Matsusada Precision

Programmable regulated DC power supply

VOL Series

NEW

# Compact High Power / CVCC

## Programmable regulated DC power supply

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

# VOL series

CE

(except some models)


MADE IN JAPAN

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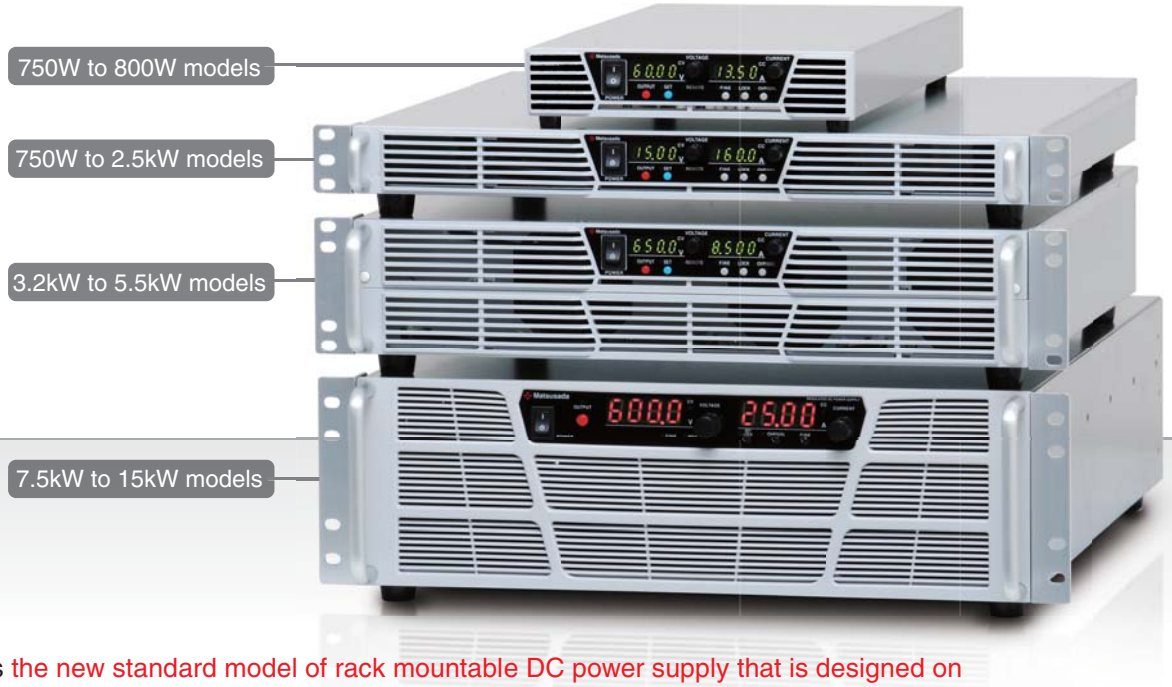
Compact High Power / CVCC
Programmable regulated DC power supply

# 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 6V to 650V / 600W to 15kW total of 157 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 R & D 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.

World Wide
PFC circuit and universal input wound 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

| Max output | | | MODEL | Ripple | | Dim. (⇒P.8,9) |
|---|---|---|---|---|---|---|
| Voltage(V) | Current(A) | Power | | (mVrms) | (mArms)* | |
| 6 | 130 | 780W | Half VOLJ6-130 | 10 | 260 | A |
| 6 | 130 | 780W | VOL6-130 | 10 | 260 | C |
| 6 | 220 | 1.3kW | CE VOL6-220 | 10 | 320 | E |
| 6 | 310 | 1.8kW | VOL6-310 | 10 | 1500 | E |
| 6 | 530 | 3.2kW | VOL6-530 | 10 | 900 | H |
| 7.5 | 1000 | 7.5kW | VOL7.5-1000 | 20 | 5100 | K |
| 8 | 100 | 800W | Half VOLJ8-100 | 20 | 220 | A |
| 8 | 100 | 800W | VOL8-100 | 20 | 220 | C |
| 8 | 180 | 1.4kW | VOL8-180 | 20 | 250 | E |
| 8 | 300 | 2.4kW | VOL8-300 | 20 | 1500 | E |
| 8 | 400 | 3.2kW | VOL8-400 | 20 | 2000 | H |
| 8 | 600 | 4.8kW | VOL8-600 | 20 | 2500 | H |

| Max output | | | MODEL | Ripple | | Dim. (⇒P.8,9) |
|---|---|---|---|---|---|---|
| Voltage(V) | Current(A) | Power | | (mVrms) | (mArms)* | |
| 10 | 80 | 800W | Half VOLJ10-80 | 10 | 160 | A |
| 10 | 80 | 800W | VOL10-80 | 10 | 160 | C |
| 10 | 150 | 1.5kW | CE VOL10-150 | 10 | 300 | E |
| 10 | 240 | 2.4kW | CE VOL10-240 | 10 | 500 | E |
| 10 | 340 | 3.4kW | VOL10-340 | 10 | 900 | H |
| 10 | 510 | 5.1kW | VOL10-510 | 10 | 2000 | H |
| 10 | 1000 | 10kW | VOL10-1000 | 20 | 5100 | K |
| 12.5 | 64 | 800W | Half VOLJ12.5-64 | 20 | 200 | A |
| 12.5 | 64 | 800W | VOL12.5-64 | 20 | 200 | C |
| 12.5 | 120 | 1.5kW | VOL12.5-120 | 20 | 200 | E |
| 12.5 | 190 | 2.4kW | VOL12.5-190 | 20 | 1500 | E |
| 12.5 | 800 | 10kW | VOL12.5-800 | 20 | 2600 | K |

