The HSM series comprises a group of ten models, seven 1000 watt power supplies with outputs from 3.3 volts to 48 volts and three 1500 watt power supplies with outputs from 24 to 48 volts. All models feature current sharing for parallel operation and redundancy applications. 1000W HSM have a wide-range input (90-277V a-c). The 1500W models operate 180-277V a-c. Both incorporate power factor correction to meet EN61000-3-2. These modern power supplies operate at 100KHz using current mode control to provide rapid response to source and load changes and tight stabilization.

HSM may be remotely controlled over the range 20% to 110% of their rated voltage by means of an external voltage (2-11V) or resistance (by a 10K variable resistance).

HSM have optional built-in "or-ing" diodes for redundancy paralleling. These are specified by appending the suffix "R" to the model number.

FEATURES

- Remote sensing.
- Control/programming of the voltage channel, current limit, overvoltage set point.
- Current "walk in" circuit.
- 5V auxiliary floating supply, 100mA.
- Status indicator and flags (isolated relay) for POWER, DC FAIL, OVERTEMP, FAN FAIL.

HSM MODEL TABLE

MODEL	OUTPUT VOLTAGE Volts Factory Set	OUTPUT VOLTAGE Volts Adjustment Range	OVP SETTING Volts Factory Setpoint	RATED OUTPUT CURRENT Amps 50°C	60°C	71°C	RIPPLE mV p-p Source max	Switching max	NOISE mV p-p (Spike) 20MHz	EFFICIENCY Percent 100% Load Nominal input
1000 WATT MODELS										
HSM 3.3-230	3.3	2.3-3.6	4.29	230	173	105	20	30	100	71
HSM 5-200	5	3.5-5.5	6.5	200	150	95	20	30	100	72
HSM 12-84	12	8.4-13.2	15.6	84	63	40	20	40	120	73
HSM 15-66	15	10.5-16.5	19.5	66	49.5	31.4	20	40	150	76
HSM 24-42	24	16.8-26.4	31.2	42	31.5	20	20	60	240	77
HSM 28-36	28	19.6-30.8	36.4	36	27	17	20	60	280	78
HSM 48-21	48	33.3-59.2	62.4	21	16	10	20	60	480	80
1500 WATT MODELS										
HSM 24-60	24	16.8-26.4	31.2	60	45	28.6	20	60	120	77
HSM 28-53	28	19.6-30.8	36.4	53	39.8	25.2	20	60	140	78
HSM 48-30	48	33.3-59.2	62.4	30	22.5	14.3	20	60	240	80

HSM are designed in accordance with EN 60950 and UL 1950 and have been approved by UL/CSA/VDE. A built-in conducted EMI filter attenuates the noise reflected back onto the mains below the limits of FCC, level A and CISPR, Class A. HSM are capable of sustaining full load operation through the loss of one full mains cycle at any source voltage and without indication of failure. If the mains power is lost for more than one cycle, HSM provides a flag a minimum of 5 milliseconds before the output loses regulation. They meet the ANSI C62.41 guidelines for withstanding surges on the mains. HSM are modular designs for OEM mounting.

HSM output is fully protected for any overload including a short circuit. The normal overload protection mode is continuous current limiting. A switch selectable option will latch the power off after 30 seconds to avoid damage to load wires. An overvoltage protector latches the power off whenever the output exceeds a user-set limit.

Remote control of the HSM is provided via one of two isolated TTL-level signals, one normally high, the other normally low. An internal 5V supply powers this circuit and provides an auxiliary 5V, 100mA output on all models. This voltage is available whenever source power is applied whether or not the output is inhibited. The output is normally ON if no remote logic is applied. The main output voltage is remotely trimmable by resistance.

Both output voltage and current limit are adjustable via remote analog programming (0-10V).

HSM are similar to the HSP power supply family but they are mechanically configured as modular units without the plug-in hot swap feature.

HSM can be individually installed or may be combined into a custom power assembly for multi-output requirements. Please see pages 131-135 for details on Power Assembly Program.

HSM INPUT CHARACTERISTICS

SPECIFICATIONS		RATING/DESCRIPTION	CONDITION
a-c Voltage 1000W models	nominal	100-250V a-c	Single phase
	range	90-277V a-c	Wide range
a-c Voltage 1500W models	nominal	200-250V a-c	Single phase
	range	180-277V a-c	Wide range
d-c Voltage (1)	1000W	125-420V d-c (1)	Polarity insensitive
	1500W	250-420V d-c (1)	Polarity insensitive
Brownout Voltage	1000W	75V a-c	
	1500W	150V a-c	
Source Frequency		47-440Hz	>63Hz, input leakage current exceeds tabulated value
Source Current	120V a-c	1000W: 11.0A rms	Typical
	240V a-c	1000W: 5.5A rms 1500W: 8.0A rms	
Power Factor	Typical	0.99	Any source 25% to 100% load
	Minimum	0.96	

(1) Safety approval is for a-c operation only.

