DIAC/DIFC/DSFC

Single Phase Digital O/C

DIAC

DIFC

DSFC

Single phase or ground overcurrent protection for industrial and utility power systems.

Features and Benefits

- 3 models: DIAC, DIFC, DSFC
- Direct/functional replacement of IAC, IFC, SFC
- Self-powered
- Reduced maintenance costs
- Drawout case
- Low burden

Applications

- Industrial and utility power systems
- Feeders, transmission lines, AC machines, transformers
- Facilities with medium voltage switchgear
- 50 or 60 Hz

Protection and Control

- Phase or ground overcurrent
- Separate TOC and IOC protection
- Wide pickup setting ranges
- 16 TOC curve characteristics
- RMS sensing
- Reset characteristic selection
- Manual trip levers

User Interfaces

- Pickup status LED
- TOC and IOC latched indicators
- Target reset

Protection

Single Phase TOC & IOC Protection

The DIAC, DIFC and DSFC relays contain two independently adjustable elements, one for time overcurrent (TOC) and one for instantaneous overcurrent (IOC).

The relays use RMS sensing to calculate the pickup values for TOC. Sixteen TOC characteristic curves are available, each with time dial adjustment. With this type of flexibility the relays are suitable for many different applications.

Time Overcurrent Curves

inverse	GE IAC 51 IEEE IEC
very inverse	GE IAC 53 IEEE IEC
extremely inverse	GE IAC 77 IEEE IEC
short time inverse	GE 55 GE 75 GE 95
medium time inverse	GE 57
long time inverse	GE 66
definite time steps	0.1 to 9.9 s in 0.1 s
$I^2t = K$	K = 25 to 2475 in steps of 25

The operating time with no delay is no less than 27 ms. The IOC function offers an adjustable time delay from 50 to 400 ms.

The relay comes in 1 A and 5 A models, which offer different pickup ranges.

Range/ step	1 A Rated	5 A Rated
TOC range step	0.1 to 3.18 0.02 A	0.5 to 15.9 0.1 A
IOC range step	0.2 to 31.8 0.2 A	1 to 159 1 A
IOC delay step	50 to 400 ms 25 ms	
Time Dial step	0.5 to 9.9 0.1	0.5 to 9.9 0.1

Note: The IOC function operates on the sampled values, and the algorithm virtually eliminates the decaying DC offset component.

Targets

A target seal-in unit is used to trip the associated breaker and provide a latched indication of operation. The relays have one TOC target and one IOC target. Each target and seal-in unit operates at 0.2 A and has a maximum voltage drop of 7 V.

The pickup indicator is a yellow LED that indicates the relay has sensed a current exceeding the relay pickup setting.

Contacts

A trip contact and an auxiliary contact are provided for both the TOC and IOC elements. Output seal-in is produced by the flow of current through the trip contact. These contacts are trip duty rated and suitable for use with DC power bus or capacitor trip applications.

Reset Characteristic and System Frequency

A dial is provided to select reset characteristics and system frequency.

The reset characteristic can be set to timed reset, which emulates the reset characteristics of an induction disk relay, or instantaneous reset, where the reset is fixed at 40 to 50 ms.

The system frequency can be set for 50 or 60 Hz.

Targets can be reset by using the reset button or lever which is accessible without removing the case cover.

Manual Trip

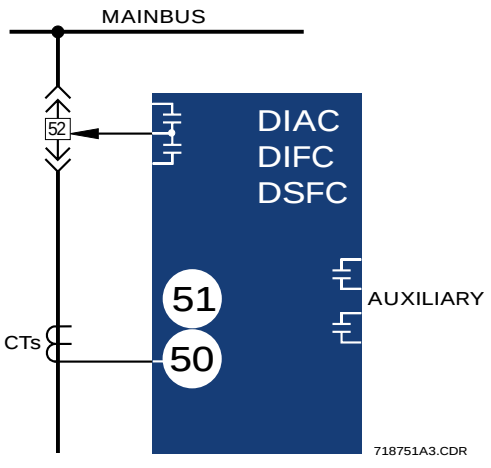
Built-in manual "pull and lift" levers are provided for TOC and IOC. These levers allow the user to test the external circuits connected to the trip and auxiliary contacts. The levers can only be accessed by removing the case cover, to help prevent unintentional operation.

