

INSTRUCTION MANUAL

MODEL 7060

RTD TEMPERATURE MONITOR





CONTENTS

RECEIVING AND HANDLING	A
INTRODUCTION	1
DESCRIPTION	1
Deviation Sheet	
SPECIFICATIONS	5
INSTALLATION	6
OPERATION	9
MAINTENANCE	10
DRAWINGS	



RECEIVING AND HANDLING

ACCEPTANCE

Vitec terms of sale, in all instances, are F.O.B. point of origin, freight prepaid. Thoroughly inspect this equipment before accepting shipment from the transportation company. If any of the goods called for in the bill-of-lading or express receipt are damaged or the quantity is short, do not accept them until the freight or express agent makes an appropriate notation on your freight bill or express receipt. Request him to make an inspection. Claims for loss or damage in shipment must not be deducted from the Vitec invoice, nor should payment of the Vitec invoice be withheld awaiting adjustment of such claims since the carrier guarantees safe delivery.

If considerable damage has been incurred to your shipment and the situation is urgent, contact the nearest Vitec District Office for assistance.

UNPACKING AND STORAGE

Store equipment in a clean, dry area. Do not unpack equipment until ready for use.

PRODUCT WARRANTY

Except as otherwise provided in Vitec's Standard Condition of Sale, all new apparatus sold by the company is warranted to be free from defects in material and workmanship and to conform to any applicable drawings and specifications approved by the company for a period of one year from date of shipment to original user or 18 months from date of shipment by company to buyer, whichever period is shorter.

If within this period the company receives from the buyer written notice of any alleged defect in any such apparatus and if this apparatus is found not to be in conformity with this warranty (the buyer having provided the company a reasonable opportunity to perform any appropriate tests thereon) the company will, at its option and expense, either repair the same or supply a replacement therefore.

The company under either option shall have the right to require the buyer to deliver the apparatus for this purpose to a designated service center and the buyer shall pay all charges for inbound and outbound transportation and for services of any kind, diagnostic or otherwise, excepting only the direct and actual cost of apparatus repair or replacement.

Apparatus sold but not manufactured by the company will be warranted as to defects in material and workmanship consistent with the warranty policy of the original manufacturer of the apparatus.



INTRODUCTION

This instruction manual contains descriptive information and functional operating and maintenance instructions for the Vitec Series 7060 R.T.D. Temperature Monitor. In order to obtain maximum usage from the instrument, the contents of this manual should be studied thoroughly. Any repairs or servicing required should be performed only by authorized Vitec service personnel.

GENERAL DESCRIPTION

The Series 7060 R.T.D. Temperature Monitoring System is designed to continuously measure, display and give an alarm indication of temperature of industrial processes and machinery. This monitor consists of eight (8) monitoring channels which receive and process signals from R.T.D.'s installed on the equipment being monitored. Meter readout is provided for operator viewing of the measured temperature or limit setpoint temperature of the individual channels. Front panel controls include a "Channel Selector" switch, and readout switch. Alarm LED's for each channel are provided to indicate an alarm condition relative to the pre-set "set point" limit for the respective channel. The "power" LED indicates power has been applied to the unit. "Set Point" potentiometers are accessible through the front panel after removing the cover plate.

CHANNEL SELECTOR SWITCH

This switch selects which channel temperature will be connected to the meter for display. The positions 1,2,3,4,5,6,7,8, indicate the channels. Monitoring functions of all channels are continuous, regardless of the position of this switch.

LIMIT READ

Actuating this momentary switch will display the respective set point limit for the channel indicated by the channel select switch.



DESCRIPTION - (Continued)

METER

The meter indicates R.T.D. temperature for individual channels as selected by the "Channel Selector" switch. Actuating the "Limit Read" switch causes the meter to display the set point temperature for that channel. The meter circuit contains a potentiometer for adjustment of full scale span of the meter. The meter movement is protected against overload.

METER READOUT UNITS

°F. or °C. per customer order.

SET POINT ADJUST

To adjust the alarm set points, set channel select switch to desired channel, hold limit read switch to desired function, finally turn the set point adjusting pot which corresponds to that channel and function, i.e. channel 3 alarm, etc. (Note: Screw adjustable set point pots are located behind set point cover, Full Scale Range Tag)

CIRCUIT DESCRIPTION

The Series 7060 Temperature Monitoring System is designed to continuously measure, display and give an alarm indication of temperatures of industrial processes and machinery. A monitor system consists of eight (8) monitoring channels which receive and process voltage signals from resistance type detectors installed on the equipment being monitored. Meter readout is provided for operator viewing of the measured temperature or limit setpoint temperature of the individual channels. Front panel controls include a "channel selector" switch, and a momentary toggle switch which when pressed to the right reads "Limit" and pressed to the left "Resets" the relays, LED's, etc. In addition, there are eight (8) red alarm lamps on the front panel, and a "PWR" lamp, green, which is lit when power is applied to the system. The set point potentiometers are screw driver accessible through the holes in the front panel.

The temperature monitor features integrated solid-state circuitry housed in a rugged metallic enclosure, assuring high reliability under various environmental conditions. All input and output connections are made at the rear mounted, functionally grouped terminals. A terminal identification drawing is included with this manual.

DESCRIPTION - (Continued)POWER SUPPLY

The power supply consists of a \pm 12 volt highly regulated dual tracking regulator for the analog circuitry. A highly regulated +5.0 volt D.C. supply is used for the digital circuitry. In addition, a reference voltage regulator is used to supply the Wheastone Bridges, limit potentiometers, the D/A and the A/D circuitry. This insures that the unit will maintain its accuracy with long term stability. The monitor printed circuit board is accessible by removing one of the side covers.

