Terwin models
µ400P, µ600P, µ500PT & µ700PT
Process Indicators/Alarm Controllers/Signal Conditioners

Installation and Instruction Manual

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This instruction manual describes the installation and operation of the universal process indicator models **µ400P, µ600P, µ500PT** and **µ700PT**.

Read this instruction manual before applying power to the unit!

1.1. General specifications

The µ400P & µ600P are universal indicator/alarm controllers with a configurable input. The µ500PT & µ700PT are universal indicator/alarm controllers with two inputs for the simultaneous measurement of 2 variables, one is configurable and the other is for pressure transducers that utilize a 6 wire negative shunt calibration system.

STANDARD:

- Totally configurable input for extrusion pressure transducers,thermocouples, PT100's (3 wire), voltage, current loop, and 4 wire 350 ohm industrial pressure transducers or load cells (µ400P & µ600P only).
- 5 digit display (µ400P & µ600P) or dual 5-digit display (µ500PT & µ700PT).
- 2 user configurable alarms.
- Instrument Size: µ400P & µ500PT 1/8 DIN43700 (96 x 48 mm, horizontal). & µ600P & µ700PT 1/4 DIN43700 (96 x 96 mm). Plug-in electronics for ease of service.
- Power supply. 85 - 265 V AC 50/60 Hz (optionally 21 - 53 V AC / V DC)

OPTIONAL:

- Modbus RS-485/RTU™ communications output.
- Analogue outputs proportional to the instrument reading.
- 24V DC transmitter power supply.
- 21 - 53V AC/DC instrument supply.

- **Inputs**: User Selectable as:
  - L : .....0 - 600 °C (Fe-CuNi, DIN43710)
  - J : .....0 - 600 °C (Fe-CuNi, IEC584)
  - K: .....0 -1200 °C (NiCr-NiAl, IEC584)
  - N: ..... 0 -1200°C (NiCrSi-NiSi, IEC584)
  - T: ..... 0 - 400°C (Cu-CuNi, IEC584)
  - R: .....0 - 1600°C (Pt/13%Rh-Pt, IEC584)
  - S: .....0 -1600°C (Pt/10%Rh-Pt, IEC584)
  - RTD, ...Pt100: -200 to +600 °C (IEC751)
  - RTD, ...Pt100: -99.9 to +200,0 °C (IEC751)
  - Current loop 0 - 20 , 4 - 20 mA (load 150 ohm)
  - Voltage 0 – 5V and 0 - 10 VDC (Impedance >1 Mohm)
  - Melt Pressure Transducer with 6 wire 80% negative shunt calibration.
  - Hydraulic Pressure transducer with 0-100mV DC output.
  - 350 ohm pressure transducers or load cells (µ400P & µ600P only).

1.2. Order Information

Examples: **(1) µ400P-01** is a single channel basic unit with no options and 85 – 256V 50/60Hz supply. **(2) µ500PT-22** is a dual channel unit with serial communications output and a 21 – 53V AC/DC supply.

Instrument Type		Options		Power supply	
µ400P	Single channel Size 1/8 DIN horizontal.	**0**	No options	**1**	85 – 265 VAC 50/60 Hz
µ600P	Single channel Size 1/4 DIN.	**1**	Analogue output (programmable)		
µ500PT	Dual channel Size 1/8 DIN horizontal	**2**	Modbus / RTU™ Serial Communications output	**2**	21- 53 V AC / V DC
µ700PT	Dual channel Size 1/4 DIN.	**3**	24VDC transmitter power supply (40mA)		

2. INSTALLATION

2.1. Electrical Installation

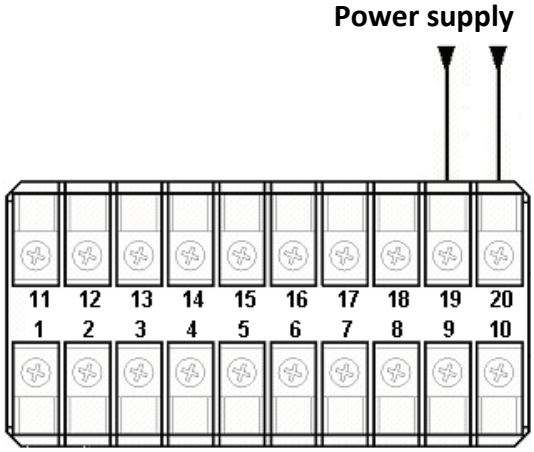
The electrical connections to the µ400P, µ600P, µ500PT and µ700PT must only be made by a qualified Electrical or Electronic Engineer. Both instruments have been designed for panel mounting to give protection to the user and should not be used as free standing units.

Before installing the instrument(s), first ensure that the intended supply voltage agrees with the specified voltage on the instrument label. Failure to observe this, may lead to irreparable damage. It is important that each instrument should be protected with a 200mA 250V fuse in the power line.

When making instrument connections we recommend the following:

- Always ensure that the power is switched off.
- Do not install the instrument close to moving parts, contactors or ..... motor starters.
- Try to avoid mechanical vibrations.
- For the signal lines, the use of a screened/shielded cable is recommended and this should be grounded at one end only.
- In the event of incorrect readings or error messages, check the wiring and also refer to the Display Error Messages in section 6.

Any installation or use of the instrument other than as specified in this manual may affect the protection levels of the unit.



2.2. Input and output configuration

The µ400P, µ600P, µ500PT & µ700PT are entirely configurable by the user, it is therefore necessary to make sure that the configuration of the instrument corresponds to the application for which it is intended.

Follow the steps in chapter 3 to change the configuration of the input or sensor signal.

2.3. Mechanical Installation

The instrument must be installed into a panel with a maximum thickness of 8 mm (0.315''). The cut-out apertures required are as follows:-

Model	Size	mm's	Inches
µ400P & µ500PT	1/8 DIN Horizontal	91.5mm w x 45.5mm h +/-0.5mm	3.6''x 1.79'' +/- 0.020''
µ600P & µ700PT	1/4 DIN	91.5mm w x 91.5mm h +/-0.5mm	3.6''x 3.6'' +/- 0.020''

The location must be subject to as little vibration as possible and it must be ensured that the ambient temperature remains between 0 and 50°C.

Insert the instrument through the panel aperture and whilst holding it firmly, tighten the two fixing clips with a screwdriver onto the interior wall of the panel. To install more than one instrument, a minimum separation must be left between instruments of 10 mm vertically (0.394'') and 20mm (0.787'') horizontally.

2.4. Removing Instrumentation From Instrument Case

Only remove the instrumentation from the case in the event of:-

a) Instrument Failure – To swap faulty instrument with a replacement.

b) To retrofit or modify an output card assembly.

It is not recommended to remove the case for any other reason. There are no user serviceable parts inside the instrument.

- *Before removing the instrument from the case*, ensure that power to the instrument has been switched off. This is to prevent damage to the instrument electronics.
- When *re-installing* the instrumentation back into the case, ensure you follow the following procedures:-

a) Ensure that the instrumentation is inserted into the case the correct way round. If installed incorrectly, permanent damage is likely to occur and the instrument will not function.

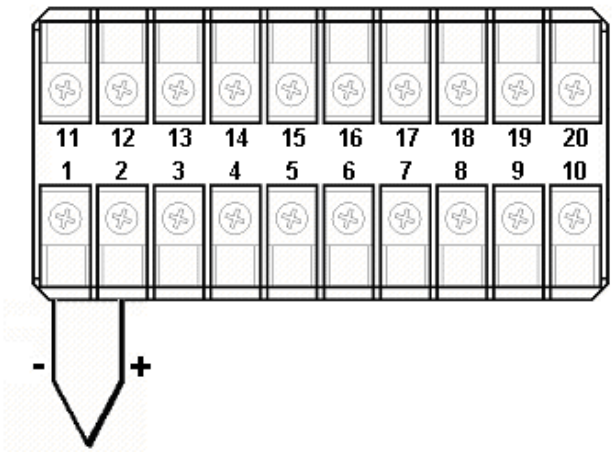
b) Line up the instrument pcb's squarely and in-line with the correct slots on the inside the case.

c) Gently push the instrument into the case. DO NOT FORCE the instrument into the case as damage may occur to the case terminals and / or pcb's. If you are experiencing difficulties, remove the instrument from the case and try again.

