



# Installation Guidelines

## VMT Lindsey Voltage Sensor Relay

### Interface Board

P/N 9350



#### WARNING

Do not touch the circuit board or any of its components when the VMT board is connected to live electrical power. The board and its components are at high voltage and may become very hot. Touching components, terminals, or the board itself while energized can result in serious injury or death.

#### WARNING

VMT board must be properly grounded prior to use. Improper grounding or failure to ground will result in unexpected voltage levels on the board. Not grounding the board may result in high voltages that can result in serious injury, damage to connected equipment, or improper readings.

#### WARNING

The VMT board must be supported by a suitable mounting bracket (not included) supporting both sides of the board and which do not extend more than 0.50 inches onto the board. Improper support may allow energized components to touch conductive surfaces. Conductive surfaces in contact with energized VMT boards may result in serious injury or death, or electrical failure of the board.

#### WARNING

When using DC control power the DC power supply negative terminal must NOT be connected to the VMT ground ; only floating ground DC supplies should be used. Connection of DC supply negative to the VMT ground will short circuit the board's power supply. Connecting the DC supply negative to the VMT ground will result in failure of the VMT board.

### SPECIFICATIONS

ELECTRICAL RATINGS	
Input Voltage	120 VAC nominal, 1000 VAC maximum
Output Voltage	120 VAC nominal, 150 VAC maximum
Frequency bandwidth	30—4200 Hz
Output Burden	>10 kOhm
POWER REQUIREMENTS	
Selectable	120 VAC, 135 mA (90 VAC min, 126 VAC max)
	24 VDC, 420 mA
	48 VDC, 200 mA
Power Ride Through	> 15 cycles. Under loss of control power the VMT maintains signal output for a minimum of 1/4 second. NOTE: Power ride through does not apply when operated from 48 VDC auxiliary power.
PHYSICAL INFORMATION	
Dimensions	100mm wide x 250mm long x 50mm high (4" wide x 10" long x 2" high)
Weight	1.0 kg (2.25 lbs)
Ordering Information	Part Number 9350

### DESCRIPTION

The Lindsey VMT is a circuit board for inclusion in RTUs or controls that provides an optimal interface between Lindsey Voltage Monitors (overhead or underground) and low impedance protective relays, metering devices, and other IEDs. It features three channels to accommodate a typical 3-phase voltage monitoring application.

Lindsey voltage monitoring insulators and underground cable accessories are designed to drive high impedance (low burden) devices. The VMT board provides the needed high impedance input for the Lindsey voltage monitors, and provides outputs designed specifically to drive low impedance devices.

## MOUNTING



### WARNING

The VMT board must be supported by a suitable mounting bracket (not included) supporting both sides of the board and which do not extend more than 0.50 inches onto the board. Improper support may allow energized components to touch conductive surfaces. Conductive surfaces in contact with energized VMT boards may result in serious injury or death, or electrical failure of the board.

The VMT has mounting provisions at each end of the circuit boards. Both ends of the boards must be securely fastened with #10 screw hardware. The mounting bracket used must support the entire edge of the board. Mounting hardware should not extend more than 0.50" onto the board in order to avoid contacting electronic components or circuit board traces.

