

FTB9000 Bidirectional Power Supply (5 kW... 180 kW)

High-power Bidirectional DC Power Supply



FTB9000 series

- Output voltage: 80 V up to 2250 V;
- Output current: up to ± 4500 A;
- Output power: standalone 5 kW up to ± 180 kW, parallel up to ± 1800 kW;
- 0.05%+0.05%F.S. and 0.1%+0.1%F.S. accuracy for voltage and current measurement respectively;
- Power factor 0.99, efficiency > 93%;
- Regenerative load function, regenerative efficiency up to 95%;
- Bi-directional power transfer, seamless switch between sourcing and sinking;
- Automatic line loss compensation;
- CV, CC, CP, CR function;
- CV / CC priority start (prevents voltage or current overshoot with output ON);
- Adjustable voltage/current slew rate;
- Voltage ramp function; charge/discharge function;
- User programmable sequence function;
- Battery simulator function (optional);
- Support photovoltaic battery array simulation function (optional);
- OVP, OCP, OPP, OTP, LVP etc. protection functions;
- High-voltage isolated digital, analog, monitoring and control interfaces;
- Standard LAN, USB (serial), optional RS485, GPIB or CAN ports;
- Support SCPI, MODBUS, CAN-OPEN (optional) protocol;
- 18 kW / 3U high power density, standard 19-inch chassis design.

General

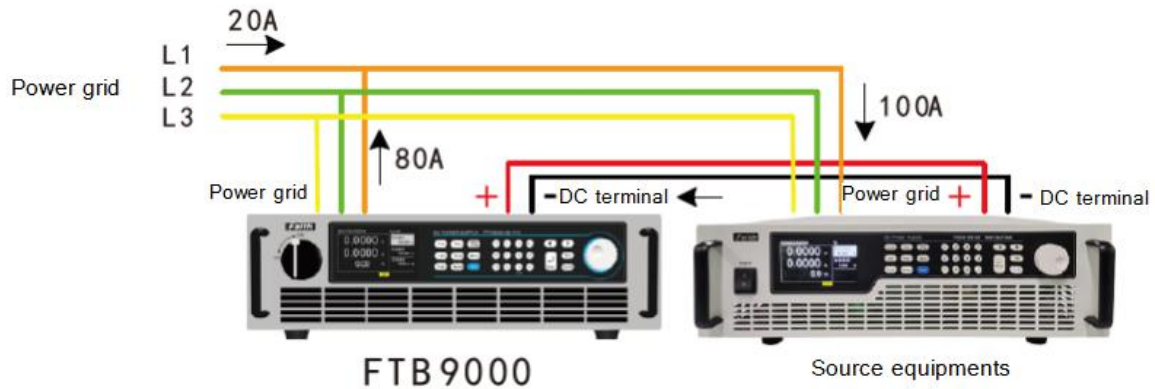
The FTB9000 series is a wide-range high-power bidirectional programmable DC power supply with both DC power supply and regenerative load functions. It can not only realize the source function, but also can be used as a regenerative load to feed the absorbed energy back to the power grid to realize the two-way flow of energy.

The voltage range of FTB9000 series is from 80V to 2250V, the current of a single machine can reach 4500A, and the maximum power of a single machine is 180kW. It can achieve seamless switching between source and load dual quadrants, and has rich test functions and a simple human-computer interface. It has a wide range of applications in high-power test scenarios such as automotive electronics, energy storage, and fuel cells, etc.

FTB9000 Bidirectional DC Source Series (5 kW...180 kW)

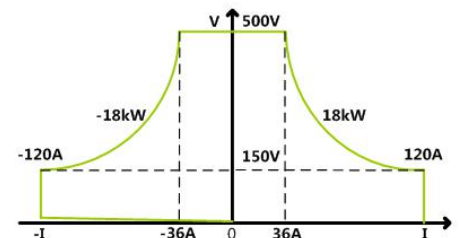
Regenerative load function

FTB9000 series products have a regenerative load function, which can feed back the energy of the device under test to the factory intranet for direct use, instead of dissipating it in the form of thermal energy. Its energy feedback conversion efficiency is as high as 95%, which can not only greatly reduce the electricity cost of users, but also avoid the use of air conditioners and other refrigeration systems and reduce noise.