| Max output | | | MODEL | Ripple | | Dim. (⇒P.8,9) |
|---|---|---|---|---|---|---|
| Voltage(V) | Current(A) | Power | | (mVrms) | (mArms)* | |
| 15 | 54 | 800W | Half VOLJ15-54 | 10 | 110 | A |
| 15 | 54 | 800W | VOL15-54 | 10 | 110 | C |
| 15 | 100 | 1.5kW | CE VOL15-100 | 8 | 150 | E |
| 15 | 160 | 2.4kW | CE VOL15-160 | 8 | 300 | E |
| 15 | 227 | 3.4kW | VOL15-227 | 10 | 500 | H |
| 15 | 340 | 5.1kW | VOL15-340 | 15 | 600 | H |
| 16 | 50 | 800W | Half VOLJ16-50 | 10 | 110 | A |
| 16 | 50 | 800W | VOL16-50 | 10 | 110 | C |
| 16 | 95 | 1.5kW | CE VOL16-95 | 10 | 150 | E |
| 16 | 150 | 2.4kW | CE VOL16-150 | 10 | 300 | E |
| 16 | 220 | 3.5kW | VOL16-220 | 10 | 500 | H |
| 16 | 320 | 5.1kW | VOL16-320 | 15 | 600 | H |
| 20 | 40 | 800W | Half VOLJ20-40 | 10 | 80 | B |
| 20 | 40 | 800W | VOL20-40 | 10 | 80 | D |
| 20 | 80 | 1.6kW | CE VOL20-80 | 10 | 160 | E |
| 20 | 125 | 2.5kW | CE VOL20-125 | 12 | 250 | E |
| 20 | 170 | 3.4kW | VOL20-170 | 15 | 300 | G |
| 20 | 260 | 5.2kW | VOL20-260 | 15 | 400 | G |
| 20 | 500 | 10kW | VOL20-500 | 20 | 2600 | J |
| 25 | 400 | 10kW | VOL25-400 | 20 | 1700 | J |
| 30 | 27 | 800W | Half VOLJ30-27 | 10 | 60 | B |
| 30 | 27 | 800W | VOL30-27 | 10 | 60 | D |
| 30 | 53 | 1.6kW | CE VOL30-53 | 20 | 100 | E |
| 30 | 84 | 2.5kW | CE VOL30-84 | 20 | 160 | E |
| 30 | 115 | 3.5kW | ★ VOL30-115 | 20 | 200 | G |
| 30 | 180 | 5.4kW | ★ VOL30-180 | 20 | 260 | G |
| 30 | 333 | 10kW | VOL30-333 | 20 | 1700 | J |
| 35 | 45 | 1.6kW | CE VOL35-45 | 20 | 90 | E |
| 35 | 72 | 2.5kW | CE VOL35-72 | 30 | 150 | E |
| 35 | 100 | 3.5kW | ★ VOL35-100 | 30 | 230 | G |
| 35 | 155 | 5.4kW | ★ VOL35-155 | 30 | 280 | G |
| 40 | 20 | 800W | Half VOLJ40-20 | 15 | 60 | B |
| 40 | 20 | 800W | VOL40-20 | 15 | 60 | D |
| 40 | 40 | 1.6kW | CE VOL40-40 | 20 | 70 | E |
| 40 | 62 | 2.4kW | CE VOL40-62 | 20 | 100 | E |
| 40 | 85 | 3.4kW | ★ VOL40-85 | 20 | 130 | G |
| 40 | 130 | 5.2kW | ★ VOL40-130 | 20 | 180 | G |
| 40 | 250 | 10kW | VOL40-250 | 20 | 100 | J |
| 45 | 18 | 800W | Half VOLJ45-18 | 15 | 60 | B |
| 45 | 18 | 800W | VOL45-18 | 15 | 60 | D |
| 45 | 35 | 1.5kW | CE VOL45-35 | 20 | 70 | E |
| 45 | 55 | 2.4kW | CE VOL45-55 | 30 | 100 | E |
| 45 | 78 | 3.5kW | ★ VOL45-78 | 30 | 130 | G |
| 45 | 120 | 5.4kW | ★ VOL45-120 | 30 | 180 | G |
| 50 | 200 | 10kW | VOL50-200 | 20 | 80 | J |
| 60 | 13.5 | 800W | Half VOLJ60-13.5 | 12 | 45 | B |
| 60 | 13.5 | 800W | VOL60-13.5 | 12 | 45 | D |
| 60 | 26 | 1.5kW | CE VOL60-26 | 20 | 50 | E |
| 60 | 42 | 2.5kW | CE VOL60-42 | 20 | 80 | E |
| 60 | 60 | 3.6kW | ★ VOL60-60 | 20 | 100 | G |
| 60 | 90 | 5.4kW | ★ VOL60-90 | 20 | 135 | G |
| 60 | 167 | 10kW | VOL60-167 | 20 | 67 | J |
| 60 | 250 | 15kW | VOL60-250 | 20 | 100 | J |
| 80 | 10 | 800W | Half VOLJ80-10 | 25 | 20 | B |
| 80 | 10 | 800W | VOL80-10 | 25 | 20 | D |
| 80 | 20 | 1.6kW | CE VOL80-20 | 25 | 40 | E |
| 80 | 31 | 2.4kW | CE VOL80-31 | 25 | 60 | E |
| 80 | 45 | 3.6kW | ★ VOL80-45 | 25 | 80 | G |
| 80 | 68 | 5.4kW | ★ VOL80-68 | 25 | 100 | G |
| 80 | 125 | 10kW | VOL80-125 | 25 | 50 | J |
| 80 | 187.5 | 15kW | VOL80-187.5 | 25 | 100 | J |
| 100 | 8 | 800W | Half VOLJ100-8 | 20 | 20 | B |
| 100 | 8 | 800W | VOL100-8 | 20 | 20 | D |
| 100 | 16 | 1.6kW | CE VOL100-16 | 20 | 25 | F |
| 100 | 25 | 2.5kW | CE VOL100-25 | 25 | 50 | F |
| 100 | 36 | 3.6kW | ★ VOL100-36 | 25 | 60 | I |
| 100 | 55 | 5.5kW | ★ VOL100-55 | 25 | 80 | I |
| 100 | 100 | 10kW | VOL100-100 | 25 | 40 | J |
| 100 | 150 | 15kW | VOL100-150 | 25 | 100 | J |

