

# DC Power Supply Module

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*QT330VDC24V12R*

## Features and Specifications

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Nominal input voltage: 330V DC.

Operating input voltage range: 296V to 364V DC.

Output voltage: 24V  $\pm$ 1V DC.

Output current: 12A.

Output Voltage Ripple and Noise: 150mV(Peak-to-Peak @ 20 MHz Bandwidth)

Output Line Regulation:  $\pm$ 0.3%

Output Load Regulation:  $\pm$ 0.3%

Power ON time: <500mS

Rise time: <50mS

Insulation resistance: 50M $\Omega$  @ 500V DC

Output voltage overshoot during load current transient: <1V

Efficiency: 90%

Operating temperature: -10°C to +55°C

Storage temperature: -20°C to +85°C

100% redundant DC/DC power module

Input power ON/OFF switch

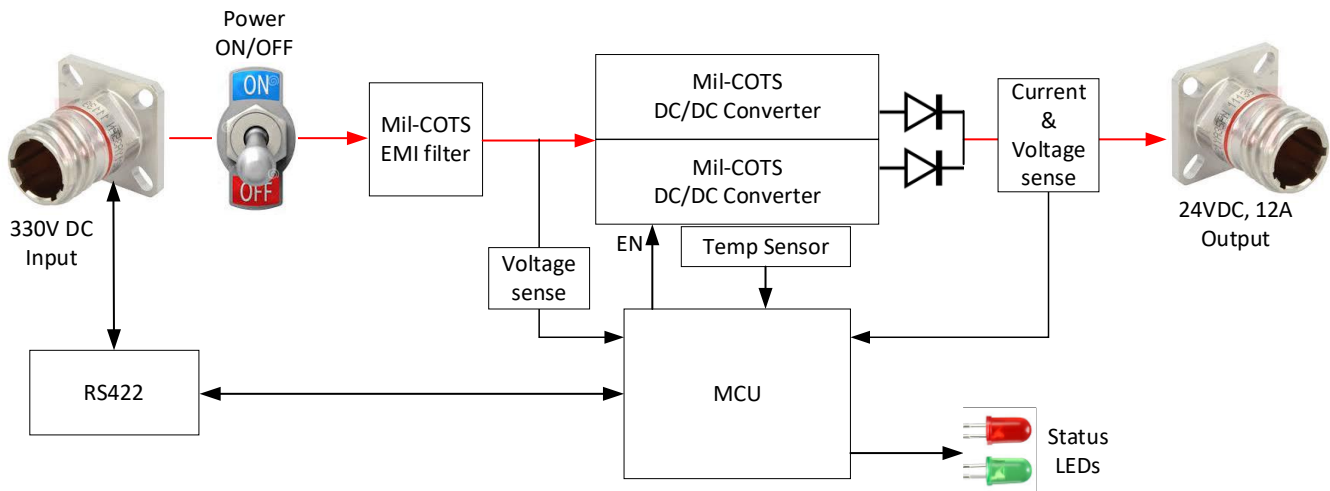
Power status LED indications

Remote control and status monitoring over RS422.

Over Voltage, Over Temperature and Over Current protection.

2U rack mountable ruggedized enclosure.

## Block Diagram



## Basic operation and features

The Power Supply Module (PSM) uses two Mil-COTS DC to DC convertors connected in parallel for redundancy. These Mil-COTS converters use a two-stage power conversion topology. The first stage is a buck-converter that keeps the output voltage constant over variations in line, load, and temperature. The second stage uses a transformer to provide the functions of input/output isolation and voltage step-up or step-down to achieve the output voltage required.

A microcontroller is used to monitor the input voltage, temperature, output voltage and current. If any of these monitoring parameters are out of range the microcontroller will disable the DC/DC convertors and indicate the status on the LEDs.

The microcontroller also responds to commands over the RS422 interface to control the power supply module and report the status of the power supply module. Power supply parameters like input voltage, temperature, output voltage, output current, etc., can be monitor remotely. At power on the power supply module will be in default enabled state.

