Applications for PM10 Smart Meter

PM10 Smart Meter

PM10 replaces the programmable logic in small applications

PM10 can be delivered according to customer settings

On the MekuWin configuration software can be set all functions

USB

Inputs:
Temperature sensors
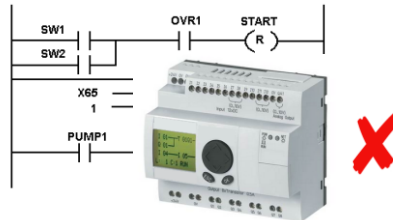Pcess inputs
Pulse sensors
Digital inputs

Output
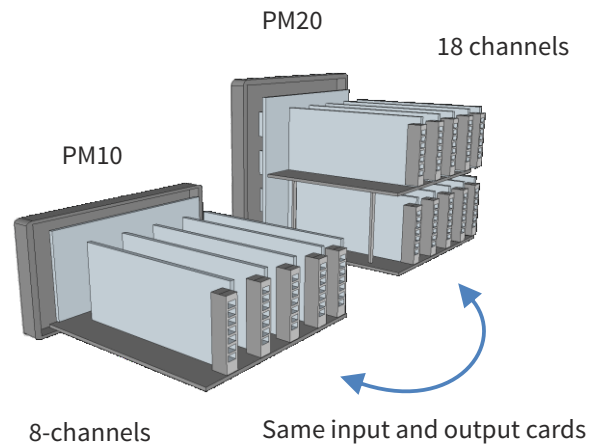0/4-20 mA/V-outputs
Digital outputs
Relays alarms
Serial ouput RS485

PM10 replaces a PLC in small applications
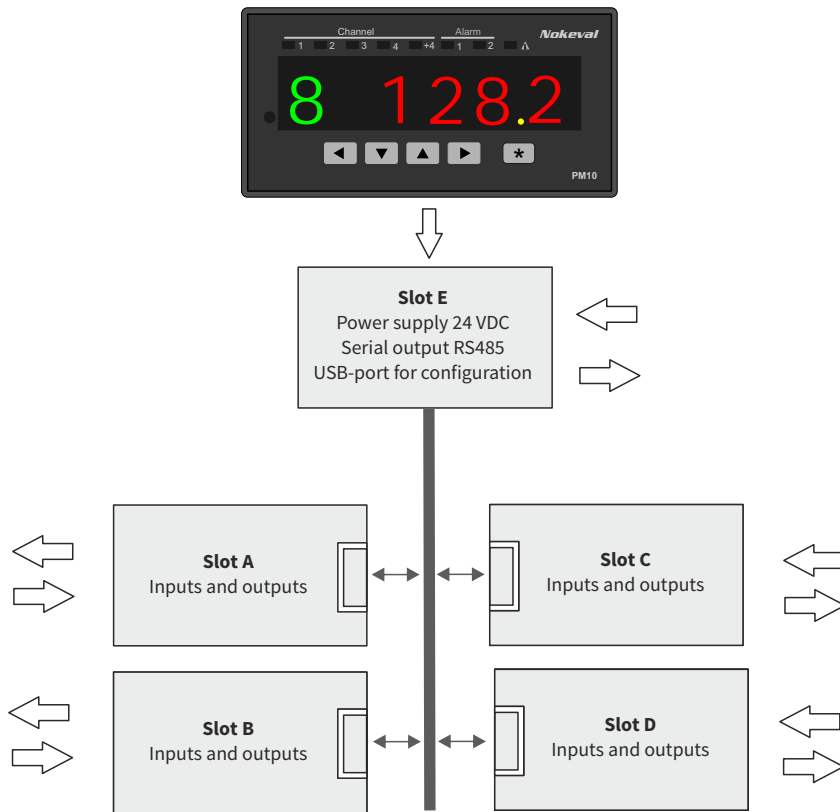

PM20

18 channels

PM10

PM10-series enlarges by changing only the case

The PM10 series can be easily extended to larger channel numbers by changing only the case. The model PM20 will be in the production during 2015.

8-channels

Same input and output cards

PM10 Smart Meter

Slot E
Power supply 24 VDC
Serial output RS485
USB-port for configuration

Slot A
Inputs and outputs

Slot C
Inputs and outputs

Slot B
Inputs and outputs

Slot D
Inputs and outputs

Input and output card can be installed freely to slots A-D
Cards have been isolated from internal bus and other cards.

Input and output cards
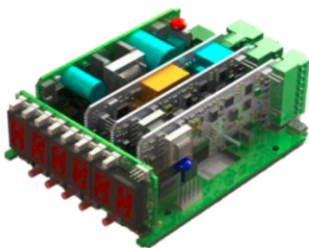
Analog inputs:	2 Universal inputs (same common), isolated from other cards, one I/O-line, sensor supply 15 V for transmitters
Inputs:	Pt100, Pt1000, 0/4-20 mA, 0-5/10V, mV, potentiometers, totalizer for mA/V-inputs
Analog outputs:	2 Outputs 4-20 mA or 0-10V, one I/O-line
Alarm card:	2 relays with changeover contact

Coming at 2015
Pulse input card: 2 pulse input for PNP, NPN and Namur sensors, alternatively I/O-lines

Configurable display colors

The colours of the display can be changed from a menu. The chosen colours are the red, orange, yellow and green. Furthermore, the channel can be showed the text signs.

