



# **IT-M3400 Bidirectional DC Power Supply**

## **APPLICATIONS**

- Low-power power module testing
- Intelligent industry equipment testing

Power supply testing of automotive electronic equipment

Your Power Testing Solution



#### Bidirectional

High efficient power regeneration

Battery simulation/charge and discharge test

Independent control of multiple channels

IT-M3400 bidirectional DC power supply integrates the features of a bidirectional power supply and a regenerative load. It keeps the advantages of high power density and modular architecture design of M series.

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Instantional DC Power Supply

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It can meet the customer's test requirement of different current and power level. Enables synchronous control and independent setup of up to 256 channels, empowering efficient and scalable production line testing. At the same time, it has high-precision output and measurement, and has made a number of safety designs for testing, suitable for multiple test fields, such as power modules, intelligent industrial equipment, automotive electronics, charging and discharging tests of various small-capacity batteries.

#### FEATURE

- 1U Half-rack, high power density
- Bidirectional energy flow
- Utilizes third-generation SiC power devices for efficient energy recovery.
- Battery test
- Battery simulation
- Supports synchronous control of up to 256 channels with proportional tracking function
- High speed measurement, 10 times/s updating rate
- CC/CV priority
- Adjustable output impedance
- Programmable voltage and current rise and fall time

- Temperature measurement function, over temperature protection
- List
- Various protection such as OCP / UCP / OVP / OTP / OPP / UVP over heat protection, grid fault protection and fault storage, foldback, Power-off protection, sense abnormal protection
- Automatic detection of power grid state to realize reliable grid connection
- Pre charge function to prevent overshoot of DC loading current
- Anti-reverse protection function through optional accessories
- Five optional cards, supporting RS232,CAN,LAN,GPIB, USB\_TMC,USB\_VCP, RS485, analog and IO

Model	Voltage	Current	Power	Model	Voltage	Current	Power
IT-M3412	60V	30A	200W	IT-M3414	300V	6A	200W
IT-M3422	60V	30A	400W	IT-M3424	300V	6A	400W
IT-M3432	60V	30A	800W	IT-M3434	300V	6A	800W
IT-M3413	150V	12A	200W	IT-M3415	600V	3A	200W
IT-M3423	150V	12A	400W	IT-M3425	600V	3A	400W
IT-M3433	150V	12A	800W	IT-M3435	600V	3A	800W

# 01 IT-M3400 bidirectional DC power supply

# www.itechate.com 02



#### Seamless switching between source and sink

Different from the traditional power supply and load, when positive and negative current switch, there will be a short jump and Incoherence. IT-M3400 integrates source and sink function in one, which is capable of achieving high-speed and seamless switching between source and sink. In this way, a fast and seamless switch between source and sink effectively avoids voltage or current overshoot, which is widely used in batteries, battery packaging, battery protection boards and other energy storage equipment testing.

\* Only available for single unit

#### 10 Half-rack mini size

IT-M3400 is 1U Half-rack mini size and support output up to 800W, not only with high power density, but also with high resolution, high precision and high stability. The output voltage can reach 600V and the output current can reach 30A. There are 12 models in the whole series, with a wide range of output design, and one unit can cover a wide range of applications.

#### **Applications**



CC priority charge and discharge seamless switching





# **CC & CV priority function**

IT-M3400 continues to support CC / CV priority function, help customers solve a variety of severe problems in long-term testing. For test that require high-speed voltage, users can select the CV priority mode to obtain a faster voltage climb speed; or choose CC priority mode, output current without overshoot, used to test DUT with constant current operating characteristics. This function is widely used in power supply transient simulation and characterization test applications, such as lasers, integrated circuits, charge and discharge, automotive electronics.



## Module architecture, any combination

IT-M3400's modular plug-in architecture can easily stack instruments like building blocks without any additional accessories. Besides that, users can choose IT-E154 rack installation kit, easily install one or more instruments in a standard 19-inch cabinet.