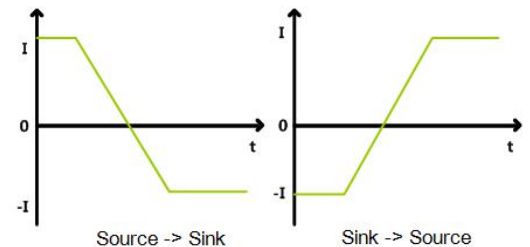
Wide operating region, two-quadrant operation

The FTB9000 series combines two devices in one: a power supply (source) and an electronic load (sink) with energy recovery capability. At the same time, this series provides up to 3 times wider output range, thus more applications can be tested using a single supply avoiding the need for multiple power supplies.



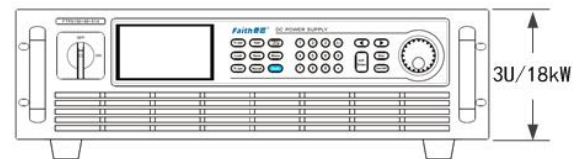
Seamless switch between sourcing and sinking

When conventional DC power supply and load switch between positive and negative currents, a short step will be generated at 0 A, resulting in discontinuous current commutation. FTB9000 not only has two-quadrant working ability, but also has high-speed current switching ability, which can realize seamless connection between positive and negative current switching, effectively avoid voltage or current overshoot, and is widely used in motors, battery packs, BMS and energy storage systems test.



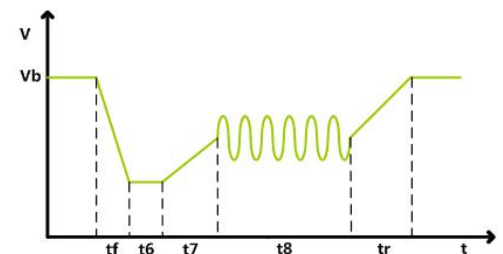
18 kW / 3U high power density

The FTB9000 series provides a high power density of 18 kW / 3U, with features such as accurate output, fast response, and low ripple noise.



User programmable sequence function

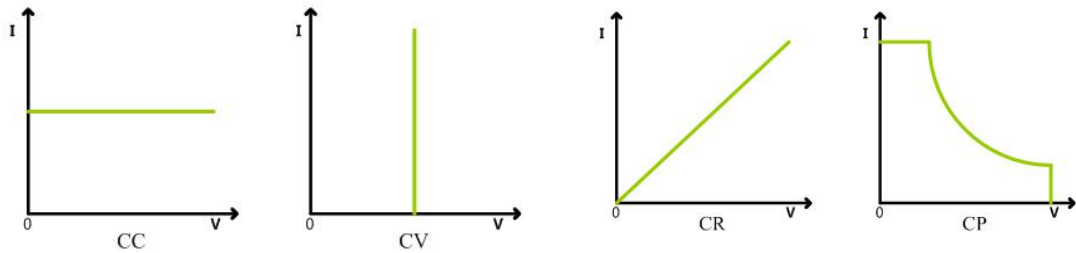
The FTB9000 series provides users with user programmable sequence functions to simulate power interruptions, instantaneous drops, and simulating other voltage and current changes. A total of 10 sequence files, each file has 100 steps, supports loop and link to facilitate complex waveform output.



Load function

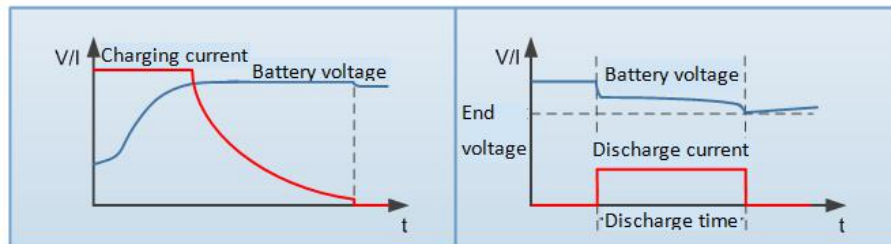
When the FTB9000 works as a regenerative load, it has four basic working modes: constant current, constant voltage, constant power, and constant resistance, which can meet a wide range of testing needs.

