

# Free Combination 200 W Output Capacity. 3 New Models!



New

# Compact Multi-Output DC Power Supply PMX-Multi Series

Three models with 2, 3 and 4 outputs
Each output is isolated
High setting resolution (Voltage: 1 mV, Current: 0.1 mA)
Tracking control in all channels
Simultaneous display of all channel statuses
ON/OFF delay of each output
Simple series/parallel connection between channels (CH1 & CH2)
LAN (LXI Compliant)/USB/RS232C standard interface
Turning output on and off using an external contact
Remote sensing function
Key lock, Preset memory function (3 slots)
High quality LCD panel for improved visibility

## Free Combination

### **Compact Multi-Output DC Power Supply** PMX-Multi Series **NFW**

Each output is isolated.

Simple series/parallel connection between channels. 200 W Output Capacity.

Three models with 2, 3 and 4 outputs.

The PMX-Multi series is a multi-channel DC power supply with isolated outputs on each channel. The PMX32-3DU (2ch), PMX32- 3TR (3ch), and PMX32-2QU (4ch) are all capable of simultaneous output in all channels and come with an output tracking feature.

Also, channels 1 & 2 of each model can be easily connected in either series or parallel to increase the output voltage/current at the press of a button, LAN (LXI Compliant), USB, and RS232C are included as standard digital interfaces for easy system integration.

The PMX-Multi benefits from a low noise, series regulator design that makes this series the perfect choice for experiments involving transistors, IC circuits, and op amp circuits as well as R&D and production line applications.

- Three models with 2, 3 and 4 outputs.
- Each output is isolated.
- High setting resolution. (Voltage: 1 mV, Current: 0.1 mA)
- Tracking control in all channels.
- Simultaneous display of all channel statuses.
- ON/OFF delay of each output.
- Simple series/parallel connection between channels. (CH1 & CH2)
- LAN (LXI Compliant)/USB/RS232C standard interface.
- Turning output on and off using an external contact.
- Remote sensing function.
- Key lock, Preset memory function. (3 slots)
- High quality LCD panel for improved visibility.

#### Application

- Power supply for tests involving transistors, IC circuits and operational amplifiers
- Integration into semiconductor evaluation test systems
- Power supply for research and development and manufacturing line integration





Size

Sensing terminal



#### PMX32-2QU (four-output)

#### Lineup/Main Specification

Specifications		Output		Rip	ple	Line Re	gulation	Load Re	egulation	Input	Power	Weight
Model	СН	CV	СС	CV	СС	CV	СС	CV	СС	AC	Approx.	Approx.
PMX32-3DU	1	32.000 V	3.000 A		1 mA	3 mV		4 mV			700 VA	
PINIA32-3DU	2	32.000 V	32.000 V 3.000 A 1 mA 3 mV		4 mV			700 VA				
	1	32.000 V	3.000 A		1 mA	3 mV		4 mV				
PMX32-3TR	2	32.000 V	3.000 A		1 mA	3 mV	0.01%	4 mV		217 Vac*	900 VA	13 kg
	3	6.000 V	5.000 A	500 μV	2 mA	1 mV	+0.25 mA	5 mV	5 mA ± 10%	\		_
	1	32.000 V	2.000 A		1 mA	3 mV		2 mV		± 10%		(28.66 lb)
DMY22 2011	2	32.000 V	2.000 A		1 mA	3 mV	]	2 mV			000 \/A	
PMX32-2QU	3	18.000 V	2.500 A		1 mA	1 mV		3 mV	1		800 VA	
	4	18.000 V	2.500 A		1 mA	1 mV		3 mV				

<sup>\* 100</sup> Vac, 117 Vac, 200 Vac and 234 Vac are factory options.

#### Simple Series/Parallel Connection Between Channels

#### **Series Operation**

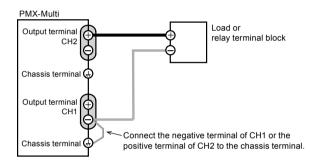
CH1 and CH2 can be connected in series to increase the overall voltage output range. CH2 operates as master and CH1 as slave. The total output voltage will be the sum of CH1 and CH2.



#### Panel display during series operation

- Output voltage: 60 V CH1: 30 V+CH2: 30 V
- Output current: 3 A

Series operation (CH1 and CH2) load connection If CH1 negative terminal is connected to the chassis terminal



#### **Parallel Operation**

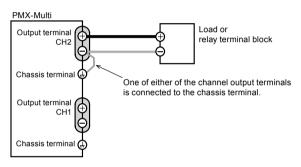
CH1 and CH2 can beconnected in parallel to increase the overall current range. CH2 operates as master and CH1 as slave. The total output current will be the sum of CH1 and CH2.



