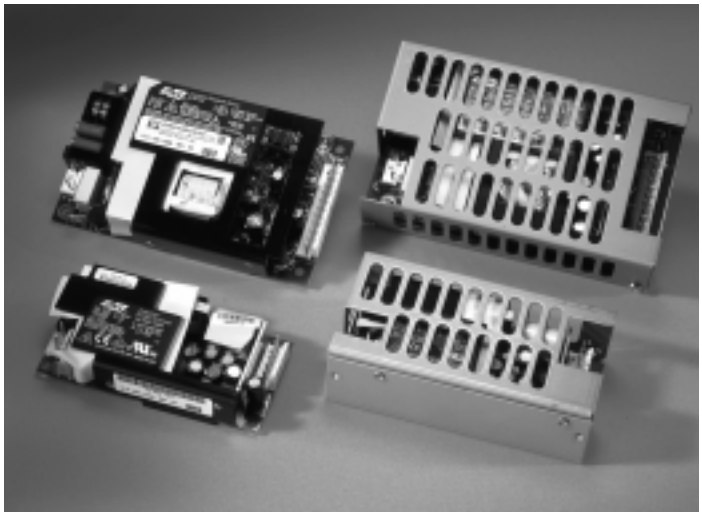
Miniature Open Frame Switchers

ERS SERIES *25-130 Watts*



CE Marked - LVD

•

High Efficiency

•

High Power Density

•

Medical Versions

•

Convection Cooled

•

High Power Density

•

International Safety Approvals

Specification

Input Voltage	•	90-132/180-264 V AC - autoranging 25-60 & 130 W, 90-264 V AC 80-100 W
Power Factor	•	0.95 min. at full load & 230 V AC - ERS130 models only
Input Frequency	•	47-63 Hz
Inrush Current	•	75 A max. @ 240 V AC
Efficiency	•	Approx. 85% @ full load (See Table)
Output Voltage	•	See Table (initial set point accuracy ±5% max)
Hold-Up Time	•	6 ms (25, 40 & 60 W), 10 ms (80 & 100 W), 15 ms (130 W) at 115 V AC
Line Regulation	•	±0.3% over full operating range
Load Regulation	•	See Table (measured from min. to max. load)
Overvoltage Protection	•	V_1 multi output units only, set @ 6.2 V ±0.4 V for 5 V & 3.95 V ±0.25 V for 3.3 V 25, 40 & 60 W models V_1 multi output units only, set @ 5.8 V 80 & 100 W models Output shuts down V_1 = 6.2 V ±0.4 V or V_2 = 4.1 V ±0.4 V 130 W models
Overload Protection (Automatic Recovery)	•	Typically 130% of max. current on single output units. Overall power limit on multi output units
Ripple & Noise	•	See Table
Power Fail	•	ERS80UQXX, ERS100UQXX and ERS130PQXX models only
Turn-on Delay	•	4 secs max. (25, 40 & 60 W), 5 secs max. (80 & 100 W), 3 secs max. (130 W) @ 115 V AC
Temperature Coefficient	•	2.4 mV/°C
Operating Temperature	•	Open frame 0-50 °C @ 100% load (derate linearly from 50 °C to 70°C @ 1.33 W/°C) Cover fitted 0-40 °C @ 100% load (derate linearly from 40 °C to 60°C @ 1.33 W/°C)
Storage Temperature	•	-40 °C to +85 °C
Altitude	•	Operating 10,000 ft max., non-operating 40,000 ft max.
Humidity	•	5 to 95% non-condensing
EMI/RFI	•	EN55022 & EN55014 class B, FCC part 15, class B (CISPR11 & CISPR14, class B, FCC part 15, class B for '-M' models)
Safety Standards	•	IEC950, EN60950, UL1950, class 1 SELV (IEC601, EN60601, UL2601, class 1 SELV '-M' versions)
Covers	•	Available for all models
MTBF	•	Typically >200,000 hours

