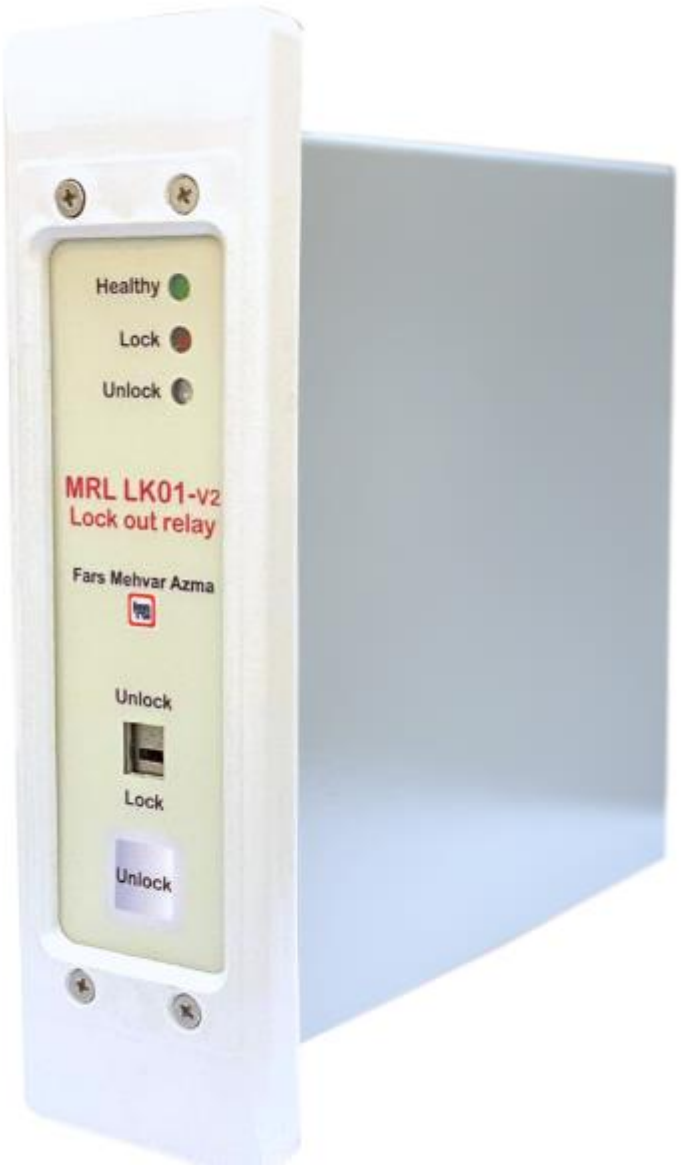
MRL LK01-T2
Fast Lockout relay



I: Introduction:

I-1: Applications

MRL LK01-V2 lock out relay is used in close blocking applications for high voltage and medium voltage circuit breakers. This system contains 2 normally open and 4 changeover semi heavy duty contacts.

I-2: Construction

Withdraw able case
Front LED and mechanical indicators (locking indicator)
Front safety LED indicator
Latching LED facility
Manual electrical & mechanical resetting & remote resetting
Keeping status after power interruption

T: Technical data

T-1: Inputs

One digital input for *locking* signal
Vin lock, range: 70+/-10 to 180 V dc
Nominal Voltage: 110 V dc
One digital input for *unlocking* signal
Vin unlock, range: 70+/-10 to 180 V dc
Nominal Voltage: 110 V dc

T-2: Contacts Specifications

- 2 normally open *heavy duty and fast* contacts:
-Operating time: Pick up: 12 m Sec
Drop out: 22 m Sec
-Contact material: $AgSnO^2$
-Permanent current: 16A
-Max peak current: 25 A

-Breaking current capacity: At 125 V dc: 12 A
At 110 V dc: 16 A

-Max. switching voltage: 140Vdc, 700 Vac

- 4 change over *semi heavy duty* and fast contacts:
  - -Operating time: Pick up: 12 m Sec
    Drop out: 12 m Sec
  - -Contact material: $AgSnO^2$
  - -Permanent current: 16A
  - -Max peak current: 25 A
  - -Breaking current capacity: At 125 V dc: 0.8 A
    At 110 V dc: 1 A
  - -Max. switching voltage: 110Vdc, 300 Vac
- One change over contact ***only*** for watch dog
  - -Breaking current capacity: At 125Vdc: 0.4A
    At 110Vdc: 0.5A
  - -Contact material: AgNI0.15

Other specifications:

