1/32 DIN TEMPERATURE CONTROLLER
QUICK-START MANUAL 0037-75530 (PK512)

MECHANICAL INSTALLATION
The 3204 Controller is designed to be mounted in a 1/32 DIN panel cutout. The units are sleeve mounted with the front bezel assembly rated NEMA4/IP66 provided that:
- The panel is smooth and the panel cutout is accurate
- The mounting instructions are carefully followed

DIN PANEL CUTOUT
1/32 DIN: 45.0mm +0.6 / -0 wide, 22.2mm +0.3 /-0 high
Minimum Panel Thickness: 9.5mm
Maximum Spacing: 20mm vertical, 10mm horizontal

MOUNTING
To mount a controller, proceed as follows:
1. Check that the controller is correctly oriented and then slide the unit into the cutout.
2. Slide the panel clamp over the controller sleeve pressing it firmly against the panel until the controller is held firmly.
3. The controller front bezel and circuit board assembly can be unplugged from the sleeve. Grasp the bezel firmly by the recesses on each side and pull. A screwdriver can be used as a lever if required.
4. When refitting the bezel assembly, it is important to press it firmly into the sleeve until the latch clicks in order to compress the gasket and seal to NEMA4/IP66 rating.

CLEANING
Wipe down with damp cloth (water only)
Note: The controller should be isolated before moving or refitting in the sleeve, and electrostatic precautions should be observed when handling the controller outside the sleeve.

DIMENSIONS

Model	Bezel* Width	Bezel* Height	Behind Panel Width	Behind Panel Height	Overall Length	Behind Panel Length*
1/32 DIN – 48 x 24 mm	51.0	28.5	44.8	22.0	116.2	106.7

*Dimensions include gasket

ELECTRICAL INSTALLATION (Also see important Safety Information)
OUTPUT DEVICES
Two of the following output devices are fitted to the controllers, depending on the model.
1. Solid state relay drive (SSd/SSd1/SSd2) 5Vdc +0/-15%, 15mA non isolating. To switch a remote SSR (or logic)
2. Miniature power relay (rLY/rLY1) 2A/250VAC resistive, Form A/SPST contacts.
3. Sub-miniature power relay (rLY2) 1A/250VAC resistive, Form A/SPST contacts.

OUTPUT DEVICE ALLOCATION
Any of the available outputs may be chosen for the main setpoint (SP1), the remaining device being automatically allocated to the second setpoint (SP2)
Dual relay or dual SSd output model are available to order. Please contact your local distributor for details.
Designed for use with the following supply voltages
1. 100-240V 50-60 Hz 4.5 VA (nominal) +/-10% maximum permitted fluctuation
2. 12V-24V (AC/DC) +/-20% 4.5 VA polarity not required

WIRING THE CONNECTOR
Prepare the cable carefully. Remove a maximum of 8mm of insulation and ideally tin to avoid bridging. Prevent excessive cable strain. Maximum recommended wire size: 32/0.2mm 1.0mm² (18AWG).

INDUCTIVE LOADS
To prolong relay contact life and suppress interference, it is recommended engineering practice to fit a snubber (0.1 uf/100 ohms) between terminals 5 and 6.

CAUTION: Snubber leakage current can cause some electromechanical devices to be hold ON. Check with the manufacturer's specifications.

EN61010 - /CSA 22.2 No 1010.1 92
- Compliance shall not be impaired when fitted to the final installation.
- Designed to offer a minimum of basic insulation only.
- The body responsible for the installation is to ensure that supplementary insulation suitable for Installation Category II or III is achieved when fully installed.
- To avoid possible hazards, accessible conductive parts of the final installation should be protectively grounded in accordance with EN6010 for Class 1 Equipment.
- Output wiring should be within a protectively grounded cabinet.
- Sensor sheaths should be bonded to protective earth or not be accessible.
- Live parts should not be accessible without the use of a tool.
- When fitted to the final installation, an IEC/CSA approved disconnecting device should be used to disconnect both LINE and NEUTRAL conductors simultaneously.
- A clear instruction shall be provided not to position the equipment so that it is difficult to operate the disconnecting device.

