VFD500-F110 Crane Commissioning Guide

1、Main circuit wiring

110kW and above

Braking resistor

Braking chopper

PB + −

Below 90KW

Braking resistor

PB + −

R

3 phase input

S

T

Breaker

U

V

W

PE

Motor

VFD500 VFD
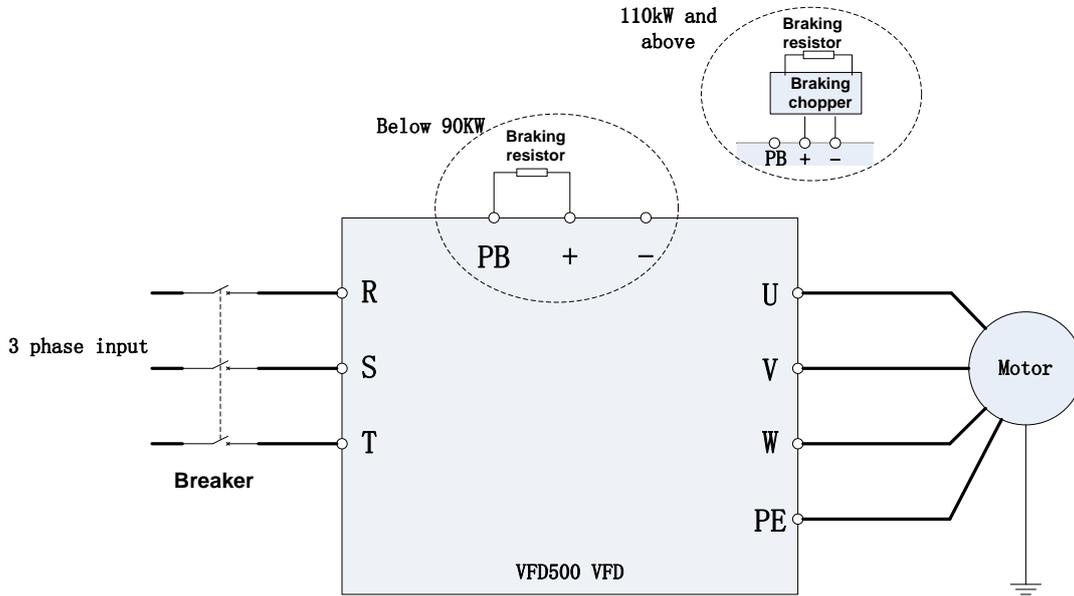
2、Control circuit wiring

Control circuit

+24V

DI1

Forward up

DI2

Reverse up

Brake feedback — DI3

Default reset — DI4

HDI

COM

+10V

AI1

AI2

GND

AI1、AI2 Input:
0〜10V/0〜20mA

485+

485-

RS485 Port

AO1

AO2

GND

AO1、AO2 output:
0〜10V/0〜20mA

HDO

COM

DO1

COM

T1A

T1B

T1C

Relay 1 output:
Factory setting is fault
signal output

T2A

T2B

T2C

Brake control output:
T2A, T2C normally
open
T2A, T2B normally
closed
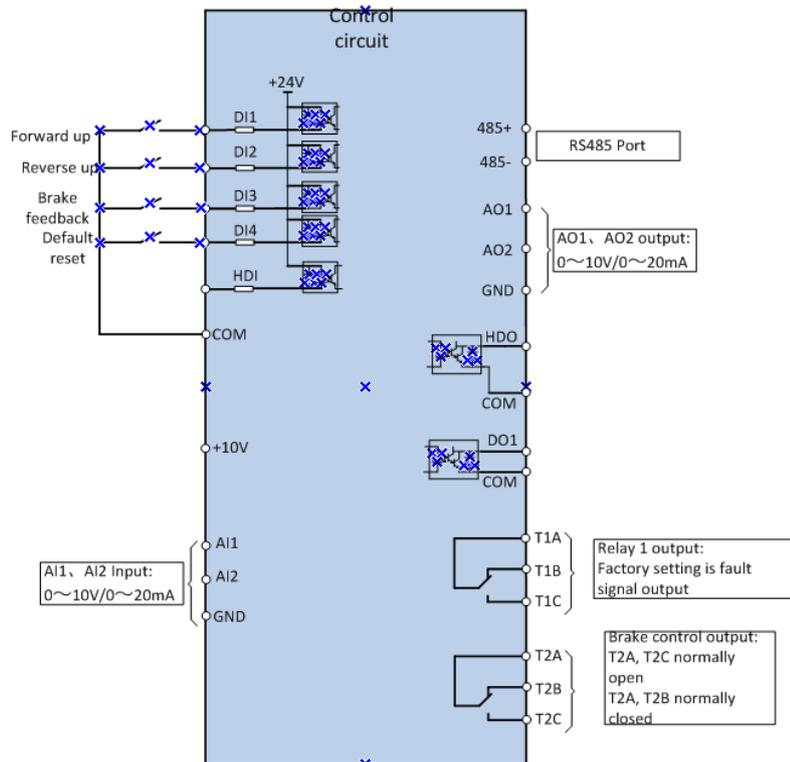
3、Set the motor nameplate parameters

Set the following parameters according to the motor nameplate

P11.02	Motor rated power
P11.03	Motor rated voltage
P11.04	Motor rated current
P11.05	Motor rated frequency
P11.06	Motor rated speed
P10.01 (closed loop)	Encoder type
P10.02 (closed loop)	Encoder lines

4、Motor self-learning

Set P11.10=1, press the "RUN" key to perform the motor static self-learning.
If the motor and the machine are not connected, the rotation self-learning can be performed.
If the motor and the machine are already connected, it is not recommended to rotate self-learning! Rotational self-learning should be performed with caution unless the stroke is long enough and under no-load conditions.

