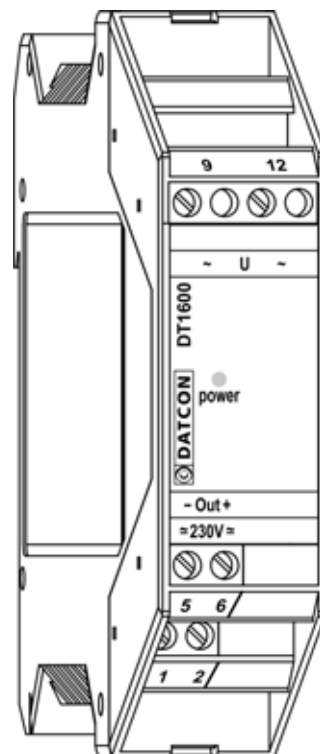


## DT1600 Ux xx xx

AC Voltage Transmitters

## Operating Instructions



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## 1. About this document

### 1.1. Function

This operating instructions manual has all the information you need for quick set-up and safe operation of DT1600 Ux xx xx. Please read this manual before you start setup.

### 1.2. Target group

This operating instructions manual is directed to trained personnel. The contents of this manual should be made available to these personnel and put into practice by them

### 1.3. Symbolism used



#### **Information, tip, note**

This symbol indicates helpful additional information.



#### **Caution, warning, danger**

This symbol informs you of a dangerous situation that could occur. Ignoring this cautionary note can impair the person and/or the instrument.

#### **List**

- The dot set in front indicates a list with no implied sequence.

#### **Action**

- This arrow indicates a single action.

#### **Sequence**

- 1 Numbers set in front indicate successive steps in a procedure.

## 2. For your safety

### 2.1. Authorized personnel



All operations described in this operating instructions manual must be carried out only by trained and authorized specialist personnel. For safety and warranty reasons, any internal work on the instruments must be carried out only by DATCON personnel.

### 2.2. Appropriate use

The DT1600 Ux xx xx is an AC voltage transmitter. Detailed information on the application range is available in **Chapter 3. Product description**.

### 2.3. Warning about misuse



Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, or damage to system components through incorrect mounting or adjustment.

### 2.4. General safety instructions



The DT1600 Ux xx xx is a high-tech instrument requiring the strict observance of standard regulations and guidelines. The user must take note of the safety instructions in this operating instructions manual, the country-specific installation standards as well as all prevailing safety regulations and accident prevention rules.

### 2.5. CE conformity

The DT1600 Ux xx xx is in conformity with the provisions of the following standard:  
MSZ EN 61326 (EMC)  
MSZ EN 61010-1 (safety)

### 2.6. Environmental instructions

Protection of the environment is one of our most important duties. Please take note of the instructions written in the following chapters:

- Chapter 3.6. **Storage and transport**
- Chapter 7.2. **Disposal**

### 3. Product description

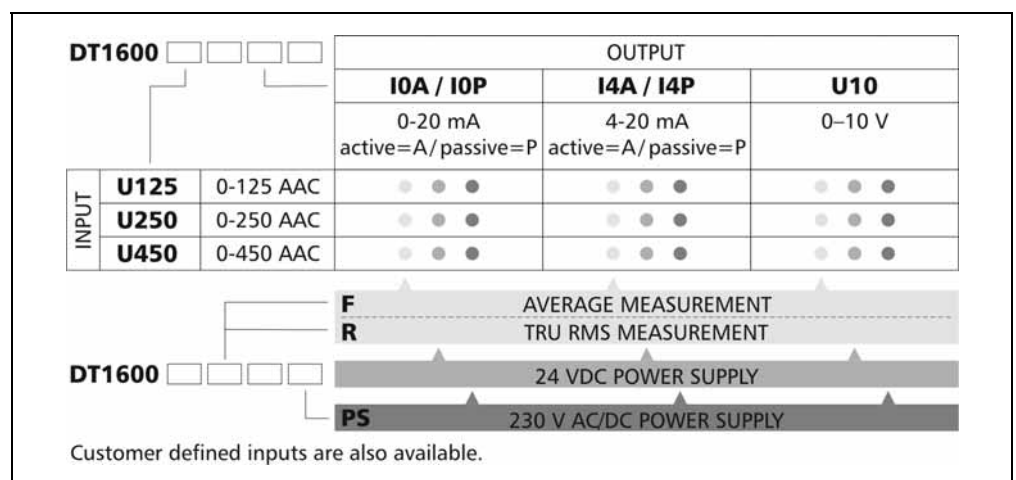
#### 3.1. Delivery configuration

##### Delivered items

The scope of delivery encompasses:

- DT1600 Ux xx xx
- documentation:  
this operating instructions manual  
certification  
warranty

#### 3.2. Type designation



#### 3.3. Principle of operation

##### Area of application

The DT1600 Ux xx xx AC Voltage Transmitters provide an output signal proportionally with the average value (F) or with the TRMS value (R) of the input AC voltage.

The version marked with R is recommended to use for measure of non-sinusoidal signals.

The output can be current (0-20 mA, 4-20 mA), active (A) or passive (P) or voltage (0-10 V).

The measuring ranges are expandable with external voltage transformers (VT). In all types the input, the output and power supply are galvanic isolated from each other.

##### Operating principle



##### Power supply

The measured voltage goes from the input through the galvanic isolated voltage transformer (VT) to the input of AC/DC converter. The AC / DC converter generates direct signal (current / voltage) proportional of the measured current.

The instrument has two different power supply version:

**DT1600 Ux xx xx:**

Power supply: 24 VDC  $\pm 10\%$

**DT1600 Ux xx xx PS:**

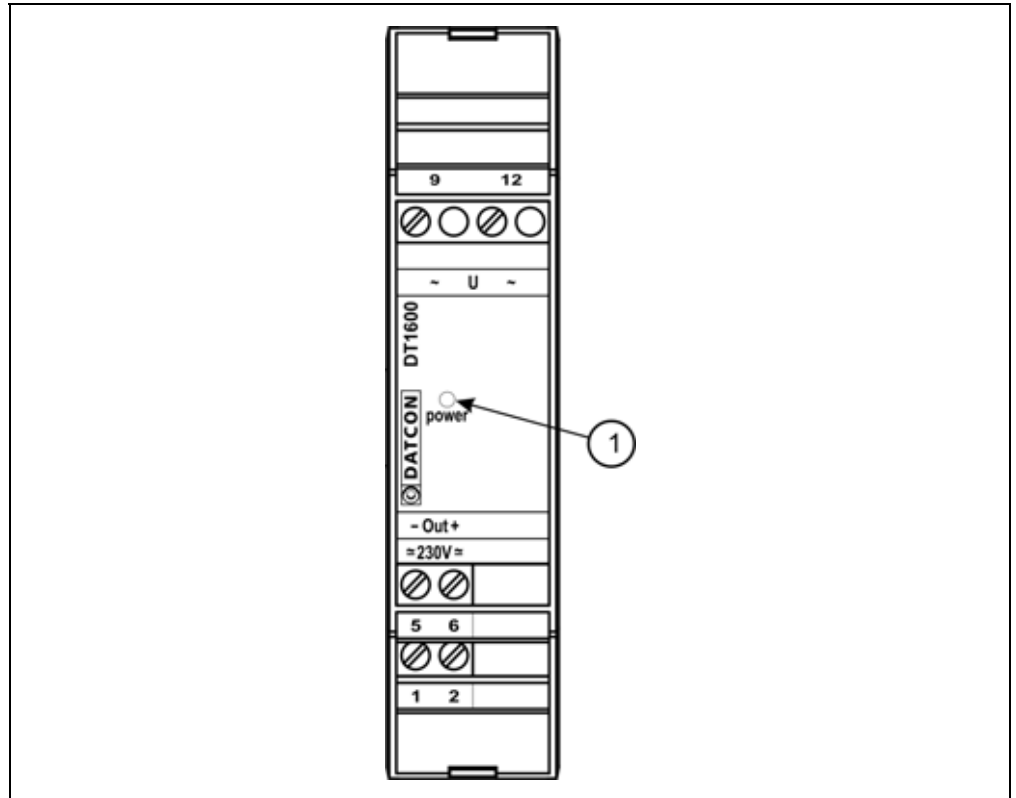
Power supply: 230 V AC/DC  $\pm 10\%$

### 3.4. Adjustment

The DT1600 Ux xx xx doesn't need any adjustment. After connected to the power supply it is ready to work.

### 3.5. Indicator

The following figure shows the indicator on the DT1600 Ux xx xx front panel.



1. The **power** green indicator shows that the instrument is in “power on” state.

### 3.6. Storage and transport

This instrument should be stored and transport in places whose climatic conditions are in accordance with chapter **9.1 Technical specifications**, as described under the title: Environmental conditions.



The packaging of DT1600 Ux xx xx consist of environment-friendly, recyclable cardboard is used to protect the instrument against the impacts of normal stresses occurring during transportation. The corrugated cardboard box is made from environment-friendly, recyclable paper. The inner protective material is nylon, which should be disposed of via specialized recycling companies.

## 4. Mounting

### 4.1. General instructions



The instrument should be installed in a cabinet with sufficient IP protection, where the operating conditions are in accordance with chapter **9.1 Technical specifications**, as described under the title: Operating conditions.

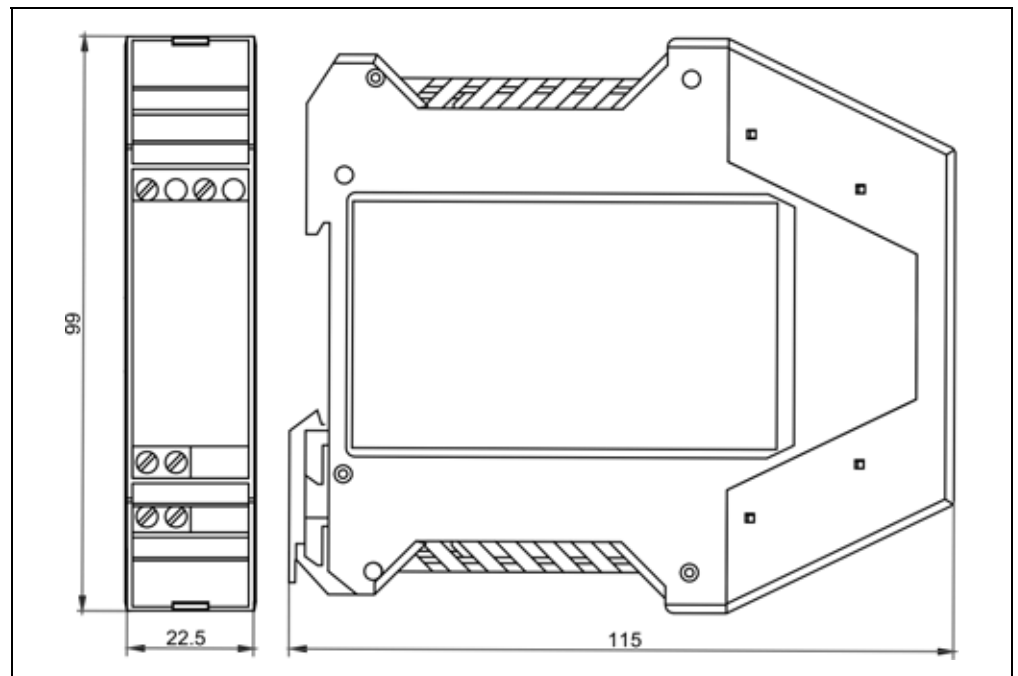
#### Mounting position

The DT1600 Ux xx xx is built in a plastic housing, for mounting on TS-35 rail. The instrument should be mounted in vertical position (horizontal rail position).



