OPERATOR'S MANUAL

438D SINGLE CHANNEL VIBRATION MONITOR

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412537-271 Rev "A"

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

AC	Alternating Current
Adj.	Adjustment
BNC	Bayonet Nut Connector
DC	Direct Current
DIP	Dual-in-Line Package
Displ.	Displacement
F	Fahrenheit
Hz	Hertz
in/sec	Inches/Second
LED	Light Emitting Diode
mA	Milliamp
N.C.	Normally Closed
N.O.	Normally Open
PCB	Printed Circuit Board
R	Resistor
S	Switch
TB	Terminal Block
VAC	Volts Alternating Current

1.0 INTRODUCTION

The 438D Single Channel Vibration Monitor is an economical approach to accurate and reliable vibration monitoring of rotating machinery.

Installation and operation of this unit will be simple and easy if the instructions are followed.

READ THIS MANUAL THOROUGHLY
TO AVOID POTENTIAL START-UP PROBLEMS.

2.0 PRODUCT DESCRIPTION

The 438D consists of the monitor, a transducer and an interconnecting cable assembly. It measures the vibration level of the machine it is connected to and displays that vibration level on the LED display on the front door. The full scale range of the unit is set by a DIP switch located on the main printed circuit board assembly and is indicated by the appropriate LED on the front door.

The 438D provides one alarm and one trip relay closure when preset alarm or trip levels are exceeded. It also has alarm and trip LED's on the front door for local indication of an alarm or trip condition. The alarm and trip levels are set in the field at 5 to 100% of full scale by two potentiometers located on the main PCB assembly. The setpoints are displayed on the LED display by activating a momentary toggle switch located on the main PCB assembly. The alarm and trip relays (triacs) can be configured to be Normally Open (N.O.), or Normally Closed (N.C.) when the measured vibration is below the setpoint value, by DIP switches located on the main PCB assembly.

The 438D also includes several electrical outputs that are quite useful. A 4-20 mADC signal proportional to the overall vibration level allows the unit to be connected to a remote device for purposes of reading or recording the vibration level. Common applications include connections to meters, data loggers or recorders. Prior to using the 4-20 mADC you must first remove the 100 ohm resistor that is mounted between TB1-3 and TB1-4. The resistor should remain in place if the 4-20 mADC is not to be used.

An AC signal proportional to the actual vibration being measured is also provided. Common applications include connections to an oscilloscope to view the raw transducer signal, or connection to a real time analysis device for analysis of the measured vibration. The signal is accessible through a BNC connector on the side of enclosure.

3.0 ELECTRICAL INSTALLATION

The KEY to a trouble free installation is proper electrical installation. A little care taken here will assure a trouble free installation.

Follow the appropriate wiring diagram as selected from Figures 2 through 7. Make special note of the following:

1. The system requires a good instrument earth ground. Do not attempt to use the machine itself as a ground; it will normally not provide proper grounding. Do not use a ground that is common to other large pieces of electrical machinery as noise or surges from these machines can feed back into the 438D and cause false alarms or trips.

2. The relays used in the alarm and trip circuits are electronic solid state relays (triacs). Triacs require a minimum load to be present for proper operation. A minimum load of at least 50 mA (approx. 7 Watts) must be present at all times. Note the triacs cannot switch DC voltage, they must be used to switch AC voltage only. Triacs cannot be tested for proper operation with a voltmeter. They must be connected such that they switch a load for testing purposes.

3. Make sure that the voltage input lines and the relay output lines are fused as noted on the wiring diagram (Figures 2 through 7).

4. If the AC output signal is utilized, use a good grade of twisted, shielded cable. Keep the cable separated from other AC or power cables.

4.0 MECHANICAL INSTALLATION

The 438D can be mounted with four 1/4 inch bolts in any location within the distance parameters of the transducer.

5.0 SETPOINT ADJUSTMENT

The ALARM and TRIP setpoints are adjusted via two potentiometers located on the printed circuit board (see Figure 1, Items marked R21 and R22). For alarm setpoint adjust R21; for trip setpoint adjust R22. Do not attempt to adjust the small square pots also located on the printed circuit board; these pots are used for calibration of the unit.

The setpoint adjustments are calibrated for 0 to 100% relative to full scale. Simply turn the pot until the arrow lines up with the required setpoint level. Do not use excessive force. Do not try to turn the pot beyond its stops. Both pots are single-turn pots.

