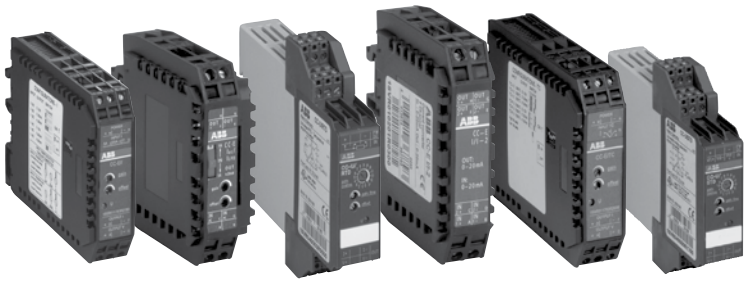
Analog signal converters



Product range for analog signal processing

CC-U range

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

Conversion, measurement and separation of

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

Characteristics

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

CC-E range

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

Conversion, measurement and separation of

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

Characteristics of single-function devices

- No adjustment or balancing necessary.

Characteristics of universal devices

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

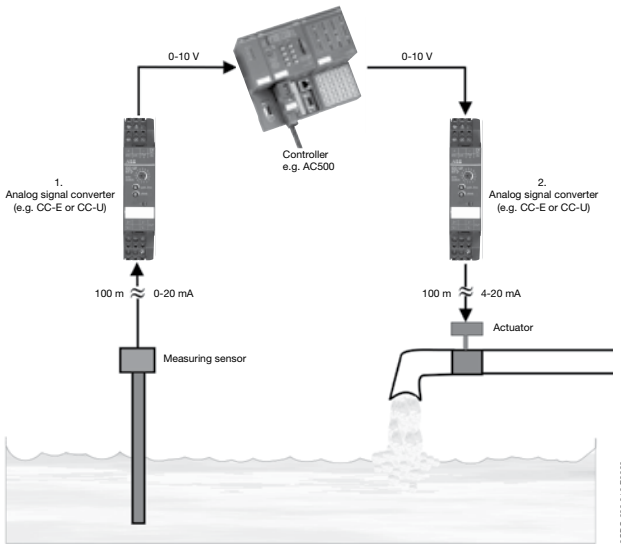
If long lines or high burdens have to be operated, it may be necessary to amplify the signal. CC analog signal converters require only low input power and provide high output power.

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.

■ existing
▲ existing for some devices
□ pending

Approvals		CC-E/STD	CC-E I/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_{AC}/ILPO	CC-U/I	CC-U/V
c UL us LISTED	UL 508, CAN/CSA C22.2 No.14	■	■	■	■	■	■	■	■	■	■	■	■	■	■
c UL us LISTED	UL 1604 (Class I, Div 2, hazardous locations), CAN/CSA C22.2 No.213	▲		■		▲	■		▲	■		▲		■	■
CB	CB scheme				■			■			■				
CCC	CCC				■			■			■				
Marks															
CE	CE	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C-Tick	C-Tick	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Analog signal converters
Overview

CC-E/STD analog signal converter with 3-way electrical isolation
- 2 universally configurable devices (type CC-E/STD)
- 2x10 single-function devices
- "Plug and Work", no adjustment of single-function devices required

Loop-powered current/current isolator without external power supply for analog current signals of 0-20 mA and 4-20 mA
- Electrical isolation between input and output
- Very low internal voltage drop ≤ 2.5 V
- Available with one or two independent channels
- Width only 18 mm (1 and 2 channels)

CC-U/STD universal signal converter with 3-way electrical isolation
- More than 120 configurations possible
- Configurable output signal response on input voltage signal interruption (low fail safe / high fail safe)
- Adjustment and operating elements on the front
- Short-circuit proof signal outputs
- Plug-i connecting terminals for inputs, outputs and supply
- Very fast signal transmission enables use in control systems

CC-U/STDR universal signal converter for standard signals, with 2 threshold relay outputs and with 3-way electrical isolation
- Standard signal converter with 7 setting ranges
- 2 threshold relay outputs with one c/o contact each (threshold and respective hysteresis can be adjusted independently from each other)
- Open-circuit or closed-circuit principle configurable by means of a DIP switch
- 2 yellow LEDs for clear status indication of the output relays
- Plug-in connecting terminals for inputs, outputs and supply

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

CC-U/RTD universal signal converter for PT10, PT100, PT1000 temperature sensors (acc. to IEC 751 and JIS C 16041), linearized with 3-way electrical isolation
- Configurable output signal response on input signal interruption (low / high fail safe)
- Adjustment and operating elements on the front-side
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply
- 2- or 3-wire connection

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

Analog signal converters
Overview

CC-E/TC analog signal converter for thermocouple signals of the types J and K with 3-way electrical isolation
- 2 universally configurable devices (type CC-E/TC)
- 2x6 single-function devices
- "Plug and Work", no adjustment of single-function devices required

CC-U/TC universal signal converter for thermocouples with 3-way electrical isolation
- Temperature signal converter for thermo-couples of the types K, J, T, S, E, N, R, B
- Continuously adjustable voltage signal input 0-10 mV and 0-50 mV
- Differential temperature meas. possible 1)
- Configurable output signal response on input signal interruption (low fail safe / high fail safe)
- Adjustment and operating elements on the front-side
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply

CC-U/TCR universal signal converter for thermocouples, with 2 threshold relay outputs and 3-way electrical isolation
- Temperature signal converter for thermocouples of the types K, J, T, S
- 2 threshold relay outputs with one change-over contact each (threshold and respective hysteresis can be adjusted independently from each other)
- Open-circuit or closed-circuit principle configurable by means of a DIP switch
- 2 yellow LEDs for clear status indication of the output relays
- Plug-in connecting terminals for inputs, outputs and supply

CC-E/I measuring converter for current signals 0-5 A, 0-20 A, AC/DC with 3-way electrical isolation
- 2 universally configurable devices (type CC-E/I)
- 2x6 single-function devices
- "Plug and Work", no adjustment of single-function devices required

