VersaEZ

MANUAL

Partlow

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Form 3916

Table of Contents

Section 1 - Introduction and General Information

The VersaEZ will record up to four process variables on a circular chart. The circular chart sizes are 10", 11", or 12" with the unit shipped to you configured to record on 12" chart paper.

The VersaEZ was designed to provide you with a product that is user friendly and delivers you a high quality, unalterable print out of your process data. Out-of-the-box the VersaEZ is set-up for most common applications. Given that there are many variables in the world of process control, no one set-up will cover most needs. Yet, preconfigured as the VersaEZ is, it will minimize the amount of time you need to commit to programming. You need only to change the parameters necessary to get your process running and documented.

This instrument is a microprocessor based circular chart recorder capable of measuring, displaying, and recording from a variety of inputs. Applications include temperature, level, pressure, flow, and others. The instrument can be specified as either a one, two, three, or four pen model.

The standard process sensor inputs (up to 4 total inputs) are user configurable to directly connect to and convert thermocouple, RTD, millivolt, volt, milliamp or contact closure inputs. Thermocouple and RTD linearization, as well as thermocouple cold junction compensation, are performed automatically. Up to four individually isolated 24 VDC regulated transmitter power supplies are available for transmitter inputs, each providing up to 25 mADC.

OPTIONS

The instrument is available with a full compliment of options. Up to four isolated universal inputs are available with each being configurable to any of the available input types. Up to four isolated transmitter power supplies can be added. Up to four inputs can be assigned as “process variables,” allowing up to two alarms for each. Alarms can be process high or low. The alarming capability is standard, but the hardware outputs are optional. Up to eight on/off relay outputs are available. Besides alarms, any of 20 other digital values/states can be used to actuate on/off outputs. Up to 4 isolated analog outputs are available. Other options include PC based configuration software and a communications interface.

Optional totalization is available for input values. An input value can be treated as a process value to provide alarming and special display capability.

Up to 4 variables can be recorded as analog trend lines on chart sizes of 10, 11, or 12 inches in diameter. The trend lines can be the result of instantaneous values, connecting the values, drag pen, average values, or connecting the average values. The trend lines can be scaled and positioned on the chart in zones. Trend scales, units, and a trend tag can be printed in the same color as time lines.

Dates, times, batch numbers, operator IDs, process values and scales can all be printed on the chart in color.

Definitions for a large number of “Terms and Concepts” described in this manual are included in Appendix C.

CAUTION: READ THIS MANUAL

THE INTERNATIONAL HAZARD SYMBOL IS FOUND ADJACENT TO THE LOWER PLATEN HOLD DOWN SCREW. IT IS IMPORTANT TO READ THIS MANUAL BEFORE INSTALLING OR COMMISSIONING THE UNIT.

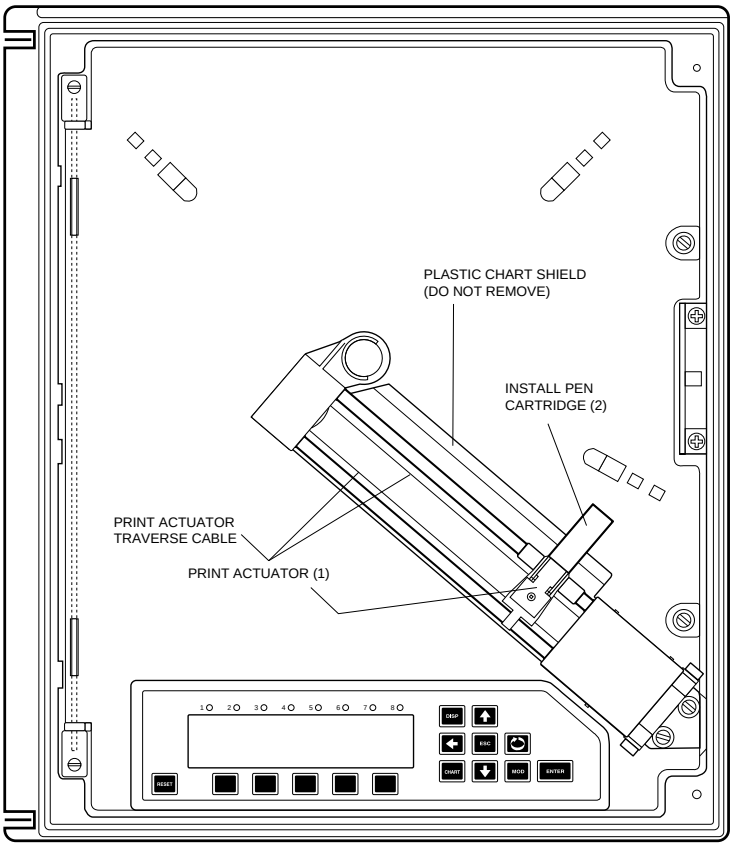
1.1 UNPACKING

Remove the instrument and pen cartridge assembly from the shipping container and inspect for any damage due to shipment. If any damage is noticed due to transit, report and file a claim with the carrier. Write the model number and serial number in spaces provided on Page 1-3 of this manual for future reference. The model number and serial number are found on the label on the case, viewed when platen is open.

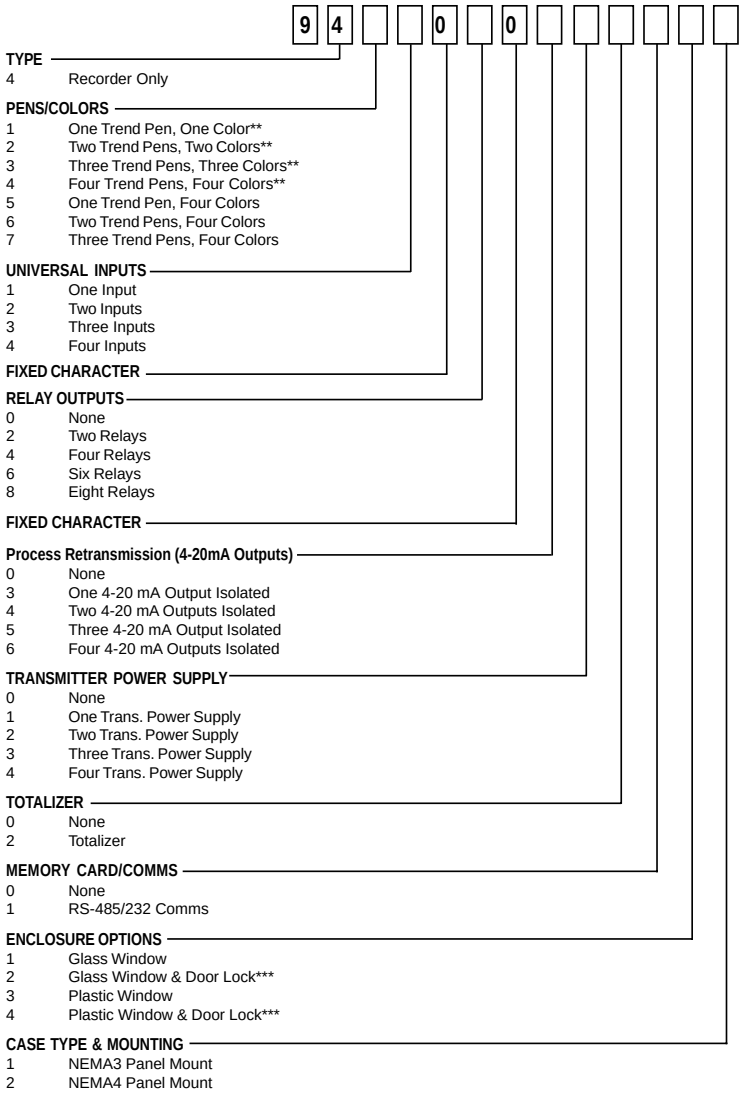
1.2 INSTALLATION OF PEN CARTRIDGE ASSEMBLY

Remove the pen cartridge assembly from its shipping container. With mounting tab on the bottom, slide the pen cartridge assembly (item 2 on Figure 1-1) into the print actuator (item 1 on Figure 1-1).

FIGURE 1-1



1.3 VerzaEZ 4 PEN COLOR RECORDER



** Pens/colors are added to the instrument in the following order: red, then green, then blue, and then black.

*** Door Lock N/A with NEMA 4

Section 2 - Installation and Wiring

Read these instructions carefully before proceeding with installation and operation. Electrical code requirements and safety standards should be observed. Installation should be performed by qualified personnel.

2.1 MOUNTING (Panel and Surface described below, pipe - to be determined)

Figure 2-1A and 2-1B (below and page 2) shows an installation view and physical dimensions for a panel mounted instrument. The panel where the instrument will be mounted must provide rigid support for the approximately 25 pound instrument. Adjacent instruments may be mounted within a minimum of 2 inches horizontally and 1 inch vertically, providing that proper panel support is supplied.

Panel Mounting Hardware Required: (not provided with instrument)

(4) #10 flat head bolts with nuts
(4) lock washers

Panel Mounting

1. Cut panel opening to the dimensions illustrated in Figure 2-1A (below).
2. Pre-drill four 3/16 dia. holes for mounting or use the drill template molded into the case after inserting the instrument into the panel.
3. Insert the instrument in the panel opening. Firmly fasten the instrument to the panel using the nuts, bolts and lock washers.

Surface Mounting

Install the mounting brackets, ordered separately, on the vertical sides of instrument housing. Use the brackets to fasten the instrument to the surface. Hardware recommended - #10-24 Screws.

FIGURE 2-1A

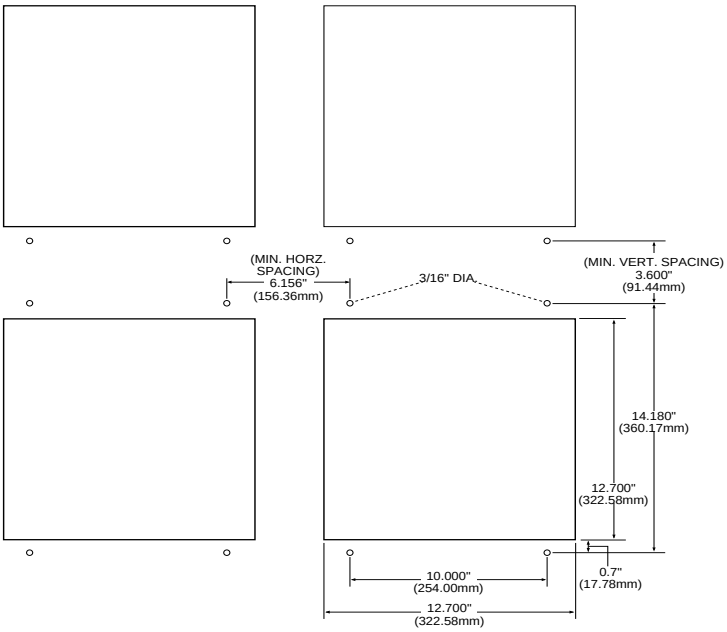
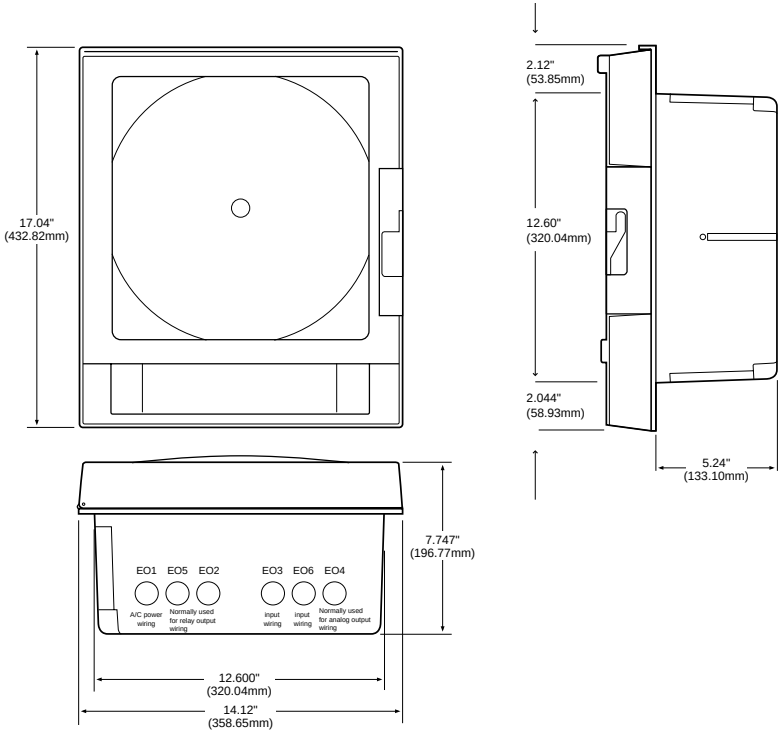


FIGURE 2-1B


17.04"
(432.82mm)
2.12"
(53.85mm)
12.60"
(320.04mm)
2.044"
(58.93mm)
5.24"
(133.10mm)
7.747"
(196.77mm)
EO1
EO5
EO2
EO3
EO6
EO4
A/C power wiring
Normally used for relay output wiring
Input wiring
Input wiring
Normally used for analog output wiring
12.600"
(320.04mm)
14.12"
(358.65mm)

2.2 PREPARATION FOR WIRING

This product is in conformity with the protection requirements of EU Council Directive 89/336EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. The factory cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of this product.

Electrical noise is a phenomenon typical of industrial environments. The following are guidelines that must be followed to minimize the effect of noise upon any instrumentation.

Installation Considerations

Listed below are some of the common sources of electrical noise in the industrial environment:

- Ignition Transformers
- Arc Welders
- Mechanical contact relay(s)
- Solenoids

Before using any instrument near the devices listed, the instructions below should be followed:

1. If the instrument is to be mounted in the same panel as any of the listed devices, separate them by the largest distance possible. For maximum electrical noise reduction, the noise generating devices should be mounted in a separate enclosure.

2. If possible, eliminate mechanical contact relay(s) and replace with solid state relays. If a mechanical relay being powered by an instrument output device cannot be replaced, a solid state relay can be used to isolate the instrument.

3. A separate isolation transformer to feed only instrumentation should be considered. The transformer can isolate the instrument from noise found on the AC power input.

4. If the instrument is being installed on existing equipment, the wiring in the area should be checked to insure that good practices have been followed.

AC Power Wiring

Earth Ground

The instrument includes noise suppressing components that require an earth ground connection to function. To verify that a good earth ground is being attached, make a resistance check from the instrument chassis to the nearest metal water pipe or proven earth ground. This reading should not exceed 100 ohms. Each instrument should have a dedicated earth ground. Do not chain link multiple instrument ground wires.

Neutral (For 115 VAC)

It is good practice to assure that the AC neutral is at or near ground potential. To verify this, a voltmeter check between neutral and ground should be performed. On the AC range, the reading should not be more than 50 millivolts. If it is greater than this amount, the secondary of the AC transformer supplying the instrument should be checked by an electrician. A proper neutral will help ensure maximum performance from the instrument.

Wire Isolation/Segregation

The instrument is designed to promote proper separation of the wiring groups that connect to the instrument. The AC power wire terminals are located near the bottom of the power supply board. The analog signal terminals are located near the bottom of the instrument boards. Maintain this separation of the wires to insure the best protection from electrical noise. If the wires need to be run parallel with any other wiring type(s), maintain a minimum 6 inch space between the wires. If wires must cross each other, do so at 90 degrees to minimize the contact with each other and reduce cross talk. Cross talk is due to the electro magnetic field induced by a wire as current passes through it.

Use of Shielded Cable

Shielded cable helps eliminate electrical noise being induced on the wires. All analog signals should be run with shielded cable. Connection lead length should be kept as short as possible, keeping the wires protected by the shielding. The shield should be grounded at one end only. The preferred grounding location is at the sensor, transmitter or transducer.

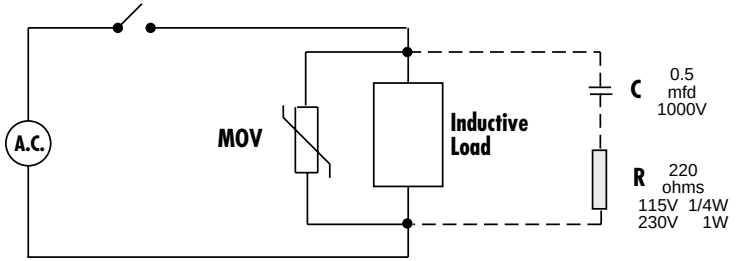
Noise Suppression at the Source

Usually, when good wiring practices are followed, no further noise protection is necessary. Sometimes in severe electrical environments, the amount of noise is so great that it has to be suppressed at the source. Many manufacturers of relays, contactors, etc. supply “surge suppressors” which mount on the noise source.

For those devices that do not have surge suppressors supplied, RC (resistance capacitance) networks and/or MOV (metal oxide varistors) may be added.

Inductive Coils - MOV’s are recommended for transient suppression in inductive coils connected in parallel and as close as possible to the coil. See Figure 2-2 (below). Additional protection may be provided by adding an RC network across the MOV.

