Matsusada Precision

Compact and high power DC-DC converter

VDD Series

NEW

HIgh power of 6kW max.
Low profile and light weight design

Programmable DC-DC converter

VDD series

6V to 650V

1.5A to 600A

1kW to 6kW

Suitable for R&D of a sollar battery, secondary battery, EV and so on.

1 to 2kW models

3 to 5kW models

6kW models

www.matsusada.com

VDD series

Programmable DC-DC converter with multi function and excellent operability

VDD series is a high power and variable output DC-DC converter which can be operated on DC.
Because the DC operation, VDD is most suitable for many applications.
For example, it is the best choice for R&D of next-generation energy systems and anti-disaster measure systems, such as Smart house in which electricity is supplied as DC mutually between home rechargeable batteries and EVs, and Voltage adjustment when driving DC electronic equipment by emergency large rechargeable batteries.
Furthermore, you can istall VDD into your system easily, because it is equipped with various digital interface such as LAN (Ethernet *1) and USB. *2

*1 : Ethernet is a registered trademark of Xerox Corp.
*2 : Adaptors will be needed additionally. And, -LGob option will be needed if it will be used under specific condition. Please see page 10 for detail.

Compact and high power
1kW to 6kW

Ideal for research and development with low noise switching method.

Wide input voltage is available.

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.

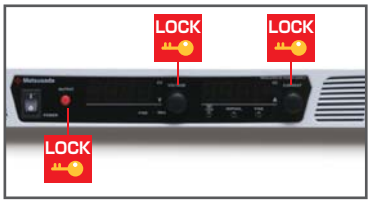
Lineup

Output voltage (V)	Output current (A)	Output power (W)	Model	Ripple	
				(mVrms)	(mArms)*
0 to 6	0 to 133	800	VDD6-133	8	320
	0 to 266	1600	VDD6-266	8	1500
	0 to 500	3000	VDD6-500	10	900
0 to 8	0 to 240	1900	VDD8-240	8	3000
	0 to 600	4800	VDD8-600	10	3000
0 to 10	0 to 90	900	VDD10-90	8	300
	0 to 180	1800	VDD10-180	8	500
	0 to 300	3000	VDD10-300	10	900
	0 to 500	5000	VDD10-500	10	3000
0 to 15	0 to 60	900	VDD15-60	8	150
	0 to 133	2000	VDD15-133	8	300
	0 to 200	3000	VDD15-200	10	500
	0 to 333	5000	VDD15-333	15	600
0 to 20	0 to 50	1000	VDD20-50	8	160
	0 to 100	2000	VDD20-100	8	250
	0 to 150	3000	VDD20-150	15	300
	0 to 250	5000	VDD20-250	15	400
0 to 30	0 to 33	1000	VDD30-33	8	100
	0 to 66	2000	VDD30-66	8	160
	0 to 100	3000	VDD30-100	20	200
	0 to 166	5000	VDD30-166	20	260
0 to 35	0 to 28	1000	VDD35-28	8	90
	0 to 57	2000	VDD35-57	8	150
	0 to 85	3000	VDD35-85	30	230
	0 to 142	5000	VDD35-142	30	280
0 to 45	0 to 22	1000	VDD45-22	8	70
	0 to 44	2000	VDD45-44	8	100
	0 to 66	3000	VDD45-66	30	130
	0 to 110	5000	VDD45-110	30	180
0 to 60	0 to 16.6	1000	VDD60-16.6	8	50
	0 to 33.3	2000	VDD60-33.3	8	80
	0 to 50	3000	VDD60-50	30	100
	0 to 83	5000	VDD60-83	30	135
0 to 80	0 to 12.5	1000	VDD80-12.5	8	40
	0 to 25	2000	VDD80-25	8	60
	0 to 37	3000	VDD80-37	30	80
	0 to 62	5000	VDD80-62	30	100
0 to 100	0 to 10	1000	VDD100-10	8	25
	0 to 20	2000	VDD100-20	8	50
	0 to 30	3000	VDD100-30	30	60
	0 to 50	5000	VDD100-50	30	80
0 to 150	0 to 6.6	1000	VDD150-6.6	10	20
	0 to 13.3	2000	VDD150-13.3	25	35
	0 to 20	3000	VDD150-20	30	40
	0 to 33	5000	VDD150-33	30	55
0 to 200	0 to 5	1000	VDD200-5	40	15
	0 to 10	2000	VDD200-10	40	25
	0 to 15	3000	VDD200-15	40	30
	0 to 25	5000	VDD200-25	40	40
0 to 300	0 to 3.3	1000	VDD300-3.3	25	10
	0 to 6.6	2000	VDD300-6.6	35	18
	0 to 10	3000	VDD300-10	50	20
	0 to 16.6	5000	VDD300-16.6	50	30
0 to 350	0 to 18	6000	VDD350-18	80	30
0 to 500	0 to 2	1000	VDD500-2	100	5
	0 to 4	2000	VDD500-4	100	12
	0 to 6	3000	VDD500-6	100	15
	0 to 10	5000	VDD500-10	100	20
0 to 600	0 to 1.66	1000	VDD600-1.66	60	5
	0 to 3.3	2000	VDD600-3.3	75	10
	0 to 5	3000	VDD600-5	150	15
	0 to 8.3	5000	VDD600-8.3	150	15
0 to 650	0 to 1.5	1000	VDD650-1.5	150	5
	0 to 3	2000	VDD650-3	150	10
	0 to 4.6	3000	VDD650-4.6	150	15
	0 to 7.6	4900	VDD650-7.6	150	15