High alarm

Low alarm
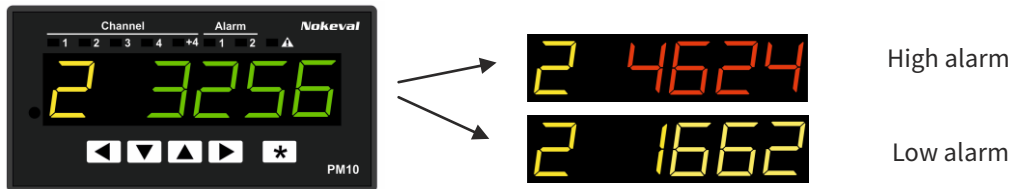
Alarms are changed colors of the display

Non-linear sensors

Specific linearization for all channels

Input

Four outputs
4-20 mA or 0-10V

Linearization can be done for every channel separately

Power supply for two wire transmitters

Power +15V

2-wire transmitter
4-20 mA

4-20 mA

Serial output RS-485

Alarms

Output 4-20 mA

Output 4-20 mA

Input channel can be connected active
or passive 4-20mA transmitter

Mass flow meter

Alarms   Outputs

Temperature

Pressure

Flow rate
Flow speed
Mass flow

Flow
4-20 mA

Flow meter
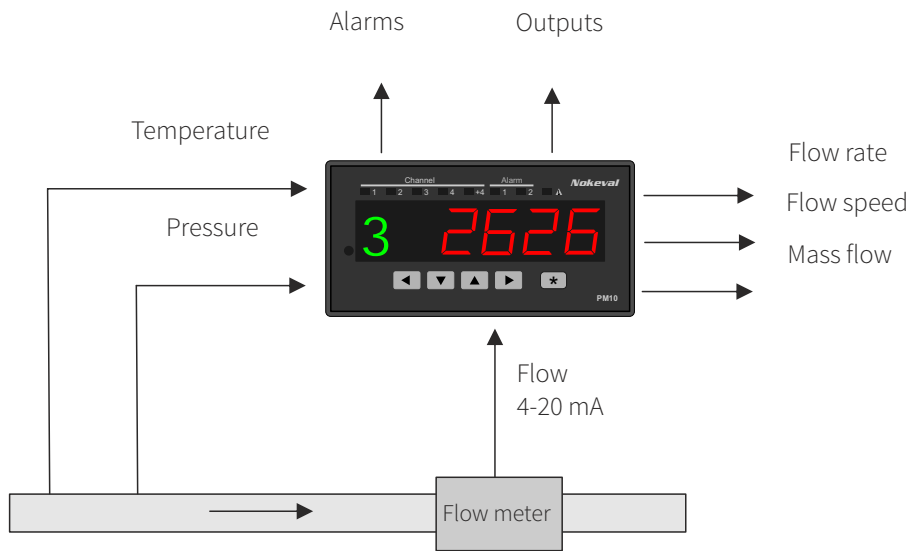
You can write mathematical functions between channels e.g. mass flow.

Multi-channel controller

Setpoint for preheating

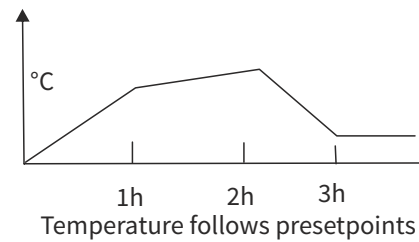Setpoint for oven

Infrared sensor for a target

Output power 1

Output power 2

Preheating 162 °C

Oven 190 °C
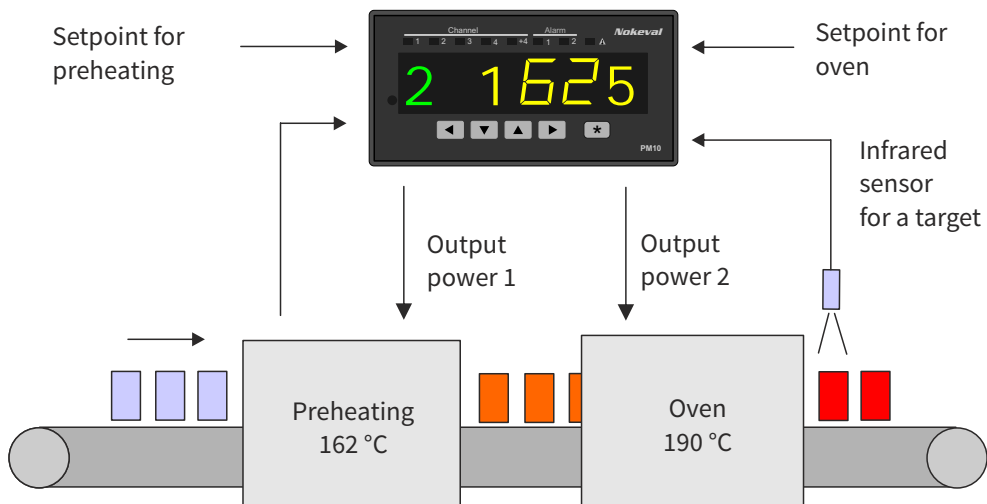
The measured temperature of the product adjusts the temperture of the oven.

Setpoint on external contact

Setpoint

125°C

163°C   2

140°C   3

Preset values for contacts.