CAUTION: DO NOT REMOVE OR INSERT ASSEMBLY WITH INPUT POWER APPLIED TO THE MONITOR. THIS COULD RESULT IN DAMAGE TO THE INTERNAL CIRCUITS OF THE MONITOR.

The regulators have inherent current limiting circuits for added protection.

A green LED, mounted on the front panel, labeled "PWR" is lit when A.C. power is applied to the monitor.

RTD BRIDGE, MULTIPLEXER - Instrumentation Amplifier (See Block Diagram)

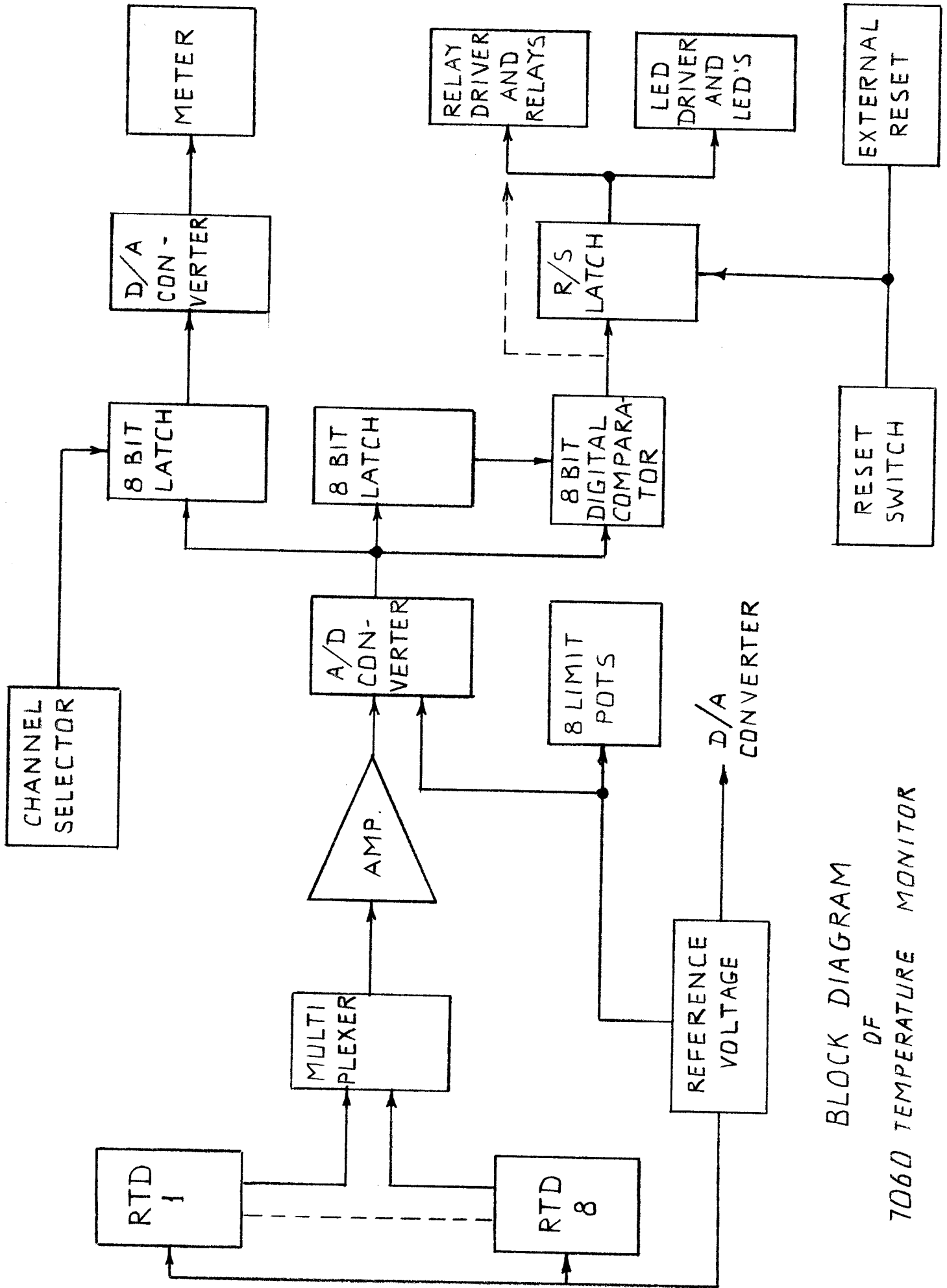
Each RTD is connected in a bridge circuit by three leads to cancel the effect of lead resistance. Each bridge contains a potentiometer for zeroing the bridge to the meter. The bridge unbalance created by the RTD resistance increase due to the temperature being measured is multiplexed and amplified by a highly accurate, gain stable instrumentation amplifier. The output of the instrumentation amplifier is applied to the D/A converter.

DIGITAL ELECTRONICS

The RTD analog signal voltages and the limit signal voltages are converted into an 8 bit byte by the A/D converter. The representative 8 bit byte of the RTD signal is stored in a latch and compared against the 8 bit byte of the corresponding limit voltage. If the analog signal exceeds the limit voltage, a pulse is outputted from the digital comparator which is latched. The output from the latch drives the LED and relay driver stages and these will remain energized as long as the latch's output is high. In order to extinguish the LED and de-energize the relay, it is necessary to press the toggle switch (front plate) to the reset position. Remote reset can be accomplished at the rear terminals also.