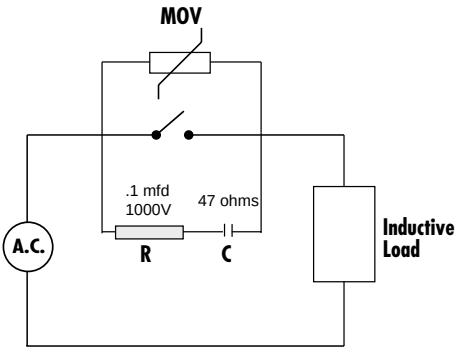
FIGURE 2-2



Contacts - Arcing may occur across contacts when the contact opens and closes. This results in electrical noise as well as damage to the contacts. Connecting a RC network properly sized can eliminate this arc.

For circuits up to 3 amps, a combination of a 47 ohm resistor and a 0.1 microfarad capacitor (1000 volts) is recommended. For circuits from 3 to 5 amps, connect 2 of these in parallel. See Figure 2-3 (below).

FIGURE 2-3



Sensor Placement (Thermocouple or RTD)
Thermocouple lead resistance should not exceed 300 ohms. If this is exceeded, instrument accuracy could be affected.

Two wire RTD's should be used only with lead lengths less than 10 feet.

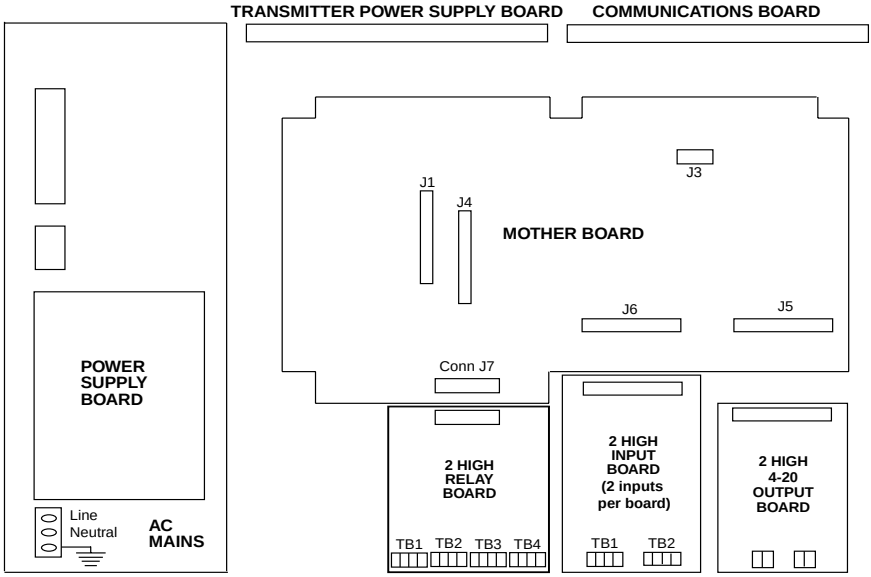
If the temperature probe is to be subjected to corrosive or abrasive conditions, it should be protected by the appropriate thermowell. The probe should be positioned to reflect true process temperature:

In liquid media - the most agitated area
In air - the best circulated area

2.3 WIRING CONNECTIONS - INPUTS

All wiring connections are typically made to the instrument at the time of installation. Connections should be made at the terminal blocks, one 14 gauge wire maximum, using copper conductors except for thermocouple inputs. See Figure 2-4 (below) for the terminal block locations. The recommended torque for the AC Mains connector on the power supply board is 113ins-oz and the recommended torque for all other connectors in the unit is 85ins-oz.

FIGURE 2-4



The instrument case may have numerous conduit openings, EC1 - EC6 (conduit openings are referenced on page 2-2), depending upon the number of inputs and outputs specified (EC5 and EC6 are not included on all models). To help minimize electrical noise that may adversely affect the operation of the instrument, do not run input and/or 4-20mA output connections through the same conduit entry as relay or power supply connections. See Figure 2-1B (page 2-2) for conduit opening locations.

2.3.1 SHIPPED CONFIGURATION/JUMPER POSITIONING

Each instrument is factory shipped with all parameters set to default values. These defaults are shown on page 3-2.

Jumpers are used to condition the sensor inputs. All jumpers are located on the Input Board(s) see diagram on page 2-9. The instrument is shipped from the factory with the jumpers configured as follows:

JU2	IF FITTED	UPSCALE BREAK
JU3		Non-Contact Closure Input
		T/C, mV, 0/1V, Switch, mA
JU5	IF FITTED	UPSCALE BREAK
JU6		Non-Contact Closure Input
		T/C, mV, 0/1V, Switch, mA
JU7		WIDE SPAN
JU8		WIDE SPAN
JU15	IF FITTED	Non-RTD
JU16	IF FITTED	Non-RTD
		Non-mA
		Non-mA

There are 2 additional jumpers per Input Board that are used for ID. These must be positioned as shown in Table 2-1 below as per their location inside the instrument. Board 1 is the bottom board.

TABLE 2-1 BOARD ID JUMPERS

If any board is removed from the instrument in a multiple stack of boards, it MUST BE installed in the correct sequence or these jumpers MUST BE moved. If not installed correctly, calibration will be affected.

2.3.2 SENSOR BREAK and OUT-OF-RANGE DETECTION

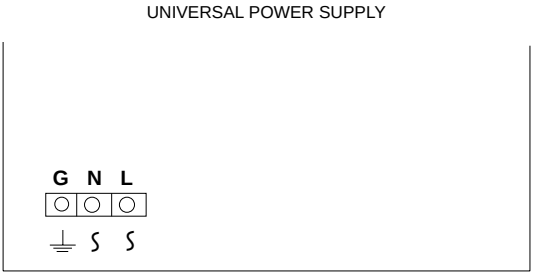
Sensor break and out-of-range conditions are determined and handled by the software. When either occurs, the software will drive the input value to +99999 or -99999 based upon whether SENSOR BREAK is software configured for UPSCALE or DOWN SCALE in Input Configuration. Any outputs will react accordingly. Out-of-range is defined as being more than 5% out of the span established by RANGE LIMIT LOW and RANGE LIMIT HIGH.

For 5 or 10 Volt and Current inputs, the analog signal goes to zero when there is a sensor break, due to voltage divider or shunt resistors. For sensor break detection to work on these input types, the INPUT RANGE LOW (analog signal low) and/or RANGE LIMIT LOW (engineering units low) parameters must be set high enough such that at zero volts/mA, the resultant value will be at least 5% below the span established by RANGE LIMIT LOW and RANGE LIMIT HIGH.

2.3.3 AC POWER CONNECTIONS

WARNING: UNIT SHOULD HAVE A POWER SWITCH OR CIRCUIT BREAKER IN CLOSE PROXIMITY OF EQUIPMENT AND WITHIN EASY REACH OF THE OPERATOR. THE SWITCH SHALL BE MARKED AS THE DISCONNECTING DEVICE FOR THE UNIT.

FIGURE 2-6
Connect the line voltage, hot and neutral, to L and N respectively. Connect the ground wire to the terminal labeled G.



2.3.4 THERMOCOUPLE CONNECTIONS

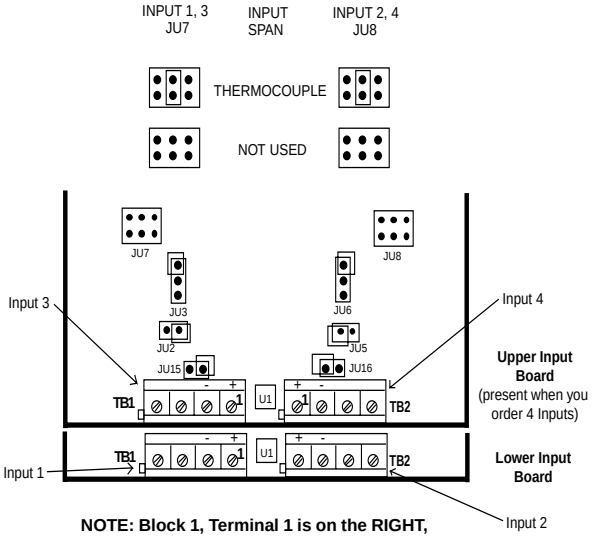
NOTE: Up to two Input Boards may be present; stacked 2 high. Input Board 1 is the bottom board.

Input Board 1 is used for Input 1 and, if equipped, Input 2. Input Board 2 is used for Input 3 and Input 4, if equipped.

Connect the positive (+) leg of the thermocouple to terminal 1 and the negative (-) leg to terminal 2 on the Input Board. Terminal block 1 (TB1) is for Input 1 in highest position and 3 highest position. Terminal block 2 (TB2) is for Input 2 in lowest position and 4 in highest position (see diagram below).

NOTE: JUMPERS JU7/JU8 MAY BE MOVED TO THE NARROW SPAN POSITION FOR BETTER RESOLUTION IF THE MAXIMUM TEMPERATURE DOES NOT EXCEED THE UPPER SPAN LIMIT AS SHOWN IN APPENDIX B, PAGE B-1, AND THE THERMOCOUPLE BEING USED IS J, K, E, or N ONLY.

FIGURE 2-7A



NOTE: Block 1, Terminal 1 is on the RIGHT, Block 2, Terminal 1 is on the LEFT.

2.3.5 RTD CONNECTIONS

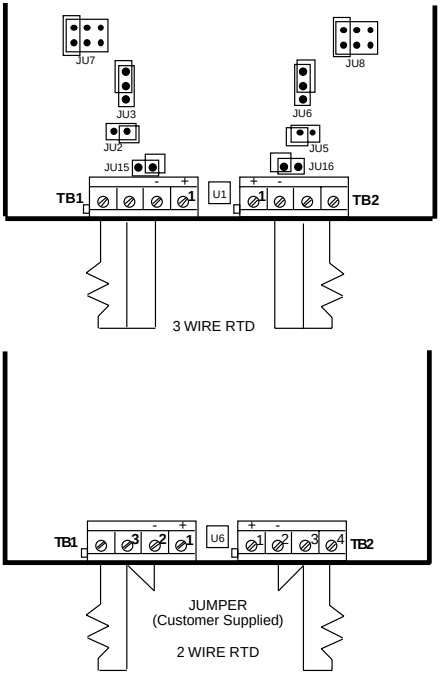
Note: Up to two Input Boards may be present; stacked 2 high. Input Board 1 is the bottom board.

Input Board 1 is used for Input 1 and, if equipped, Input 2. Input Board 2 is used for Input 3 and Input 4, if equipped.

Connect 2 wire RTD inputs to terminals 3 and 4 on the Input Board(s) for RTD. Install a jumper between terminals 2 and 3. Terminal block 1 (TB1) is Input 1 in lowest position and 3 in highest position and terminal block 2 (TB2) is Input 2 in lowest position and 4 in highest position.

Connect 3 wire RTD inputs to terminals 2, 3 and 4 (common legs on terminals 2 and 3) on the Input Board(s) for RTD. Terminal block 1 (TB1) is Input 1 in lowest position and 3 in highest position and terminal block 2 (TB2) is Input 2 in lowest position and 4 in highest position.

FIGURE 2-8A



NOTE: Block 1, Terminal 1 is on the RIGHT, Block 2, Terminal 1 is on the LEFT.

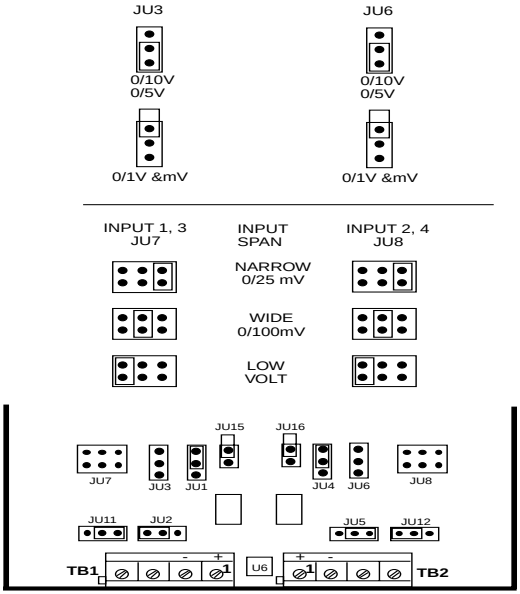
2.3.6 VOLTAGE CONNECTIONS

Note: Up to two Input Boards may be present; stacked 2 high. Input Board 1 is the bottom board.

Input Board 1 is used for Input 1 and, if equipped, Input 2. Input Board 2 is used for Input 3 and Input 4, if equipped.

Connect positive (+) leg to terminal 1 and negative (-) leg to terminal 2 on the Input Board(s) for volt input. Terminal block 1 (TB1) is Input 1 in lowest position and 3 in highest position and terminal block 2 (TB2) is Input 2 in lowest position and 4 in highest position.

FIGURE 2-9A



NOTE: Block 1, Terminal 1 is on the RIGHT, Block 2, Terminal 1 is on the LEFT.

2.3.7 CURRENT CONNECTIONS

Note: Up to two Input Boards may be present; stacked 2 high. Input Board 1 is the bottom board.

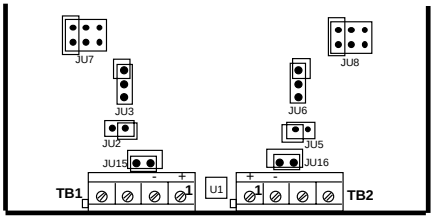
Input Board 1 is used for Input 1 and, if equipped, Input 2. Input Board 2 is used for Input 3 and Input 4, if equipped.

Connect positive (+) leg to terminal 1 and connect negative (-) leg to terminal 2 on the Input Board(s) to be current input. Terminal block 1 (TB1) is Input 1 in lowest position and 3 in highest position and terminal block 2 (TB2) is Input 2 in lowest position and 4 in highest position.

Installation of shunt resistor is NOT REQUIRED. Positioning JU15/16 properly connects the appropriate shunt resistor that is populated on the Input Board.

NOTE: INPUT CONDITIONING JUMPERS MUST BE POSITIONED AS SHOWN FOR CURRENT INPUT IN FIGURE 2-10A. ALSO NOTE: THERE IS NO SENSOR BREAK DETECTION FOR ZERO BASED CURRENT INPUTS. EXAMPLE: 0-20MA.

FIGURE 2-10A



NOTE: Block 1, Terminal 1 is on the RIGHT, Block 2, Terminal 1 is on the LEFT.

2.3.8 SWITCH INPUT CONNECTIONS

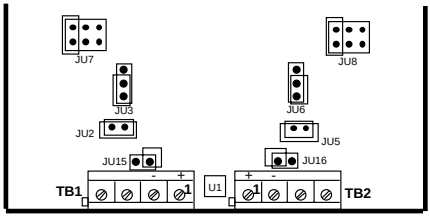
Note: Up to two Input Boards may be present; stacked 2 high. Input Board 1 is the bottom board.

Input Board 1 is used for Input 1 and, if equipped, Input 2. Input Board 2 is used for Input 3 and Input 4, if equipped.

Connect one leg to terminal 1 and connect the other leg to terminal 2 on the Input Board(s) for a switch input. Terminal block 1 (TB1) is Input 1 and 3 and terminal block 2 (TB2) is Input 2 and 4.

NOTE: INPUT CONDITIONING JUMPERS MUST BE POSITIONED AS SHOWN FOR SWITCH INPUT IN FIGURE 2-11.

FIGURE 2-11A



NOTE: Block 1, Terminal 1 is on the RIGHT, Block 2, Terminal 1 is on the LEFT.

2.4 WIRING CONNECTIONS - OUTPUTS

Relay output(s), if provided, may be assigned to any actuator, which includes alarms and/or optional control capability. Current output(s), if provided, may be assigned to any analog value, which includes derived and process values for retransmission or control. Assignment of the function is accomplished in Configuration.

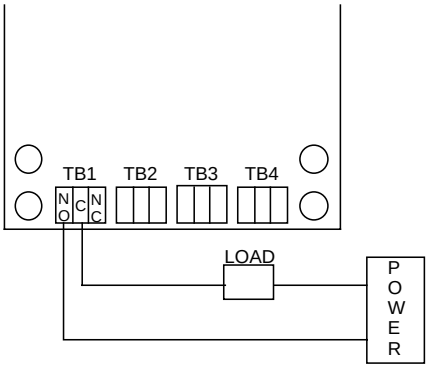
2.4.1 SPDT RELAY OUTPUT

Note: Up to two Boards may be present; stacked 2 high. Board 1 is the bottom board.

SPDT is designated as Relay 1 through Relay 8. Relay 1 through Relay 4 are located on Board 1 and Relay 5 through Relay 8 (if provided) are located on Board 2. See Figure 2-4, page 2-6.

Connections are made as shown. Terminal connections are made using TB1 thru TB4, Relay 1 thru Relay 4 respectively.

FIGURE 2-12

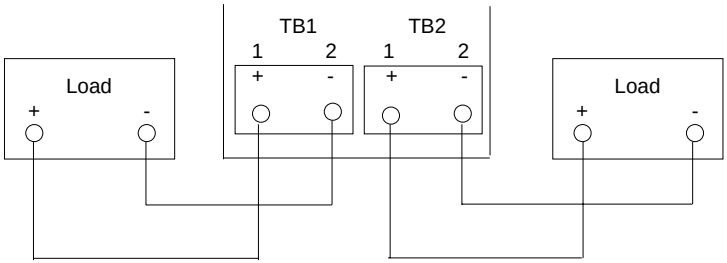


2.4.2 CURRENT OUTPUT

Isolated
Isolated current outputs are designated current output 1 through current output 4. Current output 1, and if specified, current output 2, are located on board 1. Current outputs 3 and 4, if specified, are located on board 2.