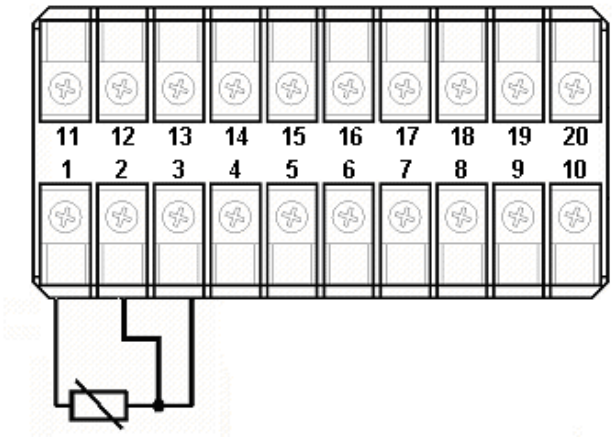
3. INPUTS / OUTPUTS

3.1. Signal input options - Examples

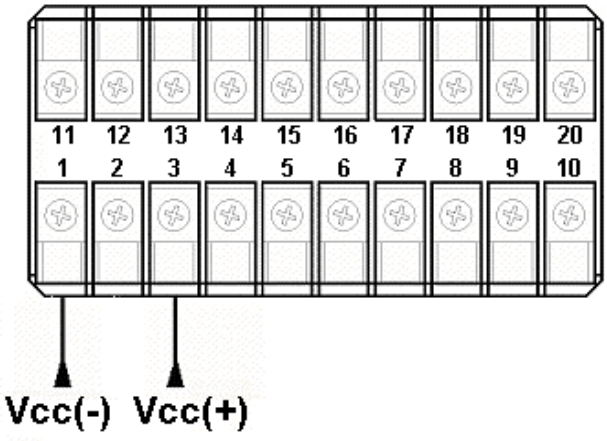
This chapter diagrammatically describes the connection of the different options for the input signal.



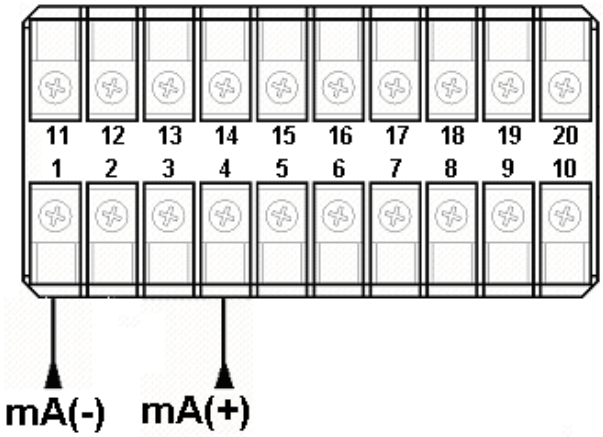
Thermocouple input connections



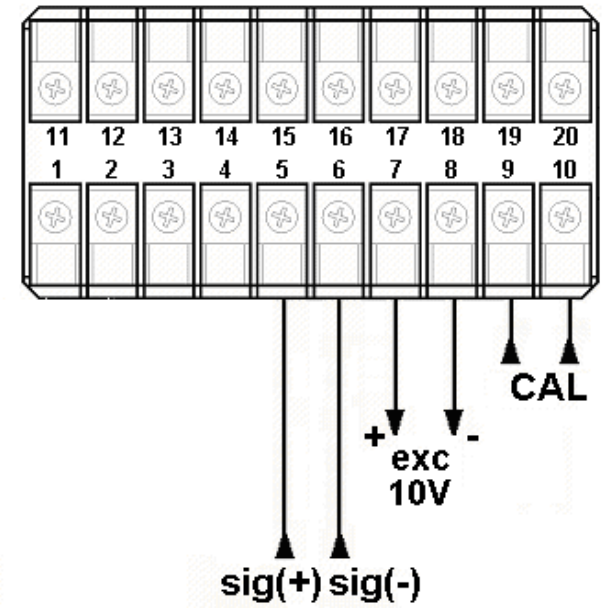
RTD, PT100 input connections



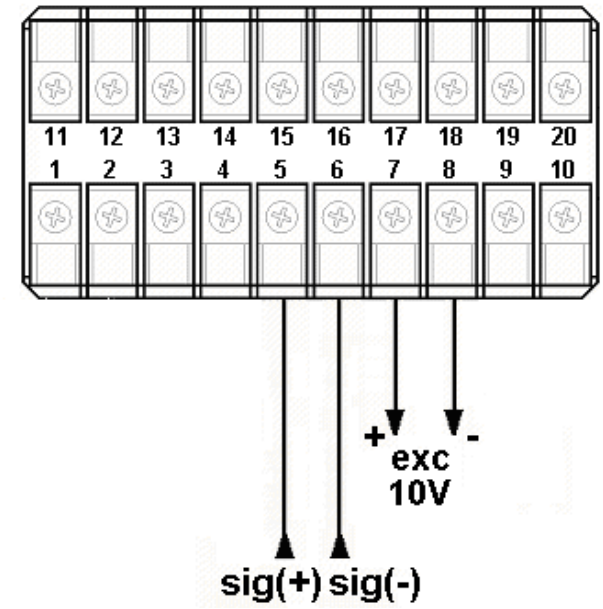
Connection for the linear voltage input



Connection for the linear current input



Connection for a pressure transducer with a 6 wire 80% negative shunt calibration system, such as a Terwin 2000 / 5000 Series **Melt Pressure Transducer** or 3000 series Hydraulic pressure transducers (0-100mV or 3mV/V).



Connection for pressure sensors or load cells etc that have a 350 ohm strain gauge and a required excitation of 10VDC.

3.2 Configuration of the different inputs

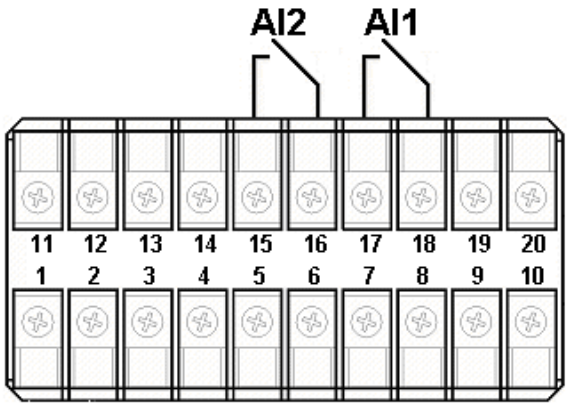
When despatched from our works, the input **(InP)** and full scale value **(FSV)** will be set up in accordance with customers' order instructions. If not specified, the model µ400P & µ600P will have the full-scale value set to a default value of 10,000. The model µ500PT & µ700PT will have the configurable input (channel 1) defaulted to a type 'J' thermocouple which covers the range of 0 - 600°C. Channel 2 corresponds to the pressure transducer input and will again be defaulted to 10,000.

To alter the default values above, simply scroll through the menu until **InP** is displayed and by using the 'up' or 'down' buttons, select the appropriate input value from the table below and then press the enter button. Similarly, to alter the full scale value, scroll through the menu until **FSV** is displayed and then using the 'up' or 'down' buttons, select the full scale value required and then press the enter button.