| Max output | | | MODEL | Ripple | | Dim. (⇒P.8,9) |
|---|---|---|---|---|---|---|
| Voltage(V) | Current(A) | Power | | (mVrms) | (mArms)* | |
| 120 | 6.6 | 800W | Half VOLJ120-6.6 | 30 | 20 | B |
| 120 | 6.6 | 800W | VOL120-6.6 | 30 | 20 | D |
| 125 | 80 | 10kW | VOL125-80 | 25 | 32 | J |
| 125 | 120 | 15kW | VOL125-120 | 25 | 50 | J |
| 150 | 5 | 750W | Half VOLJ150-5 | 25 | 10 | B |
| 150 | 5 | 750W | VOL150-5 | 25 | 10 | D |
| 150 | 10 | 1.5kW | CE VOL150-10 | 25 | 20 | F |
| 150 | 16.6 | 2.5kW | CE VOL150-16.6 | 25 | 35 | F |
| 150 | 24 | 3.6kW | CE VOL150-24 | 25 | 40 | I |
| 150 | 36 | 5.4kW | CE VOL150-36 | 25 | 55 | I |
| 150 | 66 | 10kW | VOL150-66 | 25 | 26 | J |
| 150 | 100 | 15Kw | VOL150-100 | 25 | 50 | J |
| 160 | 5 | 800W | Half VOLJ160-5 | 30 | 10 | B |
| 160 | 5 | 800W | VOL160-5 | 30 | 10 | D |
| 200 | 4 | 800W | Half VOLJ200-4 | 35 | 15 | B |
| 200 | 4 | 800W | VOL200-4 | 35 | 15 | D |
| 200 | 8 | 1.6kW | CE VOL200-8 | 35 | 15 | F |
| 200 | 12.5 | 2.5kW | CE VOL200-12.5 | 35 | 25 | F |
| 200 | 18 | 3.6kW | VOL200-18 | 35 | 30 | I |
| 200 | 27 | 5.4kW | VOL200-27 | 35 | 40 | I |
| 200 | 50 | 10kW | VOL200-50 | 35 | 20 | J |
| 200 | 75 | 15kW | VOL200-75 | 35 | 20 | J |
| 250 | 3.2 | 800W | Half VOLJ250-3.2 | 50 | 10 | B |
| 250 | 3.2 | 800W | VOL250-3.2 | 50 | 10 | D |
| 250 | 40 | 10kW | VOL250-40 | 35 | 16 | J |
| 250 | 60 | 15kW | VOL250-60 | 35 | 20 | J |
| 300 | 2.5 | 750W | Half VOLJ300-2.5 | 50 | 10 | B |
| 300 | 2.5 | 750W | VOL300-2.5 | 50 | 10 | D |
| 300 | 5.3 | 1.6kW | CE VOL300-5.3 | 50 | 18 | F |
| 300 | 8 | 2.4kW | CE VOL300-8 | 50 | 18 | F |
| 300 | 8.3 | 2.5kW | CE VOL300-8.3 | 50 | 18 | F |
| 300 | 12 | 3.6kW | VOL300-12 | 50 | 20 | I |
| 300 | 18 | 5.4kW | VOL300-18 | 60 | 30 | I |
| 300 | 33 | 9.9kW | VOL300-33 | 60 | 13 | J |
| 300 | 50 | 15kW | VOL300-50 | 60 | 20 | J |
| 350 | 2.2 | 770W | Half VOLJ350-2.2 | 50 | 10 | B |
| 350 | 2.2 | 770W | VOL350-2.2 | 50 | 10 | D |
| 400 | 25 | 10kW | VOL400-25 | 60 | 10 | M |
| 400 | 37.5 | 15kW | VOL400-37.5 | 60 | 10 | M |
| 500 | 1.6 | 800W | Half VOLJ500-1.6 | 30 | 5 | B |
| 500 | 1.6 | 800W | VOL500-1.6 | 60 | 5 | D |
| 500 | 3.2 | 1.5kW | CE VOL500-3.2 | 60 | 5 | F |
| 500 | 5 | 2.5kW | CE VOL500-5 | 60 | 12 | F |
| 500 | 7 | 3.5kW | VOL500-7 | 60 | 15 | I |
| 500 | 11 | 5.5kW | VOL500-11 | 60 | 20 | I |
| 500 | 20 | 10kW | VOL500-20 | 60 | 8 | M |
| 500 | 30 | 15kW | VOL500-30 | 60 | 10 | M |
| 600 | 1.3 | 780W | Half VOLJ600-1.3 | 60 | 5 | B |
| 600 | 1.3 | 780W | VOL600-1.3 | 60 | 5 | D |
| 600 | 2.7 | 1.6kW | CE VOL600-2.7 | 60 | 5 | F |
| 600 | 4.1 | 2.4kW | CE VOL600-4.1 | 60 | 10 | F |
| 600 | 6 | 3.6kW | VOL600-6 | 60 | 15 | I |
| 600 | 9 | 5.4kW | VOL600-9 | 60 | 15 | I |
| 600 | 17 | 10kW | VOL600-17 | 60 | 7 | M |
| 600 | 25 | 15kW | VOL600-25 | 60 | 10 | M |
| 650 | 1.2 | 780W | Half VOLJ650-1.2 | 150 | 5 | B |
| 650 | 1.2 | 780W | VOL650-1.2 | 150 | 5 | D |
| 650 | 2.5 | 1.6kW | VOL650-2.5 | 150 | 10 | F |
| 650 | 3.8 | 2.5kW | VOL650-3.8 | 150 | 10 | F |
| 650 | 5.5 | 3.6kW | VOL650-5.5 | 150 | 15 | I |
| 650 | 8.5 | 5.5kW | VOL650-8.5 | 150 | 15 | I |
| 650 | 13 | 8.5kW | VOL650-13 | 100 | 15 | L |
| 650 | 15.5 | 10kW | VOL650-15.5 | 100 | 30 | M |
| 650 | 23 | 15kW | VOL650-23 | 100 | 45 | M |

* This is the value in 10% to 100% of rated output when resistive load is connected. Please contact our sales office about the value when non-linear load such as semiconductor of laser diode etc. is connected.

Half : Half rack size.

CE : 1.3kW to 1.6kW models correspond to Low Voltage Directive and EMC Directive. 1.8kW to 5.5kW models correspond to Low Voltage Directive. The model which has not yet acquired CE marking at present is going to acquire it in future. Please refer to our sales office for the latest acquisition situation. In addition, the model which attached -LMi option or -L(400V) / -L(480V) / -L(3P ) / -L(1P) option is out of CE marking acquisition object. (See P.10 about these options.)

