HEDY

HD710 User Manual

（0.4kW~11kW）

（V1.5）

Foreword

Thank you for using HD710 AC drives made by Guangzhou HEDY Intelligent Equipment Co., Ltd.

This manual introduces installation, setup and commissioning of HD710 Drive, also troubleshoot and maintenance.

We will update the manual to improve it termly, and the contents in this document are subject to change without notice.

Please read the information carefully, and keep the manual, please make sure that the end customer has the manual.

Contents

Warnings, Cautions and Notes

Warning

A **Warning** contains information, which is essential for avoiding a safety hazard.

Caution

A **Caution** contains information, which is necessary for avoiding a risk of damage to the product or other equipment.

NOTE

A **Note** contains information, which helps to ensure correct operation of the product.

 **WARNING**
• The HD710 AC drive should ONLY be installed by aqualified electrician. • Install the drive on the inflaming material like metal sheet in case a fire. • Do not install the Drive in the explosion air environment. • Even when the motor is stopped, dangerous voltage is present at thePower Circuit terminals L1, L2, L3 , U, V, W ,anddepending on the framesize, DC+ and DC−, or BR. • Dangerous voltage is present when input power is connected. Afterdisconnecting the supply, wait at least 10 minutes (to let the intermediate circuitcapacitors discharge) before removing the cover. • PE terminals must be earthedvery well.

 **CAUTION**
• The HD710 is not a field repairable unit. Never attempt to repair amalfunctioning unit; contact the factory or your local Authorized Service Center forreplacement. • The HD710 will start up automatically after an input voltage interruption if the external run command is on. • Prior to measurements on the motor or the motor cable, disconnect the motor cable from the Variable Speed Drive. • Before connecting the Variable Speed Drive to mains, make sure that the HD710 front cover is closed.

1 Technicalspecification

1.1 Model reference

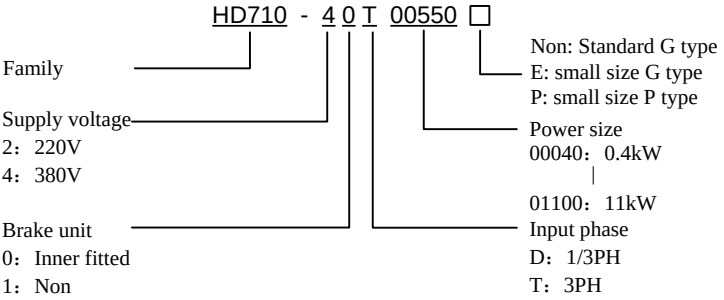


Figure1-1 HD710 Model description

1.2 Ratinglabel

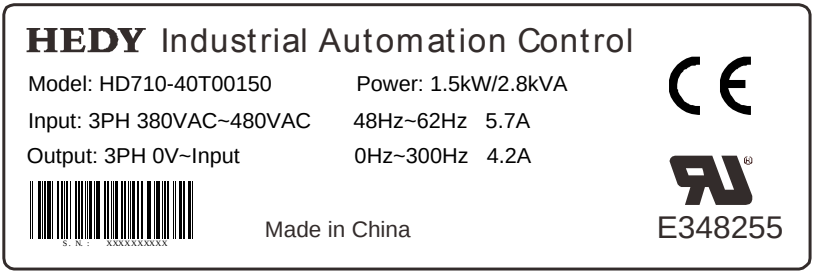


Figure1-2 HD710 Rating label

1.3 Power size

Power size of HD710 is referred to the standard 4 poles induction motor at rated voltage.

E: Heavy duty

P: Normal duty

Overload of E type and standard type: 150% rated output current, 1 minute

Overload of P type: 110% rated output current, 1 minute

Table 1-1 220V rating data

Power supply: 220V, 50Hz, single/three phase					
Model Name	**Drive Power Size (kVA)**	**Rated Input Current(A)**	**Rated Output Current(A)**	**MotorPower (kW)**	**Size**
		1/3PH			
HD710-20D00040	1.1	7.1/4	2.8	0.4	A
HD710-20D00075	1.9	12.8/7.1	5	0.75	A
HD710-20D00150	3.0	20.5/11.3	8	1.5	A
HD710-20D00220	4.2	24/14.5	11	2.2	B
HD710-20D00400	6.7	30.4/16.5	17.6	4	C

Table 1-2 380V rating data

Power supply: 380V, 50Hz, three phase					
Model Name	**Drive Power Size(kVA)**	**Rated Input Current(A)**	**Rated Output Current(A)**	**MotorPower(kW)**	**Size**
HD710-40T00075	1.7	3.6	2.5	0.75	A
HD710-40T00150	2.8	5.7	4.2	1.5	A
HD710-40T00220E	3.4	6.1	5.2	2.2	A
HD710-40T00220	3.8	8.3	5.8	2.2	B
HD710-40T00400	6.3	13.2	9.5	3.7	B
HD710-40T00550E	8.6	14.3	13	5.5	B
HD710-40T00550P	8.6	14.3	13	5.5	B
HD710-40T00550	8.6	12.4	13	5.5	C
HD710-40T00750	11	16.1	17	7.5	C
HD710-40T01100P	15.2	21	23	11	C

1.4 General technical data

Table 1-3 General technical specifications

Input Power	**Input Voltage U_{in}**	200V(−10%)～240V(+10%)1/3PH 380V(−10%)～480V(+10%) 3PH
	Input Frequency	48Hz～62Hz
	Maximum Supply Imbalance	⩽3%
Power Output	**Output Voltage**	0V～U_{in}
	Output Frequency	0Hz～300Hz
Main PerformanceFunction	**Voltage Control**	V/F, Open loop Vector Control
	Switching Frequency	1kHz～15kHz
	Adjust Speedrange	Open loop vector -1:100, V/F mode -1:50
	Start Torque	0.5Hz: 100% rated torque, 1Hz: 150% rated torque
	Torque Accuracy	7%
	Reference Resolution	Digit- 0.01Hz, Analogue- 0.1%×Max. frequency
	Accel.& Decel.Rate	0.1s～3600s
	Voltage Boost	0.1%～30.0% %
	Overload	E type and standard type: 150% rated output current, 1 minute Ptype: 110% rated output current, 1 minute
	V/F	4 types: V/F(user can program) and ramp (2.0 power, 1.7 power, 1.2 power)
	DC Braking	Injection frequency: 0.0%～100.0% Max. frequency Injection current: 0.0%～300.0% rated current Injection time: 0.00s～60.00s
	Dynamic Brake	Brake rate: 0.0%～100.0%
	Jog	Jog frequency: 0.00Hz～50.00Hz Jog acceleration and deceleration rate: 0.1s～60.0s Jog interval time: 0.1s～60.0s
	Preset	4 speeds(decided by control terminals)
	AVR	Maintain the rated output voltage when the input power supply voltagechanged.
Control Terminal	**Reference Source**	Digit: Display panel, UP/DOWN, comms.
		Analogue: AI1: 0V～10V, 0(4) mA～20mA

Control Terminal	**Operating Mode**	With optional display panel, Control terminal, Serial comms.
	Digit Input Terminals	DI1～DI3: Programmable terminals
	DigitalOutput Terminals	DO1: Programmable terminal, Max. output current:50mA
	Analogue Output	AO1: programmable terminal, 0V～10V
	Status Relay	1 programmable relay, contactor data: AC250V/2A（COSφ =1） AC250V/1A（COSφ =0.4） DC30V/1A
Comms.	**Connector**	RJ-45 Port
	Protocol	Modbus-RTU
Environment	**Altitude**	1000m rated 1000m～3000m,1% rated current derating per 100m
	Operating Temperature	-10°C～+40℃
	Max. Humidity	≤90%RH, no-condensing
	Vibration	≤5.9m/s^2（0.6g）
	Storage Temperature	-40°C～+70°C
	Running Environment	Indoor, non-flammable, no corrosive gasses,no contamination with electrically conductive material,avoid dust which may restrict the fan
Option Module		LED Display panel, HDOM-232, HDOM-USB, Display panel pallet, HDSOFT (PCTools), etc.
Protection		Output shortage, over current, over load, over voltage, under Voltage, Phase loosing, over heat (heatsink and junction), external trip, etc.
Efficiency		1.5kW and below: ≥89% 2.2kW～11kW：≥93%
Mounting Method		Surface mounting, through hole
Enclosure		IP20, IP21 (by adding option device)
Cooling Method		220V/0.4kWmodel is nature cool, others are forced air cool

2 Installation and cabling

2.1 Dimension

2.1.1 Parts of drive

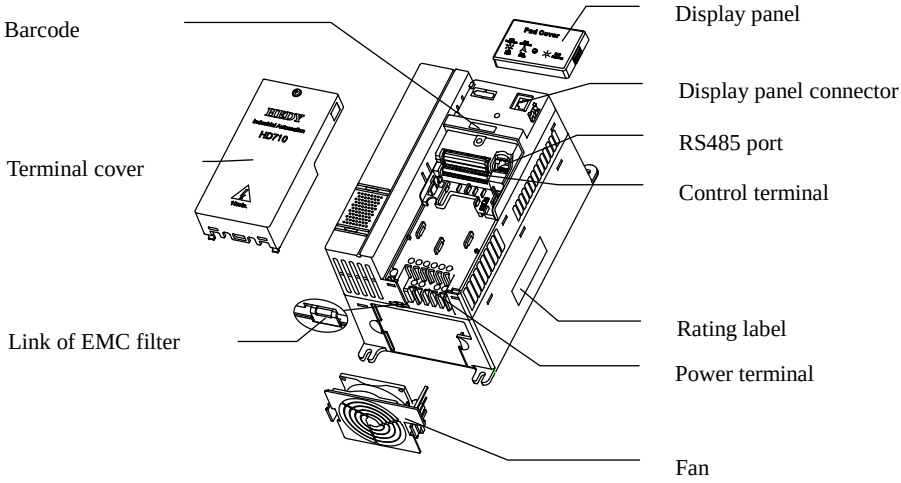


Figure 2-1 Parts of HD710 drive

2.1.2 Diagram of mounting

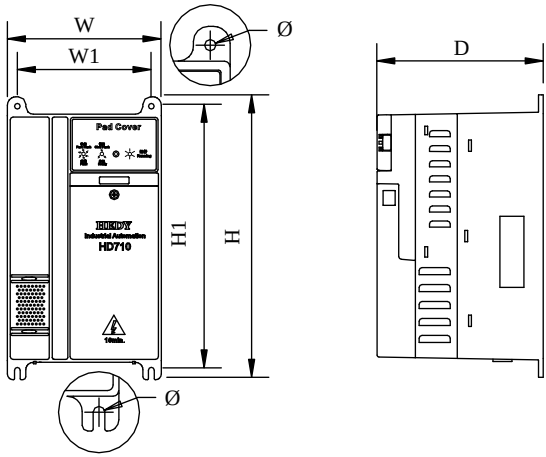


Figure 2-2 Mechanical dimension and mounting

Table 2-1 Mechanical dimension

Size	Model Name	W (mm)	W1 (mm)	H (mm)	H1 (mm)	D (mm)	Mounting HoleØ (mm)	Weight (kg)
A	HD710-20D00040	97.4	80	202.4	190	148.8	5	1.4
	HD710-20D00075							
	HD710-20D00150							
	HD710-40T00075							
	HD710-40T00150							
	HD710-40T00220E							
B	HD710-20D00220	142.4	123.5	220.4	208	155.5	5	2.2
	HD710-40T00220							
	HD710-40T00400							
	HD710-40T00550E							
	HD710-40T00550P							
C	HD710-20D00400	163.1	142	300	280	176.8	6	4.7
	HD710-40T00550							
	HD710-40T00750							
	HD710-40T01100P							

2.1.3 Display panel pallet

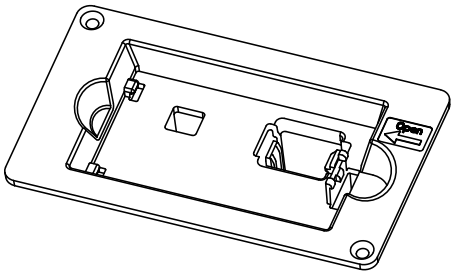


Figure 2-3 Outlook of display panel pallet

Diagram of pallet dimension and mounting

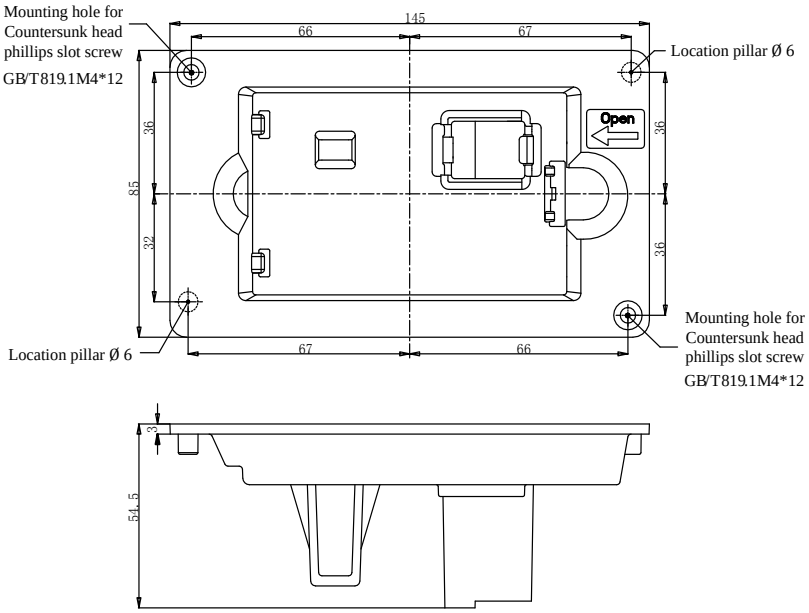


Figure2-4 Outlook dimension of pallet

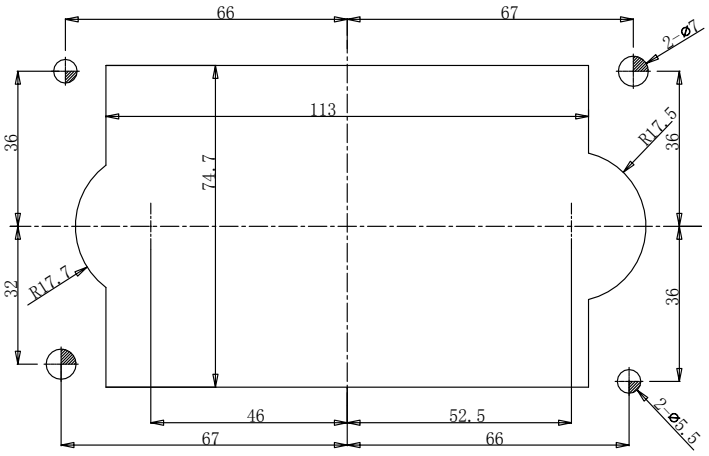


Figure 2-5 Pallet mounting dimension

2.1.4 Simple display panel pallet

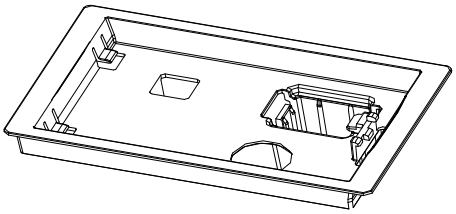


Figure 2-6 Outlook of Simple display panel pallet

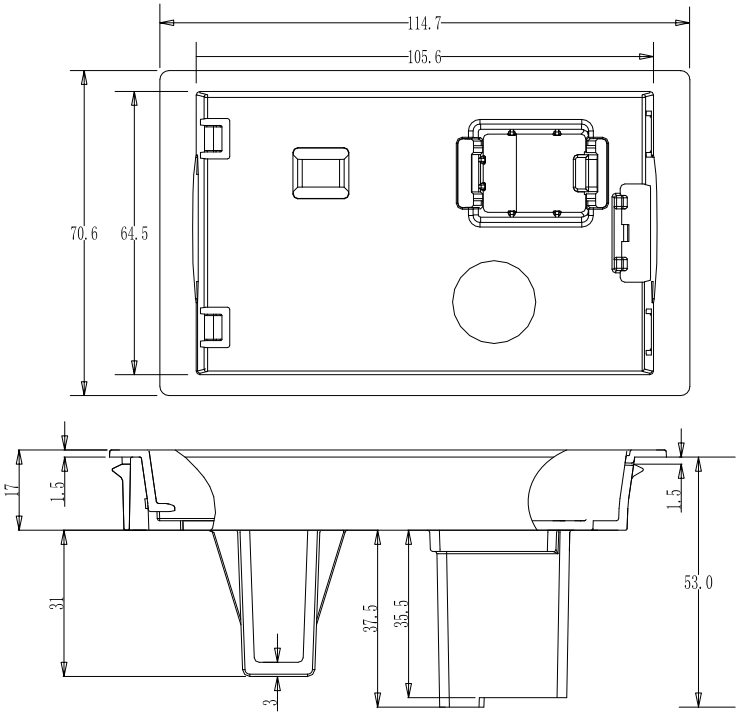


Figure 2-7 Outlook dimension of simple display panel pallet

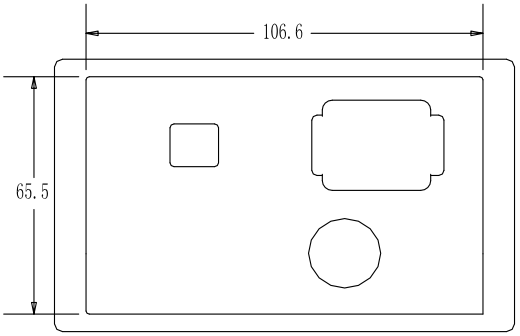


Figure 2-8 Simple display panel pallet mounting dimension

2.2 Mechanical installation

2.2.1 Drive installation diagram

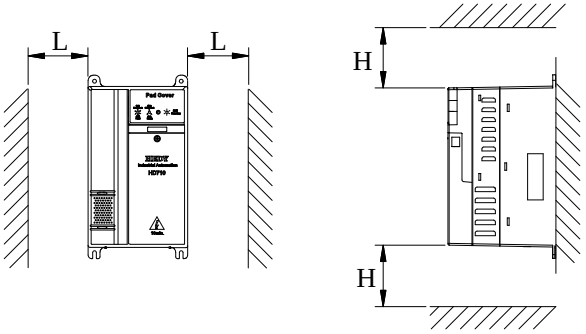


Figure 2-9 Single drive installation

Recommending: L≥50mm，H≥100mm

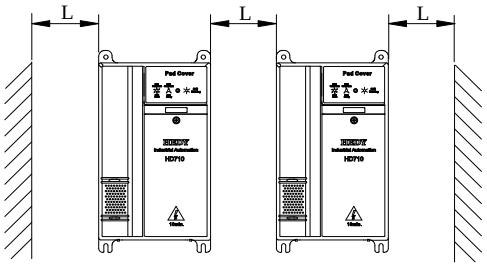


Figure 2-10 Multi drives installation

Recommending: L≥50mm

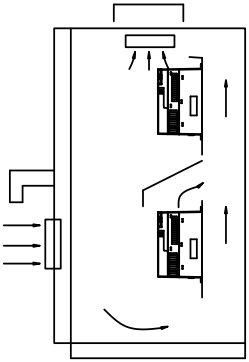


Figure 2-11 Multi drives vertical installation

2.2.2 Fit and removethe terminal cover

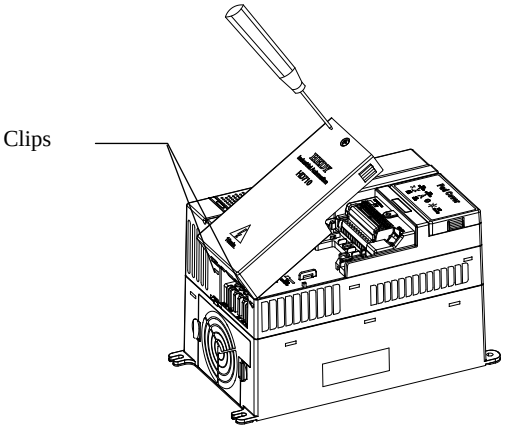


Figure 2-12 fit and remove the terminal cover

Remove: twist the screw out, loose the clip then take off the cover.

Fit: by a suitable angle, put the clips into the slots on the middle cover, push the cover on, tighten the screw M4×10 (Torque 1N m).

2.2.3 On and off the display panel

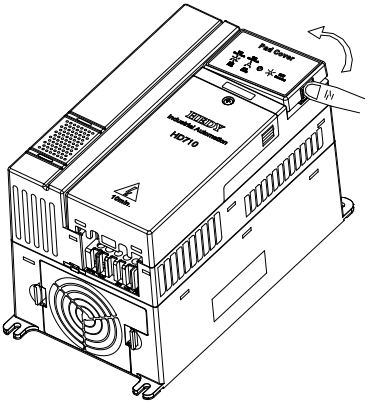


Figure 2-13 Diagram of the display panel fitting

Off: push the spring clip, and then pull up the display panel.

On: fit the left two clips (correct angle) into the slots on the control pod, and then push down the display panel.

