

Plug-in Signal Conditioners M-UNIT

DC ALARM
(front control button adjustment)

MODEL **MSEF**

MODEL & SUFFIX CODE SELECTION

MSEF-□5-□□

MODEL _____

INPUT _____

Current	Voltage
A : 4 – 20mA DC	4 : 0 – 10V DC
B : 2 – 10mA DC	5 : 0 – 5V DC
C : 1 – 5mA DC	6 : 1 – 5V DC

OUTPUT _____

5 : Dual trip; SPDT or transfer contact

POWER INPUT _____

AC Power	DC Power
B : 100V AC	G : 200V AC*1
C : 110V AC	H : 220V AC*1
D : 115V AC	J : 240V AC*1
F : 120V AC	S : 12V DC*1
	R : 24V DC*1

OPTIONS _____

/UL : UL approval

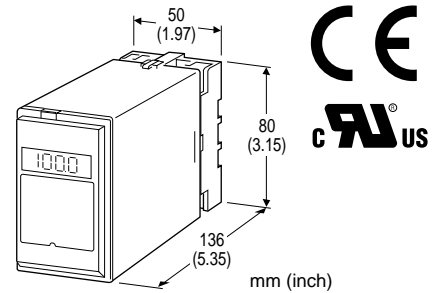
*1. Option /UL not selectable.

ORDERING INFORMATION

Specify code number and variables.
• **Code number** (e.g. MSEF-65-B/UL)

GENERAL SPECIFICATIONS

Construction: plug-in
Connection: M3.5 screw terminals
Housing material: flame-resistant resin (black)
Isolation: input to output to power
Setpoint adjustments: front control buttons
Display: LED, 4-digit digital meter
Display range: -14.0 – +113.5%
Front LEDs: red/green dual-color LED
Run mode: Red turns ON in tripped condition.
L1 for Output 1, L2 for Output 2
Check mode: Green turns ON.
Set mode: Red/green turns ON.
Latching output: Alternatively selectable to deadband option; reset with power turned OFF.



Functions & Features

- Providing SPDT relay outputs at preset DC input levels
- Dual trip
- Latching or non-latching output
- Deadband, ON-delay, Hi/Lo trip, failsafe action can be programmed with front UP/DOWN control buttons
- Enclosed relays
- High-density mounting

Typical Applications

- Annunciator
- Various alarm applications

INPUT & OUTPUT

■ **INPUT**

• **DC Current:** shunt resistor attached to input terminals (0.5W)

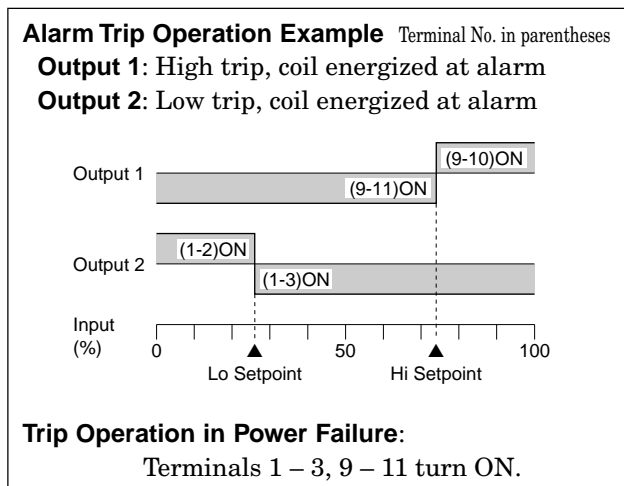
Input resistance: For resistance values other than listed below, specify when ordering.

Input	Input Resistance
4 – 20mA	: 250 (Ω)
2 – 10mA	: 500
1 – 5mA	: 1000

• **DC Voltage:** 0 – 10V DC, 0 – 5V DC or 1 – 5V DC

Input resistance: 1MΩ minimum

OUTPUT



- Relay Contact:** 120V AC @5A ($\cos\phi=1$)
 240V AC @2.5A ($\cos\phi=1$)
 30V DC @5A (resistive load)
 electrical life 10^5 cycles (rate 30/min.)
 - Maximum switching voltage:** 300V AC or 125V DC
 - Maximum switching power:** 600VA or 150W
 - Minimum load:** 5V DC @10mA
 - Mechanical life:** 5×10^7 cycles
- For maximum relay life with inductive loads, external protection is recommended.