CC-E I_{AC}/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


CC-E/I


CC-E V/V


CC-E I/I-2


CC-U/STD

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 0-20 mA, 4-20 mA	CC-E/STD1) 3)	1SVR011700R0000	0.088 (0.194)
	0-10 V	0-10 V	CC-E V/V	1SVR011710R2100	0.083 (0.183)
		0-20 mA	CC-E V/I	1SVR011711R1600	0.084 (0.185)
		4-20 mA	CC-E V/I	1SVR011712R1700	0.084 (0.187)
	0-20 mA	0-10 V	CC-E I/V	1SVR011713R1000	0.082 (0.181)
		0-20 mA	CC-E I/I	1SVR011714R1100	0.084 (0.187)
		4-20 mA	CC-E I/I	1SVR011715R1200	0.084 (0.185)
	4-20 mA	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)
	-10...+10 V	-10...+10 V	CC-E V/V	1SVR011719R2600	0.082 (0.181)
110-240 V AC	0-5 V, 0-10 V 0-20 mA, 4-20 mA	0-5 V, 0-10 V 0-20 mA, 4-20 mA	CC-E/STD 3)	1SVR011705R2100	0.090 (0.198)
	0-10 V	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)
	0-20 mA	0-10 V	CC-E V/V	1SVR011723R1200	0.091 (0.200)
		0-20 mA	CC-E V/I	1SVR011724R1300	0.088 (0.194)
		4-20 mA	CC-E V/I	1SVR011725R1400	
	4-20 mA	0-10 V	CC-E V/V	1SVR011726R1500	0.096 (0.212)
		0-20 mA	CC-E V/I	1SVR011727R1600	0.087 (0.192)
		4-20 mA	CC-E V/I	1SVR011728R2700	0.088 (0.194)
loop powered	-10...+10 V	-10...+10 V	CC-E V/V	1SVR011729R2000	0.086 (0.190)
	0-20 mA, 4-20 mA	0-20 mA, 4-20 mA	CC-E I/I-12)	1SVR010200R1600	0.038 (0.084)
			CC-E I/I-22)	1SVR010201R0300	0.044 (0.097)
24-48 V DC, 110-240 V AC, 100-300 V DC, 24 V AC	refer to table	refer to table 2 c/o	CC-U/STD	1SVR040000R1700	0.125 (0.276)
				1SVR040001R0400	0.126 (0.278)
			CC-U/STDR4)	1SVR040010R0000	0.142 (0.313)
				1SVR040011R2500	

1) 1604 Class I, Div.2 (universal device)
2) CC-E-I/I-1 has 1 channel, CC-E-I/I-1 has 2 channels
3) 3-way electrical isolation
4) with relay output

Temperature signal converters
Ordering details


CC-E/RTD


CC-U/RTD

RTD Converters

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

1) 1604 Class I, Div.2 (universal device)
2) CC-E-i/i-1 has 1 channel; CC-E-1/1-1 has 2 channels
3) with relay output

Thermocouple converters
Ordering details

CC-E TC

Thermocouple converters

Supply voltage range	Input signal	Output signal	Type	Catalog number	Weight (1 pce) kg (lb)
24 V DC	thermocouple types J and K	0-10 V, 0-20 mA, 4-20 mA	CC-E/TC[1)]	1SVR011702R2600	0.089 (0.196)
	type J 0...600 °C	0-10 V	CC-E TC/V	1SVR011750R0100	0.087 (0.192)
		0-20 mA	CC-E TC/I	1SVR011751R2600	0.084 (0.187)
		4-20 mA	CC-E TC/I	1SVR011752R2700	0.102
	type K 0...1000 °C	0-10 V	CC-E TC/V	1SVR011753R2000	0.084 (0.185)
		0-20 mA	CC-E TC/I	1SVR011754R2100	
		4-20 mA	CC-E TC/I	1SVR011755R2200	0.086 (0.190)
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)
	type J 0...600 °C	0-10 V	CC-E TC/V	1SVR011760R0300	0.084 (0.187)
		0-20 mA	CC-E TC/I	1SVR011761R2000	0.088 (0.194)
		4-20 mA	CC-E TC/I	1SVR011762R2100	0.1 (0.220)
	type K 0...1000 °C	0-10 V	CC-E TC/V	1SVR011763R2200	0.086 (0.190)
		0-20 mA	CC-E TC/I	1SVR011764R2300	0.088 (0.194)
		4-20 mA	CC-E TC/I	1SVR011765R2400	0.086 (0.190)
24-48 V DC, 100-300 V DC, 110-240 V AC, 24 V AC	refer to table	refer to table 2 c/o	CC-U/TC	1SVR040004R0700	0.130 (0.287)
				1SVR040005R0000	0.128 (0.282)
			CC-U/TCR [1)]	1SVR040014R2000	0.145 (0.320)
				1SVR040015R2100	

1) with relay output

Measuring converters
Ordering details

CC-E I_{AC}/ILPO

CC-U/I

Measuring converters

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

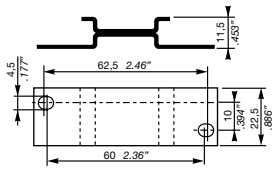
[5] with relay output
[6] for sinusoidal currents
[7] for current RMS values
[8] for voltage RMS values

Analog signal converters
Accessories
Approximate dimensions

Accessories

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

Approximate dimensions



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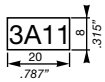
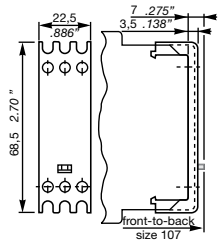


MAR.01



Sealable cover - COV.01

Analog signal converters
Technical data

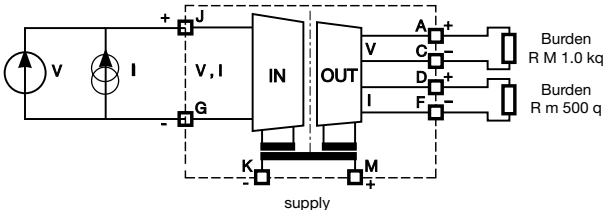
CC-E/STD, CC-E x/x (universal devices)

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

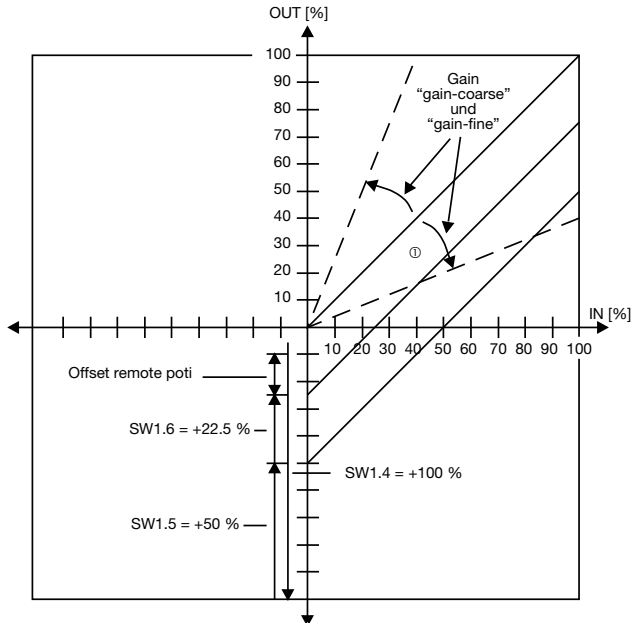
*) Detection of input voltage signal interruptions:

If the input signal circuit is interrupted, the output signal changes to the adjusted minimum value (low fail safe) or maximum value (high fail safe).
If "No fail safe" is configured, input signal interruptions are not detected.