Inp Value	Meaning
0	J : 0 - 600 °C (Fe-CuNi, IEC584)
1	L : 0 - 600 °C (Fe-CuNi, DIN43710)
2	K: 0 -1200 °C (NiCr-NiAl, IEC584)
3	N: 0 - 1200°C (NiCrSi-NiSi, IEC584)
4	T: 0 - 400°C (Cu-CuNi, IEC584)
5	R: 0 - 1600°C (Pt/13%Rh-Pt, IEC584)
6	S: 0 - 1600°C (Pt/10%Rh-Pt, IEC584)
7	RTD, Pt100: -200 to +600 °C (IEC751)
8	RTD, Pt100: -99,9 to +200,0 °C (IEC751)
9	Voltage 0 - 5 VDC (Impedance >1 Mohm)
10	Voltage 0 – 10VDC (Impedance >1 Mohm)
11	Current loop 0 - 20 mA (load 150 ohm)
12	Current loop 4 - 20 mA (load 150 ohm)
13	**(µ400P & µ600P only) Melt Pressure Transducer** or Hydraulic Pressure Transducer.
14	350-ohm strain gauge pressure sensors & load cells etc., **model µ400P & µ600P only.**

3.3 Alarms

Both the µ400P and µ500PT includes 2 alarms. In the case of the µ500PT & µ700PT, these alarms may be associated independently with the required channel using the **CH.A1** and **CH.A2** parameters. Channel 1 corresponds to the configurable input and channel 2 to the pressure input. The alarm output is by relay with SPST contacts (one voltage-free contact). The alarm outputs are as follows:



The working configuration of the alarms is performed by means of the **CA.1** and **CA.2** parameters that are detailed in section 4.8.

1. Type of activation

   High Alarm: The alarm is activated when the process variable is equal to or higher than the consignment point of the alarm. For instance, if the consignment point of the alarm is at 450°C, the alarm will remain on as long as the temperature is greater than or equal to 450°C.

   Low Alarm: The alarm is activated when the process variable is equal to or lower than the consignment point of the alarm. For instance, if the consignment point of the alarm is at 450°C, the alarm will remain on as long as the temperature is lower than or equal to 450°C.

2. Type of action

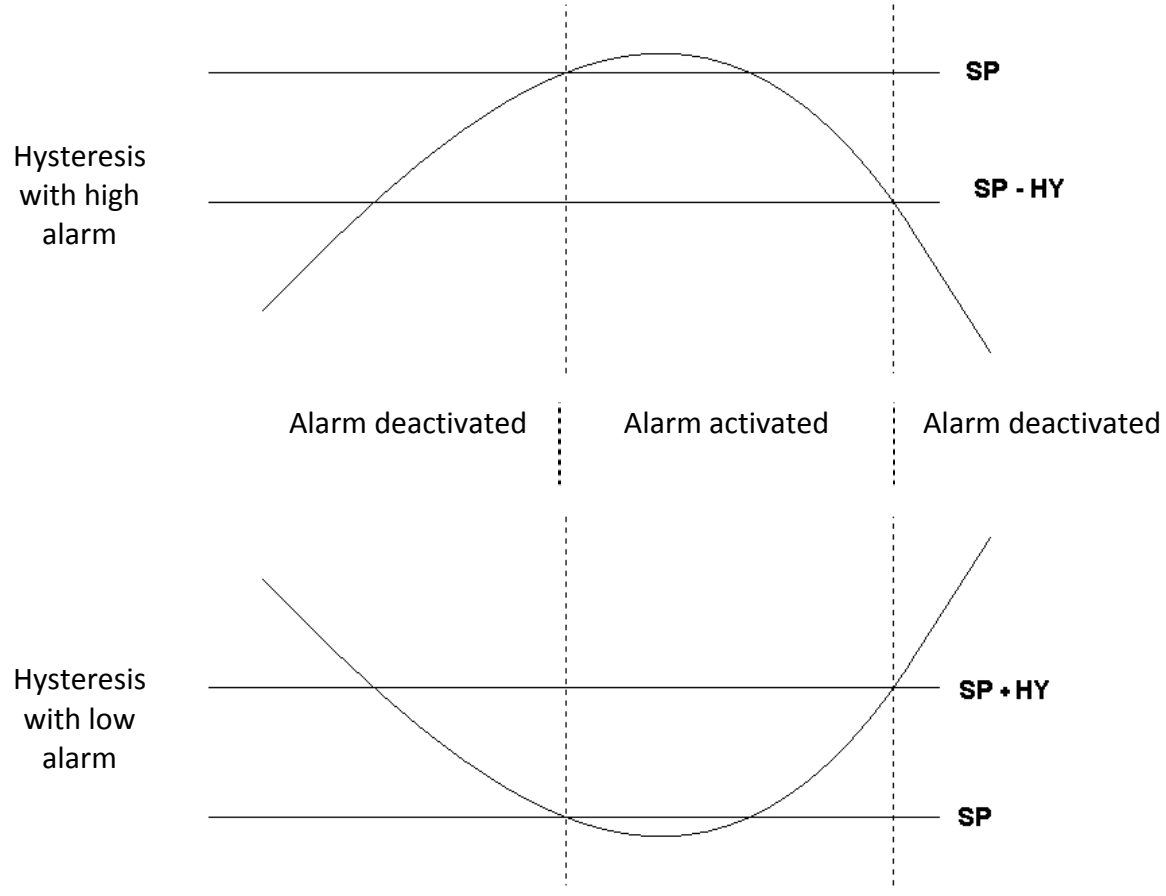
   Direct Action: The output relay is usually off and is activated when the alarm condition occurs.

   Inverse Action: The output relay is usually on and is deactivated when the alarm condition occurs.

By combining the type of activation and the type of action, it is possible to configure the following alarm operation modes:

Configuration C.A1/2	Working mode
0	Alarm disabled
1	High alarm, direct action
2	High alarm, inverse action
3	Low alarm, direct action
4	Low alarm, inverse action

The alarm hysteresis can be set up using the **HY.A1 or HY.A2** parameter. This hysteresis is used so that an activated alarm is not deactivated until the margin indicated from the consignment point has been exceeded. The following graphs show the behaviour of a high and low alarm with hysteresis:



The activation of each alarm may be set up so that it is only activated once the activation condition has been fulfilled for a period of time of up to 20 seconds. This is achieved using the **dLY.A1** and **dLY.A2** parameters. If these parameters are 0, the activation is instantaneous.