#### Panel display during parallel operation

- Output voltage: 30 V
- Output current: 6 A CH1: 3 A+CH2: 3 A

Parallel operation (CH1 and CH2) load connection



Note: Connect load wiring to the CH2 output terminal Connection to CH1 can cause damage.

#### **Tracking Feature**

The tracking feature allows the operator to control the ratio for increase/decrease of output among multiple channels within the power rating. This feature can be used freely among all channels with two ratio options:absolute value variation and variation ratio.

#### **Absolute Value Variation**

This mode allows for voltage/current settings in all specified channels to change at the same rate as a selected channel.

#### **Variation Ratio**

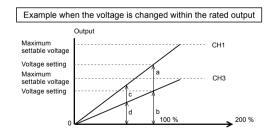
This mode allows for voltage/current settings in all specified channels to change in equal proportion to a selected voltage or current rating.

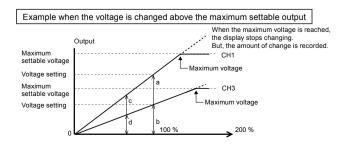
\*The variable range is from 0.0% to 200.0%

#### Example of operation of tracking feature: PMX32-2QU

When you turn the rotary knob during tracking operation, the outputs change at the same percentage as the preset output percentage (b/a). b/a = d/c

This proportional expression is satisfied.



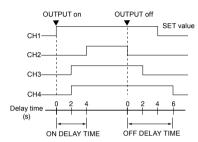


#### **Delay Function**

The optional setting creates a programmable delay between the OUTPUT switch being activated and the actual output being released. The setting range for DELAY TIME is from 0.1 - 99.9 seconds.

When power supplies are not activated properly, there is the slight risk of damage being caused to the overall system. For this reason ON delay control is a very important feature that is required for power source output. This feature is also necessary when turning output OFF, and is highly convenient for operating circuits.

#### [Timing chart of delay function]



On-delay value	Off-delay value
0 s	4 s
4 s	0 s
2 s	2 s
2 s	6 s
	value 0 s 4 s 2 s

Note: The actual rise/fall time with output off will vary depending on the output and load conditions. Note that the timing chart above ignores rise and fall time. There are cases where the actual delay time varies by a few tens of milliseconds even when the delay time is set to 0 seconds.

#### Easy Access with the Built-in Web Server

Use a browser from a PC, smartphone, or tablet to access the web server built into the PMX-Multi series for convenient control and monitoring.

#### [Recommended browser]

- Requires for the Internet Explorer version 9.0 or later
- Requires for the firefox 8.0 or later
- Requires for the safari / mobile Safari 5.1 or later
- Requires for the Chrome 15.0 or later
- Requires for the Opera 11.0 or later

\*Connecting with a smartphone, tablet, etc. requires a Wi-Fi environment (wireless LAN router etc.).



#### **Rear Panel**

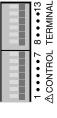
#### LAN (LXI Compliant)/USB/RS232C standard interface



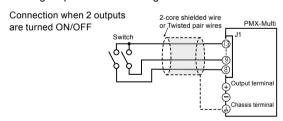
External control terminal block

Pin arrangement of the CONTROL TERMINAL

The CONTROL TERMINAL on the rear panel can be turning output on and off using an external contact



#### • Turning output on and off using an external contact



Pin no.	Signal name	Description		
1	OUTPUT ON STATUS(CH1)			
2	OUTPUT ON STATUS(CH2)	On when output is on		
3	OUTPUT ON STATUS(CH3)	(output through an open-collector photocoupler). *1		
4	OUTPUT ON STATUS(CH4)	1		
5	POWER ON STATUS	On when the power is on (output through an open-collector photocoupler). *1		
6	ALARM STATUS	On when a protection function (OVP, OCP, OHP) is activated or when an alarm signal (ALARM IN) is received.		
7	STATUS COM	Status signal common for pins 1 to 6.		
8	OUTPUT ON/ OFF CONTROL(CH1)			
9	OUTPUT ON/ OFF CONTROL(CH2)			
10	OUTPUT ON/ OFF CONTROL(CH3)	Output on/off control using external contact input.		
11	OUTPUT ON/ OFF CONTROL(CH4)			
12	ALARM IN	All channel outputs are turned off when an alarm signal is received		
13	FRAME GND	External signal common for pins 8 to 12. *2		

- \*1 Open collector output: Maximum voltage of 30 V and maximum current of 8 mA.
  The status common is floating (isolation voltage or less). It is isolated from the control circuit.