Input

Output power

High alarm +5%

Low alarm -10%

Deviation alarms follow setpoint
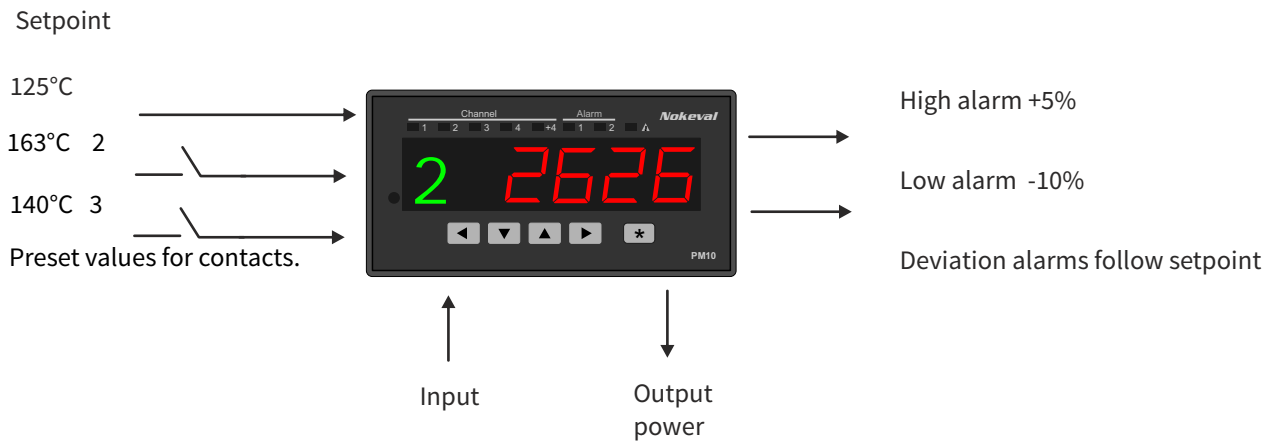
Programmable controller

°C

1h   2h   3h

Temperature follows presetpoints

Setpoint controller with preset values

100%

50 %

0 %

Preset values

Four output channels
4-20 mA or 0-10V

Output can be adjusted by using external contact to the preset value, if a new value is needed to set rapidly or very often. The front keys can be configured for working as an external contact. All channels can be set to follow one channel output.
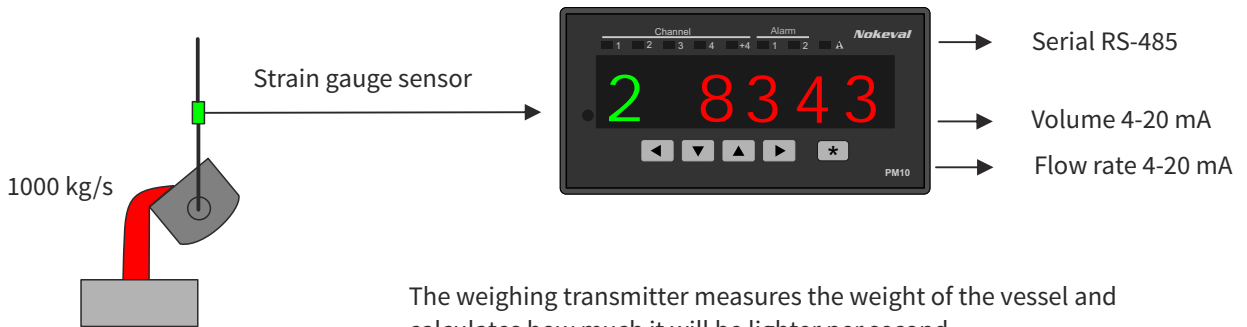
Eight wireless transmitters


Wireless transmitters

Receiver

+15 VDC

RS-485

Serial RS-485

8 outputs
4-20 mA or 0-10V
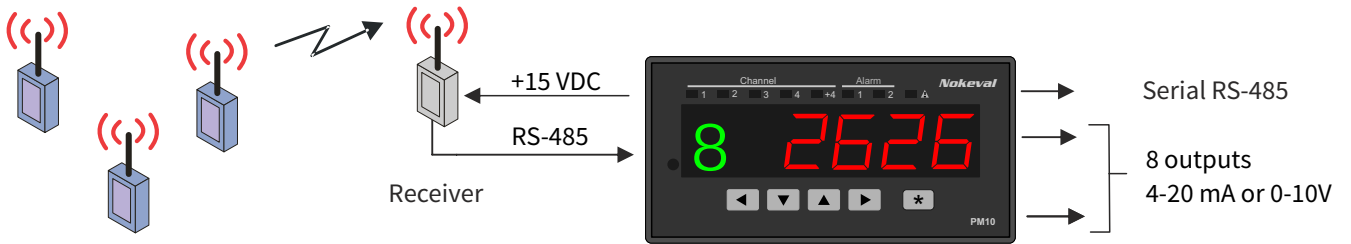
Eight wireless transmitters can be
installed to the display

Flowmeter for difficult materials

Strain gauge sensor

1000 kg/s

Serial RS-485

Volume 4-20 mA

Flow rate 4-20 mA

The weighing transmitter measures the weight of the vessel and
calculates how much it will be lighter per second.
The volume of the vessel is showed on the second channel.