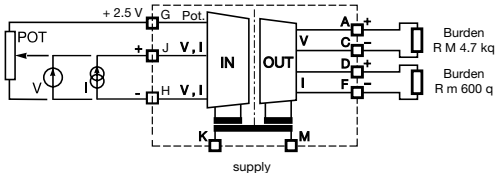
Output	Switch 2	1	2	3	4	5	6
0...5 V				■		■	
0...10 V						■	
1...5 V		■	■	■		■	
2...10 V		■	■	■			
-10...+10 V					■		
-5...+5 V					■	■	
-10...0 V				■	■		
-5...0 V				■	■	■	
0...6.66 V			■			■	
-10...+3.33 V			■		■		
-5...+1.66 V			■		■	■	
0...8 V			■	■			
0...4 V			■	■		■	
-10...-2 V			■	■	■		
-5...-1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

Legend	
■	ON
	OFF
	no influence

Adjustment range



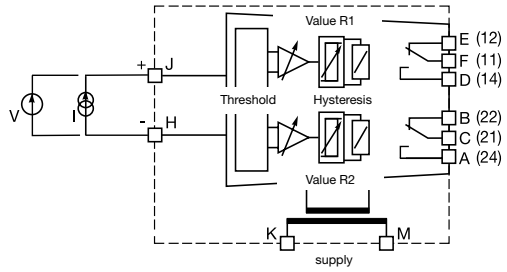
Wiring instruction



Analog signal converters
Technical data

CC-U/STDR with relay output

Wiring instruction

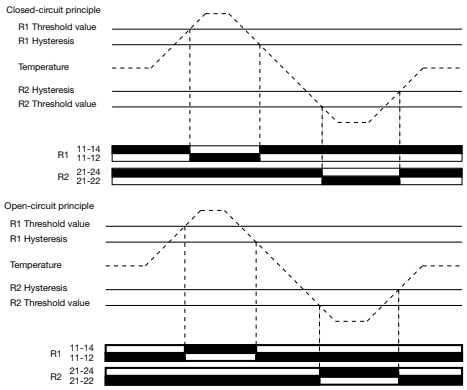


DIP switch settings

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

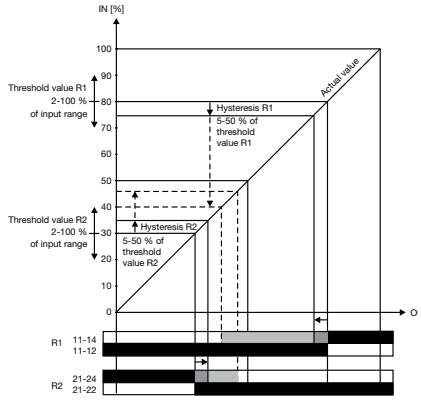
Legend
■ ON
OFF
no influence

Function diagrams



Switching points

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



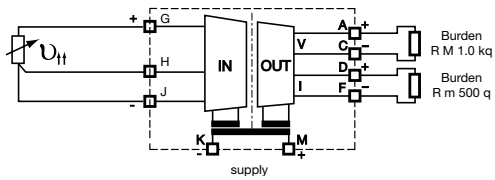
CC-E/RTD

DIP switch settings

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

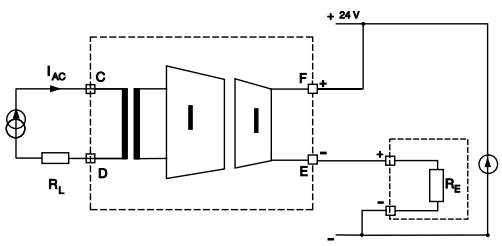
Legend
■ ON
OFF
no influence

Wiring instruction



CC-E I_{AC}/ILPO

Wiring instruction



Analog signal converters
Technical data

CC-U/RTD

DIP switch settings

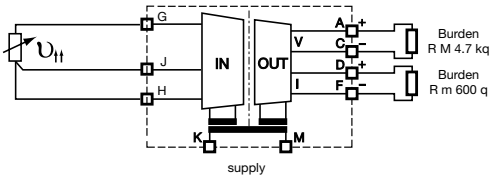
Input		Switch 1						Switch 2						Gain
Type	Range	1	2	3	4	5	6	1	2	3	4	5	6	Coarse
PT10	0...500 °C	■							■		■			F
	0...550 °C	■							■					E
	0...600 °C	■							■		■			D
	0...650 °C	■							■					C
	0...700 °C	■							■					B
	0...750 °C	■							■					A
	0...800 °C	■							■					9
	0...850 °C	■							■					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

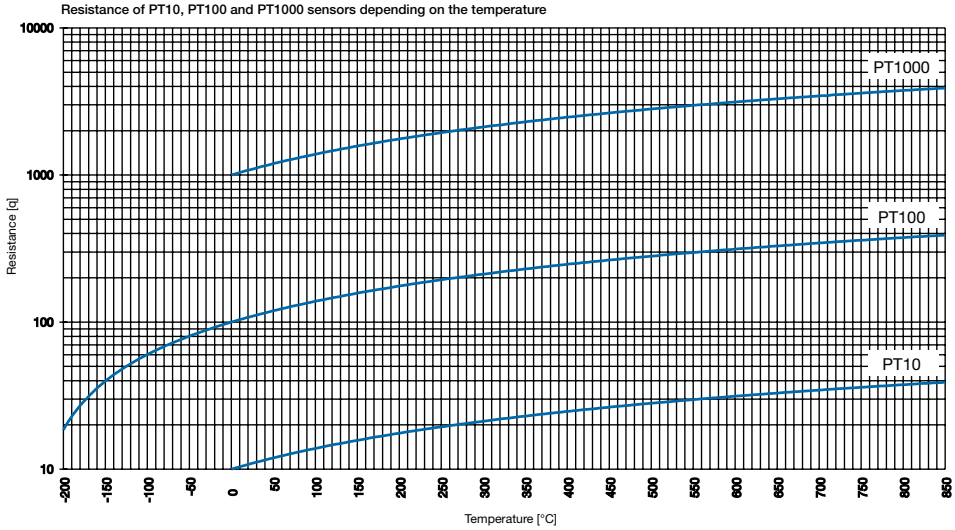
*) Detection of input signal interruptions:
If the input signal circuit is interrupted, the output signal changes to the adjusted minimum value (low fail safe) or maximum value (high fail safe).