SENSOR SELECTION

Thermocouples	Description	Sensor Range	Linearity
tC b	Pt-30% Rh/Pt-6%Rh	0 to 1800°C	2.0*
tC E	Chromel/Con	0 to 600°C	0.5
tCJ	Iron/Constantan	0 to 800°C	0.5
tC K	Chromel/Alumel	-50 to 1200°C	0.25*
tC L	Fe/Konst	0 to 800°C	0.5
tC n	NiCroIL/NISII	-50 to 1200°C	0.25*
tC r	Pt13% Rh/Pt	0 to 1600°C	2.0*
tC s	Pt10% Rh/Pt	0 to 1600°C	2.0*
tC t	Copper/Con	-200 to 250°C	0.25
Resistance Thermometer RTD	Pt100/RTD-2	-200 to 400°C	0.25*

Linear process inputs (Input mV range: 0 to 50mV)
Displays 0-20mV, 4-20mV setpoint limits

Lin 1	0 to 100, 0 to 400	± 0.5%
Lin 2	0 to 100, -25 to 400	± 0.5%
Lin 3	0 to 1000, 0 to 3000	± 0.5%
Lin 4	0 to 1000, -250 to 3000	± 0.5%
Lin 5	0 to 2000, 0 to 3000	± 0.5%

Notes: 1 Linearity: 5-95% sensor range
2 *Linearity B:5° (70° to 500°C) K/N:I° >350°C exceptions: R/S: 5°<300°C T:I° <-25° >I50°C, RTD/Pt100: 0.5° <-100°C

CONNECTION DIAGRAM

Comms (Option) — 9 10 11
TxRx(+)TxRx(-) Gnd — RS485
Tx Rx Gnd — RS232

Input — 1 2
Outputs — 3 4 5 6
Supply — 7 8

F1 Fuse: 1A time lag type to IEC127. CSA/UL rating 250 Vac
S1 Switch: IEC/CSA/UL Approved disconnecting device

Thermocouple
RTD / ssd / RTD / ssd
0-50 mV Linear

Outputs can be assigned as either SP1 or SP2 Control

100-240V 50/60Hz
12-24V 50/60Hz
12-24VDC ±20%
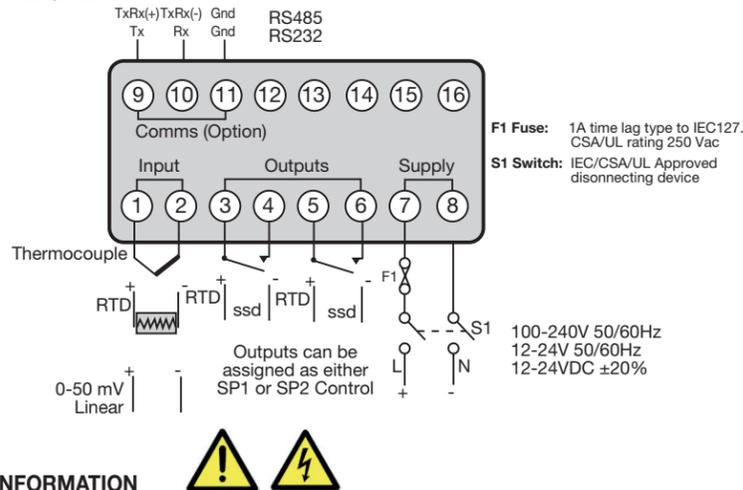
SAFETY INFORMATION
INSTALLATION
Designed for use:
UL873 - only in products where the acceptability is determined by Underwriters Laboratories, Inc.
EN61010-1/CSA 22.2 No 1010.1 ·92
To offers minimum of basic insulation only.
Suitable for installation within Category II and III and Pollution Degree 2.
SEE ELECTRICAL INSTALLATION. It is the responsibility of the installation engineer to ensure this equipment is installed as specified in this manual and is in compliance with appropriate wiring regulations.

CONFIGURATION
All functions are front selectable. It is the responsibility of the installing engineer to ensure that the configuration is safe. Use the program lock to protect critical functions from tampering.

ULTIMATE SAFETY ALARMS
Do not use SP2 as the sole alarm where personal injury or damage may be caused by equipment failure.