* This is the value of rated output current at 10% to 100% of rated output voltage.

Standard functions

Key Lock Function



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

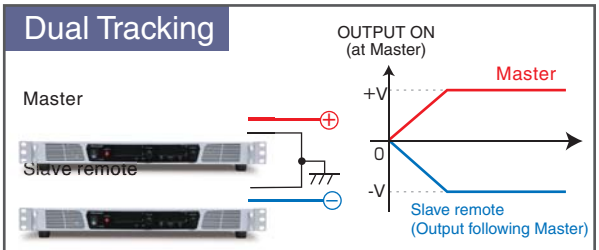
Lock all the function other than reset lock mode. This mode is good for purpose to avoid mis-operation completely.

Dual Tracking, Multiple Outputs

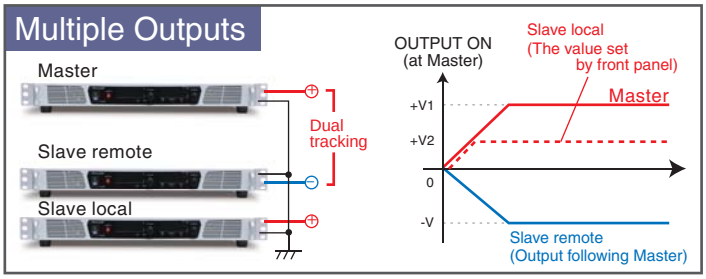
Dual tracking control, which enables both positive and negative outputs simultaneously in master slave operation, is possible. Multi outputs and various versatile operations are also possible by combining above dual tracking control and slave local mode. Positive and negative output(+V, -V) of dual tracking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

*Please refer to P.9 for detail connection.

