User Manual

V6/V5−T−T8 Tension Control Inverter

V&T

Foreword

The V6/V5−T series inverter is a kind of high−performance vector control/torque control inverter for tension control produced by V&T Technologies Co., Ltd. The inverter adopts world-leading vector control and torque control technologies with / without speed sensor. It not only has the same outstanding control performance with high end inverter, but also has enhanced the product reliability and environmental adaptability, as well as the customized and industrial design with tension control characteristics considered to better meet the requirements of tension control. This manual shall be used together with the user manuals of V6/V5−H general purpose inverter.

Introduction to V6/V5−T Tension Control Inverter

■ Technology Highlights of Tension Control Inverter

- ◆ Unified parameter setting: All the reeling in / reeling out parameters are set in the H group of industrial parameters and no need to switch among multiple parameters;
- ◆ Intelligent parameter setting: The intelligent parameter setting guidance is available for reeling in / reeling out mode, once user has set the reeling in / reeling out mode, the unit will automatically guide the parameter settings one by one;
- ◆ Online parameter adjustment: Most of parameters can be adjusted online, and user can perform the keypad commissioning and host communication commissioning conveniently;
- ◆ Variable parameter applications: Flexible multi-section tension taper and multiple kinds of reeling diameter switching are available to fully resolve the issue of uneven tightness of reeling in materials, and eliminate the waste and save cost.

■ Functional Features of Tension Control Inverter

- ◆ **Torque mode:**

Multiple kinds of reeling in methods to meet the requirements of different industries;

Multiple kinds of speed limit and multiple options for avoiding uncontrolled spinning;

Tension boost and multi section tension taper makes the reel-in materials tidier;

Multiple dynamic compensations are available: Faster and more stable dynamic response for acceleration / deceleration;

Internal automatic reel change and excellent dynamic torque performance ensure that there is no impact and no broken during reel change.

- ◆ **Speed mode:**

Adjustment of multiple groups of PID parameters can be done quickly and smoothly according to the reel diameter, line speed and frequency;

Detection of broken material and braking functions can effectively monitor the abnormal condition during production;

PID can respond quickly without oscillation during automatic reel change.

- ◆ **Reel diameter calculation:**

Multiple kinds of reel diameter calculation are available;

Automatic online adjustment of reel diameter;

Multi section output control with taper

- ◆ **Applications:**

Cutting machine, printing machine, dyeing machine, packaging machine and paper making machine

■ Principles of V6/V5−T Tension Control Inverter

Torque control mode: Main constant tension through torque control and automatic reel diameter calculation. In this working mode, the inverter does not need external tension

controller, and does not need to feedback the current position or external tension signal, and even does not need to use speed feedback PG to realize constant tension control. However, in the tension control with a high requirement, speed feedback PG should be used.

Speed control mode: Realize precise speed PID regulation through external line speed reference and the feedback signals that represent the current position or tension, so as to make the position signal or tension feedback signal in preset balance position to realize constant tension control. In this working mode, the inverter does not need external tension controller and speed feedback PG, but needs the external signal that represents the current position or tension to realize constant tension control.

■ Typical Reeling-in Tension Control

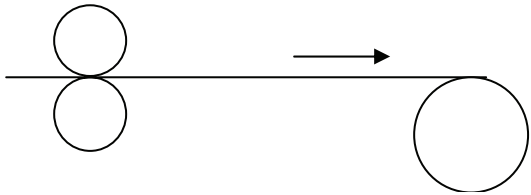


Figure 1 Constant tension control can be realized in torque control mode

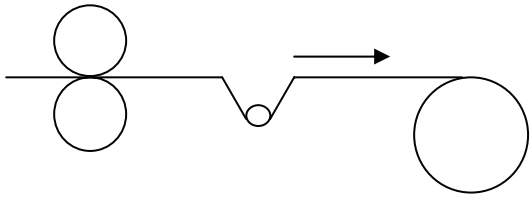


Figure 2 Constant tension control can be realized in speed control mode

■ Introduction to Tension Control Solution

◆ **Torque solution**

Torque control mode means the inverter controls motor output torque instead of frequency, and the output frequency changes automatically with the speed change.

1) Simple tension control mode

In this mode, there is no tension feedback signal, no internal automatic reel diameter calculation, with the increase of reel diameter, the output torque of reel-in axis

is bigger and bigger, due to the adjustment of tension coefficient, and the output torque of reel-in axis becomes bigger also to realize the constant tension control.

2) Constant tension control mode

In this mode, there is no tension feedback signal, no internal automatic reel diameter calculation, with the increase of reel diameter, the output torque of reel-in axis changes according to the formula F=T/R (wherein, F: tension of material; T: torque of reel-in axis; R: radius of reel), so, to maintain constant F, with the increase of reel diameter, T=F*R also increases to realize the constant tension control.

3) Torque PID control mode

Torque PID control mode needs tension feedback signal, the inverter automatically adjusts the output torque according to the feedback tension so as to realize the constant tension control.

◆ **Functional module related to torque mode**

1) Tension setting part: Used to set the tension, user can set according to the materials and process requirement for reeling, and the tension taper can be used to decrease the tension with the increase of the reel diameter so as to improve the reel shape;

2) Reel diameter calculation part: Used for calculating or obtaining reel diameter and selecting calculating method according to different applications: Line speed mode, analog value mode and pulse mode;

3) Torque compensation part: Some part of the output torque is used to overcome the rotating inertia of the reeling-in(out) rod during acceleration or deceleration process, torque compensation can be made for the inertia according to the acceleration or deceleration rate through proper parameter settings automatically, so as to keep the stable tension during acceleration or deceleration process. The compensation for friction can overcome the affect of the system friction to the tension.

4) Automatic reel change part: Perform automatic reel change in running process, need to set the pre-drive function in torque mode.

◆ **Speed Solution**

In speed mode, inverter can work in following modes: Vector control without speed PG feedback 1, vector control without speed PG feedback 2 and vector control with speed PG feedback 2.

1) Speed PID control mode

Speed PID control needs tension or position feedback signals to form a close loop regulation, and the inverter automatically regulate the output frequency according to the feedback signal to control the tension or position to achieve the preset value.

2) Constant line speed control mode

For some applications that require stable running but do not need fast adjustment of line speed, use constant line speed control mode to perform constant line speed control without PID regulator, more stable than common close loop control.

◆ **Functional Module Related to Speed Mode**

1) PID part: The target value channel and feedback signal value of PID are set by H1 group of parameters, and the PID parameters are mainly set by P8 group, and the second group of PID parameters in H1 group can provide assistance to realize the linear switching between two sets of PID parameters and realize better result in the whole process.

2) Line speed input part: This part is important, and there are two functions: one is to calculate the matching frequency of the inverter through line speed and another is to calculate the reel diameter through line speed.

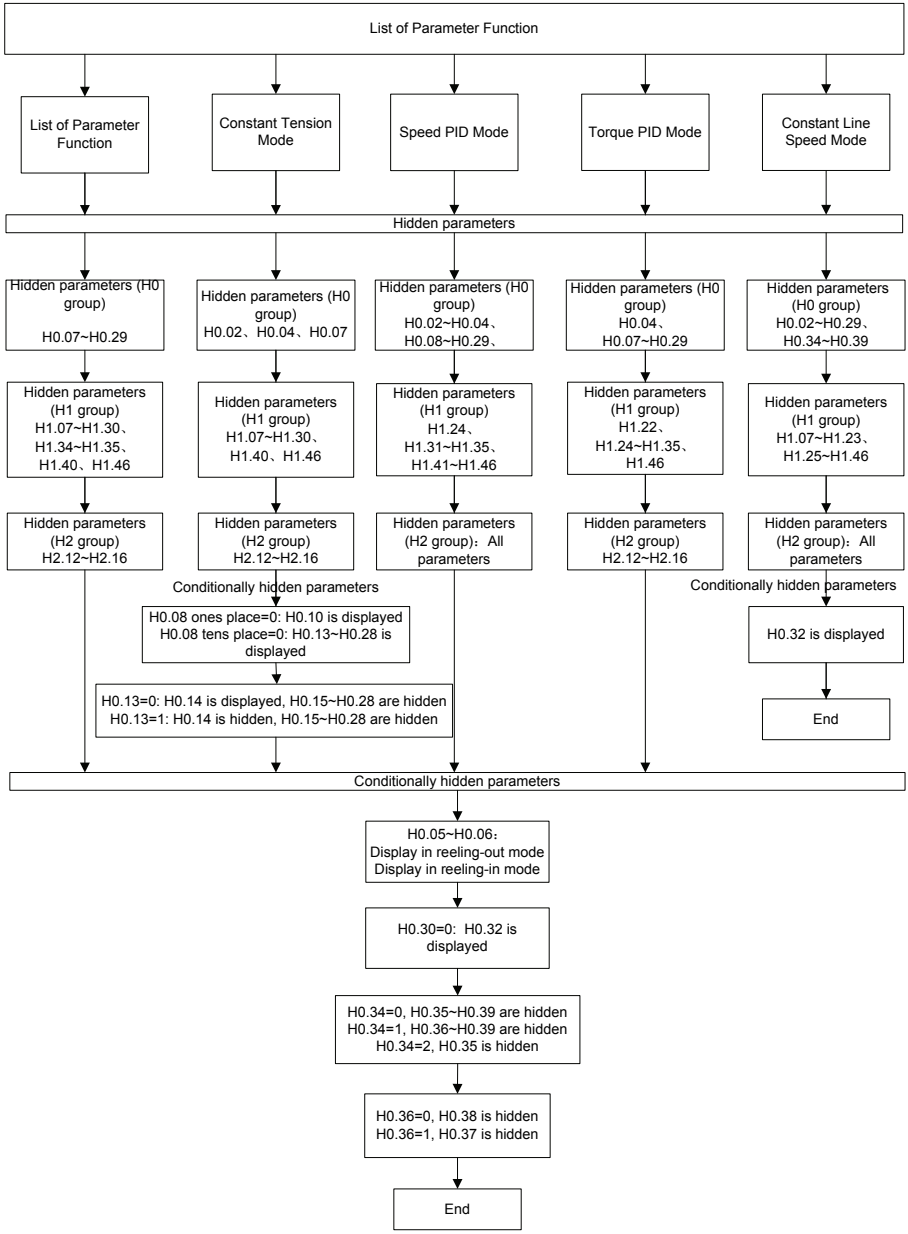
3) Reel diameter calculation part: Used for calculating or obtaining reel diameter and selecting calculating method according to different applications: Line speed mode, analog value mode and pulse mode;

4) Automatic reel change part: Perform automatic reel change in running process, need to set the pre-drive function in torque mode.

