



AC undervoltage, open or reverse phase protection.

Features and Benefits

- Target seal-in units available
- Drawout case

Applications

- AC Machine undervoltage detection
- Reverse phase sequence detection
- Open phase detection on starting

Protection and Control

- Undervoltage
- Phase sequence
- Open phase
- Time delay available



Description

The ICR is a three-phase voltage operated induction-disk time delay relay designed to respond to phase sequence, open phase or undervoltage. Each ICR relay includes a basic induction-disk unit and may also include dual rated target seal-in units.

The ICR51A relay has a single circuit closing contact which opens on undervoltage or reversed-phase sequence, and a time dial for selecting the time delay for the contact closing. This relay does not have a target or seal-in unit. When the relay is adjusted to open its contact at 75 percent of rated voltage, the time required to close the contact, with rated voltage applied and a time dial setting of 10, is 10 sec.

The ICR53 and ICR54 relays have single pole double throw electrically separate contacts. The left contact opens on undervoltage or reverse phase sequence and the right N.C. contact may have a target seal-in unit. Also, forms are available with two target seal-in units or no target seal-in units. These relays do not have a time dial.

In general the ICR53A, 53B and 53C relays will provide a time delay of 1.2 sec if adjusted for 90 percent pickup and 80 percent dropout when the voltage is suddenly dropped from the rated value to zero.

The ICR53D is similar to the other ICR53 relays except it provides a long time delay of 3 sec when the applied voltage is suddenly dropped to zero.

For a very short time delay of 0.17 sec, the ICR54A and 54B relays are available. Otherwise, they are similar to the ICR53A and ICR53B.

Case Construction

The ICR53A is furnished in a single-end (SI) drawout case.

The ICR53 and ICR54 contain a contact that is closed when the

relay is de-energized. For this reason, these relays are supplied in double-end (S2) drawout cases. The external connections are such that the relay coils are energized when either the upper or lower connection plug is put in place. The relay will, therefore, have time to open its closed contact before the second connection plug can be put in place. It is necessary to have both plugs in place before the contact circuits are completed. Refer to Figure 2.

ICR relays are used principally for protection of ac machines from undervoltage and, when starting, from open-phase or reverse-phase sequence. They are also recommended for other applications, such as automatic throw-over equipments, where it is desired to check the presence of three-phase voltage for correct phase sequence.

Application

The most extensive application of these relays is in metal-clad switchgear, where they are used to prevent the starting of a machine, if the phase and voltage conditions of the circuit are not correct. They also function to stop the machine, if the voltage across the relay terminals falls below a predetermined value. Usually, these relays will not disconnect a running motor, if one phase of the supply is open-circuited, because the motor will supply three-phase potential to the relay even with one phase disconnected from the source. However, these relays will prevent the starting of the motor when one phase is open, and will also prevent starting in the wrong direction, if the phase sequence is reversed.

Time delay of contact operations may be necessary to prevent shutdown on temporary dips in voltage. Delay may also be necessary to attain proper sequential operation with other devices in the control circuit.

Timing is determined by the calibration settings of the right and left contacts for all ICR relays except the ICR51A which has one normally open contact and a time dial adjustment.

Operation

For these relays the induction disk is actuated by a watt metric type operating unit. The voltage coils are located above and below the operating disk. Phase shift is provided in each coil by a series capacitor to produce a split-phase field which develops torque on the induction disk.

Burdens

The burdens imposed by the two potential circuits at rated voltage and 60 Hz are as follows:

Volts	Coil Circuit	Watts	Vars ^①	VA	PF
120	5-6	2.15	4.70	5.20	0.41
120	7-8	0.66	2.30	2.40	0.27
240	5-6	3.55	13.15	13.3	0.26
240	7-8	0.41	6.38	6.40	0.06
480	5-6	2.83	23.8	24.0	0.12
480	7-8	0.45	23.0	23.0	0.02

^① Capacitive

Contact Ratings

The current carrying rating of the ICR 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 Section 16 for contact data for relays that include target seal-in units.

