
PM 9000 V1.0

Programmable Measuring Unit

Instruction Manual



ERMA

Electronic GmbH

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1. Description

The universal programmable display PM 9000 is designed for DIN-rail mounting for 35 mm or 32 mm G-rails. Because of the small dimensions, the PM 9000 can be mounted into small wall or clamp cases.

The PM 9000 is supplied with up to 100 ranges for measuring. The unit is able to work with many different input signals like analog signals or digital signals. Most of the available sensors can be connected to the PM 9000. By this way an efficient storekeeping is possible when using these instruments.

Up to 10 sets of parameters can be stored. The user is able to program up to 10 different cases of special applications needed. By a switch with 10 positions, the desired set of parameters can be selected in a short time.

By this way the costs for storekeeping as well as the idle time of a machine using this unit can be reduced.

To prevent the programming of the PM 9000 by unauthorized persons, the unit is supplied with a hidden programming button.

2. Safety Instruction

This instrument is produced in accordance with Class II of IEC 348 and VDE 0411. When delivered the instrument has been tested to meet all functions described. Before installing the instrument please read the mounting and servicing instructions.

We have no liability or responsibility to customer or any other person or entity with respect to any liability, loss or damage caused or alleged to be caused directly or indirectly by equipment or software sold or furnished by us. Read the installation instruction carefully. No liability is assumed for any damage caused by improper installation.

Inspect the instrument module carton for obvious damage. Be sure there are no shipping and handling damages on the module before processing. Do not apply power to the instrument if it has been damaged.

The warranty does not apply to defects resulting from action of the buyer, such as mishandling, improper interfacing, operation outside of design limits, improper repair or unauthorized modifications.

2.1. Symbol Explanation



Caution



Attention



Instruction



Tip

Caution: Will be used at **dangerous for life and health !**

Attention: Will cause **damage**

Instruction: If not noticed, **trouble** may occur

Tip: Useful hints for **better operation**

3. Mounting

3.1. Place Of Operation

Attention must be paid to the protection against humidity, dust, and high temperature at the place of operation

3.2. Mounting Of The PM 9000

The PM 9000 is supplied with an universal mounting for the two DIN-rails of 35 mm (DIN EN 50022 - 35 x 7,5 and DIN EN 50022 - 35 x 15) and 32 mm (DIN EN 50035 - G - 32).

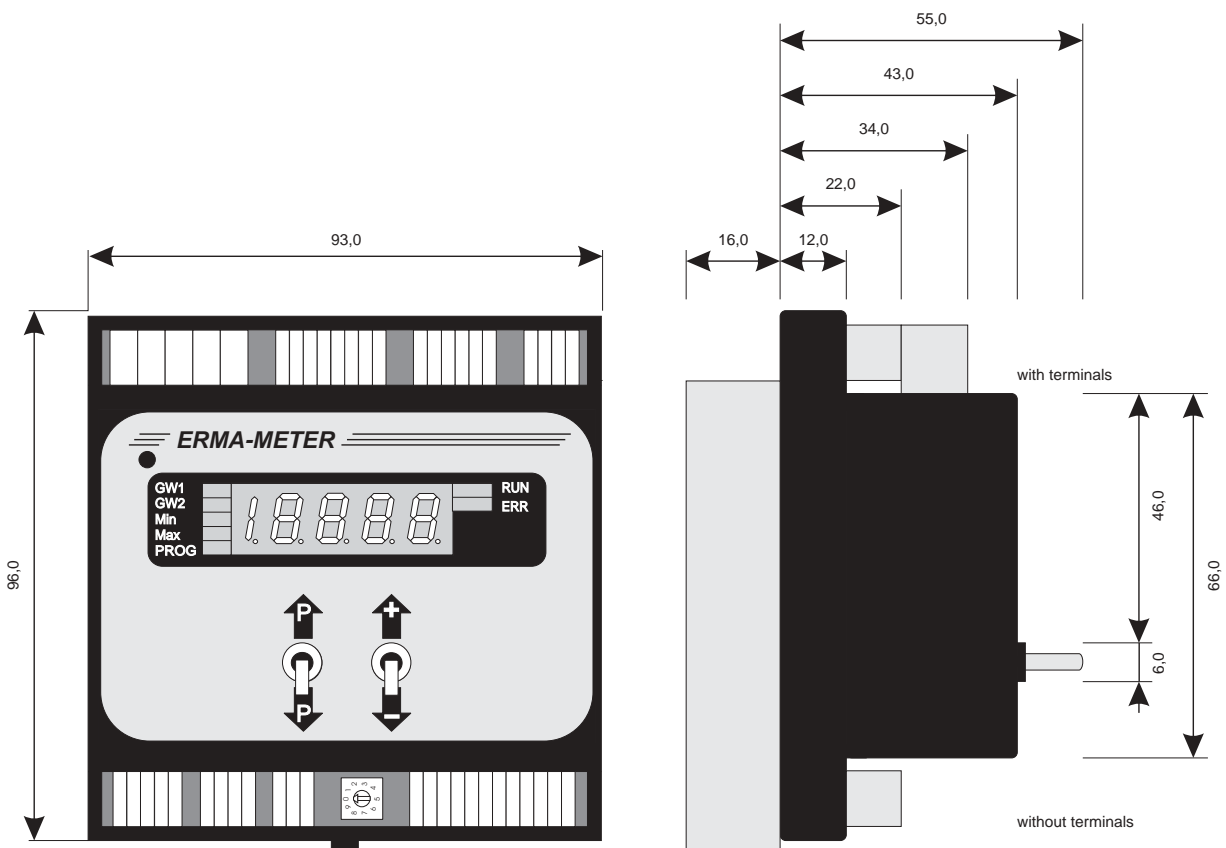


Figure 1

4. *Elektrical Connection*

4.1. *General Instructions*



- It is forbidden to plug or unplug connectors with voltage applied
- Attach input and output wires to the connectors only without voltages applied
- Cords must be provided with sleeves
- Attention must be paid that the power supply voltage applied will agree with voltage noticed at the name plate.
- The instrument has no power-on switch, so it is in operation as soon as the power is connected.

4.2. *Hints Against Noisy Envirement*

All inputs and outputs are protected against noisy environment and high voltage spikes. Nevertheless the location should be selected to ensure that no capacitive or inductive interference can have an effect on the instrument or the connection lines.

It is advisable:



- To use shielded cables.
- The wiring of shields and ground (0V) should be star-shaped.
- The distance to interference sources should be as long as possible. If necessary, protective screen or metal enclosures must be provided.
- Coils of relays must be supplied with filters.
- Parallel wiring of input signals and AC power lines should be avoided.