◆ **Setting of Tension Control Functions**

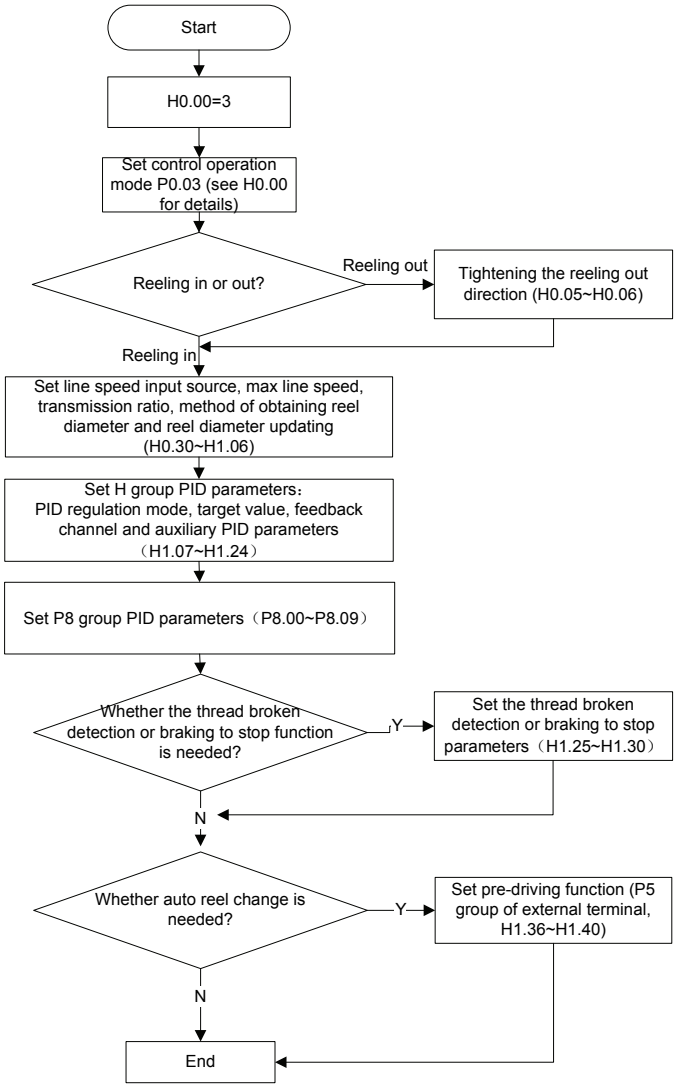
Function Codes	Functions in Tension Control
H0.00 to H0.29	Set reeling mode, reference tension and tension taper
H0.30 to H1.06	Line speed setting, reel diameter calculation, reel diameter reset
H1.07 to H1.09	PID regulated target value, feedback value and regulation mode
H1.10 to H1.24	Second group of PID parameters (See P8 group for first group of PID parameters)
H1.25 to H1.30	Thread broken detection of feedback signal and braking
H1.31 to H1.35	Tension compensation part
H1.36 to H1.40	Auto reeling-out parameter
H1.41 to H1.45	Torque reeling-out parameters
H2.00 to H2.02	Line speed gain and offset under torque mode
H2.07 to H2.12	Special applications

◆ **Parameter Index Function** (Note: At H0.00=0 when tension control mode is disabled, all H group parameters are displayed)

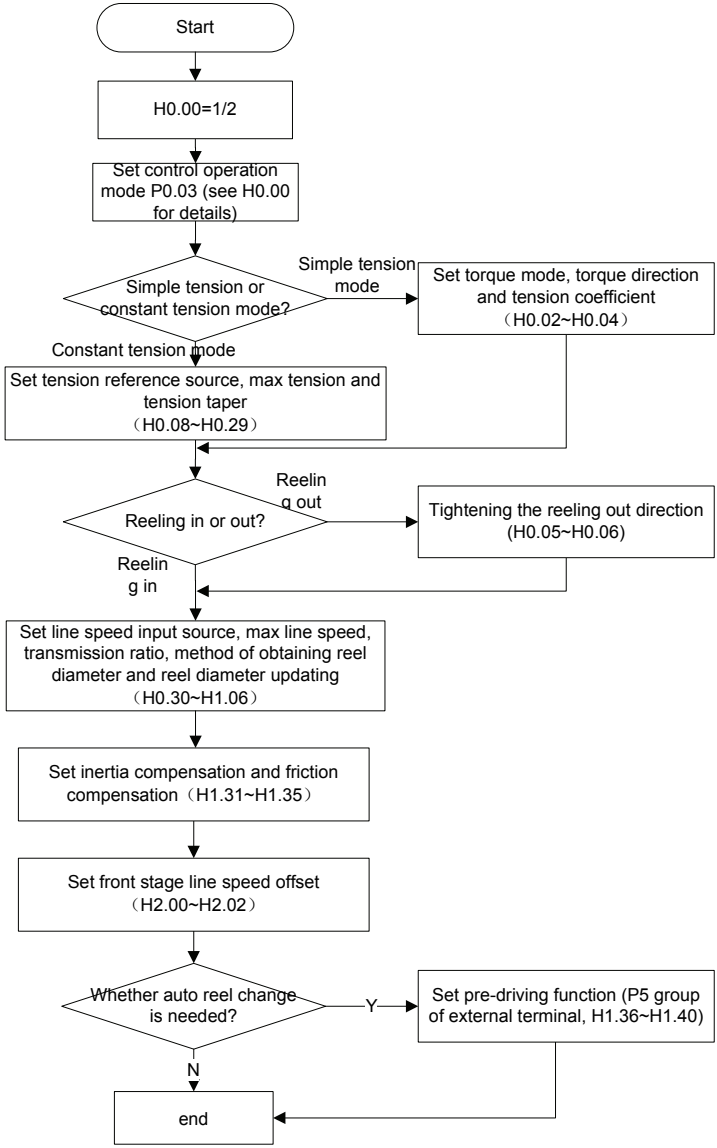


Setting Process under Each Control Mode

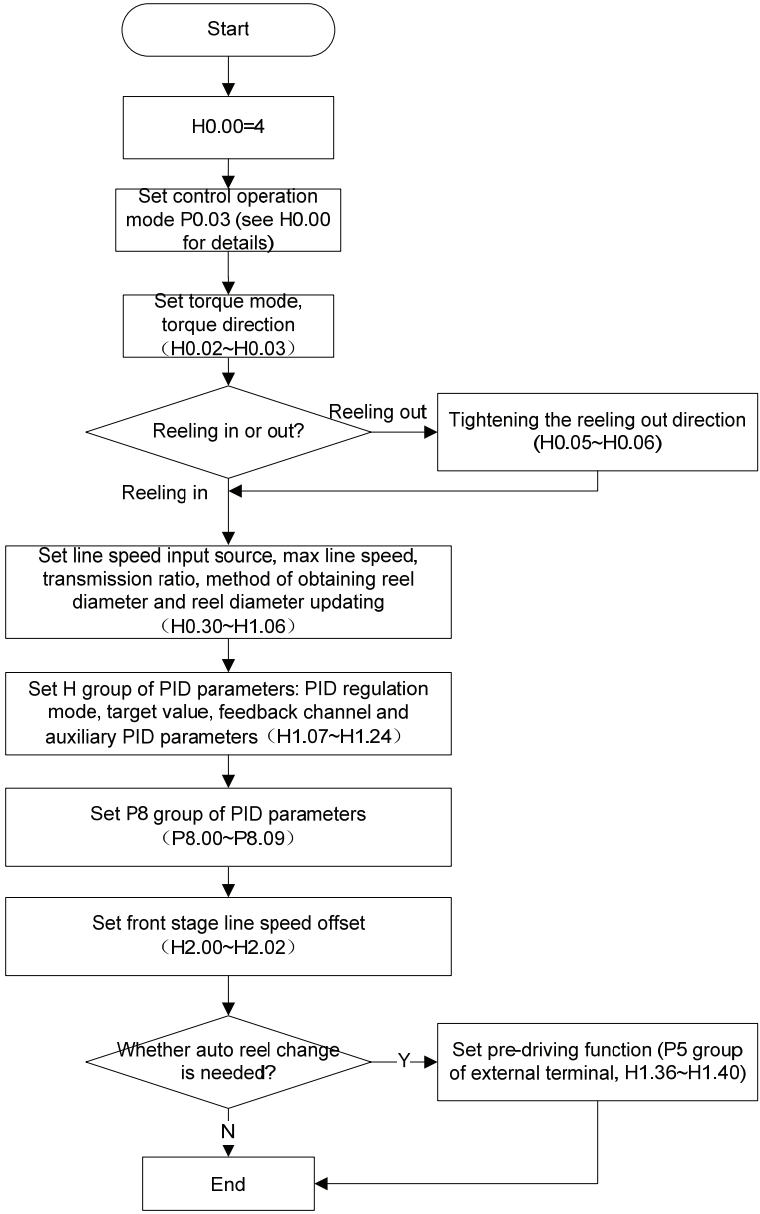
1 Speed PID Control Mode with Pendulum Rod or Tension Feedback Signal



2 Simple Tension and Constant Tension Control Mode without Pendulum Rod or Tension Feedback Signal



3 Torque PID Control Mode with Tension Sensor



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2 Relationship between Inverter Function code and Register Address in Communication Protocol 31

Chapter 1 Tension Control Parameter Table

Meanings of Each Item in Function Code Parameter Table

Item	Meanings
Function code	The number of function code, such as H0.00
Function code	The name of function code, which explains the function code's meanings.
Factory setting	Restore the settings of the function code after the inverter is delivered (see P0.01).
Setting range	The value from minimum value to maximum value that can be set to this function code.
Unit	V: Voltage; A: Current; ºC: Celsius degree; Ω: Ohm; mH: Milli−henry; rpm: Rotating speed; %: Percentage; bps: baud rate; Hz, kHz: Frequency; ms, s, min, h, kh: Time; kW: Power; /: No unit
Property	○: This function code can be changed during operation; ×: This function code can only be changed during stopping process; *: The setting of this function code is read−only and cannot be changed.
Function code	Function code parameter setting list
User setting	Used for recording parameters by user

1.1 List of Function Codes for Tension Control

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection	User setting
P0.01	Function code protection	0	0 to 5	/	×	0: All the parameters can be modified; 1: All the parameters cannot be modified; 2: Restore parameters in zone P to factory settings; 3: Restore parameters in zone P to factory settings; (except for P9 group) 4: Recover the parameters in zone P and zone A to factory settings; 5: Recover all the parameters to factory settings.	V5V6
P0.03	Control operation mode	0	0 to 11	/	×	Note: When H0.00 is non zero, see H0.00 for the settings of P0.03. **V/F control:** 0: Open loop control process; 1: Analog value feedback process close loop control; 2: PG feedback process close loop control; 3: Combined control mode; **Vector control without speed PG feedback:** 4: Open loop control process; 5: Analog value feedback process close loop control; 6: PG feedback process close loop control; 7: Combined control mode; **Vector control with speed PG feedback:** 8: Open loop control process 9: Analog value feedback process close loop control; 10: PG feedback process close loop control; 11: Combined control mode;	Options 8 to 11 are only for V6.

