Universal signal transducer UKU

with fully isolated inputs and outputs

Universal signal transducer UKU

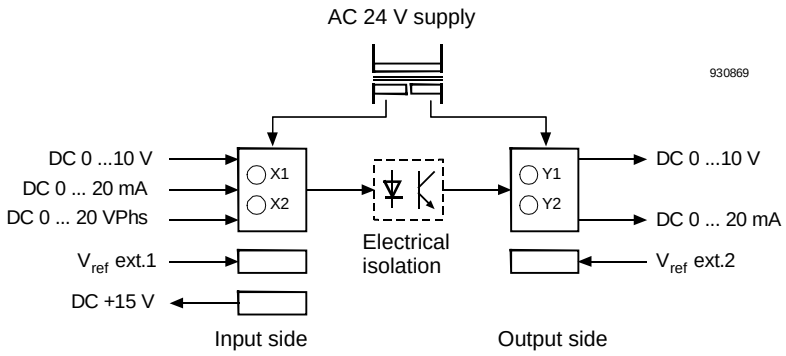
- **Full isolation between the inputs and outputs**
- **Signals can be converted and linearised**
- **Adjustable signal level and curve rotation**
- **All outputs short-circuit proof**

Use

The UKU universal signal transducer is used for galvanic isolation of various current and voltage signals. These can be converted in the signal transducer and linearised. The signal level and curve rotation can also be adjusted.

Functions

Signal structure



The input signal goes into an A/D converter before passing through an opto-isolator to the output stage. The signal is then processed to give the appropriate voltage ratio as determined by the settings for Y1 (cut-in) and Y2 (slope), and finally provided as a filtered analogue output.

Electrical isolation

In addition to the opto-isolation between signal inputs and outputs, each stage has a fully-isolated electrical supply.

Electrical protection

All inputs are overvoltage-proof to AC 24 V and DC 24 V. Higher voltages will damage the transducer. The outputs are all short-circuit proof (including the auxiliary supply voltage). There is full isolation between the inputs and outputs and the AC 24 V supply.

Conversion

Each universal signal transducer can convert one signal.
The options for conversion are as follows:

DC 0 ... 20 V phase cut	into DC 0 ...10 V or DC 0(4) ... 20 mA
DC 0 ... 10 V	into DC 0 ...10 V or DC 0(4) ... 20 mA
DC 0 ... 20 mA	into DC 0 ...10 V or DC 0(4) ... 20 mA

Ordering

When placing an order, please specify the quantity, product description and type code.

Example :
1 universal signal transducer UKU

Technical design

Reference inputs/outputs

Adjustment ranges and characteristic curves

The input or output curve setting is determined by an internal reference of DC 10.00 V or an external reference voltage.
For an external reference, Switch 3 or Switch 10 should be set to "external".
The external reference voltage is connected to Terminals 8 and 9 ($V_{ref.}$ ext.1) or Terminals 31 and 32 ($V_{ref.}$ ext.2).

Examples:
– For the internal reference voltage: 100 % = 10.00 V
– For the external reference voltage: e.g. 100 % = 6.0 V (see connection example 3)

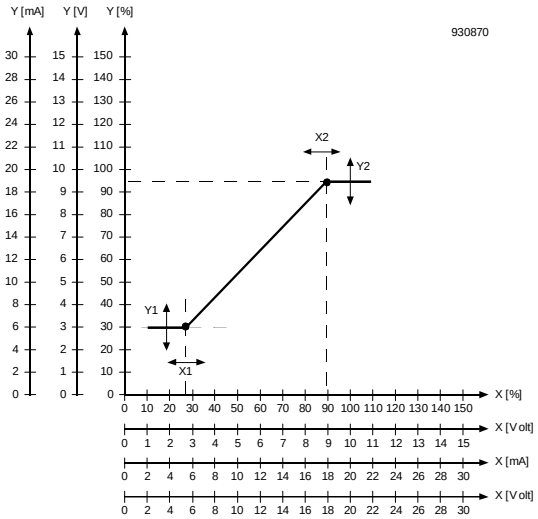
Signal adaptation

Specific signal levels and curve rotations can be achieved to an accuracy of 1 % by adjusting the associated potentiometers and step switches with a suitably sized screwdriver. The relevant scale is the one associated with the connected input or output.

Setting the curves

Input signal
A separate minimum value (X1) and maximum value (X2) can be set for the input signal. A coarse setting, in steps of 10 %, can be set on potentiometers 2 and 4. Potentiometers 5 and 6 are used for a fine, linear, adjustment.

Output signal
A separate minimum value (Y1) and maximum value (Y2) can be set for the output signal. A coarse setting, in steps of 10 %, can be set on potentiometers 9 and 11. Potentiometers 7 and 8 are used for a fine, linear, adjustment.



