

1/4 DIN COMPACT PROCESS CONTROLLER CONCISE PRODUCT MANUAL (59427-1)

The following symbol is use on the product labels:



Caution, refer to installation manual when connecting

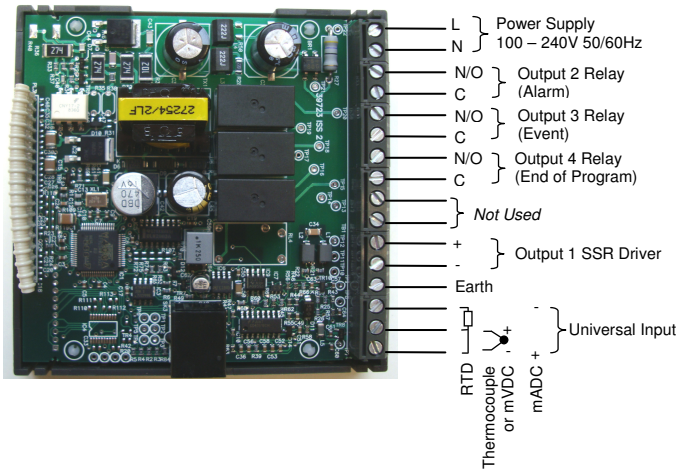
1. INSTALLATION

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.

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

Main Board Connectors

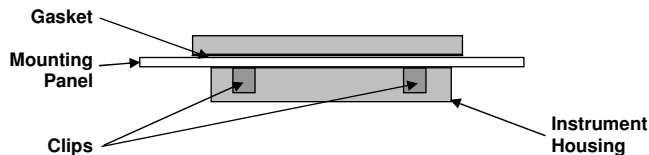
CAUTION: A UL listed 1A anti-surge fuse, rated 250V should be fitted to the power input. An IEC60947-1 & IEC60947-3 compliant isolation switch should be fitted close to the unit, in easy reach of the operator, and appropriately marked.



Note: 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.

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

Panel Mounting



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

2. SPECIFICATIONS

PROCESS INPUT

Sampling Rate: 4 per second.
Resolution: 16 bits. Always four times better than display resolution.
Impedance: >10MΩ resistive, except DC mA (5Ω) and V (47kΩ).
Temp Stability: Error <0.01% of span per °C change in ambient temperature.
Supply Variation: Supply voltage influence negligible within supply limits.
Humidity Influence: Negligible if non-condensing.
Process Display: Displays up to 5% over and 5% under span limits.
Process Variable: Reading adjustable ± Controller Span. +ve values added to Process Variable, -ve values subtracted from Process Variable
Input Offset: Thermocouple & RTD - Control goes to off. High & Sensor Break alarms activate.
Sensor Break Detection: Linear (4 to 20mA, 2 to 10V and 1 to 5V only) - Control goes to off. Low & Sensor Break alarms activate.

Isolation: Isolated from all outputs (except SSR driver).

Supported Thermocouple Types & Ranges:

Type	Range °C	Range °F
B	+100 to 1824 °C	+211 to 3315 °F
C	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
K *	-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
T *	-240 to 400 °C	-400 to 752 °F

Optional decimal place can be displayed up to 999.9 °C/F

Thermocouple Calibration: ±0.1% of full range, ±1LSD (±1 °C for internal CJC). Linearization better than ±0.2°C (±0.05 typical) on ranges marked * in the table above. Linearization for other ranges is better than ±0.5°C.
BS4937, NBS125 & IEC584

Supported RTD Types & Ranges:

Type	Range °C	Range °F
3-Wire PT100	-199 to 800 °C	-328 to 1472 °F

Optional decimal place can be displayed up to 999.9 °C/F

RTD Calibration: 0.1% of full range, ±1LSD. Linearization better than ±0.2°C (±0.05 typical). PT100 input to BS1904 & DIN43760 (0.00385Ω/Ω/°C).

RTD Excitation: Sensor current 150µA ±10%.
Lead Resistance: <0.5% of span error for max 50Ω per lead, balanced.

Supported Linear Types & Ranges:

Type	Range	Offset Range
mA DC	0 to 20mA DC	4 to 20mA DC
mV DC	0 to 50mV DC	10 to 50mV DC
V DC	0 to 5V DC	1 to 5V DC
V DC	0 to 10V DC	2 to 10V DC

Scalable from -9999 to 10000. Decimal point selectable from 0 to 3 places, but limited to 5 display digits (e.g. 9999.9)

Overload Limit: Maximum 1A on mA input, 30V on voltage input.

DC Calibration: ±0.1% of full range, ±1LSD.

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OUTPUTS

Relay

Type & Rating: Single Pole Single Throw (SPST); 2A resistive at 120/240VAC.
Lifetime: >500,000 operations at rated voltage/current.
Isolation: Reinforced safety isolation from power / signal inputs and SSR Driver output.
Basic 240V isolation between relays.

SSR Driver

Drive Capability: SSR driver voltage >10V into 500Ω minimum.
Isolation: Not isolated from the signal input.