HSM CURRENT HARMONICS, SOURCE TRANSIENTS AND EMI SPECIFICATIONS

PARAMETER	DOCUMENT	SPECIFICATION
IMMUNITY(1)		
Radiated RF (Ampl. mod.)	EN61000-4-3	10V/m, 80-1000MHz
Radiated RF (Pulse mod.)	EN61000-4-3	10V/m, 900MHz
Magnetic Field	EN61000-4-8	30A/M, 50Hz
Electrostatic Discharge	EN61000-4-2	4KV (contact) 8KV (air)
Conducted RFI	EN61000-4-6	10Vrms, 0.15-80MHz
Electrical Fast Transient	EN61000-4-4	2KV, Tr/Th = 5/50ns
Surge (CM, DM)	EN61000-4-5	4KV (CM) Tr/Th = 8/20µs 2KV (DM) Tr/Th = 8/20µs
EMISSIONS		
Conducted RF	FCC, Class A CISPR 22, Class A	0.45-30MHz 0.15-30MHz
Current Harmonics	EN61000-3-2	0-2KHz

(1) All immunity levels meet the requirements for heavy industrial applications per EN50082-2 using Criteria A (no operational effect).

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HSM OUTPUT CHARACTERISTICS

SPECIFICATIONS		RATING/DESCRIPTION	CONDITION
Output Setting Range		70% - 110% (1)	Of nominal output
		70% - 125% (1)	48V Models only
Source Effect	typ	0.05%	Nominal ± 15%
	max	0.1%	
Load Effect	typ	0.05%	5%-100% load (operation between 0-5% load results in increased ripple and degraded transient response)
	max	0.1%	
Temperature Effect	typ	0.01%	Per degree C (0 to 50°C)
	max	0.02%	
Combined Effect (source, load temperature & time)	typ	0.15%	
	max	0.3%	
Time Effect (drift)	typ	0.05%	0.5-8.5 hours
	max	0.1%	
Start Up Time	max	1 second	Any source/load
Recovery Characteristics	Excursion	<3% of nominal output	50-100% load
	Recovery	1000W: 100 µsec 1500W: 300 µsec	Return to 1% of setting
Ride Through	min	21.5 Milliseconds	From loss of source to flag signal
Hold Up Time	min	5 Milliseconds	After signal flag
Overshoot	turn on	+3% max	Any source, 5%-100% load
	turn off	none	
Error Sense	3.3 & 5V	0.25V	Voltage allowance per wire
	All others	0.4V	
Series Connection (output floats)		500V	Maximum voltage off ground
Parallel Connection (for redundancy)		Current shares within 5% of rated load	5-100% load
Selective Overvoltage Shutdown		Adjustable 100-140% of nominal; factory set to 130%	Latched, reset by cycling source power off
Current Limiting		Constant current mode Factory set 110% of I_0 max	Optional shutdown mode with 20 second delay
Remote On/off	RC-1	Normally high	Isolated form C or TTL
Remote On/off	RC-2	Normally low	Isolated form C or TTL
Overtemperature		Thermostat, auto re-start	With hysteresis

(1) When remotely controlled by voltage or resistance, the HSM may be controlled over a range of 20%-110% of rated output. 20% to 125% for 48V models.

HSM GENERAL SPECIFICATIONS

SPECIFICATIONS		RATING/DESCRIPTION	CONDITION
Temperature		-20° to +71°C (see model table)	Operating
		-40° to +85°C	Storage
Humidity		0 to 95% RH	Non-condensing operating & storage
Shock		20g 11msec ±50% half sine	Non-operating 3-axes 3 shocks each axis
Vibration		5-10Hz 10 mm double amplitude	Non-operating 1 hour each axis
		10-55Hz 2g	
Altitude	operating	Sea level to 10,000 ft	
	storage	Sea level to 160,000 ft	
Isolation	Output-case	500V d-c	25°C, 65%-RH
Withstand Voltage	Input-output	3000V a-c rms	25°C, 65%-RH
	Input-case	1500V a-c rms	
Safety		UL 1950; VDE EN 60950; CSA 22.2 No. 60950-00	Information Technology Equipment
Modular Construction		Enclosed, bolt-down style	Stand alone or rack mountable into RA-58 series
Cooling		Internal d-c fan	Exhaust to rear

FEATURES

- Safety Agency Approvals: UL recognized (SELV) - UL 1950; CSA certified (SELV) - CSA 22.2 No. 234-M90 (Level 5); VDE recognized (SELV) - EN60950/IEC 950.
- HSM are capable of sustaining full load operation through the loss of one full mains cycle at any source voltage without indication of failure. If mains power is lost for more than one cycle, HSM provide a flag a minimum of 5 milliseconds before the output loses regulation.
- HSM meet ANSI C62.41/EN61000-4-5 guidelines for withstanding surges on the mains.
- HSM are 5" x 5" x 13.75" bolt down modules that easily mount in a user's equipment or in a 3U power assembly rack.

