E-MAX SFR-2/59

SFR - Frequency Relay

- Proven Reliability
- Direct Settability
- Simple Installation
- Alarm Status Monitors

The SFR-2/59 Frequency Relay is a second generation relay designed to provide reliable load shedding during abnormal frequency conditions. The device has up to three electromechanical relay outputs which may be used to trip power circuit breakers.

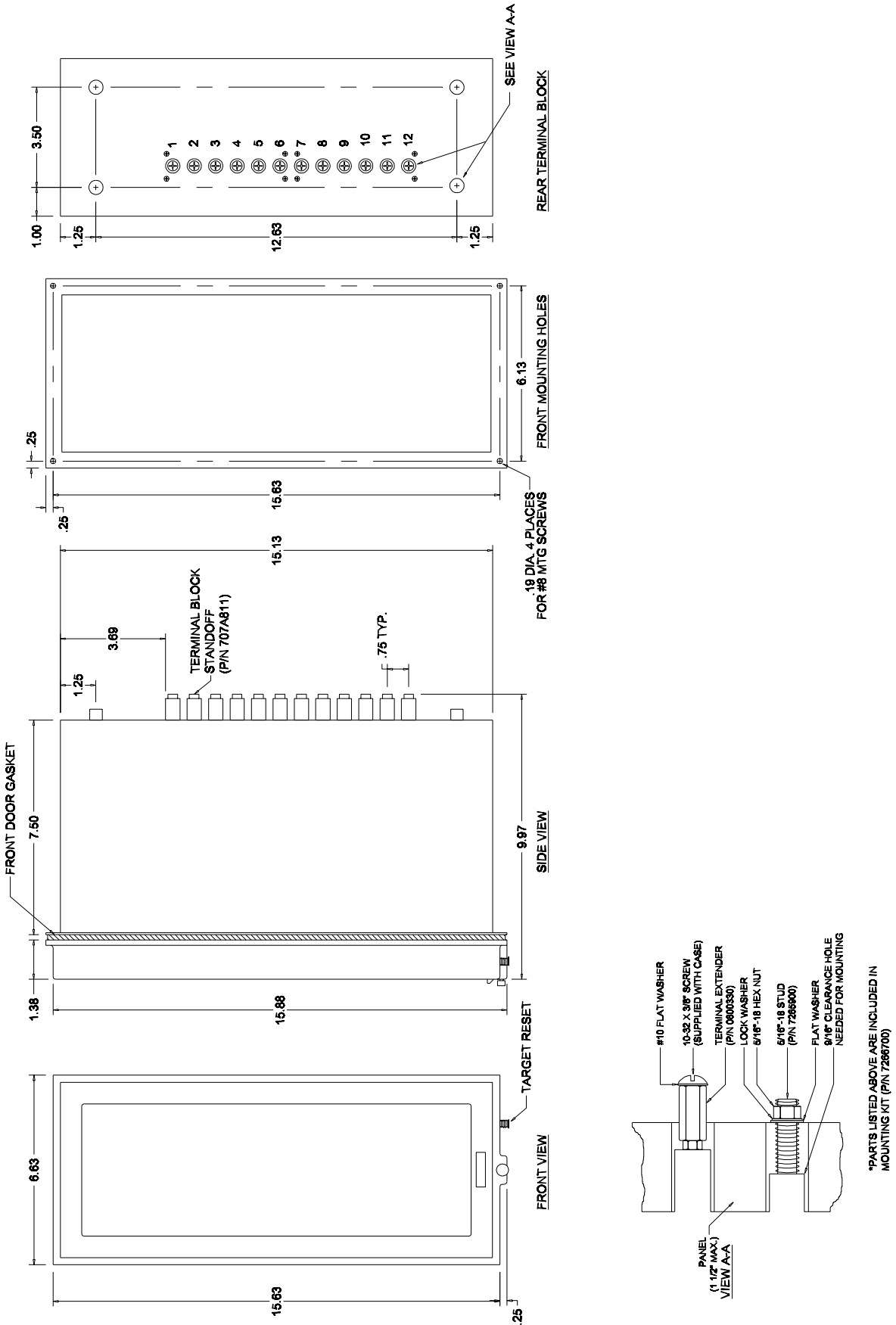
Special inhibit circuits prevent false trips due to loss of signal, loss of voltage, or an internal power failure. The relay will not false trip due to noise.

