UNIFLEX CI 35
Universal transmitter

FEATURES

- Compact design, only 22,5 mm wide
- Clips onto top-hat DIN rail
- Plug-in screw terminals or spring-clamp connectors
- Dual-line LC display with additional display elements
- Process values always in view
- Convenient 3-key operation
- Universal input with high signal resolution (>15 bits)
- Universal output with high resolution (14 bits) as combined voltage/current output
- Relay output
- Quick response; only 100 ms cycle time, i.e. also suitable for fast signals
- Customer-specific linearization
- Measurement value correction (offset or 2-point)
- Min/max indicator ('slave pointer')
- Preset for output value

APPLICATIONS

- Measurement, scaling, and separation of electrical signals, e.g. for:
- Heat treatment plants
- Drying equipment
- Furnace builders
- Metallurgy
- Kilns
- General machine building
- Research and development
- etc.

DESCRIPTION

UNIFLEX CI 35 transmitters are designed to give precise and cost-effective signal detection and processing tasks.

Every CI 35 has one universal input, one universal output and a relay.

Galvanic isolation is provided between inputs and outputs as well as from the supply voltage.

Mounting

The compact CI 35 is clipped onto a top-hat DIN rail, and can also be unmounted very simply.

All connections are of the plug-in type, so that a transmitter can be replaced very quickly without disturbing the wiring.

Display and operation

The two-line LC display permits simultaneous indication of the measured value and all of the unit's operating functions.

Moreover, a LED and 4 other display elements give a reliable indication of operating status, operating mode, and error messages.

The user-configurable engineering unit of the measured value can be included in the display.

By means of the extended Operating Level, it is possible to show any signal or parameter in the 2nd display line.

Engineering Tools

The transmitter settings are also configurable by means of an Engineering Tool.

Via the BlueControl® software, including the transmitter simulation and especially the convenient connection via the BluePort® front interface, the user can solve the task in hand without having to work through operating instructions.
Of course, practically all settings can also be made from the device front.
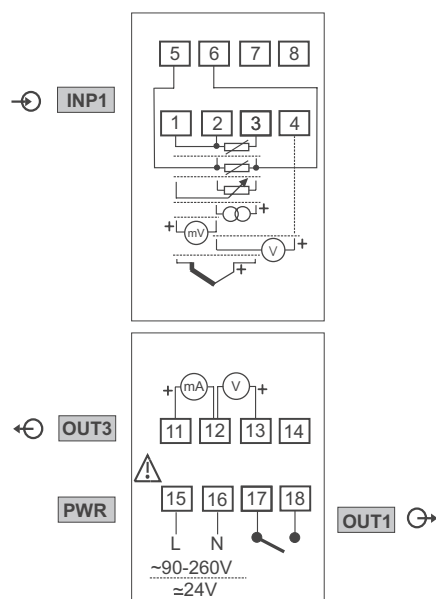
Password protection

If required, unauthorized access to the various Operating Levels can be prevented with a password, or an entire level can be blocked.

TECHNICAL DATA

Bild 2: Anschluss CI 35

UNIVERSAL INPUT INP1

Type: single ended, exept thermocouples

Resolution:	> 15 bits
Decimal point:	0 to 3 decimals
Digital input filter:	adjustable 0.0...999.9 s
Scanning cycle:	100 ms (only INP1)
Linearization:	31 segments, adaptable with BlueControl®
Measurement value correction:	2-point or offset
Limiting frequency:	1.7 Hz

Thermocouples (Table 1)

Input resistance:	≥ 1 MΩ
Influence of source resistance:	1 µV/Ω
Input circuit monitor:	sensor break, polarity

Cold-junction compensation

- Internal
  - additional error: typical ≤± 0.5 K
    max. ≤ +1.2 K

- External:
  - value setting: 0 ...100 °C

Break monitoring

Sensor current: ≤ 1 µA

Operating sense configurable

Resistance thermometer (Table 2)

Connection technique:	3 or 4-wire
Lead resistance: (max. at range end)	max. 30 Ω
Input circuit monitoring:	break and short circuit

Measurement span

Separated into ranges

Physical measurement range: 0...4,500 Ω

The BlueControl® software enables the internal characteristic curve for the KTY 11-6 temperature sensor to be adapted.

