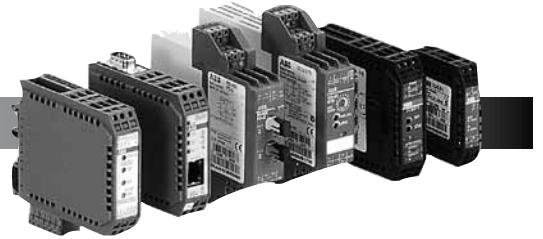


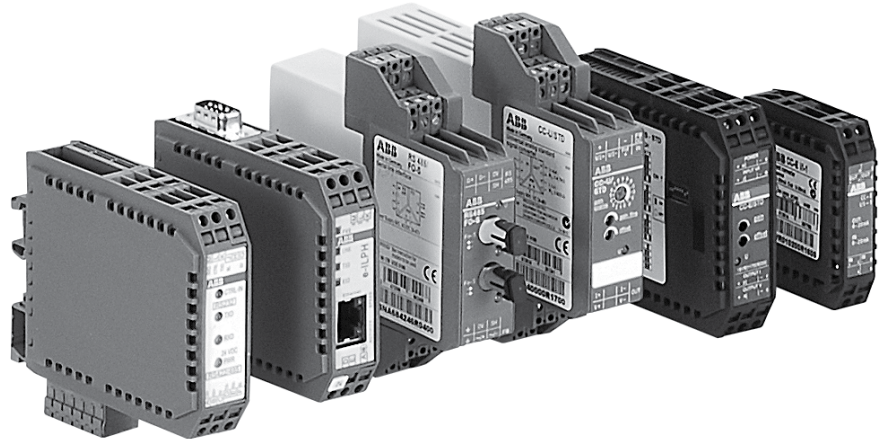


## 12 - Signal and data converters



General information .....	12.1
<b>Analog signal converters .....</b>	<b>12.3 – 12.26</b>
Features and benefits .....	12.3
Application, approvals and marks .....	12.4
Overview .....	12.5 - 12.6
Ordering details .....	12.7 - 12.10
Approximate dimensions .....	12.11
Technical data .....	12.12 - 12.24
Technical diagrams, connection diagrams, approximate dimensions .....	12.25
<b>Signal data converters .....</b>	<b>12.27 – 12.44</b>
General information .....	12.27
Overview .....	12.28
Ordering details table .....	12.29
Benefits and advantages .....	12.30
Ordering details .....	12.31
Approximate dimensions .....	12.32 - 12.34
Technical data .....	12.35 - 12.44

## Notes



# 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.

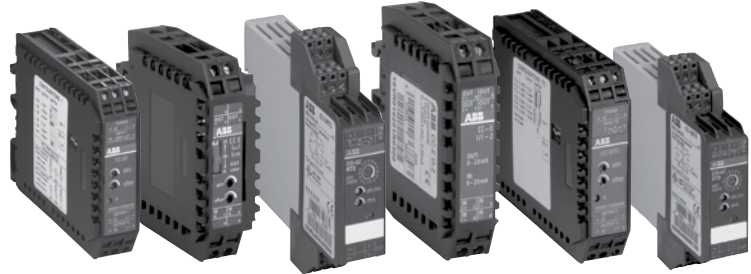
ABB's range of analog signal converters are ideally suited when existing electrical or physical values have to be converted into proportional standard signals or relay threshold signals.

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.





## 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

## 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

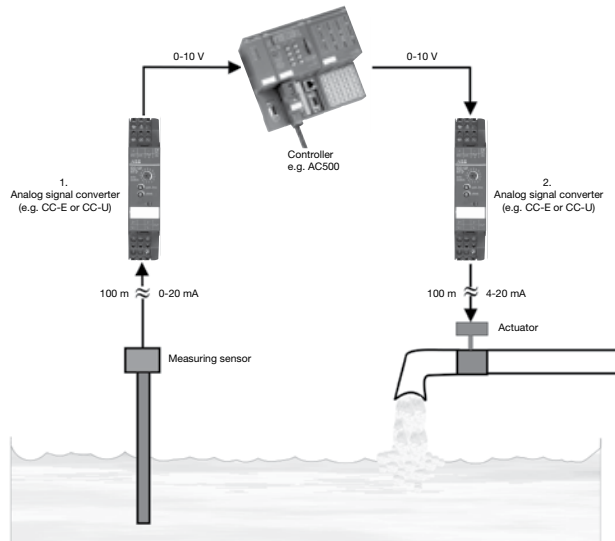
If long lines or high burdens have to be operated, it may be necessary to amplify the signal. CC analog signal converters require only low input power and provide high output power.

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.

12

- existing
- ▲ existing for some devices
- pending

		CC-E/STD	CC-E/I	CC-U/STD	CC-U/STDR	CC-E/RTD	CC-U/RTD	CC-U/RTDR	CC-E/TC	CC-U/TC	CC-U/TCR	CC-E/I	CC-E I <sub>AC</sub> /I <sub>PO</sub>	CC-U/I	CC-U/W
<b>Approvals</b>															
	UL 508, CAN/CSA C22.2 No.14	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	UL 1604 (Class I, Div 2, hazardous locations), CAN/CSA C22.2 No.213	▲		■		▲	■		▲	■		▲		■	■
	CB scheme				■			■			■				
	CCC				■			■			■				
<b>Marks</b>															
	CE	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	C-Tick	■	■	■	■	■	■	■	■	■	■	■	■	■	■

### 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  $\leq 2.5$  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  $\Omega$
- 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 <sup>1)</sup>
- 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

### 12 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<sub>AC</sub>/ILPO 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	0-20 mA	CC-E V/I	1SVR011711R1600	0.084 (0.185)
		4-20 mA	CC-E V/I	1SVR011712R1700	0.084 (0.187)
		0-10 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)
		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 0-20 mA, 4-20 mA	CC-E/STD 3)	1SVR011705R2100	0.090 (0.198)
	0-20 mA	0-10 V	CC-E V/V	1SVR011720R2300	0.096 (0.212)
		0-20 mA	CC-E V/I	1SVR011721R1000	0.087 (0.192)
		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	
		0-10 V	CC-E V/V	1SVR011726R1500	0.096 (0.212)
		0-20 mA	CC-E V/I	1SVR011727R1600	0.087 (0.192)
loop powered	-10...+10 V 0-20 mA, 4-20 mA	4-20 mA	CC-E V/I	1SVR011728R2700	0.088 (0.194)
		-10...+10 V	CC-E V/V	1SVR011729R2000	0.086 (0.190)
	0-20 mA, 4-20 mA	CC-E I/I-12)	1SVR010200R1600	0.038 (0.084)	
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-E I/I-22)	1SVR010201R0300	0.044 (0.097)
			CC-U/STD	1SVR040000R1700	0.125 (0.276)
				1SVR040001R0400	0.126 (0.278)
			CC-U/STDR4)	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

### RTD Converters



CC-E/RTD



CC-U/RTD

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 <sup>1)</sup>	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 -50...+50 °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)
110-240 V AC	refer to table	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)
		4-20 mA	CC-E RTD/I	1SVR011790R2200	0.089 (0.196)
	PT100 0...100 °C	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	
		0-10 V	CC-E RTD/V	1SVR011794R1200	0.087 (0.192)
	PT100 -50...+50 °C	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)
		0-20 mA	CC-E RTD/I	1SVR011798R2600	0.089 (0.196)
24-48 V DC, 100-300 V DC, 110-240 V AC, 24 V AC	refer to table	4-20 mA	CC-E RTD/I	1SVR011799R2700	0.088 (0.194)
		refer to table 2 c/o	CC-U/RTD	1SVR040002R0500	0.126 (0.278)
				1SVR040003R0600	0.128 (0.282)
			CC-U/RTDR <sup>3)</sup>	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	0-10 V, 0-20 mA, 4-20 mA	CC-E/TC <sup>1)</sup>	1SVR011702R2600	0.089 (0.196)	
		0-10 V	CC-E TC/V	1SVR011750R0100	0.087 (0.192)	
	type J 0...600 °C	0-20 mA	CC-E TC/I	1SVR011751R2600	0.084 (0.187)	
		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	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)
type J 0...600 °C		0-20 mA	CC-E TC/I	1SVR011761R2000	0.088 (0.194)	
		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)	
type K 0...1000 °C		4-20 mA	CC-E TC/I	1SVR011765R2400	0.086 (0.190)	
		refer to table	refer to table 2 c/o	CC-U/TC	1SVR040004R0700	0.130 (0.287)
	1SVR040005R0000				0.128 (0.282)	
	CC-U/TCR <sup>1)</sup>				1SVR040014R2000	0.145 (0.320)
1SVR040015R2100						

1) with relay output

## Measuring converters

### Ordering details



CC-E I<sub>AC</sub>/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 <sub>AC</sub> /V 1)	1SVR011770R0500	0.090 (0.198)
	0-5 A, 0-20 A, AC	0-20 mA	CC-E I <sub>AC</sub> /I 1)	1SVR011771R2200	0.092 (0.203)
		4-20 mA	CC-E I <sub>AC</sub> /I 1)	1SVR011772R2300	
		0-10 V	CC-E I <sub>DC</sub> /V 1)	1SVR011773R2400	0.092 (0.207)
		0-20 mA	CC-E I <sub>DC</sub> /I 1)	1SVR011774R2500	0.091 (0.200)
		4-20 mA	CC-E I <sub>DC</sub> /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 <sub>AC</sub> /V 1)	1SVR011780R1100	0.092 (0.203)
	0-5 A, 0-20 A, AC	0-20 mA	CC-E I <sub>AC</sub> /I 1)	1SVR011781R0600	0.092 (0.207)
		4-20 mA	CC-E I <sub>AC</sub> /I 1)	1SVR011782R0700	0.095 (0.209)
		0-10 V	CC-E I <sub>DC</sub> /V 1)	1SVR011783R0000	0.093 (0.205)
		0-20 mA	CC-E I <sub>DC</sub> /I 1)	1SVR011784R0100	0.095 (0.209)
		4-20 mA	CC-E I <sub>DC</sub> /I 1)	1SVR011785R1100	
250 V AC	0-1 A, 0-5 A, AC	4-20 mA	CC-E I <sub>AC</sub> /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

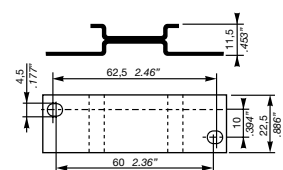
## Accessories

### Approximate dimensions

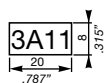
#### Accessories

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)

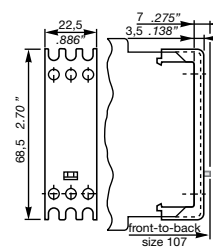
#### Approximate dimensions



ADP.01



MAR.01



Sealable cover - COV.01

# Analog signal converters

## Technical data

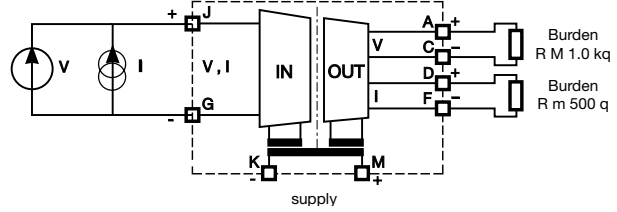
### CC-E/STD, CC-E x/x (universal devices)

