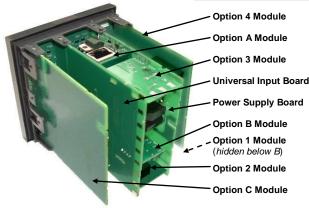
GRAPHICAL ¼ DIN PROCESS CONTROLLER CONCISE PRODUCT MANUAL (59405-6)

An additional manual (59410) is supplied for the Profiler & Data Recorder features. A full user guide is also available from your supplier.

The following symbols are use on the product labels:				
\land	Caution, refer to installation manual when connecting		Equipment protected through- out by double insulation	
\sim	Alternating current	\sim	Both direct and alternating current	

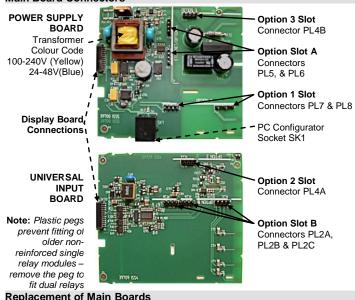
1. INSTALLATION

CAUTION: Installation should be only performed by technically competent personnel. It is the responsibility of the installing engineer to ensure that the configuration is safe. Local regulations regarding electrical installation & safety must be observed - e.g. US National Electrical Code (NEC) and/or Canadian Electrical Code. Installing Option Modules



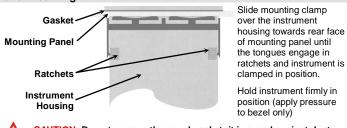
- To access the option modules, first pull the instrument from the housing.
- a. Detach the main boards by lifting first the upper, and lower mounting struts.
- b. Plug the required option modules into the correct connectors, as shown below.
- c. Locate the module tongues in the corresponding slot on the opposite board.
 d. Hold the Power and Input boards together while relocating on their mountings.
- Push the boards forward to ensure correct connection to the Display board.
- f. Replace the instrument by aligning the boards with the guides in the housing, then slowly push the instrument back into position.

Note: Option modules are automatically detected at power up. Main Board Connectors



CAUTION: Replacement of main boards should only be carried out if

View Set Weak Set We



CAUTION: Do not remove the panel gasket; it is a seal against dust and moisture.

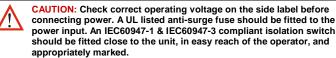
Rear Terminal Wiring

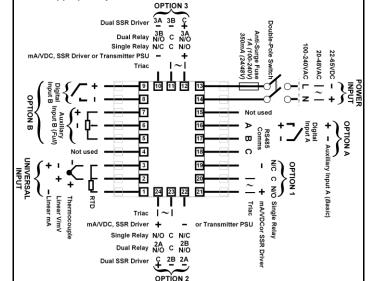
CAUTION: The instrument is double insulated. All external circuits connected must provide double insulation.

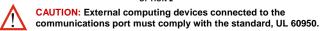
Failure to comply with the installation instructions may impact the protection provided by the unit.

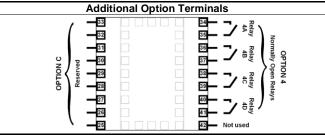
Note: The wiring diagrams show all possible option combinations. The connections required depend on the options fitted. Use single strand (1.2mm / AWG18 max size) copper wire, except for the thermocouple input, where the correct thermocouple or compensating cable and connectors should be used.

