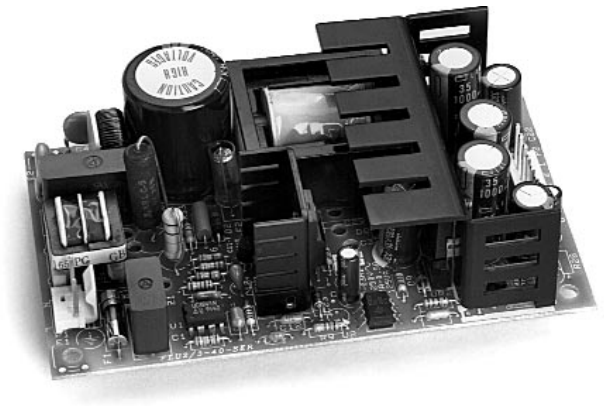
40W

Open-Frame Switching Power Supplies

- Single, Dual and Triple Output Models
- Universal AC-Input and DC-Input Models
- *CE* Mark: UL/CSA/EN60950 Approvals
- BABT Approvals
- Austel CCL Certification
- Models with UL544/CSA C22.2-601/EN60-601 Medical Safety Approvals
- EN55022/FCC Class B Input Line Filter
- 0% Minimum Load Requirement
- Over-Current/Short-Circuit Protection
- 2-Year Warranty
- Minimum 200,000-Hour MTBF



Characteristics

Input Voltage	FLU and MDU models, universal input range 85-265 VAC single phase or 100-370 VDC. DC-input models, 36-75 VDC (48V, nominal).
Input Line Frequency	47-440 Hz (ac input models).
Input Line Protection	MOV transient protected (FLU and MDU series). Input line fuse provided on-board. (See Note 1.)
EMI Filter	Standard. Performance surpasses conducted EMI requirements of EN55022/FCC Class B by 10 dB, typ.
DC Output	See table. (Note 2.)
Continuous Output Power	40W, maximum.
Leakage Current	MDU Series, non-patient contact rating: 500 µA, maximum.
Output Voltage Adjust	Primary output adjustable ±5%. Auxiliary outputs fixed.
Efficiency	62-75%, typical (nominal input line voltage, nominal load conditions).
Hold-Up Time	FLU and MDU models: 16 ms (115 VAC input), 32 ms (230 VAC input), minimum, at full load
Overload Protection	Power-limit circuit.
Short-Circuit Protection	Continuous.
Over-Voltage Protection	Primary output only.
Soft Start	Standard on all models.
Design Topology	Flyback converter with current-mode control.
Frequency of Operation	40 kHz (fixed).
Hi-Pot Isolation	FLU Series: 5300 VDC, input-to-output for one minute. (Note 3.) MDU Series: 5700 VDC, input-to-output for one minute. (Note 3.)
Noise, Ripple and Spike	1% peak-to-peak, maximum. (See Note 5.)
Temperature Range	-20°C to +70°C.
Output Power De-Rating	De-rate output power and current linearly 2%/°C from +50°C to +70°C.
Temperature Coefficient	±0.05%/°C over the entire operating temperature range.
Relative Humidity	0 to 95%, non-condensing.
Altitude	0 to 10,000 feet.
Cooling	Convection cooling is adequate. Moving air is recommended for operation in a confined area.
Storage Temperature	-40°C to +85°C.
Storage Humidity	0 to 95%, non-condensing.
Mean Time Between Failures	>200,000 hours. (Note 6.)

