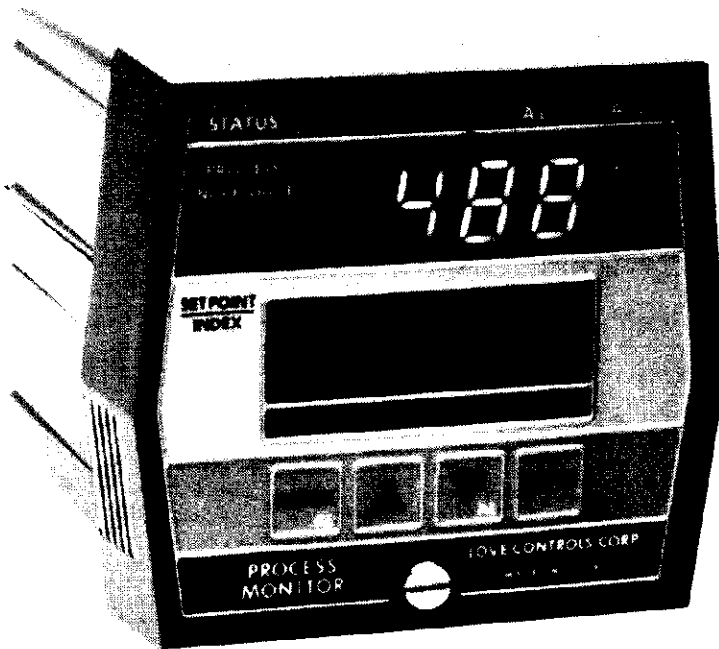


APRIL 1990

# Instructions For The 300 Series Universal Microprocessor Temperature/Process Monitor



**if all else fails,  
please read these  
instructions**

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## Table of Contents

General	
Model Identification .....	3
Front Panel Presentation .....	4
Temperature Ranges .....	4
Description .....	5
Installation	
Voltage Selection .....	5
Removal From the Housing .....	5
Mounting .....	5-6
Power Wiring .....	6
Input Wiring .....	6
Input Selection	
Temperature .....	6
Voltage and Current .....	7
External Wiring .....	8
The Security Switch .....	8-9
Monitor Operation	
Operation .....	9-10
Programmable Functions .....	10
Alarm Operation	
Operation .....	11
Programmable Functions .....	11
Options	
Factory Programming, Option 520 .....	12
Isolated Power Supply, Option 550 .....	12
Rear Terminal Enclosure, Option 617 .....	12
Splash and Dust Resistant Construction, Option 6156 .....	12
Tamper Resistant Cover, Option 6162 .....	12
Blind Holes for Option 6162, Option 6166 .....	12
Other Options .....	12
Specifications .....	12-13
Glossary of Terms .....	13-14
Programming	
Diagnostic Error Messages .....	15-18
Programming in the Set-up Mode .....	19-25
Set-up for Input Corrections .....	26
Input Changes	
Changing Sensors .....	26
Dimension Drawing .....	26
Warranty .....	26
Blank Program Selection Table .....	27-30

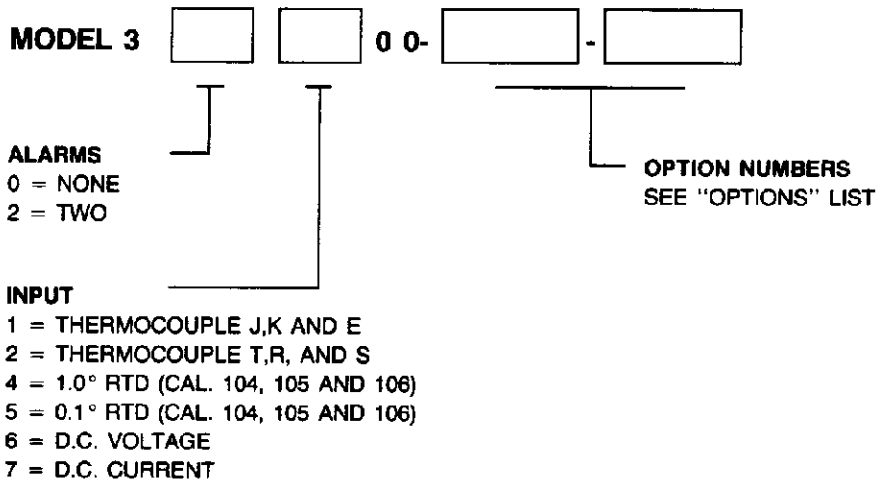
# Instructions for the 300 Series

## Universal Microprocessor Temperature/Process Monitor

### Model Identification

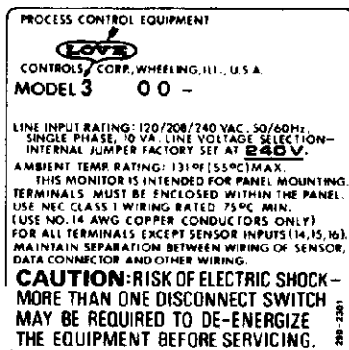
The model number appears on the label affixed to the top of the monitor.

The model number is made up as follows:

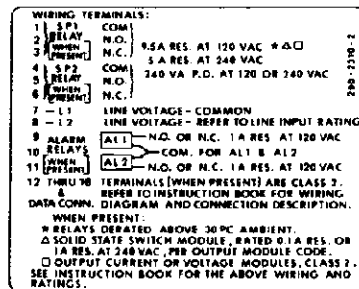


The following labels are affixed to the control:

The top

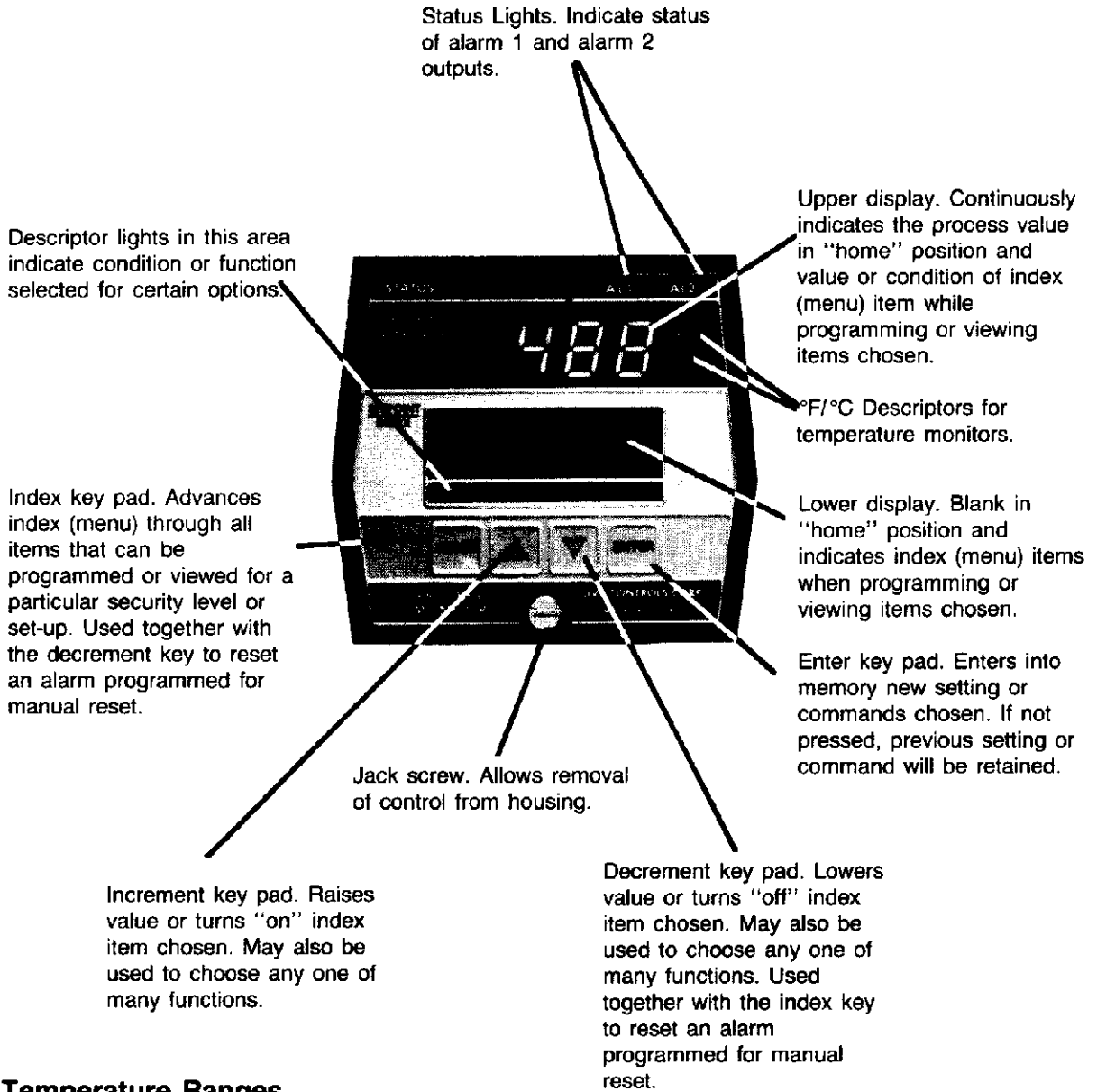


The bottom



The Model number is filled in on the above label at the factory.