Main Terminals









2. SPECIFICATIONS

PROCESS INPU	Г			
Sampling Rate:	10 per second.			
Resolution:	16 bits. Always for	our times better than	display resolution.	
Impedance:	>10MΩ resistive,	except DC mA (5Ω) a	and V (47kΩ).	
Temp Stability:	Error <0.01% of s	pan per °C change ir	ambient temperature	.
Supply Variation:	Supply voltage inf	luence negligible with	hin supply limits.	
Humidity Influence:	Negligible if non-c	condensing.		
Process Display:	Displays up to 5%	over and 5% under	span limits.	
Process Variable nput Offset: Sensor Break	Process Variable,	-ve values subtracte	+ve values added to d from Process Varial o pre-set power value.	
Detection:	High & Sensor Br Linear (4 to 20mA	eak alarms activate.	V only) - Control goes	
Isolation:	Isolated from all o	utputs (except SSR o	driver) at 240V AC.	
Supported	Туре	Range °C	Range °F	
Thermocouple	В	+100 to 1824°C	+211 to 3315°F	
Types & Ranges:	С	0 to 2320°C	32 to 4208°F	
	D	0 to 2315°C	32 to 4199°F	
	E	-240 to 1000°C	-400 to 1832°F	
	J	-200 to 1200°C	-328 to 2192°F	*
	К	-240 to 1373°C	-400 to 2503°F	*
	L	0 to 762°C	32 to 1402°F	*
	N	0 to 1399°C	32 to 2551°F	*
	PtRh 20%:40%	0 to 1850°C	32 to 3362°F	
	R	0 to 1759°C	32 to 3198°F	
	S	0 to 1762°C	32 to 3204°F	
	Т	-240 to 400°C	-400 to 752°F	*
	T Optional decir		-400 to 752°F played up to 999.9°C/F	
Thermocouple Calibration:	±0.1% of full range	mal place can be disp e, ±1LSD (±1°C for ir		=).

 $\pm 0.1\%$ of full range, ± 1 LSD ($\pm 1^{\circ}$ C for internal CJC if enabled). Linearization better than better $\pm 0.2^{\circ}$ C (± 0.05 typical) on ranges marked * in the table above. Linearization for other ranges is better than better than $\pm 0.5^{\circ}$ C. BS4937, NBS125 & IEC584

Power Rating:

Isolation:

0	Tours	D		D	- 05
Supported RTD		Range °C	0	Rang	
Types & Ranges:	3-Wire PT100 NI120	-199 to 800 -80 to 240°			o 1472°F o 464°F
	-	-80 to 240°		-	
RTD Calibration:	0.1% of full rang			γυαυρ	
	Linearization be PT100 input to E	tter than ±0.2°C			
RTD Excitation:	Sensor current 1	50µA ±10%.			
Lead Resistance:	<0.5% of span error for max 50 Ω per lead, balanced.				
Supported Linear	Туре	Range		Offse	t Range
Types & Ranges:	mA DC	0 to 20mA [0mA DC
	mV DC V DC	0 to 50mV I 0 to 5V DC	DC	10 to 1 to 5	50mV DC
	V DC	0 to 30 DC	2		0V DC
		-9999 to 10000	. Decima	l point	selectable from
		s, but limited to			
Maximum Overload:	1A on mA input		on voltag	e input	terminals.
DC Calibration: DC Input Multi-Point	±0.1% of full ran	•	dofined	nuuho	ro botwoon 0 1
Linearization:	Up to 15 scaling and 100% of inp		denned a	arrywrie	ere between 0.1
Supported Input	Туре	Slot A Ranges	5	Slot B	Ranges
Types & Ranges:	MA DC	0 to 20, 4 to 20) (, 4 to 20
	mV DC				, 10 to 50,
	V DC	0 to 5, 1 to 5,) to 10) to 5,	
		0 to 10, 2 to 10) () to 10	, 2 to 10
	Potentiometer			>2000	2
Accuracy:	±0.25% of input	range ±1 LSD.			
Sampling Rate:	4 per second.				
Resolution:	16 bits.				
Impedance:	>10M Ω resistive				
Sensor Break Detection:	4 to 20mA, 2 to pre-set power va				
Isolation:	Reinforced safe Digital Input B).				
Auxiliary Input	Scalable as Ren	note Setpoint (I	RSP) inpu	ut betw	een –9999 and
Scaling:	10000, but is co				
DIGITAL INPUTS					
Volt-free contacts	Open contacts (
(or TTL):	Closed contacts				•
Isolation: Digital Input	Reinforced safe Edge Sensitive.				
		Requires mion			
Sensitivity:	change function				
Sensitivity: Response Time:	change function Slot A <0.25 se	cond, Slot B <1	.5 second	ds.	-
Sensitivity:	change function Slot A <0.25 sec Function	cond, Slot B <1	.5 secono <mark>Logic Hi</mark>	ds. gh	Logic Low
Sensitivity: Response Time: Selectable Digital	change function Slot A <0.25 se	cond, Slot B <1	.5 second	ds. gh 1 c	-
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Sensitivity: Response Time: Selectable Digital Input Functions: See the Supplen OUTPUTS Caution: <i>Plastic pegs</i> <i>Remove the peg to fit</i> Single Relay Type & Rating: Lifetime:	change function Slot A <0.25 set Function Internal Setpoin Auto/Manual Co Control Outputs mentary Manual for s prevent fitting of dual relays (all d Single pole dout	cond, Slot B <1 t Select introl Select or extra options older non-rein ual relay modu ole throw (SPD ions at rated ve	.5 second Logic Hin Local SP Automatii Enabled on Profile forced sir les have T); 2A res Ditage/cui	ds. gh 1 c er or R ngle rel reinford sistive a rrent.	Logic Low Alternate SP Manual Mode Disabled ecorder versions ay modules – ced isolation) at 120/240VAC.
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24V nominal (19 to 28V DC) into 910 Ω minimum resistance.