2.3 Electric installation

2.3.1 Power terminals

L1	**L2**	**L3/N**	**U**	**V**	**W**
PE	**+DC**	**+DC1**	**BR**	**−DC**	**PE**

Figure 2-14 Size A, B power terminals

L1	**L2**	**L3**	**U**	**V**	**W**
PE	**+DC**		**BR**	**−DC**	**PE**

Figure 2-15 Size C power terminals

Table 2-2 Power terminal of Size A, B, C

Terminals	Function
L1, L2, L3/N	AC power supply.For single phase supply, suggest to use L1, L3/N
+DC,+DC1	For DC choke, linked by busbar factory set
BR	Brake resistor, another end is +DC
−DC	Minus DC bus
U, V, W	Output terminals(Motor terminals)
PE	Protective earth terminal

2.3.2 Power connections

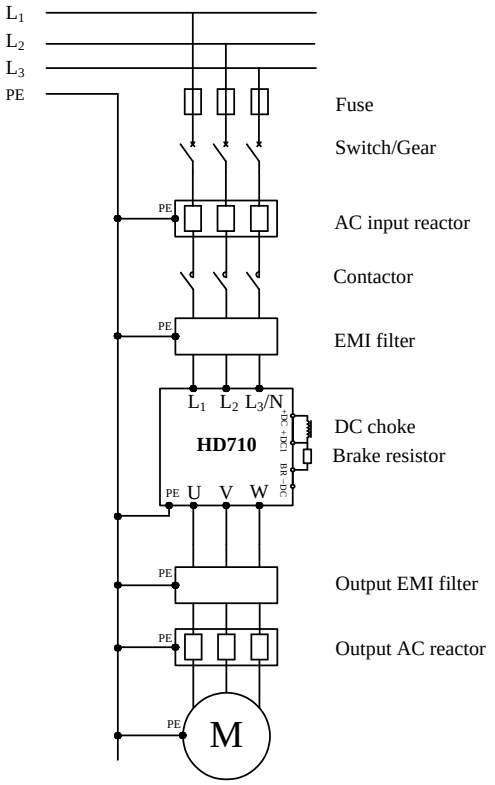


Figure 2-16 Typical power connections

Note:

- The selection of fuse and switch refers to table 2-3.
- Do not suggest using the power contactor to control the RUN/STOP of the drive.

- In default carrier frequency, the maximum motor cable length is 100 meters.When the motor cable is longer than 100m, recommend to use output reactor.
- For safety, Drive and Motor must be earthed, and the earth contacting resistance must be less than 10Ω. The earthing conductor minimum cross-sectional area should be the same as phase conductor the cross-sectional area.

Table 2-3 Recommending switch, fuse, power cable and control cable

Model Name	Input				Power				Control Cable (mm^2)
	Switch (A)		Fuse (A)		Input Current (A)	Supply Cable (mm^2)		Motor Cable (mm^2)	
	1PH	3PH	1PH	3PH	1/3PH	1PH	3PH	3PH	
HD710-20D00040	16	10	10	6	7.1/4	1.0	1.0	1.0	≥0.5
HD710-20D00075	25	25	16	16	12.8/7.1	1.5	1.0	1.0	≥0.5
HD710-20D00150	32	25	20	16	20.5/11.3	2.5	1.5	1.0	≥0.5
HD710-20D00220	50	32	32	20	24/14.5	4.0	2.5	1.5	≥0.5
HD710-20D00400	32		20		30.4/16.5	2.5		2.5	≥0.5
HD710-40T00075	10		6		3.6	1.0		1.0	≥0.5
HD710-40T00150	16		10		5.7	1.0		1.0	≥0.5
HD710-40T00220E	25		16		8.3	1.5		1.0	≥0.5
HD710-40T00220	25		16		8.3	1.5		1.0	≥0.5
HD710-40T00400	32		20		13.2	2.5		1.5	≥0.5
HD710-40T00550E	32		20		14.3	2.5		2.5	≥0.5
HD710-40T00550P	32		20		14.3	2.5		2.5	≥0.5
HD710-40T00550	25		16		12.4	2.5		2.5	≥0.5
HD710-40T00750	32		20		16.1	2.5		2.5	≥0.5
HD710-40T01100P	40		25		21	4.0		4.0	≥0.5

2.3.3 Typical cabling

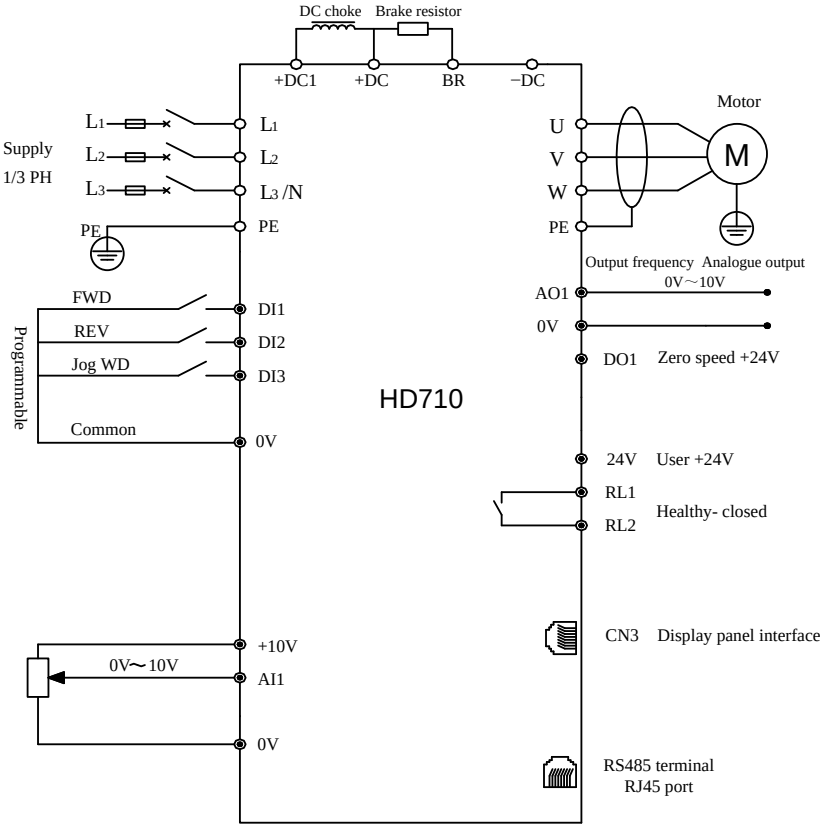


Figure 2-17 Typical cabling

Note:

- All the programmable control terminal functions are factory default set.
- For control wire, recommend using unshielded twisted pair, shielded cable, or shielded twisted pair.
- 5.5kW～11kW models (including 220V/4kW), inner DC Choke is fitted.

2.3.4 Control terminals& cabling

RL1	RL2	0V	AI1	10V	AO1	DO1	24V	0V	DI1	DI2	DI3

Figure 2-18 Control terminal diagram

Table 2-4 Control terminal &Comms.Port

Type	Terminal Name	Function	Tech. Spec.
Serial Comms.	RS485	RJ45 Port	Two lines, Modbus-RTU protocol
Digital Input	DI1～DI3	Programmable digital input terminals	The common can be 0V or 24V by setting the P04.10 (default is 0V) Input resistance: 10 kΩ High, low logic threshold:10V±1V Sample time: 1ms
Digital output	DO1	Programmable digital output terminal1	Output: 24V/0V Max. output current: 50mA Updating rate: 20ms
Analogue Input & Output	AI1	Programmable Analogue input1	0V～10V Input resistance:17kΩ 0(4)mA～20mA Load resistance:188Ω Min. potentiometer resistance: 0.5kΩ Resolution: 0.1% Accuracy: 2% Sampling period: 5ms
	AO1	Programmable Analogue output	0V～10V Max. output current: 5mA Resolution: 0.4% Accuracy:±5% Updating rate: 5ms
Rail supply & Relay	10V	Analogue reference rail	Accuracy: 2% Max. output current: 20mA
	24V	User supply	Accuracy: ±15% Max. output current: 100mA
	0V	Common	Common reference point for control signal

Type	Terminal Name	Function	Tech. Spec.
Rail supply & Relay	RL1, RL2	Programmable Relay1 output contactor Default: Relay1is closed when powered and healthy.	Type: form A (normal open) Updating rate: 5ms Contactor rating: 250VAC/2A(cosφ=1) 250VAC/1A(cosφ=0.4) 30VDC/1A

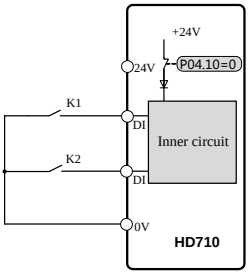
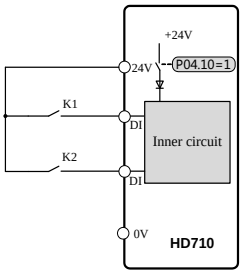
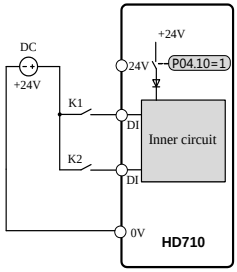
■ Digital input common

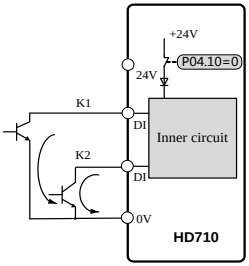
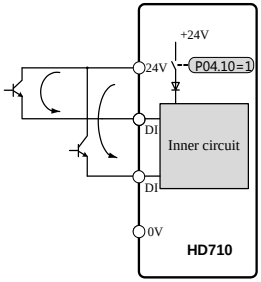
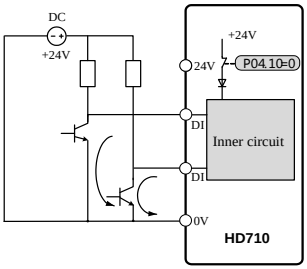
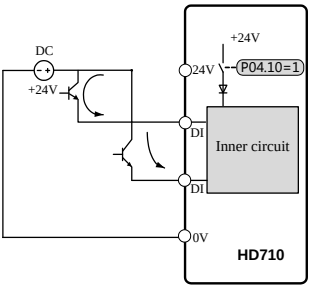
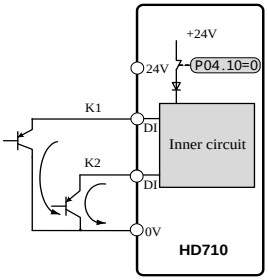
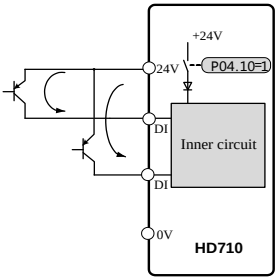
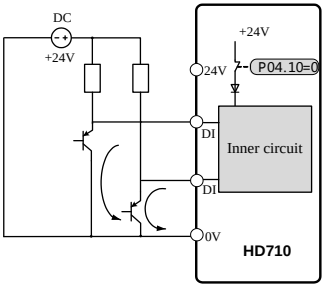
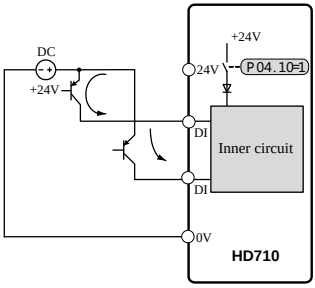
There are three programmable digital input terminals.

The common of DI could be programmed as 0V or 24V, the default is 0V. The parameter P04.10 can control the selection. When P04.10=0, common is 0V, P04.10=1, common is 24V.

Different types connection of DI & Common as showed in table 2-5.

Table 2-5 HD710 Digital input base function list

P04.10 / Connection		P04.10=0(Source)	P04.10=1 (Sink)
Switch type	By inner 24V		
	By outer supply	–	

Connection \ P04.10		P04.10=0 (Source)	P04.10=1 (Sink)
OC (NPN)	By inner 24V		
	By Outer supply		
OC (PNP)	By inner 24V		
	By Outer supply		

Note: When outer supply is used, the range is11V to 30V.

- Digital output

  There is 1 digital output terminal, OC type (24V output). **When use the DO to drive the rail winding, please take care the polarity of the rail winding of the relay, and use the snubber circuit by the winding.**

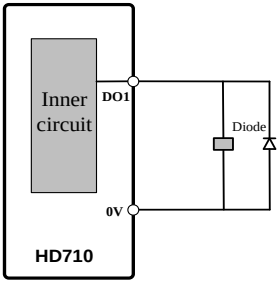


Figure 2-19 Digital output connection

- Analogue input

  HD710 drive has one Analogue input channel.

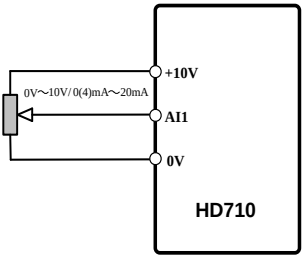


Figure 2-20 Analogue input connection

- Analogue output

  Output is voltage (0V～10V), Max output current is 5mA.

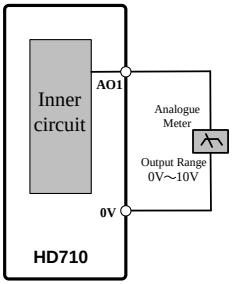


Figure 2-21 Analogue output

2.3.5 Brake resistor

The actual resistance on the site application is decided by the motor power, system inertia, decelerating rate, etc.Users can choose it according to the actual situation.

Table 2-6 Brake resistor draft rating

Spec. / Model	Min.resistance (Ω)	Max. brake current (A)	Peak power (kW)	60s average power (kW)
HD710-20D00040	41	10	4.15	1.9
HD710-20D00075	41	10	4.15	1.9
HD710-20D00150	41	10	4.15	1.9
HD710-40T00075	120	7	5.67	2.67
HD710-40T00150	120	7	5.67	2.67
HD710-20D00220	20	21	8.48	4
HD710-40T00220E	120	7	5.67	2.67
HD710-40T00220	65	13	10.4	4.9
HD710-40T00400	50	17	13.5	6.4
HD710-20D00400	12	35	14.3	6.7
HD710-40T00550E	24	35	28.7	13.5
HD710-40T00550P	50	17	13.5	6.4
HD710-40T00550	24	35	28.7	13.5
HD710-40T00750	24	35	28.7	13.5
HD710-40T01100P	24	35	28.7	13.5

2.3.6 EMC guide

EMC management suggestion:

- Immunity

  360-degree ground clamps with the screen of the cable; avoid"Pigtail" ground fitting. Control cable and power cable should be layoutin the independent metal grooves; the earth conductor in the motor cable must be connected directly to the earth terminal of the drive and the motor. Recommend to use the shielded motor cable.

- Cable clearance

  Do not place control cable in a zone extending 300mm around the drive and power cables.

2.3.7 EMC filter

- Optional RFI filter
  - Place the RFI filter close to the drive as possible, and the cable between the filter and drive is shorterand better.
  - The enclosure of the filter must be connected with the drive earth terminal.

- Inner EMC filter

The drive leakage current is different with the Inner EMC filter fitted or not.

Table 2-7 HD710 ground leakage current data

Model	SizeA		SizeB		SizeC	
	200V	400V	200V	400V	200V	400V
With inner EMC filter (mA)	10	9	11	7	8.0	18.0
Without inner EMC filter (mA)	0.1	0.1	0.2	0.1	0.0	0.3

Note:

- The test condition of the Table 2-7 is no motor load.
- When a ground leakage protecting contactor is used for front power supply, the internal EMC filter should be removed.

- Remove the inner EMC filter

There is a metal link between the ground and EMC filter as show in the below figures.

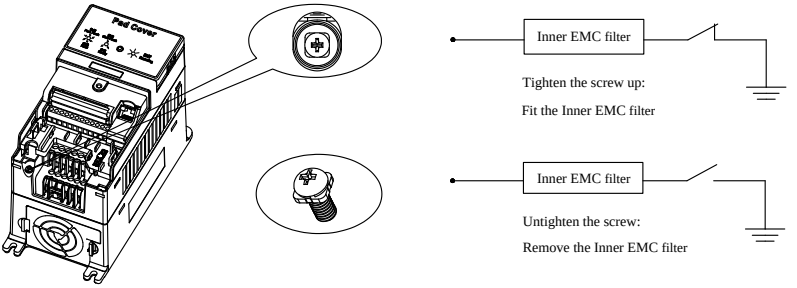


Figure 2-22 Fit and remove the inner EMC filter (Size A)

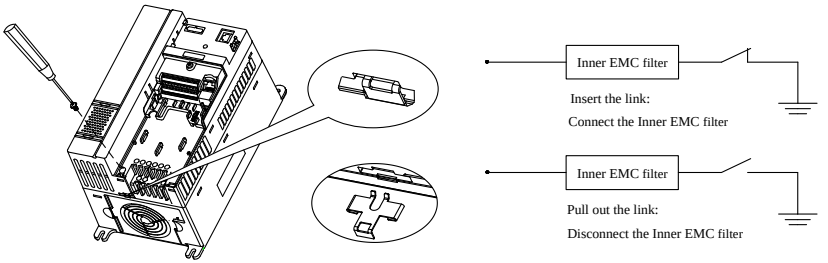


Figure 2-23 Fit and remove the inner EMC filter (Size B & C)

Note: After remove the link of EMC filter, please keep the link in case to fit the EMC filter again.

3 Operation & Display

3.1 Display panel

The HD710 drive can use two kinds of display panel: status display panel and LED display panel.

Status display panel(built-in)

LED display panel (Optional module)

Figure 3-1 Operation panels

3.1.1 Status display panel

Status display panel is standard configuration of HD710 series drive. In some application, with the default function parameters setting and status display panel, it is fit for requirement. Default parameters setting as Table3-1 shown:

Table 3-1 Terminal default function with status display panel

Input/Output Terminal	Function Code	Default
DI1	P04.05	0, run forward
DI2	P04.06	1, run reverse
DI3	P04.07	2, jog forward
AI1	P04.16	16, analogue reference frequency
AO1	P04.03	0, output frequency
DO1	P04.11	8, at zero speed
Relay1	P04.09	0, drive healthy

With status display panel, the following setting is necessary:

- Rated power, voltage, current, frequency, and speed of motor and drive are matched;
- Drive is in V/F control mode;
- AI1 is selected as source reference, which inputs by external potentiometer and other method;
- Drive is under terminal control mode;
- Accelerationrate is 5s and decelerationrate is 10s.

With status display panel, only the following operation is enabling:

- run forward (DI1), run reverse (DI2), jog forward (DI3) ;
- Adjust setting frequency(AI1) with potentiometer;
- Get output frequency with AO1;
- Get drive Zero Speed Status with DO1;
- Get drive status with Relay1.

With indication of status display panel, the following information is valid:

Table 3-2 Status light

Status light display mode	Description
Off	Drive is powered off
Slow flashing	Drive stops, and the flashing period is about 1s.
Fast flashing	Drive is tripped, and the flashing period is about 200ms.
On	Drive is running

Change parameters setting with LED display panel or HDSoft, if it is required.

3.1.2 LED display panel

Figure 3-2 LED display panel

There is a 5-digit LED display of 8 segment, 3 unit lights, and a RUN light on the HD710 Drive LED display panel. Itis showed as figure 3-2.

The LED display panel can show the drive status, parameters and value, trip, warning information, etc.The run light is on the top-right corner of the RUN switch.When the drive is active, the light is on.

Table 3-3 Unit light

Unit	Function	Colour
Hz	On: output frequency Flash: Reference frequency	Green
A	On: Output current	Green
V	On: Output voltageFlash: DC bus voltage	Green

3.1.3 Switch function

Table 3-4 Switch function

Switches	Function Description
	In different level display, press the key will return the last level. Long press on the switch, will display output frequency.
	Default function is jog.
	Enter next level of the display panel display.
	When it is display panel control mode (P01.03=2), pressing the key will make the drive run.
	• Stop, the key will stop the drive. • Reset the drive.
 	These keys are used to select parameters and edit their values. Under display panel mode, they are used to increase and decrease the speed of the motor.
	• Under Run/Stop mode, if press the key, the LED display panel will be reference frequency,output frequency, output current, output voltage, DC bus voltage in turn. • Under the edit of parameter value mode, pressing the key will change the bite of the value.

Note:If there is a conflict on the content of parameter, press the  key cannot enter to the next parameter.

3.1.4 Display panel operation

The display panel can control the running of the drive, or monitor the status of the drive, details as below:

- LED display

  LED default shows the output frequency when the drive stops.

  Press ≫ will cycle display:reference frequency,output frequency, output current, output voltage, DC bus voltage. Operation procedure is as figure 3-3A:

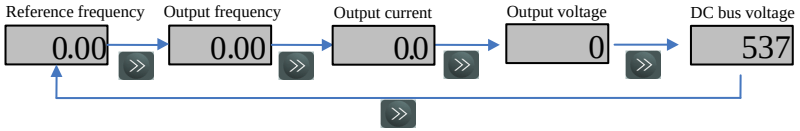


Figure 3-3 A Display switchover flow

  In running mode, normal display is output frequency.