#### 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

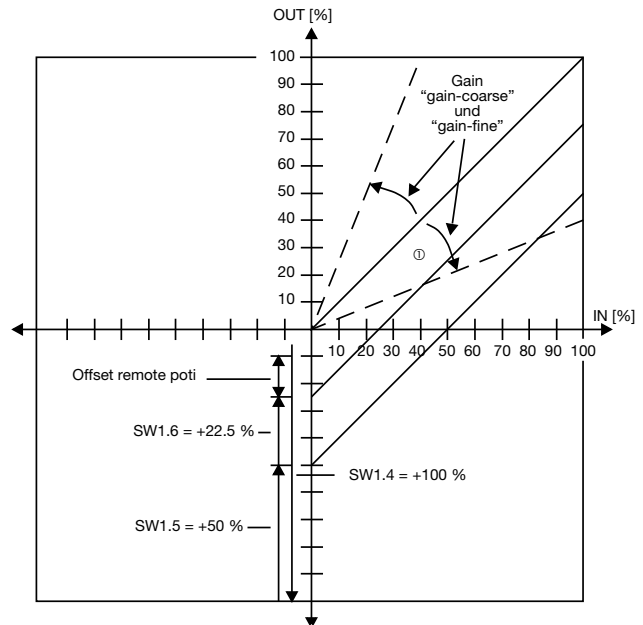
#### DIP switch settings

Input	Switch 1								Gain	Coarse Type
	1	2	3	4	5	6	7	8		
Potentiometer	■	■	■	■	■	■	■	■	0	C
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
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 *)	■	■	■	■	■	■	■	■	-	-

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	■	■	■	■	■	■

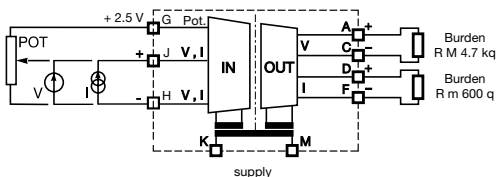
Legend	
■	ON
□	OFF
□	no influence

#### Adjustment range



\*) 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.

#### Wiring instruction

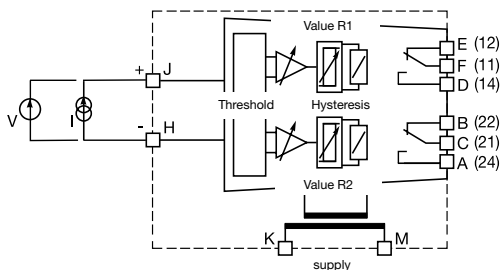


# Analog signal converters

## Technical data

### CC-U/STDR with relay output

#### Wiring instruction

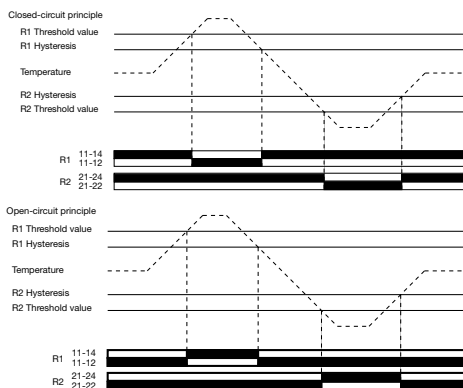


#### DIP switch settings

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						■

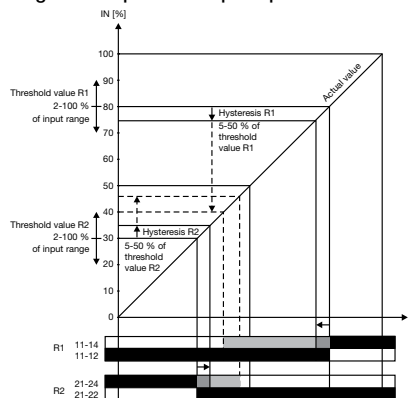
Legend	
■	ON
□	OFF
◻	no influence

#### Function diagrams



#### Switching points

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



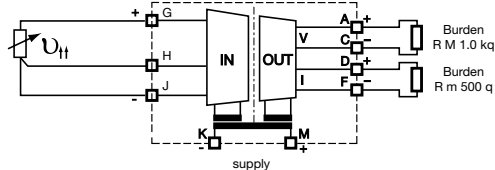
### CC-E/RTD

#### 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							

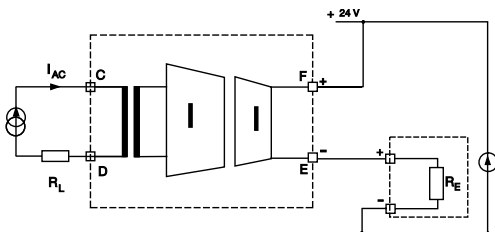
Legend	
■	ON
□	OFF
◻	no influence

#### Wiring instruction



### CC-E I<sub>AC</sub>/ILPO

#### Wiring instruction



# Analog signal converters

## Technical data

### CC-U/RTD

#### DIP switch settings

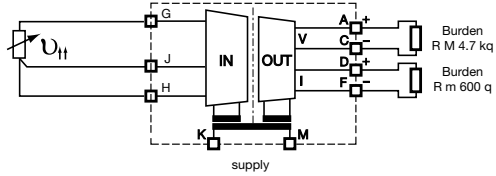
Type	Input Range	Switch 1						Switch 2						Gain Coarse	
		1	2	3	4	5	6	1	2	3	4	5	6		
PT10	0...500 °C														F
	0...550 °C														E
	0...600 °C														D
	0...650 °C														C
	0...700 °C														B
	0...750 °C														A
	0...800 °C														9
0...850 °C											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

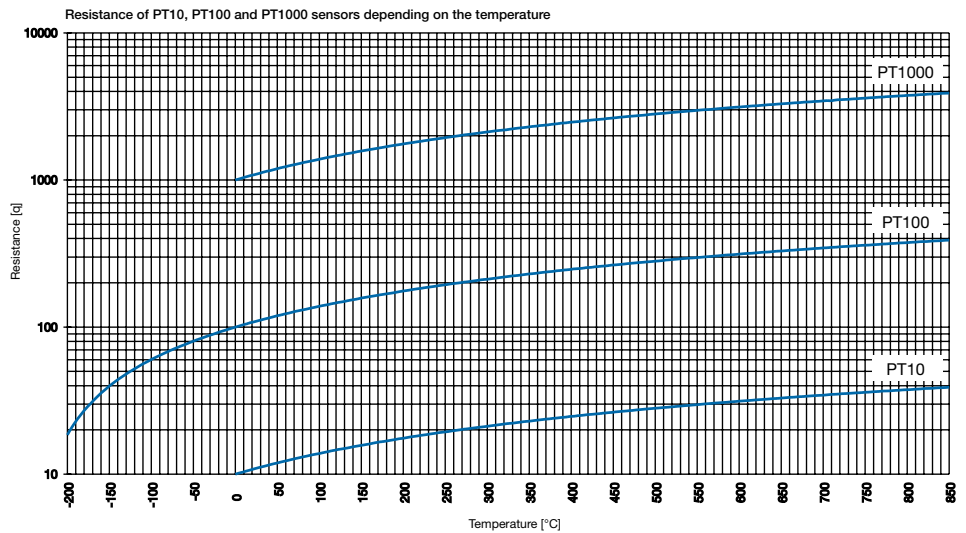
Legend	
■	ON
□	OFF
□	no influence

#### 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).



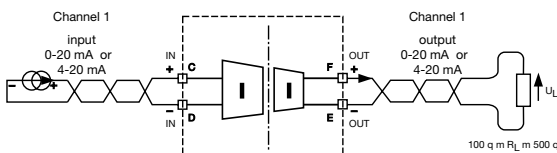
#### Characteristic curves



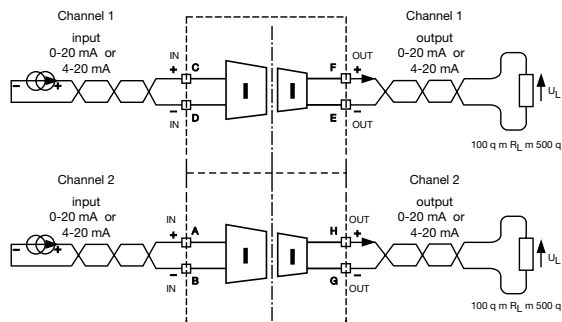
### CC-E I/I-1 and CC-E I/I-2

#### Wiring instruction

##### CC-E I/I-1



##### CC-E I/I-2





# Analog signal converters

## Technical data

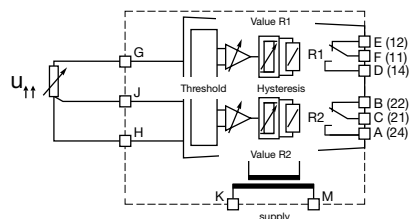
### CC-U/RTDR with relay output

#### DIP switch settings

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

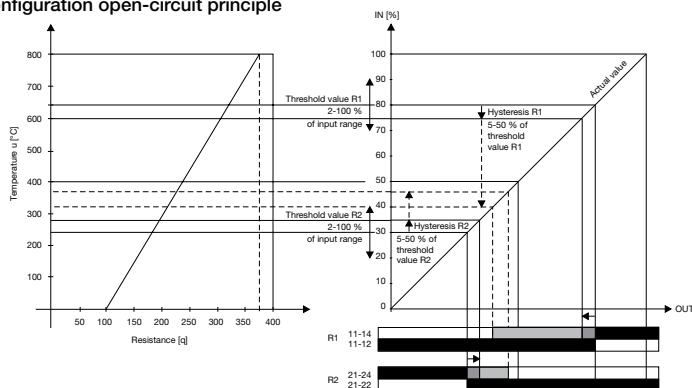
Legend	
■	ON
□	OFF
◻	no influence

#### Wiring instruction

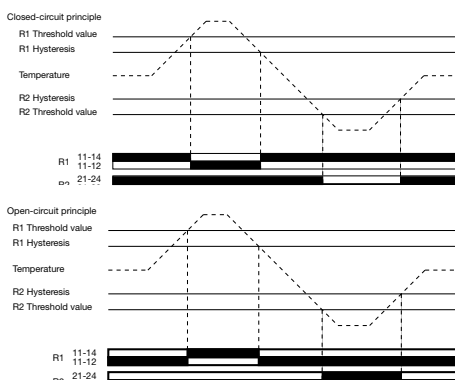


### Switching points

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



#### Function diagrams



### CC-E/TC, CC-E/I

#### DIP switch settings CC-E/TC

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

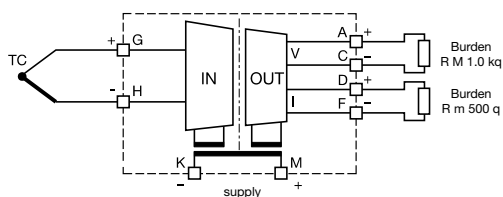
Legend	
■	ON
□	OFF
◻	no influence

#### DIP switch settings CC-E/I

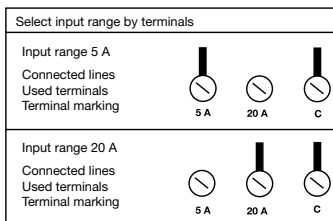
Input	Output	Switch					
		1	2	3	4	5	6
I - DC	0...10 V	■					
	0...20 mA	■					
I - AC	0...10 V	■					
	4...20 mA	■					

