

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 error has occurred. **Caution: Do not continue with the process until the issue is resolved.**

Message Displayed	Reason
Option Slot <i>n</i> Error	Fault detected. Replace the module in slot <i>n</i>
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

LED Indicators LED Function Labels

Process Variable Value Engineering Units

Actual Setpoint Value Primary Power or -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 through the screens. Where adjustment is possible*, press **↑** or **↓** to alter the values. *If adjustment is not disabled in Configuration.

7. SCREEN SEQUENCES

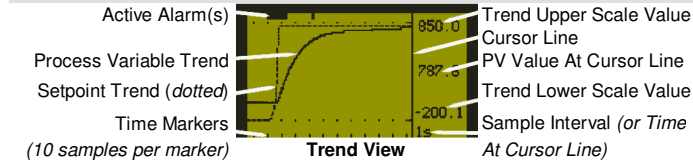
The parameters displayed depend on how the instrument has been configured. After 2 minutes without key activity, most screens revert to the next higher menu level, until reaching the base Operation Mode display. **Note:** Additional screens will be displayed if the USB, Profiler or Recorder Options are fitted - Refer to the Supplementary Manual. Screens marked **Ⓞ** persist unless changed by the user. Screens marked **W** are also included in the Setup Wizard. Menus marked **Ⓛ** = 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 Ⓢ are showed to the right of the lists when more menu options are available above Ⓢ or below Ⓢ.

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

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 **Ⓢ** 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 un-calibrated input is replaced by "ERROR". In OPEN or ERROR conditions, the Control Outputs go to the pre-set power value (see Control Config).. **Caution: 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.**

Input Configuration:

- Process Variable Input Type **w** From Thermocouple, RTD and Linear inputs. - see specifications section for details.
- Engineering Units **w** Select display units from: °C; °F; °K; bar; %; %RH; pH; psi or none.
- Decimal Point Position **w** Display resolution with 0; 1; 2 or 3 decimal places. Temperature inputs are limited to 1 decimal place.
- Multi-Point Scaling Enable **w** Enables/disables Linear Input Multi-Point Scaling.
- Scale Range Lower Limit **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
- Multi-Point Scale Point(s) **w** "breakpoints" can scale input vs. displayed value, between the linear input scale limits. *A breakpoint set at 100% input ends the sequence.
- Scale Range Upper Limit **w** Enables/disables internal Thermocouple Cold Junction Compensation. The default value is Enabled.
- CJC Enable/Disable **w** Trims the PV. +Ve values add to, -Ve values subtract from measured input. **Caution: Use with care!**
- Process Variable Offset **w** Filter unwanted noise from input signal. Adjustable from 0.1 to 100.0 seconds or OFF (default = 2s). **Caution: Use with care!**
- Input Filter Time **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* Type **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 Lower 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 Limits.
- Auxiliary Input *n* Scaling Upper Limit **w** Trims the Aux Input A or B. +Ve values are added to, -Ve values subtracted from the measured auxiliary input.
- Auxiliary Input *n* Offset

Control Configuration:

- Control Enable/Disable From: Enabled; Disabled; Digital Input A, or B or Operator Selectable - Allows the control output(s) to be turned off.
- Auto/Manual Mode Access **w** From: Automatic Control; Manual Control; Operator Selectable; Digital Input A or B Selectable.
- Control Type **w** Single - Primary Control Output only (e.g. Heating or Cooling only) or Dual - Primary & Secondary (e.g. Heating & Cooling).
- Primary Control Action **w** Reverse or Direct. Reverse = "apply primary power when below setpoint". Secondary output action always opposite to Primary.
- Control Status Display of the current process variable and setpoint values - Read Only.
- Power Output Level Primary and Secondary control % output power levels - Read Only.
- Primary Proportional Band From: On-Off control or 0.1% to 999.9% proportional band. Read Only during automatic tuning.
- Secondary Proportional Band From: On-Off control or 0.1% to 999.9% proportional band. Read Only during automatic tuning.
- Integral Time Constant Integral Time value (Automatic Reset) from 1s to 99min 59s or OFF. Read Only during automatic tuning
- Derivative Time Constant Derivative Time value (Rate) from 1s to 99 min 59s or OFF. Read Only during automatic tuning
- Manual Reset (Bias) Manual Reset value (Bias) from 0-100% (-100 to +100% for Primary & Secondary control type).
- Overlap / Deadband Overlap (+ve values) or Deadband (-ve values) between Primary & Secondary Proportional Bands.
- Primary On-Off Differential Primary On-Off control hysteresis (deadband) from 0.1 to 10.0% of Span (centred about setpoint).
- Secondary On-Off Differential Secondary On-Off control hysteresis (deadband) from 0.1 to 10.0% of Span (centred about setpoint).
- Pri. & Sec. On-Off Differential Combined Primary & Secondary On-Off Control hysteresis (deadband) from 0.1 to 10.0% of Span.
- Primary Cycle Time Primary Power Cycle Time from 0.5s to 512s. Relay, SSR Driver or Triac Control Outputs only.
- Secondary Cycle Time Secondary Power Cycle Time from 0.5s to 512s. Relay, SSR Driver or Triac Control Outputs only.
- Primary Power Lower Limit Minimum Primary Output Power limit, from 0 to 90%. Must be 10 or more % less than the upper limit. **Caution: Use with care**
- Primary Power Upper Limit Maximum Primary Output Power limit, from 10 to 100%. Must be 10 or more % higher than the lower limit. **Caution: Use with care**
- Secondary Power Lower Limit Minimum Secondary Output Power limit, from 0 to 90%. Must be 10 or more % less than the upper limit. **Caution: Use with care**
- Secondary Power Upper Limit Maximum Secondary Output Power limit, from 10 to 100%. Must be 10 or more % higher than the lower limit. **Caution: Use with care**
- Sensor Break Pre-set Power Output The power level (-100 to +100%) applied if the PV input (or active RSP) is lost. Default value is OFF (0% power).
- Setpoint Selection **w** From: Local SP1; Alternate SP; Operator Selectable; Digital Input A or B Selectable.
- Alternate Setpoint Source **w** From: Local SP2; Auxiliary Input A or B Remote SP Selectable.
- Setpoint Upper Limit Maximum allowable setpoint values. Adjustable within Input Span limits. Applies to local and remote setpoints. **Caution: Use with care!**
- Setpoint Lower Limit Minimum allowable setpoint values. Adjustable within Input Span limits. Applies to local and remote setpoints. **Caution: Use with care!**
- Setpoint Ramp Editing Enables/disables changing of Setpoint Ramp Rate in Operation Mode - Note: this does not turn off an active ramp.
- Setpoint Ramp Rate Setpoint Ramp Rate value (1 to 9999 LSDs per hour or OFF). Applied at start-up and SP changes.
- Local Setpoint 1 Value **w** Local Setpoint 1 value, between the Setpoint Upper and Lower Limits.
- Local Setpoint 1 Offset +ve values added to / -ve values subtracted from Setpoint 1 value when instrument is a slave in multi-zone applications. Otherwise set to zero.
- Local Setpoint 2 Value **w** Local Setpoint 2 value, between the Setpoint Upper and Lower Limits.
- Local Setpoint 2 Offset +ve values added to / -ve values subtracted from Setpoint 2 value when instrument is a slave in multi-zone applications. Otherwise set to zero.

Output Configuration:

- No Outputs Warning If Outputs Configuration menu is entered without any output modules fitted.
- Linear Output *n* Type **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 **w** Voltage required if Output *n* is 0-10VDC adjustable Transmitter PSU.
- Output *n* Usage **w** From: Primary or Secondary Control; Alarms; Profile Events & Alarms; Retransmit Process Variable or Setpoint.
- Output *n* Alarm Selection **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.
- Retransmit Output *n* Scale Low **w** Displayed value at which the retransmission output = minimum. Adjustable from -1999 to 9999.
- Retransmit Output *n* Scale High **w** Displayed value at which the retransmission output = maximum. Adjustable from -1999 to 9999.