INSTRUMENT PANEL FEATURES

Green Display: Process temperature or program Function/Option
Green LED: Setpoint 1 output Indicator
Red/Orange LED: Setpoint 2 output indicator

INSTRUMENT ADJUSTMENTS
To enter or exit program mode: Press ▲ ▼ together for 3 seconds
To scroll through functions: Press ▲ or ▼
To change levels or options: Press ★ ▲ together or ★ ▼ together
To view setpoint: Press ★
To increase setpoint: Press ★ ▲ together
To decrease setpoint: Press ★ ▼ together
To reset an alarm or fault condition: Press ▲ ▼ together briefly
Notes: If experiencing difficulty by becoming "lost" in program mode, press ▲ and ▼ together for 3 seconds to return to display mode, check the INSTRUMENT ADJUSTMENTS above and try again.

When in program mode, after 60 seconds of key inactivity the display will revert to either **inPt : tCs** or, if the initial configuration has been completed, the measured value. Any settings already completed will be retained.

GETTING STARTED
After power-up the controller requires programming with the following information:
- Type of Sensor
- Allocation of Output Devices to SP1/SP2 (Relay or SSd)
- Operating unit
- Temperature Sepoint

When the above information has been programmed into the controller, it will be operational with the following factory settings.
Proportional band/gain — 10°C / 18°F
Integral time reset — 5 mins
Derivative time Rate — 25 secs
Proportional cycle-time — 20 secs (Typical setting for relay input)
DAC Derivative approach control — 1.5 (Average setting for minimum overshoot)

INITIAL SET-UP
On power-up, the controller will display the self-test sequence followed by the initial display **inPt : nonE**
1. **Select input sensor**
   Press and hold ★ and use the ▲ or ▼ buttons to scroll through the sensor selection list until the correct sensor is displayed. Release the buttons. The display will now read selected sensor type e.g. **inPt : tCs**
   Press ▲ once. The display will now read **unit : nonE**
2. **Select unit.**
   Press and hold ★ and use the ▲ or ▼ buttons to scroll through the unit selection list until the correct unit is displayed. Release the buttons. The display will read selected unit e.g. **unit : °C**.
   Press ▲ once. The display will now read **SP1:SSd**
3. **Select SP1 (Main setpoint output device)**
   Note: Dual Relay and Dual SSd Output Options Models have their outputs pre-configured. Move to step 4.
   Press and hold ★ and use the ▲ or ▼ buttons to select **SSd** or **rLY** as required. The controller will now read selected output device e.g. **SP1.d : SSd**
4. **To enter initial configuration into controller memory**
   Press and hold both ▲ and ▼ buttons for 3 seconds. The display will now read **ParK** and measured variable (temperature) (e.g. 23) **ParK** is displayed because a setpoint has not yet been entered.
   To display setpoint: Press and hold ★. The displays will now read **unit** (e.g. °C) and **0**
   To enter setpoint, Press and hold ★ and use ▲ button to increase or ▼ button to decrease the reading and scroll to required setpoint value. (The digit roll-over rate increases with time).

THE CONTROLLER IS NOW OPERATIONAL WITH FACTORY SETTINGS

Note: For precise control of an application the controller may need to be TUNED. Please see the following section on AUTOTUNE

AUTOTUNE
This is a single shot procedure to match a controller to the process. Select either **Tune** or **Tune at Setpoint** from the criteria below.

The **Tune** program should be used when the load temperature is at or near ambient. The procedure will apply disturbances when the temperature reaches 75% of the setpoint value, causing overshoot which is monitored in order to adjust the DAC overshoot inhibit feature. Care should be taken to ensure that any overshoot is safe for the process.

The **Tune at Setpoint** program is recommended when:
- The process is already at setpoint and control is poor
- The setpoint is less than 100°C
- Re-tuning after a large setpoint change
- Tuning multi-zone and/or heat-cool applications

Notes: DAC is not re-adjusted by Tune at setpoint.
Proportional Cycle Time can be pre-selected before running the Autotune program.

Hereafter in the Manual the symbol (▲ ▼) signifies both button are held pressed for 3 seconds to ENTER or EXIT program mode.

TUNE OR TUNE AT SETPOINT PROGRAM
Enter program (▲ ▼) and from the display **tunE : oFF** press and hold ★ and press ▲ to display **tunE : on** or **tunE : AtSP** Exit program mode. (▲ ▼).

The **TUNE** program will now start. The display will show **tunE** as the process temperature climbs to setpoint.
Note: During tuning, the main setpoint (SP1) LED will flash.