Hardware

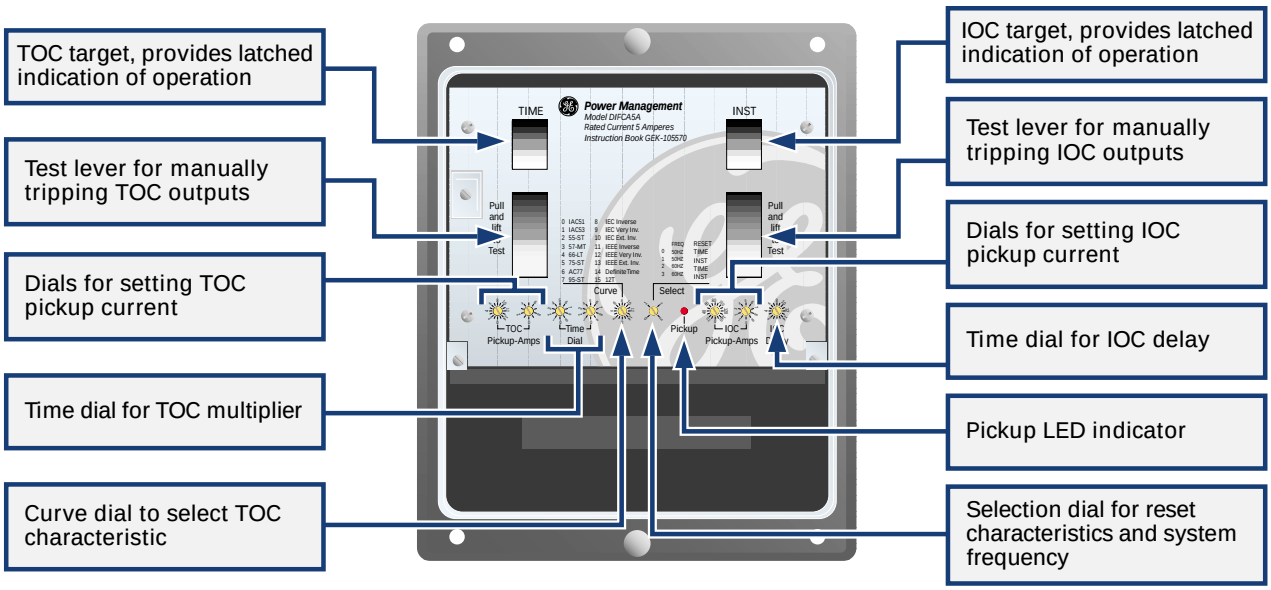
The DIAC, DIFC, and DSFC are available in the same cases as the IAC, IFC, and SFC units they have been designed to replace. The digital relay is available as a complete drawout case and cradle assembly.

The drawout connection/test system of the DIAC and DSFC has 10 connection points. The drawout connection/test system of the DIFC has 14 connection points and a visible CT shorting bar. As the connection plug is withdrawn the trip circuit is broken prior to the current shorting bar engagement.

Functional Block Diagram



Features



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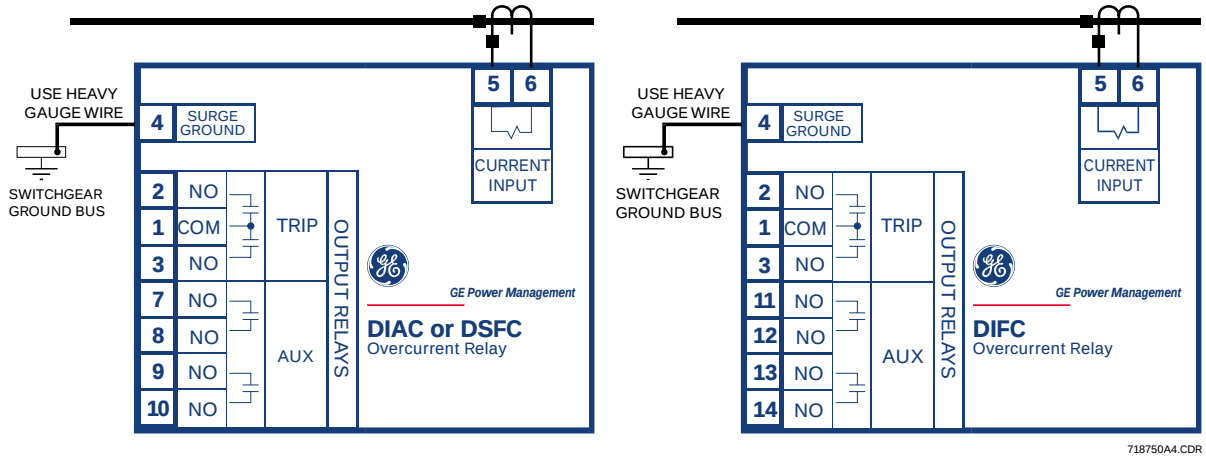
Typical Wiring



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NOTES:
1) Relay contact state shown in the non operative state
2) Terminal numbers shown for all 3 models

GUIDEFORM SPECIFICATIONS

Feeder protection shall be provided using digital microprocessor, self-powered, single phase relays. Protection features shall include:

- instantaneous overcurrent (50 or 50G)
- time overcurrent (51 or 51G)
- independent TOC and IOC pickup and timing settings
- 16 selectable TOC curves meeting GE, IEEE, and IEC standards
- latched targets for IOC and TOC which operate on trip circuit current

The reset characteristic can be selected to either emulate an induction disk or fast reset. The system frequency can be selected to be 50 or 60 Hz.