Connections are made as shown. Terminal connections are made using TB1 (output 1 lowest board position and 3 highest board position), terminal 1 is positive and terminal 2 is negative, and TB2 (output 2 lowest board position and 4 highest board position), terminal 1 is positive and terminal 2 is negative.

FIGURE 2-13B



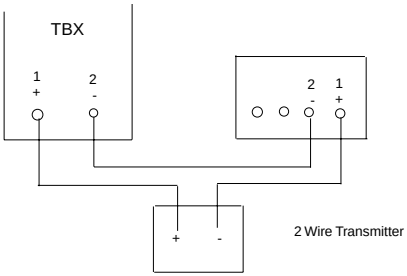
2.4.3 24VDC TRANSMITTER POWER SUPPLY

Note: Up to four transmitter power supplies may be present. One transmitter can provide up to 25mA of current at 24 VDC.

Transmitter outputs are designated as Transmitter Output 1 through Transmitter Output 4. Transmitter Output 1 is at TB1, Transmitter Output 2 is at TB2, Transmitter Output 3 is at TB3 and Transmitter Output 4 is at TB4.

If an isolated 24 VDC regulated transmitter power supply has been specified, the connections should be made as shown.

FIGURE 2-14A



2.4.4 COMMUNICATIONS

The connections should be made as shown: Terminal block TB1 is used for RS-232 (Figure 2-14B) and terminal block TB3 is used for RS-485 (Figure 2-14c). Jumpers JP1 and JP3 must be positioned as shown.

FIGURE 2-14B

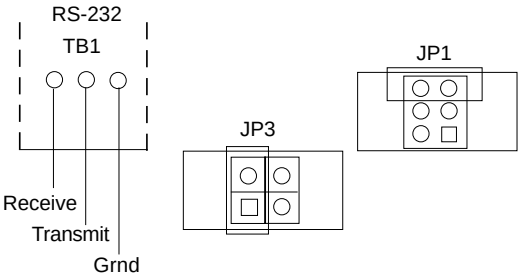


FIGURE 2-14C

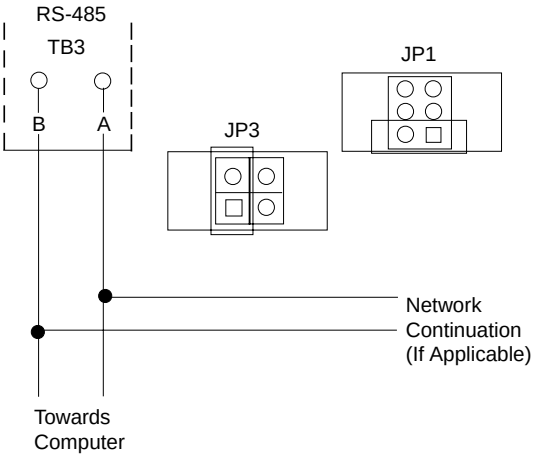
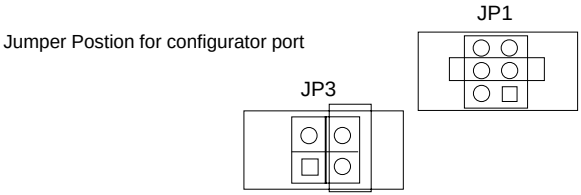


FIGURE 2-14D



Section 3 - Getting Started -
Use this section to start recording immediately.

To start recording, press the “CHART” key, the message “START RECORDING” will appear on the top line and the selections “NO” and “YES” will be on the bottom line. Depress the function key beneath the “YES” prompt (F5) and a brief message will appear and then begin recording.

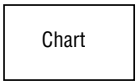
The recorder will begin printing in red. The recorder will print the scale, reference tag, date and time.

The red pen is factory set (assigned) to pen 1. The green pen is factory set (assigned) to pen 2. The blue pen is factory set (assigned) to pen 3. The black pen is factory set (assigned) to pen 4.

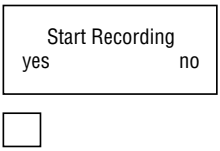
The unit is setup for a J type Thermocouple with an input range of -328 to 1400 °F. The VersaEZ will record from 0 to 100 (°F for default) units on a 12 inch chart over a 24 hour period with 24 major divisions and 4 minor periods. Factory default settings for the VersaEZ are listed on the next 3 pages.

To start recording:

Press the chart key



Press the function key under the word "yes"



VersaEZ will start printing.

NOTE: The first recorder prints using the red pen also the TIME, DATE, and CHART TAG also print in red. If relays or current outputs are not specified in the model number then IV(n) is assigned to Recorder (n) when PROGRAM DEFAULT is executed.

1. If a basic model number (943 30 000 000 11) is entered before the PROGRAM DEFAULT is executed then only INPUTS, RECORDERS and INSTRUMENT SETTINGS will display.
2. PROCESS VARIABLES, ALARM SETPOINT, RELAYS and CURRENT OUTPUTS will not show unless configured in the model number.
3. PROCESS VARIABLES will show if RELAYS or CURRENT OUTPUTS are available.

These are the factory configuration settings for the VersaChart-EZ

You may change these settings in configuration mode to match your application requirements.

1. Chart

Chart Size	=	12 Inch
Chart Tag	=	Unit #1
Normal Speed	=	24 Hr
Major Time Periods	=	24
Minor Time Periods	=	4
Blank Major Periods	=	2
Time Pen/Color	=	RED
Date Pen/Color	=	RED
Chart Tag Pen/Color	=	RED
Action On New Chart	=	NONE-JUST CONTINUE
Stop After One Rev.	=	NO

2. Inputs

Display Tag	=	INPUT N where n is 1-4
Input Type	=	TC **Thermocouple**
TC Type	=	J
Degrees C/F	=	°F
Sensor Break	=	UPSCALE
Input Range Low	=	-328 °F
Input Range High	=	1400 °F
Other Units	=	°F
Value Filter	=	0 secs
Display Option	=	IN BOTH MODES
Display Filter	=	0 secs

3. Process Variables

Display Tag	=	PROCESS VAL N where n 1-4
PV Input	=	IV N where n 1-4
Display Units	=	°F
PV Decimal Position	=	0
PV Value Filter	=	0 secs
PV Display Option	=	IN BOTH MODES
PV Display Filter	=	0 secs

4. Recorders Section P

Recorder Tag	=	REC 1 Note: Recorder 1 to 4 available.
Recording Method	=	DRAG -MIN TO MAX
Recorder Decimal Position	=	0
Recorder Chart Divisions	=	100
Recorder Zone 1 Low	=	0
Recorder Zone 1 High	=	100
Recorder Span 1 Low	=	0 units
Recorder Span 1 High	=	100 units
Recorder Scale 1 Interval	=	10 divisions
Recorder Zone 2 High	=	Division 0
Recorder Span 2 High	=	0 units
Recorder Scale 2 Interval	=	10 divisions
Recorder Filter	=	0 secs

5. Totalizers

Total Display Tag	=	TOTAL N where N=1-4
Total Input Value	=	IV N where N=1-4 TOTAL 1 is associated with IV1 etc.
Total Time Base	=	PER SEC
Total Is Flow	=	TIMES (Factor Statement) example (times) 10, 100, .1 etc.
Total Display Units	=	GAL.
Total Decimal Position	=	0
Total Display Option	=	IN BOTH MODES
Totalizer Preset	=	1 units
Total Low Flow Cutoff	=	0 units
Total Reset Actuator	=	NONE/OFF

The following parameter occur only in the first totalizer menu and apply to all totals.

Print All Totals	=	NO
Day To Print Totals	=	DAILY
Print Time AM:PM	=	05:00 PM

6. Relays (1-8)

Relay Actuator	=	A(N) where n is 1-8
Alarm Type	=	PROCESS - HIGH
Alarm Hysteresis	=	0

7. Current Outputs (1-4)

Current Source	=	NONE USED
Current Range Low	=	0 units
Current Range High	=	100 units
Current Output Range	=	4-20ma
Current Output On Error	=	0 mA

8. Instrument Settings

Instrument Tag	=	VERSACHART #1
Display Option	=	IN SEQUENTIAL MODE
Date Display Format	=	MM/DD/YY
Time Display Format	=	AM/PM
Current Date	=	Current Date if Real Time Clock Set
Current Day	=	Must be Set
Current Time	=	Current Day if Real Time Clock Set
Comms Address	=	1
Comms Bit Rate	=	9600
Comms Parity	=	Odd
Comms Swap Long Data	=	NO
Input Scan Sequence	=	4 INPUTS = 4 SCANS/SEC

9. Leds

Led (N) where n=1-8	=	A(N) where N is 1-8

10. Alarm Setpoints

PV	Alarm	Setpoint	RELAY	ACTUATOR	ALARM TYPE
1	A11	100	1	A1	Process-High
	A12	100	2	A2	Process-High
2	A21	100	3	A3	Process-High
	A22	100	4	A4	Process-High
3	A31	100	5	A5	Process-High
	A32	100	6	A6	Process-High
4	A41	100	7	A7	Process-High
	A42	100	8	A8	Process-High

11. Display

Display Mode	=	SEQUENCE
Display Format	=	1 VAL
Sequential Display	=	DURATION **1** SECONDS

12. Chart Message

Printing Totals is the only chart message printed.

13. Operator Message

CHART IS FULL is the only message displayed if STOP AFTER ONE REV = YES

Section 4 - Configuration Example

This section provides you with a step-by-step configuration example for one channel input to an imaginary set of conditions. This example will familiarize you with the keystrokes so you can begin your own configuration.

Before starting to configure and set-up the recorder, it is essential that you know exactly what you want it to do. *Below is our imaginary set of input conditions that you will enter into the recorder.*

Configuration Input

Input (Channel)	2
IV (Input variable)	2
Change Tag from "Input 2" to "Vat 2"	Tag "Vat 2"
Input Type	RTD
Degrees	˚C
Decimal Position	1 (0.0)

Configuration Recorder

Change TAG (Display name) from "Rec 1" to	"Pen 1"
Change Pen 1 color from red to	green
Pen position on error, go to Division 50 (scale 0-100)	50

Press the  key prompting the systems menu. The display should read.

Select Configuration

Press the  arrow key.

Configure Inputs

Press the  arrow key again.

Input Number 1

Change the input number from 1 to 2 by pressing the  key. The 1 will be underlined.

Input Number 1

Press the  arrow key and change the input to 2. Then, press the  key.

Input Number 2

Press the  key. Now, press the  key. The “I” in “input” will be underlined. By pressing the  arrow keys  used for moving cursor to the right) scroll through the alphabet and change the word “Input” to “VAT”. When you are through, press  .

IV2 Display Tag Input 2

IV2 Display Tag VAT 2

Press the key. We will now change the input type from TC (thermocouple) to RTD.

IV2 Input Type
TC

Press the MOD key. "TC" will flash. Now press the arrow key and RTD will appear. Press ENTER.

IV2 Input Type
RTD **mA**

Press the key.

IV2 RTD Type
PT 100.00385 DIN

Press the key again. "°F" will appear.

IV2 Degrees C/F
°F

Press the MOD key. "°F" will be flashing.
Press the function key under the "°C".

IV2 Degrees C/F
°C

Press the key.

IV2 Sensor Break
Upscale

Press the key again. Press the MOD key.
"°F" will be flashing. Press the function key under "°C".

IV2 Display Units
°F

IV2 Display Units
°C

Press the key, then press the MOD key.

IV2 Decimal Position
0

The "O" will become underlined, "O". Press the arrow key and 1 will appear. Press the ENTER key.

IV2 Decimal Position
1

Press the key.

IV2 Input Correct
.0

Press the key again.

Input Number
3

At this point the unit will prompt you to configure input number 3. Since we have just configured input 2, we will move on to another area of channel configuration. So let us exit out of input configuration and practice configuring the section dubbed “Recorders.” Recorders defines values being recorded: tags, methods, source of data, chart divisions and zoning.

Press the  arrow key. This takes you out of the input configuration section.

Configure
Inputs

Now press  key.

Configure
Process Variables

Press the  key again.

Configure
Recorders

Press the  arrow key.

Recorder Number
1

Press the  key. Press the  key. “Rec”, notice that the “R” has an underline. Press the  arrow key until “P” appears. Press the  key until the underline appears under the “C”. (Leave the letter “E” as is.) Press the  arrow key until “N” appears. Press the  key. The LED should read “Pen 1.”

R1 Recorder TAG
REC 1

R1 Recorder TAG
Pen 1

Press the  key.

R1 Value To Record
PV1

Press the  key again. Now press the  key.

R1 Pen Color
Red

The word “Red” will flash. Press the  arrow once.

R1 Pen Color
Green

“Green” will appear. Press  .

Press the  key.

R1 Span 1 Low
0 ˚F

Press the  key again.

R1 Span 1 High
100 ˚F

Press the  key again. Now press the  key. The last zero will be underlined “10<u>0</u>”. Press the  arrow key twice. The “<u>1</u>00” will be underlined. Press the  arrow key and 0 will appear.

R1 Position On Error	
Division	100

Press the  key once, then press the  arrow key until “5” appears. Press  .

R1 Position On Error	
Division	50

You have now completed the configuration example.

Press the  arrow key.

Configure
Recorders

Press the  arrow key again.

Select
Configuration

You are now back to the system menu level. Congratulations, you have just configured the VersaEZ. Redo the exercise again or create your own if you believe you need more practice. The ensuing pages outline for you the steps involved in configuring all aspects of this recorder.

Section 5 - Configuration

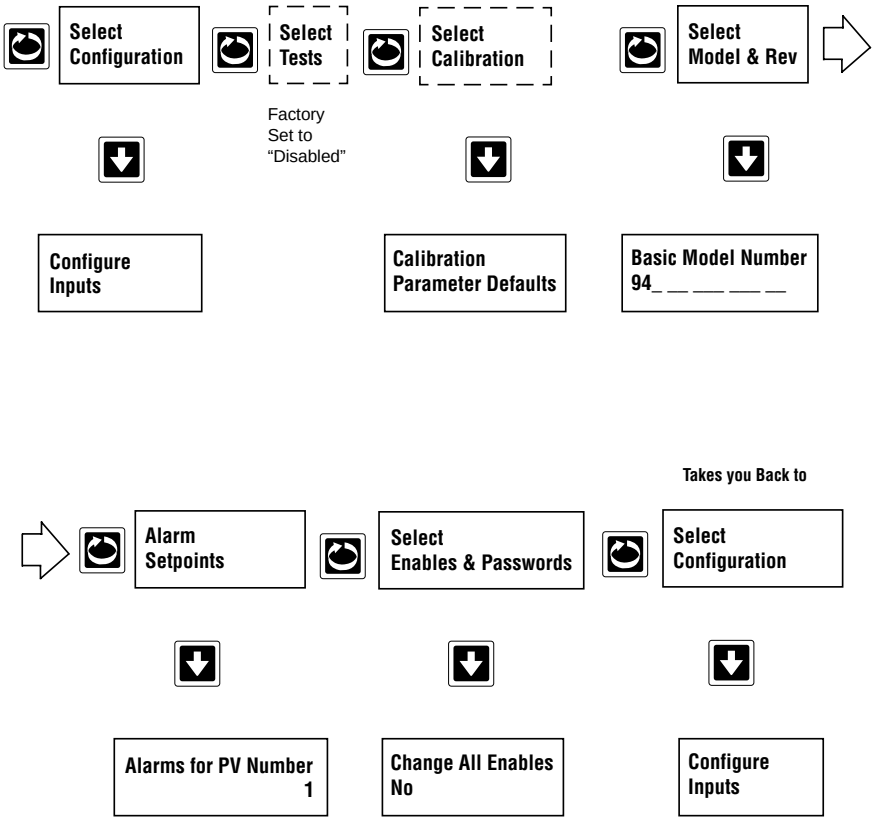
There are four main categories for configuring a VersaEZ recorder:

A – System Menu Configuration
B – Chart Configuration
C – Channel (Input) Configuration
D – Display Configuration

The flow diagrams are there to outline for you the various parameter choices, in the order in which they appear, as you step through the configuration process. Also, included on the flow diagram are the default setting, providing you a quick reference for matching your specific process requirements.

Section 5A - System Menus

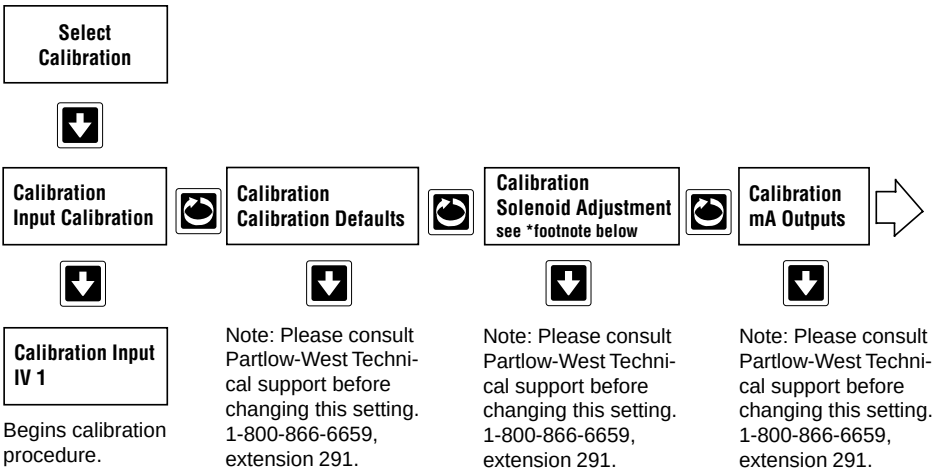
Provides access to the main areas of the VersaChart's configuration groupings. By pushing the (↓) arrow key, you access parameters for any of the functions under that system menu.

