

NEW

Compact High Power/CVCC

Programmable regulated DC power supply

6V to 650V / 1.2A to 1000A / 600W to 15kW

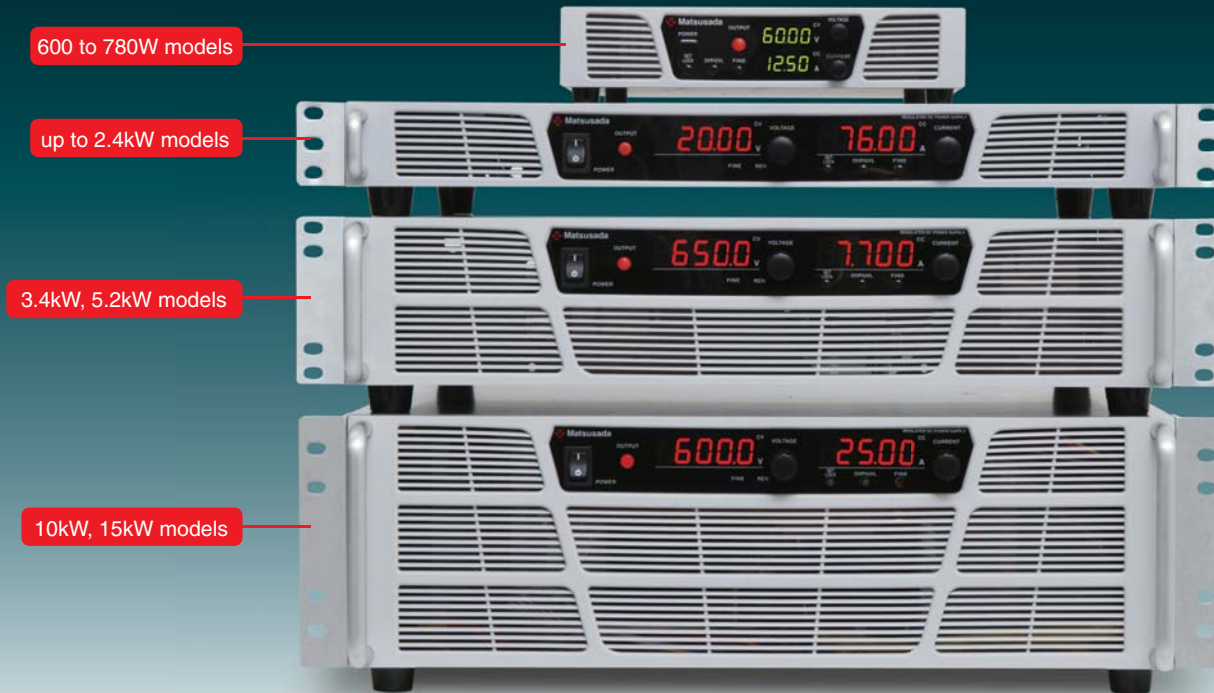
VOLseries



(except some models)



VOL series



VOL series is the new standard model of rack mountable DC power supply that is designed on attention to “Cost performance”, “Wide variety” and “High reliability”. Offering original low noise switching method and wide lineups of 6 to 650V/600W to 15kW total of 120 models to meet various applications. Also it is to achieve high reliability as a result of our high voltage power supply technology built up over 30 years. In addition, by carefully selecting the features and pursue the cost down, we could achieve power supplies which keeps same low noise, high stability, and high reliability, but more reasonable price. VOL series support strongly research and development as power supplies that are to be used for various applications and user friendly.



Compact and high power

Max 15kW



Ideal for research and development with **low noise switching method**.



PFC circuit and **universal input** would not select the place of operation.



Various operations by connecting multiple power supplies, such as **master/slave**, is possible.



VOL adopt **large 4-digit monitor display** for both voltage and current, which contributes to precise monitoring with better recognition.



Operability and safety are improved with new features of key-lock function and acceleration rotary encoder, that increment will vary by speed of rotation.

Lineup

Voltage(V)	Max output		MODEL	Ripple		Dim. (⇒P.8,9)
	Current(A)	Power		(mVrms)	(mArms)*	
6	100	600W	VOLJ6-100	10	260	
	100	600W	VOL6-100	10	260	
	200	1.2kW	VOL6-200	10	320	
	300	1.8kW	VOL6-300	10	1500	
	500	3kW	VOL6-500	10	900	
7.5	1000	7.5kW	★ VOL7.5-1000	20	5100	
8	600	4.8kW	VOL8-600	10	3000	
	70	700W	VOLJ10-70	10	160	
10	70	700W	VOL10-70	10	160	
	150	1.5kW	VOL10-150	10	300	
	240	2.4kW	VOL10-240	10	500	
	330	3.3kW	VOL10-330	10	900	
	500	5kW	VOL10-500	10	2000	
	1000	10kW	★ VOL10-1000	20	5100	
12.5	800	10kW	★ VOL12.5-800	20	2600	
16	47.5	760W	VOLJ16-47.5	10	110	
	47.5	760W	VOL16-47.5	10	110	
	95	1.5kW	VOL16-95	10	150	
	150	2.4kW	VOL16-150	10	300	
	220	3.5kW	VOL16-220	10	500	
	320	5.1kW	VOL16-320	15	600	
20	38	760W	VOLJ20-38	10	80	
	38	760W	VOL20-38	10	80	
	76	1.5kW	VOL20-76	10	160	
	120	2.4kW	VOL20-120	12	250	
	165	3.3kW	VOL20-165	15	300	
	250	5kW	VOL20-250	15	400	
25	400	10kW	★ VOL25-400	20	1700	
	500	10kW	★ VOL25-500	20	2600	
30	25	750W	VOLJ30-25	10	60	
	25	750W	VOL30-25	10	60	
	50	1.5kW	VOL30-50	20	100	
	80	2.4kW	VOL30-80	20	160	
	110	3.3kW	VOL30-110	20	200	
	170	5.1kW	VOL30-170	20	260	
	333	10kW	★ VOL30-333	20	1700	
40	19	760W	VOLJ40-19	15	60	
	19	760W	VOL40-19	15	60	
	38	1.5kW	VOL40-38	20	70	
	60	2.4kW	VOL40-60	20	100	
	85	3.4kW	VOL40-85	20	130	
	125	5kW	VOL40-125	20	180	
50	250	10kW	★ VOL40-250	20	100	
	200	10kW	★ VOL50-200	20	80	
60	12.5	750W	VOLJ60-12.5	12	45	
	12.5	750W	VOL60-12.5	12	45	
	25	1.5kW	VOL60-25	20	50	
	40	2.4kW	VOL60-40	20	80	
	55	3.3kW	VOL60-55	20	100	
	85	5.1kW	VOL60-85	20	135	
	167	10kW	★ VOL60-167	20	67	
	250	15kW	★ VOL60-250	20	100	
80	9.5	760W	VOLJ80-9.5	25	20	
	9.5	760W	VOL80-9.5	25	20	
	19	1.5kW	VOL80-19	25	40	
	30	2.4kW	VOL80-30	25	60	
	42	3.3kW	VOL80-42	25	80	
	65	5.2kW	VOL80-65	25	100	
	125	10kW	★ VOL80-125	25	50	
	187.5	15kW	★ VOL80-187.5	25	100	