LOOP CONTROL

Tuning Types: Automatic Pre-Tune and Manual Tuning.
Proportional Bands: 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: Proportional Output Power Bias 0 to 100%.
Differential: ON/OFF switching differential 0.1% to 10.0% of input span
Approach Control: 10 to 100. Larger values bias the approach control for greater speed to setpoint, smaller values bias for minimised overshoot.
Cycle Time: Selectable from 0.5 to 512 seconds.
Setpoint Ramp: Ramp rate from 1 to 9999 LSDs per hour, and infinite (step).

ALARM

Alarm Type: Process High, Process Low, Band and Deviation. Band and Deviation (high or low) alarm values are relative to the current setpoint value.
Alarm Hysteresis: A dead-band from 1 LSD to full span (in display units) before deactivation of the alarm.

OPERATING CONDITIONS (FOR INDOOR USE)

Temperature: 0°C to 60°C (Operating), -20°C to 80°C (Storage).
Relative Humidity: 20% to 95% non-condensing.
Supply Voltage and Power: 100 to 240VAC ±10%, 50/60Hz, 7.5VA.

CONFORMANCE NORMS

EMI: CE: Complies with EN61326.
Safety: CE: Complies with EN61010-1.
Considerations: Pollution Degree 2, Installation Category II.
Front Panel Sealing: To IP62.
Front Panel Cleaning: Wash with warm soapy water and dry immediately.

DISPLAY

Display Type: 160 x 80 pixel, monochrome graphic LCD with a dual colour (red/green) backlight.
Display Area: 66.54mm (W) x 37.42mm (H).
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 View Data Displayed: 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.
Trend View Sample Rate: Sample every 1; 2; 5; 10; 15; 30 seconds or 1; 2; 5; 10; 15; 30 minutes.

DIMENSIONS

Weight: 0.2kg maximum.
Size: 96 x 96mm (Front Bezel). 30mm (Depth Behind Panel).
Mounting Panel: Panel must be rigid. Maximum thickness 2.0mm.
Panel Cut-out: 92mm x 92mm whole size. Tolerance +0.5, -0.0mm.
Ventilation: 20mm gap required above, below and behind.

3. POWER UP SEQUENCE

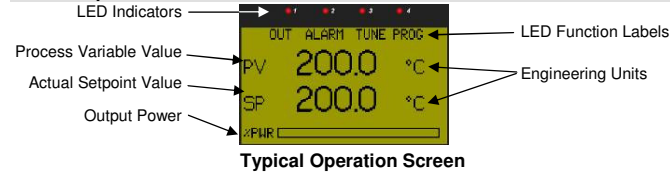
Following the power-up self-test and logo screen, the instrument enters Operation Mode, from which the user can select the instrument's Main Menu (refer to the Screen Sequence list).

4. OPERATION MODE

This mode is entered at power on, or accessed from the Main Menu.

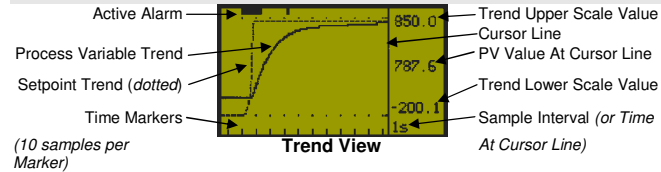
Note: Configuration must be completed before starting normal operations.

Normal Operation



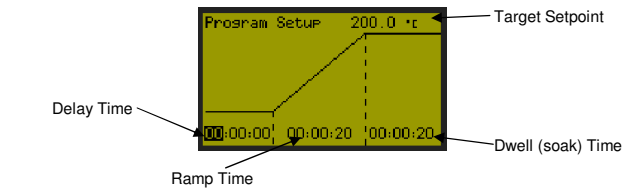
Subsequent screens allow the display and selection/adjustment of Setpoint, enable/disable control, alarm status and trends. Press **←** or **→** to move forward or back through the screens. Press **□** or **■** to alter the values.

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.**

Ramp / Dwell Program Setup



A delay time of 00:00:00 (hh:mm:ss) is no delay. The program starts immediately. A ramp time of 00:00:00 (hh:mm:ss) is an immediate STEP to the target setpoint. A dwell time below 00:00:00 is an INFINITE soak, until the program is stopped.

Over/Under Range & Input Fail Indications

If the process input is >5% above or below the scale max/min, the displayed value is replaced with the word "HIGH" or "LOW". If a signal break is detected, the value is replaced with "OPEN" and an uncalibrated input is replaced by "ERROR". In OPEN or ERROR conditions, the Control Outputs off. **Caution: Correct the problem before continuing normal operation.**

5. SCREEN SEQUENCES

The parameters displayed depend on how the instrument has been configured. Most screens revert to the base operating screen after 2 minutes without activity. Screens marked **Ⓞ** persist unless changed by the user.

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 **↓**. Menus marked **Ⓞ** = Require a un-lock code for access.