X1	Minimum input signal value
X2	Maximum input signal value
Y1	Minimum output signal value
Y2	Maximum output signal value

Auxiliary supply voltage

An auxiliary supply voltage of DC 15 V is available on the input side, for applications utilising active sensors. (Connection is via Terminals 3 and 4).

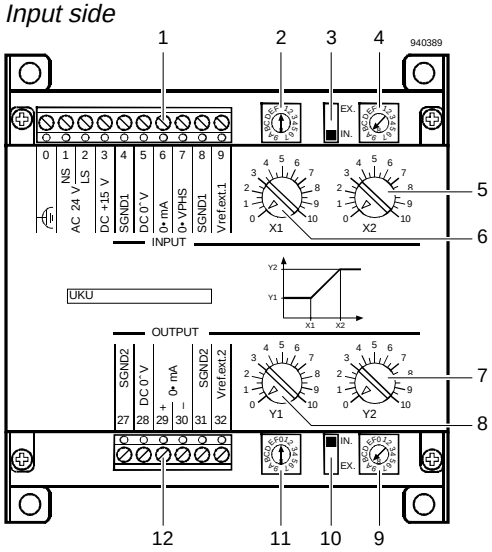
Important : Max. output current = 15 mA!

Mechanical design

The universal signal transducer consists of a metallic enclosure, accommodating the electronic PCB. The facilities for connection and adjustment are located externally for easy access.

The connections and adjustment options are as follows:

Input side



Output side

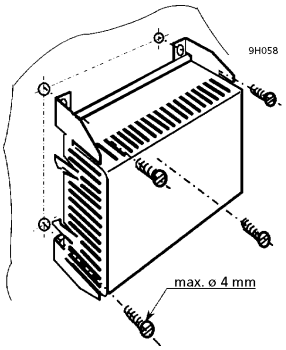
Key :

1		Terminal connections on input side
2, 4	X1, X2	Coarse setting * for input signal characteristic
3	EX / IN	External/internal reference voltage switch
5, 6	X1, X2	Fine setting ** for input signal characteristic
7, 8	Y1, Y2	Fine setting ** for output signal characteristic
9, 11	Y1, Y2	Coarse setting * for output signal characteristic
10	EX / IN	External/internal reference voltage switch
12		Terminal connections on output side

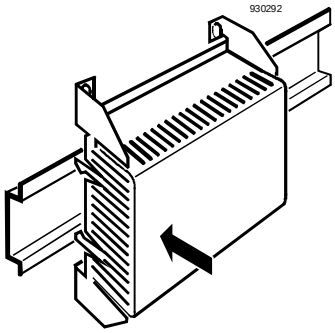
* Coarse setting in steps of 10 %
** Fine setting in steps of 1 %

Mounting notes

- The device may be mounted in any orientation.
- The connection terminals should be freely accessible.
- The air must be allowed to circulate freely, to dissipate the heat generated during operation.



Surface mounting
The base incorporates four drilled holes for surface mounting.



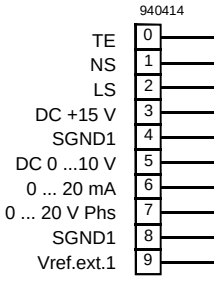
Rail mounting
The base of the housing is designed for snap-mounting on standard DIN/EN rails.
Rail type: EN50022-35 x 7.5

Technical data

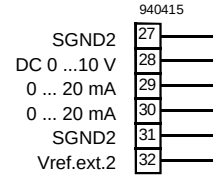
Supply voltage	AC 24 V, 50 ... 60 Hz
– Max. voltage tolerance	±10%
Power consumption	Max. 6 VA
Inputs, SGND1	
DC 0 ...10 V	Input impedance 100 k ohms
	Max. input voltage DC 16 V
DC 0 ... 20 V phase cut	Input impedance 6 k ohms
	Max. input voltage DC 32 V phase cut
DC 0 ... 20 mA	Input impedance 125 ohms
	Max. input current DC 20 mA
Reference inputs	
V_{ref} external 1, SGND1	Input impedance 100 k ohms
	Input range DC 2.5 ...16 V
V_{ref} external 2, SGND2	Input impedance 100 k ohms
	Input range DC 2.5 ...16 V
Output range, SGND2	
DC 0 ...10 V	Min. load resistance > 1 k ohms
	Max. output voltage DC 16 V
DC 0 ... 20 mA	Max. load resistance < 800 ohms
	Max. output current DC 20 mA
Auxiliary supply DC 15 V, SGND1	Voltage tolerance ± 1 %
	Max. output current DC 15 mA
Accuracy	
Offset error	–1 %
Steepness error	–1 %
Linearity error	– 0.5 %
Connections	Screw terminals, max. 2 x 1.5 mm^2
Protection standard	IP20 to IEC529
Interference immunity	IEC801-2/ -3/ -4/ -5
Radio interference suppression	Class B (to VDE 0871, July 1992)
Environmental conditions	to DIN-IEC 68-2-1/2
Ambient temperature of device:	
Operation	0 ... 45 °C
Transport and storage	– 25 ... 70 °C
Weight (incl. packaging)	0.49 kg
Dimensions (W x H x D)	118 x 118 x 52 mm
Housing colour	NCS5005 R20B
Conformity	Meets the requirements for CE marking

