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# C series

## 28 VDC to DC

- **High Density Linear Single and Dual-Output Power Supplies**
- **Low Ripple, 50 mV P-P Max; Regulation 0.1%**
- **187 Standard Models, 3 to 210 Watts**

### Specifications

#### Input:

24 to 30 V dc. Other standard inputs available. (See Option H.)

#### Efficiency:

Up to 55%.

#### Line Regulation:

Single output within 0.1%, dual output within 0.2%, or 10 mV (whichever is greater) for input change of 24 to 30 V dc with load constant.

#### Load Regulation:

Single output within 0.1%, dual output within 0.2%, or 20 mV (whichever is greater) from no load to full load with line constant.

#### Tracking Accuracy (CC Models only):

The negative output will track the positive output to within 1.0% or 100 mV (whichever is greater) for all rated conditions.

#### Pard (Noise and Ripple):

0.02% or 5 mV rms (whichever is greater), 50 mV peak-to-peak at 25 MHz bandwidth.

#### Isolation Voltage:

200 V dc input to output, input to case, and output to case.

#### Insulation Resistance:

50 megohms minimum between input and output, input and case, output and case when measured at 50 V dc.

#### Polarity:

Inputs and outputs are isolated. Either positive or negative side of output may be grounded.

#### Temperature Range:

Operating  $-55^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$  baseplate temperature; storage temperature  $-65^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ .

#### Temperature Coefficient:

0.015%/ $^{\circ}\text{C}$  from  $-20^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$  baseplate temperature; 0.03%/ $^{\circ}\text{C}$   $-55^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$ .

#### Input Transient Protection:

In accordance with MIL-STD-704A Fig. 9, Limit 1 (80 V dc for 0.1 second).

#### Load Transient Response:

Single output: output voltage returns to regulation limits within 150 microseconds, dual output: 200 microseconds; after a 50% step change in load current.

#### Turn-On/Turn-Off Overshoot:

Single output, 0.1% or 20 mV, dual, 0.2% or 30 mV, whichever is greater, maximum from nominal voltage set point.

#### Short Circuit Protection:

Completely protected against short circuit of any duration. Output automatically restores to normal after removal of short.

#### Overvoltage Protection:

External modules are available for use with all models and internal OVP circuit is available for selected models. Please see Option -1.

#### Electromagnetic Interference:

Units were designed and built to minimize EMI/EMC emissions, and comply with the requirements of MIL-STD-461A by virtue of their topology, construction, and enclosure.

#### Reliability:

The MTBF calculated per MIL-HDBK-217D, under operating conditions of  $50^{\circ}\text{C}$  baseplate temperature, maximum operating input voltage and full rated output power is 248,367 hours (Model C5D10), 134,044 hours (Model CC12D2.0) for ground benign and 37,750 hours (Model C5D10), 15,276 hours (Model CC12D2.0) for air inhabited transport environments. Consult factory for other model and environment information.

#### Environment:

Units are encapsulated and hermetically sealed to meet the environmental requirements of MIL-STD-810C and MIL-E-5400P.



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## Options

The following standard options are available on the C, CC Series power supplies. Please refer to the option section of this catalog for detailed information.

### Special Connectors:

A military-type hermetically sealed connector is provided as **Option A** in place of our standard header to extend out the top surface. (To order, replace "D" in model number with "A," i.e., C5A2.5.)

### Severe Shock, Acceleration and Vibration:

Special encapsulation, **Option E**, enables all units to withstand 60 g's shock, 50 g's acceleration and 30 g's vibration. (To order, add "E" after "D" in model number, i.e., C5DE2.5.)

### Wide Input Voltage:

**Option H** recenters the input voltage to provide alternate inputs from 20 V dc to 32 V dc. See page 81 for output current derating. (To order, add "H" after "D" in model number. Add new input voltage range in parentheses after model number, i.e., C5DH2.5 (26-32).

### Remote Turn On/Off:

**Option L** provides isolated terminals to turn outputs on/off with TTL logic signal. (To order, add "L" after "D" in model number, i.e., C5DL2.5.) This option applies to C models in cases 2D and 7A only and is not available with the Y or A option. **Option L** applies to CC models with cases 10C, 10D and 11E only. Pin number limitation prevents use of this option in CC models already having the Y (remote sense) option.