A 0 to 20 sec adjustable time delay is built into the alarm and trip circuits to help avoid false trips. The unit is shipped with 0 sec time delay, but can be adjusted in the field for up to 20 sec. Turn the pot clockwise to increase the time delay. Adjust pot R12 for alarm time delay and R11 for trip time delay (see Figure 1, Items marked R11 and R12).

6.0 RELAYS

Both the alarm and trip solid state relays (triacs) are set at the factory to be normally open below the setpoint. (Think of them as single pole light switches that are normally off (open), but turn on (close) when the vibration level gets too high.) The relays are not dry contacts. To operate properly, the load current must be 50 mA minimum.

The relays can be changed to normally closed below setpoint (open when the vibration setpoints are exceeded) using switch S1. When switch S1 is in positions 2 & 3, alarm and trip relays are normally open; switching S1 to the opposite position makes the relays normally closed (see Figure 1, Items identified as S1).

When shipped from the factory, the relays are normally NON-LATCHING. This means that after the vibration returns to a normal level, the relays will automatically reset themselves. The 438 can be changed to a LATCHING configuration in the field by removing the jumper between terminal block points TB2-1 and TB2-2. Without this jumper installed, the relays will stay latched when the vibration returns to a level less than the setpoint. A normally open set of contacts should be added across TB2-1 and TB2-2 to reset latched relays.

If desired, the relay action can be inhibited by connecting terminal points TB2-3 and TB2-2. This feature is normally used during machine tests or repair procedures. CAUTION should be used however, as this feature totally eliminates operation of the relays. No vibration protection is available while this feature is in use.

7.0 SPECIFICATION

The 438D Specification is shown in Figure 8.

