

Nokeval

No 210807 V1.20

Manual

Model 2061

**Scalable counter / Batch controller
for pulse sensors**

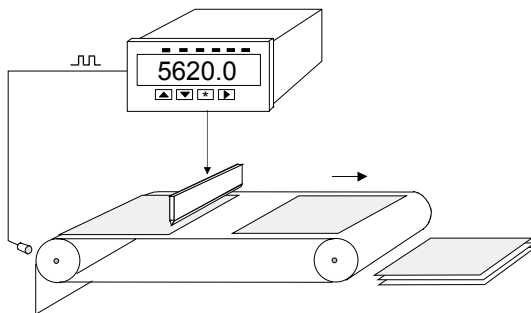
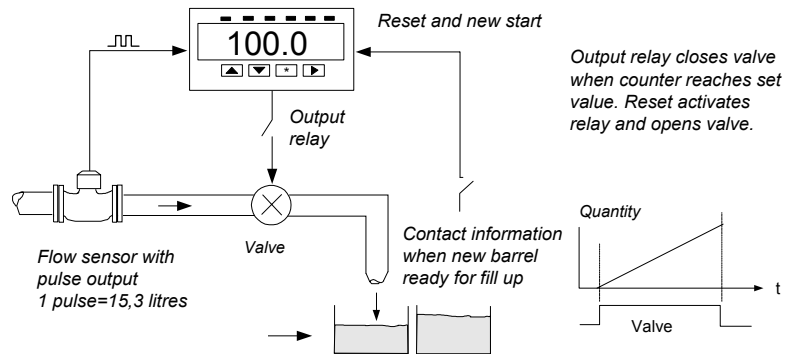


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Counter / batch controller 2061 for pulse sensors

Application examples

Picture to right shows application of flow sensor with pulse output. Below an application in piece goods automation.



Scalable pulse input may be set to indicate real value in display, f.ex. 1 pulse corresponds 5,3 m³ on display or 1 pulse corresponds 15,3 litres.

Description

Counter 2061 suits well for distance measurement of various movement sensors, for piece count or for dosage. Counter has red or green display, count up or down. Input pulse can be scaled to correspond desired number value, f.ex. one pulse may correspond three numbers or parts of numbers in display (1 pulse=0.034 digits in display).

Display memory stores calculated value for one week after power break.

You can use counter as a dosimeter by setting alarm value to correspond desired batch value. Output relay is activated when calculated batch is reached. New count starts by resetting counter with a remote contact. You can also determine start level from which you count down (emptying) or up (filling).

Output relays can also be used as an pulse divider

when using internal reset (Loop function). When alarm value is reached, f.ex. 26,5 input pulses are converted to correspond one output pulse; in this state output relay sends only 200 mS impulse when counter resets. Count amount can be set with front panel arrow keys.

Input cards of this meter belongs to a 2000 product series and changing the input card to another type changes the whole meters functions. F.ex. counter for analog input signal is available as model 2026 (own data sheet). Whole 2000 series is based on red or green display motherboards (also available low and high voltage power supply) which combines 36 variants of digital panel meter. With optional add-on cards you can modify a meter that suits best for your application.

Technical specification:

Sensors:

NPN, PNP, Namur, Picup, closing contact
Input voltage levels 0 = < 1V, 1 = 5..32V

Sensor supply

24 VDC \pm 5%, max. 150 mA

Display scaling:

-99999..999999

Input frequency range:

0..5 kHz

For contact input the range is 0...40 Hz

(See Jumper settings on next page)

Decimal selection:

0,001..1,000

Measuring method:

Counting of input pulses into counter. You can multiply counter value with desired number value. Result is shown in display.

Output:

Alarm relay will be activated when set point is reached. Alternatively Loop-function; display is reseted automatically when alarm value is reached and relay activated only for 200 mS.

Relays:

You can set alarm value using front panel keys.
Relay contacts max. 230 VAC, 0,5 A. Alternatively semiconductor relays 60 V / 0,5 A

Display memory:

Measurement card 2061 stores display value in memory for an a week without external power supply.