-Mechanical life: 10^4 operations
-Operating temperature: 0 to 70 °C
-Storage temperature: -20 °C to 70 °C
-Max operating humidity: 90% at max 40 °C
-Insulation between input and output contacts: 6 KV
-Dielectric strength between open contacts: 1.5 KV
-Ambient altitude: < 2000 m

T-3: Features

- Easy to install, withdraw able structure
- High insulation
- Operating DC input range: Aux: 60 – 180 V dc
  Nominal: 110 V dc

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T-4: Power consumption

Normal: 0.3 W
Peak power @ switching time (200ms): 9.6 W

T-5: Technical specifications according to standard

T – 5.1 Mechanical specifications

Design: Modular FMA Full draw-out Case – 2U
Mounting: Rack or flush mounting

Terminal connections: *Phoenix Contact MTSB 2.5* Terminal Block Connector with FMA designed *holding clamp*. (At rear side)

T – 5.2 Environmental conditions

Ambient Temperature Range
Per IEC 60255-6: 1988
Operating temperature range: Continuous Withstand: 0 to +70°C
Storage Temperature Range: –20 to +70°C

Tested as per IEC 60068-2-1 & IEC 60068-2-2, 2007

Ambient Humidity Range
Humidity: Per IEC 60068-2-78: 2001
Per IEC 60068-2-30: 2005:

Solar radiation: No limitation

Insulation
Rated insulation: 300

Per IEC 60255-5: 2000, Insulation resistance > 100MΩ at 500Vdc

High Voltage (Dielectric) Withstand
Per IEC 60255-5: 2000, 2Kv rms AC, 1 minute

Between all case terminals connected together, and the case earth, and between all terminals of independent circuits.

2.0kVrms for one minute between all terminals and case earth

2.0kVrms for one minute between all terminals of independent circuits, including contact circuits

1.5kVrms for one minute across dedicated normally open contacts of output relays.

1.5kVrms AC for one minute, across open contacts and across open contacts of changeover output relays.

Impulse Voltage Withstand Test
Per IEC 60255-5: 2000
The product will withstand without damage impulses of 1.2 / 50 μs, peak value: 5kV, 0.5J across
Each independent circuit and the case with the terminals of each independent circuit connected together.
Independent circuits with the terminals of each independent circuit connected together.
Terminals of the same circuit.

Electro Magnetic Compatibility (EMC)
DC Supply Interruption
Per IEC60255-11:1979
The product will withstand a 20ms interruption in the auxiliary voltage in its quiescent condition

AC Ripple on DC Supply
Per IEC60255-11:1979:
The product will operate with 12% AC ripple on the DC auxiliary supply without any additional measurement errors

Disturbances on AC Supply
Per IEC61000-4-11:1994:
The product satisfies the requirements of EN61000 - 4 - 11 for voltage dips and short interruptions.

1 MHz Burst High Frequency Disturbance Test
Per IEC 60255-22-1: 2008, Class III,
Common-mode test voltage: 2.5 kV,
Differential test voltage: 1.0 kV,
Test duration: 2 s, Source impedance: 200 Ω

Electrical Fast Transient or Burst Requirements

Per IEC 60255-22-4: 2002
The product complies with all classes up to and including Class A 4kV without any mal-operations or additional measurement errors.

Fast transient disturbances on terminal block, communications (common mode only)	2kV, 5ns rise time, 50ns decay time, 5kHz repetition time, 15ms burst, repeated every 300ms for 1min in each polarity, with a 50Ω source impedance.
Fast transient disturbances on power supply, I/O signal, data and control lines (common mode only)	4kV, 5ns rise time, 50ns decay time, 2.5kHz repetition time, 15ms burst, repeated every 300ms for 1min in each polarity, with a 50Ω source impedance.

Per IEC 61000-4-4: 2004.
The product complies with all classes up to and including Level 4 4kV without any mal-operations or additional measurement errors:

Fast transient disturbances on power supply (common mode only)	2kV, 5ns rise time, 50ns decay time, 5kHz repetition time, 15ms burst, repeated every 300ms for 1min in each polarity, with a 50 Ω source impedance.
Fast transient disturbances on I/O signal, data and control lines (common mode only)	2kV, 5ns rise time, 50ns decay time, 5kHz repetition time, 15ms burst, repeated every 300ms for 1min in each polarity, with a 50 Ω source impedance.

Immunity to Electrostatic Discharge

Per IEC 60255-22-2: 1997 & IEC61000-4-2:2001
The product will withstand application of all discharge levels up to the following without Mal - operation:
15 kV discharge in air to user interface, display, and exposed metalwork.
8 kV discharge in air to all communication ports.
8 kV point contact discharge to any part of the front of the product.

