

This document must be retained for future reference.

It is the responsibility of the person installing the electrical equipment to ensure that the installation meets the requirements of the IET wiring regulations and is therefore 'fit for purpose'. Factors such as correct selection of components, cable sizing, protective devices and Earth bonding are all critical and should be checked prior to full testing and power-up. Any other regulations applicable to the equipment being installed such as the Machinery Directive and current health and safety legislation must also be adhered to.

All connections (including factory made) must be checked for the correct tightness prior to commissioning of the electrical installation.
All connections should also be inspected periodically to ensure correct tightness.

DO NOT USE POWER TOOLS ON THESE PRODUCTS



Technical Data: 3 Phase Variable Frequency Drives, Machine install ready and unit only variants, 1.5kW to 18kW, FR200 series.

The FR200 series 3 phase variable frequency drives are available in machine-install ready & VFD unit-only options. They are a compact, reliable and economical solution to many motor control applications requiring speed or torque control within the power range of 1.5kW to 18kW. Available in 3 compact frame sizes, the VFD products have many features generally associated with higher specification 3 phase 380VAC drives including sensor-less vector mode, output frequency up to 600 Hz and a full 150 % overload for 1 minute.

Two enclosure sizes of the machine-install ready options are available with the two highest power drives being housed in the larger size enclosure and all are supplied pre-assembled into the lockable IP54 steel enclosure complete with external control switches and status indicators mounted on the front panel.

The VFD unit-only products are intended for OEM customers for installation into high end drive applications and can be wall or flange mounted. However, due to their IP20 rating, they need to be installed in a dust and moisture free environment and not in direct sunlight. These products can be used for accurate speed control, constant torque and low speed response applications so are ideal for use with general motor, fan and pump installations. All products have an on-board fan to aid cooling and include integrated braking resistors suitable for the stated loads. Configuration is via the front mounted keypad which can be removed and is capable of remote communication up to 100m from the main unit with a suitable

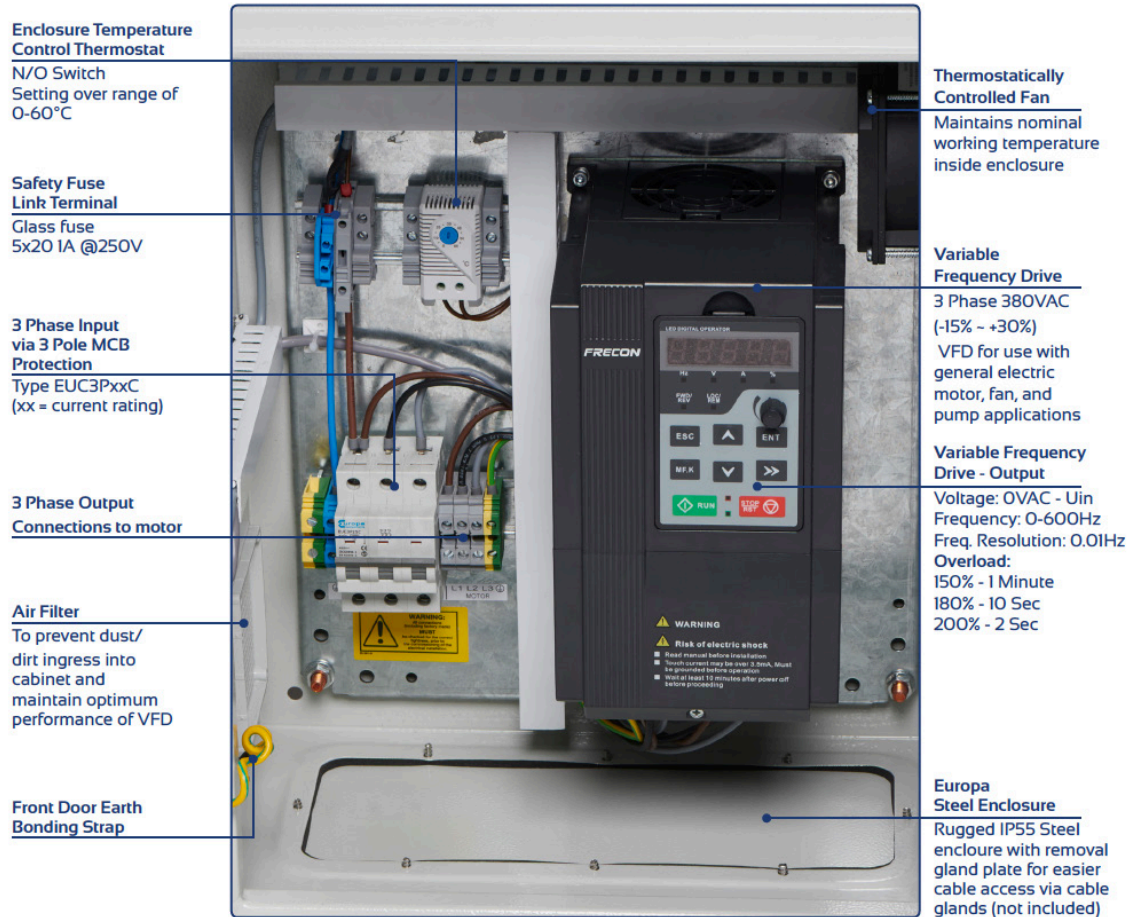
RJ45 connection lead. A comprehensive user manual is supplied with the product which contains both a quick start and detailed parameter guide.

