

DC170W-24V-12V-PBF

170W / 24Vdc, 12Vdc DUAL OUTPUT,
28Vdc INPUT POWER SUPPLY



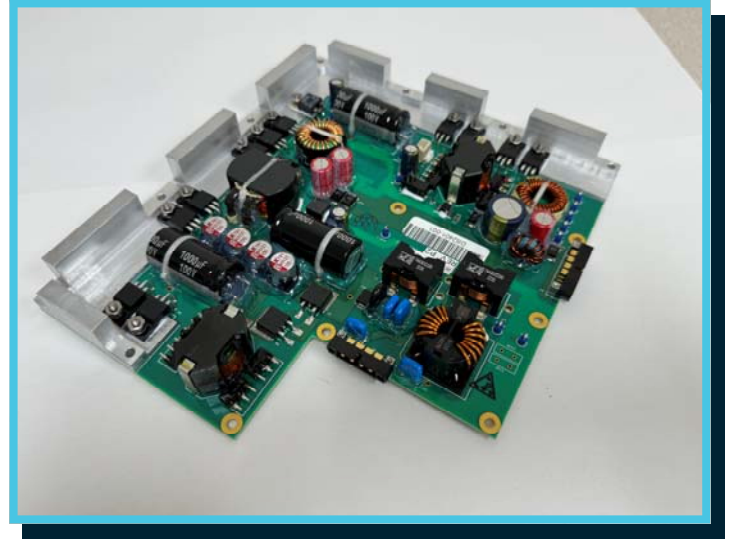
Providing two isolated output voltages and up to 170W continuous output power, the **DC170W-24V-12V-PBF** is optimized for 28Vdc RTCA/DO-160G airborne applications.

The **DC170W-24V-12V-PBF** is capable of providing up to 12W output on the 12V output during momentary input DC brown-out conditions for greater than 200mSec and supply efficiency exceeds 89% at full rated output load.

Weighing less than 26 ounces, the **DC170W-24V-12V-PBF** is constructed on a multi-layer PWB occupying less than 0.035m² (176mm x 190mm).

Converter power devices are horizontally mounted on an aluminum supply frame with total supply height less than 24mm. Interconnection is accomplished using two right-angle high-reliability Harwin M80-Datamate connectors.

The **DC170W-24V-12V-PBF** meets all performance requirements over the temperature range of -55°C to +100°C (supply frame temperature) and is reverse polarity and hot-swap protected.



FEATURES

	Efficiency: 89.5% typical at full rated output load
	Wide input range: 20.5 – 32.2Vdc
	Solid-state inrush current limiting
	Size: 176mm x 190mm x 24mm; Weight: less than 26 ounces
	Two isolated DC outputs: +24V and +12V
	Independent over-current and over-voltage protection on each output
	Input DC valid status line (TTL)
	Over-temperature fault signal (TTL)
	MTBF: 261,000 Hours, RIAC 217Plus, Aic cat, 30°C operating/ -55°C dormant, 21%DC, 1825 Cycles/ year

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STANDARD OUTPUTS

PARAMETER	OUTPUT VOLTAGE	
	+24V	+12V
Voltage Regulation	24.0V \pm 2%	12.0V \pm 2%
Output Current	5.6A	3.33A
Maximum Load	130W	40W
Minimum Load	0A	0A
Pk-Pk Ripple + Noise (20MHz BW)	250mVpp	150mVpp
Overcurrent Trip-point	8.8A	5.4A