## Front Panel Presentation



## Temperature Ranges

Thermocouple		
Ordering Code	Sensor Type	Range
1	J	-100 to +1600°F/-73 to +871°C
	K	-200 to +2500°F/-129 to +1371°C
	E	-100 to +1800°F/-73 to +982°C
2	T	-350 to +750°F/-212 to +398°C
	R	0 to 3200°F/-17 to +1760°C
	S	0 to 3200°F/-17 to +1760°C

RTD		
Ordering Code	Sensor Type	Range
4 1.0° Resolution	100 ohm Plat. .00385, Cal. 106	-328 to +1607°F/-200 to +875°C
	100 ohm Plat. .00392, Cal. 104	-328 to +1607°F/-200 to +875°C
	120 ohm Nickel, Cal. 105	-112 to +608°F/-80 to +320°C
5 0.1° Resolution	100 ohm Plat. .00385, Cal. 106	-200.0 to +990.0°F/-128.9 to +532.2°C
	100 ohm Plat. .00392, Cal. 104	-200.0 to +990.0°F/-128.9 to +532.2°C
	120 ohm Nickel, Cal. 105	-112.0 to +385.0°F/-80.0 to +196.1°C

## Description

The Love Model 300 Series monitor is microprocessor based.

Two large LED displays indicate all controller parameters as well as process temperature (or other input variable).

A wide selection of inputs are offered with multiple choice thermocouple or RTD selection in the same control. Input scaling may be field programmed for voltage or current inputs.

Status lights indicate alarm (if equipped) conditions at all times.

Every parameter of the monitor may be field adjusted, if desired. Three levels of security are also provided. Four front panel membrane key pads are used to view or change all selected index (menu) items.

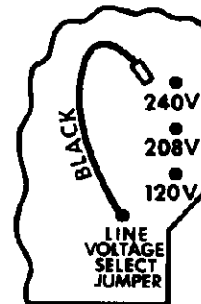
Complete non-volatile memory eliminates the need for battery back-up and attendant battery problems.

Many options are available, including two alarm outputs.

## Voltage Selection. FAILURE TO SELECT PROPER VOLTAGE CAN RESULT IN TRANSFORMER BURN-OUT.

Check the label affixed to the top of the monitor housing to determine the line voltage for which the unit will operate as shipped. This is usually 240 V.A.C. 50/60 HZ.

To change this input voltage, remove the monitor from its housing as described under "Removal from the Housing". There is a black jumper located along the right edge of the circuit board as you are facing the rear of the control. This jumper is soldered to one terminal and plugged on to one of the voltage select terminals. These terminals are marked 120V, 208V, or 240V. If you wish to change the voltage input, unplug the jumper from the terminal that it is on, using a long-nosed plier and pulling straight up. Plug it on to the desired voltage terminal. Replace monitor into its housing.



## Removal from the Housing

The monitor does not have to be removed from its housing for mounting. However, if security switch or alarm jumper changes are required, it will have to be removed.

To remove the monitor from its housing, turn the jack screw, located in the center of the bottom edge of the monitor face, in a counter-clockwise direction until loose. Pull the monitor forward to slide out of the housing.

To replace, slide the monitor chassis into the housing in its proper slots until the jack screw is engaged. Turn the jack screw clockwise, while at the same time pushing gently on the top edge of the monitor, until tight. **Do not** over tighten.

## Mounting

Select a location for mounting where the monitor will not be subject to excessive temperature, shock, vibration, dust, moisture, oil or other liquids.

All models are designed for mounting in an enclosed panel through a 3<sup>5</sup>/<sub>8</sub> in. x 3<sup>5</sup>/<sub>8</sub> in. (92 mm x 92 mm) cutout. No other holes are required.

Remove the U bracket from the housing by removing the two mounting screws from the rear of the monitor housing. Slip the monitor through the cutout from the front of the panel and replace the U bracket. Tighten bracket screws until the monitor is secure in its cutout. **Do not** over tighten these screws.

### Power Wiring

Wire in accordance with the wiring diagrams.

Make all wiring connections in accordance with the National Electrical Code and local regulations. Use N.E.C. Class 1 wiring for all power terminals. Use No. 14 AWG copper conductors only.

Grounding of the monitor is not required.

It is advisable to fuse the incoming power line to terminal 8 with a type 3AG or MDL 1/8A SLO-BLO fuse. Be sure that it fuses the instrument power input only.

### Input Wiring

Do not run thermocouple or other input wiring in the same conduit as power leads. Use only the type of thermocouple or RTD probe for which the monitor has been programmed. The type may be viewed by stepping through the menu using the Index key pad. Voltage or current input values are shown on the serial number label inside the instrument.

For thermocouple input, always use extension leads of the type designated for your thermocouple. Generally, the red wire from the thermocouple is *negative*.

**On thermocouple input units, do not remove reference junction compensator assembly connected under terminals 15 and 16 by a tab terminal and red wire.**

### Input Selection

Where displays are shown in these instructions, a heavy line at the top  indicates the upper display, while a heavy line at the bottom  indicates the lower display.

Inputs appear as follows:

Temperature:

Upper display —

= Iron/Constantan

= Copper/Constantan

= Chromel/Alumel

= Plat. 13% R.H./Plat.

= Chromel/Constantan

= Plat. 10% R.H. /Plat.

= PLT. 100 OHM .00392 N.B.S. Curve RTD

= NICKEL 120 OHM RTD

= PLT. 100 OHM .00385 DIN curve RTD

Lower display—

= Input

**Voltage and Current:**

Almost any Linear Scale may be programmed by the user (including decimal point positioning).

The scale range must fall within a 4000 or less count range. The term "count" in this case means the amount of numbers that can be displayed regardless of the position of the decimal point.

For example; 0 to 4000, -2000 to +2000, -10.0 to 390.0, 1.000 to 5.000 and 30.00 to 70.00 are all at the 4000 count maximum.

The minimum value for any range must be 100 counts or more.

For example; -50 to +50, 0 to 100, 2.5 to 12.5, .50 to 1.50 and -.010 to .090 are all at the 100 count minimum.

If the scale low value **[SCALE]** and the scale high value **[SCALE]** are greater than 4000 counts or less than 100 counts, then, either **[CHECK]** **[SCALE]** or **[CHECK]** **[SCALE]** will show up on the display, depending on which one is presently being programmed (opposite one shows the error).