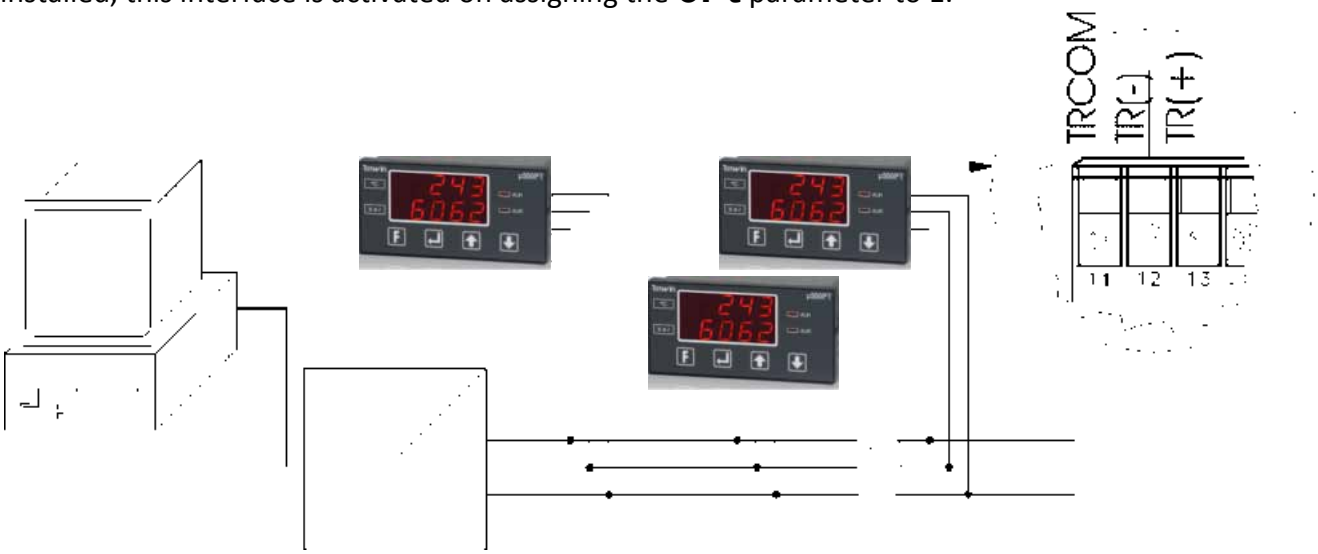
It is also possible to mask both alarms. This is particularly useful when first powering the instrument and where it is desirable to avoid alarm status. To configure the masked alarm, first set up the alarm configuration **CA.1** and **CA.2** as detailed in section 3.3. Next using the function key (F) select either **NAS.A1** or **NAS.A2** and configure each to either '1' (mask on) or '0' (mask off). When the mask feature has been selected, the relay associated with the masked alarm will not be activated on the first excursion through the setpoint but with subsequent excursions, the masked circuit will be disabled. In the event of the instrument power being turned off, the masked circuit(s) will be activated again when power is applied.

Under normal circumstances, alarm relays have on/off control action. However, where it is desirable to interlock an alarm relay upon reaching alarm status, it is possible to introduce a latching circuit to both set points as follows. Scroll through the menu using the function key (F) until the desired set point **Lch.A1** or **Lch.A2** is achieved. The display will flash in the programme mode and by using the 'up' arrow, configure the required set point(s) to '1' and then press the enter key - the latching circuit is now enabled. By entering '0', the latching circuit(s) will be disabled.

To cancel the latched alarm(s), press both the 'up' and 'down' arrows simultaneously. Providing that the condition which caused the alarm has been corrected, the alarm status will be cancelled.

3.4 Serial Communications (Optional)

The serial communications interface is RS485, 2 strands + ground, half duplex. Once installed, this interface is activated on assigning the **OPt** parameter to 1.



There is a specific instruction manual for the interface and communications protocol. Please contact our sales department if required.

3.5 Auxiliary analogue output (Optional)

The auxiliary analogue output may be 0 - 20 mA, 4 - 20 mA, 0 – 5V or 0 - 10V and the option must be configured using the front panel keypads and internal DIP switches. The outputs are activated by assigning the value 2 (0 – 5V), 3 (0 – 10V), 4 (0 – 20mA) or 5 (4 - 20mA) to the **Opt** parameter.

Once activated, the analogue output may be set up as direct or inverse signal.

Direct Output (**AOut.5** = 0 *)* means that the value of the output signal increases along with the process variable.

Inverse Output (**AOut.5** = 1 *)* means that the value of the output signal falls as the process variable increases.

Additionally, it is possible to scale the output signal over a given range of the instrument span. This function is possible by altering Analogue Output Low =(**AOut.L**) and Analogue Output High =(**AOut.H**)

For example, an instrument with a type J thermocouple input has a scale of 0 - 600°C. If this instrument has an analogue output of 4-20 mA, it is possible to set up **AOut.L** = 100°C and **AOut.H** = 500°C with which the analogue output will take the following values:

Process (°C)	Direct Analogue Output (mA)	Inverse Analogue Output (mA)
0	4.0	20.0
100	4.0	20.0
200	8.0	16.0
300	12.0	12.0
400	16.0	8.0
500	20.0	4.0
600	20.0	4.0

In the model µ500PT & µ700PT, it is possible to set the channel associated to the digital output by means of the **SEt.CH** parameter. Channel 1 corresponds to the configurable input and channel 2 corresponds to the pressure input.

4. OPERATION

4.1 Introduction

The indicators may be set up by means of a series of parameters accessible from a menu. The availability of some parameters depends on the set-up of the instrument and the model. Point 4.7 describes all of the configurable parameters and point 4.9 graphically displays the route necessary to access each of the parameters.

The operation of the menus is controlled by means of 4 keypads with the following function:

F: Function key. This key is used to scroll through the menu.

▲: This key increases the value of the displayed parameter. If it is held down, the speed of display change will increase. If the µ400P or µ600P is set up for a 350 ohm load cell application (**INP = 14**) and this key is held down for 3 seconds from outside the menu, the value of the displayed reading is taken as a Tare. When the instrument is applying a tare, this is indicated by means of a point that flashes on the last digit.

▼: This key decreases the value of the displayed parameter. If it is held down, the speed of the display change will increase. If the µ400P is set up for a 350 ohm load cell application (**INP = 14)** and this key is held down for 3 seconds from outside the menu, the value of the Tare is eliminated.

↵: Enter key. When scrolling through the menu to select a new parameter, this key must be pressed to confirm the ..change. The display will then flash to indicate that the parameter has been saved.

When the µ400P or µ600P is configured for use with a pressure transducer that employs a 6 wire 80% negative shunt calibration system such as the Terwin 2000 or 5000 series extrusion transducers, pressing the enter key for 3 seconds will introduce automatic calibration. The display will show **Zero**, **-----**, **Span**, **-----** and **SAVE**. By pressing the enter key once more, the calibration has been saved and has been completed. This calibration method is also standard on the µ500PT & µ700PT, as channel 2 has been assigned for use with extrusion pressure transducers.

4.2 Alarm warning indicators

The front display panel is provided with 2 LED warning indicators. These are labelled as AL#1 and AL#2.

4.3 Applying power/display check

On connecting the power supply, the instrument shows the message **tESt 4** moving through the displays while all the internal parameters are initiated.

4.4 Loss of power supply

In the event of a power failure, all working parameters in the instrument are stored in an internal memory. When the power supply returns, it will return to the previous operating mode.

4.5 Automatic calibration of the pressure transducer

This indicator has an automatic self-calibration function for pressure transducers that employ a 6 wire 80% negative shunt calibration system. In the µ500PT & µ700PT, this function is always available, whereas in the µ400P & µ600P, it is only available when the input is set up for a pressure transducer input (**INP = 13).**

To activate the self-calibration, the ↵ must be held down for 3 seconds. Firstly, the zero value of the transducer is calibrated, and then calibrated at 80% of the pressure transducer's full scale value (**FSV**). If the transducer is subject to pressure when the calibration mode is selected, the reading will not be correct and the process may be over pressurised.

At the end of the self-calibration, the message **SAVE** appears (if the measurements taken are correct). By pressing ↵ the new calibration is confirmed, whereas by pressing function key F it is discarded. If the sensor or associated cable assembly is damaged, the instrument message **FaiL** will be displayed.

4.6 Tare function – model µ400P & µ600P only

This indicator allows a tare to be added to the measurement when it is set up with a 350 ohm strain gauge input. To activate a new tare, hold down the ▲ key. Once activated, the **tAr.On** message appears and the decimal point of the last digit flashes, indicating that the indicator is adjusted. To deactivate the tare, press the ▼ key for 3 seconds, the **tAr.Of** message will now appear.

