

**Nokeval**

No 259202

# Manual

**Models 575F, 1000F,  
1100F, 1800-2061**

**Scalable counter for  
pulse sensors**



**Manufacturer:**

Nokeval Oy

Yrittäjätatu 12

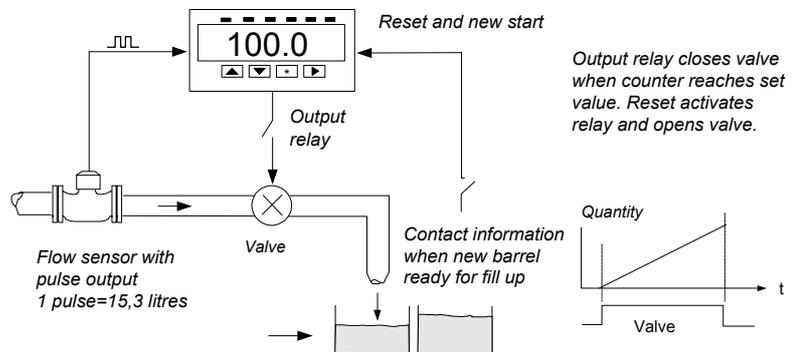
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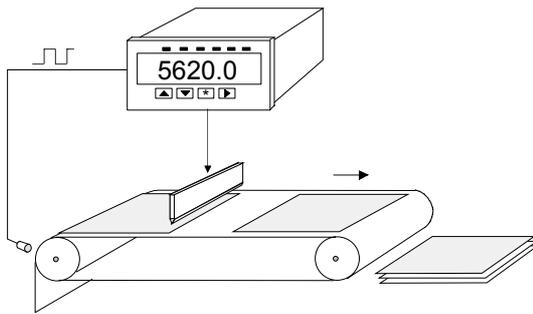
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## Counter / batch controller XX-2061 for pulse sensors



Picture on the right shows application of flow sensor with pulse output.  
Below an application from piece goods automation.

Scaleable pulse input may be set to indicate real value on display, e.g. 1 pulse corresponds to 5,3 m<sup>3</sup> on display or 1 pulse corresponds to 15,3 litres.



## Description

The field display series XX-2061 is designed for pulse counting and batch control in applications where a readability of 20 to 100 metres is required.

The incoming pulses are freely scaleable on display to correspond the wanted number value, e.g. 1 incoming pulse equals to 5,34 on display. Display memory stores the calculated value in memory for one week after power supply break.

The preset function makes it possible to use the counter as a batch controller as well. Counting can be done up- or downwards from the preset value. Alarm relays may control other devices. New counting can be started automatically or manually by external key.

Large field counters are part of a larger display series where by changing the input/output cards the display can be modified to other input values such as temperature, serial or frequency input. Two power supply possibilities, one for 85..240 VAC and the other for 24 VDC, both galvanically isolated from input/output. Readability of the displays is also good outdoors if exposure to direct sun light is prevented by using a sun cover. Case protection is IP54-IP65.

Readability of displays:	Digit size	Distance
	57 mm	20..30 m
	100 mm	40..50 m
	180 mm	ca.100m

# Technical specification:

**Sensors:** NPN, PNP, Namur, closing contact  
**Input voltage levels:** 0 = < 1V, 1 = 5..32V  
**Sensors supply:** 24 VDC ± 5%, max. 150 mA  
**Input frequency range:** 0..5 kHz  
**Decimal selection:** 0,001..1  
**Display scaling:** freely by configuration keys

**Measuring method:**  
 Counting of input pulses into counter. You can multiply the counter value by a desired number value. The result is shown on display.

**Output:**  
 Alarm relay will be activated when the set point is reached. Alternatively loop-function; display is reset at alarm value automatically and relay is activated for only 200 mS.

**Serial output:**  
 RS232 and RS485. Serial output only for measurement reading. Baud rate and address (RS485 selectable).