## Multi-channel independent control, up to 256 channel

IT-M3400 provides flexible multi-channel function, the users can build-up multi-channel source-sink system, each unit will show the channel number on the front panel. PC only need to connect with one unit to control and program all the units independently by GUI software.

IT-M3400 support maximum 16\*16 channels, each 37U rack can integrate 64 units which is 64 channels.



# Your Power Testing Solution

IT-M3400 bidirectional DC power supply

#### Power regenerative and eco-friendly

With the power regeneration function, IT-M3400 can feed back up to 90% power instead of consuming it as heat. It not only save your cost of electricity, HVAC and cooling infrastructure, but also help to reduce carbon emission and impact on the environment.

#### Production facility: 24Hr/day x 7 work days x 52 weeks

Power	Electricity cost saved (appr. USD/year)	CO <sub>2</sub> emission reduced (appr. ton/year)
200 W	220.15	1567.76
400 W	440.29	3135.53
800 W	880.59	6271.05

1. approximate electricity price 0.14USD/ kWh for industry facility in California

2. 1 kWh power consumption  $\approx 0.997 \text{ CO}_2$  emission

\* The extra cost of air conditioning is not included.

## **Battery simulation function**

IT-M3400 can simulate up to 99 batteries in series and parallel. The user can set the battery voltage, capacity, internal resistance, and SOC to quickly define the battery matrix.

The user can set the battery by choosing ITECH optional professional BSS2000 battery simulation software, by setting common battery parameters to quickly establish the battery characteristic curve, they can also set the initial capacity of the battery, to verify the characteristics of the product in different states of the battery. At the same time, BSS2000 supports user to import matlab battery matrix or import the actual battery charge and discharge curve through .CSV file, to simulate real battery's charge and discharge characteristics.

\*Please contact ITECH for further details.

#### **Battery Test Function**

IT-M3400 series Regenerative Power System, which integrates power supply and regenerative electronic load one unit, and adjustable output impedance design, can simulate the charging and discharging characteristics of the battery, and perform other testing, too. It can be used not only test the multiple single cells, but also comprehensive test the battery packages. It can also perform the battery setting and data processing in various test conditions and plot the test figure.

## Optional ITS5300 professional battery test software can perform the following test items:

- working condition simulation
  Reliability Test

Charge and Discharge

- Battery DC IR Test
- Battery endurance test Battery Temperture Test
- characteristic Battery cycle life test
- Battery capacity test Over charge and Over discharge endurance test
  - Battery conformity test

# R&D lab: 8Hr/day x 5 work days x 52 weeks Power Electricity cost saved CO2 emission reduced

	(appr. USD/year)	(appr. ton/year)
200 W	52.42	373.28
400 W	104.83	746.55
800 W	209.66	1493.11

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BSS2000 battery emulation software interface



## **Multi-Protection Function**

IT-M3400 have various protection functions such as OCP / UCP / OVP / OTP / OPP / UVP, power grid fault protection and fault storage functions, as well as power-off protection and Sense sensing abnormal protection.

The unique Foldback protection function is used to turn off the output when the power CV / CC is switched, so as to protect DUT that are sensitive to voltage overshoot and current overshoot.

The automatic detection function of power grid state will shut down the product in case of sudden disconnection of power grid connection, which can realize reliable grid connection function and islanding protection function.

Precharge function can prevent DC loaded current from overshoot. Users can choose anti reverse connection module to realize anti reverse connection function to effectively suppress battery surge.



## **Optional Accessories**

IT-M3400 rear panel provides interface expansion slot for users to expand. Different interfaces can be selected to realize different functions, such as communication interface, external analog interface, temperature sensor, etc.

