



An induction disk synchronism check relay when two sources are already interconnected.

Features and Benefits

- Telephone type relay units available
- Mechanical targets available
- Drawout case

Applications

- Bus or line synchronism check

Protection and Control

- Synchronism check operation
- Adjustable time delay
- Selectable phase calibration range
- Instantaneous bus and line undervoltage
- Time delay dead-line live-bus and/or dead-bus live-line check



Description

The IJS is an induction disk synchronism check relay that has two shaded pole U-magnet driving elements acting on opposite sides of a single rotating disk. One operating element drives the disk in the contact closing direction and the other in the restraining or opposite direction. The disk shaft is restrained by a spiral spring, to hold the contacts open when the relay is de-energized. The motion of the disk is retarded by permanent magnets to give a time delay.

Application

Generally, the IJS relay is applicable as a synchronism-check relay to permit closure of a circuit breaker only when two sources connected to it are synchronized elsewhere. It determines that synchronism is being maintained by other interconnections, and

then permits closure of the circuit breaker. In such an application, the voltages on either side of an open line breaker may be slightly out of phase with each other because of load flow on the rest of the system. The relay, however, can be calibrated to permit closure of the breaker under these conditions if the voltage and the phase-angle differences are not excessive.

The relay has an adjustable time delay and permits operation only if the phase angle remains less than a definite number of degrees for a selected time. The relay operating torque increases as the phase angle decreases and is a maximum when the two compared voltages are in phase.

On systems where the two sides of a given breaker may or may not be interconnected elsewhere at any given moment when paralleling is desired, the IJS is used at the same location for synchro-

nism check when the frequency difference is negligible or zero due to the existence of an inter-connection elsewhere.

Forms of the relay are available with a rated calibration range up to 60 degrees. For settings over 20 degrees, consideration should be given to the resulting generator stresses at the instant of closure through existing system impedances, as in any other situation involving out-of-phase closure.

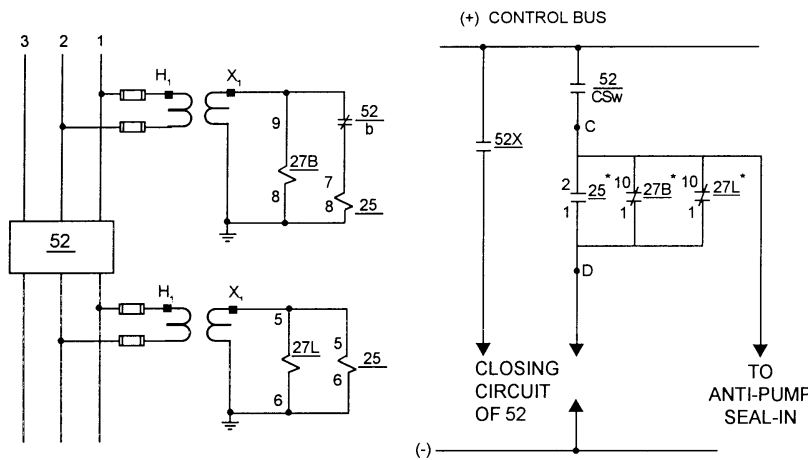
The IJS51A is the basic synchronism-check relay and includes a target seal-in unit. IJS52A is similar to the basic IJS51A but without the target seal-in unit.

Dead Line or Bus

In addition to permitting closure of the breaker when the two sources are in permanent synchronism, it is sometimes desirable to permit closure when either section is de-energized or dead.

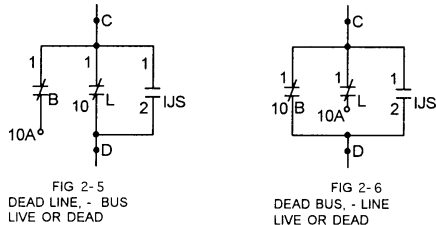
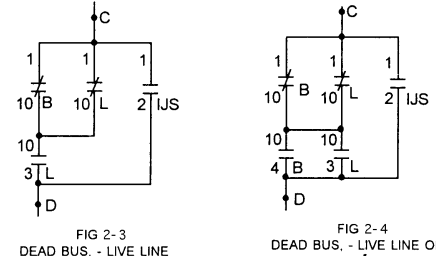
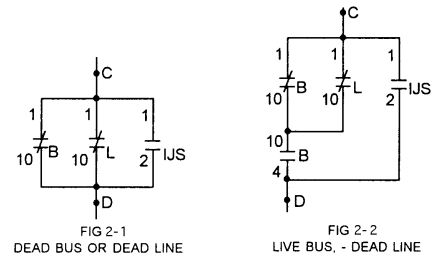
Connection Diagram

Fig. 1. Typical elementary diagram of external connections of IJS52D relay (Ref. 0264B0496)



* CONNECTIONS FOR BREAKER CLOSING WITH EITHER THE BUS OR LINE DEAD. SEE FIG 2-1 TO 2-6 FOR OTHER CONNECTIONS.