Competitively priced, compact and ideal for OEM machine builders, these products will provide an optimised solution for a cost-effective, AC energy saving variable speed drive without compromising on performance.



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Machine Install-Ready

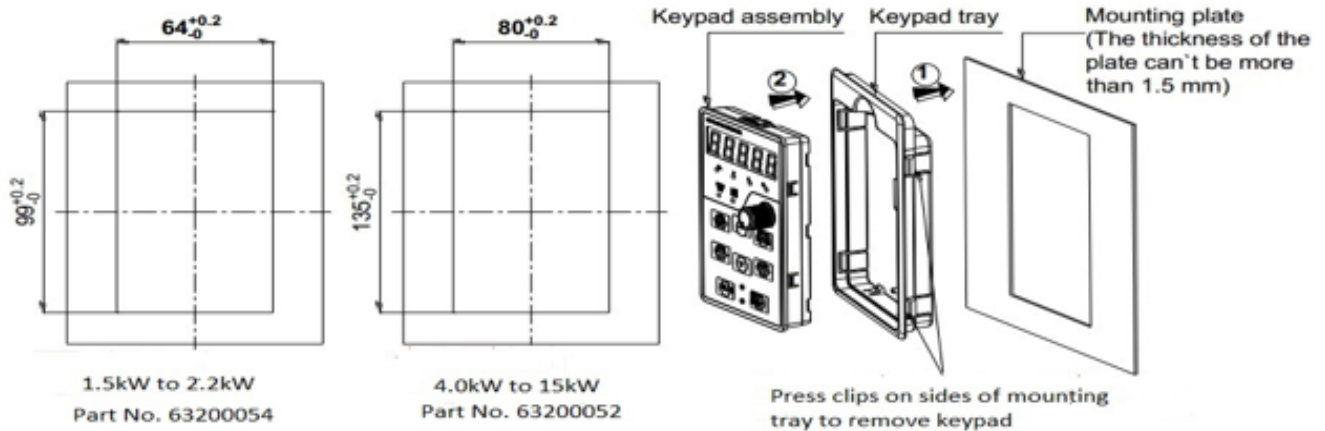


Repliplug and other accessories

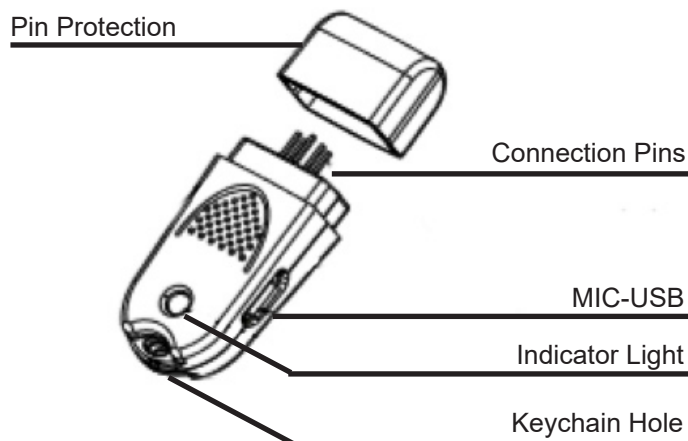
Compact flash drive for the FR200 series VSD's. Time saving as a copy of the VFD parameters can be taken from one unit and copied to multiple other units quickly and efficiently. Similar in size to a small USB memory stick and powered by the VSD main circuit or external power supply/laptop via micro USB port. Also available, remote keypad mounting tray and extension data cables – see user manual for more information.