FTB9000 Bidirectional DC Source Series (5 kW...180 kW)



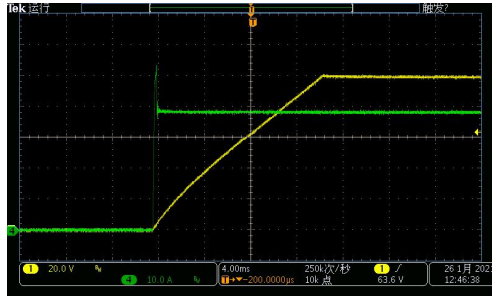
Battery charge / discharge function

Due to its unique bidirectional design, the FTB9000 series has a charge/discharge test function, and is suitable for charge/discharge tests of various batteries and energy storage devices.

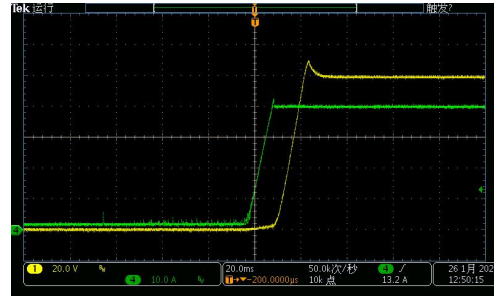


CV / CC priority

When power supply is connected to an inductive or capacitive load, it will cause voltage or current overshoot, which may trigger the protection of the device under test, or even cause the device under test to be damaged in severe cases. This series power supply provides CC priority and CV priority function, which forces the power supply to operate in CC or CV mode at the moment the output is turned on, effectively avoids the current or voltage overshoot resulted from capacitive or inductive load.



CV Priority



CC Priority

Master-slave parallel

FTB9000 series power supply allows for master-slave parallel of up to 10 identical units. In parallel operation, slave units download parameters from master unit and current are shared automatically. FTB9000 series power supply does not support master-slave serial operation.

Optional analog programming and monitoring interface

In addition to front panel and remote interface control, there is a galvanically isolated analog interface terminal, located on the rear of the device. It offers analog inputs to set voltage, current, power from 0...100% through control voltages of 0 V...5 V. To monitor the output voltage and current, there are analog outputs with 0 V...5 V. Also, several inputs and outputs are available for controlling and monitoring the device status.

Digital interfaces

All models features two galvanically isolated digital interfaces by default, these are standard LAN and USB (optional RS485, GPIB, CAN interface). USB, LAN and RS485 can be used to control and monitor the devices either with SCPI language commands or ModBus RTU protocol, while with GPIB only SCPI is supported, with CAN only CANOpen is supported.

FTB9000 Bidirectional DC Source Series (5 kW...180 kW)

Control software

FTB9000 series provide a control software for Windows PCs, which can read test data, generate images, export reports, print reports, etc. in real time, it is convenient for customers to use.

Options

- Graphical visualization of the actual values;
- Digital interface modules for GPIB, CAN, RS485;
- Analog programming and monitoring interface (analog interface on the rear)