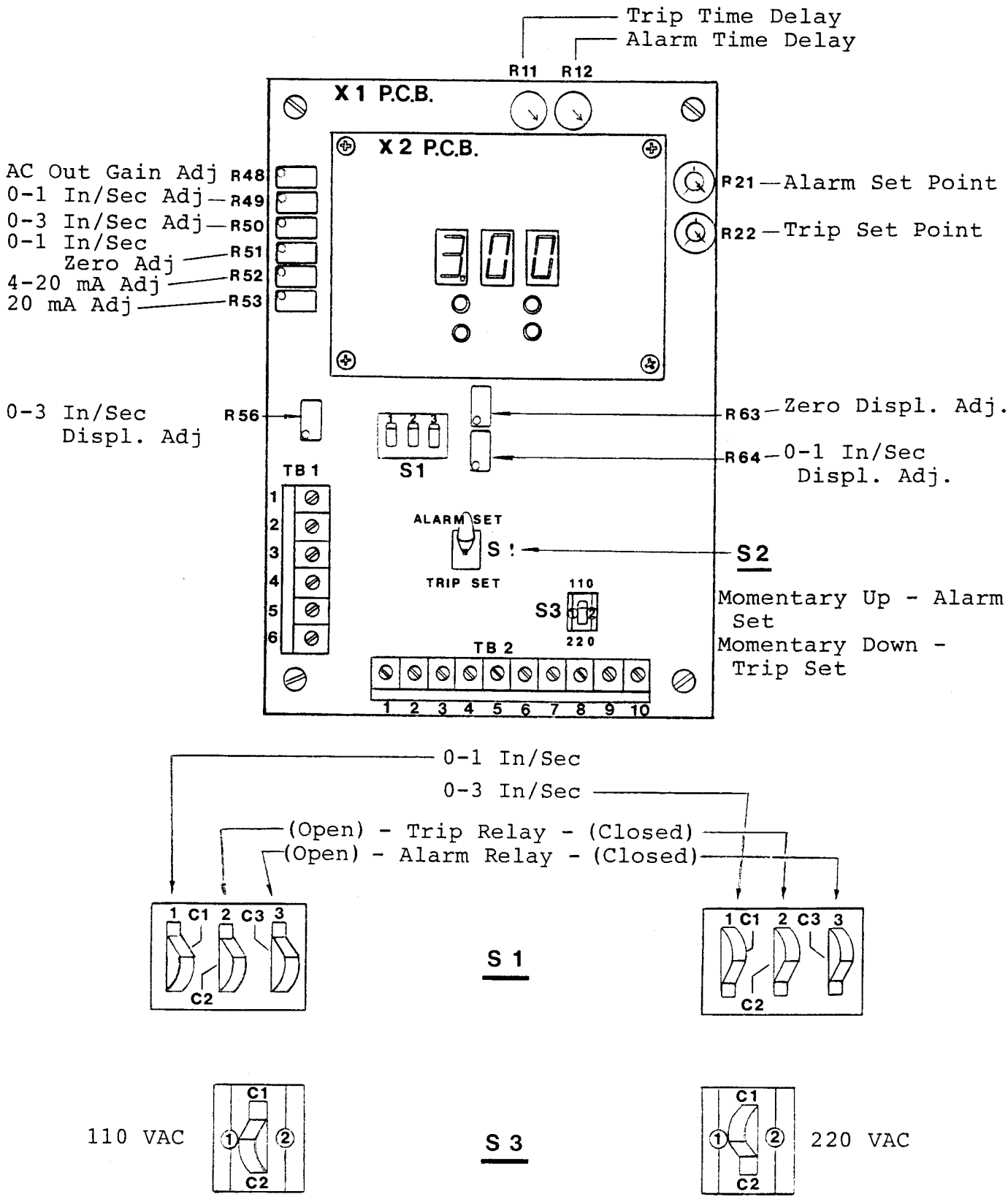

FIGURE 1 COMPONENT LOCATION AND IDENTIFICATION OVERVIEW

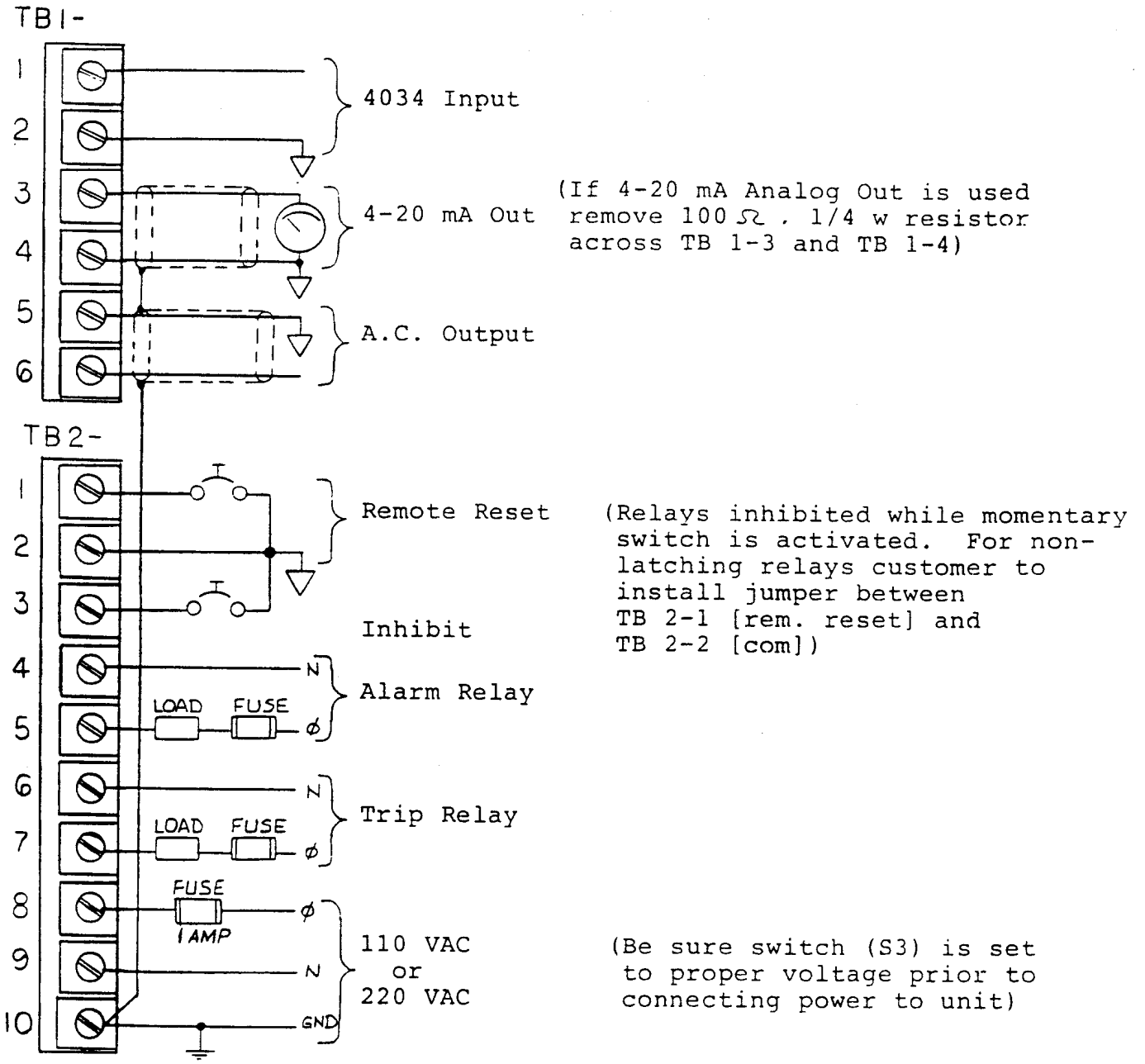

FIGURE 2 438D VIBRATION MONITOR CUSTOMER WIRING: FOR 4034 INPUT TRANSDUCER

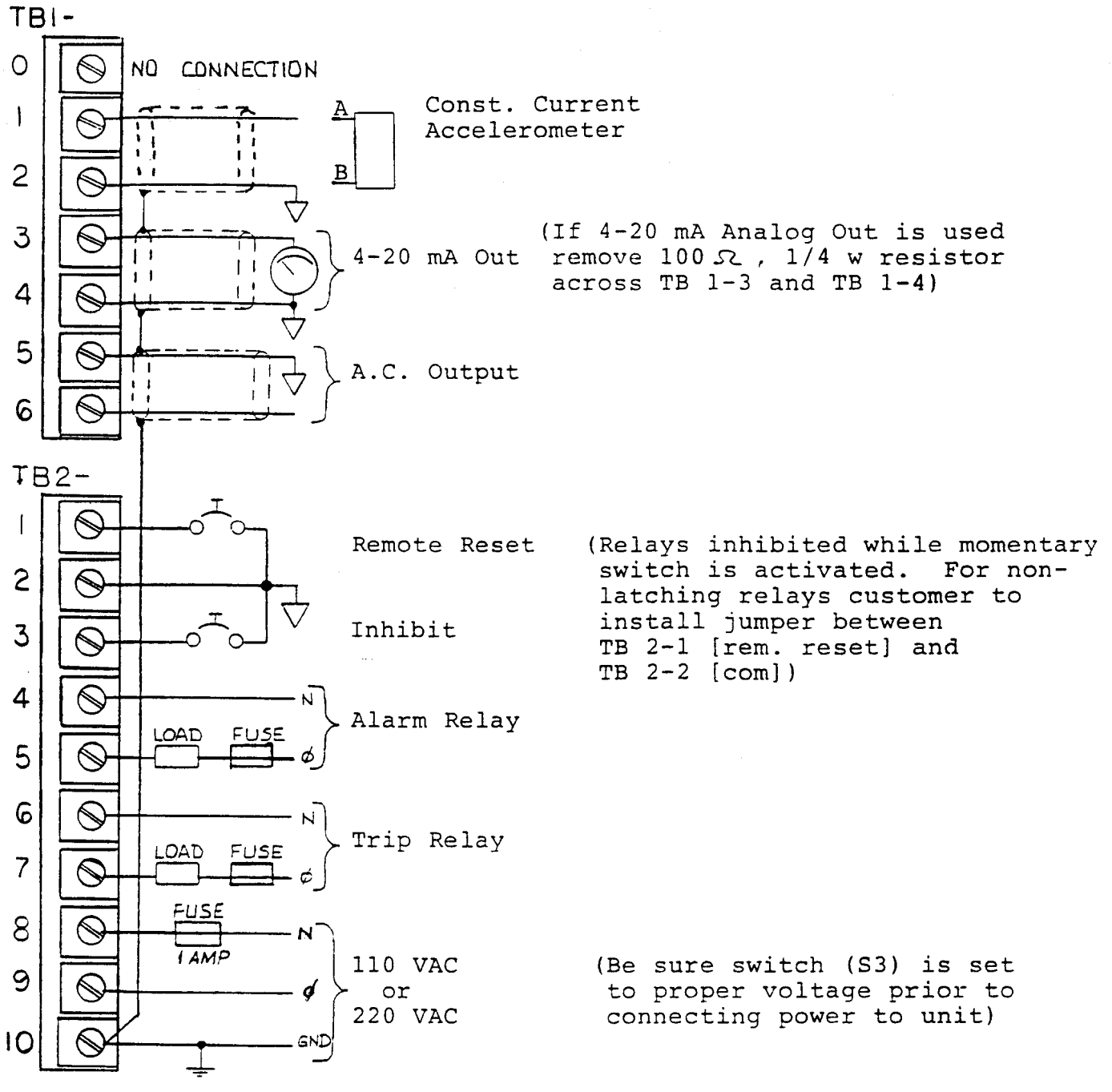

FIGURE 3 438D VIBRATION MONITOR CUSTOMER WIRING: FOR 4073 INPUT TRANSDUCER

