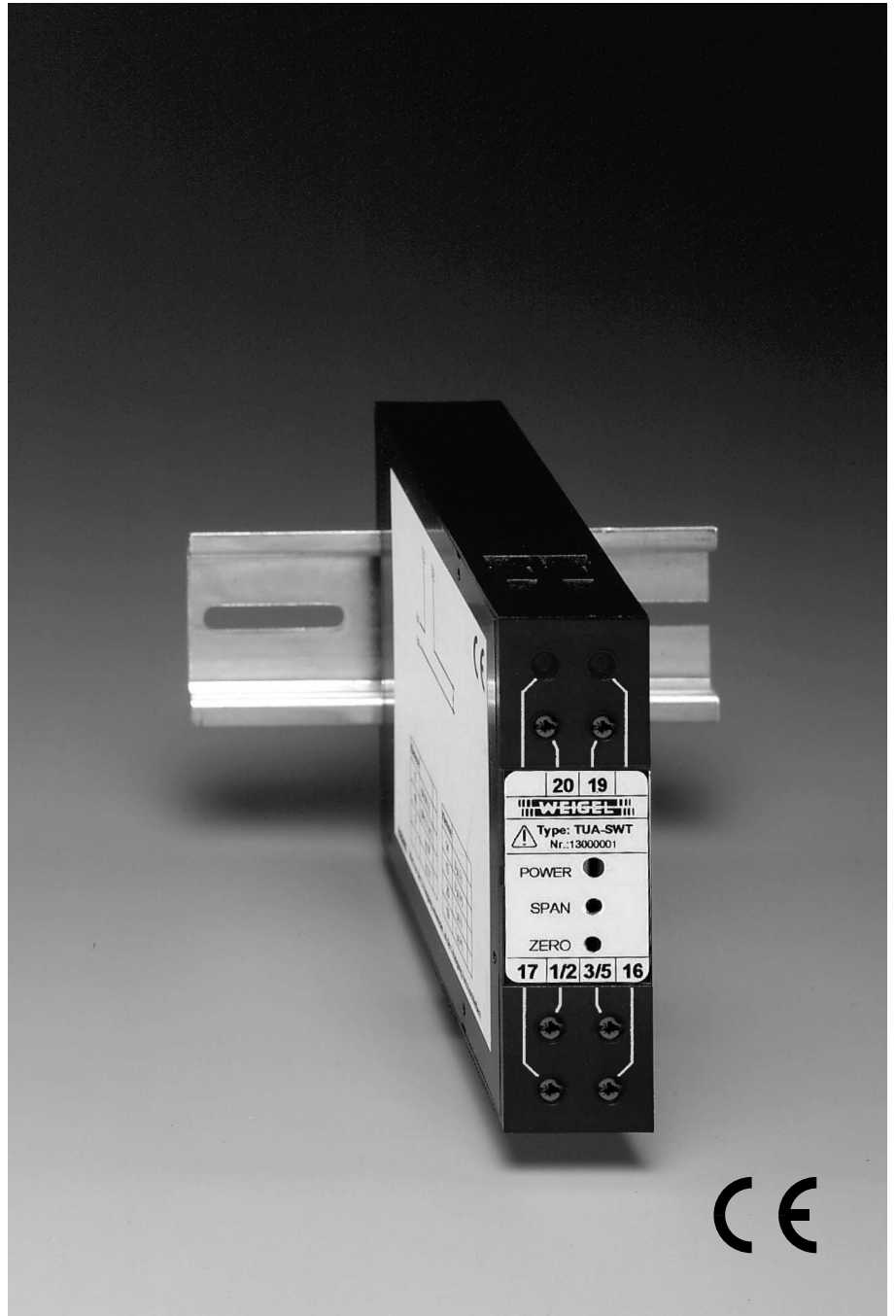


Data Sheet

698.D.001.01

Isolating Amplifier for DC Signals, Switchable

TUA-SWT



WEIGEL

Application

The switchable isolating amplifier **TUA-SWT** accepts a DC signal (current or voltage), amplifies and galvanically isolates this signal and produces a load independent DC current or voltage output.

The signal can be transmitted over a considerable distance and fed into indicators, recorders and/or control systems. It is possible to connect more than one measuring or control device to the output circuit provided the total impedance does not exceed the rating.

Power supply is effected by a separate auxiliary voltage input. Input, output and auxiliary voltage input are **galvanically isolated from each other**.

The isolating amplifier complies with safety requirements and is tested for interference immunity.

