Matsusada Precision

High Speed Bi-polar Power Supply

DOP Series

NEW

Four-quadrant fast response bi-polar power supply

High power

▶▶▶ 600Vp-p(0 to ±300V) / 2kW max.

Broad bandwidth

▶▶▶ DC to 30kHz

DOP series

www.matsusada.com

DOP series

DOP series is four-quadrant bi-polar power supply which source and sink electric power. They can be used in 2 modes of a constant voltage(CV) or a constant current(CC). The weight is half of the conventional units by adopting the aluminum frame. They are compact and high speed, driving output proportional to the input waveform such as a sine wave, triangular wave, saw wave, and square wave.

DOP series is most appropriate for inductive load including coil and transformer, capacitive load like capacitor, test of DC servo motor or automobile electric appliances, and surface treatment.

All the models are completely solid-state with output voltage between ±5V and ±300V.

Even faster model, DOS series or amplifier with function generator, DOPF series, are available. Contact to local sales office for details.

Features

Response speed

Newly developed DOP Series is the most appropriate for transient response test with such high power and broad bandwidth.

Wide lineup

Select a model fitting for your applications from the lineup of various output voltage and current.

DC bias

10-turn potentiometer to be used for the output setting volume when used as the DC power supply and for the bias setting when used as AC power suppluy is equipped.

Silent operation

Operating noise bacame quiet by having employed the silent fan, and also it became easy-to-use.

DC output meter

3-digit digital meter displays the DC value of the output voltage and current. (The option of rms indication is available.)

Compact & light weight

For maximum compactness and light weight, DOP Series has been improved for small footprint and easy carry.

Constant voltage (CV) / Constant current (CC)

A single switch selects between CV and CC modes.

Four-quadrant action

DOP Series can be used both as a high speed response DC power supply and as a DC electronic load.

Complete protective function

Protective function against over voltage/current and protective measures against output short-circuit are completely provided.

Master-slave

The option of Master-slave control will resolve power shortages.

Applications

- Inductive load such as coil and transformer
- Capacitive load such as electric double-layer capacitor
- Voltage regulation tests for in-vehicle electrical component
- Evaluation test for solar panel related devices
- Various motor tests
- For surface treatment

Lineup

*Models with voltage, current or frequencies not listed here are also available. Please contact the nearest sales office.