Horizontal mounting may cause overheating and damage of the instrument.

### 4.2. Main dimensions of the instrument

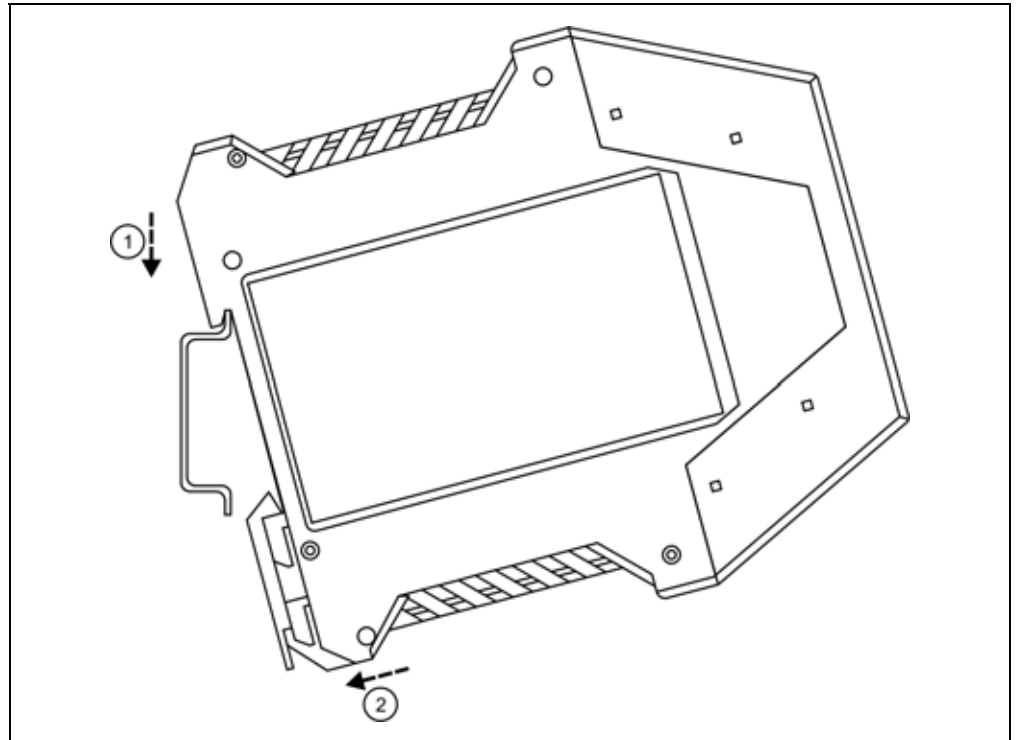




### 4.3. Mounting procedure

The following figure shows the mounting procedures (fixing on the rail):

#### Mounting on the rail



The mounting doesn't need any tools.

1. Tilt the instrument according to the figure; put the instrument's mounting hole onto the upper edge of the rail (figure step 1.).
2. Push the instrument's bottom onto the bottom edge of the rail (figure step 2.), you will hear the fixing assembly closing.
3. Check the hold of the fixing by moving the instrument firmly.

## 5. Connecting

### 5.1. Preparing the connection

Always observe the following safety instructions:

- Connect or disconnect only in the complete absence of line voltage
- If overvoltages are accepted, overvoltage arresters should be installed
- You should take note the data concerning on the overcurrent protection in installation.
- Use only a screwdriver with appropriate head



#### Select connection cable

Take note the suitability of the connecting cable (wire cross-section, insulation, etc.).

You may use either solid conductor or flexible conductor.