CHANNEL SELECTOR SWITCH - (Front Plate)

This is a BCD coded switch which selects the channel temperature or set point for that channel.



BLOCK DIAGRAM
OF
7060 TEMPERATURE MONITOR



DESCRIPTION - (Continued)

"LIMIT READ" TOGGLE SWITCH - (Front Plate)

Placing the toggle switch in the limit read position causes the set point temperature of the channel indicated by the "Channel Selector" switch to be displayed on the meter. The set points are adjustable through holes in the front panel.

"RESET" TOGGLE SWITCH - (Front Plate)

Placing the toggle switch in the "RESET" position, resets the LED's and relays to the non-alarm condition if the alarm condition has been removed.

METER

The meter indicates RTD temperature for individual channels as selected by the "Channel Selector" switch. Pressing the toggle switch to the "Limit Read" position causes the meter to display the set point temperature for that channel. The meter circuit contains a potentiometer R27 for adjustment of full scale span of the meter. The meter is protected against overload by the constant current limit of the D to A converter.



ANALOG OUTPUTS - (OPTION)

A separate Analog Output for each of (8) channels is available. This option consists of an auxilliary (piggyback) analog driver P.C.B. Assembly, an auxilliary (piggyback) rear connector terminal block P.C.B. Assembly and associated interconnecting ribbon cable assemblies.

The analog driver auxilliary P.C.B. Assembly can be configured to provide analog outputs of: 0-1 VDC, 0-5 VDC, or 4-20 ma DC (see deviation sheet for analog output per S.O.)

The auxilliary rear connector terminal block P.C.B. Assembly has the analog outputs available on TB5 and TB6. This P.C.B. has been fitted with hinged standoffs for ease of access to terminal block TB3, located on main rear connector assembly. To swing the auxilliary P.C.B. out of the way, unplug ribbon cable connector J1, and remove the two (2) hold down screws, located top and bottom center on the auxilliary P.C.B. (see drawing 79904-128, Sh.2)



SPECIFICATIONS FOR A COMPLETE 8-CHANNEL RTD TEMPERATURE MONITOR MODEL 7060

- a) Eight channels available for RTD's.
- b) One setpoint each channel. (8 total).
- c) One alarm relay each channel. (8 total).
- d) One LED for power. (Green).
- e) Eight LED's for alarm. (Red).
- f) One meter.
- g) One 8-channel selector switch to read each channel.
- h) One momentary toggle switch for reset and limit read to read alarm setpoints.
- i) Available for 110 or 220 VAC - 50 or 60 cycles.
- j) An optional separate analog signal of 0-1 VDC, 0-5 VDC or 4-20 MA proportional to full scale is available at terminals on aux. rear connector board for all 8 channels simultaneously. (Consult factory).
- k) Relay contacts - Form C (SPDT) 5 amp. non-inductive at 115 V - 60 Hz. De-energized below set point is standard, energized below trip is optional.
Latching or non-latching per customer order.



INSTALLATION

GENERAL

Inspect the instrument and packing case for any evidence of damage or unusual abuse in transit. Check the unit for obvious dents, scratches, or broken fittings. Any damage should be reported to the shipper at once.

VITEC MAKES NO WARRENTY AGAINST EQUIPMENT THAT HAS BEEN SUBJECTED TO IMPROPER HANDLING PROCEDURES. ANY CLAIM AGAINST TRANSPORTATION DAMAGE MUST BE FILED BY THE RECIPIENT WITH THE TRANSPORT SERVICE USED.

The R.T.D. Temperature Monitor is ready for installation upon receipt, requiring only mounting and the connection of power source and R.T.D. input cables. Each instrument is individually tested to listed specifications prior to shipment to ensure satisfactory performance.

MECHANICAL INSTALLATION

The series 7060 R.T.D. Temperature Monitor is designed for mounting on the customer's vertical panel. A panel cutout must be provided. See drawing No. 79904-128, Sh. 1. The series 7060 R.T.D. Temperature Monitor is designed for use as a bench top or panel mounted device.

NOTE: THIS MONITOR IS NOT INTENDED FOR HOSTILE ENVIRONMENT AND MUST BE PROTECTED FROM DIRT, MOISTURE AND EXTREME HEAT (ABOVE 125°F).

To panel mount the Model 7060 the panel mounting rails must first be removed from the case. This is accomplished by removing the four (4) outermost screws as viewed from the rear. (Do not confuse these screws with the rear connector mounting screws). After these screws have been removed, the panel mounting rails may be slid out of their tracks. At this point the Model 7060 can be placed in a 7.25 x 3.56 panel cutout. (See drawing 79904-128, Sh 1). The rails may then be replaced along with the retaining screws thereby securing the monitor. (see Fig.1)

The R.T.D.'s are mounted on the equipment at points designated by the customer. Mounting dimensions and direction of mounting may be particular to the R.T.D. Therefore, detailed installation instructions are not normally included in the monitor manual. Information on a particular R.T.D. is available upon request.