Model	Output Voltage Output	(V)	Output Current Min. (A)	Nom. (A)	Max. (A)	Output Voltage Tol.	Line Reg.	Load Reg.	Cross-Reg.
AC-DC Singles									85-265 VAC Input
FLU1-40-1AD	V1	5	0.0	8.00	8.00	1.0%	0.1%	0.2%	—
FLU1-40-2AD	V1	9	0.0	4.40	4.40	1.0%	0.1%	0.2%	—
FLU1-40-3AD	V1	12	0.0	3.30	3.30	1.0%	0.1%	0.2%	—
FLU1-40-4AD	V1	15	0.0	2.70	2.70	1.0%	0.1%	0.2%	—
FLU1-40-5AD	V1	24	0.0	1.70	1.70	1.0%	0.1%	0.2%	—
FLU1-40-6AD	V1	28	0.0	1.40	1.40	1.0%	0.1%	0.2%	—
AC-DC Singles									To UL544/EN60-601/CSA 22.2-601.1
MDU1-40-1AD	V1	5	0.0	8.00	8.00	1.0%	0.1%	0.2%	—
MDU1-40-2AD	V1	9	0.0	4.40	4.40	1.0%	0.1%	0.2%	—
MDU1-40-3AD	V1	12	0.0	3.30	3.30	1.0%	0.1%	0.2%	—
MDU1-40-4AD	V1	15	0.0	2.70	2.70	1.0%	0.1%	0.2%	—
MDU1-40-5AD	V1	24	0.0	1.70	1.70	1.0%	0.1%	0.2%	—
MDU1-40-6AD	V1	28	0.0	1.40	1.40	1.0%	0.1%	0.2%	—
AC-DC Duals									85-265 VAC Input
FLU2-40-1AD	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
	V2	+12	0.0	2.00	3.00	5.0%	0.5%	3.0%	4.0%
FLU2-40-2AD	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
	V2	+15	0.0	1.70	2.00	5.0%	0.5%	3.0%	4.0%
FLU2-40-3AD	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
	V2	+24	0.0	1.00	1.50	5.0%	0.5%	3.0%	4.0%
FLU2-40-4AD	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
	V2	+28	0.0	1.00	1.00	5.0%	0.5%	3.0%	4.0%
FLU2-40-5AD	V1	5(ISO)	0.0	6.00	6.00	1.0%	0.2%	1.0%	—
	V2	5(ISO)	0.0	2.00	2.00	3.0%	0.5%	1.0%	1.0%
FLU2-40-6AD	V1	12(ISO)	0.0	2.00	3.00	1.0%	0.2%	1.0%	—
	V2	12(ISO)	0.0	1.00	2.00	3.0%	0.5%	1.0%	1.0%
FLU2-40-7AD	V1	15(ISO)	0.0	1.50	2.50	1.0%	0.2%	1.0%	—
	V2	15(ISO)	0.0	1.20	2.00	3.0%	0.5%	1.0%	1.0%
AC-DC Duals									To UL544/EN60-601/CSA 22.2-601.1
MDU2-40-1AD	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
	V2	+12	0.0	2.00	3.00	5.0%	0.5%	3.0%	4.0%
MDU2-40-2AD	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
	V2	+15	0.0	1.70	2.00	5.0%	0.2%	3.0%	4.0%
MDU2-40-3AD	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
	V2	+24	0.0	1.00	1.50	5.0%	0.2%	3.0%	4.0%
MDU2-40-4AD	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
	V2	+28	0.0	1.00	1.00	5.0%	0.5%	3.0%	4.0

40W

Open-Frame Switching Power Supplies

Model	Output Voltage Output	(V)	Output Current Min. (A)	Nom. (A)	Max. (A)	Output Voltage Tol.	Line Reg.	Load Reg.	Cross-Reg.
DC-DC Duals							36-75 VDC Input		
DC2-40-1AC	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
	V2	+12	0.0	2.00	3.00	5.0%	0.5%	3.0%	4.0%
DC2-40-2AC	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
	V2	+15	0.0	1.70	2.00	5.0%	0.2%	3.0%	4.0%
DC2-40-3AC	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
	V2	+24	0.0	1.00	1.50	5.0%	0.2%	3.0%	4.0%
DC2-40-4AC	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
	V2	+28	0.0	1.00	1.00	5.0%	0.5%	3.0%	4.0%
AC-DC Triples							85-265 VAC Input		
	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
FLU3-40-1AD	V2	+12	0.0	1.50	3.00*	5.0%	1.0%	3.0%	4.0%
	V3	-12	0.0	0.50	0.70	5.0%	0.2%	1.0%	1.0%
	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
FLU3-40-2AD	V2	+12	0.0	1.50	3.00*	5.0%	1.0%	3.0%	4.0%
	V3	-5	0.0	1.00	1.00	3.0%	0.2%	1.0%	1.0%
	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
FLU3-40-3AD	V2	+15	0.0	1.20	2.00†	5.0%	1.0%	3.0%	4.0%
	V3	-15	0.0	0.50	0.60	5.0%	0.2%	1.0%	1.0%
	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
FLU3-40-4AD	V2	+24	0.0	0.75	1.50§	5.0%	1.0%	3.0%	4.0%
	V3	-12	0.0	0.50	0.70	5.0%	0.2%	1.0%	1.0%
	V1	5(ISO)	0.0	5.00	6.00	1.0%	0.2%	0.5%	—
FLU3-40-5AD	V2	12(ISO)	0.0	0.30	0.50	4.0%	0.5%	1.0%	1.0%
	V3	12(ISO)	0.0	0.30	0.50	4.0%	0.5%	1.0%	1.0%
	V1	5(ISO)	0.0	5.00	6.00	1.0%	0.2%	0.5%	—
FLU3-40-6AD	V2	15(ISO)	0.0	0.30	0.50	4.0%	0.5%	1.0%	1.0%
	V3	15(ISO)	0.0	0.30	0.50	4.0%	0.5%	1.0%	1.0%

