

# FAULT CLEAR<sup>®</sup>

Triple-Single Auto Recloser

Our product contributes to improve "Your Grid Reliability".

## ▶ Working directly with SEL controller

FAULT CLEAR<sup>®</sup> works directly with "SEL-651R-2" and 32-pin control cable for three-phase/triple-single application and "SEL-351RS" controller with 10-pin control cable for single-phase application.

## ▶ Pole-ready design

FAULT CLEAR<sup>®</sup> is also ready to "pole-ready" design for **easy installation at the site**, which is included lightning arresters, NEMA pads, PTs for the controller.

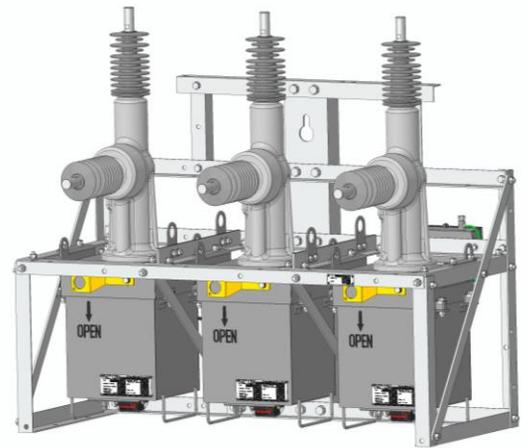
## ▶ Long-term reliability

FAULT CLEAR<sup>®</sup> is designed to have a long service life by selecting reliable materials and parts. Bushings are made of of Hydrophobic Cycloaliphatic Epoxy (HCEP) with silicon sheds for high UV environments.

## ▶ 10-year warranty\*

FAULT CLEAR<sup>®</sup> is designed to have a long service life by selecting reliable materials and parts, which allows us to offer 10-year warranty at no extra cost. \*Limited to Reclosers sold in the United States.

Rated voltage [kV]	27
Rated frequency [Hz]	60
Rated current [A]	800
Overload current (8hours) [A]	960
BIL(Basic Impulse Level) [kV]	150
Rated power frequency withstand voltage [kV]	60(Dry), 50(Wet)
Mechanical endurance [operations]	10,000
Rated interrupting current [kA]	16
Rated short-circuit making current [kA <sub>peak</sub> ]	41.6
Duty cycle [operations]	116
Max. closing time [msec]	48
Max. opening time [msec]	24
Creepage distance [inches(mm)]	43.7 (1,110)
Pollution level	Very heavy
Ambient temperature [°F(°C)]	-40 to +140 (-40 to +60)
Total weight (Recloser+bracket) [lbs (kg)]	518 (235)



### Options

- ▶ 2- or 4-hole NEMA pad or clamp type connector
- ▶ Animal/bird guard
- ▶ Power transformer for controller
- ▶ Lightning arrester
- ▶ Recloser bracket  
[Center-pole] [Alley-arm]

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## Features and advantages

# FAULT CLEAR® has durable polymer insulators.

Partial discharge **less than 10pC** at  $V_{L-N}=17.2kV$

Partial discharge is deeply related on the quality of distribution equipment.  
 "Less than 10pC", it is clearly indicated that equipment is well-designed and high quality.

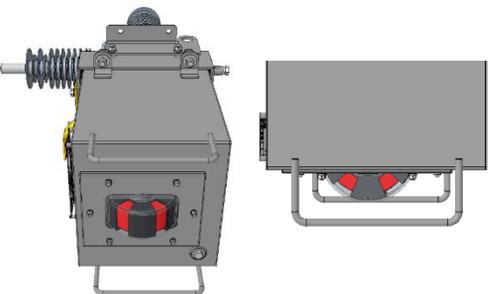
Type test result "Partial discharge tests"						
No.	HV Applied	Switch position	Inception Voltage[kV]	Extinction Voltage[kV]	Measuring Voltage	
					Voltage[kV]	PD[pC]
1	A, a	Closed	29.6	25.7	17.2	6
2	B, b		25.7	21.5	17.2	6
3	C, c		32.2	26.6	17.2	6
4	A	Open	30.2	22.5	17.2	6
5	B		38.2	33.7	17.2	7
6	C		45.2	36.1	17.2	6
7	a		38.6	25.0	17.2	7
8	b		27.1	19.6	17.2	7
9	c		30.0	24.8	17.2	7

※Background noise was 6pC.