### Remote Output Adjustment:

With **Option R**, an adjustment potentiometer can be remotely located to adjust the output voltage. (To order, add "R" after "D" in model number, i.e., C5DR2.5.)

### Remote Error Sensing:

With **Option Y**, regulator monitors the output voltage directly at the load using extra "sensing" leads and compensates for a dc voltage drop of up to 0.3 volt in the load leads. This option included at no extra charge when Option A is ordered. (To order, add "Y" after "D" in model number, i.e., C5DY2.5.)

### Enhanced Reliability:

**-ER Option** provides increased reliability by using higher levels of military-grade components. (To order, add "-ER" following model number, i.e., C5D10-ER.)

### Internal Overvoltage Protection:

**Option -1** provides an internal crowbar-type OVP for models. In some models this option will result in a case size increase. Consult factory for details. (To order, add "-1" following model number, i.e., C5D2.5-1.)



**36 Popular Single-Output Models<sup>1</sup>**

Output <sup>2</sup> Voltage Range	Output Current (Amps)	Size (See Dwg.)	Weights (Lbs.)	Weights (Kgs.)	Model Number
4.5-5.5	2.5	2D	1.2	0.6	C5D2.5
	5.0	6B	1.7	0.8	C5D5.0
	10.0	7A	2.6	1.2	C5D10
5.5-6.5	2.5	2D	1.2	0.6	C6D2.5
	5.0	6B	1.7	0.8	C6D5.0
	10.0	7A	2.6	1.2	C6D10
9.5-10.5	1.8	2D	1.2	0.6	C10D1.8
	3.5	6B	1.7	0.8	C10D3.5
	7.5	7A	2.6	1.2	C10D7.5
11-13	1.2	2D	1.2	0.6	C12D1.2
	2.5	6B	1.7	0.8	C12D2.5
	5.0	7A	2.6	1.2	C12D5.0
14-16	1.2	2D	1.2	0.6	C15D1.2
	2.5	6B	1.7	0.8	C15D2.5
	5.0	7A	2.6	1.2	C15D5.0
17-19	1.2	2D	1.2	0.6	C18D1.2
	2.5	6B	1.7	0.8	C18D2.5
	5.0	7A	2.6	1.2	C18D5.0

Output <sup>2</sup> Voltage Range	Output Current (Amps)	Size (See Dwg.)	Weights (Lbs.)	Weights (Kgs.)	Model Number
23-25	0.8	2D	1.2	0.6	C24D0.8
	1.8	6B	1.7	0.8	C24D1.8
	3.5	7A	2.6	1.2	C24D3.5
25-27	0.8	2D	1.2	0.6	C26D0.8
	1.8	6B	1.7	0.8	C26D1.8
	3.5	7A	2.6	1.2	C26D3.5
27-29	0.8	2D	1.2	0.6	C28D0.8
	1.8	6B	1.7	0.8	C28D1.8
	3.5	7A	2.6	1.2	C28D3.5
31-33	0.6	2D	1.2	0.6	C32D0.6
	1.2	6B	1.7	0.8	C32D1.2
	2.5	7A	2.6	1.2	C32D2.5
45-47	0.5	2D	1.2	0.6	C46D0.5
	0.8	6B	1.7	0.8	C46D0.8
	1.8	7A	2.6	1.2	C46D1.8
90-100	0.25	2D	1.2	0.6	C95D0.25
	0.5	6B	1.7	0.8	C95D0.5
	1.0	7A	2.6	1.2	C95D1.0

**24 Popular Dual-Output Models<sup>2</sup>**

Output <sup>4</sup> Voltage Range	Output Current (Amps)	Size (See Dwg.)	Weights (Lbs.)	Weights (Kgs.)	Model Number
±4.5-±5.5	0.5	10C	2.3	1.1	CC5D0.5
	1.0	10C	2.3	1.1	CC5D1.0
	2.0	10D	2.5	1.2	CC5D2.0
	3.5	11E	3.9	1.8	CC5D3.5
±11-±13	0.5	10C	2.3	1.1	CC12D0.5
	1.0	10C	2.3	1.1	CC12D1.0
	2.0	10D	2.5	1.2	CC12D2.0
	3.5	11E	3.9	1.8	CC12D3.5
±14-±16	0.5	10C	2.3	1.1	CC15D0.5
	1.0	10C	2.3	1.1	CC15D1.0
	2.0	10D	2.5	1.2	CC15D2.0
	3.5	11E	3.9	1.8	CC15D3.5

