

4. CONNECTIONS

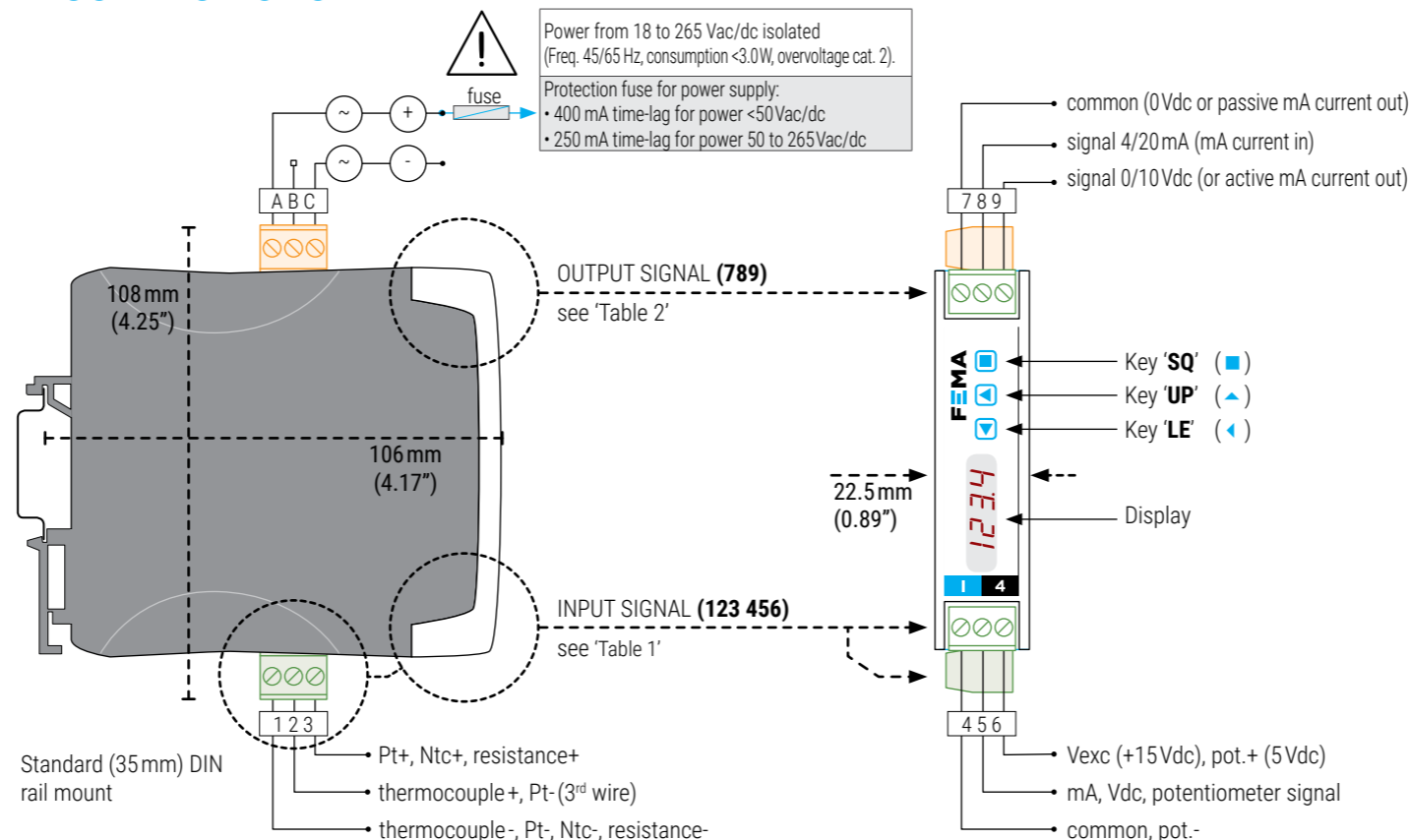


Table 1 | INPUT signal connections

INPUT signal	Input terminal		1	2	3	4	5	6
4/20 mA (passive loop)							mA- (in)	+15Vexc (out)
4/20 mA (active loop)						mA+ (out)	mA- (in)	
0/10 Vdc (2 wires)					common	+Vdc		
0/10 Vdc (3 wires)					common	+Vdc		+15Vexc
Thermocouples	tc-	tc+						
Ntc	ntc-		ntc+					
Pt100 (3 wires)	pt100-	pt100- (3 rd wire)	pt100+					
Pt100 (2 wires)	pt100-	short to terminal 1	pt100+					
Pt500, Pt1000	pt-		pt+					
Resistances	res-		res+					
Potentiometer				pot-	signal			pot+ (+5Vexc)
Passive potentiometer				common	signal			Vexc (in)