Batch contoller

Flow meter

Valve (relay contact)

Start

Serial RS-485
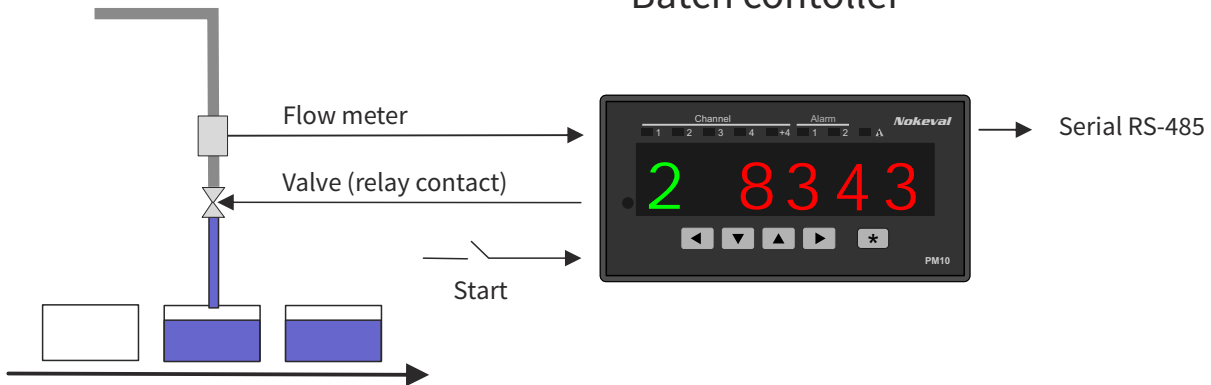
The batch controller can operate with filling or emptying activity.
New batch amount happens automatically or it can be started with
an external key or from the front panel. The second channel can be
used to show the number of the batch items or volume.

Replacing thermocouple cable with copper cable

Thermocouples

CU-Cables

Pt100
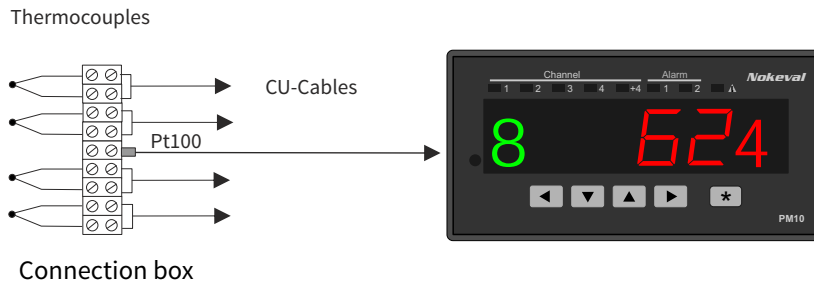
Connection box

Thermocouple compensation points can be moved into the connection box and to use copper cable as an extension cable. Any types of thermocouples can be used.

Emissivity correction of IR-sensors

IR-sensor

Reference sensor

Alarms

Output 4-20 mA
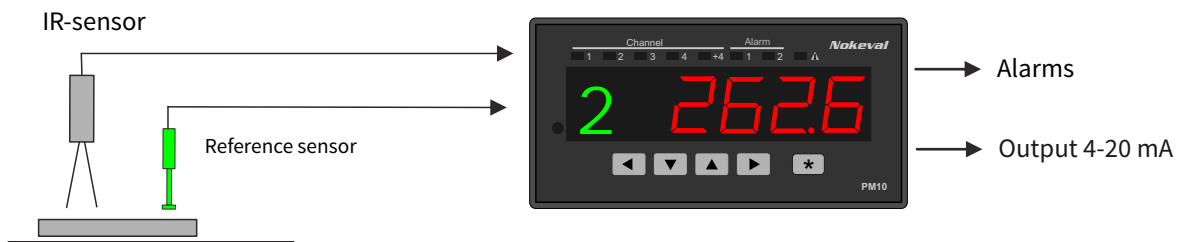
After checking the surface temperature, PM10 adjusts the factor of emissivity to the right value.

Humidity and temperature display

Humidity transmitter

+24V

4-20 mA

Pt100 temperature sensor

Alarms

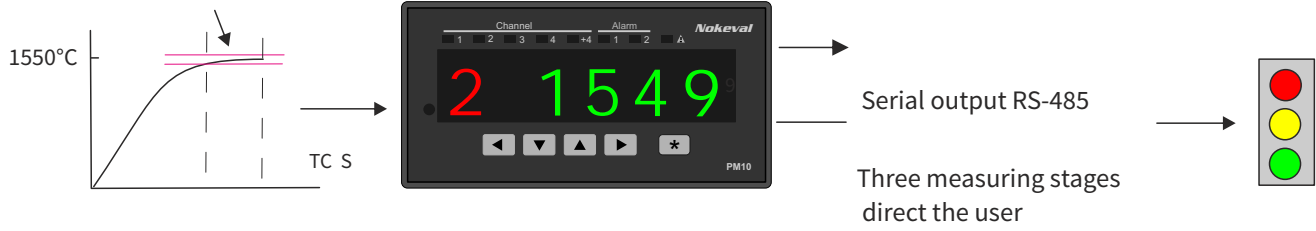Output 4-20 mA

Two channels can be shown if display values are only for three digits. Channels can be separated with different colours.