General

| | |
|--------------|--|
| Display | Height 14,5 mm: 6 digits bright red LED |
| Power supply | 85..240 VAC or 12..32 VDC and 24 VAC |
| Front panel | Protection IP65 with gasket |
| Weight | 240 g |

How to order:

2061- REL2-24VDC

Meter type

(counter in this case)

Relay card REL2

Power supply

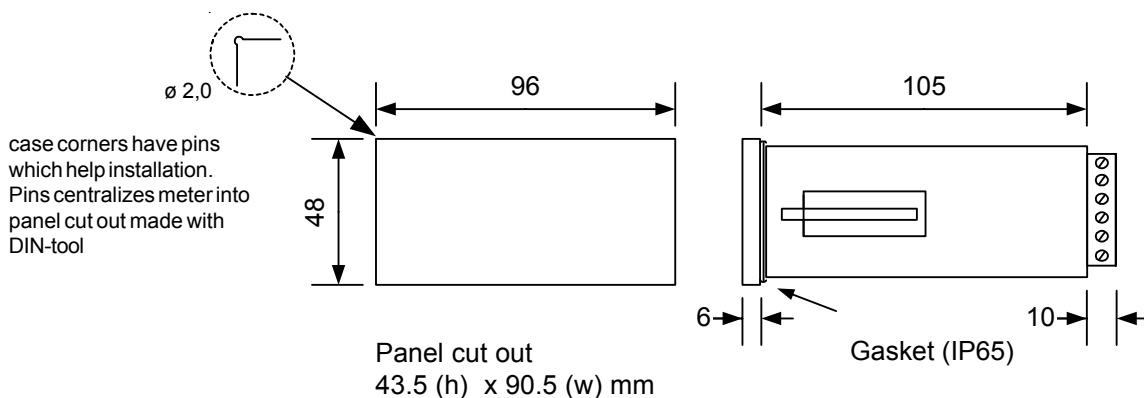
12..32 VDC and 24 VAC

Optional cards:

| | |
|---------------|---------------|
| Relay card | 2000-REL2 |
| I/O-card | 2000-I/O |
| Serial output | 2000-RS |
| 2061GR | Green display |

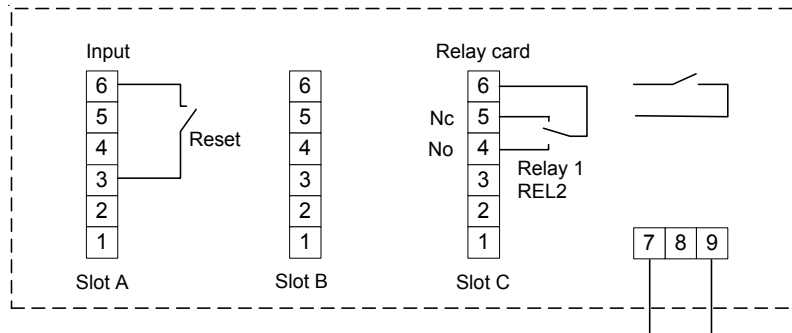
Motherboard accepts two optional cards

Dimensions

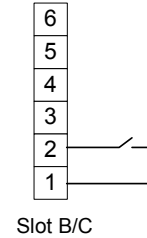


Connections:

Input and output cards



Up/down counting selection from external contact: Use option card 2000-I/O card



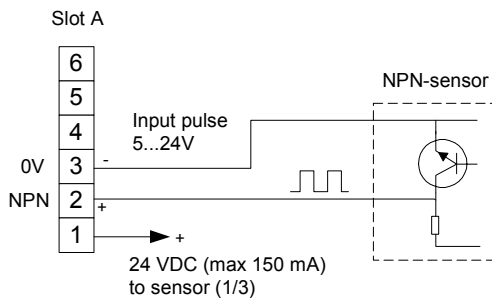
It is possible to connect external reset to the display. For this function attach closing contact connectors to input card (A) pins 3 and 6. Display can also be reset by pressing ▼ and ▲ simultaneously.