Table 2 | OUTPUT signal connections

OUTPUT signal	Output terminal		7	8	9	Connections
4/20 mA active output	mA- (in)	mA+ (out)				
4/20 mA passive output* (*external loop power needed)	mA+ (out)	mA- (in)				
0/10 Vdc	common	+Vdc				

5. HOW TO ORDER

Reference	Description
I4P	Signal converter
I4P.1442	Signal converter with custom features

6. PREDEFINED CONFIGURATION CODES

Table 3 | Predefined configuration codes

Input signal range	Sensor	Output 4/20mA codes	Output 0/10Vdc codes
4/20 mA	Process	010	110
0/10 Vdc		011	111
0/100 %	Potentiometer	012	112
0/100 %	Passive Pot.	013	113
0/1 KOhm	Resistance	014	114
0/10 KOhm		015	115
0/100 KOhm		016	116
0/1 MOhm		017	117
Reserved		018 to 019	118 to 119
-80/120 °C	Ntc 44004	020	120
-80/120 °C	Ntc 44005	021	121
-80/120 °C	Ntc 44006	022	122
-80/120 °C	Ntc 44007	023	123
-80/120 °C	Ntc 44008	024	124
-80/75 °C	Ntc 44030	025	125
-80/75 °C	Ntc 44031	026	126
-80/75 °C	Ntc 44032	027	127
-80/75 °C	Ntc 44033	028	128
-80/75 °C	Ntc 44034	029	129
-50/90 °C	Ntc R ₂₅ =10K β=3500	030	130
-200/1200 °C	Thermoc. J	031	131
0/700 °C		032	132
0/400 °C		033	133
0/250 °C		034	134
0/150 °C		035	135
-200/1372 °C	Thermoc. K	036	136
0/1200 °C		037	137
0/700 °C		038	138
0/400 °C		039	139
0/300 °C		040	140
0/250 °C		041	141
0/150 °C		042	142
Reserved		043 to 044	143 to 144
-200/1300 °C	Thermoc. N	045	145
0/1200 °C		046	146
0/1000 °C		047	147
Reserved		048 to 049	148 to 149

Table 3 | Predefined configuration codes

Input signal range	Sensor	Output 4/20mA codes	Output 0/10Vdc codes
-200/1000 °C	Thermoc. E	050	150
0/1000 °C		051	151
0/800 °C		052	152
0/500 °C		053	153
0/300 °C		054	154
-200/400 °C	Thermoc. T	055	155
0/400 °C		056	156
0/300 °C		057	157
0/200 °C		058	158
-50/1768 °C	Thermoc. R	059	159
0/1600 °C		060	160
0/1000 °C		061	161
-50/1768 °C	Thermoc. S	062	162
0/1600 °C		063	163
0/2320 °C	Thermoc. C	064	164
0/1500 °C		065	165
250/1820 °C	Thermoc. B	066	166
Reserved		067 to 069	167 to 169
-200/850 °C	Pt100 (2 and 3 wires)	070	170
0/600 °C		071	171
0/400 °C		072	172
0/300 °C		073	173
0/200 °C		074	174
0/100 °C		075	175
-50/+50 °C		076	176
Reserved		077 to 079	177 to 179
-200/850 °C	Pt500	080	180
-200/850 °C	Pt1000	081	181
Reserved		082 to 099	182 to 199
(End of list)		'---	
(Custom selection)		'uSEr'	

Notes

• Code 'uSEr' indicates that a user custom configuration is active, and it does not match any of the listed codes. The code 'uSEr' is non-selectable, for information only.