Measurement system of molten metals

The display will lock when 3 values are inside the limits

1550°C

TC S

S type thermocouple

2 1549

Channel 1 2 3 4 +4   Alarm 1 2 A   Nokeval

PM10

Serial output RS-485

Three measuring stages direct the user

The temperature measurent of molten metal is made with a disposable sensor tip which is pushed to the end of a long measuring rod (3-5 m).
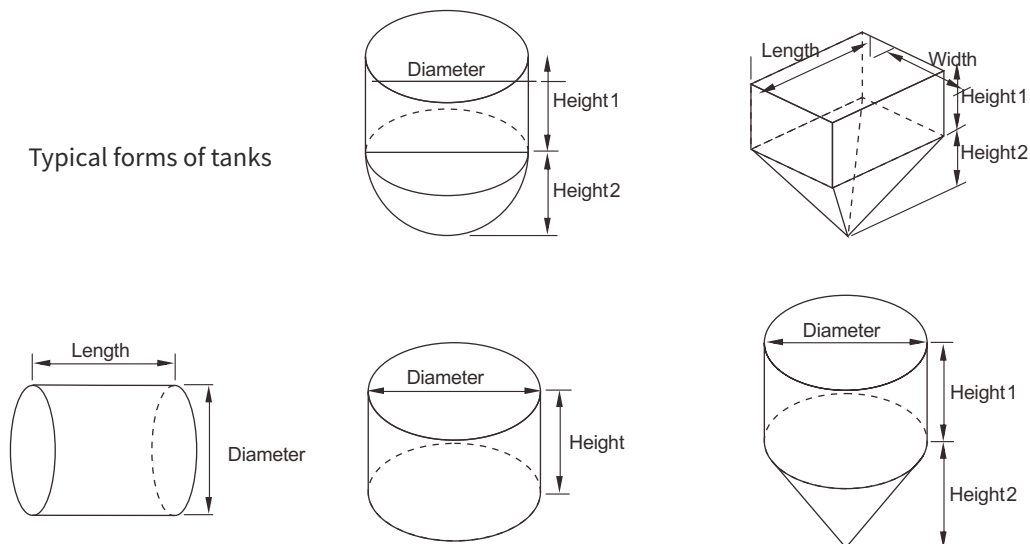
Lights for users:
1. Green - sensor is connected to measuring rod
2. Yellow - measuring stage has been started
3. Red - the measurement is ready and hold on, take out measurement rod from molten metal.

Volume measurement of tanks

4 2626

Channel 1 2 3 4 +4   Alarm 1 2 A   Nokeval

PM10

4-20 mA

Pressure transmitter

Four outputs
4-20 mA or 0-10V

The volume measurement of tanks can be done by linearization of input signal according to the form of tank.

Typical forms of tanks

Diameter
Height1
Height2

Length   Width
Height1
Height2

Length
Diameter

Diameter
Height

Diameter
Height1
Height2

Alarm changes the colour of the display
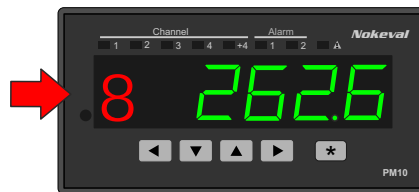

High alarm

Low alarm

It will also be possible to choose the flashing operation
of the display when the setpoint value is exceeded
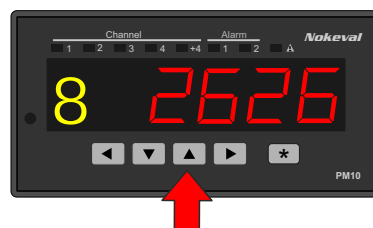
The preset values can be shown on a channel number

8 Setpoints

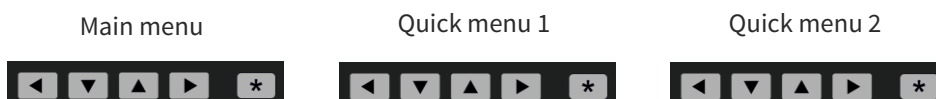|	
0	56°C
1	132°C
2	155°C
4	185°C
5	195°C
6	230°C
7	290°C
8	320°C

Preset values can be selected by manual or I/O-lines

The special functions of keys can be created according to application
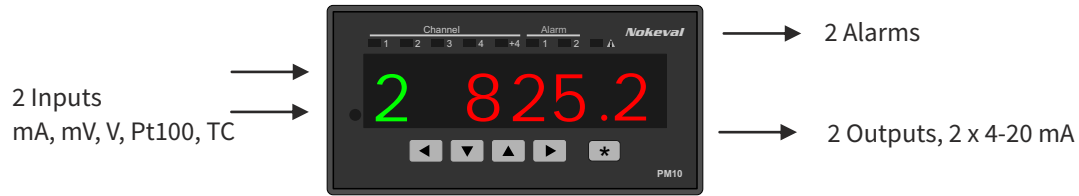

Several menus can be created and change them quickly
for helping users to control process better

Main menu   Quick menu 1   Quick menu 2

The menu can be changed by manual or I/O-lines or according to a process stage

Two channel display

2 Inputs
mA, mV, V, Pt100, TC

2 Alarms

2 Outputs, 2 x 4-20 mA

Four channel display and transmitter

4 Inputs
mA, mV, V, Pt100, TC

4 Outputs
4-20 mA or 0-10V
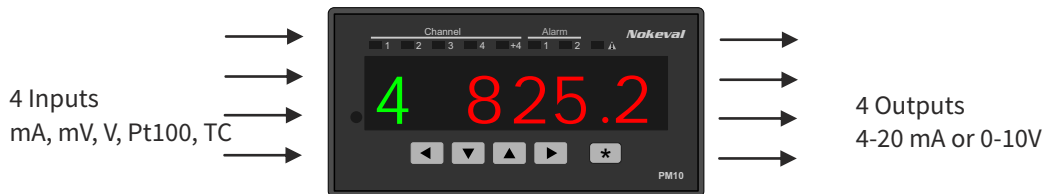
Three displays for 22 input channels

8 Inputs

8 Inputs

6 Inputs

RS-485

Data acquisition system

Max 31 displays (248 channels)