**Relays:**  
 You can set alarm value by button inside the case. Relay contacts max. 230 VAC, 0,5 A. Alternatively semiconductor relays 60 V / 0,5 A

**Display memory:**  
 Add-on card 2000-MEM stores display for 1 week without power supply.

**General**  
 Power supply 85..240 VAC or 24VDC (12W)

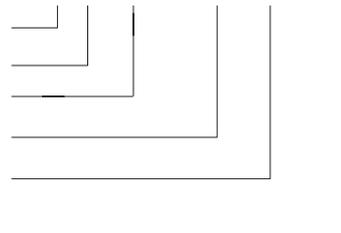
## Models:

- 575F5-2061** Digit size 57 mm, 5 digits  
Dark grey plastic enclosure, IP65
- 1000F4-2061** Digit size 100 mm, 4 digits  
Black steel enclosure, IP65
- 1100F6-2061** Digit size 100 mm, 6 digits  
Black steel enclosure, IP65
- 1800Fx-2061** Digit size 180 mm, 2-5 digits  
Black steel enclosure, IP65  
x = number of digits, please specify in your order

## How to order:

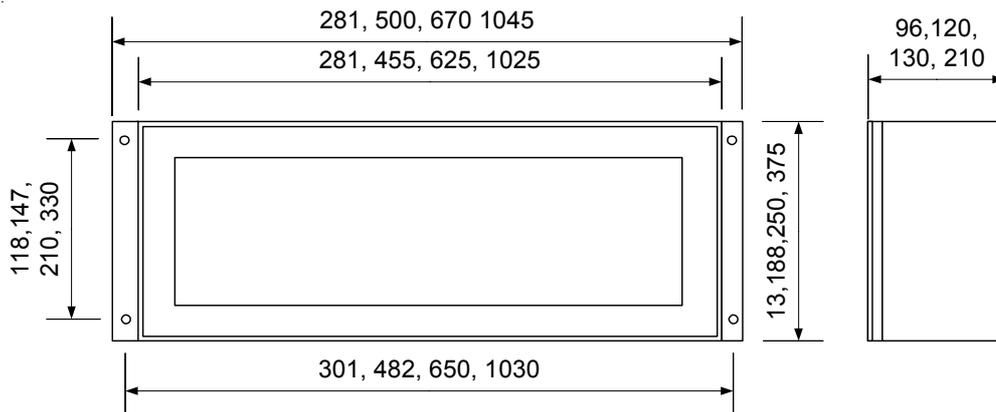
**Model** **1000F6-2061-MEM-REL2-24VDC**

Model  
 Number of digits  
 Input card 2061  
 Memory card MEM  
 Relay card REL2  
 Power supply  
 85-230VAC or 24VDC



The counter is also available for analog inputs 0/4-20 mA or 0-10 V, series 575F-1800F-2026

## Dimensions:



Dimensions shown in the order:  
 575F, 1000F, 1100F, 1800F

1000F-1800F metal enclosure  
 575F plastic enclosure

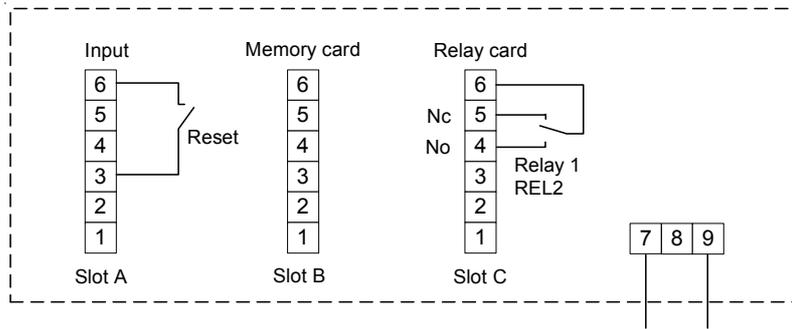
Glands: 2 x PG 11

# Connections:

## Input and output cards

External reset of the display is obtained by connecting closing key to connectors of input card (A) 3 and 6. Display can also be reset by pressing ▼ and ▲ simultaneously.

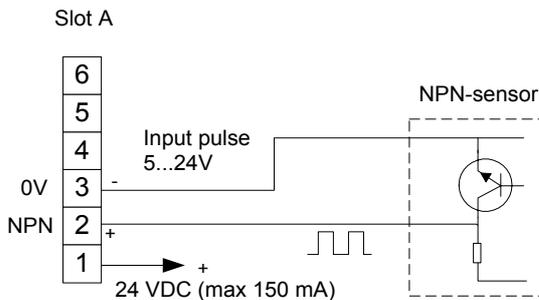
Expansion slot A has been meant for input card and the expansion slot as option to chosen relay card (slot C).