When the **TUNE** or **TUNE AT SETPOINT** program is complete the PID values are entered automatically. The process temperature will rise to setpoint and control should be stable. If not, this may be because optimum cycle time is not automatically implemented. To set the cycle time see PROPORTIONAL CYCLE-TIME.

PROPORTIONAL CYCLE-TIME
The choice of cycle-time is influenced by the external switching device or load, e.g. contactor or SSR. A setting that is too long for a process will cause oscillation and a setting that is too short will cause unnecessary wear to an electro-mechanical switching device.
Factory set - To use the 20 sec. factory set cycle-time no action is needed whether autotune is used or not.

To manually Select AUTOTUNE Calculated CYCLE-TIME
When AUTOTUNE is completed, enter program (▲ ▼) and select **CYC.t** in **Level 1**. The display will read **CYC.t:20** (factory setting) To view the new calculated optimum value, press and hold both ★ and ▼ buttons until indexing stops. The calculated value will be displayed e.g. **A16**. If acceptable, exit program (▲ ▼) to implement this setting.

To Preselect Automatic Acceptance of AUTOTUNE Calculated CYCLE-TIME
Before AUTOTUNE is initiated select **CYC.t** in **Level 1**, press and hold both ★ and ▼ buttons until indexing stops at **A - -**. Exit program (▲ ▼) to accept calculated value automatically.

To Manually Pre-select Preferred CYCLE-TIME
Before AUTOTUNE is initiated, select **CYC.t** in **Level 1**, press and hold both ★ and ▲ or ▼ buttons until indexing stops at preferred value then exit program (▲ ▼) to accept.

CYCLE-TIME RECOMMENDATIONS

Output Device	Factory Setting	Recommended Minimum
Internal relay - rLY / rLY1/ rLY2	20 seconds	10 seconds
Solid state drives - SSd / SSd1 / SSd2	20 seconds	0.1 seconds

PROGRAMMER - RAMP SOAK
This feature enables the controller to ramp up or down from current temperature to a target setpoint at a predetermined rate. It then controls at the target setpoint for an adjustable soak period before switching off the SP1 output.
- Set Setpoint Ramp rate (0 to 9995 deg/hour)
- From **SPrr** in Level 1, press and hold ★ and ▲ or ▼ to scroll to required ramp rate.
- Set **Soak** (if required) 0 to 1440 minutes
- From **SoAk** - - in Level 1, press and hold ★ and ▲ or ▼ to scroll to required Soak time.
- Set **Ramp on** (Off: On: Hold)
- From **Sprn** In Level 1, press and hold ★, then press ▲ to select **On**
- Exit program (▲ ▼) to enter settings into memory and commence ramp to target setpoint.
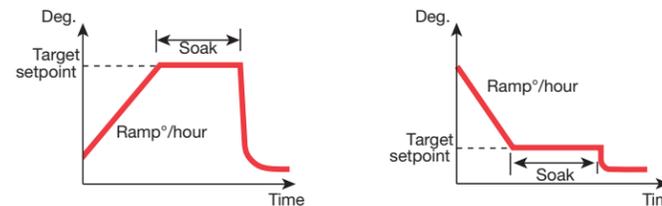
Notes:
- In **Ramp** on configuration, if power is removed from the controller, the Ramp will re-start when power is restored.
- The **Ramp** hold option suspends the ramp at its last value.
- If no **Soak** period has been set, control at target setpoint continues indefinitely.
- SP2 deviation alarms follow the ramp setpoint and can be used to alarm "out of limits" ramp rate

WARNING: The Soak timer is triggered when the ramp setpoint reaches the target setpoint. If the ramp rate is set too fast for the process, the Soak timer will be triggered before the process temperature reaches the target setpoint.

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PRECISION HEAT AND CONTROL

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SECOND SETPOINT

SECOND SETPOINT (SP2) ALARM OUTPUT

Configure SP2 output to operate as an alarm from SP2.A in Level 2 and set the temperature, alarm setting in SEt.2 Level 1. The alarm will be triggered when the process temperature changes according to the options listed below.

dV.hi	sets off alarm signal when temperature rises above a pre-set temperature above the setpoint.
dV.Lo	sets off alarm signal when temperature falls below a pre-set temperature below the setpoint.
bAnd	sets off alarm signal when temperature rises above or falls below a pre-set temperature above or below the setpoint.
FS.hi	sets off alarm signal when the temperature rises above setpoint to a pre-set temperature above scale maximum.
FS.Lo	sets off alarm signal when the temperature falls below setpoint to a pre-set temperature above scale minimum.