  Press ≫ will cycle display:output frequency,reference frequency,output current, output voltage, DC bus voltage. Operation procedure is as figure 3-3B:

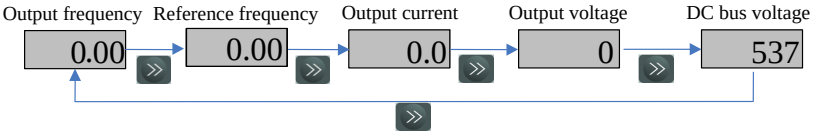


Figure 3-3 B Display switchover flow

- The view of the parameter and the edit of parameter value

  For HD710 family, there are three levels about parameter view and edit.

  Level1: menu group

  Level2: parameter

  Level3: parameter content

  Operation flow is described in figure 3-4:

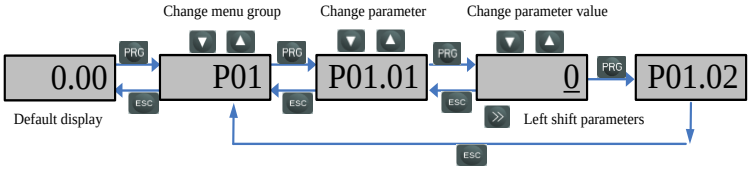


Figure 3-4 Parameter view and edit flow

Note:

- In level3, user can turn the display to level2 by pressing the PRG or ESC switch, the difference between them is:

  Press PRG will save the change of the value and return level2 (next parameter), press PRG again, will display the value of next parameter. PressESC will not save the change and return the level2 (current parameter), pressingthe ESC switchagain will return the level1 display.

- Only after pressing thePRG switch, the change can be active.
- If there is no bite of parameter value is flashing, means the value of the parameter cannot be changed. The reasons maybe:
  - ➢ It is an actual parameter, cannot be changed.
  - ➢ Drive is running, and the parameter cannot be changed at running.
- If more than one parameters are being set to same value(function), will happen following phenomena:
  - ➢ Display panel set up, the change will not be active after pressing PRG, and the display cannot enter the next parameter.
  - ➢ HDSoft set up, the drive will trip at F021.

■ Example of parameter editing

The example is to change the value of P02.01 from 0.00Hz to 45.50Hz, as the following figure 3-5. The number with underline is flashing.

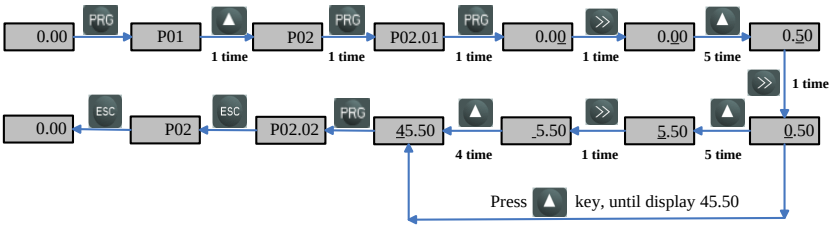


Figure 3-5 Editing parameter flow

- Autotune

  When do the motor auto-tune, make sure to set up the correct data of motor from the motor nameplate.

  Refer to the motor nameplate; enter in right value into following parameters:

  P01.12 motor rated voltage

  P01.13 motor rated current

  P01.15 motor rated frequency

  P01.16 motor rated speed (RPM)

  P01.19 motor power factor

  Then operate as below:

  Set P01.17=1, press PRG, press ESC to return the normal display.Press RUN and the drive will do the autotune.

  The display panelis shownas figure 3-6:

Figure 3-6 Autotune display

After finishing the autotune, the drive will stop.

3.2 Drive control

3.2.1 Control mode

Through P01.03, there are 3 control modes:

0: Terminal

1: Serial comms.

2: Display panel

3.2.2 Reference source

HD710 has five kinds of reference source, by setting P01.04, source channels are as following:

0: AI1

1: Preset

2: UP/DOWN

3: Serial communication

4: Display panel

3.3 Quickcommissioning

3.3.1 Terminal control

Terminal control is default control mode of HD710. As a result, LED display panel RUN and MF (default is jog) is invalid. Terminal connection is as Fig. 3-7 shown:

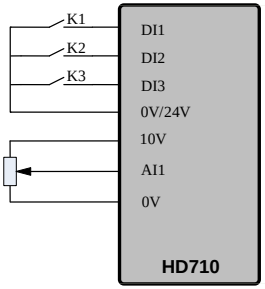


Figure 3-7 Two-wire (default) cabling

- Close the switch K1, the drive is running forward and the run light is on. Open the switch K1, the drive will stop at the ramp mode set by P01.11. When the inverter is disabled, the run light is off.
- Close the switch K2, the drive is running reverse andthe run light is on. Open the switch K2, the drive will stop at the ramp mode set by P01.11. When the inverter is disabled, the run light is off.

  Note: Adjusting the potentiometer can change the output frequency.
- Close the switch K3, the drive will run at 5.00Hz (the default value of P02.18) at the acceleration rate (P01.08). Open the switch K3, the drive will stop at the ramp mode set by P01.11.

Note: Jog again have to wait the interval period set by P02.19.

3.3.2 Display panelcontrol

Set: P01.03 (The user operation mode) =2 display panel control mode

P01.04 (Frequency source selector) =4 display panel

Other parameters Settings as table 3-5：

Table 3-5 Display panel control setup

Parameter Setup	Description
P01.13=motor nameplate data	Set the motor rated voltage
P01.14=motor nameplate data	Set the motor rated current
P01.15=motor nameplate data	Set the motor rated frequency
P01.16=motor nameplate data	Set the motor rated speed
P01.19=motor nameplate data	Set the Power factor of the motor

Other parameters are default setup.

- Jog

  Press 

and hold, the drive will run at thesetting value of P02.18. Release the switch, the drive will stop at the ramp mode set by P01.11.

  Note: Jog again have to wait the interval period set by P02.19.

- Common Run

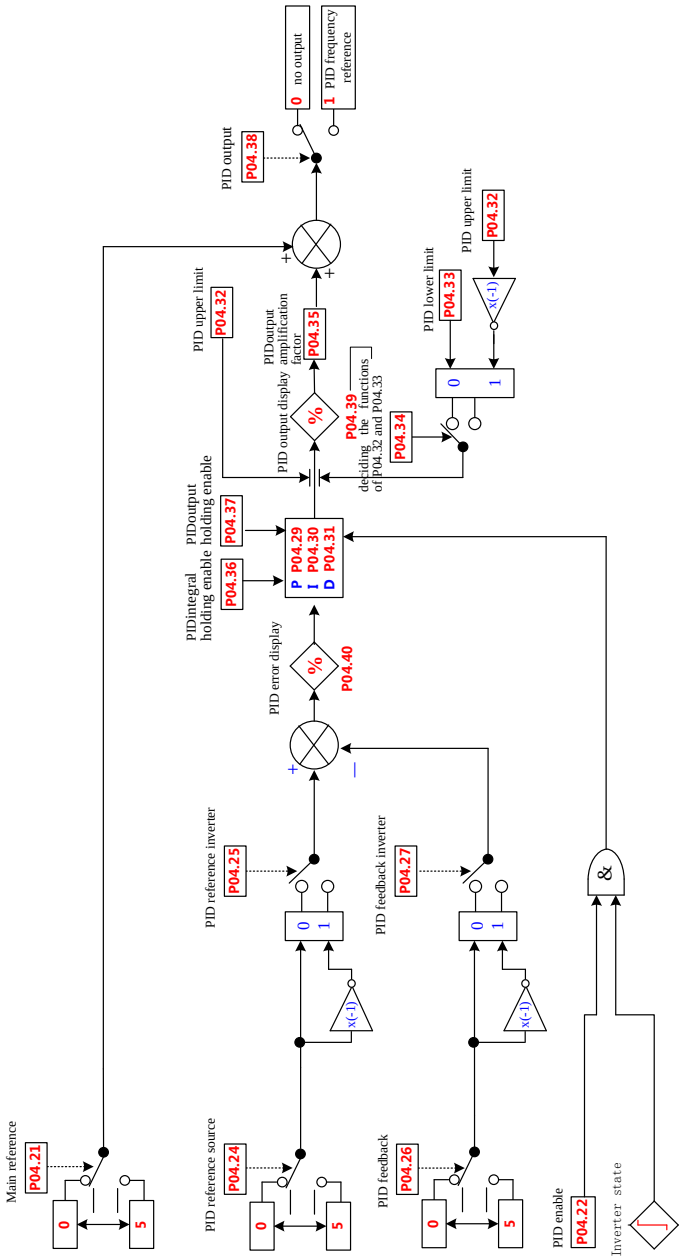
  Press 

, drive is running, Run light is on. Press 
, output frequency is up, Press 
, output frequency is down. Press 

, the drive will stop, when the inverter output is disabled, Run light is off.

3.4 User PID controller

HD710 has a programmable PID controller. The block diagram is as below:



The PID controller gets deviation between the referencevalue (P04.24) and the feedback value (P04.26), and controls according to P (proportion set by P04.29), I (integration set by P04.30) and D (differentiation set by P04.31) to make the output of PID controller according to he feedback in real time.

PID controller is often applied to Stress Control,Press Control,Temperature Control,Flow control,etc.

Please refer to menu04 in Appendix2 for parameters about PID control.

Using HD710 PID controller can achieve process closed-loop control.

4 Parameter

4.1 Property of parameter

The following parameter description includes:

Parameter ID: code of parameter.

Parameter name: simple explanation of the parameter.

Parameter range: the range of the parameter's content, in 【】is the default value.

Change mode: to define if the parameter can be modified, and under what condition can change the parameter.

Run&Stop Write &Readcan be done at running and stopping.

Stop Only Write &Readcan be done only at stopping.

Actual Read only

4.2 Menu P01: Basic Parameter

ID	Function	Range【Default】	Change Mode
P01.01	Load default	0～1【0】	Stop Only

0: no action

1: load default

When drive is not in running state, load default value (except for motor's parameters) and cloning them to EEPROM if P01.01=1.

Note:

- Copy drive parameters to display panel with P03.03 = 1, before restoring factory parameter;
- Restore factory parameter can also be executed in fault status.

ID	Function	Range【Default】	Change Mode
P01.02	Motor control mode	0～2【0】	Stop Only

0: V/F

1: Open loop vector control 1

2:Open loop vector control 2

Note: To use open- loop vector control mode 1 or 2, please set up motor parameters correctly (rated voltage, current, pole pairs, rated speed and power factor) and finish auto-tune.

ID	Function	Range【Default】	Change Mode
P01.03	Control mode	0～2【0】	Stop Only

0: Control terminal

1: Comms.

2: Display panel

ID	Function	Range【Default】	Change Mode
P01.04	Reference source selector	0～4【0】	Run&Stop

0: Analogue reference

In this mode, the frequency can be adjusted by changing the value of Analogue reference. It can work in voltage or current mode. Please refer to P01.05.

1: Preset speed reference

In this mode, the frequency can be adjust by changing P02.07 to P02.10 (preset 1～prest4).See menu2 for detail.

2: UP/DOWN reference

UP/Down terminal is used to set the frequency. In this mode, two terminals among DI1 to DI3 should be set to 11 (output falling) and 10 (output rising) separately. For example:

To set DI1 as UP terminal and DI2 as DOWN terminal, the following operations are needed.

P04.05 = 10

P04.06 = 11

3: Serial communication

In this mode, the frequency can be adjusted by changing P02.07 (preset 1)

4: Display panel

The UP and DOWN keys are used to set the frequency. When the UP (DOWN) key is pushed, the given frequency value will increase(decrease) continuously.

5： PID frequency reference

Choose PID output as the reference source.

ID	Function	Range【Default】	Change Mode
P01.05	AI mode selector	0～6【6】	Stop Only

AI1 signal can be voltage or current mode:

0: 0mA～20mA

1: 20mA～0mA

2: 4mA～20mA(current loosing with trip)

3: 20mA～4mA(current loosing with trip)

4: 4mA～20mA(current loosing without trip)

5: 20mA～4mA(current loosing without trip)

6: 0V～10V

- When it is setup as from 0 to 5, if current input is beyond 26mA, the drive will generate a trip F012.
- When it is setup as 2 or 3, if current input less than 3mA, the drive will generate a trip F013.

ID	Function	Range【Default】	Change Mode
P01.06	Max. frequency	0.00Hz～300.00Hz【50.00】	Stop Only
P01.07	Min. frequency	0.00Hz～Max. frequency【0.00】	Stop Only

These parameters are used to select the Max. Frequency and Min. frequency.

Note：

The minimum frequency range is 0.00Hz to the maximum frequency, and the default is 0.00Hz. If P03.01=0 (reverse enabled), then the minimum frequency is constant for 0.00Hz.

ID	Function	Range【Default】	Change Mode
P01.08	Accel. rate	0.0s～3600.0s【5.0】	Run&Stop
P01.09	Decel. rate	0.0s～3600.0s【10.0】	Run&Stop

Acceleration rate is the time from 0.00Hz to maximum reference (P01.06).

Deceleration rate is the time from maximum reference (P01.06) to 0.00Hz.

For example:

P01.06=100.00Hz, set up the maximum reference

P01.08=10.0s set accelerating time

After starting, the drive output frequency is from 0.00Hz ramp to 50.00Hz the accelerating time is:10.0s × (50.00Hz/100.00Hz) =5.0s

ID	Function	Range【Default】	Change Mode
P01.10	Start mode	0～2【0】	Stop Only

0: Start directly

Start with the set start frequency (P02.11) and start frequency hold time (P02.12).

1:First DC injection, then start

First DC injection brake（Refer to P02.13,P02.14），then start with mode 0.

3: Catch a spinning

Automatic tracking the motor speed and direction, the running motor can start smoothly without impact.

ID	Function	Range【Default】	Change Mode
P01.11	Stop mode	0～2【0】	Stop Only

0:Ramp stop

When receiving the stop command, the drive ramp down to zero frequency.

1:Coast stop

When receiving the stop command, immediately terminating the output, the drive is freedom to stop as the mechanical inertia.

3:Ramp stop + DC injection

When receiving the stop command, the drive reduces the output frequency according to deceleration time, when it gets to the stop DC injection brake start frequency (P02.15), the DC injection brake begins.

The function about the stop DC injection brake, please refer to the explanation of P02.16, P02.16, P02.17.

ID	Function	Range【Default】	Change Mode
P01.12	Motor rated voltage	200V：0V～240V【220】 400V：0V～480V【380】	Stop Only
P01.13	Motor rated current	0.1A～30.0A【by model】	Stop Only

ID	Function	Range【Default】	Change Mode
P01.14	Number of motor pairs of pole	0～4【0】	Stop Only

0: Calculate motor pole pairs with motor rated voltage and current

P(Number of pole pairs) =60× F(rated frequency) / N(rated speed). Integer part is valid.

For example:

F(rated frequency) = 50.00Hz, N(rated speed) = 1460.

N = 60 * F / P

P = 60 * F / N = 60 * 50 / 1460 = 2.054

Therefore, the motor is 2-pole pairs motor (4-polepairs motor).

1: Number of pole pairs (2 pole pairs motor)

2～4: Same as 1.

ID	Function	Range【Default】	Change
P01.15	Motor rated frequency	1.00Hz～300.0Hz【50】	Stop Only
P01.16	Motor full load speed	0rpm～18000rpm【0】	Stop Only

This parameter is used to set parameters of controlled asynchronous motor.

To ensure the controlling performance,please set the parameters according to the parameters of motor nameplate.

Note:

- When P01.16 is set to 0, slip automatic compensation function is disabled.
- When P01.16 is set to non-zero numbers, P01.14 automatically switches to 0calculatingnumber of pole-pairs.

ID	Function	Range【Default】	Change
P01.17	Auto-tune	0～1【0】	Stop Only

0: No measurement

1: Auto-tune 1 (run a time)

Set P01.17=1, at first time to get enable and run command, the drive start to measure.Then, P01.17=0, the result will be stored to EEPROM.

ID	Function	Range【Default】	Change
P01.18	Motor stator resistance	0.000Ω～60.000Ω【0】	Stop Only

After motor auto-tune finished, the parameter is refreshed. If the calculated resistance is over the maximum value, drive display F016 trip.

ID	Function	Range【Default】	Change
P01.19	Motor power factor	0.00～1.00【0.85】	Stop Only

This parameter and motor rated current (P01.13) are used to calculate the motor rated torques current and excited current.

The motor rated torques current is used to control by drive, while the excited current is used to compensate the stator resistance in vector controlling mode.

ID	Function	Range【Default】	Change Mode
P01.20	Switch frequency	1kHz～15kHz【by model】	Run&Stop

This parameter is used to set the carrier frequency of PWM output from drive. Carrier frequency affects noise and loss of motors. Please refer the table following:

Table 4-1 The carrier frequency changes on the influence of motors and drives

Carrier frequency	Lower → higher
Motor noise	More → less
Waveform of current	Worse → better
Motor temperature	Higher → lower
Drive temperature	Lower → higher
Leakage current	Less → more
Radiation	Less → more

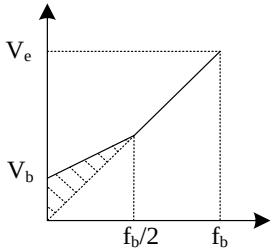
ID	Function	Range【Default】	Change Mode
P01.21	Voltage boost	0.0%～30.0%【by model】	Run&Stop

Voltage boost is used to improve the torque ability at low frequency.The higher voltage boost, the easier motor becomes hot and over current. For big load, increasing the value; while decrease the value. When the value is set to 0, there is no torque improvement.

Voltage boost (P01.21) for each drive power, as following table shows:

Table 4-2 Voltage boost default value of each drive power

Drive Power	Default Value
0.4kW～4kW	3.0%
5.5kW～11kW	2.0%



Ve：Motor rated voltage
V_b：Boost voltage＝Ve×P01.21
f_b：Motor rated frequency

Figure 4-1 Voltage boost

ID	Function	Range【Default】	Change
P01.22	V/F control mode	0～3【0】	Stop Only

Different V/F characteristic is defined by P00.23 to meet the demanding from different load. There are three kinds of fixed curve and one user programmed line.

- When P01.22 is 0, user can define the different fold lines by setting of P02.01～P02.02. The default V/Fis a straight line, as the line 0 in Figure 4-2.
- When P01.22is 1, it is a 2.0 law ramp, curve1 in figure 4-2.
- When P01.22 is 2, it is a 1.7 law ramp, curve2 in figure 4-2.
- When P01.22 is 3, it is a 1.2 law ramp, curve3 in figure 4-2.

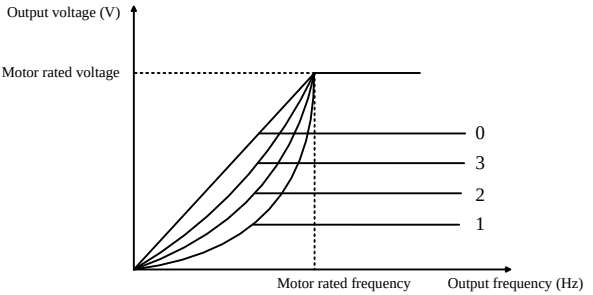


Figure 4-2 MotorV/F curve

ID	Function	Range【Default】	Change Mode
P01.23	Power up	0～3【0】	Stop Only

The motorized UP/DOWN modes are given in the table below:

Table 4-3 Power up UP/DOWN reference default value

P01.23	Mode	Comment
0	Zero at power up	● Reset to zero at each power-up. ● UP/DOWN and reset are active at all times.
1	Last value at power up	● Set to value at power-down when drive power-up. ● UP/DOWN and reset are active at all times.
2	Zero at power-up and only change when drive running	● Reset to zero at each power-up. ● UP/DOWN are only active when the drive is running. ● Reset is active at all times.
3	Last value at power-up and only change when drive running	● Set to value at power-down when drive powered-up. ● UP/DOWN are only active when the drive is running. Reset is active at all times.

ID	Function	Range【Default】	Change Mode
P01.24	Power up reference frequency	0～2【0】	Run&Stop

When reference source is the display panel reference (P01.04=4), after the drive power up, the output frequency is:

0: 0.00Hz

1: the running frequency when last powered off

2: preset1

ID	Function	Range【Default】	Change Mode
P01.25	UP/DOWN Acceleration rate	0.0s～250.0s【10】	Run&Stop

This parameter defines the time taken for the motorized pot function to ramp from 0 to 100.0%. Twice this time will be taken to adjust the output from −100.0% to +100.0%.

ID	Function	Range【Default】	Change Mode
P01.26	Digital mode, reference frequency when rerun	0～1【1】	Stop Only

0: run again after stop, reference frequency is 0Hz.

1: run again after stop, reference frequency is the last value.

4.3 Menu P02: Adjustive Parameter

ID	Function	Range【Default】	Change Mode
P02.01	V/F frequency	0.00Hz～P01.15【0.00】	Stop Only
P02.02	V/F voltage	0.0%～100.0%【0.0】	Stop Only

When P01.22=0, user can set up the parameters P02.01 and P02.02 to define the V/F curve, as the below diagram. By adding a point on the V/F curve showed as below, this can improve the performance during the acceleration under a specific application situation. Under the default setup, the V/F curve is a straight line.