Examples of typical programming for **[SCALE]** & **[SCALE]** for various scale ranges are;

SCALE RANGE	<b>[SCALE]</b> VALUE	<b>[SCALE]</b> VALUE
-350 +999	-350	999
-67 +113	-67	113
	or -67.0	113.0
-2 +0	-2.00	0
	or -2.000	0.000
-0.1 +0.4	-.100	.400
0 +15,000	0	150 (x100)
	or 0	1500 (x10)

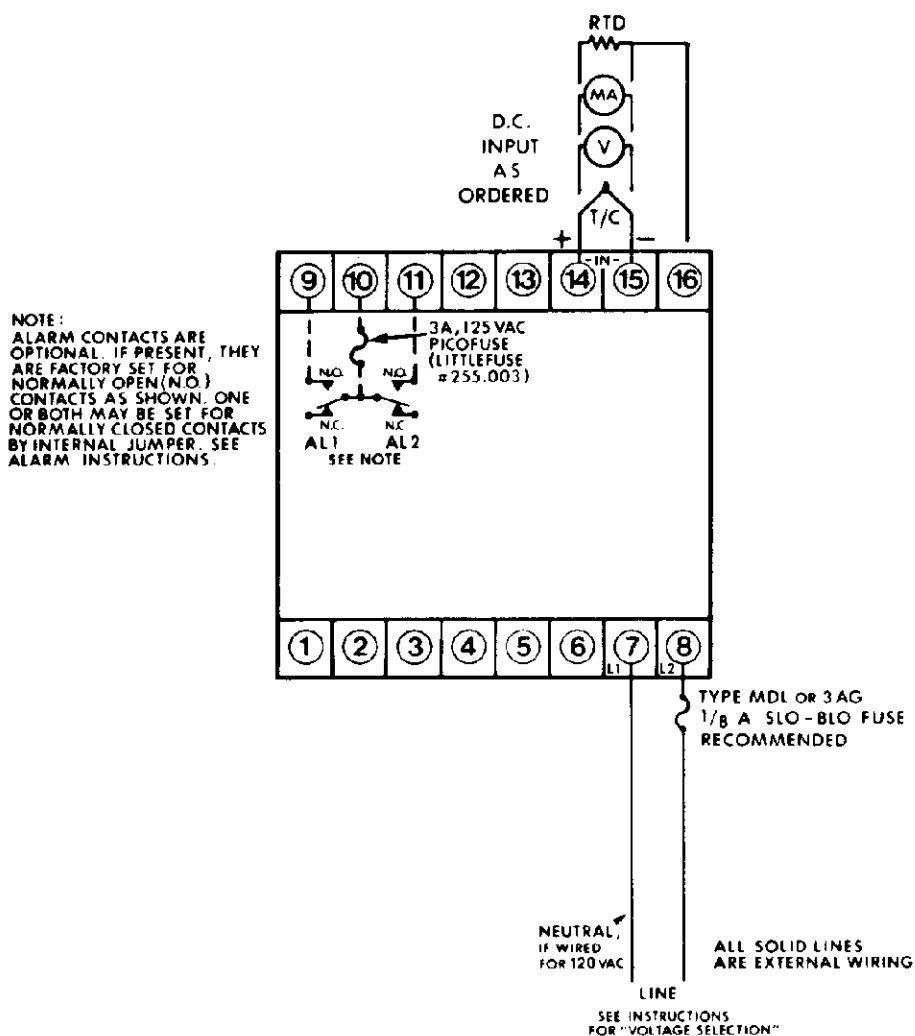
All standard ranges may be programmed for 0 suppression (**[OSUP]**) (20% range elevation) by the user for Process Signals.

INPUT FOR STANDARD RANGES	INPUT FOR 0 SUPPRESSION <b>[OSUP]</b> PROGRAMMED <b>[ON]</b>	INPUT IMPEDANCE
0 to 1 MA	0.2 to 1 MA	100 ohms
0 to 5 MA	1 to 5 MA	20 ohms
0 to 20 MA	4 to 20 MA	5 ohms
0 to 50 MA	10 to 50 MA	2 ohms
0 to 10 MV	2 to 10 MV	10K ohms
0 to 20 MV	4 to 20 MV	10K ohms
0 to 50 MV	10 to 50 MV	10K ohms
0 to 100 MV	20 to 100 MV	10K ohms
0 to 250 MV	50 to 250 MV	10K ohms
0 to 500 MV	100 to 500 MV	10K ohms
0 to 1 V	0.2 to 1 V	20K ohms
0 to 5 V	1 to 5 V	100K ohms
0 to 10 V	2 to 10 V	200K ohms
> 10	USE 10 V RANGE & EXTERNAL VOLTAGE DIVIDER	

°F and °C descriptors as well as no descriptors at all may be programmed by the user. A multiple Engineering Units Label Card is provided with each instrument. The card has labels of the most common Engineering Units on it as well as blanks to create your own. The appropriate label is applied to the upper R.H. corner of the silver area opposite "SET POINT/INDEX" on the front of the instrument.

Overflow and Underflow protection may be manipulated by the user to protect from 1.) A shorted input line, 2.) Suppressed range inputs which require some time before entering the instrument scale range and 3.) Potential runaway input conditions (like overrange) and other time related input fault conditions (See "Diagnostic Error Messages").

## EXTERNAL WIRING



### The Security Switch

The security switch allows the user to limit the changes that may be made while the monitor is in operation. This will help prevent unauthorized personnel from changing important settings.

The security switch allows three conditions to be selected.

1. **Set-up:** Allows all programmable functions to be viewed and changed.
2. **Level 1:** Allows changes to alarm set points (if equipped).

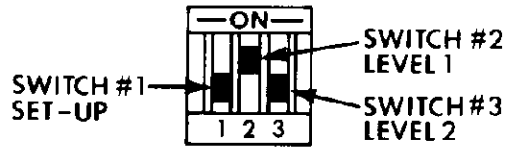
The following may be viewed, but *not* changed: lowest alarm set point value, highest alarm set point value and T/C or RTD type.

3. **Level 2:** No changes may be made. The following may be viewed: alarm set points, lowest and highest alarm set point value and T/C or RTD type.

The security switch is located inside the monitor. It is set for security level 1 as shipped from the factory. To change the setting, remove the monitor from its housing as described under "Removal from the Housing". The switch is mounted on the right hand side of the processor printed circuit board near the front of the instrument.



Looking from the rear of the monitor, look between the upper and lower PCBs to the right of the transformer. The switch has three slide actuators as shown below:



Select the slide actuator for the security condition desired. With a small screw driver move the selected slide actuator to the ON (up) position. Move the other slide actuators to the OFF (down) position. If two or more slide actuators are left in the ON position, security will be set for the lowest position. If all slide actuators are left in the OFF position, **FR 2** **EESE** will appear on the displays upon power up.

See the section “Programming in the Set-up Mode” for further instructions for the Set-up Mode.

### Operation

In showing what the displays may indicate in these instructions, a heavy line at the top of the displayed item means that it appears on the upper display **▬** ; heavy line at the bottom, the lower display **▬** .

After mounting and wiring, power the system. All lamps and display segments come on for 2 seconds for a lamp test for visual test to determine if they are all operative. Turn off, then on, if more time is needed. Then **SELF** **EESE** is displayed, indicating that an internal diagnostic test is taking place. If **FR 2** **EESE** is then displayed, service and /or recalibration is required. When the control passes the diagnostic test, the upper display will then indicate the process value.

For all instructions following, other than under “Programming in the Set-up Mode”, it is assumed that the security switch is in the level 1 condition.

When the upper display indicates the process value and the lower display is blank, that is considered to be “home” position.

Press the “Index” key pad each time to advance through the various programmable or viewable parameters for a particular security condition.

When stepping through the various “Index” positions, if no keys are pressed for 4 to 5 seconds, the displays will revert to “Home” position. This can be defeated by keeping either the “Index” or “Enter” key pad depressed.

The “Increment” **▲** key pad is used to raise an alarm setting. The “Decrement” **▼AL** key pad is used to lower an alarm setting. They both operate at a variable speed to allow rapid setting. Settings change faster as the key is depressed longer. These keys are also used to turn certain functions on or off or to choose any one of many conditions for certain functions. This would be done while programming.

The “Index” **INDEX** and “Decrement” **▼AL** key pads are also used to manually reset an alarm. See “Alarm Operation”.

No settings will be entered into memory without depressing the “Enter” **ENTER** key pad. The previous setting will be retained if not entered. Pressing the “Enter” key will cause the displays to momentarily blank, indicating that the new data has been entered into memory.

Depress "Index" key pad. If alarms are in your model, **#### RL1** will be indicated and the alarm 1 set point may be set. Be sure to depress "Enter" after the set point has been selected.

Depress "Index" key pad. **#### RL2** indication allows selection of alarm 2 set point. Be sure to read the instructions given under "Alarm Operation."

Depress "Index". **#### SP<sub>L</sub>** is displayed. This indicates the lowest set value that may be set for alarm settings. This cannot be set in level 1. It may only be viewed.

Depress "Index". **#### SP<sub>H</sub>** is displayed. The highest set value that may be set. Viewed only.

Depress "Index". **U-IC inP** indicates input calibration. See "Input Wiring" for designations of various input calibrations. This cannot be changed in level 1. It may be viewed only.