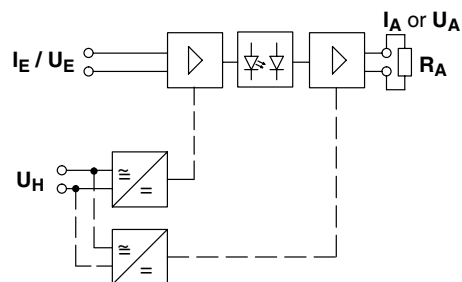
It is designed to be mounted in machines/systems. Regulations for installation of electrical systems and equipment have to be observed.

Operating Principle

Current measurement is effected by means of a shunt, voltage measurement by means of a voltage divider.

The signal will then be galvanically isolated from input via an optical path and converted into a proportionally impressed DC voltage or into a load independent DC current proportional to the input signal.

Block Circuit Diagram



General Data

case details	projecting case clamping to TH 35 DIN rail according to DIN EN 60 715
material of case	ABS/PC black self-extinguishing to UL rating 94 V-0
terminals	screw-terminals
wire cross-section	4 mm ² max.
enclosure code	IP 40 case IP 20 terminals
dielectric test	3510 V all circuits to case, 3510 V auxiliary voltage to input or output, 2210 V input to output
operating voltage	300 V (rated voltage phase to zero)
class of protection	II
measurement category	CAT III
pollution level	2
dimensions WxHxL	22.5 mm x 80 mm x 115 mm
weight	approx. 0.12 kg

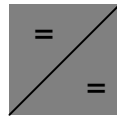
Inputs

input quantity	DC current or DC voltage, switchable	
current input	DC current I_E switchable	
unipolar	live zero	bipolar
0 ... I_{EN}	0.2 I_{EN} ... I_{EN}	$-I_{EN}$... 0 ... $+I_{EN}$
0 ... 0.1 mA		± 0.1 mA
0 ... 0.2 mA		± 0.2 mA
0 ... 0.5 mA		± 0.5 mA
0 ... 1 mA	0.2 ... 1 mA	± 1 mA
0 ... 2 mA		± 2 mA
0 ... 5 mA	1 ... 5 mA	± 5 mA
0 ... 10 mA	2 ... 10 mA	± 10 mA
0 ... 20 mA	4 ... 20 mA	± 20 mA
input resistance R_E	$\leq 16 \Omega$	
overload limit	2 I_{EN} continuously (40 mA max.)	
voltage input	DC voltage U_E switchable	
unipolar	live zero	bipolar
0 ... U_{EN}	0.2 U_{EN} ... U_{EN}	$-U_{EN}$... 0 ... $+U_{EN}$
0 ... 60 mV		± 100 mV
0 ... 100 mV		± 200 mV
0 ... 200 mV		± 500 mV
0 ... 500 mV		± 1 V
0 ... 1 V	0.2 ... 1 V	± 2 V
0 ... 2 V		± 5 V
0 ... 5 V	1 ... 5 V	± 10 V
0 ... 10 V	2 ... 10 V	± 20 V
0 ... 20 V	4 ... 20 V	± 40 V
0 ... 40 V		
input resistance R_E	$\geq 100 \text{ k}\Omega$	
overload limit	2 U_{EN} continuously (40 V max.)	

Outputs

output quantity	standard signal, switchable	
current output	load independent DC current	
output current	I_A	0 ... 20 mA, 4 ... 20 mA, or -20 ... 0 ... +20 mA
rated current (switchable)	I_{AN}	
burden voltage	12 V	
load	$R_{Amax} \leq 12 \text{ V} / I_{AN}$	
current limitation	to approx. $1.1 \cdot I_{AN}$ at R_{Amax}	
voltage output	impressed DC voltage	
output voltage	U_A	
rated voltage (switchable)	U_{AN}	0 ... 10 V, 2 ... 10 V, or -10 ... 0 ... +10 V
load	$R_{Amin} \geq U_{AN} / 5 \text{ mA}$	
current/voltage output	residual ripple $\leq 0.5\%$ pp	
response time	approx. 50 ms	
idling voltage	$\leq 13 \text{ V}$	

Input and outputs are galvanically isolated.

