

Faith

**Regenerative high-power
programmable
DC load
FTR9000 series**



SHENZHEN FAITHTECH CO., LTD

|Summary

FTR9000 series is a regenerative programmable DC electronic load. It not only has the function of traditional consumable load, but also cleanly feeds the energy consumed by traditional load back to the power grid to achieve the purpose of energy conservation. It can be widely used in new energy equipment testing, lithium ion, fuel and other battery discharge testing, automatic testing system, AC/DC, DC/DC and other one-way module product testing and aging. The product is equipped with rich communication, programming interfaces, color screens and a variety of text menu interfaces, which is easy to operate and intuitive. It is a common equipment in the power electronics, new energy, sensors, motor drives, system integration and other industries.

|Features

- Single unit: voltage: 0 ~ 2250V Current: 0 ~ 4500A Power: 0 ~ 180kW;
- The extended power of master slave parallel operation can reach 1.8MW;
- Voltage precision: 0.05%+0.05% F.S; Current accuracy: 0.1%+0.1% F.S;
- The power factor is 0.99, and the overall efficiency is higher than 93%;
- Automatic compensation for wire loss;
- It has the functions of constant voltage, constant current, constant power and constant resistance;
- Voltage and current slew rate can be set;
- With battery discharge test function;
- It has sequence and waveform functions, and can realize complex voltage and current waveforms, such as automobile electronic test voltage waveform and user-defined waveform;
- Over voltage, over current, over power, over temperature, low voltage, power down, island protection and other comprehensive protection functions;
- High voltage isolation digital, analog, monitoring and control interfaces;
- The communication interface is equipped with LAN, USB as standard, RS485, CAN or GPIB as options;
- The communication protocol supports SCPI, MODBUS, CAN-OPEN (optional) protocols, and provides the upper computer and SDK development package for secondary development;
- TFT color LCD screen, Chinese, English and traditional Chinese menu interface
- Intelligent fan control;
- Standard 19 inch rack design, pulley design can be selected for more than 16U.

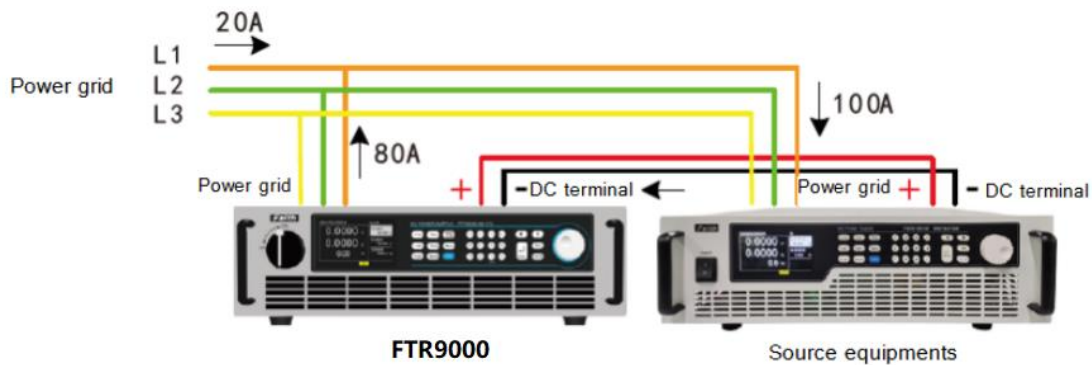
|Application field

- Production and development of energy storage and micro grid equipment
- Production and development of server power supply, UPS and inverter

- Solar battery array, wind power applications
- Fuel cell, power cell, lead acid battery, super capacitor applications
- Aerospace, railway, new energy vehicles, motor driver test applications
- UAV, laser, sensor applications