Models are available in one, two, or three separate frequency trip points and independent output circuits. Relays that trip on one frequency with reset on a higher frequency and relays with automatic reclosing sequences are available as well as overfrequency and over/under frequency models.

New models feature Alarm Status Monitoring. These new units monitor the power supplies and trip circuits delivering visual indication coupled with a relay contact to further increase the proven reliability of the E-MAX SFR.

Features

Interchangeable	Internal Chassis is plug-in replaceable with E-MAX type SFR Frequency Relays
Maintainability	All plug-in printed circuits with MTTR<10 minutes by board replacement. Low cost Test Input Paddle available.
Low Burden	Burden extremely low signal 2.5 VA on signal source.
Low Power	Isolated Power Supply 40 - 155 Vdc 120 Vac ± 10%
Field Expandable	1 to 3 Trip Points Selectable Under or Over Frequency Auto Restoration of Load (Delay 0.3 to 600 seconds)
Direct Settability	Frequency to 2 decimals Time Delay to Trip, 6 to 81 cycles in one cycle steps


SEE VIEW A-A
REAR TERMINAL BLOCK
3.50
1.00
1.25
12.63
1.25
1 2 3 4 5 6 7 8 9 10 11 12
.25
.25
15.63
6.13
FRONT MOUNTING HOLES
.19 DIA. 4 PLACES
FOR #8 MTG SCREWS
15.13
3.69
1.25
TERMINAL BLOCK
STANDOFF
(P/N 707A811)
.75 TYP.
FRONT DOOR GASKET
7.50
9.97
SIDE VIEW
1.38
15.88
TARGET RESET
6.63
FRONT VIEW
15.63
.25
#10 FLAT WASHER
10-32 X 3/8" SCREW
(SUPPLIED WITH CASE)
TERMINAL EXTENDER
(P/N 0800330)
LOCK WASHER
5/16"-18 HEX NUT
5/16"-18 STUD
(P/N 7286900)
FLAT WASHER
9/16" CLEARANCE HOLE
NEEDED FOR MOUNTING
PANEL
(1 1/2" MAX.)
VIEW A-A
*PARTS LISTED ABOVE ARE INCLUDED IN
MOUNTING KIT (P/N 7286700)

Specifications

Frequency Accuracy ±.007 Hz on 60 Hz base

Time Delay Accuracy ± cycle

Surge Withstand The SWC test wave is an oscillatory wave with a nominal frequency of 1.5 MHz.(1.0 to 1.5 MHz range), 2.5 kV (-0+20%) crest value of the first half cycle peak, envelope decaying to 50 % of the crest value of the first peak in 6 microseconds from the start of the wave. Source impedance of the surge generator used to produce the test wave is to be 150 ohms. The test wave to be applied to a test specimen at a repetitive rate of not less than 50 tests per second for a period of at least 2.0 seconds.

The test wave is applied between all inputs and the case; between all inputs and the case; between each input and all other inputs. This is a differential and a common mode test. Each test is applied consecutively for two seconds. The relay must not falsely operate at four digital cycles delay.

Signal Loss Test The relay will not falsely operate at four digital cycles delay when the signal is removed, regardless of the rate.

Power Loss Test The relay will not falsely operate at four digital cycles delay when the signal is removed, regardless of the rate.