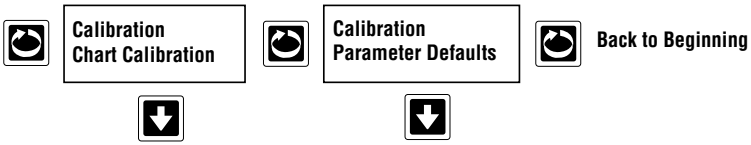


Under the “System” menu prompt, below and on the following two pages, we have provided detailed flow diagrams for the following:

- Select Calibration
- Alarm Setpoints
- Enables and Passwords

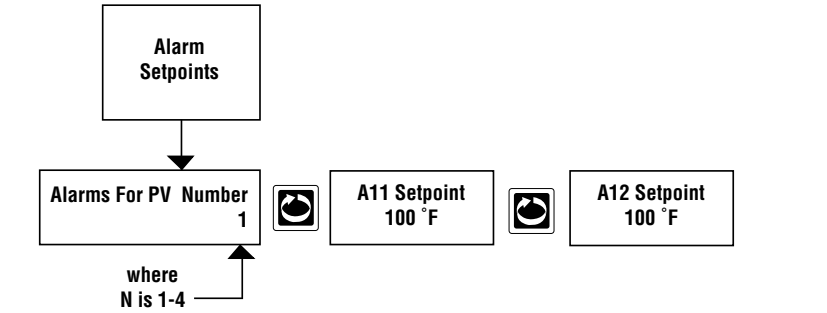
We will start with “Select Calibration.” This section is used to perform calibration of all input sources to the recorder.

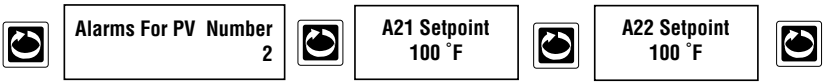




***Footnote:** The “solenoid” referenced here refers to the solenoid in the print arm mechanism. Please consult the factory before changing settings in this area.

“Alarm Setpoints” allows you to configure the point at which you want an alarm to energize. For example, Alarm Relay A11 will energize at 100 °F and turn on an indicating light. The “Alarm Setpoint” prompt will only appear for Alarms that have been configured. In other words, if you have two alarms, the A11 and A12 will appear when configuring the Alarm Setpoints.





Continues for Alarms 3 and 4.

Note: The units for Alarm Hysteresis are defined under “Process Variables.” Additionally, the decimal position is also configured in the “Process Variables” section.

Enables & Passwords

Enables and Passwords provides a means of enabling or disabling prompt sections and provides additional operational security with the use of 6 digit password.

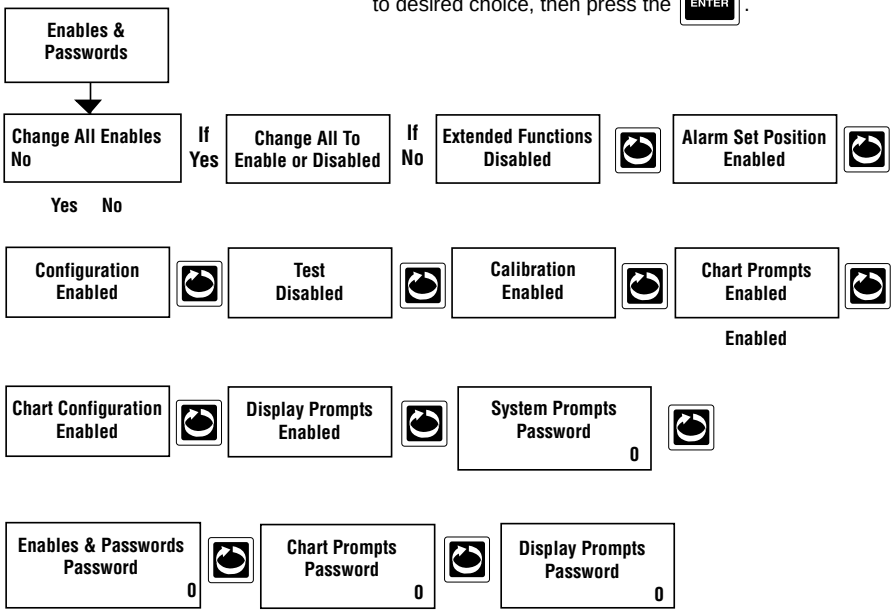
If the Display prompts or Chart prompts are disabled, those prompt sections will not be accessible and DISPLAY KEY DISABLED or CHART KEY DISABLED will be displayed when the corresponding key is pressed. If other prompt sections are disabled, their corresponding access or selection prompts will not appear.

Passwords can restrict access to the Display, Chart, and System prompts, and the Enables and Passwords prompts section. If any of the passwords are set to a value other than zero, the corresponding password will be requested when the operator attempts to access that prompt section. Should a password be forgotten or misplaced, contact the factory for the master password.

From the Normal Display, press the  until **ENABLES & PASSWORDS** appears in the lower display line. If **PASSWORD** appears in the lower display line, the correct "password" will need to be entered before access to Enables & Passwords is allowed.

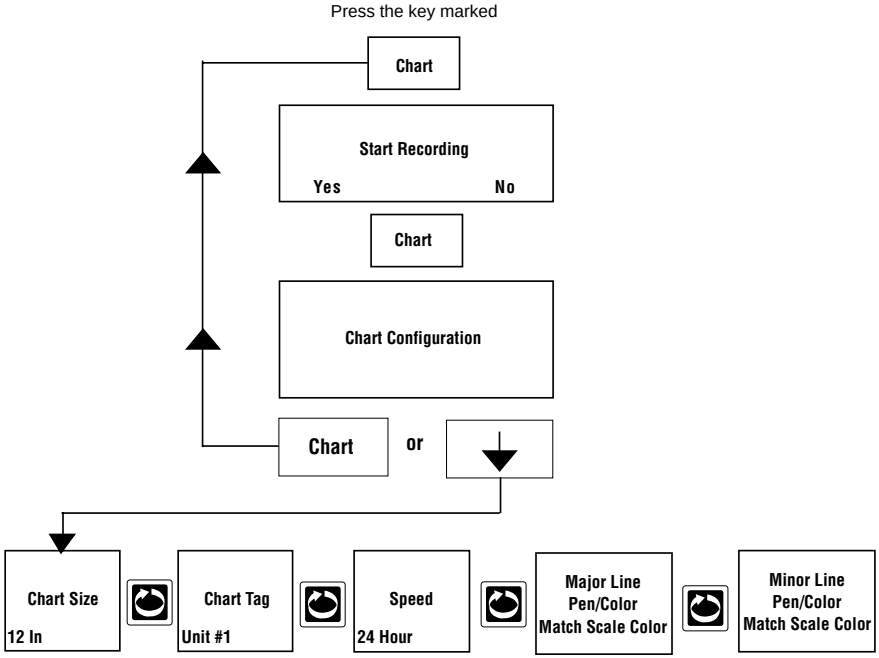
Press the  to change, then  ,

to desired choice, then press the  .



Section 5B - Chart Configuration

To enter Chart configuration, from the Normal Display, press the CHART until **SELECT** appears in the upper display line and **CHART CONFIGURATION** appears in the lower display line. If **CHART KEY DISABLED** appears in the lower display line, then see footnote below. If **PASSWORD** appears in the lower display line, the correct "password" will need to be entered before access to the Chart Select is allowed.



NOTE: **CHART KEY DISABLED** will appear in the lower display. Refer to Section 9, Enables & Passwords, for instructions to enable Chart Prompts.

If the Chart Prompts are not disabled BUT the password is other than zero, **CHART PROMPTS PASSWORD** will appear in the display when the CHART key is pressed. If the correct "password" is entered, **CHANGE CHART** will appear in the upper display. If the incorrect "password" is entered, **INVALID PASSWORD** will appear in the upper display.

If the Chart Prompts is not disabled AND the password is set to zero, when the CHART key is pressed, CHANGE CHART will appear in the upper display.

For the prompts associated with the CHART key, the unit automatically goes into the modify mode, unless the prompt is for SELECT CHART CONFIGURATION. For simplicity of operation etc., upon selection of a new choice, the unit will automatically go into the modify mode, unless its a special case as noted below.

In this prompt section, use the CHART key to advance to the next prompt without modifying the current parameter.

Section 5C - Channel Configuration

The channel configuration section covers seven categories of Recorder set-up/ Those are as follows:

1. Inputs – used to set-up the recorder for various Input sensor types.

2. Process Variables – used for values stored in the recorder that alarms and relays use for reference setpoint. The default settings are as follows:

IV1 ——————————— PV1
IV2 ——————————— PV2
IV3 ——————————— PV3
IV4 ——————————— PV4

3. Recorders – defines values that are being recorded such as tags, methods, source of data, chart deviations and zoning.

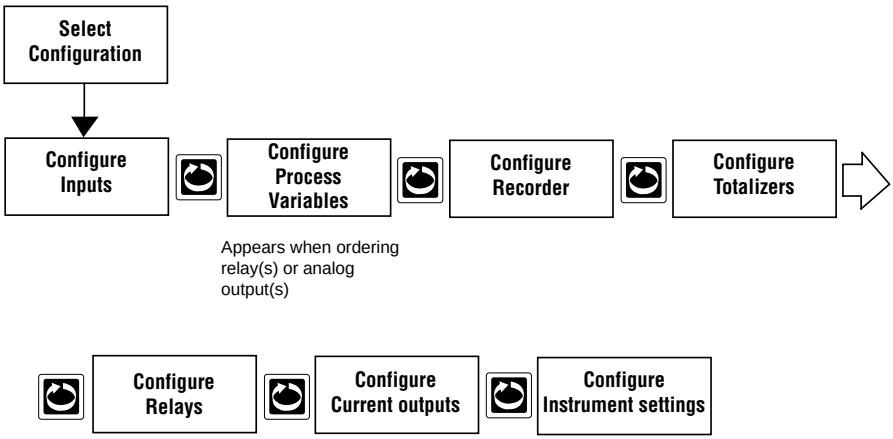
4. Totalizers – used for recording the total value of a process variable(s) over a defined time period. For example, gallons per minute over 48 hours.

5. Relays (Alarms) – defines the relay assignment for alarm outputs.

Relay 1 ———— Alarm 1
Relay 2 ———— Alarm 2
• •
• •
• •
Relay 8 ———— Alarm 8

6. Current Outputs (4-20mA) – used primarily for process retransmission, assigning the current output to a source.

7. Instrument Settings – identification references for the Recorder: name, data, and time.



Channel Configuration

Selections made in Configuration set up the recorder for operation. Not all sections are applicable for every recorder. Before or during configuration of your recorder, it is recommended that the Software Reference/Record Sheet (found at end of Section 3) be completely filled in.

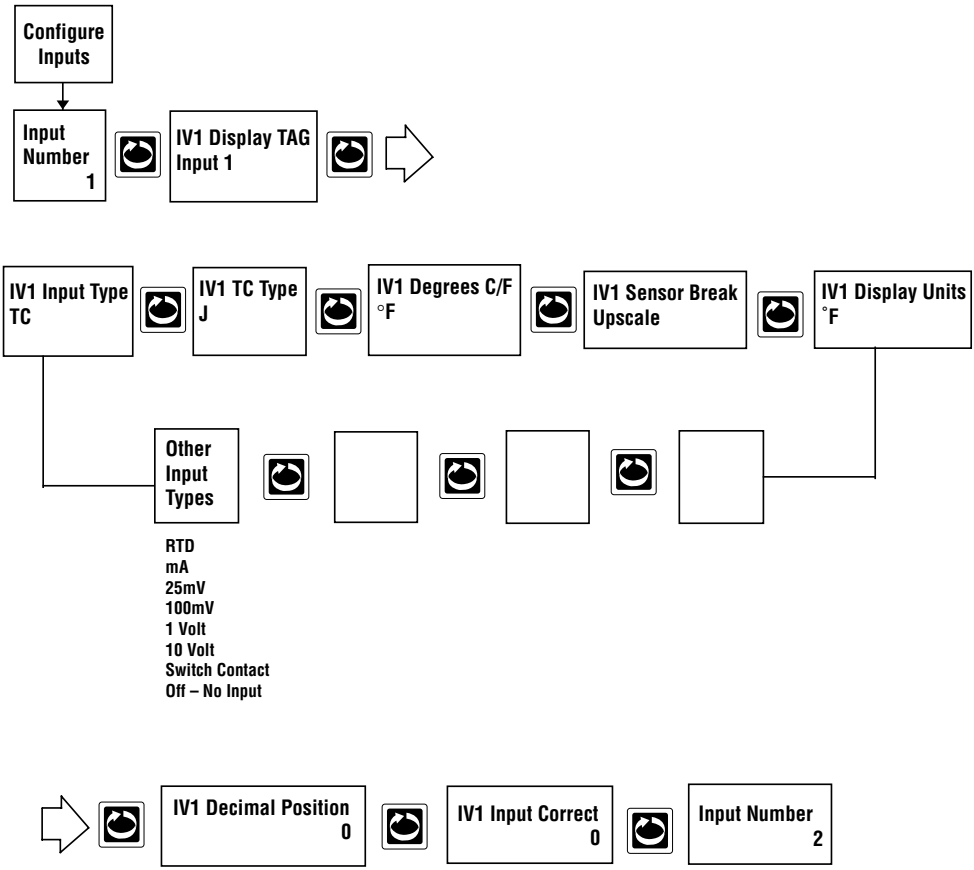
Entering Configuration

From the Normal Display, press the  until **CONFIGURATION** is seen in the lower display line. If **PASSWORD** appears in the lower display line, the correct "password" will need to be entered before access to CONFIGURATION is allowed. If **CONFIGURATION** is not displayed, then Configuration has been disabled. Refer to Enables and Passwords, for instructions to enable Configuration.

INPUTS

Input defines input types, ranges, units, scaling and display status for each of 1-4 inputs.

With **CONFIGURATION** in the lower display line, press the  then  until **INPUTS** appears in the lower display line. (See diagram on the next page.)



All values shown are default values.

PROCESS VARIABLES

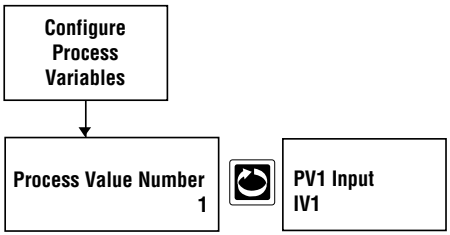
Process Variables define variables for use with alarms and/or control outputs.

From the Normal Display, press the  until **CONFIGURATION** is seen in the lower display line. If **PASSWORD** appears in the lower display line, the correct "password" will need to be entered before access to Configuration is allowed. If **CONFIGURATION** is not displayed, then Configuration has been disabled. Refer to Enables and Passwords, for instructions to enable Configuration.

With **"SELECT CONFIGURATION"** in the display, press the  , then the  until **PROCESS VARIABLES** appears in the lower display line.

1. Press the  to display **PROCESS VALUE NUMBER**.

Appears when ordering relay(s) or analog output(s)



The default settings are as follows:

IV1 ———————— PV1
IV2 ———————— PV2
IV3 ———————— PV3
IV4 ———————— PV4

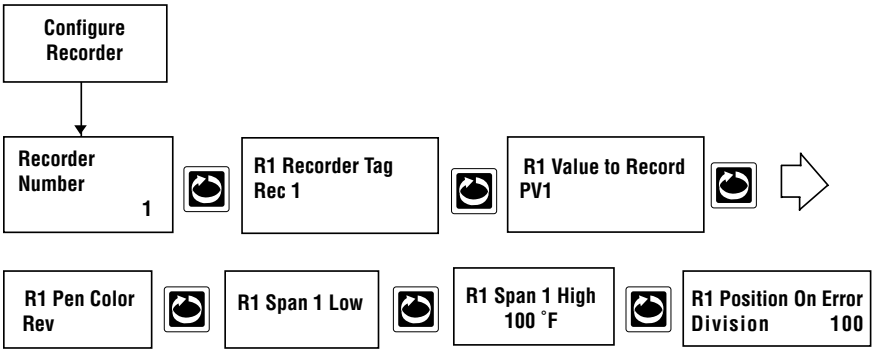
RECORDERS

Recorders defines values being recorded, tags, method, source of data and chart divisions and zoning.

In the Normal Display, press the  until **CONFIGURATION** is seen in the lower display line. If **PASSWORD** appears in the lower display line, the correct “password” will need to be entered before access to Configuration is allowed. If **CONFIGURATION** is not displayed, then Configuration has been disabled. Refer to Enables and Passwords, for instructions to enable Configuration.