INSTALLATION

- Power input**
- AC:** rating $\pm 10\%$, 50/60 ± 2 Hz, approx. 3VA
 - DC:** rating $\pm 10\%$; ripple 10% p-p max.; approx. 3W (120mA at 24V)
- Operating temperature:** -5 to +60°C (23 to 140°F)
Operating humidity: 30 to 90% RH (non-condensing)
Mounting: surface or DIN rail
Dimensions: W50×H80×D136 mm (1.97"×3.15"×5.35")
 See General Spec. Sheet Figure C-1.
Weight: 400 g (0.88 lbs)
Terminal assignment: See General Spec. Sheet Figure D-2.

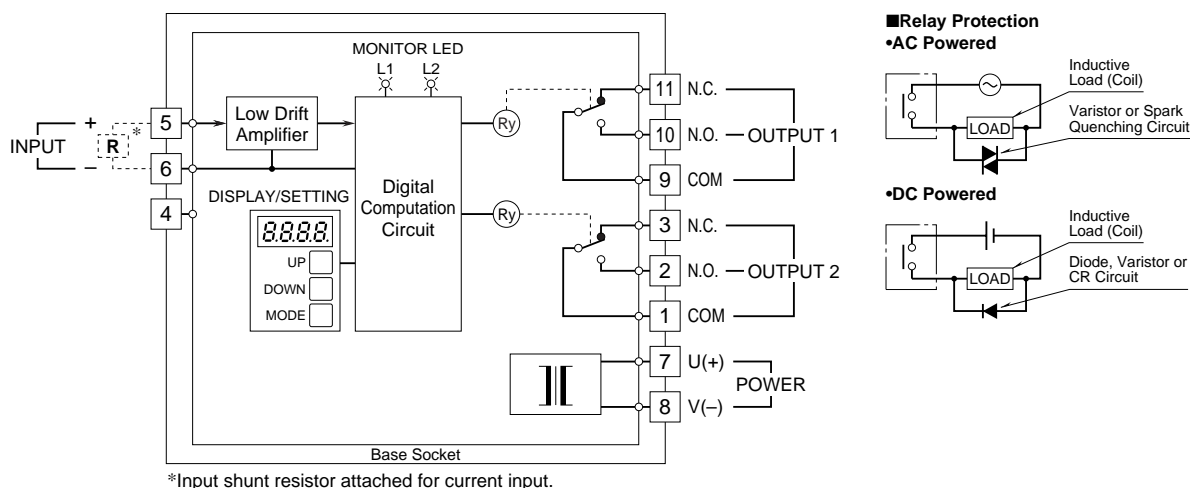
PERFORMANCE in percentage of span

- Setpoint accuracy:** $\pm 0.5\%$
- Display accuracy:** $\pm 1.0\%$
- Deadband setpoint accuracy:** $\pm 0.3\%$
- Trip point repeatability:** $\pm 0.1\%$
- Temp. coefficient:** $\pm 0.015\%/^{\circ}\text{C}$ ($\pm 0.008\%/^{\circ}\text{F}$)
- Response time:** ≤ 0.5 seconds (0 - 100% at 90% setpoint)
- Line voltage effect:** $\pm 0.1\%$ over voltage range
- Insulation resistance:** $\geq 100\text{M}\Omega$ with 500V DC
- Dielectric strength:** 2000V AC @1 minute
 (input to output to power to ground)

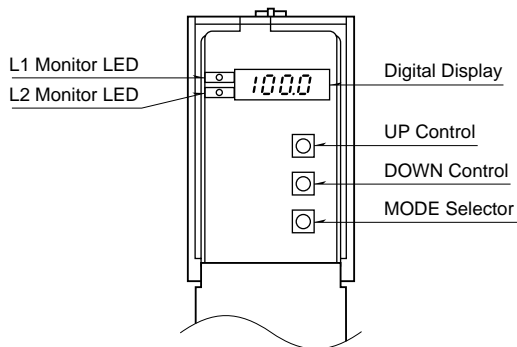
STANDARDS & APPROVALS

- CE conformity:** EMC Directive (89/336/EEC)
 EMI EN50081-2
 EMS EN50082-2 (EN61000-6-2)
 Low Voltage Directive (73/23/EEC)
 Installation category II
 Pollution degree 2
 Max. operating voltage 300V
 Input to output to power - Basic insulation
- Approval:** UL/C-UL general safety requirements
 (UL 3111-1, CAN/CSA-C22.2 No.1010-1)