SUBSIDIARY SP2 MODE

The following additional alarm functions can be added to the above alarm configurations using the features found in *SP2.b* in Level 2.

LtCh	Once activated, the alarms will latch and can be manually reset when the alarm condition has been removed.
Hold	This prevents any alarm operation on power-up and is automatically disabled once the process reaches setpoint in order to allow normal alarm operation.
Ltho	Combines the effects of both LtCh & Hold end can be applied

SECOND SETPOINT (SP2) PROPORTIONAL CONTROL OUTPUT

Configure in Level 1 using *CyC.2* to select proportional cycle time and *bnd.2* to adjust proportioning band. For Heat/Cool operation see full operating manual. In on/off mode, *bnd.2* adjusts SP2 hysteresis.

SP2 OUTPUT AND LED INDICATION STATES - IN ALARM CONDITION

Alarm Type	On-Off Operating Mode		Proportional Operating Mode	
Deviation **dU.hi dU.Lo bAnd**	SP2 Output State	SP2 LED State ☀	SP2 Output State	SP2 LED State ☀
			bAnd On-On Mode Only	
Full Scale **FS.hi FS.Lo**		☀		☀
Cool Strategy		☀	Temperature above setpoint	☀

Output ON. (Relay or SSd energized) Output OFF. (Relay or SSd de-energized) LED ON

SP2 ALARM ANNUNCIATOR

When an SP2 alarm mode is selected in SP2.A the alarm annunciator -*AL*- is displayed, alternating with the process temperature, during alarm condition.
Note: The annunciator will automatically reset when the temperature returns within the *bnd.2* setting in Level 1
The annunciator may be disabled by selecting function *noAL : on*, in level 4.

SP2 IN COOL STRATEGY   See full operating manual (ADVANCED SETTINGS)

ERROR MESSAGES

Display Flashes	Fault Type	Action
inPt : FAIL	SENSOR FAULT Thermocouple burnout RTD/Pt100 open or short circuitor negative over-range.	Check sensor/wiring
dAtA : FAIL	NON-VOLATILE MEMORY ERROR	De-power briefly. Replace unit if problem persists
hAnd : FAIL	MANUAL POWER ERROR SPI set to ON/OFF In *CYC.t*	Select proportional mode
tunE : FAIL	IMMEDIATE FAIL ON AUTOTUNE START Note: To reset and clear error press ▲ ▼ together briefly to cancel message.	1. If display setpoint = 0 then enter setpoint 2. If SP1 set to ON/OFF in *CyC.t* then select proportional mode
	FAIL LATER DURING AUTOTUNE CYCLE The thermal characteristics of the load exceed the autorune algorithm limits. The failure point is indicated by any display 0.0 in *tech* e.g. Ctb = 0.0	1. Change conditions. e.g. raise setpoint 2. Try *tunE : AtSP* 3. If the error message persists. Call local sales representative for advice.