For temperature ranges, the °F/°C descriptor alongside the upper display will indicate which temperature scale that the monitor is programmed for. This may be changed in the set-up condition only.

### Programmable Functions

The programmable functions in your monitor are as outlined in the following chart.

If programming must be changed, see "Programming".

**Programmable Functions Chart**

Inputs	Input Type Ordered								
	Thermocouple J, K and E		Thermocouple T, R and S		RTD		Voltage or Current		
	Can Be Programmed For	Normal Factory Program	Can be Programmed For	Normal Factory Program	Can Be Programmed For	Normal Factory Program	Can Be Programmed For	Normal Factory Program	
Type J Thermocouple	✓	As Ordered					These Inputs Not Programmable	As Ordered	
Type K Thermocouple	✓								
Type E Thermocouple	✓								
Type T Thermocouple			✓	As Ordered					
Type R Thermocouple			✓						
Type S Thermocouple			✓						
RTD 100 Ω Plat. 00385					✓	As Ordered			
RTD 100 Ω Plat. 00392					✓				
RTD 120 Ω Nickel					✓				
Display	°F	✓	As Ordered	✓	As Ordered	✓	As Ordered	✓*	
	°C	✓		✓		✓		✓*	

\*For voltage or current input. °F/°C display only for temperature scaling. Other engineering units may be used for various scaling.

## Alarm Operation and Alarm Programmable Functions



If your monitor is equipped with alarms, they may be programmed for various types of operation as described in the following chart. Normal factory programming is as shown in the chart. If it is satisfactory, no programming change is necessary. If programming must be changed, see "Programming in the Set-up Mode".

**CAUTION:** In any critical application where failure could cause expensive product loss or endanger personal safety, a second redundant limit controller is recommended.

### Programmable Functions for Alarms

#### Alarms (Optional)

Programmable Items		Alarm 1		Alarm 2	
		Can Be Programmed For	Normal Factory Program	Can Be Programmed For	Normal Factory Program
Alarm Reset	Automatic	✓	✓	✓	✓
	Manual	✓		✓	
Alarm Action	Reverse Acting (Low Alarm)	✓	✓	✓	
	Direct Acting (High Alarm)	✓		✓	✓
Alarm Power Interrupt Circuit	Off	✓	✓	✓	✓
	On	✓		✓	
Alarm Status Lights	Lit When Alarm Output Is "On"	✓	✓	✓	✓
	Lit When Alarm Output Is "Off"	✓		✓	
Alarm Light Behavior	Flashing	✓	✓	✓	✓
	Steady	✓		✓	
Alarm Output Contacts (Selected by Internal Jumper)	Normally Open with No Power	✓	✓	✓	✓
	Normally Closed With No Power	✓		✓	
Alarm Points Minimum Setting	The Range Within Which The Alarms May Be Set	✓	Min.	Same As Alarm 1	
Alarm Point Maximum Setting		✓	Max.	Same As Alarm 1	

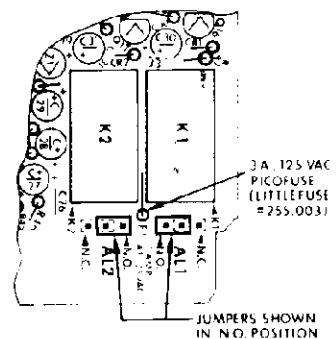
When programmed for manual alarm reset, the "Index"  and "Decrement"  key pads act as a manual reset switch when both are depressed at the same time.

Reset will occur only if there is no alarm condition.

Alarm output contacts may be re-programmed for normally closed operation (one or both) by internal jumper.

To change the jumper position, remove the monitor from its housing as described under "Removal from the Housing". On the left side of the upper PCB, as viewed from the rear near the rear terminals, the AL1 and AL2 jumpers can be seen. See sketch below. There are three posts in the PCB for each jumper. The center post is common. The outer posts are marked N.O. (normally open) and N.C. (normally closed). Change the jumper position by pulling it straight up from the PCB and off the posts. Replace it in the desired position by pushing it over the posts.

When setting the alarm set point, set for the process value where an alarm must be initiated.



## Options

**Option 520. Factory Programming.** Set-up menu pre-programmed to customer specifications instead of the standard factory programs as outlined in the "Programmable Functions Chart". Program may be checked by placing the security switch in the set-up condition and stepping through each "Index" position.

**Option 550. Isolated Power Supply.** This option *must* be present in the monitor when Isolated Current or Isolated Voltage process output #2 (option 535 or 538) is installed.

**Option 617. Rear Terminal Enclosure.** The enclosure may be used to simply cover the rear terminals or to surface mount the monitor. To mount the enclosure to the monitor, follow the instructions packaged with the enclosure.

**Option 6156. Splash and Dust Resistant Construction.** Consists of a gasketed splash resistant cover which snaps over the bezel, a gasket between the bezel and housing and a gasket between the housing and customer panel. Follow the instructions packaged with the cover.

**Option 6162. Tamper Resistant Cover.** Similar to Option 6156, except screws are provided (top and bottom) that lock into two blind holes in the instrument bezel. The instrument must be supplied with these holes. See Option 6166 below. Gasketed cover only. No extra gaskets provided. Follow the instructions packaged with the cover.

**Option 6166. Blind Holes for Option 6162.** Blind holes are provided in the instrument bezel to accept the tamper resistant cover.

## Other Options

For other options, see separate instruction sheet furnished if that option was ordered.

## Specifications

**Input:** Thermocouple, RTD, current or voltage.

**Input Impedance:** 15 megohms minimum.

**Accuracy:**  $\pm 0.25\%$  of span  $\pm 1$  least significant digit.

**Resolution:** 1 or 0.1 degree.

**Line Voltage Stability:** +10%, -15% change in line voltage from nominal will not shift the alarm point by more than 0.05% of span.

**Temperature Stability:** 3  $\mu\text{V}/^\circ\text{C}$  typical, 6  $\mu\text{V}/^\circ\text{C}$  maximum.

**Maximum Thermocouple Resistance:** 1000 ohms. 200 ohms equals less than  $\pm 0.1\%$  of span error.

**Humidity Conditions:** 0 to 90% up to 40°C non-condensing. 10 to 50% at 55°C non-condensing.

**Common Mode Rejection:** 140 DB minimum at 60 Hz.

**Normal Mode Rejection:** 65 DB typical, 60 DB minimum at 60 Hz.

**Supply Voltage:** 120/208/240/V.A.C., 50/60 Hz by jumper selection.

**Power Consumption:** 10 V.A. nominal.

**Ambient Temperature Range:** 0 to 55°C (32 to 130 °F).

**Storage Temperature:** -40 to +80°C (-40 to +175°F).

**Displays:** 0.56" high LED displays indicate Process Value/Set Point or Index Value/Index.

**Display Update:** Greater than 10 times per second.

**Status Lights:** Descriptor and alarm conditions are indicated. Descriptors by red LED's, alarm conditions by yellow LED's.

**Backup:** Non-volatile memory. No batteries required.

**Input Protection:** Error message appears on the display for either open or shorted sensor input (except thermocouples, open only) and for either over or under range current or voltage inputs.

**Other Protection:** Error messages are displayed also for the following reasons: self diagnostic test has failed, internal reference is out of specification, pre-set set point limits have been exceeded, ambient temperature at the control is out of the specification range.

**Diagnostics:** Self-check, display and lamp test and full array of error messages.

**Programmability:** See programmable functions chart.

**Alarms:** Two optional. Full selection of alarm actions.

**Alarm Relays:** 1.0 A at 120 V.A.C. only. For resistive loads. Normally open or normally closed output contacts selected by internal jumper. Alarm relays are fused.

**Security:** Three conditions selected by internal switch.

**Housing:** Flame retardant U.L. rated plastic. Sealed membrane switch front panel is moisture and oil resistant. Wiring terminals are located on the rear. Full plug-in construction.

**Weight:** Approx. 2.5 lbs.

## GLOSSARY OF TERMS

### Alarm Output Contacts

- A. Normally open means that the output contacts are open when the instrument is not powered.
- B. Normally closed means that the output contacts are closed when the instrument is not powered.
- C. This selection is made via an internal jumper.

### Alarm Power Interrupt Circuit

Allows alarm that is set for manual reset to reset itself automatically after a power interruption if no alarm condition exists when the power is restored.

