TEP06/P

Measuring transducer for pyranometers and pyrgeometers

FIEDLER

ELECTRONICS FOR ECOLOGY

- *Inputs for 2 pyranometers and pyrgeometers - direct connection of Net Radiometer CNR4*
- *Possibility of connecting up to 4 Hukseflux HFP01 heat flow sensors*
- *Four-wire connection of 2 Pt100 sensors*
- *Reading of measured values via RS485 at a distance of up to 500 m*
- *FINET or Modbus RTU / RS485 protocols*
- *Very high transmission accuracy due to the unique electronic connection*
- *Low transmitter temperature coef. (5ppm)*
- *Temperature resolution up to 0.002 ° C*
- *Compatible with all FIEDLER telemetry stations*

Basic description

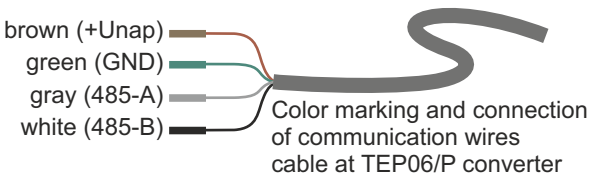
The measuring transducer TEP06 / P is used to convert small output voltages of pyranometers, pyrgeometers or heat flow sensors to a digital signal of the RS485 bus. In addition, two Pt100 resistance temperature sensors can be connected to the transmitter. Temperature sensors are connected in four wires and therefore the length of the cable to the sensor does not affect the accuracy of temperature measurement.

Up to 4 voltage outputs of radiation sensors can be connected to one TEP06 / P converter. It is thus possible to monitor, for example, the reflected short-wave solar radiation measured by standard pyranometers CMP3 or CMP11 and at the same time to measure long-wave radiation using a pair of suitable pyrgeometers.

Connecting the converter to the recording unit

The TEP06/P converter communicates with the connected recording unit via the RS485 bus under the FINET or Modbus RTU protocol. The converter is also powered from the connected unit via the same communication cable.

If it is necessary to measure more quantities than the inputs on the converter allow, it is possible to connect a larger number of TEP06/P or TEP06 converters to one recording unit via the RS485 bus. The converters are supplied with a preset communication address 4 as standard, and therefore in such a case it is necessary to set different communication addresses for the converters.



Color marking and connection of communication wires cable at TEP06/P converter

Connecting the Net Radiometer CNR 4

The TEP06/P converter is ideal for processing signals from the Net Radiometer CNR 4, which contains pairs of pyranometers and pyrgeometers.

The first two measuring channels K1 and K2 of the TEP06/P converter are intended for the connection of a pair of pyranometers. A pair of pyrgeometers is connected to channels K3 and K4. Channels K5 and K6 are used for accurate measurement of the metal body temperature of the NetRadiometer CNR4 or another long-wave radiation sensor - but they can also be used for any other temperature measurement. The last 2 channels K13 and K14 contain the square of the temperature in Kelvin obtained from channels K5, K6. This power is required for the calculation of the temperature-corrected value of the long-wave radiation of the pyrgeometers of the CNR 4 sensor in the connected recording unit H7 according to the formula:

$$E=V/C+5{,}67*10^{-8}*T^4$$

where: C is the constant of the pyrgeometer expressing the dependence between the output voltage of the sensor and the measured incident energy in W / m2.

The resulting measured value of long-wave radiation is positive if the sensor temperature is colder than the surroundings (soil, sky). However, this rule also applies the other way around, so it is important to measure not only the output voltage of the pyrgeometer but also the surface temperature of the CNR 4 sensor.

Net Radiometer CNR 4

Enviromonitoring
Meteorology
Research

FIEDLER AMS s.r.o.
Lipová 1789/9, 370 05 Ceske Budejovice, Czech Republic
Tel.: +420 386 358 274, e-mail: prodej@fiedler.company

Full range of products, demo access to the data server and complete price list on **www.fiedler.company**

TEP06/P

MEASURING TRANSDUCER FOR PYRANOMETERS AND PYRGEOMETERS

Technical parameters

Measuring channels (4 radiation, 2 temp. 2 calcul.):

- **K1:** shortwave (Upper pyranometr)
- **K2:** shortwave (Lower pyranometr)
- **K3:** longwave (Upper pyrgeometr)
- **K4:** longwave (Lower (pyrgeometr)
- **K5:** longwave (interní Pt100)
- **K6:** temperature (externí Pt100)
- **K13:** $K5^4$ (4th power of the temperature from K5)
- **K14:** $K6^4$ (4th power of the temperature from K6)

Voltage inputs: 4

Measuring range of voltage inputs: ± 9 mV (± 18 mV, ± 36 mV, ± 72 mV, ± 144 mV, ± 288 mV, ± 576 mV, ± 1.15 V)