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



FRONT PANEL CONFIGURATION & PROGRAMMING



The MSEF has three function modes for checking and programming parameters:

- Run mode:** Normal operating mode.
Either one or both LEDs are OFF or turned to red.
- Check mode:** Parameters can be indicated on the display in turn.
Either one or both LEDs turns to green.
Normal output as in the Run mode.
- Set mode:** Used to change parameters.
Either one or both LEDs turns to red/green.
The output is held at the status just before the MSEF is turned into the Set mode.

- **L1 Monitor LED:** Red: Run mode. Indicates the Output 1 alarm is tripped.
Green: Check mode. Indicates parameters for the Output 1.
Red/Green: Set mode. Parameters for the Output 1 is modifiable.
- **L2 Monitor LED:** The L2 LED is for the Output 2.
- **Digital Display:** Run mode: The 4-digit display indicates the input percentage.
Check/Set mode: Indicates the setting item ID and set values.
Alarm setpoints are represented in 4-digit numbers. The other items are shown with its item ID (alphanumerical characters) followed by set values.
- **UP/DOWN Controls:** Pressing UP/DOWN Control Button briefly changes parameter in minimum increments.
Keeping pressing UP/DOWN Control Button increases the speed of change.
- **MODE Selector:** Switches the three function modes and the set items.
Run > Check: Press briefly the MODE Selector.
Run/Check > Set: Press the MODE Selector for 2 seconds.
Next item: In Check/Set mode, press briefly the MODE Selector. Items appear in the order shown in the table below. In Check mode, the unit automatically returns to the Run mode after all the items are displayed in turn.
Set > Run: Pressing the MODE Selector for 2 seconds stores the parameter modification and return the unit to the Run mode.

Programmable items and default settings

	ITEM	L1	L2	DISPLAY	SELECTABLE RANGE	INCRE.	DEFAULT
1	Output 1 trip point	ON	—	-10.0 – 110.0	-10.0 – 110.0%	0.5	80%
2	Output 2 trip point	—	ON				20%
3	Output 1 deadband / Latching	ON	—	H 0.5 – H 15.0	0.5 – 15.0% *1	0.5	1.0%
4	Output 2 deadband / Latching	—	ON	HLCH	Latching enabled/disabled *2		Disabled
5	Output 1 trip action	ON	—	A H1 A H2	High trip, coil energized at alarm High trip, coil de-energized at alarm	—	H1
6	Output 2 trip action	—	ON	A L1 A L2	Lo trip, coil energized at alarm Lo trip, coil de-energized at alarm	—	L1
7	ON delay time	ON	ON	d 0.5 – d 5.0	0.5 – 5.0 sec.	0.5	0.5 sec.
8	Power ON delay time	ON	ON	Pd 1 – Pd 5	1 – 5 sec.	1	2 sec.

*1 : (Hi trip point) – (Deadband) ≥ -14.0 (Lo trip point) + (Deadband) ≤ 113.5

*2 : Latching relays are enabled by setting "HLCH" instead of deadband.

In order to reset the relays, turn power supply off and on.

■HOW TO MODIFY THE PARAMETERS

- 1) Press MODE Selector briefly one or more times until the item you need to modify turns up.
Confirm the set value (Check mode).
- 2) Press MODE Selector for 2 seconds to turn the unit into the Set mode.
[(1) and (2) can be performed in a reverse order.]
- 3) Press UP or DOWN Control Buttons until the display shows a desired setting.
- 4) Repeat (1) and (3) to change more parameters.
- 5) Keep pressing MODE Selector for 2 seconds to store the setting and return the unit to the Run mode.
If the buttons are left untouched for longer than 20 seconds, the unit automatically returns from the Check/Set mode to the Run mode, however, no parameter change performed in the Set mode is effectuated.