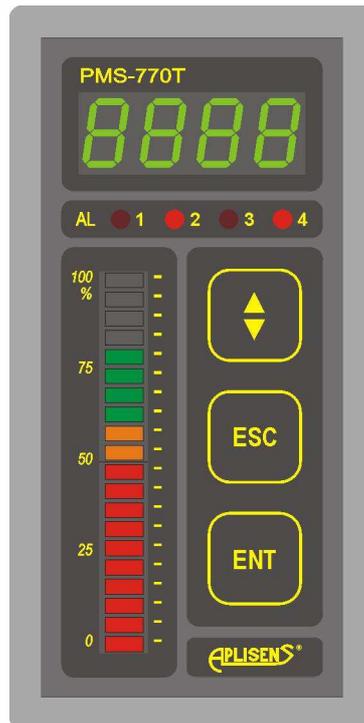


APLISENS

Manufacture of pressure transmitters
and control instruments



User's manual

PMS-770T

TABLE OF CONTENTS

1. INTRODUCTION

- 1.1. General information
- 1.2. Features
- 1.3. Safety
- 1.4. EMC considerations

2. INSTALLATION

- 2.1. Unpacking
- 2.2. Mechanical assembly
- 2.3. Electrical connections

3. OPERATION

- 3.1. Programming
- 3.2. Set-point adjustment
- 3.3. Error codes
- 3.4. Display and outputs test

4. TECHNICAL SPECIFICATIONS

5. REVISION HISTORY

6. DISCARDED ELECTRONIC EQUIPMENT COLLECTING INFORMATION.

SYMBOL	DESCRIPTION
	CAUTION or WARNING: Tells you about the risk of electrical shock.
	CAUTION, WARNING or IMPORTANT: Tells you of circumstances or practices than can effect the instrument's functionality and must refer to technical documentation.
	INFORMATION: Helpful information.
	INFORMATION: Discarded electronic equipment collecting

1. INTRODUCTION

1.1. General information

PMS770T is panel meter for a wide range of industrial applications. Provides measurement of voltage and current process signals, analogue signal retransmission and ON/OFF relay control.

1.2. Features

Measurement - User programmable 4-digit read-out of voltage or current signals is provided. Filtering time-constant, read-out rounding and decimal point position may be also programmed. The unit features also a 10 point linearisation routine.

Bargraph indication - 20 point, tricolour LED bargraph allows easy judgement of levels and threshold values.

Control outputs - 4 relay outputs are available. Threshold levels with individual hysteresis and ON/OFF function are user programmed.

analogue output - The instrument has 4-20mA fully isolated output for analogue retransmission.

Sensor excitation - 24VDC/25mA isolated output provides sensor excitation.

1.3. Safety

 *Hazardous voltage exist within enclosure. Only trained personnel should perform installation and service. Electrical wiring should be performed in accordance with all applicable national standards and regulations. Instrument is protected in accordance with Class II of EN-61010-1.*

- read the manual carefully before installation,
- disconnect power supply before installation and wiring,
- do not touch the terminals while power is being supplied,
- do not attempt to operate the instrument if any damage is found,
- do not operate the unit in aggressive or explosive environment,
- do not expose the instrument to condensing moisture,
- provide sufficient air circulation to keep the temperature in specified range.

1.4. Electromagnetic compatibility

 *Instrument meets EN-61326 EMC standard requirements for industrial environment.*

Follow listed below instructions to provide proper operation in real conditions:

- Do not install the product near devices generating strong electromagnetic fields,
- wire the lines connected to the meter separately from power lines carrying high voltages or currents,
- use twisted or shielded signal lines in noisy environment,
- always apply functional grounding,
- apply external surge protectors close to the unit if long lines are connected,
- apply additional filtering in noisy environment.

2. INSTALLATION

2.1. Unpacking

The shipping carton should contain:

PMS770T meter	1 pcs,
fixing clip	2 pcs,
operating manual	1 pcs.

Unpack the instrument and check it for obvious signs of damage. If any damage occur notify the supplier and do not attempt further use. If the unit appears to be in good condition read the Operating Manual before installation and use.