5、Confirm the rotation direction of the motor

Set P59.00=1, use the terminal to operate up/down, and observe whether the running direction is correct: forward run to go up, reverse run to descend. If the direction of the motor is wrong, change the direction in the following ways:
Method 1: Swap any two-phase wiring of U, V and W;
Method 2: Set P22.13=1 (software swaps the output phase sequence);
Method 3: Swap the wiring of DI1 and DI2;

Closed-loop vector encoder direction confirmation：

During closed-loop vector control, if there is no rotation self-learning, you should first use open-loop debugging to this step to ensure the correct direction of the motor. Then open-loop up/down, observe whether the encoder feedback r10.12 is correct, if the size and sign (the REV indicator is consistent with the actual running direction) are correct, you can set P00.04=2 to perform closed-loop vector control.

6、Lifting logic optimization
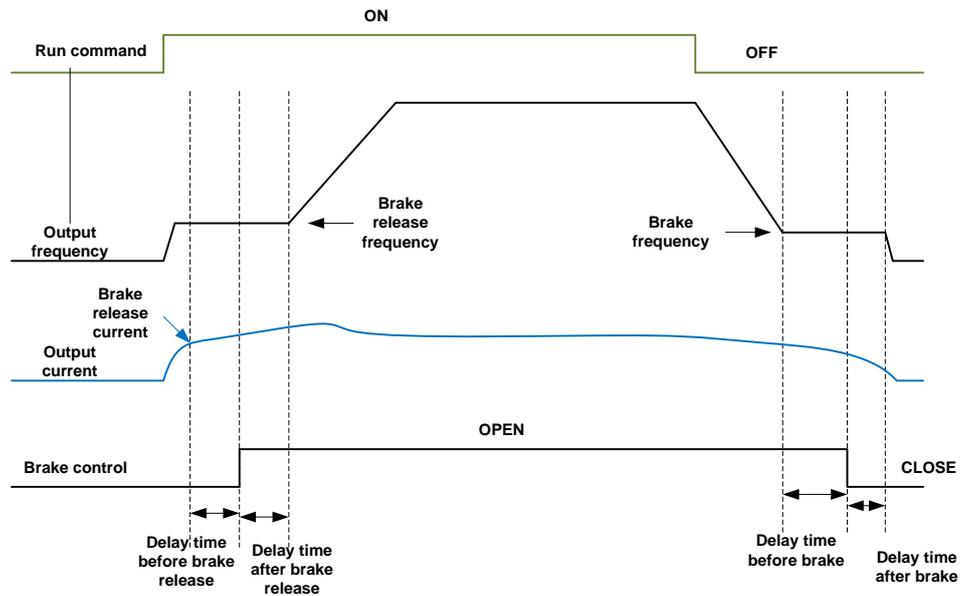
Set parameter P59.00=1 lifting mode, then the following parameters will be set automatically：

Parameter	Description	When P59.00 is set from 0 to 1
P00.06	Command source, 0: Operation panel, 1: Terminal, 2: Communication	1
P01.00	Main frequency source, 6: Multi-speed	6
P23.00	Bus voltage control, 0x00: close overvoltage stall 0x00	0x00
P03.01	Acceleration time 3.00	3.00
P03.02	Deceleration time 3.00	3.00
P59.01	Downward start and stop control	Determined by P00.04
P59.03	Upward release frequency	Determined by P00.04
P59.04	Upward brake frequency	Determined by P00.04
P59.05	Downward release frequency	Determined by P00.04
P59.06	Downward brake frequency	Determined by P00.04
P59.08	Brake release mode	Determined by P00.04

7、Special parameters for lifting function

Symbol Description:

"☆" means that the set value of this parameter can be changed when the inverter is in stop or running state.

"★" indicates that the set value of this parameter cannot be changed when the inverter is in the running state.

"●" indicates that the value of this parameter is the actual detection record value and cannot be changed.