Transducer resolution within ± 9 mV: ± 0.1 uV

Measurement accuracy: 0.015% of range

Resistance inputs: 2x Pt100, four-wire connection

Measuring range: -50°C to +100°C (optionally +500°C)

Measured temperature resolution: 0.002 °C

Transducer measure.error: type ±0.01°C, max ±0.1 °C

Measurement error including connected sensors:
type 0.15 + 0.001 * t [°C], max 0.25 + 0.002 * t [°C]

Maximum cable length to Pt100 sensor: 50 m

Measurement time of one channel: <0.5 sec

Output: RS485

Communication protocols: FINET (Modbus RTU)

Range of adjustable addresses: 1 to 240

Output cable: 4-core PUR cable 1 to 100 m (5 m)

Supply voltage: Un: 6 to 16 V DC

Current consumption: <10 mA

Mechanical dimensions: 90 x 60 x 25 mm

Weight (without cables and sensors): 350 g

Material: ABS, PUR

Working temperature: -40 to +70 °C

Connection of other sensors and transducers

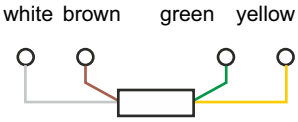
Heat flux measurement

Some applications may require, in addition to global radiation and temperature measurements, heat flow measurements through soil, building structures, and the like. The TEP06/P transmitter can have selected voltage inputs set to measure heat flux using Hukseflux sensors. The request for setting the inputs must be entered when ordering the transmitter (setting the appropriate measuring range).

Heat flow sensor
Hukseflux HFP01

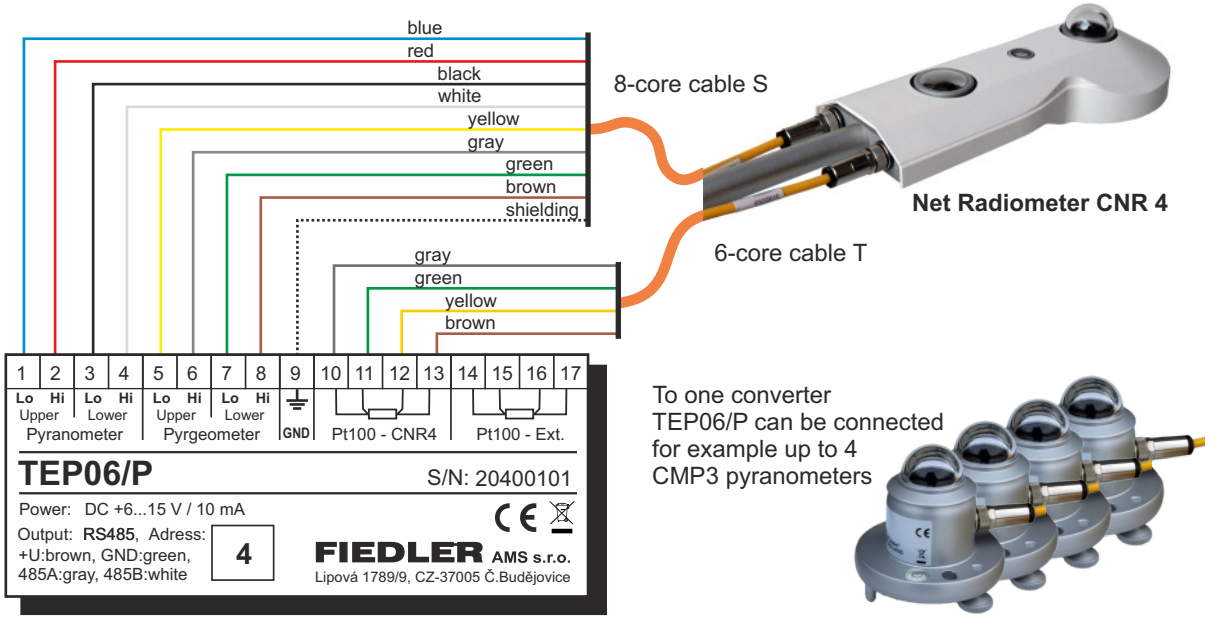
Temperature measurement

Up to 2 Pt100 sensors with a four-wire cable can be connected to the transmitter. Due to the high accuracy of the transmitter, it is advisable to use only sensors of accuracy class A or better. Suitable sensor types include, for example, the Pt100-XM sensor, which can be ordered from the transmitter manufacturer. This temperature sensor is designed for measuring in the outdoor environment, in water, in the soil, etc.



Pt100-XM temperature sensor
and connection of its terminals

Connecting the Net Radiometer CNR 4



To one converter TEP06/P can be connected for example up to 4 CMP3 pyranometers

Enviromonitoring
Meteorology
Research

FIEDLER AMS s.r.o.
Lipová 1789/9, 370 05 Ceske Budejovice, Czech Republic
Tel.: +420 386 358 274, e-mail: prodej@fiedler.company

Full range of products, demo access to the data server and complete price list on
www.fiedler.company