2 Alarms
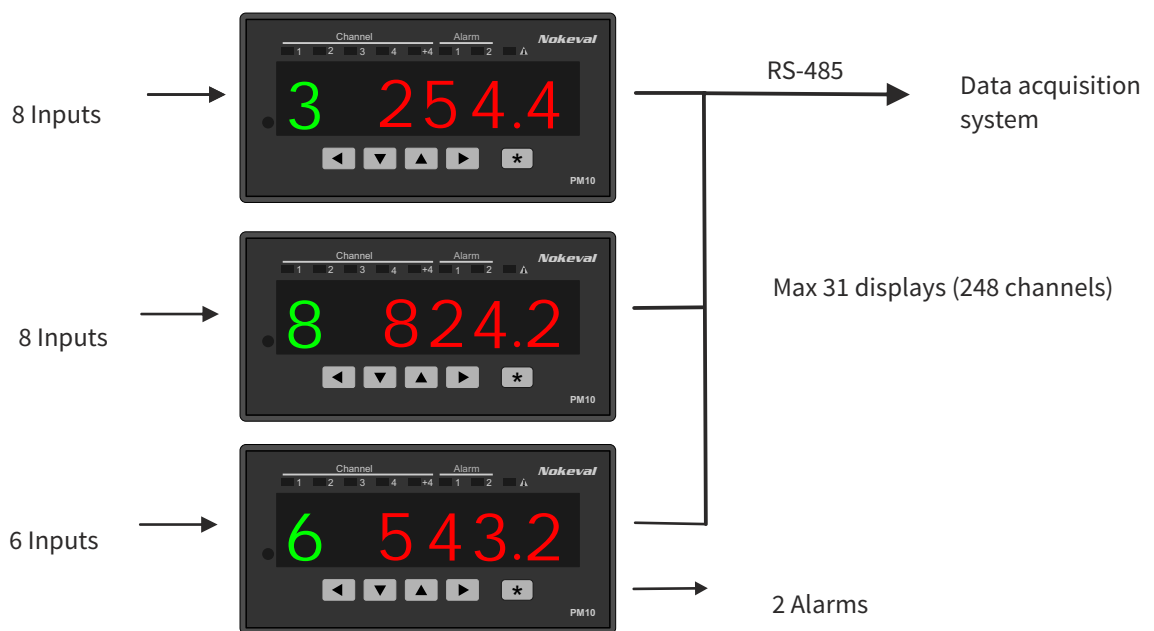
Protocol converter for serial bus RS485

Serial card RS485

I/O-lines
DO (2)
DI (1)

Master   **Slave**

Slave
RS485

1. RS485
Protocol 1

2. RS485
Protocol 2

Master
RS485

Transmitters

Two different protocols can be connected.
Serial ports can be set for the slave or master
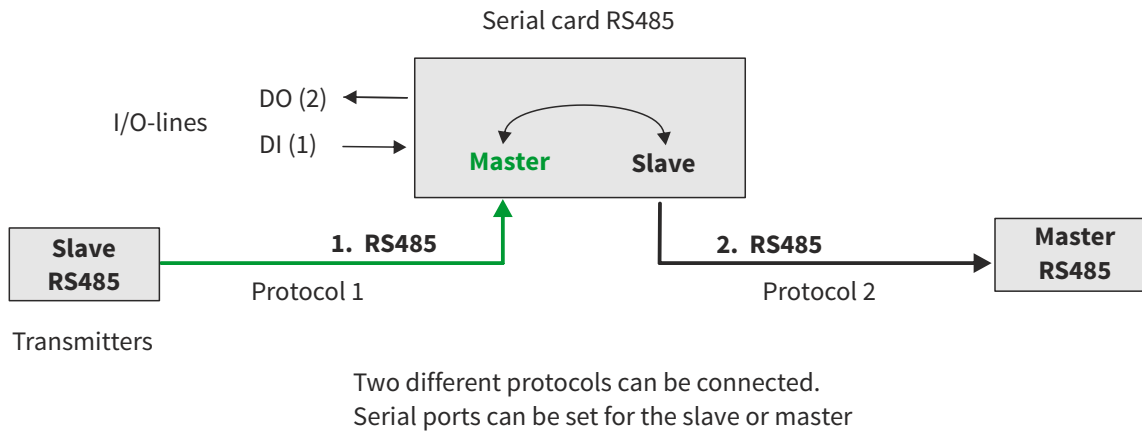
Multichannel display for remote transmitters