### Alarm Reset

- A. Automatic: after the process value reaches the alarm set point, the alarm activates and will automatically de-activate upon process value return to a non-alarm condition.
- B. Manual: after the process value reaches the alarm set point, the alarm activates and will not de-activate until the process value returns to the non-alarm condition and the alarm reset is manually actuated via the alarm reset key pads.

### Factory Programming to Customer Specifications

Setting up the programmable items shown in the "Programmable Functions Chart" to customer specifications other than the "Normal Factory Program". Keep in mind that all items shown in the chart are customer programmable in the field.

**Linearized Process Output**

Either a current or voltage signal output from the monitor that is representative of the process value. This signal is linearized so that a linear relationship exists between the process value and the signal. The signal can be used as an input to a recorder, printer, computer, etc..

**Output-Reverse Acting**

Alarm relay energized at or below the alarm set point (as for low alarm).

**Output-Direct Acting**

Alarm relay energized at or above the alarm set point (as for high alarm).

**Peak Indication**

Memorizes, and displays on demand, the highest process value reached by the process since last reset.

**Scaling**

Where the input to a control is either current or voltage, the set points and indication may be customer scaled to represent temperature, humidity, flow, pressure, etc.

**Set Point Minimum/Maximum Setting**



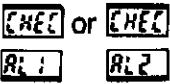










Set point range; setting the range over which the set point(s) may be set. Alarm set points will be limited by these settings.

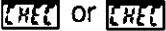



















**Valley Indication**

Memorizes, and displays on demand, the lowest process value reached by the process since last reset.

### Diagnostic Error Messages

The 300 Series Monitor will display several error messages in accordance with its diagnostics to give appropriate warning when necessary. When the chart below shows Outputs "Turned off", this means that relays are de-energized.

Display	Meaning	Outputs	Action Required
	Both displays blank (unlit). Monitor is not getting any power or voltage supply is too low.	Turned off.	Check to make sure power supply is turned on. Check voltage selection jumper inside control (see "Voltage Selection"). Check fuses external to the monitor. Failure to select proper voltage to the monitor can result in transformer burn-out.
	Fail test. Appears upon power up if internal diagnostics detects a failure. Failure may be circuit related or if one of the security switches is not in the "on" position. This is also displayed if, during the course of normal operation, a catastrophic event occurs. Displays flash.	Turned off.	First check to see if the security switch of your choice is "on". If it isn't, turn it on. Replacing the monitor back into its housing and turning the power on will reset the monitor.  If one of the security switches is on and this message occurs, remove the monitor from service.
	One or more of these messages will appear upon power up, if the alarm set points are set either below or above the  or  programmed values or beyond the input range ends.   = Alarm one set point.  = Alarm two set point.	Turned off.	In the "Set-up" mode, correct  or  to be within the  or  limits or re-program  or  to be at or beyond the selected set points, but not beyond the input range. See "Programming in the Set-up Mode."

Display	Meaning	Outputs	Action Required
 or   	<p>Check 'Set Point Low' value or check 'Set Point High' value appears upon power-up, if  or  is programmed either below or above the input range ends. See "Temperature Ranges."</p>	<p>Turned off.</p>	<p>Correct  or  by re-programming in the "Set-up" mode to within the input range. See "Programming in the Set-up Mode".</p>
 	<p>Check 'Set Point High' value. Appears when, in the "Set-up" mode, one or more of the alarm points is set above the maximum value entered for . It will also appear if any alarm is set above  while in security Level 1. The set point will not be accepted and the previously entered set point will be retained. The displays return to home position.</p>	<p>Turned off during "Set-up".</p> <p>Remain active in security Level 1.</p>	<p>In "Set-up", select an alarm point below the 'Set Point High' value or re-program  to a new value above the highest alarm point, but not beyond the input range.</p> <p>In security Level 1, select an alarm point below the 'Set Point High' value or re-program  to a new value. See "Programming in the Set-up Mode".</p>
 	<p>Check 'Set Point Low' value. Appears when in the "Set-up" mode, one or more of the alarm points is set below the minimum value entered for . It will also appear if any alarm is set below  while in security Level 1. The set point will not be accepted and the previously entered set point will be retained. The displays return to home position.</p>	<p>Turned off during "Set-up".</p> <p>Remain active in security Level 1.</p>	<p>In "Set-up", select an alarm point above the 'Set Point Low' value or re-program  to a new value below the lowest alarm point, but not below the input range.</p> <p>In security Level 1, select an alarm point above the 'Set Point Low' value or re-program  to a new value. See "Programming in the Set-up Mode".</p>



Display	Meaning	Outputs	Action Required
<p> <math>\overline{0FL}</math> or <math>\overline{0FL}</math>  <math>\overline{####}</math>    <math>\overline{####}</math>            sequencing to  <math>\overline{bRd}</math>  <math>\overline{inP}</math> </p>	<p>Underflow or overflow of current or voltage input. <math>\overline{0FL}</math> flashes under low end of zero suppressed range <math>\overline{05UP}</math> or under the first 0.1% of zero start range. <math>\overline{0FL}</math> flashes at 0.5% above the top of the range. Lower display continues to indicate the set value.</p> <p>When <math>\overline{inPt}</math> (input fault time) has been programmed for <math>\overline{0.1}</math> min. (6 sec.) to <math>\overline{5400}</math> min. (9 hrs.), then outputs will remain active until the end of this time, when, <math>\overline{bRd}</math> <math>\overline{inP}</math> will flash and outputs are turned off.</p> <p>When <math>\overline{inPt}</math> (input fault time) has been programmed for <math>\overline{0FF}</math>, then outputs remain active indefinitely.</p> <p><math>\overline{bRd}</math> <math>\overline{inP}</math> is displayed on input polarity reversal or beyond the underflow or overflow minimal limits when <math>\overline{inPt}</math> has been programmed as described above. Displays flash.</p>	<p>Remain active</p> <p>Remain active to Turned off.</p> <p>Remain active</p> <p>Turned off.</p>	<p>Input signal may normally go above or below range ends. If not, check input and correct. If the condition is corrected before sequencing to bad input, the displays will go back to normal indication (home position) without further attention.</p> <p>Correct input. Turn power to the monitor off, then on, to reset.</p> <p>Underflow and/or overflow is normal. No action required.</p> <p>Correct input. Turn power to the monitor off, then on, to reset.</p>
<p> <math>\overline{bRd}</math>  <math>\overline{inP}</math> </p>	<p>Bad input. RTD sensor open or shorted. Displays flash.</p>	<p>Turned off.</p>	<p>Correct sensor condition. Turn power to the monitor off, then on, to reset.</p>

Display	Meaning	Outputs	Action Required
	Open input. T/C circuit open. For T/C input only. Displays flash.	Turned off	Correct T/C or T/C leads. Turn power to the monitor off, then on, to reset.
	Area appears if the monitor ambient temperature nears either extreme of its specification of 0°C (32°F) or 55°C (131°F). Upper display continues to indicate the process value. Both displays flash.	Remain active	Correct ambient temperature conditions by eliminating cause (too near heated area, cabinet filters clogged, poor location, etc.). Will reset to home position when condition is corrected.
	Area appears with blank upper display if the monitor ambient temperature reaches 5°C (9°F) beyond the extreme of its specification. This occurs at -5°C (23°F) or +60°C (140°F). Lower display remains steady.	Turned off.	Correct ambient temperature conditions by eliminating cause (too near heated area, cabinet filters clogged, poor location, etc.). Turn power to the monitor off, then on, to reset.
	Check calibration. Appears during normal operation if internal reference or associated circuitry is out of tolerance. Intermittant flashing occurs at edge of specification, alternating with home position. When over specification, display flashes continuously without alternating.	Remain active at edge of specification. Turned off when over specification.	Remove monitor for service and/or recalibration.
	The difference between "Scale Low Value"  and "Scale High Value"  is programmed for greater than 4000 or less than 100 counts during programming of voltage or current input scale range.	Turned off	Program within the allowable count range.

## Programming in the Set-up Mode

As an aid to programming, a blank "Programming Selection Table" is located in the back of this instruction booklet. It may be used to pre-select your program choices.

Remove the monitor from its housing as described under "Removal From the Housing".

Set the security switch to "Set-up". Switch #1 "ON", switches #2 and #3 off (down) as described under "The Security Switch".