(Option to use DC Linear output as 0-10V stabilised PSU).

Reinforced safety isolation from inputs and other outputs.

COMMUNICATIO	NS	
PC Configuration		
Connection:	RS232 via PC Configurator Cable to RJ11 socket under case.	
Isolation:	Not isolated from input or SSR Driver outputs. For bench configuration only. CAUTION: Do not use in live applications.	
RS485	алтанан алтун алтан алтан алтан арринан ар	
Connection:	Locates in Option Slot A. Connection via rear terminals (refer to wiring diagram).	
Protocol:	Modbus RTU.	
	Slave address range 1-255 or Setpoint master mode.	
Data Type:	4800, 9600, 19200, 38400, 57600 or 115200 bps. 8 data bits and 1 stop bit. Odd, even or no parity.	
Isolation:	240V reinforced safety isolation from all inputs and outputs.	
Ethernet		
Connection:	Locates in Option Slot A. Connection via RJ45 connector on top of case.	
Protocol:	Modbus TCP. Slave only.	
Supported Speed:	10BaseT or 100BaseT	
Isolation:	240 V reinforced safety isolation from the supply, inputs and outputs (except SSR Drivers).	
See the St	upplementary Manual for extra options on USB/Recorder version	
Tuning Types:	- Pre-Tune, Auto Pre-Tune, Self-Tune or Manual Tuning.	
Proportional Bands:	Primary & Secondary (e.g. Heat & Cool) 0.5% to 999.9% of input span in 0.1% increments, or On/Off control.	
Automatic Reset:	Integral Time Constant, 1s to 99min 59s and OFF	
Rate:	Derivative Time Constant, 1s to 99 min 59s and OFF	
Manual Reset:	Bias 0 to 100% (-100% to +100% Primary & Secondary).	
Deadband/Overlap: Differential:	-20% to +20% of Primary + Secondary Proportional Band. ON/OFF switching differential 0.1% to 10.0% of input span	
Auto/Manual	Selectable with "bumpless" transfer when switching between	
Control:	Automatic and Manual control.	
Cycle Times: Setpoint Ramp:	Selectable from 0.5s to 512s. Ramp rate selectable 1 to 9999 LSDs per hour and infinite.	
ALARMS	Ramp rate selectable i to 3333 LOD's per nour and mininte.	
Alarm Types:	Up to 5 alarms selectable as Process High, Process Low,	
	Band, Deviation, Rate of Signal Change (per minute), Sensor/input Break, Loop Alarm. Band and Deviation (high or low) alarm values are relative to the current setpoint value.	
Alarm Hysteresis:	A deadband from 1 LSD to full span (in display units) for Process, Band or Deviation Alarms. Rate Of Change Alarm hysteresis is the shortest time (1 to 9999 secs) the rate of change must be above the threshold for the alarm activate, or fall below the threshold to deactivate. Note: If the duration is less than this time, the alarm will not activate no matter how fast the rate of rise.	
	Logical OR of alarms 1 & 2, 1 to 3, 1 to 4 or 1 to 5.	
OPERATING CO	mentary Manual for extra options on Profiler or Recorder version: NDITIONS (FOR INDOOR USE)	
Temperature:	0°C to 55°C (Operating), –20°C to 80°C (Storage).	
Relative Humidity:	20% to 95% non-condensing.	
Supply Voltage and Power:	Mains versions: 100 to 240VAC ±10%, 50/60Hz, 20VA. Low voltage versions: 20 to 48VC 50/60Hz 15VA or 22 to 65VDC 12W.	
CONFORMANCE EMI:		
Safety	CE: Complies with EN61010-1. UL, cUL to UL61010C-1.	
Considerations:	Pollution Degree 2, Installation Category II.	
-	: To IP66 (IP65 front USB connector). <i>IP20 behind the panel.</i> (<i>IP rating not recognised / approved by UL</i>).	
Front Panel Cleaning	Wash with warm soapy water and dry immediately. Close the USB cover (if fitted) before cleaning.	
DISPLAY	cises are considered in million before ordening.	
Display Type:	160 x 80 pixel, monochrome graphic LCD with a dual colour	
Display Area:	(red/green) backlight. 66.54mm (W) x 37.42mm (H).	
	0 to 9, a to z, A to Z, plus () - and _	
Trend View:	120 of 240 data points shown in a scrollable window. Data is not retained when power turned off or if time base is changed.	
Trend Data:	Any active alarm plus PV (solid) & SP (dotted) at sample time or Max/Min PV between samples (candle-stick graph). Auto scales from 2 to 100% of Input Span.	
· ·	1; 2; 5; 10; 15; 30 seconds or 1; 2; 5; 10; 15; 30 minutes.	
DATA RECORDE	R Refer to the Supplementary Product Manual for information.	
PROFILER	Profiler option can be purchased from your supplier if required.	
DIMENSIONS	Refer to the Supplementary Product Manual for information.	
Weight:	0.65kg maximum.	
Size:	96 x 96mm (Front Bezel). 117mm (Depth Behind Panel).	
Mounting Panel:	Panel must be rigid. Maximum thickness 6.0mm (0.25inch).	

