Configuration number: HD50-FY

1. Overview

Shenzhen Haipu Monte Technology Co., Ltd. according to the special application requirements of the industry, the local functions and design of the inverter has made corresponding custom design changes, in order to facilitate your use, please refer to this document and "HD50 high-performance vector control driver user manual" for operation.

2. Hardware change instructions

Not involved.

3. Description of structural changes

Not involved.

4. Function parameter setting

Add the anti-shake control logic function of the lifting industry large and small cars, and the software is modified accordingly.

4.1 Parameter summary table

parameter	Parameter name	Set the range	Factory value	attribute revise
D04.00	Shake-resistant enabling	0 - 1	Actual value	*
D04.01	Rope length	0.001 - (50.000 + center of gravity offset) m	Actual value	*
D04.02	Total encoder pulses (high bit).	0 - 65535	Actual value	*
D04.03	Total number of encoder pulses (low bit).	0 - 65535	Actual value	*
D04.04	Rope length ratio	0.0 - 100.0%	Actual value	*
F03.00	Acceleration and deceleration mode selection	0: Linear acceleration and deceleration 1:S curve acceleration and deceleration	1	○
F03.11	Acceleration starts with an S-word characteristic song line	0.00 - 2.50s	0.10s	○
F03.12	The S-word feature song at the end of the	0.00 - 2.50s	0.15s	○

	acceleration line			
F03.13	The deceleration begins with an S-word characteristic curve line	0.00 - 2.50s	0.15s	○
F03.14	S-character characteristic curve at the end of deceleration	0.00 - 2.50s	0.00s	○
F15.00	DI1 terminal function selection	53: Pulse frequency input (DI6 only). **Note:** This function is only available in non-closed-loop vector control mode, otherwise it will affect its use. 70: Upper limit switch input 71: Anti-shake enabled	2	×
F15.01	DI2 terminal function selection		3	×
F15.02	DI3 terminal function selection		0	×
F15.03	DI4 terminal function selection		0	×
F15.04	DI5 terminal function selection		0	×
F15.05	DI6 terminal function selection		0	×

		Note: Terminal shake-proof switching at F25.00=1 Effective. 72: Select the center of gravity offset of 1 73: Select the center of gravity offset of 2 74: Select the center of gravity offset of 3 **Note**: The center of gravity offset 1-3 refers to F25.15-F25.17		
F16.01	AI1 terminal function	16: Rope length input	2	×
F16.02	AI2 terminal function		0	×
F16.03	AI3 terminal function		0	×
F25.00	Shake-resistant enabling	0: Prohibited 1: Enable	0	×
F25.01	Anti-shake system damping	0.0 - 1.0	0.0	○
F25.02	Parameter adjustment mode	0: Slow down Kp switching. 1: Manual. 2: Automatic. 3: Continuous change of Kp during deceleration.	2	×
F25.03	Anti-shake acceleration time	0.1 - 6000.0s	2.5s	○
F25.04	Anti-shake deceleration time	0.1 - 6000.0s	2.0s	○
F25.05	Maximum line speed for large and small cars	0.00 - 100.00m/min	40.00m/min	×
F25.06	Rope length acquisition method	0: Number setting 1: Encoder feedback 2: Analog input 3: High speed pulse input	0	○
F25.07	Rope length number setting	0.001 - 50.000m	10.000m	○
F25.08	Rope length calibration enable	0: Prohibited 1: Enable	0	○
F25.09	Learn rope length high	0.000 - 50.000m **Description**: Refers to the hook at the upper limit switch, roll The distance from the center of the barrel to the hook is detailed in 4.2.1.	0.000m	○
F25.10	Learn rope length low	0.000 - 50.000m	0.000m	○
F25.11	Calibration highs	0 - 65535	0	*
F25.12	Calibrate lows	0 - 65535	0	*

F25.13	The rope length is reset enabled	0: Prohibited 1: Enable	1	×
F25.14	Maximum rope length	0.000 - 50.000m **Note**: Based on the field measurement input, the values are the same The maximum rope length of the lifting mechanism is 4.2.2/4.2.3 for details.	10.000m	○
F25.15	Center of gravity offset 1	0.000 - 10.000m **Description**: Refers to the distance between the hook and the center of gravity of the load to be hoisted, selected by terminal function 72-74, used Compensation is calculated for rope length.	0.000m	○
F25.16	Center of gravity offset 2		0.000m	○
F25.17	Center of gravity offset 3		0.000m	○
F25.18	Differential regulation coefficient Kd	0.0 - 50.0	0	○
F25.19	Proportional control coefficient Kp	0.0 - 50.0	10.0	○
F25.20	Kp correction coefficient	50% - 100%	85%	○