• Code '----' identifies the end of the list, it follows code '199' and the list continues with code '010'. Select '----' to exit the list without applying changes.

1. INSTALLATION AND START-UP

1. Install the instrument at the DIN rail
2. Connect the power supply (see section 4)
 - see section 7 for an explanation on 'normal mode' of operation
3. Access the 'configuration menu' (see section 7) and at the 'function code' parameter (see section 8), introduce one of the 'predefined configuration codes' (see section 6)
4. If a custom configuration is needed, download the user's manual for a full explanation on how to customize input and output signal ranges (see section 3)
 - customize the input signal range
 - customize the output signal range
5. Connect the output signal (see section 4)
 - to validate remote devices (PLC, SCADA, HMI, ...), access the 'force' menu (press and maintain the 'UP' (▲) key for 1 second) and use the 'force' functions to manually set the output to different values
6. Connect the input signal (see section 4)
 - for a list of display errors see section 9
7. Other functions you may consider to configure:
 - the 'Messages' function, to access information on the input and output values
 - the 'SOS' mode, to set the output fixed to a value (if input signal is missing)
 - the 'Label', to define a name for the instrument
 - the 'Password' function, to block access to the 'configuration menu'

Access the user's manual (see section 3) for detailed explanations. Do not forget to read the 'installation precautions' section at the user's manual.

2. MATERIAL INCLUDED

The instrument is provided with the following elements :

- 1 x instrument I4P
- 4 x plug-in screw terminals, connected to the instrument
- 1 x Quick installation guide

3. ADDITIONAL DOCUMENTATION

User's manual I4P	www.fema.es/docs/5488_I4P_manual_en.pdf
Datasheet I4P	www.fema.es/docs/5486_I4P_datasheet_en.pdf
Quick installation guide I4P	www.fema.es/docs/5484_I4P_installation_en.pdf
CE Declaration of conformity	www.fema.es/docs/5480_CE-Declaration_I4P_en.pdf
Warranty	www.fema.es/docs/4153_Warranty1_en.pdf
Web	www.fema.es/Series_I4



Scan the QR code to directly access the user's manual of this instrument.

7. HOW TO OPERATE

AT POWER-UP When the power supply is connected:

- the 'display' shows the firmware code 'b0.xx'.
- the 'display' shows the configured 'units' and 'input range' (for example: 'mA' and '420').
- the instrument is now in 'normal mode' of operation and the 'display' shows the 'information' configured at the 'DISP' parameter.

FROM 'NORMAL MODE' OF OPERATION

- key 'SQ' (■) gives access to the 'configuration menu' (see section 8).
- key 'UP' (▲) gives access to the 'force' menu (see section 1).
- key 'LE' (◀) activates the 'messages' function.

'ECO' FUNCTION ('DISPLAY' POWERED OFF)

The 'Eco' function (enabled by default) powers off the display under the following conditions:

- the instrument is in 'normal mode' of operation.
- there is no interaction from the operator for 60 seconds.

HOW TO ENTER THE 'CONFIGURATION MENU'

With the instrument in 'normal mode' of operation, press the 'SQ' (■) key and maintain for 1 second. The horizontal leds light from bottom to top. When the upper led lights, the instrument enters into the 'configuration menu'.

The first menu entry displayed is 'Function code' (codE). You can introduce one of the 'predefined configuration codes' (see section 6) for a fast configuration, or download the user's manual (see section 3) for a full explanation on the functions available.

If the 'SQ' (■) key is released before entering into the 'configuration menu', the horizontal leds light downwards from top to bottom, and the instrument returns to 'normal mode' of operation.

HOW TO OPERATE INSIDE THE 'CONFIGURATION MENU'

Inside the 'configuration menu', use the front keypad to move through menu entries, parameters, and select configuration values:

- Key 'SQ' (■)** functions as the 'ENTER' key. It selects the menu entry currently displayed. At numerical value entries, it validates the number displayed.
- Key 'UP' (▲)** moves vertically through the different menu entries. At numerical value entries, it modifies the selected digit by increasing its value to 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.
- Key 'LE' (◀)** functions as the 'ESCAPE' key. It leaves the selected menu entry, and eventually, will leave the 'configuration menu'. When leaving the 'configuration menu', the changed parameters are activated. At numerical value entries, the 'LE' (◀) key allows to select the active digit. To modify a numeric value press the 'UP' (▲) key to increase the value '+1'. Press the 'SQ' (■) key to validate the value.