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection	User setting
Reeling mode selection, tension setting and taper setting (H0.00 to H0.29)							
H0.00	Tension control mode	0	0 to 4	/	×	0: Disabled 1: Simple tension mode(Without position / tension feedback signal) Note: P0.03=4/8 2: Constant tension mode(Without position / tension feedback signal) Note: P0.03=4/8 3: Speed PID mode(With position / tension feedback signal) Note: P0.03=3/7/11 4: Torque PID mode(With position / tension feedback signal) Note: P0.03=4/8 5: Constant line speed mode(With line speed feedback signal) Note: P0.03=0/4/8 Note: Pd.00 ones place(speed / torque mode) auto updating	Options 1, 2 and 4 are only for V6.
H0.01	Reeling mode	0	0 to 1	/	○	0: Reeling in, 1: Reeling out	V5V6
H0.02	Torque mode (without pendulum rod and tension sensor feedback) selection	12	11 to 24	/	○	Ones place: Torque reference channel 1: AI1;2: AI2;3: AI3;4: DI; Tens place: Torque reference selection 1: Torque reference 1; 2: Torque reference 2; Note: P6.21(Function selection of analog channel) auto updating	V6
H0.03	Torque direction and reverse running disabled	000	000 to 112	/	○	Ones place: Torque direction selection (Ones place is automatically set based on reeling-in/out mode) 0: Equivalent standard product(见 P6.21); 1: Same with commanded running direction; 2: Reverse to commanded running direction; Tens place: Whether reverse running is enabled in torque mode 0: Enabled;1: Disabled Hundreds place: Auto or manual selection of torque (tension) direction 0: Auto(Ones place is automatically updated based on reeling-in/out mode); 1: Manual(Ones place is set manually based on requirements); Note: Pd.00 tens place (Torque direction) auto updating	V6
H0.04	Coefficient for simple tension mode	0	0.0 to 500.0%	%	○	0.0 to 500.0%	V6
H0.05	Reeling-out tightening	0	0 to 1	/	○	0: Disabled;1: Enabled	V5V6
H0.06	Limit of tightening frequency	1.00	0.00 to 50.00	Hz	○	0.00 to 50.00Hz	V5V6
H0.07	High limit of reverse running frequency	0.00	0 to 300.0	Hz	○	0 to 300.0Hz	V5V6
H0.08	Tension and taper setting source	502	000 to 544	/	○	Ones place: Tension setting source 0: Digital tension setting(H0.10); 1: AI1;2: AI2;3: AI3;4: DI; Tens place: Taper setting source 0: Digital taper reference;	V6

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection	User setting
						1: AI1;2: AI2;3: AI3;4: DI; Hundreds place: Reeling-out tension setting source 0: Digital tension setting(H2.10); 1: AI1;2: AI2;3: AI3;4: DI; 5: Reeling-out tension source is determined by ones place of H0.08;	
H0.09	Max tension setting	0	0 to 65535	N	×	0 to 65535N	V6
H0.10	Digital tension setting	0	0 to 65535	N	○	0 to 65535N	V6
H0.11	Tension boost at zero speed	0.0	0.0 to 200.0%	%	○	0.0 to 200.0%	V6
H0.12	Threshold at zero speed	0.0	0.0 to 100.0%	%	○	0.0 to 100.0%	V6
H0.13	Digital taper mode	0	0 to 1	/	○	0: Single section taper(H0.14); 1: Multi section taper (H0.15 to H0.21);	V6
H0.14	Single section digital taper	0.0	0.0 to 200.0%	%	○	0.0 to 200.0%	V6
H0.15	Multi section taper 1	0.0	0.0 to 200.0%	%	○	Bigger than reel diameter range 1, use this taper	V6
H0.16	Multi section taper 2	0.0	0.0 to 200.0%	%	○	Reel diameter range 2 to Reel diameter range 1, use this taper	V6
H0.17	Multi section taper 3	0.0	0.0 to 200.0%	%	○	Reel diameter range 3 to Reel diameter range 2, use this taper	V6
H0.18	Multi section taper 4	0.0	0.0 to 200.0%	%	○	Reel diameter range 4 to Reel diameter range 3, use this taper	V6
H0.19	Multi section taper 5	0.0	0.0 to 200.0%	%	○	Reel diameter range 5 to Reel diameter range 4, use this taper	V6
H0.20	Multi section taper 6	0.0	0.0 to 200.0%	%	○	Reel diameter range 6 to Reel diameter range 5, use this taper	V6
H0.21	Multi section taper 7	0.0	0.0 to 200.0%	%	○	Reel diameter range 7 to Reel diameter range 6, use this taper	V6
H0.22	Reel diameter range 1	0.0	0.0 to 5000.0	mm	○	0.0 to 5000.0mm, smaller than the diameter of full reel	V6
H0.23	Reel diameter range 2	0.0	0.0 to 5000.0	mm	○	0.0 to 5000.0mm, reel diameter range 3 to reel diameter range 1	V6
H0.24	Reel diameter range 3	0.0	0.0 to 5000.0	mm	○	0.0 to 5000.0mm, reel diameter range 4 to reel diameter range 2	V6
H0.25	Reel diameter range 4	0.0	0.0 to 5000.0	mm	○	0.0 to 5000.0mm, reel diameter range 5 to reel diameter range 3	V6
H0.26	Reel diameter range 5	0.0	0.0 to 5000.0	mm	○	0.0 to 5000.0mm, reel diameter range 6 to reel diameter range 4	V6
H0.27	Reel diameter range 6	0.0	0.0 to 5000.0	mm	○	0.0 to 5000.0mm, reel diameter range 7 to reel diameter range 5	V6
H0.28	Reel diameter range 7	0.0	0.0 to 5000.0	mm	○	0.0 to 5000.0mm, less than reel diameter range 6	V6
H0.29	Tension taper compensation and correction	0.0	0.0 to 6553.5	mm	○	0.0 to 6553.5mm	V6

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection	User setting
Line speed setting, reel diameter calculation and reel diameter reset (H0.30 to H1.06)							
H0.30	Line speed setting source	1	0 to 4	/	○	0: Digital line speed(H0.32) 1: AI1;2: AI2;3: AI3;4: DI; **Note:** P0.04(Open loop main reference mode); P0.05(Open loop digital frequency reference); P6.21(Function selection of analog channel) auto updating	V5V6
H0.31	Max line speed	300.0	0.0 to 6000.0	m/min	○	0.0 to 6000.0m/min	V5V6
H0.32	Digital line speed	0.0	0.0 to 6000.0	m/min	○	0.0 to 6000.0m/min	V5V6
H0.33	Transmission ratio	1.00	0.20 to 50.00	Hz	○	0.20 to 50.00Hz	V5V6
H0.34	Method of obtaining reel diameter accumulating	0	0 to 2	/	○	0: Line speed mode; 1: Analog value mode; 2: Pulse mode;	V5V6
H0.35	Selection of analog mode channel for obtaining reel diameter	1	1 to 4	/	○	1: AI1;2: AI2;3: AI3;4: DI;	V5V6
H0.36	Selection of pulse mode channel for obtaining reel diameter	0	0 to 1	/	○	0: Pulse input from multi function terminals X1 to X6; 1: PG pulse input at motor side of X7 / DI terminal;	V5V6
H0.37	Number of pulses for each layer in X pulse mode	0	0 to 65535	/	○	Total number of pulses for one more layer	V5V6
H0.38	Number of rotations for each layer in PG pulse mode	0	0 to 65535	/	○	Total number of rotations of motor for one more layer	V5V6
H0.39	Layer thickness setting	0.00	0.00 to 655.35	mm	○	Thickness of each layer: 0.00 to 655.35mm	V5V6
H0.40	Diameter setting 1 for full reel	600.0	0.0 to 5000.0	mm	×	0.0 to 5000.0mm	V5V6
H0.41	Diameter setting 1 for empty reel	100.0	0.0 to 5000.0	mm	×	0.0 to 5000.0mm	V5V6
H0.42	Diameter setting 2 for full reel	600.1	0.0 to 5000.0	mm	×	0.0 to 5000.0mm	V5V6
H0.43	Diameter setting 2 for empty reel	100.1	0.0 to 5000.0	mm	×	0.0 to 5000.0mm	V5V6
H0.44	Diameter setting 3 for full reel	600.2	0.0 to 5000.0	mm	×	0.0 to 5000.0mm	V5V6
H0.45	Diameter setting 3 for empty reel	100.2	0.0 to 5000.0	mm	×	0.0 to 5000.0mm	V5V6
H0.46	Current reel diameter	100.0	0.0 to 5000.0	mm	×	0.0 to 5000.0mm	V5V6
H1.00	Target reel diameter (read only)	Actual value	0.0 to 5000.0	mm	*	0.0 to 5000.0mm	V5V6
H1.01	Reel diameter detection time	0.500	0.000 to 60.000	s	○	0.000 to 65.535s	V5V6
H1.02	Reel diameter operation setting	B000	0000 to F111	/	○	Ones place: Current reel diameter during stop 0: Keep at the current diameter; 1: Auto recovery to the diameter of empty reel; Tens place: Current reel diameter upon power failure	V5V6

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection	User setting
						0: Keep at the current diameter; 1: Auto recovery to the diameter of empty reel; Hundreds place: Reel diameter reset 0: Reset is not allowed during running; 1: Reset is allowed during running; Thousands bit: Reel diameter filter coefficient 0~F, the bigger the value, the better the reel diameter filtering effect, reel diameter has no step change, but too big diameter results in slow updating;	
H1.03	Min line speed for reel diameter updating	10.0	0.0 to 6000.0	m/min	○	0 to Max line speedH0.31	V5V6
H1.04	Min running frequency for reel diameter updating	1.00	0.00 to 50.00	Hz	○	0.00 to 50.00Hz	V5V6
H1.05	Max line speed change rate for reel diameter updating	5.0	0.0 to 5000.0	m/s	○	0.0 to 5000.0m/s	V5V6
H1.06	Startup transition time	5.0	0.1 to 600.0	s	○	0.1 to 600.0s	V5V6
PID target value, feedback value and regulation mode(H1.07 to H1.09)							
H1.07	PID regulation selection	0001	0000 to 2123	/	○	Ones place: PID gain transition mode 0: Only P8 group PID parameters are used; 1: Transition according to reel diameter (Dmax to Dmin); 2: Transition according to line speed (H0.31 to H1.03); 3: Transition according to frequency(P0.13 to P0.14); Tens place: PID result limit mode in speed mode 0: No limit; 1: Relative max frequency limit; 2: Limit according to main reference; Hundreds place: Torque PID mode 0: PID regulation; 1: Main reference torque + PID; Thousands bit: PID result limit mode in torque mode 0: No limit; 1: Limit according to Max torque; 2: Limit according to reference torque;	V5V6
H1.08	Source of target value for PID regulation	0	0 to 4	/	○	0: Digital reference(P8.00); 1: AI1;2: AI2;3: AI3;4: DI; Note: P1.02(Close loop control main reference mode) auto updating	V5V6
H1.09	Source of feedback value for PID regulation	2	1 to 4	/	○	1: AI1;2: AI2;3: AI3;4: DI; Note: P1.05(Close loop control main feedback mode) auto updating	V5V6
Parameters of second group of PID regulation(H1.10 to H1.24)(Note: Refer to P8.00 to P8.09 for the first group PID regulation parameters)							
H1.10	Auxiliary proportional gain Kp	0.200	0.000 to 10.00	/	○	0.000 to 10.00	V5V6
H1.11	Auxiliary integral gain Ki	0.500	0.000 to 10.00	/	○	0.000 to 10.00	V5V6
H1.12	Auxiliary differential gain Kd	0	0.000 to 10.00	/	○	0.000 to 10.00	V5V6
H1.13	Filtering time of differential value	8	0 to 1024	s	○	Kd filtering coefficient	V5V6