SPECIFICATIONS

WHEN MOUNTED WITHIN SUITABLE AVIONICS ENCLOSURE

	RTCA/DO-160G, section 4, altitude/ temperature (operating) to 55,000 feet, category F2 equipment
	RTCA/DO-160G, section 6, humidity (operating) category B
	RTCA/DO-160G, section 7, shock (operating) category B
	RTCA/DO-160G, section 8, vibration (operating) category R (C&C1), S(MLY)
	RTCA/DO-160G, section 15, magnetic effect, category Z
	RTCA/DO-160G, section 16, power input requirements for DC input, cat Z equip (except interrupts)
	RTCA/DO-160G, section 17, voltage spike, category A equipment
	RTCA/DO-160G, section 18, conducted susceptibility, category Z equipment
	RTCA/DO-160G, section 19, induced signal susceptibility, category CC equipment
	RTCA/DO-160G, section 20, conducted and radiated susceptibility, category RR equipment
	RTCA/DO-160G, section 21, conducted and radiated emissions, category H equipment
	RTCA/DO-160G, section 22, lightning induced transients, category A3J3L3
	RTCA/DO-160G, section 23, lightning direct effects, category 2A2A
	Operating temperature: -55°C to +100°C, supply frame temperature, no forced air required



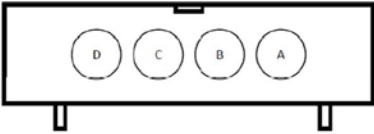
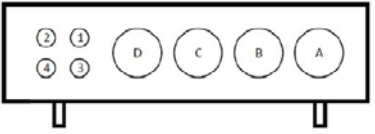
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INTERCONNECTION

SUPPLY SIDE CONNECTORS AND PIN-OUTS

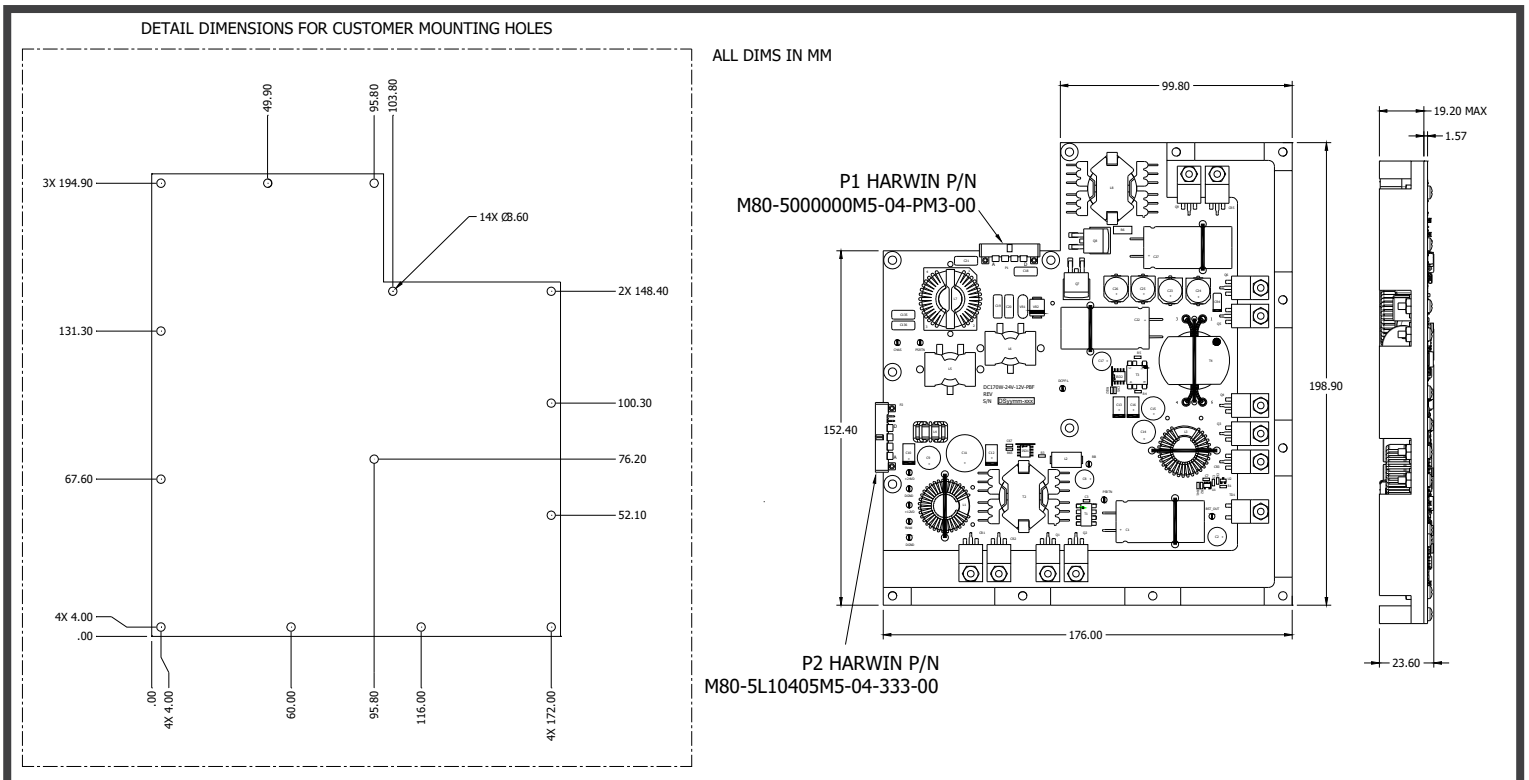
Connector	P1	P2
Pin #	HARWIN P/N M80-5000000M5-04-PM3-00-000 (Supply side is male)	HARWIN P/N M80-5L10405M5-04-333-00-000 (Supply side is male)
A	+28V	+24Vout
B	+28V	DGND
C	+28V-Return	+12Vout
D	28V-Return	DGND
1	--	INPUT-POWER-GOOD-H
2	--	24V-OUTPUTEN-H
3	--	SUPPLY-TEMP-GOOD-H
4	--	DGND
LOOKING AT CONTACTS, MALE, SUPPLY SIDE		