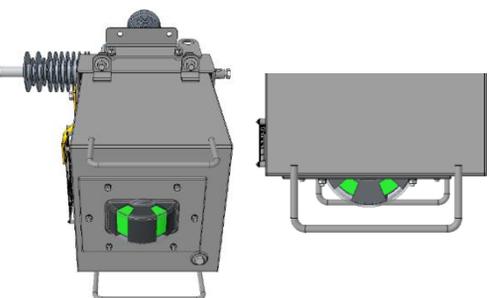
# FAULT CLEAR® has a high-visibility indicator.

It remains **clear** and **transparent** in its lifetime.

The indicator cover is subjected to accelerated weathering for 3,042hrs.  
 Slight discoloration with an amber tint was observed.



**Closed** position [Reflective]



**Open** position [Reflective]

### Accelerated weathering test results



**As for discoloration, it's equivalent to 10-15 years** in outdoor exposure.

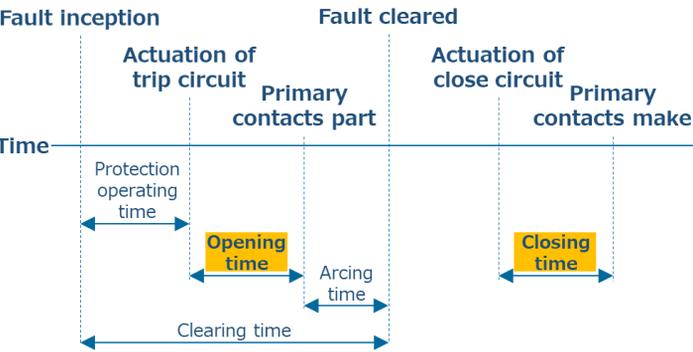
Sunshine weather meter [S80, SUGA]  
 Irradiance : 255W/m<sup>2</sup> at 300 to 700 nm  
 Light only : 12 min.  
 Light and spray : 48 min.

# FAULT CLEAR® has a high-speed mechanism.

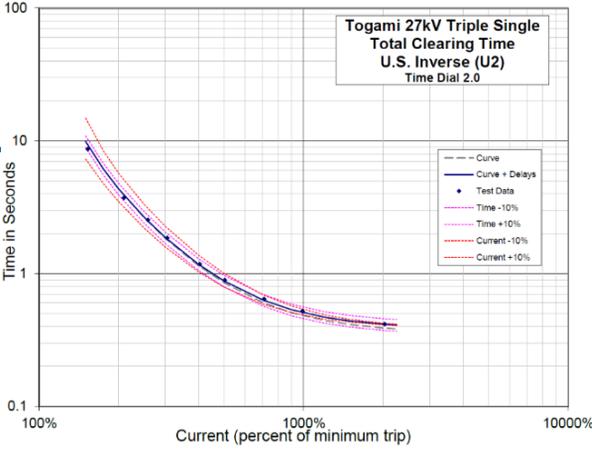
Closing time : **38msec** ± 10ms

Opening time : **14msec** ± 10ms

High speed opening time leads to decrease clearing time.  
It helps to achieve correct coordination with other equipment.