4.3. Connection And Pin Assignment

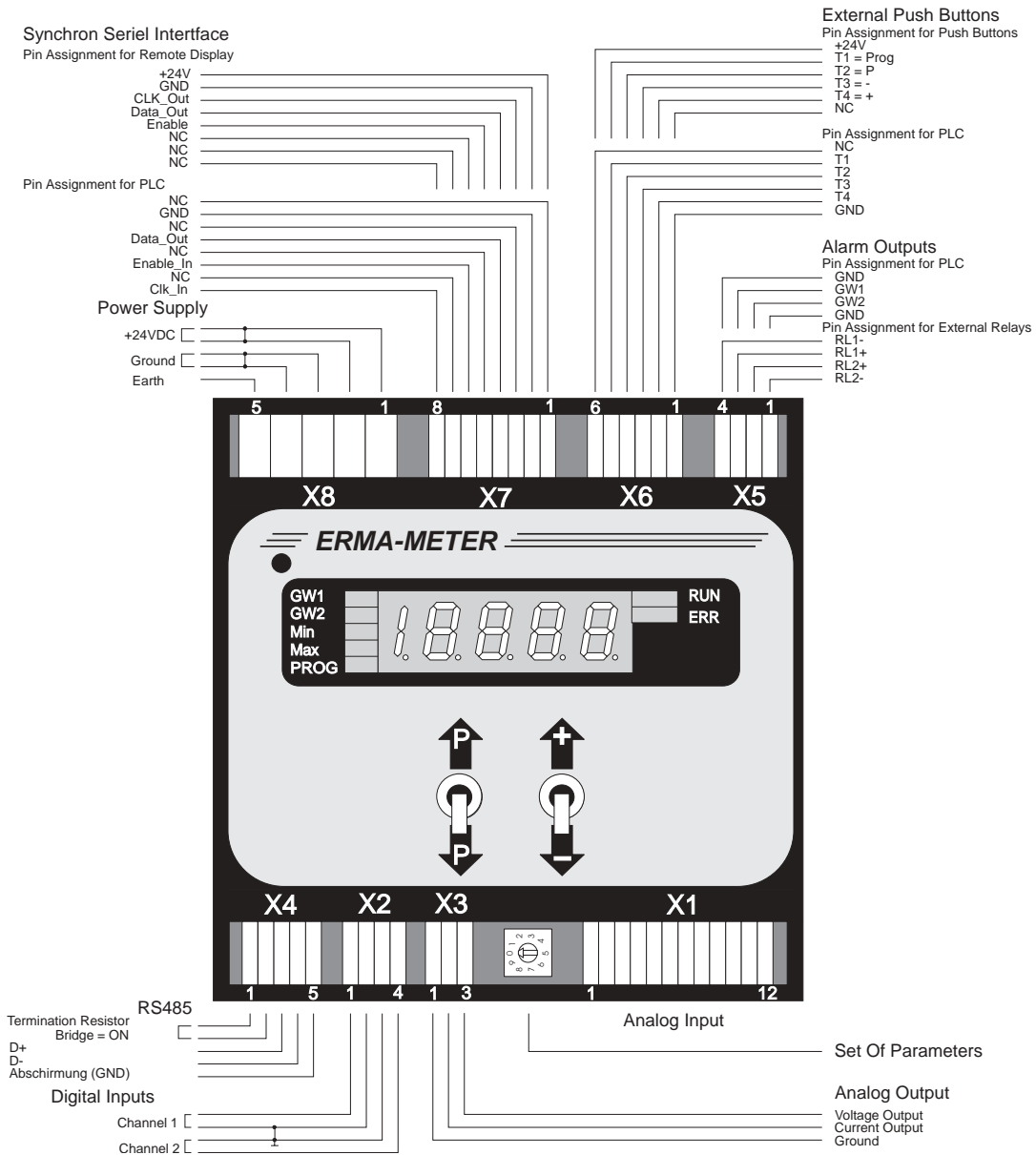


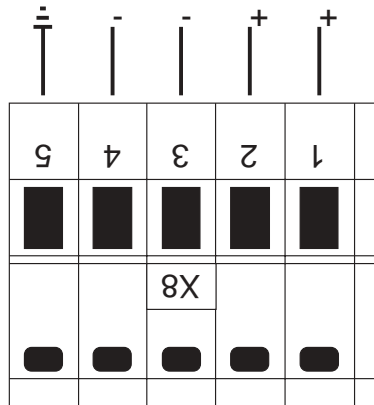
Abbildung 1



All inputs and outputs are connectors, designed as plug-in terminals Enclosed to the PM 9000 there is a special tool. This tool must be used for connecting the wires to the connectors X1 to X7. By this way damage to the connectors can be avoided.

4.4. Connection Of Power Supply Voltage

At the connector X8 there is an internal junction between terminal 1 and 2 and also an internal junction between terminal 3 and 4. By this way it is possible to make a Daisy Chain of the power supply to other instruments. Attention must be paid that the junction is only effective when the connector is plugged in.

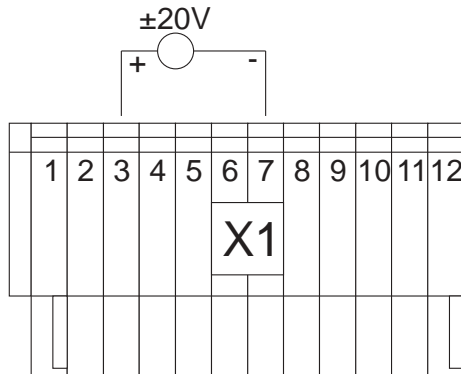


4.5. Connection Of Signal Inputs

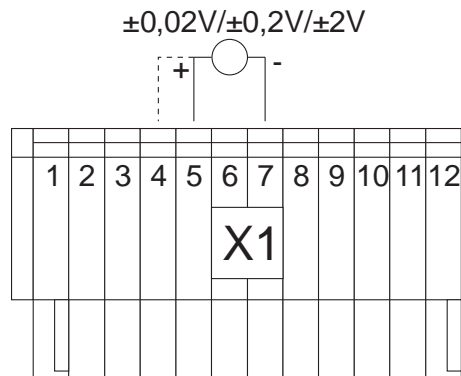
Analog signals are connected to terminal X1. There are many different possibilities for connections (see figure below).

		1	5V Sensor Supply
		2	0,75mA Current Output
		3	±20V Voltage Input
		4	±0,02/±0,2/±2V Voltage Input
		5	±0,02/±0,2/±2V Voltage Input
	X1	6	±20mA Current Input
		7	Measuring Ground
		8	Measuring Ground
		9	Potentiometer Input
		10	Ground for Sensor Supply/Current Output
		11	Reserved
		12	Reserved

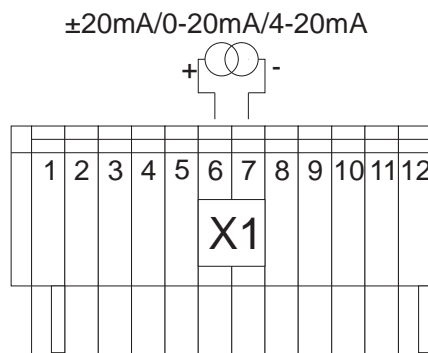
4.5.1. Input Voltage Range $\pm 20V$



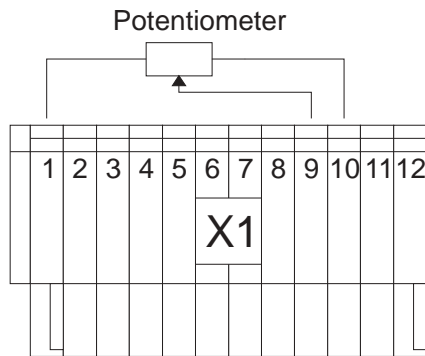
4.5.2. Input Voltage Ranges $\pm 2V$, $\pm 0,2V$ $\pm 20mV$



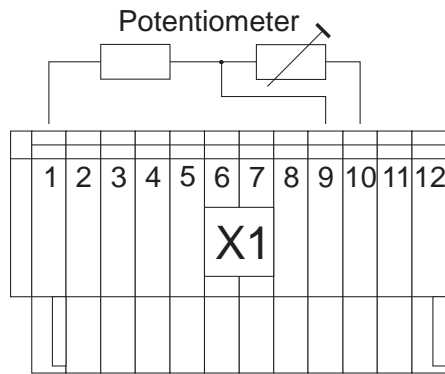
4.5.3. Input Current Ranges $\pm 20mA$, $0/4-20mA$



4.5.4. Potentiometers

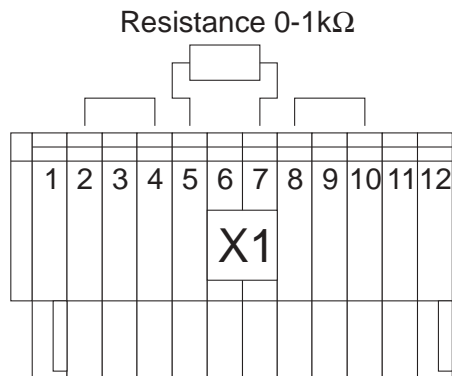


Version A

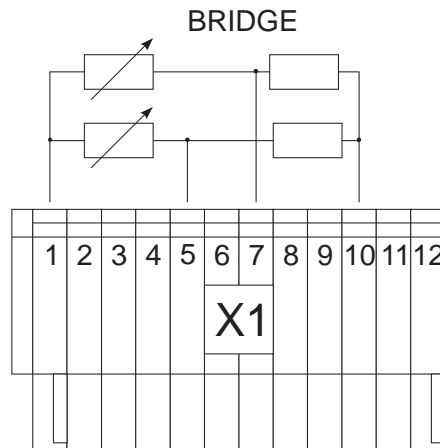


Version B

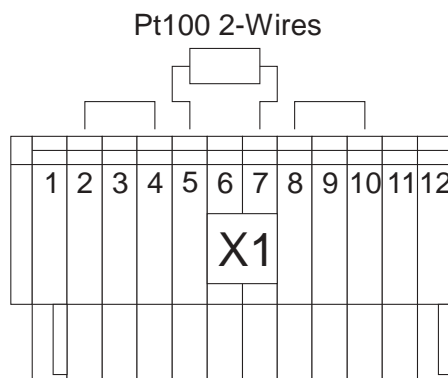
4.5.5. Resistive Sensors 0-1kΩ



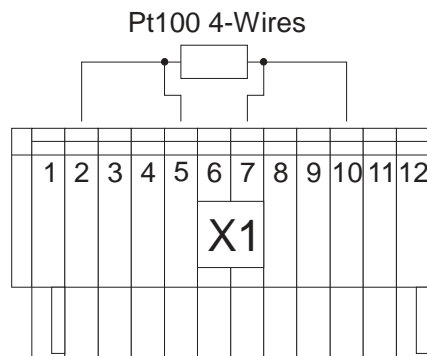
4.5.6. Strain Gage



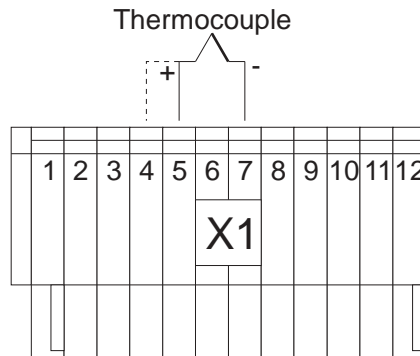
4.5.7. RTD Inputs (2-Wires)



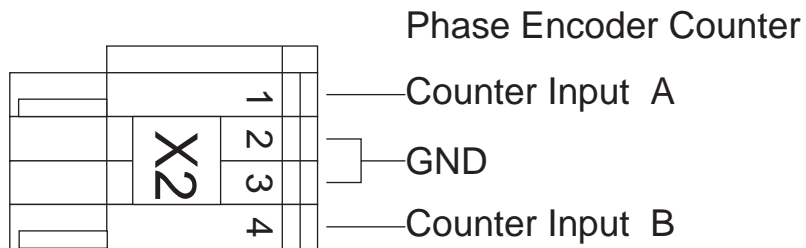
4.5.8. RTD Inputs (4-Wires)