Legend	
■	ON
□	OFF

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



#### Input range selection - CC-E/I



# Analog signal converters

## Technical data

### CC-U/V

#### DIP switch settings

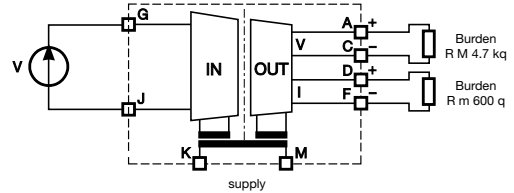
Output	Switch
	1 2 3 4 5 6
0...5 V	ON OFF OFF OFF OFF OFF
0...10 V	ON OFF OFF OFF OFF OFF
1...5 V	ON OFF OFF OFF OFF OFF
2...10 V	ON OFF OFF OFF OFF OFF
-10...+10 V	ON OFF OFF OFF OFF OFF
-5...+5 V	ON OFF OFF OFF OFF OFF
-10...0 V	ON OFF OFF OFF OFF OFF
-5...0 V	ON OFF OFF OFF OFF OFF
0...6.66 V	ON OFF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

Legend  
 ON  
 OFF  
 no influence

#### Input range selection

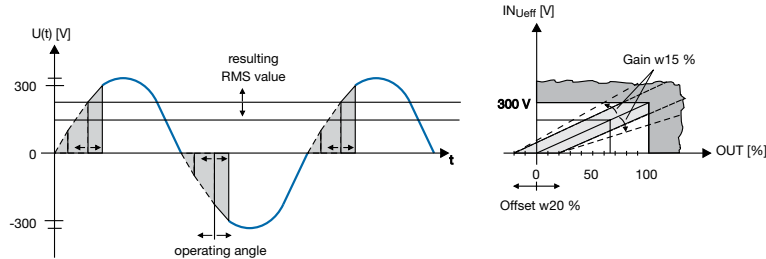
Selecting input range by front-face rotary switch	Switch position
0...100 V	1
0...150 V	2
0...250 V	3
0...300 V	4
0...400 V	5
0...450 V	6
0...550 V	7
0...600 V	8

#### Wiring instruction



#### Example of application

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



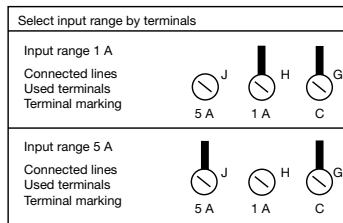
### CC-U/I

#### DIP switch settings

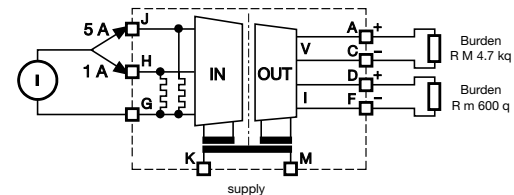
Output	Switch
	1 2 3 4 5 6
0...5 V	ON OFF OFF OFF OFF OFF
0...10 V	ON OFF OFF OFF OFF OFF
1...5 V	ON OFF OFF OFF OFF OFF
2...10 V	ON OFF OFF OFF OFF OFF
-10...+10 V	ON OFF OFF OFF OFF OFF
-5...+5 V	ON OFF OFF OFF OFF OFF
-10...0 V	ON OFF OFF OFF OFF OFF
-5...0 V	ON OFF OFF OFF OFF OFF
0...6.66 V	ON OFF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

Legend  
 ON  
 OFF  
 no influence

#### Input range selection

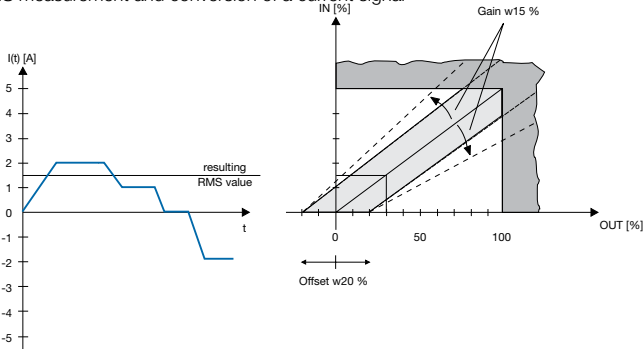


#### Wiring instruction



#### Example of application

RMS measurement and conversion of a current signal



# Analog signal converters

## Technical data

### CC-U/TC

#### DIP switch settings

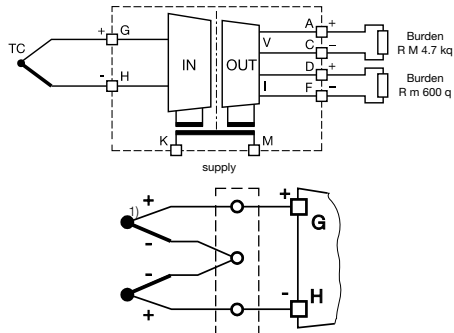
Output	Switch 3					
	1	2	3	4	5	6
0...5 V						
0...10 V						
1...5 V						
2...10 V						
-10...+10 V						
-5...+5 V						
-10...0 V						
-5...0 V						
0...6.66 V						
-10...+3.33 V						
-5...+1.66 V						
0...8 V						
0...4 V						
-10...-2 V						
-5...-1 V						
1.25...6.25 V						
7.5...+2.5 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						

Input	Range	Switch 1						Switch 2							
		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	-150...+400 °C														
N	0-250...1550 °C														
R	0-100...700 °C														
B	0-200...1000 °C														
K	0-100...650 °C														
N	0-200...1300 °C														
R	0-250...1350 °C														
B	0-450...1700 °C														
B	0-700...1750 °C														
mV	9...2...10 mV														
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

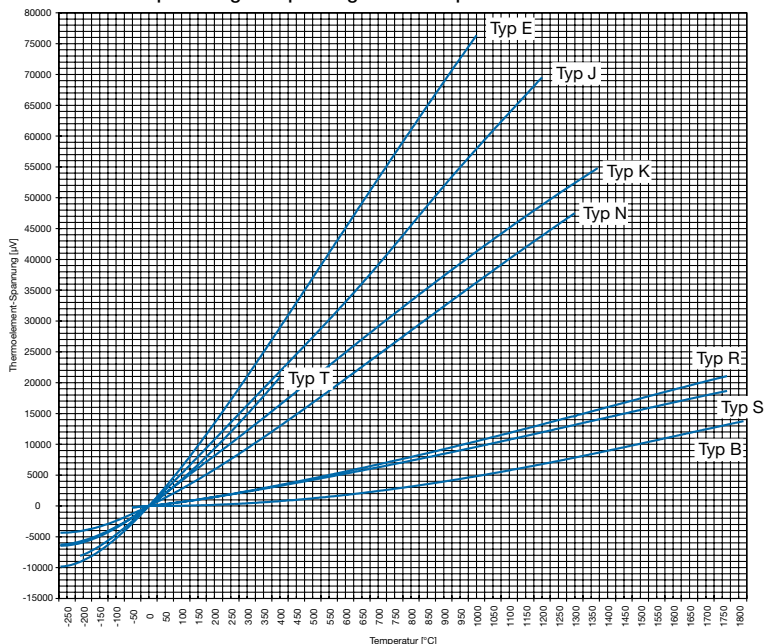
#### Wiring instruction



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

### Characteristic curve

Thermocouple voltages depending on the temperature



# Analog signal converters

## Technical data

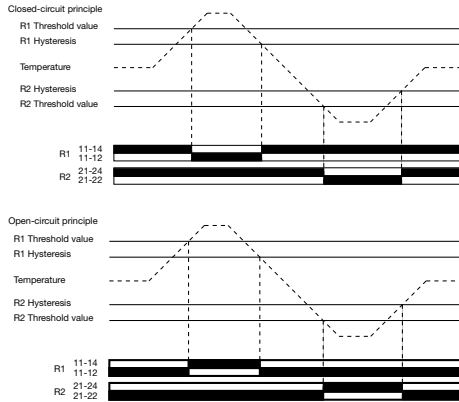
### CC-U/TCR with relay output

#### DIP switch settings

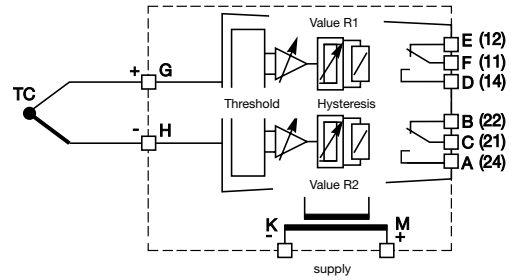
Type	Input Range	Switch					
		1	2	3	4	5	6
J	0...240 °C						
	0...480 °C						
	0...1200 °C						
K	0...250 °C						
	0...500 °C						
	0...1350 °C						
T	-150...+120 °C						
	0...220 °C						
	0...400 °C						
S	0...210 °C						
	0...380 °C						
	0...860 °C						
Output							
Closed-circuit principle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

