

DHE Series Servo



Simple Operation Manual

Safety Warnings

Security Matters

1. CAUTION	
	WARNING
	1. Do not touch inside of the servo drive. Otherwise, you may be electric shocked.
	2. Servo drive and GND terminal of servo motor must be connected to the ground or it may cause electric shock.
	3. Please check wiring at least 5mins later after powered off or it may cause electric shock.
	4. Please do not damage the cable line, cable or impose unnecessary stress, pressure load objects on it. Otherwise, may result in malfunction, damage and electric shock.
	5. During operation, do not touch the rotating part of the servo motor. Otherwise, you may be injured.
CAUTION	
	1. Operate servo motor and servo drive under specific order. Otherwise, fire and malfunction may occur.
	2. Do not place the facility in environment which has easy access to splashed water, corrosive gas, flammable gas or flammable materials. Otherwise, fire and fault may occur.
	3. Servo drives, servo motors and peripheral equipment are in high temperature when operated, keep distance or you may be burned.
	4. During a period of time after powered off, the servo drive heat radiator, regenerative resistor, servo motor are in a high temperature state. Do not touch it or you may be burned.
	5. During the using of servo motor in final product ,if the surface temperature exceeds 70℃, please tag a label to inform high temperature.
2. WIRING CAUTION	
	CAUTION
	Wire the equipment correctly and securely. Otherwise, the servo motor may operate unexpectedly.

	PROHIBITION
	1. Do not connect servo motor U, V, W terminals with industrial power supply (380V). Otherwise, fire and malfunction may occur.
	2. Connect the servo motor U, V, W terminals with the ground (E), and do not mistake on order of U, V, W terminals. Otherwise, fire and malfunction may occur.
	3. Do not conduct encoder with voltage and resistance testing. If you want to test the voltage and resistance of servo motor side of U, V, W terminals, please cut off the connection with the servo drive.
	4. Do not take the wrong terminal sequence of the encoder. Otherwise, the encoder and the servo drive may be damaged.
	INSTRUCTION
	Ground is used to prevent electric shock in case of accidents. For safety reasons, be sure to install the ground.

3. OPERATION AND RUNNING INSTRUCTION	
	CAUTION
	1. Excessive adjustments and changes will lead to instability, so do not operate it casually. Otherwise, it could be dangerous.
	2. Please fasten the servo motor and disconnect the mechanical equipment before test running. After confirmation of the operation, you can install motor with equipment. Otherwise, it could be dangerous.
	3. Self-protection arrester brake is not a stop equipment to protect facility. Please install safe stop equipment on side of facility. Otherwise, failure, injury and other accidents may occur.
	4. When servo drive alarming, try to find reasons. Reset alarm and run again only after confirming the security. Otherwise, it could be injured.
	5. Please do not be close to the device after following instantaneous power failure because it may restart again suddenly. (Please consider how to ensure the personal safety of re-start within the mechanical
	6. Verify the specifications of power. Otherwise, it may cause fire, failures and injuries.

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CHAPTER 1 OVERVIEW

1.1 Servo drive model description

<u>DHE</u>	<u>32</u>	<u>05</u>	-	<u>V</u>	<u>T</u>	<u>1</u>	<u>*</u>
1	2	3		4	5	6	7

- 1: Indicates the type of controller, DHE series.
- 2: Indicates the power supply voltage level, 32 means three-phase or single-phase 220V.
- 3: Indicates the rated output current, unit is amperes (A).
- 4: Indicates the corresponding motor encoder type. V: 2500ppr incremental optical encoder.
- 5: T represents standard and A represents analog, and D represents dual analog input.
- 6: '1' represents same controller with different motor and this bit defaults for universal drive, and motor code need separate set.
- 7: "*" indicates the controller with a particular function using a letter and if there are no special features, this bit will be omitted.

