

FST-502 three-phase motor driver
User manual

FST-502 Three phase motor driver instruction

preface

In order to fully realize the function of the inverter and ensure the safety of users, please see this operation manual. When you find difficult problems in the use process, please contact the regional dealers or our company technicians, our professional staff will be happy to serve you.

Frequency converter is a precision power electronic product. In order to protect the safety of your life and property, this manual contains "dangerous" and "attention", which is to remind you of the safety precautions you pay attention to when handling, installing, using and checking the frequency converter. Please cooperate with you.

Use instructions



The operation at that time may cause serious personal injury.



Improper operation may cause damage to the frequency converter or the mechanical system



- After the inverter is power off, do not touch the circuit board before the digital operator indicator is off;
- Do not implement the wiring in the power transmission process, do not check the circuit board when the frequency converter is in operation;
- Do not disassemble and change the internal connecting lines or lines and parts of the frequency converter;
- The inverter ground terminal shall be grounded correctly:
- 220V: grounding impedance less than 100 Ω ;



pay attention to

- Do not conduct voltage test on the components inside the inverter, these semiconductor parts are vulnerable to high voltage damage;
- The U, V and W of the inverter output terminals shall not be connected to the AC power supply;
- Main circuit board CMOS integrated circuit is vulnerable to static influence and damage, do not touch the main circuit board.

1. Display interface



1.1 Display the interface description:

L1 lock key, RS485 communication when flashing



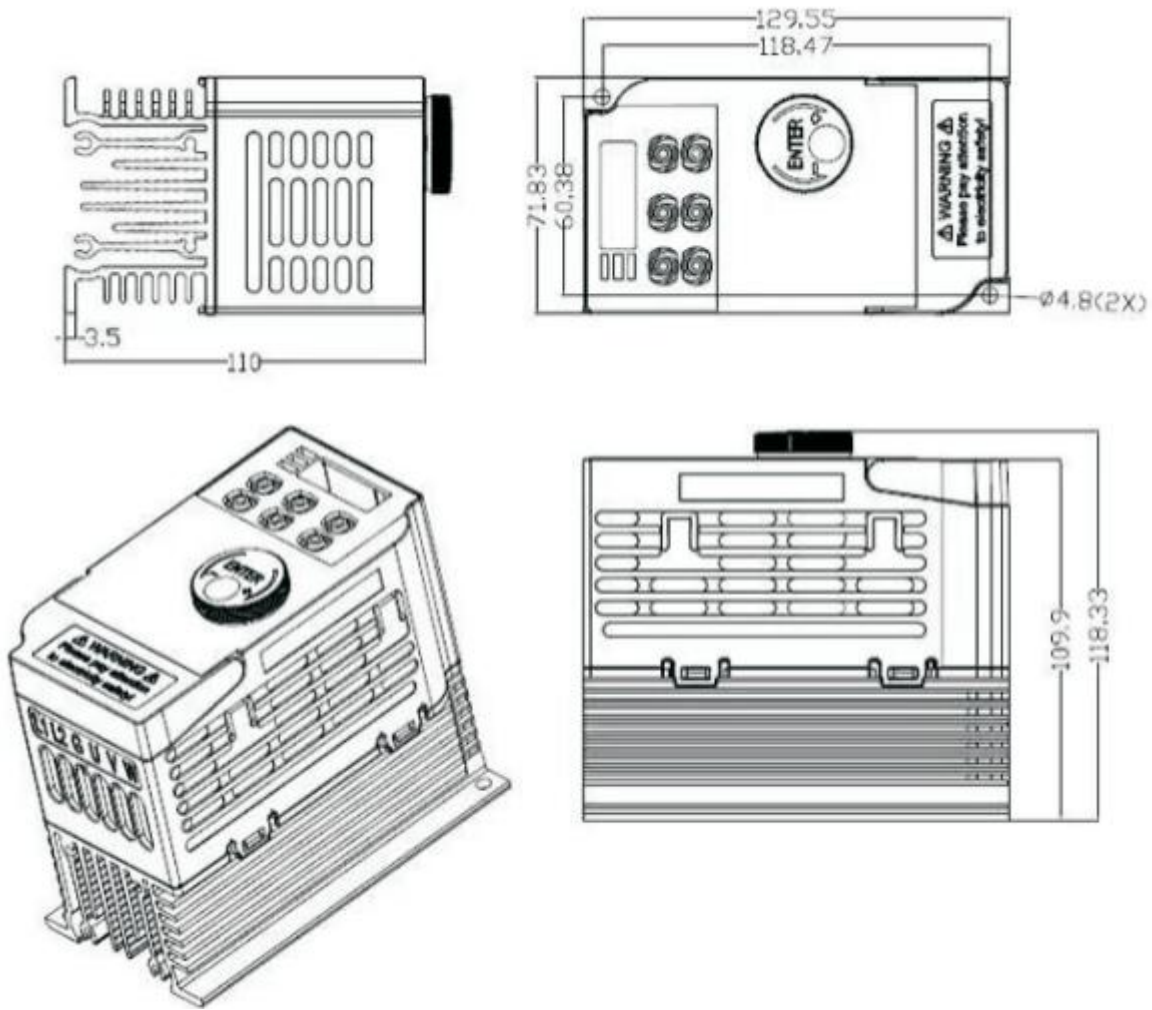
L1: Operation panel lock is often bright, not bright after unlocking, and flashing during communication control.