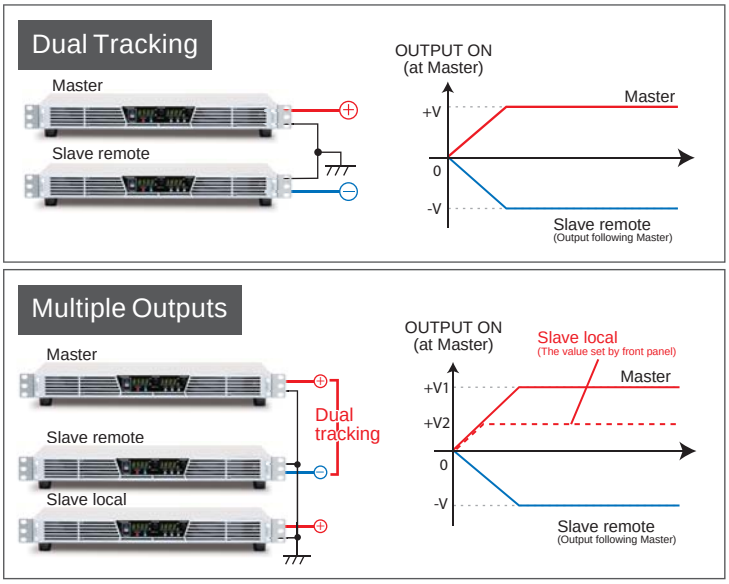
★ : These models are going to achieve CE marking approval in a few days.

# Standard functions

## 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.

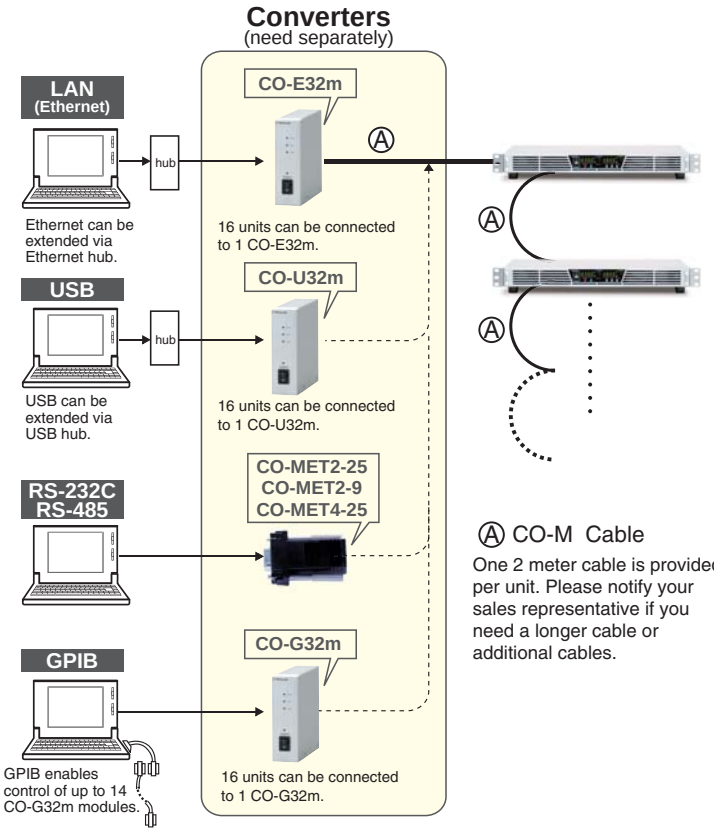
*Please refer to P.7 for detail connection.




## Digital Interface

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

*Ethernet is a registered trademark of Xerox Corporation.




Ⓐ CO-M Cable

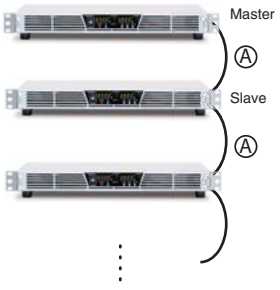
One 2 meter cable is provided per unit. Please notify your sales representative if you need a longer cable or additional cables.

## 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 complelely.

## Master / Slave Control




Up to 16 units

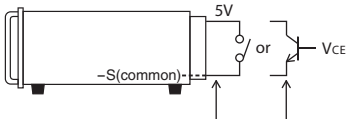
Ⓐ CO-M cable

One 2-meter cable is attached to a power supply.
Please notify your sales representative if you need a longer cable or additional cables.

This function is not for output current equally from each VOL parallelly-connected. If equal output current is desired, please consult with sales.

Master / Slave control is only possible with units with the same model number.

## Remote Switch ON / OFF

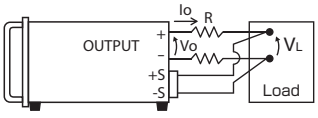



| Output | Relay | Open collector |
|---|---|---|
| ON | Short | $V_{CE}$ ≦ 0.4V |
| OFF | Open | $V_{CE}$ ≧ 2V |

·Sink current 1mA
·Logic of OUTPUT can be reversed

## Remote sensing

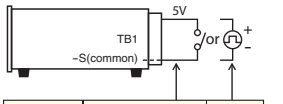
Prevents voltage drop down ($V_O$-$V_L$) due to resistance (R) or deterioration of stability by contact resistance.




| Output voltage (V) | Voltage drop (V MAX) |
|---|---|
| ≦20 | 0.5 |
| 20< ≦60 | 1 |
| 60< | 2 |

## Remote Control

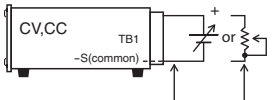
### Remote / Local change




| Mode | External relay | TTL |
|---|---|---|
| Remote | Short | Low |
| Local | Open | High |

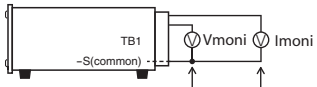
Each of voltage, current or all the modes can be switched by relay or TTL signal.

### Output control



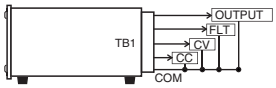

| Vout·Iout | Control voltage | R |
|---|---|---|
| 0 to MAX | 0 to 5V / 0 to 10V input imp.500kΩ | 0 to approx.10kΩ or 0 to approx. 5kΩ |

### Output Monitor




| Output 0 to MAX | 0 to 5V / 0 to 10V Output imp.1kΩ | 0 to 5V / 0 to 10V Output imp.1kΩ |
|---|---|---|

### Status Output




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

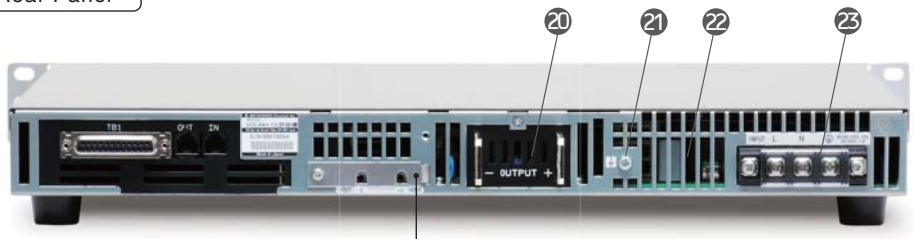
*ON when OVP, UVL, OTP, ACF, reverse connection of sensing or interlock(LD) status.