Connection terminals

Input side (top)



Output side (bottom)



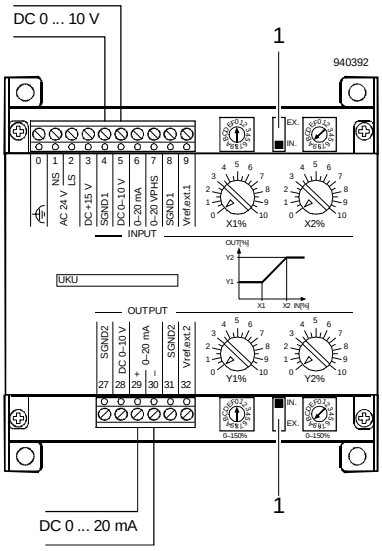
Application examples

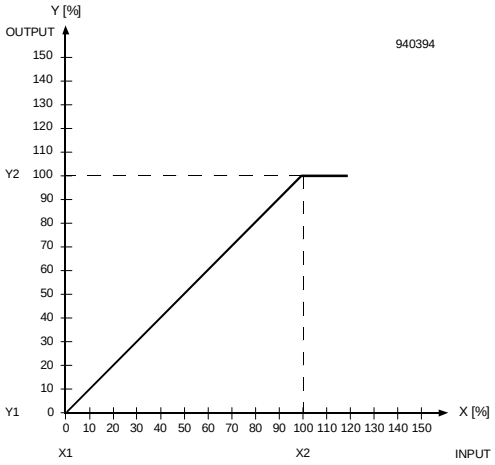
Examples of connection and settings

Example 1

Input : DC 0 ...10 V (0 ...100 %)

Output : DC 0 ... 20 mA (0 ...100 %)





Switch settings :

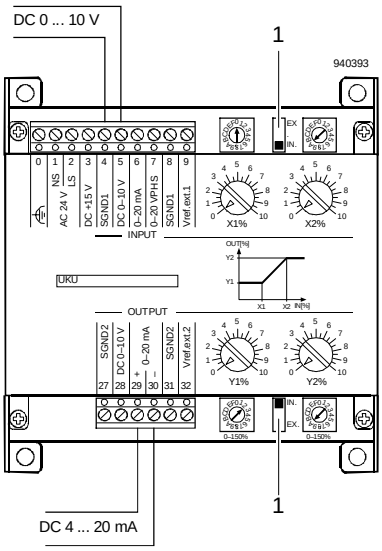
X1	Coarse setting : 0 = 0 %	Fine setting:	0 = 0 %
X2	Coarse setting : A = 100 %	Fine setting:	0 = 0 %
Y1	Coarse setting : 0 = 0 %	Fine setting:	0 = 0 %
Y2	Coarse setting : A = 100 %	Fine setting:	0 = 0 %

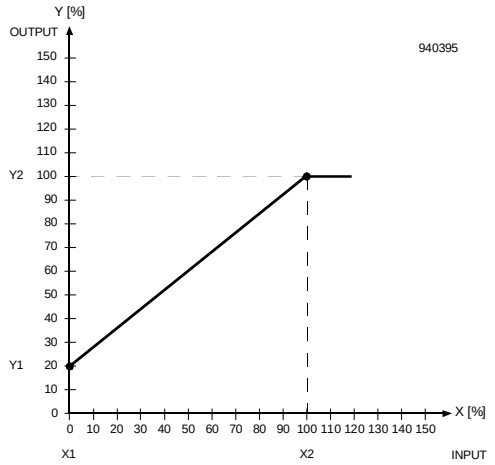
1 EX / IN The internal reference voltage of 10 V is used here. Set switch to **IN**.