Conducted Emissions
Per EN 55022: 1998:
0.15 – 0.5MHz, 79dBµV (quasi peak) 66dBµV (average)
0.5 – 30MHz, 73dBµV (quasi peak) 60dBµV (average).

Radiated Emissions
Per EN 55022: 1998:
30 - 230MHz, 40dBµV/m at 10m measurement distance
230 - 1GHz, 47dBµV/m at 10m measurement distance.

Immunity to Radiated Electromagnetic Energy
Per IEC 60255-22-3: 2000, Class III & IEC61000-4-3:2002
Test field strength, frequency band 80 to 1000 MHz:
10 V/m, test using AM: 1 kHz / 80%, at 80 to 1GHz,
30 V/m, test using AM: 1 kHz / 80%, at 80 to 900MHz and 1.4GHz to 2.0GHz

Conducted Immunity
Per IEC 60255-22-6: 2001
10 V/m, test using AM: 1 kHz / 80%, at 0.15 to 80MHz,

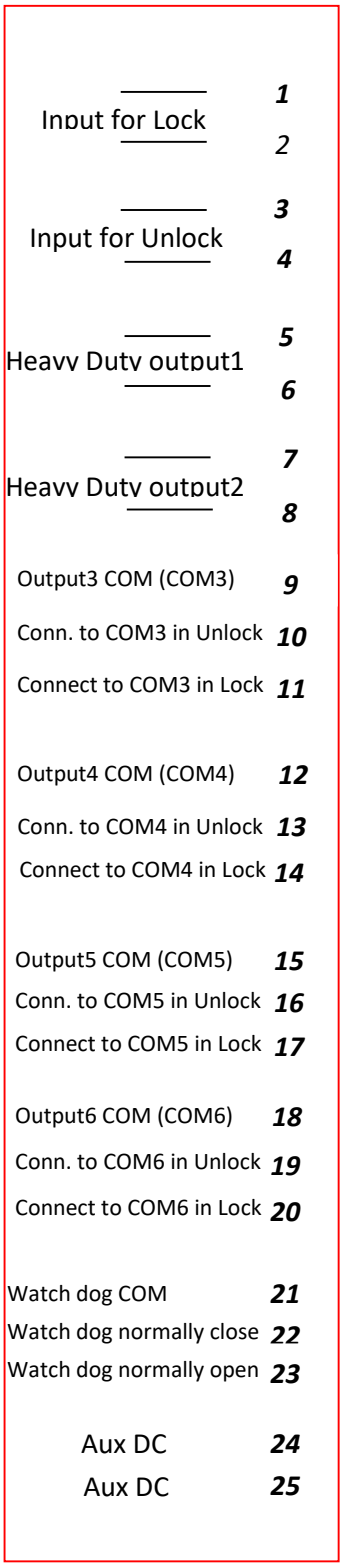
Surge Immunity
Per IEC 60255-22-5: 2002
Class IV: 4kV common mode 12Ω source impedance, 2kV differential mode 2Ω source impedance – power supply
Class IV: 4kV common mode 42Ω source impedance, 2kV differential mode 42Ω source impedance – opto inputs, relays, CT, VT
Class IV - 4kV common mode 2Ω source impedance applied to cable screen – terminal block communications

Power Frequency Magnetic Field Immunity
Per IEC 61000-4-8:2001, class V: 100A/m quiescent condition, 1000A/m short duration (1-3s)