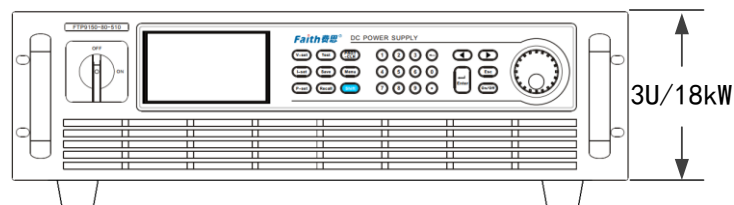
|Energy feedback

FTR9000 series products can recover the output energy of DC source equipment and feed it back to the internal power grid without pollution. The recovered electric energy can be directly used by internal appliances, reducing the heat energy generated by energy consumption, so as to achieve a win-win situation of work and energy conservation.



|3U/18kW high power density

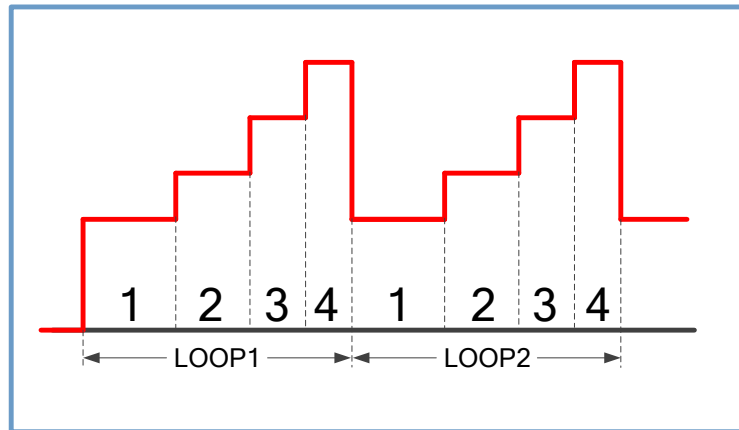
FTR9000 series regenerative high-power programmable DC electronic load adopts high power density design. Compared with ordinary energy consumption electronic load, its volume is reduced by 80% under the same power, and its use is more flexible and convenient.



|Sequence and waveform function

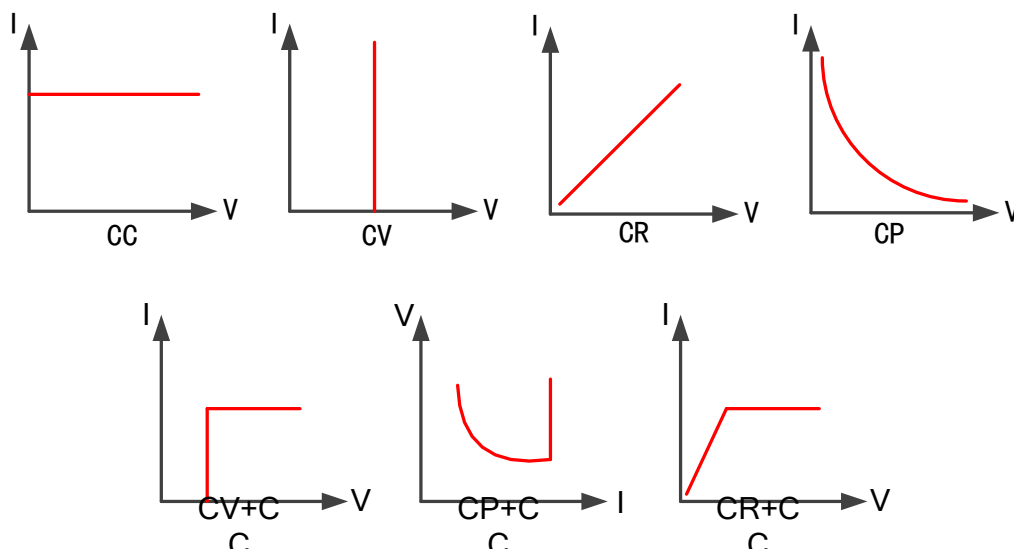
The FTR9000 series electronic load provides the sequence test function, which can

edit up to 10 test files, 100 steps each. Support load time sequence changes in CC, CV, CR, CP and other modes, and support sequence editing functions such as file linking. Up to 5000 steps of time sequence editing can be completed, and the single step time range is 1ms~99999s.