Parameter	Name	Description	Factory Value	Attribute
Group 59 Special parameters for lifting function				
P59.00	Lifting function selection	0：general mode 1：Lifting mode When set from 0 to 1, the relevant parameters are automatically set; When set from 1 back to 0, the relevant parameters are restored to their default values	0	★
P59.01	Downward start-stop control	**Units digit**：frequency direction when the brake is released 　0：negative 　1：positive **Tens place**：frequency direction when braking 　0：negative 　1：positive	0x11（VF、SVC） 0x01（VC）	★

When going down, the schematic diagram of the opening frequency and the braking frequency:
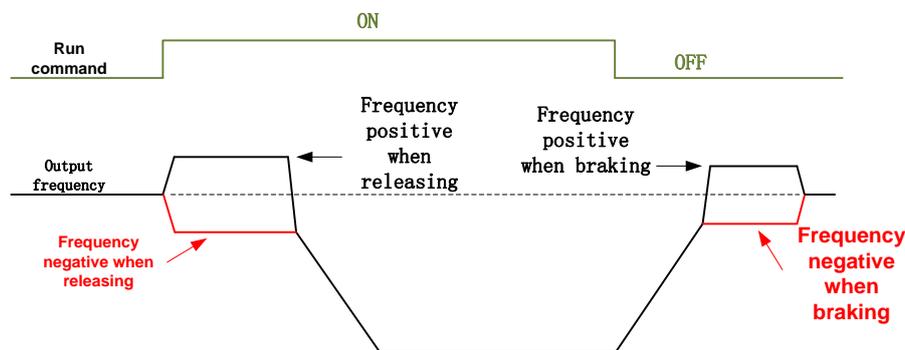
P59.03	Upward release frequency	0.00~10.00Hz	2.00Hz（VF、SVC） 1.00Hz（VC）	☆
P59.04	Upward brake frequency	0.00~10.00Hz	2.00Hz（VF、SVC） 0.00Hz（VC）	☆
P59.05	Downward release frequency	0.00~10.00Hz	2.00Hz（VF、SVC） 0.30Hz（VC）	☆
P59.06	Downlink brake frequency	0.00~10.00Hz	2.00Hz（VF、SVC） 0.00Hz（VC）	☆
P59.07	Release current	0.0~100.0% Percentage of motor rated current	30.0%	☆
P59.08	Brake release mode	0：Frequency brake release 1：Frequency + Current	1（VF、SVC） 0（VC）	★

Parameter	Name	Description	Factory Value	Attribute
P59.09	Delay time before upgoing brake release	0.00~5.00	0.2	☆
P59.10	Delay time after upgoing brake release	0.00~5.00	0.3	☆
P59.11	Delay time before upward brake	0.00~5.00	0.3	☆
P59.12	Delay time after upward brake	0.00~5.00	0.4	☆
P59.13	Delay time before descending brake release	0.00~5.00	0.2	☆
P59.14	Delay time after descending brake release	0.00~5.00	0.3	☆
P59.15	Delay time before descending brake	0.00~5.00	0.3	☆
P59.16	Delay time after descending brake	0.00~5.00	0.5	☆
P59.17	Brake feedback	0: No feedback 1: Open state feedback 2: Closed state feedback When there is brake feedback, set the corresponding DI terminal function to 57, and set this parameter to the correct feedback type.	0	★

P59.18	Running reverse control	0：Direct reverse running is not allowed during running
		  If the operation is reversed, the stop logic will be executed first, and the brake logic will be completed and then reversed.
		1：Reverse operation is allowed during operation
		  If the operation is reversed, the frequency command will be reversed directly, and stop logic will not be inserted in the middle.
			0	★

P59.23	Closed-loop self-start pulse number	When the motor position (the number of pulses fed back by the encoder) moves and exceeds this value after stopping, the inverter will run automatically and keep the speed of 0.00Hz, and report Er.LF3 fault. Note: This function is used to avoid the slippage caused by the loose brake.	0	☆
P59.25	Zero-crossing jump frequency	0.00~5.00Hz In open loop (VF, SVC) control, the acceleration/deceleration time is 0.00s	2.00Hz	☆

DI function added：

57：Brake feedback input

DO function added：

47：Brake control output

8、Lifting failure：

Fault code	Fault name	Panel display	Fault cause	Troubleshooting countermeasures
45	Brake feedback fault	Er.LF1 ErLF1	The brake feedback function is valid, and no brake feedback signal is detected within the time after the brake is released or after the brake is applied.	1、Check whether the brake feedback signal is normal 2、Check whether the delay time after releasing the brake or the delay time after holding the brake is reasonable
47	Brake hook	Er.LF3 ErLF3	The brake hook is detected when the encoder is closed	1、Check whether the brake is normal 2、Check whether the setting of P59.234 is reasonable

9、Solutions to common problems:

9.1 The feeling of falling is obvious at the moment of opening the gate

A. Make sure that the motor self-learning has been carried out;

B. Appropriately increase the release current P59.07;

C. Appropriately increase the slip compensation gain P12.11, or slightly reduce the motor rated speed P11.06;

Interpretation: The reference value of slip compensation gain P12.11 is P11.05-(P11.06*P11.09/60). When setting the motor nameplate, if P11.05=50.00Hz, P11.06=1500rpm, it will cause the P12.11 slip compensation to fail and the output to be too small!

D. For the phenomenon of falling up and down, increase P59.03; for the phenomenon of falling down, increase P59.05;

9.2 The feeling of lifting is obvious when the brake is released in the downward direction

A. Appropriately reduce the downlink release frequency P59.05

9.3 The frustration is obvious when the brake is applied, and the stop is not stable

A. Appropriately reduce the brake frequency, P59.04 (up), or P59.06 (down)