DEVICE FUNCTION NUMBERS	
25	SYNCHRONISM CHECK UNIT
27B	BUS UNDERVOLTAGE UNIT
27L	LINE UNDERVOLTAGE UNIT
52	POWER CIRCUIT BREAKER
52C.SW	CONTROL SWITCH (TYPE SBM)
52X	AUXILIARY RELAY FOR 52



The IJS52D includes the normal synchronism check induction element. It also includes two telephone type instantaneous undervoltage units designated as "B" for bus and "L" for line. Depending on the external connections, the telephone-type instantaneous undervoltage units "27B" and "27L" will permit reclosing of the breaker under a variety of system conditions. See Figure below.

The IJS52E provides a combination of synchronism-check operation, with a time-delay dead-line-live-bus and/or dead-bus-live-line check.

It performs either or both of the voltage checking functions (as selected by external switch contacts) by means of internally mounted instantaneous voltage relays which connect both coils of the IJS unit to the bus or line when the voltage on the opposite side of the controlled breaker is 15 percent or less of rated value. The pickup time of the IJS unit at 0 degrees is thus the closing delay for the dead-lineline-bus and/or the live-line-dead-bus checking functions.

The IJS52E performs the synchronism-check function in the usual manner whenever the voltage on each side of the controlled breaker is at or above 45 percent of rated value. This insures that both of the instantaneous voltage relays will be picked up, and in that position they connect the coil circuits of the IJS unit to the bus and line so that the unit responds to phase relations in the usual way.

The IJS52F is similar to the IJS52D except it includes an additional telephone-type unit, (25X) to provide three N.O. electrically separate contacts.

The IJS52G is similar to the IJS52E except for the addition of a selector switch. This switch has two positions – in the "down" position the relay will function as hot line-dead bus checking

scheme. In the "up" position of this switch the relay functions as a hot bus-dead line checking scheme.

Ratings

The operating and restraining coils of the synchronism-check unit are continuously rated. The contact of this unit will make and carry momentarily 30 A but it has no interrupting rating. The current-carrying ratings are affected by the selection of the tap on the seal-in coil.

For the IJS52D, 52E and 52F the telephone-type voltage relay contacts will make and carry 30 A momentarily for normal duty, but

the circuit must be opened by a breaker auxiliary switch or other suitable means.

The telephone-type relays have operating coils rated the same as the main unit, and are continuously rated.

Burdens

The maximum burden for the synchronism-check unit is 12 VA, 4 W at 60 Hz. The burden varies with the phase difference of the two voltages with a minimum at zero degrees to a maximum at 180 degrees.

The burden of each telephone-type undervoltage unit is 13 VA and 8 W at 115 V 60 Hz.

Selection Guide

Frequency (Hz)	VAC	Closing ^① Angle at Rated Volts	Target Seal-in (A)	Main Contacts	Model Number	Case Size	Approx. Wt. lbs (kg)	
							Net	Ship
IJS51A, SYNCHRONISM CHECK WITH SEAL-IN UNIT								
60	115	20° 20/60°	0.2/2	1 N.O.	IJS51A1A IJS51A3A	S1	13 (5.9)	17 (7.8)
50	115	20/60°	0.2/2	1 N.O.	IJS51A4A			
IJS52A, SYNCHRONISM CHECK WITHOUT SEAL-IN								
60	115	20°	----	1 N.O.	IJS52A1A	S1	13 (5.9)	17 (7.8)
	115	20/60°	----		IJS52A7A			
	230	20°	----		IJS52A8A			
	120	10°	----		IJS52A10A			
50	115	20°	----	1 N.O.	IJS52A2A			
IJS52D, SYNCHRONISM CHECK WITH 2 INSTANTANEOUS UNDERVOLTAGE UNITS, BUS AND LINE								
60	115	20°	----	1 N.O.	IJS52D1A	S1	14 (6.3)	18 (8.1)
	115	20/60°	----		IJS52D3A			
	67	20/60°	----		IJS52D6A			
50	115	20° 20/60°	----	1 N.O.	IJS52D2A IJS52D4A			
IJS52E, SYNCHRONISM CHECK WITH TIME DELAY CHECK, BUS AND LINE								
60	115	20° 20/60°	----	1 N.O.	IJS52E1A IJS52E3A	S1	14 (6.3)	18 (8.1)
50	115	20°	----	1 N.O.	IJS52E2A			
		20/60°	----		IJS52E4A			
IJS52F, SIMILAR TO IJS52D EXCEPT WITH ADDED TELEPHONE AUXILIARY RELAY								
60	115	20°	Auxiliary VDC 125	Auxiliary 3 N.O.	IJS52F1A	M2	21 (9.6)	27 (12.2)
IJS52G, SIMILAR TO IJS52E EXCEPT WITH SELECTOR TOGGLE SWITCH								
60	115	20° 20/60°	----	1 N.O.	IJS52G1A IJS52G3A	S1	14 (6.3)	18 (8.1)

① For relays with 20/60 degree range, specify closing-angle setting desired, when ordering. If not specified on order, factory setting will be 40 degrees.