Multiple work mode

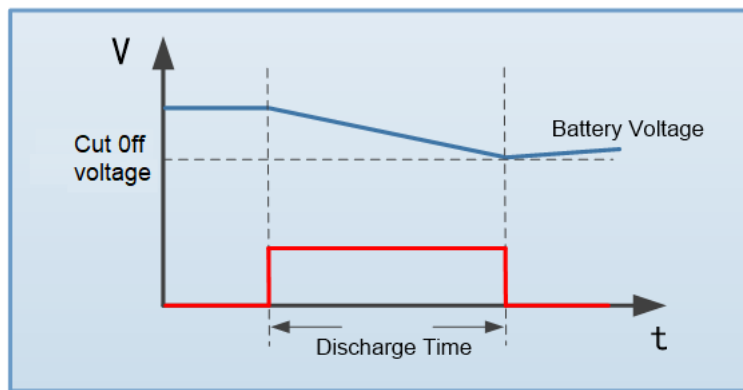
The FTR9000 series has four basic operating modes of constant current, constant voltage, constant resistance and constant power, which can meet a wide range of test requirements. At the same time, it also has the functions of CV+CC, CR+CC, CP+CC multiple composite operation modes. Users can set the current limit value according to their own test requirements to avoid over-current damage to the test product during the test. Among them, CV+CC mode can be used to simulate the charging characteristics of batteries, test charging piles, vehicle charger and other similar products. CR+CC mode can simulate power supply voltage and current limitation and accuracy test.



|Battery test

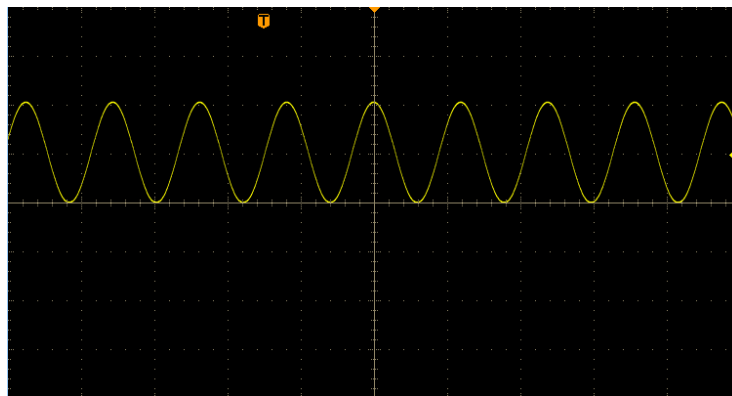
FTR9000 series electronic load has battery test function. Three discharge modes of constant current, constant resistance and constant power are provided, and the discharge cut-off conditions can be set by yourself: cut-off voltage, cut-off time and cut-off electricity, If any of the three conditions is met, the discharge will stop. During the discharge, the discharge electricity and time will be recorded.

The FTR9000 series conducts battery internal resistance and capacity tests by DC discharge method (DCR).