Legend	
■	ON
□	OFF
□	no influence

#### Function diagrams

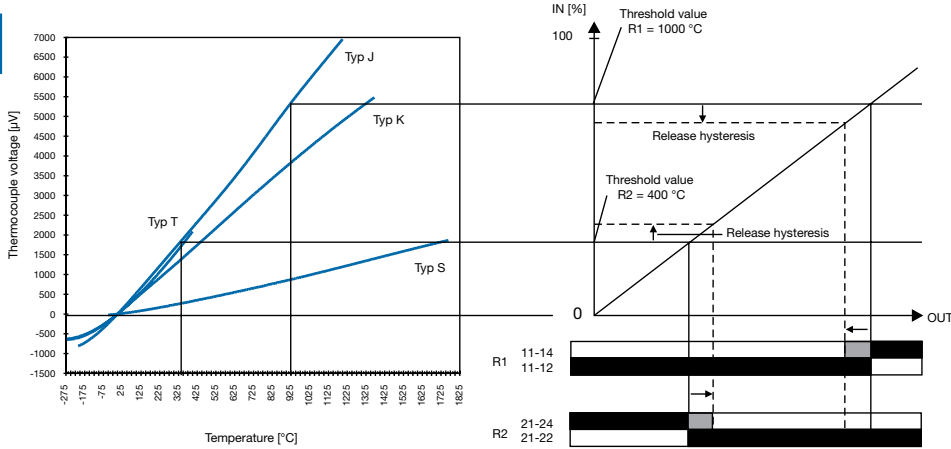


#### Wiring instruction



### Switching points

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



# Analog signal converters

## Technical data

Type		CC-E/STD	CC-E/RTD <sup>3)</sup>	CC-E/TC
<b>Input circuits - Analog inputs</b>	<b>J-G-H</b>	<b>Current</b>	<b>Voltage</b>	<b>Temperature sensors</b>
Input signal		Standard signals		PT100
Rated input range		0...20 mA / 4...20 mA	0...5 V / 0...10 V / -10...+10 V	-50...+500 °C
Limitation of input signals		+55 mA	± 11 V	
Influence of line resistance		-	< 0.01 %/Ω	< 0.5 % / 100 Ω
Gain adjustment range		± 5 % (universal devices)		
Offset adjustment range		± 5 % (universal devices)		
Input impedance		50 Ω	1 MΩ	-
Suppression at 50 Hz		-	-	> 35 dB
Common-mode rejection		-	100 dB	
<b>Output circuits - Analog outputs</b>	<b>D-F, A-C</b>	<b>Current</b>		<b>Voltage</b>
Output signal		0-20 mA, 4-20 mA		0-5 V, 0-10 V
Output burden		≤ 500 Ω		≥ 1.0 kΩ
Accuracy <sup>1)</sup>		± 0.5 % of full-scale		
Residual ripple		< 0.5 %		
Response time		200 μs	10 ms	
Transmission frequency		2 kHz	80 Hz	2 Hz (up to -3 dB)
Reaction to input circuit interruption			High fail safe: Output voltage > 115 % of measuring range <sup>2)</sup> Low fail safe: Output voltage < -0.6 V, output current = 0 mA	
<b>Supply circuits</b>	<b>K-M</b>	<b>DC versions</b>		<b>AC versions</b>
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.
<b>Indication of operational states</b>		U: green LED		
<b>General data</b>		operation / storage		
Ambient temperature range		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		
<b>Electrical connection</b>		rigid		
Wire size		0.2-4 mm <sup>2</sup> (24-12 AWG)		
		fine-strand with(out) wire end ferrule		
		0.2-2.5 mm <sup>2</sup> (24-14 AWG)		
Stripping length		7 mm (0.28 inch)		
Tightening torque		0.5 Nm (4.4 lb.in)		
<b>Electromagnetic compatibility</b>		EN 61000-6-2		
Interference immunity		Level 3 (±6 kV / ±8 kV)		
electrostatic discharge (ESD)	IEC/EN 61000-4-2			
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		
<b>Isolation data</b>		2.5 kV AC		
Test voltage between all isolated circuits				
Rated insulation voltage				

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

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

<sup>3)</sup> 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
<b>Input circuits - Analog inputs</b>		
<b>Current</b>		
Input current $I_{IN}$		0-20 mA, 4-20 mA
Min. input current		< 100 $\mu$ A
Max. input current		50 mA <sup>1)</sup> ( $V_{IN} < 18$ 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 <sup>1)</sup> ( $I_{IN} < 50$ mA)
<b>Output circuits</b>		
Output current $I_{OUT}$		0-20 mA, 4-20 mA
Output load $R_L$		0-500 $\Omega$
Output voltage $U_{OUT}$		$I_{OUT} \times R_L$
Residual ripple		< 20 mV <sub>pp</sub> (500 $\Omega$ , 20 mA)
Response time (0-100 %)		< 15 ms (0-500 $\Omega$ , 20 mA), < 5 ms (500 $\Omega$ , 20 mA, 25 °C)
Accuracy		$\leq 0.1$ % of full-scale (20 mA)
Load influence (0-500 $\Omega$ )		$\leq \pm 0.05$ % / 100 $\Omega$ , $\leq -0.1$ % / 100 $\Omega$ (25 °C)
<b>General data</b>		
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		< $\pm 50$ ppm / °C
Mounting		DIN rail (IEC/EN 60715)
<b>Electrical connection</b>		
Wire size	rigid	0.2-4 mm <sup>2</sup> (24-12 AWG)
	fine-strand with(out) wire end ferrule	0.2-2.5 mm <sup>2</sup> (24-14 AWG)
Stripping length		7 mm (0.28 inch)
Tightening torque		0.5 Nm (4.4 lb.in)
<b>Standards</b>		
Product standard		EN 50178
Low Voltage Directive		2006/95/EC
EMC Directive		2004/108/EC
<b>Electromagnetic compatibility</b>		
Interference immunity		EN 61000-6-2
electrostatic discharge (ESD)	EN 61000-4-2	Level 3 ( $\pm 6$ kV / $\pm 8$ kV)
electromagnetic field (HF radiation resistance)	EN 61000-4-3	10 V/m
fast transients (Burst)	EN 61000-4-4	Level 3 ( $\pm 2$ kV / 5 kH)
powerful impulses (Surge)	EN 61000-4-5	$\pm 2$ kV / $\pm 1$ 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
<b>Isolation data</b>		
Insulation voltage input / output		500 V <sub>eff</sub> / 50 Hz
Insulation voltage between channels		5 kV <sub>eff</sub> / 50 Hz (device with 2 channels)
Pollution category		2
Overvoltage category		II

<sup>1)</sup> The input parameters have to be limited to the indicated maximum values.

# Analog signal converters

## Technical data

Type	CC-U/STD			CC-U/RTD <sup>3)</sup>		CC-U/TC	
Input circuits - Analog inputs	J-G-H			Temperature sensors		Thermocouples (IEC 584-1 and 2)	
	Current	Voltage	Potentiometer				
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 <sup>2)</sup>	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 adjustable: 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 % for different ranges			± 5 %		± 10 %	
Input impedance	51 Ω	6 MΩ	3 GΩ	-		-	
without detection of input signal interruption	51 Ω	3.5 MΩ	9.5 GΩ	-		-	
with detection of input signal interruption	-	-	-	-		-	
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				U: green LED			
General data							
Ambient temperature range operation / storage				-20...+60 °C / -40...+80 °C			
Temperature coefficient	±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			plug-connector with screw terminals 0.2-2.5 mm <sup>2</sup> (24-12 AWG)			
	fine-strand with(out) wire end ferrule			plug-connector with screw terminals 0.2-2.5 mm <sup>2</sup> (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 kH)			
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
<b>Input circuits - Analog inputs</b>	J-H			
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			
<b>Output circuits - Relay outputs</b>	E-D-F, B-C-A		Relay, 2 c/o contacts	
Rated switching voltage	250 V AC			
Rated switching current	AC12 (resistive) 230 V AC15 (inductive) 230 V DC12 (resistive) 24 V DC13 (inductive) 24 V	4 A 3 A 4 A 2 A		
AC rating (UL 508)	Utilization category (Control Circuit Rating Code) max. rated operational voltage max. continuous thermal current at B 300 max. making/breaking apparent power at B 300	B 300 300 V AC 5 A 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 <sup>6</sup> switching cycles			
Electrical lifetime	at AC12, 230 V, 4 A	0.1 Mio. switching cycles		
<b>Supply circuits</b>	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
<b>Indication of operational states</b>			U: green LED R1: yellow LED / R2: yellow LED	
Supply voltage			U: green LED	
1st / 2nd output relay energized			R1: yellow LED / R2: yellow LED	
<b>General data</b>				
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			
<b>Electrical connection</b>				
Wire size	rigid fine-strand with(out) wire end ferrule	plug-connector with screw terminals 0.2-2.5 mm <sup>2</sup> (24-12 AWG) plug-connector with screw terminals 0.2-2.5 mm <sup>2</sup> (24-12 AWG)		
Stripping length	7 mm (0.28 inch)			
Tightening torque	0.4 Nm (3.5 lb.in)			
<b>Electromagnetic compatibility</b>				
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 kH)		
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		
<b>Isolation data</b>				
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

Type	CC-E/I		CC-E I <sub>AC</sub> /ILPO
	J-G-H		C-D
<b>Input circuits - Analog inputs</b>	AC current	DC current	2 meas. ranges selectable
Rated input range	0-5 A / 0-20 A	0-5 A / 0-20 A	0-1 A / 0-5 A / sinusoidal
Measuring frequency			50/60 Hz
Overload capacity of inputs	input range 1	10 x I <sub>Nom</sub> (50 A) for max. 1 s	10 x I <sub>Nom</sub> (50 A) for max. 2 s
	input range 2	10 x I <sub>Nom</sub> (200 A) for max. 1 s	10 x I <sub>Nom</sub> (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
<b>Output circuits - Analog outputs</b>	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 <sup>1)</sup>	± 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		-
<b>Supply circuits</b>	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		typ 1.5 W	typ 1.5 VA
<b>Indication of operational states</b>		U: green LED	-
<b>General data</b>			
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	
<b>Electrical connection</b>			
Wire size	rigid	0.2-4 mm <sup>2</sup> (24-12 AWG)	
	fine-strand with(out) wire end ferrule	0.2-2.5 mm <sup>2</sup> (24-14 AWG)	
Stripping length		7 mm (0.28 inch)	
Tightening torque		0.5 Nm (4.4 lb.in)	
<b>Electromagnetic compatibility</b>			
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	
<b>Isolation data</b>			
Test voltage (between all isolated circuits)		2.5 kV AC	
Rated insulation voltage		-	250 V AC

<sup>1)</sup> 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
<b>Input circuits - Analog inputs</b>	<b>J-G-H</b>	<b>any current signals, RMS measurement</b>	<b>any voltage signals, RMS measurement</b>
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 <sub>Nom</sub> (10 A) for max. 2 s 10 x I <sub>Nom</sub> (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
<b>Output circuits - Analog outputs</b>	<b>D-F, A-C</b>	<b>Current</b>	<b>Voltage</b>
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 <sup>1)</sup>			±0.5 % of full-scale
Temperature coefficient		±250 ppm/°C max.	±300 ppm/°C max.
Residual ripple			< 0.15 %
Response time			150 ms
<b>Supply circuits</b>	<b>K-M</b>		
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	plug-connector with screw terminals 0.2-2.5 mm <sup>2</sup> (24-12 AWG)
	fine-strand with(out) wire end ferrule	plug-connector with screw terminals 0.2-2.5 mm <sup>2</sup> (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

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

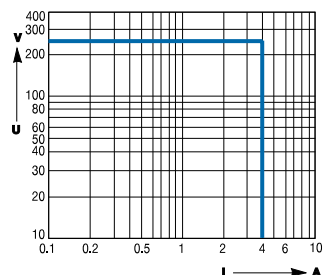
# Analog signal converters

Technical diagrams, connection diagrams  
Approximate dimensions

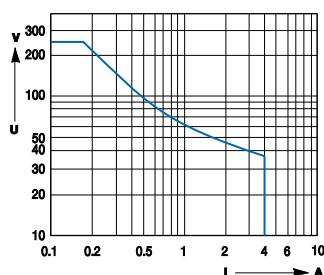
## Technical diagrams

### Load limit curves CC-U/xxR

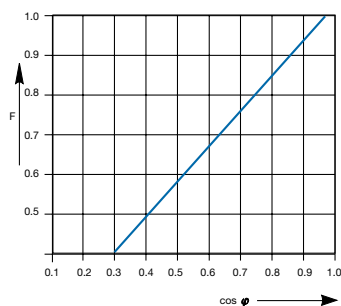
Resistive AC load



Resistive DC load

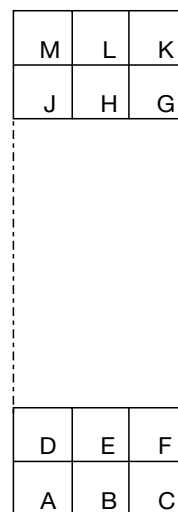


Derating curve



## Connection diagram CC-U/x

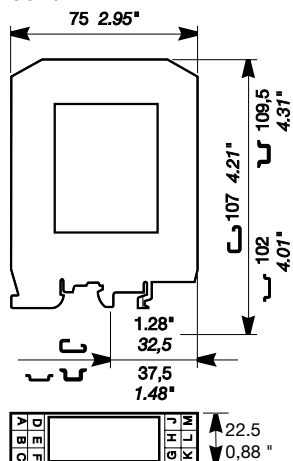
Width 22.5 mm (0.89 in)