1.2 Servo motor model description

<u>130</u>	<u>ST</u>	-	<u>Z</u>	<u>M</u>	<u>050</u>	<u>C</u>	<u>2</u>	<u>A</u>	-	<u>I</u>	/	<u>**</u>
1	2		3	4	5	6	7	8		9		10

- 1、Indicates base number .There are currently eight kinds of sizes base. They are 40, 60, 80, 90, 110, 130, 150, 180 (Units: mm).
- 2、Indicates the code of performance parameters, ST means sine wave-driven permanent magnet synchronous motors.
- 3、'Z' indicates electromagnetic holding brake, 'Y' for permanent magnet holding brake, no brakes if the third digit are default.
- 4、Indicates the feedback type, 'M' for 2500ppr incremental photoelectric encoder, 'S' for 2500ppr line-saving photoelectric encoder, 'CA' for magnetic encoder.
- 5、Indicates the rated output torque $\times 0.1\text{NM}$.
- 6、Indicates rated speed:

A for 1500r/min	D for 3000r/min
B for 2000 r/min	E for 1000r/min
C for 2500r/min	

- 7、Indicates the motor operating voltage, '2' for 3-phase AC 220V, '4' for 3-phase AC 380V.
- 8、Indicates the type of output shaft:

A for straight shaft with key, key width 6mm.	E for straight shaft with key, key width 10mm.
B for no keys on straight shaft.	F for straight shaft with key, key width 4mm.
C for straight shaft with key, key width 8mm.	G for straight shaft with key, key width 12mm.
D for straight shaft with key, key width 5mm.	H for straight shaft with key, key width 3mm.

9、Derived number, indicates motor encoder specifications.

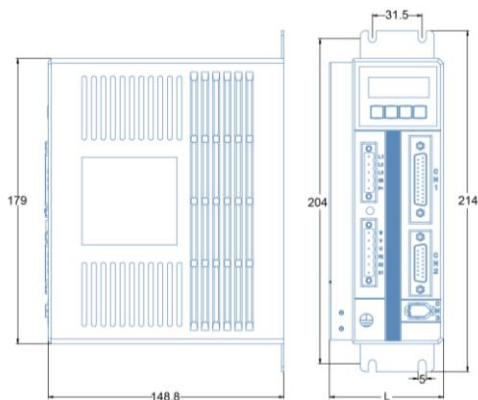
10、Derived number, distinguish differences in the details, is used when it's a non-standard motor.

CHAPTER 2

SERVO DRIVE AND MOTOR INSTALLATION

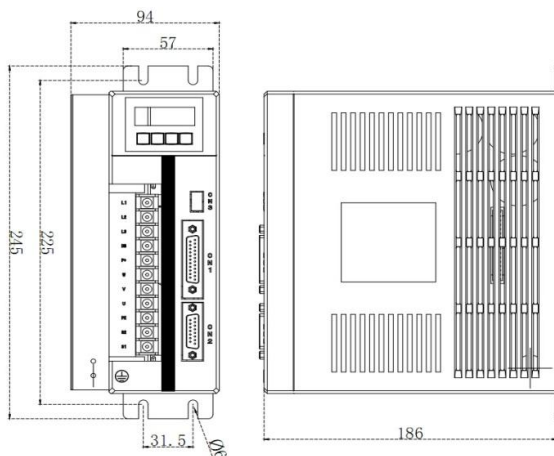
2.1 Servo drive installation size

Units: mm



	L (mm)	Cooling fans	Braking resistor
3201、3202、3204 Series	72	Carry with	Carry with
3205、3206 Series	77.5	Without	Without

Units: mm



3210、3220 Series

2.2 Power supply

Supply to the servo drives single-phase 220V or three-phase 220V commercial power.

When use single-phase electrics, connect to L1, L3. When use three phase electric, connect L1, L2 and L3 terminals.

