



features

- Four useful power rails in one package
- Rugged construction
- Universal mains input
- Overvoltage Protection on all 5 volt rails
- "Off the shelf" availability



description

The "ESM" Series of System Power Units have been developed to meet the general requirements of hybrid analogue/digital systems designers, in one composite package. These linear power supplies provide four separate output rails offering d.c. voltages of 5 volts stabilised for digital circuits, ± 12 to ± 15 volts stabilised for analogue circuits, and 12 or 24 volts unstabilised for powering indicator lamps, relays, remote regulators etc.

The whole unit is packaged in a ruggedly constructed chassis offering versatile mounting facilities. Separate front panel terminals are provided for mains input and d.c. outputs, also low and high voltage wiring is kept separate within the unit. The units will accept a wide mains input range and a fast acting auto resetting over-current circuit gives complete protection against short-circuit and overload conditions on the logic and analogue supplies. The 5 volt supply also has an overvoltage "crowbar" protection circuit built in as standard. The 24 volt supply is protected by a fuse mounted on the

front panel. If the 5 volt supply is accidentally shorted to the -12 volt rail the inversion on the logic rail will not exceed 1 volt. Likewise if the $+12$ volt rail is short-circuited to the -12 volt rail then neither rail will reverse in polarity by more than 1 volt.

The "EMP" Series of Power Units are complimentary to the established ESM systems power units. This series is designed to provide economical "off the shelf" power for micro-processor based systems.

A 5 volt primary power rail and a 5-9 volt bias supply, together with an auxiliary ± 12 volt supply provide maximum flexibility of configuration to power microcomputers and RAM systems.

All outputs are regulated and are over-current protected. The primary 5 volt output is over-voltage protected by fast acting clamping circuits without the "nuisance" tripping normally associated with conventional crow-bar types.

specification

Input Voltage:	105, 115, 220 and 240 volts A.C. $+10\%$ -15%			
Input Frequency:	45-65 Hz			
D.C. Output:	See voltage/current chart, table 1			
Remote Sensing:	Provided on 5v rails only to compensate for 0.5v drop per line			
Operating Temperature:	-10°C to 70°C .			
Storage Temperature:	-30°C to $+85^{\circ}\text{C}$			
Reverse Polarity Protection:	By diode across all outputs			
Insulation Resistance:	Tested at 500 volts d.c. between output terminals and earth. Withstands 2.1kV d.c. between line and neutral connected together and earth			

	5 volt lines	± 12 volt lines	5-9 volt lines	12 or 24 volt lines
*Voltage Adjustment:	4.75-5.25v	$+12$ to 15v (-ve tracks to within 1%)	5.0-9.0v	None
Voltage Resolution:	20mV	50mV	20mV	—
Line Regulation for $+10$-15% change:	0.05%	0.06%+3mV	0.05%	As input change
Load Regulation				
No load to full load:	0.2%	0.2%	0.4%	5 volt change
Ripple & Noise: (Full Load & over 1MHz BW)	$<2\text{mV p.p.}$	$<5\text{mV p.p.}$	$<5\text{mV p.p.}$	$<4\text{v p.p.}$
Output Impedance				
100 KHz:	0.1 Ω	0.25 Ω	0.1 Ω	—
500 KHz:	0.25 Ω	0.50 Ω	0.25 Ω	—
Temperature Coefficient: (After 10 minutes operation)	$\pm 0.03^{\circ}\text{C}$	$\pm 0.03^{\circ}\text{C}$	$\pm 0.03^{\circ}\text{C}$	—
Overload Protection Point:	110-150%FL	110-150%FL	110-150%FL	Fused
Short Circuit Current:	15 to 60%FL	40-60%FL	15-60%FL	—
Overvoltage Protection:	At 6.8v reducing to less than 1.5v	Not fitted	Not fitted	Not fitted

*Adjustment shown for $\pm 12\text{v}$ line is applicable to ESM Series only. EMP units have a +ve 12v line with the -ve 12v tracked from it.

trade-off information:

Tables show maximum load currents available when all outputs are fully loaded for various tolerances of the selected nominal mains input. In practical installations all outputs are unlikely to be used in

this way. Subject to observing I_{max} for each output and the maximum ambient operating temperature of $+70^{\circ}\text{C}$, then the further various "trade-offs" shown for each model are possible:-

EMP 3 and ESM 3

Limits of Mains Input	Nominal Mains $\pm 5\%$				Nominal Mains $\pm 10\%$				Nominal Mains $+10\% -15\%$			
Ambient Temperature	I_{max}	40°C	60°C	70°C	I_{max}	40°C	60°C	70°C	I_{max}	40°C	60°C	70°C
EMP/ESM 5v rails	3A	2.75A	2.75A	2.1A	2.5A	2.3A	2.1A	2A	2A	2A	2A	2A
EMP $\pm 12\text{v}$ rails	0.55A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A
EMP 5/9v rail	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A
ESM $\pm 12-15\text{v}$ rails	0.55A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A
ESM 12 or 24v rail	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A

5 volt rail—For each Amp shortfall on the 5v rail, ± 12 volt may be increased by 0.1 Amp, or
Temperature ambient increased by 20°C , or
Negative mains limit decreased by 1%.