Model	Output voltage V(rms)	Output current A(rms)	Output power W	Frequency response Hz(-3dB)	Dimensions (⇒P.6・P.7)	Weight kg(approx.)
DOP5-30	±5(3.5)	±30(21)	150	DC to 20k	A	17
DOP5-60	±5(3.5)	±60(42)	300	DC to 20k	B	23
DOP6-120	±6(4.2)	±120(84)	720	DC to 20k	C(Busbar type)	47
DOP10-15	±10(7)	±15(10.5)	150	DC to 20k	A	11
DOP10-30	±10(7)	±30(21)	300	DC to 20k	A	17
DOP10-60	±10(7)	±60(42)	600	DC to 20k	B	23
DOP20-7.5	±20(14)	±7.5(5.3)	150	DC to 20k	A	11
DOP20-15	±20(14)	±15(10.5)	300	DC to 20k	A	17
DOP20-30	±20(14)	±30(21)	600	DC to 20k	A	23
DOP20-60	±20(14)	±60(42)	1200	DC to 20k	C(Terminal board type)	40
DOP20-100	±20(14)	±100(70)	2000	DC to 20k	C(Busbar type)	47
DOP25-6	±25(17.6)	±6(4.2)	150	DC to 30k	A	11
DOP25-12	±25(17.6)	±12(8.6)	300	DC to 30k	A	17
DOP25-24	±25(17.6)	±24(17.1)	600	DC to 30k	A	23
DOP25-48	±25(17.6)	±48(34)	1200	DC to 20k	C(Terminal board type)	40
DOP25-80	±25(17.6)	±80(56)	2000	DC to 20k	C(Busbar type)	47
DOP30-40	±30(21)	±40(28.6)	1200	DC to 20k	C(Terminal board type)	40
DOP45-3.3	±45(32)	±3.3(2.4)	150	DC to 20k	A	12
DOP45-6.6	±45(32)	±6.6(4.7)	300	DC to 20k	A	17
DOP45-13.3	±45(32)	±13.3(9.5)	600	DC to 20k	A	23
DOP45-16	±45(32)	±16(11.3)	720	DC to 20k	A	23
DOP45-26.7	±45(32)	±26.7(18.9)	1200	DC to 20k	C(Terminal board type)	40
DOP45-44.4	±45(32)	±44.4(31.1)	2000	DC to 20k	C(Terminal board type)	47
DOP60-2.5	±60(42)	±2.5(1.75)	150	DC to 20k	A	12
DOP60-5	±60(42)	±5(3.5)	300	DC to 20k	A	17
DOP60-10	±60(42)	±10(7)	600	DC to 20k	A	23
DOP60-20	±60(42)	±20(14)	1200	DC to 20k	C(Terminal board type)	40
DOP60-33.3	±60(42)	±33.3(23.3)	2000	DC to 20k	C(Terminal board type)	47
DOP70-17	±70(49)	±17(12)	1200	DC to 20k	C(Terminal board type)	40
DOP80-25	±80(56)	±25(18)	2000	DC to 20k	C(Terminal board type)	47
DOP120-2.5	±120(84)	±2.5(1.75)	300	DC to 20k	A	18
DOP120-5	±120(84)	±5(3.56)	600	DC to 20k	C(Terminal board type)	30
DOP120-10	±120(84)	±10(7)	1200	DC to 20k	C(Terminal board type)	40
DOP150-2	±150(105)	±2(1.4)	300	DC to 20k	A	18
DOP150-4	±150(105)	±4(2.8)	600	DC to 20k	C(Terminal board type)	30
DOP150-8	±150(105)	±8(5.6)	1200	DC to 20k	C(Terminal board type)	40
DOP200-1.5	±200(141)	±1.5(1.05)	300	DC to 20k	A	18
DOP200-1.75	±200(141)	±1.75(1.23)	350	DC to 20k	A	18
DOP200-3	±200(141)	±3(2.1)	600	DC to 20k	C(Terminal board type)	30
DOP200-3.5	±200(141)	±3.5(2.47)	700	DC to 20k	C(Terminal board type)	30
DOP200-6	±200(141)	±6(4.2)	1200	DC to 20k	C(Terminal board type)	40
DOP300-1	±300(210)	±1(0.7)	300	DC to 20k	A	18
DOP300-2	±300(210)	±2(1.4)	600	DC to 20k	C(Terminal board type)	30
DOP300-4	±300(210)	±4(2.8)	1200	DC to 20k	C(Terminal board type)	40

Specifications

Input voltage
Input current

Model	Input voltage ±10% · AC50/60Hz	Input current	Recommended breaker
150W	115V single phase	4A	115VAC/15A
300W		7A	
600W	230V single phase	7A	230VAC/15A
700W 720W		8A	
1.2kW		13A	230VAC/20A
2kW		20A	230VAC/30A

External control voltage(Vcon-in) −10V to +10V (Input impedance is 10 kΩ or more.)

Output indication (DC value indication) Output voltage 3-digit digital meter ±999
Output current 3-digit digital meter ±999

DC bias 10-turn potentiometer enables setting between −100% and +100%.

Ripple Less than 0.02%rms

Stability 0.016 % / Hr typ.

Setting accuracy ±0.5 % F.S

Distortion factor CV : 0.05 % CC : 0.5 %

Regulation Line : 0.05 % (for ±10 % input change)
Load : 0.05 % (for 10 to 100 % load change)

Temperature coefficient 0.02% / °C

Output monitor Output voltage : −10V to +10V±1%F.S
Output current : −10V to +10V±1%F.S
Output impedance 1kΩ

Protections Protection against output short-circuit, overvoltage, overcurrent
Blackout protection(can be canceled with -LN option)

Operating temp. 0°C to +40°C

Storage temp. −40°C to +85°C

Humidity 20% to 80%RH(no condensation)

Accessories Input cable ... 2.5 m(1)
(3-pin connector for 115V input model Flying lead for 230V input model)
Instruction manual(1)

Protections

Over voltage protection (O.V.P)

DOP series is equipped with over voltage protection, which protects load by limiting voltage up to approx. 120% of the rated output voltage even at abnormal conditions.