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

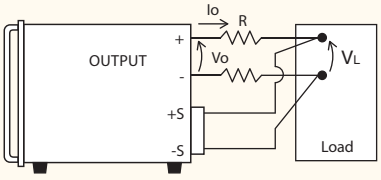
# Functions

### Front Panel


### Rear Panel




**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＜ ≦60 | 1 |
| 60＜ | 2 |

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

# Specifications

● : Single phase ★ : Three-phase

**Input**

| Lineup | Input Voltage range (50 / 60Hz) | Rated input voltage (50Hz / 60Hz) | Input Currenr*1 | Input Current Protection | Model |
|---|---|---|---|---|---|
| 750 to 800W models | 85 to 264VAC | 100 to 240V ● | 11A @ 100V | Fuse15A | Standard |
| 1.3 to 1.6kW models | 85 to 264VAC*2 | 100 to 240V ● | 20A @ 100V | Fuse30A | Standard |
| 1.8 to 2.5kW models | 180 to 264VAC*3 | 200 to 240V ● | 16A @ 200V | Fuse30A | Standard |
| | | 200 to 240V ★ | 10A @ 200V | | -L(3P) option |
| 3.2 to 3.6kW models | 180 to 264VAC | 200 to 240V ● | 26A @ 200V | Fuse30A | -L(1P) option |
| | 180 to 264VAC*3 | 200 to 240V ★ | 15A @ 200V | | Standard |
| | 342 to 460VAC | 380 to 415V ★ | 8A @ 400V | Fuse15A | -L(400V) option |
| 4.8 to 5.5kW models | 180 to 264VAC*3 | 200 to 240V ★ | 22A @ 200V | Fuse30A | Standard |
| | 342 to 460VAC | 380 to 415V ★ | 12A @ 400V | Fuse20A | -L(400V) option |
| 7.5 to 10kW models | 180 to 253VAC | 200 to 230V ★ | 45A@200V | Fuse75A | Standard |
| | 342 to 440VAC | 380 to 400V ★ | 24A@400V | Fuse50A | -L(400V) option |
| | 432 to 528VAC | 480V ★ | 20A@480V | | -L(480V) option |
| 15kW models | 180 to 253VAC | 200 to 230V ★ | 65A@200V | Fuse100A | Standard |
| | 342 to 440VAC | 380 to 400V ★ | 35A@400V | Fuse50A | -L(400V) option |
| | 432 to 528VAC | 480V ★ | 27A@480V | | -L(480V) option |

[ Power factor ] 750W to 5.5kW models: 0.99 typ. (single phase) 0.95 typ. (three phase) 7.5kW to 15kW models : 0.88 typ.

*1 : At maximum output power. *2 : Rated input voltage range is between 100 to 240VAC (50 / 60Hz) while applying CE marking.

*3 : Rated input voltage range is between 200 to 240VAC (50 / 60Hz) while applying CE marking.

**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.

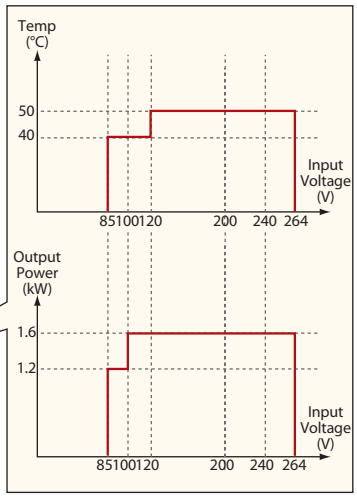
Over temperature protection (OTP)
Output is cut off when internal part is heated abnormally.
Reset (after the temperature has gone down to normal) : Manual recovery by OUTPUT switch or remote switch.

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 16 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 (the time before returning to less than 10% of the setting voltage for 70% to 100% load change at the time of CV operating)

**Operation temperature**

up to 1.6kW 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.
1.8kW 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 (up to 800W models : DC500V 1minute)

**Accessories**

·Instruction manual (1) ·Output terminal cover (1) ·Remote connector cover (1)
·CO-M cable 2m (1) ·AC cable 2.5m (1) <only for 750W to 800W models>

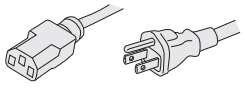
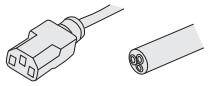
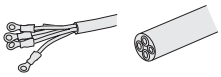
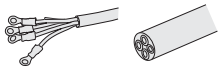
# Various Digital Control Functions

| | |
|---|---|
| **Control function** | Output ON / OFF setting |
| | Status output (fault / output / OVP / UVL / OTP / ACF / reversible sense connection / interlock) |
| | Maximum 16 units(-LGob model : 32units) 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 |
| | Output voltage setting / Output current setting 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.

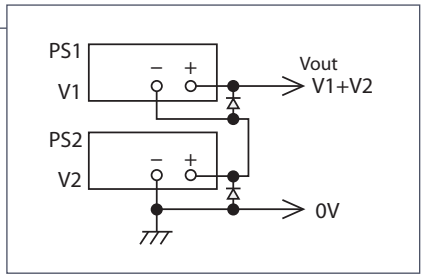
| CABLE TYPE 8 (attached by 750W to 800W models) | CABLE TYPE 3 (separate) (available for 750W to 800W models) | CABLE TYPE 5 (separate) (available for 1.3kW to 2.5kW models) | CABLE TYPE 6 (separate) (available for 2.5kW to 5.5kW models) | CABLE TYPE 7 (separate) (available for 7.5kW to 15kW models) |
|---|---|---|---|---|
| 125V / 15A | 250V / 10A | 250V / 25A | 250V / 25A | 250V / 75A |
|  |  |  |  |  |

# Operation example

VOL series of same model number can be connected in series or parallel to increase output voltage or current. In that case, local control or the control in the digital master slave is recommended.
Because the common of the outside input/output control connector (TB1) is connected to the negative output, please do not connect common more than two.