Dual Tracking

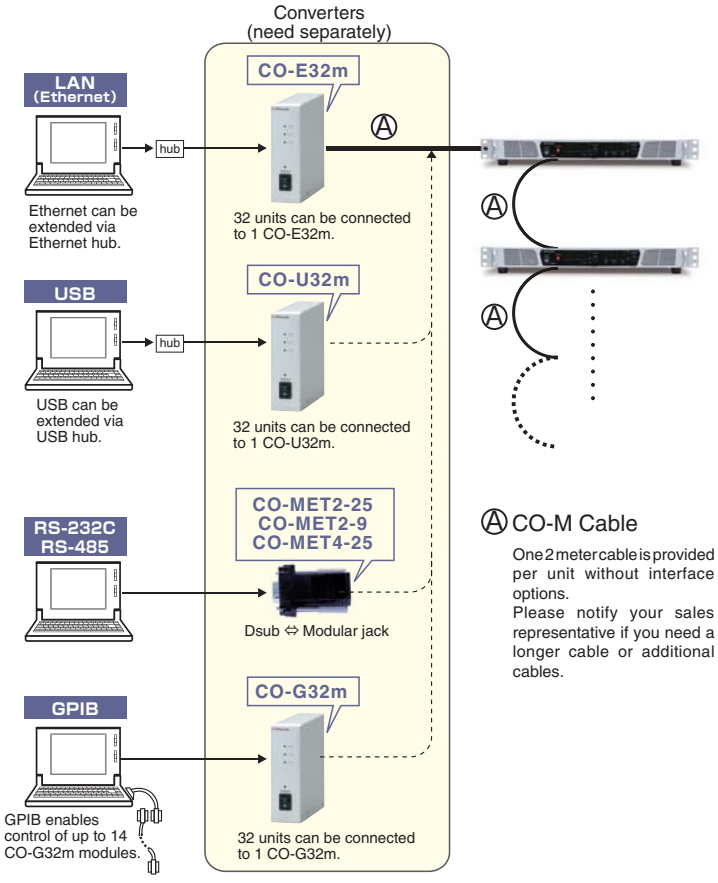


Multiple Outputs



Digital interface

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

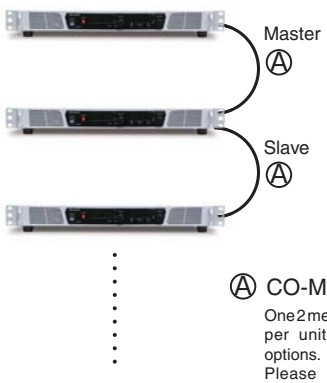


Ⓐ CO-M Cable

One 2 meter cable is provided per unit without interface options.
Please notify your sales representative if you need a longer cable or additional cables.

Master / Slave control

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

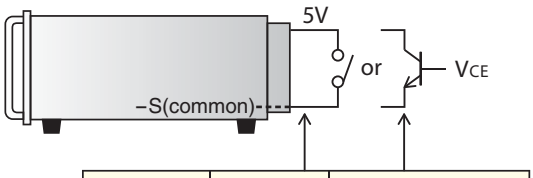


Ⓐ CO-M Cable

One 2 meter cable is provided per unit without interface options.
Please notify your sales representative if you need a longer cable or additional cables.

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

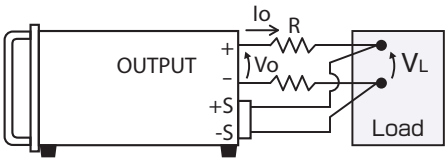


Output	Relay	Open collector
ON	Short	V_{CE} ≦ 0.4V
OFF	Open	V_{CE} ≧ 2V

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

Remote sensing

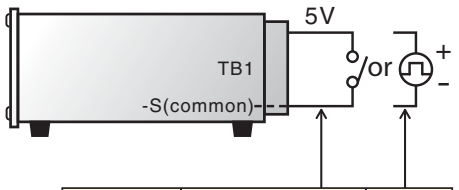
Prevents voltage drop down (V_O-V_L) due to resistance (R) or deterioration of stability by contact resistance.



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

Remote Control

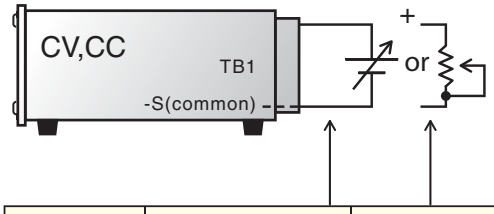
Remote / Local change



Mode	External relay	TTL
Remote	Short	Low
Local	Open	High

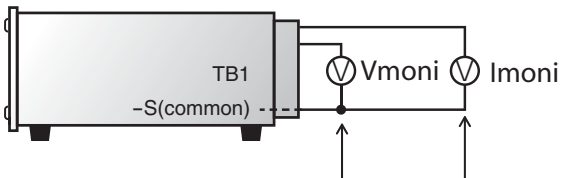
Each of voltage, current or all the modes can be switched by relay or TTL signal.