Voltage(V)	Max output		MODEL	Ripple		Dim. (⇒P.8,9)	
	Current(A)	Power		(mVrms)	(mArms)*		
100	7.5	750W	VOLJ100-7.5	20	20		
	7.5	750W	VOL100-7.5	20	20		
	15	1.5kW	VOL100-15	20	25		
	24	2.4kW	VOL100-24	25	50		
	33	3.3kW	VOL100-33	25	60		
	50	5kW	VOL100-50	25	80		
	100	10kW	★ VOL100-100	25	40		
	150	15kW	★ VOL100-150	25	100		
	125	80	10kW	★ VOL125-80	25	32	
		120	15kW	★ VOL125-120	25	50	
150	5	750W	VOLJ150-5	25	10		
	5	750W	VOL150-5	25	10		
	10	1.5kW	VOL150-10	25	20		
	16	2.4kW	VOL150-16	25	35		
	22	3.3kW	VOL150-22	25	40		
	34	5.1kW	VOL150-34	25	55		
	66	9.9kW	★ VOL150-66	25	26		
	100	15kW	★ VOL150-100	25	50		
200	3.8	760W	VOLJ200-3.8	35	15		
	3.8	760W	VOL200-3.8	35	15		
	7.5	1.5kW	VOL200-7.5	35	15		
	12	2.4kW	VOL200-12	35	25		
	16.5	3.3kW	VOL200-16.5	35	30		
	25	5kW	VOL200-25	35	40		
	50	10kW	★ VOL200-50	35	20		
250	75	15kW	★ VOL200-75	35	20		
	40	10kW	★ VOL250-40	35	16		
	60	15kW	★ VOL250-60	35	20		
	2.5	750W	VOLJ300-2.5	50	10		
300	2.5	750W	VOL300-2.5	50	10		
	5	1.5kW	VOL300-5	50	10		
	8	2.4kW	VOL300-8	50	18		
	11	3.3kW	VOL300-11	50	20		
	17	5.1kW	VOL300-17	50	30		
	33	9.9kW	★ VOL300-33	60	13		
	50	15kW	★ VOL300-50	60	20		
	25	10kW	★ VOL400-25	60	10		
	7.5	15kW	★ VOL400-37.5	60	10		
	500	0.5	750W	VOLJ500-1.5	30	5	
1.5		750W	VOL500-1.5	60	5		
3		1.5kW	VOL500-3	60	5		
0.8		2.4kW	VOL500-4.8	60	12		
0.6		3.3kW	VOL500-6.6	60	15		
10		5kW	VOL500-10	60	20		
20		10kW	★ VOL500-20	60	8		
30		15kW	★ VOL500-30	60	10		
600	1.3	780W	VOLJ600-1.3	60	5		
	1.3	780W	VOL600-1.3	60	5		
	2.6	1.5kW	VOL600-2.6	60	5		
	4	2.4kW	VOL600-4	60	10		
	5.5	3.3kW	VOL600-5.5	60	15		
	8.5	5.1kW	VOL600-8.5	60	15		
	17	10.2kW	★ VOL600-17	60	7		
	25	15kW	★ VOL600-25	60	10		
650	1.2	780W	VOLJ650-1.2	150	5		
	1.2	780W	VOL650-1.2	150	5		
	2.3	1.5kW	VOL650-2.3	150	10		
	3.6	2.3kW	VOL650-3.6	150	10		
	5	3.2kW	VOL650-5	150	15		
	7.7	5kW	VOL650-7.7	150	15		

*At 10 to 100% of rated output voltage and rated output current.

Half rack size.

Please inquire the situation of CE certification. It is under procedure.

A power supply with -LEt option doesn't have CE marking.(Please refer to page 10 for -LEt option.)

★ : To be released soon.

For details, please contact your nearby sales office.

Standard functions

Key Lock Function

Lock all front panel operation to prevent erroneous operation. (emergency stop by power switch is still valid.)



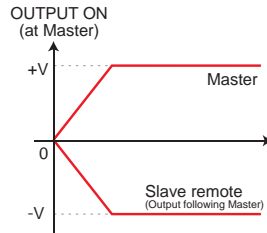
Lock all the function other than reset lock mode. This mode is good for purpose to avoid mis-operation completely.

