



*Generator and generator system fault pickup protection.*

### Features and Benefits

- Inverse time-current operating curve
- 2 electrically separate contacts
- Target seal-in unit
- Induction unit design
- Drawout case

### Applications

- System fault backup protection
- Generator fault backup protection

### Protection and Control

- Time O/C unit with voltage restraint
- Instantaneous o/c unit available



## Description

IFCV relays are drawout, induction disc time-overcurrent relays having voltage restraint and inverse time characteristics.

IFCV relays are supplied with two electrically separate contacts. One of these contacts, which operates the target seal-in unit, is on the induction disc unit and can be used as a trip contact; the second contact of the seal-in unit can be used for alarm or remote indication.

## Applications

**System Fault Backup Protection** should be provided at the source of fault current, the generator, to minimize the damage resulting from a short circuit if the primary protective devices should fail to operate. Overcurrent relays with voltage restraint, IFCV, are recommended for this application. Three single-phase relays are required for each generator, with potential coils energized from line-to-line potential of the protected line. With full voltage applied to the restraint coil the relay should be set to pick up between 150 and 200 percent of full load on unregulated machines, and between 200 and 250 percent on regulated generators. For best protection the relays should be connected to trip both the armature and field breaker. This can be effected by means of a multicontact auxiliary relay, HSA.

**Generator Fault Backup Protection.** Under certain conditions this relay will provide protection for the generator. It will operate if an internal fault is not cleared by differential relays, provided sufficient current is fed into the fault from other sources.

**Voltage Restraint** will prevent the relay operating on heavy loads such as motor-starting currents. With zero restraint voltage the relay will operate at 25 percent of tap value. Therefore, complete

loss of restraint potential will usually allow the relay to operate even though machine output is less than full load. High sensitivity is achieved with the voltage restraint feature, and the relay requires less current to operate on faults than on loads or power swings.

**Relay Time Characteristics** are suitable for obtaining selectivity with feeder circuits which utilize time-overcurrent relays.

Typical internal and external connections are shown in Figures 1, 2 and 3.

## Burdens

### Time Overcurrent Unit

#### POTENTIAL CIRCUIT

V	Freq. (Hz)	W	VARS	VA
120	50	9.26	14.4	17.1
120	60	9.43	17.4	19.7

#### CURRENT CIRCUIT

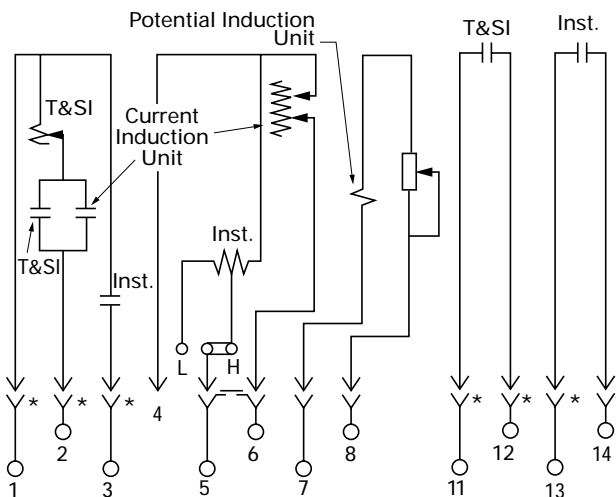
Range	Freq.	Tap	A	Imp Ohms	VA	PF
2-16	50	2	5	3.10	77.5	.43
2-16	60	2	5	2.58	64.5	.43

#### INSTANTANEOUS UNIT

Hi Seismic Inst. Unit (Amps)	Hz	Line Position	Range (A)	Min Pickup (A)	Burdens at Min. Pickup (Ohms)			Burdens in Ohms (Z) Times Pickup		
					R	J <sub>x</sub>	Z	3	10	20
6-150	60	L	6-30	6	0.110	0.078	0.135	0.095	0.081	0.079
		H	30-150	30	0.022	0.005	0.023	0.022	0.022	0.022
6-150	50	L	6-30	6	0.092	0.065	0.112	0.079	0.068	0.066
		H	30-150	30	0.018	0.004	0.019	0.018	0.018	0.018

## Connection Diagrams

Fig. 1. Internal connections IFCV51BD relay.