With **CONFIGURATION** in the display, press the  , then the  until **RECORDERS** appears in the lower display line.

1. Press the  to display **RECORDER NUMBER**.



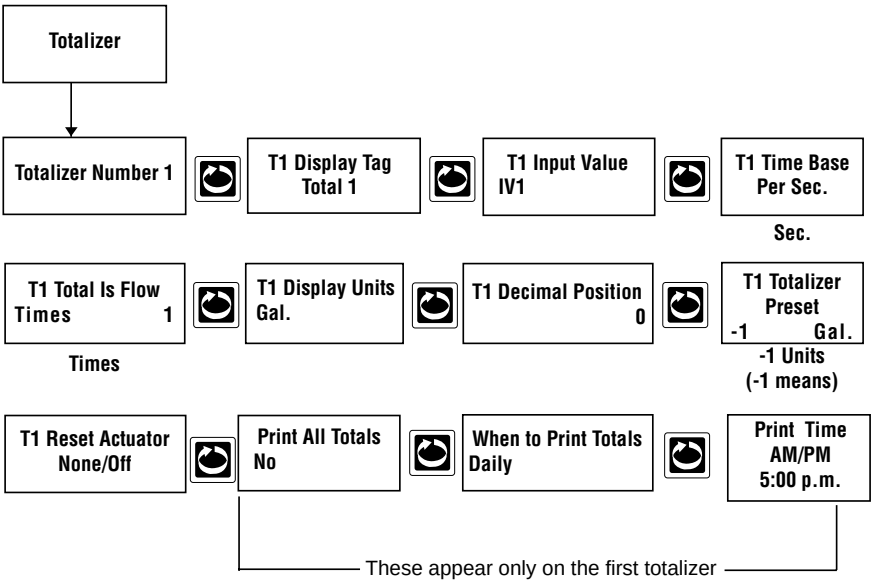
TOTALIZERS

Totalizers are seen only if TOTALIZATION was specified and present in the model number order matrix.

From the Normal Display, press the until **CONFIGURATION** is seen in the lower display line. If **PASSWORD** appears in the lower display line, the correct "password" will need to be entered before access to Configuration is allowed. If **CONFIGURATION** is not displayed, then Configuration has been disabled. Refer to Enables and Passwords, for instructions to enable Configuration.

With **CONFIGURATION** in the display, press the , then the until **TOTALIZERS** appears in the lower display line.

1. Press the to display **TOTALIZER NUMBER**.



All values shown are default values

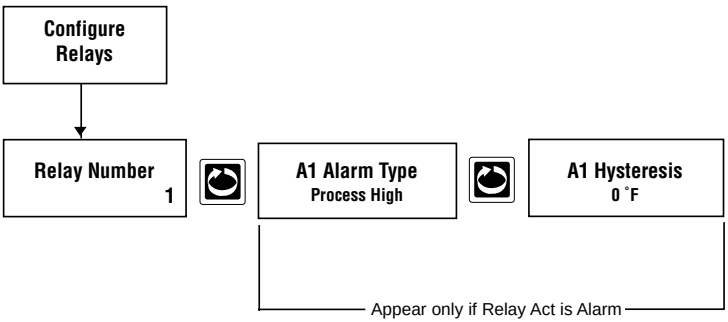
RELAYS (ALARMS)

Relays only available when specified and present in the model number order matrix.

From the Normal Display, press the  until **CONFIGURATION** is seen in the lower display line. If **PASSWORDS** appears in the lower display line, the correct “password” will need to be entered before access to Configuration is allowed. If **CONFIGURATION** is not displayed, then Configuruation has been disabled. Refer to Enables and Passwords, for instructions to enable Configuration.

With **CONFIGURATION** in the display, press the  , then the  until **RELAYS** appears in the lower display line.

1. Press the to display **RELAY NUMBER**.



LED 1 thru 8 are associated with alarm actuators A1 thru A8.

***NOTE:** Units correspond to Units configured in Process Variables.

CURRENT OUTPUTS

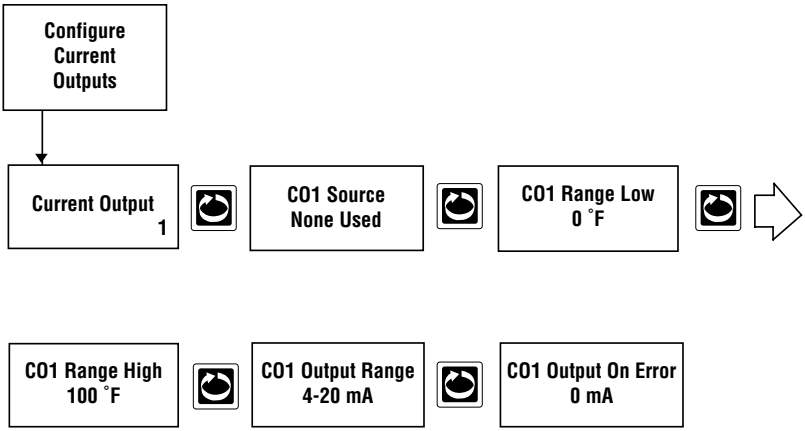
Only seen if current outputs has been specified and present in the model number order matrix.

From the Normal Display, press the until **CONFIGURATION** is seen in the lower display line. If **PASSWORD** appears in the lower display line, the correct “password” will need to be entered before access to Configuration is allowed. If **CONFIGURATION** is not displayed, then Configuration has been disabled. Refer to Enables and Passwords, for instructions to enable Configuration.

With **CONFIGURATION** in the display, press the , then the until **CURRENT OUTPUTS** appears in the lower display line.

1. Press the to display **CURRENT OUTPUT**.

Used for transmission of your process value to a remote device.



All values shown are default values.

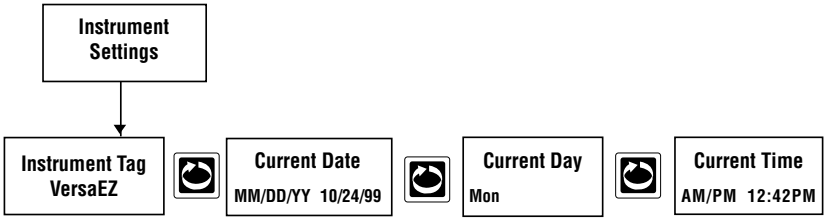
INSTRUMENT SETTINGS

Instrument Settings define instrument tag, display option and date/time format.

From the Normal Display, press the  until **CONFIGURATION** is seen in the lower display line. If **PASSWORD** appears in the lower display line, the correct "password" will need to be entered before access to Configuration is allowed. If **CONFIGURATION** is not displayed, then Configuration has been disabled. Refer to Enables and Passwords, for instructions to enable Configuration.

With **CONFIGURATION** in the display, press the  , then the  until **INSTRUMENT SETTINGS** appears in the lower display line.

1. Press the  to display **INSTRUMENT TAG**.



To change any value:

1) Hit "Mod" Key

2) Use "Arrow" keys to change value or move cursor

3) Hit Enter

Section 5D - Display Configuration

Allows you to customize your LED screen display. Begin by pressing the “Display” key.

DIsplay Programming

Selections made in the Display prompts section determine what is displayed and how it is displayed.

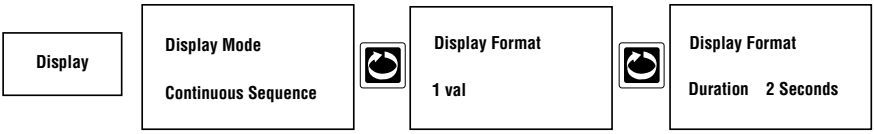
From the Normal Display, press the DISP. If the Display prompts are disabled, when the DISP key is pressed, **DISPLAY KEY DISABLED** will appear in the lower display line. Refer to Section 9, Enables and Passwords, for instructions to enable Display prompts.

If the Display Prompts are not disabled BUT the password is other than zero, **DISPLAY KEY PASSWORD** will appear in the display when the DISP key is pressed. If the correct “password” is entered, **DISPLAY MODE** will appear in the upper display line. If the incorrect “password” is entered, **INVALID PASSWORD** will appear in the upper display line.

If the Display Prompts are not disabled AND the password is set to zero, when the DISP key is pressed, **DISPLAY MODE** will appear in the upper display line.

For the prompts associated with the DISP key, the unit automatically goes into the modify mode. For simplicity of operation, use the Special keys below the display, referred to as F1 thru F5, for making choice selections. Upon selection of a new choice/value, the unit will again automatically go into the modify mode.

In this prompt section, use the DISP key to advance to the next prompt without modifying the current parameter.



Choose either continuous or sequence, then press the enter key.

Appendix A - Test

Test describes all possible diagnostic tests built into the recorder.

From the Normal Display, depress the  until **TESTS** appears in the lower display line. If **PASSWORD** appears in the lower display line, the correct "password" will need to be entered before access to Test is allowed. If **TESTS** is not displayed, then Test has been disabled. Refer to Section 9, Enables and Passwords, for instructions to enable Test.

A list of available tests and their purpose are shown in Table A-1.

TABLE A-1 AVAILABLE TEST

Relays	Used to verify that all LEDs, Relays and/or Solid State Relay Drivers (SSRD) are working correctly.
Display	Used to verify the display is functional.
Keypad	Used to verify that all keys are functional.
LEDs	Used to verify that the functionality of the LEDs.
Chart Demonstration	Used to demonstrate chart capabilites. **CAUTION:** When this test is initiated, any parameter values previously programmed in Chart Configuration and Recorders are replaced with the demonstration values.
A/D Reset Counter	Displays the number of times the A/D counter has been reset. **FACTORY USE ONLY!**
A/D Raw Hex Counts	Displays raw counts for inputs and grounds. **FACTORY USE ONLY!**
Calibrated Input Values	Displays calibrated input values for inputs and grounds. **FACTORY USE ONLY!**
mA Output	Used to verify the mA Output is functional.

A.1 RELAY TEST

Allows the operator to verify that the LEDs, Relay and/or SSRD output(s) is/are working. A Volt/Ohm meter will be required to test the output.

Step 1

With **RELAY** in the lower display line, depress the  and **INITIATE RELAY TEST** appears in the upper display line and **NO** appears in the lower display line. Depress MOD, select YES, depress ENTER to perform the test.

Step 2

TEST IN PROCESS appears in the upper display line, LED 1 will be lit and Relay 1 will be energized or SSRD 1 will be on. For SPDT relays, connect the meter across the NO. and COM output terminals in the ohm scale. The meter should read continuity with the relay on and infinitity when the relay is off. For SSRD outputs, connect the meter across the output terminals in the Volt DC scale. The meter should read +5 VDC when the SSRD is on and 0 VDC when the SSRD is off.

Step 3

When each depression of the ENTER advances through each available Relay and/or SSRD. All eight LEDs should light, one after the other, as all 8 are always present.

Step 4

To exit the test, depress the ESC.

A.2 DISPLAY TEST

Allows the operator to verify that all dots in the VFD are working. No test equipment is required to perform this test.

Step 1

With **DISPLAY** in the lower dipslay line, depress the  and **INIT DISPLAY TEST** appears in the upper display line and **NO** appears in the lower display line. Depress MOD, select YES, then depress ENTER to perform the test.

Step 2

All dots in the vacuum fluorescent display will light. With each successive depression of the  , the display will show 2 lines of characters, then all dots being lit, then characters, etc.

Step 3

To exit the test, depress ESC when the lines of characters are displayed. The instrument will return to the normal display.

A.3 KEYPAD TEST

Allows the operator to verify that the keypad is functional. No test equipment is required to perform this test.

Step 1

With **KEYPAD** in the lower display line, depress the ↓ and **INITIATE KEYPAD TEST** appears in the upper display line and **NO** appears in the lower display line. Depress MOD, select YES, then depress ENTER to start the test.

Step 2

THE KEY PRESSED WAS appears in the upper display line and **ENTER KEY** appears in the lower display line. With each depression of a key (**EXCEPT ESC**), the name of that key will appear in the lower display line. **The ESC key will exit this test.**

Step 3

To exit this test, depress the ESC key and the instrument will return to the normal display.

A.4 LED TEST

Allows the operator to verify that the LEDs are functional. No test equipment is required to perform this test.

Step 1

With **LED** in the lower display line, depress the ↓ and **INITIATE LED TEST** appears in the upper display line and **NO** appears in the lower display line. Depress the MOD, select YES, then depress ENTER to start the test.

Step 2

LED TEST PROCEDURE will appear in the upper display line and **PRESS ENTER TO START** will appear in the lower display line. Depress ENTER, and **PRESS ENTER TO INDEX** appears in the lower display line.

Step 3

Depress ENTER and LED 1 should light. With each successive depression of ENTER, the LEDs turn ON, then OFF in order, 1 through 8, then all ON, then all OFF. If ENTER is depressed again, the sequence begins again.

Step 4

To exit the test, depress the ESC and the instrument will return to the normal display.

A.5 mA OUTPUT TEST

Allows the operator to verify that the current output(s) is/are functioning properly. A milliamp meter is required to perform this test.

Step 1

With **mA OUTPUT** in the lower display line, depress the ↓ and **INITIATE mA OUT TEST** appears in the upper display line and **NO** appears in the lower display line. Depress MOD, select YES, then depress ENTER to start the test.

Step 2

SELECT mA OUTPUT will appear in the upper display line and **1 2 3 4** will appear in the lower display line. To select output to be tested, depress the key directly under the desired output number.

Step 3

Connect the milliamp meter across the output terminals being tested. Be sure to observe proper polarity when connecting the meter, terminal 1 is positive. Use the ↑ ↓ to increase or decrease the current output in 1 mA steps, from 0 to 22 mA.

Step 4

The current output reading should be equal to the displayed value.

Step 5

To exit the test, depress the ESC and the instrument will return to the normal display.

Appendix B - Calibration

Calibration describes all possible field calibration procedures for the recorder as well as methods of invoking default program and calibration values. The procedures described include the input and range calibration as well as chart calibration.

From the Normal Display, press the  until **CALIBRATION** appears in the lower display line. If **PASSWORD** appears in the lower display line, the correct "password" will need to be entered before access to Calibration is allowed. If **CALIBRATION** is not displayed, then Calibration has been disabled. Refer to Section 9, Enables and Passwords, for instructions to enable Calibration.

Press the  to display **CALIBRATION** in the upper display and **SOLENOID ADJUSTMENT** in the lower display line. Press the  to advance the lower display to other calibrations available.

The table below (Table B-1) lists the calibration routines. All instruments are calibrated prior to shipment from the factory.

CAUTION: Do not attempt any calibration without the proper test equipment that meets or exceeds the specifications listed below.

RTD Inputs:	Decade box with 0.01% resolution or equivalent OR 100 ohm ± 0.01% AND 277 ohm ± 0.01%.
CURRENT Inputs:	0.00 mA to 20.00 mA Source ± 0.01 mA DC
*TC or 0/25 mV Inputs:	0.00 mV to 25.00 mV Source ± 0.01 mV DC
*TC or 0/100 mV Inputs:	0.00 mV to 100.00 mV Source ± 0.01 mV DC
0 to 1 VOLT Inputs:	0.00 V to 1.00 V ± 0.01 V DC
0 to 10 VOLT Inputs:	0.00 V to 10.00 V ± 0.01 V DC

:

* For TC only - one (1) mercury thermometer ± .25 deg. C or equivalent and a Type X thermocouple; X = type of TC input being calibrated.

TABLE B-1 CALIBRATION ROUTINES

Input Calibration	Performs calibration of all input sources
Parameter Defaults	Invokes the default values for all program parameters
Chart Calibration	Performs calibration of the pen to the chart. It is recommended that chart calibration be performed whenever the chart size is changed.
Milliamp Outputs	Performs calibration of current outputs
Solenoid Adjustment	Allows calibration of the current through the solenoid driver and is adjusted at the factory to maximize life of the solenoid actuators. This procedure would not normally need to be performed in the field.
Calibration Defaults	Invokes the calibration default values.

App. B

B.1 INPUT CALIBRATION

This routine allows for the calibration of all input channels and all input types.

Important Notes:

1. The calibration information is stored on each input board for all input types in an Electrically Erasable Programmable Read Only Memory (EEPROM). The instrument and every input board supplied to the field is shipped from the factory calibrated for each input type.

2. Recalibration should only be performed if it is determined that the Recorder is outside of the operating specifications for the instrument itself (without considering the input source). Input Correction should be used to correct for Input Signal inaccuracies.

3. If recalibration is necessary, it is only required for the particular input type and range that is being used.

Step 1

With **INPUT CALIBRATION** in the lower display line, press the  to enter the Input Calibration. The upper display line will display **CALIBRATE INPUT** and the lower display line will display **IV1**. If an input other than input 1 is to be calibrated, use the MOD, LEFT, SCROLL, UP or DOWN as required to select the proper input number, then press the 

.

Step 2

Press the  and the upper display line will display **IVx CAL BOARD TYPE** (x = input number selected) and the lower display line will display **TC/VOLT**. If the input to be calibrated is TC/VOLT/mA, press the  to move to the next step. If the input to be calibrated is RTD, press 

, then F5, then  .