Dual Tracking, Multiple Outputs

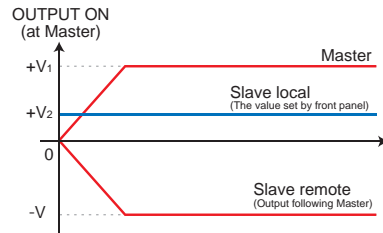
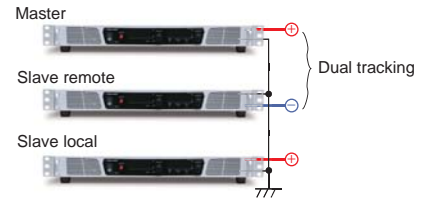
Dual tracking control, which enables both positive and negative outputs simultaneously in master slave operation, is possible. Multi outputs and various versatile operations are also possible by combining above dual tracking control and slave local mode. Positive and negative output(+V, -V) of dual tracking control and set output voltage of slave local mode can be output simultaneously by turning on the master unit.

*Please refer to P.7 for detail connection.

Dual Tracking

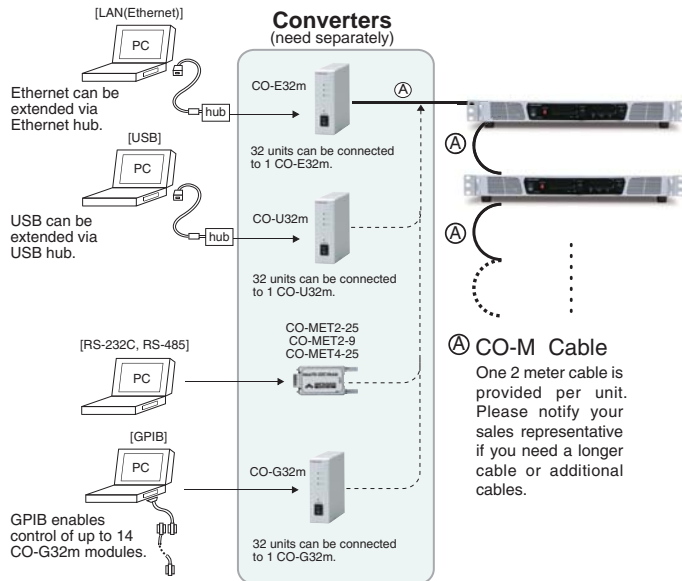


Multiple Outputs



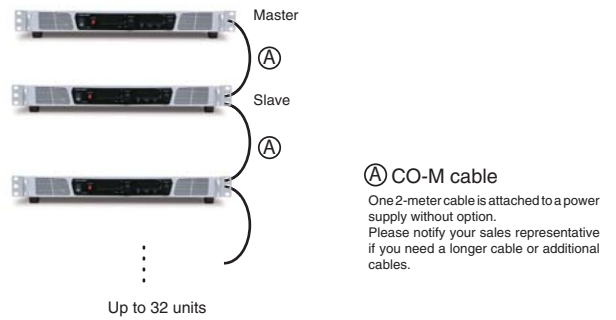
Digital Interface

Digital control of USB / Ethernet / RS-232C / RS485 / GPIB and one-control on master slave operation.



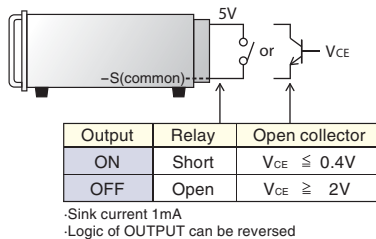
Master / Slave Control

The Master/Slave control function allows you to control up to 32 units connected in parallel from a single unit.



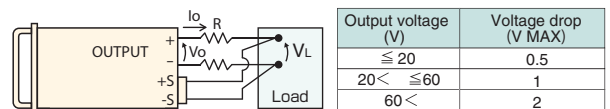
Master / Slave control is only possible with units with the same model number. But, it is valid only power supply without -LGob, -LUs1, and -LEt option.

Remote Switch ON / OFF



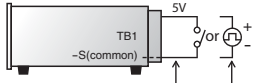
Remote sensing

Prevents voltage drop down ($V_o - V_L$) due to resistance (R) or deterioration of stability by contact resistance.



Remote Control

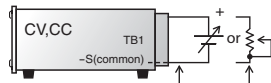
Remote/Local change



Mode	External relay	TTL
Remote	Short	Low
Local	Open	High

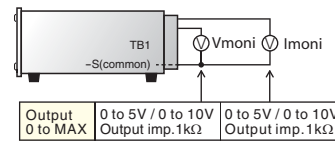
Each of voltage, current or all the modes can be switched by relay or TTL signal.

Output control



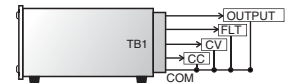
Vout·Iout	Control voltage	R
0 to MAX	0 to 5V / 0 to 10V input imp.500kΩ	0 to approx.10kΩ or 0 to approx. 5kΩ

Output Monitor



Output	0 to 5V / 0 to 10V Output imp.1kΩ	0 to 5V / 0 to 10V Output imp.1kΩ
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Status Output



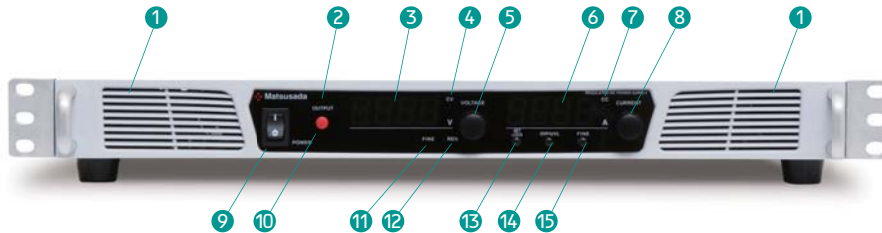
OUTPUT ON when OUTPUT
FLT ON when fault *
CV CC ON when each mode

*On when OVP, UVL, OTP, ACF, reverse connection of sensing or interlock(LD) status.

