Programmable converter PMR10

Temperature inputs from RTD or thermocouple sensors
Potentiometer or variable resistor inputs
Sensor supply for NPN, PNP, NAMUR and analogue inputs
Analogue or pulse outputs
Galvanic separation, supply - input - output
DC supply or AC supply voltages up to 400 VAC
Made in accordance with the CE and EMC regulations

PMR10 is a multirange converter / isolation amplifier with temperature, resistance, pulse and analogue inputs and current, voltage, pulse or relay outputs.
The unit has a number of programmable input functions:

Temperature monitoring with 3-wire RTD sensors Pt100, Pt500; Pt1000, Ni100, Ni500 and Ni1000, including sensor cable monitoring.
Temperature monitoring with thermocouple sensors type J (Fe-CuNi), type K (NiCr-Ni), type R (Pt13%Rh-Pt), type S (Pt10%Rh-Pt), type T (Cu-CuNi), type B (Pt30%Rh-Pt6% Rh), type N (Nicrosil-Nisil) or type E (NiCr-CuNi).
When the unit is programmed for thermocouple sensor, you can select between internal Cold Junction Compensation and external CJC-box, which gives a higher accuracy.No matter which type of temperature sensor is used, the unit will compensate for the unlinearity of the sensor.

Potentiometer monitoring. If this function is selected, the output signal will indicate the actual position of the potentiometer, independent of the total value of the potentiometer.
Resistor monitoring. With resistor monitoring the output signal is an expression of the actual value of the resistor, compared with the programmed metering range.

Speed monitoring with programmable inputs from NPN, PNP or NAMUR sensors, including supply voltage for the sensor.

Input signals from analogue transducers, including supply voltage for the transducer.

You can select between 2 different output configurations:

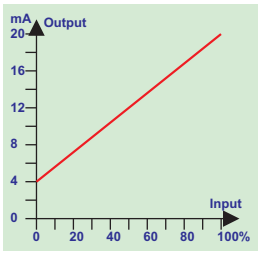
- Type A is supplied with analogue current output, programmable between 0 and 20 mA and analogue voltage output, programmable between -10 and +10 V.
- Type B has the same outputs as type A, but in addition it is also supplied with pulse output, programmable to a maximum frequency of 10 kHz.

The unit is supplied with 2 trimming potentiometers, which can be used to fine-adjust the metering range, if the unit is used with analogue outputs. In either case the potentiometers can be disabled, if the adjustment possibility is not wanted.

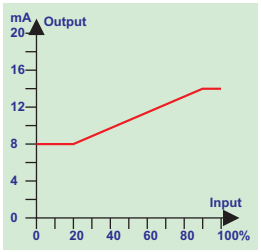
If you want, you can order the unit with specified metering ranges, or you can program it yourself, by means of the C-mac programming software for PC and a small interface to connect between the PC and the module.

All parameters in the converter are programmable within the specified limitations (min. and max. input and output levels), giving the following possibilities:

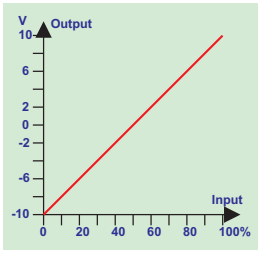
- **Basic converter, (0 to defined input range and standard output range, 0-20 mA, 4-20 mA or 0-10 V).**



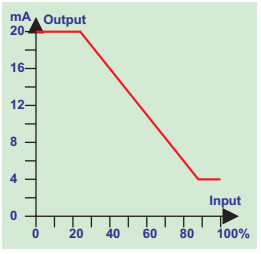
- **Converter with input and/or output offset, e.g. 10 to 50 °C input and 8 to 15 mA output.**



- **Bidirectional output range (only voltage output), e.g. -10 to +10 V.**



- **Inverted function with or without offset, e.g. 150 to 20 S input and 4 to 20 mA output.**



PMR10 connections:

Supply voltage.

terminal 15 and 16

Inputs.

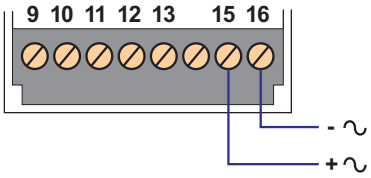
1: sensor cable monitor
2: current input
3: voltage input
4: sensor current out
5: NPN/PNP input
6: transducer supply out
7: NAMUR supply
8: input common

Outputs, type PMR10-A and PMR10-B.