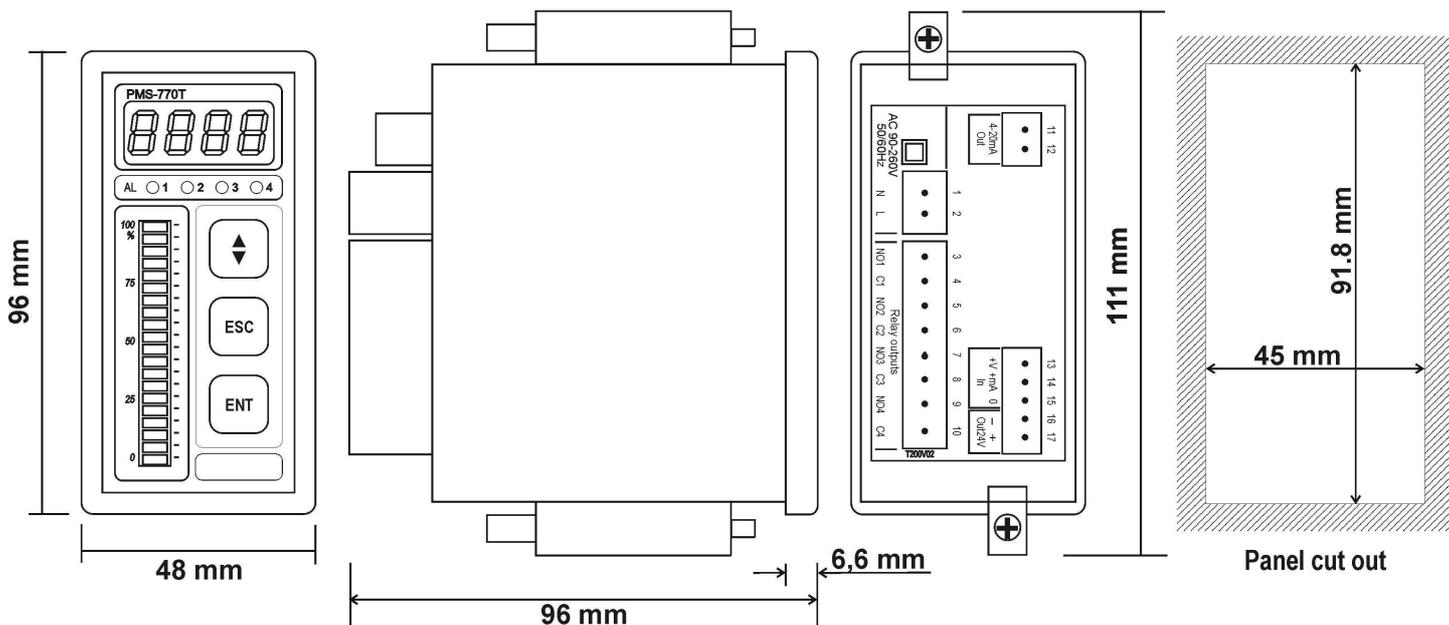


Fig.1 PMS770T basic dimensions.

2.2. Mechanical assembly

The unit is designed for front panel mounting. It requires panel cut-out according to the specification with proper distance to other devices.

Mounting procedure:

- put the meter from the front side into the panel cut-out,
- assemble fixing clips (plastic screws should be placed inside the both fixings),
- attach fixing clips by putting in housing holes and sliding backwards,
- tighten the screws just enough to hold the housing firmly in place.

2.3. Electrical connections

 *Disconnect power supply before installation and wiring. Check power supply voltage on instrument's label.*

Electrical connection procedure:

- check if the unit is properly fixed,
- unplug terminal blocks on the rear wall,
- make required connections according to wiring table and diagrams,
- replug terminal blocks,
- check the connections before applying power **INCORRECT CONNECTIONS CAN DAMAGE YOUR METER!**

Connector	Pin number	Symbol	Terminal description	Rating
POWER SUPPLY	1	N	supply	AC 90-260V 50/60Hz
	2	L	supply	
RELAY OUTPUT	3	NO1	AL1 relay NO	1A/250VAC
	4	C1	AL1 relay common	
	5	NO2	AL2 relay NO	
	6	C2	AL2 relay common	
	7	NO3	AL3 relay NO	
	8	C3	AL3 relay common	
	9	NO4	AL4 relay NO	
	10	C4	AL4 relay common	
ANALOGUE OUTPUT	11	Out 4-20mA	analogue output	4-20mA
	12	Out 4-20mA	signal ground	
ANALOGUE INPUT	13	In: +V	analogue voltage input	10V
	14	In: +mA	analogue current input	20mA
	15	In: 0V	analogue input common	
AUX. SUPPLY	16	24VDC: -	aux supply negative	24VDC
	17	24VDC: +	aux supply positive	