'ROLLBACK' FUNCTION

If there is no interaction from the operator for 30 seconds, the instrument exits the 'configuration menu' discarding changes, and returns to 'normal mode' of operation.

WHEN EXITING THE 'CONFIGURATION MENU'

When exiting the 'configuration menu' without changes (either by 'rollback' activation or because there are no changes in the configuration), the horizontal leds light down from top to bottom, and the instrument returns to 'normal mode' of operation.

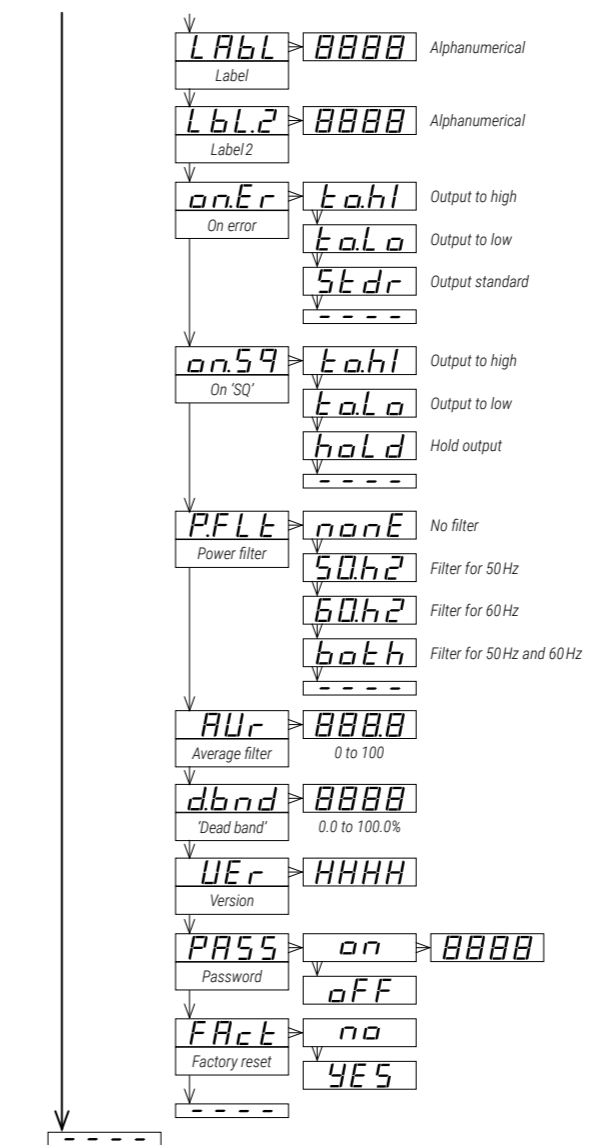
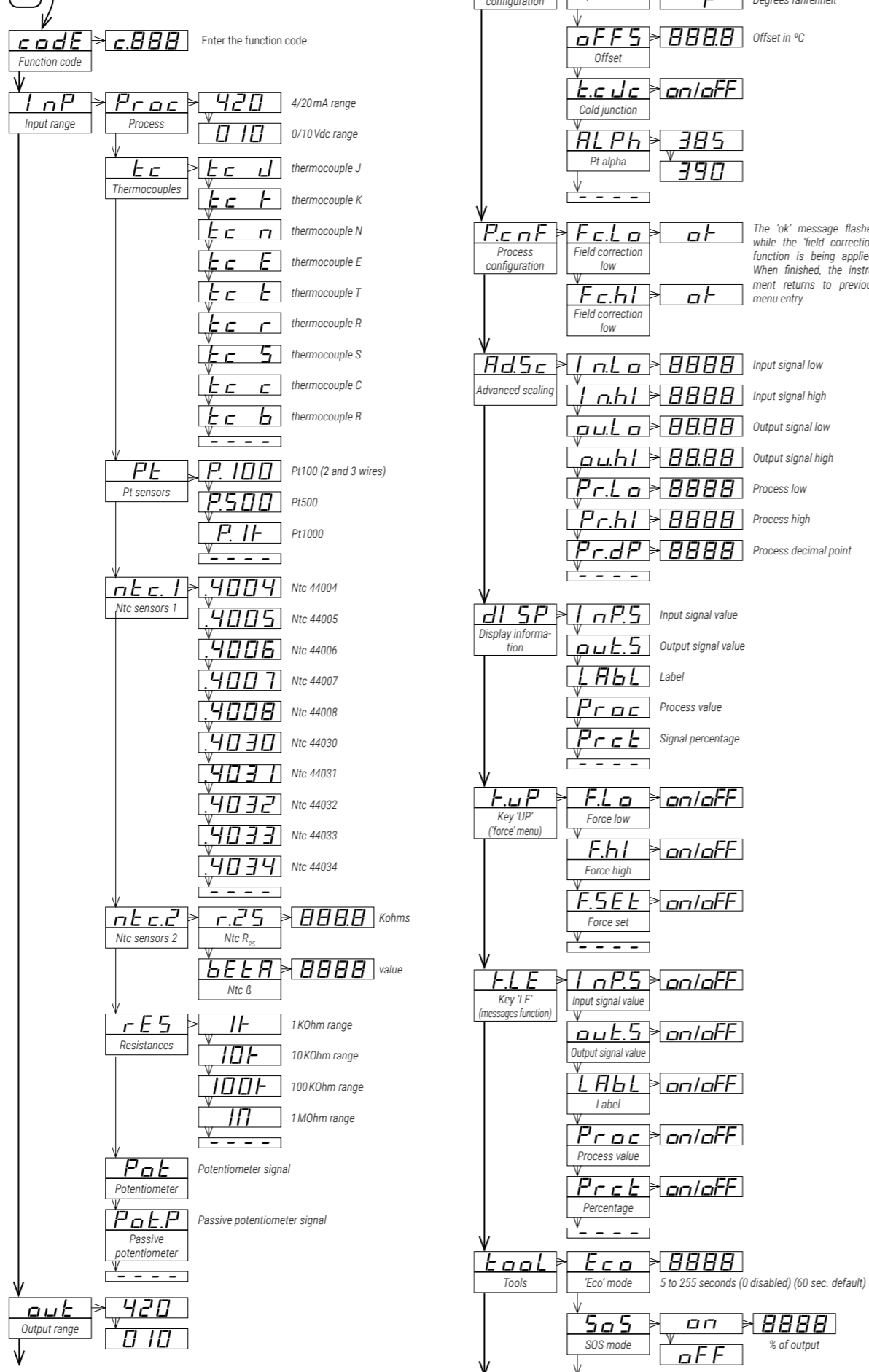
When exiting the 'configuration menu' with changes, the display leds light a round shape while the new configuration is stored. When the round shape is finished, a start-up is applied. After start-up, the new configuration is active and the instrument is in 'normal mode' of operation.