Step 3

IVX CAL WHAT RANGE should be in the upper display line and **OFF - NO INPUT** should be in the lower display line. To calibrate, press the 

, then UP, DOWN, LEFT, SCROLL as required to select the input range to be calibrated per Table B-2, then press 

.

TABLE B-2 RANGE SELECT

Select	IF	Input Is
TC WIDE		TC and not T, R, S, or B
TC NARROW		TC and other than above
RTD		RTD
mA		CURRENT
25 mV		mV and maximum is 25 mV or less
100 mV		mV and maximum is 100 mV or less
1 VOLT		Volt and maximum is 1 Volt or less
10 VOLT		Volt and maximum is 10 Volts or less

Step 4

Be sure that the jumpers on the Input Board for the Input being calibrated are positioned as shown in Table B-3, and Figure B-1 or Table B-3A and Figure B-1A, depending on which circuit board is fitted.

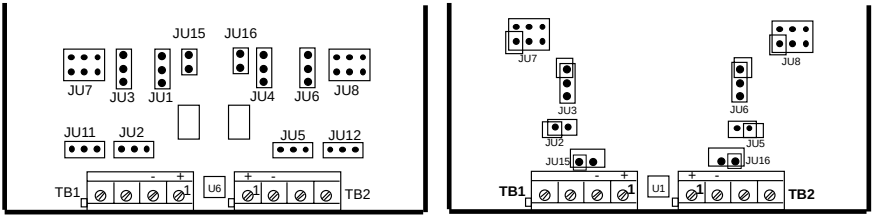
TABLE B-3 INPUT BOARD JUMPER POSITIONS

	INPUT 1, 3, 5, 7						INPUT 2, 4, 6, 8					
	JU1	JU2	JU3	JU7	JU11	JU15	JU4	JU5	JU6	JU8	JU12	JU16
TC NARROW	U	L	P	R	R	P	U	R	P	R	L	P
TC WIDE	U	L	P	M	R	P	U	R	P	M	L	P
RTD	P	L	U	L	L	P	P	R	U	L	R	P
mA	U	L	P	L	R	U	U	R	P	L	L	U
25 mV	U	L	P	R	R	P	U	R	P	R	L	P
100 mV	U	L	P	M	R	P	U	R	P	M	L	P
1 VOLT	U	L	P	L	R	P	U	R	P	L	L	P
10 VOLT	U	L	D	L	R	P	U	R	D	L	L	P

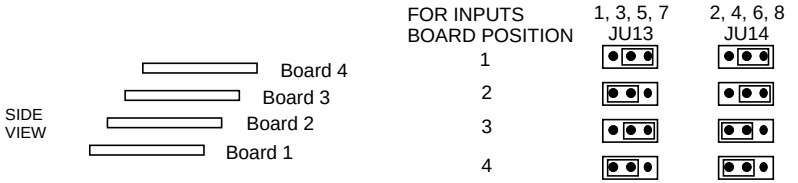
	INPUT 1, 3, 5, 7				INPUT 2, 4, 6, 8			
	JU2	JU3	JU7	JU15	JU5	JU6	JU8	JU16
TC NARROW	P	P	R	P	P	P	R	P
TC WIDE	P	P	M	P	P	P	M	P
RTD	P	U	L	P	P	U	L	P
mA	P	P	L	F	P	P	L	F
25 mV	P	P	R	P	P	P	R	P
100 mV	P	P	M	P	P	P	M	P
1 VOLT P	P	P	L	P	P	P	L	P
10 VOLT	P	D	L	P	P	D	L	P

CODE: D - DOWN, L - LEFT, M - MIDDLE, P - PARKED, R - RIGHT, U - UP, F - FITTED

FIGURE B-1



There are up to an additional 2 jumpers per Input Board that are used for BOARD ID. Location (Board 1 is the bottom board) determines the position of JU13 and/or JU14.



When installing an Input Board for any reason, check the location (where this board is mounted), then verify the position of JU13 and/or JU14. **TC WIDE or TC NARROW were selected, go to Step 5, if not, go to Step 6.**

Step 5

Depress the  and the upper display line will show **IVx CAL CJC OR TC** and the lower display line will show **TC, or CJC**. Select TC by depressing the  , then the  until TC is blinking, then depress the  .

Step 6

Depress the  and the upper display line will show **IVx PERFORM CAL** and the lower display line will show **NO**. Select YES to perform the calibration. Connect the appropriate one of the following inputs to the input terminals of the input being calibrated:

100 ohm resistor	RTD Inputs
0.0 mA DC	Current Inputs
0.0 mV DC	TC or mV DC Inputs
0.0 V DC	Volt Inputs

Wait one minute, then depress the  key.

Step 7

Connect the appropriate one of the following inputs to the input terminals of the input being calibrated:

277 ohm resistor	RTD Inputs
20.00 mA DC	Current Inputs
25.00 mV DC	TC or 0/25 mV DC Inputs
100.00 mV DC	TC or 0/25+ mV DC Inputs
1.00 V DC	1 V DC Inputs
10.00 V DC	10 V DC Inputs

Wait one minute, then depress the  key.

Step 8

Repeat steps 1 through 8 for each input to be calibrated.

B.2 COLD JUNCTION CALIBRATION

Step 1

With **INPUT CALIBRATION** on the lower display line, press the  to enter the Input Calibration. The upper display will display **CALIBRATE INPUT** and the lower display line will display **IV1**. If other than IV1 or IV2 is to be calibrated, depress  and select the input number for which it is desired to calibrate.

Note: There exists only one CJC sensor per input board or for every two input channels.

Step 2

Depress  and the upper display line will display **IVx CAL BOARD TYPE** (x=input number selected) and the lower display line will display **TC/VOLT** or **RTD**. Select **TC/VOLT**.

Step 3

Depress  and **IVx CAL WHAT RANGE** should appear in the upper display line. Depress  ,

then  until **TC NARROW TC WIDE** are displayed in the lower display line. Select which type of TC used by depressing  to alternately select TC NARROW or TC WIDE (see Table B-2, page B-2), then depress  the when the TC Range used is blinking.

Step 4

Be sure that the jumpers on the Input Board for the input being calibrated are positioned as shown in Table B-3, Page B-3.

Step 5

Depress the  and **IVx CAL CJC OR TC** will appear in the upper display line, and **TC** or **CJC** will appear in the lower display line. Select CJC by depressing the  , then the  until CJC is blinking, then depress the  .

Step 6

IVx CJC TC TYPE will appear in the upper display line and **J** will appear in the lower display line. Depress the 

, then UP, DOWN, LEFT and SCROLL as required to select the type of TC being used, then depress the 

.

Step 7

Connect the proper TC type up to the input being calibrated. Place the ther mometer next to the **HOT** Junction (sensor point) of the TC connected. Depress the  and the upper display line will display **IVx CAL CJC** and lower display line will display **CJC READS: 25.0 C**. Depress the 

, then use the UP/DOWN to change the display to read what the mercury thermometer is reading, then depress the 

.

Step 8

Depress the  and the upper display line will display **IVx PERFORM CAL**. Depress the 

and select **YES** to perform calibration of the CJC.

Wait one minute, then depress the 

key.

Step 9

Repeat steps 1 through 8 for each input board to be calibrated.

B.3 PARAMETER DEFAULTS

This routine will invoke all of the default program parameter values. See Appendix C for the listing of default values.

Step 1

With **PARAMETER DEFAULTS** in the lower display line, depress the  and **SET DEFAULTS** will appear in the upper display line and **NO** in the lower display line.

Step 2

Depress 

then select YES to set the defaults.

B.4 CHART CALIBRATION

Step 1

With **CHART CALIBRATION** in the lower display line, depress  to enter the Chart Calibration. The upper display line will display **START CALIBRATION**. To perform the chart calibration, depress 

and select YES, then depress the 

. Press any key to continue.

Step 2

The upper display line will display **INNER RING CALIBRATE** and the lower display line will display **SCROLL TOGGLES RING**. The keys will function as follows:

CHART	Will place a dot on the inner or outer ring, whichever is selected for calibration
SCROLL	Will select either the inner or outer ring
UP	Will move the selected (inner or outer) ring position to the left and print a dot in the new position without moving the chart.
DOWN	Will move the selected (inner or outer) ring position to the right and print a dot in the new position without moving the chart.
RESET	Will move the chart 30 steps while not printing any dots
ESC	Will exit with no change to the calibration values
ENTER	Will exit with the new values being stored

Step 3

With **INNER RING CALIBRATE** on the upper display line, depress the to view the current location of the inner ring zero point. Use UP/DOWN to position the dot accordingly, use RESET to move the chart.

Step 4

Depress the  to toggle the upper display line to read **OUTER RING CALIBRATE**.

Step 5

Depress the 

to view the current location of the outer ring zero point. Use UP/DOWN to position the dot accordingly, use RESET to move the chart.

Step 6

Depress the 

to save calibration values.

B.5 MILLIAMP OUTPUT CALIBRATION

This routine is used to adjust the mA Output(s) for span. A milliamp meter is required to perform this calibration.

Step 1

With **mA OUTPUTS** in the lower display line, depress  the and **CAL WHICH mA OUTPUT** appears in the upper display line and **1** appears in the lower display line. To change, depress the  , then the  to desired output number, then depress  .

Step 2

Connect the milliamp meter across the corresponding output terminals observing proper polarity, terminal 1 is positive.

Step 3

Depress  and **INITIATE mA CAL** appears in the upper display line and **NO** appears in the lower display line. Depress  select YES, then depress  .

Step 4

The display should be flashing the message: **USE UP/DN TO ADJUST OUTPUT TO 20 mA ENTER WHEN DONE**. Depress  or  and **HIT UP/DN OR ENTER** appears in the upper display line and **OUTPUT TO 20 mA** appears in the lower display line.

Step 5

Use the  as necessary to adjust the output to 20.00 on the milliamp meter. Depress  to enter the new value or  to return to previous value. Depressing either ENTER or ESC exits the calibration.

B.6 SOLENOID CALIBRATION

CONSULT FACTORY.

This adjustment is made with an oscilloscope and a 10 ohm resistor. It should not have to be readjusted unless the setting has been changed inadvertently.

B.7 CALIBRATION DEFAULTS

This routine will invoke a set of predetermined calibration values that are intended to emulate a "design center" condition. In other words, the calibration values used would be the values derived for a unit whose critical components would be equal to the nominal values. These default values should be used only:

1. When it is known that the current calibration values are inaccurate and not acceptable and quick action is needed to restore the recorder to some basic level of operation.

2. To initially calibrate a brand new input board (never before calibrated) as a starting point in the calibration process. This is the procedure initially used to test the boards on start-up at the factory.

Step 1

With **CALIBRATION DEFAULTS** in the lower display line, depress the  . **SET CAL DEFAULTS** appears in the upper display line and **NO** appears in the lower display line.

Step 2

Depress 

and then select YES, then depress 

.

Appendix C - Key Prompt Examples

Character Modify Mode

Instrument Tag X
VersaEZ #1

MOD = >

Press

Instrument Tag X
VersaEZ #1

The current character will be underlined. The ↑ & ↓ when pressed will select a new character from a list of letters and characters.

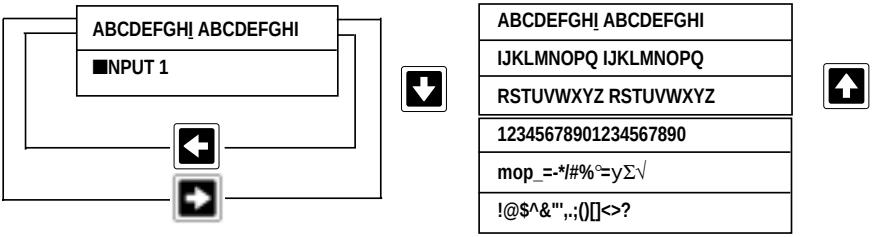
↑ A
B
C
.
.
V etc. ↓

Pressing the ← will move the underline cursor to the left and → will move the cursor to the right. The character that was underlined retains the last character selected. The underline cursor will wrap when the end of the text field is reached in either direction. Pressing ESC will exit MODIFY MODE and the text will revert to the original text.

Pressing the ENTER will exit the modify mode and save the text.

Character Selection Mode

Pressing the MOD + MOD will enter the CHARACTER SELECTION MODE. The top line will be replaced by a character selction line.



The bottom line will have a block character over the character to be changed. The upper line will underline the character which matches the current character in the bottom line. A block character will cover the current character on the bottom line of the display. The left and right arrows keys will move the underline of the top row left or right and wrap in either direction. The up and down arrow keys will select the next character group for the top line of the display.

Pressing MOD will change the block character on the bottom line to match the underlined character on the top line of the display and advance to the next character.

Pressing ESC will exit CHARACTER SELECTION MODE and enter CHARACTER SELECTION MODE.

Pressing ESC again will exit CHARACTER SELECTION MODE and revert to original text without saving changes made to the text.

Pressing ENTER will save the text to memory, exit and display the new text line.

Choice Entry

Press the MOD to change, then ↑ ↓ , ← ↻ to desired choice, then press the ENTER .

Value Entry

Press the MOD to change, then ↑ ↓ or ← ↻ , then ↑ ↓ , then press ENTER .

Appendix D - Specifications

INPUTS

Input Types	
Thermocouple	Types J, K, T, R, S, E, B, N, G, D, C, Ni/Ni-Moly, and Platinel II.
RTD	Platinum 100, 2 or 3 wire .00385 coefficient DIN 43760/IEC 751 .00392 coefficient USA .00392 coefficient SAMA Nickel 100, 2 or 3 wire
Voltage DC	0 to 25mV, 0 to 100 mVDC, 0 to 1 VDC, 0 to 10 VDC
Current DC	0 to 20mA, 4 to 20mA Internal 50 ohm shunt resistor
Contact Closure	Open/closed switch sensing without external voltages or resistors
Impedance	25mV, 100mV, 1 Volt: > 10 meg ohms 10 Volt: > 50 K ohms mA: 50 ohms
RTD Excitation Current	1 mA

INPUT PERFORMANCE

Measurement Error	± .025% of measurement span reference accuracy
Cold Junction Compensation Error	± 0.2°C @ 25 degrees C
Cold Junction Compensation Rejection	0.04°/degree C deviation from 25 degrees C
Linearization Error	TCs: ± 0 .25°C typical, ± 0.5°C worst case with exceptions RTDs: ± 0.1°C typical, ± 0.3°C worst case
Ambient Temperature Error	± 0 .01% of span per degree C deviation from 25 degrees C
Factory Calibration Error	Refer to the Accuracy Table
Isolation	500 VDC/350 VAC
Common Mode Rejection	120 dB min.
Normal Mode Rejection	100 dB min. @ 60 Hz or greater
Scan Rate	The input scan rate is programmable and dependant on the number of active inputs present. The total scans per second for the instrument is 16 scans/second, and the instrument can have up to 8 inputs configured.