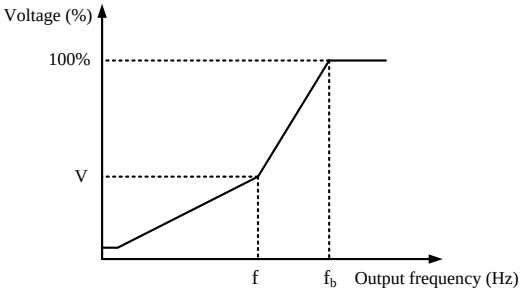


Figure 4-3 V point of V/F

ID	Function	Range【Default】	Change Mode
P02.03	Current limit	0%～300%【200】	Stop Only

This parameter is a coefficient for current limit. It is efficient for both motor and generator torques. When P02.03 is 100%, the limited current is equal to motor rated current.

ID	Function	Range【Default】	Change Mode
P02.04	Current controller Kp gain	0.001～10.000【0.020】	Stop Only
P02.05	Current controller Ki time	0.00s～100.00s【0.20】	Stop Only

User can adjust dynamic responding characteristic of system by setting P02.04 and P02.05. It can shorten time of dynamic responding to increase proportion gain or decrease integral time. However, adjusting too more will cause system shocking.

Our suggestion: if default setting cannot meet requisition, please make sharp tuning with it: increase value of P02.04 at first to ensure that system does not shock, and then decrease P02.05 to speedup respond.

ID	Function	Range【Default】	Change Mode
P02.06	Slip compensation error	0rpm～18000rpm【0】	Stop Only

The changing of motor load torque will generate error of motor slipping, and variety of motor speed.When motor speed does not match to references, adjusting P02.06 will fix it.

ID	Function	Range【Default】	Change Mode
P02.07	Preset 1	−P01.06～+P01.06【5.00】	Stop Only
P02.08	Preset 2	−P01.06～+P01.06【10.00】	Stop Only
P02.09	Preset 3	−P01.06～+P01.06【20.00】	Stop Only
P02.10	Preset 4	−P01.06～+P01.06【30.00】	Stop Only

With input terminal selection mode, one of preset1 (P02.07)～preset4 (P02.10) acts as setting frequency.

Note: Preset reference is prior to other mode.

For example:

Setting parameters as following:

P04.06 = 8 DI2 acts as preset select bit0

P04.07 = 9 DI3 acts as preset select bit1

As a result, preset has the following twooperation modes:

- When preset is selected as reference, the relationship between selected preset and terminal status is as Table 4-4 shown.

Table 4-4 Map1 between preset and preset select terminal

DI3status (1 bit)	DI2status (0 bit)	Frequency source selector
OFF	OFF	Preset 1 (P02.07)
OFF	ON	Preset 2 (P02.08)
ON	OFF	Preset 3 (P02.09)
ON	ON	Preset 4 (P02.10)

- When preset is not set as reference, the relationship is as Table 4-5 shown.

Table 4-5 Map2 between preset and preset select terminal

DI3status (1 bit)	DI2status (0 bit)	Frequency source selector
OFF	OFF	Keep initial setting reference
OFF	ON	Preset 2 (P02.08)
ON	OFF	Preset 3 (P02.09)
ON	ON	Preset 4 (P02.10)

ID	Function	Range【Default】	Change Mode
P02.11	Start frequency	0.00Hz～50.00Hz【0.00】	Stop Only
P02.12	Hold time for start frequency	0.0s～60.0s【0.0】	Stop Only

Start frequency (fs, P02.11) means the initiate speed at drive startup. Hold time for start frequency (T_1, P02.12) is the holding time at Fs.Refer to the below diagram:

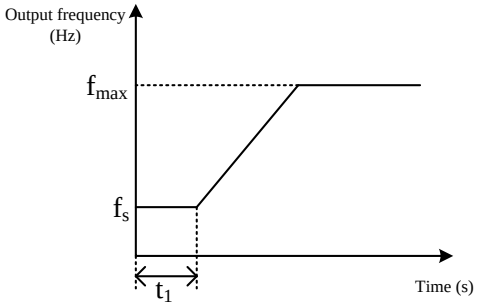


Figure 4-4 Start frequency & Hold time for start frequency

ID	Function	Range【Default】	Change Mode
P02.13	StartDC injection current	0.0%～100.0%【0.0】	Run&Stop
P02.14	StartDC injection time	0.0s～60.0s【0.0】	Run&Stop

The parameters P02.13 & P02.14 are valid at P01.10=1 only. Refer to the below diagram.

Start DC injection current (P02.13) is present of drive rated current. If start DC injection time (P02.14) is 0.0s, there is no process of DC injection.

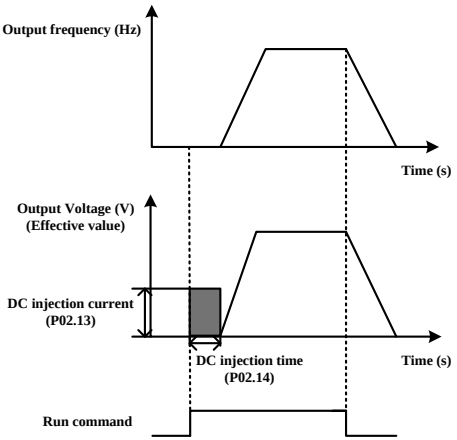


Figure 4-5 DC injection

ID	Function	Range【Default】	Change Mode
P02.15	StopDC injecting frequency	0.0%～20.0%【0.0】	Run&Stop
P02.16	StopDC injecting current	0.0%～100.0%【0.0】	Run&Stop
P02.17	StopDC injecting time	0.00s～60.00s【0.00】	Run&Stop

P02.15 is certain percent of P01.06.

P02.16 is certain percent of P01.13.

If Stop DC injection time is 0.00s, the drive will not DC inject.

ID	Function	Range【Default】	Change
P02.18	Jog frequency	0.00Hz～50.00Hz【0.00】	Run&Stop
P02.19	Jog interval time	0.1s～60.0s【1.0】	Run&Stop

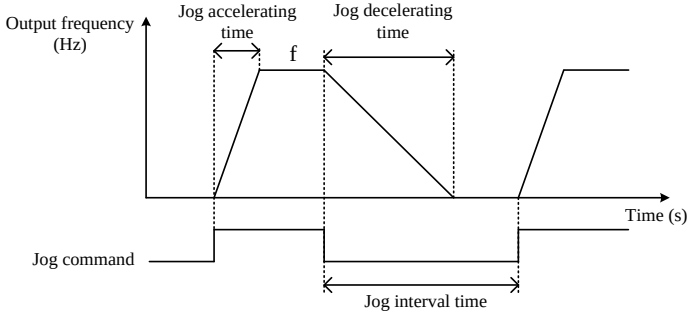
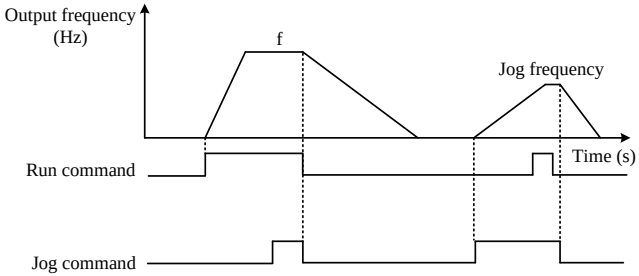


Figure 4-6 jog

Jog interval time (P02.19) is from cancelling the last Jog command to the next Jog command coming into effect. The Jog command is invalid during Jog interval time and the drive will run at 0.0Hz. If the command is always valid, it will carry out the Jog command after finished the Jog interval time.

Note:

- Underdisplay panelcontrol mode, press the switchMF will enable Jog command with default setting. After releasing the switchMF, drive will stop according to setting of P01.11. In Terminal Control mode, some of DI terminals can be programmed to realize Jog forward or Jog reverse function. So does Serial Communication.
- Jog accelerating/decelerating rate is according to Acc/Dec time(P01.08/P01.09).
- Jog command is NOT valid in running state.
- Running command is invalid during jogging.



ID	Function	Range【Default】	Change Mode
P02.20	Skip frequency	0.00Hz～P01.06【0.00】	Stop Only
P02.21	Band of skip frequency	0.00Hz～30.00Hz【0.00】	Stop Only

The skip frequency is available to prevent continuous operation at a speed that would cause mechanical resonance. When a skip reference parameter is set to 0, filter is disabled. The skip reference band parameters define the frequency or speed range either side of the programmed skip reference, over which reference are rejected. The actual reject band is therefore twice that programmed in these parameters, the skip reference parameters defining the centre of the band. When the selected reference is within a band, the lower limit value of the band is the last reference. The last reference is limited among minimum frequency (P01.07) to maximum frequency (P01.06).

For example:

P01.06=50.00Hz, P01.07=0.00Hz,

P02.20=2.00Hz, P02.21=1.00Hz. (Other parameters with default)

When the given frequency is among 1.00Hz to 3.00Hz, the last frequency is 1.00Hz. When the given frequency is among 4.00Hz to 6.00Hz, the last frequency is 4.00Hz. The frequency out of skip reference band is not changed.

For example:

P01.06=50.00Hz, P01.07=0.10Hz，

P02.20=2.00Hz, P02.21=3.00Hz. (Other parameters with default)

When the given frequency is among 0.00Hz to5.00Hz, the last frequency is 0.10Hz. The frequency out of skip reference band is not changed.

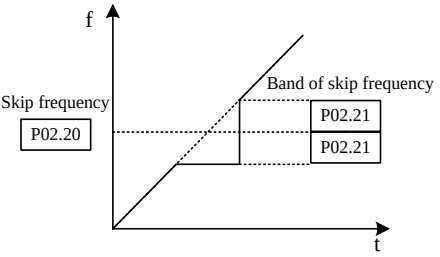


Figure 4-7 Skip frequency

Note:The drive output frequency can pass through skip reference band during acceleration and deceleration.

ID	Function	Range【Default】	Change Mode
P02.22	Threshold of zero speed	0.00Hz～P01.06【0.50】	Run&Stop

This parameter is used with P02.23 together.

Note:This parameter is nopolar.

For example:

Set P02.22 = 0.50Hz, when the output frequency is ranged −0.5Hz to 0.5Hz, at the same time drive is running.

ID	Function	Range【Default】	Change
P02.23	Band of frequency arrival	0.00Hz～P01.06【2.50】	Run&Stop

This parameter is supplementary define of frequency arrival.As the below diagram, when output frequency of device is in the error, if defined to frequency arrived, DO terminal will output different level.

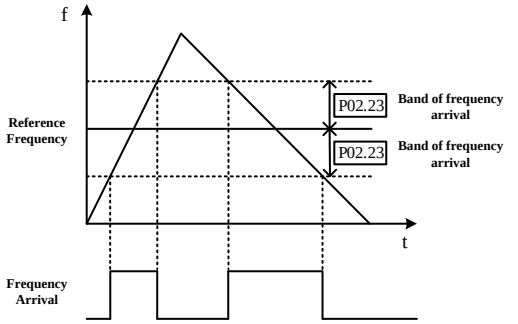


Figure 4-8 Frequency arrival & Band of frequency arrival

ID	Function	Range【Default】	Change mode
P02.24	Acceleration and deceleration mode	0～3【0】	Stop Only

0：Line

1：S curve1

2：S curve2

3：special curve

This parameter is to choose acceleration and deceleration mode, line or S curve.

0：Line

Output frequency will increase or decrease with constant slope

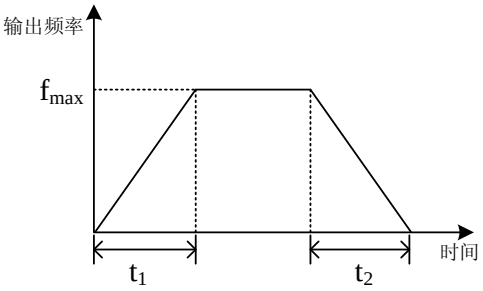


Figure 4-9 Line acceleration and deceleration mode

1：S curve1

Output frequency will increase or decrease as a S Curve

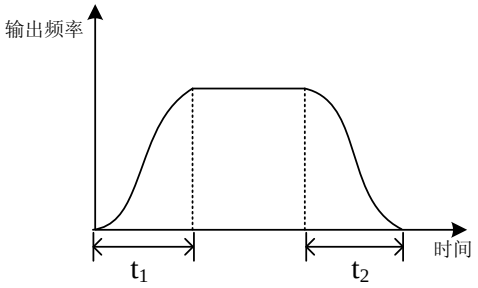


Figure 4-10 Curve acceleration and deceleration mode

Please set the speed value as S curve when acceleration or deceleration begins and ends, and acceleration or deceleration will be smooth with reduced impact. This mode is suitable to start and stop handling or transfer load, such as escalator, conveyor, etc.

2：S curve2

Output frequency willincrease or decrease as an S Curve

It is similar to S Curve 1. The main difference is that if there is a stop command during acceleration or deceleration process, S Curve 1 will not decelerate immediately, but S Curve 2 will.

3：Special curve

When quick acceleration and deceleration are needed in some occasion, say, machine tools, choosing this mode will effectively enhance acceleration and deceleration, avoiding frequent overcurrent. P02.25 and P02.26 may need to be set in this mode.

ID	Function	Range【Default】	Change mode
P02.25	S curve start time	0.0%～40.0%【5.0%】	Run&Stop
P02.26	S curve end time	0.0%～40.0%【5.0%】	Run&Stop

P02.25 indicates S curve start time inacceleration or deceleration.

P02.26 indicates S curve finish time when the drive accelerates or decelerates to the stable running frequency.

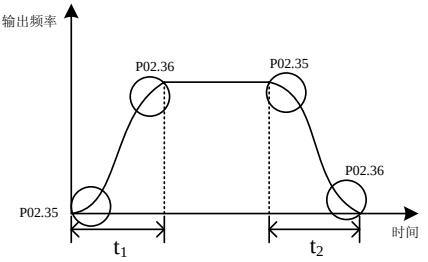


Figure 4-11 S curve start and end time

NOTE:

- P02.25 and P02.26 only become effective when P02.03≠0.
- The value of P02.25 and P02.26 is a percentage of the actual acceleration or deceleration rate.

For example:

- P01.06 (the maximum frequency)=50.00Hz, P01.08 (acceleration rate 1)=10s,
- P02.25=20%, P02.26=30%, if setup reference is 25.00Hz, the acceleration rate will be 5s after the drive starts.

S curve start time=5s×20.0%＝1s, S curve finish time＝5s×30.0%＝1.5s.

ID	Function	Range【Default】	Change mode
P02.27	AI input percentage 1	P02.29～100.0%【100.0%】	Run&Stop
P02.28	Output frequency percentage 1	P02.30～100.0%【100.0%】	Run&Stop
P02.29	AI input percentage 2	P02.31～P02.27【50.0%】	Run&Stop
P02.30	Output frequency percentage 2	P02.32～P02.28【50.0%】	Run&Stop
P02.31	AI input percentage 3	0.0%～P02.29【0.0%】	Run&Stop
P02.32	Output frequency percentage 3	0.0%～P02.30【0.0%】	Run&Stop

The above six parameters are used to adjust AI Curve

User can define AI curve by setting P02.27～P02.32, shown as below. AI curve can be defined by adding three points,（V1，f1）、（V2，f2）and（V3，f3）to meet special load characteristics.

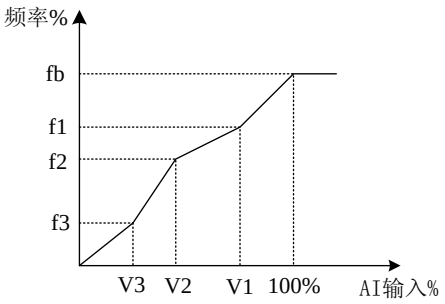


Figure 4-12 User-defined AI Curve

Eg:P01.04=0，P1.06=50；P02.27=80%，P02.28=60%，and when AI input voltage is 8V (0-10V), output frequency will be 60%×50=30Hz.

ID	Function	Range【Default】	Change mode
P02.33	User code	0～9999【0】	Run&Stop

Set user code

The default value of P02.33 is "0", where user code function is disabled, and all parameters (except factory parameters) can be viewed or changed (if changes are allowed). If inputting a non-zero value (1～9999)into P02.33, and pressing PRG key to store the value, the user code function will be activated. If user code cannot be verified successfully, all parameters cannot be viewed or changed expect that P02.33 can be viewed.

Verify user code

If entering the correct code into P02.33 and pressing PRG, the user code will be verified successfully, with the value of P02.33 as the user code, and all parameters can be viewed or changed (if changes are allowed). After verifying user code successfully, if there is no action on any key in two minutes, then the value of P02.33 will change to zero automatically, with user code enabled.

Remove user code

There are two ways to remove HD710 user code:

- Removeby software

After inputting correct code into P02.33 and pressing PRG, change the user code to "0" and press PRG, and the user code will be removed.

- Remove by hardware

When the drive is power-on, press the keys of PRG+STOP+▽ at the same time, and user code will be removed after powering up, and factory defaults will be restored.

Note:

When user code is enabled, RS485 serial communication can work.

4.4 Menu P03: Accessorial Parameter

ID	Function	Range【Default】	Change Mode
P03.01	Run direction select	0～1【0】	Stop Only

This parameter is used to permit drive reversing or not.

0: reverse is permitted

1: reverse is disabled

ID	Function	Range【Default】	Change Mode
P03.02	Deadtime for running direction change	0.0s～3000.0s【0.0】	Run&Stop

When drive changes run direction, it will hold at 0.00Hz for some time, which is set by P03.02. As the below diagram.

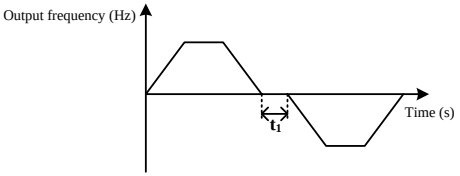


Figure 4-13 Dead time for running direction change

ID	Function	Range【Default】	Change Mode
P03.03	Parameter cloning	0～2【0】	Stop Only

0: No action

1: Cloning up to display panel from drive

Press the switch MOD after set P03.03=1, drive clones parameters ranged from P01.01 to P05.25 to EEPROM on display panel.

2: Cloning down to drive from the display panel

Press the switch MOD after set P03.03=2, drive clones parameters ranged from P01.01 to P05.25 from the display panel.

Note:

- After cloning parameters, P03.03 recovers to 0.
- Only the parameters with US attribution can be cloned.
- Before cloning down to the drive from the display panel, cloning up to the display panel from the drive is necessary. After cloning up to the display panel from the drive, the parameters are stored in EEPROM on display panel forever.

- Before cloning down to the drive from the display panel, the drive checks the version and integrality of parameters from the display panel at first, and then trips if some errors occur such as parameters being empty, or some parameter lacked, or version different.
- Cloning down to drive from the display panel can be operated many times for the parameter existed in EEPROM on display panel.
- Cloning parameters (P05.23) is only limited between drive with same type. And the cloning parameters do not include drive rated parameters, such as rated voltage、rated current and so on.

ID	Function	Range【Default】	Change Mode
P03.04	Auto energy saving control	0～1【0】	Stop Only

ID	Function	Range【Default】	Change Mode
P03.05	AVR control	0～2【1】	Stop Only

0: off

1: on for all condition

2: on except ramp

When the input voltage deviates from rated value, setting P03.05 can maintain the constant output voltage. Therefore, AVR should act under normal circumstances, especially when input voltage is higher than the rated value. If set P03.05=0 at ramp stop, the decelerating time is short, the operating current is slightly higher; set P03.05=1, the motor decelerates smoothly, operating current is smaller, but the decelerating time longer.

ID	Function	Range【Default】	Change Mode
P03.06	Auto-start after power off	0～1【0】	Stop Only
P03.07	Wait time for auto-start	0.0s～60.0s【0.0】	Run&Stop

Set P03.06=0, the drive cannot run automatically.

Set P03.06=1, the drive start to run automatically after time arrive setting of P03.07.

When set P03.06 = 1, with different control mode the auto-restart is different:

- Display panel mode: the drive start to run automatically after time arrive setting of P03.07
- Terminal mode: the drive start to run automatically after time arrive setting of P03.07, only when running command is enable.

Note: Please use this parameter CAREFULLY.

ID	Function	Range【Default】	Change
P03.08	Dynamic brake rate	0.0%～100.0%【50.0】	Run&Stop
P03.09	Dynamic brake DC voltage points	200V：350V～390V【390】 400V：650V～780V【780】	Stop Only

Brake unit works in the chopper way. P03.08 is used to define duty ratio of brake unit switch, the higher duty ratio the more apparentbraking effect. Setting this parameter should be according to braking resistor value and power.

ID	Function	Range【Default】	Change
P03.10	Switch frequency auto adjust	0～1【1】	Run&Stop

0: Off

Switchfrequency automatic adjustment is disabled.

1: On

Switchfrequency automatic adjustmentis enabled.

- If set P03.10=0, this function is disabled. Once it is disabled, if the IGBT temperature is too high, the drive will produce trip F009 immediately, LED on the display panel will be off, and IGBT will be blocked.
- If set P03.10=1, thermal protection will automatically adjust switch frequency according to IGBT temperature, in order to prevent the drive from overheating.

