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## AV-11

### Analog Transmitters

#### of measurement voltage [4-20mA]



www.fif.com.pl

F&F products are covered by an 24 months warranty from date of purchase

#### PURPOSE

AV-11 module is designed to measure voltage and converting the measured quantity to an unified analog output signal the current from range 4-20mA.

#### FUNCTIONING

The transmitter measures the value of input voltage (AC or DC voltage circuit). The value of the measured voltage is converted to a proportional output current I<sub>out</sub> signal in the range 4-20 mA, which corresponds to the measurement range 0 to 282.8 VAC or 0-400VDC.

The transmitter measures the rms value voltage TrueRMS, which ensures high measurement accuracy even with distorted waveforms.

Signal output of module is secured noise filter, which eliminates interference network, affecting the accuracy of the transmitted signal. This allows the use of signal cables up to 300m.

#### Installation

1. Take OFF the power.
2. Put the module on the rail.
3. power supply connect to joints 10(-)-12 (+)[U<sub>pow</sub>].
4. Measured voltage connect to joints 4(L+)-6(N-)[U<sub>in</sub>].
5. The output signal 11 (+) [I<sub>out</sub>] connected to the current analog input (AI) of the receiving device. ATTENTION! Both devices must have a single point GND (-). ATTENTION! Maximum length of UTP cable - 300m.

Optionally, the joints 11 - 11' [I<sub>out</sub>] can be connected to an ammeter or other current measuring device.

#### ATTENTION!!

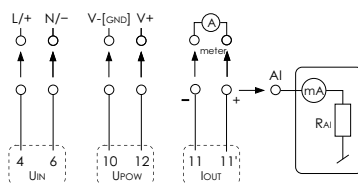
Due to the differences between the inner resistance (R<sub>AI</sub>), analog current devices that can be used with AC-11 module is necessary power to the appropriate voltage V +. The minimum voltage can be calculated from the formula.

$$U_{V+} > \frac{R_{AI}(Q) + 400}{50} [V]$$

R<sub>AI</sub> - inner resistance of input of receiver device.

In the case of the module supply voltage lower than the required outcome measurements will be saddled with a mistake.

#### WIRING DIAGRAM



#### Auxiliary calculation formulas

Based on a linear function  $y=a*x+b$  calculate formulas;

$$[1] \quad U_{ACm} = [17,675 \times I_{wy} - 70,7] \pm 0,5\%$$

$$\text{where } a = \frac{282,8 - 0}{20 - 4} = 17,675$$

$$[2] \quad U_{DCm} = [25 \times I_{wy} - 100] \pm 0,5\%$$

$$\text{where } a = \frac{400 - 0}{20 - 4} = 25$$

U<sub>ACm</sub> - measured AC voltage [V]

U<sub>DCm</sub> - measured DC voltage [V]

4-20 [mA] - Current signal output

0-282.8 [V] - Measuring range AC

0-400 [V] - Measuring range AC

± 0.5% - Processing error

#### Assembly

##### General assumptions

- recommended the use of filters and surge suppression (eg, OP-230)
- recommended is wiring to UTP (twisted pair) for connecting the module to another device
- In the case of shielded cables grounded screens performed only on one side and as close to the device
- not installed parallel signal wires in close proximity to the line and high voltage średnie
- do not install the module in close proximity to electrical devices, high-power electromagnetic measuring instruments, devices with phase power regulation, and other devices which can introduce distortions

#### TECHNICAL DATA

supply	9+30V DC
measure range TrueRMS	
AC	0+282,8V
DC	0+400V
max. instantaneous voltage	320V AC / 450V DC
max. measurement mistake	±0,5V
max. current load	4+20mA
length of signal cable	300m
breakdown voltage IN->OU	3KV
power consumption	0,8W
working temperature	-20°C+50°C
relative humidity	85% to +30°C
connection	screw terminals 2,5mm <sup>2</sup>
dimensions	1 module (18mm)
protection level	IP20

#### Working with programming controller MAX [F&F]

Example of program instruction in ForthLogic Language, reading of input current and convert the value of the measured to voltage;

for AC: 1 AI? 17.675 F\* 70.7 F-  
for DC: 1 AI? 25.0 F\* 100.0 F-

More information in the user programming in ForthLogic language.

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