Part Number	Description
FR200-DSD	DSD Flash Drive Device for VFD's
63200054	Keypad Mounting Frame, small (fits FR200-4T-1.5G to 2.2G)
63200052	Keypad Mounting frame, large (fits FR200-4T-5.5G to 015G)
02310012	Keypad Extension data cable, 2metres
02310013	Keypad Extension data cable, 3metres
02310014	Keypad Extension data cable, 5metres
02310015	Keypad Extension data cable, 10metres

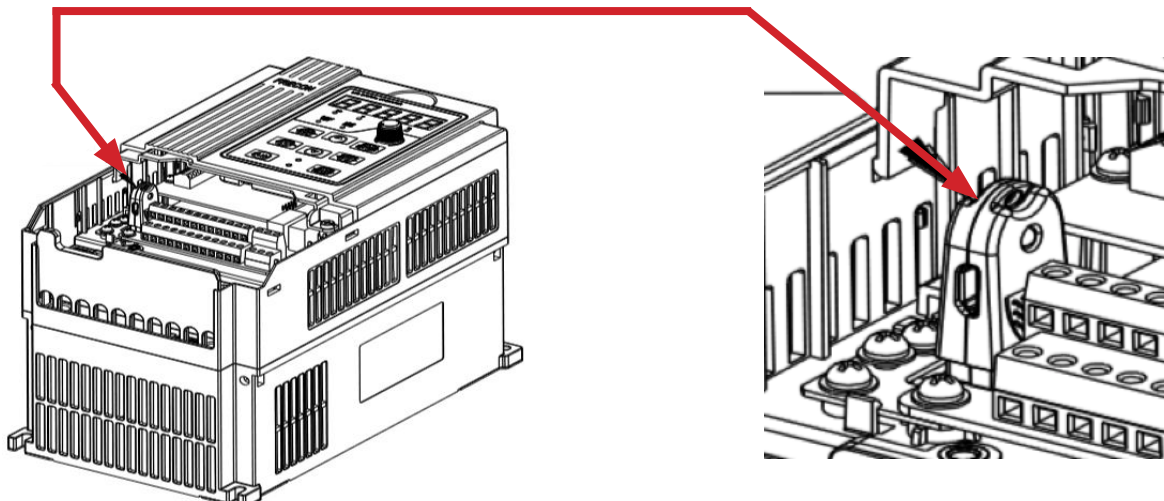
Keypad Holder (additional accessory, not included) for remote positioning if required