MECHANICAL INSTALLATION

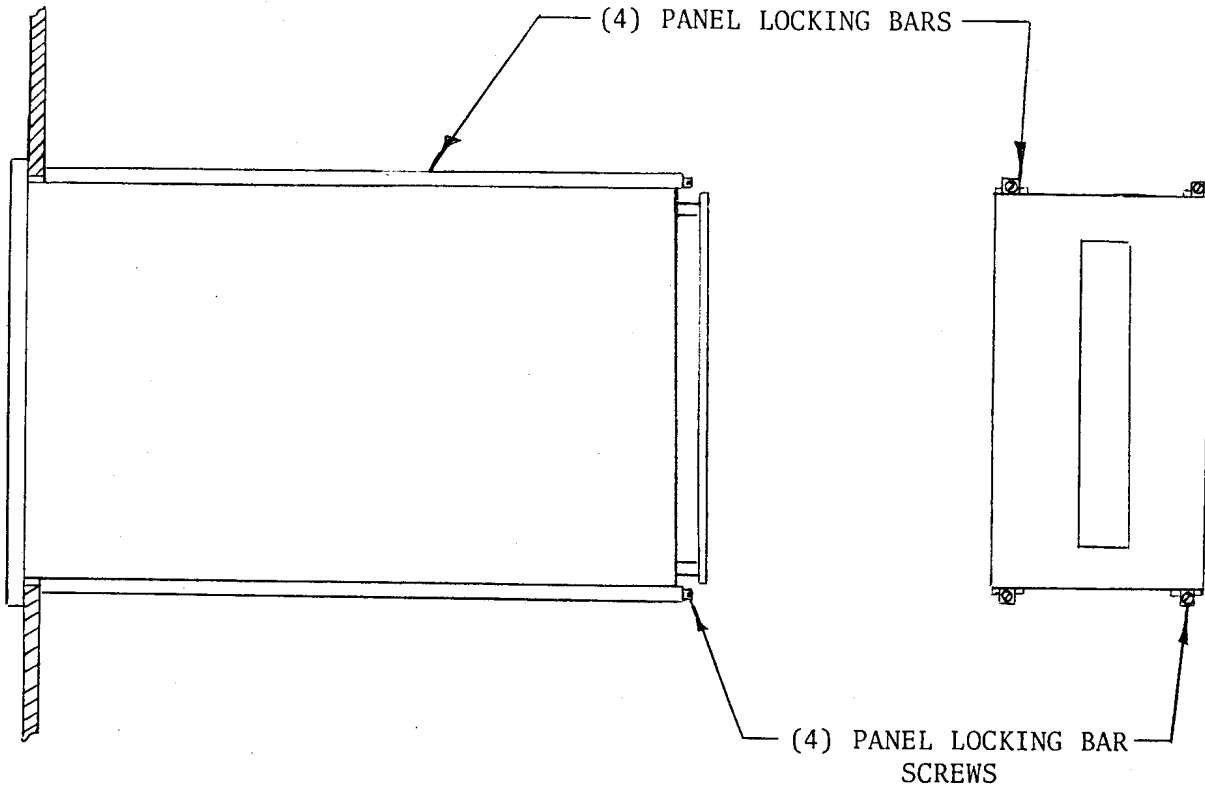


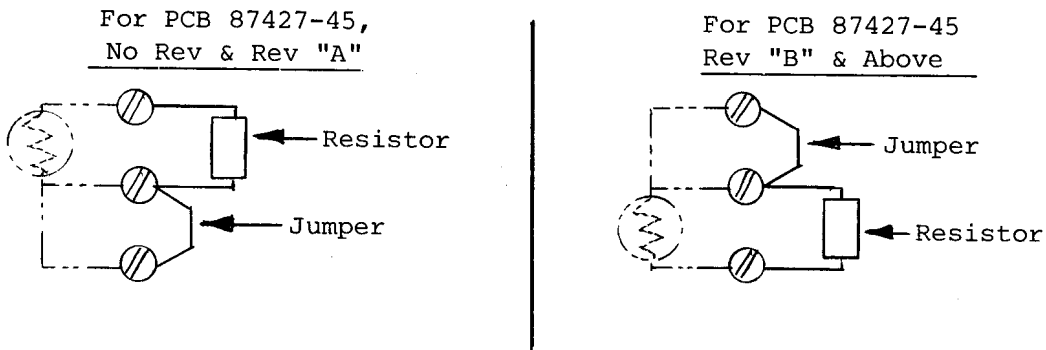
FIG.1

INSTALLATION - (Continued)

ELECTRICAL INSTALLATION

All Electrical connections are made to the terminal strips mounted on the rear of the housing. See Drawing No. 412530-___ (see deviation sheet for dash number).

The Model 7060 is capable of monitoring 8 inputs, if however all eight channels are not going to be utilized, Jumpers and/or Resistors must be installed across the unused terminal input points, see chart below.



TYPICAL UNUSED INPUT TERMINAL JUMPERING

JUMPERING CHART For Unused Inputs	
RTD	Resistor Value
10 Ω	0 Ω , (Jumper)
100 Ω	88.7 Ω
120 Ω	100 Ω

The monitor is functional with power connected to terminals TB2-1, 2 and 3 and the RTD and relay connections completed.

REMOTE RESET

TB1-1 and TB1-2 may be used for connecting a remote, normally open, reset switch.

CAUTION: SHUT OFF INPUT POWER FOR MONITOR BEFORE CONNECTING OR DISCONNECTING WIRING TO TERMINALS.

BE SURE TO CONNECT TB2-3 TO A GOOD EARTH GROUND.



GROUND CONNECTION

WARNING: SEVERE, POSSIBLE FATAL ELECTRICAL SHOCK CAN RESULT FROM
CONTACT WITH AN INADEQUATELY GROUNDED TEMPERATURE MONITORING SYSTEM.
TO ENSURE SAFETY OF OPERATING PERSONNEL ... AN INSULATED GROUNDING
WIRE OF AT LEAST 18 AWG SHOULD BE CONNECTED FROM MONITOR TERMINAL
TB2-3 TO A SUITABLE EARTH GROUND. REFER TO NATIONAL ELECTRIC CODE
REGULATIONS FOR YOUR AREA FOR SPECIFIC REQUIREMENTS.