Model options



Voltage	Model	Current	Power	Size	Voltage	Model	Current	Power	Size
80V	FTB9050-80-150	150A	5kW	3U	300V	FTB9060-300-75	75A	6kW	3U
	FTB9100-80-300	300A	10kW	3U		FTB9120-300-150	150A	12kW	3U
	FTB9150-80-450	450A	15kW	3U		FTB9180-300-225	225A	18kW	3U
	FTB9300-80-900	900A	30kW	6U		FTB9360-300-450	450A	36kW	6U
	FTB9450-80-1350	1350A	45kW	16U		FTB9540-300-675	675A	54kW	16U
	FTB9600-80-1800	1800A	60kW	16U		FTB9720-300-900	900A	72kW	16U
	FTB9750-80-2250	2250A	75kW	22U		FTB9900-300-1125	1125A	90kW	22U
Voltage	Model	Current	Power	Size	Voltage	Model	Current	Power	Size
500V	FTB9060-500-40	40A	6kW	3U	800V	FTB9060-800-25	25A	6kW	3U
	FTB9120-500-80	80A	12kW	3U		FTB9120-800-50	50A	12kW	3U
	FTB9180-500-120	120A	18kW	3U		FTB9180-800-75	75A	18kW	3U
	FTB9360-500-240	240A	36kW	6U		FTB9360-800-150	150A	36kW	6U
	FTB9540-500-360	360A	54kW	16U		FTB9540-800-225	225A	54kW	16U
	FTB9720-500-480	480A	72kW	16U		FTB9720-800-300	300A	72kW	16U
	FTB9900-500-600	600A	90kW	22U		FTB9900-800-375	375A	90kW	22U
Voltage	Model	Current	Power	Size	Voltage	Model	Current	Power	Size
1000V	FTB9120-1000-40	40A	12kW	3U	1500V	FTB9120-1500-25	25A	12kW	3U
	FTB9240-1000-80	80A	24kW	6U		FTB9180-1500-40	40A	18kW	3U
	FTB9360-1000-120	120A	36kW	16U		FTB9360-1500-80	80A	36kW	6U
	FTB9480-1000-160	160A	48kW	16U		FTB9540-1500-120	120A	54kW	16U
	FTB9600-1000-200	200A	60kW	22U		FTB9720-1500-160	160A	72kW	16U
Voltage	Model	Current	Power	Size	Voltage	Model	Current	Power	Size
2250V	FTB9180-2250-25	25A	18kW	3U	2250V	FTB9720-2250-100	100A	72kW	16U
	FTB9360-2250-50	50A	36kW	6U		FTB9900-2250-125	125A	90kW	22U
	FTB9540-2250-75	75A	54kW	16U		FTB91080-2250-150	150A	108kW	22U

Optional accessories table 1

Item	Type or specifications	Notes
Graphical visualization of the actual values	FTB9000 FaithPower	software for FTB9000 series
GPIB interface	Model name ends with Suffix "G"	
CAN, RS485 interface	Model name ends with Suffix "R"	
Analog interface	Model name ends with Suffix "F"	

FTB9000 Bidirectional DC Source Series (5 kW...180 kW)

Optional accessories table 2: High current test cable matching table

Specification	DC2-2P15M	DC16-2P15M	DC25-2P20M	DC50-2P20M	DC50-2P40M	DC120-2P20M	DC150-2P20M
Max voltage	750V						
Max current	10A	60A	100A	200A	200A	300A	400A
Terminal	M8/Alligator	M8/M8	M8/M8	M8/M8	M8/M8	M8/M8	M10/M10
Length	~1.5m	~1.5m	~2m	~2m	~4m	~2m	~2m
Shape							

Optional accessories table 2: AC Input cable matching table

Specification	AC6-3P20M	AC6-4P20M	AC6-4P40M	AC16-4P20M	AC16-4P20M	AC35-4P30M
For model	1Ø, < 6.5kW	3Ø, <= 15kW	3Ø, <= 15kW	3Ø, 20k-30kW	3Ø, 20k-30kW	3Ø, 35k-60kW
Terminal	O-Type M4	O-Type M4	O-Type M4	O-Type M5	O-Type M5	O-Type M8
Length	~ 2m	~ 2m	~ 4m	~ 2m	~ 4m	~ 3m

General specification

General specification	
Item	参数
AC input	3Ø AC input, 340VAC ~ 480VAC, 47Hz ~ 63Hz
Power factor	0.99(typical)
Efficiency	> 93% (typical)
Output voltage	0 ~ rated value (max 2250V, set via menu, input through numeric keys or rotary knob)
Output current	0 ~ rated value (max 10000A, set via menu, input through numeric keys or rotary knob)
Output power	0 ~ rated value (max 180kW, set via menu, input through numeric keys or rotary knob)
V measurement accuracy	0.05%+0.05%F.S.
I measurement accuracy	0.1%+0.1%F.S.
V/I monitoring	V/I monitoring voltage: DC 0 ~ 5V
Display	4.3-inch TFT color LCD, support simplified Chinese, traditional Chinese and English
Operation way	Function keys, numeric keys and rotary knob (double knob for V/I respectively)
Transient response	For a 10%~90% load change, the amount of time for the power supply voltage resumes to 0.75% accuracy range of rated value is less than 2ms
Parallel	Max 10 identical models through master-slave parallel
Protection	OVP, OCP, OTP, OPP, LVP etc.
Communication	LAN、USB 串口 (optional GPIB、CAN、RS485)
Protocol	SCPI、MODBUS、CAN-Open (optional) protocol
Work Temperature	0°C~40°C
Storage temperature	-20°C~70°C
Using altitude	< 2000m
Cooling way	Air cooling, intelligent fan control