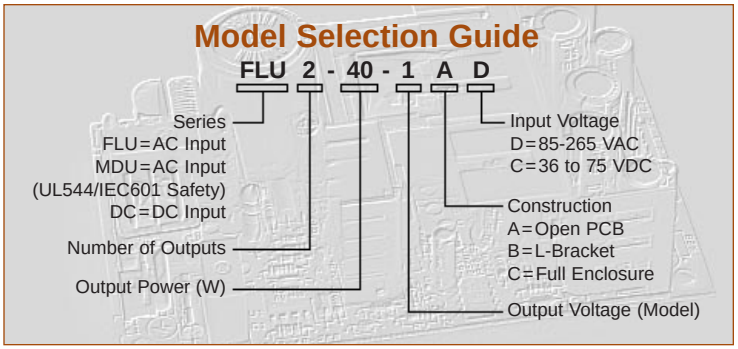
Model	Output Voltage Output	(V)	Output Current Min. (A)	Nom. (A)	Max. (A)	Output Voltage Tol.	Line Reg.	Load Reg.	Cross-Reg.
AC-DC Triples						To UL544/EN60-601/CSA 22.2-601.1			
	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
MDU3-40-1AD	V2	+12	0.0	1.50	3.00*	5.0%	1.0%	3.0%	4.0%
	V3	-12	0.0	0.50	0.70	5.0%	0.2%	1.0%	1.0%
	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
MDU3-40-2AD	V2	+12	0.0	1.50	3.00*	5.0%	1.0%	3.0%	4.0%
	V3	-5	0.0	1.00	1.00	3.0%	0.2%	1.0%	1.0%
	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
MDU3-40-3AD	V2	+15	0.0	1.20	2.00†	5.0%	1.0%	3.0%	4.0%
	V3	-15	0.0	0.50	0.60	5.0%	0.2%	1.0%	1.0%
	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
MDU3-40-4AD	V2	+24	0.0	0.75	1.50§	5.0%	1.0%	3.0%	4.0%
	V3	-12	0.0	0.50	0.70	5.0%	0.2%	1.0%	1.0%
DC-DC Triples							36-75 VDC Input		
	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
DC3-40-1AC	V2	+12	0.0	1.50	3.00*	5.0%	1.0%	3.0%	4.0%
	V3	-12	0.0	0.50	0.70	5.0%	0.2%	1.0%	1.0%
	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
DC3-40-2AC	V2	+12	0.0	1.50	3.00*	5.0%	1.0%	3.0%	4.0%
	V3	-5	0.0	1.00	1.00	3.0%	0.2%	1.0%	1.0%
	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
DC3-40-3AC	V2	+15	0.0	1.20	2.00†	5.0%	1.0%	3.0%	4.0%
	V3	-15	0.0	0.50	0.60	5.0%	0.2%	1.0%	1.0%
	V1	+5	0.0	3.00	5.00	1.0%	0.2%	1.0%	—
DC3-40-4AC	V2	+24	0.0	0.75	1.50§	5.0%	1.0%	3.0%	4.0%
	V3	-12	0.0	0.50	0.70	5.0%	0.2%	1.0%	1.0%

* Peak output current rating = 5.0A (<60 seconds, duty cycle <10%).
† Peak output current rating = 3.0A (<60 seconds, duty cycle <10%).
§ Peak output current rating = 2.0A (<60 seconds, duty cycle <10%).