FUNCTION LIST (LEVELS 1 TO 4) - LEVEL 1

Function	Option [Factory settings] shown in brackets	Description
Select Autotune		
tunE	[oFF], on, *ParK*. AtSp	Used to switch the Autotune feature on and off, to select *ParK* or tune at setpoint. *ParK* temporarily turns the output(s) off. To use select *ParK* and exit program mode. To disable re-enter program at *tunE* and select *oFF*.
SP1 Operating Parameters		
bAnD	0.1 to° °C/°F [10°C/18°F]	**Proportional band/Gain or Hysteresis** *25% sensor maximum proportional control eliminates the cycling of on-off control. Heater power is reduced, by time proportioning action, across the proportional band.
int.t	oFF, 0.1 to 60 minutes [5.0]	**SP1 Integral time/reset** Auto-corrects proportional control offset error
dEr.t	oFF 1 - 200 seconds [25]	**SP1 derivative time/rate** Supresses overshoot and speeds response to disturbances
dAC	0.5 - 5.0 x bAnd [1.5]	**SP1 derivative approach control dAC** Tunes warm-up characteristics, independent of nominal operating conditions by controlling when derivative action starts during warm-up (smaller dAC value = nearer setpoint).
CyC.t	A - - , on.oF, 0.1 - 81 sec [20]	**SP1 proportional cycle-time**, (see section above). Determines the cycle rate of the output device for proportional control. Select *on.oF* for ON/OFF mode.
oFSt	0 to° °C/°F	**SP1 offset/manual reset** * ±50% bAnd. Applicable in proportional and ON/OFF mode with Integral disable: *Int.t : oFF*.
SP.LK	[oFF] on	**Lock main setpoint** Locks the setpoint preventing unauthorized adjustment.
Programmer Settings		
SPrr	[0] to 9995 deg/hour	Sets the ramp rate
SPrn	on [oFF] hold	Switches the ramp on or off, or hold at last ramp value
SoAK--	[oFF] 0 to 1440 min	Sets the soak time
SP2 Operating Parameters		
SEt2	0 to° °C/°F [0]	**Adjust SP2 setpoint** * Deviation Alarms DV.hi, DV.Lo, bAnd 25% sensor maximum. * Full scale alarms FS.hi, FS.Lo sensor range f/s
bnd.2	0.1-° °C/°F [2.0 °C/3.6°F]	**Adjust SP2 hysterisis or proportional band/gain** (see CyC.2 setting) * 25% of sensor full scale
CyC.2	[on.oFF] 0.1-81 seconds	**Select SP2 ON/OFF or proportional cycle-time** Select on.oFF for ON/OFF mode, or the cycle rate of SP2 output device for proportional mode.

LEVEL 2

Function	Option [Factory settings] shown in brackets	Description
Manual Control Modes		
SP1.P	0 to 100% Read Only	Read SP1 output percentage power
hAnD	[oFF] 1 to 100% (not in On/Off)	**SP1 manual percentage power control** For manual control should a sensor fail. Record typical SP1.P values beforehand
PL.1	100 to 0% duty cycle [100]	**Set SP1 power limit percentage** Limits maximum SP1 heating power during warm-up and in proportional band
PL.2	100 to 0% duty cycle [100]	**Set SP2 percentage power limit** (cooling)
SP2 Operating Modes		
SP2.A	[none] dV.hi, dV.Lo, bAnd FS.hi, FS.Lo, Cool	**Main SP2 operating mode**
SP2.b	[none] LtCh, hoLd, nLln	**Subsidiary SP2 mode:** latch/sequence, Non-linear cool proportional band
Input Selection and Ranging		
diSP	[1] 0.1	Select display resolution: for display of process temperature, setpoint, OFSt, Set2, hi.SC, Lo.SC
hi.SC	[Sensor min. (sensor max.] °C/°F	Set full scale
Lo.SC	[Sensor min.] sensor max. °C/°F	Set scale minimum (default 0°C or 32°F)
inPt	[none]	Select Input sensor (See SENSOR SELECTION table)
Unit	[none] °C °F bAr Psi Ph rh sEt	Select °C/°F or process units

LEVEL 3

Function	Option [Factory settings] shown in brackets	Description
Output Configurations (Note: "read only" after initial config. rSET ALL full reset to factory settings required to change SP1.d subsequently)		
SP1.D	[none] rLY SSd rLY1 rLY2 SSd1	**Select SP1 output device.** Dual Relay & Dual SSd output options are factory set
SP2.D	[none] rLY SSd rLY2 rLY1 SSd2	**Read SP2 Output device** (read only) Dual Relay & Dual SSd output options are factory set
For SP1.d & SP2.d (Note: when in initial configuration only) Hold ★ and ▲ or ▼ for 10 seconds to move to or from output options in **RED**		
burn	SP1 / SP2 [uP.SC] Upscale/Upscale dn.SC Downscale/Downscale 1u.2d Upscale/Downscale 1d.2u Downscale/Upscale	**Sensor burn-out/break protection** **CAUTION: Settings affect fail safe state**
rEu.d	SP1 / SP2 [1r.2dC] Reverse/Direct 1d.2d Direct/Direct 1r.2r Reverse/Reverse 1d.2r Direct/Reverse	**Select Output Modes:** Direct/Reverse Select Reverse on SP1 for heating and Direct for cooling applications **CAUTION: Settings affect fail safe state**
rEu.L	SP1 / SP2 [1n.2n] Normal/Normal 1l.2n Invert/Normal 1n.2l Normal/Invert 1l.2l Invert/Invert	**Select SP1/2 LED indicator modes**
SPAn	[0.0] to ±25% Sensor max.	**Sensor Span adjust.** For recalibrating to align readings with another instrument e.g. External Meter, data logger. See full operating manual (ADVANCED SETTINGS)
ZEro	[0.0] to ±25% Sensor f/s	Zero sensor error (See span adjust above).
CheK	[oFF] on	Select control accuracy monitor
rEAD	[Var] hi Lo	Read control accuracy monitor
tECH	[Ct A] CT b, Ct1, Ct2, Ct3, Ct 4, oS, 1uS, oS 2	Read Autotune tuning cycle data (see operating manual)
UEr		Software version number
rSET	[none] ALL	Resets all functions to factory settings. **CAUTION: This selection will lose all of the current settings**