This parameter is set to 1, frequency converter thermal protection model according to automatically adjust the temperature will IGBT switch frequency, in order to prevent overheating frequency converter.

Note: Automatic adjustment range limited to P01.20 value.

ID	Function	Range【Default】	Change Mode
P03.11	Low DC bus operation (only for 380V models)	0～1【0】	Stop Only

0: Off

1: On

This function is used to allow the 3-phase 380VAC input drive can run in single-phase 220VAC power source when the 3-phase AC input power is failure.

When 3-phase 380 VAC power failure, user can switch it to single-phase 220VAC backup power supply, so the drive can still run at derating conditions. For example, the function can guarantee elevator safety to stop at the door after a power failure.

Set P03.11=1, the drive DC bus voltage reduction will cause lower output power. At the same time, LED on display panel flashing indicates that the drive is using a backup lower power supply.

Note:If P03.11=1, voltage:<330VDC→display trip H005, <230VDC→display trip F003.

ID	Function	Range【Default】	Change Mode
P03.12	Comms. control word	0～65535【0】	Run&Stop

P03.12 is used to control the drive in serial communication control mode (P01.03=1).

P03.12 is Comms. control word in serial communication control mode.P03.12 is a 16-bit binary number. the meanings of each bit are shown as below table.It is displayed in decimal form on the display panel.

Table 4-6 Comms. control word description

Bit	Function
0	Drive enable
1	Run
2	3-wire enable
3	Run forward
4	Run reverse
5	FWD/REV
6	Jog forward
7	Jog reverse
8	Fault reset
9	Saving parameters
10	Clean the trip tack log
11	Enable comms to write parameters
12	Reserved
13	Reserved
14	Reserved
15	Reserved

Bit 0～7: Start and stop logic control of the drive. In serial communication control mode (P01.03=1), the user can control the drive by changing comms control word (P03.12).

Bit 8: The bit changing from 0 to 1 will resetthe drive(fault condition disappear and the failure code < F030).

Bit 9: The bit changing from 0 to 1 will bring parameters saved to the EEPROM.

Bit 10: The bit changing from 0 to 1 willcleanerror recording of the drive.

Bit 11: The bit changing from 0 to 1 willmake selector parameters become effective.

Table 4-7 Source reference is serial communication

Source parameters selector	
Analogue output function select	P04.03
Relay function	P04.09
DO function	P04.11
DI1~DI3 function	P04.05～P04.07
3-wire mode	P04.08
AI1 function selector	P04.16

Note:

- These parameters are set through the display panel, it will be effective after pressing the switch PRG;
- Different destination parameter selector select the same destination parameter will cause function conflict, to avoid the conflict:
- When the parameter is set through the display panel, the function will not be effective after pressing the switch PRG, and not enter into the next function code;
- When the parameter is set through serial communication or HDSoft, the drive will produce trip F021.

For serial communications, refer to Appendix 1 communication.

ID	Function	Range【Default】	Change Mode
P03.13	Ramp hold by high	0～1【1】	Stop Only
P03.14	High voltage threshold	220V：350V～370V【370】 400V：750V～780V【780】	Stop Only

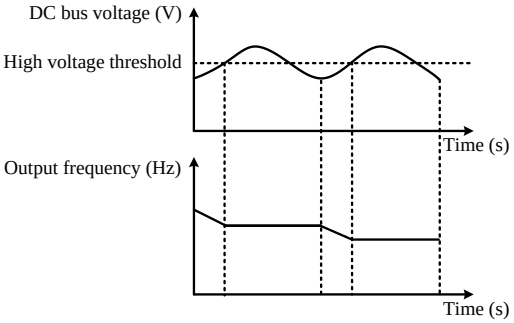


Figure 4-14 High voltage threshold

0: Disable

1: Enable

At ramp stop, the motor speed may appear lower than the drive's output frequency for the load inertia, and the motor may back power to the drive. It causes that the drive DC bus voltage increases. If no measures are taken, it will generate over-voltage protection.

- When P03.13=0, the occurrence of the above situation, the bus voltage has been increased until over-voltage protection, display over voltage fault (F002).
- When P03.31=1, high voltage threshold function is effective. This function is detecting the DC bus voltage during ramp stop, and compares with P03.14, if more than P03.14, the output frequency is held until it is lower than P03.14, decelerating on.

Note: When the externalbrake resistor is connected to the drive, recommendbanning high voltage threshold

ID	Function	Range【Default】	Change Mode
P03.15	Overload factor	0～(drive rated current/motor rated current)×100%【100】	Run&Stop

If set P03.15=0, motor protecting is disabled.

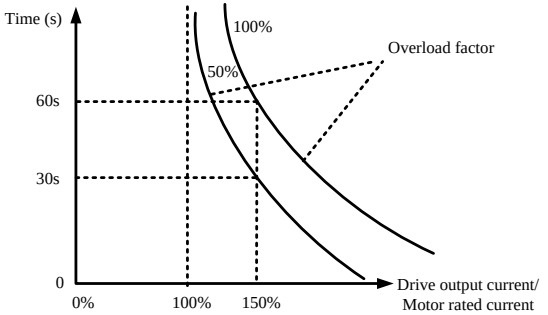


Figure 4-15 Overload protection

Default value is 100%, the detection time responding to overcurrent 150% is 60s.

Range: 0～(drive rated current/motor rated current)×100%

At different current rates, the overload protection at different times, as the below table:

Table 4-8 Protection time

Drive output current/Motor rated current	Default protection time
1.1	3000s
1.2	2000s
1.3	500s
1.4	100s
1.5	60s
1.6	30s
1.7	10s
1.8	3s

(Specific protection time needs experiments to confirm. More than 1.8 times need protecting for 3s.)

Examples for specific protection time setting:

P01.13=5.0A, drive rated current=10.0A.

Range of P03.15 setting=0～(drive rated current/motor rated current)×100%=0 ~ 200%

Range of P03.15 changed according to Drive rated current / Motor rated current

This parameter is used for adjusting the detection time of overload protection.

Setting value meaning:

When output current has not reached 100% of motor rated current, overload protection does not act.

When output current is slightly more than 100% of motor rated current, the time of overload protection will be very long.

Set P03.15=50%, when the output current corresponded changes to 150% of motor rated current, the overload detection time is 30s.

Set P03.15=100%, when the output current corresponded changes to 150% of motor rated current, the overload detection time is 60s.

Set P03.15=200%, when the output current corresponded changes to 150% of motor rated current, the overload detection time is 120s.

Overload protection acts, the drive blocks IGBT, generates F010 trip, turns off the LED switch on the display panel.

Note:

- If setting value exceeds default value, please run carefully to prevent overheating of the motor.

- If value of motor current setting is more than the drive current, overload protection calculated based on the drive rated current.

ID	Function	Range【Default】	Change Mode
P03.16	Auto reset	0～100【0】	Stop Only
P03.17	Auto reset delay	2.0s～20.0s【5.0】	Stop Only

Drives reset automatically if set P03.16 > 0, and reset time is defined by value of P03.06, reset interval time is defined by P03.17. (Expect for F001 & F006, reset needs 10s).

P03.16 is valid for the same trip. It is invalid if reset times get to P03.16 or interval beyond 5 minutes, and the drive recover reset times to 0.

Manual reset will recover reset times to 0. The trip F001, F018, F020 and upon F030 occur, automatic reset is invalid.

ID	Function	Range【Default】	Change Mode
P03.18	Address	0～247【1】	Run&Stop

This parameter is used to define the drive address on serial communicating bus. Commonly, the drive is slave machine.HD710 applies to Modbus RTU protocol.

ID	Function	Range【Default】	Change Mode
P03.19	Baud rate	0～5【3】	Run&Stop

0: 2.4KBPS

1: 4.8KBPS

2: 9.6KBPS

3: 19.2KBPS

4: 38.4KBPS

5: 57.6KBPS

This parameter is used for selecting communication baud rate, the unit is KBPS.Baud rate is a parameter that measure the communications speed. It indicates the number of transfer bit every second.

ID	Function	Range【Default】	Change Mode
P03.20	Comms. configuration	0～3【1】	Run&Stop

This parameter is used for setting communication used data format.

0: 1-8-1, RTU, without checking

1: 1-8-2, RTU, without checking

2: 1-8-1, RTU, with odd bit checking

3: 1-8-1, RTU, with even bit checking

ID	Function	Range【Default】	Change Mode
P03.21	Power off undervoltage faultdisable	0～1【0】	Run&Stop

0: enabled

When P03.21 = 0, if the drive powers off, the fault relay will be active.

1: disabled

When P03.21 = 1, if the drive powers off, the fault relay will be not active.

ID	Function	Range【Default】	Change Mode
P03.22	Setting stop time when zero speed	0.0s～3000.0s【0.0】	Run&Stop

When the drive is running at zero speed (when theabsolutevalue of output frequency is less than or equal to P02.22), the user can set this parameter to make the drive stop after the setting time. When the setting time is 0.0s, the parameter is invalid.

ID	Function	Range【Default】	Change Mode
P03.23	keypad lock	0～2【0】	Run&Stop

This parameter is to lock or unlock the keypad.

0. all keys unlocked

1. all keys locked

2. all keys locked expect RUN and STOP/RESET keys

Note:

1. When the value of P03.23 is 1 or 2, pressing PRG will lock the keypad.
2. If the keypad is locked, pressing and holding ESC for more than 5 seconds will unlock. P03.23 will be restored to 0 after unlocking.

ID	Function	Range【Default】	Change mode
P03.24	current limit protection control	0～3【0】	Stop Only

0: Enable current limit protection

1: Disable current limit protection above fundamental frequency

In general, when the motor is running above fundamental frequency, the current limit factor will decrease automatically according to the output frequency to keep constant power.

If P03.24=1, then current limit factor will not be changed.

2: Current limit protection disabledat fast increase or decrease

At fast increase or decrease, the drive will not alarm over current fault (F001) in a short time. In this condition, the drive will predict the value of current that can possibly arrive. If the predicting current value is larger, the drive will automatically adjust the acceleration or deceleration rate.This function is valid when the acceleration or deceleration rate is less than one second. If P03.24=2, the drive will not automatically adjust the acceleration or deceleration rate.

3: Both disabled

Note: P03.24 = 1, the current limit protection is disabled above fundamental frequency, the motor may be damaged. Please use this function carefully.

ID	Function	Range【Default】	Change mode
P03.25	input phase failure delay	0.0s～3000.0s【0】	Stop Only

If set P03.25 to non-zero value, input phase loss always occursin the set time, then the drive will trip F004.

If set P03.25 to 0.0, shield F004.

NOTE: If the input phase loss is not stable, the timer will execute decresing or increasing operation and will not be reset.

ID	Function	Range【Default】	Change mode
P03.26	output phase failure protection	0～255【0】	Stop Only

The parameter is used to select that drive output phase loosing protection is enabled or disabled.

When P03.26=0, output phase loosing protection is enable

When P03.26=1, outputphase loosing protection is disabled, the drive will not initiate a F005 trip.Please use carefully.

ID	Function	Range【Default】	Change mode
P03.27	run direction	0～1【0】	Stop Only

0：Forward

1：Reverse

When this parameter is set to be 1, it is adjusting any two phases of UVW.

4.5 Menu P04: Terminal Parameter

ID	Function	Range【Default】	Change Mode
P04.01	AI offset	−100.0%～+100.0%【0.0】	Run&Stop

Analogue input can increase a offset (−100%～+100%). If the sum of analogue input and offset is more than the range ±100%, the result is limited to ±100%.

ID	Function	Range【Default】	Change Mode
P04.02	AI filter time	0.00s～10.00s【0.10】	Run&Stop

ID	Function	Range【Default】	Change Mode
P04.03	Analogue output function select	0～6【0】	Run&Stop

This parameter is used to assign analogue output to which parameter. The default value is output frequency (P05.09). The output frequency (P05.09) corresponding to analogue output 0V～10V is indicated as 0.0%～100.0% of P01.06.

0: Output frequency

1: Reference frequency

2: Output current

3: Motor speed

4: DC voltage

5: Output voltage

6: no function

When AO1 select the following function and 100% output:

0: output frequency	Maximum running frequency
1: reference frequency	Maximum running frequency
2: output current	3 times motor rated current
3: motor speed	The motor speed (rpm) is calculated according to the maximum frequency
4: DC voltage	220：415V
	400：830V
5: output voltage	Motor rated voltage

For example:

If you want to make AO (0V～10V) indicate DC bus voltage (0V～315V), set the following:

Set P04.03 = 4, when actual DC bus voltage is 300V, AO = 10V * (300V / 315V * 100%) = 9.52V

ID	Function	Range【Default】	Change Mode
P04.04	Analogue output scaling	0.000～20.000【1.000】	Run&Stop

This parameter is used to enlarge the analog output according to user requirements.

ID	Function	Range【Default】	Change Mode
P04.05	DI1 function	0～16【0】	Stop Only
P04.06	DI2 function	0～16【1】	Stop Only
P04.07	DI3 function	0～16【2】	Stop Only

0: run forward(FWD)

1: run reverse(REV)

2: Jog forward

3: Jog reverse

4: run

5: FWD/REV

6: /stop

7: coast stop

8: preset select bit 0

9: preset select bit 1

10: UP

11: DOWN

12: reset of UP/DOWN output

13: external trip

14: reset trip

15: control channel is switched to terminal

16: no function

Description:

- 0～7: Operation mode
- 8～9: preset select 0/1

  When preset is selected as reference source, 3 or 4 presets can be selected.

  Note: Preset is prior to other reference. That is one or two of DI1, DI2 and DI3 is set as preset select bit 0 (8) or preset select bit1 (9). And at the same time, terminals areactive, and then source reference is change to preset which is decided by terminals status. Refer to the explanation of parameters P02.07 to P02.10 for detail.
- 10～12: UP/DOWN

UP/DOWN output is controlled by the 3 bits, which increases or decreases with P01.08 or P01.09.

Note: UP and DOWN act at the same time, then UP/DOWN holdsits current value.

- 13: external trip

  When DI is select as external trip function, Trip F018 is displayed, once DI is connected with common part.

- 14: reset trip

  Set DI as reset trip function. When drive is in fault status, and the fault number is less than F030, once DI is connected to common part, the trip is cleared.

- 15: control channel is switched to terminal

  Once DI is set as this function. When DI is connected to common part, the control mode is changed to terminal control from current control mode. Ex. P01.03 = 2, DI3 is set as control channel is switched to terminal (DI3 = 15), when DI3 is connected with common part, then drive is controlled by terminal.

ID	Function	Range【Default】	Change Mode
P04.08	3-wire mode	0～2【0】	Stop Only

0: disable

1: 3-wire 1

2: 3-wire 2

When 3-wire control mode1 (P04.08=1) is selected, DI1, DI2, DI3 are automatically set as below:

DI1 is STOP switch SB1 (N.C.), level-triggered, P04.05=6

DI2 is FWD switch SB2 (N.O.), edge-triggered (latched), P04.06=0

DI3 is REV switch SB3 (N.O.), edge-triggered (latched), P04.07=1

Wiring is as below figure 4-12:

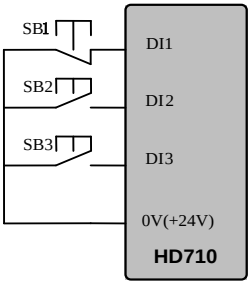


Figure 4-163-wire control mode 1 connection

SB1: Stop button SB2: Run Forward button SB3: Run Reverse button

Press SB2, drive is running forward and the order is latched;

Press SB3, drive is running reverse and the order is latched;

Press SB1, drive stops.

When (P04.08=2) 3-wire control mode2 is selected, DI1, DI2, DI3 are automatically set as below:

DI1 is RUN switch SB1 (N.O.), edge-triggered (latched), P04.05=4

DI2 is STOP Switch SB2 (N.C.), level-triggered, P04.06=6

DI3 is FWD/REV Switch K, level control, P04.07=5

Wiring is as below figure 4-13:

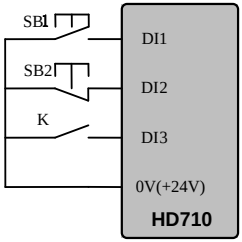


Figure 4-173-wire control mode 2 connection

SB1: Run button SB2: Stop button K: Direction switch

Press SB1, drive is running, order is latched.

K is open, run forward; K is closed, run reverse.

Press SB2, drive stops.

Note:

After press SB2, drive stops, release the SB2button, the drive keeps stop, have to trigger the SB1 again, and then drive will run.

ID	Function	Range【Default】	Change Mode
P04.09	Relay function	0～9【0】	Stop Only

0: Drive healthy

No trips generated after power on, the relay acts;

1: Drive is active

IGBT working, the drive is running, the relay acts;

2: External trip

External fault alarm occurs, the relay acts;

3: Under voltage trip

When the DC bus voltage level below the under voltage limit, the relay acts;

4: Alarm indicator

The relay acts with alarm Hxxx;

5: Frequency is arrival

When output frequency in band of frequency arrival, the relay acts;

6: Torque limit is working

When torque reference is limited by torque limit, the relay acts;

7: Back up

8: At zero speed

When output frequency lower than P02.22, the relay acts.

9: no function

ID	Function	Range【Default】	Change Mode
P04.10	DI common select	0～1【0】	Stop Only

This parameter is used to define common point of digital input terminal.

0: common point is 0V (source);

1: common point is +24V (sink).

ID	Function	Range【Default】	Change Mode
P04.11	DO1 function	0～9【8】	Stop Only

0: Drive healthy

No trips generated after power on, DO1 output +24V;

1: Drive is active

IGBT working, the drive is running, DO1 output +24V;

2: External trip

External fault alarm occurs, DO1 output +24V;

3: Under voltage trip

When the DC bus voltage level below the under voltage limit, DO1 output +24V;

4: Alarm indicator

Alarm Hxxx, DO1 output +24V;

5: Frequency is arrival

When output frequency in band of frequency arrival, DO1 output +24V;

6: Torque limit is working

When torque reference is limited by torque limit, DO1 output +24V;

7: Back up

8: At zero speed

The drive output indication signal at zero speed. More specifically, when output frequency lower than P02.22, DO1 output +24V.

9: no function

ID	Function	Range【Default】	Change Mode
P04.12	AI1 scaling	0.000～20.000【1.000】	Run&Stop

This parameter is used to scale the analogue input 1 if so desired.

ID	Function	Range【Default】	Change Mode
P04.13	AI1 upper limit	0.0%～100.0%【100】	Run&Stop

ID	Function	Range【Default】	Change Mode
P04.14	AI1 lower limit	0.0%～P04.13【0】	Run&Stop

ID	Function	Range【Default】	Change Mode
P04.15	Relay1 inverter	0～1【0】	Run&Stop

The relay status is controlled by this parameter:

If P04.15 is set to 0, Relay1 status inverter disabled.

If P04.15 is set to 1, Relay1 status inverter enabled.

ID	Function	Range【Default】	Change Mode
P04.16	AI1 function selector	0～16【16】	Stop Only

0: run forward (FWD)

1: run reverse (REV)

2: Jog forward

3: Jog reverse

4: run

5: FWD/REV

6: 3-wire enable

7: coast stop

8: preset select bit 0

9: preset select bit 1

10: UP

11: DOWN

12: reset of UP/DOWN output

13: external trip

14: reset trip

15: control channel is switched to terminal

16: analogue reference frequency

Note:

- Terminal AI1 can be used as analogue input terminal and digital input terminal.
- 0～15: digital input function, refer to P04.05～P04.07 for details.
- 16: analogue input function, analogue reference frequency.

ID	Function	Range【Default】	Change Mode
P04.17	analogue input operation display	−100.0%～100.0%【0.0%】	Actual

- Analogue input operation display indicates analogue operation result after analogue input is added toanalogue input deviation, multipliedby analogue amplification factor, and limited by analogue input upper and lower limits, which can be the reference value of PID.
- Note: when treating analogue input display as PID reference value, please set P04.16 to analogue reference frequency.

ID	Function	Range【Default】	Change Mode
P04.21	Main reference	0～5【0】	Run&Stop

0： no input

1： multistage velocity 3

2： multistage velocity 4

3： analogue input operation display

4： UP/DOWN

5： keypad

PID main reference is the percentage of the set function code value to its maximum value.

ID	Function	Range【Default】	Change Mode
P04.22	PID enable	0～1【0】	Run&Stop

0： off

1： on

ID	Function	Range【Default】	Change Mode
P04.23	Reserved		

ID	Function	Range【Default】	Change Mode
P04.24	PID reference source	0～5【0】	Run&Stop

0： no input

1： multistage velocity 3

2： multistage velocity 4

3： analogue input operation display

4： UP/DOWNkeypad

Like PID main reference, PID reference source acts as input of PID module in the form of percentage.

ID	Function	Range【Default】	Change Mode
P04.25	PID reference inverter	0～1【0】	Run&Stop

0：off

1：on

ID	Function	Range【Default】	Change Mode
P04.26	PID PID feedback	0～5【0】	Run&Stop

0： no input

1： multistage velocity 3

2： multistage velocity 4

3： analogue input operation display

4： UP/DOWN keypad

Like PID main reference, PID feedback acts as feedback input of PID module in the form of percentage.