Output control



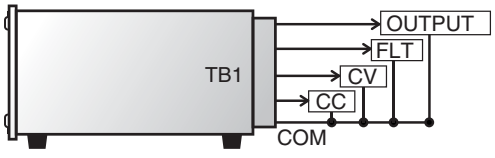
Vout·Iout	Control voltage	R
0 to MAX	0 to 5V / 0 to 10V input imp. 500kΩ	0 to approx. 10kΩ or 0 to approx. 5kΩ

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



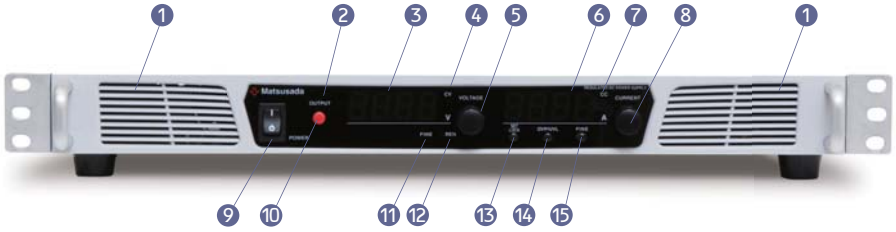
OUTPUT ON when OUTPUT
FLT ON when fault *
CV CC ON when each mode

*On when OVP, UVL, OTP, DCF, 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.

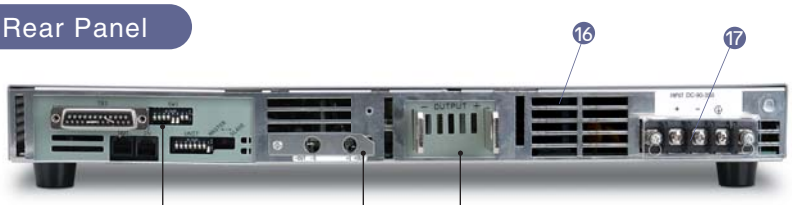
Functions

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. **DC input terminal (M4)**

Rear Panel



Function setting switch(SW1)

[Voltage Control]

0V to 5V/10V Local ⟷ 0 to approx.10kΩ or 0 to approx. 5kΩ

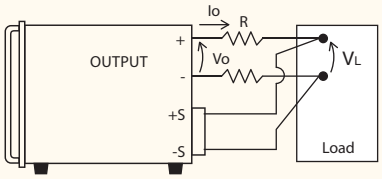
[Current Control]

0V to 5V/10V Local ⟷ 0 to approx.10kΩ or 0 to approx. 5kΩ

[Blackout Protection]

OFF ⟷ ON

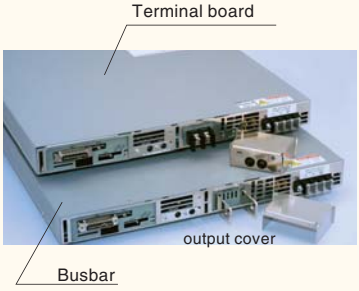
Remote sensing



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

Output terminal



Various Digital Control Functions

Control function	Output ON/OFF setting
	Status output (fault / output / OVP / UVL / OTP / DCF / sense connection reversely / 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
	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.

Specifications

Input

	Input voltage	Model
1kW	90 to 350Vdc	Standard
2kW	250 to 350Vdc	Standard
	350 to 420Vdc	-L(400V) option
3kW	250 to 350Vdc	Standard
	350 to 420Vdc	-L(400V) option
5kW 6kW	250 to 350Vdc	Standard
	350 to 420Vdc	-L(400V) option

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

Voltage regulation

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

Current regulation

Line: 0.01% of maximum output (for ±10% DC 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 digital meter (±0.5%FS±1digit at 23°C±5°C)
Output current: 4-digit digital 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(DCF)·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 (only 2kW or more models)
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