  \*2 FRAME GND is connected to the chassis.

#### **Specifications**

- Unless specified otherwise, the specifications are for the following settings and conditions
   Loads are purely resistive loads.
   The product is warmed up for at least 30 minutes.
- The product is warnied up to a reast of minutes.

  The negative output is connected to the chassis terminal with a short bar.

  Values indicated by "TYP" are typical values. These values do not guarantee the performance of the PMX series (multiple-output).

  \*rating: Indicates the rated.

  \* set: Indicates a setting.

  \* reading: Indicates the readout value.

- Rated load and no load are defined as follows:
  In constant-voltage mode (when the output current is set to a value greater than or equal to the maximum output current with rated output voltage)
  Rated load: Refers to a resistive load that, when the rated output voltage is applied, makes the flowing current 95 % to 100 % of the maximum output current with rated output voltage.

No load: Refers to a load through which no output current flows. In other words, refers to an open load (no load being connected).

In constant-current mode (when the output voltage is set to a value greater than or equal to the maximum output voltage with rated output current)

Rated load: Refers to a resistive load that, when the rated output current flows, makes the voltage drop to 95 % to 100 % of the maximum output voltage with rated output current. Including the voltage drop in the load cables, the product's output voltage must not exceed the maximum output voltage with rated output current. Refers to a resistive load that, when the rated output current flows, makes the voltage drop to 10 % of the maximum output voltage with rated output current or 1 V whichever is higher.

### **EU/GB Models** 234Vac ± 10%

#### **■AC Input**

Item	PMX32-3DU	PMX32-3TR	PMX32-2QU
Nominal input rating	217 Vac *1, 50 Hz/ 60 Hz, single phase		
Input voltage range	± 10%		
Input frequency range	47 Hz to 63 Hz		
Inrush current (MAX) *2	150 Amax	150 Amax	150 Amax
Power (MAX)	700 VA	900 VA	800 VA

- 100 Vac, 117 Vac, 200 Vac, and 234 Vac are factory options.

  Excludes the charge current component that flows through the capacitor of the internal EMC filter circuit immediately after the POWER switch is turned on (for approximately 1 ms).

#### **■**Output

Item			PMX32-3DU	PMX32-3TR	PMX32-2QU
		CH1	32.000 V	32.000 V	32.000 V
	Output voltage	CH2	32.000 V	32.000 V	32.000 V
Rating		СНЗ	_	6.000 V	18.000 V
		CH4	_	_	18.000 V
		CH1	3.000 A	3.000 A	2.000 A
	Output current	CH2	3.000 A	3.000 A	2.000 A
	Output current	CH3	_	5.000 A	2.500 A
		CH4	_	_	2.500 A
		CH1	33.600 V	33.600 V	33.600 V
	Maximum	CH2	33.600 V	33.600 V	33.600 V
	voltage setting	CH3	_	6.300 V	18.900 V
		CH4	_	_	18.900 V
	Resolution			1 mV	
	Voltage setting accu	ıracy *1		±(0.03% set +5 mV)	
		CH1	3 mV	3 mV	3 mV
	Input line	CH2	3 mV	3 mV	3 mV
	regulation *2	СНЗ		1 mV	1 mV
Const-		CH4		_	1 mV
	Load regulation *3	CH1	4 mV	4 mV	2 mV
		CH2	4 mV	4 mV	2 mV
ant		CH3		5 mV	3 mV
oltage		CH4		_	3 mV
	Transient respons			50 µs	
	Ripple noise (rms	) *5		500 μV	
	Command delay			80 ms	
	Rise time (at rated load) *6		10 ms ±30%		
		CH1	350 ms ±30%	350 ms ±30%	350 ms ±30%
	Fall time	CH2	350 ms ±30%	350 ms ±30%	350 ms ±30%
	(at no load) *7	CH3	_	220 ms ±30%	240 ms ±30%
		CH4	_	_	240 ms ±30%
	Temperature coef	ficient	100 ppm/°C		
		CH1	3.150 A	3.150 A	2.100 A
	Maximum	CH2	3.150 A	3.150 A	2.100 A
	current setting	СНЗ	_	5.250 A	2.625 A
		CH4	_	_	2.625 A
	Resolution			0.1 mA	
	Current setting accu	ıracy *1	±(	0.3% set +0.1% ratin	g)
Const- ant	Input line regulation	on *2		0.01% + 0.25 mA	
current	Load regulation *8	3		5 mA	
		CH1	1 mA	1 mA	1 mA
	Ripple noise	CH2	1 mA	1 mA	1 mA
	(rms) *5	СНЗ		2 mA	1 mA
		CH4	_	_	1 mA
	Temperature coefficient (TYP)				

