# SINGLE GENERATOR CONTROL PANEL OPERATION USING LOVATO RGK800 CONTROLLER

## AUTOMATIC CONTROL (Also see Lovato Operating Manual)

Normally the Main Generator Panel Isolator should be On, E-stop on Main Panel and On-Board panel not depressed as well as controller in auto. If these conditions are not met the Controller will not allow the generator to start automatically. To clear e-stop alarm – release e-stop and press off key then select auto again.

The mains supply (Tap Changer) is monitored by the Generator Controller to within Voltage Limits - 230V + 12% (P13.03) and -15% (P13.01) and Frequency Limits 50Hz +-7% (P13.09+P13.11) .

Panel E-stops normal

| | | | |
|---|---|---|---|
| E-stop | Push button (Main Panel) | COMM 1 POS/34 | On |
| E-stop | Push button (On Board Panel) | COMM 1 POS/34 | On |

Panel Isolator switched on

| | | | |
|---|---|---|---|
| Panel Isolator | Rotary Switch | EI 01(I9) | On |

## AUTO START

When the mains supply voltage exceeds these limits and the supply is still on the system will wait for a period of 60 seconds (P13.02+P13.04) and if the supply voltage has not recovered in this period the following sequence of events should occur:

- Generator will start up, after generator voltages are stable the change over will move from Pos1 to Pos 0 to Pos 2 and all loads will run off generators.
- Energize Gen. 1 fuel solenoid.

| **FUNCTION** | **FIELD DEVICE** | **CONTROLLER I/O / TERMINAL** | **Delay/Status /Config Menu** |
|---|---|---|---|
| Gen Fuel Solenoid | R1/R1.1 | O.1/35 | 5s-P13.16 |

- Energize Gen. 1 Crank solenoid 1s later (P11.08)

| | | | |
|---|---|---|---|
| Gen Crank Solenoid | R2 | O.2/36 | 5s-P13.16 |

De – Energize crank relay 5 seconds later (P11.10) or when Controller detects Generator Frequency.

- Delay monitor of oil pressure

| | | | |
|---|---|---|---|
| Gen Oil Pressure | K8 (On-Board) via sensor | I.1/53 | On |

If generator successfully started – Engine Running - Generator Output within limits Voltage Limits - 230V + 10% (P14.03) and -10% (P14.01) and Frequency Limits 50Hz +-7% (P14.09+P14.11), monitored by Generator Controller, the generator will run without load for 25s as a warm-up period, then change over to Pos 2, which will energise the Common Busbar, energizing all Loads.

| | | | |
|---|---|---|---|
| Gen Pos 2 | Gr100 | O.10/12 | 25s-P14.05. |

**GENERATOR STOP MAINS RESTORED**

When the mains supply normalizes (within limits) the generator shall carry the load for a further 60s (P13.05). If the mains supply remains within the limits in this period the following should occur:

- Change over switch to move from Pos 2 to Pos 0 to Pos 1 1s delay (P12.01) which will energise the Common Busbar, energizing all Loads.

| | | | |
|---|---|---|---|
| Mains Pos 1 | MR100 | O.9/10 | 60s-P13.05 |

The generator will run for another 120s (P11.18 – Generator Cooling Time) then stop.

**ALARMS / INDICATIONS: (NB: All Inputs show on Controller only after delays has run out)**

Mains Fail:

If the mains monitor relay MMR100 is de-energized, the input (EI 2(I10)) would be on. energize relay(K5;O.5) and turn scada contact on.

Tap changer Fail:

If the Generator Controller detects the Tap Changer Output to be out of limits it would turn on Tap changer fail relay(R12;RA2/) and turn Tap changer Fail scada relay on after 60 secs (P13.02/04).