When the contacts of the induction unit are not bypassed by the seal-in unit contacts, they may try to interrupt the circuit. The interrupting rating of the contacts for noninductive loads are as follows:

Make and Interrupt on	AC Amps	DC Amps
125 volts 250 volts	1.50 0.75	0.30 0.15

Connection Diagrams

Fig. 1. Typical external connections for the ICR53A or ICR54A (AC machine protection)

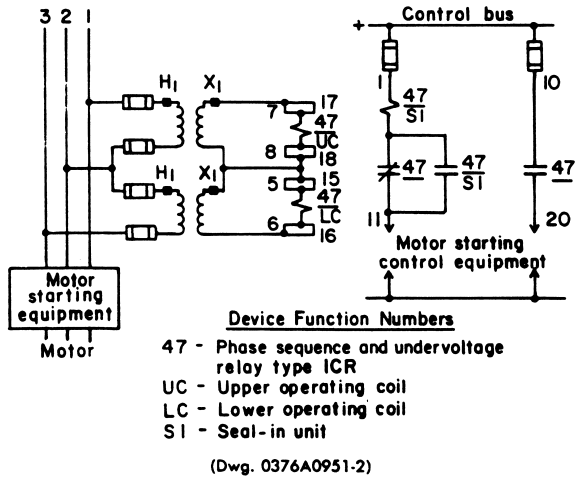
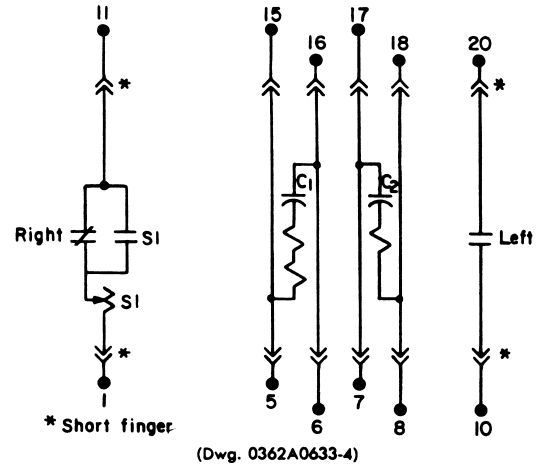


Fig. 2. Typical internal connections for ICR53A or ICR54A relay



Selection Guide

Rated Volts AC	Closing Volts Range				Target Seal-in Unit 0.2/2 Amp	Model Number		Case Size	Approx Wt Lb (kg)	
	① N.C. Right Contact		② N.O. Left Contact			60 Hertz	50 Hertz		Net	Ship
	Range in % of N.O. Contact	Factory Setting Volts	Range in % of Rated V.	Factory Setting Volts						
ICR51A— Adjustable Time - 10 Seconds Max. on No. 10 Time Dial (1-N.O.)										
120 208 240 480	.....	.....	65-95	90 164 180 360	.....	ICR51A21A A28A A22A A23A	ICR51A24A A27A A25A A26A	S1	12 (5.4)	16 (7.3)
ICR53A— 1.2 Sec. Time Delay on Loss of Volt 75-100 1 N.C.- 1 SI Unit										
120 208 240 480	75-90	96 166 192 384	75-100	108 187 216 432	.....	Target SI Unit in N.C. Circuit only		S2	13 (5.9)	17 (7.7)
					Yes	ICR53A1A A8A A2A A3A	ICR53A4A A7A			
ICR53B— 1.2 Sec. Time Delay on Loss of Voltage. 1 N.O. and 1 N.C. - No SI Units										
120 208 240 480	75-90	96 166 192 384	75-100	108 187 216 432	.....	ICR53B1A B6A B2A B3A	ICR53B8A B4A	S2	12 (5.4)	16 (7.3)
ICR53C— 1.2 Sec. Time Delay on Loss of Voltage. 1 N.O. and 1 N.C. - 2 TSI Units										
120 240 480	75-90	96 192 384	75-100	108 216 432	.....	Target SI Unit in N.C. and N.O. Circuit		S2	13 (5.9)	17 (7.7)
					Yes	ICR53C1A C3A C4A	..... .....		
ICR53D— 3 Sec. Time Delay on Loss of Voltage. 1 N.O. and 1 N.C. - No TSI Units										
120 208	75-90	96 166	75-100	108 187	.....	ICR53D1A D6A	..... .....	S2	12 (5.4)	16 (7.3)
ICR54A— 0.17 Sec. Time Delay on Loss of Voltage. 1 N.O. and 1 N.C. - 1 TSI Unit										
120 208 240 480	75-90	96 166 192 384	75-100	108 187 216 432	.....	Target SI Unit in N.C. Circuit only		S2	13 (5.9)	17 (7.7)
					Yes	ICR54A1A A8A A2A A3A	ICR54A7A A9A			
ICR54B— 0.17 Sec. Time Delay on Loss of Voltage. 1 N.O. and 1 N.C. - No TSI Units										
120 240	75-90	96 166	75-100	108 216	.....	ICR54B1A B2A	..... .....	S2	12 (5.4)	16 (7.3)

① The right contacts are opened when the relay is energized, and will close when the voltage drops to values equal to, or less than, those listed in this column.

② The left contacts, which are closed when the relay is energized, will open when undervoltage occurs. If single-phase or reverse-phase sequence exists, these contacts will not close when the relay is energized.