Common is floating in open collector output of common. With stand voltage 30Vdc, sink current 5mA or less.

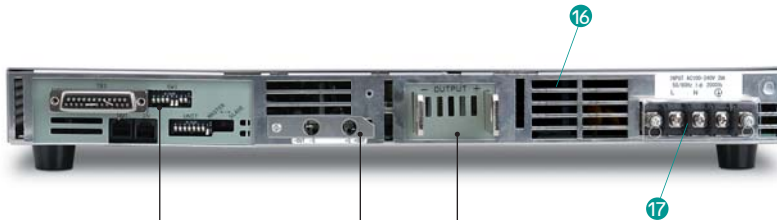
Functions

Front Panel



- 1 Air intake
- 2 OUTPUT
Light on when output is ON.
- 3 Output voltage, OVP setting display
- 4 Constant voltage mode
- 5 Output voltage, OVP setting dial
- 6 Output current, UVL setting display
- 7 Constant current mode
- 8 Output current, UVL setting dial
- 9 Power ON/OFF switch
This has priority over all operations for safety reason.
- 10 Output ON/OFF switch
To be used to turn output on/off when local mode as well resetting protection functions.
- 11 FINE display
Light on when FINE condition.
- 12 Remote programming display
Light on when voltage/current remote control.
- 13 Output preset / Keylock setting switch
- 14 OVP/UVL setting switch
- 15 FINE setting switch
- 16 Exhaust hole
- 17 AC input terminal (M4)

Rear Panel



Function setting switch(SW1)

[Voltage Control]



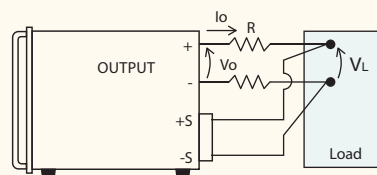
[Current Control]



[Blackout Protection]



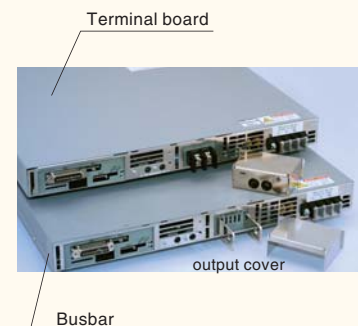
Remote sensing



Prevents voltage drop down ($V_o - V_L$) due to resistance (R) or deterioration of stability by contact resistance.

Output voltage(V)	Voltage drop(V MAX)
≤ 20	0.5
$20 < \leq 60$	1
$60 <$	2

Output terminal



Specifications

Input	Output power	Input Voltage (50/60Hz)	Phase	Input Current*1	Input Current Protection	Model
	760W	85 to 264VAC	1Ø	11A @ 100V	Fuse15A	Standard
	1.5kW	85 to 264VAC *2	1Ø	20A @ 100V	Fuse30A	Standard
	2.4kW	180 to 264VAC	1Ø	16A @ 200V	Fuse30A	Standard
			3Ø	10A @ 200V		-L(3P) option
	3.4kW	180 to 264VAC	1Ø	26A @ 200V	Fuse30A	-L(1P) option
		180 to 264VAC	3Ø	15A @ 200V		Standard
		342 to 460VAC		8A @ 400V	Fuse15A	-L(400V) option
	5.2kW	180 to 264VAC	3Ø	22A @ 200V	Fuse30A	Standard
		342 to 460VAC		12A @ 400V	Fuse15A	-L(400V) option
	10kW *3	180 to 253VAC	3Ø	45A @ 200V	Fuse75A	Standard
		342 to 440VAC		24A @ 400V		Fuse50A
		432 to 528VAC		20A @ 480V	Fuse50A	-L(480V) option
	15kW	180 to 253VAC	3Ø	65A @ 200V	Fuse75A	Standard
		342 to 440VAC		35A @ 400V		Fuse50A
		432 to 528VAC		27A @ 480V	Fuse50A	-L(480V) option

Power factor : up to 5.2kW models - 0.99typ.(1Ø), 0.95typ.(3Ø) / 10kW*3 to 15kW models - 0.88typ.

*1:At maximum output power

*2:Rated input voltage range is between 100 to 240VAC(50/60Hz)while applying CE mark.

*3:Including VOL7.5-1000

Output control

Local: Constant voltage: rotary encoder on front panel

Constant current: rotary encoder on front panel

Remote: Constant voltage: external control voltage 0V to 5V / 10Vdc or external variable resistor 0Ω to approx. 5kΩ / 10kΩ

Constant current: external control voltage 0V to 5V / 10Vdc or external variable resistor 0Ω to approx. 5kΩ / 10kΩ

Voltage regulation

Line: 0.01% of maximum output (for 100Vac to 250Vac±10% input change)

Load: 0.01%+2mV of maximum output (for 10% to 100% load change)

Current regulation

Line: 0.01% of maximum output (for 100Vac to 250Vac±10% input change)

Load: 0.02%+5mA of maximum output (for 10% to 100% load change)

Stability

0.05%/8Hr of maximum output voltage

Temperature coefficient

0.01% / °C of maximum output voltage

0.04% / °C of maximum output current

Output display

Output voltage: 4-digit meter (±0.5%FS±1digit at 23°C±5°C)

Output current: 4-digit meter (±0.5%FS±1digit at 23°C±5°C)

Monitor output

Output voltage monitor: 5V or 10V / maximum output voltage

Output current monitor: 5V or 10V / maximum output current

Protections

Over voltage protection (OVP) Output is cut off at a set value.

Under voltage limitation(UVL) Output is cut off at a set value.

Setting range: approx. 5% to 110% of rated output

Local setting: Rotary encoder on front panel

Reset: Manual recovery by OUTPUT switch or remote switch.