- At an ambient temperature of 23 °C ±5 °C.
- 90% to 100% or 100% to 110% of the nominal input voltage rating, rated load. The amount of change that occurs when the load is changed from no load to rated load at
- the rated output voltage. The value is measured at the sensing point.

  The amount of time required for the output voltage to return to a value within "rated output voltage to (0.05% + 10 mV)." When the load current is changed from 10% to 100% of the rated output current. The value is measured at the sensing point.

- rated output current. Ine value is measured at the sensing point. When the measurement frequency bandwidth is 5 Hz to 1 MHz. The time for the output voltage to rise from 10% to 90% of the rating when the output is turned on. The time for the output voltage to fall from 90% to 10% of the rating when the output is turned off. The amount of current change when the load is changed from 10% of the rated voltage or 1 V, whichever is higher, to the rated voltage at rated output current.

#### **■Display Function**

Item			PMX32-3DU	PMX32-3TR	PMX32-2QU	
Volt-	Maximun	n display	99.999 (fixed decimal point)			
meter	Display a	ccuracy *1	±(0.1% of reading +	10 mV)		
Am-	Maximun	n display	9.999 (fixed decima	I point)		
meter	Display a	ccuracy *1	±(0.2% of reading +	5 mA)		
	ОИТРИТ	ON/OFF	Output on: "ON" display (green) Output off: "OFF" display			
	Output-o off delay	n delay/		SET" when set. ing output-on delay/ ed after the output-o		
	CV opera	ation	"CV" display (green)			
	CC opera	ation	"CC" display (red)			
Opera-	Alarm op	eration	Displays "ALARM" (red) when a protection function is activated.			
tion display	Memory		Displays "PRESET A," "PRESET B," or "PRESET C" when a memory area is in use.			
	key lock		Displays "LOCK" when the keys are locked.			
	Tracking		Displays "TRACKING 1" or "TRACKING 2" when tracking is in operation.			
	Remote operation  LAN operation		Displays "REMOTE" during remote control.			
			Displays or blinks "LAN" (depending on the status).  No fault status: Lights green. Fault status: red. Standby status: Blinks red. WEB identify status: Blinks green.			

<sup>\*1.</sup> At an ambient temperature of 23 °C±5 °C.

#### ■Protection Function

an rote off of a motion					
Item		PMX32-3DU	PMX32-3TR	PMX32-2QU	
Overvoltage	Action	Turns the output off, displays "OVP," and displays "ALARM" (red).			
protection	Setting range	10% to 110% of the	rated output voltage	1	
(OVP)	Setting accuracy	±(1% of rating)			
	Resolution	1 mV			
Overcurrent	Action *1	Turns the output off, displays "OCP," and displays "ALARM" (red).			
protection	Setting range	10% to 110% of the rated output current			
(OCP)	Setting accuracy	±(1% of rating)			
	Resolution	0.1 mA			
Overheat protection (OHP) Action		Turns the output off, displays "OHP," and displays "ALARM (red).			

This does not protect against the discharge current peak that is generated from the capacitors inside the product's output section when the load is changed suddenly.

#### **■**Signal Output

Item		PMX32-3DU	PMX32-3TR	PMX32-2QU	
	OUTPUT ON STATUS	On when output is on.			
Status Signal output *1	ALARM STATUS	On when an alarm	CP, OHP).		
output *1	POWER ON STATUS	Turns on when the power is turned on			

Photocoupler open collector output;
Maximum voltage 30 V, maximum current (sink) 8 mA. Isolated from the output and control circuits. The status common is floating (within the isolation voltage).