Wiring instruction



Characteristic curves

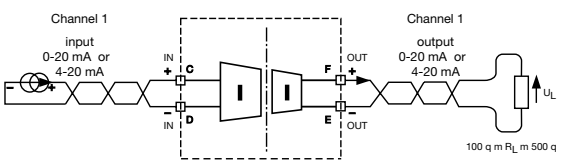
Resistance of PT10, PT100 and PT1000 sensors depending on the temperature



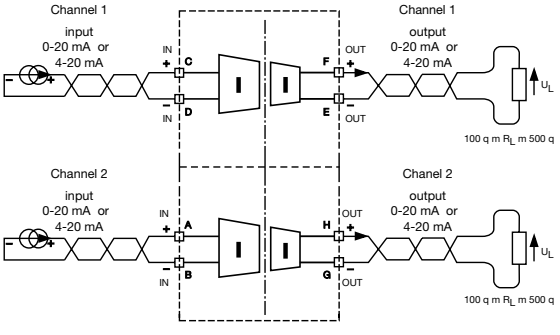
CC-E I/I-1 and CC-E I/I-2

Wiring instruction

CC-E I/I-1



CC-E I/I-2



Analog signal converters
Technical data

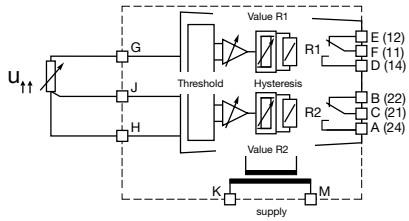
CC-U/RTDR with relay output

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						

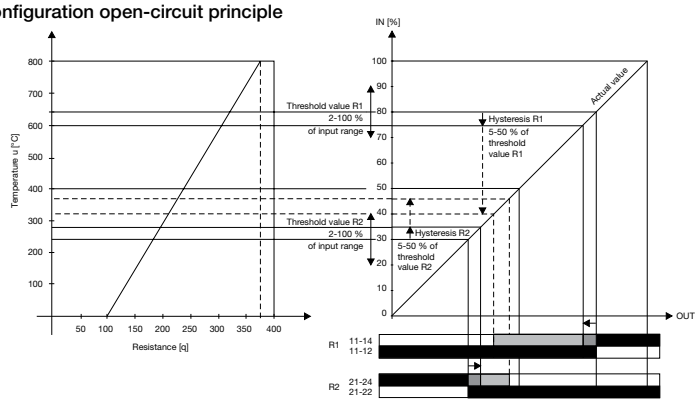
Legend	
■	ON
	OFF
	no influence

Wiring instruction

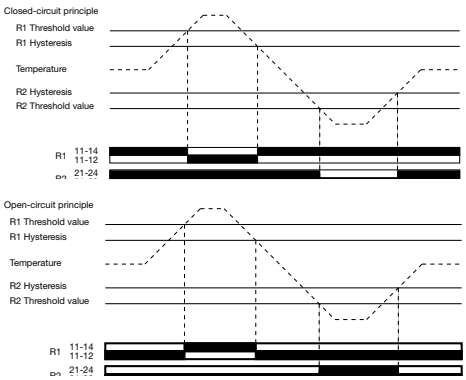


Switching points

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							

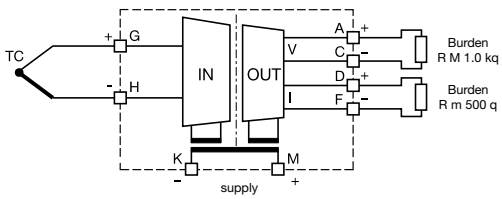
Legend	
■	ON
	OFF
	no influence

DIP switch settings CC-E/I

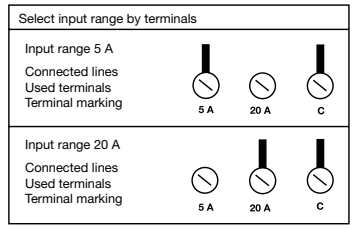
Input	Output	Switch 1	2	3	4	5	6
I - DC	0...10 V	■					
I - AC							
I - DC	0...20 mA	■					
I - AC							
I - DC	4...20 mA	■	■	■			
I - AC			■	■			

Legend	
■	ON
	OFF

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



Input range selection - CC-E/I



Analog signal converters
Technical data

CC-U/V

DIP switch settings

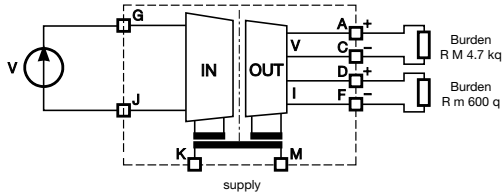
Output	Switch 1	2	3	4	5	6
0...5 V			■		■	
0...10 V					■	
1...5 V	■	■	■		■	
2...10 V	■	■				
-10...+10 V				■		
-5...+5 V				■	■	
-10...0 V			■	■		
-5...0 V			■	■	■	
0...6.66 V		■			■	
-10...+3.33 V		■		■		
-5...+1.66 V		■		■	■	
0...8 V		■	■			
0...4 V		■	■		■	
-10...-2 V		■	■	■		
-5...-1 V		■	■	■	■	
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

Input range selection

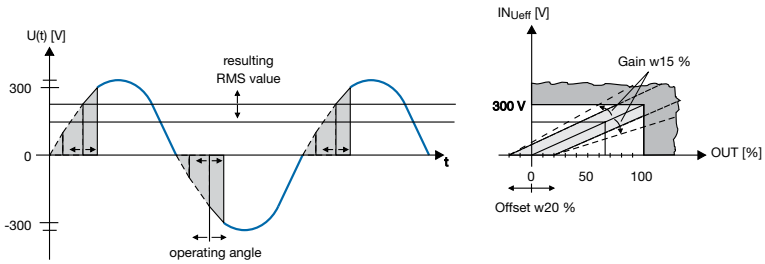
Selecting input range by front-face rotary switch	Switch position
0...100 V	1
0...150 V	2
0...250 V	3
0...300 V	4
0...400 V	5
0...450 V	6
0...550 V	7
0...600 V	8

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

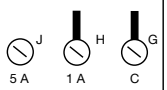
Output	Switch 1	2	3	4	5	6
0...5 V			■			■
0...10 V						■
1...5 V	■	■	■			■
2...10 V	■	■				
-10...+10 V				■		
-5...+5 V				■	■	
-10...0 V			■	■		
-5...0 V			■	■	■	
0...6.66 V		■				■
-10...+3.33 V		■		■		
-5...+1.66 V		■		■	■	
0...8 V		■	■			
0...4 V		■	■			■
-10...-2 V		■	■	■		
-5...-1 V		■	■	■	■	
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