		Note: The parameters after the switch account for the parameters before the switch Percentage.		
F25.21	Frequency switching threshold	0.00 - F00.06	5.00Hz	×
F25.22	Kp toggles the filtering time	0.01 - 10.00s	0.2s	○
F25.23	Kp reduces the filtering time	0.01 - 10.00s	0.2s	○
F25.24	Kp increases the filtering time	0.01 - 10.00s	0.2s	○
F25.25	Kp increase or decrease change cutoff coefficient	5% - 100%	20%	○
F25.26	Kp correction value	0.0 - 20.0 **Note**: Corresponding to -10.0 – 10.0, positive values will increase the acceleration and deceleration time, no overshoot; Negative values are shortened Acceleration and deceleration time, overshoot increased.	10.0	×
F25.27	Choice of parking method	0: Adaptive curve shutdown 1: Linear shutdown	0	×
F25.28	Ramp parking frequency	0.00 - 20.00Hz	7.00Hz	×
F25.29	Anti-shake free parking frequency	0.00 - 10.00Hz	0.50Hz	×
F25.30	Pulse count direction selection	0: Consistent orientation 1: The direction is reversed	0	×

4.2 Rope length calculation instructions

The anti-shake effect depends on whether the rope length is calculated accurately, and the more accurate the calculated rope length, the better the anti-shake effect. By setting F25.06, you can choose from the following four modes to calculate the rope length:

1) Mode 0 (F25.06=0): Determined by F25.07, the actual rope length is entered directly into F25.07 in meters;

2) Mode 1 (F25.06=1): Feedback calculation via encoder, debug and calculation steps see 4.2.1;

3) Mode 2 (F25.06=2): Calculated via external analog input, see 4.2.2 for debugging and calculation steps;

4) Mode 3 (F25.06=3): Calculated via high-speed pulse input, see 4.2.3 for debugging and calculation steps;

4.2.1 Encoder feedback calculates the rope length step

1) Set the encoder parameters: F14.00=1.

2) Set the rope length calibration parameters: F25.00=1, F25.06=1, F25.08=1.

3) Determine Pulse Count Direction: Make sure the hook is increased when running down D04.03. This is done by controlling the hook to run downwards and looking for changes in D04.03

A) If D04.03 increases, the pulse count is in the correct direction, go directly to step 4);

B) If D04.03 decreases, the pulse count is in the wrong direction, F25.30 is reversed, and the hook is lowered to see D04.03

Increase, then proceed to step 4). 4)

Measure learning rope length low:

A) Control the hook to descend so that the hook is in a lower position 1 (Look at the scene situation, generally for easy measurement, take off the ground 1 meters left and right position), as shown in Figure 1;

B) Measure the distance from the center of the reel to the hook with a tape measure 1;

C) Enter the measured distance 1 in meters into F25.10 and press ENTER to determine.

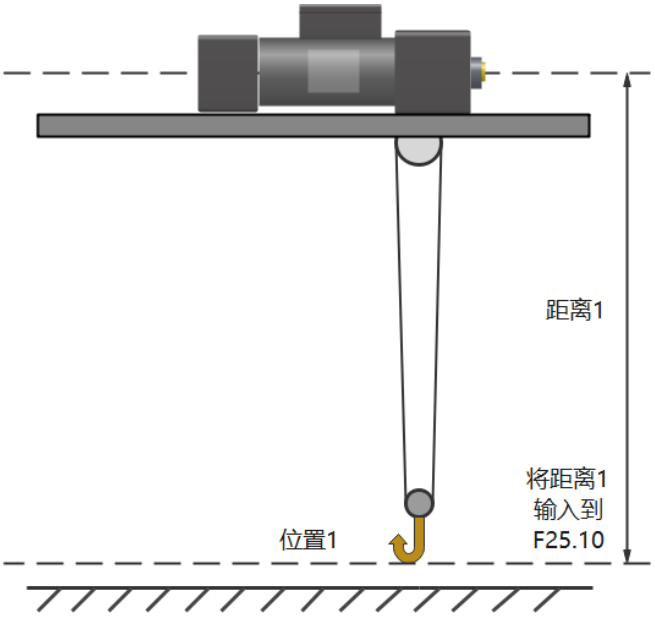


Figure 1

5) Measuring learning rope length high position:

A) Control the hook to rise until the upper limit position 2, as shown in Figure 2, corresponds to the upper limit switch of the lifting mechanism;

B) Measure the distance from the center of the reel to the hook with a tape measure 2;

C) Enter the measured distance 2 in meters into F25.09 and press ENTER to determine.

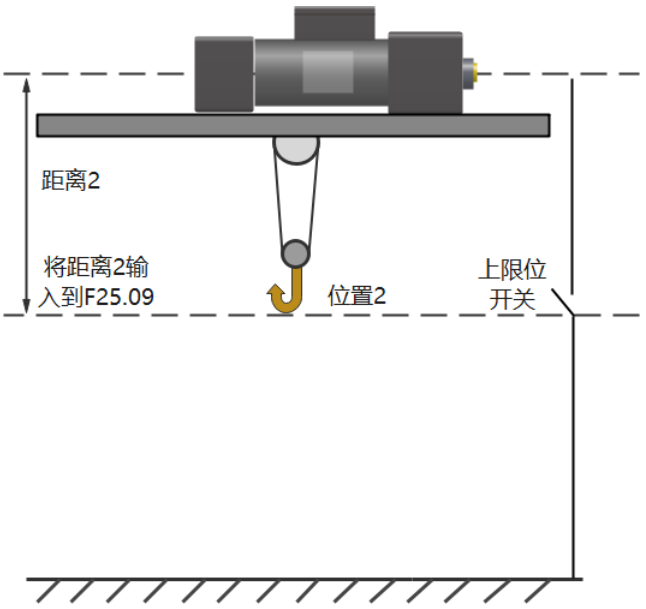


Figure 2

6) Then set the parameter F25.08=0, and the calibration is complete. At this point, D04.01=F25.09, the calibration values are displayed in F25.11, F25.12.