4.7 Limits of configurable parameters

SP.A1	Alarm consignment point 1		
	Minimum value:		
		Probe selected	Value
		Thermocouple	Minimum probe value
		PT100 RTD's	Minimum probe value
		Linear input(V or mA)	in.L parameter
		Pressure transducer	-10% full scale value
		350 ohm load cell (µ400P&µ600P)	0
	Maximum value:		
		Probe selected	Value
		Thermocouple	Maximum probe value
		PT100 RTD's	Maximum probe value
		Linear input(V or mA)	in.H parameter
		Pressure transducer	FSV
		350 ohm load cell (µ400P&µ600P)	FSV
SP.A2	Alarm consignment point 2		
	Minimum value:		
		Probe selected	Value
		Thermocouple	Minimum probe value
		PT100 RTD's	Minimum probe value
		Linear input(V or mA)	in.L parameter
		Pressure transducer	-10% full scale value
		350 ohm load cell (µ400P&µ600P)	0
	Maximum value:		
		Probe selected	Value
		Thermocouple	Maximum probe value
		PT100 RTD's	Maximum probe value
		Linear input(V or mA)	in.H parameter
		Pressure transducer	FSV
		350 ohm load cell (µ400P&µ600P)	FSV
C.A1	Alarm configuration 1 Minimum value: 0 Maximum value: 4		
C.A2	Alarm configuration 2 Minimum value: 0 Maximum value: 4		
Hy.A1	Alarm hysteresis 1(only visible if C.A1 > 0) Minimum value: 0		
	Maximum Value:	If alarm configured low	SP.A1 – Probe Low Limit
		If alarm configured high	Probe High Limit – SP.A1
Hy.A2	Alarm hysteresis 2(only visible if C.A2 > 0) Minimum value: 0		
	Maximum value:	If alarm configured low	SP.A1 – Probe Low Limit
		If alarm configured high	Probe High Limit – SP.A1

Ch.A1	Alarm channel 1 (only visible in µ500PT & µ700PT if C.A1 > 0) Minimum value: 1 Maximum value: 2
Ch.A2	Alarm channel 2 (only visible in µ500PT & µ700PT if C.A2 > 0) Minimum value: 1 Maximum value: 2
Mas.A1	Alarm mask 1 (only visible if C.A1 > 0) Minimum value: 0 Maximum value: 1
Mas.A2	Alarm mask 2 (only visible if C.A2 > 0) Minimum value: 0 Maximum value: 1
DLy.A1	Alarm delay 1 (only visible if C.A1 > 0) Minimum value: 0 Maximum value: 300
DLy.A2	Alarm delay 2 (only visible if C.A2 > 0) Minimum value: 0 Maximum value: 300
Lch.A1	Alarm manual deactivation 1 (only visible if C.A1 > 0) Minimum value: 0 Maximum value: 1
Lch.A2	Alarm manual deactivation 2 (only visible if C.A2 > 0) Minimum value: 0 Maximum value: 1
Bias1	Channel bias 1 Minimum value: -9999 Maximum value: 99999
Bias2	Channel bias 2 (only visible in µ500PT & µ700PT) Minimum value: -9999 Maximum value: 99999
INP	Channel input numbers Minimum value: 0 Maximum value: 14 in µ400P & µ600P 12 in µ500PT & µ700PT
Unit	Unit (only visible if INP < 9) Minimum value: 0 Maximum value: 1
Dp	Position of the decimal point (only visible if INP > 8) Minimum value: 0 Maximum value: 3
in.L	A lower value for the scale of linear signal inputs (only visible if INP = 9, 10, 11, 12) Minimum value: -9999 Maximum value: In.H -1
in.H	A higher value for the scale of linear signal inputs (only visible if INP = 9, 10, 11, 12) Minimum value: in.L + 1 Maximum value: 99999
FSV	Pressure input or load cell strain gauge full scale value (only visible in µ400P & µ600P if Inp >13. Always visible in µ500PT & µ700PT for pressure input) Minimum value: 0 Maximum value: 1
Zero.S	Gauge zero voltage (only visible in µ400P & µ600P if INP = 14) Minimum value: -3.00 Maximum value: FSV.S – 0.01

FSV.S	Maximum gauge voltage (only visible in µ400P & µ600P if INP = 14) Minimum value: Zero.S + 0.01 Maximum value: 37.00
Filtr	Display Filter: Value 0 (off) or 1 (on)
tyPE	Pressure transducer input type: Minimum value 0 Maximum value 2
Opt	Optional functions Minimum value: 0 Maximum value: 5
Set.Ch	Channel associated with analogue output (only visible if Opt = 2) µ500PT & µ700PT only. Minimum value: 1 Maximum value: 2
AOut.S	Analogue output sign (only visible if Opt = 2) Minimum value: 0 Maximum value: 1
AOut.L	Analogue output low limit (only visible if Opt = 2) Minimum value: channel probe minimum Maximum value: AOut.H – 1
AOut.H	Analogue output high limit (only visible if Opt = 2) Minimum value: AOut.L - 1 Maximum value: channel probe maximum
Addr	Modbus address (only visible if Opt = 1) Minimum value: 0 Maximum value: 240
Speed	Transmission speed (only visible if Opt = 1) Minimum value: 0 Maximum value: 3
Prty	Transmission parity (only visible if Opt = 1) Minimum value: 0 Maximum value: 2
Dlay	Modbus delay (only visible if Opt = 1) Minimum value: 0 Maximum value: 10
Pass	Password Minimum value: 0 Maximum value: 99999
LeUeL	Security level Minimum value: 0 Maximum value: 1