9: output common
10: current output
11: voltage output
12: pulse output (type PCV10-B only)

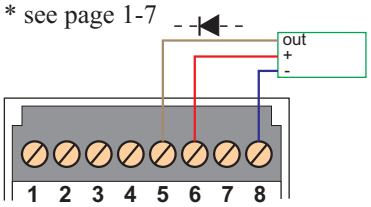
Connection drawings:

Supply voltage:

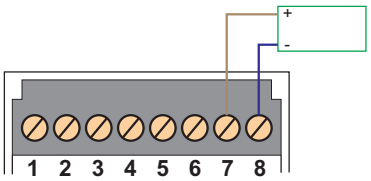


Sensor inputs:

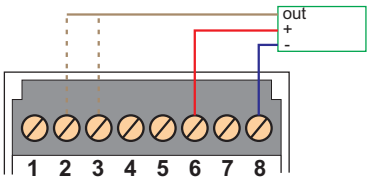
PNP and NPN sensor
* see page 1-7



NAMUR sensor

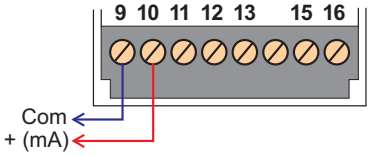


Analogue transducer



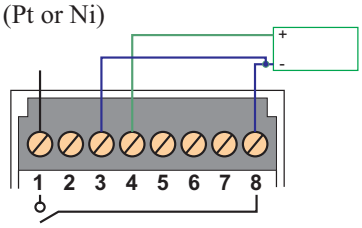
Analogue current output:

Programmable ranges
between 0 and 20 mA

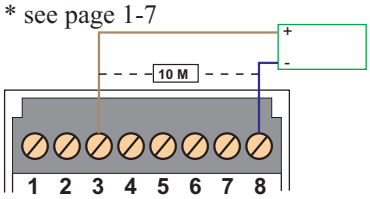


Temperature inputs:

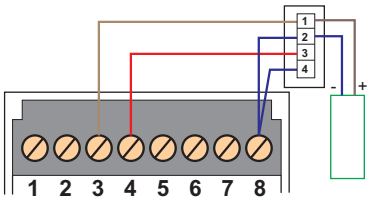
RTD sensor
(Pt or Ni)



Thermocouple sensor, direct
* see page 1-7

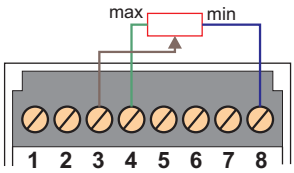


Thermocouple sensor,
external CJC-box

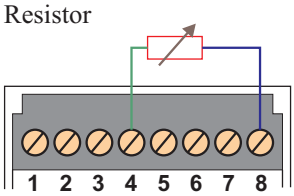


Resistance inputs:

Potentiometer

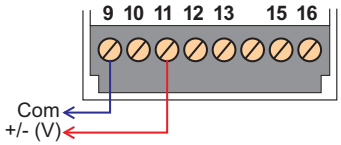


Resistor

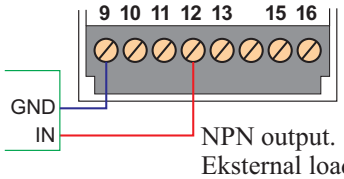


Analogue voltage output:

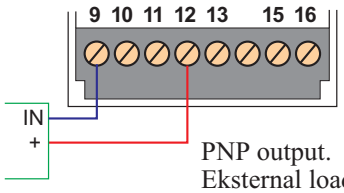
Programmable ranges
between -10 and +10 V



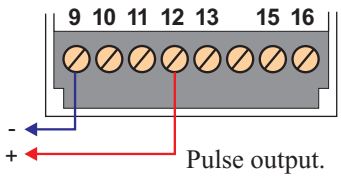
Pulse outputs (type PMR10-B only):