UL RECOGNIZED CSA CERTIFIED VDE APPROVED

HSM are CE marked per the Low Voltage Directive (LVD), EN60950.

Accessory Housings for HSM Models

RA 58 (3) HSM Modules
independent slots, hardwire
English 19˝W x 5.25˝H x 16.4˝D
Metric 483 x 133 x 417 mm

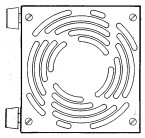
RA 61 (4) HSM Modules
independent slots, hardwire
English 24˝W x 5.25˝H x 16.4˝D
Metric 610 x 133 x 417 mm

Accessories for HSM Models

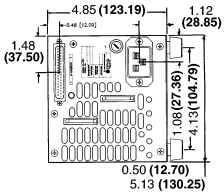
118-0776	line cord set with NEMA 5-20P termination (125V/20A)
142-0381	source power entry mating connector
142-0422	I/O mating connector
108-0203	I/O connector jackposts (set of two)
108-0294	I/O connector shell
101-0159	screw for mounting I/O connector shell

OUTLINE DIMENSIONAL DRAWINGS

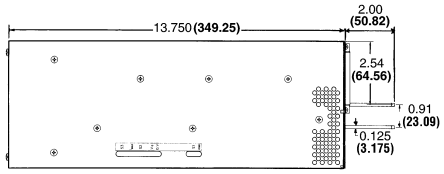
Fractional dimensions in light face type are in inches,
dimensions in bold face type are in millimeters.
Tolerance: ± 1/64" **(0.4)** between mounting holes
± 1/32" **(0.8)** other dimensions



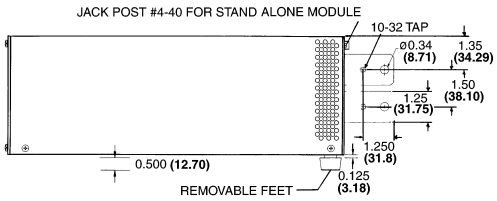
FRONT VIEW



REAR VIEW



TOP VIEW



SIDE VIEW

HSM SIGNALS AND FLAGS

SPECIFICATIONS	RATING/DESCRIPTION		CONDITION
Status Flags (Form C dry relay contacts)	POWER	Indicates low source voltage signal asserted 5 msec prior to loss of output voltage	Both NO and NC available
	OUTPUT	Indicates normal operation	
	OVER TEMP	Over temperature shutdown	
	FAN FAIL	Failure of internal fan	
Auxiliary Voltage (isolated)		4.5-5.5V d-c isolated 0-100 milliamperes	Present whenever housekeeping supply is operating

HSM CONTROL

SPECIFICATIONS		RATING/DESCRIPTION	CONDITION
Voltage set programming (mode selected by internal switches isolated)	Internal	Multiturn potentiometer	The DCOK/DCFAIL fault detect window tracks the programmed output voltage, OVP trip unaffected
	External 1	Resistance 0-10K = 100-50% of rated output voltage	
	External 2	Voltage 2-11V = 20-110% of rated output voltage, 20-125% for 48V models	
Current limit programming (mode selected by internal switches)	Internal	Multiturn potentiometer	
	External	Voltage 2-10V = 20-100% of rated output current	
Remote ON/OFF	Normal H	TTL level	Isolated 5V, 100mA internal pull up supply
	Normal L	TTL level	
Forced load share		Single wire connection between modules	0-5.5V signal indicates each module's current

HSM PHYSICAL CHARACTERISTICS

SPECIFICATIONS		RATING/DESCRIPTION	CONDITION
Dimensions	English	5.38" x 5.22" x 13.75"	Excluding terminals
	Metric	137 x 133 x 349 mm	
Weight	English	18lbs	
	Metric	8.2Kg	
Source connection		3 pin IEC connector	Compatible with molded line cord
Load connection		Two bus bars 1.25" x 0.125" x 2.5"	
Signal connection		37 Pin D-subminiature connector	