#### Preparing cables

Prepare the cable for the connection.

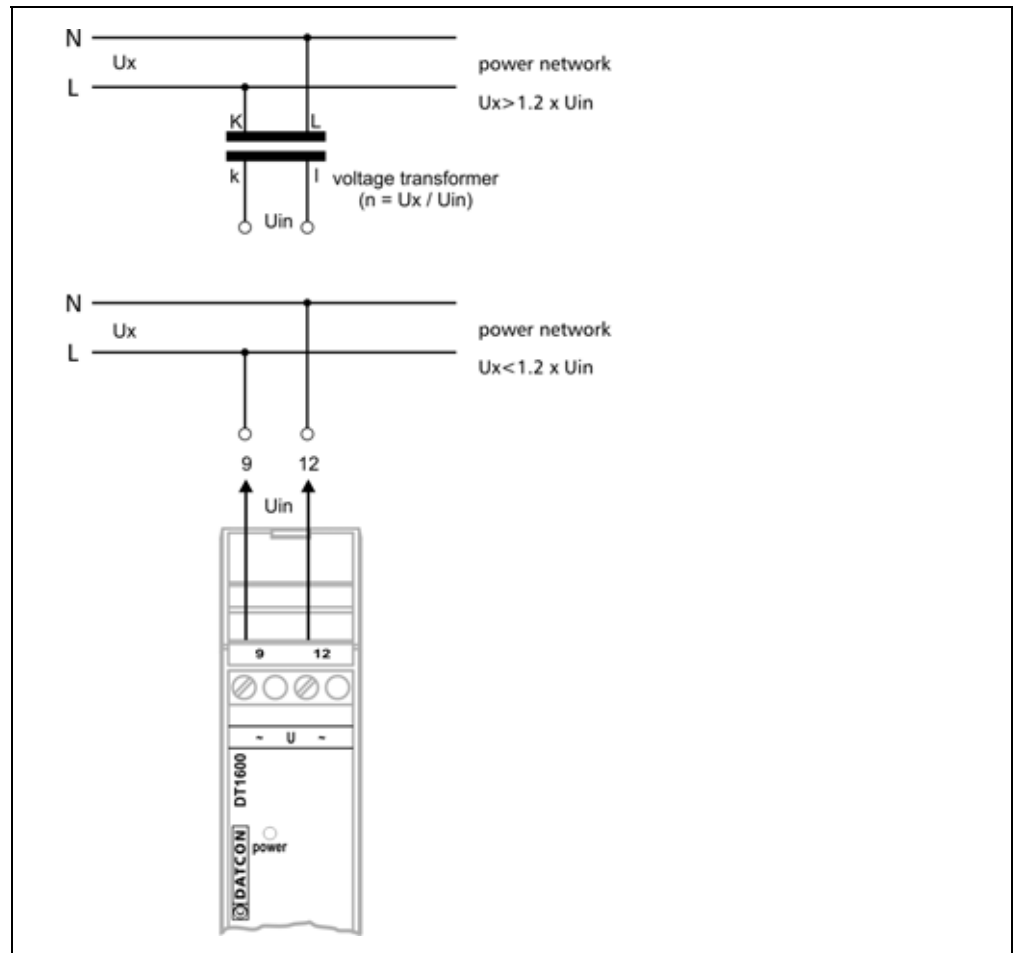
Strip approx. 8 mm insulation.

In case of using flexible conductor use crimped wire end.