Powersupply
85..240 VAC or
12..32 VDC and
24 VAC
No polarity

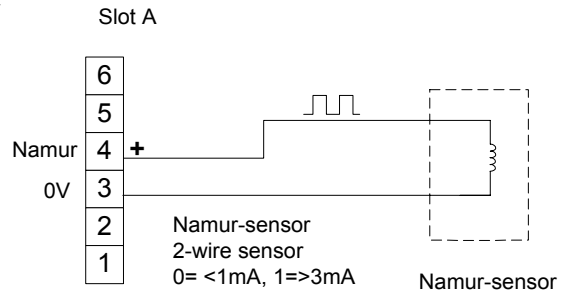
Alarm cards:
Frequency of output relay is max. 1Hz. With bigger frequencies use the additional I/O-card, max. 40V, 50mA.

Expansion slot A is for input card and the expansion slots B and C is for optional cards.

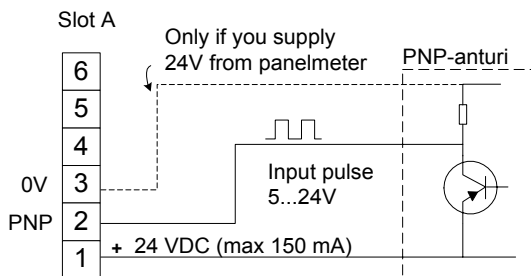
NPN-sensor



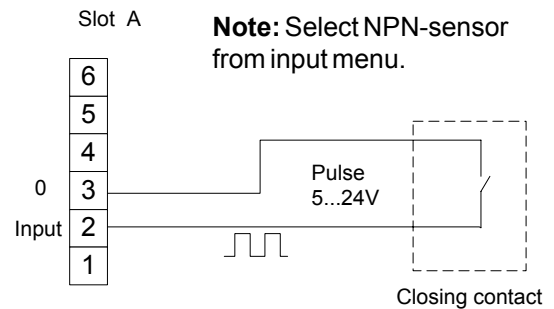
Namur-sensor



PNP-sensor



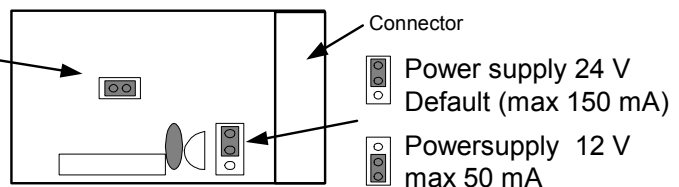
Contact input



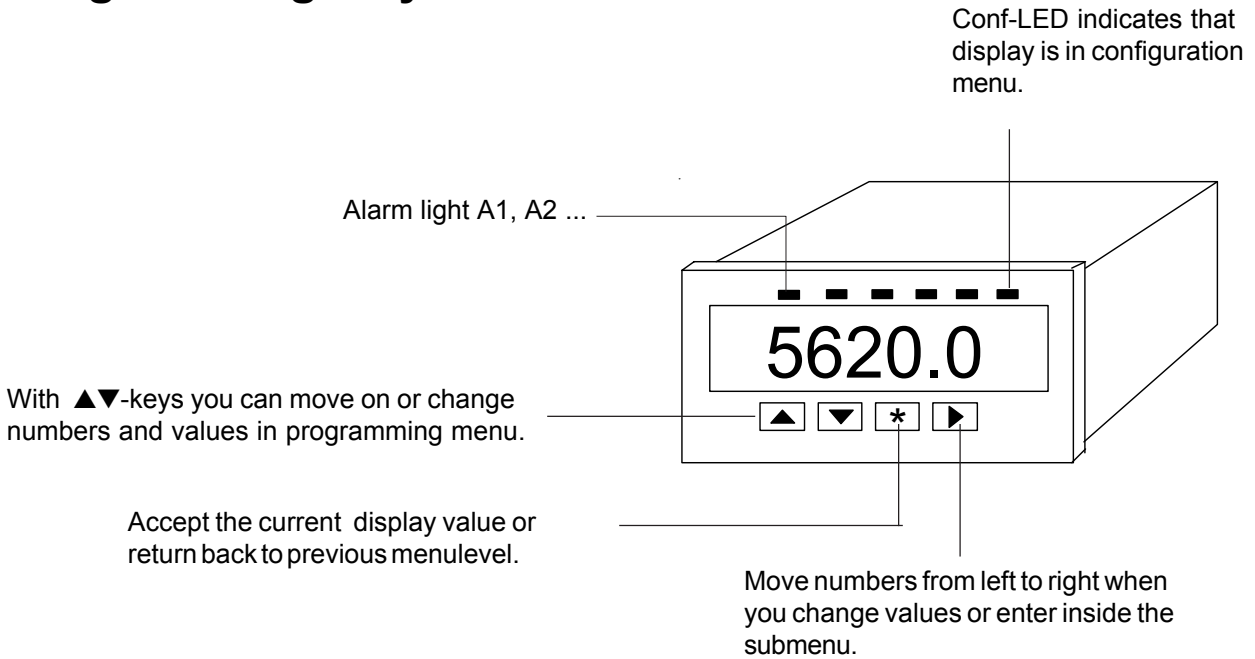
Input card jumper settings

Jumper setting for contact input.
Max. input frequency 40 Hz.

Power supply selection to sensor:



Programming keys



Programming state

The programming state is entered pressing simultaneously ★- and ▲ -buttons for 2 seconds. In programming state it is possible to change many different values f.ex. scaling the display, change alarm values, select sensors etc.

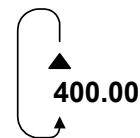
Alarm setting

Alarm values can be changed and viewed in measuring state. Other functions must be done in configuration mode. Unit has one alarm level which can be viewed with ►-button. After ►-pressing the light A1-LED lids and display shows alarm1 level, A1-LED blinks to inform that unit is in alarm level state. Second ►-push returns display into measuring state. If buttons are not pressed within 8 seconds the unit returns automatically into measuring state and saves settings. When A1 led blinks user can enter editing mode using ▲ or ▼-buttons. Values can be changed as described above. Accept changes with □-button.

Setting of alarm value

You can set alarm value by ▲□-keys number by number. Setting starts from largest number from left to right. You may go to next number by ► -key. Exit by ★-key.

Number setting



▲▼
Numbers
0...9 and , (decimal)