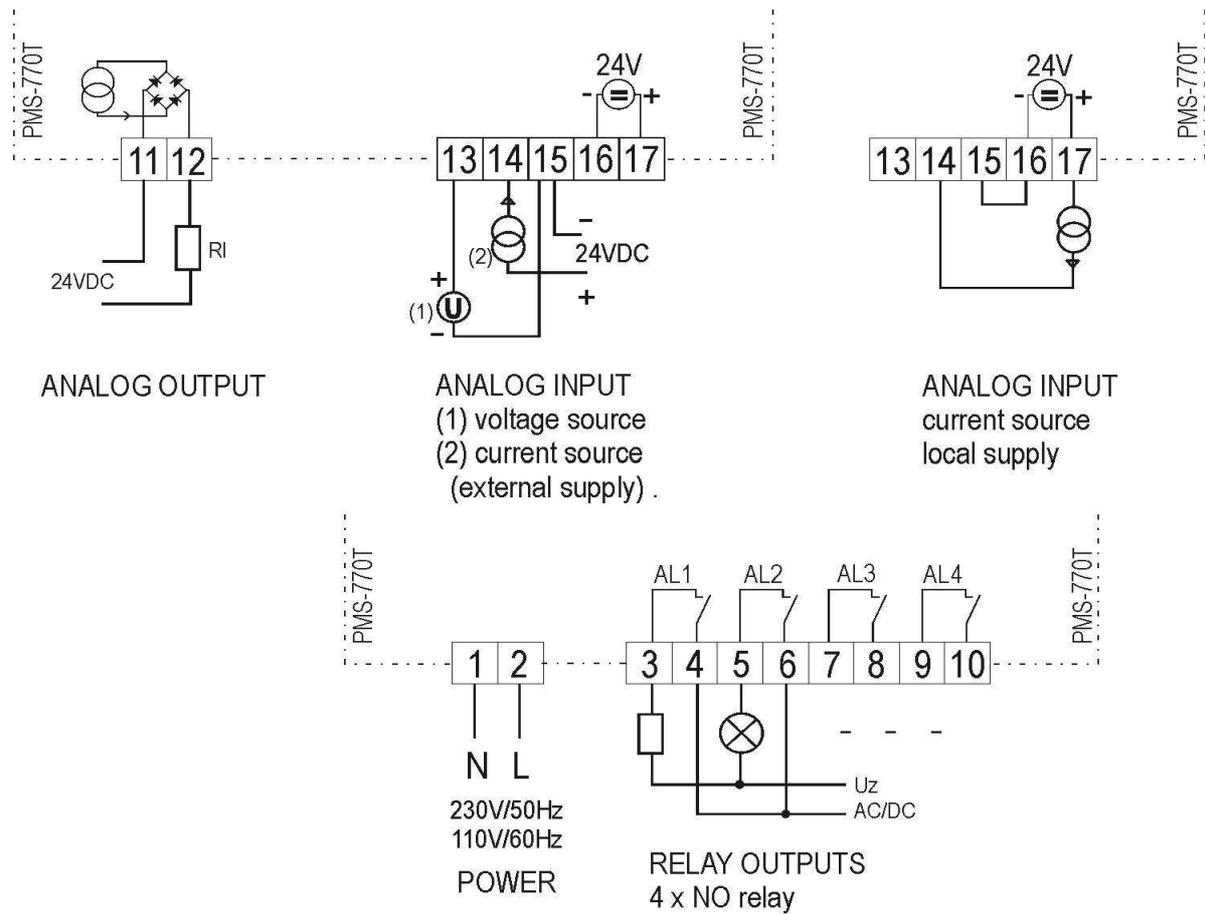


Fig. 2 Wiring diagrams.

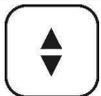
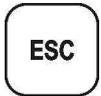
3. Meter operation.

3.1. Programming

 *Incorrect programming may cause incorrect read-out and uncontrolled output relay operation!*

The meter has many user-selected programme settings. All settings may be done with front panel push-buttons. Set-points levels are programmed directly in normal mode. Other settings require entering programme mode. Programming menu is code protected.

Button function in programming mode.

Button	Name	Description	Comments
	CHG	- scrolling through menu functions and options - changing numerical values	
	ESC	- ESCAPE - go to previous menu level	

Button	Name	Description	Comments
	ENT	- ENTER, access to function - selected value/option confirmation	

I To enter programming mode press **ESC** key for 2 seconds until „P.cod” message appear. Then press **ESC, CHG,CHG, ENT** combination. „Fn00” message should appear.

In programming menu several functions are available. Detailed function description is given in the table.

Use **CHG** key to navigate through the functions and **ENT** key to enter selected function. Numerical values should be set digit by digit. Flashing digit should be adjusted using **CHG** key and stored with **ENT** key. All the settings are stored in non-volatile memory while leaving the programming menu if **ENT** key is pressed while “SAVE” message appears. If **ESC** key is pressed, changes are not stored and the meter returns to normal mode.