Panel Cut-out Size: 92mm x 92mm. Tolerance +0.5. -0.0mm.

20mm gap required above, below and behind.

Ventilation

3. POWER UP SEQUENCE

Following the power-up self-test and logo screen, the instrument normally enters Operation Mode, from which the user can select the instrument's Main Menu (refer to the Screen Sequence list). The exceptions to this are the first power-up after purchase, when option modules have been changed or if an error is detected.

Setup Wizard

An easy Setup Wizard runs automatically at first ever power-up. Follow the Wizard to setup parameters required for typical applications (screens marked w in the Screen Sequence list). A partial Wizard also runs whenever option modules have been changed, this only shows parameters affected by the changes. The Wizard can also be run from the Main Menu. It exits to Operation Mode once completed.

Start-Up Errors

These messages indicate that a hardware or configuration an error has occurred. Caution: Do not continue with the process until the issue is resolved.

Message Displayed	Reason
Option Slot n Error	Fault detected. Replace the module in slot n
Configuration Problem	Check all instrument parameters before using
For Service Contact	Details of who to contact if a fault persists

4. OPERATION MODE

This mode is entered at power on, or accessed from the Main Menu. If required, all Operation Mode parameters can be made read only (see Display Configuration). Note: Configuration must be completed before starting normal operations.

Normal Operation



-ve Deviation Bar Graph Typical Operation Screen +ve Deviation Bar Graph Subsequent screens allow the display and selection/adjustment* of Setpoint(s). setpoint ramps, auto/manual control, enable/disable control, alarm status and trends.

Press 🖬 or 🖬 to move forward or back though the screens. Where adjustment is possible*, press ☐ or ☐ to alter the values. *If adjustment is not disabled in Configuration.

Trend View



Trend View graphs PV; PV & SP; or Max/Min PV between samples, plus active alarms Trend Scale Values adjust automatically to visible data (between 2 to 100% of the input span). Sample intervals are set in Display Configuration. Pressing or moves the Cursor Line back through the last 240 data points. Note: Data is not retained at power down or the Sample Interval is changed. Manual Control

rend Upper Scale Value

PV Value At Cursor Line

Trend Lower Scale Value

Cursor Line

At Cursor Line)

Depending on the Control Configuration settings, automatic or manual control can be selected from the Auto/Manual selection screen, or via a digital input. Switching to or from manual mode is via Bumpless Transfer. In Manual mode the Setpoint display is replaced by a 0 to 100% power output level, labelled "Man". Press or or to set the required manual power.

