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KSG I/U

Galvanic separator and signal converter
analog current signal 0/4-20mA
for analogue voltage signal 0-10V
in a housing for a DIN rail



1. Main description of KSG I/U

KSG I / U is primarily used to provide galvanic separation between two analogue signal circuits. In addition, it converts a 0-20mA or 4-20mA analog current signal into a 0-10V analog voltage signal.

The analogue input can be supplied with a 0 / 4-20mA current signal generated by any other electrical / electronic device. The analog input can also be connected to a 2-wire passive transducer of any physical size (eg temperature, pressure) operating in the standard of 4 20mA.

The methods of connecting the KSG I/U analog input are shown on diagram.

When connecting a passive 2-wire transmitter, you can use the additional 24V supply output - terminal No. 3, which is also galvanically isolated from the KSG I / U power terminals No. 1 and 2. Thanks to this solution, there is no need for an additional power supply in the loop between the transmitter and analog current input.

It should be remembered that the voltage at the auxiliary power output is not stabilized and when the current in the loop increases, the voltage drops slightly (by approx. 3V at 20mA), which however does not affect the correct operation of the passive converter stabilizing the current in the loop. A small pulsation of max +/- 0.2V is also characteristic.

The auxiliary power supply output also has a current limit of up to 30mA, which also protects the output against short-circuiting. Therefore, it should not be used to power other devices than a passive transducer, which always consumes less than or equal to 20mA - 4-20mA loop current.

Short-circuit protection is also implemented on the input and on the analog output, ensuring effective protection of the device against damage in case of incorrect connection of external signals, eg before supplying 24V voltage to current input or shorting of voltage output to ground.

2. KSG I/U separator configuration.

The device can work with an input signal of 0-20mA or 4-20mA converting it into a 0-10V voltage signal. It is also possible to force an analog output to a constant 0V or 10V signal regardless of the current input signal value. There are therefore 4 modes of operation of the device, which are selected using two jumpers.

- no jumpers: 4-20mA signal conversion to 0-10V signal
- jump.1: conversion of 0-20mA signal to a 0-10V signal
- jump.2: forcing a voltage of 10V on the voltage output
- jump.1 and jump.2: forcing on the voltage output a constant voltage of 0V

The jumpers should be made with a short section of the electric wire or using the relay contacts to control the inputs No. 6, 7, 8 KSGI / U. No voltage or current signals should be connected to the jumper inputs.

Forcing fixed voltage signals 0V and 10V can be used for 2 positioning control of analog signal of any voltage-controlled electric device. Forcing the 10V value on the voltage output is also useful for performing the KSG I / U calibration - point 3.

3. Calibration of KSG I/U input and output signal

The values of analog signals - input current and voltage output are calibrated by the manufacturer at the production stage of the device. However, it is possible to independently correct these signals in a small range \pm several percent. For this purpose, internal multi-turn potentiometers are used, the knobs of which are accessible from the outside of the housing without the need to open it. They are visible from both sides of the housing, in the first slot under the cable connectors.

Note - do not mindlessly turn the knobs of the calibration potentiometers, as this will cause large inaccuracies in analog signal processing and the need for a new KSGI / U calibration.

4. The method of correct calibration KSG I/U

To calibrate need an accurate voltmeter DC voltage source, and precise constant current signal with a value of 10mA to 18mA. First, the voltage output signal should be calibrated.