App. D

ACCURACY TABLES

To achieve stated results, the following thermocouples must be used with the INPUT TYPE/RANGE set to TC NARROW

See Note:		1	2	3	4	5	6
TC TYPE	RANGE °C	REF ACC'Y °C	LIN. ACC'Y °C	FACTORY CAL °C	REF+LIN +CAL °C	DEVIATION ACC'Y °C	RESOL °C/bit
T	0/400	0.12	0.09	0.34	0.55	0.04	0.018
	-200/0	0.23	0.19	0.70	1.12	0.02	0.036
	-250/-220	0.73	0.36	1.90	2.98	0.00	0.111
R	800/1700	0.43	0.19	0.83	1.45	0.09	0.065
	200/800	0.58	0.25	1.08	1.90	0.06	0.088
S	250/1750	0.56	0.25	1.05	1.87	0.15	0.086
B	200/1800	0.74	0.31	1.34	2.39	0.16	0.113

See Note:		1	2	3	4	5	6
RTD TYPE	RANGE °C	REF ACC'Y °C	LIN. ACC'Y °C	FACTORY CAL °C	REF+LIN +CAL °C	DEVIATION ACC'Y °C	RESOL °C/bit
385 DIN	-160/480	0.16	0.03	0.13	0.33	0.06	0.025
	-200/-160	0.14	0.20	0.12	0.46	0.00	0.022
392 USA	-100/450	0.16	0.03	0.13	0.32	0.05	0.025
392 SAMA	-200/560	0.29	0.13	0.24	0.66	0.06	0.044
100 ohm Nickel	-40/200	0.09	0.05	0.07	0.21	0.02	0.013

	See Note:	1	2	3	4	5	6
TC TYPE	RANGE °C	REF ACC'Y °C	LIN. ACC'Y °C	FACTORY CAL °C	REF+LIN +CAL °C	DEVIATION ACC'Y °C	RESOL °C/bit
J WIDE	0/1200	0.43	0.20	0.32	0.95	0.12	0.066
	-200/0	0.63	0.08	0.56	1.28	0.02	0.097
J NARROW	0/400	0.11	0.05	0.33	0.50	0.04	0.017
	-200/0	0.16	0.08	0.56	0.80	0.02	0.024
K WIDE	0/1370	0.62	0.26	0.40	1.28	0.14	0.095
	-250/0	1.05	0.30	0.78	2.13	0.03	0.159
K NARROW	0/500	0.15	0.08	0.39	0.62	0.05	0.023
	-250/0	0.26	0.30	0.78	1.35	0.03	0.040
E WIDE	0/1000	0.33	0.19	0.28	0.80	0.10	0.050
	-250/0	0.66	0.42	0.62	1.71	0.03	0.101
E NARROW	0/300	0.09	0.19	0.29	0.57	0.03	0.014
	-250/0	0.17	0.42	0.62	1.21	0.03	0.025
N WIDE	0/1300	0.68	0.21	0.42	1.32	0.13	0.104
	-250/0	1.44	0.60	0.93	2.97	0.03	0.220
N NARROW	0/600	0.18	0.11	0.44	0.73	0.06	0.028
	-200/0	0.31	0.20	0.81	1.32	0.02	0.048
	-250/-200	0.93	0.60	2.15	3.68	0.01	0.142
To achieve stated results, the following thermocouples must be used with the INPUT TYPE/RANGE set to TC NARROW							
G	1800/2300	1.59	0.54	0.79	2.92	0.05	0.243
	800/1800	1.23	0.43	0.64	2.30	0.10	0.188
	500/800	1.38	0.25	0.70	2.33	0.03	0.210
	300/500	1.79	0.25	0.87	2.91	0.02	0.274
	0/300	3.65	0.58	1.61	5.84	0.03	0.557
C	1800/2300	2.14	0.54	1.01	3.68	0.05	0.326
	1200/1800	1.62	0.43	0.80	2.85	0.06	0.247
	300/1200	1.33	0.28	0.68	2.29	0.09	0.202
	0/300	1.54	0.12	0.77	2.43	0.03	0.235
D	1800/2300	1.88	0.38	0.90	3.26	0.05	0.287
	300/1800	1.32	0.40	0.68	2.40	0.15	0.201
	0/300	1.75	0.26	0.85	2.86	0.03	0.267
NNM	450/1370	0.44	0.33	0.33	1.10	0.09	0.067
	0/450	0.56	0.13	0.37	1.06	0.05	0.085
Platinel II	1000/1400	0.72	0.28	0.44	1.44	0.04	0.110
	500/1000	0.59	0.20	0.38	1.17	0.05	0.089
	0/500	0.62	0.10	0.40	1.12	0.05	0.095

INPUT TYPE	See Note: SPAN mV	1 REF ACC'Y uV	3 FACTORY CAL uV	4 REF+LIN +CAL uV	5 DEVIATION ACC'Y uV	6 RESOL °C/bit
10V	0/10000	2500	1000	3500	1000	381
1V	0/1000	250	100	350	100.0	38.1
100mV	0/100	25	20	45	10.0	3.81
25mV	0/25	6	20	26	2.5	0.954

INPUT TYPE	See Note: SPAN mA	1 REF. ACC'Y uA	3 FACTORY CAL uA	4 REF+CAL uA	5 DEVIATION ACC'Y uA/°C	6 RESOL. uA/bit
mA	4/20 0/20	5 5	2 2	7 7	2.0 2.0	0.763 0.763

NOTES: The table attempts to show the effect of each significant factor which contributes to the overall measurement error. See the enumerated items below for more specific explanations of each column of data.

1. Reference Acc'y based on 0.025% (250ppm) of input voltage span.

2. Linearization Acc'y is based on conformance to NIST Monograph 175 (based on the ITS-90) for letter-designated thermocouple types, or other industry standards for non letter-designated type TCs and all RTDs.

3. Factory Cal is defined by limits of repeatability in a manufacturing environment per the table for zero and span calibrations, and ± 0.15°C for thermocouple cold junction calibrations.

4. The REF + LIN + CAL column represents the total "static" error allowed for an instrument as produced by the manufacturing process.

5. Deviation Acc'y is derived from a temperature coefficient of 0.01%/°C or ± 100ppm/°C expressed in units of the corresponding range.

6. Resolution on thermocouples and RTDs is derived as a function of the input voltage range and dV/dT.

OTHER INPUT SPECIFICATIONS

Processing	Square root and exponential functions for linear inputs
Value Cutoff	None, at value, to zero below value, to zero near zero
Sensor Fault Detection	Sensor break on all TCs, RTDs, 1 volt, 1 to 5 volt, 4-20mA, and millivolt inputs Sensor high and low on all inputs, 5% above or below range
Sensor Break	Upscale or downscale
Transmitter Power Supplies	Up to four isolated 25mA @ 24VDC supplies available

RECORDING

Pen Type	Disposable 4 pen fiber tip marker assembly
Pen Colors	Red, green, blue, and black
Chart Size	10", 11", 12" (12" are 11.875" actual size)
Chart Drive	DC stepper motor
Chart Rotation	12, 24, 48, 7 day
Recording Methods	Drag pen simulation, instantaneous value, connect the values, average value, connect the averages
Action on New Chart	Print scales, print range list, begin normal recording
Chart Messages	Printing of totals with date/time stamp

RECORDING PERFORMANCE

Chart Recording Accuracy	0.3% of chart span reference accuracy
Chart Rotation Accuracy	±0.2 minutes for a 24 hour rotation, assuming all backlash removed

OPERATOR INTERFACE

Display	Two line, 40 character vacuum fluorescent display with .21 inch (5 mm) high characters
Status Indicators	Eight user configurable, red LED status indicators
Keypad	Fifteen keys for programming and unit operation
Display Formats	Three, refer to manual
Display Modes	Automatic or manual sequencing

ALARMS

Number	Up to two alarms for each of four process variables
Type	Process high or low
Hysteresis	Fully adjustable

ON/OFF OUTPUTS

On/Off Output Actuators	Any of over 20 digital values/states can be used to actuate on/off outputs (e.g. alarms, time/dates, timers, etc.)
Relays	SPDT, contacts rated 5 amps resistive at 115 VAC, 2.5 amps resistive at 230 VAC - 1/8 HP at 230 VAC (single phase), 250 VA at 115/230 VAC.

PROCESS TRANSMISSION CURRENT OUTPUTS

Drivers	Any of over 20 values can be used to drive analog outputs (e.g. inputs, derived variables, etc.)
Output Span	0 to 20mA or 4 to 20mA, nominal
Resolution	12 bits based on a 0 to 25.6mA span
Accuracy	±0.1% of 20mA span reference accuracy
Compliance	650 ohm load

TOTALIZERS

Number	Four are included in the option
Digits	Nine, displayable with and without commas
Types	Continuous
Presets	One per totalizer
Pulsed Outputs	Fully configurable

POWER REQUIREMENTS

Line Voltage	Universal power supply, 85 min to 265 max. VAC 50/60Hz
Power Consumption	60 VA maximum

CONSTRUCTION

Enclosure	Gasketed cover, case, and windows. Structural foam case and cover with plastic or glass window areas. Door lock available.
NEMA Rating	NEMA 3 standard, NEMA 4X optional
Conduit Openings	Four openings standard, 2 additional as required
Mounting	Panel, wall, or optional pipe mounting
Overall Dimensions	14.12 inches wide x 16.77 inches high x 7.75 inches deep (358.65mm wide x 425.96mm high x 196.85mm deep)
Panel Cutout	12.7 inches wide x 12.7 inches high (322.58mm wide x 322.58mm high)
Panel Depth	5.25 inches (133.35 mm)
Panel Protrusion	2.5 inches (63.5mm)
Weight	25 lbs maximum

ENVIRONMENTAL AND OPERATING CONDITIONS

Operating Temperature	0 to 50°C (32 to 122°F)
Storage Temperature	-40 to 65°C (-40 to 149°F)
Humidity	10 to 90% RH, non-condensing
Vibration	0.3 to 100 Hz @ 0.2g
Mounting Position	Up to 30° forward or backward tilt from vertical Up to 10° side tilt from vertical
Reference Conditions	25°C ± 2°C and 60% RH ± 5% RH

OTHER SPECIFICATIONS

Clock Accuracy	1 minute/month typically, 4 minutes/month worst case
Battery Backup	5 years minimum life, 10 years typically

DIGITAL COMMUNICATIONS

Type	RS-232C/RS-485 serial communications port. Half-duplex.
Protocol	ModBus RTU
Network Control	Can be configured as either the master or a slave
Bit Rate	User configurable 1200, 2400, 4800, or 9600 bit per second
Parity	Odd, even or none
Address	User configurable 1 to 247

GENERAL REFERENCE DATA

Data Backup	EEPROM for input board calibration data EEPROM for motherboard calibration data Battery backed SRAM for configuration data
Warranty	Two years

APPROVALS AND COMPLIANCE

Safety	UL Approved for USA - UL 1092, UL 916, and QUXY - File E67237 UL Certified for Canada - CSA Spec 142 - File E67237
Immunity/Susceptibility	CE - Complies with EN 50082-2
Emissions	CE - Complies with EN 55011
Hazardous Locations	ETL Listed Class I and II, Division 2 and Class III, Division 1 and 2, Reference No. 5604?2

* ModBus is a trademark of MODICON, Inc.

WARRANTY AND RETURN STATEMENT

These products are sold by the factory under the warranties set forth in the following paragraphs. Such warranties are extended only with respect to a purchase of these products, as new merchandise, directly from the factory or from a factory distributor, representative or reseller, and are extended only to the first buyer thereof who purchases them other than for the purpose of resale.

Warranty

These products are warranted to be free from functional defects in materials and workmanship at the time the products leave the factory and to conform at that time to the specifications set forth in the relevant factory instruction manual or manuals, sheet or sheets, for such products for a period of two years.

THERE ARE NO EXPRESSED OR IMPLIED WARRANTIES WHICH EXTEND BEYOND THE WARRANTIES HEREIN AND ABOVE SET FORTH. PARTLOW MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE PRODUCTS.

Limitations

The factory shall not be liable for any incidental damages, consequential damages, special damages, or any other damages, costs or expenses excepting only the cost or expense of repair or replacement as described above.

Products must be installed and maintained in accordance with the factory instructions. Users are responsible for the suitability of the products to their application. There is no warranty against damage resulting from corrosion, misapplication, improper specifications or other operating condition beyond our control. Claims against carriers for damage in transit must be filed by the buyer.

This warranty is void if the purchaser uses non-factory approved replacement parts and supplies or if the purchaser attempts to repair the product themselves or through a third party without factory authorization.

Returns

The factory's sole and exclusive obligation and buyer's sole and exclusive remedy under the above warranty is limited to repairing or replacing (at the factory's option), free of charge, the products which are reported in writing to the factory at its main office.

The factory is to be advised of return requests during normal business hours and such returns are to include a statement of the observed deficiency. The buyer shall pre-pay shipping charges for products returned and the factory or its representative shall pay for the return of the products to the buyer.

Appendix E - Configuration Reference/Record Sheet

Configuration INPUT

Parameter	Input 1	Input 2	Input 3	Input 4
DISPLAY TAG				
INPUT TYPE/RANGE				
T/C TYPE				
RTD TYPE				
DEG C/F				
SENSOR BREAK	Upscale Downscale	Upscale Downscale	Upscale Downscale	Upscale Downscale
INPUT RANGE LOW				
INPUT RANGE HIGH				
PULSE RATE HIGH	Pulse/Sec	Pulse/Sec	Pulse/Sec	Pulse/Sec
COMMS ADDRESS				
COMMS REGISTER				
REGISTER TYPE				
V/MA CONVERSION				
DISPLAY UNITS				
OTHER UNITS				
DECIMAL POSITION				
RANGE LIMIT LOW	Units	Units	Units	Units
RANGE LIMIT HIGH	Units	Units	Units	Units
EXPONENT				
CUTOFF TYPE				
CUTOFF VALUE				
INPUT CORRECT 1	@	@	@	@
INPUT CORRECT 2	@	@	@	@
VALUE FILTER	Seconds	Seconds	Seconds	Seconds
DISPLAY OPTION				
OPEN/1 DESCR.				
CLOSED/0 DESCR.				
DISPLAY FILTER	Seconds	Seconds	Seconds	Seconds

Configuration RECORDERS

Parameter	RCDR-1	RCDR-2	RCDR-3	RCDR-4
RECORDER TAG				
VALUE TO RECORD				
PEN/COLOR				
RECORDING METHOD				
DECIMAL POSITION				
CHART DIVISIONS				
ZONE 1 LOW	division	division	division	division
ZONE 1 HIGH	division	division	division	division
SPAN 1 LOW				
SPAN 1 HIGH				
SCALE 1 INTERVAL	divisions	divisions	divisions	divisions
ZONE 2 HIGH	division	division	division	division
SPAN 2 HIGH				
SCALE 2 INTERVAL	divisions	divisions	divisions	divisions
POSIT ON ERROR	division	division	division	division
FILTER	seconds	seconds	seconds	seconds

Configuration INPUT

Parameter	TOTAL-1	TOTAL-2	TOTAL-3	TOTAL-4
DISPLAY TAG				
INPUT VALUE				
TIME BASE				
TOTAL IS FLOW	times	times	times	times
DISPLAY UNITS				
DECIMAL POSITION				
DISPLAY OPTION				
DISPLAY FORMAT				
TOTALIZER TYPE				
TOTALIZER PRESET				
LOW FLOW CUTOFF				
RESET ACTUATOR				
HOLD ACTUATOR				
PULSED OUT	no yes	no yes	no yes	no yes
PULSE EVERY				

Configuration RELAYS

Parameter	RLY-1	RLY-2	RLY-3	RLY-4
RELAY USAGE				
ACTUATOR				
T.P. VALUE				
CYCLE TIME	seconds	seconds	seconds	seconds

Parameter	RLY-5	RLY-6	RLY-7	RLY-8
RELAY USAGE				
ACTUATOR				
T.P. VALUE				
CYCLE TIME	seconds	seconds	seconds	seconds

Configuration CURRENT OUTPUTS

Parameter	CO-1	CO-2	CO-3	CO-4
SOURCE				
RANGE LOW				
RANGE HIGH				
OUTPUT RANGE	mA	mA	mA	mA
OUTPUT ON ERROR	mA	mA	mA	mA

Configuration INSTRUMENT SETTINGS

Parameter	
INSTRUMENT TAG	
DISPLAY OPTION	
INSTR. ON ACTUATOR	
ALARMING ON ACTUATOR	
CONTROL ON ACTUATOR	
DATE DISPLAY FORMAT	
TIME DISPLAY FORMAT	
CURRENT DATE	
CURRENT DAY	
CURRENT TIME	
TIME TO LOG DATA	
COMMUNICATIONS MODE	
COMMS ADDRESS	
COMMS BIT RATE	
COMMS PARITY	
INPUT SCAN SEQUENCE	

Appendix F - Glossary of Terms

Next to each term is the prompt section it appears in, as appropriate, and the applicable section or page of this manual. Terms that are printed in all upper case letters appear in the instruments display, or are keypad designations. In some cases, additional words are inserted for readability.

While many of the terms listed are actually the prompt shown on the first line, the definition refers to the corresponding parameter value, choice, or text. Some prompts appear multiple times in a section or in multiple sections, with each occurrence having a separate value associated with it.

ACTION ON NEW CHART - Chart Configuration
Specifies the action the recorder takes when a new chart is installed; NONE - JUST CONTINUE trending, PRINT a RANGE LIST first, or PRINT a set of SCALES for each pen first.

ALARM SETPOINTS
Prompt section containing parameters which specify the setpoint of each alarm configured within the Process Variables section of Configuration.

ALARMS ON ACTUATOR - System Prompts - Configuration - Instrument Settings
Parameter that selects an actuator which controls whether process alarming is active. When inactive, all process alarms (A11 through A42) are reset and ignored.

ALARM TYPE - System Prompts - Configuration - Process Variables
Parameter that specifies the type of alarm: PROCESS HIGH, PROCESS LOW, RATE RAISING, etc.

AT VALUE - System Prompts - Configuration - Inputs
One of the choices for CUTOFF TYPE which specifies that the resultant IV (Input Value) is set to the CUTOFF VALUE whenever the input valve is less than the CUTOFF VALUE. The CUTOFF VALUE may be positive or negative, allowing cutoff to occur at any point.

BLANK MAJOR PERIODS - Chart Prompts - Chart Configuration
Parameters that specifies the number of major time lines to print between sets of scales, or said another way, the number of major time divisions to leave between sets of major time divisions which include scales. This is used to reduce the clutter on the chart if every time line included a scale line and the scale values. For example, if three trend lines are being recorded on a 24 hour chart, setting BLANK MAJOR LINES to 5 would yield a completed chart with 3 sets of scales (3 time lines, scale lines, and scale values in each set) evenly spaced around the chart with 5 major time lines between each set of scales.

CALIBRATION - System Prompts
Prompt section where routines for performing various calibrations are located.

CHANGE ALL ENABLES - System Prompts - Enables & Passwords
Prompt which provides ability to change all enable settings at once, rather than one at a time. When YES is selected, the next prompt will be CHANGE ALL TO. See CHANGE ALL TO.

CHANGE ALL TO - System Prompts - Enables & Passwords
Prompt at which the choice changes all enable settings. The choices are DISABLED, ENABLED, and TOGGLE. The TOGGLE choice causes all sections that are enabled to be disabled, and vice versa. This prompt is accessed only by selecting YES for CHANGE ALL ENABLES.