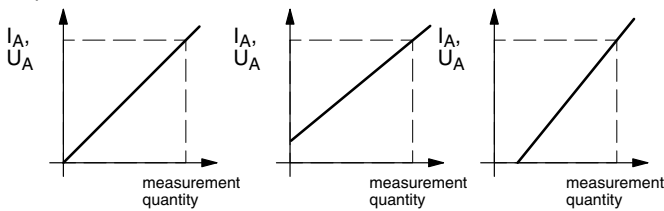


Isolating Amplifier for DC Signals, Switchable

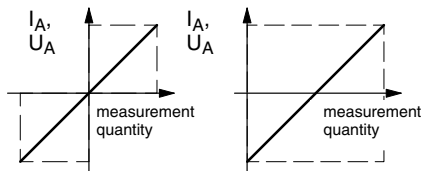
Conversion Characteristics

examples

unipolar



bipolar



Auxiliary Supply

power supply unit	auxiliary voltage	power consumption
H6	DC 85 ... 230 V / AC 85 ... 230 V (DC -15%/+33%; AC ±15%)	< 3.4 VA
H7	DC 24 ... 60 V / AC 24 ... 60 V (DC -15%/+33%; AC ±15%)	< 3.4 VA

Galvanic isolation between input, output and auxiliary voltage

Accuracy at Reference Conditions

accuracy class 0.5 (±0.5% of end value)
 temperature coefficient ≤ 0.01%/K
 valid for standard products and a life-period of 1 year maximum

reference conditions

auxiliary voltage 24 V DC ±10% or
 230 V AC ±10% 50 Hz
 load 0.5 · R_{A max} for current output
 2 · R_{A min} for voltage output
 ambient temperature 23 °C ±2K
 warm-up ≥5 min

Environmental

climatic suitability climatic class 3 to VDE/VDI 3540 sheet 2
 operating temperature range -25 ... +55 °C
 storage temperature range -40 ... +70 °C
 relative humidity ≤ 75% annual average, non-condensing

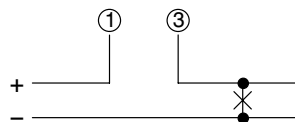
Rules and Standards

DIN EN 60 529	Enclosure codes by housings (IP-code)
DIN EN 60 688	Electrical measuring transducers converting AC quantities into analog or digital signals
DIN EN 60 715	Dimensions of low voltage switching devices: standardized DIN rails for mechanical fixation of electrical devices in switchgears

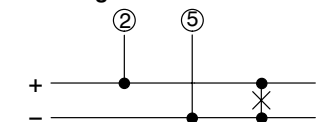
- DIN EN 61 010-1 Safety requirements for electrical measuring, control and laboratory equipment Part 1: General requirements
- DIN EN 61 326-1 Electrical equipment for measurement, control and laboratory use – EMC requirements Part 1: General requirements
- VDE/VDI 3540 sheet 2 Reliability of measuring and control equipment (classification of climates for equipment and accessories)

Connections

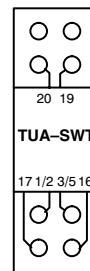
current



voltage



Terminal Assignment



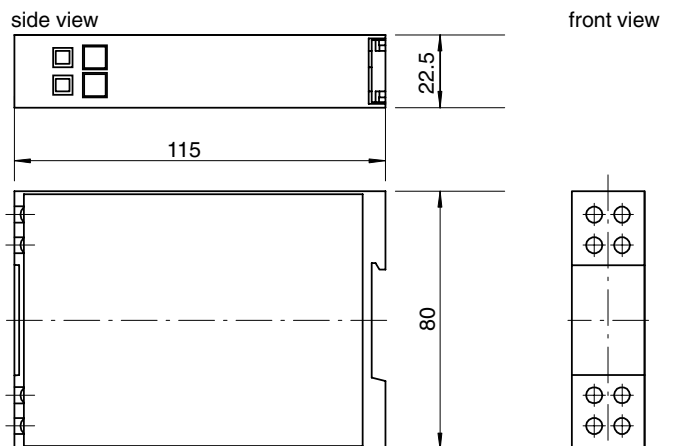
T.	Function	T.	Function
1	I _E (+)	19	U _A , I _A (+)
3	I _E (-)	20	U _A , I _A (-)
2	U _E (+)		
5	U _E (-)		
16	U _H L1(+)		
17	U _H N (-)		

I_E current input
 U_E voltage input
 U_H auxiliary voltage input

I_A current output
 U_A voltage output

The terminal numbering correspond to details in the connection diagrams.

Dimensions



(dimensions in mm)

Ordering Guide

Type	
TUA-SWT	Isolating amplifier for DC signals Input switchable Output switchable
Auxiliary supply	
H6	DC 85 ... 230 V / AC 85 ... 230 V (DC -15%/+33%; AC \pm 15%)
H7	DC 24 ... 60 V / AC 24 ... 60 V (DC -15%/+33%; AC \pm 15%)

Ordering example

TUA-SWT H7

Isolating amplifier for DC signals, auxiliary voltage 24 V DC

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– specifications subject to change without notice; date of issue 04/15 –