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection	User setting
H1.14	PID result limit ratio	100.0%	0 to 100.0%	%	○	0 to 100.0%	V5V6
H1.15	PID integral limit ratio	100.0%	0 to 100.0%	%	○	0 to 100.0%	V5V6
H1.16	Offset frequency for PID result limit	1.00	0.00 to 50.00	Hz	○	0.00 to 50.00Hz(Only tens place of H1.07=2: Enabled when PID result limit is based on main reference)	V5V6
H1.17	Selection of balance transition mode	00	00 to 21	/	○	Ones place: Transition between the upper and lower positions 0: Disabled; 1: Enabled; Tens place: Transition voltage in middle positions 0: Disabled; 1: Separation of integral item; 2: Proportional item for acceleration;	V5V6
H1.18	Transition adjustment for balance in upper position	1000	0 to 65535	/	○	0 to 65535	V5V6
H1.19	Transition adjustment for balance in lower position	2000	0 to 65535	/	○	0 to 65535	V5V6
H1.20	Voltage for transition in middle position	0.35	0 to 10.00	V	○	0 to 10.00V	V5V6
H1.21	Max deviation value for stopping updating of target reel diameter in PID mode	1.25	0 to 10.00	V	○	0 to 10.00V	V5V6
H1.22	PID regulation in speed mode	0	0 to 1	/	×	0: PID regulation result not related to reel diameter; 1: PID regulation result related to reel diameter;	V5V6
H1.23	Whether PID is disabled at non-constant speed	0	0 to 1	/	○	0: Enabled;1: Disabled;	V5V6
H1.24	Line speed feedback input channel(Only H0.00=5, enabled in constant line speed mode)	2	1 to 4	/	○	1: AI1;2: AI2;3: AI3;4: DI;	V5V6
Thread broken detection and braking to stop (H1.25 to H1.30)							
H1.25	Thread broken detection enabled	0	0 to 4	/	○	0: Thread broken detection disabled; 1 to 3: AI1 to AI3 are used as thread broken detection signals; 4: DI is used as thread broken detection signal;	V5V6
H1.26	Thread broken detection voltage	1.36	0.00 to 10.00	V	○	0.00 to 10.00, thread broken happens if the value is below this setting	V5V6
H1.27	Thread broken detection time	3.0	0.0 to 6553.5	s	○	0.0 to 6553.5s, thread broken happens if the detection lasts for this setting time	V5V6
H1.28	Stopping mode upon thread broken	00	00 to 13	/	○	Ones place: Stopping mode definition 0: Deceleration to stop;1: Coast to stop; 2: Deceleration + DC injection braking;3: Stopping at max speed; Tens place: Alarm mode definition 0: No alarm and stop according to the mode defined by ones place; 1: Alarm and forcing the coast-to-stop;	V5V6
H1.29	Braking frequency for stopping	1.50	0.0 to 300.0	Hz	○	0.0 to 300.0Hz	V5V6
H1.30	Braking time for stopping	6.0	0.0 to 600.0	s	○	0.0 to 600.0s	V5V6

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection	User setting
Tension compensation part(H1.31 to H1.35)							
H1.31	System inertia compensation coefficient	10.0	0.0 to 200.0	%	○	0.0 to 200.0	V6
H1.32	Acceleration compensation coefficient for material inertia	15.0	0.0 to 200.0	%	○	0.0 to 200.0	V6
H1.33	Deceleration compensation coefficient for material inertia	10.0	0.0 to 200.0	%	○	0.0 to 200.0	V6
H1.34	Compensation value for high speed sliding friction	10.0	0.0 to 100.0%	%	○	0.0 to 100.0%	V6
H1.35	Compensation mode for high speed sliding friction	00	00 to 11	/	○	Ones place: Compensation reference 0: Compensate based on frequency;1: Compensate based on line speed; Tens place: Compensation direction 0: Forward;1: Reverse;	V6
Auto reeling-out parameter(H1.36 to H1.40)							
H1.36	Pre-driving speed gain	100.0	0.0 to 200.0	%	○	Set speed gain in pre-driving process	V5V6
H1.37	Amplitude limiting mode for pre-driving torque	0	0 to 1	/	○	0: Rated torque;1: Set amplitude limit according to tension;	V5V6
H1.38	Pre-driving torque gain	100.0	0 to 200.0%	%	○	Set amplitude limit for torque in pre-driving process	V5V6
H1.39	Reel diameter calculation delay after pre-driving ended	5.0	0.0 to 100.0	s	○	After pre-driving, do not calculate reel diameter until the preset time is out	V5V6
H1.40	PID calculation delay after pre-driving ended	0.0	0.0 to 100.0	s	○	After pre-driving, do not perform PID calculation until the preset time is out	V5V6
Torque reeling-out parameters(H1.41 to H1.45)							
H1.41	Reel diameter position when torque reeling-out changed to speed mode	0.0	0.0 to 5000.0	mm	○	0.0 to 5000.0mm	V6
H1.42	Torque position when torque reeling-out changed to speed mode	0.0	0.0 to 200.0	%	○	0.0 to 200.0%	V6
H1.43	Driving torque limit in speed mode	0.0	0.0 to 200.0	%	○	0.0 to 200.0%	V6
H1.44	Braking torque limit in speed mode	0.0	0.0 to 200.0	%	○	0.0 to 200.0%	V6
H1.45	Speed gain in speed mode	100.0%	0 to 200.0%	%	○	0.0 to 200.0%	V6
Line speed gain and offset in front stage(H2.00 to H2.02)							
H2.00	Line speed gain	100.0%	0 to 200%	%	○	0.0 to 200.0%	V6
H2.01	Line speed offset mode	0	0 to 2	/	○	0: Line speed offset;1: Frequency offset; 2: Line speed offset is the max running frequency with function of avoiding uncontrolled spinning;	V6
H2.02	Line speed offset value	5.0	0.0 to 100.0%	%	○	H2.00=0: Line speed offset value=H2.01*Max line speed; H2.00=1: Frequency offset value=H2.01 * Max running frequency;	V6

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection	User setting
H2.07	Compensation for material inertia mode and tension taper mode	0115	0000 to F115	/	○	Ones place: Compensation for material inertia 0 and 3: Quadratic curve; 1 and 4: Cubic curve; 2 and 5: Quartic curve; Tens place: Whether tension taper is enabled at zero speed 0: Enabled;1: Disabled; Hundreds place: Selection of taper curve mode 0: Direct line;1: Curve; Thousands bit: Filtering coefficient for tension reference (only in constant tension mode) 0~F, the bigger the value, the less the step change of tension, but response is slow, set according to system response requirement;	V6
H2.09	Other operation modes (used in special conditions)	0111	0000~1111	/	○	Ones place: Reel diameter change direction 0: Single direction, 1: Dual direction; Tens place: Tightening in reverse direction in speed mode at zero speed (enabled in both reeling-in and reeling out modes) 0: Not related to reel diameter, 1: Related to reel diameter; Hundreds place: Frequency direction in speed mode at zero speed (enabled in both reeling-in and reeling out modes) 0: Single direction, 1: Dual direction; Thousands bit: Reel diameter updating mode 0: Closing gradually; 1: Fast skipping mode;	V5V6
H2.10	Digital tension setting for reeling-out	0	0 to 65535	N	○	0 to 65535N	V6
H2.11	Tension control mode channel (used in special conditions)	000	000~155	/	○	Ones place: Reeling-in mode 0~5: Tension control mode selection, refer to H0.00; Tens place: Reeling-out mode 0~5: Tension control mode selection, refer to H0.00; Hundreds place: Tension control mode setting channel 0: H0.00 setting is enabled; 1: H2.11 setting is enabled;	V5V6

1.2 Other Related Parameters

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection	User setting
P8.00	Digital voltage reference for analog feedback close loop control	0.00	0.00 to 10.00	V	○	0.00 to 10.00V	
P8.01	Digital speed reference for PG feedback close loop control	0	0 to 30000	rpm	○	0 to 30000rpm	
P8.02	Number of pulses per rotation of PG	1000	1 to 9999	/	×	1 to 9999	
P8.03	Proportional gain KP	0.200	0.000 to 10.000	/	○	0.000 to 10.000	
P8.04	Integral gain Ki	0.500	0.000 to 10.000	/	○	0.000 to 10.000	
P8.05	Differential gain Kd	0.000	0.000 to 10.000	/	○	0.000 to 10.000	
P8.06	Sampling cycle	0.002	0.001 to 30.000	s	○	0.001 to 30.000s	
P8.07	Deviation limit	00.2	0.0 to 20.0	%	○	0.0 to 20.0%	
P8.08	PID regulation selection	10	00 to 11	/	○	Ones place: Integral mode 0: Frequency reaches high/low limit, stop integral regulation; 1: Frequency reaches high/low limit, continue integral regulation; Tens place: Output frequency 0: Must be consistent with preset running direction; 1: Reverse to the preset running direction; Ones place: Integral mode 0: Frequency reaches high/low limit, stop integral regulation; 1: Frequency reaches high/low limit, continue integral regulation Tens place: output frequency 0: Be consistent with preset direction; 1: Reverse to preset direction	
P8.09	PID reverse enabled	0	0 to 1	/	○	0: PID forward 1: PID reverse	

1.3 List of Parameter Settings Displayed by Operation Panel

Function code number	Function code name	Factory setting	Setting range	Unit	Property	Function code selection	User setting
P2.02	Selection of operating parameters	1CB0	0000 to FFFF	/	○	LED ones place: 0: Reference frequency (Hz); 1: Bus voltage(V); 2: AI1(V); 3: AI2(V); 4: AI3 (V); 5: DI (%); 6: Tension setting(N); 7: Actual line speed(m/min); 8: Close loop reference (%); 9: Close loop feedback (%); A: Reference torque(%); B: Running frequency(Hz); C: Output current (A); D: Output torque (%); E: Reel diameter(mm); F: Front stage reference line speed(m/min); LED tens place, hundreds place and thousands bit: Same with above	
P2.03	Selection of parameters displayed in stopping process	3210	0000 to FFFF	/	○	LED ones place: 0: Reference frequency (Hz); 1: Bus voltage(V); 2: AI1(V); 3: AI2(V); 4: AI3 (V); 5: DI (%); 6: Tension setting(N); 7: Actual line speed(m/min); 8: Close loop reference (%); 9: Close loop feedback (%); A: Reference torque(%); B: Running frequency(Hz); C: Output current (A); D: Output torque (%); E: Reel diameter(mm); F: Front stage reference line speed(m/min); LED tens place, hundreds place and thousands bit: Same with above	