0 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 : DC1000V 1 minute
Between input power supply and chassis : DC1000V 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 interface option>

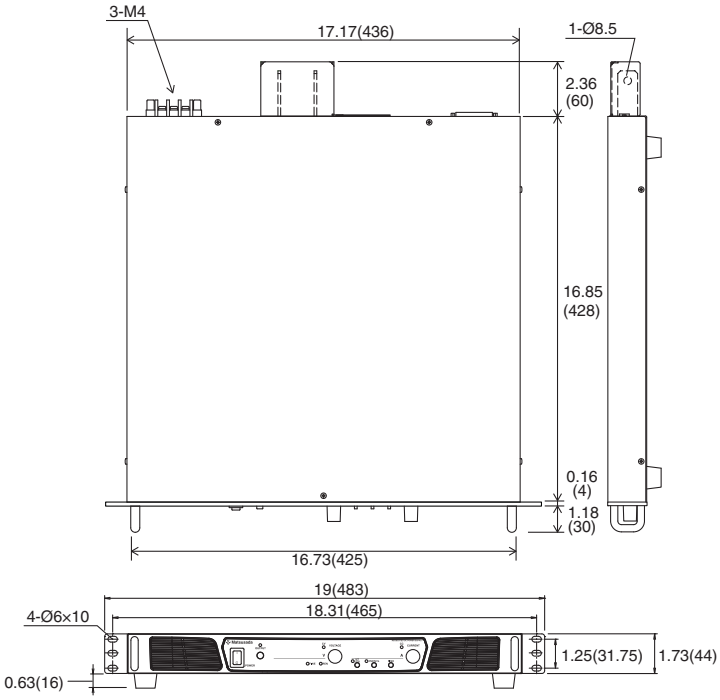
Dimensions inch(mm)

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.

1kW, 2kW models

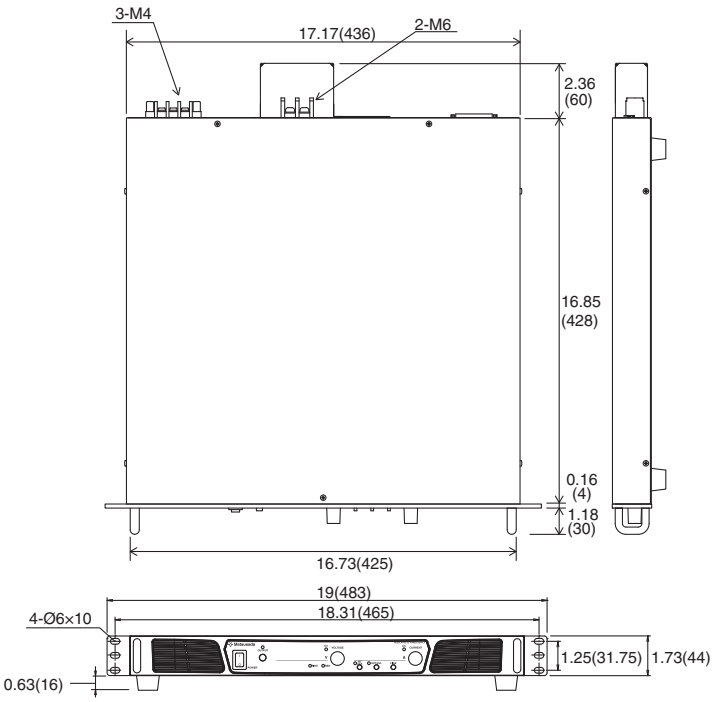
Busbar output type

Weight : 8kg typ.