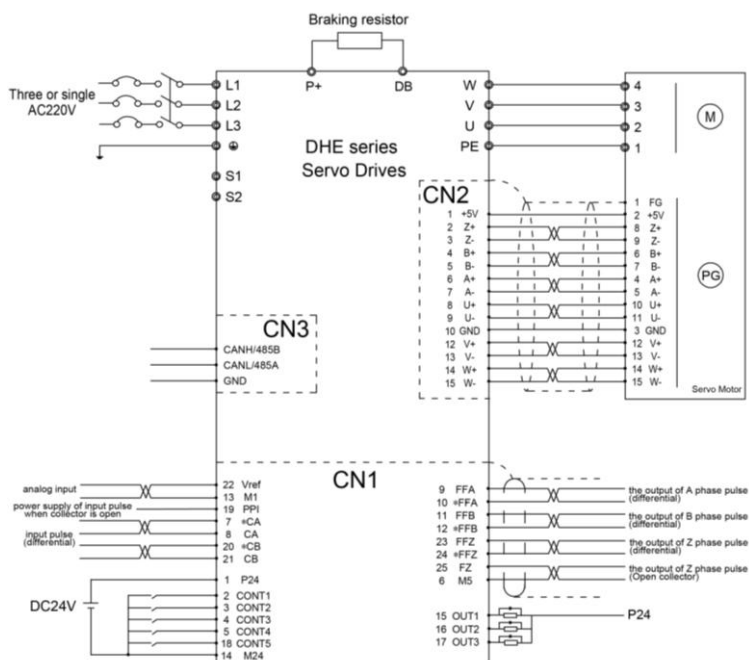
Voltage: Single phase 200 ~ 230V -10% ~ +10%, three-phase 200 ~ 230V -15% ~ +10%

Frequency: 50/60Hz

Phase number: Single phase (power supply L1, L3), three-phase (power supply L1, L2, L3).

※ If the supply voltage exceeds a given limit value, it will damage the servo drives.

2.3 Wiring diagram



Note:

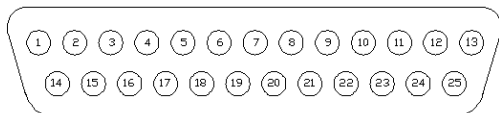
- 1、DHE3205、3206 has built-in braking resistor internally, other series need to be optional if required.
- 2、CN1 is a DB25 female connector, CN2 is a DB15 female connector, CN3 is a 3P outlet.
- 3、Control power S1 and S2 not required to connect in the standard case.

CHAPTER 3

WIRING AND DETAILED INSTRUCTIONS

3.1 The input and output command control sequence (CN1)

Servo drive control connector (DB25 male connector)pins:



Servo drives connector 1 (CN1) connected with the host controller control sign. The signs are defined as table.

Code	CN1 connector number	Signal name	Function and definition
P24 M24	1 14	Control signal input and output power supply	Control signal input and output signals with input power.(DC24V/0.3A)
CONT1 CONT2 CONT3 CONT4 CONT5	2 3 4 5 18	Enter the command control sequence	Enter the command control sequence signal. (DC24V/10mA) CONT1: Servo Enable(RUN) CONT2: (not specified) CONT3: (not specified) CONT4: (not specified) CONT5: (not specified)
OUT1 OUT2 OUT3	15 16 17	Output command control sequence	Output command control sequence Signal (Maximum DC30V/50mA) OUT1 : (Default value: 4) OUT2: ((not specified) OUT3: ((not specified)
PPI CA *CA CB *CB	19 8 7 20 21	Input pulse train differential input or open collector input	PPI: Open collector power input (DC24V +5%/-5%) Differential input:CA,*CA,CB,*CB: Maximum input frequency 500KHz. Open collector input:*CA,*CB: Maximum input frequency 200KHz. It has 3 patterns like command pulse / sign, forward / reverse pulse and 90 degree phase difference of 2-way signal pulse. *CA, *CB connected to negative.