1.4 List of Input and Output Terminal Function Parameter Settings

P5.00	Selection of Terminal X1 input function	99	0 to 99	/	×	32: Diameter 1 of full reel 33: Diameter 2 of full reel 34: Diameter 3 of full reel 35: Diameter 1 of empty reel 36: Diameter 2 of empty reel 37: Diameter 3 of empty reel 38: Stopping reel diameter calculation 39: Forced thread broken detection disabled 40: Reserved 41: Switch between reeling-in and reeling-out 42: Pre-driving enabled 43: Tension control disabled See Table 1−1	
P5.01	Selection of Terminal X2 input function	99	0 to 99	/	×		
P5.02	Selection of Terminal X3 input function	99	0 to 99	/	×		
P5.03	Selection of Terminal X4 input function	99	0 to 99	/	×		
P5.04	Selection of Terminal X5 input function	99	0 to 99	/	×		
P5.05	Selection of Terminal X6 input function	99	0 to 99	/	×		
P5.06	Selection of X7/DI terminal input function	99	0 to 99	/	×		
P6.21	Selection of analog channel function	0000	0000 to 6666	/	×	LED ones place: AI1 function selection 0: Open loop frequency or close loop analog reference; 1: Torque reference 1; 2: Torque reference 2; 3: Reserved 4: Reserved 5: Motor temperature feedback 6: Speed limit; LED tens place: AI2 function selection is same with above LED hundreds place: AI3 function selection is same with above LED thousands bit: DI function selection is same with above	
P7.00	Selection of Y1 terminal output function	0	0 to 47	/	○	See Table 1−2	
P7.01	Selection of Y2/DO terminal output function	1	0 to 71	/	○	See Table 1−2 and Table 1−3	
P7.02	Selection of relay terminal output function	14	0 to 47	/	○	See Table 1−2	
P7.03	Selection of Terminal AO1 output function	48	48 to 71	/	○	See Table 1−3	
P7.04	Selection of Terminal AO2 output function	49	48 to 71	/	○		

◆ Table 1−1 Definition of Multi Function Input Terminal

No.	Function Definition	No.	Function Definition
0	Forward jog	1	Reverse jog
2	Run forward(FWD)	3	Run reverse(REV)
4	3-wire running control	5	Pulse frequency DI input (only valid for X7/DI terminal)
6	Multi section digital voltage terminal 1	7	Multi section digital voltage terminal 2
8	Multi section digital voltage terminal 3	9	Multi section frequency terminal 1
10	Multi section frequency terminal 2	11	Multi section frequency terminal 3
12	Multi section frequency terminal 4	13	Acceleration / deceleration time terminal 1
14	Acceleration / deceleration time terminal 2	15	Clearing of digital regulation frequency
16	Frequency increase command	17	Frequency decrease command

No.	Function Definition	No.	Function Definition
18	Acceleration / deceleration disabled command	19	External fault input
20	Terminal reset input upon fault	21	External interrupt contact input
22	Inverter running disabled	23	Stopping via terminal
24	Coast to stop via terminal	25	DC braking 1 via terminal
26	Emergent stop 1(Stopping at max speed)	27	DC braking 2 via terminal
28	Counter trigger input	29	Counter trigger clearing
30 to 31	Reserved	32	Current reel diameter forced to diameter 1 of full reel
33	Current reel diameter forced to diameter 2 of full reel	34	Current reel diameter forced to diameter 3 of full reel
35	Current reel diameter forced to diameter 1 of empty reel	36	Current reel diameter forced to diameter 2 of empty reel
37	Current reel diameter forced to diameter 3 of empty reel	38	Stopping reel diameter calculation
39	Forced thread broken detection disabled	40	Reserved
41	Switch between reeling-in and reeling-out	42	Pre-driving enabled
43	Tension control disabled	44 to 46	Reserved
47	Single phase input for PG pulse close loop feedback	48	Command switching to operation panel
49	Command switching to terminal	50	Command switching to host
51	Switching between Close loop input and open loop input for main frequency source	52	Main frequency source switching to digital
53	Reserved	54	Main frequency source switching to AI1
55	Main frequency source switching to AI2	56	Main frequency source switching to AI3
57	Main frequency source switching to DI	58	Auxiliary frequency source switching to disabled
59	PID enabled	60	Auxiliary frequency source switching to AI1
61	Auxiliary frequency source switching to AI2	62	Auxiliary frequency source switching to AI3
63	Auxiliary frequency source switching to DI	64	Switching between speed control and torque control
65	Forcing speed limit to Pd.06 and Pd.07	66	Terminal for enabling zero servo
67	Forcing close loop output to 0	68	PID reverse
69 to 98	Reserved		

◆Table 1−2 Definition of Multi Function of Digital Output

Function Setting	Meaning	Function Setting	Meaning
0	Inverter in running process (RUN)	1	Frequency arrival signal (FAR)
2	Frequency level detection signal 1(FDT1)	3	Frequency level detection signal 2(FDT2)
4	Inverter or motor overload pre-alarm detection signal (OL)	5	Low voltage locking (LU)
6	Stop due to external fault (EXT)	7	Frequency high limit (FHL)
8	Frequency low limit (FLL)	9	Inverter in zero speed running
10	Preset counting value tripping	11	Arrival counting value tripping

Function Setting	Meaning	Function Setting	Meaning
12	Reserved	13	Inverter ready to run (RDY)
14	Inverter fault	15	Inverter alarm
16 to 18	Reserved	19	Output X1
20	Output X2	21	Reserved
22	Zero current detected (related to motor)	23	Stopping command indication
24 to 33	Reserved	34	Braking signal indication

◆Table 1−3 Definition of Functions of Multi Function Analog Output and Pulse Output

Function Setting	Selection of Output Signal	Definition of Analog Output Range	Definition of Pulse Output Range
48	Output frequency	Max frequency P0.11 corresponds to 10V/20mA	Max frequency P0.11 corresponds to P7.10
49	Frequency setting	Max frequency P0.11 corresponds to 10V/20mA	Max frequency P0.11 corresponds to P7.10
50	Output current	2 times of inverter rated current corresponds to 10V/20mA	2 times of inverter rated current corresponds to P7.10
51	Motor current	2 times of motor rated current corresponds to 10V/20mA	2 times of motor rated current corresponds to P7.10
52	Output torque	2 times of motor rated torque corresponds to 10V/20mA	2 times of motor rated torque corresponds to P7.10
53	Output voltage	2 times of max output voltage P0.12 corresponds to 10V/20mA	2 times of max output voltage P0.12 corresponds to P7.10
54	Bus voltage	1000V corresponds to 10V/20mA	1000V corresponds to P7.10
55	AI1	10V corresponds to 10V/20mA; 20mA corresponds to 5V/10mA	10V corresponds to P7.10;20mA corresponds to 50% of P7.10
56	AI2	Same with AI1	Same with AI1
57	AI3	−10V to 10V corresponds to 0 to 10V/20mA	−10V to 10V corresponds to 0 to P7.10
58	DI	Max input pulse frequency P5.10 corresponds to 10V/20mA	Max input pulse frequency P5.10 corresponds to P7.10
59	Output power	2 times motor rated output power corresponds to 10V/20mA	2 times motor rated output power corresponds to P7.10
60	Percent ratio of host	10000 corresponds to 10V/20mA	10000 corresponds to P7.10
61	Heatsink temperature	0 to 100℃ corresponds to 0 to 10V/20mA	100℃ corresponds to P7.10
62	Output frequency 2	Max frequency P0.11 corresponds to 0 to 10V/20mA	Max frequency P0.11 corresponds to P7.10
65	Reel diameter output	Max reel diameter corresponds to 10V/20mA	Max reel diameter corresponds to P7.10

Chapter 2 Description of Tension Control Parameters

2.1 Tension Control Function Parameters (H Zone)

2.1.1 Reeling mode selection, tension setting and taper setting

H0.00	Tension control mode	0 to 5

0: Disabled: Tension control function is disabled and the inverter is the same with the standard inverter;

1: Simple tension mode (Without position / tension feedback signal): No need of tension detection and feedback, and the inverter roughly controls the tension of the material through controlling the torque. This function is suitable for the application where the material is thick and has no high requirement for precision. Reference torque=Initial torque × (1+Tension coefficient×(Current reel diameter / diameter of empty reel −1)). Initial torque is set in H0.02 and tension coefficient is set in H0.04. The running mode P0.03 should be set to 4/8.

If H0.04 is set to 0, this is equivalent to constant torque mode.

2: Constant tension mode (Without position / tension feedback signal): No need of tension detection and feedback, and the inverter precisely controls the tension of the material through controlling the torque. The running mode P0.03 should be set to 4/8.

3: Speed PID mode (With position / tension feedback signal): Need tension detection and feedback, and the inverter controls the tension through controlling the output frequency. The running mode P0.03 should be set to 3/7/11.

4: Torque PID mode (With position / tension feedback signal): Need tension detection and feedback, and the inverter controls the tension by controlling the output torque through PID close loop. The running mode P0.03 should be set to 4/8.

5: Constant line speed mode(With line speed feedback signal): For the applications that require stable operation but do not need quick line speed regulation, use constant line speed control to realize constant line speed without the need for PID regulation, which is more stable than common close loop control operation. Line speed target value is set in H0.30, and line speed feedback value is set in H1.24, and the reel diameter obtaining mode of H0.34 is automatically set to line speed mode. P0.03 should be set to 4/8.

Note: Pd.00 ones place (speed / torque mode) is automatically updated and manual setting is not needed.

H0.01	Reeling mode	0 to 1

0: Reeling in 1: Reeling out

Use the reeling mode together with the terminal for switching between reeling-in and reeling-out, when the terminal for switching between reeling-in and reeling-out is disabled, the actual reeling mode is consistent with the function code setting, when the terminal is enabled, the actual reeling mode is reverse to the function code setting.

In torque mode: During reeling in, the torque direction is the same with the speed direction. During reeling out, the torque direction is reverse to the speed direction. During the process of switching between reeling-in and reeling-out, you need to change H0.01 or use the terminal for switching between reeling-in

and reeling-out to realize the switching.

Note: In speed mode, use #41 terminal to switch between the reeling in and reeling out, and the running direction is switched to the reverse direction automatically and the PID forward is also switched to PID reverse.

H0.02	Torque mode (without pendulum rod and tension sensor	11 to 24

Torque mode setting	
Ones place	Torque reference channel 1: AI1;2: AI2;3: AI3;4: DI;
Tens place	Torque reference selection Torque reference 1: Mode 1(0 to 100% corresponds to 0 to 200%); Torque reference 2: Mode 2(0 to 100% corresponds to −200% to 200%);

Note: This function is only enabled in simple tension mode. P6.21 will be updated automatically, manual setting is not needed.

Ones place: Torque reference channel cannot be overlapped with H0.30 (line speed reference channel), otherwise the tension control function is disabled.

Torque reference 1: Use the Per Unit value converted from the analog value to determine the torque reference. 0 to 100% Per Unit value corresponds to 0 to 200% positive torque input, for example, the positive half axis in Figure 1−1. When using AI3 to input −10V to 10V, the −100% to 100% Per Unit value converted from the input analog value corresponds to −200% to 200% input torque in both positive and negative directions, for example, the positive and negative half axis in Figure 1−1.

Torque reference 2: Use the Per Unit value converted from the analog value to determine the torque reference. 0 to 100% Per Unit value A is corrected through (A-50%) ×2, so the 0 to 100% Per Unit value A corresponds to −200% to 200% torque reference in both positive and negative directions, as shown in Figure 1−2.

Note: When using AI3 to input 0 to 10V, use torque reference 2, when using AI3 to input −10V to 10V, please use torque reference 1.