## Type test result "Time-current tests"

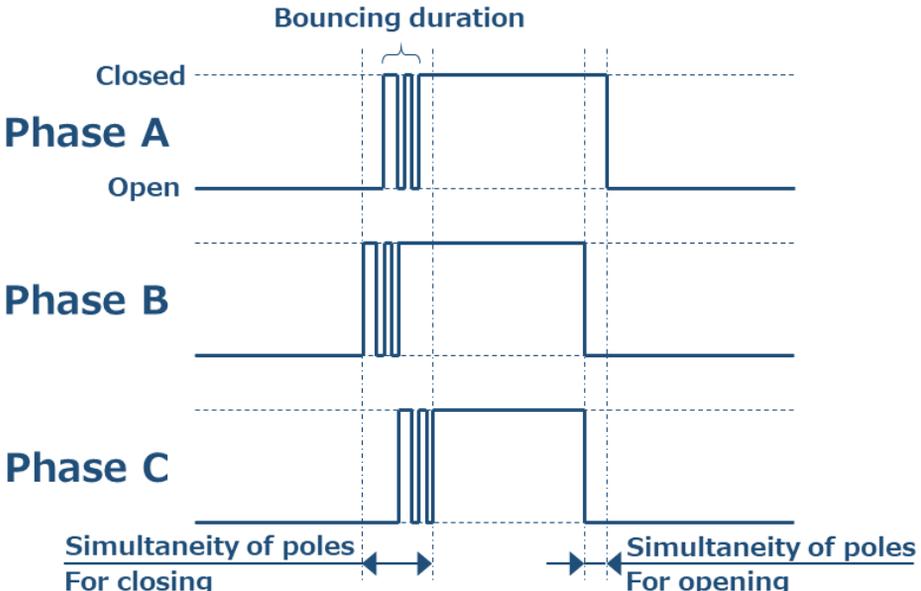


# FAULT CLEAR® has a high-precision mechanism.

Simultaneity of poles : **less than 4msec**

Bouncing duration of the main contacts : **less than 3msec**

Simultaneity of poles is important to avoid nuisance trip (51G).  
And, also it helps to suppress switching surge.



## Features and advantages

# FAULT CLEAR® has high-accuracy integrated CT.

Temperature range: **-40°F ~ +140°F** (-40°C ~ +60°C)

Accuracy class : **Class 1.0, 5P20**

“5P20” means that the ratio error : ±5% is guaranteed up to 16kA.  
It has an outstanding followability with Time Current Curves.

CT accuracy Class 1.0 according to IEC60044-1			
Ratio error [±%]			
40A	160A	800A	960A
3.0	1.5	1.0	1.0
Phase displacement [± minutes]			
40A	160A	800A	960A
180	90	60	60

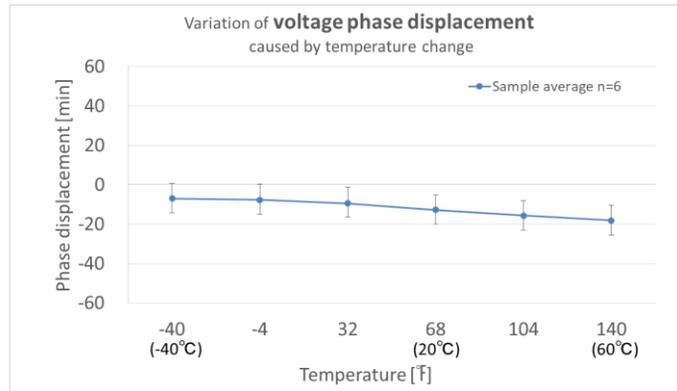
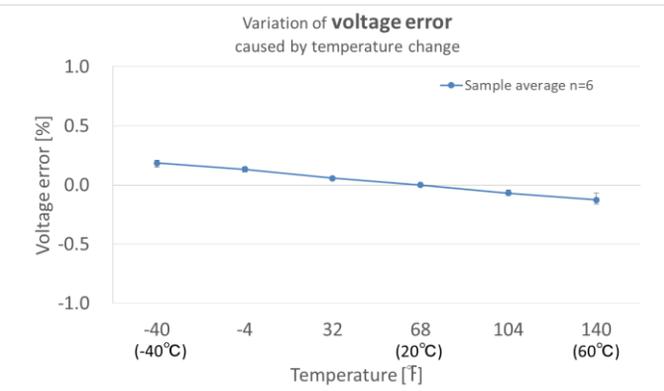
# FAULT CLEAR® has high-accuracy integrated RVS.

Temperature range: **-40°F ~ +140°F** (-40°C ~ +60°C)

Accuracy class : **±0.5%\***

\* The RVD is on the new model.  
The changeover will begin for units produced in January 2024.

Our Resistive Voltage Sensors(RVS) satisfy ±0.5% through the temperature range -40°F ~ +140°F [-40°C ~ +60°C], and at operation voltage from 13.2kV to 27kV.