**Input under voltage protection:** The power supply module is designed to turn off when the input voltage is too low(<296V), helping avoid an input system instability problem. The lockout logic is a comparator with DC hysteresis(10V). When the input voltage is rising, it must exceed the typical Lower Turn-On Voltage Threshold(306V) value before the converter will turn on. Once the converter is on, the input voltage must fall below the typical Lower Turn-Off Voltage Threshold(296V) value before the converter will turn off.

The power supply module automatically recovers from the input under voltage lockout condition when the input voltage falls back to the normal range.

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**Input over voltage protection:** The power supply module is designed to turn off when the input voltage is too high(>364V). The lockout logic is a comparator with DC hysteresis(10V). When the input voltage is falling, it must fall below the typical Upper Turn-On Voltage Threshold(354V) value before the converter will turn on. Once the converter is on, the input voltage must rise above the typical Upper Turn-Off Voltage Threshold(364V) value before the converter will turn off.

The power supply module automatically recovers from the input over voltage lockout condition when the input voltage falls back to the normal range.

**Over-Temperature protection:** A temperature sensor on the power supply module senses the average temperature of the DC/DC modules. The power supply module generates an alarm when the temperature reaches 75°C. The thermal shutdown logic is designed to turn the converter off when the temperature at the sensed location reaches the Over-Temperature Shutdown value(85°C). It will allow the converter to turn on again when the temperature of the sensed location falls by the amount of the Over-Temperature Shutdown Restart Hysteresis (10°C) value.

The power supply module automatically recovers from the over temperature lockout condition when the temperature falls back to the normal operating range.

**Output Over-Voltage protection:** The power supply module is designed to turn off when the voltage across the output exceeds the Output Over-Voltage Protection threshold(26V), the DC/DC convertor module will be immediately disabled. This prevents damage to the load circuit due to over voltage.

The power supply module will not automatically recover from the output over voltage lockout condition. It needs to be manually power cycled to recover from this fault condition.

**Output Over-Current protection:** The power supply module is designed to turn off when the output current exceeds the Over-Current Threshold (120% of normal) value), the DC/DC convertor module will be immediately disabled. The DC/DC convertor module will also be disabled if the output current stays at 110% of normal value for more than 50mS.

The power supply module will not automatically recover from the output over current lockout condition. It needs to be manually power cycled to recover from this fault condition.

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## Interface details

Front panel:



LED status indication:

No.	Green LED	Red LED	Description
1	ON	OFF	Normal operation. Input and output are normal.
2	ON	ON	Input normal. Output fault (over voltage/current/ Temperature). Output disabled.
3	OFF	ON	Input fault (input over/under voltage). Output disabled
4	OFF	OFF	Power switched OFF or no input power.

### Input power connector:

Part number: D38999/20WB35PN, Keying: N (Normal)

Input connector pin designations:

No.	Pin No.	Signal name	Description
1	1, 2, 3	+Vin	330V positive input voltage
2	4, 5, 6	-Vin	330V input voltage return
3	7	PSM_RX+	Power Supply Module RS422 receive positive line.
4	8	PSM_RX-	Power Supply Module RS422 receive negative line.
5	9	PSM_TX+	Power Supply Module RS422 transmit positive line.

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6	10	PSM_TX-	Power Supply Module RS422 transmit negative line.
7	11	GND	Ground reference
8	12	PSM_Enable+	Power supply enable signal RS422+
9	13	PSM_Enable-	Power supply enable signal RS422-

### Output power connector:

Part number: D38999/20WC4SN, Keying: N (Normal)

Output connector pin designations:

No.	Pin No.	Signal name	Description
1	1, 2	+Vout	24V positive output voltage
2	3, 4	-Vout	24V output voltage return

## Ordering Information/ Part Numbering

Example QT330VDC24V12R

Make	Input voltage	Output voltage	Output current	Redundancy
QT	270VDC 330VDC	12V : 12V output 15V : 15V output 24V : 24V output 28V : 28V output	24: 24 A 20: 20 A 12: 12 A 10: 10A	R: redundant DC/DC convertors

## Contact information

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