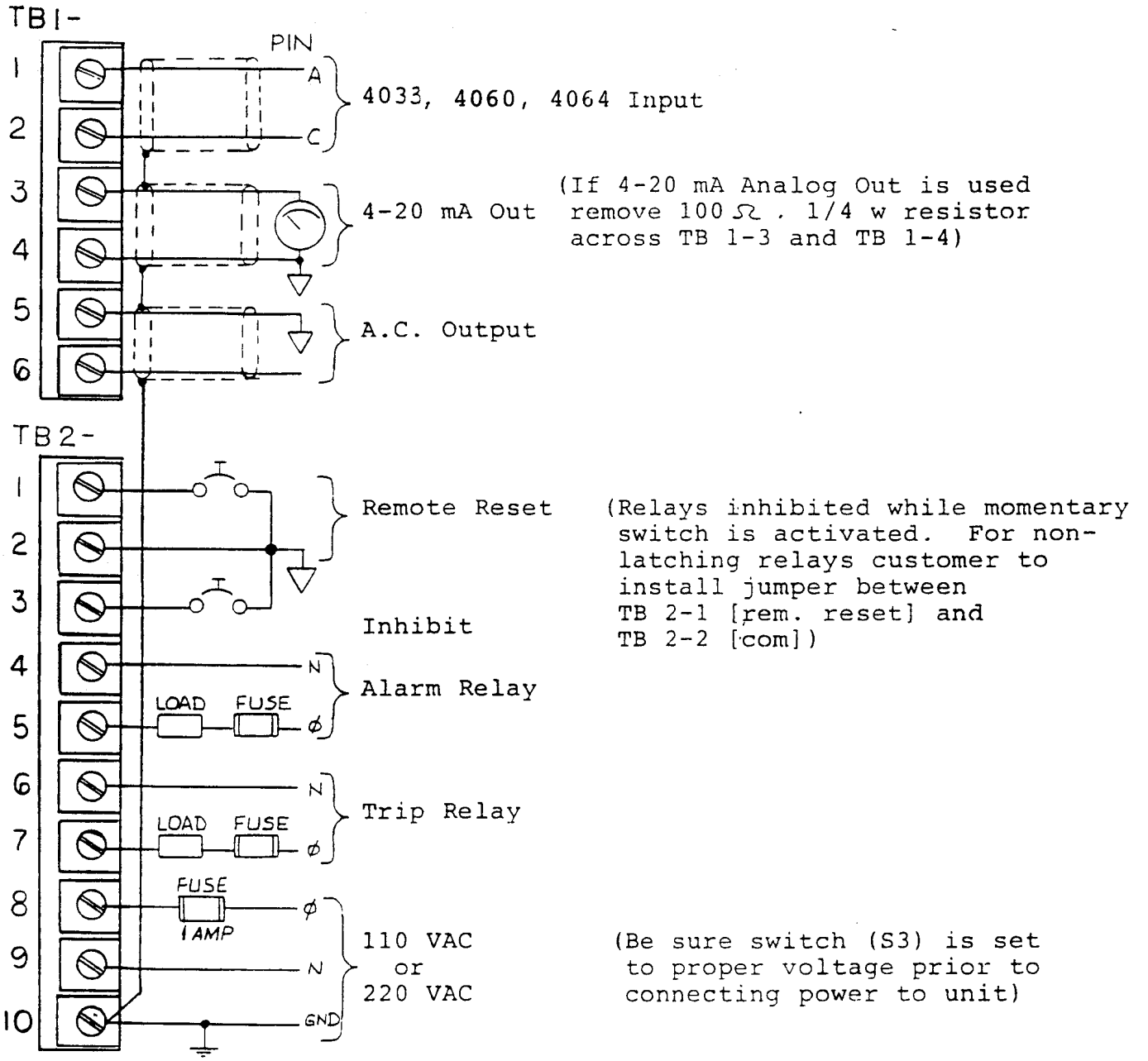

FIGURE 4 438D VIBRATION MONITOR CUSTOMER WIRING: FOR 4033 INPUT TRANSDUCER

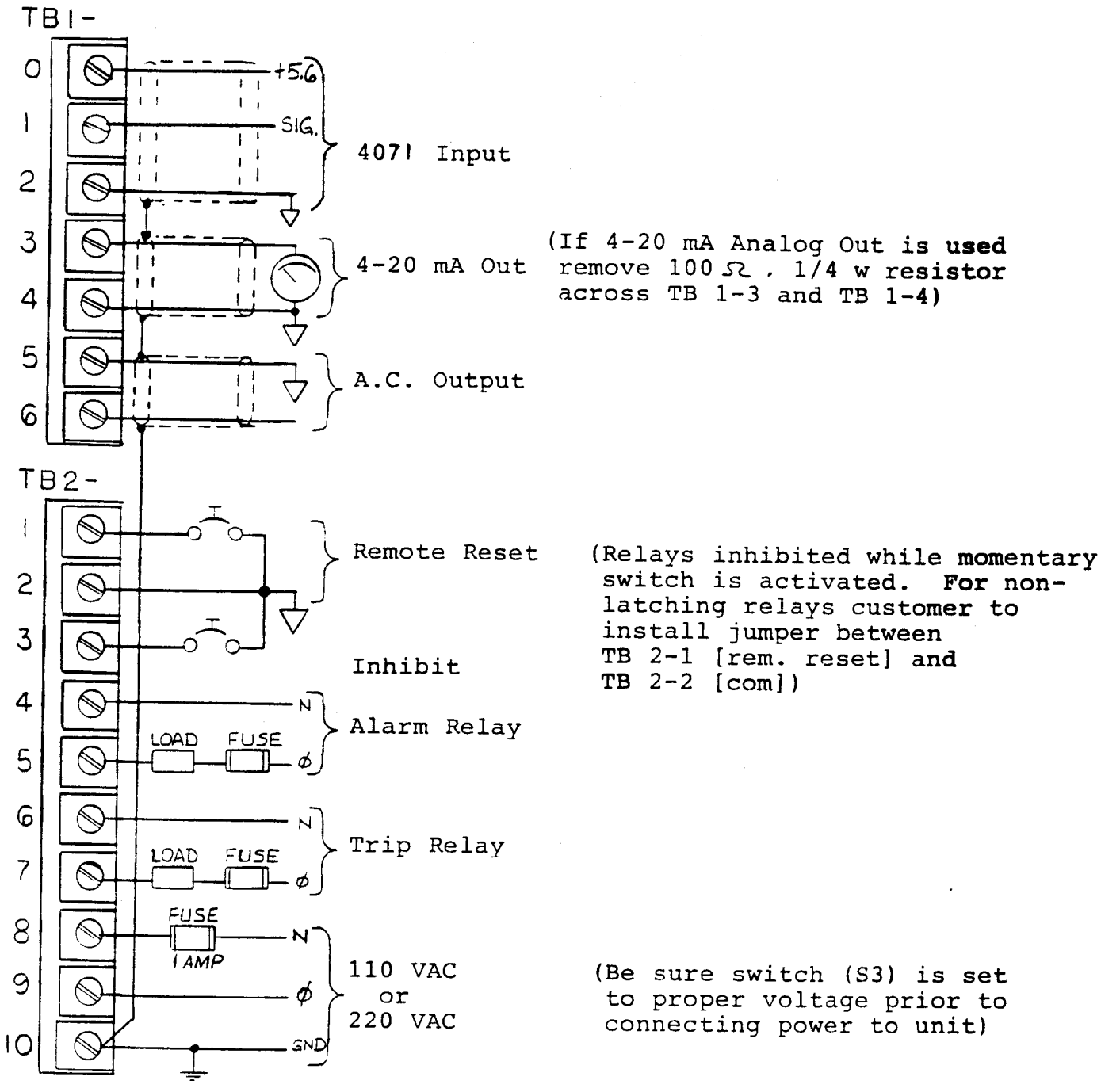

FIGURE 5 438D VIBRATION MONITOR CUSTOMER WIRING: FOR 4071 INPUT TRANSDUCER

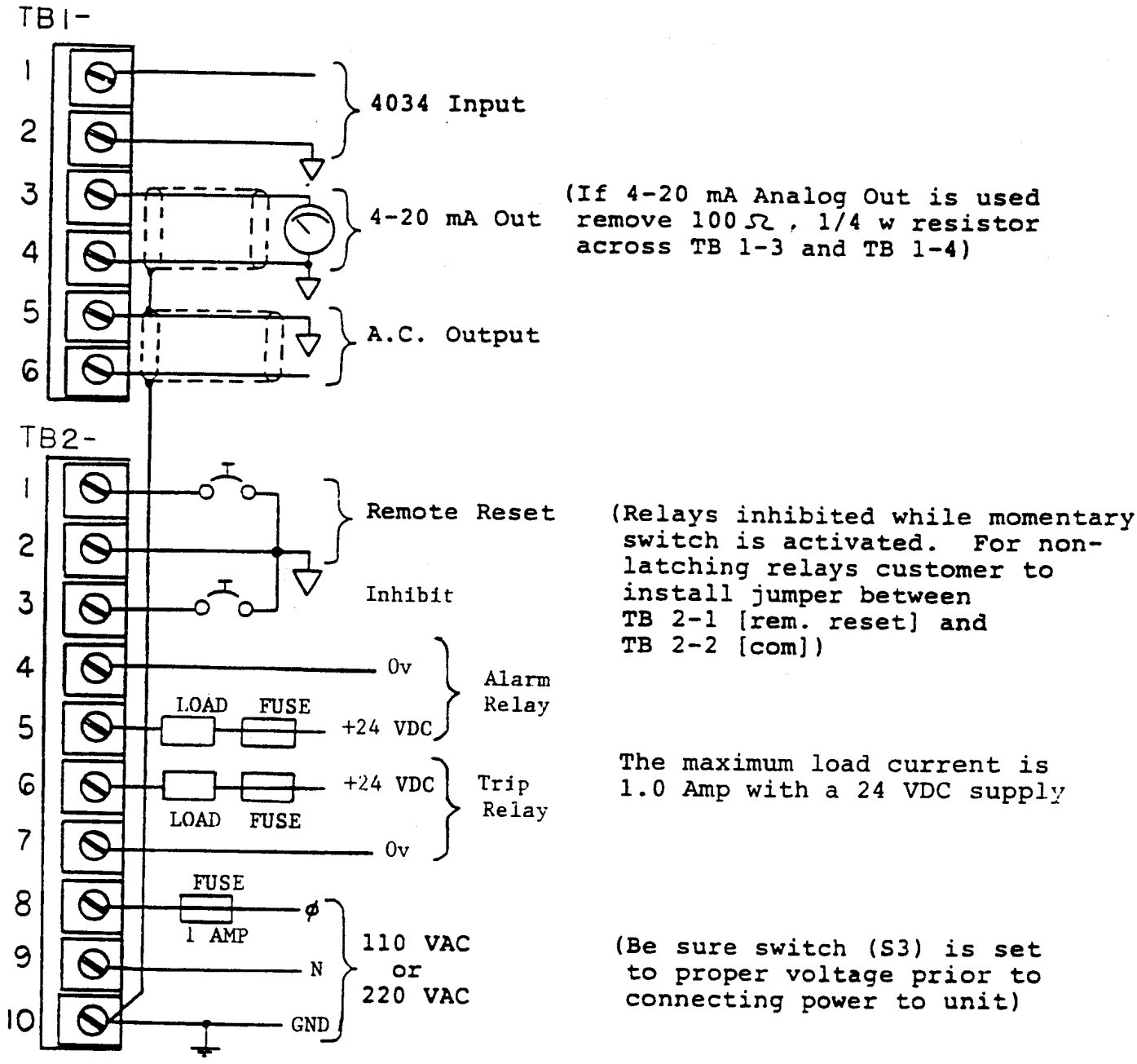