※As for the voltage error, these values are based on the value at 60°F.  
※These values are obtained by the appropriate measuring instrument.

# FAULT CLEAR® has highly-rated of IP degrees.

Ingress protection degrees of the enclosure : **IP67, IPX6**

The enclosure keeps great airtightness throughout its lifetime. It doesn't have an air vent. However, a sufficient absorbent is included in the enclosure. So, No condensation!

**6**  
Dust tight  
Category 1, 8hrs

Ingress Protection **IP 6 7** Temporary immersion 30 min.   
**X 6** Powerful water jets All directions

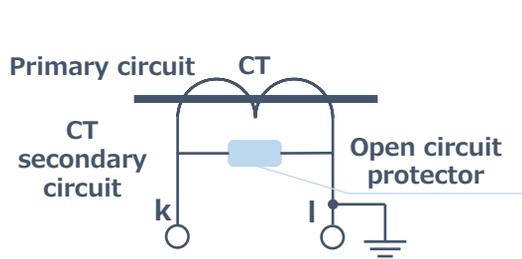
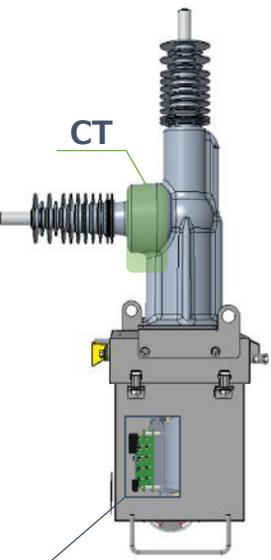
**1<sup>st</sup> digit**  
Degree of solid particle protection

**2<sup>nd</sup> digit**  
Degree of liquid ingress protection

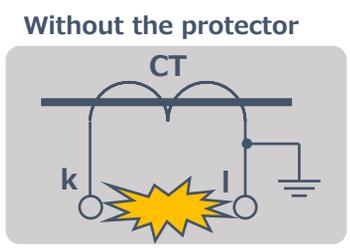
# FAULT CLEAR® has a high-safety protection on CT.

Durable **CT secondary open circuit protectors**

In case CT secondary circuit is open, (i.e. the control cable is disconnected etc.) The protection circuit limits the open circuit voltage on CT secondary circuit. This protector has a large current capacity. No thermal damage by rated current(800A). It keeps FAULT CLEAR® safe.