LEVEL 4

Access to level 4 is gained through *UEr* in level 3. Press and hold ▲ or ▼ for 10 seconds.
Enter level 4 at *LocK*. Release ▲ and ▼ together. Display reads *LoCK nonE*

Function	Option [Factory settings] shown in brackets	Description
Security		
LoCK	[none] LEV.3 LEV.2 ALL	**Program security using lock** *LEV.3* Locks level 3 and 4 only - Technical Function. *LEV.2* Locks levels 2, 3 and 4 only - Configuration and Technical Functions *ALL* Locks all functions *LoCK ALL*
Function Options		
Prog	[Auto] StAY	**Program Mode Auto-Exit Switch.** Auto-exit returns display to normal if 60 seconds of key inactivity. Select *StAY* to disable
no.AL	[oFF] on	Disable SP2 alarm annunciator - AL select on to disable -AL
di.SS	Dir, 1 to 32 [6]	Display Sensitivity – *dir* = direct display of Input 1 max., *32* = min. sensitivity
dEr.S	0.1 to 1.0 [0.5]	Derivative Sensitivity

SPECIFICATIONS

Thermocouple	9 types
Standards:	IPTS/68/DIN 43710
CJC Rejection:	20:1 (0.05°C) typical
External Resistance:	100Ω maximum
Resistance Thermometer	RTD-2/Pt100 2 wire
Standards:	DIN 43760 (100Ω 0°C/138.5Ω 100°C Pt)
Bulb Current:	0.2mA maximum
Linear process Inputs	
mV range:	0 to 50mV
Applicable to all Inputs SM = Sensor Maximum	
Calibration Accuracy:	±0.25%SM ±1°C
Sampling Frequency:	Input 10Hz, CJC 2 sec.
Common Mode Rejection:	Negligible effect up to 140dB. 240V. 50-60 Hz
Series Mode Rejection:	60dB, 50-06 Hz
Temperature Coefficient:	150ppm/°C SM
Reference Conditions:	22°C ±2°C, rated voltage after 15 minutes settling time.
Output Devices	
SSd/SSd1/SSd2:	Solid state relay driver. To switch a remote SSR 5Vdc +0/-15% 15mA non-isolated
Miniature Power Relay:	Form A/SPST contacts (AgCdO) rLY and rLY1: 2A/250ac resistive load rLY2: 1A /250ac resistive load
General	
Displays	4 digits, high brightness green LED. 10mm (0.4") high
Digital Range	-199 to 9999
Hi-Res Mode	-199.9 to 999.9
LED Output Indicators	Flashing, SP1 square, green; SP2 Round Red
Keypad	3 Elastomeric buttons
Environmental	
Humidity	Max. 80%
Altitude	up to 2000M
Installation	Categories II and III
Pollution	Degree II
Protection	NEMA 4X, IP66
EMC Emission	EN50081-1 FCC Rules 15 subpart J Class A
EMC Immunity	EN50082-2
Ambient	0-50°C (32-130°F)
Mouldings	Flame Retardant Polycarbonate
Weight	110g (3.9 oz)
Approvals	CE UL, (file number E81867), cUL, FM (3545)

FUNCTIONS MENU

Range of Adjustment shown in red under description. If applicable, factory settings shown in **bold**.

* Note: Dual Relay and Dual SSd Output Options Models have their outputs pre-configured.