Replace the monitor into its housing and power the instrument.

All lamps and display segments come on for 2 seconds for a lamp test for user examination to determine if they are all operative. Turn power off, then on, if more time is needed.

In showing what the displays may indicate in these instructions, a heavy line at the top of the displayed item means that it appears on the upper display  ; heavy line at the bottom, the lower display  .

is then displayed, indicating that an internal diagnostic test is taking place. If   is then displayed, service and/or recalibration is required.

When the monitor passes the diagnostic test, the upper display will then indicate the process value. This is considered "home" position. The monitor will return to the "home" position if no keys are pressed for 8-10 seconds. This can be defeated by holding in either the "Index" or "Enter" key pads.

Repeated actuation of the "Index" key pad advances the various programmable functions onto the displays for either viewing or changing. At each function display, if nothing is done, the monitor will return to the "home" position unless the "Index" or "Enter" key pads are continually depressed as described above.

The "Increment"  key pad is used to raise a setting, turn certain functions "on" or to choose any one of many conditions for certain functions. The "Decrement" key pad  is used to lower a setting, turn certain functions "off" or to choose any of many conditions for certain functions. They both operate at a variable speed to allow rapid setting. Settings change faster as the key is depressed longer.

Index items may be presented in reverse order by depressing the "Decrement" key pad and then depressing the "Index" key pad.

No settings can be entered into memory without depressing the "Enter" key pad. The previous setting will be retained if not "Entered". When depressing the "Enter" key pad the displays will momentarily go blank, indicating that the new data has been "Entered" into memory.

Programmable data will be presented as shown in the following chart. At each step press "Enter" if you wish to retain that particular data choice that is being newly entered. If no change is desired, press "Index" to proceed to next programmable function. If the displays automatically return to the "home" position before being able to make changes, simply repeatedly depress the "Index" key until back to the function of interest.

### Set Point Changes (Alarms Only)

CON- DITION	Display Reads	Change Value in Upper Display by Pressing	Comments
B.	#### <b>SP1</b> Alarm #1 Set Point (if equipped)	▲ or ▼ Variable Speed	Press "Enter" to retain. Press "Index" to proceed to next programmable function. This function may also be changed in "level 1 security".
C.	#### <b>SP2</b> Alarm #2 Set Point (if equipped)	▲ or ▼ Variable Speed	Press "Enter" to retain. Press "Index" to proceed to next programmable function. This function may also be changed in "level 1 security."

### Other Monitor Functions

CON- DITION	Display Reads	Change Value in Upper Display by Pressing	Comments
E.	F or C temperature scale selection.	▲ Selects °F. ▼ Selects °C.	All temperature values converted and displayed in chosen scale (except certain options). Press "Enter" to retain and proceed to condition G. Descriptor [°F] or [°C] to the right of the upper display will light. <b>This condition not present on current or voltage inputs. See condition T8.</b>
G.	#### <b>SPL</b> Lowest set point desired for Alarm #1 or Alarm #2.	▲ or ▼ variable speed.	This function sets the low end of the desired alarm set point span of the monitor. (Alarms Only)
H.	#### <b>SPH</b> Highest set point desired for Alarm #1 or Alarm #2.	▲ or ▼ variable speed	This function sets the high end of the desired alarm set point span of the monitor. (Alarms Only)

### Alarm Functions (If Equipped)






















CAUTION: In any critical application where failure could cause expensive product loss or endanger personal safety, a second redundant limit controller is recommended.

CON- DITION	Display Reads	Change Value in Upper Display by Pressing	Comments
N.	<p><input type="checkbox"/> <b>dir</b>   <input type="checkbox"/> <b>RL IR</b></p> <p>or</p> <p><input type="checkbox"/> <b>rē</b></p> <p>Alarm #1 action direct or reverse</p>	<p><input type="checkbox"/> <b>▲</b> to select <input type="checkbox"/> <b>dir</b></p> <p>Direct Acting</p> <p><input type="checkbox"/> <b>▼<sub>AL</sub></b> to select <input type="checkbox"/> <b>rē</b></p> <p>Reverse Acting</p>	<p>Direct acting: relay coil energized when the process value is <i>above</i> the alarm set point. Usually used for high alarm.</p> <p>Reverse acting: relay coil energized when the process value is <i>below</i> the alarm set point. Usually used for low alarm.</p>
O1.	<p><input type="checkbox"/> <b>ON</b>   <input type="checkbox"/> <b>RL IL</b></p> <p>or</p> <p><input type="checkbox"/> <b>OFF</b></p> <p>Alarm #1 status light "lit"</p>	<p><input type="checkbox"/> <b>▲</b> lit when alarm #1 output is "ON".</p> <p><input type="checkbox"/> <b>▼<sub>AL</sub></b> lit when alarm #1 output is "OFF".</p>	
O2.	<p><input type="checkbox"/> <b>ON</b>   <input type="checkbox"/> <b>RL IF</b></p> <p>or</p> <p><input type="checkbox"/> <b>OFF</b></p> <p>Alarm #1 status light flasher.</p>	<p><input type="checkbox"/> <b>▲</b> to select <input type="checkbox"/> <b>ON</b></p> <p><input type="checkbox"/> <b>▼<sub>AL</sub></b> to select <input type="checkbox"/> <b>OFF</b></p>	<p>When "ON" is selected, the alarm status light will flash when it is lit.</p> <p>When "OFF" is selected, the alarm status light will stay on steadily when lit.</p>
P1.	<p><input type="checkbox"/> <b>ONDF</b>   <input type="checkbox"/> <b>RL IR</b></p> <p>or</p> <p><input type="checkbox"/> <b>RL</b></p> <p>Alarm #1 reset choice. Automatic or manual</p>	<p><input type="checkbox"/> <b>▲</b> to select <input type="checkbox"/> <b>ONDF</b> automatic reset.</p> <p><input type="checkbox"/> <b>▼<sub>AL</sub></b> to select <input type="checkbox"/> <b>RL</b> manual reset</p>	<p>If automatic reset is selected, press "Enter" to retain and "Index" to condition Q. If manual reset is selected, press "Index" to condition P2. With manual reset, once the alarm has been initiated, the condition must return to normal and the <input type="checkbox"/> <b>INDEX<sub>AL</sub></b> and <input type="checkbox"/> <b>▼<sub>AL</sub></b> keys must be depressed at the same time to reset.</p>
P2.	<p><input type="checkbox"/> <b>ON</b>   <input type="checkbox"/> <b>RL IP</b></p> <p>or</p> <p><input type="checkbox"/> <b>OFF</b></p> <p>Alarm #1 power interrupt function</p>	<p><input type="checkbox"/> <b>▲</b> to select <input type="checkbox"/> <b>ON</b> turns function "ON".</p> <p><input type="checkbox"/> <b>▼<sub>AL</sub></b> to select <input type="checkbox"/> <b>OFF</b> turns function "OFF".</p>	<p>Used only with manual alarm reset. If "ON" is selected, will automatically reset an alarm after a power failure and subsequent restoration if no alarm condition exists. Press "Enter" and proceed to condition Q.</p>