## 5.2. Connecting to the power network

The following figure shows the wiring plan, connecting the transmitter:

**Wiring plan, connecting to the power network**  
(see also “Application example”)



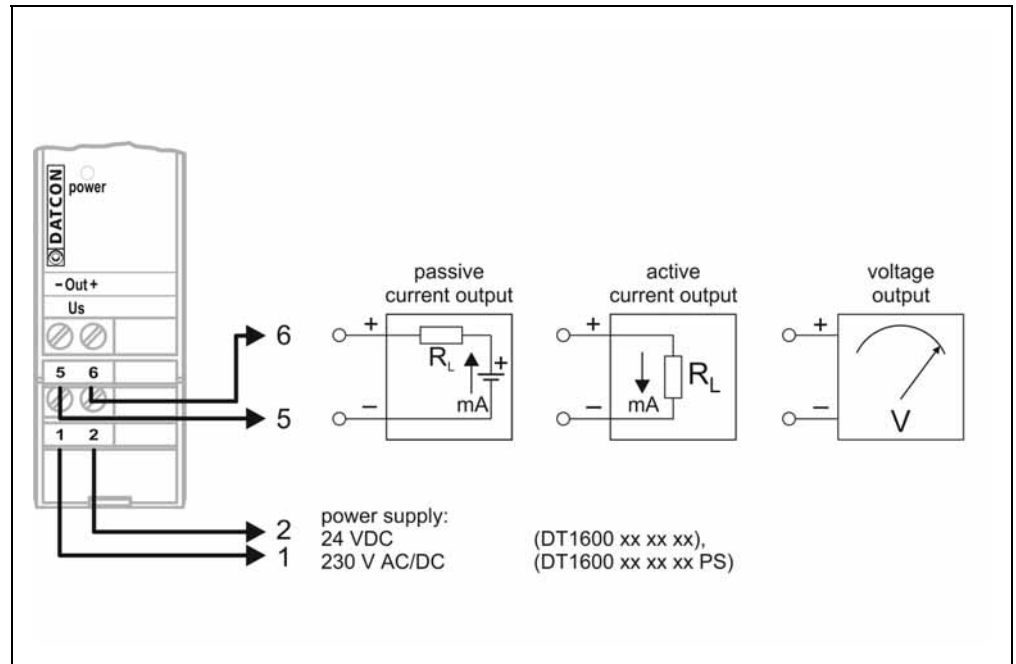
1. Loosen terminal screws.
2. Insert the wire ends into the open terminals according to the wiring plan.
3. Screw the terminal in.
4. Check the hold of the wires in terminals by pulling on them firmly.

**5.3. Connecting the signal processing unit and the power supply**

The following figure shows the wiring plan, connecting the signal processing unit and the power supply:

**Wiring plan, connecting the signal processing unit and the power supply**  
(see also “Application example”)

Be careful the polarity of the cables



1. Loosen terminal screws.
2. Insert the wire ends into the open terminals according to the wiring plan.
3. Screw the terminal in.
4. Check the hold of the wires in terminals by pulling on them firmly.

**Checking the connections**

Check if the cables are connected properly (have you connected all the cables, have you connected to the right place, do not the cable-ends touch each other).

**Put the instrument under supply voltage**

**5.4. Put the instrument under supply voltage**

After you have completed the connections, put the instrument under supply voltage. If the connection is correct the green indicator give light and you can measure output current or voltage on the output of the instrument according to the measured value of the transmitter.

## 6. Fault rectification

### 6.1. Fault finding

The fault finding must be carried out by trained and authorized personnel only.



- The green indicator is dark → check the mains voltage.  
If the mains voltage is OK: the instrument is defective.

- There is no output signal → check the input signal.  
If the input signal is OK: the instrument is defective.

When the result of fault finding is that the instrument is defective call the manufacturer service department.

### 6.2. Repairing

There is no user repairable part inside the instrument.