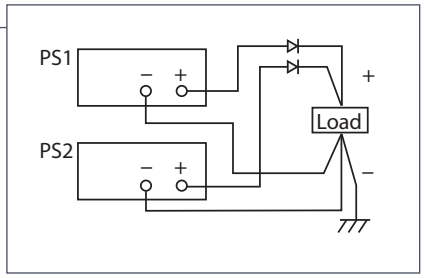
## Series operation

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.



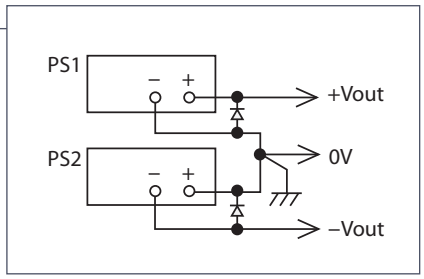

## Parallel operation

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

+output and –output are available.



# Dimensions inch(mm)

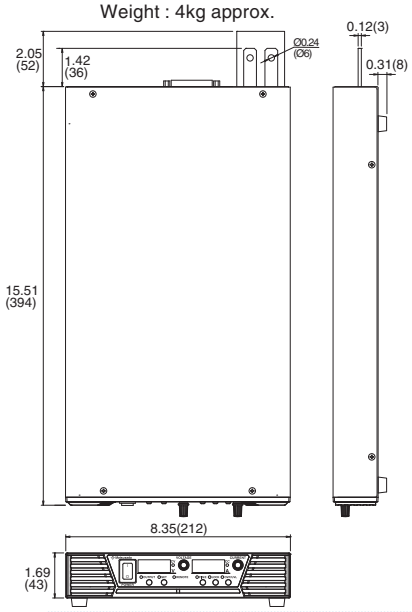
There are exhaust holes on rear panel for forced air cooling.
In case placed in a closed cabinet without extra room more than 30cm, apply additional forced cooling.

## Half rack models

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

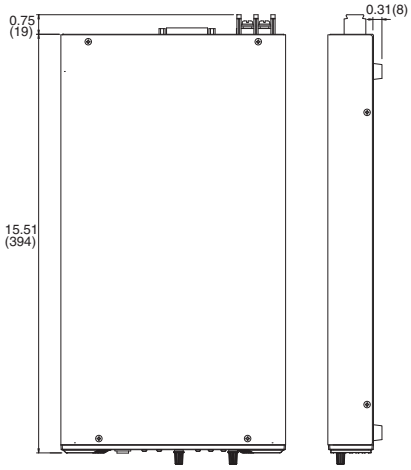
### A Busbar output type

Weight : 4kg approx.




### B Terminal board output type

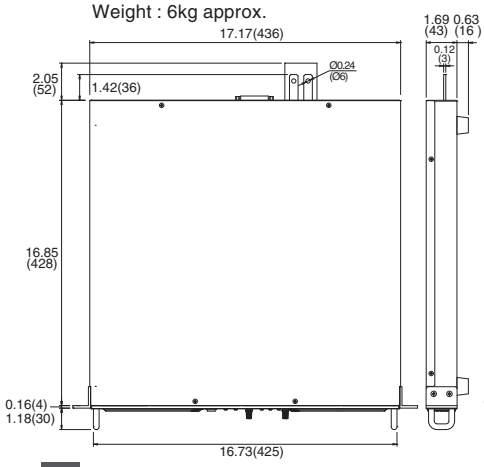
Weight : 4kg approx.




## 19-inch rack models

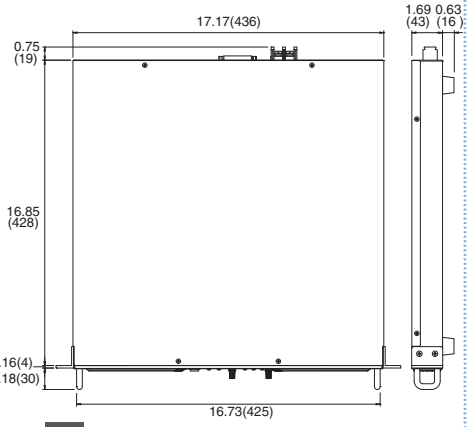
### C Busbar output type

Weight : 6kg approx.



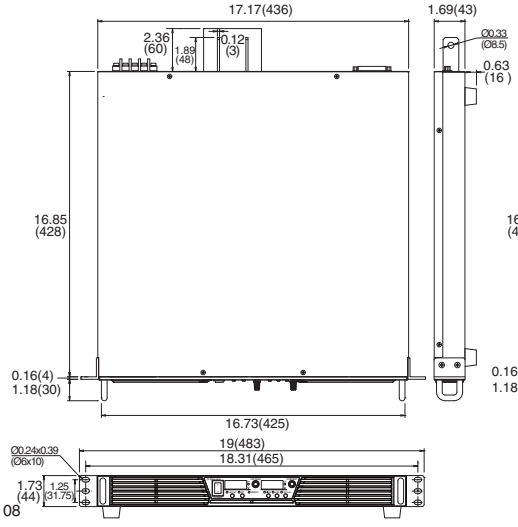

### D Terminal board output type

Weight : 6kg approx.



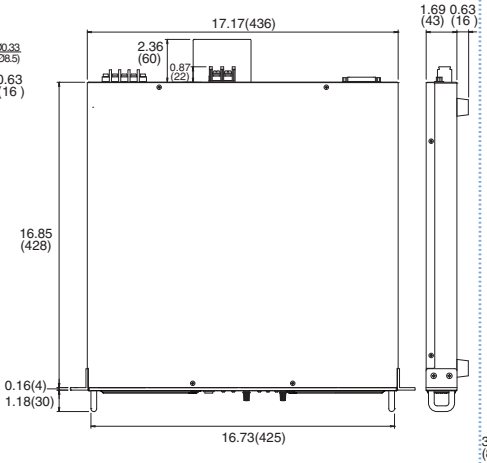

### E Busbar output type

Weight : 8kg approx.