Pictures	Model	Interface	Pictures	Model	Interface
	IT-E1205	GPIB interface		IT-E1209	USB interface
	IT-E1206	USB/LAN interface		IT-E118	Anti-reverse connection module
	IT-E1207	RS-232/CAN interface		IT-E1203	Temperature sensor
<u></u>	IT-E1208	External analog/RS485 interface		IT-E154A/B/C	Rack mount kit
				_	IT-E1206
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Rear Panel with optional interface

#### Specification

		IT-M3412	IT-M3413	IT-M3414
	Output Voltage	0~60V	0~150V	0~300V
Rated Output Value	Output Current	-30A~30A	-12A~12A	-6A~6A
(0 °C-40 °C)	Output Power	-200W~200W	-200W~200W	-200W~200W
	Current Range	-30A~30A	-12A~12A	-6A~6A
CC Mode	Resolution	10mA	1mA	1mA
	Accuracy	<0.1% +0.1% FS	<0.1% +0.1% FS	<0.1% +0.1% FS
	Voltage Range	0~60V	0~150V	0~300V
CV Mode	Resolution	1mV	10mV	10mV
	Accuracy	0.02% +0.02% FS	0.02% +0.02% FS	0.02% +0.02% FS
	Resistance Range	0~1000mΩ	0~1000mΩ	0~1000mΩ
Resistance	Resolution			
Programming (Sourcing)		0.1mΩ	0.1mΩ	0.1mΩ
(	Accuracy Power Range	2% FS	2% FS	2% FS
CP Mode		-200W~200W	-200W~200W	-200W~200W
or would	Resolution	0.1W	0.1W	0.1W
	Accuracy	1%+1%FS	1%+1%FS	1%+1%FS
Output	Range	-30A~30A	-12A~12A	-6A~6A
Current Readbac	Resolution	1mA	1mA	1mA
	Accuracy	<0.1% +0.1% FS	<0.1% +0.1% FS	<0.1% +0.1% FS
	Range	0~60V	0~150V	0~300V
Output Voltage Readbac	Resolution	1mV	10mV	10mV
vonage neadbac	Accuracy	0.02% +0.02% FS	0.02% +0.02% FS	0.02% +0.02% FS
	Range	-200W~200W	-200W~200W	-200W~200W
Output Power Readback	Resolution	0.1W	0.1W	0.1W
I Ower Readback	Accuracy	1%+1%FS	1%+1%FS	1%+1%FS
	Voltage	≤0.02% +0.02% FS	≤0.02% +0.02% FS	≤0.01% +0.01% FS
Load Regulation	Current	≤0.03% +0.03% FS	≤0.03% +0.03% FS	≤0.03% +0.03% FS
	Voltage	≤0.01% +0.01% FS	≤0.01% +0.01% FS	≤0.01% +0.01% FS
Line Regulation	Current	≤0.02% +0.02% FS	≤0.02% +0.02% FS	≤0.02% +0.02% FS
	Voltage	≤100mVp-p	≤300mVp-p	≤600mVp-p
Ripple	Current	≤30mArms	≤30mArms	≤30mArms
Rise Time	Voltage (No Load)	5ms	20ms	20ms
Rise Time	Voltage (Full Load)	10ms	50ms	50ms
Fall Time	Voltage (No Load)	5ms	20ms	20ms
Fall Time	Voltage (Full Load)		20ms	20ms
		5ms -20°C120°C	-20 °C 120 °C	-20°C120°C
DUT	Range		±1°C	
temperature measure	Accuracy	±1°C		±1°C
	Resolution	0.1 °C	0.1°C	0.1 C
	Voltage Range	100VAC~240VAC (±10%)	100VAC~240VAC (±10%)	100VAC~240VAC (±10%)
	Ovp	264VAC	264VAC	264VAC
Power Rating	Uvp	90VAC	90VAC	90VAC
	Frequency	47Hz~63Hz	47Hz~63Hz	47Hz~63Hz
	Max.input Current	1Aac (AC220V)	1Aac (AC220V)	1Aac(AC220V)
	Dc Component	-0.1A~+0.1A	-0.1A~+0.1A	-0.1A~+0.1A
Efficiency (Max.)		86%	88%	88%
Dimension (D*W*H)		450mm*214mm*43.5mm	450mm*214mm*43.5mm	450mm*214mm*43.5mm
Net Weight		5kg	5kg	5kg