Caution: Manual power level is not restricted by the output power limits.

Over/Under Range & Input Fail Indications

If the process or auxiliary inputs are >5% above or below the scale max/min, their displayed value is replaced with the word "HIGH" or "LOW" If a signal break is detected, their value is replaced with "OPEN" and an uncalibrated input is replaced by "ERROR". In OPEN or ERROR conditions, the Control Outputs go to the pre-set power value (see Control Config)... on: Correct the problem before continuing normal operation.

5. AUTOMATIC TUNING MODE

Engage Pre-Tune, Self-Tune or Auto Pre-Tune as required, from the Automatic Tuning Menu. Pre-tune is a "single-shot" routine that disengages when complete. Note: Automatic tuning will not engage if either proportional band is set to On/Off control. Also, Pre-tune (inc. Auto Pre-Tune) will not engage if the setpoint is ramping, or the Process Variable is <5% of span from setpoint. If Auto Pre-Tune is selected, Pre-tune will attempt to run at every power up. Refer to the full user guide (available from your supplier) for details on tuning.

6. SERIAL COMMUNICATIONS

Set Ethernet option IP address with supplied software for networks without DHCP. Refer to the User guide (from your supplier) for help with communications .

7. SCREEN SEQUENCES

The parameters displayed depend on how the instrument has been configured. After 2 minutes without key activity, most screens revert to the next higher menu level, until reaching the base Operation Mode display. Note: Additional screens will be displayed if the USB, Profiler or Recorder Options are fitted - Refer to the Supplementary Manual. Screens marked O persist unless changed by the user. Screens marked W are also included in the Setup Wizard. Menus marked B = Require an un-lock code for access.

Screen Navigation 🗖 = Accept Value & Move Back 🗖 = Next Item/Increment 🗖 = Prior Item/Decrement 🗃 = Accept Value & Move Forward 📑 + 🗃 = Move Up One Menu Level The symbols \Rightarrow are showed to the right of the lists when more many options are available above \uparrow or below