FIGURE 6 438D VIBRATION MONITOR CUSTOMER WIRING: FOR 4034 INPUT TRANSDUCER, AND SPECIAL 24VDC RELAYS

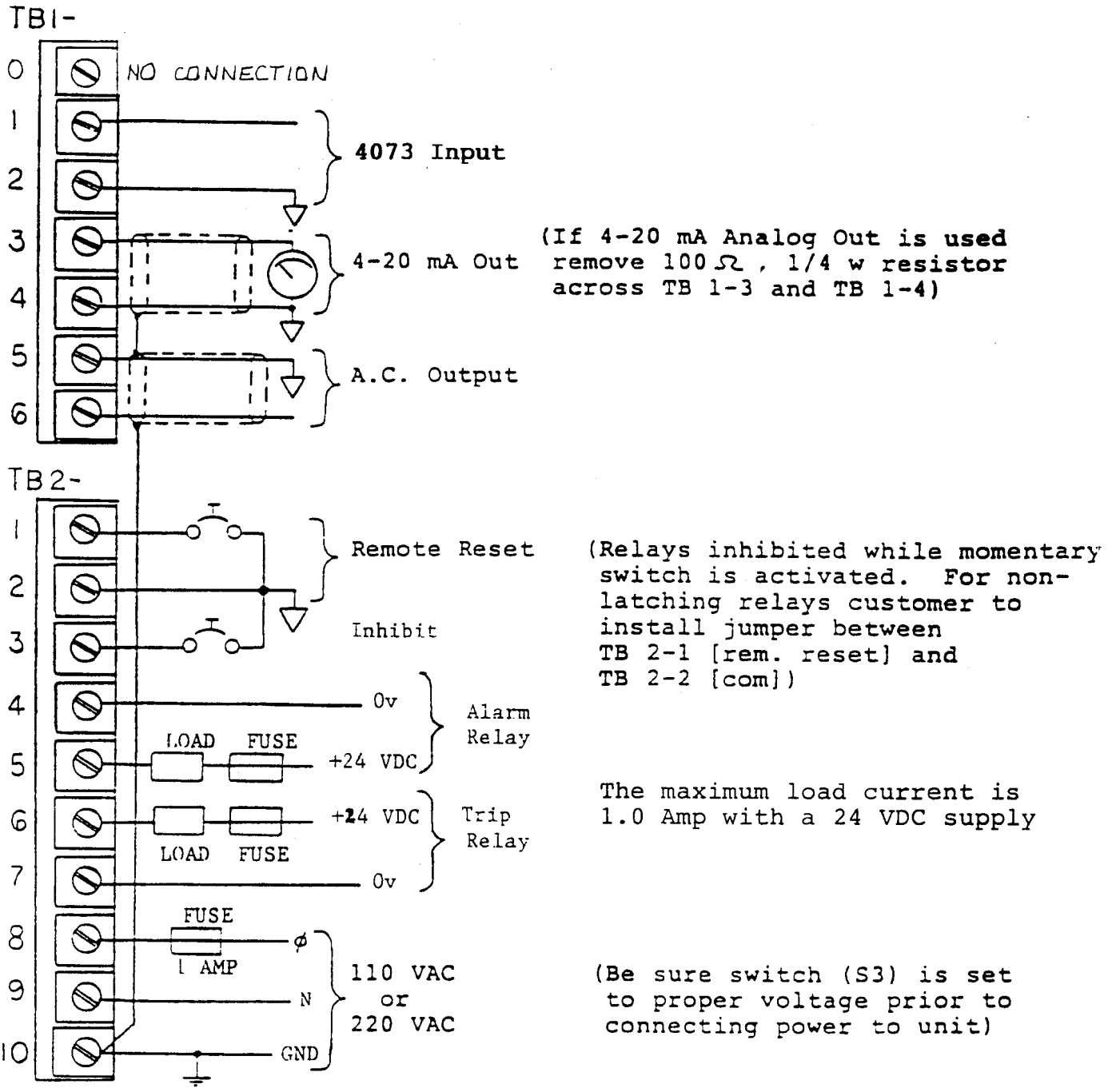

FIGURE 7 438D VIBRATION MONITOR CUSTOMER WIRING: FOR 4073 INPUT TRANSDUCER, AND SPECIAL 24VDC RELAYS

Full Scale Range:	0-1 or 0-3 in/sec, switch selectable
