



Synchronism check relay for interconnection of AC system parts.

Features and Benefits

- RS485, RS232 or fiber comm. available
- Configurable auxiliary outputs
- V f Hz line and bus metering
- Continuous or manual modes
- Part of a modular system
- Independent 2" or 4" modules
- 1/4 or 1/8 standard 19" rack case available
- 3 digit display

Applications

- Generator and network synchronism
- Bus or line synchronism check
- Manual closing of breakers

Protection and Control

- Synchronism check operation
- Undervoltage supervision
- DLDB, DLLB and LLDB indication



Description

The MLJ is a digital synchronism check relay that measures bus and line voltages, checking:

- voltage differences
- frequency slip
- phase angle between both voltages

The main applications of the MLJ are:

- connection of a generator to the network
- reestablishing the connection between two parts of the network
- manual closing of breakers

The relay sends a closing output to the breaker when all of the values fall within the set limits and maintain these values for a period of time which has been set by the user. If any of the conditions are not met, the relay will provide a close condition fault signal.

The relay has two operational modes:

- a continuous mode in which it constantly checks the synchronism
- the manual mode is activated when voltage is applied to a manual digital input, initiating the synchronism supervision when voltage is applied by another check starting digital input

The synchronism function (with the presence of line and bar voltage) can be supervised by two undervoltage units that permit the synchronism function when both voltages are above the set value.

Additionally, the relay contains dead line-dead bus (DLDB), dead line-live bus (DLLB) and live line-dead bus (LLDB) units, with the ability to select any combination of them through independent settings.

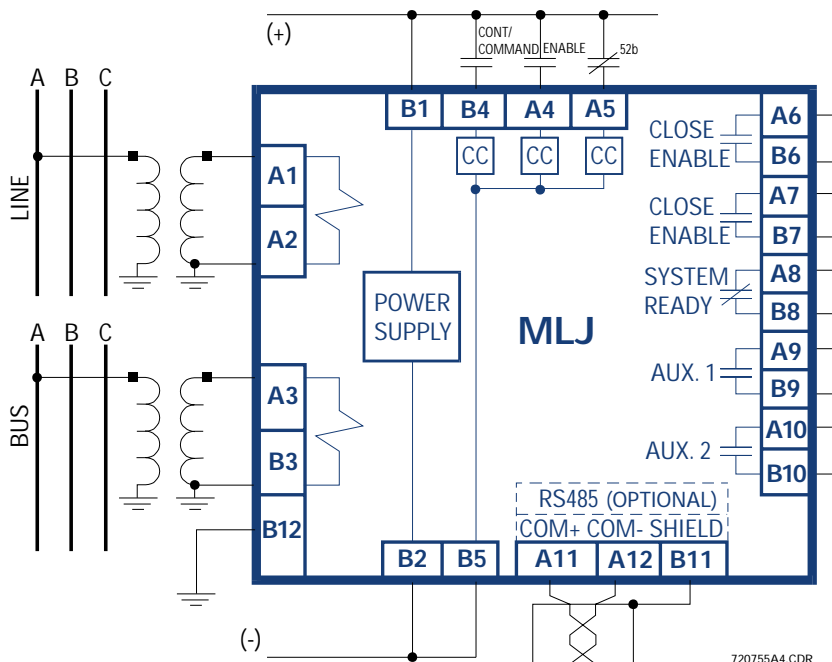
The basic relay, MLJ1000, and the RS-485 communications model, MLJ1005, are mounted in a 2" module that is compatible with the MID industrial systems.

They can also be provided in an individual 1/8 rack. The relays with additional communications via RS232 and plastic or glass fiber optics, models MLJ1006 and MLJ1007, come with an additional 2" card. The set can be mounted in either a 4" module for MID compatibility or a 1/4 rack case to be used as a stand alone relay.

Functions

- programmable synchronism verification (voltage, phase and frequency)
- two operating modes: continuous and manual
- dead line-dead bus (DLDB), dead line-live bus (DLLB) and live line-dead bus (LLDB) units
- real time measuring of line and bus voltages, voltage difference, phase difference and slip
- registering of the last close permitted
- visual indication of the line and bus status (live/dead)
- configurable auxiliary outputs
- local interface with push buttons and display
- RS485, RS232 and fiber optics communications
- self test functions
- compatible with MID industrial systems

External Connections Diagram



Man Machine Interface

Keypad

Composed of three buttons with the symbols +, -, and ENTER. Permits performing the following functions:

- view measurements
- view relay status
- view or change settings
- indicators and inputs testing

Display

Three 7 segment display

The following information is available through use of the screen:

- settings
- self tests
- line and bar status indications (live/dead)
- measurement of:
 - Line and bus voltages
 - Voltage difference
 - Phase difference
 - Slip
- Registered values for the last relay operation

Indicators

Three LEDs.