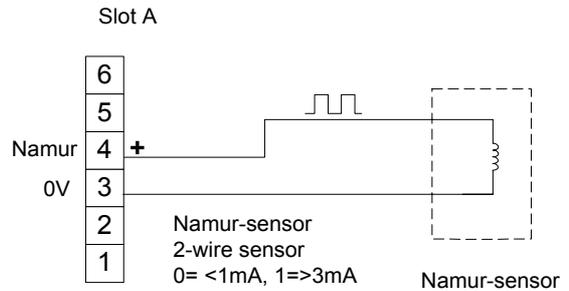
Relay card is connected to the expansion slot C.

**Powersupply**  
85..240 VAC  
or 12..32 VDC  
No polarity

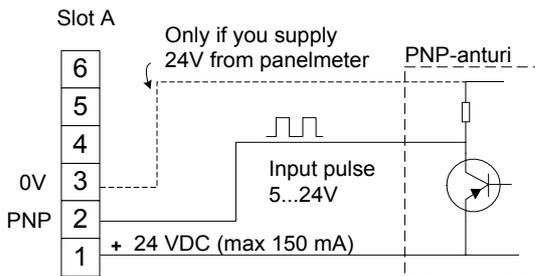
### NPN-sensor



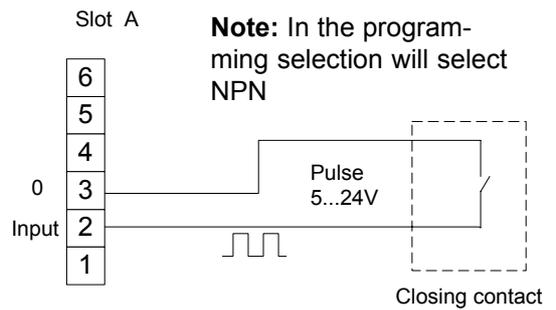
### Namur-sensor



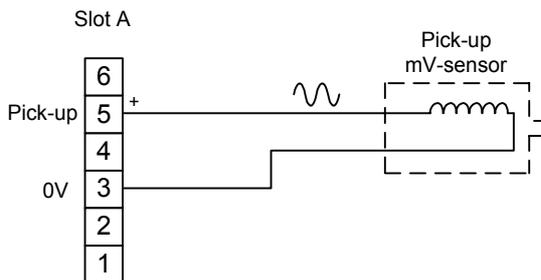
### PNP-sensor



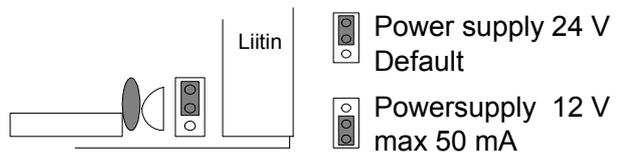
### Contact input



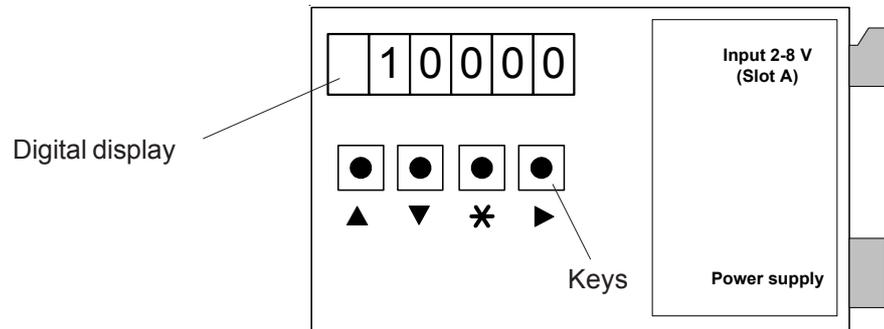
### Pick-up input



Power supply selection to sensor:



# Configuration keys



## Configuration

Switch on the power supply. Both displays should display some reading.

**Press and hold ★- and ▲- keys simultaneously to enter the configuration menu. "Dec" is displayed.**

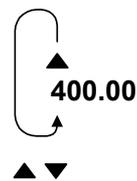
Select a setting using ▲▼ keys. To see or change its current value, push ► key. If the value needs to be changed, use arrow keys ▲▼ and ►. When done, exit with ★ key.