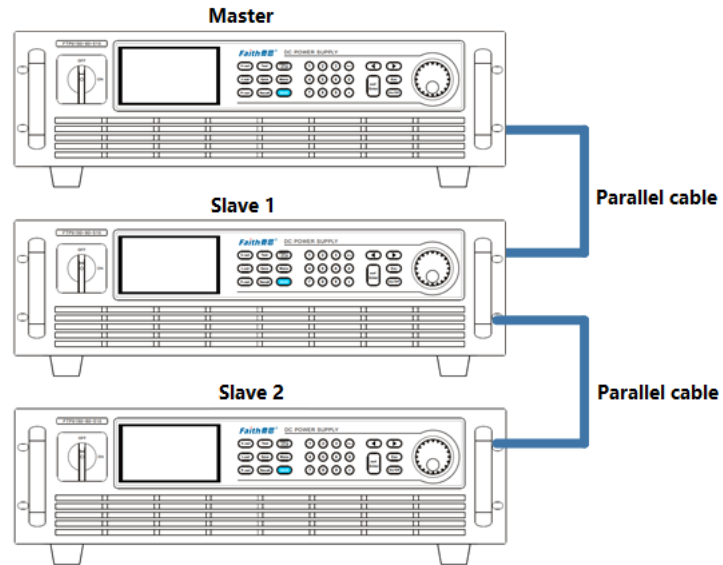
|Sine wave dynamic loading

The FTR9000 series has the sine wave carrier current function, which can be used in the impedance analysis test of fuel cells.



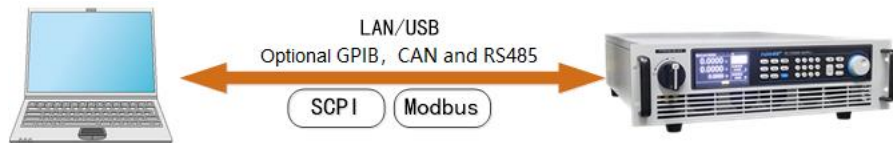
|Cascade connection

The FTR9000 cascade function supports up to 10 parallel loads, expanding the power use range of the electronic load. During the cascade, Each load automatically equalizes the current, and the slave unit automatically copies the load parameters of the master. Single unit can also be used independently, the power configuration is more flexible.



Multiple interface and multiple protocol

The FTR9000 series is equipped with a variety of communication interfaces and supports both SCPI and Modbus communication protocols. Users can configure in the menu according to requirements, which makes system integration more flexible.



Ordering information

*The specifications and models of higher power are not listed one by one;

Voltage	Model	Current	Power	Size	Voltage	Model	Current	Power	Size
80V	FTR9050-80-150	150A	5kW	3U	300V	FTR9060-300-75	75A	6kW	3U
	FTR9100-80-300	300A	10kW	3U		FTR9120-300-150	150A	12kW	3U
	FTR9150-80-450	450A	15kW	3U		FTR9180-300-225	225A	18kW	3U
	FTR9300-80-900	900A	30kW	6U		FTR9360-300-450	450A	36kW	6U
	FTR9450-80-1350	1350A	45kW	16U		FTR9540-300-675	675A	54kW	16U
	FTR9600-80-1800	1800A	60kW	16U		FTR9720-300-900	900A	72kW	16U
	FTR9750-80-2250	2250A	75kW	22U		FTR9900-300-1125	1125A	90kW	22U
Voltage	Model	Current	Power	Size	Voltage	Model	Current	Power	Size
500V	FTR9060-500-40	40A	6kW	3U	800V	FTR9060-800-25	25A	6kW	3U
	FTR9120-500-80	80A	12kW	3U		FTR9120-800-50	50A	12kW	3U
	FTR9180-500-120	120A	18kW	3U		FTR9180-800-75	75A	18kW	3U
	FTR9360-500-240	240A	36kW	6U		FTR9360-800-150	150A	36kW	6U
	FTR9540-500-360	360A	54kW	16U		FTR9540-800-225	225A	54kW	16U
	FTR9720-500-480	480A	72kW	16U		FTR9720-800-300	300A	72kW	16U
	FTR9900-500-600	600A	90kW	22U		FTR9900-800-375	375A	90kW	22U
Voltage	Model	Current	Power	Size	Voltage	Model	Current	Power	Size
1000V	FTR9120-1000-40	40A	12kW	3U	1500V	FTR9120-1500-25	25A	12kW	3U
	FTR9240-1000-80	80A	24kW	6U		FTR9180-1500-40	40A	18kW	3U
	FTR9360-1000-120	120A	36kW	16U		FTR9360-1500-80	80A	36kW	6U
	FTR9480-1000-160	160A	48kW	16U		FTR9540-1500-120	120A	54kW	16U
	FTR9600-1000-200	200A	60kW	22U		FTR9720-1500-160	160A	72kW	16U
Voltage	Model	Current	Power	Size	Voltage	Model	Current	Power	尺寸
2250V	FTR9180-2250-25	25A	18kW	3U	2250V	FTR9720-2250-100	100A	72kW	16U
	FTR9360-2250-50	50A	36kW	6U		FTR9900-2250-125	125A	90kW	22U
	FTR9540-2250-75	75A	54kW	16U		FTR91080-2250-150	150A	108kW	22U