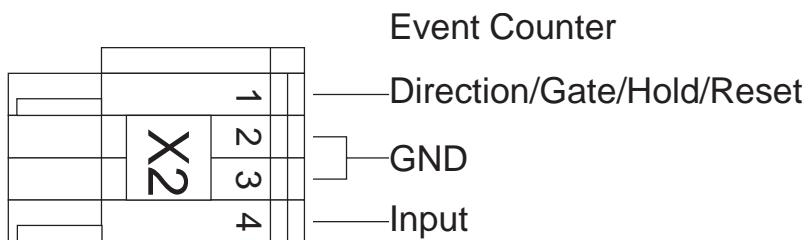
4.5.9. Thermocouple Inputs



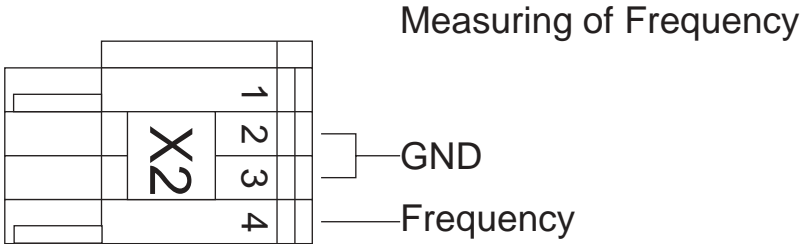
4.5.10. Incremental Inputs



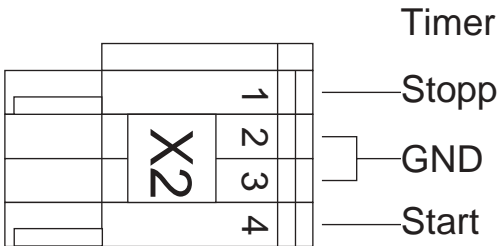
4.5.11. Counter Inputs



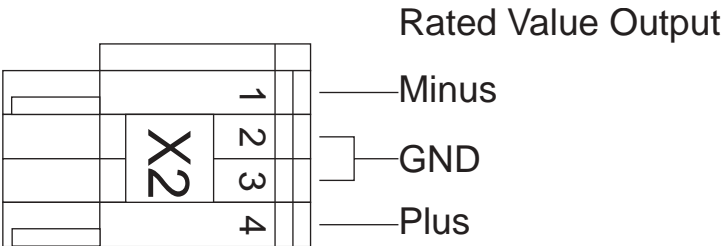
4.5.12. Frequency Measurement



4.5.13. Time Measurement



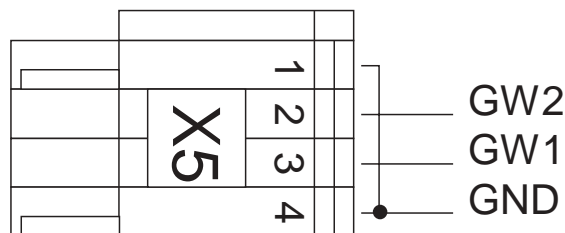
4.5.14. Rated Value



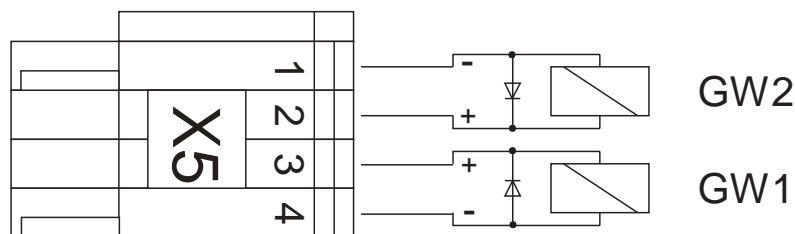
4.6. Connection Of Alarm Outputs

The instrument PM 9000 is supplied with two alarm outputs. These outputs are solid state outputs. The contacts are available at connector X5. One terminal of each contact is connected to the positive supply voltage of the PM 9000.

4.6.1. Connection To A PLC



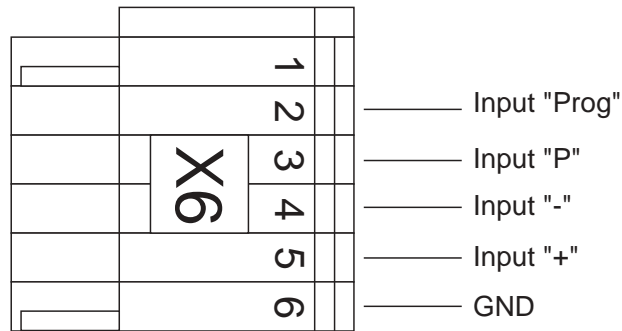
4.6.2. Connection To Power Relays



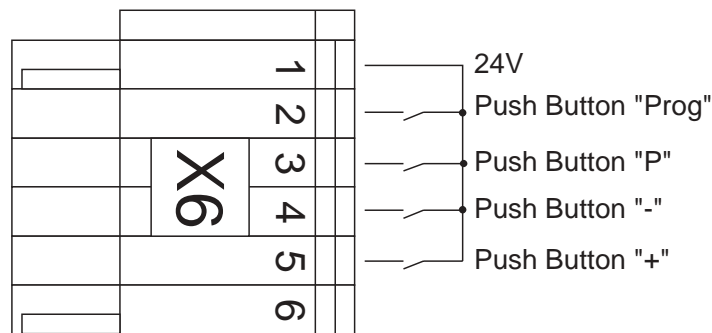
4.7. Connection Of External Push Buttons

There are some optical isolated digital inputs. With the aid of these inputs it is possible to programm functions and parameters of the PM 9000. Programming can be done via remote push buttons or by a PLC.

4.7.1. Connection To A PLC

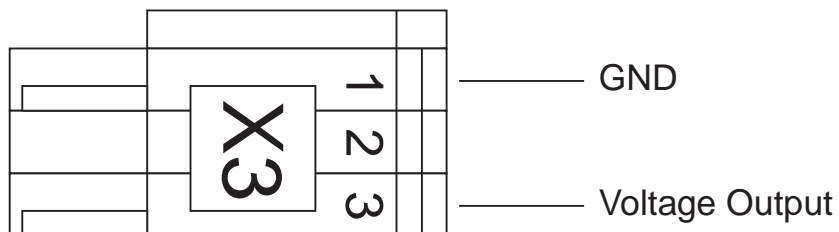


4.7.2. Connections Of Push Buttons

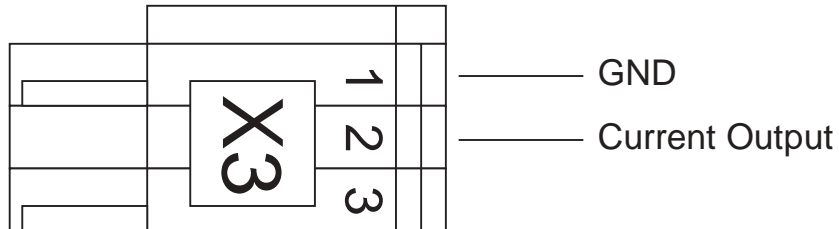


4.8. Connections Of The Analog Output

4.8.1. Analog Voltage Output



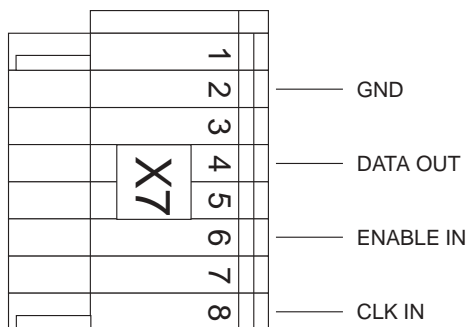
4.8.2. Analog Current Output



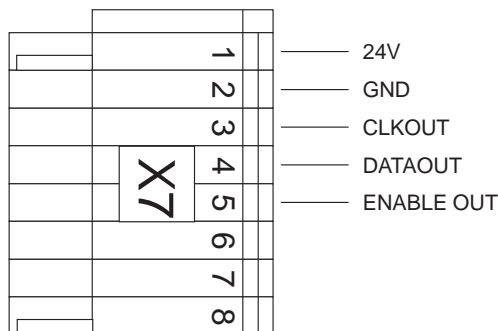
4.9. Connection Of The Synchron Serial Interface

4.9.1. Connection To A PLC

It is possible to transmit the measured values from the PM 9000 to an external unit like a PLC. In this case three ports of the PLC are used. If you want to read the values of more than one PM 9000 you need only one additional port for each additional PM 9000.



4.9.2. Connection Of The Remote Display FA 2511



5. Startup Procedure

Connect the power supply to the terminals X8 Pin 1/2 and Pin 3/4. During the initialisation the present set of parameters (PS-0 to PS-9) is displayed. After that the preselected display mode is active.

When delivered, the instrument is programmed with a standard configuration (default values). By programming the customer can change the standard configuration according to his measuring task.

Attention ! When the instrument is built in a machine and the customer wants to change the configuration, attention must be paid, that no damage will occur to the machine!

6. Recognizing The Present Modes

With the aid of the LEDs at the front of the PM 9000, you can recognize the present mode of measurement.