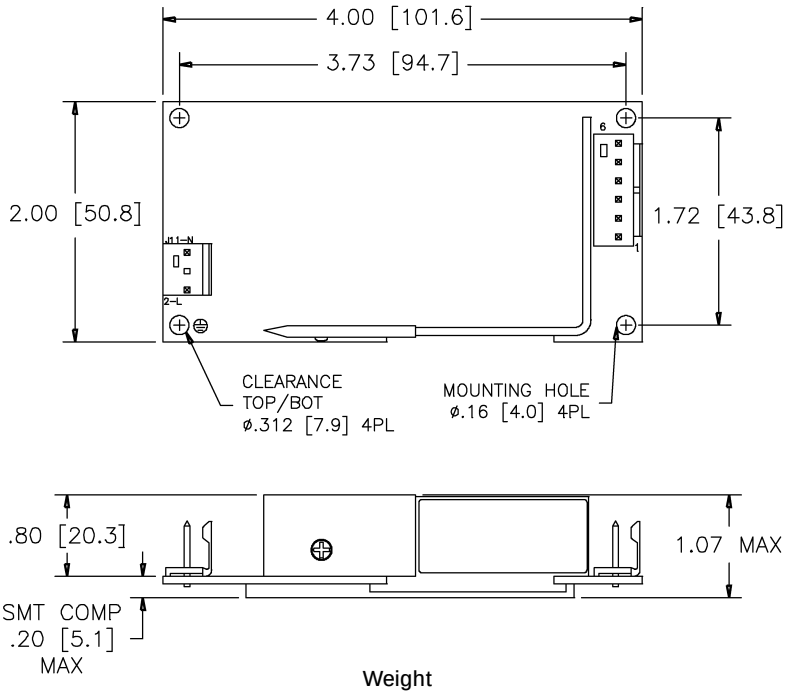
Tel: +44 (0)118 984 5515 UK ***Tel: +49 (0)700 9977 1000*** D

Output Voltage & Current Ratings - 25 Watt Models

Output Voltage	Initial Set Tolerance	Output Current Minimum[3]	Output Current Maximum[2]	Ripple & Noise[5]	Regulation Load	Regulation Line	Efficiency[1]	Model Number
5.1 V	±3%	0.20 A	5.0 A	50 mV	±0.5%	±0.3%	80%	**ERS25US05**
12.0 V	±3%	0.10 A	2.1 A	120 mV	±0.5%	±0.3%	83%	**ERS25US12**
15.0 V	±3%	0.10 A	1.7 A	150 mV	±0.5%	±0.3%	83%	ERS25US15
24.0 V	±3%	0.05 A	1.1 A	240 mV	±0.5%	±0.3%	83%	**ERS25US24**
+5.2 V_1	±3%	0.50 A	4.0 A	50 mV	±0.5%			
+12.5 V_2	±5%	0.10 A	2.0 A	120 mV	±5.0%	±0.3%	81%	**ERS25UT30**
-12.8 V_3	±5%	0.00 A	0.5 A	120 mV	±5.0%			
+5.2 V_1	±3%	0.50 A	4.0 A	50 mV	±0.5%			
+23.8 V_2	±5%	0.10 A	1.0 A	240 mV	±5.0%	±0.3%	81%	**ERS25UT31**
-12.8 V_3	±5%	0.00 A	0.5 A	120 mV	±5.0%			
+5.2 V_1	±3%	0.50 A	4.0 A	50 mV	±0.5%			
+14.6 V_2	±5%	0.10 A	1.5 A	150 mV	±5.0%	±0.3%	81%	**ERS25UT32**
-14.8 V_3	±5%	0.00 A	0.5 A	150 mV	±5.0%			
+3.3 V_1	±3%	1.00 A	4.0 A	50 mV	±0.5%			
+5.1 V_2	±5%	0.10 A	2.0 A	50 mV	±5.0%	±0.3%	75%	**ERS25UT33**
-12.8 V_3	±5%	0.00 A	0.5 A	120 mV	±5.0%			

NOTES:
1. Measured @ full load on single output models and V_1 @ 12.5 W, V_2 @ 12.5 W & V_3 @ 0 W for multi output models @ 25° C, 230 V AC after 5 min warm up cycle.
2. Maximum continuous power is 25 W with convection cooling.
3. Minimum load required for operation.
4. For medical versions add suffix '-M' (not suitable for patient connect applications).
5. Maximum allowable pk-pk PARD measured @ full load with 0.I µF C-Cap & 10 µF E-Cap (multi output models) and with 47 µF bypass (single output models) after 5 min warm up cycle and 25 MHz bandwidth.