$\pm 12\text{v}$ & $\pm 12-15$ volt rails—For each 0.1 Amp shortfall, 5 volt rail may be increased by 0.3 Amp, or
Temperature ambient increased by 5°C .

EMP 7 and ESM 7

Limits of Mains Input	Nominal Mains $\pm 5\%$				Nominal Mains $\pm 10\%$				Nominal Mains $+10\% -15\%$			
Ambient Temperature	I_{max}	40°C	60°C	70°C	I_{max}	40°C	60°C	70°C	I_{max}	40°C	60°C	70°C
EMP/ESM 5v rails	7A	5.7A	5.3A	5.1A	6.8A	5.5A	5.1A	5A	5A	5A	5A	5A
EMP $\pm 12\text{v}$ rails	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A
EMP 5/9v rail	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A
ESM $\pm 12-15\text{v}$ rails	1.1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A
ESM 12 or 24v rail	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A

5 volt rail—For each Amp shortfall on 5 volt rail, ± 12 volt may be increased by 0.2 Amp, or
Temperature ambient increased by 15°C , or
Negative mains limit decreased by 2%.

$\pm 12\text{v}$ & $\pm 12-15$ volt rails—For each 0.2 Amp shortfall, 5 volt rail may be increased by 1 Amp, or
Temperature ambient increased by 5°C .

EMP 15 and ESM 15

Limits of Mains Input	Nominal Mains $\pm 5\%$				Nominal Mains $\pm 10\%$				Nominal Mains $+10\% -15\%$			
Ambient Temperature	I_{max}	40°C	60°C	70°C	I_{max}	40°C	60°C	70°C	I_{max}	40°C	60°C	70°C
EMP/ESM 5v rails	15.5A	15A	14.6A	14.4A	15A	14.8A	14.4A	14.2A	12A	12A	12A	12A
EMP $\pm 12\text{v}$ rails	1.1A	1.0A	0.92A	0.88A	1.0A	0.95A	0.87A	0.83A	1.0A	0.95A	0.87A	0.83A
EMP 5/9v rail	2A	2A	1.8A	1.76A	2A	2A	1.74A	1.66A	2A	2A	1.74A	1.66A
ESM $\pm 12-15\text{v}$ rails	1.6A	1.5A	1.38A	1.32A	1.5A	1.43A	1.31A	1.25A	1.5A	1.43A	1.31A	1.25A
ESM 12 or 24v rail	2A	2A	1.8A	1.7A	2A	2A	1.7A	1.6A	2A	2A	1.7A	1.6A