L2: positive indicator green (FWD). The LED light flashes when the positive turn stops.

L3: Reverse indicator blue (REV). The LED light flashes when the inversion stops.

L4: Four-digit digital tube display, when P00.0 is the parameter setting interface. Er00 is a fault code display.

Installation size diagram:



1.2 Key function description:



PRG / SHIFT: Short press the entry / exit parameter setting key; long press the shift / query function parameters to display the key.

ENT: Confirm key / data setting save key.

FWD / REV: positive and reverse switch button.

UP: data setting / speed key.

RUN / STOP: Start / Stop / Recovery button.

DOWN: Data setting minus / speed minus key.

Potentiometer: panel speed regulating potentiometer, key, external port, RS485 is invalid at given frequency.

2. Function description

2.1 Brief description of the frequency converter

The frequency converter is single-phase AC220V input, driving three-phase AC220V motor and frequency output 0HZ--130.0HZ. In order to improve the output voltage, this product uses SVPWM modulation mode and carrier frequency of 8.0 KHZ. Suitable for 750W motor with a maximum output power of 1100W. The frequency converter can arbitrarily change the V / F curve by setting the V / F compensation frequency, and by setting the voltage ratio at that frequency. By setting the highest value of V / F curve, according to the load situation, maximize the use efficiency of electric energy, reduce the heating of the motor, and extend the service life of the motor and frequency converter.0HZ--130.0HZ, In order to increase the output voltage, this product uses the SVPWM modulation party

2.2 Internal parameter setting

2.2.1 Description of the operation interface

1. SHIFT query button

A. F50.0: It is displayed as the running frequency value.(F blinking is the set frequency)

B. U310: It shows the DC bus voltage value.

C. T020: It shows the IPM module temperature value.

D. U01.0: displayed as the current value.

E. D 0: It is displayed as the DI input state.

F. O 0: displayed as DO input status.

G. Er0.0: indicates the fault, according to the fault code.

2. L1 flashing represents the successful communication between the machine and the external RS485, when the operation panel button is locked, the operation is invalid, hold the lock / unlock button (SAVE / LOCK) 3S, and unlock successfully after the light is off.

3. Operation indicator lamp L2 forward FWD (green) LED, L3 reverse REV (blue) LED, flashing represents stop; constant light represents running in this mode.