Mechanical Details - 25 Watt Models



Weight
Single Output Units 6 oz/169.8g
Multi Output Units 10 oz/283.0g

Mating Connectors

J1 Molex 09-50-3031 (Centre pin removed)
Pins 08-50-0106

J2 Molex 09-50-8061
Pins 08-50-0106

Mating connector kit available order part no. ERS25-60 CON KIT.

Covers available, order part number ERS25-60 COVER or add suffix -'C' to receive unit with cover fitted.
Max dimensions 115mm x 61mm x 36mm.

Pin No	Single Output	Multi Output
J1-1	N	N
J1-3	L	L
J2-1	+V out	+V_1 out
J2-2	+V out	+V_1 out
J2-3	-V out	CMN
J2-4	-V out	CMN
J2-5	N/A	-V_3 out
J2-6	N/A	+V_2 out

Output Voltage & Current Ratings - 40 Watt Models

Output Voltage	Initial Set Tolerance	Output Current		Ripple & Noise [5]	Regulation		Efficiency [1]	Model Number
		Minimum [3]	Maximum [2]		Load	Line		
5.1 V	±3%	0.20 A	8.0 A	65 mV	±0.5%	±0.3%	82%	**ERS40US05**
12.0 V	±3%	0.10 A	3.5 A	120 mV	±0.5%	±0.3%	87%	**ERS40US12**
15.0 V	±3%	0.10 A	2.7 A	150 mV	±0.5%	±0.3%	87%	ERS40US15
24.0 V	±5%	0.05 A	1.7 A	240 mV	±0.5%	±0.3%	87%	**ERS40US24**
5.2 V_1	±3%	0.50 A	6.0 A	65 mV	±0.5%			
12.5 V_2	±5%	0.10 A	2.0 A	120 mV	±5.0%	±0.3%	85%	**ERS40UT30**
-12.0 V_3	±5%	0.00 A	0.5 A	120 mV	±5.0%			
5.2 V_1	±3%	0.50 A	6.0 A	65 mV	±0.5%			
23.8 V_2	±5%	0.10 A	1.0 A	300 mV	±5.0%	±0.3%	85%	**ERS40UT31**
-12.0 V_3	±5%	0.00 A	0.5 A	120 mV	±5.0%			
5.2 V_1	±3%	0.50 A	6.0 A	65 mV	±0.5%			
14.6 V_2	±5%	0.10 A	1.5 A	200 mV	±5.0%	±0.3%	85%	**ERS40UT32**
-15.5 V_3	±5%	0.00 A	0.5 A	150 mV	±5.0%			
3.3 V_1	±3%	0.50 A	6.0 A	65 mV	±0.5%			
5.1 V_2	±5%	0.10 A	3.0 A	65 mV	±5.0%	±0.3%	75%	**ERS40UT33**
12.0 V_3	±5%	0.00 A	0.5 A	120 mV	±5.0%			

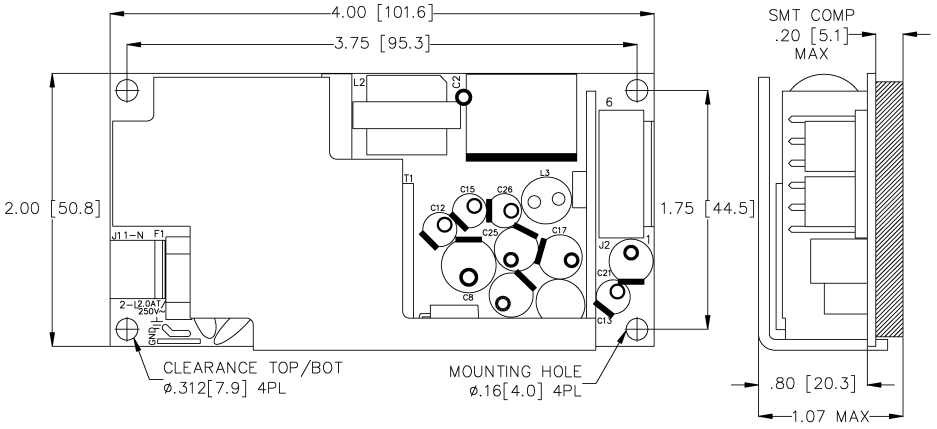
NOTES:
1. Measured on multi output models at V_1 @ 20 W, V_2 @ 20 W and V_3 @ 0 W, 230 V AC input. Single output models @ 100% load and 230 V AC.
2. Maximum total continuous output power is 40 W with free air convection.
3. Minimum load required for operation.
4. For medical versions add suffix '-M' (not suitable for patient connect applications).
5. Maximum allowable pk-pk PARD measures @ full load with 0.I µF C-Cap & 10 µF E-Cap (multi output models) and with 47 µF bypass (single output models) after 5 min warm up cycle and 25 MHz bandwidth.