RMD680

RS-485

8 outputs 4-20 mA

RS-485

16 channels for Pt100,
thermocouple, mA/V, mV

The outputs of the remote transmitter will be an advantageous
way when there are a lot of channels. PM10 shows the channels
and transmits analog outputs to other devices.
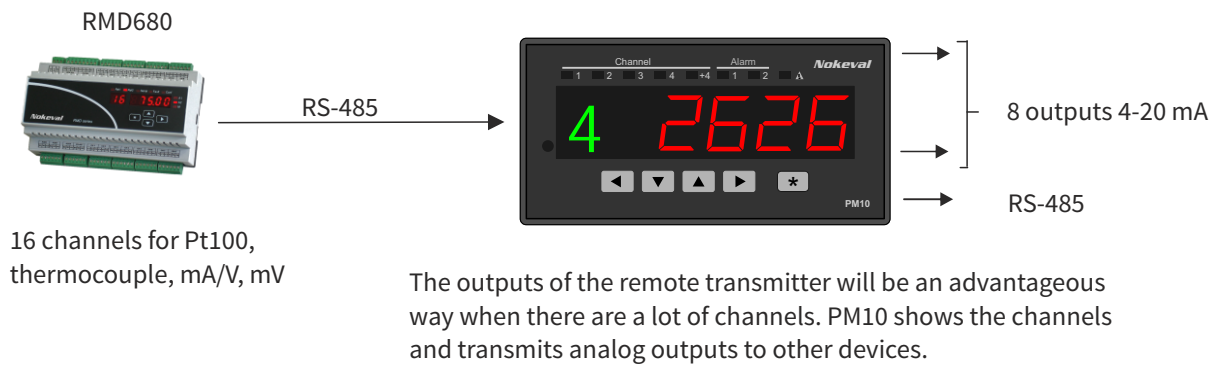
Displays for weather station with analog outputs

Vaisala weather
station WXT520

8 outputs 4-20 mA

RS-485

RS-485

Max distance 1 km

6 outputs 4-20 mA
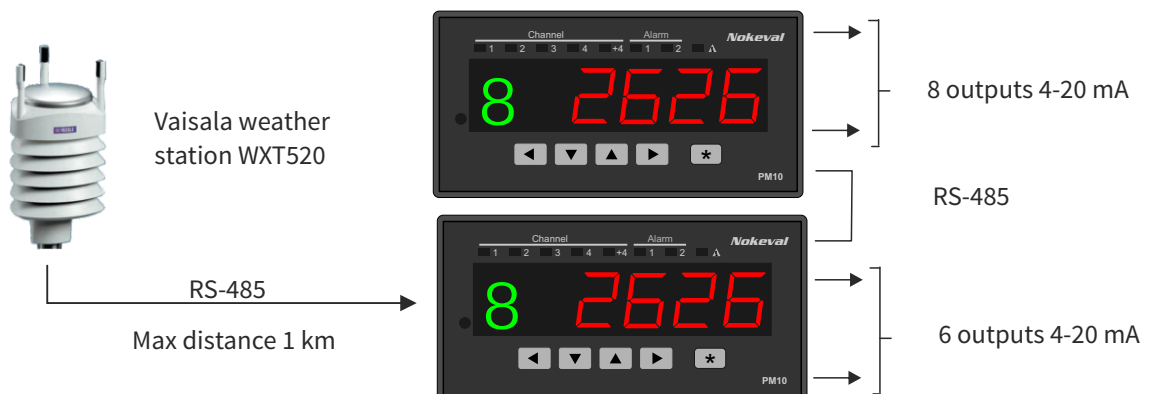
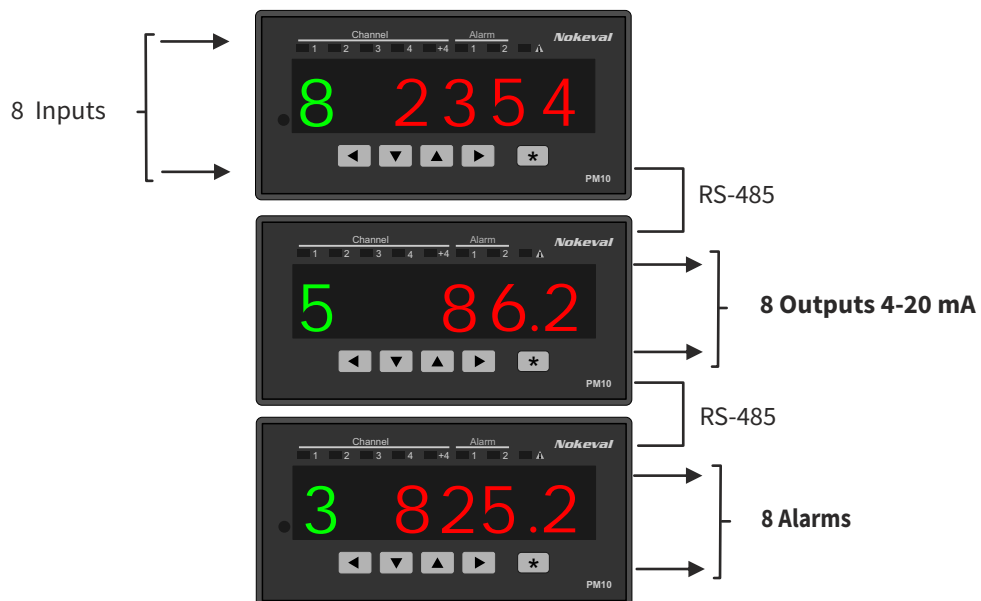All the 14 outputs of the meteorological station of Vaisala can be shown on two displays.