FTB9000 Bidirectional DC Source Series (5 kW...180 kW)

Specification sheet - 1				
Model	FTB9050-80-150	FTB9060-300-75	FTB9060-500-40	FTB9060-800-25
Power	-5~5kW	-6~6kW	-6~6kW	-6~6kW
Voltage	0~80V	0~300V	0~500V	0~800V
Current	-150~150A	-75~75A	-40~40A	-25~25A
Resistance	0.02~106Ω	0.3~800Ω	0.5~2.5kΩ	1.2~6kΩ
Model	FTB9100-80-300	FTB9120-300-150	FTB9120-500-80	FTB9120-800-50
Power	-10~10kW	-12~12kW	-12~12kW	-12~12kW
Voltage	0~80V	0~300V	0~500V	0~800V
Current	-300~300A	-150~150A	-80~80A	-50~50A
Resistance	0.01~50Ω	0.15~400Ω	0.25~1.25kΩ	0.6~3kΩ
Model	FTB9150-80-450	FTB9180-300-225	FTB9180-500-120	FTB9180-800-75
Power	-15~15kW	-18~18kW	-18~18kW	-18~18kW
Voltage	0~80V	0~300V	0~500V	0~800V
Current	-450~450A	-225~225A	-120~120A	-75~75A
Resistance	0.006~35Ω	0.1~266Ω	0.16~833Ω	0.4~2kΩ
Model	FTB9300-80-900	FTB9360-300-450	FTB9360-500-240	FTB9360-800-150
Power	-30~30kW	-36~36kW	-36~36kW	-36~36kW
Voltage	0~80V	0~300V	0~500V	0~800V
Current	-900~900 A	-450~450A	-240~240A	-150~150A
Resistance	0.003~17Ω	0.05~133Ω	0.08~416Ω	0.2~1kΩ
Model	FTB9450-80-1350	FTB9540-300-675	FTB9540-500-360	FTB9540-800-215
Power	-45~45kW	-54~54kW	-54~54kW	-54~54kW
Voltage	0~80V	0~300V	0~500V	0~800V
Current	-1350~1350 A	-675~675A	-360~360A	-215~215A
Resistance	0.002~11Ω	0.03~88Ω	0.05~277Ω	0.1~666Ω
Model	FTB9600-80-1800	FTB9720-300-900	FTB9720-500-480	FTB9720-800-300
Power	-60~60kW	-72~72kW	-72~72kW	-72~72kW
Voltage	0~80V	0~300V	0~500V	0~800V
Current	-1800~1800 A	-900~900A	-480~480A	-300~300A
Resistance	0.002~8.8Ω	0.025~66Ω	0.042~208Ω	0.1~500Ω
Model	FTB9750-80-2250	FTB9900-300-1125	FTB9900-500-600	FTB9900-800-375
Power	-75~75kW	-90~90kW	-90~90kW	-90~90kW
Voltage	0~80V	0~300V	0~500V	0~800V
Current	-2250~2250 A	-1125~1125A	-600~600A	-375~375A
Resistance	0.002~9Ω	0.02~53Ω	0.033~166Ω	0.08~400Ω
Model	FTB9900-80-2700	FTB91080-300-1350	FTB91080-500-720	FTB91080-800-450
Power	-90~90kW	-108~108kW	-108~108kW	-108~108kW
Voltage	0~80V	0~300V	0~500V	0~800V
Current	-2700~2700 A	-1350~1350A	-720~720A	-450~450A
Resistance	0.001~6Ω	0.017~44Ω	0.027~138Ω	0.066~333Ω
Model	FTB91050-80-3150	FTB91260-300-1575	FTB91260-500-840	FTB91260-800-525
Power	-105~105kW	-126~126kW	-126~126kW	-126~126kW
Voltage	0~80V	0~300V	0~500V	0~800V
Current	-3150~3150	-1575~1575A	-840~840A	-525~525A