Output Voltage & Current Ratings - 60 Watt Models

Output Voltage	Initial Set Tolerance	Output Current		Ripple & Noise [7]	Regulation		Efficiency [3]	Model Number
		Minimum [5]	Maximum [4]		Load	Line		
5.2 V	±3%	0.50 A	10.0 A [1]	65 mV	±0.5%	±0.3%	82%	**ERS60US05**
12.0 V	±3%	0.10 A	5.0 A	120 mV	±0.5%	±0.3%	87%	**ERS60US12**
15.0 V	±3%	0.10 A	4.0 A	150 mV	±0.5%	±0.3%	87%	ERS60US15
24.0 V	±5%	0.05 A	2.5 A	240 mV	±0.5%	±0.3%	88%	**ERS60US24**
48.0V	±5%	0.03 A	1.25 A	480 mV	±0.5%	±0.3%	87%	**ERS6OUS48**
5.2 V	±2%	0.50 A	8.0 A	65 mV	±0.5%			
+12.5 V	±3%	0.10 A	3.0 A	120 mV	±5.0%	±0.3%	85%	**ERS60UT30**
-12.0 V	±5%	0.00 A	0.5 A	120 mV	±5.0%			
5.2 V	±2%	0.50 A	8.0 A	65 mV	±0.5%			
23.8 V	±3%	0.10 A	1.5 A	300 mV	±5.0%	±0.3%	85%	**ERS60UT31**
-12.0 V	±5%	0.00 A	0.5 A	120 mV	±5.0%			
5.2 V	±2%	0.50 A	8.0 A	65 mV	±0.5%			
14.6 V	±3%	0.10 A	2.5 A	200 mV	±5.0%	±0.3%	85%	**ERS60UT32**
-15.5 V	±3%	0.00 A	0.5 A	150 mV	±5.0%			

NOTES:
1. Convection cooled; 12 A maximum with forced air (10 CFM).
2. For medical versions add suffix '-M', contact sales office for pricing. (Not suitable for patient connect applications).
3. Measured at full load (single output models) and V_1, @ 8A, V_2 @ 1.5 A (multi output models) with 230 VAC input, 25°C after 5 min warm up cycle.
4. Total output power not to exceed 60 W.
5. Minimum load required for operation.
6. Max load capacitance on V_3 = 1000 µF.
7. Measured @ 70% load on all outputs and 47 µF bypass @ measurement point after min warm up cycle and 20 MHz bandwidth.

Mechanical Details - 40 & 60 Watt Models



Pin No	J1	J2	
		Single	Multi
1	N	V_1	V_1
2	L	V_1	V_1
3	N/A	GND	GND
4	N/A	GND	GND
5	N/A	N/A	V_2
6	N/A	N/A	V_3

Weight
6oz/169.8g max

Molex Connectors

J1 Molex 09-50-3031
(Centre Pin removed)

J2 Molex 09-50-8061
Crimp Terminal
Molex 08-50-0106

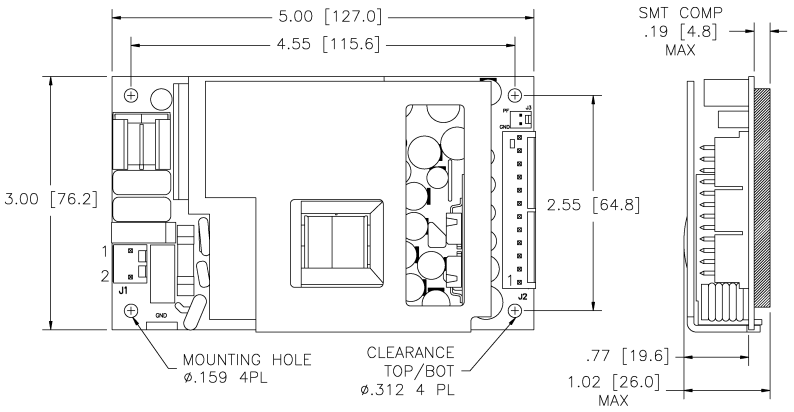
Covers available, order part number ERS25-60 COVER or add suffix -'C' to receive unit with cover fitted.
Max dimensions 115mm x 61mm x 36mm.
Mating connector kit available order part no. ERS25-60 CON KIT.