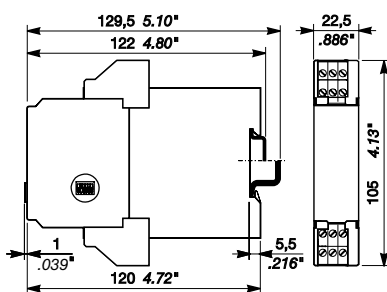
## Dimensional drawings

Dimensions in mm and inches

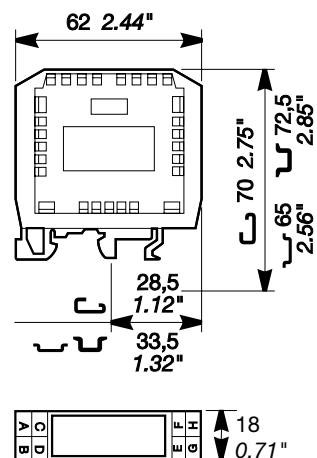
CC-E/x



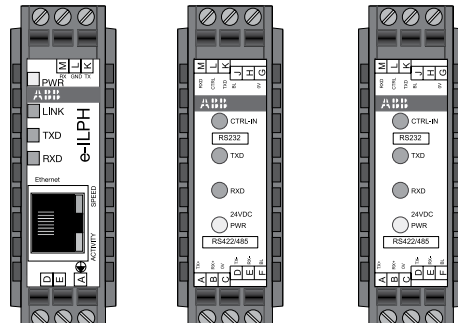
CC-U/x, CC-U/xR



CC-E I<sub>AC</sub>/ILPO, CC-E I/I







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.

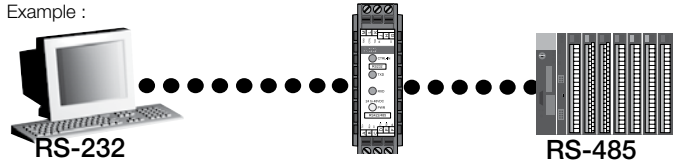
### "World Wide" communication

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.

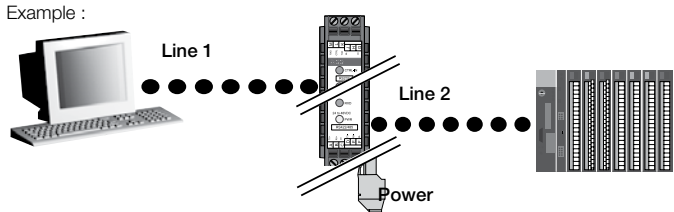
### Protocol conversion

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.

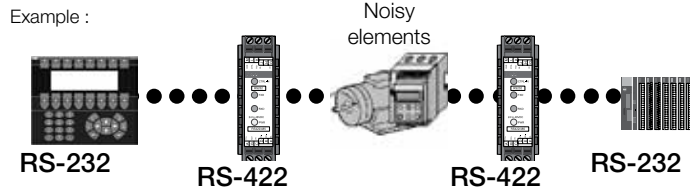
Example :



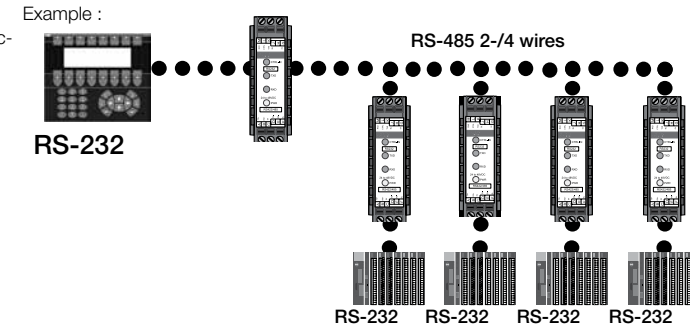
Example :



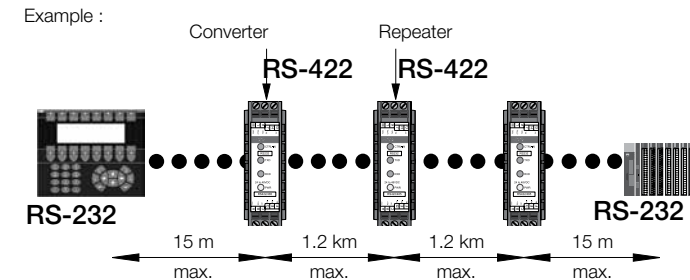
Example :



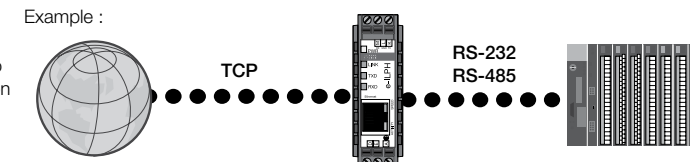
Example :



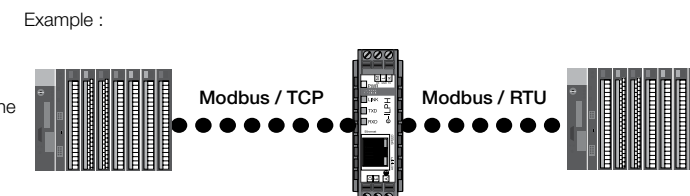
Example :



Example :



Example :



# Serial data converters

## Selection table

	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
RS422 /RS485		■					■					In-Out	1SNA684212R2200
			■				■					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

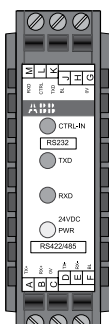
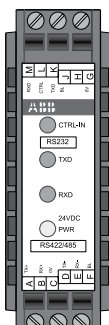
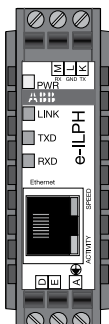
##### Galvanic isolated converter for current loop to RS 422-485 (1 or 2 pairs) serial link.

- 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



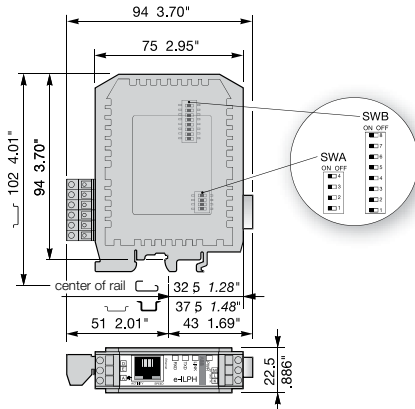
Description	Type	Catalog number	Weight (1 pce) kg (lb)
Serial data converter e-ILPH	ILPH RS 232-RS 485 / Ethernet	1SNA684252R0200	0.12 (0.265)
Serial link interface without galvanic isolation	ILPH RS 232 / RS 422-485	1SNA684231R2500	0.1 (0.220)
Serial link interface with galvanic isolation	ILPH RS 232 / 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)
	ILPH RS 232 / FO-S (24...42 V AC/DC power supply)	1SNA684236R2200	
Serial link interface 3 way galvanic isolation	ILPH RS 232 / FO-S (110...240 V AC/DC power supply)	1SNA684237R2300	0.15 (0.331)
	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

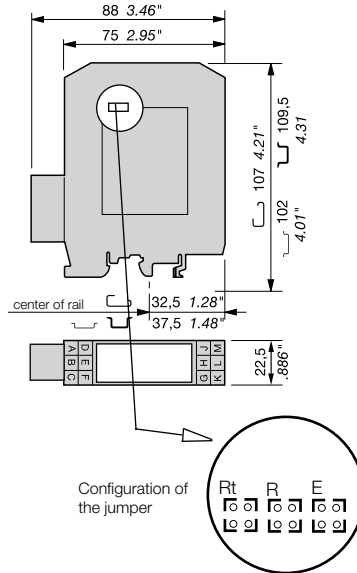
## Jumper

### Approximate dimensions

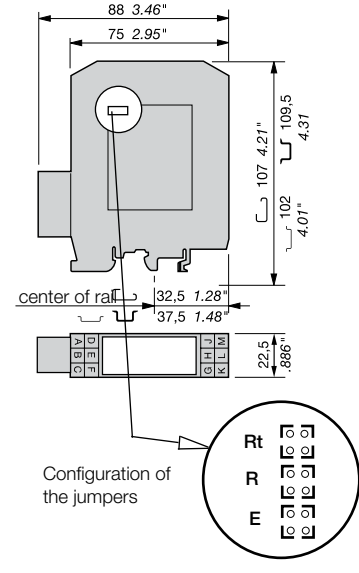
#### ILPH RS 232 - 485 Ethernet



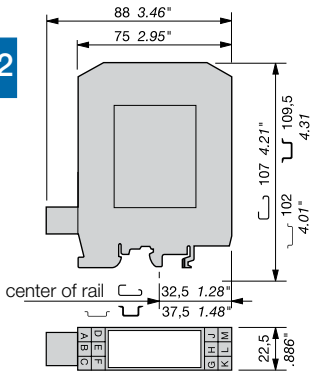
#### ILPH RS 232 - 485 Ethernet (without isolation)



#### 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	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	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

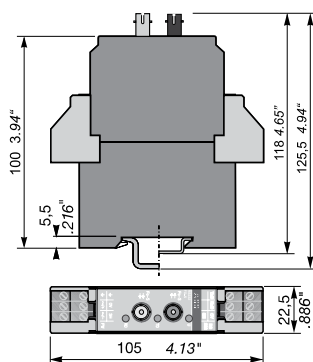
The line must always be polarized. The ILPH is used to polarize the reception channel :  
Connection by 1 wire P+ (J1.1) with 5V (J1.4)  
Connection by 1 wire P- (J1.2) with 0V (J1.3)

#### ADAPTING THE RS 422 - RS 485 LINE

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 = ∞

#### ILPH RS 232 / FO

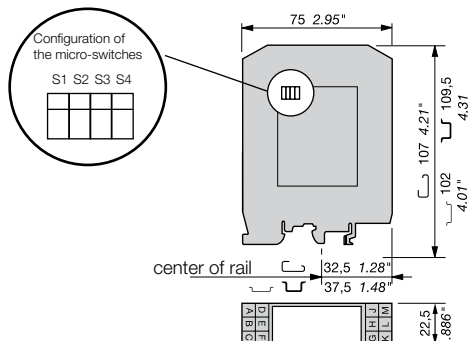


# Serial data converters

## Jumper, micro-switch

### Approximate dimensions

#### ILPH RS 232 / CL



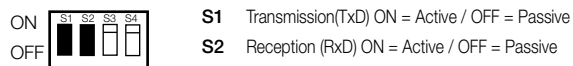
#### CONFIGURATION

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.

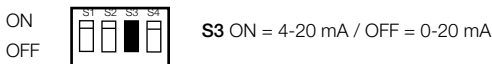
Select operating mode using **S1** and **S2**.