Terminal board output type

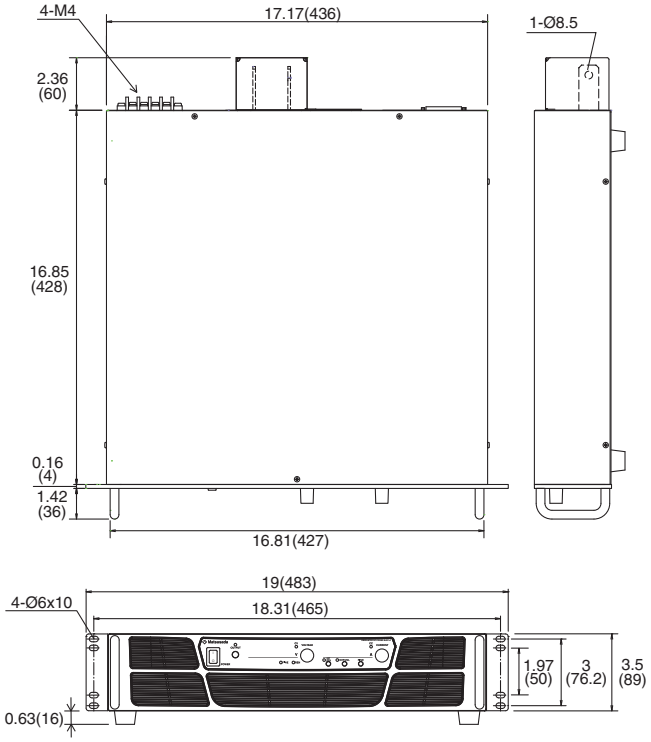
Weight : 8kg typ.



3kW, 5kW models

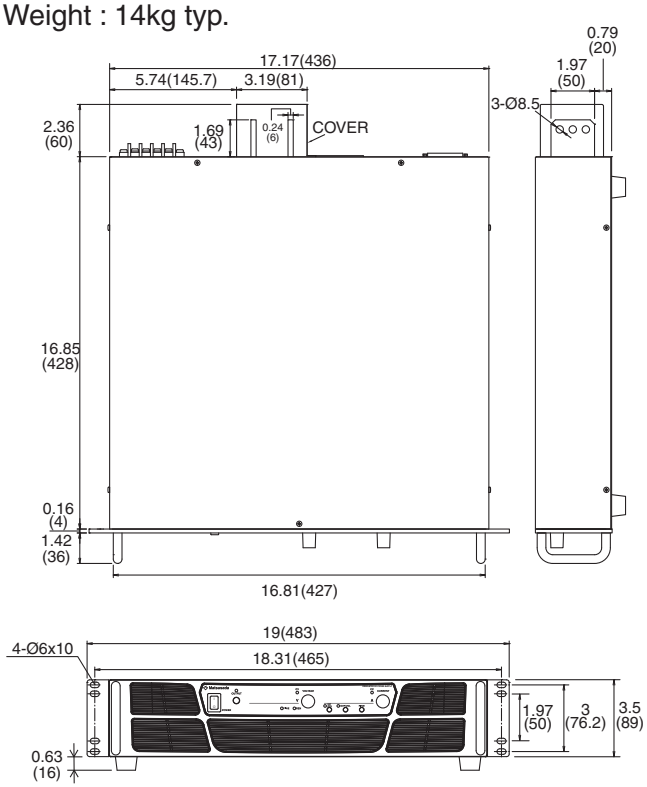
Small busbar output type

Weight : 14kg typ.