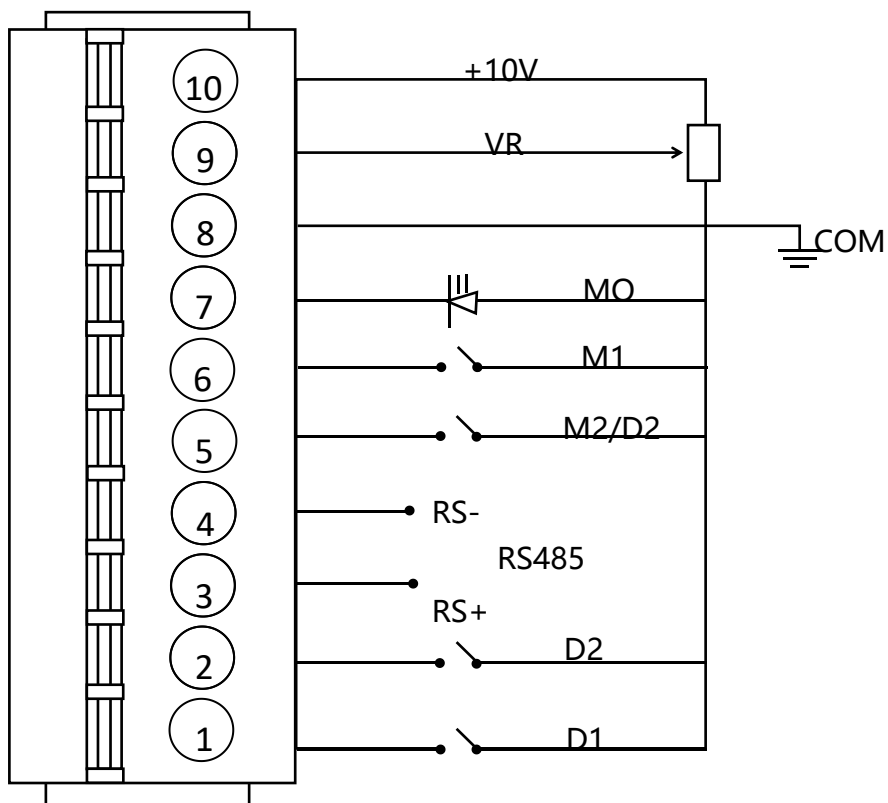
Control diagram of the external terminal:



order number	tab	function
1	D1	Section speed port
2	D2	Section speed port
3	A+	RS485 Communications +
4	B-	RS485 Communications-
5	M2/D3	The MI (Reverse) function / segment speed port
6	M1	MI (forward) function
7	MO	MO function (fault) output port
8	COM	Public port
9	VR	External potentiometer / analog quantity input port
10	+10V	Power supply by the external potentiometer

Section speed	D1	D2	D3
0	1	1	1
1	0	1	1
2	1	0	1
3	0	0	1
4	1	1	0
5	0	1	0
6	1	0	0
7	0	0	0

External terminal control wiring diagram: the COM is not allowed to connect with the external earth and zero line



2.2.2 Description of the setting interface

When pressing the PRG key to enter the parameter setting, the interface displays P00.0, and the beating value indicates the selected setting number. You can adjust the data to be set through the data shift key (SHIFT) and the addition or subtraction button () (), and the corresponding parent code is set according to the required function, press the confirmation key (ENT) to enter the subcode selection, and save the confirmation key (RUN / STOP / OK) to return to the parent code parameter interface, press the MENU key to exit the parameter setting, and return to the frequency display interface.

The master code	Function name	Subkey code	Factory value	Unit / Remarks	MODBUS address
P00.0	acceleration time	0-999.9	1	S	0
P00.1	deceleration time	0-999.9	1	S	1
P00.2	Multipoint VF frequency at point F1	0.00 HZ-Parameter 0.4	2.0	Hz	2
P00.3	Multipoint VF voltage point V1	0.0%-100.0%	15.0%		3
P00.4	Multipoint VF frequency point F2	Parameter 0.4 to parameter 0.6	25.0	Hz	4
P00.5	Multipoint VF voltage point V2	0.0%-100.0%	50.0%		5
P00.6	Multipoint VF frequency point F3	Parameter 0.4 to the motor rated frequency	50.0	Hz	6
P00.7	Multipoint VF voltage point V3	0.0%-100.0%	100.0%		7
P00.8	485	0: 1200	3	bps	8