Over temperature protection (OTP)

Output is cut off when internal part is heated abnormally.

Reset (after the temperature has gone down to normal) : Manual recovery by OUTPUT switch or remote switch.

Input brownout(ACF)-Blackout protection

Output is cut off when input voltage decreased.

Reset (when normal voltage value or recovery from blackout):

Manual recovery by OUTPUT switch or remote switch for blackout protection (re-output protection function).

Automatic recovery when blackout protection is canceled.

Sense reverse connection

Interlock

Other functions

Keylock to avoid misoperation.

Digital master slave operation.(up to 250V for series operation)

(Max 32 units for parallel or series connection.)

(Combination of parallel and series is not possible.)

Setting memory function

Quiet forced air cooling

Remote sensing

Remote switch ON/OFF (TTL or external relay)

Status signal output (CV, CC, FLT, OUTPUT)

Transient response time

Recovery time 1ms (for 70⇔100% load change)

Operation temperature

up to 1.5kW models 0°C to +50°C (when input is 120VAC to 264VAC.)

0°C to +40°C

When the input voltage is below 100VAC, the output power is to be derated at 1.2kW max.

2.4kW to 15kW model 0°C to +50°C

Storage temperature

-20°C to +70°C

Storage humidity

20% to 80% RH (no condensation)

Dielectric voltage

Between input power supply and output terminal : AC2000V 1 minute

Between input power supply and chassis : AC2000V 1 minute

Between output terminal and chassis : DC1000V 1 minute

Accessories

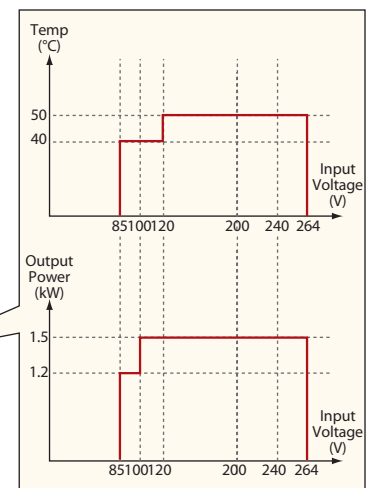
-Instruction manual (1)

-Output terminal cover (1)

-Remote connector cover (1)

-CO-M cable 2m (1) <when without option>

-AC cable 2.5m (1) <only for half rack models>



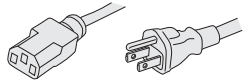
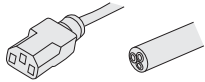
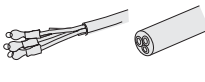
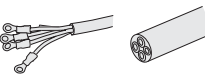
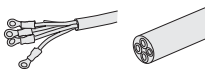
Various Digital Control Functions

Control function	Output ON/OFF setting
	Status output (fault / output / OVP / UVL / OTP / ACF / reversible sense connection / interlock)
	Maximum 32 units digital control One control function for multiple units
Write function	Output voltage setting / Output current setting Percent mode, Voltage Current Value mode
	OVP setting / UVL setting Percent mode, Voltage Current Value mode
Reading function	Output voltage reading / Output current reading Percent mode, Voltage Current Value mode
	OVP setting / UVL setting Percent mode, Voltage Current Value mode

* Minimum value of each model is same as minimum display of front panel meter.

AC input cable

Use appropriate AC cable. Contact nearby sales office in case of using VOL series in European countries.

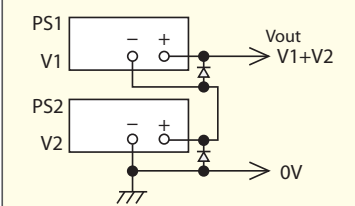
CABLE TYPE 8 (attached by default by half rack models)	CABLE TYPE 3 (separate) (available for half rack models)	CABLE TYPE 5 (separate) (available for 1.5kW to 2.4kW models)	CABLE TYPE 6 (separate) (available for 2.4kW to 5.2kW models)	CABLE TYPE 7 (separate) (available for 10kW* and 15kW models)
125V / 15A	250V / 10A	250V / 25A	250V / 25A	250V / 75A
				

* Including VOL7.5-1000

Operation example

VOL power supply of same model number can be connected in series or parallel to increase output voltage or current.

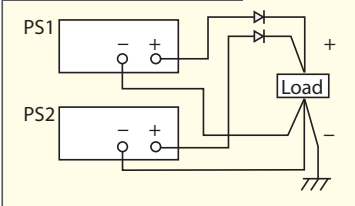
Series operation



[caution]

Total output voltage is to be up to 250V. Therefore for models with output voltage of over 250V, series operation cannot be conducted. Output current is to be the smallest current of those. Additionally, the remote switch is connected to -output, so do not connect to the other remote switch simultaneously.

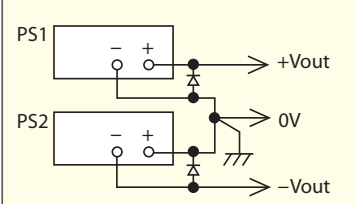
Parallel operation



[caution]

Please keep all the settings of voltage the same. Output current will be the summation of each current. Please keep OVP level of power supply maximum to prevent any damage.

Split operation



[caution]

Remote switch is connected to -output, so do not connect to the other remote switch simultaneously.

Dimensions inch(mm)

There are exhaust holes on rear panel for forced air cooling.
In case placed in a closed cabinet without extra room more than 30cm, apply additional forced cooling.