NPN output.
Eksternal load:
max. 30 V / 30 mA



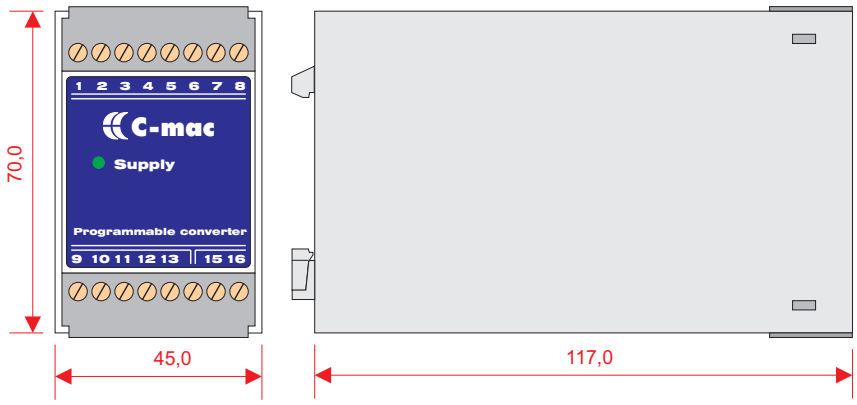
PNP output.
Eksternal load:
max. 30 V / 30 mA



Pulse output.
V_{out} = 10 V
R_{out} = 2 kΩ

Comadan Produktion a/s

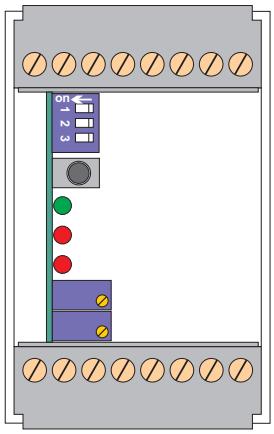
Mechanical dimensions:



Materials:

Housing base:	CYCOLOY C2100, grey
Frontplate:	CYCOLOY C2100, grey
Terminal cover:	CYCOLOY C2100, black
Terminals:	nickel plated brass
Screws:	nickel plated iron
Weight:	350 g

Programming connections and adjustments:



Programming connector CON.

Connects to the PC via C-mac interface cable.

The interface unit is internally battery powered, which means it is not necessary to connect any external supply voltage to the PMR unit during programming.

Function selector switch DS.

1 OFF: Normal mode
1 ON: Programming mode
2 OFF: Disable P1 adjustment
2 ON : Enable P1 adjustment
3 OFF: Disable P2 adjustment
3 ON : Enable P2 adjustment

Potentiometers P1 and P2.

PMR10-A and PMR10-B:

P1 = Offset fine adjust +/- 5%
P2 = Span fine adjust +/- 5%

PMR10 programming.

It is possible to program and reprogram the unit at any time, no matter if the supply voltage is connected or not. If the program is modified while the unit is installed and in operation, all input signal conversions are disabled and the output will not update as long as DS 1 is ON. Programming of the unit is made by following the instructions in the C-mac programming software.The unit starts with the modified program as soon as DS 1 is switched back to OFF position.

Fine adjustmens with potentiometer 1 and 2.

In order to avoid unwanted modifications of the programmed ranges and to ensure a good temperature stability it is only possible to fine-adjust the programmed metering ranges if you use the following procedure:

When you have a known and stable input signal, you set switch 2 or 3 ON, for P1 or P2 adjustment, respectively.When the switch has been activated for minimum 2 seconds, the supply LED extinguishes and the output signal changes to the value, which corresponds to the actual position of the potentiometer. Now you adjust the output signal to the wanted value, and then you set the switch back in OFF position. The modified range is now programmed, and the power LED is ON again. If you want to adjust the ranges again, you set the switch back in ON position, wait for the LED to extinguish, adjust on the potentiometer, and set the switch back in OFF position.

Please notice, that it is only possible to adjust on one of the potentiometers at a time, i.e. you cannot set both switch 2 and 3 ON simultaneously.

Reset to the programmed settings.

If you have fine-adjusted the programmed ranges, and you want to reset to the original settings, you use the following procedure:Set switch 2 or 3 ON, depending on which of the ranges you want to reset.Wait for the supply LED to extinguish.Set switch 1 ON, and reset switch 2 or 3 to OFF position.Set switch 1 OFF again. Now the selected range has been reset, and you can repeat the procedure on the other range, if you want.

*** Special notes:**

The counter input (terminal 5) is universal, which means it can be used for both NPN and PNP sensors, but if the sensor is a “push-pull” type (both PNP and NPN output), you must put a diode in series with the sensor output, as it is shown on the connection drawing.