#### SIGNAL LEVEL

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

This selection is made using micro-switch S3



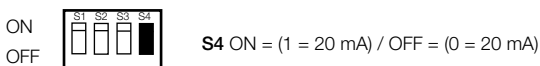
#### Caution :

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

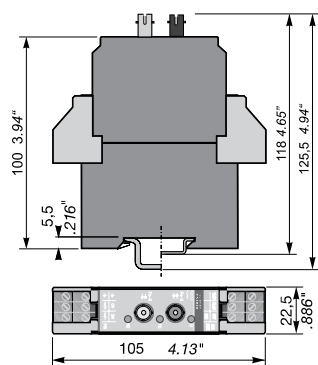
#### LOGIC LEVEL

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

using micro-switch S4

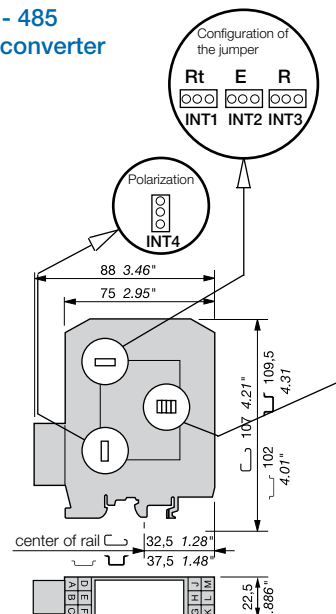


#### ILPH RS 485 / FO



#### 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 INT2 R ON R ON Jumper R in position R ON

E INT3 E ON E ON Jumper E in position E 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)

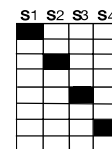
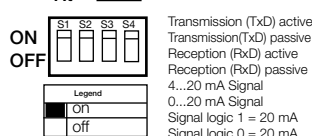
Connection by 1 wire P- (J1.2) with 0 Viso (J1.3)

#### 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 :

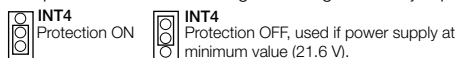
Rt INT1 \* Line adaptation, Rt = 120 Ω (Standard)

Rt INT1 \* No line adaptation, Rt = ∞



#### POLARIZATION

The polarization can be configured using the INT4 jumper.

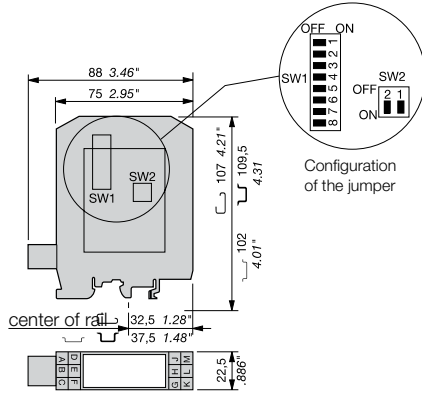


# Serial data converters

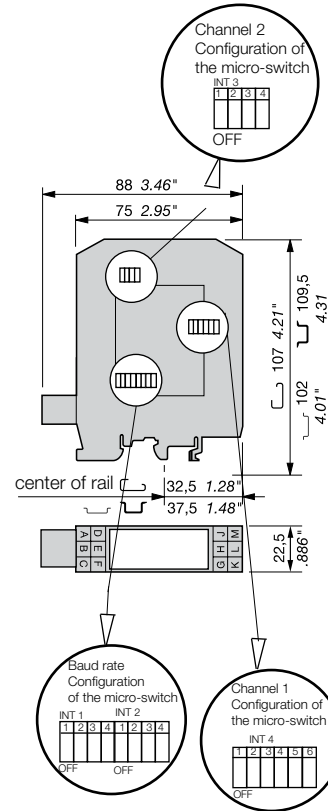
## Jumper, micro-switch

### 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,  $R_t = \infty$

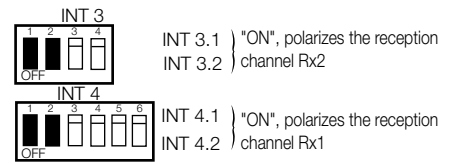
#### RS 422 - RS 485 DRIVERS CONTROL

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  $\mu$ s to 10 ms depending on the baud rate selected.

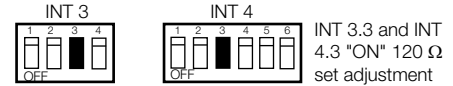
#### POLARIZATION OF THE RS 422 - RS 485 CONNECTIONS

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



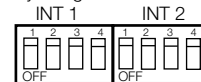
#### ADAPTING THE RS 422 - RS 485 CONNECTIONS

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

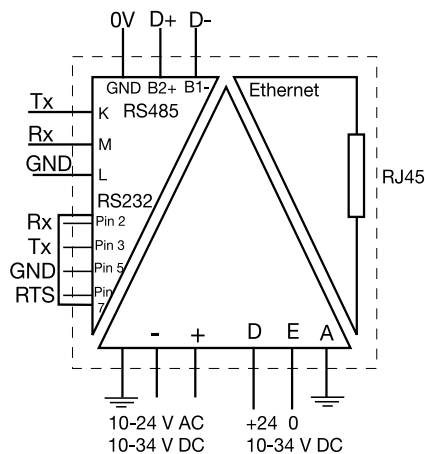
## Technical data

### Technical data

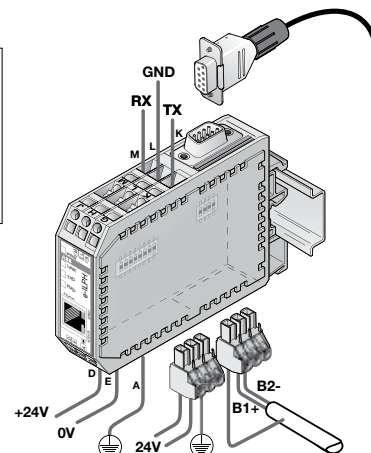
Data at  $T_a = 25\text{ }^\circ\text{C}$  and rated values, unless otherwise indicated

		ILPH RS 232 - 485 / Ethernet
<b>Power supply 1</b>		
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 <sup>2</sup> (22-14 AWG)
<b>Power supply 2</b>		
Voltage		10...34 V DC
Voltage tolerance		-10%, +10%
Consumption		2 W max
Connections		screw connector (AWG 20)
<b>Serial link 1: RS 232</b>		
Overvoltage protection		EIA RS 232
Baud rate / Transmission distance		integrated
Connections		max. 115.2 kbits/s / max. 15 m 2.5 mm <sup>2</sup> screw connector (AWG 20) or male SubD 9 points
<b>Serial link 2: RS 485</b>		
Voltage		EIA RS 485
Line polarization		integrated
End line resistance		integrated
Baud rate / Transmission distance		max. 115.2 kbits/s / max. 1200 m
Connections		coding screw removable connector 0 to 2.5 mm <sup>2</sup> (22-14 AWG)
<b>Ethernet link</b>		
Overvoltage protection		integrated
Baud rate / Transmission distance		10-100 Mbits/s / max. 100 m without Hub or Switch with CAT5 cable
Connections		RJ45 connector
<b>Traffic indication</b>		
Voltage		1 yellow LED
Status of signal		3 green LED (RxD, TxD, LINK), 2 amber or green LED (Speed, Activity)
<b>EMC behavior</b>		
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
<b>Other characteristics</b>		
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 <sup>2</sup> / stranded with ferrule, 4 mm <sup>2</sup> 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

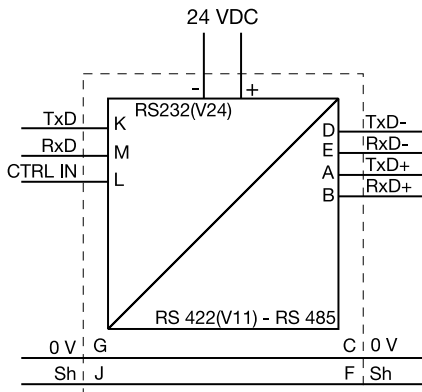
## Technical data

### Technical data

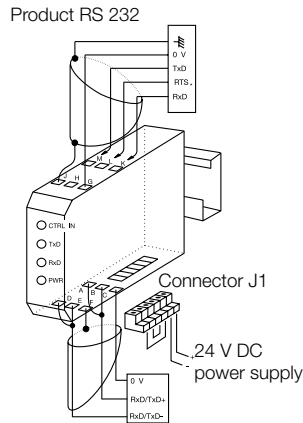
Data at  $T_a = 25\text{ }^\circ\text{C}$  and rated values, unless otherwise indicated

	ILPH RS 232 / RS 422 - 485 (without isolation)
<b>Power supply</b>	polarized
Voltage	24 V DC
Voltage tolerance	8.5...28 V DC
Supply current	100 mA max
Connections	removable screw connectors (AWG 20)
<b>Serial link 1: RS 232</b>	EIA RS 232 C / CCITT V24 V28
Overvoltage protection	integrated (transil 8 kV 1.2/50 $\mu\text{s}$ )
Baud rate / Transmission distance	max. 38.4 kbits/s / max. 1200 m
Connections	2.5 mm <sup>2</sup> screw connectors (AWG 20)
<b>Serial link 2: RS 422-485</b>	EIA RS 485 and EIA RS 422 / CCITT V11
Overvoltage protection	integrated (transil 8 kV 1.2/50 $\mu\text{s}$ )
Baud rate / Transmission distance	max. 38.4 kbits / max. 1200 m
Connections	2.5 mm <sup>2</sup> screw connectors (AWG 20)
<b>Traffic indication</b>	
Voltage	1 yellow LED
Connections	2 green LED (Rx/D, Tx/D)
<b>EMC behavior</b>	
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
<b>Other characteristics</b>	
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 <sup>2</sup> / stranded with ferrule, 4 mm <sup>2</sup> solid
Dimensions (WxDxH)	88 x 22.5 x 100 mm
Weight	100 g

12



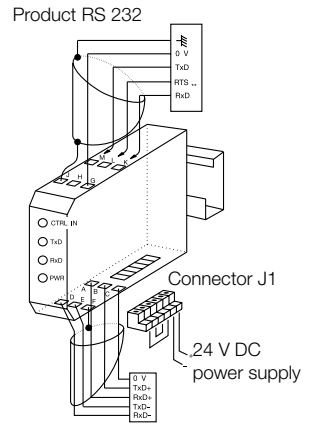
RS 422 - RS 485  
SERIAL LINK (2 wires)



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 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).