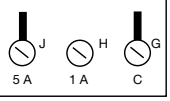
Input range selection

Select input range by terminals

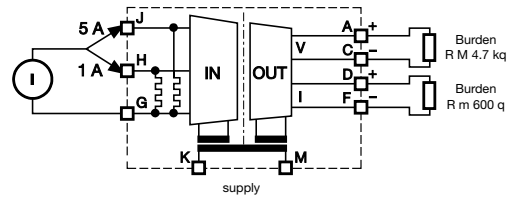
Input range 1 A
Connected lines
Used terminals
Terminal marking



Input range 5 A
Connected lines
Used terminals
Terminal marking

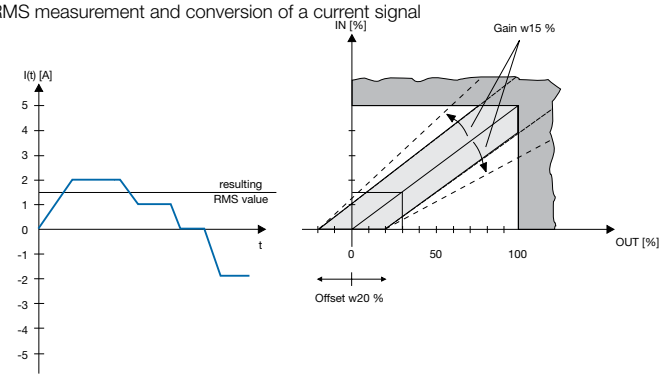


Wiring instruction



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	■	■	■		■	

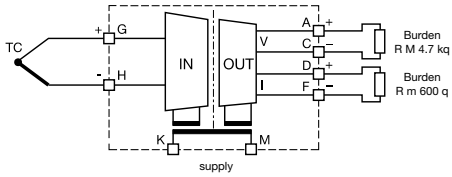
Input		Switch 1						Switch 2					
Type	Range	1	2	3	4	5	6	1	2	3	4	5	6
K	0-100...900 °C	■		■				■	■				
	0-250...1350 °C	■		■				■	■			■	
J	0-100...750 °C	■						■	■				
T	0-100...400 °C		■	■				■	■	■			
	-150-0...400 °C		■	■				■	■	■	■	■	
S	0-250...1550 °C	■	■		■	■		■					
E	0-100...700 °C							■	■				
	0-200...1000 °C							■	■			■	
N	0-100...650 °C	■			■			■	■				
	0-200...1300 °C	■			■			■	■			■	
R	0-250...1350 °C		■	■	■	■		■					
	0-450...1700 °C		■	■	■	■		■				■	
B	0-700...1750 °C		■	■	■	■							
mV	0-2...10 mV		■	■	■	■							
	0-10...50 mV												
Low fail safe *)													■
High fail safe *)													

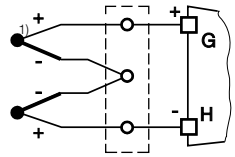
*) Detection of input signal interruptions:

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

Legend
■ ON
OFF
no influence

Wiring instruction

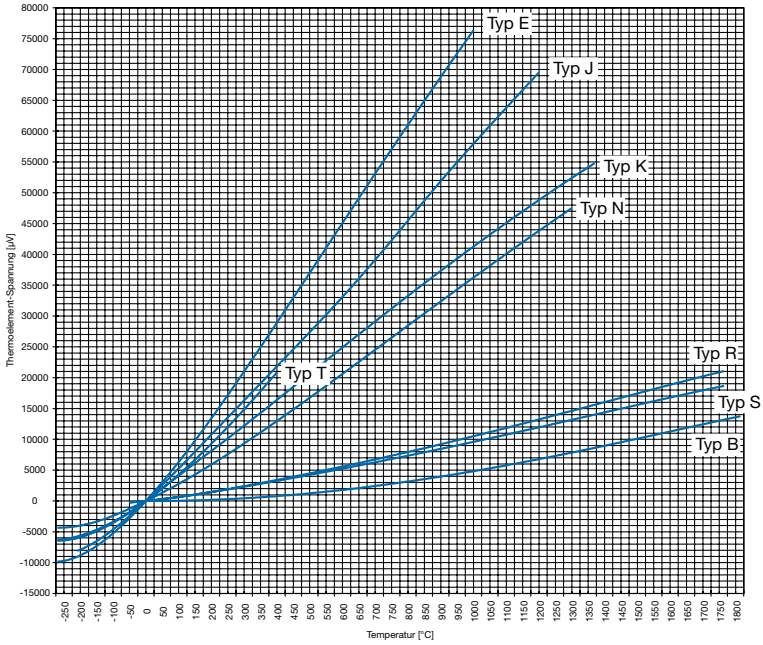




without cold-junction compensation:
switch SW2.2 = OFF

Characteristic curve

Thermocouple voltages depending on the temperature



Analog signal converters
Technical data

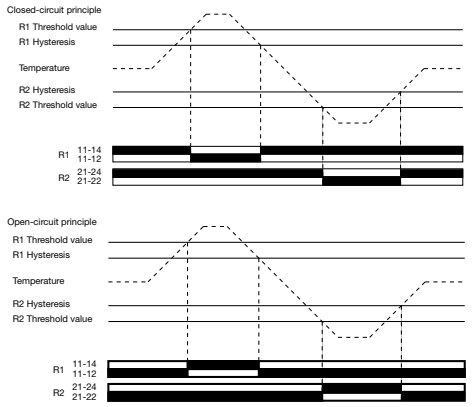
CC-U/TCR with relay output

DIP switch settings

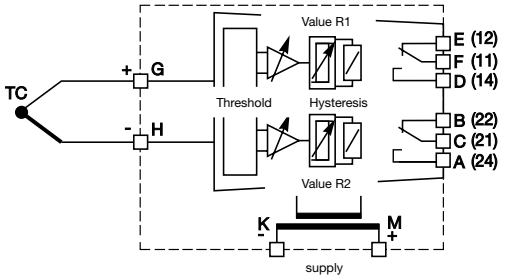
Input		Switch					
Type	Range	1	2	3	4	5	6
J	0...240 °C				■		
	0...480 °C			■	■		
	0...1200 °C						
K	0...250 °C	■			■		
	0...500 °C	■		■	■		
	0...1350 °C	■					
T	-150...+120 °C	■			■	■	
	0...220 °C	■			■		
	0...400 °C	■		■	■		
S	0...210 °C		■		■		
	0...380 °C		■	■	■		
	0...860 °C		■				
	0...1550 °C		■	■			
Output							
Closed-circuit principle							■
Open-circuit principle							