FFA *FFA FFB *FFB FFZ *FFZ	9 10 11 12 23 24	Coded disc division frequency signal output (differential)	The frequency division output terminal. Output is 90 degree phase difference of 2-way signals which is proportional to the rotate volume of servo motor. (Differential mode output) *FFA, *FFB, *FFZ connected to negative.
FZ M5	25 6	Coded disc division frequency signal output (collector)	FZ terminal is open collector output of Z-phase pulse. (Maximum DC30V/50mA) M5: Standard Potential
Vref M1	22 13	Analog input	The analog voltage input terminals. Speed command voltage (when input speed control signal)-10~+10V torque command voltage (when control torque)-10 ~ +10V. Standard potential is of M1 terminal.

※Terminal symbols M1 do not connect to M5, M24.

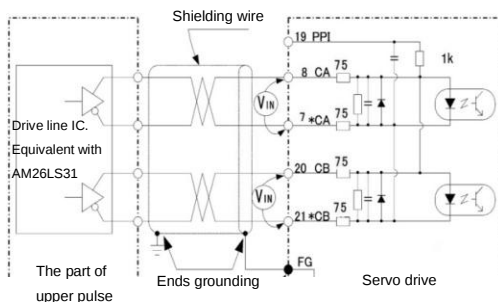
Interface circuit diagram

Signal name	Circuit
Input instructions control sequence Interface specification DC24V/10mA (every point)	
Output instructions control sequence Interface specification DC30V/50mA(max)	

Input pulse sequence Interface specification Differential input (Drive line)	
Output pulse sequence Interface specification Differential input (Drive line)	
Output pulse sequence (Open collector) Interface specification DC30V/50mA (max)	
Analog input Interface specification Input impedance 20kΩ	

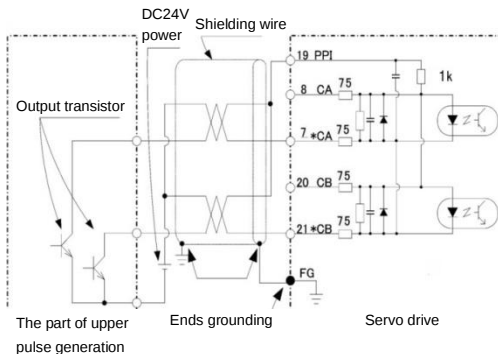
Wiring Example of input pulse sequence

① The case of differential output device



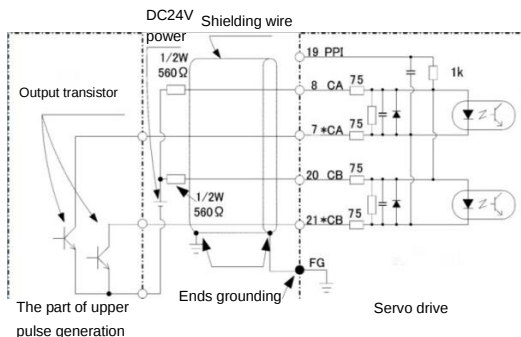
Vin: CA-*CA (CB-*CB) should be between the voltage amplitude Within 2.8V~3.7V. (Over this range, the input pulse may not be accepted sometimes.)

② The case of open collector output device (DC24V input)



DC24V power supply: power supply voltage range should be within $DC24 \pm 5\%$ or less. In addition, the circuit is maximum 40mA demand of power. Ample power must be

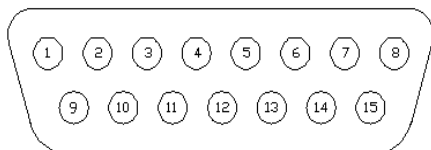
③ The open collector output devices (DC12V input)



DC12V power supply: power supply voltage range should be within $DC12 \pm 5\%$ or less. In addition, the circuit is maximum 40mA demand of power. Ample power must be prepared.

3.2 Encoder (CN2)

Servo drive encoder connector (DB15 male connector) pins:



Connect the servo motor encoder signal to the servo drive connector 2 (CN2).