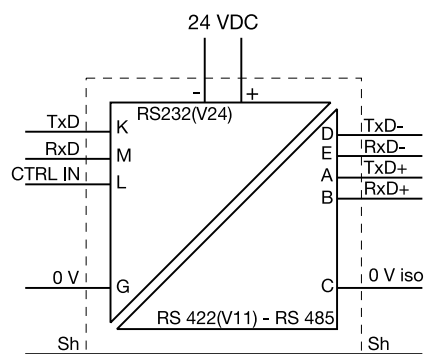
# Serial data converters

## Technical data

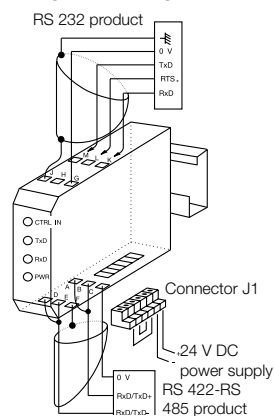
### Technical data

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

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

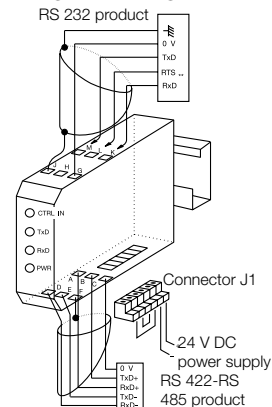


RS 422 - RS 485  
2 WIRE SERIAL LINKS



**\* 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

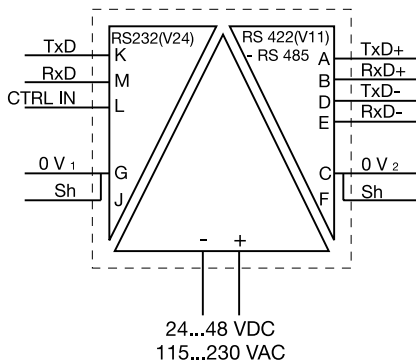
## Technical data

### Technical data

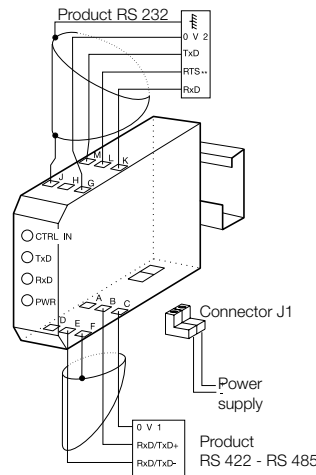
Data at  $T_a = 25\text{ }^\circ\text{C}$  and rated values, unless otherwise indicated

<b>ILPH RS 232 / RS 422 - 485 (3 way galvanic isolated)</b>	
<b>Power supply</b>	
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 (Omniconnect)
<b>Serial link 1: RS 232</b>	
Overvoltage protection	integrated (transil 8 kV 1.2/50 $\mu\text{s}$ )
Baud rate / Transmission distance	max. 19,2 kbits/s / max. 15 m / 2500 pF
Connections	2.5 mm <sup>2</sup> screw (AWG 20)
<b>Serial link 2: RS 422-485</b>	
Overvoltage protection	integrated (transil 8 kV 1.2/50 $\mu\text{s}$ )
Baud rate / Transmission distance	max. 19,2 kbits/s / max. 15 m
Connections	2.5 mm <sup>2</sup> screw (AWG 20)
<b>Traffic indication</b>	
Voltage	1 yellow LED
Connections	4 green LED (Rx/D, Rx/C/D, Tx/D, Tx/C/D)
<b>EMC behavior</b>	
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
<b>Other characteristics</b>	
Galvanic isolation between RS 232 / Power supply / RSS 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 <sup>2</sup> / stranded with ferrule, 4 mm <sup>2</sup> solid
Dimensions (WxDxH)	88 x 22,5 x 100 mm
Weight	100 g

12

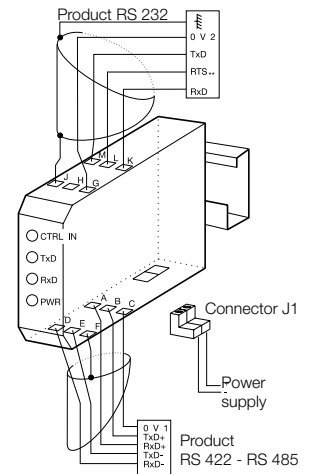


**RS 422 - RS 485  
2 WIRE SERIAL LINK**



**\*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.



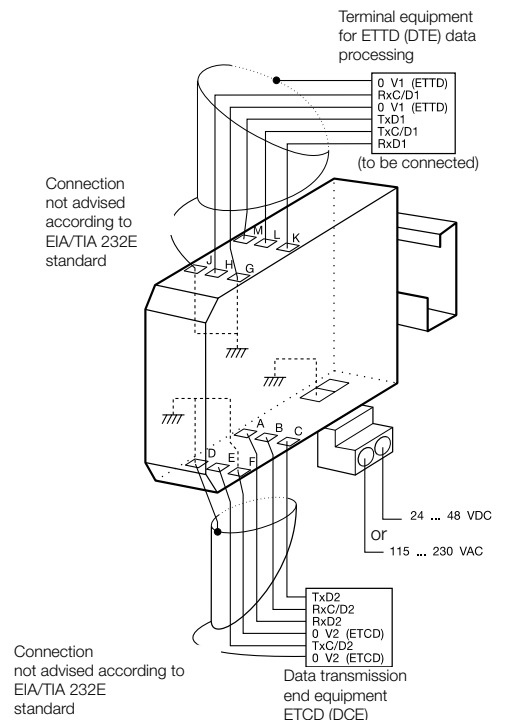
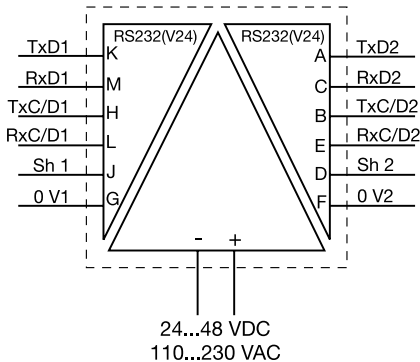
# Serial data converters

## Technical data

### Technical data

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

		ILPH RS 232 / RS 232	
<b>Power supply</b>		DC model polarized	
Voltage	24...48 V DC	115...230 V AC (50/60Hz)	
Voltage tolerance	-15%...+20%	-15%...+15%	
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	~ 3.15 VA	
Connections	Removable screw connector (Omnicontact)		
<b>Interface 1: RS 232</b>		EIA / TIA RS 232 new revision / CCITT V24 V28	
Overvoltage protection	integrated (transil 8 kV 1.2/50 $\mu\text{s}$ )		
Transmission capacity / Transmission distance	max. 19.2 kbits/s / max. 15 m / 2500 pF		
Connections	2.5 mm <sup>2</sup> screw (AWG 20)		
<b>Interface 2: RS 232</b>		EIA / TIA RS 232 new revision / CCITT V24 V28	
Overvoltage protection	integrated (transil 8 kV 1.2/50 $\mu\text{s}$ )		
Transmission capacity / Transmission distance	max. 19.2 kbits/s / max. 15 m		
Connections	2.5 mm <sup>2</sup> screw (AWG 20)		
<b>Traffic indication</b>		1 yellow LED	
Voltage			
Connections	4 green LED (Rx/D, Rx/C/D, Tx/D, Tx/C/D)		
<b>EMC behavior</b>			
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		
<b>Other characteristics</b>			
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 <sup>2</sup> / stranded with ferrule, 4 mm <sup>2</sup> solid		
Dimensions (WxDxH)	88 x 22.5 x 100 mm		
Weight	100 g		



# Serial data converters

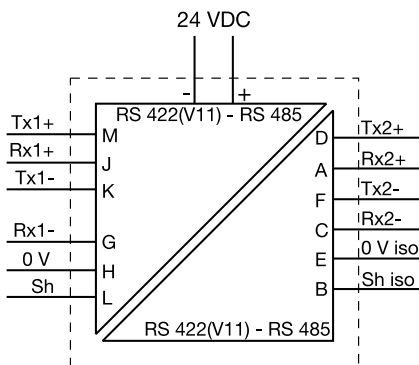
## Technical data

### Technical data

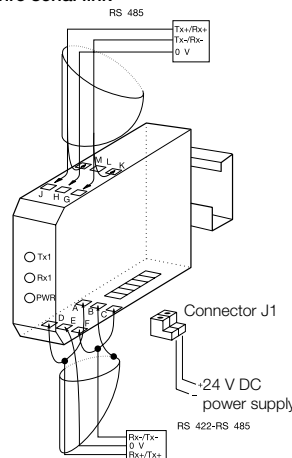
Data at  $T_a = 25\text{ }^\circ\text{C}$  and rated values, unless otherwise indicated

	ILPH RS 422 - 485 / RS 422 - 485
<b>Power supply</b>	DC model polarized
Voltage	24 V DC
Voltage tolerance	+/-15%
Supply current	120 mA max.
Connections	Removable screw connector (Omnicconnect)
<b>Interface 1: RS 422-485</b>	EIA / RS 485 and EIA RS 422 / CCITT V11
Overvoltage protection	integrated (transil 8 kV 1.2/50 $\mu\text{s}$ )
RS 485 data switching	Time switching / Time delay transmission/reception 27 $\mu\text{s}$ ...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 <sup>2</sup> screw (AWG 20)
<b>Interface 2: RS 422-485</b>	EIA / RS 485 and EIA RS 422 / CCITT V11
Overvoltage protection	integrated (transil 8 kV 1.2/50 $\mu\text{s}$ )
RS 485 data switching	Time switching / Time delay transmission/reception 27 $\mu\text{s}$ ...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 <sup>2</sup> screw (AWG 20)
<b>Traffic indication</b>	
Voltage	1 yellow LED
Connections	2 green LED (Rx/D, Tx/D, )
<b>EMC behavior</b>	
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
<b>Other characteristics</b>	
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 $^\circ\text{C}$ ... +50 $^\circ\text{C}$
Storage temperature	-25 $^\circ\text{C}$ ... +80 $^\circ\text{C}$
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm <sup>2</sup> / stranded with ferrule, 4 mm <sup>2</sup> solid
Dimensions (WxDxH)	88 x 22.5 x 100 mm
Weight	100 g

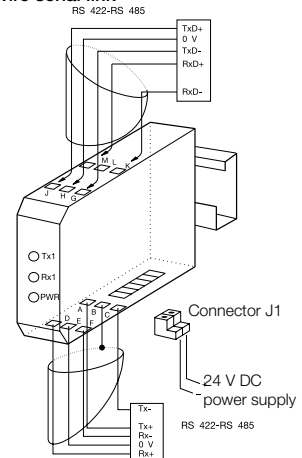
12



RS 422 - RS 485  
2 wire serial link



RS 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

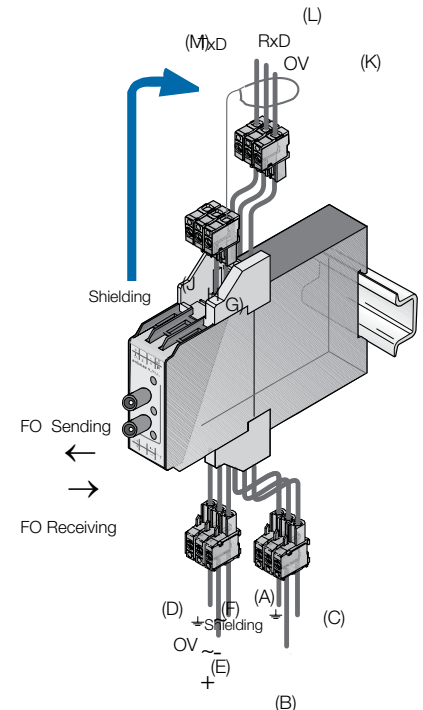
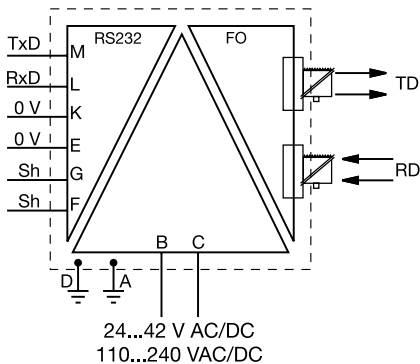
Signal converters