When all settings are complete, push ★ once more. "Save" is displayed. Push ► to save the settings done in the non-volatile memory.

### Editing numerical settings

Value is changed with ▲▼ buttons one number at a time. Changing begins from the most significant digit on the left, decimal point is selected last. Next digit to the right is selected with ► button. Accept and exit with ★ button.

Value selection



Numbers  
0...9

Selecting next digit



Decimal point selection  
with ▲▼-keys before  
number selection

# Programming

In the programming state the sensors, alarms and scaling of pulses are chosen. The programming state is achieved by pressing the star buttons and arrow buttons simultaneously for about 2 seconds. The text **Pulse** appears in the display. With the arrow keys you move upwards in submenu or in basic menu. By the

desired function you move to the arrangement state with the star button and returned to the main menu with same button. When all arrangements have been made, you move to **SAVE - UNDO** - menu, with star key. **SAVE** accepts with the button ► the changes and **UNDO** cancels the changes.

## Programming parameters

Main Men	Selection Menu	Term	Description
▲▼ move up/down in the menu ► move to the adjustment state/ the next level x accept the selection / return back			
<b>Pulse</b>		Pulse multiplier value	The numerical value that 1 pulse corresponds to on the display. The value can also be a decimal.
<b>Divide</b>		Pulse divider value	To be used in special cases when not enough decimals can be set with the multiplier value, please see the example*.
<b>Start</b>		Start value for counting	The value from which the counter starts the counting.
<b>Limit</b>		Alarm limit	The counter value at which the relay is energized.
<b>Adjust</b>	Start	Fast setting of Start value	The start value ( <b>Start</b> ) of the counting or the alarm limit value ( <b>Limit</b> ) can be changed directly in the display state without entering the configuration state.
	Limit	Fast setting of Limit value	
<b>Loop</b>	On	Loop function activated	When the loop function is selected ( <b>On</b> ), the counter resets and at the same time starts a new count automatically when the alarm limit is reached.
	Off	Loop function off	
<b>Res bl</b>	On	External reset prevented	Interlock of the external reset contact during counting. Reset can be performed only after the alarm limit has been reached. Does not prevent the reset via front panel.
	Off	External reset allowed	
<b>Check</b>	On	Check of Start / Limit values	When resetting the counter the first push of the reset button displays the value set in the <b>Adjust</b> state ( <b>Start</b> or <b>Limit</b> ). The second push resets the counter.
	Off	Checking not in use	
<b>Contac</b>	No	Closing contact	Selection of the direction for the relay function.
	Nc	Opening contact	
<b>PO res</b>	On		When connecting the power supply to the counter the <b>PO res</b> setting can prevent the start of the counting if <b>Nc</b> has been selected as the direction for the alarm relay function. In this case the counting will not start until after the <b>Reset</b> function.
	Off		
<b>Direct</b>	Up	Counting upwards	Selection of the counting direction: upwards or downwards.
	Down	Counting downwards	
<b>d Swit</b>	Off	Not used	Change of the counting direction of counter via an external contact on the 2000-I/O card.
	Nc	Change of the counting direction when the contact is opened.	
	No	Change of the counting direction when the contact is closed.	
<b>Dec</b>		Number of decimals	Number of the decimals to be shown on the display.
<b>Int</b>	0...15	Brightness of the display	Adjustment of the brightness of the display: 0...15.
<b>Sensor</b>	NPN (Contact)	Selection of the sensor type	Selection of the sensor type. Please NOTE! If a closing contact is used as the sensor, one should select <b>NPN</b> as the sensor type.
	PNP		
	Namur		
	Pickup		
<b>Baud r</b>	300...19200	Baud rate	Baud rate selection : 300...19200
<b>Address</b>	Adresse 0...127	Serial communication address	Selection of the serial communication address: 0...127
<b>RS-485</b>	Off	Serial output card RS-485 not used	Selection of the serial output card RS-485 for use. Please NOTE! If serial output RS-232 is used it need not be selected.
	Slot B	Serial output card RS-485 inserted into Slot B	
<b>Save</b>		Saving the settings	You can enter the Save and Undo state from the Main Menu by the ★ -key. The selection is accepted by the ► -key.
<b>Undo</b>		Cancelling the settings	

