



# FS0510

## *PHASE SELECTOR*



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# **FS0510 PHASE SELECTOR**

## **INTENDED USE:**

FS0510 *Phase Selector* is a device with three phase inputs designed to ensure supply of uninterrupted and regular power to systems operating on single phase and to prevent overconsumption of fuel due to unnecessary activation of generator in telephone switchboard stations or GSM base stations which have generators. As well-known, it is often experienced that some phase or phases, particularly in rural areas, are interrupted more often due to unbalanced loading of phases. In such cases, it is only possible for the system, which is supplied by a single phase, to be supplied by other available phases, if any. The present phase selector which is equipped with novel properties will meet a significant need in telephone switchboards, especially in those located in rural areas.

## **GENERAL PROPERTIES:**

*Phase Selector* which is small and has compact structure is microprocessor controlled which allows programming of different parameters through the buttons available on the device.

The device contains a Battery Charge Level Relay output to be used in sites where there is a generator. Battery Charge Level Relay changes its position depending on battery voltage connected to the device, to the condition of input phases, and also to the thermostat input located on the device. Relays contacts are used by connecting them to the related inputs of generator control devices. This relay allows the generator to go into sleep mode if any of the phases is available. When all of the phases are interrupted or out of desired values, and battery voltage is lower than the adjusted level or thermostat input is active, it allows the generator to go out of sleep mode. Thus, it prevents unnecessary operation of the generator whereby it saves maximum fuel.

Furthermore, the device is equipped with a By-pass Relay which is activated when no voltage is available at the output of the device due to any relay failure when at least one of the input voltages are available at desired values. Contact current of that relay is 1A.

LCD display on the *Phase Selector* normally allows viewing input phase voltage values and battery voltage, and when pressed on the down button, it is possible to view from which input the load is supplied, and the position of the Battery Charge Level Relay and By-pass Relay along with output voltage value.

Following parameters can be programmed on the device;

- 1- Allowable lower value for input voltages
- 2- Allowable upper value for input voltages
- 3- Allowable lower value for Battery Charge Level Relay
- 4- Allowable upper value for Battery Charge Level Relay
- 5- Position of Battery Charge Level Relay
- 6- Desired delay time for re-selection of best phase
- 7- Required delay time after reaching to the upper level for Battery Charge Level Relay

If all of the three phases are available, FS0510 devices select the one which is closest to 220 Volts AC voltages, and supplies the load connected to its output over this phase. In the event that the phase supplying the system is interrupted or goes out of the programmed values, it transfers the load to one of the two phases whose power is closest to 220 Volts AC. During the transfer, it waits for around 10 seconds in order to ensure that the power becomes stable. Similarly, in the event that the second phase, which supplies the load, is also interrupted or goes out of the programmed values, it transfers the load to the phase which has power after waiting for around 10 seconds. If all of the three phases are in good condition, the load is supplied by 48V system battery group available in the switchboard station.

In practice, if a generator is available, it is ensured that the generator waits in sleep mode through Battery Charge Level Relay till battery group can no longer supply the load, and that generators starts to work if battery voltage comes down to the programmed value, i.e., it discharges. Thus, it is possible through the generator, to supply the load and to charge battery group at the same time. If the battery voltage reaches programmed values, i.e., it is fully charged, the generator goes into sleep mode after which the task of supplying the load is again undertaken by the battery group. This continues till one of the network phases is available again (at desired values).

The device is supplied by the voltage provided from 48 Volts DC battery group, and required power is provided by DC/DC converter available on the device. The supply input is protected against inverse polarity via the 1.6A glass fuse on the case of the device. This fuse is also used to provide protection against overcurrent. DC/DC power supply can function in a wide voltage interval such as 12 to 60 Volts DC. This allows safe use of the device even when 48 Volts DC battery group in the switchboard drops to the quite low voltages.

DC supply voltage is required for operation of the phase selector. Although the device operates even at low voltages such as 12 Volts DC, it will be deactivated when the power is cut off (if it is the case where the battery group blocks its output in order to protect itself at very low voltages); so even if one of the network phase is restored, the device will not work as it would be deactivated. Therefore, we recommend our firm's product **GK0510 AC** power supply which provides output if any of the three phases is available.

FS0510 *Phase Selector* has a thermostat contact input on it. In the event that any temperature thermostat is connected to this input, and that any of the three phases is not available with air-conditioned switchboard station (i.e., three-phase air conditioner does not work), and that thermostat contact is unconnected as well, then it activates Battery Charge Level Relay after which the generator starts. Thus, it is ensured that air-conditioner is activated in case of over-temperature alarm. A resistance of 220 Ohm must be connected to input endpoint as to be parallel to thermostat's contacts, if available, or to the device thermostat terminal if not available. In this way, the device controls the lines of thermostat which is located at a distance point, and displays error message if the line is disconnected.