Output <sup>4</sup> Voltage Range	Output Current (Amps)	Size (See Dwg.)	Weights (Lbs.)	Weights (Kgs.)	Model Number
±15-±17	0.5	10C	2.3	1.1	CC16D0.5
	1.0	10D	2.5	1.2	CC16D1.0
	2.0	11E	3.9	1.8	CC16D2.0
	3.5	14D	7.9	3.6	CC16D3.5
±17-±19	0.5	10C	2.3	1.1	CC18D0.5
	1.0	10D	2.5	1.2	CC18D1.0
	2.0	11E	3.9	1.8	CC18D2.0
	3.5	14D	7.9	3.6	CC18D3.5
±19-±21	0.5	10C	2.3	1.1	CC20D0.5
	1.0	10D	2.5	1.2	CC20D1.0
	2.0	11E	3.9	1.8	CC20D2.0
	3.5	14D	7.9	3.6	CC20D3.5

1. 63 other standard C models are available with single outputs ranging continuously from 5 to 100 V dc and in power levels of approximately 12, 25, 50, 75 and 100 watts. Maximum output current levels are: 0.25, 0.5, 1.0, 1.2, 1.8, 2.5, 3.5, 5.0, 7.5 and 10 amps. To order an unlisted model, consult salesman for nearest standard voltage and use the model numbering system below.

2. 64 other standard CC models are available with dual outputs ranging

continuously from ±3 V dc to ±30 V dc and maximum output current levels per side of: 0.5, 1.0, 2.0 and 3.5 amps. To order an unlisted model, consult salesman for nearest standard voltage and use the model numbering system below.

3. Single output voltage is continuously adjustable between the limits shown by means of an externally accessible screwdriver adjustment potentiometer. Adjustment resolution is 35 millivolts for output voltages 5 through 16 V dc, 60 millivolts for outputs 18 through 50 V dc

and 90 millivolts for outputs 55 through 95 V dc.

4. Dual output voltage is continuously adjustable between the limits shown by means of an externally accessible screwdriver adjustment potentiometer. Adjustment resolution is 25 millivolts for outputs ±3 through ±4.5 V dc, 35 millivolts for outputs ±5 through ±15 V dc and 60 millivolts for outputs ±16 through ±30 V dc.

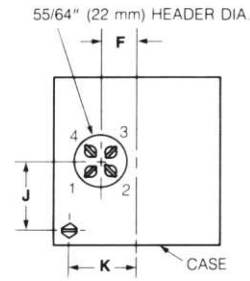
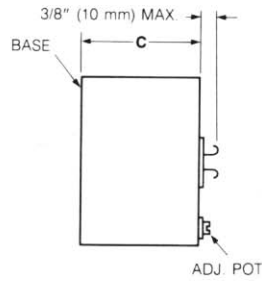
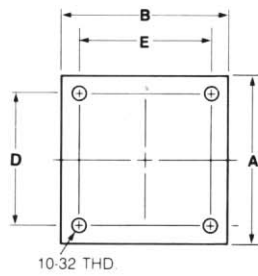
5. Maximum weight, not including options.