Alarm Configuration:

- Alarm *n* Type **w** From: Unused; High; Low; Deviation; Band; Control Loop; Rate Of Signal Change per minute; PV Signal Break; Aux. Input A or B Break.
- Alarm *n* Value **w** Alarm activation point. - applicable if type is High; Low; Deviation (+ve above, -ve below SP) or Band (above or below SP).
- Alarm *n* Hysteresis Deadband on "safe" side of alarm, through which the signal must pass before alarm deactivates.
- Signal change Alarm *n* Min. Duration 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.
- Alarm *n* Inhibit Prevents alarm activation if the alarm condition is true at power up. Activation occurs only after the condition has passed and then reoccurred.
- Loop Alarm Type From: Automatic (2x Integral Time Constant) or Manual (from Loop Alarm Time screen).
- Manual Loop Alarm Time Time allowed (after PID power output reaches min or max), for process to begin responding. Alarm activates if no response.

Communications Configuration:

- No Comms Warning If Communications Configuration menu is entered without a communications module fitted.
- Modbus RTU Parity **w** From: Odd; Even or None.
- Modbus RTU Data Rate **w** From: 9600; 19200; 57600 or 115200 bps.
- Master Mode, or Slave Address **w** Slave address (1 to 255), or multi-zone Setpoint Master Mode.
- Target Register In Slave Target register for Setpoint value in attached setpoint slave controllers.
- Master Mode Format The data format required by the attached setpoint slaves. From: Integer; integer with 1 decimal place & float.
- Serial Communications Write Enable Enables/disables writing via RS485 or Ethernet (if fitted). When disabled, all parameters are read only.

Recorder Configuration:

- Recorder Clock Configuration Refer to the Supplementary Product Manual for information about the additional screens when Data Recorder is fitted.

Display Configuration:

- Enable Custom Display Mode Enables/disables Custom Operation Mode, if configured (requires PC configuration software).
- Read Only Operation Mode Allows Operation Mode to be Read-Only or Read/Write. Screens can be seen but, values cannot be changed if Read-Only.
- Operation Mode Bar Graph Format From: PID Power or Control Deviation or.
- Trend Sample Interval 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.
- Select Trend Mode From: PV only, PV (solid) & SP (dotted) at sample time or Max/Min PV between samples (candle-stick graph). Alarm activity is always shown.
- Display Colour From: Red only; Green only; Red to Green on Alarm or Green to Red on Alarm.
- Invert Display Standard or Negative display image.
- Display Contrast Screen contrast (0 and 100) to improve clarity. 100 = maximum contrast.
- Language Select English or the alternate local language. The alternate language type can be changed using the PC software.

Lock Code Configuration:

- Lock Code View 1 View and edit the Setup Wizard; Configuration Mode; Tuning Menu and Supervisor Mode Lock Codes (1-9999 or OFF). Default Values = 10

Reset To Defaults:

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

CONFIGURATION MENU OPTIONS

Select required Main Menu Option from list. Press **Ⓢ** to continue. - Press **Ⓢ+Ⓢ** to move back to Main Menu

MAIN MENU OPTIONS

Select Main Menu Option from list. Press **Ⓢ** to continue. - Press **Ⓢ+Ⓢ** to move from Operation Mode to Main Menu

- Operation Mode:**
 - Base operating screen. LED Labels; PV value; SP value & Bar Graph
 - Auto/Manual Control Mode Selection
 - Setpoint Value Display & Adjustment
 - Setpoint Ramp Rate
 - Select Setpoint Source
 - Control Enable
 - Alarm Status
 - Trend View
 - Custom Display screens ...
- Setup Wizard:**
 - Setup Wizard Unlocking
 - Screens marked **w** ...
 - Setup Wizard Completed
- Supervisor Mode:**
 - Supervisor Mode Unlocking
 - Supervisor Mode Screens ...
- Configuration Menu:**
 - Configuration Mode Unlocking
 - Configuration Options
 - Refer to the Configuration Menu screens sequences opposite for information about the Configuration Sub-Menus.
- Automatic Tuning Menu:**
 - Automatic Tuning Mode Unlocking
 - Pre-Tune
 - Pre-Tune Status
 - Self-Tune
 - Self-Tune Status
 - Auto Pre-Tune Enable
- Profile Setup Menu:**
- Profile Control Menu:**
- USB Menu:**
- Recorder Menu:**
- Product Information Mode:**
 - Input Calibration Status
 - Calibration Check Due Date
 - Option Slot *n* Information
 - Controller Feature Information
 - Firmware Information
 - Serial Number Information
 - Date of Manufacture
- Service Information Mode:**
 - For Service Contact