Output Voltage & Current Ratings - 80 Watt Models

Output Voltage	Initial Set Tolerance	Output Current Minimum[2]	Output Current Maximum[1]	Ripple & Noise[4]	Regulation Load	Regulation Line	Efficiency[5]	Model Number
5.00 V	±2%	1.0 A	12.0 A	350 mV	±2.0%	±0.3%	88%	ERS80US05
12.00 V	±2%	0.4 A	6.8 A	350 mV	±2.0%	±0.3%	89%	ERS80US12
15.00 V	±2%	0.4 A	5.5 A	350 mV	±2.0%	±0.3%	90%	ERS80US15
24.00 V	±2%	0.2 A	3.5 A	350 mV	±1.0%	±0.3%	90%	ERS80US24
48.00 V	±2%	0.2 A	1.7 A	350 mV	±1.0%	±0.3%	90%	ERS8OUS48
5.10 V	±3%	3.0 A	10.0 A	65 mV	±0.5%	±0.3%	86%	ERS80UQ40
12.25 V	±5%	0.1 A	3.0 A	120 mV	±5.0%			
-5.00 V	-6%, +4%	0.0 A	0.8 A	100 mV	±5.0%			
-12.00 V	±5%	0.0 A	0.8 A	150 mV	±5.0%			
5.10 V	±3%	3.0 A	10.0 A	50 mV	±1.0%	±0.3%	86%	ERS80UQ41
24.00 V	±5%	0.1 A	2.0 A	240 mV	±5.0%			
-12.00 V	±5%	0.0 A	0.8 A	100 mV	±5.0%			
-12.00 V	±5%	0.0 A	0.8 A	120 mV	±5.0%			
5.10 V	±3%	3.0 A	10.0 A	50 mV	±1.0%	±0.3%	86%	ERS80UQ42
16.00 V	±5%	0.1 A	3.0 A	150 mV	±5.0%			
-5.00 V	±5%	0.0 A	0.8 A	100 mV	±5.0%			
-15.00 V	±5%	0.0 A	0.8 A	150 mV	±5.0%			
5.10 V	±3%	3.0 A	10.0 A	50 mV	±1.0%	±0.3%	86%	ERS80UQ43
12.25 V	±5%	0.1 A	3.0 A	120 mV	±5.0%			
24.00 V	±5%	0.0 A	0.8 A	240 mV	±5.0%			
-12.00 V	±5%	0.0 A	0.8 A	120 mV	±5.0%			
3.30 V	±3%	3.0 A	10.0 A	50 mV	±1.0%	±0.3%	80%	ERS80UQ44
5.10 V	±5%	0.1 A	3.0 A	50 mV	±5.0%			
12.0 V	±5%	0.0 A	0.8 A	120 mV	±5.0%			
12.0 V	±5%	0.0 A	0.8 A	120 mV	±5.0%			

NOTES:
1. Maximum total continuous output power is 80 W with free air convection. (62 W max for ERS80US05 and 70 W max for ERS8OUQ44)
2. Minimum load required for operation.
3. For medical versions add suffix '-M' (not suitable for patient connect applications).
4. Max allowable pk-pk PARD measured @ full load after 5 min warm up with 0.1 µF C-Cap and 10 µF E-Cap connected @ measured point 20 MHz bandwidth.
5. Measured @ full load (single output models) and V_1 @ 9 A, V_2 loaded to total 80 W (multi output models) 25 °C, 230 V AC and after 5 min warm up cycle.

