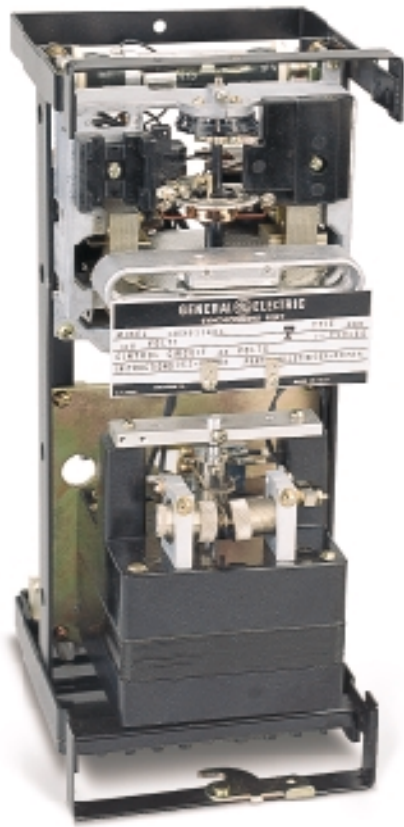


*Single-shot reclosing relays for tripped circuit breaker reclosure.*



# GXS

## Automatic Synchronizing Relays

### Application

- Hydraulic turbine-driven generators
- Internal combustion driven generators
- Tie line or bus-tie circuits
- Manual synchronizing supervision

### Protection and Control

- Synchronism check operation
- Time delay operation

### Features

- 10° to 45° closing angle adjustment
- 10 to 99 cycles time delay adjustment
- Drawout case

## DESCRIPTION

The GXS11B is an automatic synchronizing relay that has a fixed angle closing characteristic. It includes an instantaneous cup type unit, a time delay induction disk type unit and a telephone type auxiliary unit, case size M1. The GXS12A relay is similar in construction to the GXS11 except with modified internal connections and the relay is used primarily for high-speed synchronism checking.

## APPLICATION

### Automatic Synchronizing

The GXS11B is intended to give the closing indication to a circuit breaker for connecting two AC sources

together when the cut-off frequency difference and closing angle are not greater than the values at which the relay is set to close the breaker. The closing angle is adjustable.

Application limitations for GXS11B:

1. For hydraulic turbine-driven generators rated 2000 kVA and below.
2. Internal combustion engine driven generators 750 kVA and below.
3. Tie line or bus-tie circuits, if reactances of system and machines are high enough to prevent serious disturbances which might result from the fixed angle GXS.
4. The GXS should not be used as the prime synchronizing device with steam turbine or gas-turbine-driven generators of any size or rating.

### Relay Supervision of Manual Synchronizing with GXS11B

In some applications where automatic synchronizing is not required, it may be desirable to have the operator perform the synchronizing manually but still have his command to close the synchronizing breaker supervised by an automatic synchronizing relay. Thus, if both the operator and the automatic device are in agreement to close, the breaker is permitted to close. On the other hand, if there is a disagreement between them, no closing will take place and another "pass" must be made.

It should be understood there is no limitation on generator size for the relay supervision of manual synchronizing schemes and relay supervision is a back-up to help prevent a manual synchronizing error.



## APPLICATION

There are a number of different ways to accomplish this function using the GXS11B as the basic relay. The schemes require one or more auxiliary relays depending on the specific application and preference. Generally, the GXS11B with an NAA30A auxiliary will provide the most flexible supervision package.

### High-speed Synchronism check with Type GXS12A

This relay is intended for control of reclosure of a transmission line breaker which may or may not separate two systems or portions of a system when it trips. It must be used with some form of high-speed reclosing of the opposite terminal of the line, which will reenergize the line from that terminal without synchronism check.

Under these conditions it will provide a high-speed check as to whether the angle across its breaker exceeds a set value (adjustable from 10 to 45 degrees). If the angle is within the set value, reclosing is initiated after a set delay adjustable from 10 to 99 cycles but if it exceeds the set value, the reclosing relay locks itself out and will not subsequently initiate reclosure until it has been reset by closing the circuit breaker by some other means, or by opening of an external resetting contact in its DC circuit.

The relay provides no synchronism check if its contacts are bypassed by other contacts, such as instantaneous undervoltage relay contacts. A reclosing relay is necessary for limiting the number of reclosures if an undervoltage relay is used for bypassing the synchronism check equipment.

## RATINGS

The main coils of the time delay unit and instantaneous unit are rated for 115 VAC and the auxiliary unit is available for the AC and DC control voltages as indicated in the Selection Guide.

The current closing rating of the contacts is 30 A for voltages not exceeding 250 V. The current carrying rating is 20 A for one second. The time delay unit contacts should not be used to energize a circuit continuously. The contact interrupting ratings are listed below.

### Contact Interrupting Ratings

Volts	Amperes	
	AC	DC
125 250	1.0 0.50	0.3 <sup>①</sup> 0.15 <sup>②</sup>

① Noninductive load.

