission distance	max. 38.4 kbit/s / max. 15 m
Connections	2.5 mm ² screw (AWG 20)
BdC serial link 2: RS 422/485	active/passive 0...20 mA / 4...20 mA mode settable
Overvoltage protection	0=20 mA or 1=20 mA settable
Baud rate / Transmission distance	max. 38.4 kbit/s / max. 1200 m
Connections	2.5 mm ² screw (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Status signal	2 green LED (Rx/D, Tx/D)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 3 10 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between Current loop / RS 232	depending on current loop (active/passive) 500 V DC (active) / 2000 V DC (passive)
Galvanic isolation between Current loop / power supply	500 V DC (active) / 2000 V DC (passive)
Configuration of the operating mode	using internal DIP switches
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm ² / stranded with ferrule, 4 mm ² solid
Dimensions (WxDxH)	88 x 22.5 x 100 mm
Weight	100 g

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CONNECTIONS

Example of connection with a CL (Current Loop) product,

Transmission (Tx/D) in active mode and Reception (Rx/D) in passive mode. Then, the ILPH must be configured and connected Reception (Rx/D) in passive mode and Transmission (Tx/D) in active mode.

CAUTION : For any other configuration, see schematic diagram or front sticker of the product.