CHART CONFIGURATION - Chart Prompts
Prompt section containing parameters which configure the chart in a general sense. The parameters include: chart size, speed, time periods, time line colors, etc. he configuration of the trend recording is done in the RECORDERS section under CONFIGURATION.

CHART Key
The CHART key is used to enter the Chart Prompts and to advance through the individual chart prompts.

CHART MESSAGES - System Prompts - Configuration
Prompt section containing parameters which configure Chart Messages. A Chart Message consists of a text message, four values, and a time and date stamp. The message is recorded on the chart when triggered by the transition of an actuator. The text is recorded unless it is blank, and the values and time/date stamp are optional, so the message could be one to six “lines.” Missing lines cause the remaining lines to be moved up. The message overwrites the scale data (as opposed to being “ored” with it) in order to insure readability. Trend and time lines are not overwritten or lost.

CHART SIZE - Chart Prompts - Chart Configuration
Parameter that specifies the chart size: 10, 11, or 12 inches.

Chart Speed - Chart Prompts - Chart Configuration
Configured at the NORMAL SPEED prompt, provides user selectable chart speeds.

CHART TAG - Chart Prompts - Chart Configuration
Parameter used to specify a description or designation that can be printed on the edge of the chart.

CONFIGURATION - System Prompts
A section of the System Prompts which provides access to INPUTS, PROCESS VARIABLES, RECORDERS, RELAYS, and other sections to configure the various functions of the instrument.

CONTINUOUS (DISPLAY MODE) - Display Prompts
A choice for the parameter DISPLAY MODE which specifies that the instrument will continuously display a single step of the Display Sequence, and will not automatically advance. The UP or DOWN keys can be used to step backward or forward through the list or series of displays.

CURRENT OUTPUTS - System Prompts - Configuration
Prompt section containing parameters which configure the sources and ranges for the current (4-20mA) type outputs.

CUTOFF TYPE - System Prompts - Configuration - Inputs
Parameter that specifies the optional cutoff or lower boundary condition to be established and applied to an IV (Input Value).

CUTOFF VALUE - System Prompts - Configuration - Inputs
Parameter that specifies the value to be used in conjunction with CUTOFF TYPE.

DATE FORMAT - System Prompts - Configuration - Instrument Settings
Parameter that specifies the format used to display dates; MM/DD/YY, DD/MM/YY, or DD/MMM/YY.

DEGREES C/F - System Prompts - Configuration - Inputs
Parameter that specifies whether to convert a thermocouple or RTD input to a value corresponding to degrees C or F. This is not the same as UNITS, which is the text displayed for engineering units.

DISABLED - System Prompts - Enables & Passwords
Choice which causes the corresponding prompt section to be inaccessible by the operator.

DISP Key
The DISP (Display) key is used to enter the Display Prompts section and to step through the individual Display Prompts.

DISPLAY MODE - Display Prompts
Parameter that specifies the CONTINUOUS or sequential (SEQUENCE) display mode.
See OM DISPLAY MODE for Operator Messages.

DISPLAY OPTION - System Prompts - Configuration
Parameter that specifies the display option for the corresponding value or message. The choices are NOT DISPLAYED, IN CONTINUOUS MODE, IN SEQUENTIAL MODE, and IN BOTH MODES.

Display Sequence
The list or series of value and message displays that appears in the Normal Display mode.

DISPLAY TAG - System Prompts - Configuration
Parameter used to specify a description or designation that can be displayed with the Input Value, Process Variable, or Derived Variable when they are included in the Display Sequence in the 1 VAL (1 value at a time) Display Mode. The tags do not appear in the other display modes, as there is no space for them.

DISPLAY UNITS - System Prompts - Configuration
Parameter that specifies the units for the corresponding value; degrees C, F, or OTHER. If OTHER is selected, the next prompt will allow the user to enter up to six characters to be used or displayed as the engineering units.

DIVISION - System Prompts - Configuration - Recorders
Units for ZONE parameters that specify location relative to the CHART DIVISIONS parameter. Divisions means the same as rings. Division 0 is the inner ring.

ENABLED - System Prompts - Enables & Passwords
Choice which causes the corresponding prompt section to be accessible by the operator.

ENABLES & PASSWORDS - System Prompts
Prompt section where prompt sections are enabled or disabled and passwords are configured.

HYSTERESIS - System Prompts - Configuration - Process Variables
Parameter used to specify the deadband for an alarm. Deadbands are one sided below the setpoint.

INPUT - System Prompts - Configuration
Parameters found in various sections, used to specify the source of the value to be used by that functional block. For example, IV2 (Input Value 2) may be the INPUT to PV2 (Process Variable 2). That means that PV2 uses, displays, and alarms on the value from IV2, which could be determining the value from a thermocouple sensor.

INPUT CORRECTION - System Prompts - Configuration - Inputs
This is an “offset” value. The entered values specify the correction or adjustment at each point for the input.

INPUT RANGE HIGH - System Prompts - Configuration - Inputs
Parameter to specify upper range of the analog input signal when the input is volts or current. Example: 100mV, 5 VOLTS, 20mA

INPUT RANGE LOW - System Prompts - Configuration - Inputs
Parameter to specify lower range of the analog input signal when the input is volts or current. Example: 0mV, 1 VOLTS, 4mA.

INPUTS - System Prompts - Configuration
Prompts section that configures how hardware inputs are processes to provide the desired engineering values, decimal position, and units, for the sensor type and range used. Other characteristics are also configured for out-of-range checking, cutoff, input correction, filtering.

INPUT TYPE/RANGE - System Prompts - Configuration - Inputs
Specifies whether the input type is thermocouple, RTD, volts, milliamps, millivolts, pulse, switch, or not used (OFF - NO INPUT).

INSTRUMENT SETTINGS - System Prompts - Configuration
Prompts section that configures various instrument wide parameters, such as instrument tag, time and date formats, the current date and time, and some special actuator selections.

INSTRUMENT TAG - System Prompts - Configuration - Instrument Settings
Parameter used to specify a description or designation that can be displayed with the current time and date in the Display Sequence.

LOW FLOW CUTOFF - System Prompts - Configuration - Totalizers
Parameter that specifies the value below which the flow will not be added to the total. If the flow rate is negative, the flow will be subtracted if the value is more negative than the magnitude of the LOW FLOW CUTOFF value specified. If negative flow totalization (subtraction) is not desired, the negative flow rate must be cutoff at the input using CUTOFF TYPE and CUTOFF VALUE. For example, if LOW FLOW CUTOFF is 100 GAL/HR, positive flow of 0 to 99 GAL/HR will not be totalized, but negative flow of -101 or more negative would be totalized (subtracted).

Major time lines
Major time lines are printed as a series of dots, with noticeable spacing, and extend from the inner chart ring to the outer chart ring. The number of major time lines printed on the chart is determined by the MAJOR TIME PERIODS parameter in the Chart Configuration. The color of the major time lines is programmable.

MAJOR TIME PERIODS - Chart Prompts - Chart Configuration
Parameter that specifies the number of periods or sections the chart shall be divided into. This also corresponds to the number of “major time lines” printed, and indirectly, the time between them.

MATCH/SELECT - Chart Prompts - Chart Configuration
Parameters which specify whether time lines, times, and dates and chart tags should be in the same color as the scale just printed, or always be a fixed color.

MATCH SCALE COLOR - Chart Prompts - Chart Configuration
A choice for MATCH/SELECT prompts which specifies that the corresponding time line, time, or date and chart tag should be in the same color as the scale, as the chart is being printed.

Minor time lines
Minor time lines are printed as a series of dots, with spacing greater than major time lines and extend from the inner chart ring to the outer chart ring. Minor time lines are printed between major time lines, and the number of minor time lines is one less than the number of MINOR TIME PERIODS specified in Chart Configuration.

MINOR TIME PERIODS - Chart Prompts - Chart Configuration
Parameter that specifies the number of periods or sections each major time period shall be divided into. This also corresponds to one less than the number of “minor time lines” printed, and indirectly, the time between them.

NONE/OFF
One of the list of actuators which is effectively no selection. This is the default or initial configuration for most actuator parameters. It evaluates to false or 0.

Normal Display mode
The state the unit is in, relative to what’s in the display, when it is not in the Display Prompts, Chart Prompts, or System Prompts. In this state, values and/or messages are being displayed, rather than prompts.

OPERATOR MESSAGES - System Prompts - Configuration
Prompts section that configures the two lines of text and DISPLAY MODE for each Operator Message. They are displayed only if their actuator is active and appear during Normal Display as specified by the DISPLAY MODE parameter. Only one provided "chart full" if stop after one rev is no.

PEN/COLOR - System Prompts - Configuration - Recorders
Parameter used to specify the pen or color to be used.

Print interval
The time between each print cycle, when the pen actuator/cartridge assembly passes over the chart to record trend and other data. The print interval is equal to the value of the chart rotation speed (expressed in hours) expressed in seconds. For example, with a chart speed of 12 hours, the print interval is 12 seconds.

PROCESS VARIABLES - System Prompts - Configuration
Prompts section that configures up to four Process Variables, which can be used for alarming or to take advantage of the 4 PVS Display Format.

RANGE LIMIT HIGH/LOW - System Prompts - Configuration - Inputs
Parameters that specify the normal engineering unit conversion range on inputs other than TC and RTD types and provide values for the “out-of-range” testing. The RANGE LIMIT HIGH (LOW) value corresponds to the engineering unit value when the analog input is at the respective INPUT RANGE HIGH (LOW) value. If the resultant IV (Input Value) is 5% above the high value or below the low value, the unit will drive the corresponding IV to +99999 or -99999, depending upon whether UPSCALE or DOWNSCALE was selected for SENSOR BREAK. The input value will also be “flagged” as being in error. If the 5% allowed is insufficient for a particular application, the band can be widened by widening the INPUT RANGE and RANGE LIMIT values. RANGE LIMIT HIGH/LOW are not needed for the conversion of TC and RTD input types, but are included for the “out-of-range” testing. When the INPUT TYPE is changed to TC or RTD, or when the TC TYPE or RTD TYPE is changed, the high and low values will be set to the limits of the respective input, after which they may be modified.

RECORDER
In this instrument, RECORDER applies to an entity that provides the trend recording function on one of the four pens. Each RECORDER is not inherently associated with any particular input, process variable, pen or color, but rather is fully configurable to work with any of these.

RECORDERS - System Prompts - Configuration
Prompts section that configures recording method, scales, zones, colors, etc., for each RECORDER.

RELAYS - System Prompts - Configuration
Prompts section that configures actuators and other parameters associated with relay outputs.

RTD TYPE - System Prompts - Configuration - Inputs
Parameter that specifies the type of RTD: PT 100 ohm .00385 DIN, .00392 USA, .00392 SAMA, or NI 100 ohm.

Scale lines
Scale lines are printed as a series of dots, closely spaced to form a solid line, and are printed only in the area of the chart (zone or portion of chart span) used for the respective trend line. The scale lines are printed on top of major time lines. The number of scale lines printed on the chart is determined by the MAJOR TIME PERIODS parameter, the number of BLANK MAJOR TIME PERIODS, and the number of trend lines being recorded. The color of the scale line is the same as the respective trend line.

Scale values
The set of values printed next to the scale line which identify the engineering values corresponding to the respective rings on the chart, usually evenly spaced at multiples of 10 divisions or rings.

SELECT A COLOR - Chart Prompts - Chart Configuration
A choice for MATCH/SELECT prompts which specifies that the corresponding time line, time, or date and chart tag should always be printed in a fixed color. The color is selected at the next prompt.

Sensor break
While there are sensor break jumpers, JU1 and JU4, sensor break and out-of-range conditions are actually determined and handled by the software. When either occurs, the software will drive the input value to +99999 or -99999 based upon whether SENSOR BREAK is software configured for UPSCALE or DOWN SCALE. Any outputs will react accordingly. Out-of-range is defined as being more than 5% out of the span established by RANGE LIMIT LOW and RANGE LIMIT HIGH.

For 5 or 10 volt and current inputs, the analog signal goes to zero when there is a sensor break, due to voltage divider or shunt resistors. For sensor break detection to work on these input types, the INPUT RANGE LOW (analog signal low) and/or RANGE LIMIT LOW (engineering units low) parameters must be set high enough such that at zero volts/mA, the resultant value will be at least 5% below the span established by RANGE LIMIT LOW and RANGE LIMIT HIGH.

SPAN 1 HIGH - System Prompts - Configuration - Recorders
Parameter that specifies the trend value corresponding to the “top” of zone 1.
This parameter also specifies the “bottom” of zone 2, if two zones are used.

SPAN 1 LOW - System Prompts - Configuration - Recorders
Parameter that specifies the trend value corresponding to the “bottom” of zone 1.

SPAN 2 HIGH - System Prompts - Configuration - Recorders
Parameter that specifies the trend value corresponding to the “top” of zone 2.

Tag
A general term which refers to a description or designation that is displayed or recorded. There are tags for the instrument, chart, and each input, process variable, recorder, etc. Tags are text parameters.

TC TYPE - System Prompts - Configuration - Inputs
Parameter which specifies the thermocouple type to be used.

TEST - System Prompts - Section 10
Prompt section which provides access to various test routines.

Text
A general term which refers to a parameter that is a series of characters, such as a display tag, units, or contents of a configurable message.

TIME BASE - System Prompts - Configuration - Totalizers
Parameter that specifies the time base of the flow rate, so the instrument can calculate the total. The choices are units: PER SEC, PER MIN, PER HOUR, PER DAY, and PULSES.

Time between print cycles - see Print interval

TIME FORMAT - System Prompts - Configuration - Instrument Settings
Parameter that specifies the format for displaying time; AM/PM or 24 HOUR.

TMx RESET ACTUATOR - System Prompts - Confiugration - Timers
Parameter that selects an actuator, which when true, causes the specified timer value to be set to its initial value (zero or the Timer Period value), depending on whether the Timer Type is Count Up or Count Down.

TOTAL IS FLOW - System Prompts - Configuration - Totalizers
Parameter used to specify what scaling factor the flow value should be multiplied by in calculating the total value. If the choice TIMES 1,000,000 is selected, and the flow was 0.3 MGD (Million Gallons per Day), at the end of a day the total would be 0.3 million gallons, but the totalizer would display a value of 300,000 (0.3 times 1,000,000) and the total would correspond to gallons, maybe displayed as GAL.

TOTALIZER GENERAL FORMULA
The general formula for the totals, calculated each second is:

TOTAL = TOTAL + (VALUE / TTB) * FACTOR
Where: VALUE is the once a second value or one second average for the selected input source.
TTB is 1 for TOTAL TIME BASE - PER SECOND
60 for TOTAL TIME BASE - PER MINUTE
3600 for TOTAL TIME BASE - PER HOUR
86400 for TOTAL TIME BASE - PER DAY
FACTOR is the selected factor (.0001 to 100000)

TOTALIZER TYPE - System Prompts - Configuration - Totalizers
Parameter that specifies one of four types of totalizing; CONTINUOUS, PRE-LOAD, COUNT TO PRESET, or COUNT DOWN PRESET.

Trend data collection
A general term which refers to the instruments ability to collect trend data to be recorded when the chart is rotating for normal recording (which excludes initializing a new chart). If data collection remains on while the chart is not rotating or is being initialized, when rotation resumes, collected data will be recorded prior to recording current real time data. The instrument can collect up to 360 trend values. If an instrument is configured with 4 Recorders and a 24 hour chart speed, it could collect data for 36 minutes before it began to loose the oldest data. [(360 values / 4 Recorders) = 90 print cycles, times 24 seconds per print cycle (print interval), results in 2160 seconds or 36 minutes]

Value
A general term referring to a number or a parameter that is a number.

VALUE FILTER - System Prompts - Configuration
Parameter found in various sections that specifies the filtering to be applied to the value for all purposes. This filter affects the IV, PV, DV, etc. as it is used for alarming, recording or any other purpose. Zero specifies no filtering. A value of 1 to 9999 specifies the number of seconds over which values will be accumulated prior to calculating a new average for display. See DISPLAY FILTER.

V/MA CONV - System Prompts - Configuration - Inputs
Parameter that specifies the type of conversion for the input. The choices are: LINEAR, SQRT, and EXP, for linear, square root, and exponential. If EXP is selected, the next parameter will be the exponential value.

Zone
The portion of the chart over which a trend line is to be recorded. The zone may be less than the maximum area available for recording. Trends can be recorded in two adjacent zones to allow for higher resolution on one end of the recorded span. Zones are established with respect to the number of rings or divisions on the chart, typically 70, 100, or 120 rings or divisions. Division 0 is the inner ring.

ZONE 1 HIGH - System Prompts - Configuration - Recorders
Parameter that specifies the DIVISION or ring corresponding to the “top” end of the zone.
This parameter also specifies the “bottom” of zone 2, if two zones are used.

ZONE 1 LOW - System Prompts - Configuration - Recorders
Parameter that specifies the DIVISION or ring corresponding to the “bottom” end of the zone. For reverse ranges (lower engineering value at the outer portion), either the two ZONE parameters or the two SPAN parameters can be reversed.

ZONE 2 HIGH - System Prompts - Configuration - Recorders
Parameter that specifies the DIVISION or ring corresponding to the “top” end of the second zone. Setting it to zero specifies that only one zone is being used. ZONE 1 HIGH specifies the “bottom” of zone 2 if two zones are used.

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