ID	Function	Range【Default】	Change Mode
P04.27	PID feedback inverter	0～1【0】	Run&Stop

0：off

1：on

ID	Function	Range【Default】	Change Mode
P04.28	PID reference change rate	0.0 s～3200.0 s 【0.0 s】	Run&Stop

This parameter defines the time thatreference input slope needs to change from 0.0% to 100.0%.

ID	Function	Range【Default】	Change Mode
P04.29	PID proportional gain	0.000～4.000【1.000】	Run&Stop

This is the proportional gain applied to the PID error.

Proportional gain depends on the present error. Proportional adjustment immediately respond to error. Once error generates, the PID controller is enabled. It makes the error of controlled variable reduced and the proportional gain increase for reducing the error.

A high proportional gain results in a large change in the output for a given change in the error. If the proportional gain is too high, the system can become unstable. In contrast, a small gain results in a small output response to a large input error, and a less responsive or less sensitive controller.

NOTE:If P04.29 is set to zerothen the proportional action is disabled.

ID	Function	Range【Default】	Change Mode
P04.30	PIDintegralgain	0.000～4.000【0.500】	Run&Stop

This is the gain applied to the PID error before being integrated.

As long as the error is not zero,the integrator attempts to minimize the error by adjusting the process control inputs.The control action will not change until the error is zero. The system is stable and the error is disappeared. The integral action is controlled by the integral gain. If integral gain is high, the integral action is better and dynamic response is fast. If not, the integral action is weak and the dynamic response is slow. If P04.30 is set to zero then the integral action is disabled.

ID	Function	Range【Default】	Change Mode
P04.31	PIDdifferential gain	0.000～4.000【0.000】	Run&Stop

This is the gain applied to the PID error before being differentiated.

PID derivative gain is a prediction of future errors and based on current rate of change.If the PID derivative gain is set correctly, the overshoot and adjusting time will be reduced.Derivative action cannot be used independently. It is used with proportional action or integral action together.

NOTE:

- If the parameter is set too big then the derivative action is too strong. It may be cause oscillating and the PID output with a “peak” or “sudden jump”.
- If P04.31 is set to zero then the derivative action is disabled.

ID	Function	Range【Default】	Change Mode
P04.32	PID upper limit	0.0%～100.0%【100.0%】	Run&Stop
P04.33	PID lower limit	−100.0%～P04.32【0.0%】	Run&Stop
P04.34	P04.32, P04.33range	0～1【0】	Run&Stop

If P04.34 = 0, upper limit (P04.32) defines the maximum positive output of PID controller, and lower limit (P04.33) defines the minimum positive output or maximum negative output of PID controller.

f P04.34 =1, upper limit (P04.32) defines the maximum positive output or maximum negative output of PID controller.

ID	Function	Range【Default】	Change Mode
P04.35	PID output amplification factor	0.000～4.000【1.000】	Run&Stop

PID output will be adjusted by this parameter before being added to main reference. Output will adjust automatically to match target parameter range after being added to main reference.

ID	Function	Range【Default】	Change Mode
P04.36	PID integral holding enable	0～1【0】	Run&Stop

When P04.36 = 1, PID integral term will stay unchanged.

ID	Function	Range【Default】	Change Mode
P04.37	PID output holding enable	0～1【0】	Run&Stop

P04.37 = 1，The output of PID controller is a constant. When P04.37 = 1, PID output will stay unchanged.

ID	Function	Range【Default】	Change Mode
P04.38	PID output *destination*	0～1【0】	Run&Stop

Adjusted by amplification factorand added to PID main reference input,PID output value is in the form of percentage.

When P04.38= 1, the percentage PID module outputs will change to the reference value corresponding to PID frequency reference.

ID	Function	Range【Default】	Change Mode
P04.39	PID output display	−100.0%～100.%【0.0%】	Actual

This parameter displays PID error adjusted by proportional, integral and differential terms and limited by the values decided by P04.32, P04.33 and P04.34.

ID	Function	Range【Default】	Change Mode
P04.40	PID error levle	−100.0%～100.%【0.0%】	Actual

This parameter monitors the error of the PID controller.

PID error = PID reference－PID feedback

ID	Function	Range【Default】	Change Mode
P04.41	drive sleep mode enable	0～1【0】	Stop Only

0： off

1： on

ID	Function	Range【Default】	Change Mode
P04.42	drive sleep mode channel	0～1【0】	Stop Only

0： no function

1： output frequency

ID	Function	Range【Default】	Change Mode
P04.43	drive sleep threshold	0.0%～100.0%【0.0%】	Stop Only

When P4.42=1, the absolute value of output value will be less than P4.43 and lasting time will exceed P4.44; then output will be 0, H007 will be displayed on the keypad and the drive will sleep.

ID	Function	Range【Default】	Change Mode
P04.44	drive sleep delay time	0.0s～3000.0s【30.0s】	Stop Only

ID	Function	Range【Default】	Change Mode
P04.45	drive wakeup mode	0～1【1】	Stop Only

when P04.45=0, the absolute value of parameter set by wakeup feedback channel P04.46 will be less than drive wakeup threshold P04.47, and lasting time will be greater than P04.48, and the drive will be in wakeup mode from sleep mode and rerun according to the previously set parameters.

When P04.45= 1 , the absolute value of parameter set by wakeup feedback channel P04.46 will be greater than drive wakeup threshold P04.47, and lasting time will be greater than P04.48, and the drive will wakeup.

ID	Function	Range【Default】	Change Mode
P04.46	wakeup feedback channel	0～1【0】	Stop Only

0： no function

1： PID feedback reference

ID	Function	Range【Default】	Change Mode
P04.47	drive wakeup threshold	0.0%～100.0%【0.1%】	Stop Only

ID	Function	Range【Default】	Change Mode
P04.48	drive wakeup delay time	0.0s～3000.0s【0.1s】	Stop Only

ID	Function	Range【Default】	Change Mode
P04.49	Sleep status indicator	0～1【1】	Actual

When P04.49=1, it indicates the drive is in sleep status.

4.6 Menu P05: Display Parameter

ID	Function	Range【Default】	Change Mode
P05.01	Trip1	0～99【0】	Actual
P05.02	Trip 2	0～99【0】	Actual
P05.03	Trip 3	0～99【0】	Actual
P05.04	Last trip	0～99【0】	Actual

The drive records its last 4 times trip, and P05.04 records the last trip, while P05.01 records the first trip. When there is new trip (e.g. the fifth trip), the trip will be recorded in P05.04; meanwhile, all the old trip record menu number will decrease. And "the first trip" will be cleared, as "the second trip" will replace it recorded as the first trip. The following table lists trip of HD710. The trip character format is "Fxxx", "xxx" is the trip number. E.g., there is over current trip, which trip number is 1, and then drive will display F001.

Note: Trip F003 will be stored only when the drive is running.

ID	Function	Range【Default】	Change Mode
P05.05	Last trip frequency	−max. frequency～+max. frequency	Actual
P05.06	Last trip current	0.0A～3×motor ratedcurrent	Actual
P05.07	Last trip DC bus voltage	200V: 0 to 415V 400V: 0 to 830V	Actual

The three parameters are used to indicate drive running frequency, current and DC bus voltage when the last trip occurred.

ID	Function	Range【Default】	Change Mode
P05.08	Setup reference display	−max. frequency～+max. frequency【Actual】	Actual
P05.09	Running frequency	−max. frequency～+max. frequency【Actual】	Actual
P05.10	Output voltage	0V～drive rated voltage【Actual】	Actual
P05.11	DC voltage	200V rating drive: 0 to 415V【Actual】 400V rating drive: 0 to 830V【Actual】	Actual
P05.12	Output current	0.0A～3×Motor rated current【Actual】	Actual
P05.13	Torque current	±3×Motor rated current【Actual】	Actual

P05.08indicates drive setting frequency.

P05.09 indicates drive output frequency.

P05.10 indicates drive output voltage.

P05.11 indicates drive DC bus voltage.

P05.12 indicates drive output current.

P05.13 indicates torque current.

ID	Function	Range【Default】	Change Mode
P05.14	Heatsink temperature	−25℃～127℃【Actual】	Actual
P05.15	IGBT junction temperature	−25℃～200℃【Actual】	Actual

P05.14indicates heatsink temperature.

IGBT junction temperature is calculated by heatsink temperature and drive power part thermal module, which is displayed in the parameter. Moreover, the temperature can be used to change drive switch frequency to decrease power device heat loss.

ID	Function	Range【Default】	Change
P05.16	AI level	0.0%～100.0%【Actual】	Actual

Indication of AI input analog signal.In voltage input mode, its input range is 0 to 10V. And in current input mode, its range is 0 to 20mA with 10bit resolution. The value ranges from 0.0% to 100.0%, which is corresponding to P04.01 setting range.

ID	Function	Range【Default】	Change
P05.17	AO level	0.0%～100.0%【Actual】	Actual

P05.17 indicates AO output analog signal.

For example：AO1 output voltage＝5V， P05.17= $\frac{5V \times 100\%}{10V}$ =50.0%

ID	Function	Range【Default】	Change Mode
P05.18	DI1 status	0～1【Actual】	Actual
P05.19	DI2 status	0～1【Actual】	Actual
P05.20	DI3 status	0～1【Actual】	Actual

Indication of DI1, DI2 and DI3 input state.When digital input terminal is disconnected with common point, display 0; when digital input terminal is connected with common point, display 1.

ID	Function	Range【Default】	Change Mode
P05.21	Relay1 status	0～1【Actual】	Actual

The parameter is used to display Ralay1 status: 0 means relay contactor for the disconnection of state, 1 means relay contactor for the connection.

ID	Function	Range【Default】	Change Mode
P05.22	DO1 status	0～1【Actual】	Actual

The parameter is used to display digital output DO1 status: when digital output is 0V, display 0; when digital output is +24V, display 1.

ID	Function	Range【Default】	Change Mode
P05.23	Model code	0～255【Actual】	Actual

The parameter is in accord with drive model, the drive will autotune after power on. If the drive model is wrong, the drive will produce a trip F038.

HD710 each model of model parameters is shown as table below:

Table 4-9 Model parameter table

Model Name	Model Parameter	Size
HD710-20D00040	0	A
HD710-20D00075	1	A
HD710-20D00150	2	A
HD710-20D00220	3	B
HD710-20D00400	8	C
HD710-40T00075	4	A
HD710-40T00150	5	A
HD710-40T00220E	66	A
HD710-40T00220	6	B
HD710-40T00400	7	B
HD710-40T00550E	65	B
HD710-40T00550P	64	B
HD710-40T00550	9	C
HD710-40T00750	10	C
HD710-40T01100P	72	C

ID	Function	Range【Default】	Change Mode
P05.24	Power MCU software	0～99.99【Actual】	Actual
P05.25	Control MCU software	0～99.99【Actual】	Actual

Drive software version is composed of xx and yy,its format is "xx.yy". xx indicates the upgrade of hardware compatibility , yy indicates the upgrade of product file change.

ID	Function	Range【Default】	Change Mode
P05.26	running time record: year. day	0.000year.day～9.364 year.day【Actual】	Actual
ID	**Function**	**Range【Default】**	**Change Mode**
P05.27	running time record: hour. minute	0.00hour. minute ～ 23.59hour. minute 【Actual】	Actual

The operating time of the inverter is recorded by this parameter.

5 Troubleshooting

5.1 Faults and corrective actions

When drive trip (fault) happens, the display panel will display the corresponding Trip coed, drive output is disabled. HD710 trip list is in the table 5-1, the range is F001～F043. If there is a trip happens, please check according the guide in table 5-1, and record the faults phenomena carefully, if need service support, please contact local distributor or supply factory.

Table 5-1 Faults and corrective actions

Trip Code	Trip Description	Possible Reasons	Corrective Actions
F001	Over current Turn off the IGBTs, can reset after 10s when trip removed	Output shortage	Checking the motor cable and electric connection
		Accelerating or decelerating time too short	Use appropriate ramp time
		When the motor axis is not static, run the drive	By P01.10, set the start mode is spinning
		Inner fault	Contact service
F002	Over voltage Turn off the IGBTs, can reset after 1s when trip removed	Supply voltage is too high	Make sure the power supply is in the spec. arrange
		Load change suddenly	Avoid to change load suddenly
		Decelerating rate is too short	Increase the deceleration rate and add a suitable brake resistor
		Inner fault	Contact service
F003	Under voltage Turn off the IGBTs, can auto reset after trip removed	Supply voltage is low	Checking the power supply
		During drive power off	Normal, and not log in the trip tracking
		Inner fault	Contact service

Trip Code	Trip Description	Possible Reasons	Corrective Actions
F004	Input phase loosing Stop the drive according to the Stop mode, turn off the IGBTs, can reset after 1s when trip removed	Power supply phase lost	Checking the power supply and cabling
F005	Output phase loosing Stop the drive according to the Stop mode, turn off the IGBTs, can reset after 1s when trip removed	The output phase lost	Checking the output voltage and cabling
		Inner fault	Contact service
F006	Brake unit shorted Turn off the IGBTs, can reset after 10s when trip removed	Brake resistor trouble	Checking the brake resistance and the cabling
		Inner fault	Contact service
F007	Heatsink1 over heat, turn off the IGBTs, can reset after 1s when trip removed	Environmental temperature is high	Reducing the environmental temperature
		Air flow channel blocked	Clean the air flow channel
		Fan failed	Replace the fan
		Inner fault	Contact service
F008	Reserved	–	–
F009	IGBT junction over heat turn off the IGBTs, can reset after 1s when trip removed	Switch frequency is higher	Reduce the switch frequency
		Frequently accelerating and decelerating under heavy load condition	Replaced by a larger drive; increase the ramp time; enable the auto adjust function on switch frequency
		Inner fault	Contact service

Trip Code	Trip Description	Possible Reasons	Corrective Actions
F010	Motor overload Stop the drive according to the Stop mode, turn off the IGBTs, can reset after 1s when trip removed	V/F is not right	Setup V/F and boost correctly
		Supply voltage is lower	Checking the power supply and cabling
		Motor axis is stocked or the load changing is too big	Checking the load
		The factor for motor overload protecting (P12.12) is lower	Correct the factor
F011	Reserved	–	–
F012	AI1over current Stop the drive according to the Stop mode, turn off the IGBTs, can reset after 1s when trip removed	AI1 input current is over 26mA	Checking AI1 input
F013	AI1 input loosing Stop the drive according to the Stop mode, turn off the IGBTs, can reset after 1s when trip removed	AI1 input current is smaller than 3mA	Checking AI1 input
F014	User 24V overload Stop the drive according to the Stop mode, turn off the IGBTs, can reset after 1s when trip removed	Output current of 24V and DO1is over 100mA	Checking if there is shortage on the output of DO and 24V
F015	Parameter cloning wrong can reset after 1s when trip removed	The display panelcloning is abnormal	Power up again
		The display panelEEPROM is empty, and download the parameter setup to the drive	Upload the parameter setup to the display panel, then do the download
		Inner fault	Contact service

Trip Code	Trip Description	Possible Reasons	Corrective Actions
F016	Auto-tune wrong can reset after 1s when trip removed	The drive size can't match the motor power size	Change the drive
		Set the wrong motor data	Reset up the motor data by motor nameplate
		Before the auto-tune finished, stop the drive	Wait until finished
F017	Output terminal short circuit when power up	output terminal short circuit	Check wiring and motor insulation
		Current detection fault	Contact service
F018	External fault Stop the drive according to the Stop mode, turn off the IGBTs, can reset after 1s when trip removed	An external fault input from one of theDI terminals	Checking the external equipments
F019	communication fault turn off the IGBT, the drive can be reset 1 second after fault is removed	communication fault between the drive and remote keypad or other external options	check connection lines contact service
F020	EEPROM read & write failure	Wrong happens when read & write the control word	Press the STOPswitch to reset the drive and try again; contact service
		Inner fault	Contact service
F021	Destination fault can reset after 1s when trip removed	Wrong parameter destination	Checking if there parameters are set to the same function, correct it, press STOP switch to reset. Load default, and reset the drive
F022	reserved		

Trip Code	Trip Description	Possible Reasons	Corrective Actions
F023	reserved		
F024	internal time-logictripturn off the IGBT, the drive can be reset 1s after fault is removed	internal time-logic fault	Contact service
F025～F029	Reserved	–	–
F030	Soft start circuit fault Turn off IGBTs, can't reset	Soft start circuit failed	Contact service
F031	Reserved	–	–
F032	Reserved	–	–
F033	Current sense fault Turn off IGBTs, can't reset	Inner fault	Contact service
F034	Power DSP fault Turn off IGBTs, can't reset	Software overflow	Power off and up
		Inner fault	Contact service
F035	MCU can't receive the data from DSP Turn off IGBTs, can't reset	Software abnormal	Contact service
		MCU or DSP failed	Contact service
F036	MCUreceives wrong data from DSP Turn off IGBTs, can't reset	External disturbance	Proper cable layout
		Inner fault	Contact service
F037	Over current during power up Turn off IGBTs, can't reset	Earth fault or current sense circuit failure	Checking the output cabling and motor; Contact service
F038	Wrong drive model Turn off IGBTs, can't reset	Inner fault	Contact service

Trip Code	Trip Description	Possible Reasons	Corrective Actions
F039	Inner thermister failed Turn off IGBTs, can't reset	IGBT damaged	Contact service
F040	Software abnormal Turn off IGBTs, can't reset	Software running wrong	Contact service
		MCU or DSP failed	Contact service
F041	Watchdog failure Turn off IGBTs, can't reset	Software wrong	Contact service
		MCU or DSP failed	Contact service
F042	Reserved	–	–
F043	EEPROMinternal fault Turn off IGBTs, can't reset	MCU or DSP failed	Contact service
		EEPROM failed	Contact service

All above trips can be categorized into 4 types, details in table 5-2:

Table 5-2 Fault category

Type	Trips	Description
Auto reset	F003	F003 (under voltage), can auto reset the drive baseon the actual DC bus voltage.
Can not reset	≥F030	Fault from inner failure (except external disturbance).
EEPROM read & write	F020	When the trip happens, can load default, and then reset the drive.
Odinary trip 1	F001, F006	can reset after 10s when trip removed
Odinary trip 2	Other trips	can reset after 1s when trip removed

Note:

- F003 can be auto reset, the under voltage threshold level and hysteresis is different with different rated voltage level.
- When F003 happens, drive starts to save the parameters.
- Only when the drive is active, the trip F003will be recorded in the fault tracking log.
- Menu P5 is for trip tracking.

5.2 Alarm and treatment

When drive is alarming, the drive will keep running and the display panel will display relative Alarm Code(Hxxx). The alarm code will keep flashing for 3 seconds then turn over to the normal display, the normal display will flash for 3 second then back to flash alarm code, will keep this cycle until the alarm is removed.

Table 5-3 Alarm codes and treatments

Code	Description	Possibilities	Treatments
H001	Current limit is working	Output current is limited at: P02.03×P01.13	Checking the motor cable
			Properly increase the ace. and deceleration rate
			Set P01.10to be the correct start mode (spinning)
H002	Reserved	–	–
H003	Heatsink is hot	Environment temperature is higher	Reduce the environment temperature
		Air flow channel stocked	Clean the flow channel
		Fan failed	Replace the fan
H004	IGBT junction temperature is high	Frequently accelerating and decelerating	Modify the parameter setup
			Use bigger drive
H005	Low DC bus operation (only for 400V models)	Power supply voltage is low	Checking the power supply
H006	Reserved	–	–
H007	sleep alarm	the drive is in sleep mode	the alarm stops when drive is out of sleep mode

5.3 Other issues

During the drive operation, maybe some other issues can happen and not caused by drive itself, so the drive will not display Trip or alarm code. Customer can check the issues following the suggestion in below table 5-4.

Table 5-4 Other issues

Issues	Reasons	Checking And Treatment
Motor does not start	Power issue	Checking input& output voltage and unbalance level
		If the motor connection is correct
		If the busbar link between +DC and +DC1fitted correctly
	Control part	Run order input active?
		If both FWD and REV active same time?
		If the reference is 0?
		If the reference source is analogue, is there correct analogue input signal?
		If set P04.10 correctly? (correct common point)
	Parameter setup issue	If the control channel is set correctly? (P01.03)
		If the reference source is selected correctly?(P01.04)
		Check the digital input ports whether is set for 7, and is connected with the common point
	Load issue	If the load is too big?
		If the mechanical part is stuck?
	Motor torque is not enough	Check if the setup about torque parameters correctly?
Motor makes abnormal noise	Drive output voltage unbalance	Checking the motor connection
	Mechanical issue	Checking motor and related mechanical parts
	Wrong setup	Checking the parameter setup
Motor running direction abnormal	Motor cabling issue	Checking the output U, V, W if matches U, V, W of motor
	Control signal issue	Checking if the correct direction order is enable
Motor ramp motion is not stable	Accel. or decel. rate is too short	Try suitable values for P01.08and P01.09
	Too big load	Adjust the load condition

Issues	Reasons	Checking And Treatment
After ramp operating, speed is not stable	Load issue	Checking if the mechanical load keeps changing
	No auto-tune	Do the motor auto-tune
	Motor data setup issue	Checking if set the motor data according to the motor nameplate
Cannot write the parameter	Change is limited	Only can change at stop
		The parameter property is "actual"
	Conflicts on parameter setup	Load default and set the parameters correctly
No display on the Display panel	Link issue	Checking the link between the display panel and drives, if the Display panel is fixed well?
	DC bus busbar link issue	check the link between +DC and +DC1fitted well

6 Maintenance

6.1 Routine maintain

After long time running in the different environmental conditions, like high temperature, humidity, dusty, vibration, etc, some drive inner parts could be degrading somehow, this situation can make the risk of drive failure, or less of lifetime, so it is necessary to do the drive routine and termly maintenance.