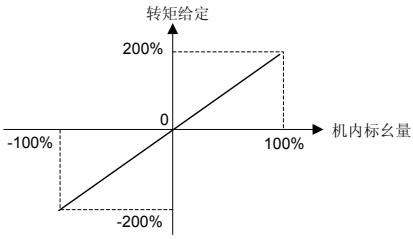

Figure 2−1 Torque reference 1

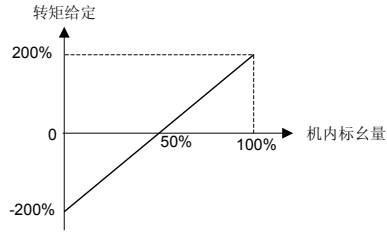

Figure 2−2 Torque reference 2

H0.03	Torque direction and reverse running disabled	000 to 112

Torque direction and reverse running disabled	
Ones place	Torque direction selection (Ones place is automatically set based on reeling-in/out mode) 0: Equivalent standard product(见 P6.21); 1: Same with commanded running direction; 2: Reverse to commanded running direction;
Tens place	Whether reverse running is enabled in torque mode: 0: Enabled;1: Disabled
Hundreds place	Auto or manual selection of torque (tension) direction 0: Auto(Ones place is automatically updated based on reeling-in/out mode); 1: Manual(Ones place is set manually based on requirements);

Ones place: Torque direction selection

1: When there is a run forward command, the torque reference is +20%. When there is a run reverse command, the torque reference is −20%;

2: When there is a run forward command, the torque reference is −20%; When there is a run reverse command, the torque reference is +20%;

0: The torque reference is always +20% no matter it is run forward or run reverse command.

Note:

◆ In torque mode, reel in when the hundreds place is 0, and the ones place is automatically set to 0; Reel out and the ones place is automatically set to 2.

◆ Pd.00 tens place (torque direction) will be automatically updated, and manual setting is not needed.

Tens place: Whether the run reverse is enabled in torque mode:

0: Enabled;

1: Disabled;

Hundreds place: Auto or manual selection of torque (tension) direction

0: Auto (Ones place is automatically updated based on reeling-in/out mode);

1: Manual (Ones place is set manually based on requirements);

H0.04	Coefficient for simple tension mode	0.0 to 500.0%

In simple tension mode, use this coefficient to automatically correct the reference for torque control;

Reference torque＝Initial torque×(1+tension coefficient H0.04×(Current reel diameter/diameter of empty reel-1)).

H0.05	Reeling-out tightening	0 to 1

0: Reverse tightening disabled

1: Reverse tightening enabled

In torque mode and speed mode, select whether the motor can run reversely to actively tighten the materials during reeling-out control process, and the limit of tightening frequency is set in H0.06.

In speed mode: When the inverter runs forward to reel out, the run reverse frequency can be limited by setting the high limit of reverse running frequency H0.07.

H0.06	Limit of tightening frequency	0.00 to 50.00Hz

When H0.05=1, the reeling-out tightening is enabled, H0.06 is the high limit of tightening frequency.

H0.07	High limit for reverse running frequency	0.00 to 300.0Hz

In speed mode, when this function is set to 0, the high limit of reverse running frequency is P0.11. When the function is set to non zero, the high limit of reverse running frequency is determined by the function code.

H0.08	Tension and taper setting source	000 to 544

Tension and taper setting source	
Ones place	Tension setting source 0: Digital tension setting(H0.10); 1: AI1;2: AI2;3: AI3;4: DI;
Tens place	Taper setting source 0: Digital taper reference; 1: AI1;2: AI2;3: AI3;4: DI;
Hundreds place	Reeling-out tension setting source 0: Digital tension setting(H2.10); 1: AI1;2: AI2;3: AI3;4: DI; 5: Reeling-out tension source is determined by ones place of H0.08;

Ones place: Tension setting source

0: Reference tension is set in H0.10, max tension shall not exceed H0.09;

1 to 4: Reference tension is determined by the Per Unit value converted from analog value;

Tens place: Taper setting source

0: The taper is digital reference, whether it is single section or multi digital section is determined by H0.13;

1 to 4: Taper reference is determined by the Per Unit value converted from analog value, 0 to 10.0V/0 to 20.00mA corresponds to 0.0 to 200.0% taper.

Hundreds place: Reeling out tension setting source

0: Digital tension setting (H2.10);

1~4: Reference tension is determined by the Per Unit value converted from analog value;

5: Reeling-out tension source is determined by ones place of H0.08;

H0.09	Max tension setting	0 to 65535N

Set the high limit of tension, and the setting of H0.10 should not be greater than the max tension setting of H0.09. The max value of analog value or pulse input corresponds to H0.09.

H0.10	Digital tension setting	0 to 65535N

When the ones place of H0.08 is set to 0, the tension setting is enabled when it is set by digital values.

H0.11	Tension boost at zero speed	0 to 200.0%

In order to overcome the static friction when the system runs at zero speed, provide preset boosted tension.

Boosted tension =H0.11* reference tension

H0.12	Threshold at zero speed	0.0 to 100.0%

Used together with H0.11, when the inverter running speed is less than this setting, then the system is considered to be running at zero speed, and the threshold at zero speed is a percentage value with reference to max frequency P0.11.

H0.13	Digital taper mode	0 to 1

0: Single section taper (H0.14); 1: Use multi section taper (H0.15 to H0.21) according to reel diameter;

Set different taper adding mode according to different manufacturing processes:

When the hundreds place of H2.07 is 0, the tension taper is as follows:

Corrected tension＝Tension before correction×{1-tension taper×[(Current reel diameter – diameter of empty reel)/(diameter of full reel -diameter of empty reel)]}

When the hundreds place of H2.07 is 1, the tension taper is as follows:

Corrected tension＝Tension before correction×{1-tension taper×[1-(diameter of empty reel+H0.29)/(Current reel diameter+H0.29)]}

H0.14	Single section digital taper	0.0 to 200.0%

Enabled when H0.13=0.

H0.15	Multi section taper 1	0.0 to 200.0%

H0.13=1, when current reel diameter is greater reel diameter range 1, the multi section taper 1 is enabled;

H0.16	Multi section taper 2	0.0 to 200.0%

H0.13=1, when current reel diameter is in the range of (Reel diameter range 2 to Reel diameter range 1), the multi section taper 2 is enabled;

H0.17	Multi section taper 3	0.0 to 200.0%

H0.13=1, when current reel diameter is in the range of (Reel diameter range 3 to Reel diameter range 2), the multi section taper 3 is enabled;

H0.18	Multi section taper 4	0.0 to 200.0%

H0.13=1, when current reel diameter is in the range of (Reel diameter range 4 to Reel diameter range 3), the multi section taper 4 is enabled;

H0.19	Multi section taper 5	0.0 to 200.0%

H0.13=1, when current reel diameter is in the range of (Reel diameter range 5 to Reel diameter range 4), the multi section taper 5 is enabled;

H0.20	Multi section taper 6	0.0 to 200.0%

H0.13=1, when current reel diameter is in the range of (Reel diameter range 6 to Reel diameter range 5), the multi section taper 6 is enabled;

H0.21	Multi section taper 7	0.0 to 200.0%

H0.13=1, when current reel diameter is in the range of (Reel diameter range 7 to Reel diameter range 6), the multi section taper 7 is enabled.

H0.22	Reel diameter range 1	0.0 to 5000.0mm
H0.23	Reel diameter range 2	0.0 to 5000.0mm
H0.24	Reel diameter range 3	0.0 to 5000.0mm
H0.25	Reel diameter range 4	0.0 to 5000.0mm
H0.26	Reel diameter range 5	0.0 to 5000.0mm
H0.27	Reel diameter range 6	0.0 to 5000.0mm
H0.28	Reel diameter range 7	0.0 to 5000.0mm
H0.29	Tension taper compensation and correction	0.0 to 6553.5mm

When the hundreds place of H2.07 is 1, and when the selected tension taper is a curve, the tension taper compensation and correction is enabled, the bigger the H0.29, the slower the decrease of tension with the reel diameter.

2.1.2 Line speed setting, reel diameter calculation and reel diameter reset

H0.30	Line speed setting source	0 to 4

Line speed setting source selection channel:

0: From digital line speed (H0.32), can write in H0.32 through host communication to provide line speed reference through communication;

1 to 3: From analog channels AI1 to AI3;

4: From X7/DI terminal input pulse;

Note: P0.04(Open loop main reference mode)、P0.05(Open loop digital frequency reference)、P6.21(Function selection of analog channel) will be automatically updated, and manual setting is not needed. The ones place of H0.30 cannot overlap with that of H0.02, otherwise the tension function is disabled.

H0.31	Max line speed	0.0 to 6000.0m/min

Set the line speed when the inverter runs at the preset max frequency.

H0.32	Digital line speed	0.0 to 6000.0m/min

When H0.30=0 and the line speed is provided by digital value, the function is enabled.

H0.33	Transmission ratio	0.20 to 50.00

Transmission ratio is the motor speed / reel shaft speed. The motor shaft and the reel shaft are connected through a conveyor belt, the transmission ratio is the ratio of the diameter of reeling-in shaft to motor shaft.

H0.34	Method of obtaining reel diameter accumulating	0 to 2

Reel diameter accumulating mode:

0: Line speed mode;

The most common mode, the AO output of the drive unit represents the analog value of the current line speed; The reeling-in / out drive inverter inputs the analog value of the current line speed through AI terminal

to calculate the reel diameter.

1: Analog value mode;

Input an analog value or pulse frequency that represents the current reel diameter through AI or DI terminal, and you need to select input channel in H0.35.

2: Pulse mode;

Use proximity switch or PG feedback signal to represent the current line speed, and accumulate the current reel diameter through the settings of H0.36 to H0.39.

H0.35	Selection of analog mode channel for obtaining reel	1 to 4

When H0.34＝1, this function is enabled,

1 to 3: Reel diameter is provided through AI1 to AI3;

4: Reel diameter is provided through X7/DI input pulse;

H0.36	Selection of pulse mode channel for obtaining reel	0 to 1

When H0.34＝2, this function is enabled to select the pulse input mode.

0: Pulse input from multi function terminals X1 to X6

Applicable to the 0 to 300Hz pulse input of proximity switch, select any terminal among X1 to X6 for pulse input and the set the terminal function to 28.

1: PG pulse input at motor side of X7 / DI terminal

Applicable to the high speed pulse input with PG installed, select X7/DI terminal input, and the set the terminal function to 47.

H0.37	Number of pulses for each layer in X pulse mode	0 to 65535

When H0.36＝0, this function is enabled to set the number of pulses for adding or removing one layer on the reel.

H0.38	Number of rotations for each layer in PG pulse mode	0 to 65535

When H0.36＝1, this function is enabled to set the number of rotations of motor for adding or removing one layer on the reel.

H0.39	Layer thickness setting	0.00 to 655.35mm

The increased or decreased thickness after one layer of silk thread is added or removed from the reel.

H0.40	Diameter setting 1 for full reel	0.0 to 5000.0mm

Initial default diameter for full reel

H0.41	Diameter setting 1 for empty reel	0.0 to 5000.0mm

Initial default diameter of reel shaft

H0.42	Diameter setting 2 for full reel	0.0 to 5000.0mm
H0.43	Diameter setting 2 for empty reel	0.0 to 5000.0mm
H0.44	Diameter setting 3 for full reel	0.0 to 5000.0mm
H0.45	Diameter setting 3 for empty reel	0.0 to 5000.0mm

Select the diameter for full reel or empty reel through multi function terminal, refer to definition table for multi function input terminals for details.