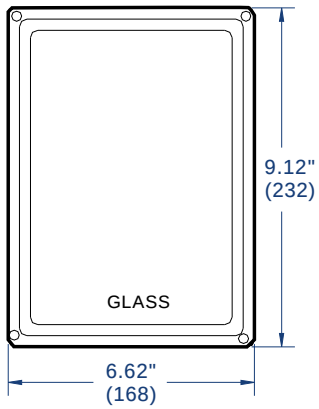
Two trip circuit test levers shall be located on the front panel. An LED pickup indicator shall be located on the front panel.

All settings shall be visible through the unit's cover. Targets may be reset without removing the cover.

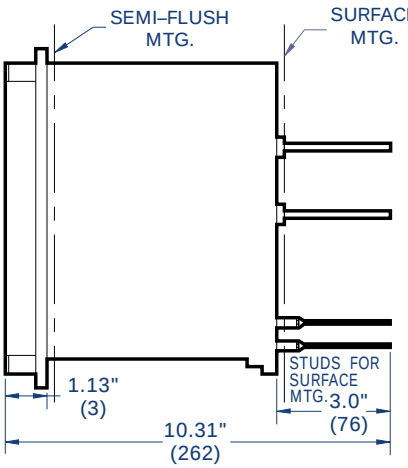
The relay shall be available as a complete drawout case and cradle assembly.

Dimensions

DIAC FRONT VIEW

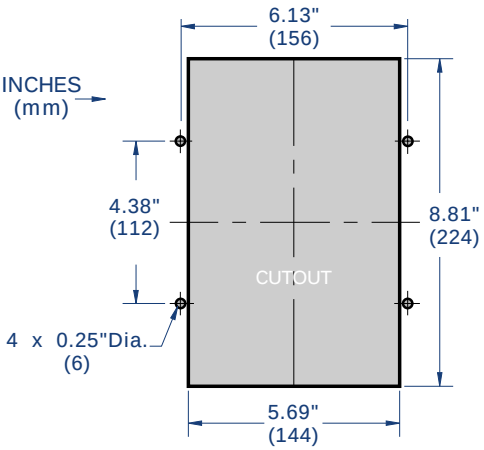


DIAC SIDE VIEW

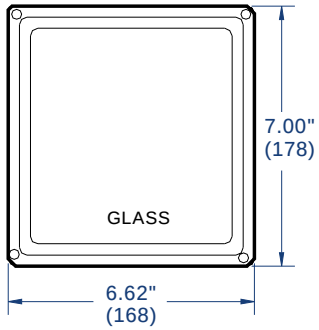


INCHES
(mm)

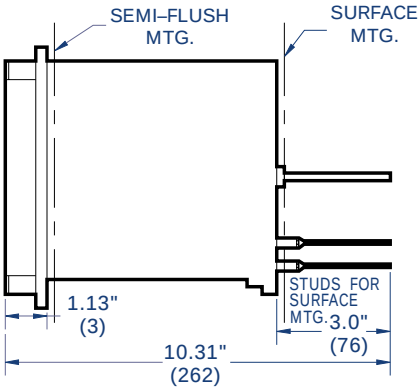
DIAC SEMI–FLUSH MTG.