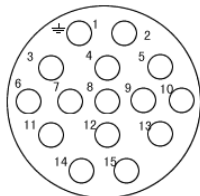
Anti-load side of the servo motor has been built an encoder; please connect encoder wiring to the servo drive wiring connector 2 (CN2).

The maximum encoder wiring length is 20m, restricted according to electric cables and wiring.

The motor flange (90(include 90) to 110(include 110)) motor encoder (CN2) plug pins definition:

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15

Flange 90 and the below plastic plug



110 flanges and above air plugs

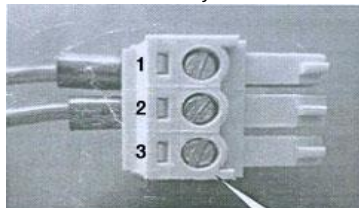
Drive-side CN2 and motor-side encoder wire pin definitions:

CN2 Terminal No.	Signal name	Motor side photoelectric encoder output pin definitions:
1	+5V (drive output)	2
2	Z+	8
3	Z-	9
4	B+	6
5	B-	7
6	A+	4
7	A-	5
8	U+	10
9	U-	11

10	GND (drive output)	3
11		
12	V+	12
13	V-	13
14	W+	14
15	W-	15
Shell	Shielding wire	1

3.3 Communication interface (CN3)

CN3 interface is RS-485 communication or CAN communication interface. This is an optional function and selected if necessary.



Plug Type: PTB350B-06-03-3

pins	485 communicate	CAN communicate
1	485B	CANH
2	485A	CANL
3	GND	GND

CHAPTER 4 SERVO PARAMETER DESCRIPTION

4.1 Parameter settings

Setting method:

Use  key to select the parameters edit mode, switch to the PN-01, using  

to select the parameter number. Press  button for more than 1 second into the parameter setting.

4.2 Parameter List

Parameter quick reference table (1)

No.	Definition	Setting range	Initial value	Change
01	Command pulse compensation α	1~32767(1 scale)	4	All the time
02	Command pulse compensation β	1~32767(1 scale)	1	All the time
03	Input pulse train form	0: Command pulse / command sign 1: 90-degree phase difference of 2-way signals 2: Forward pulse / reverse pulse	2	Outage
04	Rotation direction switch	0: Positive direction forward (CCW) / B-phase feed 1: Positive direction reverse (CW) / B-phase feed 2: Positive direction forward (CCW) / A-phase feed 3: positive direction reversal (CW) / A-phase feed	0	Outage
05~06	For manufacturer setting	-	-	-
07	Forward torque limit	0~400%	250	All the time
08	Reverse torque limit	0~400%	250	
09	Control mode switching	0: Position 1: Speed 2: Torque 3: Position $\leftrightarrow$ speed 4: Position $\leftrightarrow$ torque 5: Speed $\leftrightarrow$ torque 6: Can Communication 7: Internal position 8: Internal position $\leftrightarrow$ speed 9: Internal position torque	0	Outage

10	CONT1 input signal distribution	0: not specified 1: Servo start [RUN] 2: Reset [RST] 3: +OT 4: -OT	1	Outage
11	CONT2 input signal distribution	5:Emergency stop [EMG] 7: Clear bias 8: External regenerative resistor overheating 11: Prohibition command 12: Command pulse α selecting 0 13: Command pulse α selecting 1	0	Outage
12	CONT3 input signal distribution	14: Control mode switching 15: Manually rotate forward [FWD] 16: Reverse rotate manually[REV] 17: Multi-speed 1 [X1] 18: Multi-speed 2 [X2] 19: Acceleration and deceleration time selection	0	Outage
13	CONT4 input signal distribution	21: Idle [BX] 24: Homing Trigger 25: External reference point [REF] 26: Internal position command selecting 0 27: Internal position command selecting 1 28: Internal position command selecting 2	0	Outage
14	CONT5 input signal distribution	29: Internal position trigger signal 30: Internal position pause signal 31: Internal position clear pulse signal 32: Homing search parameters select test sites direction	-	-
15	OUT1 signal distribution	0: not specified 1: Ready [RDY] 2: Locate finishing [PSET] 3: Alarm detection: a junction 4: Alarm detection: b junction	0	Outage
16	OUT2 signal distribution	6: OT detection 7: Forced stop detection 8: Zero bias 9: Zero speed	0	Outage
17	OUT3 signal distribution	11: Braking time 12: Torque to the output 13: Homing complete 14: Homing in progress 15: Internal position complete	0	Outage
18	Not Assigned	/	/	/

