

For AC and DC circuit applications.

Features and Benefits

- Frequency compensation (optional)
- Target seal-in unit on all contacts
- Instantaneous, hinged armature type units (optional)
- Drawout case

Applications

- AC generators
- Ungrounded three-phase distribution system
- Time delay pickup or dropout

Protection and Control

- Time delay overvoltage
- Ground detection on ungrounded systems and equipment neutrals
- Instantaneous overvoltage available



DESCRIPTION

The IFV relays are single phase induction disk relays designed to respond, with time delay, to an increasing voltage. Some models are frequency compensated, and some include an instantaneous unit (hinged armature).

The IFV 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.

APPLICATION

Overvoltage Relays

IFV overvoltage relays are used for protection against simple overvoltage, but other applications are also common. They are applied to ground detection, both on feeders and on ac generators, and they are also used in timed switching arrangements, where their dependability and accuracy make them preferable to purely mechanical timing relays.

For protection against overvoltage, use the IFV51AD relay (Fig. 1). For instantaneous protection as well as time delay, use the IFV71BD.

For the detection of grounds on ungrounded three-phase systems, two methods are in general use. One measures the zero sequence potential (Fig. 3), and the other measures the actual voltage between the system neutral and ground (Fig. 5).

For the circuit of Figure 3, use IFV51DD, a low pickup relay which has its operating circuit tuned to the rated frequency. The potential transformers used in this circuit are connected grounded-Y primary, broken-delta secondary. The primaries should have ratings equal to the line-to-line voltage of the system, and the secondaries can have ratings of either 67 or 115 V.

Select a relay model with a continuous rating of three times the potential transformer secondary voltage. This is necessary because, when a ground occurs, the zero sequence voltage may be up to three times the normal transformer secondary voltage. Thus, with a potential transformer secondary rated 67 V, use a 199-V relay coil.

For ground fault protection of ac rotating machines, use a circuit similar to that shown in Figure 5 applying IFV51DD or IFV51KD. These are low-pickup relays whose coil circuits are tuned by capacitors to their rated frequencies. The circuits are thus rendered only one-eighth as sensitive to the third harmonic as they are to the rated frequency.

In Figure 5, a distribution transformer is connected between the machine neutral of the generator and ground. Normally there is no voltage on the transformer but during a fault, there is a voltage with a worst-case magnitude equal to the phase-to-ground value.

Greater sensitivity can be obtained by choosing a distribution transformer with higher secondary voltage. In such a case, the relay will not carry the fault voltage continuously, and provision must be made to de-energize the operating coil using an auxiliary relay. The short-time rating for both IFV51DD and IFV51KD is 360 V for 10 sec.

Frequency Compensation

The following IFV relays are frequency compensated overvoltage relays— IFV71AD and IFV71BD.

The frequency compensation range of these relays are 50 to 150 percent of system frequency. A typical application is on systems supplied by hydro generators, where the frequency tends to increase when faults occur. Frequency compensation is provided by an ac circuit across

the wound shading coils of the induction disk operating coil and core unit.

CHARACTERISTICS

The IFV51DD and IFV51KD relays are single-phase overvoltage relays of induction disk construction that may be used to provide very sensitive protection for overvoltage conditions.

For the minimum and maximum taps shown in the list below, the following intermediate taps are available for both the IFV51AD1A and IFV71AD1A.

TRIPPING CIRCUITS & CONTACT RATINGS

The current carrying rating of the contact circuit is determined by whether the relay has a seal-in unit and by the tap used on the seal-in coil. Without a seal-in unit the relay contacts will close and carry 30 A for tripping duty and 2 A continuously at control voltages of 250 VDC or less. Refer to the GE Power Management CD or Home Page for data on target seal-in units.

Relay	Continuous Rating (V)	Pickup Range Continuously Adj. (V)
IFV51DD	120	9.5-42
	208	14.5-65
	360	26.0-115
IFV51KD	69	5.0-22

Tap Range		Taps Available	
50 Hz	60 Hz	50 Hz	60 Hz
50-250	55-280	50, 56, 60, 72, 82, 100, 113, 125, 144, 164, 185, 211, 250	55, 64, 70, 82, 93, 110, 128, 140, 164, 186, 210, 240, 280

Selection Guide

General Description	Rated Volts	Pickup Range Volts				Target Seal-in (A)	Contacts	Model Numbers		Case Size	Approx. Wt. in lbs (kg)	
		50 Hz		60 Hz				50 Hz	60 Hz		Net	Ship
		Min	Max	Min	Max							

OVERVOLTAGE (DEVICE NO. 59)

General duty, overvoltage and control switching. Time delay 0.5 to 11.0 sec at 1.6 times tap setting.	240	50	250	55	280	0.2/2.0	2 N.O.	IFV51AD1A	C1	8 (3.6)	14 (6.3)
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LOW PICK-UP

Ground detection on 3-phase systems and on generator stator windings. Time delay for a frequency of 50 Hz 0.8-9.0 sec and at 60 Hz 0.9-9.0 sec at 200% tap setting.	120 ^①	—	—	9.5	42	0.2/2.0	2 N.O.	----	IFV51DD1A	C1	8 (3.6)	14 (6.3)
	208 ^①	—	—	14.5	65			----	2A			
	360	—	—	26.0	115			----	3A			
	120 ^①	9.5	42	—	—			IFV51DD4A	----			
	208 ^①	14.5	65	—	—			5A	----			
	360	26.0	115	—	—			6A	----			
69 ^②	5	22	5	22	IFV51KD2A ^④	IFV51KD1A ^④						