Function	Colour
Ready	Green
Close permission contacts	Red
Undervoltage (27)	Red

Communications

The remote communications system uses the GEPCE protocol for communication via the M-Link program which permits:

- viewing measurements
- viewing and changing settings
- testing inputs

- viewing the relay status
- viewing the line and bar status (live/dead)
- collecting the data of the last close permission

	Aux. Configuration
1	Close enable
2	Undervoltage
3	Dead line
4	Dead bus
5	Sync
6	Sync failure
7	System ready

MLJ Technical Specifications

PROTECTION	
SETTINGS RANGES	
Frequency:	50 or 60 Hz
Voltage Difference:	2-90 V in 0.5 V steps
Phase Difference:	2°-60° in 1° steps
Frequency Slip:	10-500 mHz in 10 mHz steps
Continuous Mode Time:	0.1-99 sec in 0.1 sec steps
Manual Mode Time:	0.1-99 sec in 0.1 sec steps
Undervoltage 25 Supervision:	Enabled /Disabled
Undervoltage Supervision Threshold:	10-180 V in 1 V steps
Line Voltage Live Level:	40-245 V in 1 V steps
Line Voltage Dead Level:	10-180 V in 1 V steps
Bar Voltage Live Level:	40-245 V in 1 V steps
Bar Voltage Dead Level:	10-180 V in 1 V steps
Failure to Close Time:	1 min
Synchronism Function 25:	Enabled /Disabled
DLDB Unit:	Enabled /Disabled
DLLB Unit:	Enabled /Disabled
LLDB Unit:	Enabled /Disabled
Auxiliary Output 1 & Output 2 Configuration:	Possible configuration options for the auxiliary outputs:
	Close permission for synchronism or undervoltage
	Synchronism unit output
	Undervoltage unit output
	Line without voltage
	Bus without voltage
	Failure to close permission
	Power supply monitoring
Unit Number:	1-255 in steps of 1
Communications Baud Rate:	300, 600, 1,200, 2,400, 4,800, 9,600, 14,400, 19,200, 38,400 bps

METERING	
ACCURACY	
Voltage:	2% or 0.5 V (whichever is greater)
Voltage Difference:	3% or 1 V (whichever is greater)
Angle:	1° for voltages between 20 and 220 VAC
	2.5° for voltages between 10 and 20 VAC
Frequency:	5 mHz (45 to 65 Hz range)
Time:	1% or 30 ms (whichever is greater)

INPUTS	
BURDEN	
Voltage Circuit Burden:	0.15 VA at 110 V-120 V
DIGITAL INPUTS:	
Two Ranges:	24-48 VDC and 110-250 VDC ±20%
Digital Input Consumption:	<2 mA

POWER SUPPLY	
RATINGS	
Rated Voltage:	63 to 220 VAC
Maximum Voltage:	440 VAC
Continuous:	24-48 VDC ±20%
Auxiliary Power:	110-240 VDC ±20%
AUXILIARY POWER CONSUMPTION:	
In Standby:	3 W (alarm relay activated)
Tripped:	6 W (all output relays activated)

OUTPUTS	
CONTACTS	
Closing Contacts:	
Max Operating Voltage:	440 VAC
Continuous Current:	16 A
Closing:	30 A
Breaking Capacity:	4000 VA
Signalling Contacts:	
Max Operating Voltage:	380 VAC, 250 VDC
Continuous Current:	8 A
Closing:	8 A
Breaking Capacity:	1760 VA

COMMUNICATIONS	
Mode:	Half duplex
Physical Connection:	RS485 RS232, plastic or glass fiber optics

ENVIRONMENTAL	
Temperature Range:	
Operating:	-20°C to 55°C (-5°F to 131°F)
Storage:	-40°C to 70°C (-40°F to 149°F)
Ambient Humidity:	Up to 95% without condensation

CASE	
PHYSICAL	
Dimensions:	
Models 1000 and 1005:	1/8 rack, 4 units high
Models 1006 and 1007:	1/4 rack, 4 units high
Weight (without packaging):	6.6 lbs (3 kg)

TYPE TESTS	
Insulation Test:	IEC 255-5, 2 kV 50/60 Hz 1 min
Impulse Test:	IEC 255-5, 5 kV 0.5 J
Interference Test:	IEC 255-22-1, Class III
Electrostatic Discharge:	IEC 255-22-2, Class IV
Radio Interference:	IEC 255-22-3, Class III
Fast Transient:	IEC 255-22-4, Class IV
RF Emission:	EN 55011, Class B
Magnetic Fields:	IEC 1000-4-8, Class V
Vibrations:	IEC 255-21-1, Class II
Shock Test:	IEC 255-21-2, Class II

APPROVALS	
CE:	Compliant

*Specifications subject to change without notice.

ORDERING

To order select the basic model and the desired features from the Selection Guide below.

MLJ100 * B010 * 00 *

MLJ100			Digital synchronism check relay
5			RS485 communications
6			RS485 + RS232 + Plastic fiber optics communications
7			RS485 + RS232 + Glass fiber optics communications
	F		24/48 VDC input and auxiliary voltage
	H		110/250 VDC input and auxiliary voltage
		C	Individual drawout housing
		S	As part of a 'MID drawout system

†Modular Industrial Protection System