FTB9000 Bidirectional DC Source Series (5 kW...180 kW)

Resistance	0.001~4.4Ω	0.014~38Ω	0.024~119Ω	0.057~285Ω
Model	FTB91200-80-3600	FTB91440-300-1800	FTB91440-500-960	FTB91440-800-600
Power	-120~120kW	-144~144kW	-144~144kW	-144~144kW
Voltage	0~80V	0~300V	0~500V	0~800V
Current	-3600~3600A	-1800~1800A	-960~960A	-600~600A
Resistance	0.001~4.4Ω	0.013~33Ω	0.021~104Ω	0.05~250Ω
Model	FTB91350-80-4050	FTB91620-300-2025	FTB91620-500-1080	FTB91620-800-675
Power	-135~135kW	-162~162kW	-162~162kW	-162~162kW
Voltage	0~80V	0~300V	0~500V	0~800V
Current	-4050~4050A	-2050~2050A	-1080~1080A	-675~675A
Resistance	0.001~3.9Ω	0.011~30Ω	0.018~92Ω	0.044~222Ω
Model	FTB91500-80-4500	FTB91800-300-2250	FTB91800-500-1200	FTB91800-800-750
Power	-150~150kW	-180~180kW	-180~180kW	-180~180kW
Voltage	0~80V	0~300V	0~500V	0~800V
Current	-4500~4500A	-2250~2250A	-1200~1200A	-750~750A
Resistance	0.001~3.5Ω	0.01~26Ω	0.017~83Ω	0.04~200Ω
Voltage programming ①				
Resolution	16bits			
Accuracy	0.05%+0.05%F.S.			
Current programming ①				
Resolution	16bits			
Accuracy	0.1%+0.1% F.S.			
Resistance programming ①				
Resolution	0.001Ω			
Accuracy	1%+0.5%I.F.S.			
Power programming ①				
Resolution	1W			
Accuracy	0.5%F.S.			
External analog programming ①				
Control voltage	0~5V corresponds to 0~100%F.S.			
Voltage accuracy	0.5%F.S.			
Current accuracy	0.5%F.S.			
Line regulation ②				
Voltage	0.01%F.S.			
Current	0.05%F.S.			
Power	0.05%F.S.			
Load regulation ③				
Voltage	0.02%F.S.			
Current	0.1%F.S.			
Power	0.75%F.S.			
Voltage measurement ①				
Resolution	16bits			
Accuracy	0.05%+0.05%F.S.			
Current measurement ①				
Resolution	16bits			

FTB9000 Bidirectional DC Source Series (5 kW...180 kW)

Accuracy	0.1%+0.1% F.S.				
Resistance measurement①					
Resolution	0.001Ω				
Accuracy	1%+0.5%I.F.S.				
Power measurement①					
Resolution	1W				
Accuracy	0.5%F.S.				
Output noise & ripple④					
Ripple Vpp	5kW	160mV	300mV	450 mV	800 mV
	10kW	320mV	300 mV	450 mV	800 mV
	15kW	320 mV	300 mV	450 mV	800 mV
Ripple Vrms	5kW	16mV	40mV	70 mV	200mV
	10kW	25 mV	40 mV	70 mV	200 mV
	15kW	25 mV	40 mV	70 mV	200 mV
Voltage rising slew rate					
Max slew rate	10000V/s		40000V/s		
Voltage fall time					
No load	< 5s			< 10s	
Full load	≤30ms				
Size (WxHxD)	5kW~18kW : 482.6mm x 132.5mm x 740.0mm, including output protective cover				
Weight	5kW≈18kg, 10kW≈25kg, 15kW≈32kg				