OPERATION

PREPARATION FOR USE

Before operating the equipment ...

- a) Check all interconnecting wiring for strict conformance to wiring diagrams. Make sure all connections are tight.
- b) Visually inspect monitor and vibration pickup wiring for loose or broken connections or damaged wires.
- c) Check for loose or damaged components.
- d) See that proper input power is available.

OPERATION OF R.T.D. TEMPERATURE MONITOR

- a) Connect input power. Monitor "PWR" indicator will light.

NOTE: THE MONITORING FUNCTION WILL COMMENCE FOR ALL CHANNELS AS SOON AS POWER IS APPLIED TO THE UNIT.

- b) Turn the CHANNEL selector switch to the desired positions. The panel meter will immediately display the temperature for the selected channel. Similarly select other channels for visual readout of temperature.
- c) The present temperature limit setpoint for a particular channel may be observed by activating the "Limit Read" switch. The monitor panel meter will display the set point, then return to the temperature reading for that channel when the switch is released.
- d) The temperature monitoring function of all channels is continuous while the unit is in operation.



MAINTENANCE

GENERAL

Vitec Series 7060 R.T.D. Temperature Monitors are manufactured of high reliability components and under normal operating conditions will give long, trouble-free service. In the event a component should fail, requiring replacement, it may become necessary to return the instrument to the manufacturer for re-calibration if it does not operate satisfactorily following repair.

REPAIR PROCEDURES

The application of solid-state circuitry yields a rugged and reliable instrument during normal operation. In the event of a suspected failure and before any repairs are attempted:

- a) Read the WARRANTY on the front of this manual.
- b) Make sure that the applied input is of sufficient amplitude and within specified range.
- c) Verify proper positioning of operating controls.
- d) Visually inspect unit for loose or broken wiring connections and defective components.

If a broken malfunction is encountered, follow these general instructions:

- a) NEVER remove or replace a component while the power cord is connected.

CAUTION: EXERCISE EXTREME CARE WHEN SERVICING THIS EQUIPMENT WHILE POWER IS CONNECTED. A SHOCK HAZARD DOES EXIST. REPAIRS SHOULD BE MADE BY QUALIFIED PERSONNEL ONLY.

- b) Properly ground all test equipment.
- c) Use only a grounded, transformer-coupled, thermostatically controlled soldering iron.
- d) Never use acid-core type solder on wiring or electronic component connections.



MAINTENANCE - (Continued)

TROUBLE ANALYSIS

Whenever trouble occurs systematically check fuses, primary power lines, external circuit elements and related wiring before trouble shooting the instrument. Failures and malfunctions often can be traced to simple causes such as supply-load connections or fuse failure.

Use the electrical schematic diagrams as an aid to locating trouble causes. These diagrams contain various circuit voltages that are averages for normal operation. Measure these voltages using the conditions for measurement specified on the schematic diagram. Use measuring probes carefully to avoid causing short circuits and damaging circuit components.

CHECKING TRANSISTORS AND CAPACITORS

Check transistors with an instrument that has a highly limited current capability. Observe proper polarity to avoid error in measurement. The transistor forward resistance is LOW, but never zero; backward resistance is always higher than the forward resistance.

For GOOD transistors, the forward resistance for any junction is always greater than zero.

NOTE: DO NOT ASSUME CIRCUIT TROUBLE IS ELIMINATED WITH THE REPLACEMENT OF ONE FAULTY COMPONENT. THIS IS ESPECIALLY TRUE WHEN ONE TRANSISTOR FAILS, CAUSING OTHER TRANSISTORS TO FAIL. REPLACING ONLY ONE TRANSISTOR, THEN TURNING POWER ON BEFORE CHECKING FOR ADDITIONAL DEFECTIVE COMPONENTS, COULD DAMAGE THE REPLACEMENT PART.

When soldering semi-conductor devices, wherever possible, hold the lead being soldered with a pair of long-nose pliers placed between the component and the solder joint ... this will usually provide an effective heat sink.

Note: The leakage resistance obtained from a simple resistance check of a capacitor is not always an indication of a faulty capacitor. In some cases a capacitor is shunted with resistances, some of which have low values. Normally, a dead short is a true indication of a shorted capacitor.



MAINTENANCE - (Continued)

PRINTED CIRCUIT BOARD MAINTENANCE

- 1) If circuit foil is intact, but not covered with solder, it is a good foil. DO NOT ATTEMPT TO COVER WITH SOLDER.
- 2) Voltage measurements can be made from either side of the board. Use a needlepoint probe to penetrate to the wiring whenever a protective coating is used on the wiring. A brass probe can be soldered to an alligator clip adapted to the measuring instrument.
- 3) Wherever possible, use a heat sink when soldering transistors.
- 4) Broken or damaged printed wiring is usually the result of an undetected imperfection, strain, or careless soldering. To repair small circuit breaks, select a short piece of hook-up wire to bridge the break, and holding the wire in place, flow solder along the length of wire so that it becomes part of the circuitry.
- 5) When unsoldering components from the board, never attempt to pry or force loose the part; unsolder the component, using a suitable solder removal tool for removing excess solder.