When inside the 'configuration menu', the output signal remains overranged at maximum signal. Other configurations available at the 'On error' parameter

When the operator exits the 'configuration menu', the output signal is underranged to minimum value for <5seconds, while the instrument restarts.

8. CONFIGURATION MENU

Press 'SQ' (■) for 1 second to access the 'configuration menu'.



9. ERROR CODES

Table 4 | Error codes

'Er.01'	Password error. The password code entered is not correct.
'Er.02'	Input hardware overrange. The input signal is higher than the maximum signal that can be measured. The output is fixed to 21 mA or 10.4Vdc
'Er.03'	Input hardware underrange. The input signal is lower than the minimum signal that can be measured. The output is fixed to 3 mA or -0.05Vdc.
'Er.04'	Output hardware overrange. The output signal should be higher than the maximum output signal that can be generated.
'Er.05'	Output hardware underrange. The output signal should be lower than the minimum output signal that can be generated.
'Er.08'	Scaled input slope not valid. The values for 'Input signal low' and 'Input signal high' can not be the same. Enter a different value to validate the parameter.
'Er.09'	Invalid scaled output slope. Values for 'Output signal low' and 'Output signal high' can not be the same. Enter a different value to validate the parameter.
'Er.10'	Invalid scaled process display slope. Values for 'Process low' and 'Process high' can not be the same. Enter a different value to validate the parameter.
'Er.11'	Short circuit error. The input signal detects a short circuit.
'Er.12'	Sensor break. Pt100 3 rd wire connected to Pt+.
'Er.13'	Overload at the 4/20mA input. Detected input signal is higher than 48mA. The instrument has opened the circuit and tries to reconnect every 1 second.
'Er.14'	Pt100 third wire is open (not connected, broken, or third wire resistance is higher than 15 Ohms). Shortcircuit terminals 1 and 2 to overlook the third wire.

Error codes are shown flashing on display. Error codes are not visible inside the 'configuration menu' or inside the 'force' menu. The error code remains active on display until the problem that caused the error is solved. In case of multiple error codes, solve the first problem to see the next active error code.

10. FACTORY CONFIGURATION

Function code (codE)	10	[c.010]
Input range (InP)	4/20mA	
Output range (out)	4/20mA	
Temperature configuration (t.cnF)		
Temperature units (dEG)	°C	
Offset (oFFS)	0.0	
Cold junction (t.cJc)	on	
Pt alpha (ALPh)	385	
Advanced scaling (Ad.Sc)		
Input signal low (In.Lo)	4.00	[mA]
Input signal high (In.hi)	20.00	[mA]
Output signal low (ou.Lo)	4.00	[mA]
Output signal high (ou.hi)	20.00	[mA]
Process low (Pr.Lo)	0	
Process high (Pr.hi)	1000	
Process decimal point (Pr.dP)	8888 (no decimal point)	
Display information (dISP)	Input signal value (InP.S)	
Key 'UP' ('force' menu) (K.uP)		
Force low (F.Lo)	on	
Force high (F.hi)	on	
Force set (FSEt)	on	
Key 'LE' ('messages' function) (K.LE)		
Input signal value (InP.S)	off	
Output signal value (out.S)	on	
Label (LAbL)	off	
Process value (Proc)	off	
Percentage (Prct)	off	
Tools (t.oOL)		
'Eco' mode (Eco)	60	[seconds]
SOS mode (SoS)	off	
Label (LAbL)	LAbL	
Label2 (LbL.2)	----	(disabled)
On error (on.Er)	to.hi	(output to max. value)
On 'SQ' (on.Sq)	to.hi	(output to max. value)
Power filter (P.FLt)	both	(50 and 60Hz filter)
Average filter (AVr)	0	(disabled)
Dead band (d.bnd)	0.0	(disabled)
Password (PASS)	off	(disabled)

RESET TO DEFAULT FACTORY PARAMETERS

To return to default factory parameters, enter into 'configuration menu', go to 'Tools' (t.oOL) / 'Factory reset' (FAct) and select 'yes'

- the leds light a round shape while the new configuration is applied
- the start up message appears ('mA 420')
- the actual signal input value is displayed
- the instrument is in 'normal mode' of operation

11. REGULATIONS

This instrument conforms to the actual CE regulations. For a copy of the 'CE declaration of conformity' see section 3. Applicable regulations are:

Security regulations EN-61010-1 ('Fixed' equipment, 'Permanently connected'. 'Double' isolation. Overvoltage category 2).

Electromagnetic compatibility regulations EN-61326-1

This instrument does not provide a general mains switch and will start operation as soon as power is connected. The instrument does not provide protection fuse, and the fuse must be added during installation. Instrument designed to be DIN rail mounted, inside a cabinet, protected from direct impacts.

- Risk of electrical shock. Instrument terminals can be connected to dangerous voltage.
- Instrument protected with double isolation. No earth connection required.
- Instrument conforms to CE rules and regulations.
- According to directive 2012/19/EU, electronic equipment must be recycled in a selective and controlled way at the end of its useful life.
- Standard warranty of 3 years according to actual european legislation. Free of cost warranty extension of 5 years, available at (see section 3).