KEY ▼ or ▲ TO VIEW FUNCTIONS

LEVEL 4 — LoCk | ProG | no.AL | di.S.S | dEr.S

USER PROTECTED SETTINGS

Security Lock nonE; LEV 3; LEV 2; ALL	Disable Program Auto-Exit Auto; StAY	Display -AL- Alarm Display Off; on	Display Averaging dir; 1 to 32 (6)	Derivative Sensitivity 0.1 to 1.0 x dEr.t (0.5)

LEVEL 3 — SP1.d | SP2.d | burn | rEu.d | rEu.L | SPAn | ZEro | ChEk | rEAd | tECh | UEr | rSET

CONFIGURE OUTPUT | **SAFETY SETTINGS** | **CALIBRATION** | **PERFORMANCE DATA** | | | Software Version Consult unit | RESET nonE; ALL

| SP1 Output Device nonE; rLY; SSd | SP2 Output Device nonE; SSd; rlY (read only) | Sensor Burn-Out uP.SC; dn.SC; 1u.2d; 1d.2u | Reverse Outputs 1r.2d; 1d.2d; 1r.2r; 1d.2r | Reverse O/P LEDs 1n.2n; 1l.2n; 1i.2n; 1i.2i | Span Adjustment 0.0 to 25% sensor f/s | Zero Adjustment 0.0 to 25% sensor full scale | Set Monitor Off; on | Read Monitor VAr; hi; Lo deg | Read Tune Data CtA; Ctb; Ct1; Ct2; Ct3; Ct4; oS1; uS; oS2 |

LEVEL 2 — SP1.P | hAnd | PL.1 | PL.2 | SP2.A | SP2.b | hi.SC | Lo.SC | inPt | unit

Quick Start Entry ←

MANUAL ADJUSTMENTS | **SP2 MODES** | **RANGING** | **CONFIGURE INPUT**

| Read SP1 Output % 0 to 100% read only | SP1 Manual Output % 0 to 100% proportional mode only | Limit SP1 Output % 100 to 0% | Limit SP2 Output % 100 to 0% | Main SP2 Mode nonE; dV.hi; dV.Lo; bAnd; FS.hi; FS.Lo; Cool | Second SP2 Mode nonE; LtCH; hold; Lt.ho; nLin | Display Resolution 1 or 0.1 degree | Set Scale Max. 0.0 Sensor max to sensor full scale | Set Scale Min. 0.0 Sensor smin to sensor full scale | Select Input Sensor nonE | Select Display Units nonE; °C; °F; bAr; PSi; Ph; rh; SEt |

LEVEL 1 — tunE | bAnd | int.t | dEr.t | dAC | CyC.t | oFSt | SP.Lk | SPrr | SPrn | SoAk | SEt.2 | bnd.2 | CyC.2

Program Entry ←

SP1 SETTINGS | **PROGRAMMER SETTINGS** | **SP2 SETTINGS**

| Autotune or Park oFF; on; tunE; ParK; At.Sp | SP1 Prop Band (gain)/hyst 0.1 deg to 25% sensor f/s (10°C/18°F) | Integral Time (Reset) Off; 0.1 to 60 min (5 min) | Derivative Time (Rate) Off; 1 to 200 sec (25 sec) | Derivative Approach 0.5 to 5.0 x bAnd (1.5) | Cycle Time or On/Off On.off; 0.1 to 81 sec (20 sec) | Offset (Manual Reset) 0 to 50% x bAnd (Int.t = off) | Setpoint Lock (SP1) Off; on | Setpoint Ramp Rate 0 to 9990 deg/hour | Ramp Off/ On On; off; hold | Soak Off; 0 to 1440 min | Adjust SP2 Setpoint +/– sensor full scale or full scale | SP2 Prop Band/Gain/ Hyst 0.1 deg to 100% sensor f/s (2°C/3.6°F) | SP2 Cycle On/Off On.off; 0.1 to 81 sec |

LEVEL C — Addr | bAud | dAtA | dbuG

Level C only visible when COMMS Option fitted.

COMMS SETTINGS

Instrument Address 0 to 255	Baud Rate 1200: 2400: 4800: 9600: 19k2	Data Format 18n1:18E1:18O1	Tx/Rx Activity Off; on

◄ TOGETHER TO CHANGE LEVELS OR OPTIONS / KEY ★ + ▲ or ▼

KEY ▼ or ▲ TO VIEW FUNCTIONS