8 channels + 8 outputs
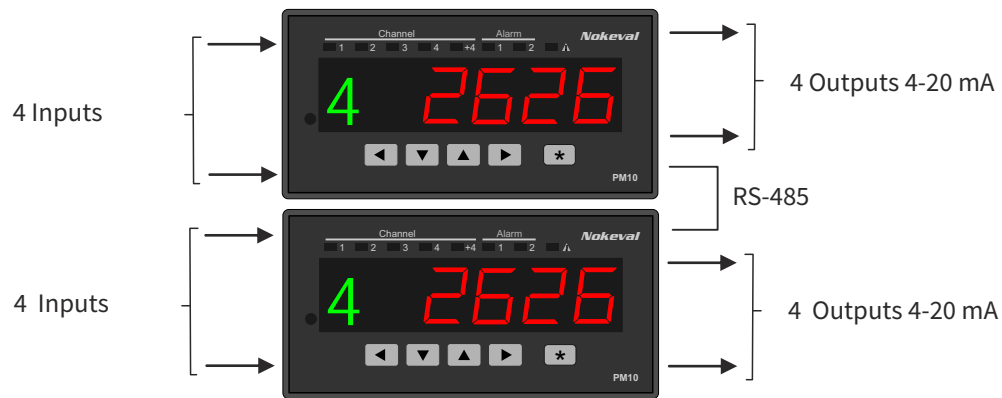
4 Inputs

4 Outputs 4-20 mA

RS-485

4 Inputs

4 Outputs 4-20 mA

Several displays can be connected together giving a
possibility of mathematical functions between channels.

8 inputs + 8 outputs + 8 alarms

8 Inputs

RS-485

8 Outputs 4-20 mA

RS-485

8 Alarms

Several displays can be connected together giving a
possibility of mathematical functions between channels.

Input selection by external rotary switch

8 inputs ⟶

BCD-Switch 4 ⟶

⟶ RS-485 (PLC)

⟶ Alarms

The input channel can be chosen also with an external rotary switch.

I/O-lines can be used for a small process controls

4 inputs ⟶

6 I/O-lines ⟷

⟶ RS-485

⟶ 4-20 mA
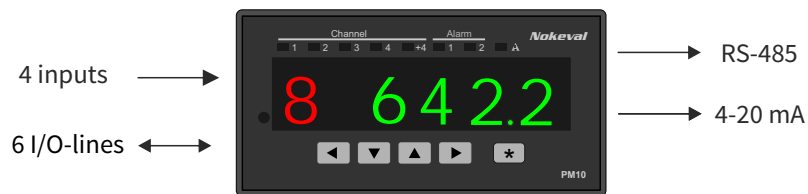
The input channel can be chosen also with an external rotary switch. The measurings are made continuously even though one of the other channels has been chosen to display.

Many kinds of sensors can be used at the same time

Flow meter

Pressure sensor 4-20 mA

Temperature Pt100

I/O-lines

The pulse divider's output

4-20mA (Rate from pulse input)

Alarms

The display can be a cumulative counter and rate display.

Moving of the output signal continously

Input
4-20 mA → [PM10 display unit: Channel 1 2 3 4 +4 Alarm 1 2 A Nokeval **8** 6 4 2.2 ◄ ▼ ▲ ► * PM10]

→ Pulse output (rate)
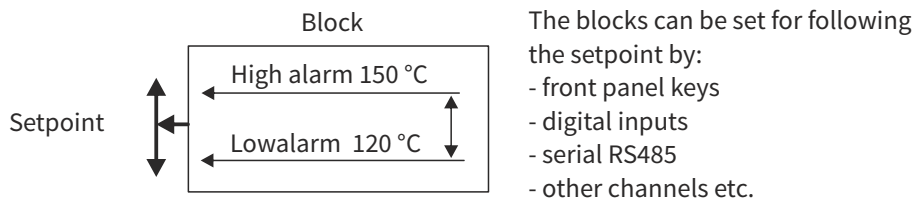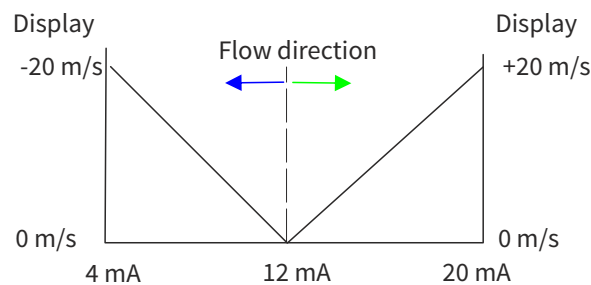
→ Output 4-20 mA

In the data acquisition systems in where the signal does not move continuously, it may be a problem when users can not be sure that the software is working right. By moving of the input value a little, the users can be sure that measured value is the real value. The display can be used also as analog to the pulse converter.

Veratile alarm blocks

Functional blocks can be formed for alarms that follows setpoint

Block

Setpoint ↕ ↔ [Block: High alarm 150 °C Lowalarm 120 °C]

The blocks can be set for following the setpoint by:
- front panel keys
- digital inputs
- serial RS485
- other channels etc.

Display for two direction flow meter with output 4-20 mA

Display
-20 m/s

Flow direction

Display
+20 m/s

0 m/s

0 m/s

4 mA   12 mA   20 mA

The display value for the negative direction of flowing on the range 12-4 mA (0-20 m/s) and to posivite direction on the range 12-20 mA (0-20 m/s).