Mechanical Details - 80 Watt Models



Weight 10oz/298.3g

Pin No	J1	J2 Single	J2 Multi
1	N	V_1	V_1
2	L	V_1	V_1
3	N/A	V_1	V_1
4	N/A	V_1	V_1
5	N/A	GND	GND
6	N/A	GND	GND
7	N/A	GND	GND
8	N/A	GND	GND
9	N/A	N/A	V_2
10	N/A	N/A	V_2
11	N/A	N/A	V_3
12	N/A	N/A	V_4

Powerfail
2.0 ms typical warning before voltage drops out of regulation. The power fail signal is active low and capable of sourcing 2.0 mA and sinking 4.0 mA

Mating Connectors

J2 Molex 09-50-3031 (Centre Pin removed)
J2 Molex 09-50-8121
J3 Molex 22-01-2021

Crimp Terminal
J1 & J2 Molex 08-50-0106
J3 Molex 08-50-0114

Mating connector kit available order part no. ERS80-100 CON KIT.

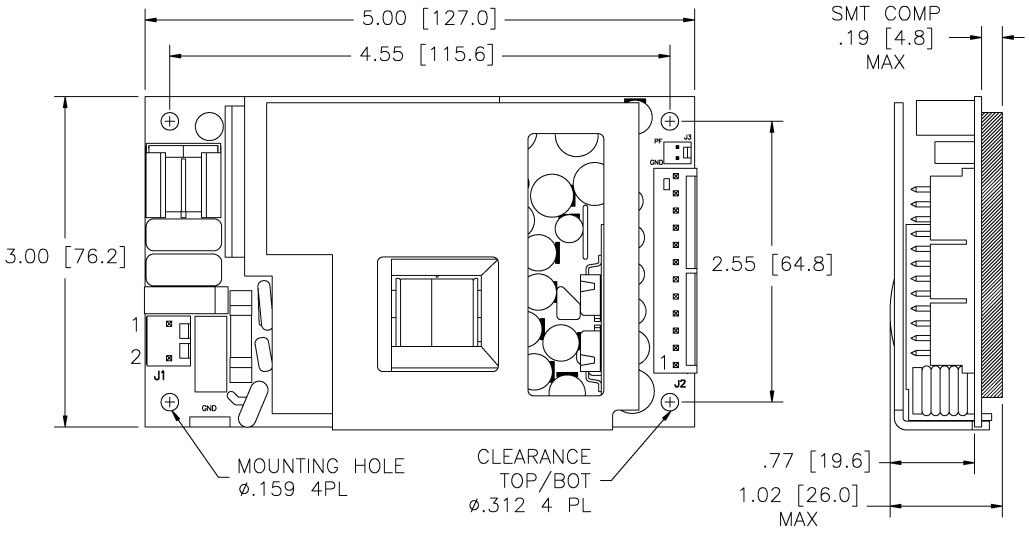
Cover available - order Part No. ERS80-130 COVER or add suffix '-C' to the model number to receive the unit with the cover fitted. Max dimensions 140mm x 84mm x 36mm.

Output Voltage & Current Ratings - 100 Watt Models

Output Voltage	Initial Set Tolerance	Output Current		Ripple & Noise[2]	Regulation		Efficiency	Model Number
		Minimum[4]	Maximum [3]		Load	Line		
12.00 V	±2%	1.00 A	7.5 A[1]	350 mV	±2.0%	±0.3%	88%	**ERS100US12**
15.00 V	±2%	0.05 A	6.7 A	350 mV	±2.0%	±0.3%	89%	ERS100US15
24.00 V	±2%	0.10 A	4.2 A	350 mV	±1.0%	±0.3%	90%	**ERS100US24**
48.00 V	±2%	0.20 A	2.1 A	350 mV	±2.0%	±0.3%	90%	**ERS100US48**
+5.10 V	±2%	3.00 A	12.0 A	65 mV	±0.5%			
+12.25 V	±5%	0.10 A	4.0 A	120 mV	±5.0%	±0.3%	86%	**ERS100UQ40**
-5.00 V	-6%, +4%	0.00 A	0.8 A	100 mV	±5.0%			
-12.00 V	±5%	0.00 A	0.8 A	150 mV	±5.0%			
+5.10 V	±2%	3.00 A	12.0 A	50 mV	±1.0%			
+24.50 V	±5%	0.10 A	2.0 A	240 mV	±5.0%	±0.3%	86%	**ERS100UQ41**
+12.00 V	±5%	0.00 A	0.8 A	100 mV	±5.0%			
-12.00 V	±5%	0.00 A	0.8 A	120 mV	±5.0%			
+5.10 V	±2%	3.00 A	12.0 A	50 mV	±1.0%			
+16.00 V	±5%	0.10 A	3.0 A	150 mV	±5.0%	±0.3%	86%	ERS100UQ42
-15.50 V	±5%	0.00 A	0.8 A	100 mV	±5.0%			
-4.80 V	±5%	0.00 A	0.8 A	150 mV	±5.0%			
+5.10 V	±2%	3.00 A	12.0 A	50 mV	±1.0%			
+12.00 V	±5%	0.10 A	4.0 A	120 mV	±5.0%	±0.3%	86%	**ERS100UQ43**
-12.00 V	±5%	0.00 A	0.8 A	120 mV	±5.0%			
-24.00 V	±5%	0.00 A	0.8 A	240 mV	±5.0%			