In accordance with Point 2.1.: **For safety and warranty reasons, any internal work on the instrument must be carried out only by DATCON personnel.**

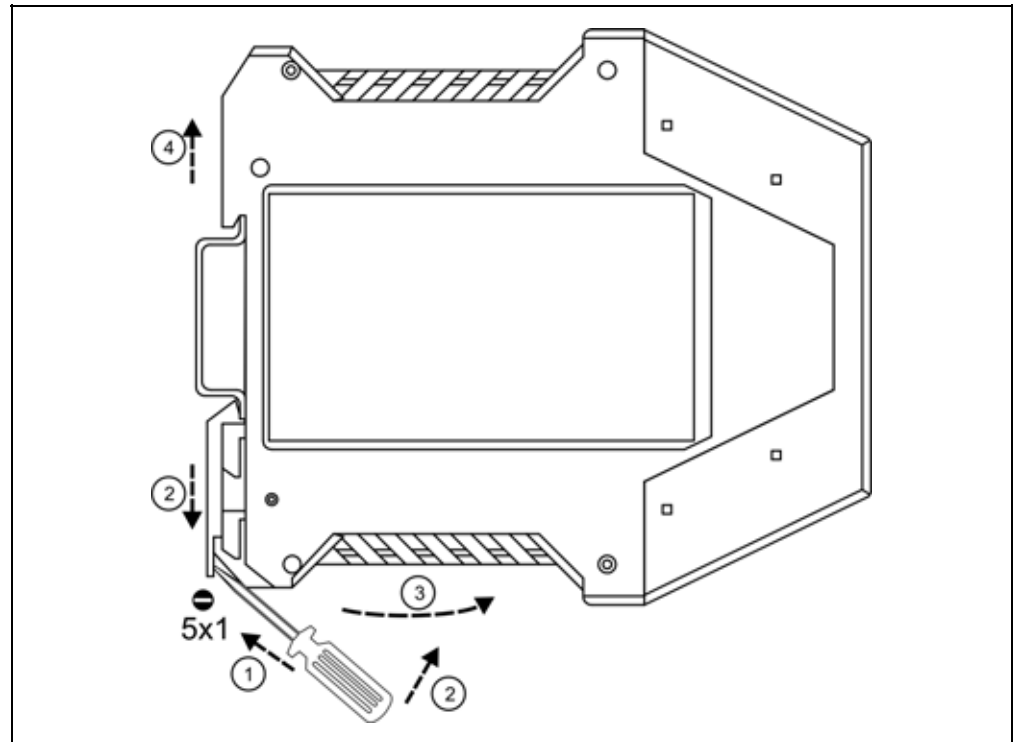


## 7. Dismounting

### 7.1. Dismounting procedure

Before dismounting take note the warnings written in Chapter 5.1. The following figure shows the dismounting procedures:

Dismounting from the rail



The dismounting procedure needs a screwdriver for slotted screws. Before dismounting disconnect all wires.

1. Put the screwdriver end into the fixing assembly's hole (figure step 1.).
  2. Lift the screwdriver handle until it possible to open the fixing assembly (figure step 2.).
  3. Keeping the screwdriver in this position lift the instrument bottom from the bottom edge of the rail (figure step 3.).
- Lift the whole instrument (you may put out the screwdriver) (figure step 4), the instrument will be free.

### 7.2. Disposal

According with the concerning EU directive, the manufacturer undertakes the disposal of the instrument that are manufactured by it and intended to be destroyed. Please deliver it in contamination-free condition to the site of the Manufacturer or to a specialized recycling company.

## 8. Calculation for application

### 8.1. Calculations

Calculating the input voltage from the transmitter output signal.

$U_x$  [V]: voltage to be measured

$n$ : voltage transformer ratio

(in case of direct connection  $n = 1$ )