#### **■**Control Functions

Item		PMX32-3DU	PMX32-3TR	PMX32-2QU
control	Output on/off control (OUTPUT ON/OFF CONT)	output off when set • Positive logic Output on when set	t to LOW (0 V to 0.5 V to HIGH (4.5 V or 5 to HIGH (4.5 V to 5 to LOW (0 V or 0.5 V	V) or open V) or open;

#### ■Sensing

Item	PMX32-3DU	PMX32-3TR	PMX32-2QU
Sensing	0.6 V for a single lir controlled at the rat		minals are

#### ■Parallel Operation and Series Operation

Item		PMX32-3DU	PMX32-3TR	PMX32-2QU		
Parallel o	peration					
Applicab	le channels	Master: CH2, slave: CH1				
	Operating range	0 V to 32 V				
Con- stant voltage	Setting range	0 V to 33.6 V				
	Setting accuracy	0.3% set + 0.1% rat	ting			
	Resolution	1 mV				
	Operating range	0 A to 6 A	0 A to 6 A	0 A to 4 A		
Con- stant	Setting range	0 A to 6.3 A	0 A to 6.3 A	0 A to 4.2 A		
current	Setting accuracy	0.4% set + 0.1% rat	ing			
	Resolution	0.2 mA				
Volt-	Maximum display	99.999 (fixed decimal point)				
meter	Display accuracy *1	±(0.5% of reading + 10 digit)				
Am-	Maximum display	9.999 (fixed decimal point)				
meter Display accuracy *1		±(1% of reading + 10 digit)				
Series or	peration					
Applicab	le channels	Master: CH2, slave: CH1				
_	Operating range	0 V to 64 V				
Con- stant	Setting range	0 V to 67.2 V				
voltage	Setting accuracy *1 *2	0.3% set + 0.1% rating				
3	Resolution	2 mV				
	Operating range	0 A to 3 A	0 A to 3 A	0 A to 2 A		
Con- stant	Setting range	0 A to 3.15 A	0 A to 3.15 A	0 A to 2.1 A		
current	Setting accuracy *1	0.4% set + 0.1% rating				
	Resolution	0.1 mA				
Volt-	Maximum display	99.999 (fixed decimal point)				
meter	Display accuracy *1	±(0.5% of reading +	20 digit)			
Am-	Maximum display	9.999 (fixed decima	al point)			
meter	Display accuracy *1	±(1% of reading + 5	digit)	·		

At an ambient temperature of 23 °C ±5 °C.

#### ■Other Functions

Item		PMX32-3DU	PMX32-3TR	PMX32-2QU	
Output-c	on delay/ off delay		'		
	Applicable channels	All channels			
	Setup	Set the output on/o	ff delay time.		
	Setting range	0.1s to 99.9s			
	Resolution	0.1s			
	Setting accuracy *1	±50ms			
Memory		Saves three combinations of voltage, current, OVP, OCP, and output-on delay/ off delay settings.			
key lock		Selectable from the following three modes.  • Loc1: Lock all keys except the OUTPUT and memory A, B, and C keys.  • Loc2: Lock all keys except the OUTPUT key.  • Loc3: Lock all keys and the rotary knob.			
Tracking					
Applicab	le channels	All channels			
Opera-	Tracking function 1 *2	Absolute value change			
mode	Tracking function 2 *3	Percentage change			
Setting accura-	CV setting accuracy	0.4% of rating + 40	mV		
cy	CC setting accuracy	0.7% of rating + 10 mA			

#### ∎Interface

Item		PMX32-3DU	PMX32-3TR	PMX32-2QU	
Common	Software protocol	IEEE Std 488.2-1992			
specifica- tions	Command language	Complies with SCPI Specification 1990.0			
RS232C	Hardware	Complies with the EIA232D specifications (excluding the terminal block) D-sub 9-pin terminal block (male) Baudrate: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps Data length: 8 bits, Stop bits: 1 bit, Parity bit: None Flow control: No			
	Program message terminator	LF during reception, LF during transmission.			
USB	Hardware	Standard type B socket. Complies with the USB 2.0 specifications; data rate: 12 Mbps (full speed)			
	Program message terminator	LF or EOM during reception, LF + EOM during transmission.			
	Device class	Complies with the USBTMC-USB488 device class specifications.			
LAN	Hardware	IEEE 802.3 100Base-TX/10Base-T Ethernet IPv4, RJ-45 terminal block			
	Compliant standards	LXI Device Specification 2016 LXI HiSLIP Extended Function Rev. 1.0 LXI VXI-11 Extended Function Rev. 1.0			
	Communication protocol	VXI-11, HiSLIP, SCPI-RAW, SCPI-Telnet			
	Message terminator	VXI-11, HiSLIP: LF or END during reception, LF + END during transmission. SCPI-RAW: LF during reception, LF during transmission.			