Replipug Details

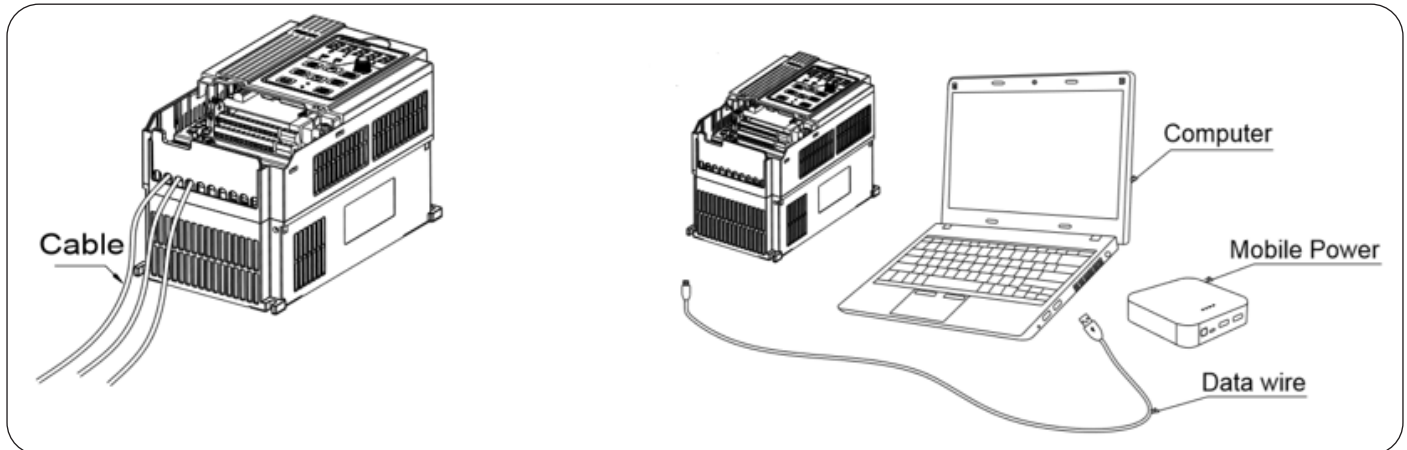


Replipug Positioning for data upload / download



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Repliplug power options:- VSD main circuit or external power supply/laptop via micro USB port.



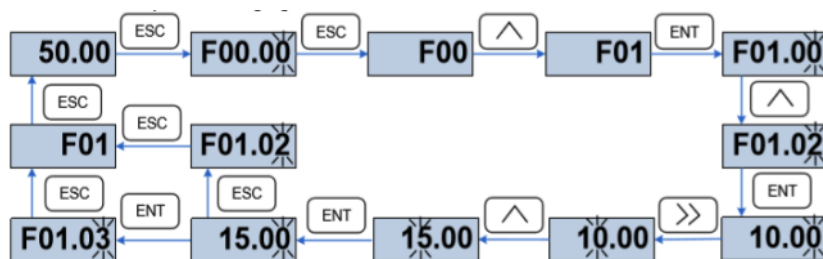
Basic programming information

Keypad programming - 3 levels:

Level 1 - Function Group Code, i.e F00 or F01 or F02 etc

Level 2 - Function Code with Group i.e F01.01 or F02.01 or F02.12

Level 3 - Function Code Value Setting, i.e Digital setting of master frequency value from 10Hz to 15Hz - see example below:



Note – In level 3 menu pressing the ESC or ENT key will return to level 2 menu however, ENT will display the next Function code **WITHOUT** changing the existing function code value. If the function code value is changed and ENT is then pressed the display will briefly show END then redisplay current function code setting. Pressing the ENT key again will display the next function code. Pressing the ESC key will abandon the current parameter changes and returns the unit to the current function code in level 2.

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Symbol	Name	Function
	Escape	Enter or exit Level I menu
	Enter	Enter the menu interfaces level by level, and confirm the parameter setting
	Increment	Increase data or function code
	Decrement	Decrease data or function code
	Shift	Select the displayed parameters in turn in the stop or running state, and select the digit to be modified when modifying parameters
	Multifunction	Perform function switchover (such as jog run and quick switchover of command source or direction) according to the setting of F16.00
	potentiometer	With the same function as AI1/AI2
	Run	Start the inverter in the keypad control mode
	Stop/Reset	Stop the inverter when it is in the running state and perform the reset operation when it is in the fault state. The functions of this key are restricted in F16.01.
	Key combinations	The inverter will free stop when the run and stop key are pressed simultaneously

Basic Set Up - VFD 'install-ready' units only

- 1) Restore factory default settings including motor parameters. F00.04=5
- 2) Master frequency control source keypad potentiometer. F01.01=1
- 3) Set Run Command to front panel switching. F02.00=1
- 4) Set motor run direction to forward. F02.01=0
- 5) Set motor reverse running to enable. F02.02=0
- 6) Set motor stopping mode to ramp down. F02.12=0
- 7) Set Motor acceleration time. F03.00=1
- 8) Set function of DI3 to 3 wire control. F04.02=03
- 9) Set fault reset function on panel stop switch. F04.03=7
- 10) Set terminals DI1-DI5 to +ve/-ve logic switching where 0=ON (=ve). F04.13=00100
- 11) Set forward/Reverse terminal control mode to 3 wire. F04.15=3
- 12) Set relay 1 function o/p to fault (error) output – F05.02 = 2
- 13) Set Relay 2 function to 'Drive Running' output. F05.03=01
- 14) Set motor parameters (ref motor legend plate) –
 - a. Motor 3 phase F08.00=0
 - Motor 1 phase F08.00=2 (Remove capacitor)
 - Motor 1 phase F08.00=3 (Leave capacitor)
 - b. Motor kW rating F08.01 = xx kW
 - c. Motor Voltage F08.02 = xx V
 - d. Torque load setting – F00.03=0

