

# SLJ

## Static Synchronism Check Relay

*A static synchronism check relay used when two sources are already interconnected.*



### Application

- Bus or line synchronism check
- High speed power transfer schemes

### Protection and Control

- Synchronism check operation
- Adjustable time delay
- Adjustable phase calibration range
- Instantaneous undervoltage
- External control of synchronism check and/or both voltage functions

### Features

- Telephone type output relay contacts
- Mechanical Target
- Front panel settings

## INTRODUCTION

The Type SLJ21A is a static synchronism check relay which is designed to permit closing of a breaker only if the angle between the voltages on the line and bus sides of the breaker is less than a set angle for a set period of time. Also included are two voltage measuring circuits to check line and bus voltage conditions. The relay is mounted in a size S2 drawout case.

## APPLICATION

The SLJ21A static relay is designed to perform the function of synchronism check before allowing a circuit breaker to be closed. The maximum angle between the parts of a system for which closing will be permitted

by the relay is referred to as the closing angle and is adjustable over a range of 10 to 60 degrees.

The relay is a single-phase device that receives single-phase voltage from the same phase on each side of the breaker, or the equivalent in the case where a delta-wye power transformer is interposed between the two sources of voltage. It is the angle between these two voltages that forms the basis of synchronism check. Refer to typical external connections, figure 1.

The relay is designed to be used primarily in those applications where the parts of the system to be joined are interconnected at other points on the system. Even though in synchronism, there may be an angular difference in the voltages

existing on either side of the breaker as a result of load flow throughout the interconnected system. It may be desirable to permit closing of the breaker even though an angular difference exists, provided, of course, the angular difference is not great enough to be detrimental to the system or connected equipment. Each application should be checked on an individual basis to determine the maximum angle for which closing can be permitted. Once this angle has been determined, the relay should be set accordingly. If desired, some time delay may be added to insure that the system is stable and that synchronism really exists.

The SLJ21A relay may be used in applications requiring a synchronism check high-speed function for supervision of fast power transfer schemes, for any application requiring fast pickup and dropout, or for any general application where synchronism check is required.



## DESCRIPTION

The SLJ21A synchronism check relay uses a block-block type measuring scheme to determine if the angle between the voltages on each side of an open breaker is within a set limit for a set amount of time. This angle is defined as the closing angle and is adjustable by timer TL-1 to permit closure from 10 to 60 electrical degrees. The pick up delay time is provided via timer TL-2 and is adjustable from 20 ms to 20 sec. The output telephone relay (25) associated with the synchronism check function has a pickup time of approximately 4-6 ms and a dropout time of 16 ms when measured from the moment of coil energization and de-energization, respectively. To these times must be added the respective pickup and dropout times of timers TL-1 and TL-2. Thus, the minimum overall operate time for the synchronism check function is approximately 30 ms, whereas the overall dropout time is approximately 25 ms. The (25) telephone unit is provided with two normally open contacts, one of which has a series-connected target.

Two undervoltage functions, one for monitoring the line voltage and the other for monitoring the bus voltage, operate through common logic and with a common telephone relay (27) to provide various combinations of dead line or dead bus operation. Dropout of each function is separately and continuously adjustable over the range of 10-120 V.

A contact converter (CC-1) is provided for external control of the synchronism check and/or both voltage functions.

## DEAD-LINE/DEAD-BUS

In order for the SLJ synchronism check function to provide an output, there must be a voltage present on both sides of the breaker, and the phase angle between these voltages must be within the closing angle setting of the relay. For applications where dead line and/or dead bus operation is required, undervoltage detectors are used to bypass the synchronism check device. These undervoltage devices are included as an integral part of the relay.

## RATINGS

### Temperature

These relays have been designed for continuous operation in ambient temperatures between -20°C and 55°C per ANSI Standard C37.90. In addition, the relay is designed to operate correctly and not malfunction nor be damaged in an ambient temperature up to 65°C.

## CONTACT RATINGS

The contacts of the telephone type units will make and carry 30 A momentarily and will carry 3 A continuously. One contact of the synchronism check unit has a series target coil which (depending on tap setting) may limit the current. The contact interrupting ratings are listed in Table 1.

### Seismic

The SLJ21A relay has been tested per IEEE Standard 501-1978. The output contacts have a rating of 6G ZPA.

### Surge Protection

The SLJ21A was designed to meet ANSI-C37.90a-1974, IEEE Standard 472-1974 SWC test. It also meets the GE "Fast Transient" test and the GE "RFI" test.

## CONNECTION DIAGRAM

Fig. 1. Typical external connections & logic diagram for SLJ21A

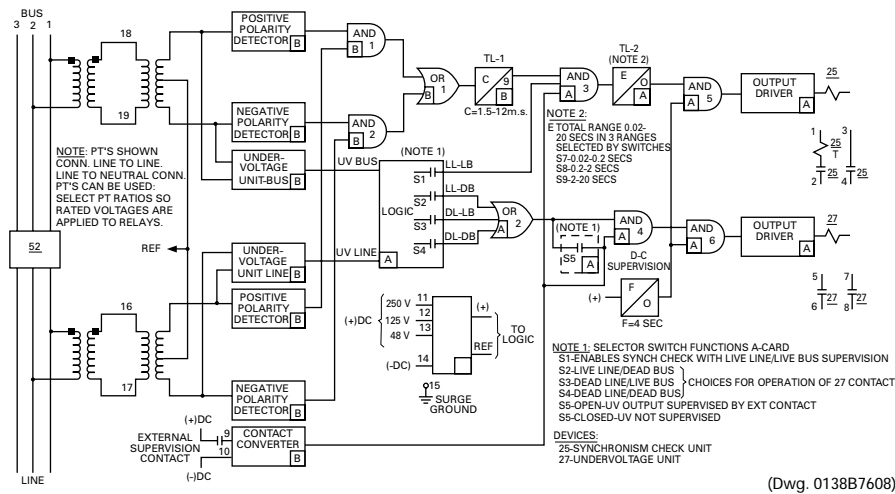


Table 1. Telephone Relay Interrupting Ratings

Volts	Interrupt Amps	
	*Inductive	Non-Inductive
48 DC	1.0	3.0
125 DC	0.5	1.5
250 DC	0.25	0.75
120 V-60 Hz	0.75	2.0
240 V-60 Hz	0.5	1.0

\*Inductive refers to an L/R time constant of 0.10 sec.

Table 2 Typical Burdens

AC Burden	W	VA
Bus Circuit	0.25	0.25
Line Circuit	0.25	0.25
DC Burden		
48 V	5.25	
125 V	14	
250 V	22	

## SELECTION GUIDE

Model Number	Frequency (Hz)	VAC	VDC	Closing Angle	Target (A)	Operating Time	Case Size	Approx. Wt. in lbs (kg)	
								Net	Ship
SLJ21A1A	50/60	120	48 125 250	10° - 60°	0.6/2	20 ms to 20 sec	S2	14 (6.4)	17 (7.7)