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MECHANICAL DIAGRAM



A DETAILED SOLIDWORKS DRAWING FURNISHED UPON REQUEST



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ELECTRICAL SPECIFICATIONS

UNLESS OTHERWISE SPECIFIED THE FOLLOWING TEST CONDITIONS APPLY: Ta = -55°C to 100°C.
CONSTANT ACTIVE LOADS APPLIED TO OUTPUTS, Vin = 28Vdc.

INPUT CHARACTERISTICS

PARAMETER	DC170W-24V-12V-PBF	REMARKS	NOTES
INPUT VOLTAGE RANGE	20.5 – 32.2Vdc	Complies with normal/ abnormal input voltages for DC operation per RTCA/DO-160G, Section 16, Category Z	2, 3
EFFICIENCY (FULL LOAD)	89.5% typical at 28Vdc input	Full rated output load (170W)	2
EFFICIENCY (50% LOAD)	87.5% typical at 28Vdc input	Half rated output load (85W)	2
INPUT VOLTAGE ABNORMAL SURGE WITHSTAND	80Vdc @ 100mSec 48Vdc @ 1 Sec	Per RTCA/DO-160G, Section 16, Category Z. 12V output remains in proper regulation during application of input surges. 24V output is disabled during input transients >35V (w/ auto reset)	1
INPUT UNDERVOLTAGE	<18.0Vdc	Input solid state circuit breaker disables for input voltages detected at or below 18.0Vdc, auto re-start when input rises above 20.5Vdc	2
INPUT CURRENT	<7A at 28Vdc input <9.5A at 20.5Vdc input	Full rated output load (170W)	2
INRUSH CURRENT	<16Apk for first 3mSec, <16Apk up to 500mSec, <12Apk up to 2Secs	Meets RTCA/DO-160G, Section 16, Cat Z for DC with "I" designation. Cold or warm start	2
START-UP TIME	<750mSec	Outputs within regulation	2
CONDUCTED EMISSIONS	RTCA/DO-160G, Section 21	Category H equipment, may require external common-mode choke or cylindrical shield bead on input power lines for compliance	1
QUIESCENT POWER	10W typical	Pout = 0W, +24V output enabled	2
STORAGE & OPERATING TEMPERATURE RANGE	-55°C TO +100°C		1
24V-OUTPUTEN-H	1.65V threshold. Pull high with 20k pull-up resistor to 3.3V level in order to enable +24V output	Pull signal down to <1Vdc with respect to DGND in order to disable the +24V output. 12V output is unaffected by this signal	2
INSULATION RESISTANCE INPUT TO OUTPUT & INPUT TO CHASSIS	>100Mohms	Tested at 500Vdc	2