## 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.

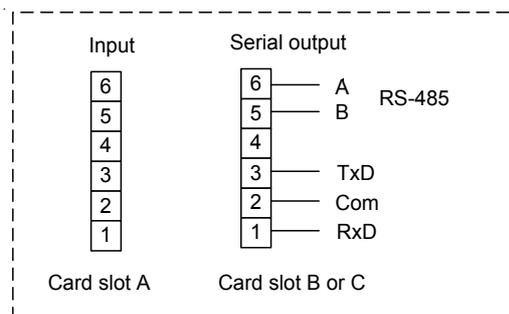
In programming stage you can first select card type (serial) mounted to slot B or C and then address and Baud rate. Baud rates are: 300, 1200, 2400, 4800, 9600, 19200 and addresses 0...127.

Accept selection and move forward by ►-key. You come back to previous level always by ★-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).

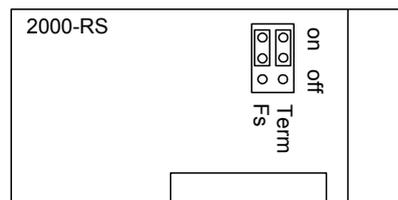
## Serial signal configuration

Mainmenu	Selection	Term	Description
▲ ▼ - move up/down to menu, ► - move to the adjustment level/next level, ★ - accept selection/return to the previous level			
Baud r	300...19200	Baud rate	Baud rate selection: 300..19200
Address	Adresse 0...127	Serial address	Serial address selection: 0..127
RS-485	Off Slot B	Serial card RS485 not in use Serial card RS485 installed slot B	RS485 serial signal selection. Note ! if used to serial signal RS232, selection doesn't need to make.

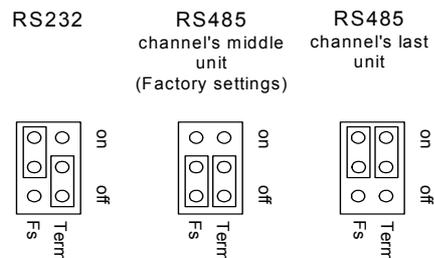
Terminal connections:

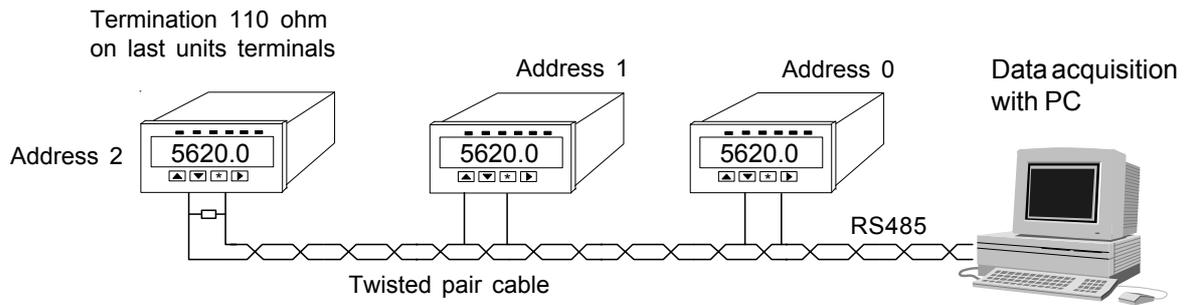


Serial card



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 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

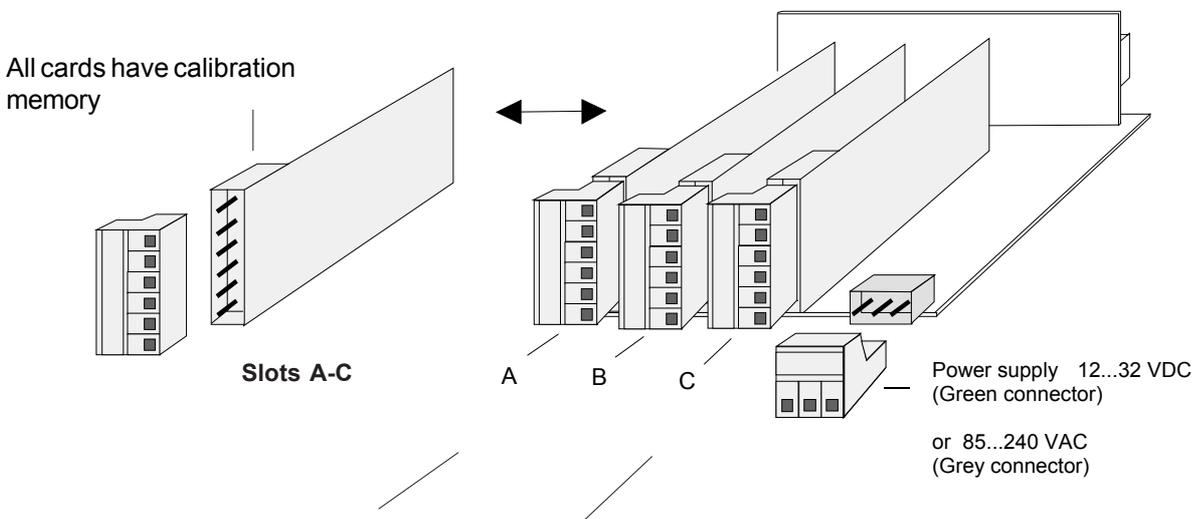
<ACK> 2 1 . 3 <ETX> <BCC>  
 Answer: 06 32 31 2E 33 03 1B