Specification

Specification 1:

Model	FTR9050-80-150	FTR9060-300-75	FTR9060-500-40	FTR9060-800-25
Voltage	80V	300V	500V	800V
Current	150A	75A	40A	25A
Resistance	0.02~106Ω	0.3~800Ω	0.5~2.5kΩ	1.2~6kΩ
Power	5kW	6kW		
Min load voltage	0.5V@150A	2V@75A	3.1V@40A	2.5V@25A
Current slew rate(Max)	75A/ms	37.5A/ms	20A/ms	12.5A/ms
Model	FTR9100-80-300	FTR9120-300-150	FTR9120-500-80	FTR9120-800-50
Voltage	80V	300V	500V	800V
Current	300A	150A	80A	50A
Resistance	0.01~50Ω	0.15~400Ω	0.25~1.25kΩ	0.6~3kΩ
Power	10kW	12kW		
Min load voltage	0.5V@300A	2V@150A	3.1V@80A	2.5V@50A
Current slew rate(Max)	150A/ms	75A/ms	40A/ms	25A/ms
Model	FTR9150-80-450	FTR9180-300-225	FTR9180-500-120	FTR9180-800-75
Voltage	80V	300V	500V	800V
Current	450A	225A	120A	75A
Resistance	0.006~35Ω	0.1~266Ω	0.16~833Ω	0.4~2kΩ
Power	15kW	18kW		
Min load voltage	0.5V@450A	2V@225A	3.1V@120A	2.5V@75A
Current slew rate(Max)	225A/ms	112.5A/ms	60A/ms	37.5A/ms
Model	FTR9300-80-900	FTR9360-300-450	FTR9360-500-240	FTR9360-800-150
Voltage	80V	300V	500V	800V
Current	900 A	450A	240A	150A
Resistance	0.003~17Ω	0.05~133Ω	0.08~416Ω	0.2~1kΩ
Power	30kW	36kW		
Min load voltage	0.5V@900A	2V@450A	3.1V@240A	2.5V@150A
Current slew rate(Max)	450A/ms	225A/ms	120A/ms	75A/ms
Model	FTR9450-80-1350	FTR9540-300-675	FTR9540-500-360	FTR9540-800-215
Voltage	80V	300V	500V	800V
Current	1350 A	675A	360A	215A
Resistance	0.002~11Ω	0.03~88Ω	0.05~277Ω	0.1~666Ω
Power	45kW	54kW		
Min load voltage	0.5V@1350A	2V@675A	3.1V@360A	2.5V@215A
Current slew rate(Max)	675A/ms	337.5A/ms	180A/ms	107.5A/ms

