

6. Case Dimensions

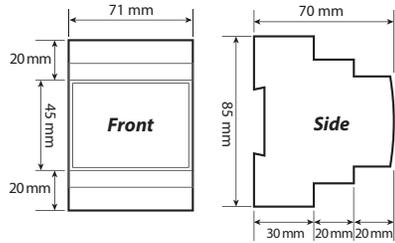


Figure 6: Case Dimensions

7. Technical Data

Setting Ranges

Undervoltage	: Off, 1% – 25%
Time delay for undervoltage	: 0.1s – 30s
Overvoltage	: Off, 1% – 20%
Time delay for overvoltage	: 0.1s – 30s
Start time delay	: 0s – 999s
Auto reset level	: 1% – 10%

(undervoltage and overvoltage)

Power Supply Input

Phase voltage	
MU150-240V	: 220V(-25%) – 240V(+20%) AC
MU150-110V	: 100V(-25%) – 120V(+20%) AC
Supply frequency	: 45Hz to 65Hz
Maximum power consumption	: 2.5VA

Contacts

Contact arrangement	: Change-over
Contact rating	: 5A, 250V AC (cosφ=1)
Contact material	: Silver alloy
Operating time	: 15 ms max
Expected electrical life	: 100,000 operations at rated current
Expected mechanical life	: 5 x 10 ⁶ operations

Indicators

Auxiliary supply	: Green LED indicator
Pickup indicator	: Red LED indicator
Trip	: 7-segment display and red LED indicators

Mechanical

Mounting	: Din rail mounted
Approximate weight	: 0.27kg

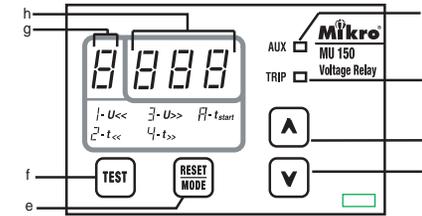
Accuracy

Protection thresholds	: ± 3 %
Time delay	: 0–0.5s, ± 15% with a minimum of 40ms

Measurements	: ± 3%
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MU150 Single Phase Voltage Relay User's Guide V3.1

Brief Overview



The Data LED showing value. Press "UP" or "DOWN" to scroll through the parameters as shown in Figure 2.

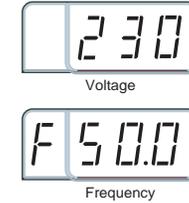


Figure 2: Voltage and frequency display. 230V and 50.0Hz shown as example

a – Auxiliary power supply LED	Symbols
b – Trip/Pickup LED	U<< - Undervoltage
c – Up key	t<< - Undervoltage time delay
d – Down key	U>> - Overvoltage
e – Reset/Mode key	t>> - Overvoltage time delay
f – Test key	⏏ - Unbalance/phase
g – Function LED	⏏ - Unbalance time delay
h – Data LED	

a) Auto Scroll

Auto scroll let the display to scroll between voltage and frequency reading every 10 seconds. To toggle auto scroll mode, press "UP" and "DOWN" simultaneously.

1. General Description

MU150 is a voltage relay that combines overvoltage, undervoltage and delay start functions.

MU150 incorporates a 4-digit LED display which allows direct numerical readout of set values, actual measured value and system indication.

MU150 has 2 relay outputs (R1 and R2). R1 is energized under normal operating condition. R2 can be configured as normally energized or de-energized. Both R1 and R2 can be assigned to operate separately by various tripping elements.

2. Voltage and Frequency Display

During power up, when the relay is not under tripping condition, the display will show voltage and frequency reading.

3. Settings

a) Setting Display

When the relay is not under tripping condition, pressing "RESET/MODE" can scroll through various settings. Function LED shows number or alphabet to indicate which setting is being view as shown in Figure 4. Table 1 gives description of each setting.

Tip: To quickly jump back to voltage display during setting display, press and hold "RESET/MODE" for more than 1.5 seconds.

b) Programming Setting

Step 1: Press "RESET/MODE" until the Function LED shows the required setting.

Step 2: Press "UP" and "DOWN" simultaneously to enter programming mode. The Function LED blinks to indicate that the relay is in programming mode.

Step 3: Press "UP" or "DOWN" to select the desired value.

Step 4: To save the selected value, press "UP" and "DOWN" simultaneously again. It will exit the programming mode with the Data LED displaying the newly set value.

To exit programming mode without saving the selected setting, press "RESET/MODE" once.