Legend	
■	ON
	OFF
	no influence

Function diagrams

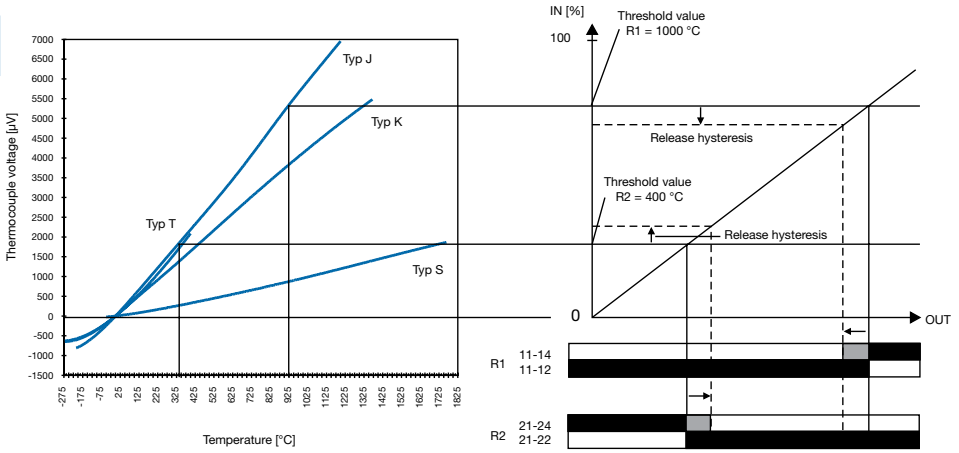


Wiring instruction



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 3)	CC-E/TC
Input circuits - Analog inputs	**J-G-H**	**Current**	**Voltage**	**Temperature sensors**	**Thermocouples (IEC 584-1 and 2)**
Input signal		Standard signals		PT100	TC.K, TC.J
Rated input range		0...20 mA / 4...20 mA	0...5 V / 0...10 V / -10...+10 V	-50...+500 °C	TC.K: 0...1000 °C, TC.J: 0...600 °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	
Output circuits - Analog outputs	**D-F, A-C**	**Current**			**Voltage**
Output signal		0-20 mA, 4-20 mA			0-5 V, 0-10 V
Output burden		≤ 500 Ω			≥1.0 KΩ
Accuracy 1)		± 0.5 % of full-scale			
Residual ripple		< 0.5 %			
Response time		200 µs		10 ms	
Transmission frequency		2 kHz		80 Hz	2 Hz (up to -3 dB)
Reaction to input circuit interruption				High fail safe: Output voltage > 115 % of measuring range 2) Low fail safe: Output voltage < -0.6 V, output current = 0 mA	
Supply circuits	**K-M**	**DC versions**			**AC versions**
Supply voltage		24 V DC			110-240 V AC - 50/60 Hz
Supply voltage tolerance		-15...+15 %			-15...+10 %
Power consumption		1.5 W typ.			1.5 VA typ.
Indication of operational states					
Rated control supply voltage U_S		U: green LED			
General data					
Ambient temperature range	operation / storage	0...+60 °C / -20...+80 °C			
Temperature coefficient		± 500 ppm/°C			
Degree of protection (DIN 40050)		IP20			
Mounting position		ventilation slots on top and bottom			
Mounting		DIN rail (IEC/EN 60715), snap-on mounting			
Electrical connection					
Wire size	rigid	0.2-4 mm² (24-12 AWG)			
	fine-strand with(out) wire end ferrule	0.2-2.5 mm² (24-14 AWG)			
Stripping length		7 mm (0.28 inch)			
Tightening torque		0.5 Nm (4.4 lb.in)			
Electromagnetic compatibility					
Interference immunity		EN 61000-6-2			
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (±6 kV / ±8 kV)			
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m			
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (±2 kV / 5 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					
Test voltage between all isolated circuits		2.5 kV AC			
Rated insulation voltage		-		-	-

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

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

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

Analog signal converters
Technical data

Type			CC-E I/I
Input circuits - Analog inputs			**Current**
Input current I_{IN}			0-20 mA, 4-20 mA
Min. input current			< 100 µA
Max. input current			50 mA[1] (V_{IN} < 18 V)
Input voltage U_{IN}			< 2.5 V + (I_{IN} x R_L)
Input voltage drop U_i			< 2.5 V (20 mA, R_L = 0 Ω)
Max. input voltage			18 V[1] (I_{IN} < 50 mA)
Output circuits			
Output current I_{OUT}			0-20 mA, 4-20 mA
Output load R_L			0-500 Ω
Output voltage U_{OUT}			I_{OUT} x R_L
Residual ripple			< 20 mV_{pp} (500 Ω, 20 mA)
Response time (0-100 %)			< 15 ms (0-500 Ω, 20 mA), < 5 ms (500 Ω, 20 mA, 25 °C)
Accuracy			≤ 0.1 % of full-scale (20 mA)
Load influence (0-500 Ω)			≤ ±0.05 % / 100 Ω, ≤ -0.1 % / 100 Ω (25 °C)
General data			
Width of the enclosure			18 mm
Weight		1 channel	approx. 0.037 kg (0.082 (0.181) lb)
		2 channel	approx. 0.044 (0.097) kg (0.097 lb)
Mounting position			any
Degree of protection		enclosure / terminals	IP20 / IP20
Ambient temperature range		operation / storage	-25...+60 °C / -40...+85 °C
Temperature coefficient			< ±50 ppm / °C
Mounting			DIN rail (IEC/EN 60715)
Electrical connection			
Wire size	rigid		0.2-4 mm^2 (24-12 AWG)
	fine-strand with(out) wire end ferrule		0.2-2.5 mm^2 (24-14 AWG)
Stripping length			7 mm (0,28 inch)
Tightening torque			0.5 Nm (4.4 lb.in)
Standards			
Product standard			EN 50178
Low Voltage Directive			2006/95/EC
EMC Directive			2004/108/EC
Electromagnetic compatibility			
Interference immunity			EN 61000-6-2
electrostatic discharge (ESD)	EN 61000-4-2		Level 3 (±6 kV / ±8 kV)
electromagnetic field (HF radiation resistance)	EN 61000-4-3		10 V/m
fast transients (Burst)	EN 61000-4-4		Level 3 (±2 kV / 5 kH)
powerful impulses (Surge)	EN 61000-4-5		±2 kV / ±1 kV
HF line emission	EN 61000-4-6		10 V
magnetisches Feld	EN 61000-4-8		30 A/m
Interference emission			EN 61000-6-4
Radiated noise		EN 55011	Class B
Operational reliability (EN 68-2-6)			4 g
Mechanical resistance (EN 68-2-6)			10 g
Environmental testing (IEC 68-2-30 Db)			24 h cycle, 55 °C, 93 % rel., 96 h
Isolation data			
Insulation voltage input / output			500 V_{eff} / 50 Hz
Insulation voltage between channels			5 kV_{eff} / 50 Hz (device with 2 channels)
Pollution category			2
Overvoltage category			II