*-LVc option(output voltage limitter) enable to control the output in 0 to approx. 110% range.

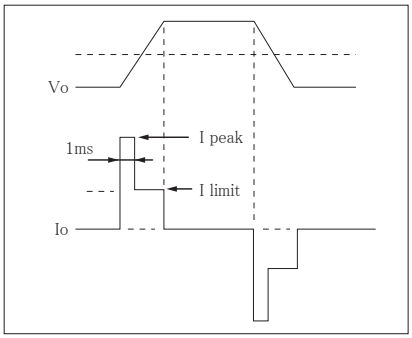
Over current protection (O.C.P)

DOP series is also equipped with over current protection, which protects power supplies and load by limiting current up to approx. 120% of the rated output current.

*-LCc option(output current limitter) enable to control the output in 0 to approx. 110% range.

High speed over current protection

DOP series is provided with 2 types of over current protections, high speed over current protection to limit the pulse current, and standard over current protection to limit the static current.
The standard over current protection limits the static current, responding at around 1ms.
Additional high speed over current protection can limit pulse current of square waveforms or from capacitor at approx. 2 times more current of rating.



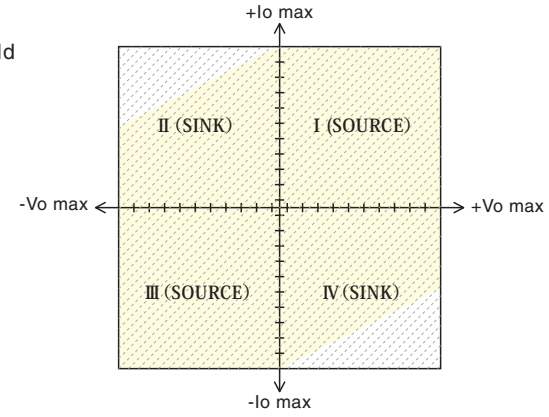
Output range

DOP series is a bi-polar power supply which can perform four-quadrant operation. They can supply (source) and absorb (sink) current in the field of the drawing on the right.

Vo max : rated output voltage
Io max : rated output current

Range of AC operation (with 50Hz or more frequency and 50 % of duty and without any DC bias)

Range of DC operation



Options

-LD	…Door switch(Interrock)
-LS	…Remote switch(Output ON / OFF)
-LN	…No protection against blackout
-LF	…Floating ground (Resistant to pressure 200Vdc)
-LMs( )	…Master-slave control*
-LPr	…rms display
-LVc	…Output voltage limit Variable from 0 to approx. 110% with front panel dial
-LCc	…Output current limit Variable from 0 to approx. 110% with front panel dial
-L(220V)	…200VAC to 240VAC ±10% single phase, 50/60Hz input(150W and 300W models only)

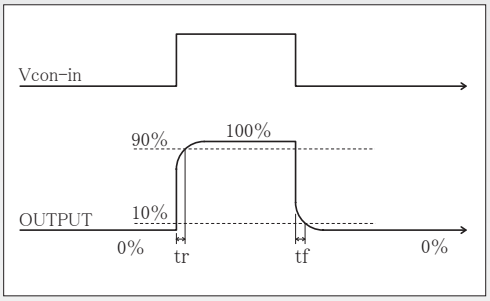
When ordering, suffix the following option mark to the model number.
<e.g> DOP25-12-LCcDFMsmNPrSVc (220V) (Alphabetical and input voltage order)

*( ) shall be “m” for Master unit, or “s” for Slave unit.
-LMsm for Master, -LMss for Slave.
Order required quantity for each unit. Master unit or slave unit are to be set at the factory, and if master to slave change is required after shipment, adjustment at the factory will be needed. Slave unit will also be able to operate by itself. Maximum 3 units including master unit can be connected.