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Product Selection

VFD Devices Only



Machine-Install Ready



Selection Chart for Machine-install ready

Part Number	Product Description	External Dim's (mm)			MCB Rating
		H	W	D	
FR200-4T-1.5ME	1.5/2.2kW 3 Phase 380V AC VFD	500	400	250	16
FR200-4T-2.2ME	2.2kW 3 Phase 380V AC VFD	500	400	250	16
FR200-4T-4.0ME	4.0/5.5kW 3 Phase 380V AC VFD	500	400	250	25
FR200-4T-5.5ME	5.5/7.5kW 3 Phase 380V AC VFD	500	400	250	32
FR200-4T-7.5ME	7.5/11kW 3 Phase 380V AC VFD	500	400	250	40
FR200-4T-011ME	11/15kW 3 Phase 380V AC VFD	700	500	300	63
FR200-4T-015ME	15/18.5kW 3 Phase 380V AC VFD	700	500	300	63

Selection Chart for Variable Speed Drive (VFD) - Unit Only

Part Number	Motor Power *	Power Capacity	Input Current	Output Current	Case Size **
	kW	kVA	A	A	mm
FR200-4T-1.5G/2.2PB-H	1.5/2.2	3	5	4.2	F2-1
FR200-4T-2.2GB-H	2.2	4	5.8	5.5	
FR200-4T-4.0G/5.5PB-H	4/5.5	6	11	9.5	F2-2
FR200-4T-5.5G/7.5PB-H	5.5/7.5	8.9	14.6	13	
FR200-4T-7.5G/011PB-H	7.5/11	11	20.5	17	
FR200-4T-011G/015PB-H	11/15	17	26	25	F2-3
FR200-4T-015G/018PB-H	15/18	21	32	32	

*First / only figure showing is for general motor applications - Second figure is for pump / fan applications

**H x W x D (mm) - F2-1 = 187 x 117 x 160, F2-2 = 249 x 146 x 177, F2-3 = 300 x 198 x 185

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Product Design

- Supports 100m remote control and speed control potentiometer

- Unique upload and download module



- Adopts SPANSION new generation motor control dedicated processor, dominant frequency 144M Hz



- PCBA with Germany original conformal coating to greatly improve life and reliability.



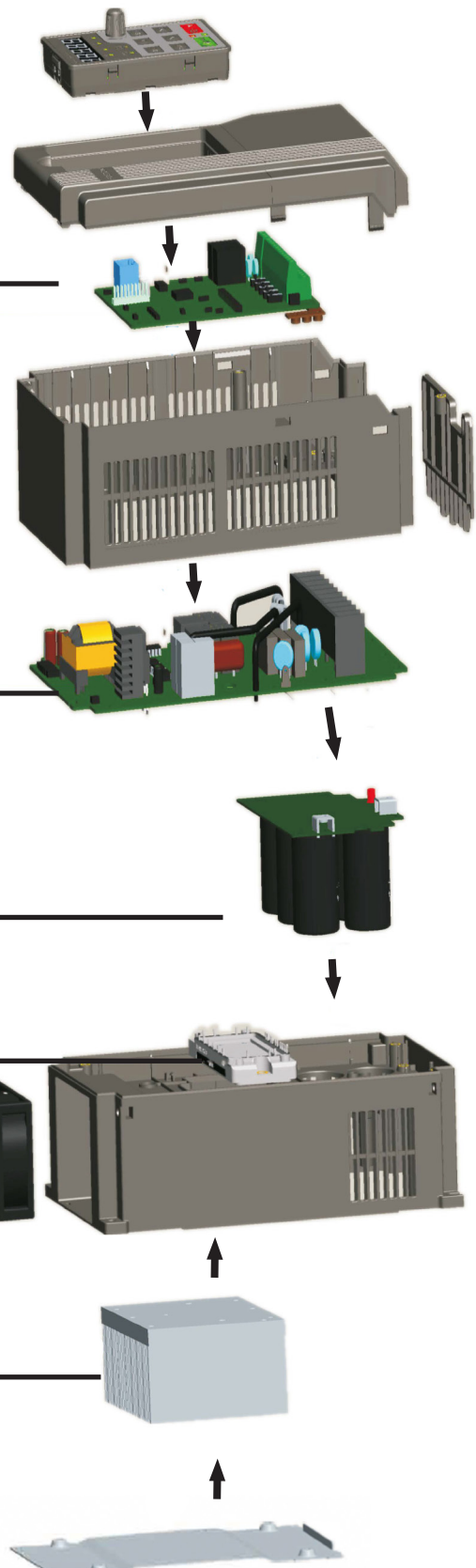
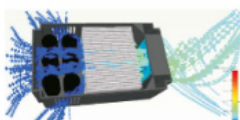
- Electrolytic capacitor technology from Hitachi, ensures ample & reliable energy storage