Notes

1. Replace the input line fuse with the same type and rating. Recommended: 2A/250V slow-blow fuse.
2. The sum of primary and auxiliary output currents from triple output models -1AD through -4AD must not exceed 5.0A.
3. Hi-pot isolation is 2200 VDC from the input of the supply to ground for 60 seconds.
4. All measurements are made directly at the terminals of the power supply.
5. Peak-to-peak and RMS metering equipment must have a 20 MHz frequency response with probes and cables that maintain a frequency response of 20 Hz to 20 MHz. Output ripple and spikes are measured directly at the output terminals of the power supply with a 0.1 µF ceramic capacitor. The probe ground band must make direct contact with the output return or common terminal to prevent erroneous noise measurements.
6. MTBF is calculated using the parts stress method in MIL-HDBK 217F (ground benign, T_A = +25°C).
7. Output voltage tolerance is measured under nominal load current conditions.
8. Line regulation is measured under nominal load conditions as the input voltage is varied from 85 to 265 VAC (ac-input models) or from 36 to 75 VDC (dc-input models).
9. Load regulation is measured at 115 VAC or 230 VAC. For single output models, load regulation is measured while output current is varied from 0% to 100% of full load. With multiple output models, the output under test is brought to 60% of nominal load; load current is then varied +40%/-30% of nominal while other outputs are held at nominal load conditions.
10. Cross-regulation is tested by changing the load on the primary output from 50% to 100% of nominal load while measuring the voltage change on the auxiliary output under test.
11. The FLU1-40, FLU2-40 and FLU3-40 series are approved to UL1950 (File E140439), CSA22.2 No. 234 (File LR52335), EN60950/IEC950/DIN VDE 0805 (TÜV Licenses R679206, R0097621, R9071501), and Austel CCL (Certificate A92/PS/004).
12. The FLU3-40 series has BABT/EN41003 approval ((NS/4199/123/R/604674).
13. The MDU1-40, MDU2-40 and MDU3-40 series are approved to UL544 (File E151357), CSA 22.2 No. 601.1 (File LR52335) and EN60-601/IEC601-1/DIN VDE 0750 (TÜV Licenses R9271474, R9271475, R9271476).
14. The DC2-40 and DC3-40 series are approved to UL1950 (File E140439), CSA22.2 No. 234 (File LR52335), and EN60950/IEC950/DIN VDE 0805 (TÜV License R9071501).

Model Selection Guide



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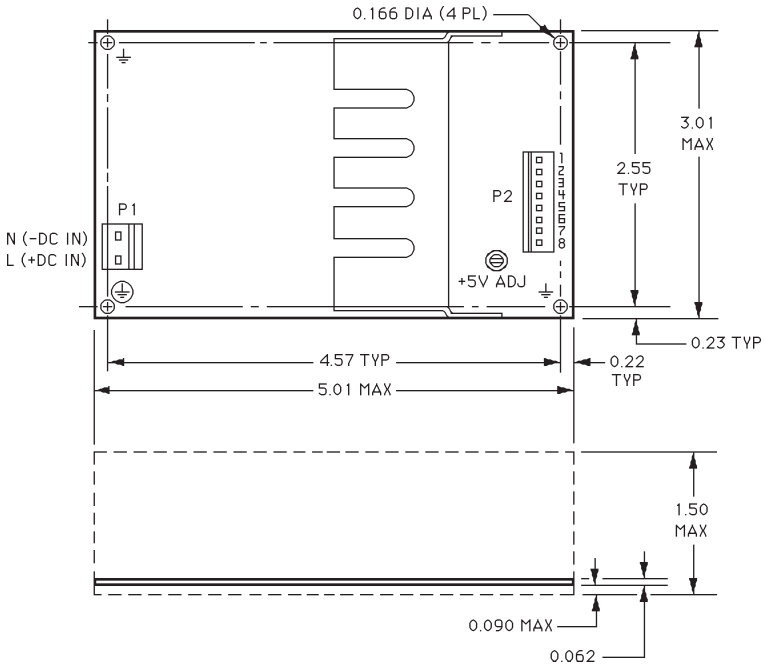