FREQUENCY COMPENSATED

Frequency sensitive applications. Frequency compensation range are 50 to 150 percent of system frequency.	240	55	280	55	280	0.2/2.0	2 N.O.	IFV71AD1A	C1	8 (3.6)	14 (6.3)
Frequency compensated; instantaneous unit added, also frequency compensated. For hydrogenerator applications; general duty for AC generator overvoltage protection and voltage regulator backup. 0.45 to 11 sec time delay.	240	55	280	55	280			IFV71BD1A ^③ 2A ^②			

- ① IFV51DD, 51KD are 360 volts at a 10 sec rating.
- ② Inst. unit adjustable 180-300 V.
- ③ Inst. unit adjustable 120-200 V.
- ④ Includes external capacitor.

Diagrams and Characteristics

Fig. 1. Typical external for IFV51AD and IFV71AD used for overvoltage protection (273A9038)

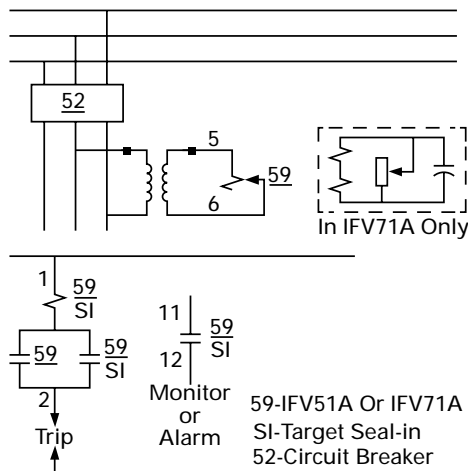


Fig. 2. Typical time voltage curve for IFV51AD (0275A2075)

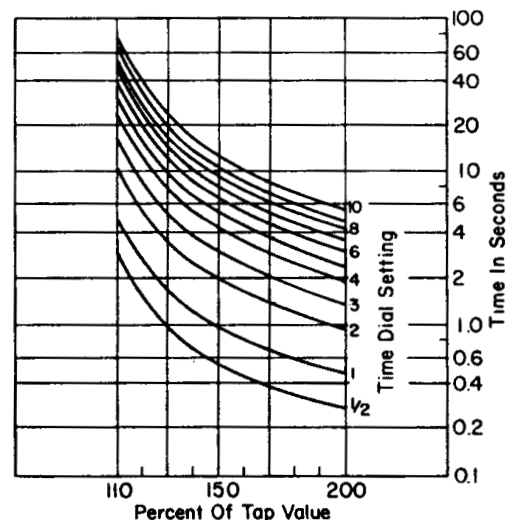


Fig. 3. Typical external for ground fault protection 3-phase. Ungrounded system IFV51DD (275A2089)

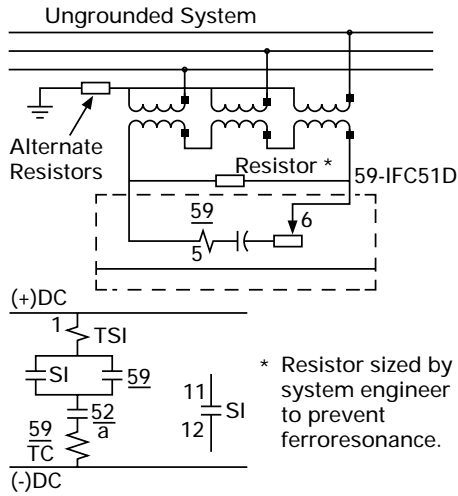


Fig. 4. Typical time voltage curve for IFV51KD and IFV51DD (0273A9519)

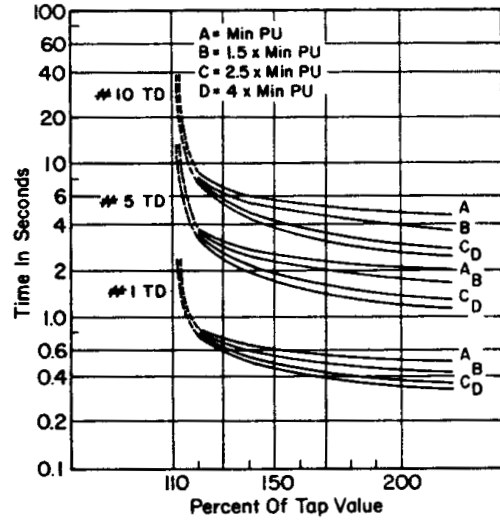


Fig. 5. Typical external for ground fault protection of an AC rotating machine Type IFV51KD (275A2090)

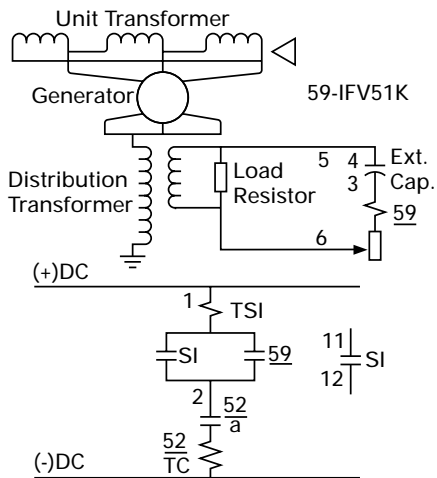


Fig. 6. Typical time voltage curve for IFV71 (0275A2074)