Specification sheet - 2			
Model	FTB9120-1000-40	FTB9120-1500-25	~
Power	-12~12kW	-12~12kW	~
Voltage	0~1000V	0~1500V	~
Current	-40~40A	-25~25A	~
Resistance	1~5kΩ	2.25~11kΩ	~
Model	~	FTB9180-1500-40	FTB9180-2250-25
Power	~	-18~18kW	-18~18kW
Voltage	~	0~1500V	0~2250V
Current	~	-40~40A	-25~25A
Resistance	~	1.5~7.5kΩ	3.6~18k
Model	FTB9240-1000-80	FTB9360-1500-80	FTB9360-2250-50
Power	-24~24kW	-36~36kW	-36~36kW
Voltage	0~1000V	0~1500V	0~2250V
Current	-80~80A	-80~80A	-50~50A
Resistance	0.5~2.5 kΩ	0.75~7.5kΩ	1.8~9kΩ
Model	FTB9360-1000-120	FTB9540-1500-120	FTB9540-2250-75
Power	-36~36kW	-54~54kW	-54~54kW
Voltage	0~1000V	0~1500V	0~2250V
Current	-120~120A	-120~120A	-75~75A
Resistance	0.33~1.6kΩ	0.5~2.5kΩ	1.2~6kΩ

FTB9000 Bidirectional DC Source Series (5 kW...180 kW)

Model	FTB9480-1000-160	FTB9720-1500-160	FTB9720-2250-100
Power	-48~48kW	-72~72kW	-72~72kW
Voltage	0~1000V	0~1500V	0~2250V
Current	-160~160A	-160~160A	-100~100A
Resistance	0.25~1.25kΩ	0.375~1.875kΩ	0.9~4.5kΩ
Model	FTB9600-1000-200	FTB9900-1500-200	FTB9900-2250-125
Power	-60~60kW	-90~90kW	-90~90kW
Voltage	0~1000V	0~1500V	0~2250V
Current	-200~200A	-200~200A	-125~125A
Resistance	0.2~1kΩ	0.3~1.5kΩ	0.72~3.6kΩ
Model	FTB9720-1000-240	FTB91080-1500-240	FTB91080-2250-150
Power	-72~72kW	-108~108kW	-108~108kW
Voltage	0~1000V	0~1500V	0~2250V
Current	-240~240 A	-240~240 A	-150~150A
Resistance	0.166~250Ω	0.25~1.25kΩ	0.6~3kΩ
Model	FTB9840-1000-280	FTB91260-1500-280	FTB91260-2250-175
Power	-84~84kW	-126~126kW	-126~126kW
Voltage	0~1000V	0~1500V	0~2250V
Current	-280~280A	-280~280A	-175~175A
Resistance	0.143~714Ω	0.214~1.07kΩ	0.514~2.5kΩ
Model	FTB9960-1000-320	FTB91440-1500-320	FTB91440-2250-200
Power	-96~96kW	-144~144kW	-144~144kW
Voltage	0~1000V	0~1500V	0~2250V
Current	-320~320A	-320~320A	-200~200A
Resistance	0.125~625Ω	0.188~938Ω	0.45~2.25kΩ
Model	FTB91080-1000-360	FTB91620-1500-360	FTB91620-2250-225
Power	-108~108kW	-162~162kW	-162~162kW
Voltage	0~1000V	0~1500V	0~2250V
Current	-360~360A	-360~360A	-225~225A
Resistance	0.11~555Ω	0.167~833Ω	0.4~2kΩ
Model	FTB91200-1000-400	FTB91800-1500-400	FTB91800-2250-250
Power	-120~120kW	-180~180kW	-180~180kW
Voltage	0~1000V	0~1500V	0~2250V
Current	-400~400A	-400~400A	-250~250A
Resistance	0.1~500Ω	0.15~750Ω	0.36~1.8kΩ
Voltage programming①			
Resolution	16bits		
Accuracy	0.05%+0.05%F.S.		
Current programming①			
Resolution	16bits		
Accuracy	0.1%+0.1% F.S.		
Resistance programming①			
Resolution	0.001Ω		
Accuracy	1%+0.5%I.F.S.		