**Model Numbering System**

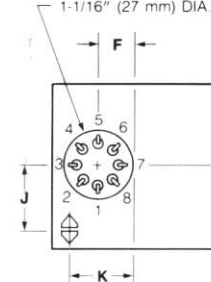
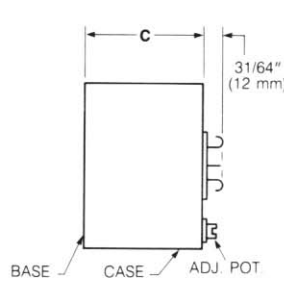
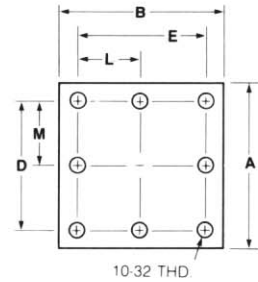
Product Line Series	Output Voltage Nominal	Header Type	Options	Output Current Maximum Load
C or CC	8	D		7.5



**Case Drawings:**



**Single-Output**



**Dual-Output**

**Dimensions**

Inches  
mm

Case Size	A	B	C	D	E	F	J	K	L	M
2D	2 51	3 76	3-1/2 89	1.50 38.1	2.50 63.5	3/4 19	3/4 19	1-1/4 32		
6B	2-3/4 70	3-1/8 79	3-5/8 92	2.25 57.2	2.62 66.6	3/4 19	1-1/8 29	1-5/16 33		
7A	2-7/8 73	3-3/8 86	4-1/2 114	2.37 60.2	2.87 72.9	3/4 19	1-3/16 30	1-7/16 37		
10C	3-3/8 86	3-3/8 86	3-3/4 95	2.87 72.9	2.87 72.9	3/4 19	1-7/16 37	1-7/16 37		
10D	3-1/2 89	3-1/2 89	4 102	3.00 76.2	3.00 76.2	3/4 19	1-1/2 38	1-1/2 38		
11E	3-3/4 95	4-1/2 114	4-1/4 108	3.25 82.6	4.00 101.6	3/4 19	1-5/8 41	2 51		
14D	6 152	6-1/4 159	3-7/8 98	5.50 139.7	5.75 146.1	1-1/4 32	2-3/4 70	2-7/8 73	2.87 72.9	2.75 69.8

**Tolerances:** If English unit is a fraction, ±1/32 inch, (0.8 mm); if English unit is a decimal, ±.015 inch, (0.4 mm).  
**Material:** Base — Aluminum 6061-T6, Case — Steel

**Finish:** Black flat lacquer per FED-STD-595, Color 37038.  
**Mounting:** 10-32 THD inserts 5/32" minimum depth are provided in baseplate. Steel 10-32 bolts American Standard, unified national fine series.

slotted studs are supplied with each unit. Metric hardware and inserts available as a special order.

**Pin Designations**

(Standard model, not including options. Consult factory for details.)

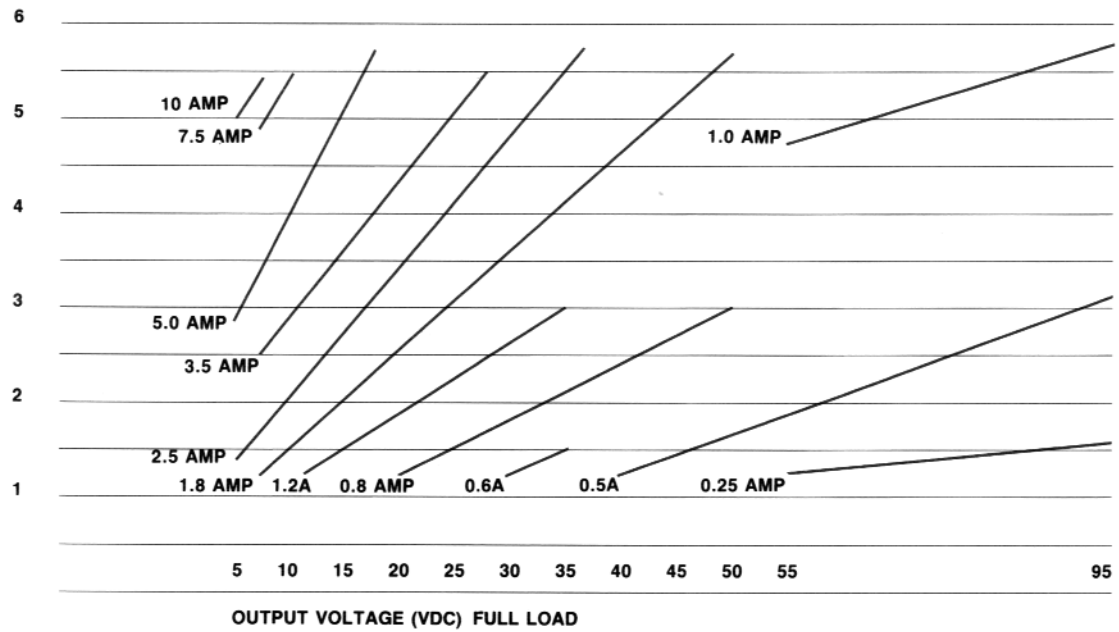
Standard C (4-Pin Header)	C with Options (8-Pin Header*)	Standard CC (8-Pin Header*)	CC with Options (8-Pin Header*)
1. +Input	1. +Input	1. +Input	1. +Input
2. -Input	2. -Input	2. -Input	2. -Input
3. +Output	3. +Output	3. +Output	3. +Output
4. -Output	4. -Output	4. Common Output	4. Common Output
	5. R/Y Option	5. -Output	5. -Output
	6. R/Y Option	6. Not Used	6. Option
	7. Not Used	7. Not Used	7. Option
	8. Not Used	8. Not Used	8. Option