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

Analog signal converters
Technical data

Type		CC-U/STD			CC-U/RTD [3]	CC-U/TC	
Input circuits - Analog inputs	**J-G-H**	**Current**	**Voltage**	**Po-tentio-meter**	**Temperature sensors**	**Thermocouples (IEC 584-1 and 2)**	
Input signal		0-20 mA 4-20 mA 10-50 mA 0-1 mA	0-100 mV 0-1 V 0-5 V 1-5 V 0-10 V 2-10 V ± 10 V	470 Ω - 1 MΩ [2]	PT10, PT100, PT1000 (IEL 751 and JICC 1604)	TC.K TC.T TC.E TC.R	TC.J TC.S TC.N TC.B
Limitation of input signals		± 55 mA	± 11 V		-	-	
Rated input range		-	-	-	Max. temperature adjust-able: 6-60 °C for PT1000 50-500 °C for PT100 500-850 °C for PT10	refer to temperature specs. of individual thermocouples	
Influence of line resistance		-	-	-	0.015 °C/Ω	< 0.01 % / 100 Ω	
Gain adjustment range (universal devices)		0.9-110 mA	45 mV - 22 V	-	see DIP switch settings		
Offset adjustment range (universal devices)		-137.5...+62.5 %			± 5 %	± 10 %	
Input impedance		for different ranges			-	-	
without detection of inp ut signal interruption		51 Ω	6 MΩ	3 GΩ	-	-	
with detection of input signal interruption		51 Ω	3.5 MΩ	9.5 GΩ	-	-	
Suppression at 50 Hz		-	-	-	-	> 40 dB	
Common-mode rejection		-	-	-	120 dB	105 dB	
Output circuits - Analog outputs	**D-F, A-C**	Current				Voltage	
Output signal		0-20 mA, 4-20 mA				0-5 V, 1-5 V, 0-10 V, 2-10 V, ± 10 V	
Output burden		≤ 600 Ω≥				4.7 KΩ	
Accuracy [1]		±0.1 % of full-scale			±0.2 % of full-scale	±0.1 % of full-scale	
Residual ripple		-			< 0.15 %	-	
Response time		200 µs			10 ms	200 ms	
Transmission frequency		1 kHz			80 Hz	2 Hz (to -3 dB)	
Supply circuits	**K-M**						
Rated supply voltage		24-48 V DC				110-240 V AC	
Supply voltage range		24-48 V DC / 24 V AC				110-240 V AC / 100-300 V DC	
Supply voltage tolerance		DC: -15...+15 %				AC: -15...+10 %	
Rated frequency		0 Hz or 50/60 Hz					
Power consumption		2 W at 24 V DC				4.5 VA at 230 V AC	
Indication of operational states							
Supply voltage		U: green LED					
General data							
Ambient temperature range	operation / storage	-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 mm² (24-12 AWG)					
	fine-strand with(out) wire end ferrule	plug-connector with screw terminals 0.2-2.5 mm² (24-12 AWG)					
Stripping length		7 mm (0.28 inch)					
Tightening torque		0.4 Nm (3.5 ib.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
Input circuits - Analog inputs		**J-H**	**Current**	**Voltage**	**Temperature sensors**	**Thermocouples (IEC 584-1 and 2)**
Measuring signal / input range			0-20 mA 4-20 mA	0-1 V / 1-5 V 0-10 / ±10 V	PT100	TC.K, TC.J TC.T, TC.S
Input resistance			approx. 50 Ω	approx. 1,5 MΩ		
Adjustable threshold			2-100 % of selected input range			
Adjustable hysteresis			5-50 % of threshold			
Repeat accuracy (constant parameters)			±0.5 % of full-scale			
Output circuits - Relay outputs		**E-D-F, B-C-A**	**Relay, 2 c/o contacts**			
Rated switching voltage			250 V AC			
Rated switching current	AC12 (resistive) 230 V		4 A			
	AC15 (inductive) 230 V		3 A			
	DC12 (resistive) 24 V		4 A			
	DC13 (inductive) 24 V		2 A			
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		B 300			
	max. rated operational voltage		300 V AC			
	max. continuous thermal current at B 300		5 A			
	max. making/breaking apparent power at B 300		3600/360 VA			
Minimum switching voltage			12 V			
Minimum switching current / power			10 mA / 0.6 VA (W)			
Response time			10 ms			
Mechanical lifetime			30 x 10^6 switching cycles			
Electrical lifetime	at AC12, 230 V, 4 A		0.1 Mio. switching cycles			
Supply circuits		**K-M**				
Rated supply voltage			24-48 V DC		110-240 V AC	
Supply voltage range			24-48 V DC / 24 V AC		110-240 V AC / 100-300 V DC	
Supply voltage tolerance			DC: -15...+15 %		AC: -15...+10 %	
Rated frequency			0 Hz or 50/60 Hz			
Power consumption			2 W at 24 V DC		4.5 VA at 230 V AC	
Indication of operational states						
Supply voltage			U: green LED			
1st / 2nd output relay energized			R1: yellow LED / R2: yellow LED			
General data						
Ambient temperature range	operation / storage		-20...+60 °C / -40...+80 °C			
Temperature coefficient			±300 ppm/°C			
Mounting position			any			
Mounting			DIN rail (IEC/EN 60715), snap-on mounting / screw mounting with adapter			
Electrical connection						
Wire size	rigid		plug-connector with screw terminals 0.2-2.5 mm^2 (24-12 AWG)			
	fine-strand with(out) wire end ferrule		plug-connector with screw terminals 0.2-2.5 mm^2 (24-12 AWG)			
Stripping length			7 mm (0.28 inch)			
Tightening torque			0.4 Nm (3.5 ib.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						
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_{AC}/ILPO
			J-G-H		C-D
Input circuits - Analog inputs			**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_{Nom} (50 A) for max. 1 s		10 x I_{Nom} (50 A) for max. 2 s
	input range 2		10 x I_{Nom} (200 A) for max. 1 s		10 x I_{Nom} (200 A) for max. 2 s
Gain adjustment range			±5 % (universal devices)		-
Offset adjustment range			±5 % (universal devices)		-
Input impedance / resistance			5A : 65 mΩ	20 A : 2.5 mΩ	5 mΩ
Output circuits - Analog outputs			**D-F Current**	**A-C Voltage**	**F-E passive current output in proportion to input current**
Output signal			0-20 mA / 4-20 mA	0-10 V	4-20 mA
Output burden / load			≤ 500 Ω	≥ 1.0 Ω	12 V DC: 150 Ω, 24 V DC: 750 Ω 30 V DC: 1050 Ω
Accuracy [1]			± 2 % of full-scale		
Offset adjustment range			±5 % (universal device)		± 5 %
Gain adjustment range			±5 % (universal device)		± 20 %
Residual ripple			< 0.5 %		
Response time			0.5 s		0.6 s
Transmission frequency			DC or 50/60 Hz		AC: 50/60 Hz
Reaction to input circuit interruption			Low fail safe: output voltage < 200 mA, output current < 400 µA		-
Supply circuits		**K-M**	**DC versions**	**AC versions**	
Supply voltage			24 V DC	110-240 V AC 50/60 Hz	12-30 V DC
Supply voltage tolerance			-15...+15 %	-15...+10 %	-
Power consumption			typ 1.5 W	typ 1.5 VA	-
Indication of operational states					
Supply voltage			U: green LED		-
General data					
Ambient temperature range	operation / storage		0...+60 °C / -20...+80 °C		-20...+60 °C / -40...+80 °C
Temperature coefficient			± 500 ppm/°C		300 ppm/°C
Degree of protection (DIN 40050)			IP20		
Mounting position			ventilation slots on top and bottom		
Mounting			DIN rail (IEC/EN 60715), snap-on mounting		
Electrical connection					
Wire size	rigid		0.2-4 mm² (24-12 AWG)		
	fine-strand with(out) wire end ferrule		0.2-2.5 mm² (24-14 AWG)		
Stripping length			7 mm (0.28 inch)		
Tightening torque			0.5 Nm (4.4 lb.in)		
Electromagnetic compatibility					
Interference immunity			EN 61000-6-2		
electrostatic discharge (ESD)		IEC/EN 61000-4-2	Level 3 (±6 kV / ±8 kV)		
electromagnetic field (HF radiation resistance)		IEC/EN 61000-4-3	10 V/m		
fast transients (Burst)		IEC/EN 61000-4-4	Level 3 (±2 kV / 5 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					
Test voltage (between all isolated circuits)			2.5 kV AC		
Rated insulation voltage			-		250 V AC