### Alarm Functions (If Equipped) (Cont.)

CON- DITION	Display Reads	Change Value in Upper Display by Pressing	Comments
Q.	<div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> dir</span> <span><input type="checkbox"/> RL2R</span> </div> <p style="text-align: center;">or</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> rE</span> </div> <p>Alarm #2 action direct or reverse</p>	<div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> ▲ to select <input type="checkbox"/> dir</span> </div> <p style="text-align: center;">Direct Acting</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> ▼<sub>Al</sub> to select <input type="checkbox"/> rE</span> </div> <p style="text-align: center;">Reverse Acting</p>	<p>Direct Acting: relay coil energized when the process value is <i>above</i> the alarm set point. Usually used for high alarm.</p> <p>Reverse Acting: relay coil energized when the process value is <i>below</i> the alarm set point. Usually used for low alarm.</p>
R1.	<div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> on</span> <span><input type="checkbox"/> RL2L</span> </div> <p style="text-align: center;">or</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> off</span> </div> <p>Alarm #2 status light "lit"</p>	<div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> ▲ lit when alarm #2 output is "ON".</span> </div> <div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> ▼<sub>Al</sub> lit when alarm #2 output is "OFF"</span> </div>	
R2.	<div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> on</span> <span><input type="checkbox"/> RL2F</span> </div> <p style="text-align: center;">or</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> off</span> </div> <p>Alarm #2 status light flasher</p>	<div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> ▲ to select <input type="checkbox"/> on</span> </div> <div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> ▼<sub>Al</sub> to select <input type="checkbox"/> off</span> </div>	<p>When "ON" is selected, the alarm status light will flash when lit.</p> <p>When "OFF" is selected, the alarm status light will stay on steadily when lit.</p>
S1.	<div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> onoff</span> <span><input type="checkbox"/> RL2r</span> </div> <p style="text-align: center;">or</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> RL</span> </div> <p>Alarm #2 reset choice automatic or manual</p>	<div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> ▲ to select <input type="checkbox"/> onoff automatic reset.</span> </div> <div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> ▼<sub>Al</sub> to select <input type="checkbox"/> RL manual reset</span> </div>	<p>If automatic reset is selected, press "Enter" to retain and "Index" to condition T. If manual reset is selected, press "Index" to condition S2. With manual reset, once the alarm has been initiated, the condition must return to normal and the <input type="checkbox"/> INDEX<sub>Al</sub> and <input type="checkbox"/> ▼<sub>Al</sub> keys must be depressed at the same time to reset.</p>
S2.	<div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> on</span> <span><input type="checkbox"/> RL2P</span> </div> <p style="text-align: center;">or</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> off</span> </div> <p>Alarm #2 power interrupt function</p>	<div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> ▲ to select <input type="checkbox"/> on Turns function "ON".</span> </div> <div style="display: flex; justify-content: space-between; align-items: center;"> <span><input type="checkbox"/> ▼<sub>Al</sub> to select <input type="checkbox"/> off Turns function "OFF".</span> </div>	<p>Used only with manual alarm reset. If "ON" is selected, will automatically reset an alarm after a power failure and subsequent restoration if no alarm condition exists.</p> <p>Press "Enter" and proceed to Condition T.</p>

## Input Selection (Thermocouple and RTD only)

CON- DITION	Display Reads	Change Value in Upper Display by Pressing	Comments
T1.	Thermocouple E, J or K  or  or  or 	 or  Single Step	<i>Do not "Enter"  . For factory use only. See "Input Wiring" for input type identification.</i> This completes programming. Return to "home" position.
T2.	Thermocouple T, R or S  or  or  or 	 or  Single Step	<i>Do not "Enter"  . For factory use only. See "Input Wiring" for input type identification.</i> This completes programming. Return to "home" position.
T3.	RTD CAL. 104, 105, or 106  or  or  or 	 or  Single Step	<i>Do not "Enter"  . For factory use only. See "Input Wiring" for input type identification.</i> Programming is complete. "Index" to "home" position or wait 8-10 seconds and "home" position will come automatically.

### Input Selection (Thermocouple and RTD Only) (Cont.)

CON- DITION	Display Reads	Change Value in Upper Display by Pressing	Comments
V.	- <input type="text" value="####"/> <input type="text" value="InP"/> to <input type="text" value="####"/> Input Correction	<input type="text" value="▲"/> or <input type="text" value="▼"/> Variable Speed	See "Set-up for Input Correction". The value of the Input Correction may be changed from -100 to +100°F or -56 to +56°C for temperature ranges with 1° resolution. For ranges with 0.1° resolution it may be changed from -100.0 to +100.0°F or -55.6 to +55.6°C. Condition V is not equipped in some controls.

After programming, turn the power to the instrument off, then on, and verify each programmed value or function. After verification, the program may be secured in either "level 1" or "level 2" security. See "The Security Switch".

### Input Selection (Current & Voltage Ranges Only) Viewable & changeable in "Setup" Mode only



































CON- DITION	Display Reads	Change Value in Upper Display by Pressing	Comments
T4.	<input type="text" value="####"/> <input type="text" value="SCALE"/> Display low value	<input type="text" value="▲"/> or <input type="text" value="▼"/> Variable Speed	This function sets the low end of the scale range. Any <input type="text" value="####"/> from 100 to 4000 counts below <input type="text" value="SCALE"/>
T5.	<input type="text" value="####"/> <input type="text" value="SCALE"/> Display high value	<input type="text" value="▲"/> or <input type="text" value="▼"/> Variable Speed	This function sets the high end of the scale range. Any <input type="text" value="####"/> from 100 to 4000 counts above <input type="text" value="SCALE"/>
T6.	<input type="text" value="."/> <input type="text" value="dP"/> or <input type="text" value="."/> or <input type="text" value="."/> Decimal point position or <input type="text" value="."/> ← No decimal pt. or <input type="text" value="..."/>	<input type="text" value="▲"/> or <input type="text" value="▼"/> Single step.	This function sets the decimal point for 1, 2 or 3 numbers beyond the decimal point. Do not "Enter" <input type="text" value="..."/> . For factory use only.



## Input Selection

(Current & Voltage Ranges Only) Viewable & changeable in "Setup" Mode only

25

CON- DITION	Display Reads	Change Value in Upper Display by Pressing	Comments
T7.	  or  Zero Suppression	 to select  turns function "ON".  to select  turns function "OFF".	Low end of scale range starts 20% above low end of input range. i.e., 0 to 20 MA input range becomes 4 to 20 MA input for scale.
T8.	  or  or  Engineering units descriptor	 or  Single step.	Select Engineering Units Descriptors:  = No descriptors. Apply appropriate label from multiple Engineering Units Label Card supplied with instrument in upper R.H. corner of silver area opposite "Set Point/Index" on the front of the instrument.  = °F descriptor.  = °C descriptor.
T9.	  to  to  Input fault time	 or  Variable Speed	Outputs remain active for this time after  or  begins flashing. 0.1 min. (6 sec.) to 540.0 min. (9 hrs.) can be selected in 6 sec. increments. After this time outputs turn off (safe) and   is displayed. When  has been selected the outputs remain active when  or  is flashing.
T10.	  to  Input Correction	 or  Variable Speed	See "Set-up for Input Correction". The value of the input correction may be changed from -1000 to +1000 counts on current or voltage ranges. Condition T10 is not equipped in some controls.

After programming, turn the power to the instrument off, then on, and verify each programmed value or function. After verification, the program may be secured in either "level 1" or "level 2" security. See "The Security Switch".

### Set-up for Input Correction

This feature allows the input value to be changed to agree with an external reference or to compensate for sensor error.

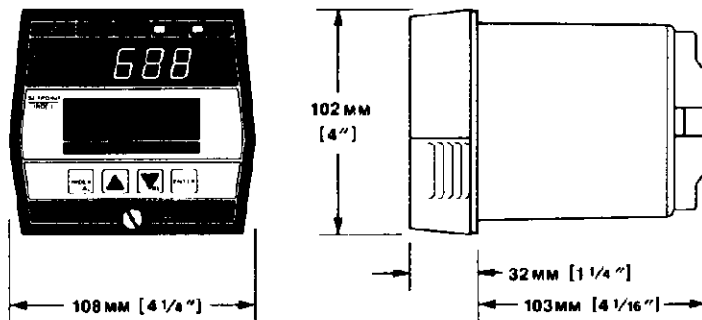
For example:

Assume that the monitor Process Value (PV) reads 200° and an external reference instrument monitoring the same temperature reads 210°. In the "Set-up" mode Index to **InPt** (usually last menu item). Change the value in the upper display by pressing the **▲** or **▼** keys until the value reads +10. Press "Enter". Return the monitor to the Level 1 or Level 2 security mode. Now, when the monitor PV reads 200° the reference should also read 200°.

### Changing Sensors

Your monitor is calibrated for three sensor types. See "Model Identification" for your input. To change from one type to another is done in programming. See Condition T1, T2 or T3 under "Programming in the Set-up Mode" and follow instructions for programming to your desired sensor.

### DIMENSIONS



**CUTOUT FOR ALL MODELS**  
**92mm x 92mm (3 5/8" x 3 5/8")**

### LIMITED WARRANTY

Love Controls Corporation warrants to the Buyer that any equipment sold will be free from defects in materials or workmanship. If, at any time within sixty (60) months after shipment of Self-Tune® Plus Controls or within three (3) months after shipment of thermocouples or other assemblies or parts, the Seller is notified of such defect and the defective item is returned to Seller by Buyer, transportation prepaid, for examination, the Seller will, at his option, either repair or replace the defective items.