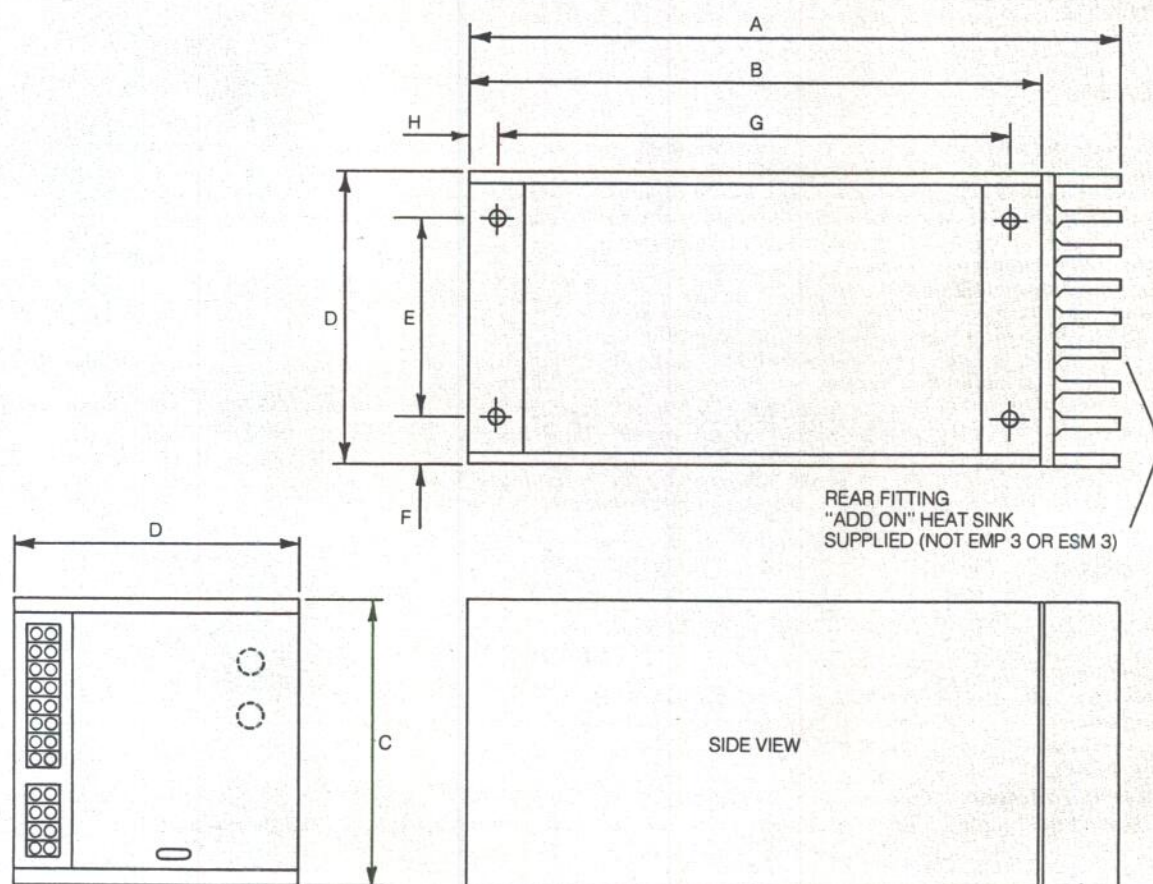
5 volt rail—For each Amp shortfall on 5 volt rail ± 12 volt may be increased by 0.2 Amp, or
Temperature may be increased by 15°C , or
Negative mains limit may be decreased by 2%.

$\pm 12\text{v}$ & $\pm 12-15$ volt rails—For each 0.2 Amp shortfall, 5 volt rail may be increased by 1 Amp, or
Temperature by 5°C .

table 1

Model	Nom. Current ratings (Amps) @ 25°C				Dimensions (mm)				Fixing Centres (mm)				Weight (KG)
	5v	±12/15v	5-9v	12 or 24v	C	D	A	B	E	F	G	H	
ESM 3	3.0	0.5	—	0.5	125	80	275	240	50	15	215	12.5	4
ESM 7	7.0	1.0	—	1.0	125	125	285	240	90	17.5	215	12.5	7
ESM 15	15.0	1.5	—	2.0	125	190	285	240	170	10	215	12.5	11
EMP 3	3.0	0.5	0.5	—	125	80	275	240	50	15	215	12.5	4
EMP 7	7.0	0.5	1.0	—	125	125	285	240	90	17.5	215	12.5	7
EMP 15	15.0	1.0	2.0	—	125	190	285	240	170	10	215	12.5	11

outline drawings



NOTE: FIXINGS ARE 8 OFF M4 THREAD—4 TOP AND 4 ON BASE OF UNITS.
ALL DIMENSIONS ARE IN MILLIMETRES.

hold up

The table below shows the maximum currents available for units to hold their output voltage within specification for a full half cycle drop-out of 50 Hz mains input supply.

Unit	Nominal Mains				Nominal Mains -5%			
	5 volt	5-9v	±12-15 volt	±12v	5 volt	5-9v	±12-15 volt	±12v
ESM 3 & EMP 3	2.8A	0.5A	0.5A	0.5A	1.8A	0.5A	0.5A	0.5A
ESM 7 & EMP 7	4.7A	1A	1.0A	0.5A	3.8A	1A	1.0A	0.5A
ESM 15 & EMP 15	13A	1.8A	1.5A	1.0A	11A	1.7A	1.5A	1.0A

P.O. approval

These units have been submitted to the Post Office for evaluation to Technical Guide 26. The ESM range are listed as "Permissible Attachments" to Post Office private circuits and may be used in complete systems intended to be submitted to the Post Office Telecommunications Headquarters for evaluation.

When ordering specifically for Post Office applications the suffix "/PO" is required after the part number.

M.T.B.F.

The mean time before failure figures have been calculated using MIL 217B and are in excess of 30,000 Hrs for all units used at maximum load and with nominal mains. The conditions assumed for calculation are

Environment Ground Benign
Ambient Air Temperature 25°C
Air temperature inside unit 45°C

ordering information

Part number only required. All units normally held in stock.

Coutant Electronics Ltd

Trafford Road, Reading RG1 8JR
Tel: 0734 55391-4 Telex 847519