Routine maintenance items:

- If there is abnormal noise from motor rotating
- If there is abnormal vibration during the motor running
- If the drive install environmental conditions changed
- If the drive fan is working well
- If the drive temperature is higher than normal

Daily clean:

- Try to keep the drive tidy.
- Clean the dust from drive surface, avoid the dust into the drive, especially metal dust.
- Effectively clean the oil stuff from the fan surface.

6.2 Periodic checking

Base on actual application and environment conditions, customer needs to do the termly checking to remove the risk of drive failure or safety issue. Attention, must make sure when the drive is powered off, the switchingsupply must bedisconnected by an approved electrical isolation device before gaining access tothe electrical connections. Checking details as below:

Table 6-1 Termly checking

Checking Area	Items	Method	Judgment
Environment	Make sure temperature, humidity, vibration level	Visual and measurement instrument	Must meet the HD710 environment specification
	If there are tools or other stuff around the drive	Visual	Remove them

Checking Area		Items	Method	Judgment
Voltage		Voltage of power and control parts	Instruments	Meet the technical specification
Mechanical		Abnormal noise or vibration	Visual, hearing	Normal
		Screws or nuts losing?	Retighten	Normal
		Deform, broken?	Visual, replace	Normal
		Colour changed by heating?	Visual and replace	Normal
		Attached dirty, dust?	Visual and clean	Normal
Power	General	Screws or nuts losing?	Retighten	Normal
		Attached dirty, dust on conductors	Clean	Normal
	Power terminal	Broken?	Visual and ask service	Normal
	Brake resistor	Smell or broken by heating?	Visual, nose	Normal
		Resistance normal?	Multimeter	The resistance should be in ± 10% error
	Transformer, choke	Unusual vibration or smell?	Visual, hearing, nose	Normal
	Contactor, relay	Cracking noise	Hearing	Normal
		Contactors are ok	Visual	Normal
Cool system	Fan	Screws loosing?	Retighten	Normal
		Colour changed by heating	Visual	Normal
		Abnormal noise or vibration	Visual, hearing, make the blades moving	Rotating smoothly
	Air flow channel	Heatsink, channel stocked?	Visual and clean	Normal

6.3 Parts replacement

Inside a drive, different parts have different lifetimes according to normal technique rules, and the actual lifetime is related with operating and environmental conditions, in order to maintain the drive to be healthy, it is recommended to replace some electrical parts termly, the suggestion is as in following table.

Table 6-2 Parts replacement recommending

Parts	Recommending Replace Time
Fan	2～3 years
Electrolytic capacitors	4～5 years
PCB	5～8 years

6.4 Drive storage

When the customer plans to store the drive for a short time or long time, please follow the below instructions:

- It is better to keep the drive in the original factory package.
- After long time storage, the drive's capacitors must be dealt with.
  Note: The calculation of storage time is not from the purchase date, but should be the factor' delivery date.

Table 6-3 Action on drive after storage

Storage Time	Action	Ready Time
In half year	No action	N/A
Half year to two years	Before run the motor, the drive is applied normal voltage for an hour	1 hour
Over two years	Use a variac to apply the voltage on the drive gradually	2 hours

6.5 Disposal

Please pay attention when the failed drives are disposal:

- Electrolytic capacitor: when set fire on the drive electrolytic capacitors, explosion may happen.
- Plastic parts:when fire the plastic parts of the drive, poisonous air could be released.。
  Handle method: handle the disposal drive as industrial waste.

Appendix

1 Communication

1. Communications port and wiring

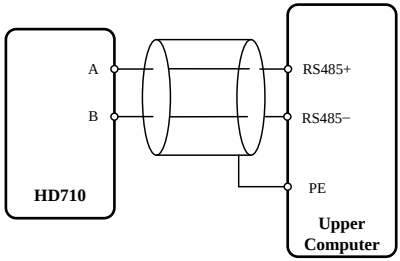
Hardware interface of HD710 drive communication:

RJ45 port

Two terminals (A/RS485+, B/RS485−)

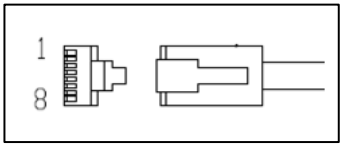
These two kinds of interface can play the same electric functions.

A serial communications link enables one or more drives to be used in a system controlled by a host controller such as a PLC or computer.



A-figure 1-1 Communications link

Note: The RJ45 port pin as shown in A-figure 1-1a, also canuse parallel line.

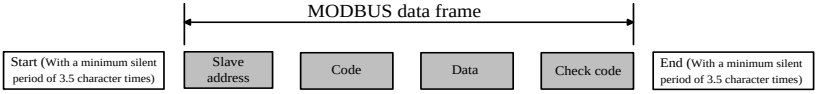


A-figure 1-1A RJ45 port pin configuration diagram

Pin Number	Function
1	NC
2	A（485+）
3	0V
4	24V
5	NC
6	Enable
7	B（485−）
8	B（485−）

2. Communication mode

HD710 uses Modbus RTU, it supports to read/ write normal registers. The frame has the following basic format,



A-figure 1-2 Modbus RTU message format

Modbus RTU uses byte type of "big-endian" to state address and data (except the CRC, which is "little-endian"), sends high byte firstly, then low byte.

The frame is terminated with a minimum silent period of 3.5 character times at start and end. Use CRC-16 to check the message information.

3. Function codes

The function code determines the different requests.

A-table 1-1 Function code

Code (Hex)	Description
03H	Read multiple registers
06H	Write single register, not save when power off
10H	Write multiple registers, not save when power off
17H	Read and write multiple registers, not save when power off

4. Parameter mapping

The Modbus register address of every parameter is listed in the last column of Parameter list in this manul for user's reference.

The mapping rules between parameter number and register address as below:

Register address (hexadecimal): MNH

M= decimal convert to hexadecimal from "m"

N= decimal convert to hexadecimal from "n"

"m" and "n" calculation is as below, use a parameter Px.y as the example,

x.y*100=m*256+n+1

For example:

Modbus register address of parameter P02.07

2.07×100=0×256+206+1

Then

m=0, n=206

by the decimal to hexadecimal converting,

M=00, N=CE,

So, the Register address=00CEH,

Note: register addresses for all HD710 parameters are in the Appendix3.

5. Function coed example 1 (03H)

The example is to read the contents in P02.07～P02.10 of HD710 drive, details as below table:

A-table1-2 Code 03H example

Master Require							
Drive Node	Code	Start Register Address		NumberOf Register Read		Check Sum Of CRC	
		MSB	LSB	MSB	LSB	LSB	MSB
01H	03H	00H	CEH	00H	04H	25H	F6H

Slave (HD710 drive) Response									
Drive Node	Code	NumberOf Register Read	Contents of P02.01～P02.10					Check Sum Of CRC	
			P02.07		……	P02.10			
			MSB	LSB		MSB	LSB	LSB	MSB
01H	03H	08H	01H	F4H	……	0BH	B8H	86H	3FH

6. Function coed example 2 (06H)

The example is to write 8 into P03.12.

A-table 1-3 Function code 06H example

Master Require							
Drive Node	Code	Register Address		Register Data		Check Sum Of CRC	
		MSB	LSB	MSB	LSB	LSB	MSB
01H	06H	01H	37H	00H	08H	38H	3EH

Slave (HD710 drive) Response							
Drive Node	Code	Register Address		Register Data		Check Sum Of CRC	
		MSB	LSB	MSB	LSB	LSB	MSB
01H	06H	01H	37H	00H	08H	38H	3EH

7. Abnormal communication

If the communication is abnormal, HD710 drive will turn back to the response frame, the format is in the below table.

A-table 1-4Abnormal response format

Drive node	code	Abnormal code	CRC checking sum	
1 bit	1 bit	1 bit	LSB	1 bit

A-table 1-5 Abnormal code description

Code	Description
81H	Not support the parameter
82H	Register address is beyond limit, the registers being read is too many
83H	The content of register is over limit

8. CRC checking

CRC is 16 bit cycle redundance checking, normally the standard CRC-16 is called: x16+x15+x2+1. Send the 16 bit CRC message to LSB, in a frame do the calculation of all bits.

```
const unsigned char auchCRCHi[] = {
    0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0,
    0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
    0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0,
    0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
    0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1,
    0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41,
    0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1,
    0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
    0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0,
    0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40,
    0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1,
    0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
    0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0,
    0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40,
    0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0,
    0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
    0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0,
    0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
    0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0,
    0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
```

```
        0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0,
        0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40,
        0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1,
        0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
        0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0,
        0x80, 0x41, 0x00, 0xC1, 0x81, 0x40
} ;
//Low-Order Byte Table
const char auchCRCLo[] = {
        0x00, 0xC0, 0xC1, 0x01, 0xC3, 0x03, 0x02, 0xC2, 0xC6, 0x06,
        0x07, 0xC7, 0x05, 0xC5, 0xC4, 0x04, 0xCC, 0x0C, 0x0D, 0xCD,
        0x0F, 0xCF, 0xCE, 0x0E, 0x0A, 0xCA, 0xCB, 0x0B, 0xC9, 0x09,
        0x08, 0xC8, 0xD8, 0x18, 0x19, 0xD9, 0x1B, 0xDB, 0xDA, 0x1A,
        0x1E, 0xDE, 0xDF, 0x1F, 0xDD, 0x1D, 0x1C, 0xDC, 0x14, 0xD4,
        0xD5, 0x15, 0xD7, 0x17, 0x16, 0xD6, 0xD2, 0x12, 0x13, 0xD3,
        0x11, 0xD1, 0xD0, 0x10, 0xF0, 0x30, 0x31, 0xF1, 0x33, 0xF3,
        0xF2, 0x32, 0x36, 0xF6, 0xF7, 0x37, 0xF5, 0x35, 0x34, 0xF4,
        0x3C, 0xFC, 0xFD, 0x3D, 0xFF, 0x3F, 0x3E, 0xFE, 0xFA, 0x3A,
        0x3B, 0xFB, 0x39, 0xF9, 0xF8, 0x38, 0x28, 0xE8, 0xE9, 0x29,
        0xEB, 0x2B, 0x2A, 0xEA, 0xEE, 0x2E, 0x2F, 0xEF, 0x2D, 0xED,
        0xEC, 0x2C, 0xE4, 0x24, 0x25, 0xE5, 0x27, 0xE7, 0xE6, 0x26,
        0x22, 0xE2, 0xE3, 0x23, 0xE1, 0x21, 0x20, 0xE0, 0xA0, 0x60,
        0x61, 0xA1, 0x63, 0xA3, 0xA2, 0x62, 0x66, 0xA6, 0xA7, 0x67,
        0xA5, 0x65, 0x64, 0xA4, 0x6C, 0xAC, 0xAD, 0x6D, 0xAF, 0x6F,
        0x6E, 0xAE, 0xAA, 0x6A, 0x6B, 0xAB, 0x69, 0xA9, 0xA8, 0x68,
        0x78, 0xB8, 0xB9, 0x79, 0xBB, 0x7B, 0x7A, 0xBA, 0xBE, 0x7E,
        0x7F, 0xBF, 0x7D, 0xBD, 0xBC, 0x7C, 0xB4, 0x74, 0x75, 0xB5,
        0x77, 0xB7, 0xB6, 0x76, 0x72, 0xB2, 0xB3, 0x73, 0xB1, 0x71,
        0x70, 0xB0, 0x50, 0x90, 0x91, 0x51, 0x93, 0x53, 0x52, 0x92,
        0x96, 0x56, 0x57, 0x97, 0x55, 0x95, 0x94, 0x54, 0x9C, 0x5C,
        0x5D, 0x9D, 0x5F, 0x9F, 0x9E, 0x5E, 0x5A, 0x9A, 0x9B, 0x5B,
        0x99, 0x59, 0x58, 0x98, 0x88, 0x48, 0x49, 0x89, 0x4B, 0x8B,
        0x8A, 0x4A, 0x4E, 0x8E, 0x8F, 0x4F, 0x8D, 0x4D, 0x4C, 0x8C,
```

```
        0x44, 0x84, 0x85, 0x45, 0x87, 0x47, 0x46, 0x86, 0x82, 0x42,
        0x43, 0x83, 0x41, 0x81, 0x80, 0x40
} ;
/*   CRC Generation for Modbus messages   */
// The function returns the CRC as a unsigned short type
unsigned short CCRC_ModbusRTUCRC16 (unsigned char *puchMsg, short usDataLen )
{
    unsigned short ReturnValue;
    // high byte of CRC initialized
    unsigned char uchCRCHi = 0xFF;
    // low byte of CRC initialized
    unsigned char uchCRCLo = 0xFF;
    // will index into CRC lookup table
    unsigned char uIndex;
    // pass through message buffer
    while (usDataLen--)      {
        // calculate the CRC
        uIndex          = uchCRCHi ^ *puchMsg++;
        uchCRCHi        = uchCRCLo ^ auchCRCHi[ uIndex ];
        uchCRCLo        = auchCRCLo[ uIndex ];
    }
    ReturnValue    = uchCRCHi;
    ReturnValue     <<= 8;
    ReturnValue      |= uchCRCLo;
    return ReturnValue;
}
```

9. HD710 communication parameters

A-table 1-6HD710 communication parameters

Parameter ID	Function	Range	Default	Change Mode	Modbus Address
P01.03	Control mode	0: Control terminal 1: Comms. 2: Display panel	0	Stop Only	0066H

Parameter ID	Function	Range	Default	Change Mode	Modbus Address
P01.04	Reference channel	0: AI1 1: Preset 2: E-port 3: Comms. 4: Display panel	0	Run&Stop	0067H
P03.12	Comms. control word	0～65535	0	Run&Stop	0137H
P03.18	Address	0～247	1	Run&Stop	013DH
P03.19	Baud rate	0：2.4KBPS 1：4.8KBPS 2：9.6KBPS 3：19.2KBPS 4：38.4KBPS 5：57.6KBPS	3	Run&Stop	013EH
P03.20	Communication configuration	0: 1-8-1, RTU, no checking 1: 1-8-2, RTU, no checking 2: 1-8-1, RTU, odd checking 3: 1-8-1,RTU,even checking	1	Run&Stop	013FH

Set:

P01.03=1 Communication control mode

P01.04=3 Inserial communicationmode, the frequency can be adjusted by changing P02.07.

P03.12 Comms. Control word. Each bit of the control word corresponds to a sequencing bit or function as shown below:

A-table 1-7Control word (P03.12) description

Bit	Function
0	Drive enable
1	Run
2	3-wire enable
3	Run forward
4	Run reverse
5	FWD/REV

Bit	Function
6	Jog forward
7	Jog reverse
8	Fault reset
9	Saving parameters
10	Clean the trip tack log
11	Enable comms. to write parameters
12	Reserved
13	Reserved
14	Reserved
15	Reserved

The common settings as below:

P03.12 = 1, binary bit is00000001B (01H), drive enable

P03.12 = 2, binary bit is 00000010B (02H), drive run

P03.12 = 8, binary bit is00001000B (08H), drive run forward

P03.12 = 16, binary bit is00010000B (10H), drive run reverse

P03.12 = 32, binary bit is 0010 0000B (20H), FWD/REV

P03.12 = 64, binary bit is01000000B (40H), drive jog forward

P03.12 = 128, binary bit is10000000B (80H), drive jog reverse

If P03.18 (drive address) = 0, the drive will not response the master.

The user can set other parameters according to the actual situation.

10. Scale definition

- Frequency: 1:100

  If the drive reference is 50.00Hz, then for hex is 1388H.

- Time rate: 1:10

  If the accelerating time is 10.0s, then for comms. Hex is 0064H.

- Current rate: 1:10

- Voltage rate: 1:1

  If voltage is 380V,then for comms. Hex is 017CH**.**

11. Examples of application

- Startthe drive running forward and setting frequency is 50.00Hz.

  Analysis:

  The drive run forward, write P03.12=0008H, ModBusregister addressof parameter

P03.12 is 0137H.

Setting frequency is 50.00Hz, write P02.07=1388H, ModBusregister address of parameter P02.07is 00CEH.

A-table 1-8Start drive running forward

Data Frames	Drive Node	Code	Register Address		Register Data		Check Sum Of CRC	
			MSB	LSB	MSB	LSB	LSB	MSB
Require	01H	06H	01H	37H	00H	08H	38H	3EH
Response	01H	06H	01H	37H	00H	08H	38H	3EH

A-table 1-9Reference frequency50.00Hz

Data Frames	Drive Node	Code	Register Address		Register Data		Check Sum Of CRC	
			MSB	LSB	MSB	LSB	LSB	MSB
Require	01H	06H	00H	CEH	13H	88H	E5H	63H
Response	01H	06H	00H	CEH	13H	88H	E5H	63H

- The drive output frequency (P05.09) is 50.00Hz (1388H), output voltage (P05.10) is 380V (017CH). Read the two parameters.

  Analysis:

  ModBus register address of parameter P05.09is 01FCH, ModBusregister address of parameter P05.10is 01FDH.

A-table 1-10Read the drive output frequency and output voltage

Data frames	Drive node	Code	Start register address		Number of register read		Number of register read bytes	The first data of register read		The second data of register read		Check sum of CRC	
			MSB	LSB	MSB	LSB		MSB	LSB	MSB	LSB	LSB	MSB
Request	01H	03H	01H	FCH	00H	02H	–	–		–		05H	C7H
Response	01H	03H	–		–		04H	13H	88H	01H	7CH	7EH	ECH

Note:When the drive is running in the communication control mode, press the switch STOP, the value of parameter P03.12 (communication control word) will not be changed. This means that the user have to reset P03.12 first in order to reset drives, and then write new control words.