$U_{IN}$  [V]: transmitter input voltage

$I_{OUT}$  [mA],  $U_{OUT}$  [V]: transmitter output signal



In case of I0, U10 outputs:

$$U_x = n * U_{IN} * I_{OUT} / 20 \quad U_x = n * U_{IN} * U_{OUT} / 10$$

1<sup>st</sup> example:

$$I_{IN} = 250 \text{ V} \quad I_{OUT} = 18 \text{ mA} \quad n = 10$$

$$I_x = 10 * 250 * 18 / 20 = 2250 \text{ V}$$

In case of I4 output:

$$U_x = n * U_{IN} * (I_{OUT} - 4) / 16$$

2<sup>nd</sup> example:

$$I_{IN} = 250 \text{ V} \quad I_{OUT} = 12 \text{ mA} \quad n = 10$$

$$I_x = 10 * 250 * (12-4) / 16 = 1250 \text{ V}$$

## 9. Appendix

### 9.1. Technical specification

#### Safety data:

The connection terminals of the inputs, the outputs and the supply voltages are galvanic isolated from each other. The isolation is in compliance with the standard MSZ EN 61010-1, taking into consideration the following:

Pollution level:	2
Measurement category:	III
Overcurrent protection in installation:	4 A

#### Input parameters:

Input voltage:

Type	$U_{IN}$ [V]	$U_{IN}$ max. [V]
U125	0-125	$2 \times U_{BE}$
U250	0-250	$2 \times U_{BE}$
U450	0-450	500

Continuous overdrive capability:	$2 \times U$ , 500 V (max.)
Input consumption:	0.5 VA (max.)
Frequency range:	40-400 Hz

#### Output parameters:

Output voltage:

Type	Range [V]	$R_g$ [Ohm]
U10	0-10	500

Output current:	see Chapter 3.2.
Burden:	500 Ohm (max.)
Overvoltage protection:	18 V (limiter)
Overcurrent protection:	40 mA (limiter)
Noise voltage:	0.2% p-p (max., FSR)
Settling time (1%):	200 ms (typical)
Output signal error:	0.2% (max.)
Temperature coefficient:	50 ppm / °C (typical)
Frequency-response:	0.5% (max., 40-400 Hz)
Supply-voltage effect:	practically zero
Loading-effect:	practically zero
Rectifying characteristic:	TRMS value (R) or average value (F)
Additional error measuring non-sinusoidal signal:	0.5% (max., R version, $F_{crest} < 3$ )



**Power supply:**

Supply voltage:	
DT1600 Ux xx xx	24 VDC $\pm 10\%$ , 1 W
DT1600 Ux xx xx PS	230 V AC/DC $\pm 10\%$ , 1.5 VA (1 W)
Overvoltage class:	CAT II.
The overcurrent protection in installation:	4 A (B)

**Ambient conditions:**

Operating temperature range:	0-50 °C (-20 - +50 °C, on request)
Storage temperature range:	-20 - +70 °C
Relative humidity:	90% (max. non condensing)
Place of installation:	cabinet

**Electromagnetic compatibility (EMC)**

Immunity: In accordance with the standard MSZ EN 61326-1 (industry area)		
ESD:	4 kV/8 kV contact / air	-A- criteria
BURST:		
Voltage measure input:	4 kV (5/50 ns, 5KHz)	-A- criteria
Main supply input (PS):	2 kV (5/50 ns, 5KHz)	-A- criteria
Analogue outputs:	1 kV (5/50 ns, 5KHz)	-A- criteria
 SURGE:		
Voltage measure input:	4 kV (CATIII, 250V)	-B- criteria
Main supply input (PS):	2 kV (line to ground)	-B- criteria
Analogue outputs:	1 kV (line to ground)	-B- criteria
Conducted RF immunity:	3 Veff	-A- criteria
Radiated RF immunity:	E =10 V/m	A- criteria
Emission: In accordance with the standard MSZ EN 61326-1 (industry area)		
Conducted RF emission:	1 group, Class A	
Radiated RF emission:	1 group, Class A	

**General data:**

Housing:	TS-35 rail mounting housing material: polyamide PA6.6
Connection:	screw-terminal
Connecting cable:	2.5 mm <sup>2</sup> (max.)
Dimensions:	22.5 x 99 x 115 mm (width x height x depth)
Weight:	0.2 kg
Protection:	IP 20

The Manufacturer maintains the right to change technical data.

**9.2. Application example**