Programming menu.

Menu function	Description	Available options	Default setting	Comments
Fn00	input selection	I- 0-20mA current input active, U- 0-10V voltage input active	I	
Fn01	linearization points	2 – 10	2	2 - linear scale
Fn02	display scaling	P01 - Pnn scaling points	P01 : 00.00 : 0000 P02 : 20.00 : 2000	Define input value and display value for each scaling point (1)
		-9.99 - 99.99 input value (with DP)		
		-999 - 9999 display value		
Fn03	decimal point	0000; 0.000; 00.00; 000.0	00.00	Leading zeros are suppressed
Fn04	display rounding	1, 2, 5, 10	1	1 - without rounding
Fn05	filter time-constant	0 – 0, 1 - 20ms, 2 - 40ms, 3 - 80ms, 4 - 160ms, 5 - 320ms, 6 - 640s, 7 - 1.28s, 8 - 2.56s, 9 - 5.12s	2	
Fn06	bargraph mode	3C – three colour (green, yellow, red) 1C - single colour (green)	3C	(2)
Fn07	set-point mode	AL1, AL2, AL3, AL4	AL1 : H : 1 AL2 : L : 1 AL3 : H : 1 AL4 : L : 1	Individual H/L and hysteresis setting for each set-point (3)
		H - high L - low		
		1 – 9999 hysteresis= [display divisions x2]		
Fn08	output scaling	P01 - zero (low) P02 - full scale	P01 : 0000 : 4.00 P02 : 2000 : 20.00	Define meter's display value and output current for both scaling points.
		-999 - 9999 meter's display value		
		03.00 - 21.00 [mA] output current		
Fn09	all reset	Ecod (4)		Reset to default setting

Remarks:

(1) - The meter is factory set to linear scale with two scaling points. If non-linear scale is needed the required number of scale points should be set in Fn01 function at first. Then, the input and display values for each point should be set.

Doubled input values are automatically rejected. Scaling point values are automatically sorted by input values in ascending order, after each Fn02 function access.

(2) - In 1 colour mode the bargraph is green with red set-points.

In 3 colour mode the central zone between AL3 and AL4 is green. Zones AL1 - AL3 and AL2 - AL4 are yellow. Zones above AL1 and below AL2 are red. Relation $AL2 \leq AL4 \leq AL3 \leq AL1$ should be true for proper colour zone display. Bargraph 0% indication corresponds to the lowest scaling point, while 100% corresponds to the highest scaling point of the digital display analogue.

(3) - The set-point number is equal to relay number. Overall hysteresis is equal to twice the value set in Fn07 function.

(4) - While „Ecod” message appears, press **ENT** key four times.

Meter's programming example

Parameter	Value	Function number	Menu setting
input type	current	Fn00	1
scaling points number	2	Fn01	2
input range	4-20mA	Fn02	P01 : 04.00 : 0000
display range	0-3000		P02 : 20.00 : 3000
decimal point position	000.0	Fn03	000.0
rounding	none	Fn04	1
filter time constant	240ms	Fn05	3
AL1 „ON” level	>2500	(1)	AL1 : 2500
AL2 „ON” level	<1000	(1)	AL2 : 1000
AL1 hysteresis	10	Fn07	AL1 : H : 0005
AL2 hysteresis	20		AL2 : L : 0010
output current at zero display	5mA	Fn08	P01 : 0000 : 05.00
output current at full scale (3000) display	19mA		P02 : 3000 : 19.00

(1) - settings available in normal mode

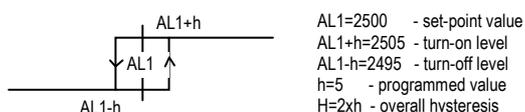


Fig.3 Hysteresis definition.

3.2. Set-point programming

Set-points are programmed in normal mode of the meter using front panel keys. Press **CHG** key for 3 seconds to enter AL1 to AL4 programming. Choose set-point to be changed with **CHG** and press **ENT** key. Adjust each flashing digit using **CHG** key and store the value with **ENT** key.

I The relation $AL2 \leq AL4 \leq AL3 \leq AL1$ should be true in 3 colour bargraph mode for proper colour zone display.