2 Parameter List

Menu P01: Basic Parameter

ID	Function	Range	Step	Default	Change Mode	Modbus Register Address
P01.01	Load default	0: no action 1: load default	1	0	Stop Only	0064H
P01.02	Motor control mode	0: V/F 1: open loop vector control1 2; open loop vector control2	1	0	Stop Only	0065H
P01.03	Control mode	0: control terminal 1: comms. 2: display panel	1	0	Stop Only	0066H
P01.04	Reference source selector	0: AI 1: Preset 2: UP/DOWN 3: Serial comms. 4: Display panel 5： PID frequency reference	1	0	Run&Stop	0067H
P01.05	AI mode selector	0: 0mA～20mA 1: 20 mA～0mA 2: 4mA～20mA(current loosing with trip) 3: 20mA～4mA(current loosing with trip) 4: 4mA～20mA(current loosing without trip) 5: 20mA～4mA(current loosing without trip) 6: 0V～10V	1	6	Stop Only	0068H
P01.06	Max. frequency	0.00Hz～300.0Hz	0.01 Hz	50.00Hz	Stop Only	0069H
P01.07	Min. frequency	0.00Hz～Max. frequency	0.01 Hz	0.00Hz	Stop Only	006AH
P01.08	Accel. rate	0.0s～3600.0s	0.1	5.0s	Run&Stop	006BH

ID	Function	Range	Step	Default	Change Mode	Modbus Register Address
P01.09	Decel. rate	0.0s～3600.0s	0.1	10.0s	Run&Stop	006CH
P01.10	Start mode	0: start directly 1: first DC injection, then start 2: catch spinning	1	0	Stop Only	006DH
P01.11	Stop mode	0: ramp 1: coasting 2: ramp+DC injection	1	0	Stop Only	006EH
P01.12	Motor rated voltage	0V～240V	1V	200V：220V	Stop Only	006FH
		0V～480V		400V：380V		
P01.13	Motor rated current	0.1A～30.0A	0.1A	By model	Stop Only	0070H
P01.14	Number of motor pairs of pole	0, 1, 2, 3, 4	1	0	Stop Only	0071H
P01.15	Motor rated frequency	1.00Hz～300.0Hz	0.01 Hz	50.00Hz	Stop Only	0072H
P01.16	Motor full load speed	0rpm～18000rpm	1rpm	0rpm	Stop Only	0073H
P01.17	Auto-tune	0: disable 1: auto-tune 1 (run a time)	1	0	Stop Only	0074H
P01.18	Motor stator resistance	0.000ohm～60.000ohm	0.001 ohm	0	Stop Only	0075H
P01.19	Motor power factor	0.00～1.00	0.01	0.85	Stop Only	0076H
P01.20	Switch frequency	1kHz～15kHz	1kHz	By model	Run&Stop	0077H

ID	Function	Range	Step	Default	Change Mode	Modbus Register Address
P01.21	Voltage boost	0.0%～30.0%	0.1%	By model	Run&Stop	0078H
P01.22	V/F control mode	0: user programmed V/F ramp 1: 2 law ramp 2: 1.7 law ramp 3: 1.2 law ramp	1	0	Stop Only	0079H
P01.23	Power up UP/DOWN reference	0: 0 1: running reference at last power off 2: 0, only can be changed when drive is active 3: running reference at last power off, only can be changed when drive is active	1	0	Run&Stop	007AH
P01.24	Power up reference frequency	0: 0.00Hz 1: the running frequency when last powered off 2: preset1	1	0	Run&Stop	007BH
P01.25	UP/DOWNAcceler ati-on rate	0.0s～250.0s	0.1s	10s	Run&Stop	007CH
P01.26	Digital mode, reference frequency when rerun	0～1	1	1	Stop Only	007DH

Menu P02: Adjustive Parameter

ID	Function	Range	Step	Default	Change Mode	Modbus Register Address
P02.01	V/F frequency	0.00Hz～P01.15	0.01Hz	0.00Hz	Stop Only	00C8H
P02.02	V/F voltage	0.0%～100.0%	0.1%	0.0%	Stop Only	00C9H
P02.03	Current limit	0.0%～300.0%	0.1%	200.0%	Run&Stop	00CAH
P02.04	Current controller Kp gain	0.001～10.000	0.001	0.020	Run&Stop	00CBH
P02.05	Current controller Ki time	0.00～100.00s	0.01s	0.20s	Run&Stop	00CCH
P02.06	Slip compensation error	0rpm～18000rpm	1rpm	0rpm	Run&Stop	00CDH
P02.07	Preset 1	−P01.06～+P01.06	0.01Hz	5.00Hz	Run&Stop	00CEH
P02.08	Preset 2	−P01.06～+P01.06	0.01Hz	10.00Hz	Run&Stop	00CFH
P02.09	Preset 3	−P01.06～+P01.06	0.01Hz	20.00Hz	Run&Stop	00D0H
P02.10	Preset 4	−P01.06～+P01.06	0.01Hz	30.00Hz	Run&Stop	00D1H
P02.11	Start frequency	0.00Hz～50.00Hz	0.01Hz	0.00Hz	Run&Stop	00D2H
P02.12	Hold time for start frequency	0.0s～60.0s	0.1s	0.0s	Run&Stop	00D3H
P02.13	Start DC injection current	0.0%～100.0%	0.1%	0.0%	Run&Stop	00D4H
P02.14	Start DC injection time	0.0s～60.0s	0.1s	0.0s	Run&Stop	00D5H
P02.15	Stop DC injecting frequency	0.0%～20.0%	0.1%	0.0%	Run&Stop	00D6H
P02.16	Stop DC injecting current	0.0%～100.0%	0.1%	0.0%	Run&Stop	00D7H
P02.17	Stop DC injecting time	0.00s～60.00s	0.01s	0.00s	Run&Stop	00D8H
P02.18	Jog frequency	0.00Hz～50.00Hz	0.01Hz	0.00Hz	Run&Stop	00D9H
P02.19	Jog interval time	0.1s～60.0s	0.1s	1.0s	Run&Stop	00DAH
P02.20	Skip frequency	0.00Hz～P01.06	0.01Hz	0.00Hz	Stop Only	00DBH
P02.21	Band of skip frequency	0.00Hz～30.00Hz	0.01Hz	0.00Hz	Stop Only	00DCH

ID	Function	Range	Step	Default	Change Mode	Modbus Register Address
P02.22	Threshold of zero speed	0.00Hz～P01.06	0.01Hz	0.50Hz	Run&Stop	00DDH
P02.23	Band of frequency arrival	0.00Hz～P01.06	0.01Hz	2.50Hz	Run&Stop	00DEH
P02.24	Acceleration and deceleration mode	0: Line 1: S curve 1 2: S curve 2 3: special curve	1	0	Stop Only	00DFH
P02.25	S curve start time	0.0%～40.0%	0.1%	20.0%	Run&Stop	00E0H
P02.26	S curve end time	0.0%～40.0%	0.1%	20.0%	Run&Stop	00E1H
P02.27	AI input percentage 1	P02.29～100.0%	0.1%	100.0%	Run&Stop	00E2H
P02.28	Output frequency percentage 1	P02.30～100.0%	0.1%	100.0%	Run&Stop	00E3H
P02.29	AI input percentage 2	P02.31～P02.27	0.1%	50.0%	Run&Stop	00E4H
P02.30	Output frequency percentage 2	P02.32～P02.28	0.1%	50.0%	Run&Stop	00E5H
P02.31	AI input percentage 3	0.0%～P02.29	0.1%	0.0%	Run&Stop	00E6H
P02.32	Output frequency percentage 3	0.0%～P02.30	0.1%	0.0%	Run&Stop	00E7H
P02.33	User code	0～9999	1	0	Run&Stop	00E8H

Menu P03: Accessorial Parameter

ID	Function	Range	Step	Default	Change Mode	Modbus Register Address
P03.01	Run direction select	0: reverse is permitted 1: reverse is disabled	1	0	Stop Only	012CH
P03.02	Deadtime for running direction change	0.0s～3000.0s	0.1s	0.0s	Run&Stop	012DH
P03.03	Parameter cloning	0: no action 1: cloning up to display panel 2: cloning down to the drive	1	0	Stop Only	012EH
P03.04	Auto energy saving control	0～1	1	0	Stop Only	012FH
P03.05	AVR control	0: off 1: on for all condition 2: on except ramp	1	1	Stop Only	0130H
P03.06	Auto-start after power off	0: off 1: on	1	0	Stop Only	0131H
P03.07	Wait time for auto-start	0.0s～60.0s	0.1s	0.0s	Run&Stop	0132H
P03.08	Dynamic brake rate	0.0%～100.0%	0.1%	50.0%	Run&Stop	0133H
P03.09	Dynamic brake DC voltage points	200V: 350V～390V	1	200V：390V	Stop Only	0134H
		400V:650V～780V		400V：780V		
P03.10	Switch frequency auto adjust	0: off 1: on	1	1	Run&Stop	0135H
P03.11	Low DC bus operation (only for 400V models)	0: off 1: on	1	0	Stop Only	0136H

ID	Function	Range	Step	Default	Change Mode	Modbus Register Address
P03.12	Comms control word	0～65535	1	0	Run&Stop	0137H
P03.13	Ramp hold by high voltage threshold	0: off 1: on	1	1	Stop Only	0138H
P03.14	high voltage threshold	220V: 350V～370V 400V: 750V～780V	1	220V：370V 400V：780V	Stop Only	0139H
P03.15	Overload factor	0～(drive rated current/motor rated current)×100%	1	100	Run&Stop	013AH
P03.16	Auto reset	0: no auto reset 1～100: times can auto reset	1	0	Stop Only	013BH
P03.17	Auto reset delay	2.0s～20.0s	0.1s	5.0s	Stop Only	013CH
P03.18	Address	0～247	1	1	Run&Stop	013DH
P03.19	Baud rate	0: 2.4KBPS 1: 4.8KBPS 2: 9.6KBPS 3: 19.2KBPS 4: 38.4KBPS 5: 57.6KBPS	1	3	Run&Stop	013EH
P03.20	Comms. configuration	0: 1-8-1, RTU, without checking 1: 1-8-2, RTU, without checking 2: 1-8-1, RTU, with odd bit checking 3: 1-8-1, RTU, with even bit checking	1	1	Run&Stop	013FH
P03.21	Power off undervoltage faultdisable	0: enabled 1: disabled	1	0	Run&Stop	0140H

ID	Function	Range	Step	Default	Change Mode	Modbus Register Address
P03.22	Setting stop time when zero speed	0.0s～3000.0s	0.1s	0.0s	Run&Stop	0141H
P03.23	keypad lock	0: all keys unlocked 1: all keys locked 2: all keys locked expect RUN and STOP/RESET keys	1	0	Run&Stop	0142H
P03.24	current limit protection control	0: Enable current limit protection 1: Disable current limit protection above fundamental frequency 2: Current limit protection disabledat fast increase or decrease 3: Both disabled	1	0	Stop Only	0143H
P03.25	input phase failure delay	0.0s～3000.0s	0.1s	0.1s	Stop Only	0144H
P03.26	output phase failure protection	0～255	1	0	Stop Only	0145H
P03.27	run direction	0：Forward 1：Reverse	1	0	Stop Only	0146H

Menu P04: Terminal Parameter

ID	Function	Range	Step	Default	Change Mode	Modbus Register Address
P04.01	AI offset	−100.0%～100.0%	0.1%	0.0%	Run&Stop	0190H
P04.02	AI filter time	0.00s～10.00s	0.01s	0.10s	Run&Stop	0191H
P04.03	Analogue output function select	0: output frequency 1: reference frequency 2: output current 3: motor speed 4: DC voltage 5: output voltage 6: no function	1	0	Run&Stop	0192H
P04.04	Analogue output scaling	0.000～20.000	0.001	1.000	Run&Stop	0193H
P04.05	DI1 function	0: run forward(FWD) 1: run reverse(REV) 2: Jog forward 3: Jog reverse 4: run 5:FWD/REV 6: 3-wire enable 7: coast stop 8: preset select bit 0 9: preset select bit 1 10: UP 11: DOWN 12: Reset of UP/DOWN output 13: external trip 14: reset trip 15: control channel is switched to terminal 16: no function	1	DI1: 0	Stop Only	0194H
P04.06	DI2 function			DI2: 1		0195H
P04.07	DI3 function			DI3: 2		0196H
P04.08	3-wire mode	0: disabled 1: 3-wire 1 2: 3-wire 2	1	0	Stop Only	0197H

ID	Function	Range	Step	Default	Change Mode	Modbus Register Address
P04.09	Relay function	0: drive healthy 1: drive is active 2: external trip 3: under voltage trip 4: Alarm indicator 5: frequency is arrival 6: Torque limit is working 7: not used 8: at zero speed 9: no function	1	0	Run&Stop	0198H
P04.10	DI common select	0: source 1: sink	1	0	Stop Only	0199H
P04.11	DO function	0: drive healthy 1: drive is active 2: external trip 3: under voltage trip 4: Alarm indicator 5: frequency is arrival 6: Torque limit is working 7: not used 8: at zero speed 9: no function	1	8	Run&Stop	019AH
P04.12	AI1 scaling	0.000～20.000	0.001	1.000	Run&Stop	019BH
P04.13	AI1 upper limit	0.0%～100.0%	0.1%	100.0%	Run&Stop	019CH
P04.14	AI1 lower limit	0.0%～P04.13	0.1%	0.0%	Run&Stop	019DH
P04.15	Relay1 inverter	0: off 1: on	1	0	Run&Stop	019EH

ID	Function	Range	Step	Default	Change Mode	Modbus Register Address
P04.16	AI1 function selector	0: run forward (FWD) 1: run reverse (REV) 2: Jog forward 3: Jog reverse 4: run 5: WD/REV 6: 3-wire enable 7: coast stop 8: preset select bit 0 9: preset select bit 1 10: UP 11: DOWN 12: reset of UP/DOWN output 13: external trip 14: reset trip 15: control channel is switched to terminal 16: analogue reference frequency	1	16	Stop Only	019FH
P04.17	analogue input operation display	−100.0% ～ 100.0%	0.1%	0.0%	Actual	01A0H
P04.18	Reserved					
P04.19	Reserved					
P04.20	Reserved					
P04.21	Main reference	0: no input 1: multistage velocity 3 2: multistage velocity 4 3: analogue input operation display 4: UP/DOWN 5: keypad	1	0	Run&Stop	01A4H
P04.22	PID enable	0～1	1	0	Run&Stop	01A5H

ID	Function	Range	Step	Default	Change Mode	Modbus Register Address
P04.23	Reserved					
P04.24	PID reference source	0: no input 1: multistage velocity 3 2: multistage velocity 4 3: nalogue input operation display 4: UP/DOWN 5: keypad	1	0	Run&Stop	01A7H
P04.25	PID reference inverter	0～1	1	0	Run&Stop	01A8H
P04.26	PID feedback	0: no input 1: multistage velocity 3 2: ultistage velocity 4 3: nalogue input operation display 4: UP/DOWN 5: keypad	1	0	Run&Stop	01A9H
P04.27	PID feedback inverter	0～1	1	0	Run&Stop	01AAH
P04.28	PID reference change rate	0.0 s ～ 3200.0 s	0.1	0.0	Run&Stop	01ABH
P04.29	PID proportional gain	0.000 ～ 4.000	0.001	1.000	Run&Stop	01ACH
P04.30	PID integral gain	0.000 ～ 4.000	0.001	0.500	Run&Stop	01ADH
P04.31	PID differential gain	0.000 ～ 4.000	0.001	0.000	Run&Stop	01AEH
P04.32	PID upper limit	0.0 % ～ 100.0%	0.1	100.0%	Run&Stop	01AFH
P04.33	PID lower limit	−100.0%～ P04.32%	0.1	0.0%	Run&Stop	01B0H

ID	Function	Range	Step	Default	Change Mode	Modbus Register Address
P04.34	P04.32, P04.33 range	0～1	1	0	Run&Stop	01B1H
P04.35	PID output amplification factor	0.000 ～ 4.000	0.001	1.000	Run&Stop	01B2H
P04.36	PID integral holding enable	off on	1	0	Run&Stop	01B3H
P04.37	PID output holding enable	off on	1	0	Run&Stop	01B4H
P04.38	PID output destination	no input PID frequency reference	1	0	Run&Stop	01B5H
P04.39	PID output display	−100.0%～100.0%	0.1%	0.0%	Actual	01B6H
P04.40	PID error level	−100.0%～100.0%	0.1%	0.0%	Actual	01B7H
P04.41	drive sleep mode enable	0～1	1	0	Stop Only	01B8H
P04.42	drive sleep mode channel	0: no function 1: output frequency	1	0	Stop Only	01B9H
P04.43	drive sleep threshold	0.0%～100.0%	0.1%	0.0%	Stop Only	01BAH
P04.44	drive sleep delay time	0.0s～3000.0s	0.1s	30.0s	Stop Only	01BBH
P04.45	drive wake up mode	0～1	1	1	Stop Only	01BCH
P04.46	wakeup feedback channel	0: no function 1: PID feedback reference	1	0	Stop Only	01BDH
P04.47	drive wake up threshold	0.0%～100.0%	0.1%	0.0%	Stop Only	01BEH
P04.48	drive wake up delay time	0.0s～3000.0s	0.1s	0.0s	Stop Only	01BFH
P04.49	Sleep status indicator	0～1	1	Actual	Actual	01C0H

Menu P05: Display Parameter

ID	Function	Range	Step	Default	Change Mode	Modbus Register Address
P05.01	Trip1	0～99	1	0	Actual	01F4H
P05.02	Trip 2	0～99	1	0	Actual	01F5H
P05.03	Trip 3	0～99	1	0	Actual	01F6H
P05.04	Last trip	0～99	1	0	Actual	01F7H
P05.05	Last trip frequency	−max. frequency～+max. frequency	0.01Hz	0.00Hz	Actual	01F8H
P05.06	Last trip current	0.0A～3× motor rated output current	0.1A	0.0A	Actual	01F9H
P05.07	Last trip DC bus voltage	200V: 0 to 415V 400V: 0 to 830V	1V	0V	Actual	01FAH
P05.08	Setup reference display	−max. frequency～+max. frequency	0.01Hz	Actual	Actual	01FBH
P05.09	Running frequency	−max. frequency～+max. frequency	0.01Hz	Actual	Actual	01FCH
P05.10	Output voltage	0V～drive rated voltage	1V	Actual	Actual	01FDH
P05.11	DC voltage	200V rating drive: 0 to 415V 400V rating drive: 0 to 830V	1V	Actual	Actual	01FEH
P05.12	Output current	0.0A～3×Motor rated current	0.1A	Actual	Actual	01FFH
P05.13	Torque current	±3×Motor rated current	0.1A	Actual	Actual	0200H
P05.14	Heatsink temperature	−25℃～127℃	1℃	Actual	Actual	0201H
P05.15	IGBT junction temperature	−25℃～200℃	1℃	Actual	Actual	0202H
P05.16	AI level	0.0%～100.0%	0.1%	Actual	Actual	0203H
P05.17	AO level	0.0%～100.0%	0.1%	Actual	Actual	0204H
P05.18	DI1 status	0～1	1	Actual	Actual	0205H
P05.19	DI2 status	0～1	1	Actual	Actual	0206H

ID	Function	Range	Step	Default	Change Mode	Modbus Register Address
P05.20	DI3 status	0～1	1	Actual	Actual	0207H
P05.21	RELAY1 status	0～1	1	Actual	Actual	0208H
P05.22	DO1 status	0～1	1	Actual	Actual	0209H
P05.23	Model code	0～255	1	by model	Actual	020AH
P05.24	Power MCU software version	0.00～99.99	0.1	Actual	Actual	020BH
P05.25	Control MCU software version	0.00～99.99	0.1	Actual	Actual	020CH
P05.26	running time record: year. day	0.000 ～ 9.364 year.day	0.001year.day	Actual	Actual	020DH
P05.27	running time record: hour. minute	0.00 ～ 23.59hour. minute		Actual	Actual	020EH

3 Declaration of Conformity

Declaration of Conformity (size A, B, C)

Guangzhou HEDY Intelligent Equipment Co., Ltd.

No.63, Punan Road, Yunpu Industry Park, Huangpu District, Guangzhou, Guangdong, 510760, China

HD710-20D00040	HD710-20D00075	HD710-20D00150	HD710-20D00220
HD710-20D00400	HD710-40T00075	HD710-40T00150	HD710-40T00220
HD710-40T00400	HD710-40T00550	HD710-40T00750	HD710-40T00220E
HD710-40T00550E	HD710-40T00550P	HD710-40T01100P	

The AC variable speed drive products listed above have been designed and manufactured in accordance with the following European harmonised standards:

EN 61800-5-1: 2007	Adjustable speed electrical power drive systems — Part 5-1: Safety requirements — Electrical, thermal and energy
EN 61800-3: 2004	Adjustable speed electrical power drive systems — Part 3: EMC requirements and specific test methods

These products comply with the Low Voltage Directive 2006/95/EC, the Electromagnetic Compatibility (EMC) Directive 2004/108/EC and the CE Marking Directive 93/68/EEC.

Printed) Dale Lee

R&D Director

Date: August 26, 2015

These electronic drive products are intended to be used with appropriate motors, controllers, electrical protection components and other equipment to form complete end products or systems. Compliance with safety and EMC regulations depends upon installing and configuring drives correctly, including using the specified input filters. The drives must be installed only by professional assemblers who are familiar with requirements for safety and EMC. The assembler is responsible for ensuring that the end product or system complies with all the relevant laws in the country where it is to be used. Refer to the User Guide. An EMC Data Sheet is also available giving detailed EMC information.

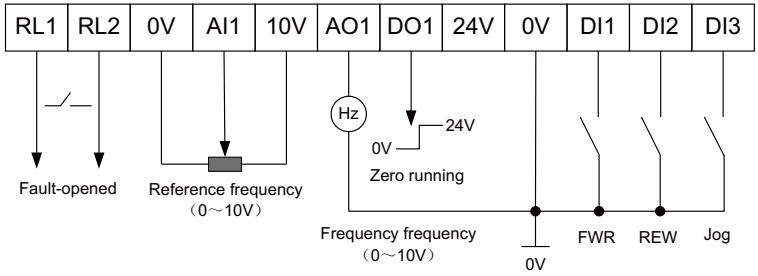
HEDY Drive Repair Card

User information	User corporation:	
	Address:	
	Post code:	Contractor:
	Tel. NO.:	Fax NO.:
Product information	Drive Family:	
	Power size(kW):	S.N.:
	Contract no.:	Purchase date:
Repairrecord	Service engineer:	Tel. NO.:
	Fixed date:	
	Fault information:	
Complaints and demanding on our products: User signature: yearmonthdate		
Return visit record: Service signature: yearmonthdate		

Service Agreement

1. Guarantee Free-service period is valid since delivery date from HEDY factory which was subjected to the serial number on the drive rating label.
2. service free for Failure or trouble caused by our product quality issue.
3. For the service that Exceeding Guarantee time or failure not caused by drive quality issuesis is out of the free range:
    1) From inappropriate, negligent, or incorrect installation or adjustment of the optional operating parameters of the equipment or from mismatching the drive with the motor;
    2) Not permitted by the factory supplier, modified the drive devices;
    3) Out of the HD710 product specification application;
    4) Failure consequences by fire, flooding, earthquake etc., un-foresee natural disasters;
    5) Without drive's serial number or the S.N. cannot be identified clearly.
4. Technical support hotline: +86-4007-000-885

Default Control Terminal Function



Guangzhou HEDY Intelligent Equipment Co.,Ltd.
Guangzhou HEDY Industrial Automation Co.,Ltd.

Add：No.63,Punan Road,Yunpu Industry Zone,Huangpu District,Guangzhou City 510760,China
Fax：+86-(0)20-3202 1660
Technical Support Hotline：+86-4007 000 885
Web Site： http://www.hedyi.com

K07HHD710V151R