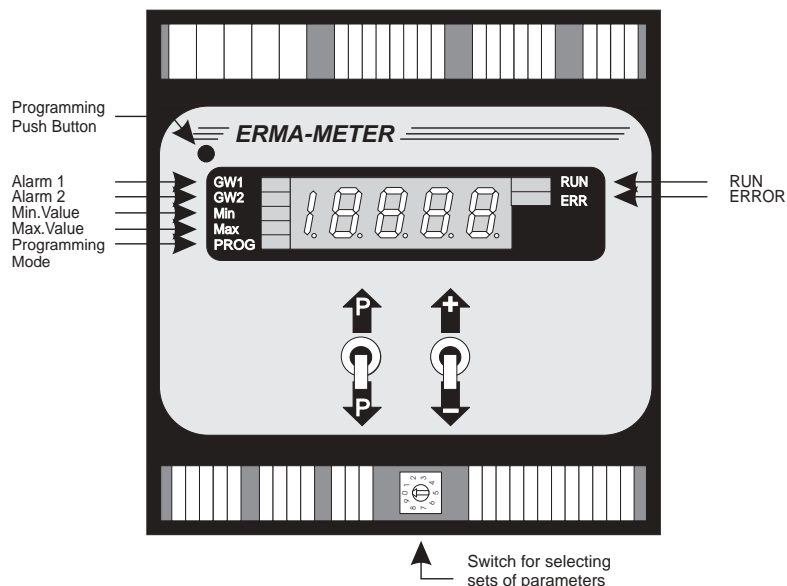


Figure 3

6. Recognizing The Present Modes

LED						Displayed Value	
X	X				L	measured resp. mean value	
X	X	L			L	minimal value	
X	X	B			L	minimal value displayed for 10 seconds	
X	X		L		L	maximal value	
X	X		B		L	maximal value displayed for 10 seconds	
L	X				L	alarm 1 is activated	
B					L	value of alarm 1 is displayed for 10 seconds	
				B	L	value of alarm 1 is edited	
X	L				L	alarm 2 is activated	
	B				L	value of alarm 2 is displayed for 10 seconds	
	B			B	L	value of alarm 2 is edited	
				L	L	programming mode is active	
				B	L	taring is active	
X	X	X	X	X	X	L	number of failure occurred is displayed
						LED ERR	
						LED RUN	
						LED PROG	
						LED max. value	
						LED min. value	
						LED alarm 2	
						LED alarm 1	

B = Flashing, L = Lighting, X = Indeterminate

7. Operation

With the aid of two toggle switches and a hidden push button **4 push button functions** can be realized. These 4 functions are marked as follows:

Function "PROG"	Actuating the programming push button with a small screwdriver (see figure 3 page 19)
Function "P"	Actuating the toggle switch "P" up or down
Function "+"	Actuating the toggle switch "+/-" up
Function "-"	Actuating the toggle switch "+/-" down

The terminals for connecting external push buttons are labelled in the same way and will fulfill the same functions.

8. Operating Modes

Using the normal operating mode without actuating the push buttons the programmed operating mode is displayed.

Besides the normal programming mode there is the possibility of a fast programming mode. Using the fast programming mode the 2 alarm values can be changed, the reset of max. or min. values can be performed, taring of the measured value is possible, counter values can be set, and many other functions can be done.

- **Display of alarm value 1**

Actuating the toggle switch "+" or "-" as long as the LED alarm 1 starts flashing. Now the alarm value 1 is displayed for about 10 seconds. After that time the display returns to the normal operating mode.

- **Editing of alarm value 1**

The first step is to display the alarm value 1, as described before. Then by pushing the button "P" the editing mode of alarm value 1 is opened. The flashing of the LED alarm 1 and the LED PROG displays the state of the editing mode. The alarm value 1 can be changed by the push button "+" and "-". The changed alarm value is stored by pushing button "P". The editing mode ends automatically after 10 seconds, if no button is actuated. In this case the changed alarm value is not stored. By this way you can interrupt the editing mode. **The alarm value 1 can be changed even if the alarm outputs are deactivated!**

- **Display of alarm value 2**

Actuating the toggle switch “+” or “-” as long as the LED alarm 2 starts flashing. Now the alarm value 2 is displayed for about 10 seconds. After that time the display returns to the normal operating mode.

- **Editing of alarm value 2**

The first step is to display the alarm value 2, as described before. Then by pushing the button “P” the editing mode of alarm value 2 is opened. The flashing of the LED alarm 1 and the LED PROG displays the state of the editing mode. The alarm value 2 can be changed by the push button “+” and “-”. The changed alarm value is stored by pressing the push button “P”. The editing mode will end automatically after 10 seconds, if no button is actuated. In this case the changed alarm value is not stored. By this way it is possible to interrupt the editing mode. **The alarm value 2 can be changed even if the alarm outputs are deactivated!**

- **Displaying the min. value**

Actuating the toggle switch “+” or “-” as long as the LED min. value starts flashing. Now the min. value is displayed for about 10 seconds. After that time the display returns to the normal operating mode.

If the source of the displayed value is already the min. value, the LED min. value is lighting.

- **Erasing the min. value**

The first step is to display the min. value, as described before. Then by pressing the push button “P” the min. value is erased.

- **Displaying the max. value**

Actuating the toggle switch “+” or “-” as long as the LED max. value starts flashing. Now the max. value is displayed for about 10 seconds. After that time the display returns to the normal operating mode.

If the source of the displayed value is already the max. value, the LED max. value is lighting.

- **Erasing the max. value**

The first step is to display the max. value, as described before. Then by pressing the push button “P” the max. value is erased.

- **Taring of the measured value, erasing the tared value**

Actuating the toggle switch “+” or “-” as long as the measured value is displayed. By pressing the push button “P” the tare mode is entered. The LED PROG starts flashing.

8. Operating Modes

By pressing the toggle switch to “+” the displayed value is stored as tare value and the displayed value is 0. Pressing the toggle switch to “-” the tared value is set to zero.

- **Presetting the counter**

(only when using the counter mode)

The presetting of the counter acts in a similar way like taring.

- **Changing the rated value by the push buttons**

(only when using rated value mode)

The changing of the rated value acts in a similar way like taring. Pressing “+” will increase, pressing “-” will decrease the rated value.

8.1. Overview Of Handling The PM 9000

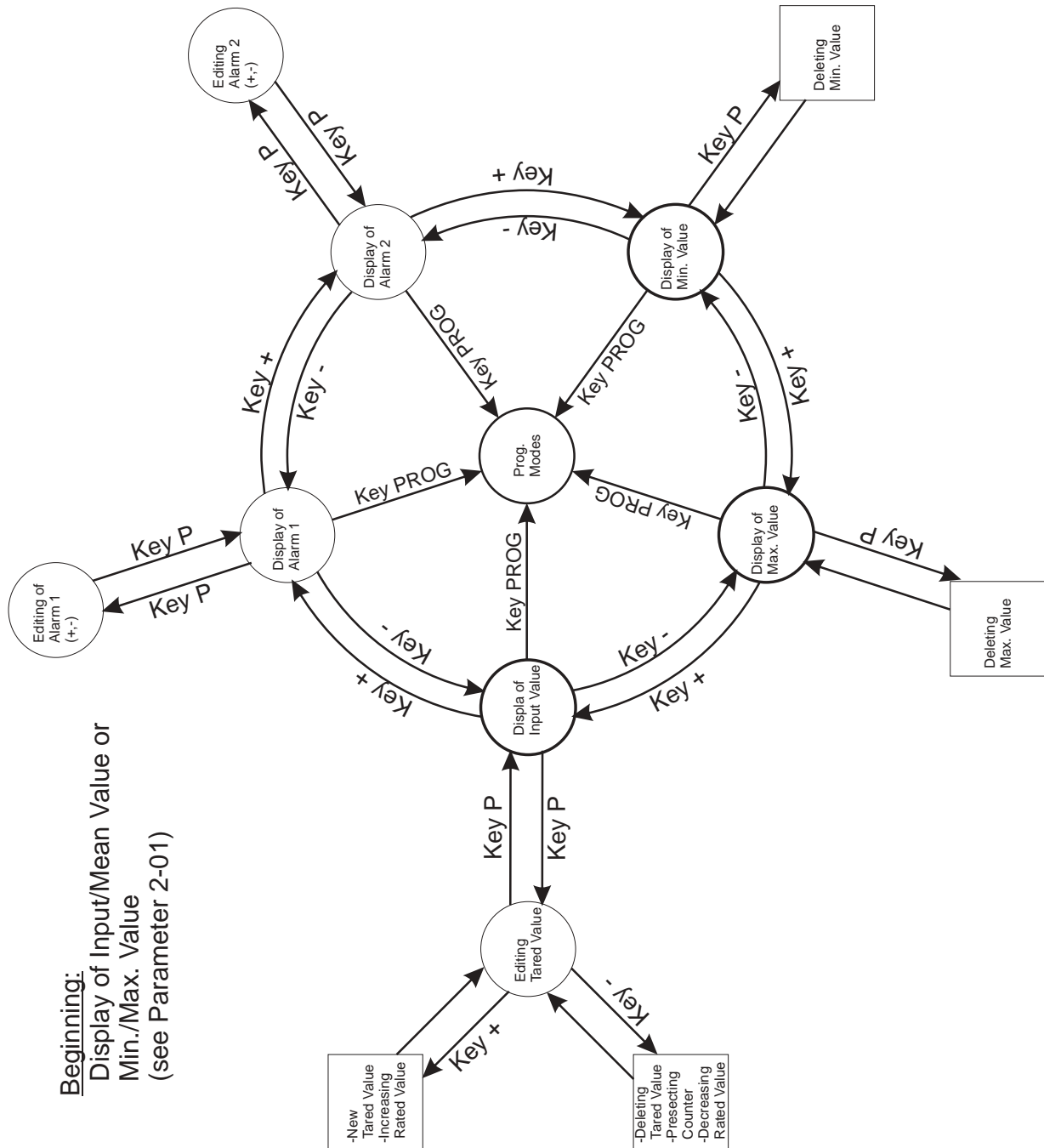


Figure 4

9. Programming

The operation respectively the programming of the unit is divided into several levels. Using the programming levels many parameters can be stored. The programming mode is entered by pressing the push button "PROG".