Characteristic of amplifier

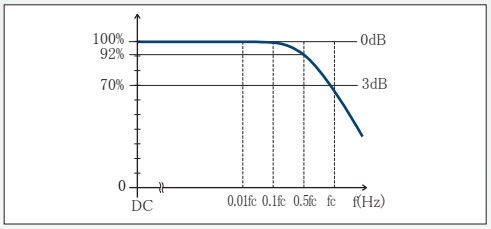
Rise time

(Stepping time): The response time is sometimes described by the rise time (as shown in the drawing on the right).
The rise time of an amplifier at a response speed of (= frequency bandwidth) Fc (Hz) is generally acquired by "tr ≒ 0.35/fc."
Fall time tf is the same as tr.
Frequency bandwidth
: at 30kHz or lower, tr = tf = around 12 μs
: at 20kHz or lower, tr = tf = around 18 μs



Response speed

When accurate output waveforms are required, select a amplifier with a frequency bandwidth higher enough than the operating frequency. In case of using sine waves, 3 to 5 times more frequency bandwidth is required, and around 10times more in case of square waves in general. Inadequate bandwidth causes not only decrease in the output amplitude but much difference between the input and output phases. Therefore operating the product while monitoring the actual output waveforms is recommended.



Capacitative load

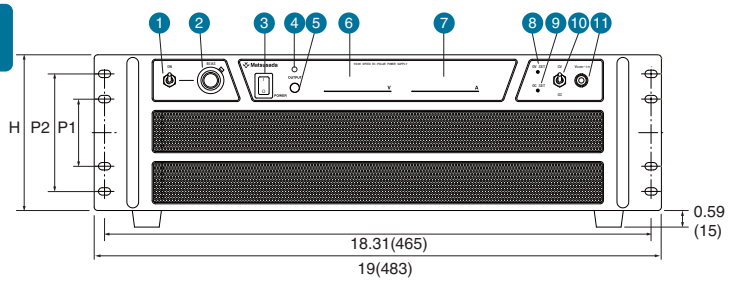
Capacitative load may cause oscillation.
In such cases, placed a power resistance in series with the output.
Be careful that the frequency bandwidth is limited depending on the resistance and capacitance placed in series when capacitative load.

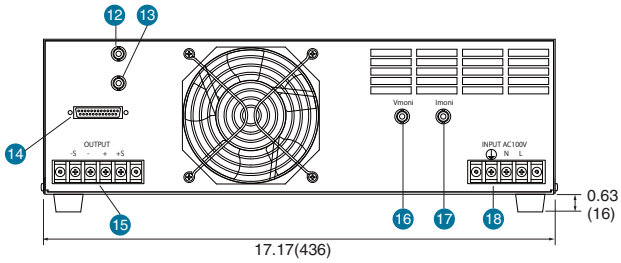
Inductive load

Some inductance of inductive load may cause resonance in CC mode.
In such cases, connect a C-R series circuit between output terminals to prevent resonance.

Functions / Dimensions inch(mm)