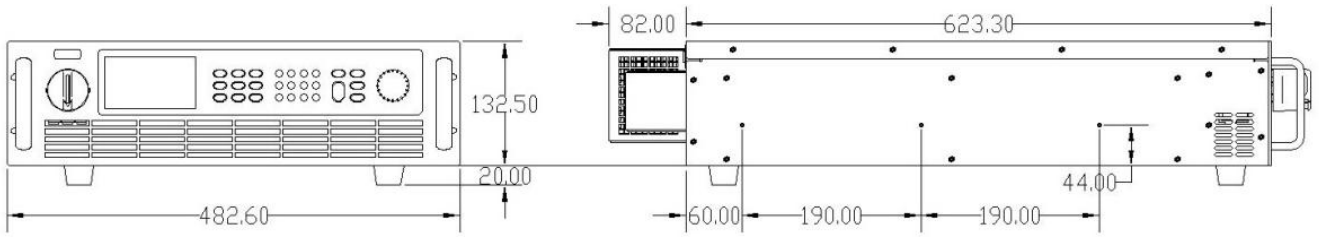
FTB9000 Bidirectional DC Source Series (5 kW...180 kW)

Power programming ^①				
Resolution	1W			
Accuracy	1%F.S.			
External analog programming ^①				
Control Voltage	0~5V corresponds to 0~100%F.S.			
Voltage Accuracy	0.5%F.S.			
Current Accuracy	0.5%F.S.			
Line regulation ^②				
Voltage	0.01%F.S.			
Current	0.05%F.S.			
Power	0.05%F.S.			
Load regulation ^③				
Voltage	0.02%F.S.			
Current	0.05%F.S.			
Power	0.05%F.S.			
Voltage measurement ^①				
Resolution	16bits			
Accuracy	0.05%+0.05%F.S.			
Current measurement ^①				
Resolution	16bits			
Accuracy	0.1%+0.1% F.S.			
Resistance measurement ^①				
Resolution	0.001Ω			
Accuracy	1%+0.5%I.F.S.			
Power measurement ^①				
Accuracy	1%F.S.			
Output noise & ripple ^④				
ripple Vpp	10kW	1600mV	-	-
	15kW	-	2400mV	3600mV
ripple Vrms	10kW	350mV	-	-
	15kW	-	400mV	400mV
Voltage rising slew rate				
Max slew rate	40000V/s			
Voltage fall time				
No load	< 10s			
Full load	≤30ms			
Size (WxHxD)	5kW~18kW : 482.6mm x 132.5mm x 740.0mm, including output protective cover			
Weight	5kW≈18kg, 10kW≈25kg, 15kW≈32kg			

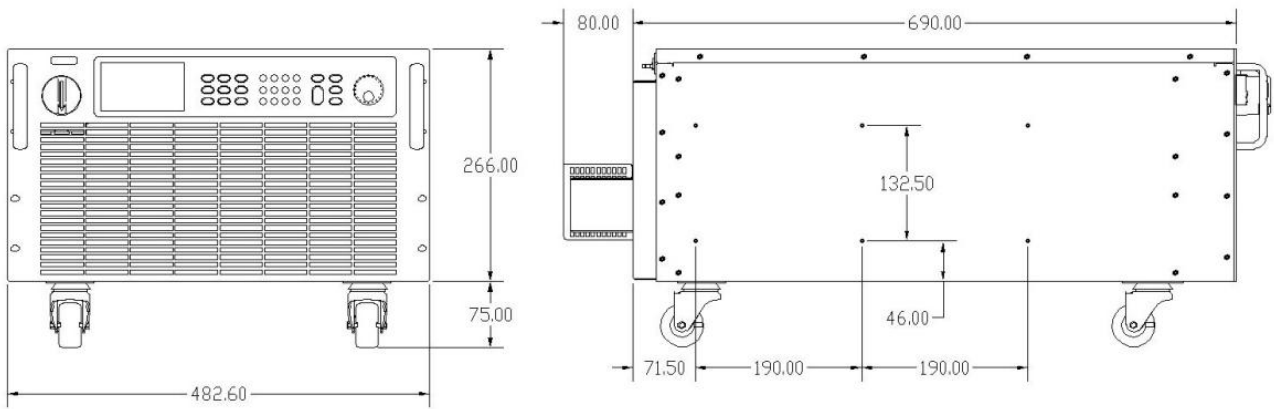
FTB9000 Bidirectional DC Source Series (5 kW...180 kW)

Dimension

5kW~18kW model dimension



20kW~36kW model dimension



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