- Utilises Infineon latest generation IGBT module, high reliability



- Independent air duct design, maximum 50°C



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FR200 Series Summary

FR200 series vector control inverter is mainly positioned as a high-end market for OEM customers and the specific requirements of fan and pump load applications, its flexible design, both embedded SVC and VF control in one, can be widely used for speed control accuracy, torque response speed, low-frequency output characteristics and other situations with higher requirements.

Excellent performance

- High starting torque
- 180% Rated torque/ 0.5Hz(SVC 1)
- 180% Rated torque/ 0.25Hz(SVC 2)
- Reduce the sensitivity from SVC control to motor parameter

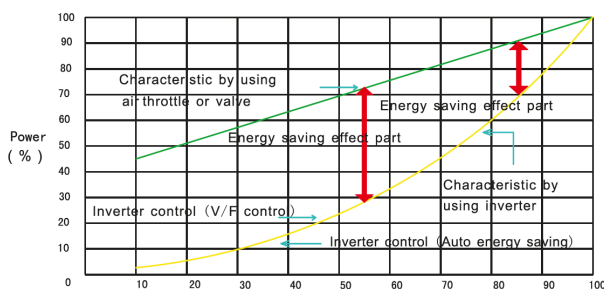


Abundant Function

- Integrated model with G&P in one *

Load torque characteristic		Variable torque characteristic (P model)	Constant torque characteristic (G model)
Load characteristic			
		Fan, pump load type	Conveyor belt, trolley and other constant torque load type
		Load torque change is proportional to speed (Non need overload capacity)	Fixed Load torque (Overload capacity required)
Inverter characteristic	Overload capacity	120% rated current: 60S	150% rated current: 60S
	Maximum output power	600Hz	600Hz

- Equipped functions most suitable for fan and pump, equipped PID control function
- To implement temperature, pressure, flow control without extra controllers



- Air flow or water flow Q(%) energy saving effect characteristic
- Different motor characteristic, different effect
- Dormant & wakeup function

Supports frequency dormant & wakeup and pressure dormant & wakeup, better adaptability for various sites

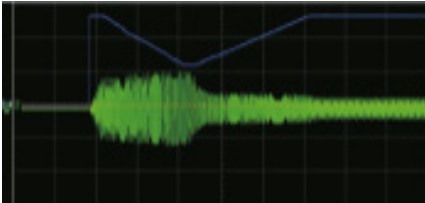
- Speed tracing function

Inverter starts motor smoothly according to motor's current running direction and speed

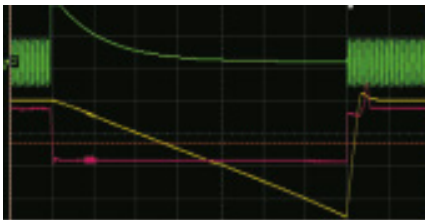
* Except FR200-4T-2.2GB - Constant Torque Only

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FR200 Series Summary

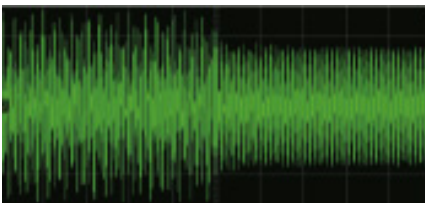


Speed tracing output frequency and current waveform



Green color is input voltage
Yellow color is output frequency
Red color is bus voltage

- Oscillation suppression function



Convenient debugging

Powerful background software



- Short-cut menu
Common parameters setting rapidly to save customer's time to read manual
- Unique upload and download module which is convenient for parameter commissioning
Restore factory parameters, backup user parameters
- Design special application macro according to industry demand