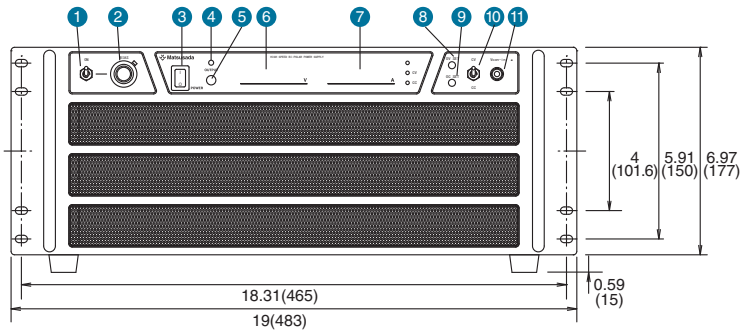
A

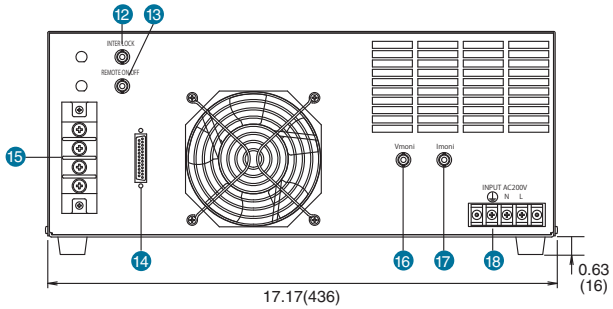


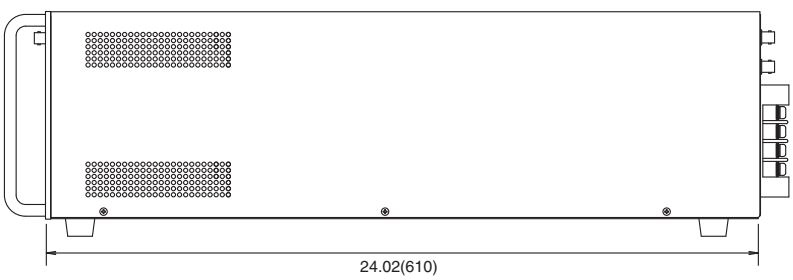


Model	H	P1	P2	D
150W (except DOP5-30)	5.24 (133)	2.25 (57.15)	3.94 (100)	18.98 (482)
300W, 350W DOP5-30	5.24 (133)	2.25 (57.15)	3.94 (100)	21.65 (550)
more than 600W	6.97 (177)	4 (101.6)	5.91 (150)	24.02 (610)

B

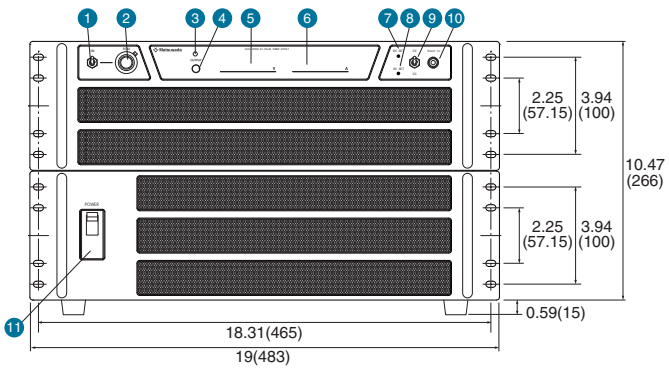




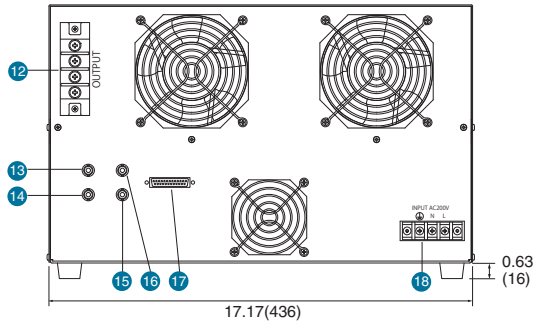


1. Bias ON / OFF switch
2. Bias setting dial
3. POWER ON / OFF switch
4. OUTPUT indication LED
5. OUTPUT ON / OFF switch
6. Votage meter
7. Current meter
8. Output voltage limiter(option)
9. Output current limiter(option)
10. CV / CC select switch
11. Vcon-in terminal
12. Door switch(option)
13. REMOTE switch ON / OFF (option)
14. Connector for Master-slave(option)
15. OUTPUT terminal
16. Voltage monitor terminal
17. Current monitor terminal
18. AC input terminal