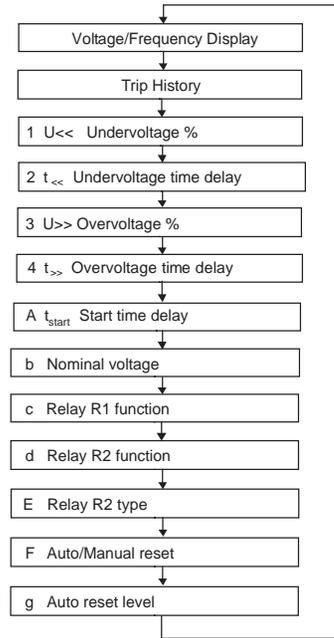


Figure 3: Display mode when pressing Reset/Mode

Setting	Function	Setting Range	Description
1	U<< Undervoltage	off, 1-25 %	Undervoltage % from nominal voltage
2	t<< Undervoltage delay	0.1-30 s	Time delay for undervoltage
3	U>> Overvoltage	off, 1-20 %	Overvoltage % from nominal voltage
4	t>> Overvoltage delay	0.1-30 s	Time delay for overvoltage
A	t _{start} Starting delay	0-999 s	On time delay of R1 during power up
b	Nominal Voltage	240V: 220,230,240 V 110V: 100,110,120 V	Nominal voltage
c	Relay R1 function	0 - 3	*Refer to Table 2
d	Relay R2 function	0 - 3	*Refer to Table 2
E	Relay R2 type	0 - 1	0: Normally de-energized 1: Normally energized
F	Auto/Manual reset	0=auto, 1>manual	auto: auto reset when trip condition clear manual: press "RESET/MODE" to reset
g	Auto reset level	1-10 %	Auto reset level for U<< and U>>

Table 1: Description of functions

c) Undervoltage

Undervoltage pickup occurs when voltage is less than [nominal voltage - U<< %], relay trips when delay time is elapsed.

d) Overvoltage

Overvoltage pickup occurs when voltage is more than [nominal voltage + U>> %], relay trips when delay time is elapsed.

e) Starting Delay

Starting delay is the delay time for R1 to energized during power up under normal condition.

f) Relay Function Selection

During tripping, output contact relay R1 and R2 will be de-energized/energized if the related tripping element is activated. The setting is shown below:

Code	OV	UV	Code
0	0	0	Code : Displays on Data LED
1	0	1	OV : Overvoltage
2	1	0	UV : Undervoltage
3	1	1	0= De-activated 1= Activated

Table 2: Relay function selection

4. Trip

a) Trip Display

During pickup, Trip/Pickup LED blinks. During tripping condition, Trip/Pickup LED on. Function LED and Data LED blinks with trip source as shown below:

Function LED	Data LED	Description
1	trip voltage	Undervoltage trip
3	trip voltage	Overvoltage trip
t	EST	Test

Table 3: Trip display

b) Trip Reset

During tripping condition, press "RESET/MODE" to reset the relay, the relay will reset if lower than threshold. Manual reset threshold for U>> / U<< and Unbalance is: Setting % - 1%.

Auto/Manual reset setting applies to U<<, U>>, Unbalance tripping. Phase Sequence and Phase loss is always auto reset.

c) Auto reset level

This sets the U<< and U>> auto reset level. Unbalance auto reset is fix to 2%.

Eg1. if U>> is set to 10% and Auto reset level is set to 2%, U>> trips when voltage >110%, U>> reset when voltage <108%

Eg2. if U<< is set to 20% and Auto reset level is set to 5%, U<< trips when voltage <80%, U<< reset when voltage >85%

If Auto reset % is equal or larger than U<< / U>> %, it will be automatically set to U<< / U>> % - 1%.

d) Trip Test

Trip test is used to simulate a tripping condition. Press "TEST" button and hold for 1.5s, trip LED blinks. After 3.5 seconds, "tEst" will blink, R1 de-energized and R2 will operate dependent on *relay R2 type*. Press "RESET/MODE" to reset.

e) Trip History Display

During Voltage and frequency display, Press "RESET/MODE" button to jump to Trip History Display. Display shows the previous trip status with a 'dot' blinking at Function LED. To clear trip history, press "UP" and "DOWN" simultaneously.

f) Trip Bypass Mode

To disable tripping due to incorrect setting, press "RESET/MODE" and "TEST" simultaneously during power up. The Trip LED slow blink to indicate Trip Bypass Mode. Go into programming mode to correct the setting. Power off and on to reset the relay. The relay will return to normal if no button is pressed for longer than 2 minutes.

5. Typical Application Diagram

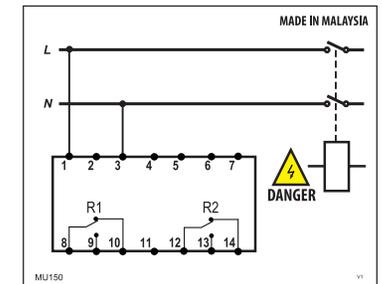


Figure 4