

Europa – Rotax 914 : 6Ah LiFePO4 battery (A) , 6Ah LiFePO4 battery (B) , 18A PM alternator

Two types of switch are used:

1. Bidirectional: a bistable 2-coil relay (Tyco BDS-A, Tyco PK2, Fujitsu FTR-K3LAB012W-PV) with monostable control – uses 0.4 mA when closed, 5 μ A when open,

2. Unidirectional: a MOSFET based load switch (BTS555) – uses 1 mA when closed, 15 μ A when open.

Both types of switch are closed by shorting the input to ground using an actuator with gold plated contacts. The master ground actuator provides for progressive power-up and progressive power-down

(suitable are NKK M2024SS1G01 SP3T toggle switch and Grayhill 58J9A36-01-2-03S keylock rotary switch):

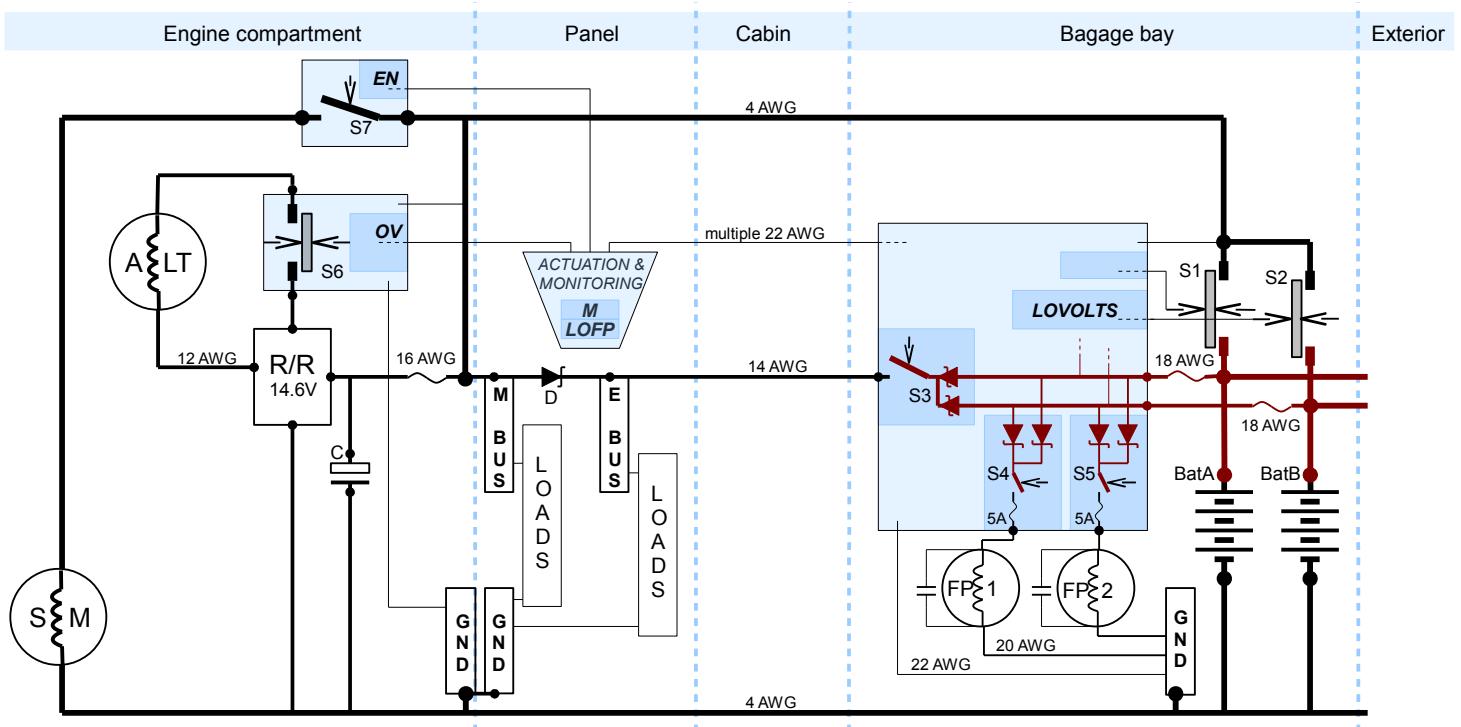
0 – all switches are open,

1 – the main bus is connected to battery A, the alternator switch is open, all other switches are enabled,

2 – the main bus is connected to battery A, the alternator switch is closed, all other switches are enabled.

There is a backup master ground.

Total leakage is $2 \times 5 + 3 \times 15 = 55 \mu\text{A}$. The self-discharge rate of each of the batteries is 200 μA .



| Id | Switch | Type/Use | Connects | Powered | Name | Actuation | Automation | Master |
|----|----------------------|----------|---|-----------|---------------|-------------|-------------|--------|
| S1 | Tyco BDS-A | B/B | BatA \leftrightarrow Mbus | BatA | DC MAIN | OFF-BAT-ON | M (1) | 1-2 |
| S2 | Tyco BDS-A | B/B | BatB \leftrightarrow Mbus | BatB | AUX BATTERY | OFF-AUTO-ON | LOVOLTS (2) | 1-2 |
| S3 | BTS555 (2x Schottky) | U/U | BatA+BatB \rightarrow Ebus | BatA+BatB | EBUS ALT FEED | OFF-ON | none | 1-2 |
| S4 | BTS555 (2x Schottky) | U/U | BatA+BatB \rightarrow FP1 | BatA+BatB | FUEL PUMP 1 | OFF-ON | none | 1-2 |
| S5 | BTS555 (2x Schottky) | U/U | BatA+BatB \rightarrow FP2 | BatA+BatB | FUEL PUMP 2 | OFF-AUTO-ON | LOFP (3) | 1-2 |
| S6 | FTR-K3LAB012W-PV | B/B | Alt \leftrightarrow R/R (\rightarrow Mbus) | Mbus | ALTERNATOR | (RESET) | OV (4) | 2 |
| S7 | 5x BTS555 | U/U | Mbus \rightarrow Starter/Motor | Mbus | STARTER | OFF-EN-(ON) | ENABLED (5) | 1-2 |
| SX | BTS555 | U/U | Mbus \rightarrow ALoad | Mbus | ALOAD | OFF-ON | none | 1-2 |

(1) M is master ground progression: 0, 1, 2

OFF 0 (all switches are open)

BAT 1 (S1 is closed, S6 open, other switches enabled)

ON 2 (S1 is closed, S6 closed, other switches enabled)

(2) LOVOLTS when Mbus voltage is below 13.5 – 14.0V (hysteresis)

OFF S2 is open

AUTO S2 is open when LOVOLTS, closed when not

ON S2 is closed

(3) LOFP when fuel pressure has been low (T.B.D.)

OFF S5 is open, LOFP is negated

AUTO S5 is closed when LOFP, open when not

ON S5 is closed, LOFP is negated

(4) OV when Mbus voltage has been above 16.2V for 200ms

S6 is open when OV, closed when not (if M = 2)

(RESET) OV is negated and S6 is closed (if M = 2)

(an SM8S18A on Mbus provides spike protection)

(5) ENABLED when the enable input of S7 is grounded

OFF S7 is open

EN ENABLED and S7 is open

(ON) ENABLED and S7 is closed

| Other | |
|---------------------|--|
| C | UCC U36D 50V 47000 μ F 9.5m Ω |
| D | T.B.D. |
| 2 Schottky @ S3 | T.B.D. |
| 4 Schottky @ S3, S4 | T.B.D. |
| BatA, BatB | Shorai LFX18L1-BS12 / LFX18A1-BS12 |