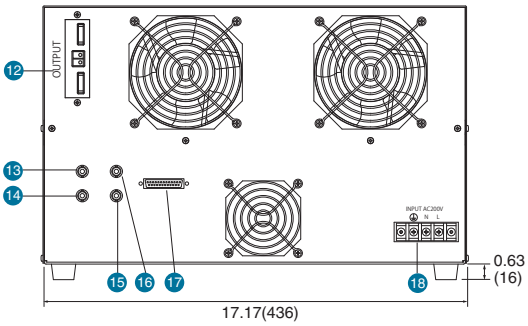
C

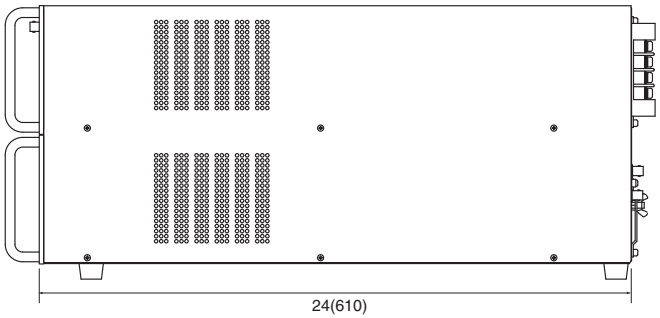


[terminal board type]



[busbar type]





1. Bias ON / OFF switch
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6. Current meter
7. Output voltage limiter(option)
8. Output current limiter(option)
9. CV/CC select switch
10. Vcon-in terminal
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13. Voltage monitor terminal
14. Current monitor terminal
15. REMOTE switch ON / OFF (option)
16. Door switch(option)
17. Connector for Master-slave(option)
18. AC input terminal

CV/CC setting selection

Inputting voltage via Vcon-in enables the control of output voltage V when CV control is selected and output current A when CC control is selected.

Vcon	In CV mode Output voltage	In CC mode Output current
−10V	−Rating	−Rating
0V	0V	0A
+10V	+Rating	+Rating

Use of BIAS

When the “BIAS ON/OFF switch” is flipped to ON, bias can be changed with the “BIAS setting dial.” Bias of the voltage can be set when CV control is selected, and that of the current can be when CC control is selected.

Scale	In CV mode Output voltage	In CC mode Output current
000(ccw)	−Rating	−Rating
500	0V	0A
1000(cw)	+Rating	+Rating

FAX

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Customer Inquiry Sheet (DOP series)

Please copy this page and above fax number after filling out form below.

■ I would like

☐ A quotation ☐ An explanation of product ☐ A demonstration ☐ To purchase
☐ Other ( )

■ Give us your requirement / comment

■ Please fill in below.

Address:	
Company:	
Dept.:	Title:
Name:	
Tel:	Fax:
E-mail:	

Warranty

We warrant that products contained in this catalog (hereinafter, the “Products”) are free from defects in material and workmanship under normal use for a period of one (1) year from the date of shipment thereof. However, the warranty period for X-ray detectors and X-ray source shall be either one (1) year from the date of shipment or 1,000 hours, whichever shorter.The above warranty shall not apply to any Product which, at our sole judgment, has been:i)Repaired or altered by persons unauthorized by us; or ii)Connected, installed, adjusted or used otherwise than in accordance with the instructions furnished by us (including being used in an inappropriate installation environment, such as in corrosive gas, high temperature and humidity). We are not liable for any loss, damage or failure of the Products after the shipment thereof caused by external factors such as disasters.If any Product is showed to be defective as satisfactory to us, we, at our sole discretion, repair or replace such defective Products at no cost to the purchaser.We assume no liability to the purchaser or any third party for special, incidental, consequential, or other damages resulting from a breach of the foregoing warranty. This warranty excludes any and all other warranties not set forth herein, express or implied, including without limitation the implied warranties of merchantability or fitness for a particular purpose. The Products are not designed and produced for such applications as requiring extremely high reliability and safety, or involving human lives (such as nuclear power, aerospace, social infrastructure facility, medical equipment, etc.). The use under such environment is not covered by this warranty and may require additional design and manufacturing processes. Regarding RoHS compliance, Matsusada Precision Inc. does not intentionally use objectionable substances in the products listed within this catalog. Matsusada Precision Inc. manufactures products using components which, according to our suppliers, are “RoHS compliant parts”. However, Matsusada Precision does not analyze each and every unit to confirm. Therefore, there may be some customized products which do not comply to RoHS. Please contact your nearby sales office for confirmation.

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