

PROTECTION

Directional Reverse Power (32RP)

Once the magnitude of the three-phase total power exceeds the pickup level in the reverse direction (negative MW) for the specified period of time a trip will occur.

The level is programmed in per unit of generator MW calculated from the rated MVA and rated power factor.

If the generator is accelerated from the power system rather than the prime mover, the reverse power element may be blocked from start for a selectable period of time.

Directional Low Forward Power (32LF)

Once the magnitude of the three-phase total power in the forward direction (positive MW) falls below the pickup level for the specified period of time an alarm will occur.

The level is programmed in per unit of generator MW calculated from the rated MVA and rated power factor.

The low forward power element is active only when the generator is online and will be blocked until the generator is brought online, for a period of time defined by the setpoint. The pickup level should be set lower than expected generator loading during normal operations. If the fuse failure function is operated the 32LF unit will be disabled.

Loss of Excitation (40)

The MIW detects loss of excitation by using an impedance element on wye connected generators. When the impedance falls within the impedance circle for the delay time specified a trip will occur if it is enabled. The user can enable circle#1 and/or circle#2 to tune their protection feature to their system. The larger circle diameter should be set to the synchronous reactance of the generator, x_d and the circle offset should be set to the generator transient reactance $x'd/2$. This element will be blocked if there is a fuse failure condition or if the generator is offline.

Fuse Failure (60)

The MIW includes a VT fuse failure unit. The unit checks the presence of negative sequence voltage against positive sequence voltage and the current value.

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www.GEIndustrial.com/pm

Inputs and Outputs

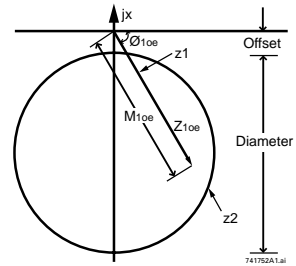
Two configurable inputs are provided for breaker status and block the loss of field. Four configurable outputs are provided for the operation of the 32RP, 32LP, 40 and 47 units.

Metering

MIW provides metering values for phase and ground currents. The accuracy is 3% in the complete range.

Configurable Logic

Up to a maximum of 4 configurable logic schemes can be implemented into the MIW by means of using a set of 4 pre-configured logic gates and timer cells. A graphical user interface is provided for configuration of MIW logic. The outputs of the MIW configurable logic can be used to configure digital outputs and LEDs.



$$\text{The formula: } Z_{1oe} = \frac{V_{AB}}{I_A - I_B} = M_{1oe} < \theta_{1oe}$$

where:
 Z_{1oe} = Secondary phase to phase loss of excitation impedance

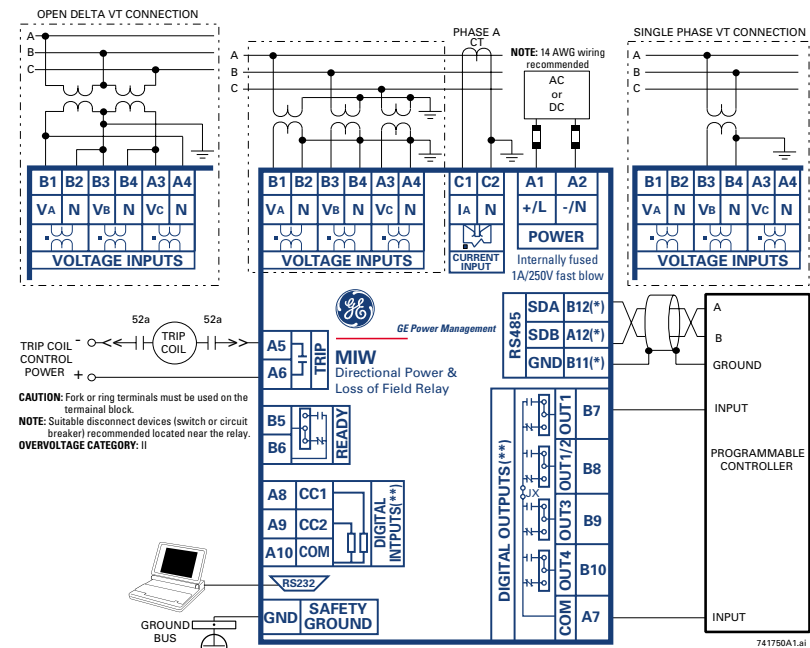
$M_{1oe} < \theta_{1oe}$ = Secondary impedance phasor (magnitude and angle)

All relay quantities are in terms of secondary impedances. The formula to convert primary impedance quantities to secondary impedance quantities is provided below.

$$\text{where: } Z_{sec} = \frac{Z_{pri} \times CT_{ratio}}{VT_{ratio}}$$

Z_{pri} = primary ohms impedance
 CT_{ratio} = programmed CT ratio, if CT ratio is 1200:5 use a value of 1200/5 = 240
 VT_{ratio} = programmed VT ratio, if VT ratio is 100:1 use a value of 100

WIRING



ORDERING

To order select the basic model and the desired features from the Selection Guide below.

MIW1 0*0E200*00*

1	Phase CT In = 1A (0.1 - 2.4 A)
5	Phase CT In = 5A (0.5 - 12 A)
F	24-48 VDC (Range: 19 ~ 58 Vdc) Power Supply
H	110-250 VDC (Range: 88 ~ 300 Vdc) Power Supply
	120-230 VAC (Range: 88 ~ 264 Vac) Power Supply
C	Individual relay
S	Mounted in an M+ system†

Accessories

DEPTH REDUCING COLLAR:
 Reduces the mounting depth in 63 mm.

† If relays are to be mounted in an M+ system either an M050 half 19" rack or M100 full 19" rack case must be ordered. The M050 and M100 racks are provided at no additional cost.