The master code	Function name	Subkey code	Factory value	Unit / Remarks	MODBUS address
	Communications Baud rate	1: 2400 2: 4800 3: 9600			
P00.9	data format	0: No check (8-N-2) 1: even check (8-E-1) 2: odd check (8-O-1) 3: No check (8-N-1)	3		9
P01.0	This machine address	0-255	1		10
P01.1	Communication timeout time	0.0-100.0	0.0	S	11
P01.2	Main frequency source X selection	0: Panel add or button button adjustment 1: The panel potentiometer 2: Communication given 3: External AI input 4: Multi-section speed	1		12
P01.3	Command source selection	0: Panel control 1: Terminal control 2: Communication control 3: Power turn 4: power reversal	0		13
P01.4	Preset frequency	0.0-Upper frequency limit	50.00	Hz	14
P01.5	MI FS	0: M1 turn / stop M2 reverse / stop 1: M1 running M2 running direction switch 3: M1 forward turn M2 inversion D1 and D2 segment speed	0		15
P01.6	MO FS	0: No function 1: In operation 2: Fault	0		16

The master code	Function name	Subkey code	Factory value	Unit / Remarks	MODBUS address
		3: Keep 4: Frequency reaches the set frequency 5: zero speed operation 6: Keep			
P01.7	Overload protection enables	1:0: no protection: 1: protection	1		17
P01.8	upper=frequency limit	0.0-130	50.00	Hz	18
P01.9	lower cut-off frequency	0.0-Upper frequency limit	0.00	Hz	19
P02.0	The motor is rated power	0.01-0.75	0.75	kW	20
P02.1	The motor is rated voltage	1-300	220	V	21
P02.2	Rated current of motor	0.01-10.00	4.00	A	22
P02.3	Rated frequency of motor	0.1-Upper frequency limit	50.0	Hz	23
P02.4	Motor rated speed	1-65535	1430	rpm	24
P02.5	Multi-segment speed 0	-100% -100% of the upper limit frequency	0.0		25
P02.6	Multi-segment speed 1	-100% -100% of the upper limit frequency	0.0		26
P02.7	Multi-segment speed 2	-100% -100% of the upper limit frequency	0.0		27
P02.8	Multi-segment speed 3	-100% -100% of the upper limit frequency	0.0		28
P02.9	Multi-segment speed 4	-100% -100% of the upper limit frequency	0.0		29
P03.0	Multi-segment	-100% -100% of the upper limit	0.0		30

The master code	Function name	Subkey code	Factory value	Unit / Remarks	MODBUS address
	speed 5	frequency			
P03.1	Multi-segment speed 6	-100% -100% of the upper limit frequency	0.0		31
P03.2	Multi-segment speed 7	-100% -100% of the upper limit frequency	0.0		32
P03.3	Downtime display selection	0: Set the frequency 1: Bus voltage 2: IPM module temperature 3: AI voltage 4: DI input state 5: DO output state	0		33
P03.4	Run to display selection	0: Run frequency 1: Bus voltage 2: Set the frequency 3: Motor speed 4: Output current 5: IPM module temperature 6: AI voltage 7: DI input state 8: DO output state	0		34
P03.5	Start the percent of the DC brake current	0-100	0		35
P03.6	Start the DC brake time	0.0-100.0	0.0	S	36
P03.7	Shutime DC brake start frequency	0.0-Upper frequency limit	0.0	Hz	37
P03.8	Percent of shutdown DC brake current	0-100	0		38
P03.9	Stop the DC brake time	0.0-100.0	0.0	S	39
P04.0	Downtime method	0: Slow down and stop. 1: Free parking	0		40

The master code	Function name	Subkey code	Factory value	Unit / Remarks	MODBUS address
P04.1	Forward and reverse dead zone time	0.0s~3000.0	0.0	S	41
P04.2	Reverse ban	0: Invalid 1: valid	0		42
P04.3	factory data reset	0: Invalid 1: restore the factory settings	0		43
P04.4	Start protection options	1:0: no protection: 1: protection	0		44
P04.5	Terminal and panel control automatic switching	0: Close 1: Run the command source terminal and panel automatic switch	1		45
P04.6	continue to have				46
P04.7	The panel controls the running direction	0: Forward turn 1: reverse	0		47
P04.8	AI maximum input voltage	0.00-10.00	5.00	V	48
P04.9	Heat dissipation fan opening temperature	Heat dissipation fan off temperature-80	65	°C	49
P05.0	Heat dissipation fan turns off the temperature	30-Opening temperature of the cooling fan	55	°C	50
P05.1	carrier frequency	6-12	8	K	51
P05.2	Panel lock time	0-1000S (not locked when set to 0)	0	S	52
P05.3	continue to have				