4.8 Parameter configurable values and initial value

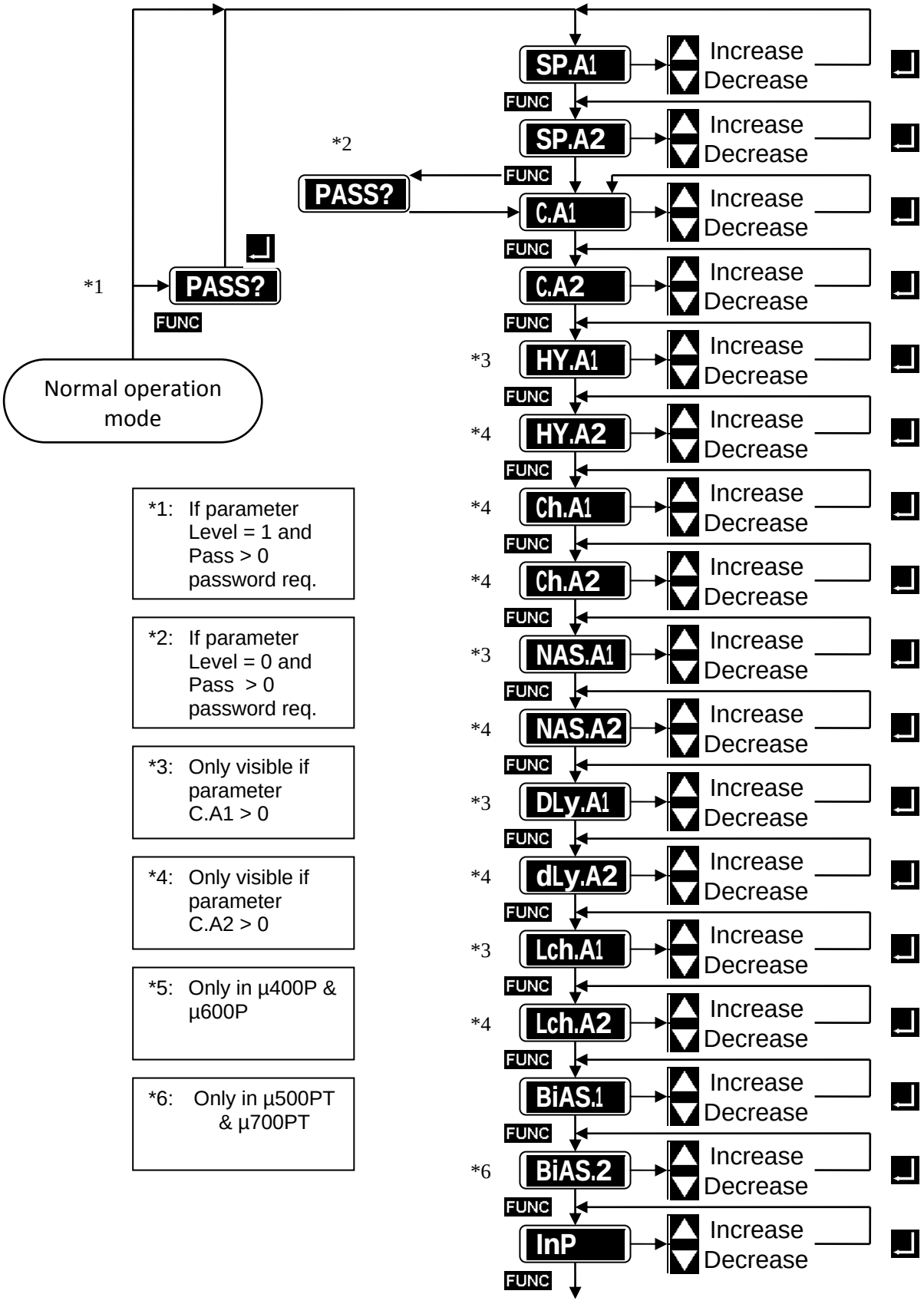
Parameter	Meaning		Initial value
SP.A1	Alarm consignment point 1		100
SP.A2	Alarm consignment point 2		200
C.A1	Alarm configuration 1		0
	Value	Meaning	
	0	Alarm disabled	
	1	Direct high alarm	
	2	Inverse high alarm	
	3	Direct low alarm	
	4	Inverse low alarm	
C.A2	Alarm configuration 2		0
	Value	Meaning	
	0	Alarm disabled	
	1	Direct high alarm	
	2	Inverse high alarm	
	3	Direct low alarm	
	4	Inverse low alarm	
Hy.A1	Alarm hysteresis 1		2
Hy.A2	Alarm hysteresis 2		2
Ch.A1	Alarm channel 1		1
Ch.A2	Alarm channel 2		1
Mas.A1	Alarm mask 1 (1 = actived, 0 = deactivated)		0
Mas.A2	Alarm mask 2 (1 = actived, 0 = deactivated)		0
dLy.A1	Alarm wait 1		0
dLY.A2	Alarm wait 2		0
Lch.A1	Alarm manual deactivation 1 (1 = activated, 0 = deactivated)		0
Lch.A2	Alarm manual deactivation 2 (1 = activated, 0 = deactivated)		0
Bias1	Channel bias 1		0
Bias2	Channel bias 2		0

Continued . . .

Inp	Channel input probe 1		0
	Value	Meaning	
	0	J : 0 - 600 °C (Fe-CuNi, IEC584)	
	1	L : 0 - 600 °C (Fe-CuNi, DIN43710)	
	2	K: 0 - 1200 °C (NiCr-NiAl, IEC584)	
	3	N: 0 - 1200°C (NiCrSi-NiSi, IEC584)	
	4	T: 0 - 400°C (Cu-CuNi, IEC584)	
	5	R: 0 - 1600°C (Pt/13%Rh-Pt, IEC584)	
	6	S: 0 - 1600°C (Pt/10%Rh-Pt, IEC584)	
	7	RTD, Pt100: -200 to +600 °C (IEC751)	
	8	RTD, Pt100: -99.9 to +200.0 °C (IEC751)	
	9	Voltage V DC 0 - 5 V (Impedance >1 Mohm)	
	10	Voltage V DC 0 - 10 V (Impedance >1 Mohm)	
	11	Current loop 0 - 20 mA (load 150 ohm)	
	12	Current loop 4 - 20 mA (load 150 ohm)	
	13	**Pressure transducer (only µ400P & µ600P)**	
	14	Pressure transducer or 350 Ω gauge (only µ400P & µ600P)	
Unit	Display Unit		0
	Value	*Meaning*	
	0	°C	
	1	°F	
Dp	Position of the decimal point		0
In.L	Low value for scaling inputs of linear signals		0
In.H	High value for scaling inputs of linear signals		99999
FSV	Pressure scale or 350 Ω gauge input		99999
Filtr	Display up-date filter		0
	Value	*Meaning*	
	0	Display filter OFF	
	1	Display filter ON	
tyPE	Pressure transducer type (ONLY when INP = 13)		0
	0	Pressure transducer with an output of –3mV to 37mV. Instrument provides Auto Zero & 80% calibration	
	1	Pressure transducer with an output of 0mV to 100mV. Instrument provides Auto Zero & 80% calibration.	
	2	Pressure transducer with an output of 0mV to 100mV (conditioned output). Instrument provides Auto Zero function.	
Zero.S	Gauge zero voltage value		-3.00
FSV.S	Gauge maximum voltage value		37.00

Opt	Optional functions		0
	Value	Meaning	
	0	No option	
	1	Communications module	
	2	Analogue output 0 - 5 V	
	3	Analogue output 0 - 10 V	
	4	Analogue output 0 - 20 mA	
	5	Analogue output 4 - 20 mA	
Set.Ch	Channel associated with analogue output		1
AOut.S	Analogue output sign		0
	Value	Meaning	
	0	Direct output	
	1	Inverse output	
AOut.L	Analogue output low limit		0
AOut.H	Analogue output high limit		600
Addr	Modbus address		0
Speed	Transmission speed		0
Prty	Transmission parity		0
	Value	Meaning	
	0	No parity	
	1	Even parity	
	2	Odd parity	
Dlay	Modbus delay		0
Pass	Password		0
Level	Security level (deactivated if Pass = 0)		0
	Value	Meaning	
	0	The password is requested for access to any parameter following the consignment points and to perform any calibration	
	1	A password is requested for entering any menu	

4.9 General menu diagram



*1: If parameter Level = 1 and Pass > 0 password req.