### Technical data

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

		ILPH RS 232 / FO	
<b>Power supplies</b>			
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		
<b>Interface 1: RS 232</b>			
	CCITT V.24/DIN 66020- CCITT V.28 DIN 66259-EIA 232 E		
Protection	Integrated (transil 8 kV 1.2/50 $\mu$ s)		
Max. speed / max. distance	Max. 115.2 kbits/s / max. 15 m / 2500 pF		
Connections	Omniconnect pluggable connector		
<b>Fiber optic interface 2</b>			
	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 $\mu$ m : -14.4 db/m; Glass : 62.5/125 $\mu$ m : -14 db/m; Plastic : 980/1000 $\mu$ m : -8 db/m		
Max. speed	Glass : -28 db/m; Plastic : -20 db/m		
Max. distance	Max. 115.2 kbits/s		
	Glass : 50/125 $\mu$ m : 3 km; Glass : 62.5/125 $\mu$ m : 4 km; Plastic : 980/1000 $\mu$ m : 40 m		
<b>Status indication</b>			
Power supply / Data exchange	1 green LED / 2 green LEDs (Rx/D, Tx/D)		
<b>EMC behavior</b>			
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		
<b>Other characteristics</b>			
Galvanic isolation input / power supply / output	2.5 kV		
Operating temperature	-20 $^\circ\text{C}$ ... +60 $^\circ\text{C}$		
Storage temperature	-40 $^\circ\text{C}$ ... +85 $^\circ\text{C}$		
Mounting	Onto DIN Rail (EN 50002)		
Connections	14 AWG (2.5 mm <sup>2</sup> ) fine stranded / 12 AWG (4 mm <sup>2</sup> ) rigid		
Dimensions (WxDxH)	105 x 22.5 x 112 mm / 4.13 x 0.89 x 4.41"		
Weight	150 g / 0.33 lb		

12



# Serial data converters

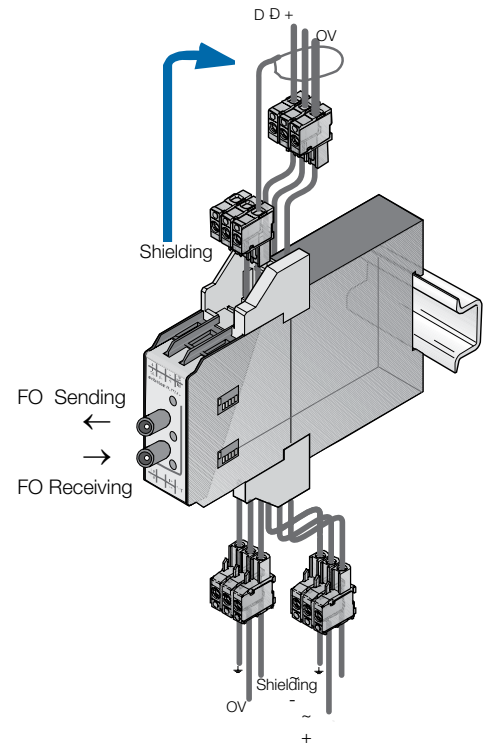
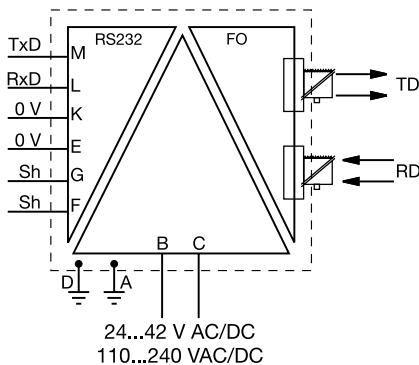
## Technical data

### Technical data

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

		ILPH RS 485 / FO	
<b>Power supplies</b>			
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		
<b>Interface 1: RS 232</b>			
Protection	ISO / IEC 8482 / DIN 66 259-4; EIA 485		
Max. speed / max. distance	Integrated (transil 8 kV 1.2/50 $\mu$ s) Max. 1.5 Mbits/s / max. 1200 m (38.4 kbit/s)		
Connections	Omniconnect pluggable connector		
<b>Fiber optic interface 2</b>			
Type of fiber / Connections	DIN VDE 0888-1 Multimode fiber Glass : ST connector; Plastic : FSMA screw connector		
Wave length	Glass : 820 nm; Plastic : 655 nm		
Max. transmission power	Glass : 50/125 $\mu$ m : -14.4 db/m; Glass : 62.5/125 $\mu$ m : -14 db/m; Plastic : 980/1000 $\mu$ m : -8 db/m		
Max. reception power	Glass : -28 db/m; Plastic : -20 db/m		
Max. speed	Max. 1.5 Mbits/s		
Max. distance	Glass : 50/125 $\mu$ m : 3 km; Glass : 62.5/125 $\mu$ m : 4 km; Plastic : 980/1000 $\mu$ m : 40 m		
<b>Status indication</b>			
Power supply / Data exchange	1 green LED / 2 green LEDs (Rx/D, Tx/D)		
<b>EMC behavior</b>			
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		
<b>Other characteristics</b>			
Galvanic isolation input / power supply / output	2.5 kV		
Operating temperature	-20 $^\circ$ C ... +60 $^\circ$ C		
Storage temperature	-40 $^\circ$ C ... +85 $^\circ$ C		
Mounting	Onto DIN Rail		
Connections	14 AWG (2.5mm $^2$ ) / 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		

12



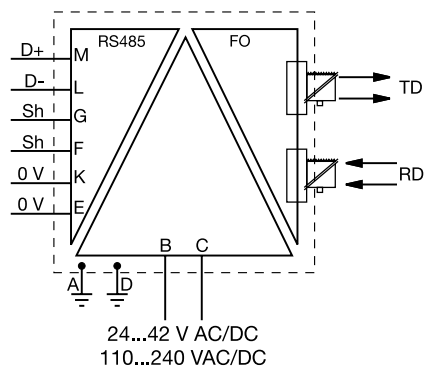
# Serial data converters

## Technical data

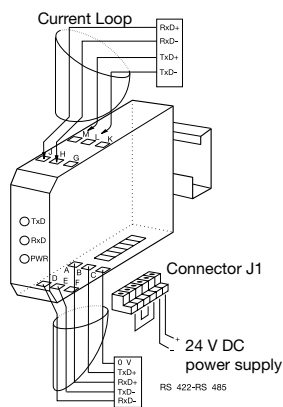
### Technical data

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

	ILPH RS 422 - 485 (for current loop)
<b>Power supply</b>	DC model polarized
Voltage	24 V DC
Voltage tolerance	+/- 10%
Supply current	120 mA max.
Connections	Removable screw connector (Omniconnect)
<b>Interface 1: Current loop</b>	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 <sup>2</sup> screw (AWG 20)
<b>Serial link 2: RS 422/485</b>	EIA RS 485 and EIA RS 422 / CCITT V 11
Overvoltage protection	integrated (transil 8 kV 1.2/50 $\mu\text{s}$ )
Baud rate / Transmission distance	max. 38.4 kbit/s / max. 1200 m
Connections	2.5 mm <sup>2</sup> screw (AWG 20)
<b>Traffic indication</b>	
Voltage	1 yellow LED
Status of signal	2 green LED (Rx/D, Tx/D)
<b>EMC behavior</b>	
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
<b>Other characteristics</b>	
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 <sup>2</sup> / stranded with ferrule, 4 mm <sup>2</sup> solid
Dimensions (WxDxH)	88 x 22.5 x 100 mm
Weight	100 g



RS 422 - RS 485  
4 wire serial link

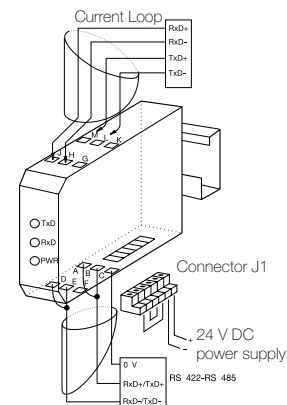


**Note :**  
The Tx/D channel of the RS 422 - RS 485 link must be polarized independently too.

RS 422 - RS 485  
2 wire serial link  
**CONNECTIONS**

Example of connection with a CL (current Loop) product, Transmission (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.

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



# Serial data converters

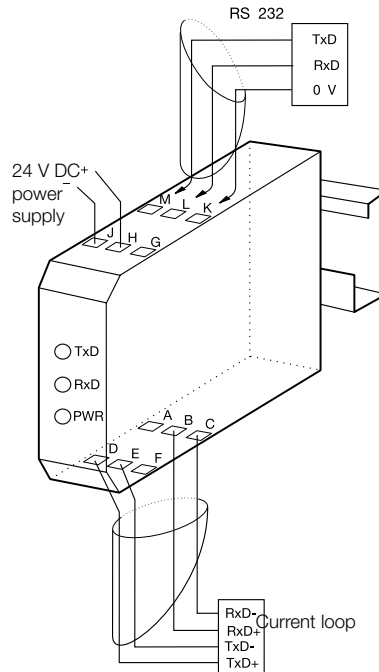
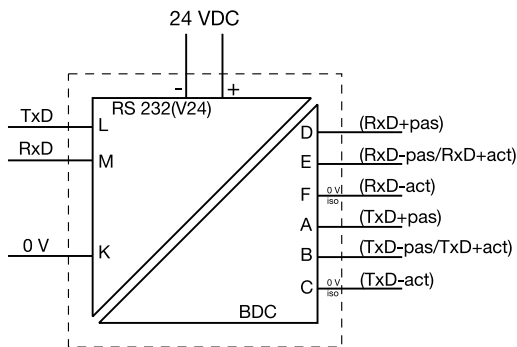
## Technical data

### Technical data

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

	ILPH RS 223 / CL
<b>Power supply</b>	DC model polarized
Voltage	24 V DC
Voltage tolerance	+/-10%
Supply current	120 mA max.
Connections	Removable screw connector (Omnicontact)
<b>Serial link 2: RS 232</b>	EIA RS 232 C / CCITT V 24 V 28
Logic level	integrated (transil 8 kV 1.2/50 $\mu\text{s}$ )
Baud rate / Transmission distance	max. 38.4 kbit/s / max. 15 m
Connections	2.5 mm <sup>2</sup> screw (AWG 20)
<b>BdC serial link 2: RS 422/485</b>	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 <sup>2</sup> screw (AWG 20)
<b>Traffic indication</b>	
Voltage	1 yellow LED
Status signal	2 green LED (RxD, TxD)
<b>EMC behavior</b>	
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
<b>Other characteristics</b>	
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 $^\circ\text{C}$ ... +50 $^\circ\text{C}$
Storage temperature	-25 $^\circ\text{C}$ ... +80 $^\circ\text{C}$
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2.5 mm <sup>2</sup> / stranded with ferrule, 4 mm <sup>2</sup> solid
Dimensions (WxDxH)	88 x 22.5 x 100 mm
Weight	100 g

12



### 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.

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