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

Analog signal converters
Technical data

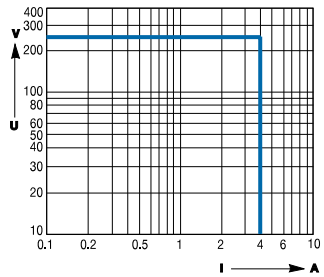
Type		CC-U/I	CC-U/V
Input circuits - Analog inputs	**J-G-H**	**any current signals, RMS measurement**	**any voltage signals, RMS measurement**
Rated input range		0-1 A 0-5 A	0-100 V, 0-200 V 0-300 V, 0-400 V 0-500 V, 0-600 V
Measuring frequency		0-600 Hz	
Overload capacity of inputs	input range 1	10 x I_{Nom} (10 A) for max. 2 s	-
	input range 2	10 x I_{Nom} (50 A) for max. 2 s	-
Gain adjustment range		±15 %	
Offset adjustment range		±20 %	
Input impedance / resistance		1A: 60 mΩ, 5 A: 12 mΩ	> 800 kΩ
Output circuits - Analog outputs	**D-F, A-C**	**Current**	**Voltage**
Output signal		0-20 mA, 4-20 mA	0-5 V, 1-5 V, 0-10 V, 2-10 V, ± 10 V
Output load		≤ 600 Ω	≥ 4.7 KΩ
Accuracy[1)]		±0.5 % of full-scale	
Temperature coefficient		±250 ppm/°C max.	±300 ppm/°C max.
Residual ripple		< 0.15 %	
Response time		150 ms	
Supply circuits	**K-M**		
Rated supply voltage		24-48 V DC	110-240 V AC
Supply voltage range		24-48 V DC, 24 V AC	110-240 V AC, 100-300 V DC
Supply voltage tolerance		DC: -15...+15 %	AC: -15...+10 %
Rated frequency		0 Hz or 50/60 Hz	
Power consumption		2 W at 24 V DC	4.5 VA at 230 V AC
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 mm² (24-12 AWG)	
	fine-strand with(out) wire end ferrule	plug-connector with screw terminals 0.2-2.5 mm² (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 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			
Insulation voltage (between all isolated circuits)		1.5 kV	
Test voltage (between all isolated circuits)		1.5 kV / 50 Hz	

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

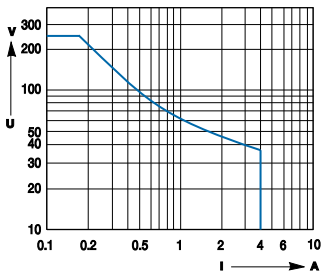
Analog signal converters
Technical diagrams, connection diagrams
Approximate dimensions

Technical diagrams
Load limit curves CC-U/xxR

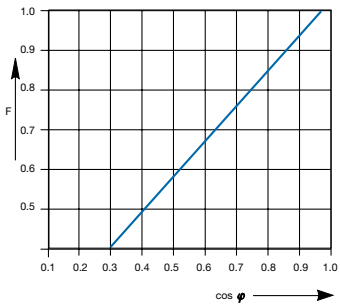
Resistive AC load



Resistive DC load

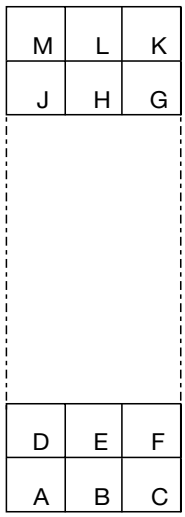


Derating curve



Connection diagram CC-U/x

Width 22.5 mm (0.89 in)



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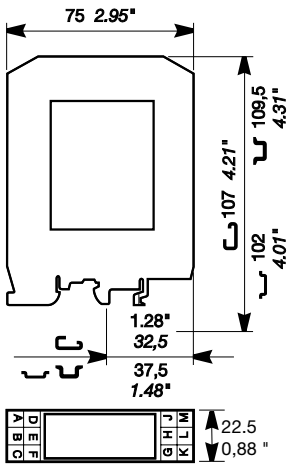
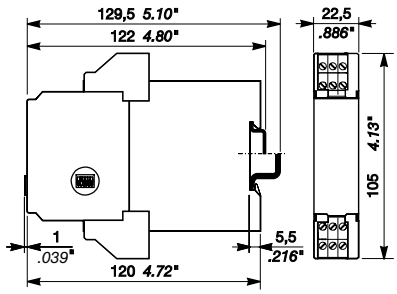
Dimensional drawings

Dimensions in mm and inches

CC-E/x



CC-U/x , CC-U/xR



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