#### **■**General Specifications

Item		PMX32-3DU	PMX32-3TR	PMX32-2QU	
Weight (main unit only)		Approx. 13 kg (28.66 lb)			
Dimensions (mm(inches))		214(8.46)W×124(4.88)(MAX155(6.10))H×400(15.75)(MAX435(17.13))D			
	Operating temperature range	0 °C to 40 °C (32 °F to 104 °F)			
Environ- mental conditions	Operating humidity range	20%rh to 85%rh (no condensation)			
	Storage temperature range	-25°C to 70°C (-13°F to 158°F)			
	Storage humidity range	90%rh or less (no condensation)			
	Installation location	Indoor use, altitude of up to 2000 m, overvoltage category II			
1 1 2	Between channels	±70 Vdc			
Isolation voltage	Between the output and chassis	±70 Vdc			
	Between the primary circuit and chassis	No abnormalities at 1500 Vac for 1 minute.			
Withstand- ing voltage	Between the primary and secondary circuits	No abnormalities at 2600 Vac for 1 minute.			
	Between the second- ary circuit and chassis	No abnormalities at 1500 Vdc for 1 minute.			
	Between the primary circuit and chassis				
Insulation resistance	Between the primary and secondary circuits	500 Vdc, 30 M $\Omega$ or greater			
resistance	Between the second- ary circuit and chassis				
	Between channels				
Cooling method		Forced air cooling using a fan motor			
Common		All channels are independent.			
Grounding polarity		Negative grounding or positive grounding possible			
Accessories		Power cord: 1 pc. (The attached power cord varies depending on the shipment destination.) Output terminal cover set: 1 set, CD-ROM: 1 disc, Packing list: 1 copy, Safety Information: 1 copy			
Electromagnetic compatibility (EMC) *1 *2		Complies with the requirements of the following directive and standards.  EMC Directive 2014/30/EU EN 61326-1(Class A *3) EN 55011(Class A *3, Group 1 *4) EN 61000-3-2, EN 61000-3-3 Applicable under the following conditions The maximum length of all cabling and wiring connected to the product must be less than 3 m.			
Safety *1		Complies with the requirements of the following directive and standards. Low Voltage Directive 2014/35/EU *2 EN 61010-1 (Class I *5 , Pollution Degree 2 *6)			
*1 Does not	apply to specially orde	red or modified prod	ducts.		

The value is measured at the sensing point.

The difference between the time from when the reference output reaches 5% of the setting to when the target output reaches 5% of the setting and the delay time setting. In tracking function 1, the output can be varied within the output range of the reference channel voltage or current.

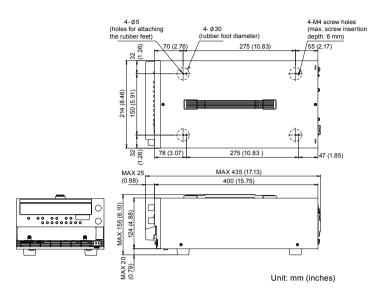
In tracking function 2, the output can be varied at the same percentage as the reference output in reference the output at the start of the tracking function. output in reference to the output at the start of the tracking function.

Does not apply to specially ordered or modified products.
Only on models that have the CE marking on the panel.
This product confirms to Class A. This product is intended for use in an industrial environment. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.

emissions to prevent interference to the reception of radio and television broadcasts. This is a Group 1 instrument. This product does not generate and/or use intentionally radio-frequency energy, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material or inspection/analysis purpose. This product confirms to Class I. Be sure to ground the protective conductor terminal of this product. If not grounded properly, safety is not guaranteed.

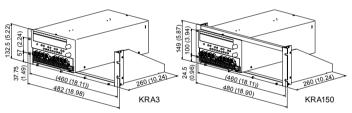
Pollution is addition of foreign matter (solid, liquid or gaseous) that may produce a reduction of dielectric strength or surface resistivity. Pollution Degree 2 assumes that only non-conductive pollution will occur except for an occasional temporary conductivity caused by condensation.

#### **External Dimensions**



#### **Options**

#### **Rack Mounting Options**



Example of PMX32-2QU Unit: mm (inches)

Name	Rack mount adapter		
Model	KRA3	KRA150	
Note	For EIA inch racks	For JIS millimeter racks	



#### KIKUSUI ELECTRONICS CORPORATION

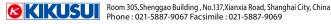
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