Frequency Response:	Variable, See Key Transducer Characteristics below
Setpoint Range:	5% to 100% of full scale
Setpoint Repeatability:	± 1% of full scale
Temperature:	-25 F to 160 F
Input Power:	120 or 220 VAC switch selectable
Analog Output:	4-20 mA DC proportional to full scale
AC Output:	100 mV/in/sec (velocity input)
	100 mV/g (acceleration input)
Relays:	1 Amp, at 70 F
	N.O. or N.C. Below Setpoint
	(switch selectable)
	Latching or Non-latching
	(jumper selectable)
	0-20 second adjustable time delay
	Minimum load current, 0.05 Amps
Enclosure:	NEMA 4

Key Transducer Characteristics

Part No.	Transducer Number	Temp., F	Frequency Response Range, Hz	Frequency Response Tolerance
Velocity				
412585-159A	4034	180	12 - 1,000	± 15%
602885-49R	4033-400	400	20 - 1,500	± 5%
602885-49Y	4033-500	500	20 - 1,500	± 5%
Accelerometer				
412790-39A	4071	185	2.1 - 3,500	± 5%
412790-77A	4073	250	0.8 - 10,000	± 3 db

FIGURE 8 438D SINGLE CHANNEL VIBRATION MONITOR SPECIFICATION