**Instantaneous Setting**  
Set Link To "h" For High Range And To "L" For Low Range. Link Shown In High Range Position.

\* = Short Finger

ifcv fig 2.ai

Fig. 2. Internal connections of IFCV51AD relay.

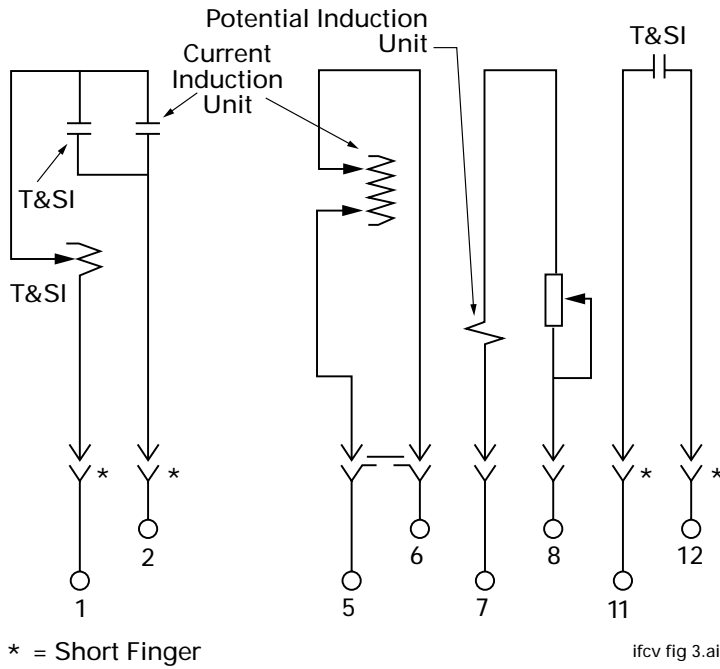
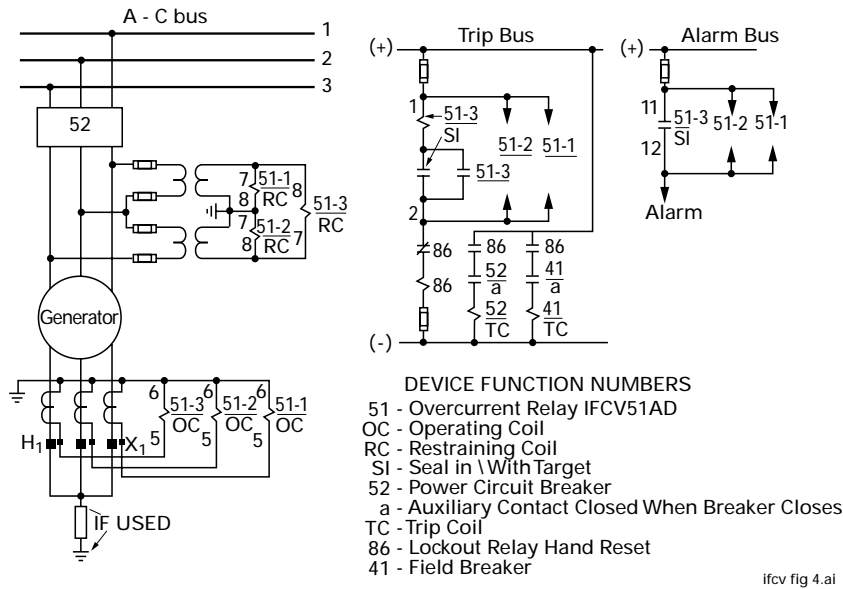


Fig. 3. Typical external connections of IFCV relays for back-up protection against external faults to a generator.



## Selection Guide

### Single-phase (with 0.2/2.0 A T&SI)

Current Operating Range (A)			Restraint (V)	Model Number		Contacts ①	Case Size	Approx. Wt. in lbs (kg)	
Time Overcurrent Unit		Instantaneous Unit		60 Hz	50 Hz			Net	Ship
At Rated Voltage	At Zero Volts								
2-16	0.5-4	—	120	IFCV51AD1A	IFCV51AD2A	2 N.O.	C1	8	14
2-16	0.5-4	6-150	120	IFCV51BD1A	IFCV51BD2A			(3.6)	(6.3)

① See description paragraph on previous page.