**No open circuit voltage**  
**No any defects** on the secondary circuit



**Open circuit Voltage is excited.**  
In case the control cable is disconnected.

**Open circuit protector**  
[Inside the enclosure]

## Features and advantages

**FAULT CLEAR®** has a high capacity of load current.

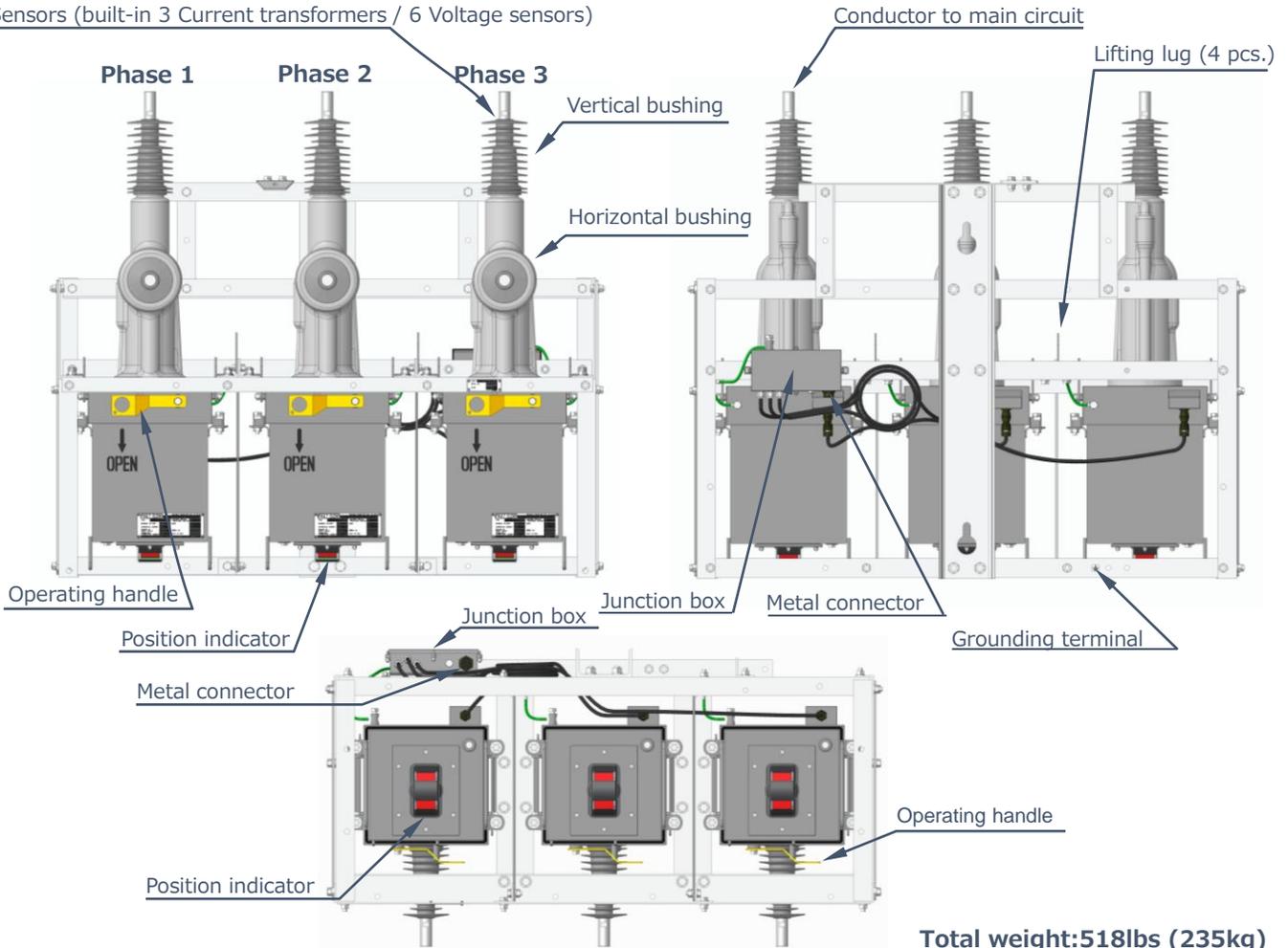
The main circuit resistance : **less than 60μΩ**  
 The type test result with a **sufficient margin**

Our type test result shows FAULT CLEAR® has a sufficient margin on a load current capacity.

Type test result "Temperature rise test"			
Avg. test current	963.7A		
Avg. ambient temperature	25.0°C		
Duration of test	5.5hours		
Max. temp-rise test point	Stable temperature		Max. temp-rise limit
	Abs.	Ref.	
B phase upper bus	66.0°C	41.0K	65K

## Product overview

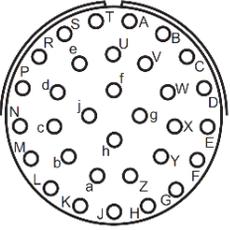
Bushing (Body: Epoxy resin; Shed: Silicon)  
 Sensors (built-in 3 Current transformers / 6 Voltage sensors)



Total weight: 518lbs (235kg)