Programmmenu

| Mainmenu | Menuvalue | Description | | |
|--|-------------|--|---|--|
| ▲▼ - moving up/down in menu, ► - changes settingd/move to a next level, ★ - accept/return back | | | | |
| Pulse | | Pulse multiplier value | What value 1 pulse means in display. Value can include decimals. | |
| Divide | | Value of pulse divider (normally 1.0) | Used in special case when there is not possible to use multiplier to set enough decimals. | |
| Start | | Value where countin starts | | |
| Limit1 | | Alarmlevel 1 | Counter value when the alarm 1 pulls. | |
| Cont 1 | No | Closing contact, alarm 1 | Alarm 1 relay position setup | |
| | Nc | Opening contact, alarm 1 | | |
| Adjust | Adj 1 | Start | Starting value (Start) or counting alarm value (Limit 1) can be changed directly from display without entering inside menu | |
| | | Limit1 | | |
| | Adj 2 | Off | | Alarm 2 (Limit 2) value can be also changed directly from display |
| | | Limit 2 | | |
| Loop | On | Loop function in use | With loop function (On), when Limit 1 is achieved, counter reset's to start value and start automatically new counting. | |
| | Off | Loop function not in use | | |
| Limit2 | | Alarmlevel 2 | Counter value when alarmrelay 2 pulls. | |
| Follow | On | Alarmlevel 2 depends the alarmlevel 1. | Value of the alarmlevel 1 added to alarmlevel 2, after the combined value alarm 2 pulls. | |
| | Off | Alarmlevel is absolute. | Alarmlevel 2 function is exactly like alarmlevel 1. | |
| Cont 2 | No | Closing contact, alarm 2 | Alarm 2 relay position setup | |
| | Nc | Opening contact, alarm 2 | | |
| Divout | 2...65535 | Value of divider | States how many pulses needed to pull alarm. When Divout = 0, divider is not in use. | |
| REL2 | Limit 2 | Relay 2 = Alarm 3 Relay 3 = Divide out | Relay 2 and relay 3 setup. Here you can switch relay 2 and relay 3 functions among themselves | |
| | Divout | Relay 2 = Divide out Relay 3 = Alarm 3 | | |
| Res bl | On | External reset prohibited | External reset contact lock while counting. Reset can be done after alarmlevel is achieved. Doesen't affect resetting from the front panel. | |
| | Off | External reset allowed | | |
| Check | On | Start / Limit value inspection | When resetting counter, first pulse brings the value of what is selected in Adjust setting (Start or Limit). Second reset pulse clears the counter value. | |
| | Off | Inspection is not used | | |
| PO res | On | Relays in alarm state after the power up (until reset) | This function can be use to prevent starting dosage immediately after power up. | |
| | Off | Relays working normally after power up | | |
| Direct | Up | Counting up | Selection of which direction the counter start counting, up or down. | |
| | Down | Counting down | | |
| E Swit | Mode | OFF | Optional external contact | |
| | | revers | This external contact can be used to change counting direction or step back to previous value. | |
| | | Step | External contact step back. | |
| | Slot | Slot B | I/O-card in slot B | External contact should be wired to optional I/O card (in slot B or C) to channel 4. |
| | | Slot C | I/O-card in slot C | |
| | Contac | NC | Contact normally closed | NOTE! If optional external contact is not in use, "Mode" setting must be "OFF". |
| NO | | Contact normally open | | |
| Dec | 0..5 | Number of decimals | How many decimals are shown in display. | |
| Int | 0...15 | Intesnsity of display | Change the display intensity from 0 to 15 | |
| Sensor | NPN | Closing contact also | Type of pulse sensor. NOTE ! If closing contact is used, please select sensor to NPN. | |
| | PNP | | | |
| | Namur | | | |
| | Pickup | | | |
| | Intern | Internal 10 Hz | | |
| Baud r | 300...19200 | Baud rate | Baud rate for serial interface: 300...19200 | |
| Adress | SCL | Addre 0...127 | Serial data protocol selection | |
| | ASCII | End 0..31 | | |
| RS-485 | Off | RS485 not in use | RS485 serialdata-card selection. If RS232 is used, this setting can be "OFF". | |
| | Slot B | RS485 used in slot B. | | |
| Save | ► | Save the changes to memory | You can jump to Save and Undo selection in main menu using ★-button. Selection is confirmed with ►-button. | |
| Undo | ► | Cancels selections | | |

Serial output RS485/RS232 (option)

Meter may be provided with optional serial output and you can read measurements by e.g. PC. Display programming can not be made via serial port. Additional card provides serial signal RS232 and RS485, only one of those can be selected.

Serial signal is isolated from both input signal and power supply. Meters with RS485 can be max. 31 in same loop and longest distance 1000m. RS232 enables only connection of two devices and max. distance 10..20 m.

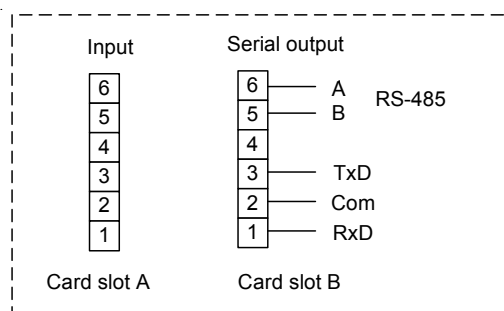
In programming stage you can first select card type (serial) mounted to slot B or C and then address and Baud rate. Baud rates are: 300, 1200, 2400, 4800, 9600, 19200 and addresses 0...127.

Accept selection and move forward by \rightarrow -key. You come back to previous level always by \leftarrow -key. Program remembers card type mounted, if it has been saved by save command when leaving program. In case you can not choose serial card, slot has automatically recognized card (plug and play).