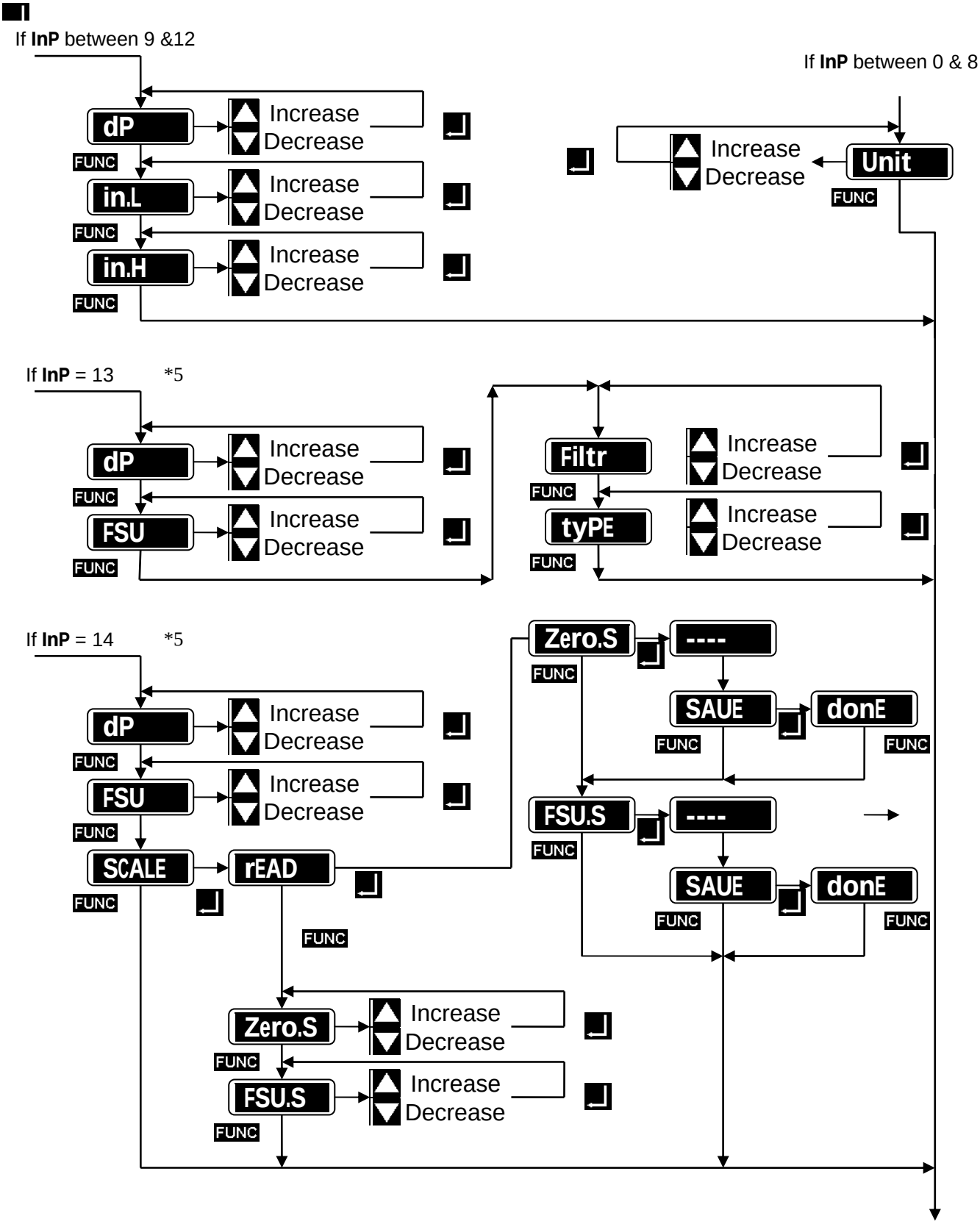
*2: If parameter Level = 0 and Pass > 0 password req.

*3: Only visible if parameter C.A1 > 0

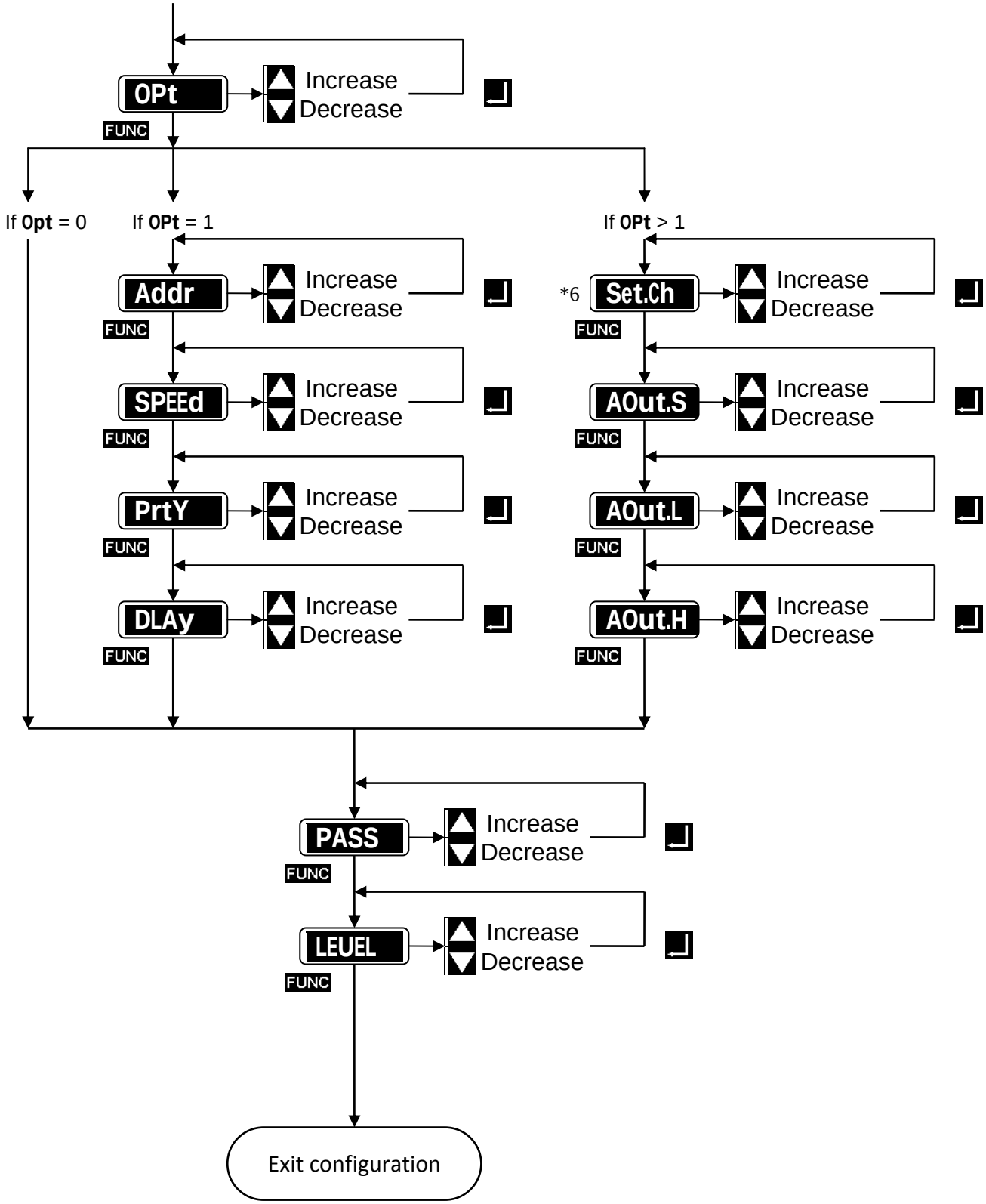
*4: Only visible if parameter C.A2 > 0

*5: Only in µ400P & µ600P

*6: Only in µ500PT & µ700PT

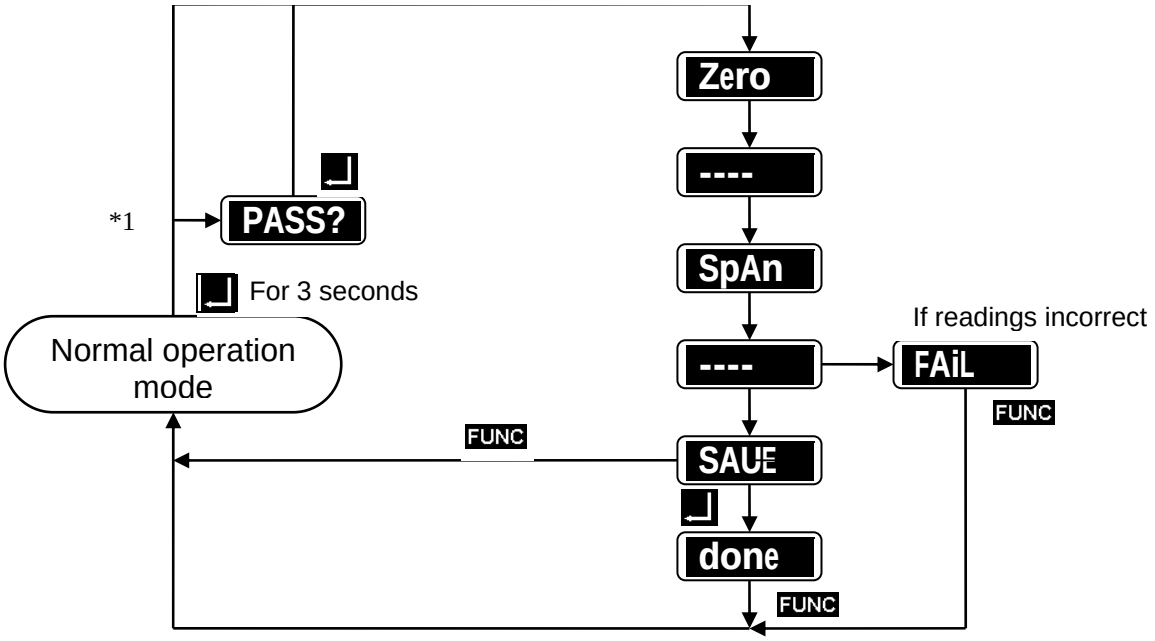

If InP between 9 &12
If InP between 0 & 8
dP
in.L
in.H
Unit
FUNC
Increase
Decrease
If InP = 13 *5
FSU
Filtr
tyPE
If InP = 14 *5
SCALE
rEAD
Zero.S
FSU.S
SAUE
donE