### F Terminal board output type

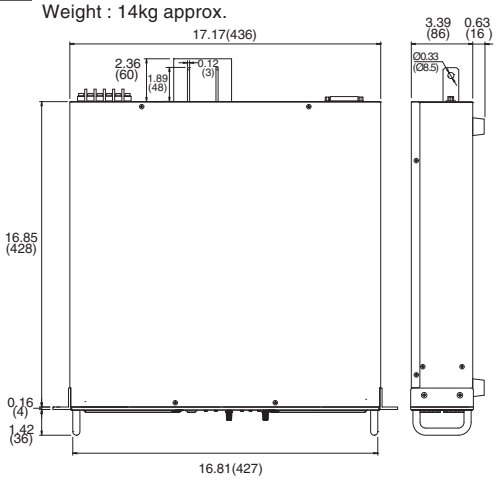
Weight : 8kg approx.




## 19-inch rack models

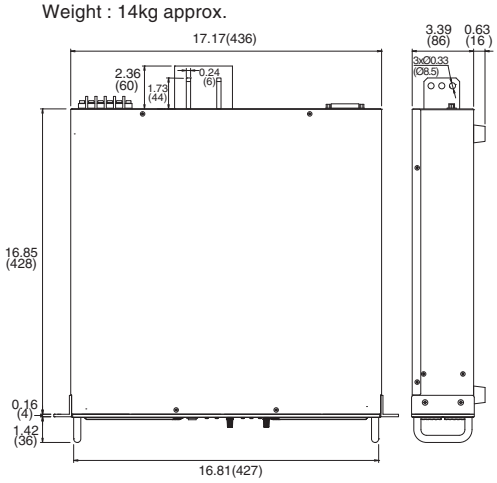
### G Small busbar output type

Weight : 14kg approx.



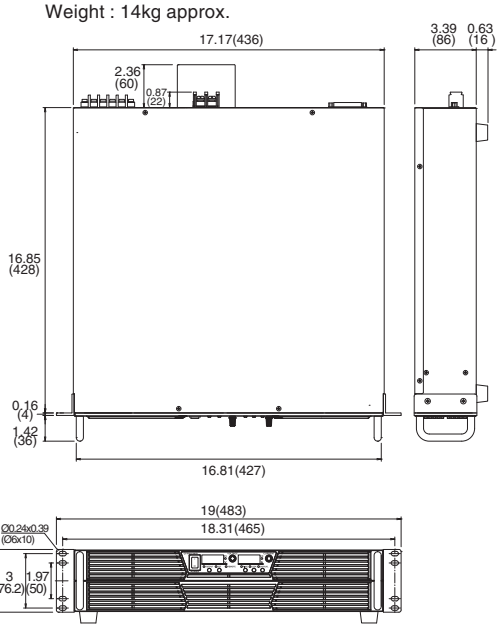

### H Large busbar output type

Weight : 14kg approx.




### I Terminal board output type

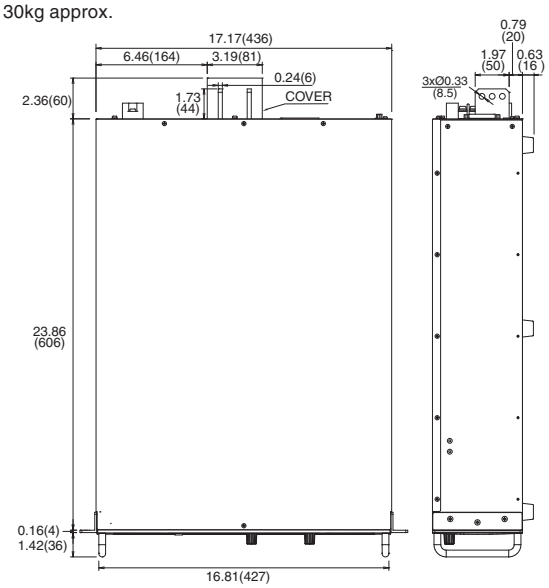
Weight : 14kg approx.



## 19-inch rack models

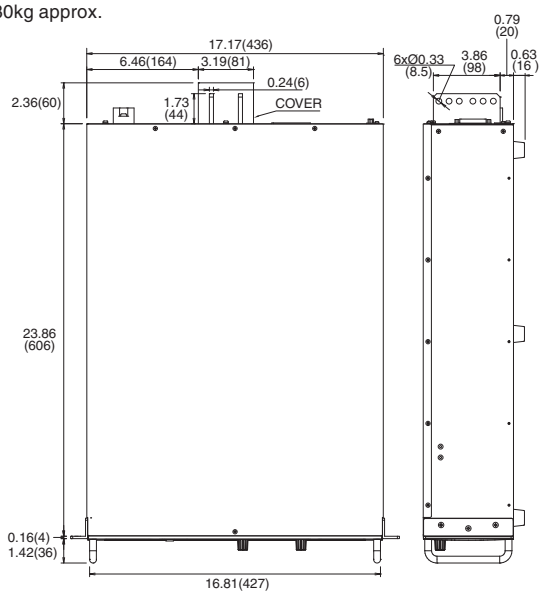
### J Small busbar output type

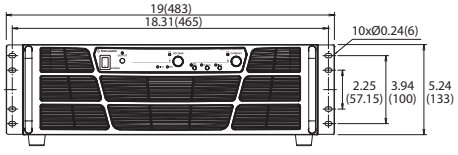
Weight : 30kg approx.




### K Large busbar output type

Weight : 30kg approx.