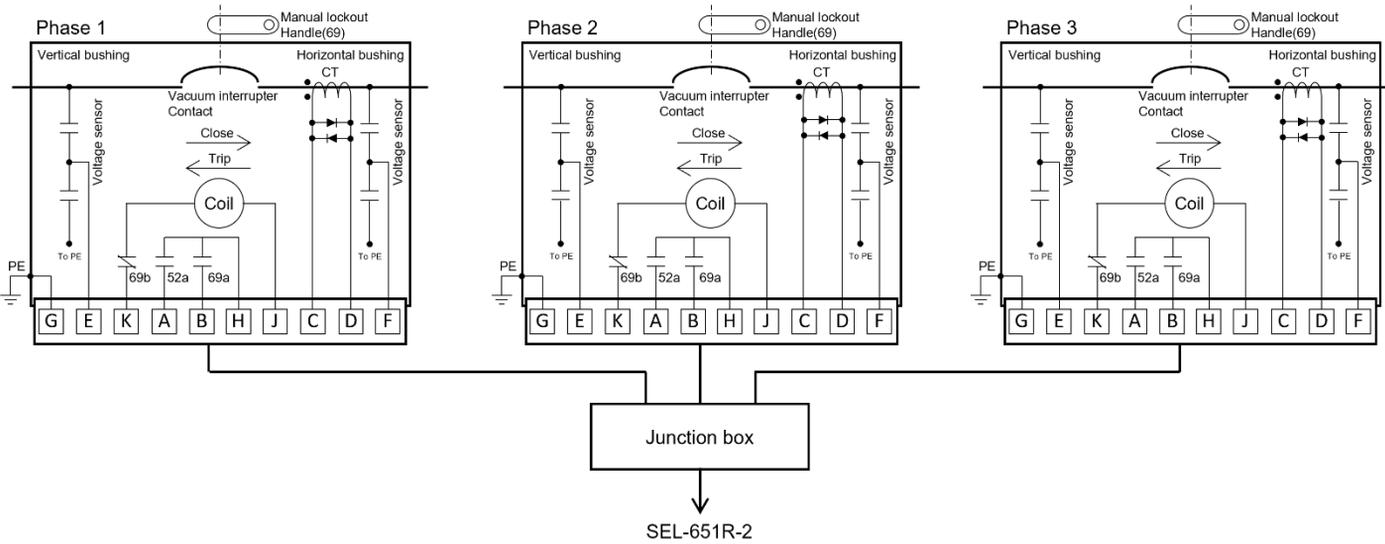
# Connector configurations

**FAULT CLEAR® connector # of pins: 32-pin Insert arrangement: 18-32**



32-pin Connector pin assignment			
<b>A</b>	Terminal Current – Phase 1	<b>T</b>	—
<b>B</b>	Terminal Current – Phase 2	<b>U</b>	Monitored Auxiliary Contact (52a) – Phase 1
<b>C</b>	Terminal Current – Phase 3	<b>V</b>	Monitored Auxiliary Contact (52a) – Phase 2
<b>D</b>	Current Return	<b>W</b>	Monitored Auxiliary Contact (52a) – Phase 3
<b>E</b>	—	<b>X</b>	Monitored 69 Contact
<b>F</b>	+12 Vdc (Whetting Voltage) for monitoring recloser status	<b>Y</b>	Actuator Close – Phase 1
<b>G</b>	Recloser Ground	<b>Z</b>	Actuator Trip – Phase1
<b>H</b>	—	<b>a</b>	—
<b>J</b>	Voltage (horizontal) – Phase 1	<b>b</b>	—
<b>K</b>	Voltage (horizontal) – Phase 2	<b>c</b>	—
<b>L</b>	Voltage (horizontal) – Phase 3	<b>d</b>	—
<b>M</b>	Voltage (horizontal) – Common	<b>e</b>	—
<b>N</b>	Voltage (vertical) – Phase 1	<b>f</b>	Actuator Close – Phase 2
<b>P</b>	Voltage (vertical) – Phase 2	<b>g</b>	Actuator Trip – Phase 2
<b>R</b>	Voltage (vertical) – Phase 3	<b>h</b>	Actuator Close – Phase 3
<b>S</b>	Voltage (vertical) – Common	<b>j</b>	Actuator Trip – Phase 3

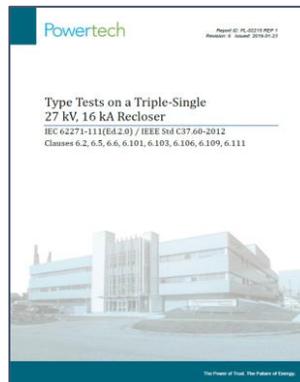
## Circuit diagram



## Applicable standard

FAULT CLEAR® is designed and tested in accordance with IEEE C37.60/IEC62271-111:2012. The certified test was carried out at Powertech lab.

Report ID:PL-02215 REP 1, PL-02215 REP 2





Make the society, the Earth,  
and the future prosperous!

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