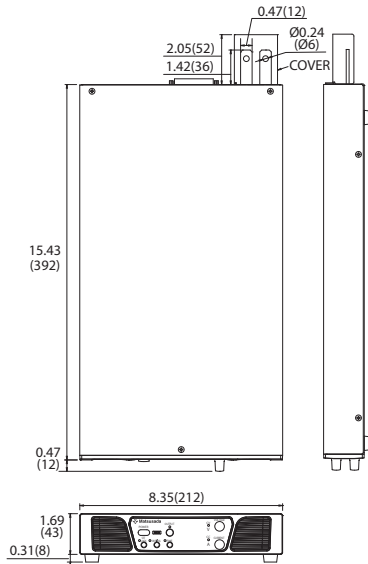
Half rack models

19-inch rack mount holder is available. Contact us for details.

A

Busbar output type

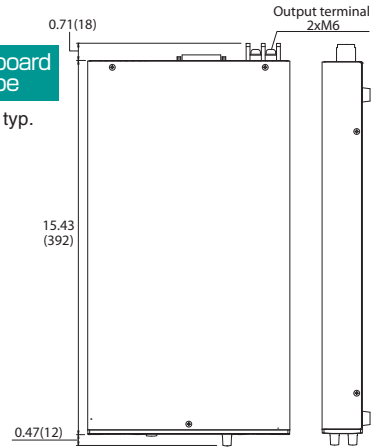
Weight : 4kg typ.



B

Terminal board output type

Weight : 4kg typ.

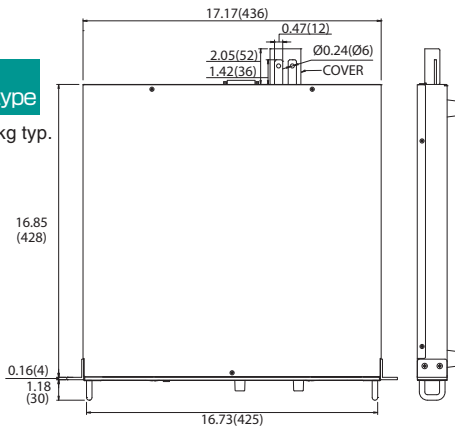


19-inch rack models

C

Busbar output type

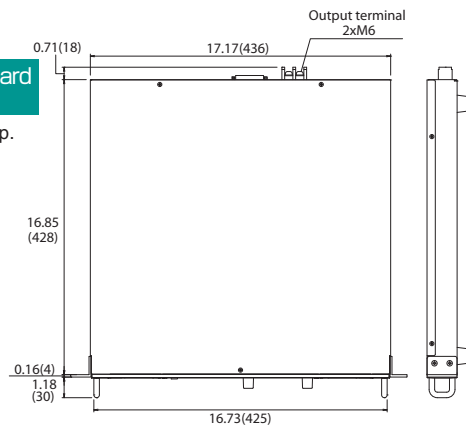
Weight : 6kg typ.



D

Terminal board output type

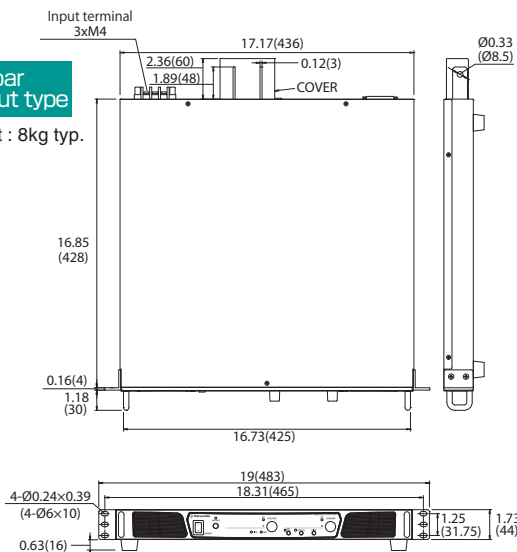
Weight : 6kg typ.



E

Busbar output type

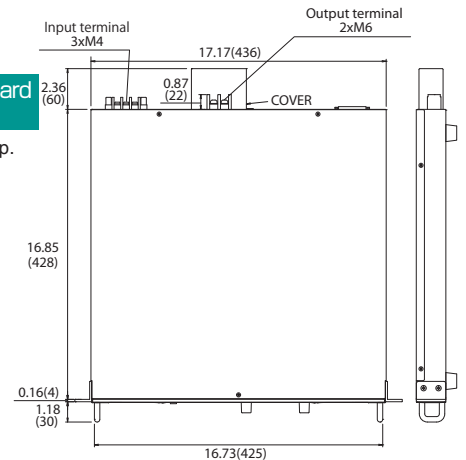
Weight : 8kg typ.



F

Terminal board output type

Weight : 8kg typ.

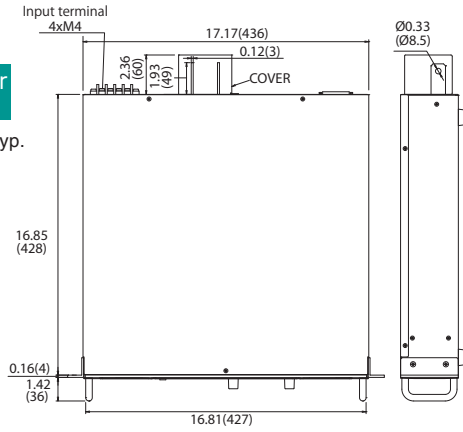


19-inch rack models

G

Small busbar output type

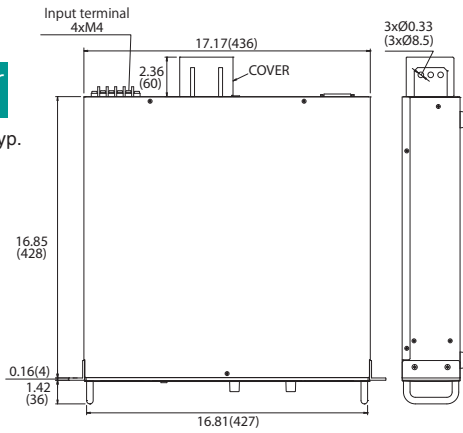
Weight : 14kg typ.