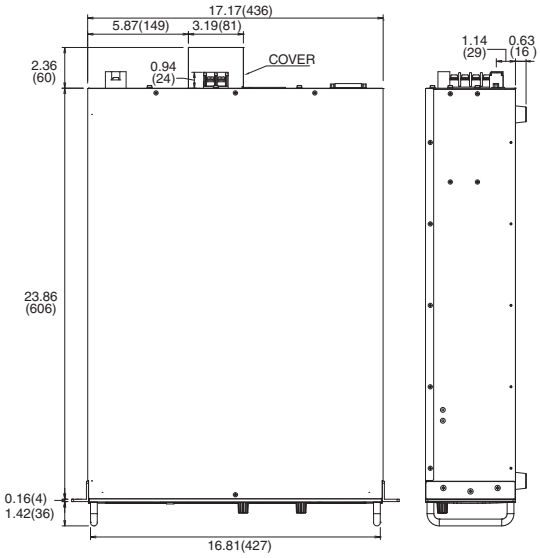



## 19-inch rack models

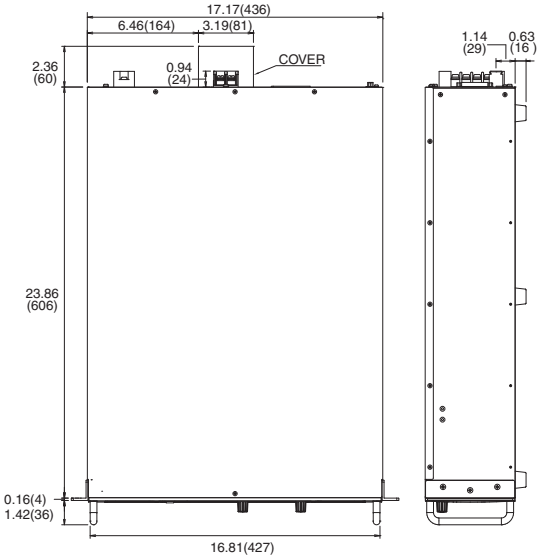
### L Terminal board output type

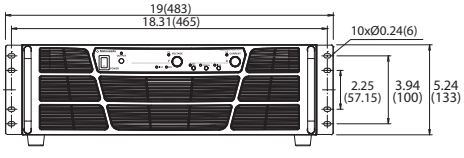
Weight : 30kg approx.




### M Terminal board output type

Weight : 30kg approx.



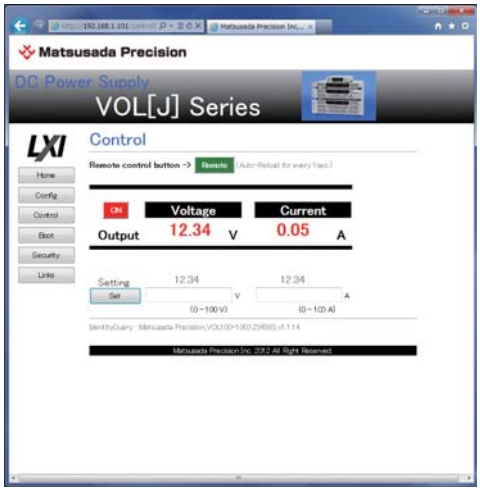



# Options

## -LMi : Multi-digital interface *

Digital control by LAN(Ethernet), USB(USBTMC) and RS-485(Multidrop) is available. (These simultaneous use is impossible. And, RS-485 supports only FULL DUPLEX communications.)
This option includes -L(SCPI) option, and attaches IVI driver corresponding to SCPI command. It makes it easy for control program development with various programming languages such as LabView, VisualBasic and C# etc.

The model with this option does not have CE marking.




## -LUs1 : USB Interface Board *

The models with USB interface integrate it with -LMi option model. But the conventional -LUs1 option models continue the production, too. Please refer to our sales office for details.

## -L(SCPI) : SCPI command *

Enable control via SCPI command.

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

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

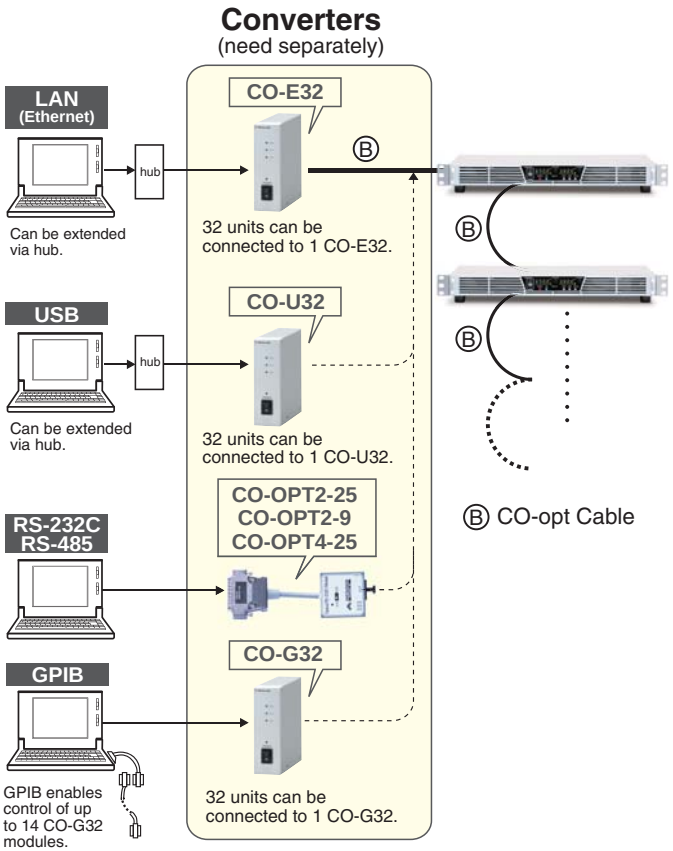
Please see page 6.

The model with these options does not have CE marking.

## -LGob : Optical Interface Board *

**-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

* : These options cannot be selected together. Need to be selected either one.
See CO series catalog for details and function of digital interface.

When ordering , suffix the above option number to the model number.
<e.g.> VOL100-36-LGob(Fc40)(SCPI)(1P)
VOL500-11-LUs1(400V)
VOL650-3.8-L(Mc0.5)(3P) (alphabetical, AC input order)

## Sold separately AC single phase input cable(3 lines)

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)

# TECHNICAL NOTE

## Connection · Operation

### Connection of load

· Please use a short lead wire that is sufficiently thick for the connection.

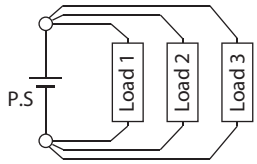
· Please use PVC electric cable (105°C) that can fully tolerate the voltage used. It is necessary to consider current capacity, length limit of output wire by sensing (0.5V/lead) and so on for wiring with load. Please refer to the following diagram to determine the thickness of cable.

| AWG | mm2 | 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 |

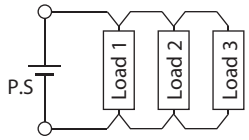
Use several cables or copper bar for model over 350A.

### Parallel connection of load

**O Good example**




**✕ Bad example**

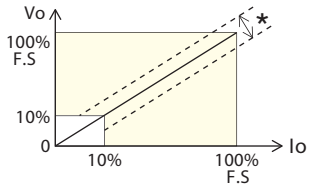



## Definition of specifications

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.

FAX

USA/canada : +1-888-652-8651

other countries : +81-6-6150-5089

# Customer Inquiry Sheet (VOL 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.


**Matsusada Precision Inc.**

For products www.matsusada.com/product For contact www.matsusada.com/contact

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