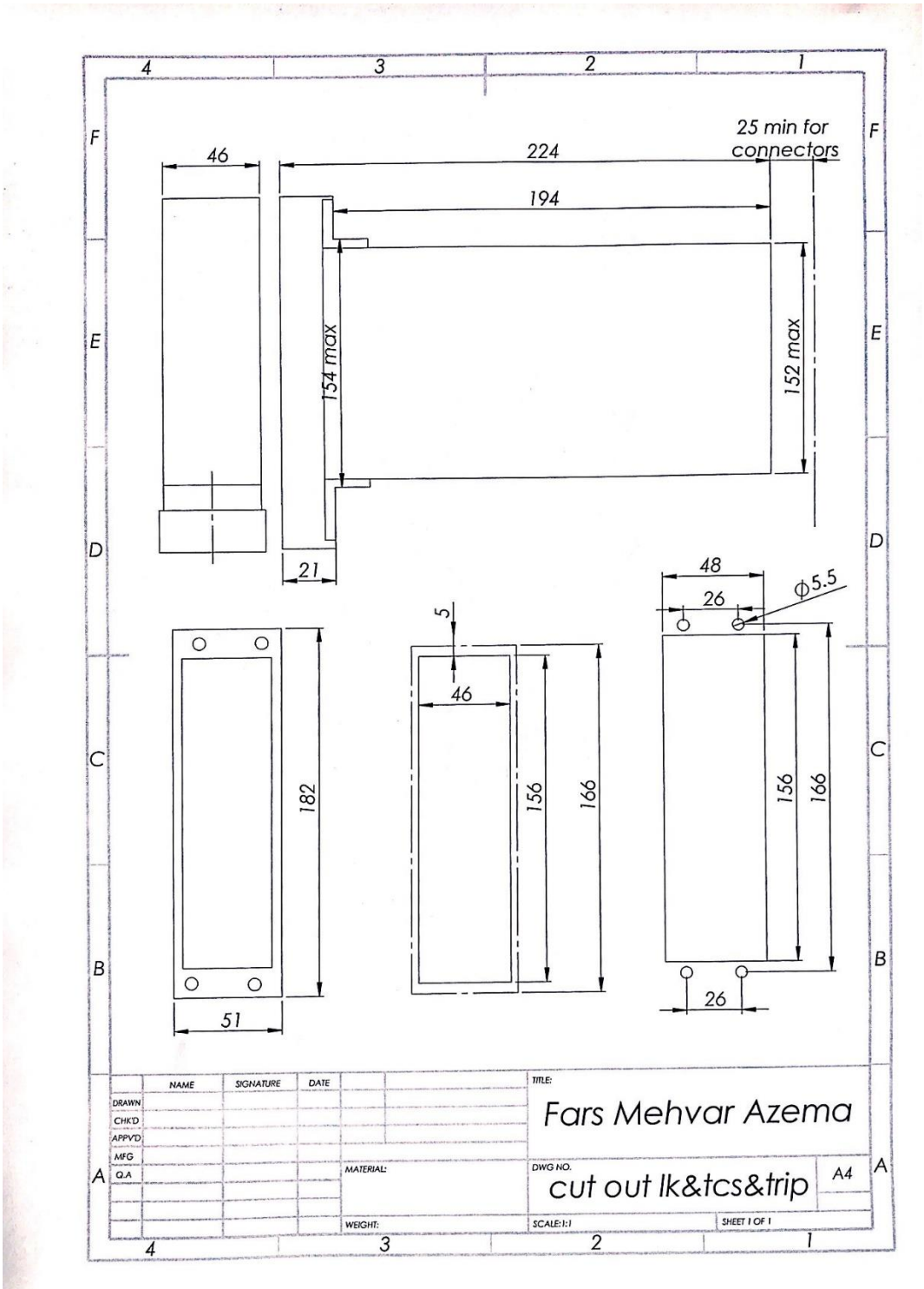
Pulse Magnetic Field Immunity
Per IEC 61000-4-9:2001, class V: 1000A/m pulse (5 positive, 5 negative)

Damped Oscillatory Magnetic Field
Per IEC 61000-4-10:2001, class V: 100A/m @100kHz / 1MHz 2 second burst duration
Oscillatory Waves Immunity
Per IEC 61000-4-12:2001:
2.5kV peak between independent circuits and case earth
1.0kV peak across terminals of the same circuit

T-6: Connection diagram



T – 7: Dimensions & panel cut out



T-8: Usage Note

MRL LK01-V2 contains 2 normally close (at unlock state) heavy duty plus 4 changeover semi heavy duty contacts. *Also there is a watch dog relay and a green blinking healthy LED that always ensures the correct operation of system.*

Two other LEDs show the status of lock out relay. When a trip signal comes, the red LED turns ON, to show lock out status, and remains ON, until reset key pushed or remote reset is done. When the relay is not locked out, the blue LED is ON.

An important facility in this relay is that, keeps the contact and LED status after power interruption. This means if the relay is locked or unlocked, and DC power of relay is removed, during DC missing, and after DC power is established again, the relay keeps its status.

If the relay is locked and DC is still connected, the relay can be unlocked by related input, or by reset key on front panel, or by pushing the small groove at middle of panel down. If the dc is not connected, the relay can be locked or unlocked only by pushing manually the related groove down or up.

Note: Watch dog relay contact is not so strong as other contacts, and should be used only for watch dog alarm.

The red LED shows the lock out status, and blue LED shows the unlock status.