Model	FTR9600-80-1800	FTR9720-300-900	FTR9720-500-480	FTR9720-800-300
Voltage	80V	300V	500V	800V
Current	1800 A	900A	480A	300A
Resistance	0.002~8.8Ω	0.025~66Ω	0.042~208Ω	0.1~500Ω
Power	60kW	72kW		
Min load voltage	0.5V@1800A	2V@900A	3.1V@480A	2.5V@300A
Current slew rate(Max)	900A/ms	450A/ms	240A/ms	150A/ms
Model	FTR9750-80-2250	FTR9900-300-1125	FTR9900-500-600	FTR9900-800-375
Voltage	80V	300V	500V	800V
Current	2250 A	1125A	600A	375A
Resistance	0.002~9Ω	0.02~53Ω	0.033~166Ω	0.08~400Ω
Power	75kW	90kW		
Min load voltage	0.5V@2250A	2V@1125A	3.1V@600A	2.5V@375A
Current slew rate(Max)	1125A/ms	562.5A/ms	300A/ms	187.5A/ms
Model	FTR9900-80-2700	FTR91080-300-1350	FTR91080-500-720	FTR91080-800-450
Voltage	80V	300V	500V	800V
Current	2700 A	1350A	720A	450A
Resistance	0.001~6Ω	0.017~44Ω	0.027~138Ω	0.066~333Ω
Power	90kW	108kW		
Min load voltage	0.5V@2700A	2V@1350A	3.1V@720A	2.5V@450A
Current slew rate(Max)	1350A/ms	675A/ms	360A/ms	225A/ms
Model	FTR91050-80-3150	FTR91260-300-1575	FTR91260-500-840	FTR91260-800-525
Voltage	80V	300V	500V	800V
Current	3150A	1575A	840A	525A
Resistance	0.001~4.4Ω	0.014~38Ω	0.024~119Ω	0.057~285Ω
Power	105kW	126kW		
Min load voltage	0.5V@3150A	2V@1575A	3.1V@840A	2.5V@525A
Current slew rate(Max)	1575A/ms	787.5A/ms	420A/ms	262.5A/ms
Model	FTR91200-80-3600	FTR91440-300-1800	FTR91440-500-960	FTR91440-800-600
Voltage	80V	300V	500V	800V
Current	3600A	1800A	960A	600A
Resistance	0.001~4.4Ω	0.013~33Ω	0.021~104Ω	0.05~250Ω
Power	120kW	144kW		
Min load voltage	0.5V@3600A	2V@1800A	3.1V@960A	2.5V@600A
Current slew rate(Max)	1800A/ms	900A/ms	480A/ms	300A/ms
Model	FTR91350-80-4050	FTR91620-300-2025	FTR91620-500-1080	FTR91620-800-675
Voltage	80V	300V	500V	800V

Current	4050A	2050A	1080A	675A
Resistance	0.001~3.9Ω	0.011~30Ω	0.018~92Ω	0.044~222Ω
Power	135kW	162kW		
Min load voltage	0.5V@4050A	2V@2025A	3.1V@1080A	2.5V@675A
Current slew rate(Max)	2025A/ms	1012.5A/ms	54A/ms	337.5A/ms
Model	FTR91500-80-4500	FTR91800-300-2250	FTR91800-500-1200	FTR91800-800-750
Voltage	80V	300V	500V	800V
Current	4500A	2250A	1200A	750A
Resistance	0.001~3.5Ω	0.01~26Ω	0.017~83Ω	0.04~200Ω
Power	150kW	180kW		
Min load voltage	0.5V@4500A	2V@2250A	3.1V@1200A	2.5V@750A
Current slew rate(Max)	2250A/ms	1125A/ms	600A/ms	375A/ms
CV mode①				
Resolution	16bits			
Accuracy	0.05%+0.05%F.S.			
CC mode①				
Resolution	16bits			
Accuracy	0.1%+0.1% F.S.			
CR mode①				
Resolution	0.001Ω			
Accuracy	1%+0.5%I.F.S.			
CP mode①				
Resolution	1W			
Accuracy	0.5%F.S.			
External analog programming①				
Control voltage	0~5V对应0~100%F.S.			
Voltage accuracy	0.5%F.S.			
Current accuracy	0.5%F.S.			
Voltage measurement①				
Resolution	16bits			
Accuracy	0.05%+0.05%F.S.			
Current measurement①				
Resolution	16bits			
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.			