	The symbols	\clubsuit are showed to the right of the lists when more menu options are available above \clubsuit or below \checkmark .
	Operation Mode:	
	PV value; SP value & Bar Graph	O LED Labels = LED indicator functions. Defaults are HEAT, COOL, TUNE & ALARM - these labels can be altered with configuration software Bar Graph = Primary/Secondary Power or Control Deviation see Bar Graph Format screen.
	Auto/Manual Control Mode Selection	
	Setpoint Value Display & Adjustment	
	Setpoint Ramp Rate	Setpoint Ramp Rate adjustment (in Display Units per hour) if enabled in Control Configuration.
	Select Setpoint Source	Select if local setpoint 1 or the alternate setpoint is active if enabled in Control Configuration.
	Control Enable	Enables/disables control outputs if enabled in Control Configuration.
	Alarm Status	Active / inactive status of all configured Alarms.
	Trend View	A trend graph of PV & SP, or the Max/Min value of the PV between samples. Any active alarm(s) are indicated at the top of the graph.
	- Custom Display screens	Up to 50 Configuration parameters can be copied into Operation Mode using the PC software. In this mode they are not pass code protected.
 		Note: Operation Mode screens can be made globally read only from Display Configuration
8	Setup Wizard:	
	Setup Wizard Unlocking	w Enter correct code number to access Setup Wizard. Default Value = 10
	- Screens marked w	w Press 🖬 to select each major configuration parameter in turn. Follow the on-screen prompts to alter the values.
	Setup Wizard Completed	w Confirms completion of the Setup Wizard. Exits to Operation Mode.
8	Supervisor Mode:	
	Supervisor Mode Unlocking	If Supervisor Mode is configured (requires PC software), enter correct code number to continue. Default Value = 10
	- Supervisor Mode Screens	Press 🖬 to select up to 50 Configuration parameters in turn. Follow on-screen prompts to alter the values.
8	Configuration Menu:	
	Configuration Mode Unlocking	Enter correct code number to access Configuration Mode. Default Value = 10
	Configuration Options	Select required Configuration Menu Option from list. Press 🖬 to continue.
		eens sequences opposite for information about the Configuration Sub-Menus.
8		
	Automatic Tuning Mode Unlocking	Enter correct code number to access Automatic Tuning Menu.
	Pre-Tune	w Turn Pre-Tune on/off. Pre-Tune is disabled in On-Off Mode; if PV <5% of span from SP; during Profiles or if a Ramping Setpoint is set.
	Pre-Tune Status	Shows current Pre-Tune status. Active or Inactive.
	Self-Tune	Turn Self-Tune on/off. Self-Tune is disabled in On-Off Mode and is suspended during setpoint ramping or profile ramp segments.
	Self-Tune Status	Shows current Self-Tune status. Active or Inactive.
	Auto Pre-Tune Enable	Enables/Disables Automatic Pre-Tune attempt at power-up. Normal Pre-Tune engagement rules are applied.
٨	Profile Setup Menu:	Refer to the Supplementary Product Manual for information about the additional screens when the Profiler feature is fitted.
8	Profile Control Menu:	Refer to the Supplementary Product Manual for information about the additional screens when the Profiler feature is fitted.
8	USB Menu:	Refer to the Supplementary Product Manual for information about the additional screens when the USB or Data Recorder features are fitted.
8	Recorder Menu:	Refer to the Supplementary Product Manual for information about the additional screens when Data Recorder is fitted.
	Product Information Mode:	
	Input Calibration Status	Calibration status of mVDC, VDC, mADC, RTD and Thermocouple CJC inputs. All should be "Calibrated".
	Calibration Check Due Date	Date re-calibration is due if Calibration Reminder Enabled in Inputs Configuration.
	Option Slot n Information	Type of Option Modules (<i>if any</i>) fitted in Option Slot s 1-4, A or B
	Controller Feature Information	Controller Only; USB Port; Data Recorder (includes USB Port) or Profiler.
	Firmware Information	Type and version of firmware.
	Serial Number Information	Instrument serial number.
	Date of Manufacture	Date of Manufacture
	Service Information Mode:	
	Service information would.	

Input Configuration

Process Variable Input Type Engineering Units Decimal Point Position Multi-Point Scaling Enable Scale Range Lower Limit Multi-Point Scale Point(s) Scale Range Upper Limit CJC Enable/Disable Process Variable Offset Input Filter Time Auxiliary Input n Type

Auxiliary Input n Offset Control Configuration:

Control Enable/Disable Auto/Manual Mode Access Control Type Primary Control Action Control Status Power Output Level Primary Proportional Band Secondary Proportional Band Integral Time Constant Derivative Time Constant Manual Reset (Bias) Overlap / Deadband Primary On-Off Differential Secondary On-Off Differential Pri & Sec On-Off Differential Primary Cycle Time Secondary Cycle Time Primary Power Lower Limit Primary Power Upper Limit Secondary Power Lower Limit Secondary Power Upper Limit Sensor Break Pre-set Power Output Setpoint Selection Alternate Setpoint Source Setpoint Upper Limit Setpoint Lower Limit Setpoint Ramp Editing Setpoint Ramp Rate Local Setpoint 1 Value Local Setpoint 1 Offset Local Setpoint 2 Value Local Setpoint 2 Offset Output Configuration: No Outputs Warning Linear Output n Type Output n Usage Output n Alarm Selection Retransmit Output n Scale Low Retransmit Output n Scale High Alarm Configuration Alarm n Type Alarm n Value Alarm n Hysteresis Signal change Alarm n Min. Duration Alarm n Inhibit Loop Alarm Type Manual Loop Alarm Time Communications Configuration: No Comms Warning Modbus RTU Parity Modbus RTU Data Rate Master Mode, or Slave Address

Target Register In Slave Master Mode Format Serial Communications Write Enable Recorder Configuration: Recorder Clock Configuration: **Display Configuration**

Enable Custom Display Mode Read Only Operation Mode? Operation Mode Bar Graph Format Trend Sample Interval Select Trend Mode Display Colour Invert Display **Display Contrast** Language