Serialdata setup in program-menu

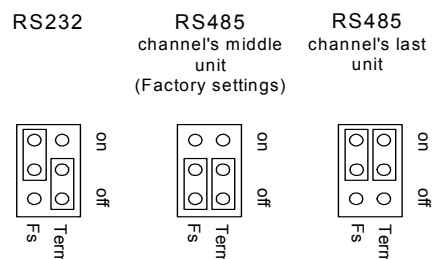
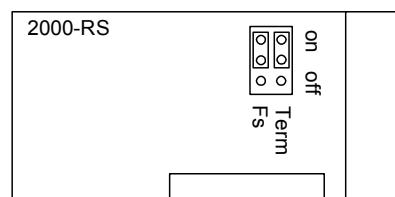
| Mainmenu | Selection menu | Name | Description |
|---|----------------|---------------------------------|---|
| ▲▼ - moving up-/down in menu, ► - change value or move to a next level, ★ - accept /return back to previous level | | | |
| Baud r | 300...19200 | Baud rate | Baudrate speed selection: 300..19200 |
| Addres | SCL | Addre 0...127 | SCL & Serial address selection |
| | ASCII | End 0...31 | ASCII & end mark selection |
| RS-485 | Off | Serialcard RS485 not in use | RS485 serialdatacard selection. NOTE ! If used RS232 you doesnt need to make this selection. |
| | Slot B | Serialcard RS485 used in slot B | |

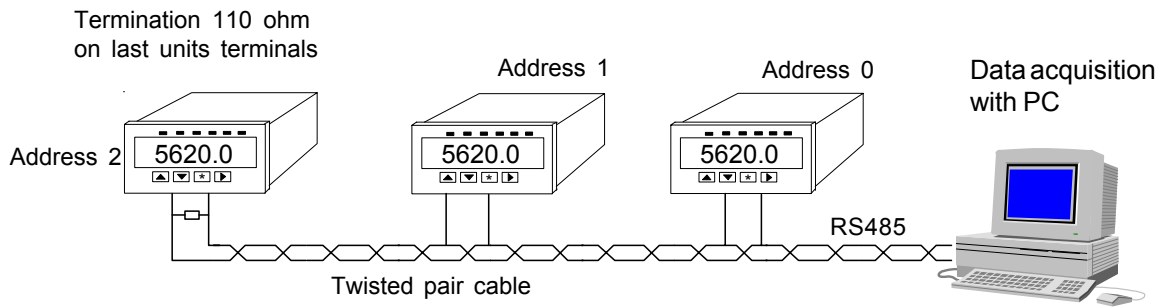
Terminal connections:



By serial signal RS485 last unit must be terminated by 110 ohm resistor. you can make termination at terminal connectors or by connecting jumper J1 to ON-position.

Serial card





Serial communication

Baudrate: 300, 1200, 2400, 4800, 9600 and 19 200
 1 Start, 8 Data and 1 Stop bit, no parity.

Serial protocol (SCL):

MESSAGES: When asking the measurement data from the panelmeter 2061 through the serial port, a command sequence which is in accordance with the SCL protocol is used for the inquiry:
 (Only the measurement results can be asked from the panelmeter 2061)

<ADDR+80h>COMMAND STRING<ETX><BCC>

<ADDR>

The first byte character to be sent contains the ADDR (0..127) of the address of the destination device and at the same time functions as the start bit of the command. 80H (in a decimal 128) with which an uppermost bit is set as the number one is added to the address.

COMMAND STRING: When measurement data is requested, the actual command is: MEA CH 1 ? , in which 1 means the channel number. (there is only one channel in the panelmeter 2061 so the number is always 1).

<ETX>

<ETX> mean the end mark of the command, ASCII character 03h.

<BCC>

Finally the checksum is calculated using the XOR operation on the byte characters of the actual command including the ETX. In the example the ASCII codes have been presented in hexadecimal.

e.g.

One wants the measurement result from the display unit address 1. To the channel an inquiry is sent: MEA CH 1 ? (ASCII codes shown for <BCC> calculation)

```
M E A   C H   1   ? <ETX>  <BCC>
4Dx45x41x20x43x48x20x31x20x3F x03  = 6F
```

(Presented the XOR operation with a character x)
 (ASCII code 20h corresponds to space character)

So the following bytes are sent to 2061:
 81 4D 45 41 20 43 48 20 31 20 3F 03 6F

RETURN MESSAGE: The answer from the panelmeter 2061 is obtained in the following format:

<ACK>RETURN MESSAGE<ETX><BCC>

<ACK>

The first byte of the answer contains the start of the answer <ACK> (ASCII-code 06h) and the answer itself, endmark <ETX> (ASCII-03h) and the checksum of the answer which is calculated from all the byte characters of the answer including <ACK> and <ETX>. 2061 counts the checksum in which case the receiver does not need necessarily to care about it,

e.g.

e.g. When a measurement result is for example 21.3, it will be obtained from the panelmeter in the following form

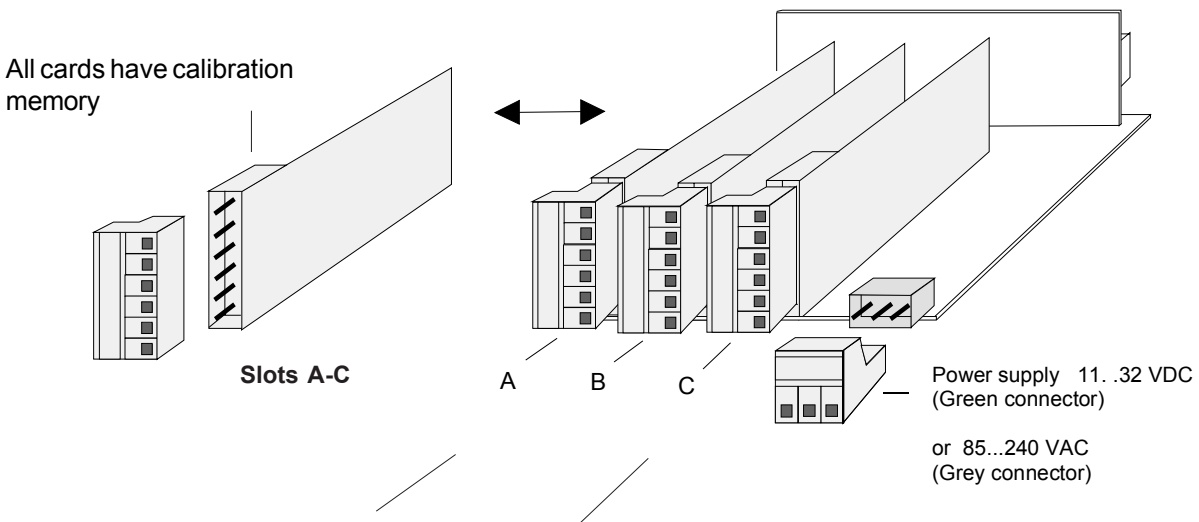
```
<ACK> 2   1   .   3 <ETX> <BCC>
Answer: 06  32  31 2E 33  03  1B
```

Panelmeter 2000 construction

The 2000 series panelmeters are modular and easy to assemble. According to customers wishes. The basic construction consists of mother board with three slots, A, B and C. Slot A determines meter type and provides always input signal. Slot B and C are interchangeable. As factory delivery input signal is always installed into slot A, mA output into slot B and alarms into slot C. In case of f.ex 4 alarms and relay card with 2 change-over contact (2 + 2 relays) are used, you must place second

relay card into slot B. If you accept only closing or opening relay contacts, you need only one relay card with 4 relays placed into slot C. The slot B is now usable for other optional outputs.

You can have different types of meters by only changing the input card in slot A. Data sheet of each type of meter dictates the possible combinations. Recalibration of card is not needed; only scaling and other settings must be set by front panel keys.



Change of meter type:

Input card is placed always to slot A. By changing input card you can get an other type of meter. You can change meter with pulse input to meter with current input, thermocouple, strain gage etc.

Additional slots:

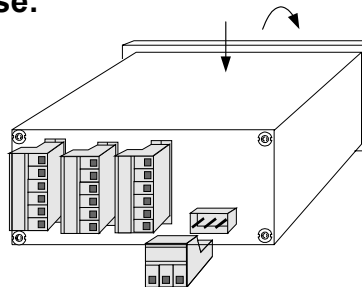
Additional cards provide output 4..20 mA, alarms, serial interface, BCD output etc. Meter data sheet dictates possible combinations. grey connectors allow line voltage 110..240 VAC (relay contacts).