H0.46	Current reel diameter	0.0 to 5000.0mm

Means the actual reel diameter during reeling-in / out operation, and the diameter can be set manually prior to operation, and can also be cleared to the diameter for full reel or empty reel through multi function terminal, and the value will be automatically updated.

H1.00	Target reel diameter (read only)	0.0 to 5000.0mm

Display current target reel diameter

H1.01	Reel diameter detection time	0.000 to 60.000s

The time needed for automatically updating the current reel diameter when the system runs stably in reeling-in / out operation mode.

H1.02	Reel diameter operation setting	0000 to F111

Select initialization or saving current reel diameter through reel diameter operation setting or whether the reel diameter reset is allowed during stopping or power failure process.

Reel diameter operation setting	
Ones place	Current reel diameter during stop 0: Keep at the current diameter; 1: Auto recovery to the diameter of empty reel;
Tens place	Current reel diameter upon power failure 0: Keep at the current diameter; 1: Auto recovery to the diameter of empty reel;
Hundreds place	Reel diameter reset 0: Reset is not allowed during running; 1: Reset is allowed during running;
Thousands place	Reel diameter filter coefficient 0~F, the bigger the value, the better the reel diameter filtering effect, reel diameter has no step change, but too big diameter results in slow updating;

H1.03	Min line speed for reel diameter updating	0 to 6000.0m/min

Set the min speed for starting calculating the reel diameter. When the inverter detects that the line speed is less than this value, the inverter stops calculating the reel diameter. Correctly setting this value can effectively avoid the big deviation of reel diameter calculation at low speed. Generally this value is set to 10% of max line speed.

H1.04	Min running frequency for reel diameter updating	0.00 to 50.00Hz

Set the min running frequency for reel diameter updating.

H1.05	Max line speed change rate for reel diameter updating	0.0 to 5000.0m/s

Set the max line speed change rate for reel diameter updating to avoid the step change of reel diameter during acceleration / deceleration of main unit.

H1.06	Startup transition time	0.1 to 600.0s

In tension control mode, the current reel diameter will not be automatically updated within this time setting after the system starts up.

2.1.3 PID target value, feedback value and regulation mode

H1.07	PID regulation selection	0000 to 2123

PID regulation mode setting	
Ones place	PID gain transition mode 0: Only P8 group PID parameters are used; 1: Transition according to reel diameter(Dmax to Dmin); 2: Transition according to line speed(H0.31 to H1.03); 3: Transition according to frequency(P0.13 to P0.14)
Tens place	PID result limit mode in speed mode 0: No limit; 1: Relative max frequency limit; 2: Limit according to main reference
Hundreds place	Torque PID mode 0: PID regulation;1: Main reference torque + PID
Thousands place	PID result limit mode in torque mode 0: No limit; 1: Limit according to Max torque; 2: Limit according to reference torque

Ones place: Transition mode of gain

0: Only P8 group PID gain parameters are used;

1: Transition according to reel diameter: At empty reel diameter, the P8 group PID parameters have the most significant effect, and the H1 group PID parameters have the weakest effect. At full reel diameter, the P8 group PID parameters have the weakest effect, and the H1 group PID parameters have the most significant effect.

2: Transition according to line speed: At min line speed H1.03, the P8 group PID parameters have the most significant effect, and the H1 group PID parameters have the weakest effect. At max line speed H0.31, the P8 group PID parameters have the weakest effect, and the H1 group PID parameters have the most significant effect.

3: Transition according to frequency: At min frequency P0.14, the P8 group PID parameters have the most significant effect, and the H1 group PID parameters have the weakest effect. At max frequency P0.13, the P8 group PID parameters have the weakest effect, and the H1 group PID parameters have the most significant effect.

Tens place: PID result limit mode in speed mode

0: No limit, the max frequency of PID regulation is P0.11;

1: Relative max frequency limit, the limit ratio is set by H1.14 and H1.15;

2: Limit according to main reference, the limit ratio is set by H1.14 and H1.15;

Hundreds place: Torque PID mode

0: PID regulation, that is, the output torque is regulated by PID, and only 0 and 1 of thousands place is enabled for torque mode PID result limit;

1: Main reference torque + PID, the main reference torque channel is set by the ones place of H0.02;

Thousands bit: PID result limit mode in torque mode

0: No limit, PID regulation result can reach the max torque;

1: Limit according to Max torque, the limit ratio is set by H1.14 and H1.15;

2: Limit with reference to main reference torque, the limit ratio is set by H1.14 and H1.15;

Note: During reeling-in, the max torque is the drive torque limit of Pd.08. During reeling-out, the max torque is the drive torque limit of Pd.09.

H1.08	Source of target value for PID regulation	0 to 4

Set the target value for tension or position feedback signal, the target value source is:

0: From digital value (P8.00);

1 to 3: From analog channels AI1 to AI3;

4: From pulse input of X7/DI terminals;

Note: P1.02 (Close loop control main reference mode) is automatically updated, and manual setting is not needed.

H1.09	Source of feedback value for PID regulation	1 to 4

Set the feedback channel for tension or position feedback signals, and the channel is:

1 to 3: From analog channels AI1 to AI3;

4: From pulse input of X7/DI terminals;

Note: P1.05 (Close loop control main feedback mode) is automatically updated, and manual setting is not needed.

2.1.4 Second group of PID regulation parameters

H1.10	Auxiliary proportional gain Kp	0.000 to 10.000
H1.11	Auxiliary integral gain Ki	0.000 to 10.000
H1.12	Auxiliary differential gain Kd	0.000 to 10.000

In close loop tension control mode, they are the complement parameters for PID close loop gain regulation, and the regulation transition mode is set by the ones place of H1.07.

H1.13	Filtering time of differential value	0 to 1024s

In close loop tension control mode, the parameter is used to regulate the quick jittering of pendulum rod. Too long filtering time will slow the response to the reeling-in / out driving operation, and will cause oscillation of pendulum rod.

H1.14	PID result limit ratio	0 to 100.0%

Set the PID regulation limit value, in speed PID mode, limit according to the limit mode set by the tens place of H1.07; In torque PID mode, limit according to the limit mode set by the thousands place of H1.07.

H1.15	PID integral limit ratio	0 to 100.0%

Set the limit of PID integral item, when the setting is 0, there is no limit. When the setting is non-zero, in speed PID mode, limit according to the limit mode set by the tens place of H1.07; In torque PID mode, limit according to the limit mode set by the thousands place of H1.07.

H1.16	Offset frequency for PID result limit	00.00 to 50.00

In speed PID mode: The tens place of H1.07 is 2, and the PID result is valid when the limit is according

to main reference.

Max frequency of PID regulation＝Main reference frequency× H1.14 + H1.16

For example: The tens place of H1.07 is 2, the main reference frequency is 20.00Hz, H1.14=50.0%, H1.16=1.00Hz, then PID limit value＝11.00Hz.

H1.17	Selection of balance transition mode	00 to 21

Selection of balance transition mode	
Ones place	Transition between the upper and lower positions 0: Disabled;1: Enabled
Tens place	Transition voltage in middle positions 0: Disabled;1: Separation of integral item; 2: Proportional item for acceleration

H1.18	Transition adjustment for balance in upper position	0 to 65535
H1.19	Transition adjustment for balance in lower position	0 to 65535

The parameters are used to adjust the speed of transition between the upper and lower positions, when the ones place of H1.17 is 1, they are enabled to reduce the system oscillation when the PID target value changes. But when the transition value is too big, the system regulation will be lagged.

Balance transition of upper position: When the PID target value is less than the previous PID target value, the previous PID target value will be transited to the current target value;

Balance transition of lower position: When the PID target value is greater than the previous PID target value, the previous PID target value will be transited to the current target value.

H1.20	Transition voltage in middle positions	0.00 to 10.00V

The setting should not be less than 10% of target value.

Determine the transition mode according to the tens place of H1.17:

0: Disabled;

1: PID regulation result related to reel diameter, automatically adjust PID result according to the change of the current reel diameter;

2: Proportional item for acceleration, used to suppress the overshoot outside of (balance position±H1.20) and improve the system response speed in the meantime.

H1.21	Max deviation value for stopping updating of target reel	0.00 to 10.00V

When the difference between the tension or position feedback value and the target value is greater than H1.21, the updating of the target reel diameter stops.

H1.22	PID regulation in speed mode	0 to 1

0: PID regulation result not related to reel diameter;

1: PID regulation result related to reel diameter, and the PID result is regulated automatically according to the change of current reel diameter.

H1.23	Whether PID is disabled at non-constant speed	0 to 1

0: Enabled;

1: Disabled, used to avoid the fluctuation caused by PID regulation in accelerating process, can be used in the scenario when the feedback signal is the current line speed.

H1.24	Line speed feedback input channel	1 to 4

Enabled only when H0.00=5 (Constant line speed mode), used to feedback the current actual line speed, and 0 to 10V/0 to 20mA corresponds to 0 to max line speed set in H0.31.

1 to 3: Input from analog channels AI1 to AI3;

4: Input from pulse input of X7/DI terminals;

2.1.5 Thread broken detection and braking to stop

H1.25	Thread broken detection enabled	0 to 4
H1.26	Thread broken detection voltage	0.00 to 10.00V
H1.27	Thread broken detection time	6553.5s
H1.28	Stopping mode upon thread broken	00 to 13

In speed mode, judge whether thread broken has happened according to the position of the pendulum rod. When the feedback voltage is lower than thread broken detection voltage of H1.26, and this voltage has been kept for thread broken detection time of H1.27, the inverter will automatically execute the stopping command upon thread broken.

H1.25: Thread broken detection enabled, the thread broken detection channel is set according to the pendulum feedback channel.

0: Thread broken detection disabled;

1 to 3: Reference is from analog channels AI1 to AI3;

4: Reference is from pulse input of X7/DI terminals;

The stopping mode upon thread broken is determined by the ones place and tens place of H1.28.

Stopping mode upon thread broken	
Ones place	Stopping mode definition 0: Deceleration to stop;1: Coast to stop; 2: Deceleration + DC injection braking;3: Stopping at max speed;
Tens place	Alarm mode definition 0: No alarm and stop according to the mode defined by ones place; 1: Alarm and forcing the coast-to-stop;

H1.29	Braking frequency for stopping	0.0 to 300.0Hz
H1.30	Braking time for stopping	0.0 to 600.0s

The above two functions are used together with the multi function terminal 34. When there is a stopping command and when the running frequency is less than the braking frequency for stopping of H1.29, the terminal outputs the braking signal and the signal is automatically cancelled after the braking time for stopping of H1.30.

2.1.6 Tension compensation part

H1.31	System inertia compensation coefficient	0.0 to 200.0

Compensate the fixed rotating inertia that is not related to the system and reel diameter. Increase the

coefficient if the tension on the material is decreased when the empty reel starts up. Generally, when the reeling-in/out shaft is light, the coefficient can be set to 5% to 10%; For heavy shaft, the coefficient can be set to 15% to 30%.