…Next page…


OPt
FUNC
Increase
Decrease
If Opt = 0
If OPt = 1
If OPt > 1
Addr
SPEEd
PrtY
DLAy
*6
Set.Ch
AOut.S
AOut.L
AOut.H
PASS
LEUEL
Exit configuration

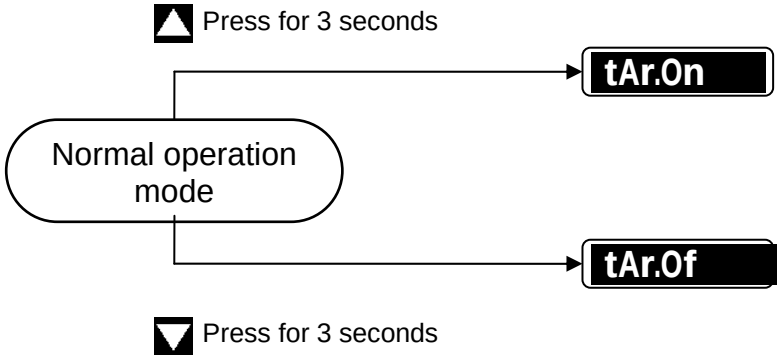
Automatic calibration of the pressure transducer

Only for use with µ400P & µ600P when input (**INP** = 13)



Tare activation/deactivation

Only for use with µ400P & µ600P when input (**INP** = 14)



4.10 Parameter protection

By assigning a value other than 0 to the **PASS** parameter, the menu block is activated. If the **LEVEL** is assigned to 0, the points of the consignment can be modified. If **LEVEL** is assigned to 1, they are all blocked. Once the block is activated, it is necessary to enter the assigned key in the **PASS** parameter to be able to access the menus.

5. TECHNICAL SPECIFICATIONS

Format	**µ400P & µ500PT**	1/8 DIN43700 (96 x 48 mm, horizontal).
	µ600P & µ700PT	1/4 DIN43700 (96 x 96 mm).
		All have plug-in electronics for ease of service.
Power supply		85 - 265 V AC 50/60 Hz (optionally 21 - 53 V AC / V DC)
Consumption		8 VA
Ambient Temp.		0 - 50°C
Relative humidity		max. 95% non condensing
Installation cat.		II according to EN61010-1
Pollution grade		I according to EN61010-1
Box		ABS self-extinguishable
Dimensions		96 x 48 x 98 mm (3.78 x 1.89 x 3.86 inches)
Panel drill holes		91,5 x 45,5 (±0,5) (3.6 x 1.79 +/-0.020 inches)
Display	**µ400P & µ600P**	Single channel. 5 digits x 13 mm high. 2 alarm warning lights
	µ500PT & µ700PT	Dual channel. Each with 5 digits x 10 mm high. 2 alarm warning lights
Inputs		User-configurable as: L : 0 - 600 °C (Fe-CuNi, DIN43710) J : 0 - 600 °C (Fe-CuNi, IEC584) K: 0 - 1200 °C (NiCr-NiAl, IEC584) N: 0 -1200°C (NiCrSi-NiSi, IEC584) T: 0 - 400°C (Cu-CuNi, IEC584) R: 0 - 1600°C (Pt/13%Rh-Pt, IEC584) S: 0 - 1600°C (Pt/10%Rh-Pt, IEC584) RTD, Pt100: -200 to +600 °C (IEC751) RTD, Pt100: -99,9 to +200,0 °C (IEC751) Current loop 0 - 20, 4 - 20 mA (load 150 ohm) Voltage 0 - 5, 0 – 10VDC (Impedance >1MΩ) Melt Pressure transducer, Hydraulic pressure transducer. Load cells with 350 ohm gage (µ400P & µ600P only)
Accuracy		Better than +/- 0.25% of full scale value
Analogue output		(Optional) User-configurable: 0 - 5V, 0 - 10V, 0 - 20mA or 4 - 20mA
Serial communications		(Optional) MODBUS/RTU™ protocol

Power supply for transmitter		(Optional) 24 V DC (max. 40mA)
Alarms		2 fully configurable alarms SPST output (1A @ 250 V AC., resistive load)
Weight	ALL	~220 g. to 300 g.
Protection		Front fascia panel: IP50
CE Certification		Safety, EMI Susceptibility, EMI Emission, Harmonics, Voltage fluctuations

6. ERROR MESSAGES

NN.Err Reading error from internal memory. If this message is displayed each time power is applied, the instrument should be returned to the supplier for repair.

Depending on the type of entry, the meaning of **OUEr** and **UndEr** messages will vary as per the following table:

Input	**OUEr** meaning	**UndEr** meaning
Thermocouple	The input signal circuit has been interrupted or the input signal is above maximum.	The connection is inverted or the input signal is lower than the lower limit of the scale.
RTD's PT100	The resistance is open and the connection between terminals 2 and 3 is present, or the input signal is above maximum	Probe not connected, the connection between terminals 2 and 3 has been interrupted or the input signal is lower than the lower limit of the scale
Voltage line	The input signal is higher than the maximum limit.	The input signal circuit has been interrupted or the input signal is below the lower limit of the scale.
Current line 0 - 20 mA	The input signal is higher than the maximum limit.	The input signal circuit has been interrupted or the input signal is below the lower limit of the scale. UndEr is not always displayed when the input signal circuit is interrupted
Current line 4 - 20 mA	The input signal is higher than the maximum limit.	The input signal circuit has been interrupted or the input signal is below the lower limit of the scale.
Pressure or Gauge	The input signal is higher than the maximum limit or sensor is not connected/open circuit.	The input signal is below the lower limit of the scale.

In the event of a pressure transducer or strain gauge input being disconnected whilst the indicators have power applied to them, the indicator will bias upscale and the reading will show **OUEr**.

7.0 WARRANTY

Terwin Instruments Limited warrants the µ400P, µ600P, µ500PT & µ700PT process indicators/alarm controllers against defects in material and workmanship for a period of two years from date of despatch. Terwin Instruments' obligation under warranty is expressly limited to the repair or replacement at its factory, or at any authorised representative's repair station, providing that:

(a) Terwin Instruments Limited are notified by the buyer upon his/her discovery of a defect.
(b) The defective equipment is returned carriage paid by the buyer.
(c) Providing the defective unit has not been damaged by negligence, improper use, unauthorised repair, or alteration.

This warranty is in lieu of all other warranties, expressed or implied, including the implied warranty of fitness for a particular purpose, whether to the original purchaser or to any other person. Terwin Instruments Limited shall not be liable for consequential damage of any kind.

The aforementioned provisions do not extend the original warranty period of any article, which has been either repaired or replaced by Terwin Instruments Limited.

Terwin Instruments Limited shall not be bound by any terms, conditions, representations or warranties expressed or implied, which are not stated herein.

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Manufacturers Of Industrial Pressure / Temperature Sensors & Instrumentation