**Hills Electronic Security Power Supply – Operation and Connection Diagram**

**About the PSU**

The power supply is a DC uninterrupted power supply unit, or UPS. It will continuously supply 13.5V on the output while mains power is available and keep the backup battery charged. Once the mains power fails, it will switch to battery power for as long as the battery can supply an adequate voltage.

**DC Outputs**

The outputs of the system can be setup to run as a single 10A / 6A output (output 1), or as 5/3 x 2A outputs which are all individually fused. To select the single 10A /6A output, put the 10A/6A blade fuse in the centre and left terminal of the output selector. To select the 5/3 x 2A outputs, move the fuse to the centre and right terminal of the output selector. The 2A outputs can be setup to run continuously, or be disabled on a fire drop input. The fire drop works by supplying a nominal 12V- 27V DC to the connector marked "FD" on the board. When the Fire Voltage drops out, the outputs with the fire drop enabled, will drop out also.

**Alarm Outputs**

There are multiple relays on the board to switch between different configurations and for dry contact alarm outputs. The two alarm relays are for mains failure and battery failure. Alarm 1 will enable when there is a battery error and Alarm 2 will enable on a mains error.

**Mains Operated**

When the unit is running normally, with mains supplied and a battery connected, the alarms will be off and the green status LED (Status 2) will be on. If the green status light is flashing, the battery is being charged. Once the battery is charged, the green LED will come on solid and the battery will remain in its float stage. If the battery is missing, the red status LED (Status 1) will flash while the green LED stays on and the Alarm One relay will enable.

**Battery Operated**

If the mains supply fails, the green LED will turn off, the red LED will turn on and the Alarm Two relay will enable. If the green LED stays on, then that means that the battery was over charged. If this happens on a regular basis, the unit is faulty and will need to be serviced. When the battery runs low, the red LED will start flashing and the Alarm One relay will enable. If the battery is flat, the outputs will be disabled, both Alarm relays will be enabled and the status LEDs will flash in turn.

**Error State**

The other state it can be in is when the load is too big and collapses the mains supply. It will try to reconnect the mains supply three times in a row. If this fails, it will shut down and attempt to reconnect again in 15 seconds. This, it will only do three times. After that, the unit will need to be power cycled. During this process, both Alarm relays will be enabled, and the status LEDs will both flash quickly in unison. Any other error on the system will display the same LED flash sequence.

**(NOTE: Batteries MUST be connected all the times for 100% functionality)**

# Hillsec 12Vdc – 6A / 10A Switch-mode PSU

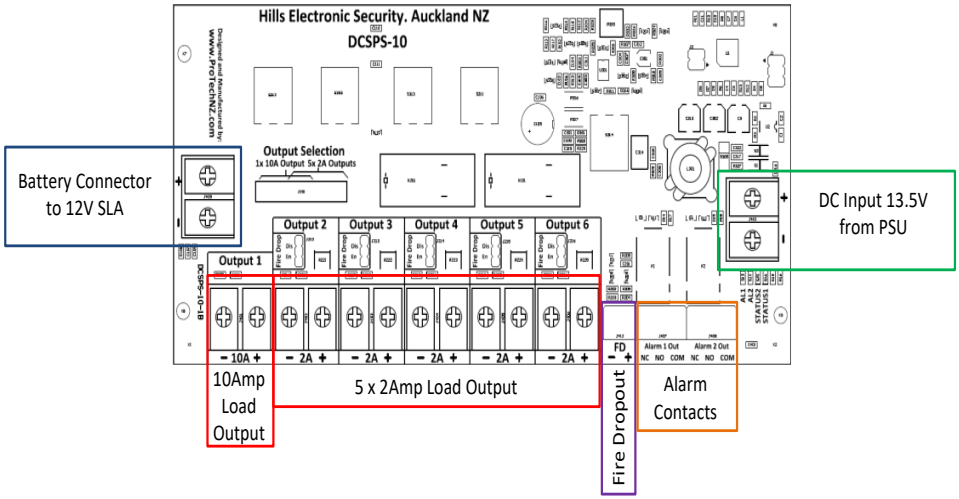
| | |
|---|---|
| Input Voltage | 230 Vac (+6% / -10%) 50 Hz |
| Input Current | 1.4A @ Full Load |
| Output Voltage | 13.5Vdc |
| Output Current | 10A |
| Output Channels | 3 / 5 x changeable to 1 x 6 / 10 amps |
| Output per Channel | 3 / 5 x 2A or 1 x 10 amps |
| Battery Charger | 13.5Vdc @ 1.5A |
| AC Main Failure Monitor | 1 x N/C and N/O contact with LED<br>(Rated at 28Vdc1amp) |
| Battery Monitor | 1 x N/C and N/O contact with LED to monitor for:<br>low battery, battery missing, periodic battery test fail<br>and battery over charged(Rated at 28Vdc1amp) |
| Fire Drop Input | 12-27 volts DC Input to Enable Fire Mode |
| Periodic battery Test | Yes – Test once a day |
| Overload Protection | PTC Over current protectors with constant current<br>limiting, short circuit shutdown with automatic<br>recovery |
| Fault indicator | Fault sequence LED |
| Low Battery Threshold Voltage | 12.5 volts DC |

## LED SEQUENCE

| Mode | Running on | Status | Green | Red | Mains Relay | Batt Relay | Description |
|---|---|---|---|---|---|---|---|
| 1 | Mains | Boost Charge | 1/s | Off | Off | Off | The battery is being charged and it is operating on **mains** |
| 2 | Mains | Float Charge | On | Off | Off | Off | The battery has reached the float charging stage and is operating on **mains** |
| 3 | Mains | Battery Missing | On | 1/s | Off | On | No battery is detected and is running on **mains** |
| 4 | Mains | Test Failed | On | 4/s | Off | On | The battery test failed and is running on **mains** |
| 5 | Battery | Testing | 1/s | On | Off | Off | Testing the battery which means the unit is running on **battery** as well. Mains available but not used |
| 6 | Battery | Over Charger | On | On | Off | On | The battery is overcharged. This means the unit is faulty as it should never go to over charged mode. Unit will automatically go to mode 12 when the battery drops in voltage |
| 7 | Battery | Battery Full | Off | On | On | Off | The battery is full and running on battery |
| 8 | Battery | Battery Getting Low | Off | 1/s | On | Off | The battery is getting near low and running on battery |
| 9 | Battery | Battery Low | Off | 1/s | On | On | The battery is below 12.5V and is now low and Running on battery |
| 10 | Battery | Test Failed | Off | 4/s | On | On | The battery test failed and running on battery |
| 11 | None | Battery Flat | 1/s | 1/s | On | On | The batteries are below 11V and therefore flat so disabled the outputs |
| 12 | | Other | 4/s | 4/s | On | On | Unit failure. If anything else goes wrong, this is the condition that comes up. Commonly used for over current fault mode and battery charger faults |

When too much current is being drawn from the outputs, the unit will try to switch to the mains connection 3 times, if it fails it will disable the outputs and try again 15 Sec later. Once it has re-tried this sequence 4 times, it will disable the outputs and not enable them again until the next power cycle.

# Printed Circuit Board Connection Diagram




## Notes

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