FLU/MDU/DC 40W SERIES

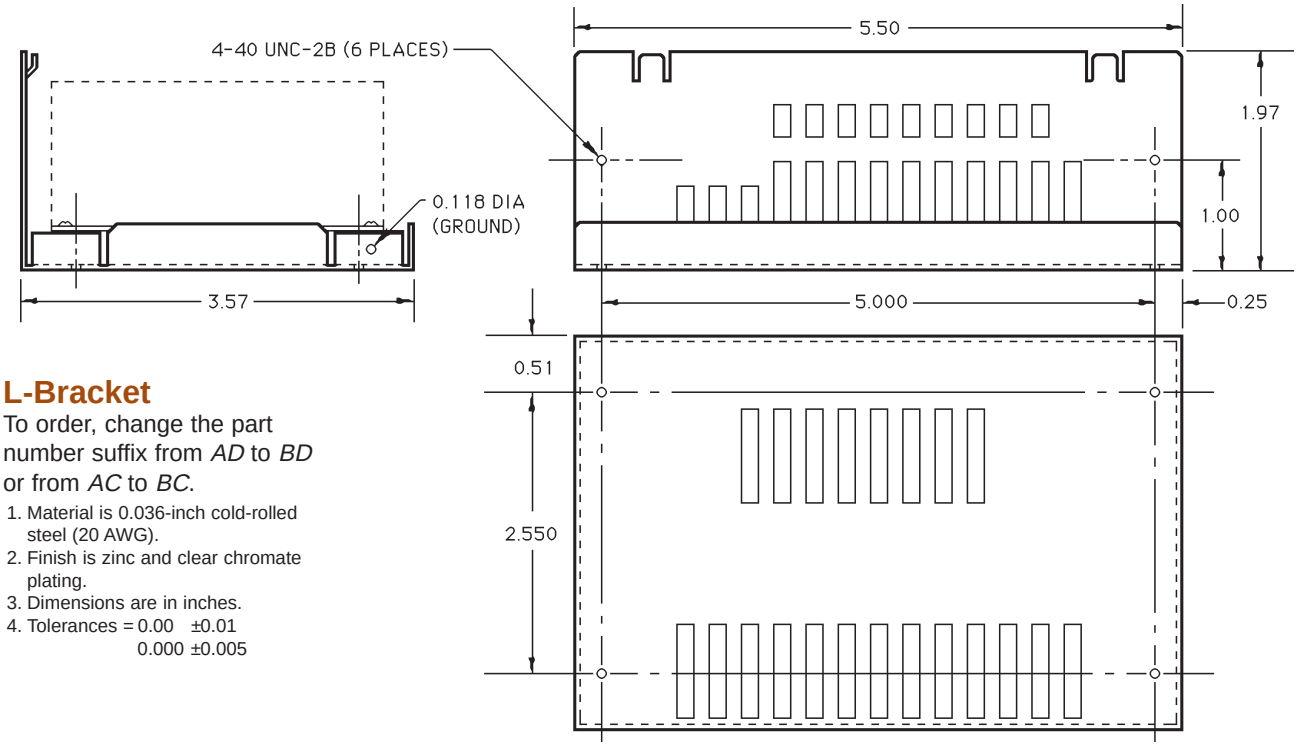
A. Dimensions shown are in inches.
B. Tolerances = 0.00 ±0.01 inch.
0.000 ±0.005 inch.
C. P1 input connectors are Molex 26-62-4030. The mating connector combines Molex housing 43061-0003 and crimp terminal 08-70-1030.
D. P2 output connectors for the 40W series, except for models 5 and 6 of the FLU3-40 series, are Molex 26-60-4060. The mating connector combines Molex housing 43061-0006 and crimp terminal 08-70-1030. Models 5 and 6 of the FLU3-40 series use Molex 26-60-4080 for the P2 connector. The mating connector uses Molex housing 43061-0008 and crimp terminals 08-70-1030.

Pin-Out

Pin	FLU1-40	MDU1-40	FLU2-40 Models 1-4	FLU2-40 Models 5-7	MDU2-40	DC2-40	FLU3-40 Models 1-4	FLU3-40 Models 5-6	MDU3-40	DC3-40
1	V1	V1	V2	$+V1_{(ISO)}$	V2	V2	V2	$+V2_{(ISO)}$	V2	V2
2	V1	V1	V1	$+V1_{(ISO)}$	V1	V1	V1	$- V2_{(ISO)}$	V1	V1
3	V1	V1	V1	$- V1_{(ISO)}$	V1	V1	V1	$+V1_{(ISO)}$	V1	V1
4	Return	Return	Common	$- V1_{(ISO)}$	Common	Common	Common	$+V1_{(ISO)}$	Common	Common
5	Return	Return	Common	$- V2_{(ISO)}$	Common	Common	Common	$- V1_{(ISO)}$	Common	Common
6	Return	Return	N/C	$+V2_{(ISO)}$	N/C	N/C	V3	$- V1_{(ISO)}$	V3	V3
7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	$+V3_{(ISO)}$	N/A	N/A
8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	$- V3_{(ISO)}$	N/A	N/A

40W

Power Supply Enclosures



L-Bracket

To order, change the part number suffix from *AD* to *BD* or from *AC* to *BC*.

1. Material is 0.036-inch cold-rolled steel (20 AWG).
2. Finish is zinc and clear chromate plating.
3. Dimensions are in inches.
4. Tolerances = 0.00 ±0.01
   0.000 ±0.005

L-Bracket and Cover

To order full enclosure, change the part number suffix from *AD* to *CD* or from *AC* to *CC*.

1. Material is 0.036-inch cold-rolled steel (20 AWG).
2. Finish is zinc and clear chromate plating.
3. Dimensions are in inches.
4. Tolerances = 0.00 ±0.01
   0.000 ±0.005