#### Specification

		IT-M3415	IT- M3422	IT-M3423
	Output Voltage	0~600V	0~60V	0~150V
ated Output Value	Output Current	-3A~3A	-30A~30A	-12A~12A
0 °C-40 °C)	Output Power	-200W~200W	-400W~400W	-400W~400W
	Current Range	-3A~3A	-30A~30A	-12A~12A
C Mode	Resolution	1mA	10mA	1mA
	Accuracy	<0.1% +0.1% FS	<0.1% +0.1% FS	<0.1% +0.1% FS
	Voltage Range	0~600V	0~60V	0~150V
V Mode	Resolution	10mV	1mV	10mV
	Accuracy	0.02% +0.02% FS	0.02% +0.02% FS	0.02% +0.02% FS
	Resistance Range	0~1000mΩ	0~1000mΩ	0~1000mΩ
lesistance	Resolution			
Programming Sourcing)		0.1mΩ	0.1mΩ	0.1mΩ
57	Accuracy Power Range	2% FS	2% FS	2% FS
P Mode		-200W~200W	-400W~400W	-400W~400W
r woue	Resolution	0.1W	0.1W	0.1W
	Accuracy	1%+1%FS	0.5%+0.5%FS	0.5%+0.5%FS
Dutput	Range	-3A~3A	-30A~30A	-12A~12A
Current Readback	Resolution	1mA	1mA	1mA
	Accuracy	<0.1% +0.1% FS	<0.1% +0.1% FS	<0.1% +0.1% FS
	Range	0~600V	0~60V	0~150V
)utput /oltage Readbacl	Resolution	10mV	1mV	10mV
onago nouabao.	Accuracy	0.02% +0.02% FS	0.02% +0.02% FS	0.02% +0.02% FS
	Range	-200W~200W	-400W~400W	-400W~400W
Output Power Readback	Resolution	0.1W	0.1W	0.1W
	Accuracy	1%+1%FS	0.5%+0.5%FS	0.5%+0.5%FS
	Voltage	≤0.01% +0.01% FS	≤0.02% +0.02% FS	≤0.02% +0.02% FS
oad Regulation	Current	≤0.03% +0.03% FS	≤0.03% +0.03% FS	≤0.03% +0.03% FS
	Voltage	≤0.01% +0.01% FS	≤0.01% +0.01% FS	≤0.01% +0.01% FS
ine Regulation	Current	≤0.02% +0.02% FS	≤0.02% +0.02% FS	≤0.02% +0.02% FS
	Voltage	≤1200mVp-p	≤100mVp-p	≤300mVp-p
lipple	Current	≤30mArms	≤30mArms	≤30mArms
lise Time	Voltage (No Load)	30ms	5ms	20ms
lise Time	Voltage (Full Load)	60ms	10ms	50ms
all Time	Voltage (No Load)	30ms	5ms	
all Time	Voltage (Full Load)	30ms	5ms	20ms
	Range	-20°C120°C	-20 °C120 °C	20ms -20 °C120 °C
)UT emperature	Accuracy	±1°C	±1°C	±1°C
neasure	Resolution	0.1 °C	0.1 °C	0.1 °C
	Voltage Range	100VAC~240VAC (±10%)	100VAC~240VAC (±10%)	100VAC~240VAC (±10%)
			· · · · · · · · · · · · · · · · · · ·	
	Ovp Uvp	264VAC	264VAC	264VAC 90VAC
ower Rating	-	90VAC	90VAC	
ower nating	Frequency	47Hz~63Hz	47Hz~63Hz	47Hz~63Hz
	Max.input Current	1Aac(AC220V)	2Aac (AC220V)	2Aac (AC220V)
Dc Component		-0.1A~+0.1A	-0.1A~+0.1A	-0.1A~+0.1A
Efficiency (Max.)		88%	86%	88%
Dimension (D*W*H)		450mm*214mm*43.5mm	450mm*214mm*43.5mm	450mm*214mm*43.5mm
Net Weight		5kg	5kg	5kg