3.3. Error codes

<i>Error code</i>	<i>Description</i>	<i>Possible reasons</i>	<i>Operation</i>
ErrF	calibration memory error	-abnormal EMC condition -internal fault	Turn off the meter for 5 s. If message reappears after power-up, contact the service.
InIF	calibration memory initialization		Turn off the meter for 5 s. If message reappears after power-up, contact the service.
ErrU	user memory error	-abnormal EMC condition -internal fault	Turn off the meter for 5 s. If message reappears after power-up press ENT button. Meter reads factory settings with momentarily displayed InIU message.
InIU	user memory initialization		If the message appears after each power-up contact the service.
display flashing	input under/overrange		-check signal source check input circuitry
9999 (flashing)	display overrange	-incorrect meter settings -incorrect input connection -internal fault	-check signal source check meter's scaling input circuitry
-999 (flashing)	display underrange	-incorrect meter settings -incorrect input connection -internal fault	-check signal source check meter's scaling input circuitry

3.4. Display and outputs test.

PMS770T has special test procedure for LED display, relays and version check. The test is initiated when the meter is powered-up with CHG key pressed. LED segments are lighted-up in following cycle:

- four digit firmware version code,
- digital display (all segments simultaneously),
- alarm leds with output relays activation,
- bargraph green (all segments simultaneously),
- bargraph red (all segments simultaneously),
- all LED segments simultaneously.

The ENT key toggles between simultaneous and single segment activation during test. ESC key closes the test.

4. TECHNICAL SPECIFICATION

CATEGORY	PARAMETER	VALUE	COMMENTS
INPUT	Accuracy	+/-0.25% FS	
	Temperature coefficient	+/- 100ppm / °C	
	Internal resolution	12 bit	
	Effective sampling rate	100Hz	
	Display update rate	5Hz	
	Filter time constant	0-5,12s	
	Normal Mode Rejection Ratio (NMRR)	>=66dB	f=50-500Hz; U _{I(peak)} <=120% FS
CURRENT INPUT	Range	0-20mA	-0.1 .. +20.5mA
	Input resistance	<65ohm	
	Input protection	internal PTC, 50mA	U <=30V
VOLTAGE INPUT	Range	0...10V	-0.05 ... +10.5V
	Input resistance	>=1Mohm	
	Voltage overrange	300%	
CONTROL RELAY OUTPUT	Rating	1A / 250VAC	
	Contact configuration	4 x NO	
	Open contact withstand voltage	1000VAC	
	Contact life mechanical / electrical	15x10 ⁶ / 1x10 ⁶	
	Load capacity	250VA	resistive load
ANALOGUE OUTPUT (PASSIVE)	Range	4-20mA	3.8-21mA
	Output voltage range	10-30VDC	
	Accuracy	+/- 0.1% FS	
	Resolution	12 bit	
	Temperature coefficient	+/- 100ppm / °C	
	Output voltage effect	+/-20ppm / V	
	Overvoltage protection level	36V	transil
	Refresh rate	30Hz	
SENSOR EXCITATION	Voltage	24VDC, +/-10%	
	Current max	25mA	
	Current limit	continuous	
	Overvoltage protection level	36V	
POWER SUPPLY	Voltage	90-260VAC 50/60Hz	
	Power consumption	<4W	
DISPLAY	Digits	4	Green LED
	Digit hight	9mm	
	Bargraph resolution	20	
ENVIRONMENTAL	Operating temperature	5..40°C	
	Storage temperature	-10 .. +70°C	
	Humidity (relative)	10-95%	without condensing

CATEGORY	PARAMETER	VALUE	COMMENTS
	Enclosure protection (front)	IP-54	
	Enclosure protection (rear)	IP-20	
	Pollution degree	2	
	Overvoltage category	II	
ELECTRIC ISOLATION	Power supply - other circuits	2300VAC	
	Relay outputs - other circuits	2300VAC	
	Signal input - functional ground	1000VAC	
	Excitation output - other circuits	1000VAC	
	analogue output - signal input	1000VAC	
MECHANICAL	Dimensions	48x96x96mm	
	Weight	230g	
	Panel cut-out	45x91.8mm	
	Panel thickness	0..10mm	
	Horizontal spacing	>60mm	axis to axis
	Vertical spacing	>150mm	axis to axis
COMPLIANCE	Electrical safety	EN 61010-1:2004	
	EMC	EN 61326:1997/A3:2004(U)	

5. REVISION HISTORY

VERSION	DATE	CHANGES INFO
1.01	01.2008	

6. DISCARDED ELECTRONIC EQUIPMENT COLLECTING INFORMATION.

 This equipment should be collected and treated according to 2002/96/EC European Directive on waste electric and electronic equipment (WEEE).

Material and substances to be removed:

Material, substance	Quantity	Comments
Printed circuit boards	131 cm ²	