NOTES:
1. Convection cooled, 8.33 A maximum with forced air (10 CFM).
2. Measured at 20 MHz bandwidth at 70% load on all outputs with 47 µF (single outputs) 0.1 µF (multi outputs) bypass at measurement point.
3. Total output power not to exceed 100 W (90 W max. for ERS100US12).
4. Minimum load required for operation.

Mechanical Details - 100 Watt Models



Weight 10oz/283.0g

Mating Connectors

J2 Molex 09-50-3031 (Centre Pin removed)
J2 Molex 09-50-8121
J3 Molex 22-01-2021

Crimp Terminal
J1 & J2 Molex 08-50-0106
J3 Molex 08-50-0114

Pin No	J1	J2	
		Single	Multi
1	N	V_1	V_1
2	L	V_1	V_1
3	N/A	V_1	V_1
4	N/A	V_1	V_1
5	N/A	GND	GND
6	N/A	GND	GND
7	N/A	GND	GND
8	N/A	GND	GND
9	N/A	N/A	V_2
10	N/A	N/A	V_2
11	N/A	N/A	V_3
12	N/A	N/A	V_4

Powerfail
1.5 ms typical warning at all line conditions and 90% load

Mating connector kit available order part no. ERS80-100 CON KIT.

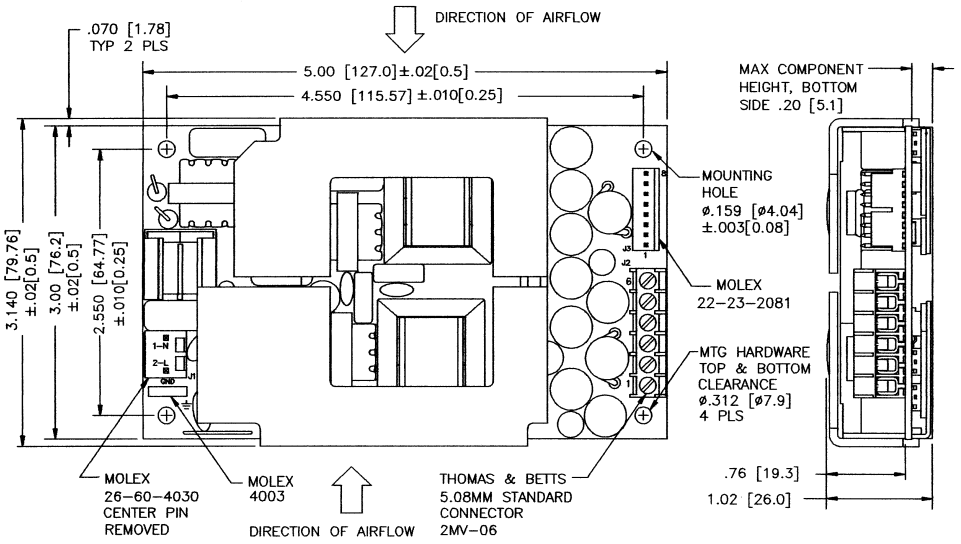
Cover available, order part ERS80-130 COVER or add suffix '-C' to the model numbers to receive the unit with the cover fitted. Maximum dimensions 140mm x 84mm x 36mm.