Electric Specification

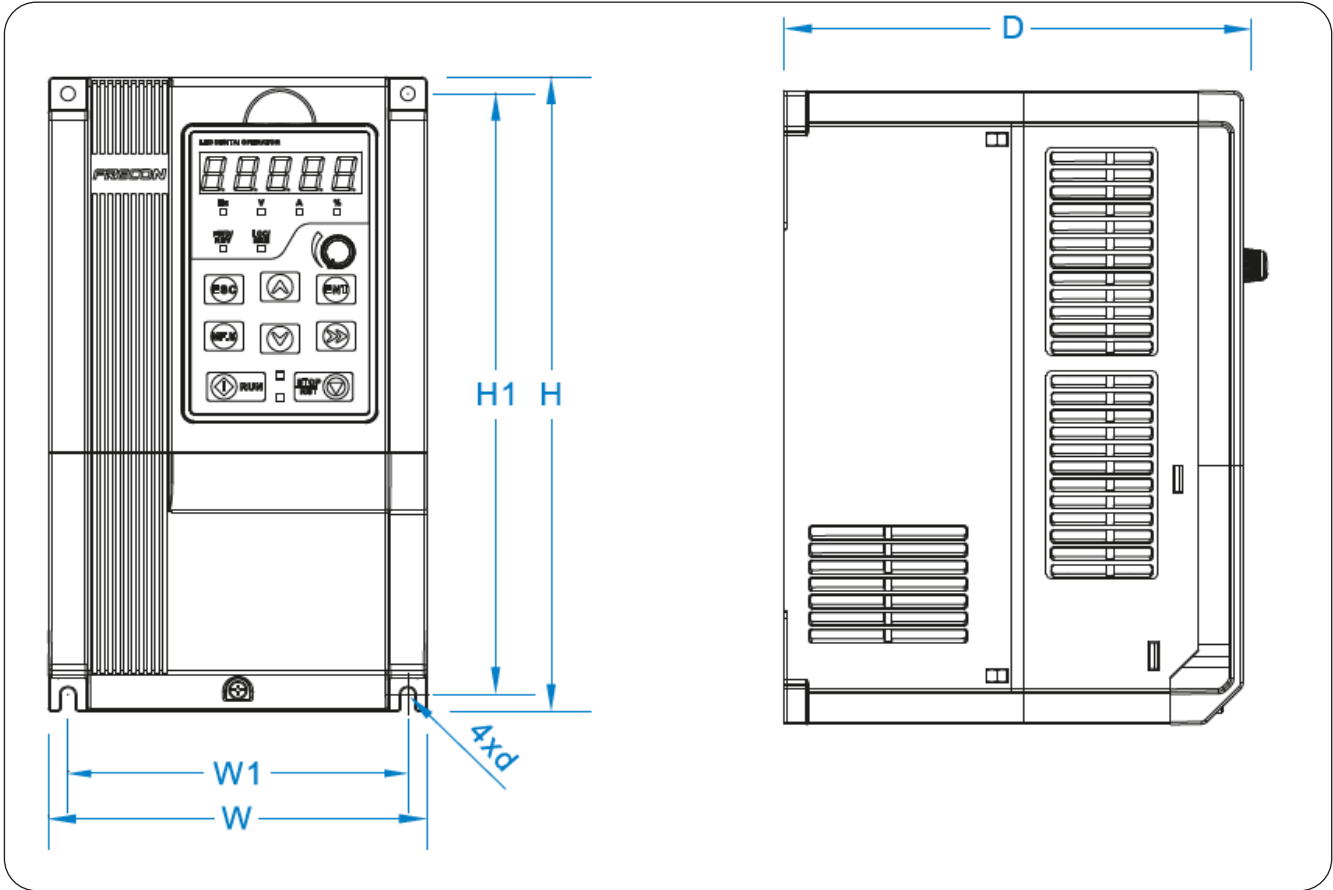
Main Power Voltage	Model No.	Motor Power (kW)	Power Capacity (kVA)	Input Current (A)	Output Current (A)	Size of the Case	Dimension (W* H* D) (mm)
380 VAC, 3 ~	FR200-4T-1.5G/2.2PB	1.5/2.2	3	5.0	4.2	F2-1	117*187*160
	FR200-4T-2.2GB	2.2	4	5.8	5.5		
	FR200-4T-4.0G/5.5PB	4.0/5.5	6	11	9.5	F2-2	146*249*177
	FR200-4T-5.5G/7.5PB	5.5/7.5	8.9	14.6	13		
	FR200-4T-7.5G/011PB	7.5/11	11	20.5	17		
	FR200-4T-011G/015PB	11/15	17	26	25	F2-3	198*300*185
	FR200-4T-015G/018PB	15/18.5	21	35	32		