	MODBUS Address (1 for some PLC)	10 Into the system
06 Write	1000	: The set frequency of 0-500 corresponds to 0-50 HZ
	1001	: Turn forward at 1, reverse at 2, and shutdown / fault reset at 3
03 Write	2000	: running frequency
	2001	: running state
	2002	: busbar voltage
	2003	: phase current
	2004	: Module temperature
	2005	: motor speed
	2006	: Fault code

2.2.3 Parameter description

1. Parameters 2.0-2.4 Motor rated parameters setting, according to the controlled motor nameplate to set the rated motor parameters, the factory rated current will change according to the change of the rated power, the rated current of the motor is an important parameter triggered by overload protection.

2. Multi-segment speed setting:

1.2 Set to (4): multiple segment speed

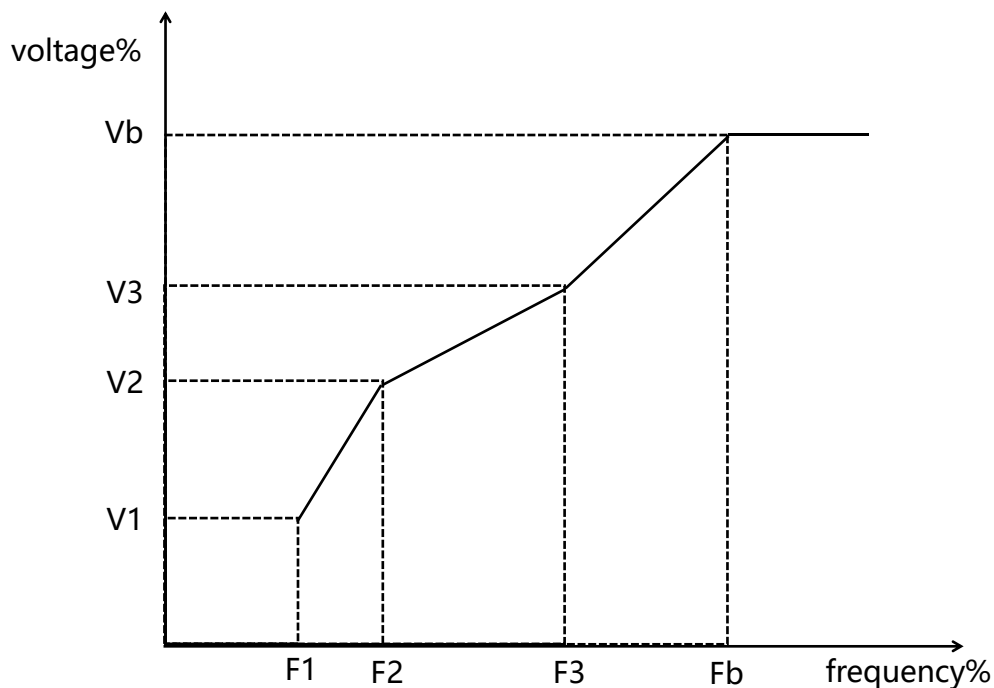
1.3 Set to (1): terminal control

1.5MI function is set as (3): M1 forward turn M2 reverse D1 and D2 for multiple segment speed.

3. 4.5 terminal and panel control, namely panel start and panel stop; port start and port stop.

2.2.4 V / F control instructions

Parameters 0.2-0.7 Six parameters define the multiple V / F curve. The multipoint V / F curve should be set according to the load characteristics of the motor. It should be noted that the relationship between the three voltage points and the frequency points must meet: $V1 < V2 < V3$, $F1 < F2 < F3$. High voltage setting at low frequency may cause the motor to overheat or even burn out, and the frequency converter may exceed loss speed or over current protection.