# Construction of field display series

The field display series is 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.

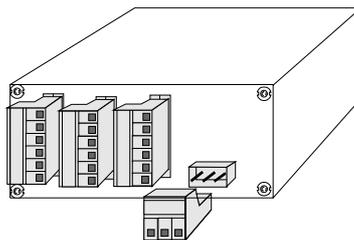
## Additional slots:

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).

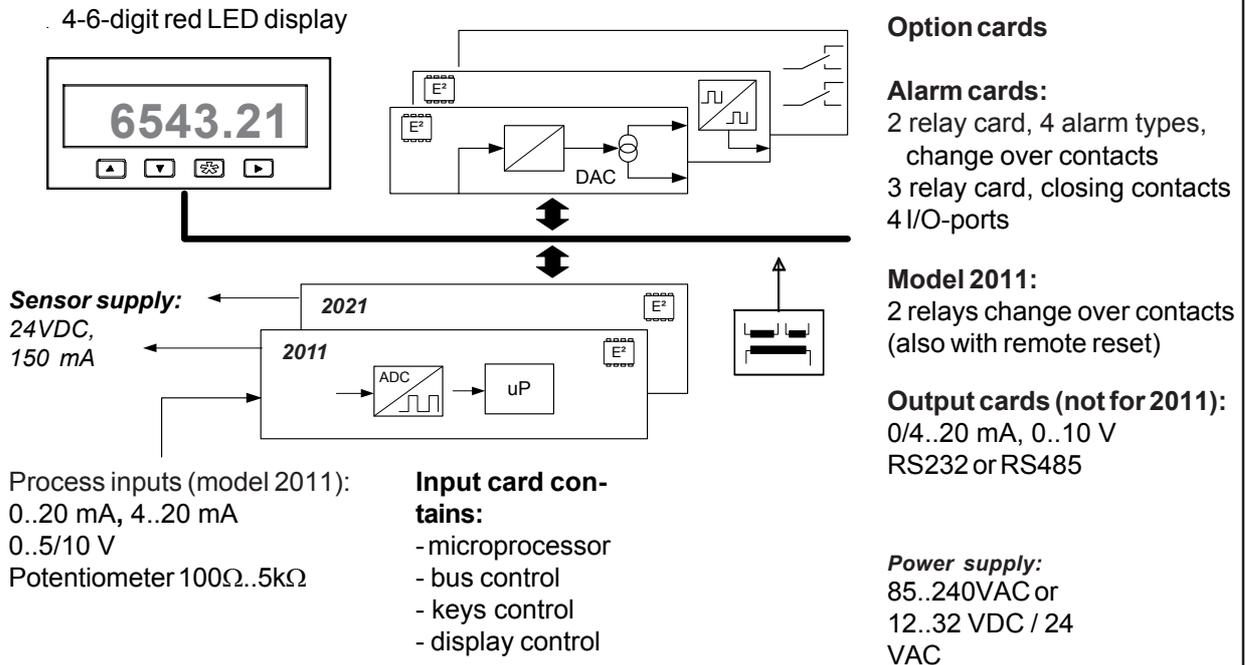
## Power supply:

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.

## Control electronic case:



# Modular field display series 575F...1800F



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:

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

**Manufacturer:**

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