MAIN MENU OPTIONS	Operation Mode:	Ⓞ
Base Operating Screen.	Program Control	PV value; SP value & Power Output Bar Graph
Control Enable/Disable	Setpoint Value	Start and stop a program
Program Status	Program Setup	Allows the control output to be turned on or off. View and alter the setpoint value.
Alarm / Event Status	Alarm / Event Status	PV value; SP value, program progress bar-graph & program status (▶ Run, Held, ■ Stopped)
Trend View	Trend View	Graphical representation of the program enabling editing of the delay, ramp, target SP and dwell time. Active / inactive status of the Alarm and Event.
Ⓞ Configuration Menu:		
Configuration Mode Unlocking	Configuration Options	Enter correct code number to access Configuration Mode. Default Value = 10
Select required Configuration Sub-Menu from the list. Press □ to continue.		
See Configuration Menu Options below for Configuration Sub-Menus information		
Ⓞ Automatic Tuning Menu:		
Automatic Tuning Mode Unlocking	Pre-Tune	Enter correct code number to access Automatic Tuning Mode. Default Value = 10
Turn Pre-Tune on/off. Pre-Tune is disabled in On-Off Mode; if PV <5% of span from SP; during a Program or if a Ramping Setpoint is set.		
Pre-Tune Status	Shows current Pre-Tune status. Active or Inactive.	
Product Information:		
Input Calibration Status	Calibration status of mVDC, VDC, mA DC, RTD and Thermocouple CJC inputs. All should be "Calibrated".	
Firmware Information	Type and version of firmware.	
Product Revision	The hardware and firmware revision level code.	
Serial Number	The instruments serial number.	
Date of Manufacture	Date of Manufacture (dd/mm/yyyy)	
Service Information:		
For Service Contact	Contact information for Service, Sales or Support.	

CONFIGURATION MENU OPTIONS	Input Configuration:	Ⓞ
Process Variable Input Type	Engineering Units	From Thermocouple, RTD and Linear inputs. - see specifications section for details.
Select display units from: °C; °F; %; bar; %; %RH; pH; psi or none.		
Decimal Point Position	Display resolution with 0; 1; 2 or 3 decimal places. Temperature inputs limited to 0 or 1 decimal place.	
Scale Range Lower Limit	Sets the usable span within the overall range selected for the input type (min = 100 units, max = range limits - see specs)	
Scale Range Upper Limit	Filter unwanted noise from input signal. Adjustable from 0.1 to 100.0 seconds or OFF (default = 2s).	
Input Filter Time	Caution: Use with care!	
Control Configuration:		
Proportional Band / On-Off Control Select	From: On-Off control or 0.1% to 999.9% proportional band. Read Only during Pre-Tune.	
Integral Time Constant	Integral Time value (Automatic Reset) from 1s to 99min 59s or OFF. Read Only during Pre-Tune	
Derivative Time Constant	Derivative Time value (Rate) from 1s to 99 min 59s or OFF. Read Only during Pre-Tune	
Manual Reset (Bias)	Manual Reset value (Bias) from 0-100%	
Approach Control	Adjustable from 10 to 100. Larger values bias the approach control for greater speed to setpoint, smaller values bias for overshoot suppression.	

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CONFIGURATION MENU OPTIONS	Ⓞ	Ⓞ
On-Off Differential	Cycle Time	On-Off control hysteresis (dead-band) from 0.1 to 10.0% of Span (centred about setpoint). Power Output Cycle Time from 0.5s to 512s.
Power Lower Limit	Power Upper Limit	Minimum Output Power limit, from 0 to 90%. Must be 10 or more % less than the upper limit. Caution: Use with care
Setpoint Upper Limit	Setpoint Lower Limit	Maximum Output Power limit, from 10 to 100%. Must be 10 or more % higher than the lower limit. Caution: Use with care
Setpoint Ramp Rate	Setpoint Value	Maximum allowable setpoint value. Adjustable within Input Span limits. Caution: Use with care!
Fan/Vent Control	Alarm Configuration:	Minimum allowable setpoint value. Adjustable within Input Span limits. Caution: Use with care!
Alarm Type	Alarm Value	Event output to switch on or off a fan / vent
Alarm Hysteresis	Alarm Inhibit	From: Unused; High; Low; Deviation or Band. Alarm activation point. - High; Low; Deviation (+ve above, -ve below SP) or Band (above or below SP).
Alarm Inhibit	Program setup:	
Starting setpoint	Setpoint Ramp Type	Starting point for the program to begin. Set to either the current setpoint or current process value.
Ramp Auto-hold type	Ramp Auto-hold Value	Select between Ramp Time or Ramp Rate
Dwell Auto-Hold Type	Dwell Auto-Hold Value	Hold the program while ramping when the PV is below, above or a band around the setpoint
Program End Action	The control deviation value before auto-hold operates on the Ramp.	
Display Configuration:		
Language	Select English or Russian.	
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.	
Trend Sample Interval	Interval between display of each 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.	
Lock Code Configuration:		
Lock Code View	View and edit the Configuration Mode and Tuning Menu 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.	