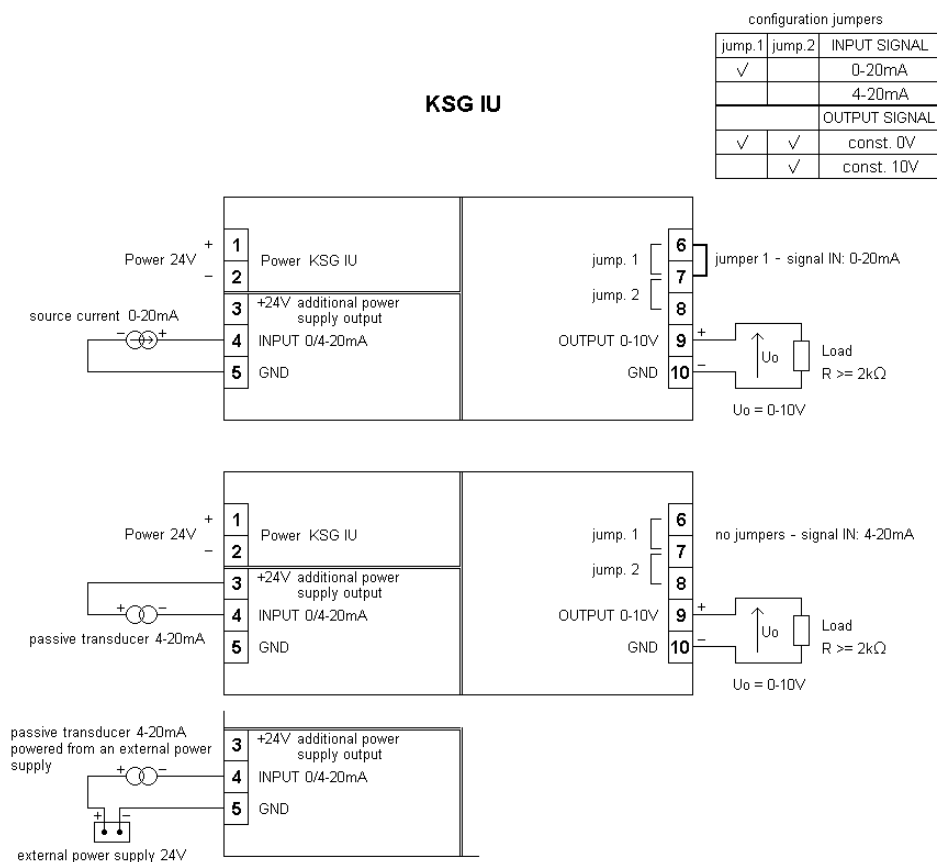
To do this:

- put on the jumper jump.2 forcing the output voltage equal to 10V
 - connect a voltmeter to the voltage signal output
 - by adjusting the potentiometer under the voltage output connectors, set the voltage value equal to 10V
- Then the value of the current input signal should be calibrated.

To do this:

- put on the jumper jump.1 forcing the signal processing 0-20mA in proportion to the 0-10V signal
- connect a voltmeter to the voltage signal output
- provide a stable and known value from the range of 10mA to 18mA to the current input
- by adjusting the potentiometer under the current input connectors, set the voltage value at the output corresponding to the input current, eg 10mA \rightarrow 5V or 12mA \rightarrow 6V, or 16mA \rightarrow 8V, or 18mA \rightarrow 9V.

5. Connection diagram of KSG I/U separator.



6. Technical data KSG I/U.

Power supply:

- power supply voltage: **24V +/-10%**
- power consumption:
 - **30mA max, with an unloaded auxiliary power supply output**
 - **60mA max, using additional power supply**
 - **80mA max, when the auxiliary power supply is shorted to ground and shorted voltage output to ground**

The additional power supply output:

- power supply voltage: **24V +/-10% unstabilized**
- voltage drop: **max 3V at the output current 20mA**
- current limit: **30mA - protection against short circuit to ground**
- level of ripple: **+/-0.2V**

Current input:

- voltage drop at the entrance: **5V max, at 20mA (corresponds to the input resistance 250Ω)**
- current limit: **30mA - protection against applying too high voltage - max 30V**

Voltage output:

- load resistance: **2kΩ or more**
- short-circuit protection: **30mA - protection against short circuit to ground**

- accuracy of analog signal processing: **+/- 0.2%**
- response / conversion time (10-90%): **0.3sek**
- separation (U/In/Out): **1kV, 50Hz, 1 min**
- operating temperature range: **0-65 °C**
- relative humidity range: **0-90% (without condensation)**
- level of security: **IP20**
- work position: **any**
- housing dimensions: **17.5 x 94 x 65 mm**
- assembly: **in a housing for a DIN rail (TS35)**