This warranty shall be effective only if installation and maintenance is in accordance with Seller's instructions and the defect is not caused by shipping damage, misuse or abuse by Buyer. There are no other warranties, written, oral or implied. The liability of the Seller shall be limited to the repair or replacement of the defective item as above set forth.

**Items which wear or which are perishable by misuse are not warranted. These include, but are not limited to, contact points, lamps, LED's, load SCR's, SSR's and triacs.**

## PROGRAM SELECTION TABLE

Use this table to fill in programming choices as an aid when programming your monitor.  
Make copies of this blank table or request additional copies from the factory.

### SET POINTS (Alarms Only)

Index Item	Choices	Choice
<input type="text" value="####"/> <input type="text" value="RL1"/> Alarm Point 1	Any value within <input type="text" value="SP_L"/> and <input type="text" value="SP_H"/> If alarms are present	
<input type="text" value="####"/> <input type="text" value="RL2"/> Alarm Point 2	Any value within <input type="text" value="SP_L"/> and <input type="text" value="SP_H"/> If alarms are present	

### OTHER MONITOR FUNCTIONS

Index Item	Choices	Choice
<input type="text" value="F"/> or <input type="text" value="F-C"/> <input type="text" value="C"/> Degrees fahrenheit or degrees celcius	<input type="text" value="F"/> or <input type="text" value="C"/> This condition not present on current or voltage inputs. See "Input Selection".	
<input type="text" value="####"/> <input type="text" value="SP_L"/> Set Point low end	any <input type="text" value="####"/> within range span (Alarms Only)	
<input type="text" value="####"/> <input type="text" value="SP_H"/> Set Point high end	any <input type="text" value="####"/> within range span (Alarms Only)	

### ALARM FUNCTIONS (IF PRESENT)

Index Item	Choices	Choice
<input type="text" value="d.r"/> or <input type="text" value="RL1R"/> <input type="text" value="r.L"/> Alarm 1 action direct acting (high alarm) or reverse acting (low alarm)	<input type="text" value="d.r"/> or <input type="text" value="r.L"/>	
<input type="text" value="O on"/> or <input type="text" value="RL1L"/> <input type="text" value="O off"/> Alarm 1 status light lit with out- put on or with output off	<input type="text" value="O on"/> or <input type="text" value="O off"/>	

## ALARM FUNCTIONS (IF PRESENT) (Continued)

Index Item	Choices	Choice
<input type="checkbox"/> On or <input type="checkbox"/> RL IF <input type="checkbox"/> OFF Alarm 1 status light flasher on or off	<input type="checkbox"/> On or <input type="checkbox"/> OFF	
<input type="checkbox"/> OnOFF or <input type="checkbox"/> RL ir <input type="checkbox"/> RL Alarm 1 reset type, on-off (automatic) or alarm (manual)	<input type="checkbox"/> OnOFF or <input type="checkbox"/> RL * IF <input type="checkbox"/> RL is selected, then also	
	select <input type="checkbox"/> RL IP , alarm 1 power interrupt function <input type="checkbox"/> On or <input type="checkbox"/> OFF	
<input type="checkbox"/> dir or <input type="checkbox"/> RL 2R <input type="checkbox"/> RE Alarm 2 action direct acting (high alarm) or reverse acting (low alarm)	<input type="checkbox"/> dir or <input type="checkbox"/> RE	
<input type="checkbox"/> On or <input type="checkbox"/> RL 2L <input type="checkbox"/> OnOFF Alarm 2 status light lit with output on or with output off	<input type="checkbox"/> On or <input type="checkbox"/> OnOFF	
<input type="checkbox"/> On or <input type="checkbox"/> RL 2F <input type="checkbox"/> OFF Alarm 2 status light flasher on or off	<input type="checkbox"/> On or <input type="checkbox"/> OFF	
<input type="checkbox"/> OnOFF or <input type="checkbox"/> RL 2r <input type="checkbox"/> RL Alarm 2 reset type, on-off (automatic) or alarm (manual)	<input type="checkbox"/> OnOFF or <input type="checkbox"/> RL * if <input type="checkbox"/> RL is selected, then also	
	select <input type="checkbox"/> RL 2P , alarm 2 power interrupt function <input type="checkbox"/> On or <input type="checkbox"/> OFF	

When confirming these functions after programming, if  RL has been selected, press "Enter" to display the alarm power interrupt function choice.

## INPUT SELECTION (THERMOCOUPLE AND RTD ONLY)

### Thermocouple Types E, J or K

Index Item	Choices	Choice
<input type="checkbox"/> E- or <input type="checkbox"/> J-10 <input type="checkbox"/> inP or <input type="checkbox"/> K Thermocouple input	<input type="checkbox"/> E- =Type E, Chromel/Constantan <input type="checkbox"/> J-10 =Type J, Iron/Constantan <input type="checkbox"/> K =Type K, Chromel/Alumel	
- <input type="checkbox"/> #### to <input type="checkbox"/> inPC <input type="checkbox"/> #### Input Correction	Any <input type="checkbox"/> #### within the input correction range.	

### Thermocouple Types T, R or S

Index Item	Choices	Choice
<input type="checkbox"/> E- or <input type="checkbox"/> R-13 <input type="checkbox"/> inP or <input type="checkbox"/> S-10 Thermocouple input	<input type="checkbox"/> E- =Type T, Copper /Constantan <input type="checkbox"/> R-13 =Type R, Plat, 13% RH./Plat. <input type="checkbox"/> S-10 =Type S, Plat, 10% RH./Plat.	
- <input type="checkbox"/> #### to <input type="checkbox"/> inPC <input type="checkbox"/> #### Input Correction	Any <input type="checkbox"/> #### within the input correction range.	

### RTD Calibrations 104, 105 or 106

Index Item	Choices	Choice
<input type="checkbox"/> 104 or <input type="checkbox"/> 105 <input type="checkbox"/> inP or <input type="checkbox"/> 106 RTD input	<input type="checkbox"/> 104 =Platinum 100 OHMS at 0°C. (American curve) alpha =.00392 OHMS/OHM/°C. <input type="checkbox"/> 105 =nickel 120 OHMS at 0°C. <input type="checkbox"/> 106 =platinum 100 OHMS at 0°C. (DIN curve) alpha=.00385 OHMS/OHM/°C.	
<input type="checkbox"/> #### to <input type="checkbox"/> inPC <input type="checkbox"/> #### Input Correction	Any <input type="checkbox"/> #### within the input correction range.	

### Input Selection (Current and Voltage Ranges Only)

Index Item	Choices	Choice
<input type="text" value="####"/> <input type="text" value="SCRL"/> Display low value.	Any <input type="text" value="####"/> from 100 to 4000 counts below <input type="text" value="SCRL"/>	
<input type="text" value="####"/> <input type="text" value="SCRH"/> Display high value	Any <input type="text" value="####"/> from 100 to 4000 counts above <input type="text" value="SCRH"/>	
<input type="text" value="."/> or <input type="text" value="."/> or <input type="text" value="dP"/> <input type="text" value="."/> or <input type="text" value=""/> Decimal point position	<input type="text" value="."/> .1 resolution or <input type="text" value="."/> .01 resolution or <input type="text" value="."/> .001 resolution or <input type="text" value=""/> 1 unit resolution. No decimal point	
<input type="text" value="On"/> or <input type="text" value="OSUP"/> <input type="text" value="OFF"/> 20% zero suppression	<input type="text" value="On"/> or <input type="text" value="OFF"/>	
<input type="text" value="0"/> or <input type="text" value=";"/> <input type="text" value="Unit"/> or <input type="text" value="2"/> Engineering units descriptor	<input type="text" value="0"/> no descriptor (apply label) or <input type="text" value=";"/> °F descriptor or <input type="text" value="2"/> °C descriptor	
<input type="text" value="OFF"/> to <input type="text" value="0.1"/> <input type="text" value="inPt"/> to <input type="text" value="5400"/> Input fault time	<input type="text" value="OFF"/> to <input type="text" value="5400"/> minutes in <input type="text" value="0.1"/> minute (6 second) increments	
- <input type="text" value="####"/> to <input type="text" value="inPt"/> <input type="text" value="####"/> Input Correction	Any <input type="text" value="####"/> within the input correction range.	