Output Voltage & Current Ratings - 130 Watt Models

Output Voltage	Initial Set Tolerance	Output Current Min[1]	Max	Fan[2]	Peak[3]	Ripple & Noise	Regulation Load	Line	Efficiency	Model Number
3.3 V	±1%	0.5 A	24.0 A	39.4 A	-	50 mV	±1%	0.3%	82%	**ERS130PS03-S**
5.0 V	±1%	0.5 A	16.0 A	25.5 A	-	50 mV	±1%	0.3%	82%	**ERS130PS05-S**
12.0 V	±1%	0.5 A	6.7 A	10.8 A	-	120 mV	±1%	0.3%	82%	**ERS130PS12-S**
15.0 V	±1%	0.5 A	5.4 A	8.7 A	-	150 mV	±1%	0.3%	82%	ERS130PS15-S
24.0 V	±1%	0.5 A	3.4 A	5.4 A	-	240 mV	±1%	0.3%	82%	**ERS130PS24-S**
48.0 V	±1%	0.5 A	2.7 A	2.7 A	-	480 mV	±1%	0.3%	82%	**ERS130PS48-S**
+5.1 V[4]	±1%	0.5 A	10.0 A	14.0 A	-	50 mV	±1%			
+3.3 V[4]	±1%	0.5 A	10.0 A	16.0 A	-	50 mV	±1%	0.3%	83%	**ERS130PQ40-S**
+12.0 V	±5%	0.1 A	1.0 A	-	1.5 A	120 mV	±5%			
-12.0 V	±5%	0.1 A	1.0 A	-	1.5 A	120 mV	±5%			
+5.1 V[4]	±1%	0.5 A	10.0 A	14.0 A	-	50 mV	±1%			
+3.3 V[4]	±1%	0.5 A	10.0 A	16.0 A	-	50 mV	±1%	0.3%	83%	ERS130PQ41-S
+24.0 V	±5%	0.1 A	1.0 A	-	1.5 A	240 mV	±5%			
-12.0 V	±5%	0.1 A	1.0 A	-	1.5 A	120 mV	±5%			
+5.1 V[4]	±1%	0.5 A	10.0 A	14.0 A	-	50 mV	±1%			
+3.3 V[4]	±1%	0.5 A	10.0 A	16.0 A	-	50 mV	±1%	0.3%	83%	ERS130PQ42-S
+15.0 V	±5%	0.1 A	1.0 A	-	1.5 A	150 mV	±5%			
-15.0 V	±5%	0.1 A	1.0 A	-	1.5 A	150 mV	±5%			

NOTES:
1. Minimum load required for operation.
2. Maximum output power. 80 W convection cooled 130 W with 15 CFM forced cooling.
3. For 1% duty cycle.
4. V_1 & V_2 adjustable via a potentiometer by ±300 mV.
5. Maximum total power on the combination of either V_1 & V_4 or V_2 & V_3 <55 W convection <75 W force cooled.
6. For volume applications a cost saving can be made by removing the current share facility - contact sales office.

Mechanical Details - 130 Watt Models



Weight 10.5oz/298g

Load Sharing/Parallel Operation
Units will accurately share load current between V_1, V_2 outputs of two similar units. The outputs will share less than 55% & more than 45% of the total system load for that voltage output. No output current will exceed its rated maximum by more than 5%. Outputs V_3 & V_4 will share current depending on their voltage set point.

Remote Sense
Maximum of 400 mV compensation for output cable drop at V_1 & V_2 outputs by direct remote sensing at load end. Use of remote sense requires 15 CFM of air flow.

Power Fail
3 ms warning after loss of AC input during all line conditions @ 130 W.

Cover available, order part ERS80-130 COVER or add suffix '-C' to the model numbers to receive the unit with the cover fitted.
Maximum dimensions 140mm x 84mm x 36mm.

Mating Connectors
J1 Molex 09-50-30-31 (Centre Pin removed)
J3 Molex 22-01-2087

Crimp Terminals
J1 Molex 08-50-0106
J3 Molex 08-50-0114

Mating connector kit available, orderpart no. ERS130 CON KIT.

Pin No	J1 Input	J2 Single Output	J3 Single Output	J2 Quad Output	J3 Quad Output
1	N	N/A	V_1 CS	V_3	+3.3 V CS
2	L	V_1	V_1 CS	+3.3 V	+5.0 V CS
3	N/A	CMN	N/A	CMN	P. Fail
4	N/A	CMN	CMN	CMN	CMN
5	N/A	V_1	V_1 Sense -	+5 V	5 V Sense -
6	N/A	N/A	V_1 Sense +	V_4	5 V Sense +
7	N/A	N/A	N/A	N/A	3.3 V Sense +
8	N/A	N/A	N/A	N/A	3.3 V Sense -