The push button "PROG" is located inside of the unit. By this way it shall be prevented that unauthorized people will change the stored parameters.

There is a small hole in the front. Only with the aid of a small screwdriver the push button "PROG" can be activated.

The stored parameters can be checked or altered any time. All of them are failsave buffered.

10 sets of parameters can be stored. If a new set of parameters is chosen this new set is effective only when the unit is started again!

9.1. Altering Or Testing Of Parameters

- **Starting the programming mode**

Activate the push button "Prog" - LED PROG is lighting green - P-00 appears at the display. Lighting of LED RUN means, that the unit is measuring with the current parameters despite of the programming.

- **Closing the programming mode**

By pressing the push button "+" or "-" select the display **PEnd** - activate push button "P" - LED PROG is switched off - normal operation will start using the changed parameters.

- **Interrupting the programming mode**

The programming mode can be stopped any time by pressing the push button "PROG". In this case the old parameters are used.

- **Selecting the first programming level**

Starting the programming mode as described. Select the desired programming level with the aid of the toggle switch "+" or "-" (P-00, P-01...).

- **Selecting the second programming level**

The second programming level is entered by pressing the push button "P". At the display appears 0-00, 1-00, ...

- **Closing the second programming level**

Select with the aid of the toggle switch "+" or "-" the display "xEnd" - activating push button "P" - will perform a jump to the first programming level.

- **Selection of parameters**
Select with the aid of the toggle switch “+” or “-” the desired parameter.
- **Editing of the selected parameter**
By pressing push button “P”, the value of the stored parameter appears at the display.
- **Editing and storing the selected parameters**
Using push button “+” or “-”, the displayed parameter can be changed. Storing is performed by pressing push button “P”. The program returns to the second programming level.

9.2. Description Of The Programming Levels

The user can program the unit with different parameters which are needed for a distinct function. The parameters can be selected and edited. For this task there are several programming levels available. The parameters should be programmed before using the unit.

P-00: Programming the input configuration

This item is designated for adjusting of input ranges, calibration, mean value mode, and values for corrections.

P-01: Linearization for up to 10-points

There is the possibility to linearize the transfer characteristic of the displayed value related to the input signal. Up to 10 points of linearization can be programmed.

P-02: Programming of alarm values

Different signals can be surveilled by two alarm values. Programming of the alarm values themselves, their hysteresis, rise time delay, fall time delay, and data source can be performed.

P-03: Programming of the display

Many different values can be displayed. With the aid of this programming level the data source displayed can be selected. In addition also points and the reaction of the last digit can be selected.

P-04: Programming of the analog output signal

With this programming level the range of the analog output the data source for the analog output can be programmed.

P-05: Programming of the synchron serial interface

With this programming level the mode of the synchron serial interface can be programmed.

9.3. Programming Of The Analog Input

Using the programming level P-00 an adjustment of the input configuration can be done.

Param.	Description	Range	Defdault value
0-00	measuring ranges	0 .. 41	0
	0 voltage -20V to +20V . (-2000/+2000)		
	1 voltage -2V to +2V . . . (-2000/+2000)		
	2 voltage -0,2V to +0,2V . (-2000/+2000)		
	3 voltage -20mV to +20mV (-2000/+2000)		
	4 current -20mA to +20mA (-2000/+2000)		
	5 current 0mA to 20mA . (0/2000)		
	6 current 4mA to 20mA . (400/2000)		
	7 potentiometer 0 to 100% . . . (0/1000)		
	8 resistance 0 to 1K Ω (0/1000)		

9. Programming

0-00	9	Strain Gage 1mV/V -100% to +100% (-1000/+1000)	0 .. 41	0
	10	Strain Gage 1,5mV/V -100% to +100% (-1000/+1000)		
	11	Strain Gage 2mV/V -100% to +100% (-1000/+1000)		
	12	Strain Gage 2,5mV/V -100% to +100% (-1000/+1000)		
	13	Strain Gage 3mV/V -100% to +100% (-1000/+1000)		
	14	Strain Gage 3,3mV/V -100% to +100% (-1000/+1000)		
	15	Pt100 2-Wires -200°C to +800°C(-2000/+8000)		
	16	reserved		
	17	Pt100 4-Wires -200°C to +800°C(-2000/+8000)		
	18	Thermocouple FeCuNi (J) -100°C to +1000°C(-100/+1000)		
	19	Thermocouple NiCrNi (K) -100°C to +1300°C(-100/+1300)		
	20	Thermocouple PtRhPt (S) 0°C to +1750°C (0/+1750)		
	21	Temperature of Compensation -20°C to +70°C (-20/+70)		
	22	Incremental Counter 4fold -9999 to +99999 (-9-999/+99999)		
	23	Incremental Counterr 2-fold -9999 to +99999 (-9999/+99999)		
24	Incremental Counter 1-fold -9999 to +99999 (-9999/+99999)			
25	Counter with Direction Input -9999 to +99999 (-9999/+99999)			

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0-00	26	Up-Counter with Gate Input -9999 to +99999 (-9999/+99999)	0 .. 41	0
	27	Down-Counter with Gate Input -9999 to +99999 (-9999/+99999)		
	28	Up-Counter with Hold Input -9999 to +99999 (-9999/+99999)		
	29	Down-Counter with Hold Input -9999 to +99999 (-9999/+99999)		
	30	Up-Counter with Reset Input (Transition) -9999 to +99999 (-9999/+99999)		
	31	Down Counter with Reset Input (Transition) -9999 to +99999 (-9999/+99999)		
	32	Up-Counter with Reset Input (Level) -9999 to +99999 (-9999/+99999)		
	33	Down-Counter with Reset Input (Level) -9999 to +99999 (-9999/+99999)		
	34	Frequency Measurement 0,1 to 9999,9Hz (+1/+99999)		
	35	Frequency Measurement 0,01 to 999,99Hz (+1/+99999)		
	36	Puls/Minute 0 to 99999/min . (0/+99999)		
	37	Puls/Hout 0 to 99999/h . . (0/+99999)		
	38	Period Time 0,1 to 9999,9s . (+1/+99999)		
	39	Puls Duration 0,1 to 9999,9s . (+1/+99999)		
40	Timer 0,1 to 9999,9s . (+1/+99999)			
41	Rated Value -9999 to +99999 (-9999/+99999)			

9. Programming

0-01	User calibration Beginning of the display range	-9999 .. +99999	Normal value
0-02	User calibration Signal value at 0-01 (Preselected value for counters, Steps for rated value)	see limits in 0-00	Normal value
0-03	User calibration end of the display range	-9999 .. +99999	default value
0-04	User calibration signal value for 0-03 (multiplication factor for counter 0,001 to 99,999) (Not when rated value)	see max. min.values in 0-00	default value
0-05	Mean value 0 no mean value 1 no mean value X number of mean value cycles	0 .. 255	0
0-06	Data source for max./min. value 0 input signal 1 mean value	0 .. 1	0
0-07	Reset time for max./min.value 0 no reset X reset time (seconds)	0 .. 255	0
0-08	Measurement of temperature 0 display with °C 1 display with °F 2 display with Kelvin (only when measurement of temp.)	0 .. 2	0
0-09	Resistance of wires Pt100 2-wires (0-100,0Ω) (only when Pt100-2-wires activated)	0 .. 1000	0
0-10	Temperature compensation 0 without compensation 1 with compensation 2 const. compensation (0-11) (only when thermocouple activated)	0 .. 2	0

0-11	Constant compensation -20,0 to +70,0°C (only when thermocouple activated)	-200 .. +700	0
0-12	Reserved	0	0
0End	Releasing programming level P-00		

Hint!



The gray parameters are reserved and will be used in the future!

User calibration

The adjustment of the display range to the physical input signal can be done by digital adaptation of the displayed values as well as corresponding input signals.. The display of overranging or underranging will only occur when the selected range is exceeded by more than 5% with the exception of:

- decimal point programmed at digit 4, no negativ values possible (see 2-00)
- programmed max. display range 99999
- programmed min. value -9999.

Hint



After the adjustment of parameter 0-00, 0-01 and 0-03, it is possible that the programmed alarm values and the programmed analog output range exceeds the programmed display range. In this case these parameters are resetted!

Changing of the parameters 0-02 and 0-04 is possible without a resetting of the alarm values or the analog output range.

Mean value

The parameter 0-05 is planned for the adjustment of the mean value. The mean value for up to 255 measurements can be selected. By this way a filter of the first order for max. 255 values can be realized. The displayed value will increase or decrease corresponding to an e-funktion. By programming a mean value factor of 0/1 this function is disabled. The displayed mean value is then behaving like the current input value!

