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KSG U/I

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



1. Main description of KSG U/I

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

The analogue input can be supplied with a 0-10V voltage signal generated by any other electrical / electronic device.

An analogue input can also be connected to a 3-channel Transducer of any physical size (eg temperature, pressure) operating in the 0-10V standard.

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

If a 3-wire transmitter is connected, an additional 24V power supply can be used - terminal no. 3, which is also galvanically separated from the KSG power supply terminals no. 1 and 2. Thanks to this solution, there is no need to use an additional power supply.

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 voltage in range 0-10V. 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, do not use it to power other devices that draw a current greater than 20 mA.

2. KSG U/I separator configuration.

The device can convert the input voltage signal 0-10V to a current signal of 0-20mA or 4-20mA. There is also the possibility of forcing a constant value of 4mA or 20mA on the current output regardless of the value of the voltage input signal. There are therefore 4 modes of operation of the device, which are selected using two jumpers.

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

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 KSG U/I. No voltage or current signals should be connected to the jumper inputs.

Forcing fixed current signals 4mA and 20mA can be used for 2 positioning control of analog current signal of any voltage-controlled electric device.

Forcing the 20mA value on the current output is also useful for performing the KSG U/I calibration - point 3

3. Calibration of KSG U/I 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 KSG / U calibration.

4. The method of correct calibration KSG U/I

To calibrate need an accurate milliammeter DC, and precise constant voltage signal with a value of 5V to 9V.

First, the current output signal should be calibrated.

To do this:

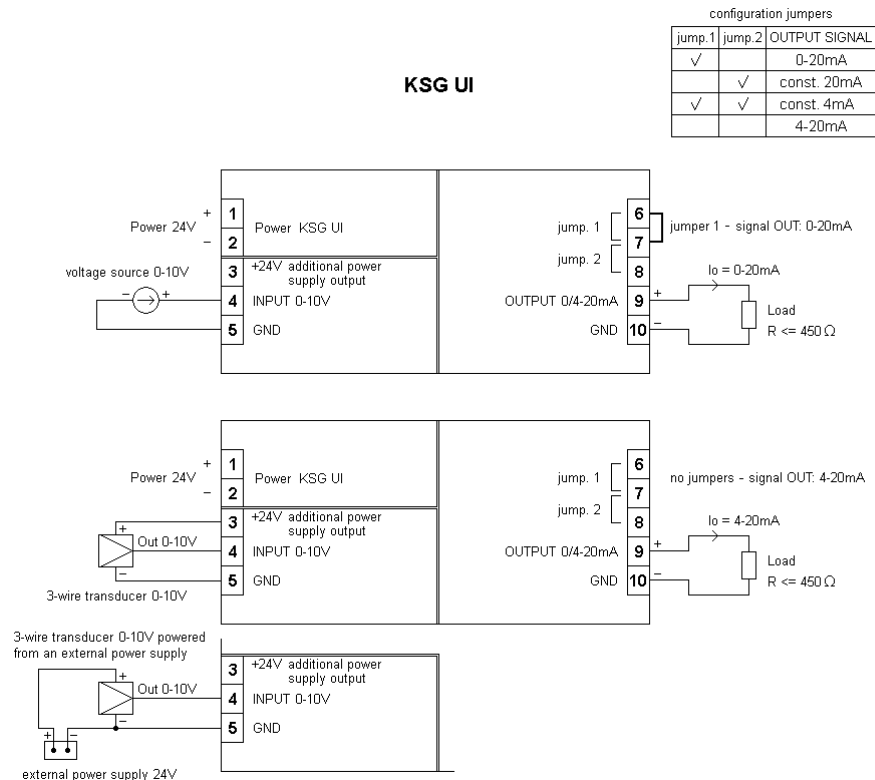
- put on the jumper jump.2 forcing the output current equal to 20mA
- connect a milliammeter to the current signal output
- by adjusting the potentiometer under the current output connectors, set the current value equal to 20mA

Then the value of the current input signal should be calibrated.

To do this:

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

5. Connection diagram of KSG U/I separator.



6. Technical data KSG U/I.

Power supply:

- power supply voltage: **24V +/-10%**
- power consumption:
 - **30mA max, with unloaded auxiliary power supply and no load current output**
 - **40mA max, with the current on the analogue output equal to 20mA**
 - **70mA max, with a current on the analogue output equal to 20mA and additional power output short-circuit 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**

Voltage input:

- input resistance: **>= 220kΩ**

Current output:

- load resistance: **max 450Ω**
- 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)**