Power supply:

There are two different mother boards power supply 85..240 VAC and 12..32 VDC. VDC-mother board accepts 24 VAC. Connectors are colour coded.

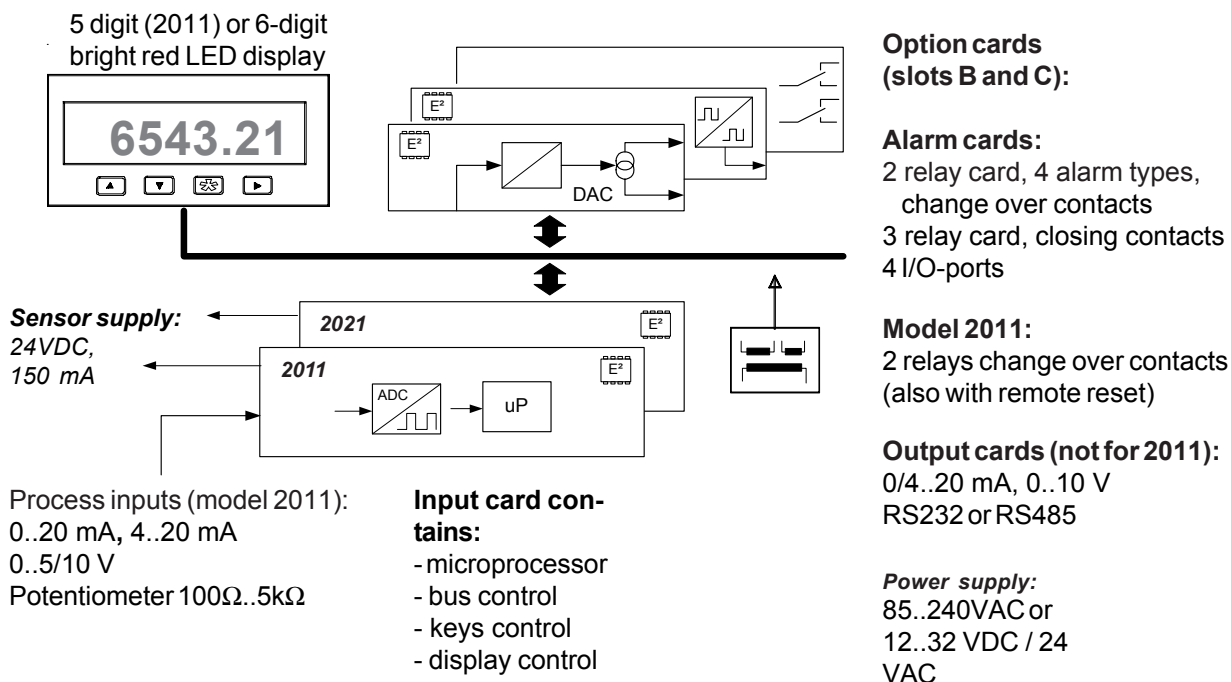
Removing meter from case:

Loose connectors and front panel, draw meter out from front. You may remove mother board from rear by opening four screws in corners of case.



Press gently case behind front panel and draw frame outwards gripping upper part of frame.

Modular indicator serie 2000



Model 2021 contains also process inputs but it can also measure RTD-sensors and thermocouples. 2021 has very accurate and fast A/D-converter (16 bit 1/64 000).

2000 series input and option cards:

| | | | |
|-----------------|---|------------------|--|
| 2011-IN | Process input | 2000-BASE | Base card with power supply |
| 2021-MU | Multi input | 2000-REL2 | Alarm card, NO/NC |
| 2031-IR | Infrared sensor input | 2000-REL3 | Alarm card, Closing contacts |
| 2041-STG | Strain gage measurement | 2000-OUT | Output card, U and I |
| 2051-Hz | Scaleable frequency indicator | 2000-RS | Serial output RS232 or RS485 |
| 2061-CNT | Counter input (max 5 kHz) | 2000-I/O | 4 pcs input /output ports (60 V / 100 mA) |
| 2066-TIM | Timer function, s/min/h ext. | | |
| 2071-RS | Serial input RS232 / RS485 | | |
| 2081-BCD | BCD-, Gray- binary code input (1-5 digits) | | |

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