Current and voltage measurement (Table 3)

Span start and span:	anywhere within the measurement range
Scaling:	freely selectable −1,999...9,999
Input circuit monitoring (current):	12.5% below span start (2 mA)

Table 1: Thermocouple input

Thermocouple type		Measurement range		Error	Typical resol.
L	Fe-CuNi (DIN)	-100...900°C	-148...1,652°F	≤ 2K	0.05 K
J	Fe-CuNi	-100...1,200°C	-148...2,192°F	≤ 2K	0.05 K
K	NiCr-Ni	-100...1,350°	-148...2,462°F	≤ 2K	0.1 K
N	Nicrosil/Nisil	-100...1,300°C	-148...2,372°F	≤ 2K	0.1 K
S	PtRh-Pt 10%	0...1,760°C	32...3,200°F	≤ 2K	0.1 K
R	PtRh-Pt 13%	0...1,760°C	32...3,200°F	≤ 2K	0.1 K
T**	Cu-CuNi	-200...400°C	-328...752°F	≤ 2K	0.03 K
C	W5%Re-W26%Re	0...2,315°C	32...4,199°F	≤ 3K	0.2 K
D	W3%Re-W25%Re	0...2,315°C	32...4,199°F	≤ 3K	0.2 K
E	NiCr-CuNi	-100...1,000°C	-148...1,832°F	≤ 2K	0.05 K
B *	PtRh-Pt6%	0(400)...1,820°C	32(752)...3,308°F	≤ 3K	0.2 K
Special		-25 … 75 mV		≤ 0.1%	0.005%

* Values apply from 400°C upwards.
**Values apply from -80°C upwards.*

Table 2: Resistive inputs

Type	Sensor current	Measurement range		Error	Typical resol.
Pt100 ***		-200...100 (150)°C	-328...212 (302)°F	≤ 1 K	0.05 K
Pt100		-200...850°C	-328...1,562°F	≤ 1 K	0.05 K
Pt1000		-200...850°C	-328...1,562°F	≤ 2 K	0.05 K
KTY 11-6*		-50...150°C	-58...302°F	≤ 2 K	0.05 K
Special*	≤ 0.25mA	0...4,500 Ω**		≤ 0.1%	0.005%
Special		0...450 Ω**		≤ 0.1%	0.005%
Potentiom.		0...160 Ω**		≤ 0.1%	0.005%
Potentiom.		0...450 Ω**		≤ 0.1%	0.005%
Potentiom.		0...1,600 Ω**		≤ 0.1%	0.005%
Potentiom.		0...4,500 Ω**		≤ 0.1%	0.005%

* Default setting is the characteristic for KTY 11-6 (-50...150°C)
** Including lead resistance
*** up to 150 °C at reduced lead resistance (max. 160 Ω)*

Table 3: Current and voltage input

Measurement range	Input resistance	Error	Typical resol.(∅)
0...10 V	≈ 110 kΩ	≤ 0.1 %	0.3 mV
-10...10 V	≈ 110 kΩ	≤ 0.1 %	0.6 mV
-5...5 V	≈ 110 kΩ	≤ 0.1 %	0.3 mV
-2.5...115 mV*	> 1 MΩ	≤ 0.1 %	4 µV
-25...1,150 mV*	> 1 MΩ	≤ 0.1 %	40 µV
-25...90 mV*	> 1 MΩ	≤ 0.1 %	4 µV
-500...500 mV*	> 1 MΩ	≤ 0.1 %	40 µV
-200...200 mV*	> 1 MΩ	≤ 0.1 %	20 µV
0...20 mA	20 Ω	≤ 0.1 %	0.8 µA

* high-impedance, without break monitoring

OUTPUTS

SURVEY OF OUTPUTS

Output	Purpose
OUT1(relay)	Limit contact, alarms, errors, status messages *
OUT3 (logic)	Same as OUT1
OUT3 (continuous)	Analog output for display value, INP1, Transmitter supply 13 V / 22 mA

All logic signals can be "OR-linked".

RELAY OUTPUT OUT1

Type:	2 NO contact
Max. contact rating:	500 VA, max. 250 V, max. 2 A at 48...62 Hz, resistive load
Min. contact rating:	6V, 1 mA DC
Switching cycles (electrical):	for I=1A/2A: ≥ 800,000/500,000 (at 250V AC, resistive load)

Note:

If the relay OUT1 is used to operate external contactors, these must be fitted with RC snubber circuits to manufacturer specifications to prevent excessive voltage peaks at switch-off.