Reeling-in mode:

During acceleration: Reference torque＝Reference torque before compensation + compensated value; During deceleration: Reference torque＝Reference torque before compensation-compensated value;

Reeling-out mode:

During acceleration: Reference torque＝Reference torque before compensation - compensated value; During deceleration: Reference torque＝Reference torque before compensation + compensated value;

H1.32	Acceleration compensation coefficient for material inertia	0.0 to 200.0
H1.33	Deceleration compensation coefficient for material inertia	0.0 to 200.0

During acceleration / deceleration, automatically compensate for the material inertia change caused by the reel diameter change.

Reeling-in mode:

During acceleration: Reference torque＝Reference torque before compensation + compensated value for acceleration; During deceleration: Reference torque＝Reference torque before compensation - compensated value for deceleration;

Reeling-out mode:

During acceleration: Reference torque＝Reference torque before compensation - compensated value for acceleration; During deceleration: Reference torque＝Reference torque before compensation + compensated value for deceleration;

H1.34	Compensation value for high speed sliding friction	0.0 to 200.0
H1.35	Compensation mode for high speed sliding friction	0.0 to 200.0

Stopping mode upon thread broken	
Ones place	Compensation reference 0: Compensate based on frequency;1: Compensate based on line speed
Tens place	Compensation direction 0: Forward;1: Reverse

In torque mode, the resistance is inconsistent at high or low speed, so the constant friction compensation torque cannot result in constant tension, and at this time, you can set H1.34 and H1.35 to compensate.

Compensation value for high speed sliding friction of H1.34: When the reeling-in/out shaft is light, set H1.34 to 5% to 10%; For heavy shaft, set to 15% to 30%.

Compensation mode for high speed sliding friction:

Ones place: Compensation reference

0: Compensate based on frequency, compensate according to the current running frequency;

1: Compensate based on line speed, compensate according to the line speed;

Tens place: Compensation direction

0: Forward, during reeling-in: Reference torque＝Reference torque before compensation + compensated value; During reeling-out: Reference torque=Reference torque before compensation - compensated value;

1: Reverse, during reeling-in: Reference torque＝Reference torque before compensation - compensated value; During reeling-out: Reference torque=Reference torque before compensation + compensated value;

2.1.7 Auto reeling-out parameter

H1.36	Pre-driving speed gain	0.0 to 200.0%

When changing the reel during operation, in order to avoid big impact, the reeling-in shaft (reeling-out shaft) should be rotated in advance, and the rotating line speed should be consistent with the line speed of the material, this is called pre-driving function.

When the pre-driving terminal is enabled, the inverter will automatically calculate the frequency according to the detected line speed and reel diameter to match the line speed. This parameter can be used to adjust the line speed matching relationship, when the setting is less than 100.0%, the surface speed of pre-driving rod should be lower than the line speed of the material.

H1.37	Amplitude limiting mode for pre-driving torque	0 to 1

In pre-driving, select torque amplitude limiting mode and this mode shall be used with H1.38.

0: Limit amplitude according to rated torque;

1: Limit amplitude according to reference torque based on current tension and reel diameter.

H1.38	Pre-driving torque gain	0.0 to 200.0%

At H1.37=0, H1.38 performs 100% amplitude limiting with reference to rated torque;

At H1.37=1, H1.38 performs amplitude limiting with reference to tension reference torque.

H1.39	Reel diameter calculation delay after pre-driving ended	0.0 to 100.0s

After pre-driving is ended, calculate the reel diameter after the delay set in H1.39.

H1.40	PID calculation delay after pre-driving ended	0.0 to 100.0s

After pre-driving is ended, perform PID calculation after the delay set in H1.40.

2.1.8 Torque reeling-out parameters

H1.41	Reel diameter position when torque reeling-out changed	0.0 to 5000.0mm
H1.42	Torque position when torque reeling-out changed to speed	0.0 to 200.0%

When the current reel diameter is less than H1.41 or when the reference torque is less than H1.42, switch from torque mode to speed mode to perform reeling out.

H1.43	Driving torque limit in speed mode	0.0 to 200.0%
H1.44	Braking torque limit in speed mode	0.0 to 200.0%

After reeling-out in torque mode is changed to reeling-out in speed mode, the driving and braking torque limit in speed mode and the limited value is with reference to the 100.0% rated torque.

H1.45	Speed gain in speed mode	0.0 to 200.0%

After reeling-out in torque mode is changed to reeling-out in speed mode, adjust the speed gain. When the setting is less than 100.0%, the reeling-out speed is lower than the speed of the reeling-in shaft.

2.1.9 Front stage line speed offset

H2.00	Line speed gain	0.00 to 200.0%
H2.01	Line speed offset mode	0 to 2
H2.02	Line speed offset value	0.0 to 100.0%

For satisfy the production needs, the speed of the reeling-in rod should be faster than that of the driving rod, and this requirement can be satisfied by setting the function.

(Corrected line speed＝Line speed before correction × H2.00 +Line speed offset value)

H2.01 sets the offset mode and H2.02 sets the offset amount.

0: Offset according to max line speed, Line speed offset value＝H2.02×Max line speed;

1: According to Max frequency offset, Frequency offset＝H2.02 × Max running frequency;

2: The speed limit is the max running frequency, when the material is broken and uncontrolled spinning happens, detect automatically and stop the motor, and **the running signals should be disconnected and re-input.**

H2.07	Compensation for material inertia mode and tension taper	0000 to F115

Compensation for material inertia mode and tension taper mode	
Ones place	Compensation for material inertia 0 and 3: Quadratic curve; 1 and 4: Cubic curve; 2 and 5: Quartic curve;
Tens place	Whether tension taper is enabled at zero speed 0: Enabled;1: Disabled;
Hundreds place	Selection of taper curve mode 0: Direct line;1: Curve;
Thousands place	Filtering coefficient for tension reference (only in constant tension mode) 0~F, the bigger the value, the less the step change of tension, but response is slow, set according to system response requirement.

Select proper processing mode according to different conditions.

Hundreds place: Selection of taper curve mode

0: Direct line: Corrected tension＝Tension before correction×{1- tension taper×[(Current reel diameter-diameter of empty reel)/(diameter of full reel - diameter of empty reel)]};

1: Curve: Corrected tension＝Tension before correction×{1- tension taper×[1-(diameter of empty reel +H0.29)/(Current reel diameter+H0.29)]}。

2.2Tension Control Function Parameters (P Zone)

P5.00	Selection of terminal X1 input function	0 to 99
P5.01	Selection of terminal X2 input function	0 to 99
P5.02	Selection of terminal X3 input function	0 to 99
P5.03	Selection of terminal X4 input function	0 to 99
P5.04	Selection of terminal X5 input function	0 to 99
P5.05	Selection of terminal X6 input function	0 to 99
P5.06	Selection of terminal X7 input function	0 to 99

The following only lists the new and modified items and the functions that have not been listed are the same with those of V6/V5−H, please refer to V6/V5−H user manual for the functions.

32: Selection of full reel diameter setting 1

Select the empty reel diameter as the setting of H0.40 through terminals, in the meantime, the current reel diameter of H0.46 is automatically set to the value of H0.40.

33: Selection of full reel diameter setting 2

Select the empty reel diameter as the setting of H0.42 through terminals, in the meantime, the current reel diameter of H0.46 is automatically set to the value of H0.42.

34: Selection of full reel diameter setting 3

Select the empty reel diameter as the setting of H0.44 through terminals, in the meantime, the current reel diameter of H0.46 is automatically set to the value of H0.44.

35: Selection of empty reel diameter setting 1

Select the empty reel diameter as the setting of H0.41 through terminals, in the meantime, the current reel diameter of H0.46 is automatically set to the value of H0.41.

36: Selection of empty reel diameter setting 2

Select the empty reel diameter as the setting of H0.43 through terminals, in the meantime, the current reel diameter of H0.46 is automatically set to the value of H0.43.

37: Selection of empty reel diameter setting 3

Select the empty reel diameter as the setting of H0.45 through terminals, in the meantime, the current reel diameter of H0.46 is automatically set to the value of H0.45.

38: Stopping reel diameter calculation

When this terminal is enabled, the inverter does not refresh reel diameter and the current reel diameter of H0.46 keeps unchanged.

39: Forced thread broken detection disabled

This terminal is used with H1.25 to H1.28 function codes, when it is enabled, the thread broken detection will be disabled and thread broken detection will not be conducted.

41: Switch between reeling-in terminal and reeling-out terminal

When this terminal is enabled, if the reeling-in/out mode is enabled , that is, H0.01＝0 (set to reeling-in), the inverter will implement reeling-out; If the reeling-in/out mode is enabled , that is, H0.01＝1(set to reeling-out), the inverter will implement reeling-in.

Note: In speed PID mode, when this terminal is enabled, switch between reeling-in and reeling-out, and the running direction is changed to reverse direction and the PID forward/reverse will also be changed.

42: Pre-driving enabled

When this terminal is enabled, the inverter works in pre-driving mode, and the terminal is used with the auto reeling-out parameter.

43: Tension control disabled

When this terminal is enabled, tension control mode is disabled, that is, set H0.00=0.

P7.03	Selection of terminal AO1 output function	48 to 71
P7.04	Selection of terminal AO2 output function	48 to 71

65: Reel diameter output

0 to full reel diameter corresponds to 0 to 10V or 0 to 20mA.

Appendix Table: Modification of Communication Protocol

1 Corresponded Register Addresses of Parameters Displayed on Operation Panel

Register Address	Parameter Name	Precision	P2.02 Option
0x8120	Reference frequency (Hz)	0.01Hz	0
0x8122	Bus voltage (V)	1V	1
0x8124	AI1(V)	0.01V	2
0x8126	AI2(V)	0.01V	3
0x8128	AI3(V)	0.01V	4
0x812A	DI(%)	0.1%	5
0x812C	Tension setting (N)	1N	6
0x812E	Motor speed(vector)	1Rpm	7
0x8130	Process close loop	0.1%	8
0x8132	Process close loop	0.1%	9
0x8134	Reference torque(%)	0.1%	A
0x8136	Running frequency(Hz)	0.01Hz	B
0x8138	Output current(A)	0.1A	C
0x813A	Output torque (%)	0.1%	D
0x813C	Reel diameter(mm)	0.1mm	E
0x813E	Line speed(m/min)	0.1m/min	F

2 Relationship between Inverter Function code and Register Address in Communication Protocol

Function code	Address range	Function code	Address range	Function code	Address range
P0	00xx	P9	09xx	H0	12xx
P1	01xx	PA	0Axx	H1	13xx
P2	02xx	Pb	0Bxx	H2	14xx
P3	03xx	PC	0Cxx	A0	15xx
P4	04xx	Pd	0Dxx	C0	16xx
P5	05xx	PE	0Exx	U0	17xx
P6	06xx	d0	0Fxx	U1	18xx
P7	07xx	d1	10xx	U2	19xx
P8	08xx	d2	11xx	U3	1Axx

Note: xx represents the index of the function codes in group, and the above table shows the hex data, and should be converted into decimal in text display. For some function codes, the address should be added with 1, please note this. For example, H0.11 corresponds to 120B(hex) address, if eview text display is used, the address should be: 4619+1＝4620.

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