Transtel Fail: (Or Transtel/Signal Fail depending on site)

If the Transtel fail relay (TR100) is de-energized, meaning there is no voltage on the Transtel DB, then input (I.5) is on. That would energize the Transtel Fail relay (R4;O.4) and turn on Transtel Fail scada relay. 20sec Delay (P18.05.04)

Signals Fail: (Only Loops not Repeaters)

If the Signal fail relay (SR100) is de-energized meaning there is no voltage on the Signal DB then input (I.6) is on. That would energize the Signal Fail relay (R10;EO.4(I10)) and turn on Signal Fail scada relay. 20sec Delay (P18.06.04)

RGK Generator Controller. Batt. O.K.:

There are two (2) conditions that can trigger this alarm:
1. If the Battery Charger 1 is faulty or the AC supply is off, I.7 will be on (switched to negative). If the input stays active for 180 secs (P18.07.04), the alarm will trigger.
2. If the battery Charger 1 voltage goes out of limits (12V +20% : P05.02; -15% P5.03) for 10secs (P05.04), the alarm will trigger (RA1).

3. If the Battery Charger 2 is faulty or the AC supply is off, EI.7 will be on (switched to negative). If the input stays active for 180 secs (P18.11.04), the alarm will trigger.
4. If the battery Charger 2 voltage goes out of limits (12V +20% : P05.02; -15% P5.03) for 10secs (P05.04), the alarm will trigger (RA9).

5. Above battery chargers will only give a fault when on mains and generator is not running. When generator is running the chargers will be switched off so that batteries only charge via the alternator and not battery charger.
The RKG controller will activate both of the above mentioned outputs in the event of battery failure while running on generator.

Fail to Start (F.T.S.):

If the generator fail to start while cranking for 5 seconds (P11.10) the crank solenoids (R2;O.2) and the fuel solenoid (R2; O.1) are reset and the systems waits for 5 seconds (P11.11) before trying to restart. After 3 attempts (P11.09) the generator failed to start (F.T.S.) is turned on and relays R14 (RA4/O.23) is energized.

Generators Low Oil Pressure:

If the Oil pressure is low, the low Oil pressure switch is triggered (I.1) and the generator will stop. The Oil Pressure Low) and relay R6 (O.6) are energized.

Generators over Temperature:

If the Generator Temperature is High, the High Engine Temp switch is triggered (I.2) and the generator will stop. The Gen Temp High relay R13 (RA3) are energized.

Generators Voltage Low:

If the generator voltage drops below 230VAC -10% (P14.01) for more than 10 seconds (P14.02) while running, the generator will stop. The Gen Volt Low and Relay R17 (RA7) are energized.

Generator Voltage High: (Not Configured at Control for some sites)

If the generator voltage rises above 230V + 10% (P14.03) for more than 10 seconds, (P14.04) while it is running, the generator will stop. The Gen Volt High and relay R18 (RA8) are energized.

Generators Frequency Low:

If the generator frequency drops below 50Hz – 7% (P14.11) for more than 10 seconds (P14.12), while it is running, the generator will stop. The Gen Freq Low and relay R15 (RA5) are energized.

Generator Frequency High: (Not Configured at Control for some sites)

If the generator frequency rises above 50Hz + 7% (P14.09) for more than 10 seconds (P14.10), while it is running, the generator will stop. The Gen Freq High relay R16 (RA6) are energized.

Gen. Run:

If the Generator Controller detects that the Generator is Running OK (all readings within limits), the Engine Running relay R3 (O.3) is energized.

Low Fuel:

If the fuel level drops below the Fuel level switch in the bulk diesel tank, the low fuel signal (I.3) goes off. The low fuel and relay R9 (EO.3(O13)) are energized.

**Faults Reset:**

Local Reset:

All faults can be reset locally by pushing the OFF Key on the RGK800 Generator Controller.

**Dummy Load**: (M22)

The dummy load contactor can only be switched on (to run the generator on dummy load) by running the generator in TEST mode. The mains must be on.

Push the TEST Key on the RGK800 Generator Controller.
The Generator will start automatically. After Gen Voltage OK - delay 25s (P14.05), the Dummy Load Contactor K100 (R7;O.11) for gen.1 will be energized.

**END**