H

Large busbar output type

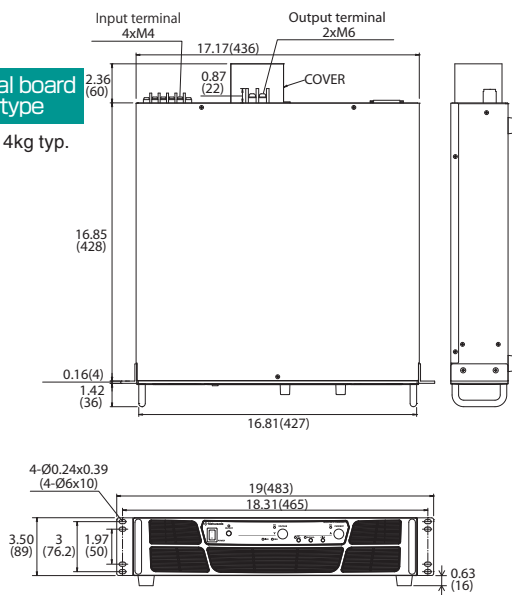
Weight : 14kg typ.



I

Terminal board output type

Weight : 14kg typ.

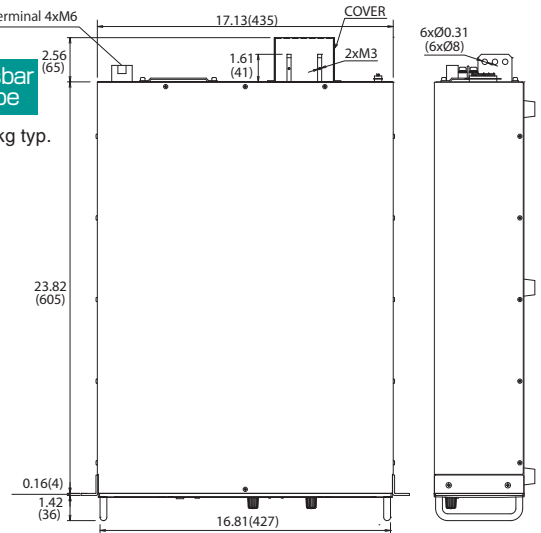


19-inch rack models

J

Small busbar output type

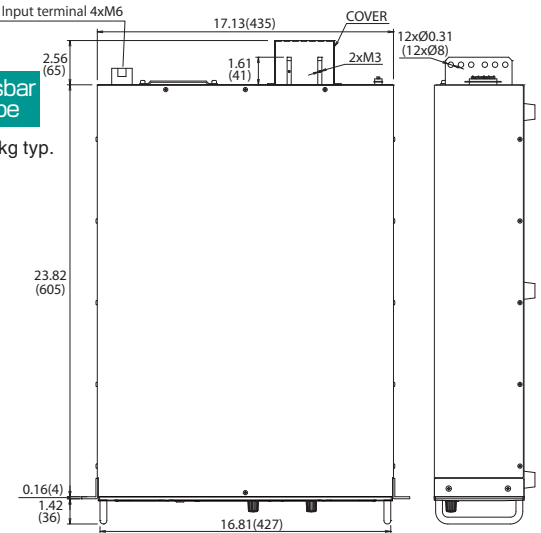
Weight : 45kg typ.



K

Large busbar output type

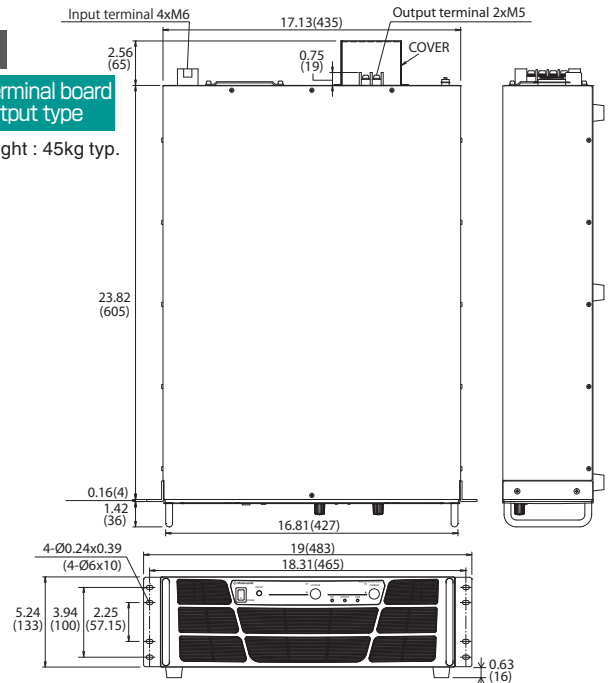
Weight : 45kg typ.



L

Terminal board output type

Weight : 45kg typ.