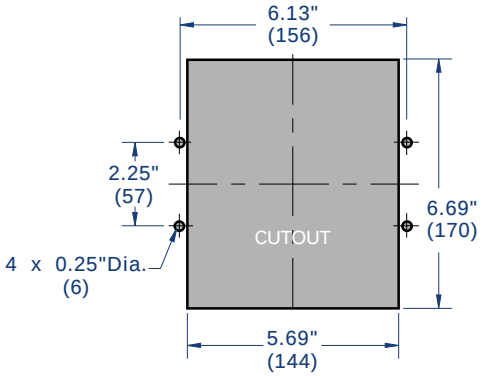
DSFC FRONT VIEW



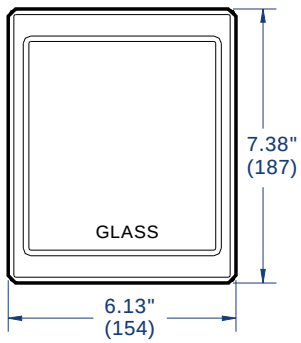
DSFC SIDE VIEW



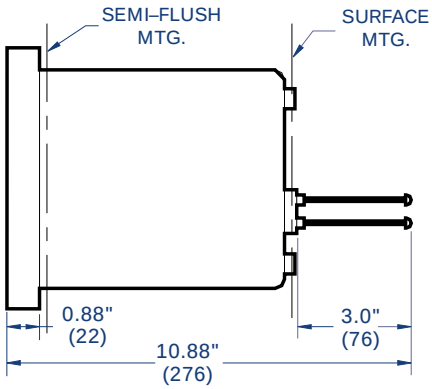
DSFC SEMI–FLUSH MTG.



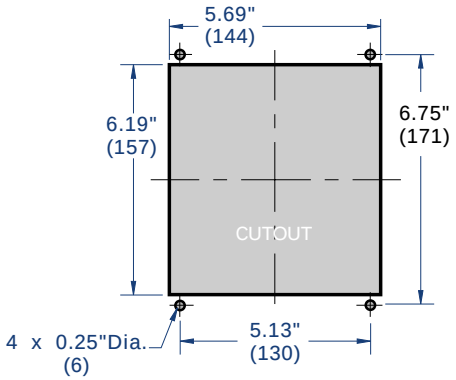
DIFC FRONT VIEW



DIFC SIDE VIEW



DIFC SEMI–FLUSH MTG.



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Technical Specifications

METERING

Frequency:	50 or 60 Hz
Rated Current:	1 or 5 A
Maximum Permissible Current:	
Continuous:	3 times rated
I^2t:	(1 A) 1520 (5 A) 38000
Three Sec:	50 times rated
One Sec:	100 times rated

INPUTS

BURDEN

AC Current Circuit:	**Input current**	**Burden**
	10% of rated	0.45 VA
	100% of rated	2.6 VA

OUTPUTS

OUTPUT CONTACT RATINGS

Load Type	Voltage	Cont	1 Sec Make & Carry	Break	Max. Load
DC Resistive	125 250	10 A	30 A	0.5 A 0.3 A	60 W
DC Inductive L/R = 40 ms	125 250 370	10 A	30 A	0.25 A 0.15 A 0.05 A	50 VA

ENVIRONMENTAL

Ambient Temperature Range:	
Storage:	-40°C to +85°C
Operation:	-40°C to +70°C
Humidity:	Up to 95% without condensation

TYPE TESTS

Insulation Withstand Test:	
Impulse Voltage:	5 kV peak, 1.2/50 µsec, 0.5 J Per IEC255.5, Class III
Surge Withstand Capability:	
Fast Transient:	Per ANSI C37.90.1 Per IEC 255.22.4, Class IV
Oscillatory:	Per ANSI C37.90.1 Per IEC 255.22.1, Class IV
Radio Frequency Interference:	25 MHz - 1 GHz keyed every 1 MHz for 2 sec Per ANSI C37.90.2 & IEC 801.3
Electrostatic Discharge:	Per IEC 801.2

APPROVALS

UL, CUL:	UL listed for USA and Canada

NOTE: Suitable for Cap-Trip Devices
Specifications subject to change without notice.

Burdens

Burdens for the overcurrent units are listed in table below. Burdens decrease with increasing current above minimum setting, due to the power supply shunting in the power supply circuit. Since the power supply is the major portion of the burden, the burden for a given input current will be constant, irrespective of pick-up settings on both TOC and IOC units.

		Burden @ Minimum Setting					Burden in ohms (Z) at multiples of minimum pickup			
UNIT	**RANGE**	**Hz**	**R**	**jX**	**Z**	**∠**	**3X**	**10X**	**20X**	**100X**
1 A	0.1/3.18	60	28.8	29.2	41.3	45°	9.36	2.32	1.24	0.768
5 A	0.5/15.9	60	1.28	1.15	1.74	42°	0.394	0.094	0.052	0.034

Ordering

D**	*	*	
IACA			IAC SI Case
IFCA			IFC CI Case
SFCA			SFC VI Case
	1		1 A nominal current
	5		5 A nominal current
		B	Revision level

Accessories

Test device for DIAC/DSFC, 20 point XLA12A1
Test device for DIAC/DSFC, 10 point XLA13A1
Test device for DIFC, 28 point XCA28A1
Current probe for DIFC XCA11A2
Test device for DIFC, 2 point XCA11A1