## **POSITION OF BATTERY CHARGE LEVEL RELAY**

Shared end of Battery Charge Level Relay along with normally open and normally closed ends are all available for use. As a result, the user can also program the position of the relay in order to use the end located in the desired position along with the shared end. The option “**NO**” normally allows use of open end while the option “**NC**” normally allows use of closed contacts of the relay. Therefore, if “**NC**” option is selected, and shared end of relay contact is used in conjunction with the normally closed end, the relay will release when the battery voltage drop to set values whereby it will be possible to directly start the generator when the phase selector is deactivated (as the relay will release) in case of any failure (except relay contacts get stuck).

## **DELAY OF BEST PHASE SELECTION**

When first introduced into the phase selector, it selects the phase, connected to its input, which is closest to 220 Volts AC, and it transfers the load on this phase, and keeps supplying the load from this phase till the phase goes out of the set values. However, by this selection it is possible to ensure that device transfers the load to another more suitable phase, if any, at the end of the time you specify (closer to 220 Volts AC) reconsidering the phase voltage. For instance, if it is set to 60 minutes, the device shall consider phase voltage in every 60 minutes, and carry out this action. If this function is not desired, the “**CANCEL**” position can be selected. Programmable time in this case is 30 to 480 minutes.

## **DELAY TIME OF BATTERY LEVEL RELAY**

In some usage areas, battery voltage reaches set upper voltage level in a short time before being fully charged in cases such as the battery is old and cannot last sufficiently. In such cases, using this program it is possible, after the battery reaches set value, to allow generator keep operating for a time you will specify. Thus, it is ensured that battery group is fully charged by keeping the charging from the generator. If this time is not desired, the “**CANCEL**” position can be selected. Programmable time in this case is 1 to 600 minutes.

## **CURRENT CAPACITY**

Relays in the FS0510 *Phase Selector* are 25 Amperes with 220 Volts AC which do not allow connection to load above this current value, and require connection of fuses that have suitable values for their inputs. Moreover, if the device is exposed to current resulting from short circuit, the relay contacts inside will be damaged.

**For use in higher current, contactors with suitable properties can be used, yet such an intention must be reported at order requesting phase selector device that have compatible properties.** Because, as the R, S, and T outputs of the standard device are parallel (short circuit), it is not to be used with contactors.

**TABLE FOR BATTERY CHARGE LEVEL RELAY POSITION**

<b>Battery Voltage Low</b>	<b>Temperature High</b>	<b>All three phase not available</b>	<b>Position of Battery Level Relay</b>
1	1	0	1 (On)
0	1	0	1 (On)
1	0	0	0 (Off)
0	0	0	0 (Off)
1	1	1	1 (On)
0	1	1	1 (On)
1	0	1	1 (On)
0	0	1	0 (Off)

On the Table, 1 indicates that the requirement in the column is available while 0 indicates it is not available. Red cells indicate that Battery Level Relay is active while blue cells indicate it is passive.

## TECHNICAL SPECIFICATION:

Dimensions	: 268(W)x120(D)x104(H) mm
Weight	: 1100 Grams
DC Supply Voltage	: 12 - 60 Volts DC
Supply Current	: ≈ 100 mA (at 48 VDC voltages)
Waiting time during phase change	: ≈ 10 secs
Load current	: 25 Amperes AC (at 220 VAC voltages)
Load voltage	: 220 Volts AC

### Adjustable values

<i>Input phase voltage lower value</i>	: 80 to 200 VAC (1 Volt range)
<i>Input phase voltage upper value</i>	: 210 to 250 VAC (1 Volt range)
<i>Lower value of battery level relay</i>	: 38.00 to 48.00 VDC (0.1 Volt range)
<i>Upper value of battery level relay</i>	: 48.50 to 58.00 VDC (0.1 Volt range)
<i>Position of batter charge level relay</i>	: NO (normally open) - NC (normally closed)
<i>Delay of best phase selection</i>	: 30 to 480 minutes or CANCEL
<i>Delay of battery level relay</i>	: 1 to 600 minutes or CANCEL

### Values viewed on LCD Display

*Voltages of Input Phases*


*Battery Voltages*

*The Phase from which the Load is supplied*

*Position of Battery Charge Level Relay*

*Position of By-Pass Relay*

*Output voltage*

These values can be viewed on LCD display by pressing button 

DC Battery Input Fuse Value : 1.6 Ampere  
Fuse is located on external surface or at the back of the device.

### Values from factory settings of the device

<i>Input phase voltage lower value</i>	: 190V AC
<i>Input phase voltage upper value</i>	: 230V AC
<i>Lower value of battery level relay</i>	: 48V DC
<i>Upper value of battery level relay</i>	: 52V DC
<i>Position of batter charge level relay</i>	: NO
<i>Delay of best phase selection</i>	: CANCEL
<i>Delay of battery level relay</i>	: CANCEL