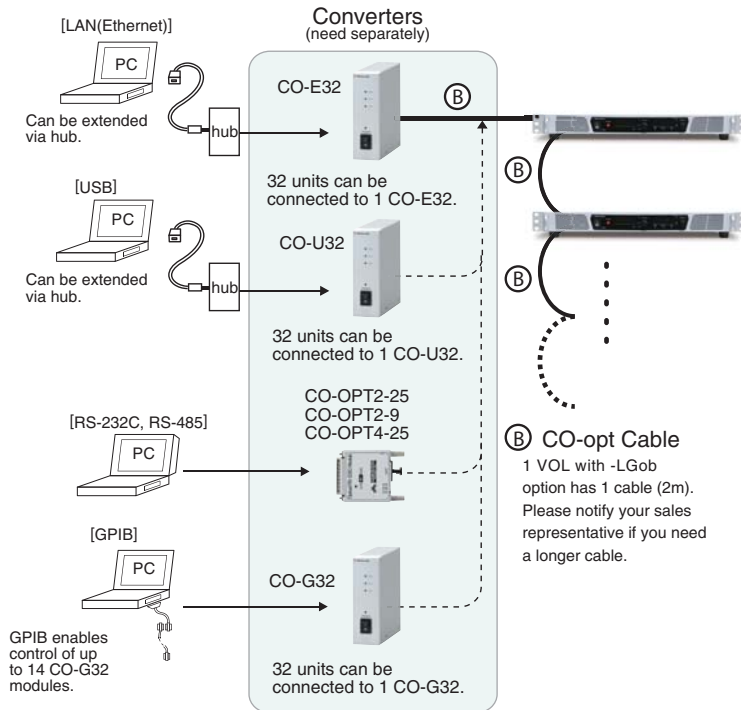
Options

-LGob Optical Interface Board

*1*2

- LGob : Optical interface board + optical cable 2m
- LGob(Fc5) : Optical interface board + optical cable 5m
- LGob(Fc10) : Optical interface board + optical cable 10m
- LGob(Fc20) : Optical interface board + optical cable 20m
- LGob(Fc40) : Optical interface board + optical cable 40m

Optical communication offers insulation control. It is to prevent malfunction such as transient phenomenon by surge, lightning induction, and exogenous noise.



Select the -LGob option when using power supply following environmental condition
Factories which has a lot of noise
(ex. in case of using power supplies and loads near motors and coils.
In case using power supply with high voltage floating (more than 250V)
The length between power supply and controller unit (PC or PLC) is more than 2-meter

-LUUs1 USB Interface Board

*1*2

Enable digital control via USB



USB hub shall be required between VOL and PC when control multiple VOL.

-LEt Ethernet Interface Board

*1*2

Enable digital control via Ethernet



Hub shall be required between VOL and PC when control multiple VOL.

A power supply with this option doesn't have CE marking.

-L(Mc0.5), -L(Mc0.15) Communication cable length change

*2

Change length of CO-M cable to 0.5-meter and 0.15-meter long.

-L(400V), -L(480V), -L(3P), -L(1P)

Input Voltage, Phase

Please see page 6.

A power supply with these options doesn't have CE marking.

AC single phase input cable(3 lines)

Sold separately

25A / 250V single phase, flying lead.

Model : CABLE TYPE5

In case of need of longer than 2.5-meter long cable,
add length in meters at the end of part number. (extension is by meter.)

(ex) 5-meter long cable : CABLE TYPE5(5)

*1) When chose these options, standard digital interface shall not be added.
See CO series catalog for details and function of digital interface.

*2) These options cannot be selected together.
Need to be selected either one.

When ordering, suffix the above option number to the model number.

<e.g.>VOL100-33-LGob(Fc40)(1P)
VOL500-10-LEt(400V)
VOL650-3.6-L(Mc0.5)(3P)
(alphabetical, AC input order)



TECHNICAL NOTE

Connection · Operation

■ Connection of load

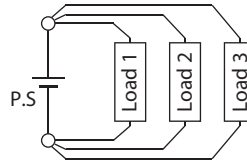
- Please use a short lead wire that is sufficiently thick for the connection.
- Please use PVC electric cable (105°C) that can fully tolerate the voltage used. It is necessary to consider current capacity, length limit of output wire by sensing (0.5V/lead) and so on for wiring with load. Please refer to the following diagram to determine the thickness of cable.

AWG	mm ²	Max current(A)
18	1.1	2
16	1.3	7
14	2.1	11
12	3.3	18
10	5.3	23
8	8.4	39
6	13	67
4	21	106
2	33	170
1	42	209
1/0	53	270
2/0	67	330
3/0	85	350

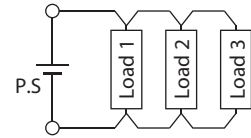
Use several cables or copper bar for model over 350A.

■ Parallel connection of load

○ **Good example**

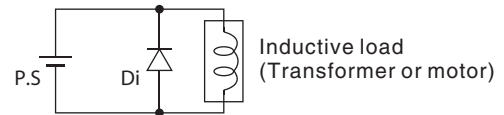


✗ **Bad example**



■ Connection of load

Please insert a diode of which rating is bigger than output voltage and current of power supply to protect the power supply from kick back of load.

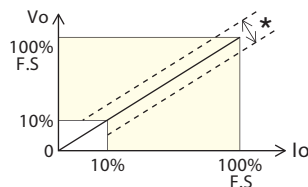


Definition of specifications

Specifications in this catalog, except otherwise specified, refer to values when maximum rating output (full scale*) after 2-hour warm up.

Applicable scope of specifications

"F.S × catalog value(*)" is applied for ripple, stability, regulations and temperature coefficient, and "value if F.S × ±1%(*)" is applied for high-voltage output linearity, monitor linearity and display linearity, both in the range of 10% to 100% of maximum rating output.



Ripple

Indication is in rms that includes high-frequency noise.

Preset

Preset value does not show the actual output status accurately. If you need an accurate setting, conduct actual output without load and set a voltage. Also for setting current, conduct output after shorting the output terminal and gradually raise current before setting at a desired value.

When selecting DC power supply

▶ Important Notice

Products on this catalog have been manufactured with consideration of safety as DC power supply, however please follow instruction manual for operation and make sure to ground the ground terminal for your safety.

Products on this catalog have been manufactured on the precondition that they are used in ground electric potential or within the range of the above series operation. Please contact our sales staff when using the product for floating of high electric potential, etc.

Products on this catalog are manufactured with consideration for protection against load discharge. However for specific experiment or continuous discharge such as sputtering, product may need discharge resistance between power supply and load or could not be used at all. Please consult with our sales staff in advance.

We recommend that you contact our sales staff with your requirement before choosing a product so that you can get the best product and the safety as high-voltage equipment is assured.