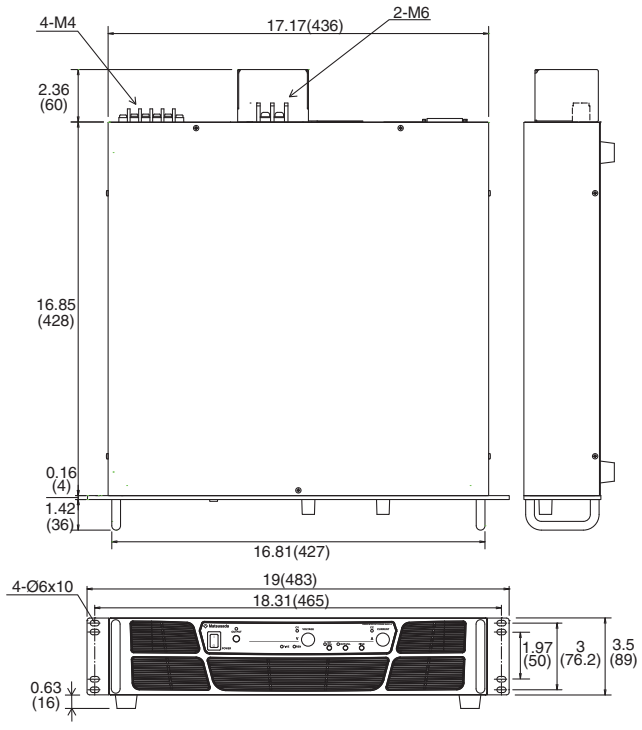
Large busbar output type

Weight : 14kg typ.



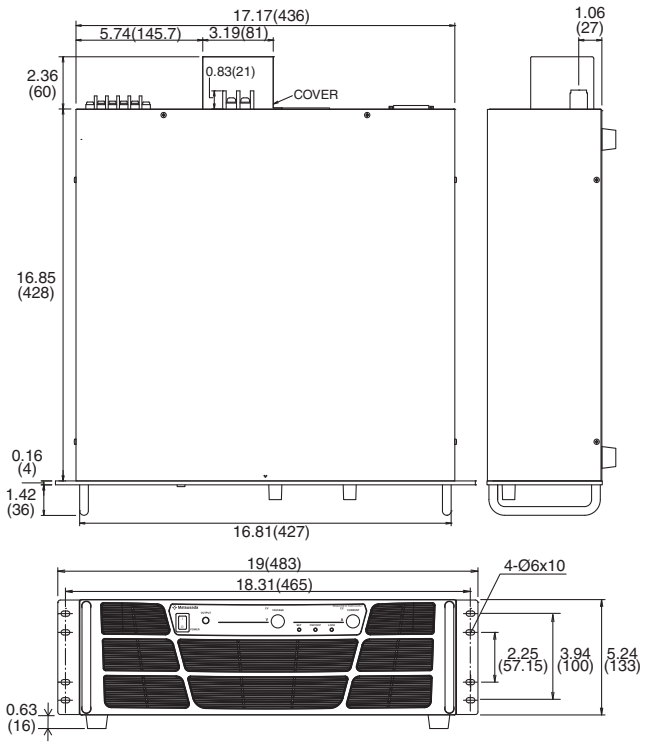
Terminal board output type

Weight : 14kg typ.



6kW models

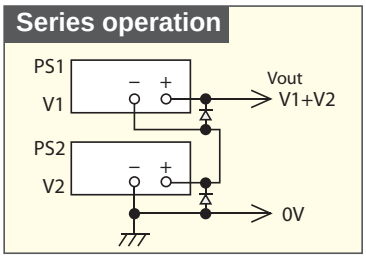
Weight : 18kg typ.



Operation example

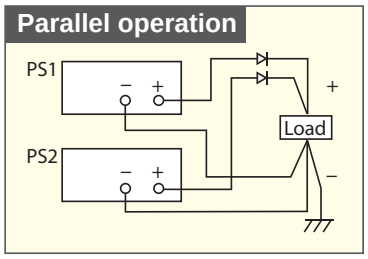
VDD series of same model number can be connected in series or parallel to increase output voltage or current.

Series operation



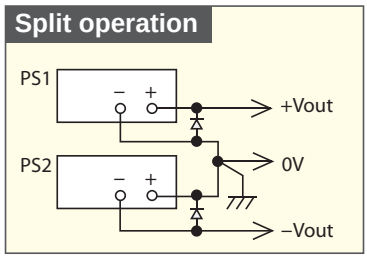
[caution]
Total output voltage is to be up to 250V. Therefore for models with output voltage of over 250V, series operation cannot be conducted. Output current is to be the smallest current of those.Additionally, the remote switch is connected to -output, so do not connect to the other remote switch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