## WIRING GUIDELINES

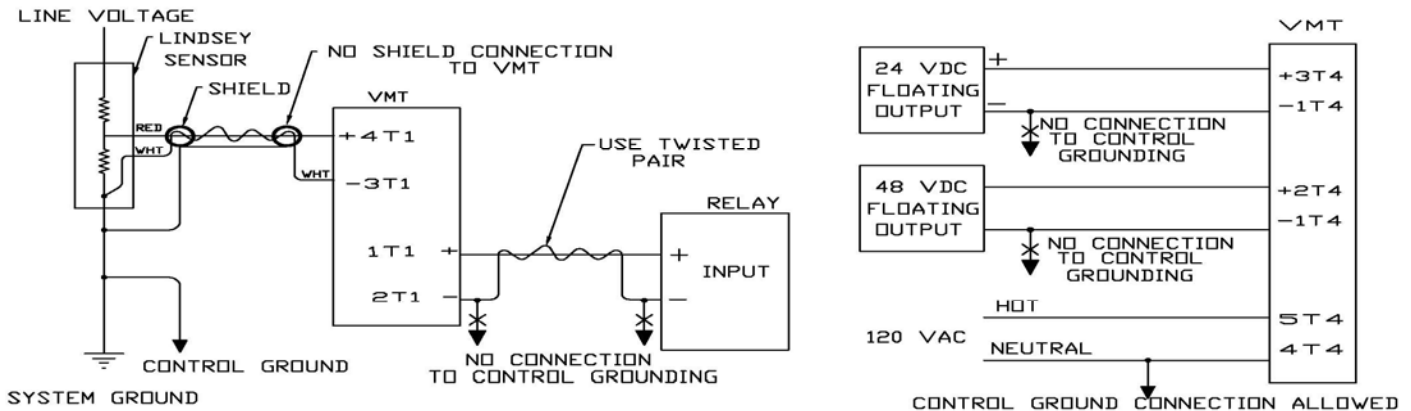


### WARNING

When using DC control power the DC power supply negative terminal must NOT be connected to the VMT ground ; only floating ground DC supplies should be used. Connection of DC supply negative to the VMT ground will short circuit the board's power supply. Connecting the DC supply negative to the VMT ground will result in failure of the VMT board.

Proper grounding is essential for best performance. VMT wiring must conform to the following guidelines. Refer to Figure 1.

FIGURE 1: VMT Wiring Diagram



## VMT Signal Connections

1. There should be only one ground reference; System Ground. This is provided by the white wire on the connected Lindsey Voltage Sensor. Make NO other ground connections to the signal circuit.
2. The Lindsey Voltage Sensor signal cable has a grounded shield. DO NOT connect the shield wire to the VMT.
3. Use twisted pair wire to connect the VMT to the protection relay. Do not share a ground wire; each phase must have a separate signal and separate signal ground wire. Do not connect the Control Ground to the twisted pair. If the twisted pair wire is shielded, connect the shield wire to terminal 2T1 of the VMT board; DO NOT connect any twisted pair shield wire to the relay or to Control Ground.

## Relay Connections

The VMT has three 2-wire outputs for connection to the 3-phase voltage input of a protection relay (or other IED). The terminal blocks are labeled TRM1, TRM2, and TRM3. See Table 1.

TABLE 1: Relay Connection Table

VMT Terminal	Connection	Lindsey Voltage Monitor
TRM1	1T1	A-phase + input
	2T1	A-phase ground input
TRM2	1T2	B-phase + input
	2T2	B-phase ground input
TRM3	1T3	C-phase + input
	2T3	C-phase ground input

## Voltage Monitor Connections

The VMT has three Voltage Monitor inputs. See Table 2.

TABLE 2: Voltage Monitor Connection Table

VMT Terminal	Connection	Lindsey Voltage Monitor	
TRM1	4T1	A-phase	+ lead
	3T1	A-phase	ground lead
TRM2	4T2	B-phase	+ lead
	3T2	B-phase	ground lead
TRM3	4T3	C-phase	+ lead
	3T3	C-phase	ground lead

## Control Power Connections



### WARNING

When using DC control power the DC power supply negative terminal must NOT be connected to the VMT ground ; only floating ground DC supplies should be used. Connection of DC supply negative to the VMT ground will short circuit the board's power supply. Connecting the DC supply negative to the VMT ground will result in failure of the VMT board.

Power connections are made to terminal block TRM4. See Table 3.

TABLE 3: Control Power Connection Table

VMT Terminal	Connection	Power Source
TRM4	1T4	DC-
	2T4	48 VDC+ (See Note)
	3T4	24 VDC+ (See Note)
	4T4	120 VAC Neutral
	5T4	120 VAC Hot

NOTE: When using a DC power supply, the negative ("-") side cannot be tied to the system ground. See WARNING above.

## CALIBRATION PROCEDURE



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The VMT board is factory calibrated for unity gain into a 30kOhm burden. The signal output can be field adjusted to accommodate other relay burdens by following these steps:

- Calibrate A-phase
  - Set Voltmeter to "AC Volts" and touch probes to 3T1 and 4T1 set screws; this is the Voltage Monitors' phase A voltage.
  - Touch Voltmeter leads to 1T1 and 2T1.
  - Compare this reading to the Voltage Monitor voltage, and adjust R60 so that they match.
- Calibrate B-phase
  - Set Voltmeter to "AC Volts" and touch probes to 3T2 and 4T2 set screws; this is the Voltage Monitors' phase B voltage.
  - Touch Voltmeter leads to 1T2 and 2T2.
  - Compare this reading to the Voltage Monitor voltage, and adjust R61 so that they match.
- Calibrate C-phase
  - Set Voltmeter to "AC Volts" and touch probes to 3T3 and 4T3 set screws; this is the Voltage Monitors' phase C voltage.
  - Touch Voltmeter leads to 1T3 and 2T3.
  - Compare this reading to the Voltage Monitor voltage, and adjust R62 so that they match.