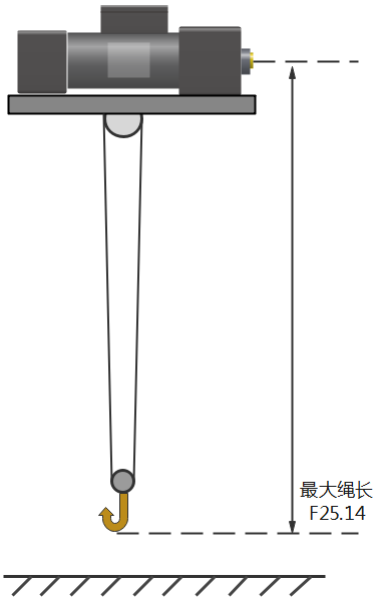
7) Move the hook up and down to see if the actual rope length is consistent with the measured rope length shown in D04.01.

Note: After running for a period of time, set F25.13=1 and raise the hook to the upper limit, triggering the DI terminal function 70 is effective to remove the accumulated error.

4.2.2 Analog input calculates the rope length step

1) Connect the AO terminal of the lifting mechanism to the AI terminal of the large and small car, this AI terminal selects function code 16;

2) Measure the maximum rope length: Drop the hook to the lowest point (corresponding to the lowest point of the rope length of the lifting mechanism), as shown in Figure 3, measure



the position distance from the center of the reel to the hook with a tape measure, and enter it into F25.14 in meters ;

Figure 3

3) At this point, D04.04 = 100.0% and the AI input is equal to 10V. Move the hook up and down to see if the actual rope length matches the measured rope length shown in D04.01.

Note: After calibration is complete, the proportional relationship satisfied: AI input value (V)/ 10(V) = D04.01 / F25.14.

4.2.3 High-speed pulse input calculates the rope length step

1) Connect the DO2 terminal of the lifting mechanism to the DI6 terminal of the large and small car, and this DI6 terminal function selects the high-speed pulse input 53;

2) Measuring the maximum rope length: the measurement method is the same as 4.2.2 of 2), the maximum rope length measured is entered into F25.14 in meters;

3) Calibration complete. Move the hook up and down to see if the actual rope length matches the measured rope length shown in D04.01. Note: After calibration is completed, the proportional relationship is satisfied: D00.35 / F16.17 = D04.01 / F25.14.

4.3 Parameter adjustment description

parameter	value	meaning
F25.02	2	Parameter adjustment mode:

		0: Slow down Kp switching. 1: Manual. 2: Automatic. 3: Continuous change of Kp during deceleration.
F25.03	2.5s	Anti-shake acceleration time
F25.04	2.0s	Anti-shake deceleration time
Adjust F25.18 **- F25.19** when **F25.02 = 1**		
F25.18	<=D04.01	Differential regulation coefficient Kd.
F25.19	15.0	Proportional control coefficient Kp. If the acceleration and deceleration process is too slow, decrease Kp, and if the overshoot in acceleration is too large, increase Kp.
Adjust F25 when F25.02=0 **20- F25.22**		
F25.20	85%	Kp correction factor. The percentage of switching parameters when decelerating. The smaller the value, the faster the deceleration, but the load swing angle increases
F25.21	= Maximum set frequency	Frequency switching threshold.
F25.22	0.4s	Kp toggles the filtering time
Adjust F25.23 **- F25.25 when F25.02=3**		
F25.23	0.2s	Kp reduces the filtering time
F25.24	0.2s	Kp increases the filtering time
F25.25	20%	Kp increase or decrease change cutoff coefficient
Adjust F25.26 when F25.02=2		
F25.26	10.0	Kp correction value 0. 0 – 20. 0 (corresponds to -10. 0 – 10. 0)。 Positive values increase acceleration and deceleration Time, no overshoot; Negative values shorten acceleration and deceleration time, and overshoot increase. Adjustable as needed.
Way to park the car		
F25.27	0	Choice of parking method 0: The deceleration curve has always been an adaptive curve, and there is free downtime after F25.29. 1: The shutdown frequency is above F25.28, and the shutdown is in accordance with the F25.27=0 method; If the shutdown frequency is below F25.28, it will be stopped in a straight line.
F25.28	7.00Hz	Ramp parking frequency
F25.29	0.50Hz	Free parking frequency The value is greater than the frequency of holding the gate

Other functional parameters are set in the same way as standard HD50 series products, see "HD50 series vector control inverter user manual"