#### Specification

		IT-M3424	IT-M3425	IT-M3432
	Output Voltage	0~300V	0~600V	0~60V
Rated Output Value	Output Current	-6A~6A	-3A~3A	-30A~30A
(0 °C-40 °C)	Output Power	-400W~400W	-400W~400W	-800W~800W
	Current Range	-6A~6A	-3A~3A	-30A~30A
CC Mode	Resolution	1mA	1mA	10mA
	Accuracy	<0.1% +0.1% FS	<0.1% +0.1% FS	<0.1% +0.1% FS
	Voltage Range	0~300V	0~600V	0~60V
CV Mode	Resolution	10mV	10mV	1mV
	Accuracy	0.02% +0.02% FS	0.02% +0.02% FS	0.02% +0.02% FS
	Resistance Range	0~1000mΩ	0~1000mΩ	0~1000mΩ
Resistance Programming	Resolution	0.1mΩ	0.1mΩ	0.1mΩ
(Sourcing)	Accuracy	2% FS	2% FS	2% FS
	Power Range	-400W~400W	-400W~400W	-800W~800W
CP Mode	Resolution	0.1W	0.1W	0.1W
	Accuracy	0.5%+0.5%FS	0.5%+0.5%FS	0.1W 0.3%+0.3%FS
	Range	-6A~6A	-3A~3A	-30A~30A
Output		1mA	1mA	1mA
Current Readbac	Accuracy	<0.1% +0.1% FS	<0.1% +0.1% FS	<0.1% +0.1% FS
	Range	0~300V	0~600V	0~60V
Output	Resolution	10mV	10mV	1mV
Voltage Readbac	Accuracy	0.02% +0.02% FS	0.02% +0.02% FS	0.02% +0.02% FS
	Range	-400W~400W	-400W~400W	-800W~800W
Output	Resolution	0.1W	0.1W	0.1W
Power Readback	Accuracy	0.5%+0.5%FS	0.5%+0.5%FS	0.1W 0.3%+0.3%FS
	-			≤0.02% +0.02% FS
Load Regulation	Voltage Current	≤0.01% +0.01% FS	≤0.01% +0.01% FS	
		≤0.03% +0.03% FS	≤0.03% +0.03% FS	≤0.03% +0.03% FS
Line Regulation	Voltage	≤0.01% +0.01% FS	≤0.01% +0.01% FS	≤0.01% +0.01% FS
	Current	≤0.02% +0.02% FS	≤0.02% +0.02% FS	≤0.02% +0.02% FS
Ripple	Voltage Current	≤600mVp-p	≤1200mVp-p	≤100mVp-p
Rise Time		≤30mArms	≤30mArms	≤30mArms
Rise Time	Voltage (No Load)	20ms	30ms	5ms
Fall Time	Voltage (Full Load)	50ms	60ms	10ms
Fall Time	Voltage (No Load)	20ms	30ms	5ms
	Voltage (Full Load)	20ms	30ms	5ms
DUT	Range	-20°C120°C	-20 °C 120 °C	-20 °C 120 °C
temperature measure	Accuracy	±1°C	±1°C	±1 C
	Resolution	0.1°C	0.1 C	0.1 °C
	Voltage Range	100VAC~240VAC (±10%)	100VAC~240VAC (±10%)	100VAC~240VAC (±10%)
	Оvр	264VAC	264VAC	264VAC
Power Rating	Uvp	90VAC	90VAC	90VAC
	Frequency	47Hz~63Hz	47Hz~63Hz	47Hz~63Hz
	Max.input Current	2Aac(AC220V)	2Aac(AC220V)	4Aac (AC220V)
	Dc Component	-0.1A~+0.1A	-0.1A~+0.1A	-0.1A~+0.1A
Efficiency (Max.)		88%	88%	86%
Dimension (D*W*H)		450mm*214mm*43.5mm	450mm*214mm*43.5mm	450mm*214mm*43.5mm
Net Weight		5kg	5kg	5kg