OUT3 AS UNIVERSAL OUTPUT

Parallel current/voltage output with common 'minus' terminal (combined use only in galvanically isolated circuits).
Freely scalable

Resolution:	14 bits
Dynamic response	Output follows the input:
(step change of input signal) T90:	≤ 540 ms
Tracking error I/U:	≤ 2 %
Residual ripple:	≤±1 %
(rel. to range end)	0...130 kHz

Current output

0/4...20 mA, configurable.
short circuit proof

Dynamic range:	-0.5...23 mA
Load:	≤ 700 Ω
Load effect:	≤ 0.02%
Resolution:	≤ 1.5 μA
Error:	≤ 0.1%

Voltage output

0/2...10V, configurable
not continuous short-circuit proof

Dynamic range:	-0.15...11.5 V
Load:	≥ 2 kΩ
Load effect:	≤ 0.06%
Resolution:	≤ 0.75 mV
Error:	≤ 0.1%
Additional error when using simultaneously the current output	≤ 0.09%

OUT3 as transmitter supply

Output:	22 mA / ≥ 13 V DC

OUT3 as logic signal

Load ≤ 700 Ω	0/≤ 23 mA
Load > 500 Ω	0/> 13 V

GALVANIC ISOLATION

Galvanic isolation is provided between inputs and outputs as well as from the supply voltage (3-port-isolation).
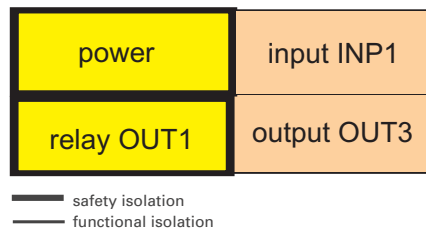Test voltage:

Between power supply and in-/outputs:	2.3 kV AC, 1 min
Between input and output:	500 V AC; 1min

Isolation:

between in-/output against earth: ≤ 33 V AC

Fig. 3: Galvanic isolation

power	input INP1
relay OUT1	output OUT3

▬▬ safety isolation
— functional isolation

FUNCTIONS

Signal processing

The selected input signal is converted into an analog output signal:

- Measurement value correction (offset and 2-point)
- Scaling
- 1st-order filter with adjustable parameters (bandwidth, see below)
- Linearization with 31 segments
- $\sqrt{x}$, with $\sqrt{-x} = 0$
- x^2

Behaviour on sensor break/short circuit

- Response of the analog output is selectable (upscale / downscale)
- Preset substitute input value, can be disabled

Min/max indicator (slave pointer)

The minimum and maximum input values are stored in the CI 35, and can be displayed by means of the keys ▼ (minimum) and ▲ (maximum). The values are resettable.

Display of engineering units

The engineering unit for the measured value can either be selected from a predefined list of standard units, or it can be defined by the user (BlueControl®). The unit appears in the second line of the display.

FILTER

Fig. 4: Filter function
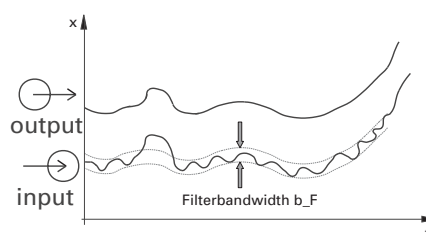
The transmitter contains a 1st-order mathematical filter with adjustable time constant and bandwidth.
The bandwidth is the adjustable tolerance range within which the filter is active above and below the process value. Measurement value changes in excess of the adjusted bandwidth are not filtered.

LIMIT VALUE FUNCTIONS

Max, Min or Max/Min monitoring with adjustable hysteresis.

Monitored signals

- Process value
- Input 1

Functions

- Input value monitoring
- Input value monitoring with storage
- Signal changes / with storage
- Reset via front panel
- Alarm discriminator adjustable from 0...9.999 seconds
- Several limit values and alarm messages can be logically "OR-linked".
- Limits can used as control signals.

ALARMS

Sensor break / short circuit

Depending on the selected input type, the input circuit is monitored for break, short circuit, and reversed polarity.

ERROR LIST

Display of error messages, warnings, and stored limit value messages in the error list. Messages are stored, and can be reset manually. Possible elements in the error list:

Sensor break, short circuit, incorrect polarity
Stored limit values
Heating current alarm
Control loop alarm
Fault during self-tuning
E.g. Re-calibration warning (message is generated when a predefined operating time is reached)
E.g. Maintenance interval for a switching device (message is generated when a predefined number of switching cycles is reached)
Internal fault (RAM, EEPROM, ...)