Lock Code Configuration: Lock Code View 1

Reset To Defaults: Reset To Default

w From Thermocouple, RTD and Linear inputs. - see specifications section for details. w Select display units from: °C; °F; °K; bar; %; %RH; pH; psi or none. w Display resolution with 0: 1: 2 or 3 decimal places. Temperature inputs are limited to 1 decimal place. Enables/disables Linear Input Multi-Point Scaling. w Sets the usable span (min = 100 units, max = range limits - see specs) for temperature inputs. For Linear inputs, Upper & Lower Limits define the values shown (-1999 to 9999) when input is at minimum and maximum values. Min span = 100 units. If Multi-Point Scaling is enabled, up to 15 w breakpoints* can scale input vs. displayed value, between the linear input scale limits. *A breakpoint set at 100% input ends the sequence. Enables/disables internal Thermocouple Cold Junction Compensation. The default value is Enabled. Trims the PV, +Ve values add to, -Ve values subtract from measured input. Caution: Use with care! Filter unwanted noise from input signal. Adjustable from 0.1 to 100.0 seconds or OFF (default = 2s). Caution: Use with care! W From: 0-10V; 2-10V; 0-5V; 1-5V, 0-20mA or 4-20mA DC. Aux B also allows 2KΩ Pot and 0-100mV Auxiliary Input n Scaling Lower Limit w Scales Aux Input A or B to show a value between -9999 and 10000 when this input is at or below it's lower limit. Constrained by the Setpoint Limits Auxiliary Input n Scaling Upper Limit w Scales Aux Input A or B to show a value between -9999 and 10000 when this input is at or above it's upper limit. Constrained by the Setpoint Limit Trims the Aux Input A or B, +Ve values are added to, -Ve values subtracted from the measured auxiliary input. From: Enabled; Disabled; Digital Input A, or B or Operator Selectable - Allows the control output(s) to be turned off. w From: Automatic Control: Manual Control: Operator Selectable: Digital Input A or B Selectable w Single - Primary Control Output only (e.g. Heating or Cooling only) or Dual - Primary & Secondary (e.g. Heating & Cooling). w Reverse or Direct. Reverse = "apply primary power when below setpoint". Secondary output action always opposite to Primary. Display of the current process variable and setpoint values - Read Only. Primary and Secondary control % output power levels - Read Only. From: On-Off control or 0.1% to 999.9% proportional band. Read Only during automatic tuning. From: On-Off control or 0.1% to 999.9% proportional band. Read Only during automatic tuning. Integral Time value (Automatic Reset) from 1s to 99min 59s or OFF. Read Only during automatic tuning Derivative Time value (Rate) from 1s to 99 min 59s or OFF. Read Only during automatic tuning Manual Reset value (Bias) from 0-100% (-100 to +100% for Primary & Secondary control type). Overlap (+ve values) or Deadband (-ve values) between Primary & Secondary Proportional Bands. Primary On-Off control hysteresis (deadband) from 0.1 to 10.0% of Span (centred about setpoint). Secondary On-Off control hysteresis (deadband) from 0.1 to 10.0% of Span (centred about setpoint). Combined Primary & Secondary On-Off Control hysteresis (deadband) from 0.1 to 10.0% of Span. Primary Power Cycle Time from 0.5s to 512s. Relay, SSR Driver or Triac Control Outputs only. Secondary Power Cycle Time from 0.5s to 512s. Relay, SSR Driver or Triac Control Outputs only. Minimum Primary Output Power limit, from 0 to 90%. Must be 10 or more % less than the upper limit. Caution: Use with care Maximum Primary Output Power limit, from 10 to 100%. Must be 10 or more % higher than the lower limit. Caution: Use with care Minimum Secondary Output Power limit, from 0 to 90%. Must be 10 or more % less than the upper limit, Caution: Use with care Maximum Secondary Output Power limit, from 10 to 100%, Must be 10 or more % higher than the lower limit, Caution: Use with care The power level (-100 to +100%) applied if the PV input (or active RSP) is lost. Default value is OFF (0% power). w From: Local SP1; Alternate SP; Operator Selectable; Digital Input A or B Selectable. w From: Local SP2: Auxiliary Input A or B Remote SP Selectable. Maximum allowable setpoint values. Adjustable within Input Span limits. Applies