Transient response	Response time less than 2ms
Parallel operation	Support the parallel operation of 10 master and slave device of same model
Protection	OVP, OCP, OPP, OTP, LVP etc
Communication interface	LAN、USB serial port (optional GPIB、CAN、RS485)
Communication protocol	SCPI、MODBUS、CAN-Open (optional)
Input characteristics	
Input voltage	340VAC~480VAC, frequency 45Hz~63Hz
Power factor	0.99(typical)
efficiency	>93% (typical)
Using environment	
Working temperature	0°C~40°C
Storage temperature	-20°C~70°C
Altitude	< 2000m
Heat dissipation method	Air cooling, intelligent fan control
Dimension (WxHxD)	5kW~18kW: 482.6mm x 132.5mm x 740.0mm, include output shield
Weight	5kW≈18kg, 10kW≈25kg, 15kW≈32kg

Specification 2:

Model	FTR9120-1000-40	FTR9180-1500-40	FTR9180-2250-25
Voltage	1000V	1500V	2250V
Current	40A	40A	25A
Resistance	1~5kΩ	1.5~7.5kΩ	3.6~18k
Power	12kW	18kW	
Min load voltage	6.2V@40A	9.3V@40A	7.5V@25A
Current slew rate(Max)	20A/ms	20A/ms	12.5A/ms
Model	FTR9240-1000-80	FTR9360-1500-80	FTR9360-2250-50
Voltage	1000V	1500V	2250V
Current	80A	80A	50A
Resistance	0.5~2.5 kΩ	0.75~7.5kΩ	1.8~9kΩ
Power	24kW	36kW	
Min load voltage	6.2V@80A	9.3V@80A	7.5V@50A
Current slew	40A/ms	40A/ms	25A/ms

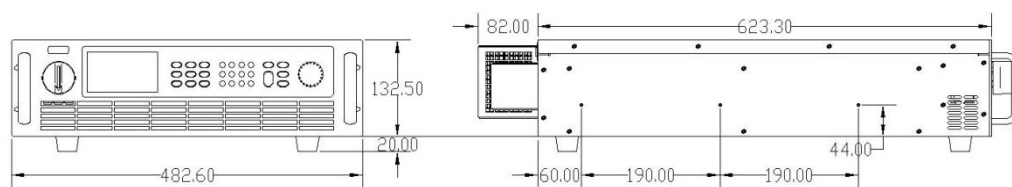
rate(Max)			
Model	FTR9360-1000-120	FTR9540-1500-120	FTR9540-2250-75
Voltage	1000V	1500V	2250V
Current	120A	120A	75A
Resistance	0.33~1.6kΩ	0.5~2.5kΩ	1.2~6kΩ
Power	36kW	54kW	
Min load voltage	6.2V@120A	9.3V@120A	7.5V@75A
Current slew rate(Max)	60A/ms	60A/ms	37.5A/ms
Model	FTR9480-1000-160	FTR9720-1500-160	FTR9720-2250-100
Voltage	1000V	1500V	2250V
Current	160A	160A	100A
Resistance	0.25~1.25kΩ	0.375~1.875kΩ	0.9~4.5kΩ
Power	48kW	72kW	
Min load voltage	6.2V@160A	9.3V@160A	7.5V@100A
Current slew rate(Max)	80A/ms	80A/ms	50A/ms
Model	FTR9600-1000-200	FTR9900-1500-200	FTR9900-2250-125
Voltage	1000V	1500V	2250V
Current	200A	200A	125A
Resistance	0.2~1kΩ	0.3~1.5kΩ	0.72~3.6kΩ
Power	60kW	90kW	
Min load voltage	6.2V@200A	9.3V@200A	7.5V@125A
Current slew rate(Max)	100A/ms	100A/ms	62.5A/ms
Model	FTR9720-1000-240	FTR91080-1500-240	FTR91080-2250-150
Voltage	1000V	1500V	2250V
Current	240 A	240 A	150A
Resistance	0.166~250Ω	0.25~1.25kΩ	0.6~3kΩ
Power	72kW	108kW	
Min load voltage	6.2V@240A	9.3V@240A	7.5V@150A
Current slew rate(Max)	120A/ms	120A/ms	75A/ms
Model	FTR9840-1000-280	FTR91260-1500-280	FTR91260-2250-175
Voltage	1000V	1500V	2250V
Current	280A	280A	175A
Resistance	0.143~714Ω	0.214~1.07kΩ	0.514~2.5kΩ
Power	84kW	126kW	
Min load voltage	6.2V@280A	9.3V@280A	7.5V@175A
Current slew rate(Max)	140A/ms	140A/ms	87.5A/ms
Model	FTR9960-1000-320	FTR91440-1500-320	FTR91440-2250-200
Voltage	1000V	1500V	2250V