DISPLAY AND OPERATION

Display

LCD:

dual-line plus additional display elements

Upper line:

4 digits, 7-segment LCD

- for process value

Lower line:

5 digits, 14-segment LCD; configurable contents (via BlueControl®)

- Engineering unit
- Parameters
- Extended Operating Level

Additional display elements

2 display elements (bars in the lower line of the LCD, identified as 1, 2, F, E)

- Bars 1 and 2: OUT1 active
- Bar E: Entry has been made in the error list

LED:

- Green = OK
- Red = limit value Lim1 triggered
- Red blinking = internal fault, configuration mismatch

Operating functions

Only three keys at the front of the CI 35 are used to operate process values, parameters, and configuration data. Different Operating Levels and selected parameters can be disabled by means of BlueControl®.

POWER SUPPLY

Depending on ordered version:

AC supply

Voltage:	90...260 V AC
Frequency:	48...62 Hz
Consumption:	approx. 7 VA max.

Universal supply 24 V UC*

AC supply:	18...30 V AC
Frequency:	48...62 Hz
DC supply: 1	8...31 V DC
Consumption:	approx. 4 VA/3 W max.

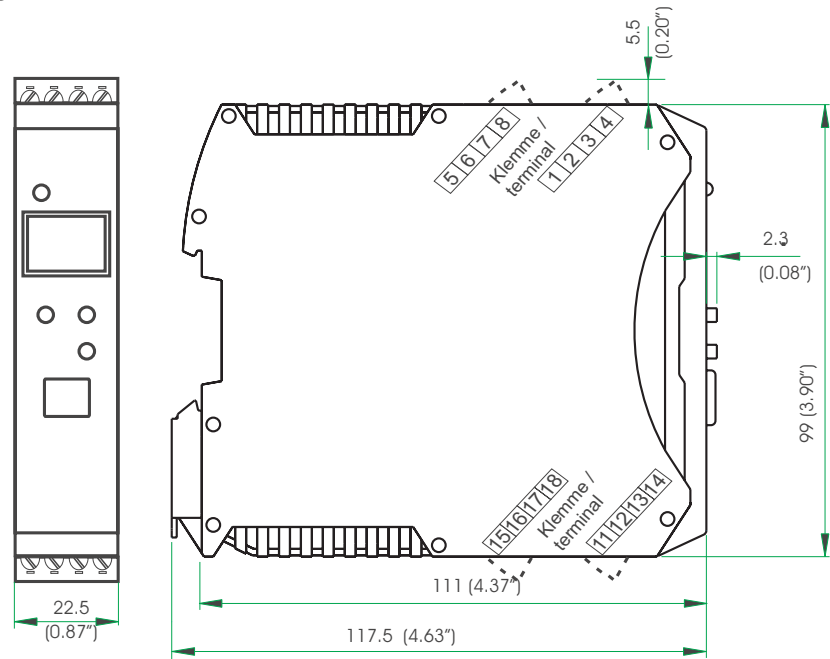Supply only from safety electrical low voltage (SELV).

Behaviour with power failure

Configuration and parameter settings:
Permanent storage in EEPROM

BLUEPORT® FRONT INTERFACE

Connection to the transmitter front via a PC adapter (see 'Accessories'). The BlueControl® software enables the CI 35 to be configured, parameters set, and operated.

Fig. 5: Dimensions CI 35

ENVIRONMENTAL CONDITIONS

Protection mode

Front panel:	IP 20
Housing:	IP 20
Terminals:	IP 20

Permissible temperatures

For specified accuracy:	-10...55°C
Warm-up time:	< 20 minutes
Temperature effect:	≤ 0.05% / 10 K
add. influence to cold junction compensation:	≤ 0.05% / 10 K
Operating limits:	-20...60°C
Storage:	-30...70°C

Humidity

Max. 95%, 75% yearly average, no condensation

Shock and vibration

Vibration test Fc (DIN EN 60068-2-6)

Frequency:	10...150 Hz
Unit in operation:	1g or 0.075 mm
Unit not in operation:	2g or 0.15 mm

Shock test Ea (DIN EN 60068-2-27)

Shock:	15 g
Duration:	11 ms

Electromagnetic compatibility

Complies with EN 61 326-1 for continuous, unattended operation.

Interference radiation:

- Within the limits for Class B devices.

Immunity to interference:

Meets the test requirements for devices in industrial areas.

Evaluation criteria:

- Surge interference partly has marked effects, which decay after the interference stops.
- With high levels of surge interference on 24 V AC mains leads, it is possible that the device is reset.
- With HF interference, effects up to 50 µV can occur.