9.4. 10-Point-Linearization

There is the possibility of an adjustment of the transfer function with up to 10 points. **This adjustment is only available when using the ranges 0 to 14!**

Param.	Description	Range	default value
1-00	Number of points	2 .. 10	2
1-01	Input value for point 1	±Display range	Value of 0-01
1-02	Output value for point 1	±Display range	Value of 0-01
1-03	Input value for point 2	±Display range	Value of 0-01
1-04	Output value for point 2	±Display range	Value of 0-01
1-05	Input value for point 3	±Display range	Value of 0-01
1-06	Output value for point 3	±Display range	Value of 0-01
1-07	Input value for point 4	±Display range	Value of 0-01
1-08	Output value for point 4	±Display range	Value of 0-01
1-09	Input value for point 5	±Display range	Value of 0-01
1-10	Output value for point 5	±Display range	Value of 0-01
1-11	Input value for point 6	±Display range	Value of 0-01
1-12	Output value for point 6	±Display range	Value of 0-01
1-13	Input value for point 7	±Display range	Value of 0-01

1-14	Output value for point 7	±Display range	Value of 0-01
1-15	Input value for point 8	±Display range	Value of 0-01
1-16	Output value for point 8	±Display range	Value of 0-01
1-17	Input value for point 9	±Display range	Value of 0-01
1-18	Output value for point 9	±Display range	Value of 0-01
1-19	Input value for point 10	±Display range	Value of 0-01
1-20	Output value for point 10	±Display range	Value of 0-01
1End	Releasing programming level P-01		

Linearisation of the input signals

- only possible for the ranges from 0 to 14 (not for RTD, Thermocouple or digital measuring ranges)

How to programm linearisation points.

- Write the number of linearisation points (parameter 1-00)
- Write the linearisation points, consisting of an input value and an output value.
- When releasing the programming of linearisation points, they are sorted in a rising order.

Reset of linearisation points by

- Changing of parameters 0-01 to 0-04
- Switching over to an other range (0-00)

Reset of the linearization

- number of linearization points = 2 (1-00)
- Linearization point 1 = Value of parameter 0-01
- Linearization point 2 = Value of parameter 0-03

9.5. Programming Level For Alarmfunctions

Using the programming level P-02 an adjustment of the alarmfunctions can be done with up to 10 points.

Param.	Description	Range	Default value
2-00	Alarm 1, Configuration 0 Alarm off 1 Contact closed by low limit 2 Contact closed by high limit 3 Contact open by low limit 4 Contact open by high limit	0 .. 4	0
2-01	Alarm 1, data source 0 Input signal 1 Mean value 2 Min. value 3 Max. value	0 .. 3	0
2-02	Alarm 1, alarm level	± max. prog. display	0
2-03	Alarm 1, hysteresis	0 .. 2000	0
2-04	Alarm 1, fall time delay 0 no delay X delay (seconds)	0 .. 255	0
2-05	Alarm 1, rise time delay 0 no delay X delay (seconds)	0 .. 255	0

9. Programming

2-06	Alarm 2, Configuration 0 Alarm off 1 Contact closed by low limit 2 Contact closed by high limit 3 Contact open by low limit 4 Contact open by high limit	0 .. 4	0
2-07	Alarm 2, data source 0 Input signal 1 Mean value 2 Min. value 3 Max. value	0 .. 3	0
2-08	Alarm 2, alarm level	± max. prog. Anzeigewert	0
2-09	Alarm 2, hysteresis	0 .. 2000	0
2-10	Alarm 2, fall time delay 0 no delay X delay (seconds)	0 .. 255	0
2-11	Alarm 2, rise time delay 0 no delay X delay (seconds)	0 .. 255	0
2End	Relasing P-02		

9.5.1. Alarmfunctions

Data sources listed below can be surveilled by alarm values:

- Input signal
- Mean value
- Max. value
- Min. value

Message of alarmfunctions

- Solid state relays
- LED's

Reset of alarm parameters

- Changing of parameter 0-01 or 0-03
- Selecting an other measuring range (0-00)

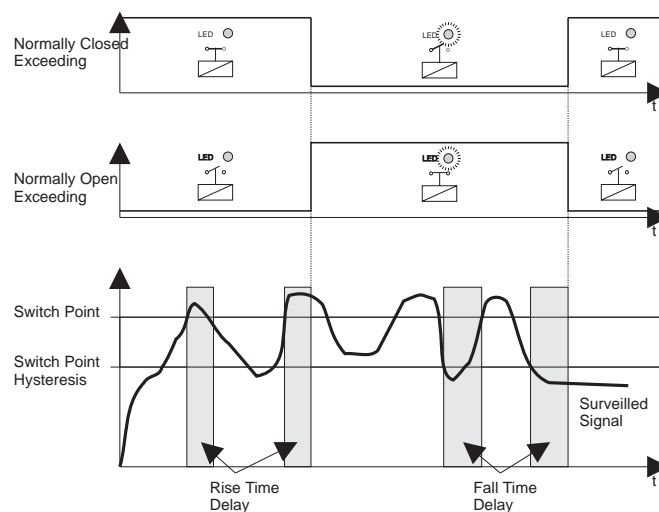
Reset of alarm

- By parameter 0-01
- Switching off of the alarm

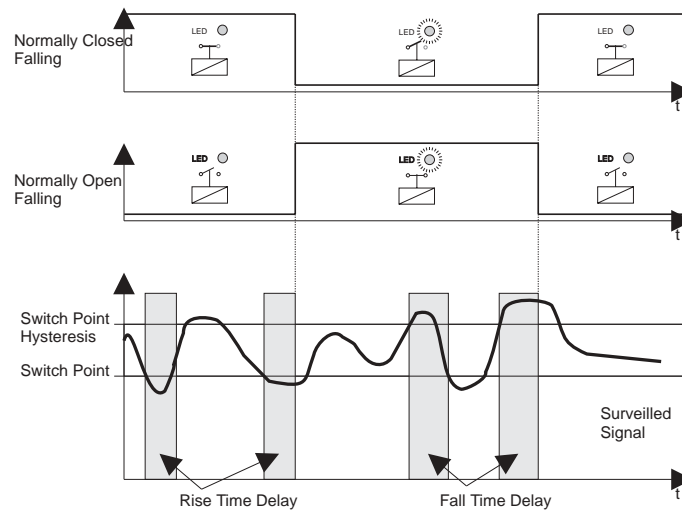
Programmable function for each alarm

- Data source
- Alarm level
- Hysteresis
- Rise and fall time
If the input signal exceeds the programmed alarm value, the responding time of the relay is delayed. If the input signal is falling short within this time the relay doesn't react.
- Behaviour of switching
Reacting of the relays when signal surveilled crosses the alarm value.

9.5.2. Alarm High Setpoint



9.5.3. Alarm Low Setpoint



Description of the configuration of the alarmfunctions:

Adjustm.	Function	Condition
1	Contact closed Contact open	$MW \leq GW$ $MW \geq GW + HYS$
2	Contact closed Contact open	$MW \geq GW$ $MW \leq GW - HYS$
3	Contact open Contact closed	$MW \leq GW$ $MW \geq GW + HYS$
4	Contact open Contact closed	$MW \geq GW$ $MW \leq GW - HYS$

MW = Value, GW = Alarm point, HYS = Hysteresis

Fall time delay/rise time delay

Can be adjusted from 0 to 255 sec. for each alarm output separately. If the alarm point is crossed, the relay is only activated when the crossing is longer than the delay time programmed.

9.6. Programming Level For The Display

These parameters determine the mode of the display. It is possible to select points, data source, and the function of the last digit.

Param.	Description	Range	Default value
3-00	Decimal Points 0 XXXXX Display range -9999 to 99999 1 XXXX.X Display range -999.9 to 9999.9 2 XXX.XX Display range -99.99 to 999.99 3 XX.XXX Display range -9.999 to 99.999 4 X.XXXX Display range 0 to 9.9999 (not when temperature measurement!)	0 .. 4	0
3-01	Data source 0 Measured value 1 Mean value 2 Min. value 3 Max. value	0 .. 3	0
3-02	Configuration of the last digit 0 Display steps = 0, 1, 2, 3... 1 Display steps = 0, 2, 4... 2 Display steps = 0, 5 3 Display steps = 0	0 .. 3	0
3End	Releasing P-03		

Hint:



If the point at the most significant position is set (Parameter 3-00 = 4), no negativ values can be displayed!

Configuration of the least significant digit (digit 1)

For calming down the display, it is possible to program the least significant digit in such a manner, that this digit displays in predetermined steps of 1, 2, 5, or 10. This can be done by the parameter in 3-02.

9.7. Programming Level For The Analog Output

Using the programming level P-04 an adjustments of the analog output can be done.

Param.	Description	Range	Default value
4-00	Configuration of analog output 0 0 .. 10 V 1 0 .. 20 mA 2 4 .. 20 mA 3 0 .. 20mA 22mA open thermocouple 4 4 .. 20mA 22mA open thermocouple 2mA at failure	0 .. 4	0
4-01	Data source for analog output 0 Input signal 1 Mean value 2 Min. value 3 Max. value	0 .. 3	0
4-02	Display for min. analog output value	± min. prog. display	0
4-03	Display for max. analog output value	± max. prog. display	20 000
4End	Releasing P-04		

Min. value and max. value of the analog output can be freely programmed provided that the values are within the programmed display range. When changing item 0-01 (min.displayed value) or 0-02 (max. displayed value) or 0-00 (measuring range), the value programmed in 4-01 is set to the value of 0-01 and the programmed value of 4-02 to the value of 0-02.