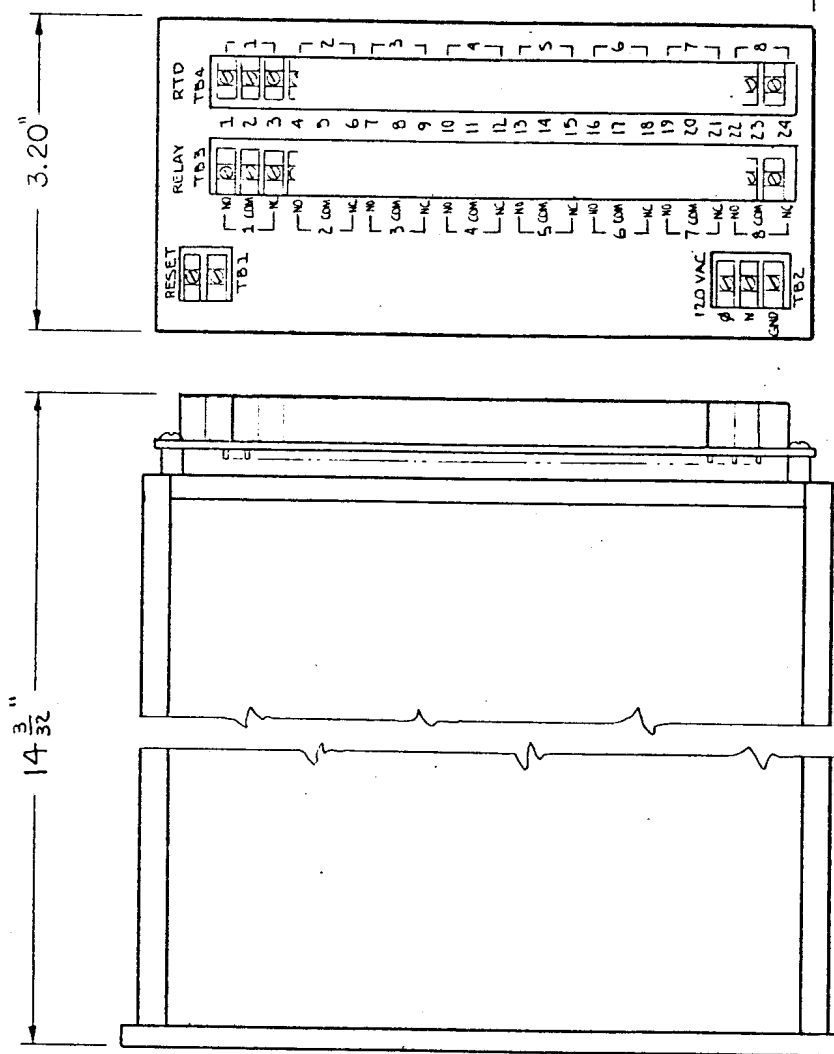
SUPPLEMENTAL DRAWINGS FOR M-7060

<u>DESCRIPTION</u>	<u>DRAWING NUMBER</u>
Case Dimensions	79904-128, Sheet 1 & 3
Rear Conn. Wiring.....	412530-*

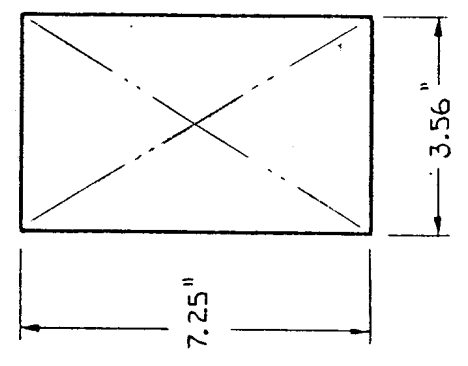
* SEE DEVIATION SHEET FOR COMPLETE PART NUMBER PER S.O.

4 3 2 1 D

ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		CHK. LIMIT READ & RESET TO TOGGLE SW. & CH. VITEC LOGS	4-2-81	J. SIMKO
B		CH. LIMIT READ & RESET TO A SINGLE TOGGLE SWITCH.	6-9-81	J. SIMKO
C		OA LENGTH WAS 13.65. PANEL CUTOUT WAS 7.52 X 3.62. ADD SETPOINT COVER	6-10-81	MT
				J. SIMKO