Current	320A	320A	200A
Resistance	0.125~625Ω	0.188~938Ω	0.45~2.25kΩ
Power	96kW	144kW	
Min load voltage	6.2V@320A	9.3V@320A	7.5V@200A
Current slew rate(Max)	160A/ms	160A/ms	100A/ms
Model	FTR91080-1000-360	FTR91620-1500-360	FTR91620-2250-225
Voltage	1000V	1500V	2250V
Current	360A	360A	225A
Resistance	0.11~555Ω	0.167~833Ω	0.4~2kΩ
Power	108kW	162kW	
Min load voltage	6.2V@360A	9.3V@360A	7.5V@225A
Current slew rate(Max)	180A/ms	180A/ms	112.5A/ms
Model	FTR91200-1000-400	FTR91800-1500-400	FTR91800-2250-250
Voltage	1000V	1500V	2250V
Current	400A	400A	250A
Resistance	0.1~500Ω	0.15~750Ω	0.36~1.8kΩ
Power	120kW	180kW	
Min load voltage	6.2V@400A	9.3V@400A	7.5V@250A
Current slew rate(Max)	200A/ms	200A/ms	125A/ms
CV mode①			
Resolution	16bits		
Accuracy	0.05%+0.05%F.S.		
CC mode①			
Resolution	16bits		
Accuracy	0.1%+0.1% F.S.		
CR mode①			
Resolution	0.001Ω		
Accuracy	1%+0.5%I.F.S.		
CP mode ①			
Resolution	1W		
Accuracy	1%F.S.		
External analog programming①			
Control voltage	0~5V对应0~100%F.S.		
Voltage accuracy	0.5%F.S.		
Current accuracy	0.5%F.S.		
Voltage measurement①			
Resolution	16bits		
Accuracy	0.05%+0.05%F.S.		
Current measurement①			

Resolution	16bits
Accuracy	0.1%+0.1% F.S.
Resistance measurement①	
Resolution	0.001Ω
Accuracy	1%+0.5%I.F.S.
Power measurement①	
Accuracy	1%F.S.
Transient response	Response time less than 2ms
Parallel operation	Support the parallel operation of 10 master and slave device of same model
Protection	OVP, OCP, OPP, OTP, LVP etc
Communication interface	LAN、USB serial port (optional GPIB、CAN、RS485)
Communication protocol	SCPI、MODBUS、CAN-Open
Input characteristics	
Input voltage	340VAC~480VAC, frequency 45Hz~63Hz
Power factor	0.99(typical)
efficiency	> 93% (typical)
Using environment	
Working temperature	0°C~40°C
Storage temperature	-20°C~70°C
Altitude	< 2000m
Heat dissipation method	Air cooling, intelligent fan control
Dimension (WxHxD)	5kW~18kW: 482.6mm x 132.5mm x 740.0mm, include output shield
Weight	5kW≈18kg, 10kW≈25kg, 15kW≈32kg

Dimensions

5kW~18kW model dimension



20kW~36kW model dimension