#### Specification

		IT-M3433	IT- M3434	IT-M3435
	Output Voltage	0~150V	0~300V	0~600V
ated Output Value	Output Current	-12A~12A	-6A~6A	-3A~3A
0°C-40°C)	Output Power	-800W~800W	-800W~800W	-800W~800W
	Current Range	-12A~12A	-6A~6A	-3A~3A
C Mode	Resolution	1mA	1mA	1mA
	Accuracy	<0.1% +0.1% FS	<0.1% +0.1% FS	<0.1% +0.1% FS
	Voltage Range	0~150V	0~300V	0~600V
V Mode	Resolution	10mV	10mV	10mV
	Accuracy		0.02% +0.02% FS	
	Resistance Range	0.02% +0.02% FS		0.02% +0.02% FS
lesistance	Resolution	0~1000mΩ	0~1000mΩ	0~1000mΩ
Programming Sourcing)		0.1mΩ	0.1mΩ	0.1mΩ
, source and the second s	Accuracy Dewor Banga	2% FS	2% FS	2% FS
DMada	Power Range	-800W~800W	-800W~800W	-800W~800W
CP Mode	Resolution	0.1W	0.1W	0.1W
	Accuracy	0.3%+0.3%FS	0.3%+0.3%FS	0.3%+0.3%FS
Dutput	Range	-12A~12A	-6A~6A	-3A~3A
Jutput Current Readback	Resolution	1mA	0.1mA	0.1mA
	Accuracy	<0.1% +0.1% FS	<0.1% +0.1% FS	<0.1% +0.1% FS
	Range	0~150V	0~300V	0~600V
)utput /oltage Readbacl	Resolution	10mV	10mV	10mV
intrage neurosuoi	Accuracy	0.02% +0.02% FS	0.02% +0.02% FS	0.02% +0.02% FS
	Range	-800W~800W	-800W~800W	-800W~800W
Dutput Power Readback	Resolution	0.1W	0.1W	0.1W
	Accuracy	0.3%+0.3%FS	0.3%+0.3%FS	0.3%+0.3%FS
and Degulation	Voltage	≤0.02% +0.02% FS	≤0.01% +0.01% FS	≤0.01% +0.01% FS
oad Regulation	Current	≤0.03% +0.03% FS	≤0.03% +0.03% FS	≤0.03% +0.03% FS
	Voltage	≤0.01% +0.01% FS	≤0.01% +0.01% FS	≤0.01% +0.01% FS
ine Regulation	Current	≤0.02% +0.02% FS	≤0.02% +0.02% FS	≤0.02% +0.02% FS
· •	Voltage	≤300mVp-p	≤600mVp-p	≤1200mVp-p
Ripple	Current	≤30mArms	≤30mArms	≤30mArms
lise Time	Voltage (No Load)	20ms	20ms	30ms
lise Time	Voltage (Full Load)	50ms	50ms	60ms
all Time	Voltage (No Load)	20ms	20ms	30ms
all Time	Voltage (Full Load)	20ms	20ms	30ms
	Range	-20°C120°C	-20°C120°C	-20 °C120 °C
)UT emperature	Accuracy	±1°C	±1°C	±1°C
neasure	Resolution	0.1°C	0.1 °C	0.1 °C
	Voltage Range	100VAC~240VAC (±10%)	100VAC~240VAC (±10%)	100VAC~240VAC (±10%)
Power Rating		264VAC	264VAC	264VAC
	Ovp	90VAC	90VAC	90VAC
	Uvp	47Hz~63Hz	47Hz~63Hz	47Hz~63Hz
onci natiliy	Frequency	4/12-0312 4Aac (AC220V)	4/112/03/12 4Aac(AC220V)	4Aac(AC220V)
	Max.input Current	-0.1A~+0.1A	-0.1A~+0.1A	-0.1A~+0.1A
Dc Component		-0. TA~+0. TA 88%	-0.1A~+0.1A 88%	-0. TA~+0. TA 88%
Efficiency (Max.)			450mm*214mm*43.5mm	450mm*214mm*43.5mm
Dimension (D*W*	*H)	450mm*214mm*43.5mm		
Net Weight		5kg	5kg	5kg



This information is subject to change without notice.For more information, please contact ITECH.

#### Taipei

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