Signal Undervoltage Adjustment 40 to 70 Vrms (dc powered versions)
60 to 70 Vrms (ac powered versions)

Target *2A Tap - 2A must operate; 200 mA must release.
*0.2 A Tap - 0.2 A must operate; 20 mA must release

Output Contacts Refer to the following table

Parameter	Amperes ac or dc (155 Vdc max.)	
Holding Coil Tap	.2A	2A
Carry for 1 Second	10A	30A
Carry - Continuous	2A	6A
Resistance	1.3	.20
Impedance at 60 Hz	1.45	.20
Break (Controlled by release of Holding Coil	0.2A	2A

Any other time characteristics may be found from $k=i^2t$

Frequency Range UF - 55.0 to 59.98 Hz OF - 60.00 to 64.00 Hz

Frequency Setting Resolution to .02 Hz of desired setting

Time Delay Resolution 1 Cycle (after 32 msecs, internal analog delay)

Temperature 0 to 140^{O} F

Humidity 0 to 95% Non-condensing

Isolation Will withstand a one minute application of 1500 Vrms, 60 Hz between each input and any other input or any input and case.

Power Supplies All relays (dc or ac) include complete isolation of logic from the power source.

Environment All relays are 100% tested at high and low temperature.

Weight 12 lbs

Signal Burden - dc powered units 3 VA max

Burden - ac powered units 18 VA max

Power Requirements 125 Vdc nominal - 0.1 A, 48 Vdc nominal - 0.2 A,
117 Vac nominal - 0.1 A, or 250 Vdc nominal - 0.6 A

SFR Frequency Relay Order Information

P/N	Model	Application	Type	Input Power
707D501	2/59	UF	1A	48 Vdc
707D502	2/59	UF	1A	125 Vdc
707D503	2/59	UF	1A	117 Vac
707D504	2/59	UF	2A	48 Vdc
707D505	2/59	UF	2A	125 Vdc
707D506	2/59	UF	2A	117 Vac
707D507	2/59	UF	3A	48 Vdc
707D508	2/59	UF	3A	125 Vdc
707D509	2/59	UF	3A	117 Vac
707D523	2/59	UF	2C	48 Vdc
707D524	2/59	UF	2C	125 Vdc
707D525	2/59	UF	2C	117 Vac
707D548	2/59	UF	12A	125 Vdc
707D549	2/59	UF	12A	48 Vdc
707D542	2/59	UF	22A	125/48 Vdc
707D514	2/61	OF	1A	48 Vdc
707D515	2/61	OF	1A	125 Vdc
707D516	2/61	OF	1A	117 Vac
707D520	2/61	OF	3A	48 Vdc
707D521	2/61	OF	3A	125 Vdc
707D522	2/61	OF	3A	117 Vac
707D517	2/60	UF/OF	2A	48 Vdc
707D518	2/60	UF/OF	2A	125 Vdc
707D519	2/60	UF/OF	2A	117 Vac
Relay Status Alarm Series				
707D611	2/59	UF	2S	125 Vdc
707D612	2/59	UF	2S	250 Vdc
707D614	2/59	UF	22S	48 / 125 Vdc
707D617	2/59	UF	ICS	48 /125 Vdc

There are 4 basic types of SFR-2 relays

Type	Description
59-1A,2A,3A	These models, for 1,2, or 3 independent trip settings, respectively, trip at underfrequency settings with adjustable delay of up to 79 cycles, can directly trip breakers. Settable seal-in coil holds trip signal until the breaker auxiliary contact opens the trip circuit.
61-1A, 2A, 3A	Similar to 59-1A, 2A, 3A except for overfrequency applications.
60-2A	Similar to 59-2A except for under/over frequency applications.

Type	Description
59-2C	Single underfrequency setpoint with reclose. Trips at one preset underfrequency with a time delay of up to 79. Settable seal-in coil holds trip signal until the breaker auxiliary contact opens the trip circuit. An independent reclosure contact is provided for direct reclosing of circuit breakers. This contact is initiated after trip has occurred and system frequency has recovered above a preset level. Reclose delay setting adjustable from 0.3 to 600 seconds ±5%.

Other configurations available including relay status alarm, long trip delay, and pre-trip alarm.