Technical Parameters

Item		Specification
Input Power	Rated Input Voltage (V) : Three phase 380 V (-15%~+30%)	
	Rated Input Frequency (Hz) : 50Hz/60Hz, ± 0.5%	
Output Power	Maximum Output Voltage (V) : 0 ~ Rated input voltage , Error <±3%	
	Maximum Output Frequency (Hz) : 0.00 ~ 600.00 Hz , Units: 0.01 Hz	
Control Characteristic	Control mode	V/f control Sensor-less vector control 1 Sensor-less vector control 2
	Speed range	1 :50 (V/f control) 1: 100 (sensor-less vector control 1) 1 :200 (sensor-less vector control 2)
	Speed accuracy	±0.5% (V/f control) ±0.2% (sensor-less vector control 1 & 2)
	Speed fluctuation	± 0.3% (sensor-less vector control 1 & 2)
	Torque response	< 10ms (sensor-less vector control 1 & 2)
	Starting torque	0.5Hz: 180% (V/f control, sensor-less vector control 1) 0.25Hz: 180% (sensor-less vector control 2)
Basic Functions	Carrier frequency	0.7kHz~ 16kHz
	Overload capability	G Model : 150% Rated Current 60s, 180% Rated Current 10s, 200% Rated Current 1s. P Model : 120% Rated Current 60s, 145% Rated Current 10s, 160% Rated Current 1s.
	Torque boost	Automatic torque boost ; Manual torque boost 0.1 % ~ 30.0%
	V/F Curve	Three ways : Three ways: straight; multi-point type; N Th-type V / F curve
	Acceleration and deceleration Curve	Line or curve acceleration and deceleration mode. Four kinds of acceleration and deceleration time, Ramp Time Range :0.0 ~ 6000.0s
	DC brake	DC brake start frequency: 0.00 ~ 600.00Hz DC brake time: 0.0s ~ 10.0s DC brake current : 0.0% ~ 150.0%
Run	Command source	Given the control panel, control terminal, serial communication port given.
	Frequency given	9 kinds of frequency sources
	Input terminal	7 Switch input terminals, one way to make high-speed pulse input. Support NPN and PNP 3-channel analog inputs, including 2-way 0 ~ 10V / 0 ~ 20mA voltage and current options, a way to support -10 ~ +10 V input
	Output Terminal	2-way switch output terminal, which supports a maximum road speed 100kHz pulse output. 2 relay output terminals. 2 analog output terminal, and optional voltage and current.
Featured Functions	Parameter copy, parameter backup, flexible parameter displayed & hidden. Reliable speed search started. Timing control, fixed length control, count function.Three faults recorded.Over excitation brake, overvoltage stall protection programmable, under voltage stall protection programmable, restart upon power loss.Motor thermal protection. Wobble frequency control.High-precision torque control, V/f separated control, torque control at sensor-less vector control.	
Protection Function	Provide fault protection dozen: Over current, Overvoltage, Under voltage, Over temperature, Overload Etc Protection.	
Enviroment	Place of Operation	Indoors, no direct sunlight, free from dust, corrosive gases, flammable gases, oil mist, water vapor, water drop and salt, etc.
	Altitude	0~2000m De-rate 1 % for every 1 00m when the altitude is above 1000 meters
	Ambient Temperature	-10°C ~ 40°C(De-rate from 40°C ~ 50°C)
Others	Installation	Wall mounted or Flange mounting
	IP grade	IP20
	Cooling Method	Fan Cooled

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F2-1~F2-3 Structure Dimension Diagram



Size of the Case	External and Installation dimensions						Weight (kg)
	W	W1	H	H1	D	Mounting Hole Diameter	
F2-1	117	107	187	177	160	4.5	1.9
F2-2	146	131	249	236	177	5.5	3.2
F2-3	198	183	300	287	185	5.5	5.4