REAR VIEW



PANEL CUTOUT

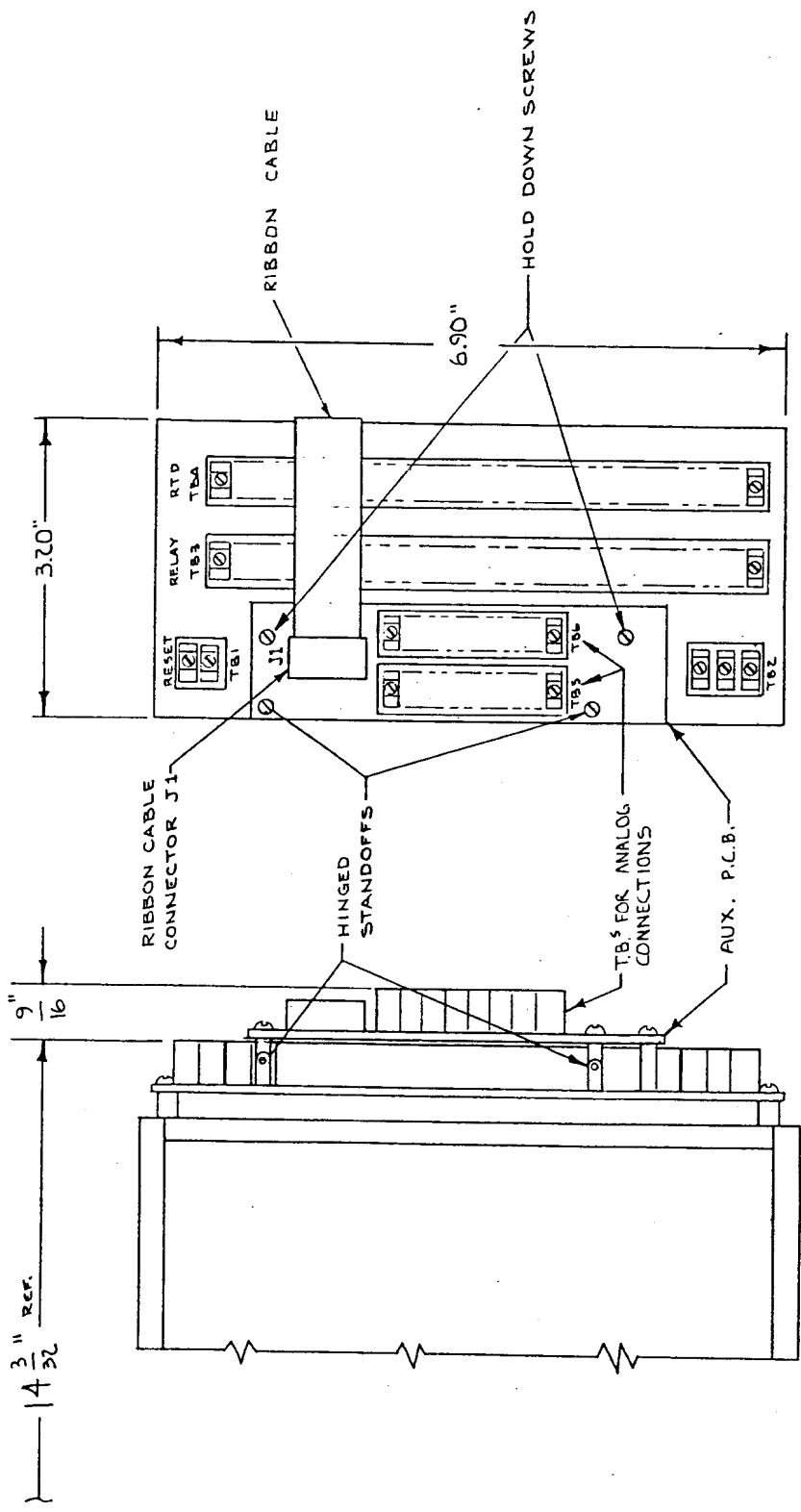
QTY	REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES				
TOLERANCES ARE:				
FRACTIONS ± 1/64				
DECIMALS .XX ± .02				
ANGLES ± 1/2°				
MATERIAL N				
FINISH N				
DO NOT SCALE DRAWING				
CONTRACT NO.				
APPROVALS DATE				
DRAWN E. ABALFY 2-5-81				
CHECKED J. SIMKO 2-5-81				
MATERIAL				
FINISH				
NEXT ASSY APPLICATION				
USED ON				
SIZE CODE IDENT NO. DRAWING NO.				
C 55093 79904-128				
SCALE 1:1				
SHEET 1 OF 3				



MODEL 7060, TEMPERATURE MONITOR, DIMENSION DWG.

4 3 2 1

REVISIONS		DATE	APPROVED
ZONE	LTR	DESCRIPTION	
	A	CONNECTED POSITION OF NIP. CABLE	3-30-82 BLS/V.S.