Example 2

Input : DC 0 ...10 V (0 ...100 %)

Output : DC 4 ... 20 mA (20 ...100 %)





Switch settings :

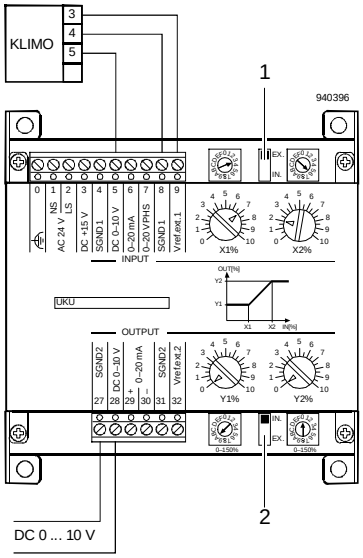
X1	Coarse setting : 0 = 0 %	Fine setting:	0 = 0 %
X2	Coarse setting : A = 100 %	Fine setting:	0 = 0 %
Y1	Coarse setting : 2 = 20 %	Fine setting:	0 = 0 %
Y2	Coarse setting : A = 100 %	Fine setting:	0 = 0 %

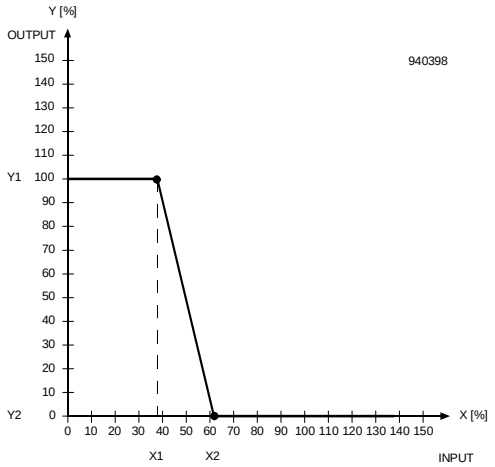
1 EX / IN The internal reference voltage of 10 V is used here. Set switch to **IN**.

Example 3

Input : KLIMO sensor voltage with bridge voltage = 6.0 V
DC 2.21 ... 3.73 V (37 ... 62 %)

Output: DC 10.0 ... 0 V (100 ... 0 %)





Switch settings :

X1	Coarse setting : 3 = 30 %	Fine setting:	7 =7 %
X2	Coarse setting : 6 = 60 %	Fine setting:	2 = 2 %
Y1	Coarse setting : A = 100 %	Fine setting:	0 = 0 %
Y2	Coarse setting : 0 = 0 %	Fine setting:	0 = 0 %

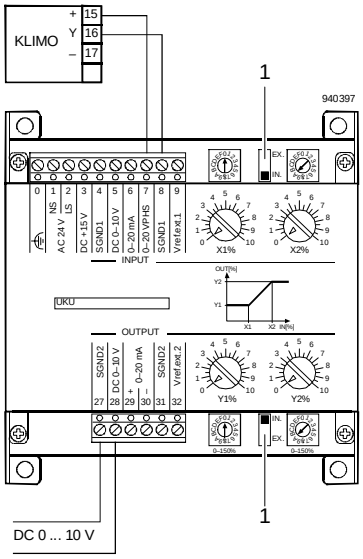
1 EX / IN On the input side, the bridge voltage of the klimo controller (Terminals 2 and 3) is required as a reference voltage: Set switch to **EX**.

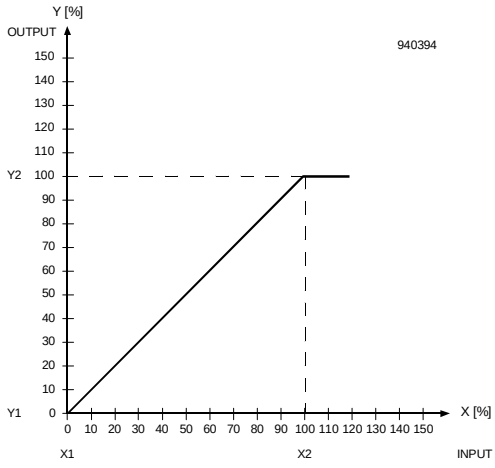
2 EX / IN On the output side, the internal reference voltage of 10 V is used. Set switch to **IN**.

Example 4

Input : DC 0 ... 20 V phase cut (0 ...100 %)

Output : DC 0 ...10 V (0 ...100 %)





Switch settings :

X1	Coarse setting : 0 = 0 %	Fine setting:	0 = 0 %
X2	Coarse setting : A = 100 %	Fine setting:	0 = 0 %
Y1	Coarse setting : 0 = 0 %	Fine setting:	0 = 0 %
Y2	Coarse setting : A = 100 %	Fine setting:	0 = 0 %

1 EX / IN The internal reference voltage of 10 V is used here. Set switch to **IN**.

Important

- **Connect KLIMO +20 V phase cut output to Terminal 7 of the UKU.**
- **Connect KLIMO output signal Y to Terminal 8 (SGND1) of the UKU. In this case do NOT use Terminal 4 of the UKU for other applications. The DC +15 V auxiliary voltage is not available with this application.**

Dimensions

All dimensions in mm