\*1-1/16" (27 mm) diameter



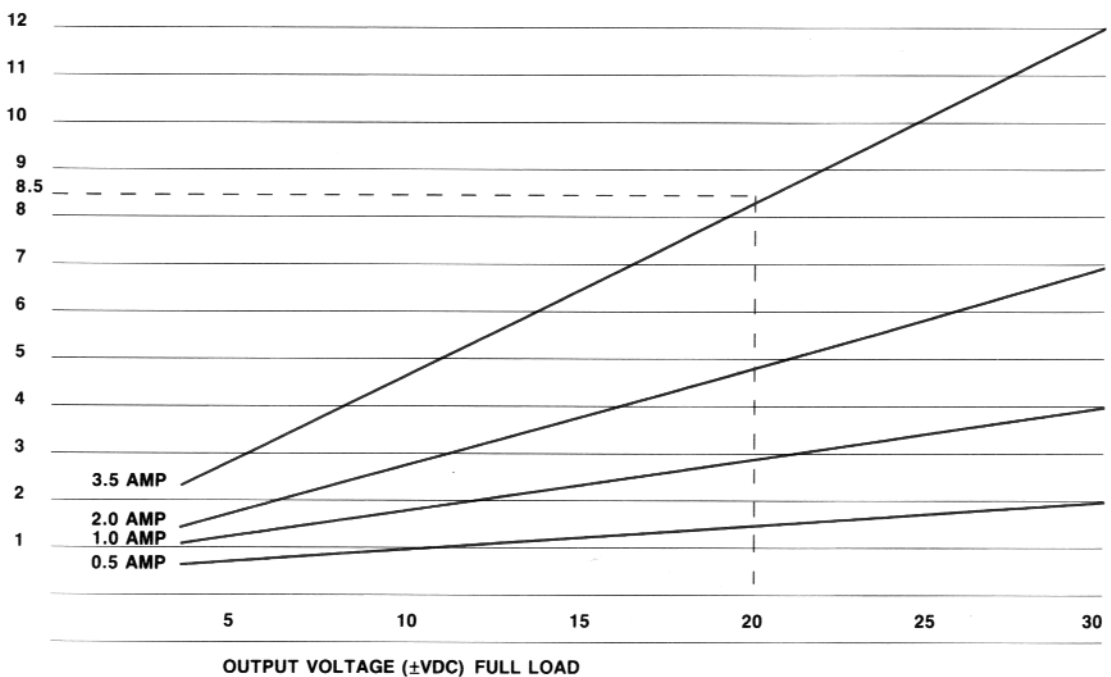
**C Input Current**

Amps  
(Typical)



**DC Input Current**

Amps  
(Typical)



The input current is described by the vertical column of numbers on the left of the chart. The curves or diagonal lines describe the output current of the specific power supply model. The output voltage is described by the horizontal row of numbers on the bottom of the chart.

By locating the intersection of the proper output voltage and the output current, the input current is read from the vertical column on the left.

For example, model CC20D3.5, ±20 volt output and 3.5 amps will require an input current of approximately 8.5 amps at full load as shown.