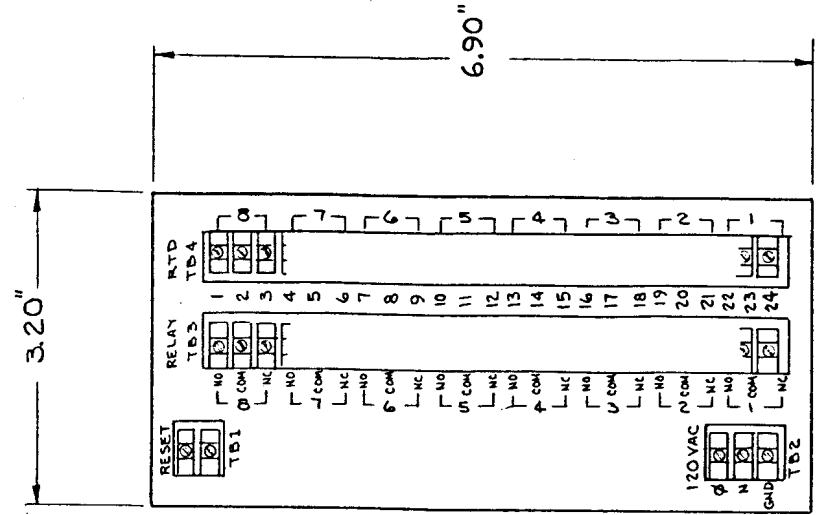


REAR VIEW

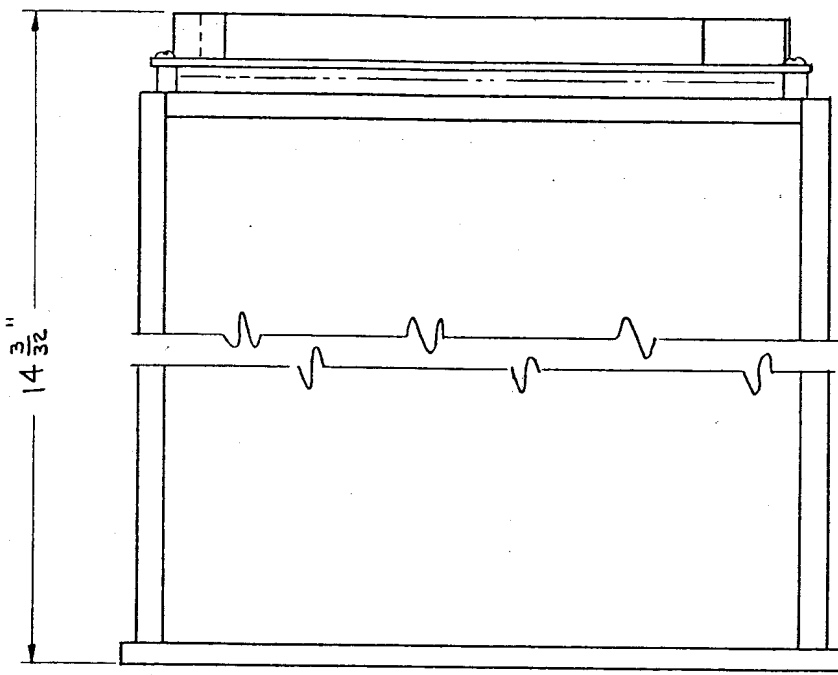
SIDE VIEW

QTY	CODE	PART OR	NOMENCLATURE
REQD	IDENT	IDENTIFYING NO.	OR DESCRIPTION
PARTS LIST			
CONTRACT NO.			
UNLESS OTHERWISE SPECIFIED		MATERIAL	
DIMENSIONS ARE IN INCHES		FINISH	
TOLERANCES ARE:		DO NOT SCALE DRAWING	
FRACTIONS	DECIMALS	ANGLES	
$\pm 1/64$.XX $\pm .02$	$\pm 1/4^\circ$	
	.XXX $\pm .005$		
DRAWN		APPROVALS	DATE
KROYAN		J.S. SIMIKO	1-27-82
CHECKED		J.S. SIMIKO	1-27-82
Vitec		MACHINERY PROTECTION INSTRUMENTATION	
MODEL 7060 TEMPERATURE MONITOR W/ANALOG OUTPUT OPTION		DIMENSION DWG.	
SIZE	CODE IDENT NO.	DRAWING NO.	
C	55093	79904-128	
SCALE	N	SHEET Z OF 3	

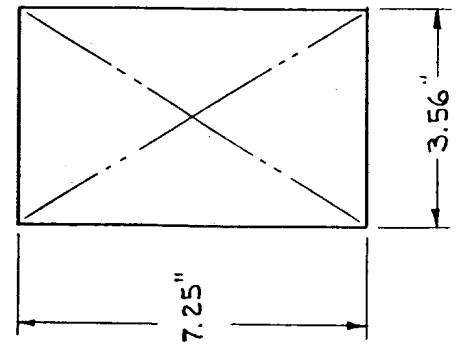
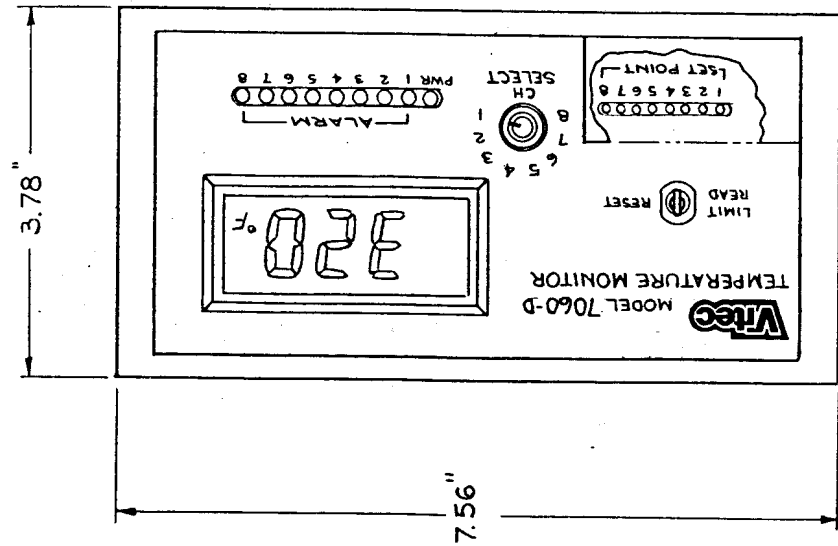
REVISIONS		DATE	APPR
LTR	DESCRIPTION		



REAR VIEW



PANEL CUTOUT



S. O. NO.		APPROVALS		SCALE
		DRAWN: [Signature]		1:1
		CHECKED: [Signature]		
		UNLESS OTHERWISE SPECIFIED		
		DIMENSIONS ARE IN INCHES		
		TOLERANCES ARE:		
		FRACTIONS DECIMALS ANGLES		
		± 1/64 XX ± 0.1 ± 1/2°		
		XXX ± .005		
		DO NOT SCALE DRAWING		
Vitec MACHINERY PROTECTION INSTRUMENTATION 31041 WINGFIELD BLVD. CLEVELAND, OH 44115		MODEL 7060-D RTD TEMP. MONITOR, DIMENSION DWG.		
C 55093		DRAWING NO.		SHEET 3 OF 3
		79904		-128