GENERAL

Housing front

Material:	Polyamide PA 6.6
Flammability class:	V0 (UL 94)

Connecting terminals

Material:	Polyamide PA
Flammability class:	V2 (UL 94) for screw terminals V0 (UL 94) for spring-clamp terminals bus connector

Electrical safety

Complies with EN 61010-1:
Over-voltage category II
Contamination degree 2
Protection class II

Electrical connections

Plug-in connector strips with choice of terminal type:

- Screw terminals or spring-clamp terminals, both for lead cross-sections from 0.2 to 2.5 mm². (AWG24-12)

Mounting method

Clip-on rail mounting (35 mm top-hat rail to EN 50 022). Locked by means of metal catch in housing base.
Close-packed mounting possible.

Mounting position: vertical
Weight: 0.18 kg

CERTIFICATION

- CE certified
- UL / cUL certified (applied for)

ACCESSORIES

BlueControl® (Engineering Tool)

PC program for configuring, parameter setting, and operating (commissioning) the CI 35 transmitter. Moreover, all settings are saved and can be printed, if required.

Depending in version, a powerful data acquisition module with trend graphics is available.

Show/hide function

The BlueControl® software enables any number of parameters and configuration setting to be shown/hidden.
This ensures that only permitted parameters & settings can be changed in the transmitter. Safety-relevant parameters are not displayed.

Simulation function

The built-in simulation serves to test the settings.

Import function

Engineerings of UNIFLEX CI/CB created by engineering tool ET/Uniflex can be read and transformed if possible.

Software requirements:
Windows 95/98/NT/2000/XP

Configuration settings made only via the Blue-Control® software (not via the transmitter's front keys)

- Customer-specific linearization
- Switch-over to 60 Hz mains frequency
- Blocking operator functions, Operating Levels, and password definition
- Text setting
- Definition of the display contents

Hardware requirements:

A special PC adapter (see 'Accessories') is required for connecting to the transmitter.

Updates and demo software from:
www.pma-online.de

Standard accessories:

- Operating notes

Table 4: BlueControl®, versions und functions:

Functionality	Mini	Basic	Expert
parameter and configuration setting	yes	yes	yes
download: writes an engineering to the device	yes	yes	yes
online-mode / visualisation	SIM only	yes	yes
creation of user defined linearizations	yes	yes	yes
configuration of extended operation level	yes	yes	yes
upload: reads an engineering from the device	SIM only	yes	yes
basic diagnosis function	no	no	yes
saves files and engineering data	no	yes	yes
printer function	no	yes	yes
online documentation / help system	yes	yes	yes
measurement correction (calibration procedure)	yes	yes	yes
data acquisition and trend function	SIM only	yes	yes
personal assistant function	yes	yes	yes

Transmitter UNIFLEX CI 35 | C | I | 3 | 5 | - | 1 | | | - | 0 | 0 | 0 | | 0 | - | | 00 |

1 universal-input
with display and BluePort®-interface

without plug-in connector terminals	**0**
with screw-terminal connectors	**1**
with spring-clamp terminals	**2**

90..260V AC, mA/V/logic +1 relay	**2**
18...30VAC/18..31VDC, mA/V/logic +1 relay	**3**

Standard configuration	**0**
Configuration to order	**9**

Standard (CE-certified)	**0**
UL /cUL - certified (applied for)	**U**

Fig. 6: Accessory parts

ACCESSORIES

Description	Quantity	Order no.
❶ Connector set with screw terminals	4 pieces	9407-998-07101
❷ Connector set with spring-clamp terminals	4 pieces	9407-998-07111
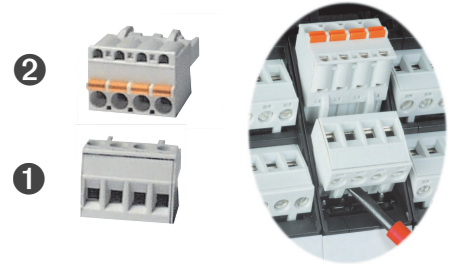
ADDITIONAL ACCESSORIES

Description	Language	Order no.
PC adapter for the BluePort° front interface		9407-998-00001
USB serial adaptor (USB to RS 232)		9407-998-00081
BlueControl° Mini	German/English	www.pma-online.de
BlueControl° with Basic license rail line	German/English	9407-999-12001
BlueControl° with Expert license rail line	German/English	9407-999-12011

➤ Please also order the associated **documentation**:

Description	Order no.
Operating instructions for CI 35 (D)	9499-040-71718
Operating instructions for CI 35 (E)	9499-040-71711