If the PMR10 is used for thermocouple monitoring, and you have a cable breakage on the sensor cable, this will not be indicated on the output, but if you connect a 10 MΩ resistor on the output as shown on the connection diagram, you will ensure, that the output will go to minimum in case of a cable breakage.

Technical data:

Supply voltage AC: 24, 115, 230 and 400 VAC +/- 10%
Supply frequency: 40-70 Hz
Supply voltage DC: 12-50 VDC
Isolation voltages: Supply - internal electronics: 3,75 kV
Input - output: 2.5 kV
Power consumption: 6 VA
Operation temp.: -20°C to +60°C
Humidity: 0-90% RH, non condensing
Temp. coefficient: < 0.003% /°C

EMC data.

Emission: EN 50 081 - 1
Immunity: EN 50 082 - 2
Safety: EN 60 730 - 1

Approvals. The module is produced in accordance with CE and high voltage regulations.

Speed and accuracy.

Conversion speed: in - out delay: min. 150 msec programmable up to 4 sec.

Accuracy:
RTD sensors: < +/-0,2°C
Thermocouple: with external CJC box: < +/- 2°C
internal compensation: < +/- 6°C
remaining ranges: < 0.2%

Linearity: better than 0.1%

Resolution: Between 1/1500 and 1/3000, dependent on the programmed metering range. If the unit is programmed with input and/or output offset, the resolution will be reduced proportionally. In either case the actual resolution is informed, when the unit is programmed.

Indications:

Green LED: Steady light = supply ON
Flashing = programming mode

Outputs.

Current output: Terminals 9-10, programmable from 0 to 20 mA.
Max. external load: 500 Ω

Voltage output: Terminals 9-11, programmable from -10 to +10 V.
Min. external load: 1000 Ω

Pulse output: Terminals 9-12, programmable NPN, PNP or active output.

NPN and PNP: Max. external voltage: 30 VDC
Max. load: 30 mA

Active output: Vout = 10 V
Rout = 2 kΩ
Min. load resistance: 10 kΩ

Out of range: If the input signal is above or below the specified range, the output signal can move up to 5% above or below the specified output range. If wanted, this function can be disabled.

Inputs.

Input impedances:
Terminal 2-8: Current input. R_{in} = 122 Ω
Terminal 3-8: Voltage input. R_{in} = 125 kΩ

RTD sensor:
Terminal 3-4-8: Metering ranges -100°C to +850°C
3-wire metering with cable comp.
Terminal 1-8: Sensor cable monitoring
output ON, if the cable is OK.
Max. external voltage: 30 VDC
Max. Load: 30 mA

Thermocouple input:
Terminal 3-4-8: Metering ranges -100°C to +1800°C depending on sensor tyep.
In- or external cold junction compensation.

Resistor and potentiometer input:
Terminal 3-4-8: Ranges from 10 Ω to 10 kΩ

Pulse input:
Terminal 5-6-8: NPN and PNP sensors. Ranges from 10 pph to 10 kHz.
Sensor supply on terminal 6: 24VDC +5% -15%, max load 20 mA.
Terminal 7-8: NAMUR sensors. Ranges from 10 pph to 10 kHz. Sensor supply on terminal 7: 8,2 VDC, R_{out} = 1 k.Ω

Transducer input:
Terminal 2-3-6-8: Ranges up to 20 mA or 10 V.
Transducer supply on terminal 6:
24 VDC +5% -15%, max load 20 mA

Panel mounting.
If several modules are placed beside each other in a control panel, there must be a minimum distance of 5 mm between each module.

Ordering guide.

1. Basic units without range programming.

PMR10-x-yyy

x = Output configuration.
A: Current and voltage output
B: Current, voltage and pulse output

yyy = Supply voltage.
024 = 24 VAC 115 = 115 VAC
230 = 230 VAC 400 = 400 VAC
712 = 12-50 VDC

2. Converters included range programming.

When the modules are ordered with programmed ranges, the same ordering numbers are used to specify the basic unit, but in additon, the wanted ranges must be specified, as shown on the examples below:

eks. 1: PMR10-A-230 In: Pt100, 0-200°C, Out: 4-20 mA
eks. 2: PMR10-B-024 In:NPN 20-90 rpm. Out: -10 to +10 V
Pulse out: NPN, 0-600 p.p.m, pulse width 20 msec.