

PROTECTION

Three Phase Time Overcurrent (51P)

The MIF provides time overcurrent protection that can be set from 0.1 to 2.4 times In. Four separate ANSI or IEC time overcurrent curves can be selected in addition to a user configurable curve. ANSI and IEC curves include: definite time, normal inverse, very inverse, and extremely inverse. For each curve, different time multipliers may be set. Three different curve types can be selected: ANSI, IEC/BS142, and one user configurable. This allows the selection of the optimum curve for coordination with fuses, feeders, motors, transformers, etc.

ANSI	IEC/BS142
normal inverse	IEC A
very inverse	IEC B
extremely inv.	IEC C
definite time	definite time

Phase Instantaneous Overcurrent Units (50PH, 50PL)

The MIF includes two separately adjustable phase instantaneous overcurrent units. Each one can be independently enabled. Settings allow the pickup setpoint to be set from 0.1 to 30 times In and a time delay from 0 to 100 seconds to be set.

Ground Time Overcurrent (51N)

The ground time overcurrent protection has the same curve selection choices and settings as the phase time overcurrent unit. The ground signal is normally derived as the residual sum of the three phase CTs eliminating the need for an additional ground sensor. Alternatively, for more sensitive detection, an additional core balance (zero sequence) ground sensor encircling the 3 phase conductors can be used.

Ground Instantaneous Overcurrent units (50NH, 50NL)

The ground instantaneous overcurrent protection has the same settings and features as the phase instantaneous overcurrent unit.

Thermal Image Unit

A thermal image unit is included to protect equipment against overheating due to excessive load. Several operating curves can be set as a function of heating time constant T1 (adjustable between 30 and 600 minutes). Cool down time constant T2 is adjustable from 1 to 6 times the heating constant.

Multiple Settings Groups

Two separate settings groups are stored in MIF nonvolatile memory, with only one group active at a given time. Switching between setting groups 1 and 2 can be done by means of a setting, a communication command or digital input activation.

Settings are divided in 2 categories, main and advanced settings. This allows users to have access to main relay functionalities in an extremely simple, user friendly way by entering only main settings, while having access to complete functionality for more complex use through advanced settings.

Inputs and Outputs

Two fixed inputs are provided for block 50P functions and block 50N functions. Four fixed outputs are provided for phase trip, ground trip, instantaneous trip, and thermal image alarm. In addition, two other outputs for general trip and service required are provided.

Metering

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

OPTION 1 FEATURES (Plus Basic Features)

Events Recording

Events consist of a broad range of change of state occurrences, including pickups, trips, contact operations, alarms and self test status. The MIF stores up to 32 events time tagged to the nearest millisecond. This provides the information needed to determine sequence of events which facilitates diagnosis of relay operation. Each event can be individually maskable in order to avoid the generation of undesired events.

Oscillography

MIF captures current waveforms and digital channels at 8 samples per cycle. One oscillography record with a maximum length of 24 cycles is stored in memory. Oscillography is triggered either by internal signals or an external contact.

Configurable I/O and LEDs

There are two configurable digital inputs in the MIF. Out of the MIF's six digital outputs, two have a fixed function (trip and service required), while the other four are user configurable. Those configurable outputs can be assigned either to a set of pre-configured values, or an OR/NOT combination of the same values.

Each configurable output can be independently latched.

The first LED has a fixed assignment (relay in service), the second fixed for trip, and the remaining four LEDs are user configurable in function, memory and/or blinking/fixed indication.

Input, output and LED configurations are performed using M+PC software.



OPTION 2 FEATURES (Plus Option 1 features)

Cold Load Pickup

When a feeder is re-energized after being de-energized for a prolonged time higher load currents can result due to a loss of load diversity. Cold load pickup is provided to prevent operation of the overcurrent functions under these conditions.

Breaker Failure Protection

A fail to open unit is provided in the MIF relay default configuration. A more complex breaker failure scheme can be easily implemented through the use of a digital input and configurable output logic (logic gates and timers).

Breaker Health

Just in time breaker maintenance is achievable by using the breaker health function. The MIF calculates and stores the cumulative I² value for the breaker. A breaker health threshold is established by a setting. If the cumulative value exceeds the threshold, a breaker health alarm is initiated.

Configurable Logic

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

USER INTERFACES

Status LEDs

The status of the relay is indicated through six LEDs located on the front panel. The first one is green and has a fixed assignment showing that the relay is in service. In option 0 models, four separate LEDs indicate if a trip, phase trip, ground trip, and/or instantaneous trip has occurred. Another LED is used to indicate if any protection functions have picked up. In option 1 and option 2 models, the last 5 LEDs are user configurable.

Keypad and Display

A three button keypad allows user access for easy relay interrogation and change of settings. Metering data, last trip information and settings are displayed through the LED dot matrix display. Note that full access to the event and oscillography records and unit configuration is possible only through PC communication.

Self Test Diagnostics

Comprehensive self test diagnostics occur at power up and continuously during relay operation. Any problem found by self tests causes an alarm and an event is logged.

Communication Ports

A front mounted RS232 and a rear RS485 port allow easy user interface via a PC. ModBus® RTU protocol is used for all ports. The relay supports baud rates from 300 to 19,200 bps. Up to 255 MIF relays can be addressed on a single communications channel. A unique address must be assigned to each relay via a setting when multiple relays are connected.

M+PC SOFTWARE

A single PC software package is required to access, configure, and monitor all relays in the M family regardless of their model, application, or available options. The M+PC software extracts the model number, version, and configuration parameters from the connected relay to display only the relevant data and options for the relay it is communicating with. This eliminates having to manually configure the relay within the software and provides a simple and easy to use operator user interface.

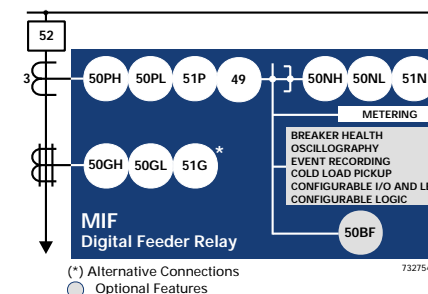
All M Family products are supplied with Windows® based M+PC software. M+PC allows communication among M Family relays for monitoring, setting changes, information and configuration.

Keep track of and react to all relay status data with ease.

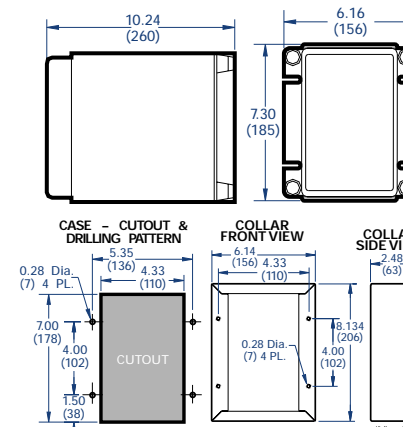


The M+PC software program may be run on a PC with the Windows 95/98/NT operating systems. The program may be used locally on the RS232 front serial port or remotely on

FUNCTIONAL BLOCK DIAGRAM



DIMENSIONS



TYPICAL WIRING

NOTE: Only for reference. For particular connections for any MIF model, please refer to its external connections drawing.