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OUTPUT CHARACTERISTICS

PARAMETER	DC170W-24V-12V-PBF	REMARKS	NOTES
RATED OUTPUT POWER	170W	Continuous, 24V output can provide higher output power (up to 225Wout) at -55°C. Contact PPI for details	2
OUTPUT VOLTAGE TOLERANCE	+24V \pm 2% +12V \pm 2%	See "STANDARD OUTPUTS" table	2
TEMPERATURE STABILITY COEFFICIENT	0.01% / °C	Maximum output voltage drift with temperature	1
OUTPUT RIPPLE + NOISE (pk-pk)	+24Voutput: <250mVpp +12V output: <150mVpp	20MHz bandwidth	2
MAXIMUM BULK OUTPUT CAPACITANCE	+24Voutput: <470uF +12V output: <1200uF		1
MINIMUM OUTPUT LOAD	0A, each output	No output load required for supply stability or for maintaining proper output regulation	2
LINE REGULATION	<0.5%	Individual output deviation for \pm 20% step change in input voltage	1
LOAD REGULATION (TRANSIENT LOAD RECOVERY)	Outputs remain within 2% regulation limits	50% step change in individual output load currents with 10uSec rise/ fall times	1
HOLD-UP TIME	200mSec @ Pout = 12W	Uninterrupted ride through for +12V output. +24V output is not held-up during momentary input power interrupts	2
ISOLATION VOLTAGE OUTPUT TO CHASSIS	0Vdc	DGND is single-point grounded to chassis ground. Contact PPI if requiring isolation	1
INPUT-POWER-GOOD-H STATUS	Signal activates high upon detection of valid input 28V level, between 19.5Vdc and 48Vdc	Open drain output with 23.2k pull-up to 9.5V. Secondary side referenced (w/ respect to DGND). Signal transitions low upon detection of invalid input voltage, 1mSec delay time, 100mA max sink current	2
SUPPLY-TEMP-GOOD-H STATUS	Signal remains high for valid supply temperature (top and bottom side PCB sensors). Signal transitions low for sensed temperature $>+106^{\circ}\text{C} \pm 3^{\circ}\text{C}$	Open drain output with 23.2k pull-up to 9.5V. Secondary side referenced (w/ respect to DGND). Signal transitions low upon detection of invalid operating temperature, 16mA max sink current	1



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OUTPUT CHARACTERISTICS (cont.)

PARAMETER	DC170W-24V-12V-PBF	REMARKS	NOTES
OUTPUT OVERCURRENT PROTECTION (non-latching)	+24Voutput: <8.8A threshold +12V output: <5.4A threshold	+24Voutput: pulse retry, 9.8A at -55°C linear reduction as temp increases, 8.8A at 100°C. +12V output: constant current limited	2
OUTPUT OVERVOLTAGE PROTECTION (non-latching)	+24Voutput: <32Vmax +12V output: <16Vmax	Pulse-by-pulse protection, < 4mSec fault to activation delay, auto-restart	1
THERMAL SHUTDOWN PROTECTION (non-latching)	110°C +/-5°C Frame	Supply will shutdown if frame temperature is sensed at 110°C+/-5°C, supply will auto-restart with ~20°C hysteresis	1

Notes:

1. Ensured by design and by verification testing, not 100% tested in production.
2. 100% tested for specification compliance in production.
3. 20.5-32.2V input range 100% tested for specification compliance in production. Section 16 power quality testing performed during supply level verification testing.