## Burdens

### Potential

Volts	Hz	Circuits Terminals	Watts	Volt Amp	PF
115	60	5-6 7-8	7.9 16.5	17.4 28.7	.45 .57

Typical packages for relay supervision of manual synchronizing

## Selection Guide

Model Number	Frequency HERTZ	Input Volts AC	Control Volts	Closing Angle	Case Size	Approx. Wt. lb. (kg)	
						Net	Ship
GXS11B1A 2A 3A 4A 5A 6A  8A 13A 14A 15A	60	115	125 DC 250 DC 230 AC 115 AC 24 DC 48 DC	10° - 30°	M1	22 (10)	34 (15.5)
	50		125 DC 250 DC 48 DC 220 DC				
GXS12A11A 12A	60 50	115	125 DC	10° - 45°	M1	22 (10)	34 (15.5)

Application	Frequency Hertz	AC Volts	Control Volts	Closing Angle <sup>③</sup>		Model Number	Case Size	Approx. Wt lb (Kg)	
				Range	Factory Setting			Net	Ship

### TYPE GXS11B—Automatic Synchronizing

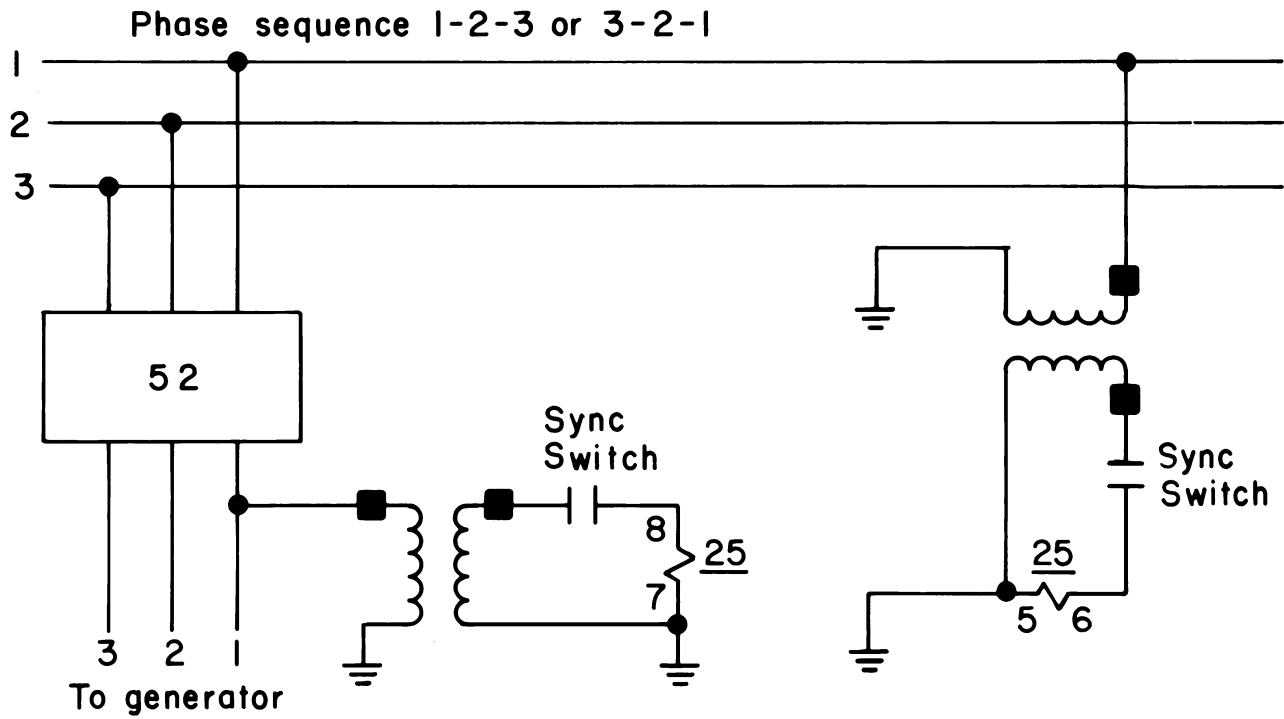
Automatic Synchronizing	60	115	24DC 48DC 125DC 250DC	10-30°	20°	GXS11B5A GXS11B6A GXS11B1A GXS11B2A	M1	25 (11.3)	31 (14.1)
			125DC	15-45°	45°	GXS11B12A			
	60	115	115AC 230AC	10-30°	20°	GXS11B4A GXS11B3A			
Automatic Synchronizing	50	115 115 115 110 100 100	48DC	10-30°	20°	GXS11B14A GXS11B8A GXS11B13A GXS11B11A GXS11B9A GXS11B7A	M1	25 (11.3)	31 (14.1)
			125DC						
			250DC						
			125DC						
			100DC						

### TYPE GXS12A—High Speed Synchronism Check

Synchronism Check	60	115	125DC	10-45°	30°	GXS12A11A	M1	25 (11.3)	31 (14.1)
	50	115	125DC 220DC 250DC	10-45°	30°	GXS12A12A GXS12A13A GXS12A14A			

③ Unless specified on the order, relay will be furnished with Closing Angle set as indicated.

Fig. 1. Typical external connections for Type GXS11B to synchronize or to supervise the operator (Scheme 1B or 2B)



**Scheme 1B** ②

- 1—GXS11B - Syn No. 25
- 2—NGA15A - Aux No. 25Y and 25Z

**Scheme 2B** ②

- 1—GXS11B - Syn No. 25
- 2—NGA15A - Aux No. 25Y and 25Z
- 1—SAM11A - Timer No. 2

**Scheme 3A or 3B** ②

- 1—GXS11B - Syn No. 25
- 1—NAA30A - Aux No. 25X

② **NOTE:** Necessary control and transfer switches must be added.