9.8. Programming Of The Synchron Serial Interface

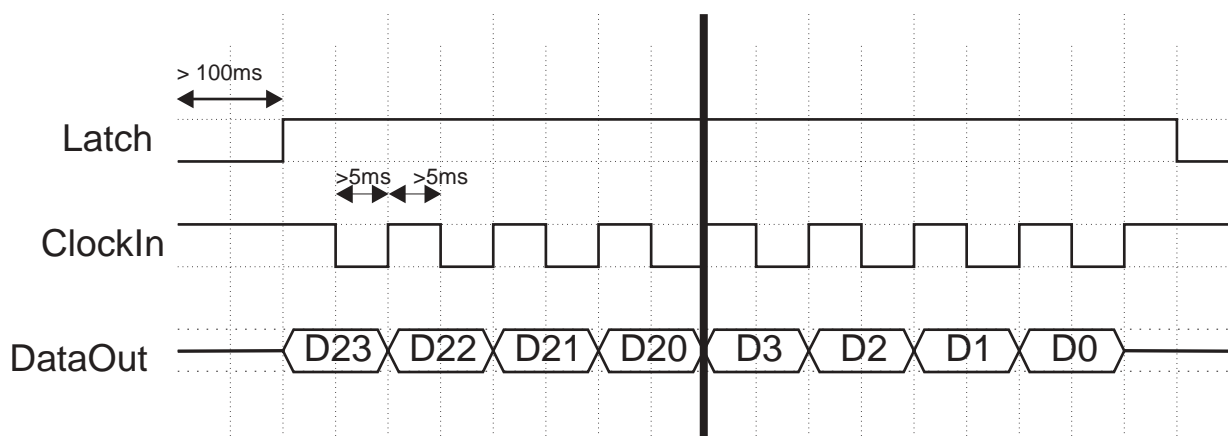
Using the programming level P-05 an adjustments of the synchron serial interface can be done.

Param.	Description	Range	Default value
5-00	0 No interface	0 .. 2	2
	1 Interface SPS-Mode		
	2 Interface FA 2511-Mode		
5End	Releasing P-05		

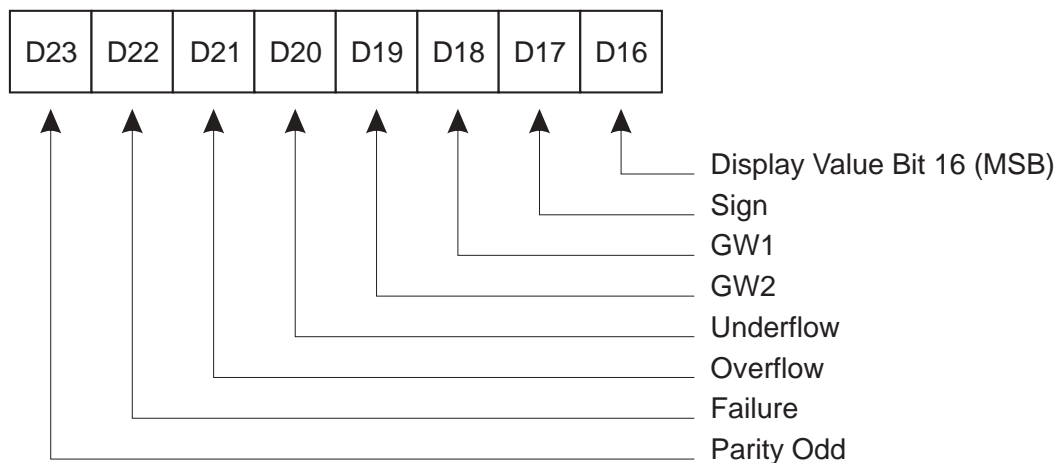
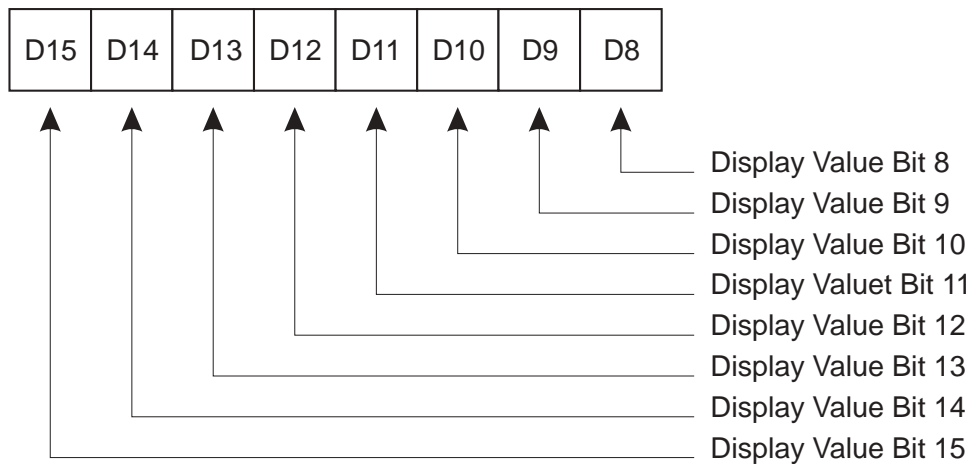
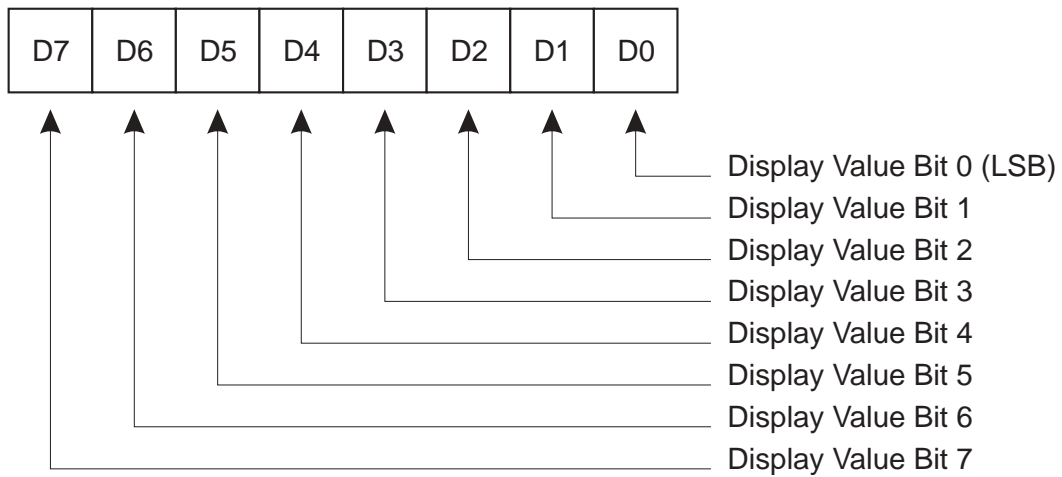
The synchron serial Interface (SSS) serves for the communication between the PM 9000 and a PLC or for a remote display. When using a PLC, only 3 digital I/O ports are required. The PLC must not have any expensive additional unit.

9.8.1. SSS Using PLC-Mode

In this case the SSS of the PM 9000 is controlled by a PLC or a PC supplied with digital I/Os. The timing diagram for the communication is shown below. The timing is determined by the PLC respectively the PC.



9. Programming

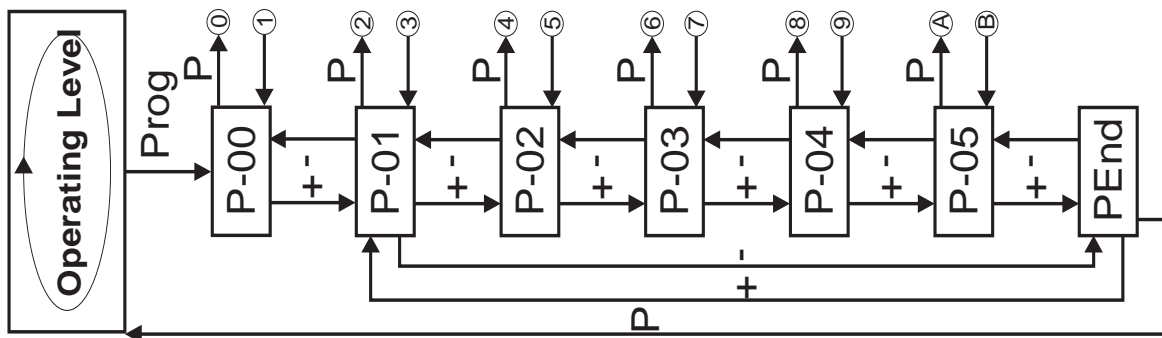
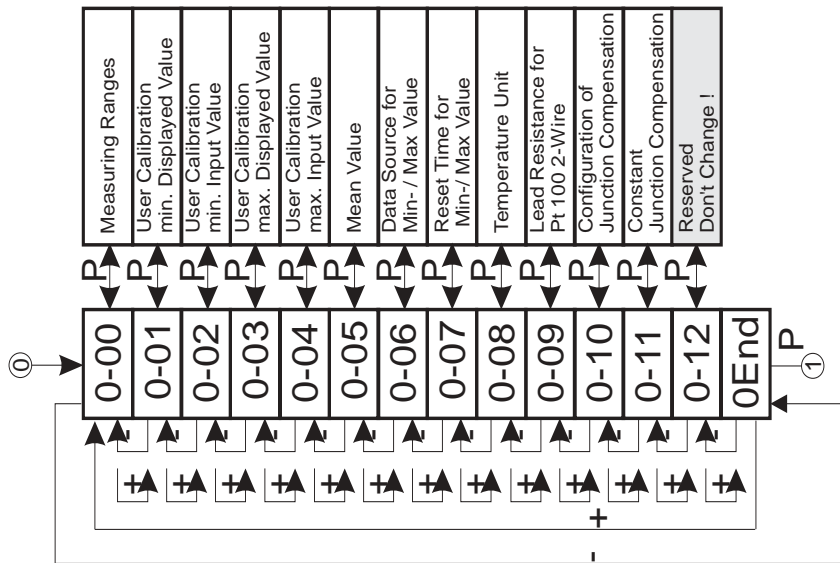
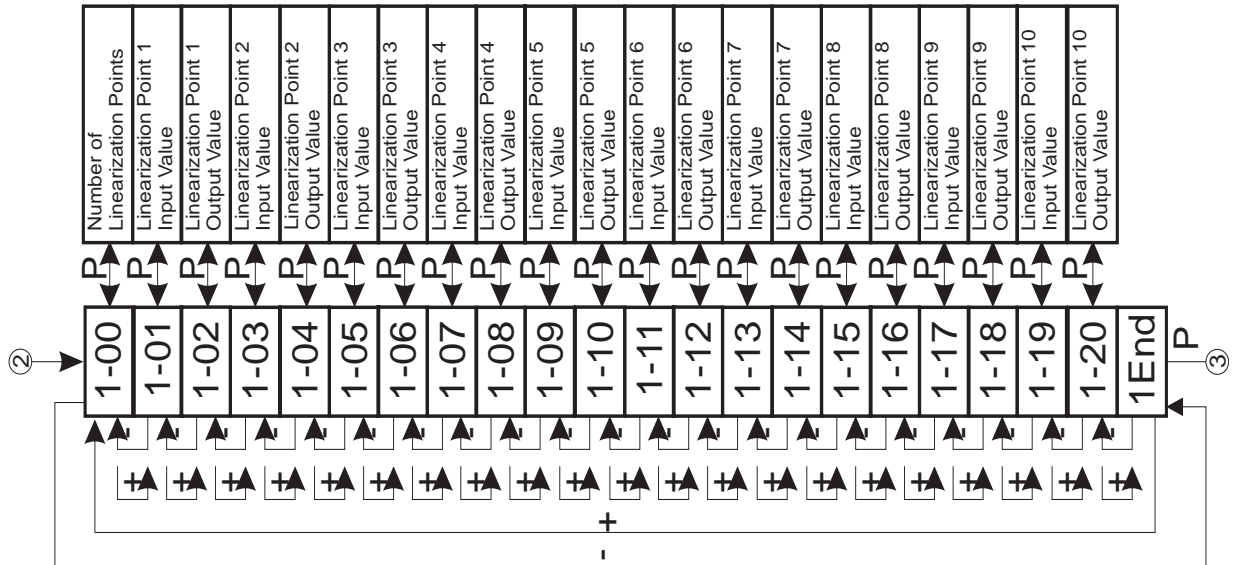