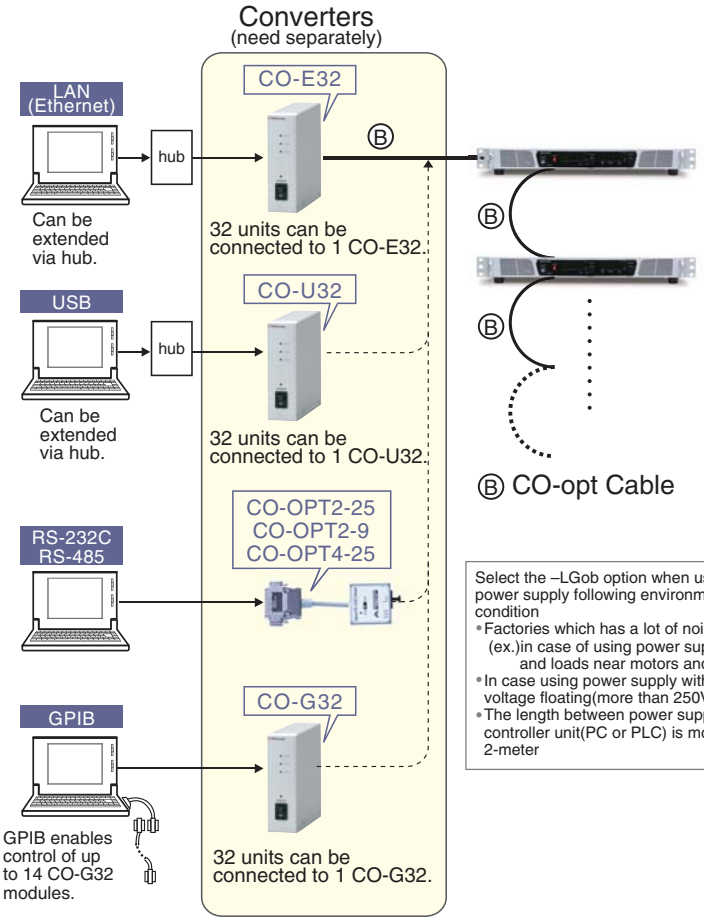
[caution]
Remote switch is connected to -output, so do not connect to the other remote switch simultaneously.

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

-L(400V) : Input voltage

Please see page 7.

-LUs1 : USB Interface Board *1*2

Enable digital control via USB

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

-LEt : Ethernet Interface Board *1*2

Enable digital control via Ethernet

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

-L(Mc0.5), -L(Mc0.15) *2 : Communication cable length change

Change length of CO-M cable to 0.5-meter and 0.15-meter long. (Only either can be selected.)

*1 If you select this option, standard digital interface and master-slave function will not be equipped. Also, please see the CO series catalog for detail of function of digital interface function.

*2 These options cannot be selected together. Only one of each can be selected.

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

<e.g.> VDD6-133-L(Mc0.5)
VDD350-18-LGob(Fc20)
VDD650-7.6-LUs1(400V)
(alphabetical, input voltage order)

TECHNICAL NOTE

Connection · Operation

Connection of load

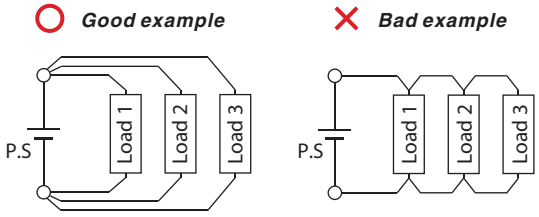
· Please use a short lead wire that is sufficiently thick for the connection.

· 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	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

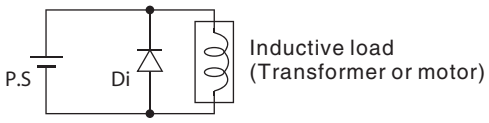
Use several cables or copper bar for model over 350A.

Parallel connection of load



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.

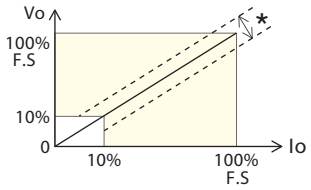


Definition of specifications

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.

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Customer Inquiry Sheet (VDD 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 merchant-ability 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 manufac-turing 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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