V1-V3: Multispeed V / F segment 1-3

F1-F3: Multi-segment frequency VF frequency percentage in segments 1-3

Vb: Motor rated voltage Fb: the rated operating frequency of the motor

3. Set cases

3.1 V / F control instructions

Case 1: Set the acceleration and deceleration time of the frequency converter

Power on, press (MENU / ESC), enter main menu to display P00.0, press (RUN / STOP), enter submenu to display 000.1 (S), set required acceleration time, press (RUN / STOP), return to main menu P00.1, press (RUN / STOP), enter submenu to display 000.1 (S), set required deceleration time, press OK (RUN / STOP) to exit the parent menu interface, if not want to save (MENU / ESC) key, previously set data is invalid.

Case 2: The frequency converter restores the factory default value

Press (MENU / ESC) key, enter the main menu to display P00.0, select the parameter P04.3 by adding or subtracting the button and the button and the shift button, press (RUN / STOP) key to enter the sub-menu to display 0, change 0 to 1, press (RUN / STOP) key, flash the digital tube slightly and return to the frequency display interface, and restore the factory setting successfully.

Case 3: Set the DC brake brake

Using the DC brake function, first determine the parameter 4.0 shutdown mode is 0: deceleration stop, then set 3.73.83.9 three parameters, three parameters are not 0, stop DC brake effect, according to the size of the motor load set 3.7 DC brake current percentage, it is recommended to start from small, increase the braking current percentage according to the

braking effect.

4. Fault code

In the converter failure, the four-digit digital tube will flash and display: Erx.x

order number	Fault code	content	Abnormal cause	Troubleshooting countermeasures
1	Er01	overcurrent	1. Frequter output circuit short circuit	1. Troubleshoot the peripheral faults
2	Er02	overvoltage		
3	Er03	undervoltage	2. The input voltage is too high / too low 3, the addition and deceleration time is too short 4. Add a sudden load during use 5. The V / F curve setting is not appropriate	2. Adjust the voltage to the normal range; 3. Increase the addition and deceleration time 4. Cancel the sudden adding load 5. Adjust the V / F curve setting
4	Er04	Output lack of phase	1. The lead from the frequency converter to the motor is not normal 2. The three-phase output of the inverter is unbalanced 3. frequency converter failure	1. Troubleshoot the peripheral faults 2. Measure whether the three-phase winding of the motor is balanced 3. Seek technical support
5	Er05	Current detection failure	hardware malfunction	1. Seek technical support
6	Er 10	Frequency converter overload	Whether the load is too large or the motor will block the rotation The selection of frequency converter is too small	1. Reduce the load and check the motor and mechanical conditions 2. Choose a more powerful frequency converter
7	Er 11	Motor overload	1.2.2 Whether the rated current setting of the motor is appropriate	1. Set the rated current of the motor normally 2. Reduce the load and

order number	Fault code	content	Abnormal cause	Troubleshooting countermeasures
			2, whether the load is too large or the motor is blocked 3, the frequency converter selection is too small	check the motor and mechanical conditions 3, choose a more powerful frequency converter
8	Er 12	Communication failure	Communication parameters were not set correctly The upper computer is not working properly The communication line is not normal	1. Set the communication parameters correctly 2. Check the wiring of the upper position machine 3. Check the communication cable
9	Er 13	The module overheating	The ambient temperature is too high The fan is blocked or damaged The frequency converter module is abnormal	1. Reduce the ambient temperature 2. Clean the air duct or replace the fan 3. Seek technical support

5. Use the environment

Power supply: single-phase AC220V \pm 20%

temperature:-10°C~55°C

Humidity: 0% ~ 65%

5.2.1. Maintenance and peripheral components

5.2.1.1. Maintenance and inspection

The inverter does not require regular inspection. take good care of one's health

In order to maintain good running characteristics for a long time, please make regular inspection at the following points. When checking, be sure to turn off the power supply, until the power indicator light is off, because the internal large capacity capacitor will have residual

voltage.

(1) Remove the internal unclean deposits.

(2) Check whether the terminal screws and part fixing screws are loose, and if the loose screws will lock them.

(3) Pressure-withstand insulation test.

(A) During the insulation withstand voltage test of the external circuit, all the wires connected with the external inverter shall be removed.

(B) When conducting the insulation withstand voltage test inside the inverter, only the main circuit of the inverter should be tested, and DC gear should be used during the test.

The insulation resistance of 500V shall be above 100M Ω