If the flags **Overflow or **Underflow** are set, the value 0 is sent to the external host!**

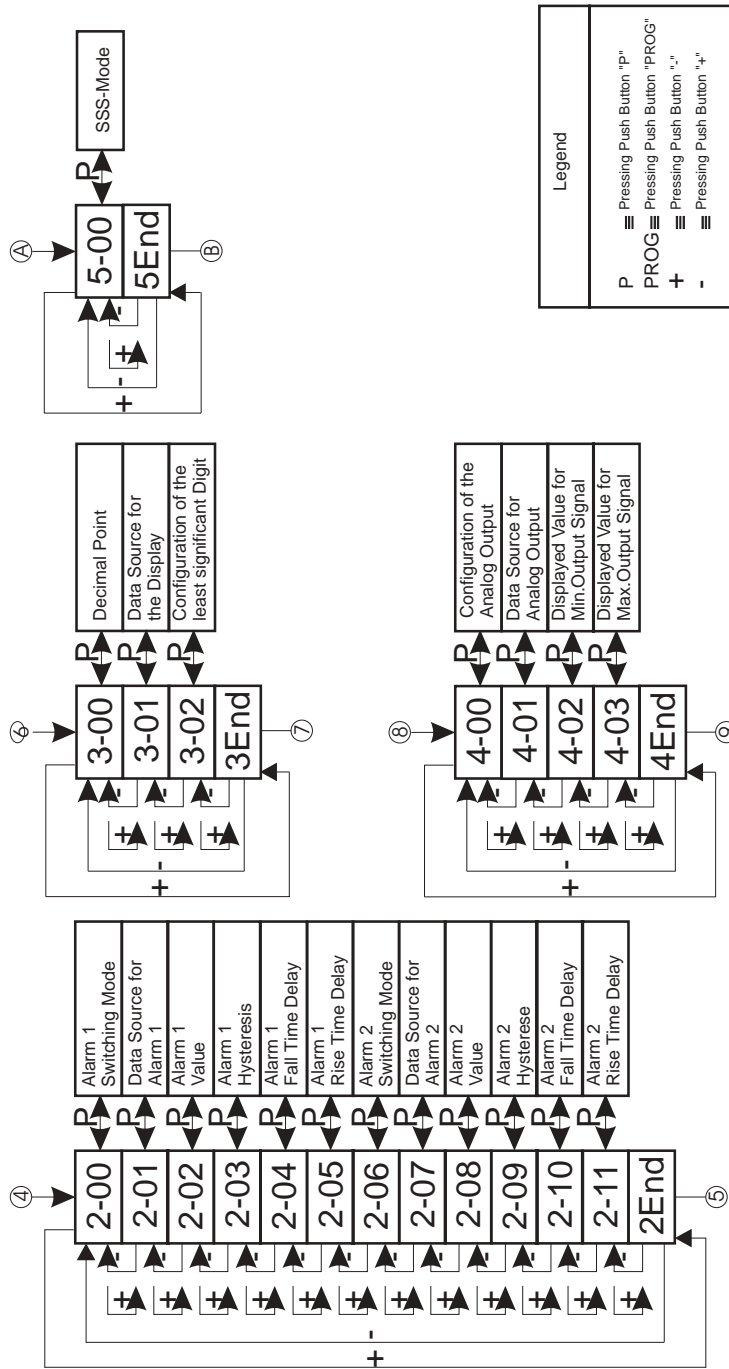
9.8.2. SSS Using FA 2511-Mode

This mode serves for controlling an external display by the PM 9000. The timing corresponds to that of the display driver MC 14489 of MOTOROLA. By this way a low-priced remote display can be used. A display of that type, **model FA 2511**, is available from ERMA-Electronic, D-78194 Immendingen.

9.9. Programming Quick Reference



9. Programming



9.10. Sets Of Parameters

A set of parameters is the complete programming of the PM 9000 for a distinct task. All parameters from 0-00 to 5-01 can be programmed. By a special switch up to 10 sets of parameters for 10 different tasks can be selected and programmed. So the user can have in stock one PM 9000 for 10 different field applications.

The set of parameters effective is the one which is selected when the PM 9000 is switched on. When selecting an other set of parameters, this set is only effective when the PM 9000 is switched on again!

10. Using As Source For A Rated Value

Using the PM 9000 as source for a rated value, the rated value can be changed by the toggle switch +/- (see handling of taring), or when using the digital inputs (see source for a rated value). When editing the rated value by external push buttons, care must be taken, that the PM 9000 is set to the taring mode. By this way an unintentional changing of the rated value is avoided. In addition it must be considered, that the input signal must be longer than 50 ms but shorter than 200 ms. If the input signal lasts longer than 200 ms, further steps caused by the input signal are performed. To receive one increment or decrement, input pulse duration must be longer than 50 ms and shorter than 200 ms.

11. Failure Code

The following failure codes, listed below, are displayed.

Code	Reason
01	Open thermocouple detection
02	thermocouple short circuit
03	Counter overflow
04	Counter underflow

12. Technical Datas

Display	6-digit, 7-segment-LED, red
Hight of Digit	7,6 mm
Display Range	-9999 bis 99999
Offset	programmable
Scale	programmable
Decimal Points	programmable
Signal input	
AD-Converter	Delta Sigma, max. 16 Bit
Accuracy	0,01 %
Display Update	5 Measurements per sec.
Set points	2, programmable
Hysteresis	programmable from 0 to 1000 Digit
Rise/Fall Time	programmable from 0 to 255 sec.
Contact Rating	1 Solid state contact (normally open) (+ power supply voltage is switched to the output screw terminal)
Load Voltage/Current Switching	24VDC/200mA selectable
Analog output	programmable for voltage or current optical isolated output
Output Range	0 .. 10 V, max. 10 mA; 0(4) .. 20 mA, max. 500 Ω
Resolution	16 Bit
Accuracy	> 12 Bit
Offset Error	$\pm 0,1$ %
Total Output Error	$\pm 0,2$ %
Synchron serial interface	
min. High-Level	14 V
max. Low-Level	5 V
Power supply voltage	18-36VDC
Power consumption	max. 3 W (all outputs max. loaded)
Environment	

13. Declaration Of Types

Operating temperature	0 .. 50 °C PM 9000/0 -20 .. 70°C PM 9000/1
Storage temperature Humidity	-20 .. 70 °C max. 85 % not-condensing
Case	
Dimensions (B x H x T)	93 x 96 x 71mm
Mounting	35 mm Din Rail DIN EN 50022 - 35 x 7,5 DIN EN 50022 - 35 x 15 32 mm G-Rail DIN EN 50035 - G - 32
CE	in conform with 89/336/EWG
Weight	max. 450 g
Connections	plug-in terminal
Accessories	manual tool for terminals

13. Declaration Of Types

PM 9000	/	
		Operating Temperature
	0	0°C to +50°C
	1	-20°C to +70°C

There is a version PM 9000/0 for an operating temperature from 0°C to +50°C and a version PM 9000/1 for a operating temperature from -20°C to +70°C.

14. Notes

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