to local and remote setpoints. Caution: Use with care! Minimum allowable setpoint values. Adjustable within Input Span limits. Applies to local and remote setpoints. Caution: Use with care! Enables/disables changing of Setpoint Ramp Rate in Operation Mode - Note: this does not turn off an active ramp. Setpoint Ramp Rate value (1 to 9999 LSDs per hour or OFF). Applied at start-up and SP changes w Local Setpoint 1 value, between the Setpoint Upper and Lower Limits. +ve values added to / -ve values subtracted from Setpoint 1 value when instrument is a slave in multi-zone applications. Otherwise set to zero w Local Setpoint 2 value, between the Setpoint Upper and Lower Limits. +ve values added to / -ve values subtracted from Setpoint 2 value when instrument is a slave in multi-zone applications. Otherwise set to zero. If Outputs Configuration menu is entered without any output modules fitted. W From: 0-5, 0-10, 1-5, 2-10V & 0-20, 4-20mA or 0-10VDC adjustable Transmitter PSU. Adjustable 0-10V Transmitter PSU *n* **w** Voltage required if Output *n* is 0-10VDC adjustable Transmitter PSU. w From: Primary or Secondary Control; Alarms; Profile Events & Alarms; Retransmit Process Variable or Setpoint. w Alarm 1; 2; 3; 4; 5 or Logical OR of alarms 1 to 2; 1 to 3; 1 to 4 or 1 to 5. Selectable Direct or Reverse Action. W Displayed value at which the retransmission output = minimum, Adjustable from -1999 to 9999. w Displayed value at which the retransmission output = maximum. Adjustable from -1999 to 9999. w From: Unused; High; Low; Deviation; Band; Control Loop; Rate Of Signal Change per minute; PV Signal Break; Aux. Input A or B Break. w Alarm activation point. - applicable if type is High; Low; Deviation (+ve above, -ve below SP) or Band (above or below SP). Deadband on "safe" side of alarm, through which the signal must pass before alarm deactivates Minimum time the rate of PV change must be above the alarm threshold for a Rate Of Change Alarm to change state (on or off). 1 to 9999 secs. Prevents alarm activation if the alarm condition is true at power up. Activation occurs only after the condition has passed and then reoccurred. From: Automatic (2x Integral Time Constant) or Manual (from Loop Alarm Time screen). Time allowed (after PID power output reaches min or max), for process to begin responding. Alarm activates if no response. If Communications Configuration menu is entered without a communications module fitted. w From: Odd; Even or None. W From: 9600: 19200: 57600 or 115200 bps w Slave address (1 to 255), or multi-zone Setpoint Master Mode. Target register for Setpoint value in attached setpoint slave controllers. The data format required by the attached setpoint slaves. From: Integer; integer with 1 decimal place & float. Enables/disables writing via RS485 or Ethernet (if fitted). When disabled, all parameters are read only. Refer to the Supplementary Product Manual for information about the additional screens when Data Recorder is fitted. Refer to the Supplementary Product Manual for information about the additional screens when Data Recorder is fitted. Enables/disables Custom Operation Mode, if configured (requires PC configuration software). Allows Operation Mode to be Read-Only or Read/Write. Screens can be seen but, values cannot be changed if Read-Only. From: PID Power or Control Deviation or. Interval between display of next value on the trend graph From: Every 1: 2: 5: 10: 15: 30 Seconds, or Every 1: 2: 5: 10: 15: 30 Minutes. From: PV only, PV (solid) & SP (dotted) at sample time or Max/Min PV between samples (candle-stick graph). Alarm activity is always shown. From: Red only; Green only; Red to Green on Alarm or Green to Red on Alarm Standard or Negative display image Screen contrast (0 and 100) to improve clarity. 100 = maximum contrast. Select English or the alternate local language. The alternate language type can be changed using the PC software. View and edit the Setup Wizard; Configuration Mode; Tuning Menu and Supervisor Mode Lock Codes (1-9999 or OFF). Default Values = 10

Set all parameters to default values. Caution: User must reconfigure all required settings before using the instrument following a reset.