19	Output pulses	16~2500[Pulse](1Scale)	2500	Outage
20	Motor electricity Angle	Can't be changed	-	-
21	Zero tolerance range	1~2000[Pulse](1Scale)	400	All the time
22	Exceeding deviation degree	10~100 [$\times 10000$ Pulse](1 Scale)	20	All the time
23	Zero speed range	10~2000[r/min](1 Scale)	50	All the time
24	Time range for locating end	0.000~1.000 Seconds (0.001 Scale)	0.000	All the time
25	Maximum current limit	0~300%	250	All the time
26	Low voltage alarm	0: No detection, 1: detection	1	Outage
27	Low voltage startup	0: Urgent deceleration stop, 1: Idling	1	Outage
28	For manufacturer setting	-	-	-
29	Written arguments against change	0: Can rewrite, 1: Prohibit rewrite	0	All the time
30	The initial display for touch panel	0~18(1 Scale)	0	Outage
31	Internal rate of 1	0.1~Maximum speed [r/min](0.1Scale)	200.0	All the time
32	Internal rate of 2	0.1~Maximum speed [r/min](0.1Scale)	500.0	All the time
33	Internal rate of 3	0.1~Maximum speed [r/min](0.1Scale)	1000.0	All the time
34	Maximum speed	0.1~Maximum speed [r/min](0.1Scale)	2500.0	All the time
35	Acceleration time 1 (run for test)	0.001~9.999 seconds (0.001 Scale)	0.100	All the time
36	Deceleration time 1 (run for test)	0.001~9.999 seconds (0.001 Scale)	0.100	All the time
37	Acceleration time 2	0.001~9.999 seconds (0.001 Scale)	0.500	All the time
38	Deceleration time 2	0.001~9.999 seconds (0.001 Scale)	0.500	All the time
39	Zero speed clamp electric level	0.0~500.0[r/min](0.1 Scale)	0.0	All the time
40	Position controller gain 1	1~400[rad/sec](1 Scale)	25	All the time
41	Speed controller gain 1	1~1000[Hz](1 Scale)	100	All the time
42	Speed regulator integral coefficient 1	0~4096 (1 Scale)	400	All the time
43	S letter time constant	0.0~100.0[msec](0.1 Scale)	10	All the time
44	Feed-forward gain	0.000~1.200(0.001 Scale)	0.000	All the time

45	Feed-forward filter time constant	0.00~250.00[msec](0.1 Scale)	0	All the time
46	Torque filter time constant	0.00~20.00[msec](0.01 Scale)	0.00	All the time
47	Speed setting filter	0.00~20.00[msec](0.01 Scale)	0.00	All the time
48	Main reason for the gain switch	0:Position deviation (x10), 1:Feedback speed, 2: Command speed	1	All the time
49	Gain switching level	1~1000 (1 Scale)	100	All the time
50	Gain switching time constant	0~100[msec] (1 Scale)	10	All the time
51	Position controller gain 2	1~300% (1 Scale)	100	All the time
52	Speed controller gain 2	1~300% (1 Scale)	100	All the time
53	Speed regulator integral coefficient 2	1~300% (1 Scale)	100	All the time
54	Analog setting filter	0.000~9.999[msec](0.001 Scale)	0.01	All the time
55	For manufacturer setting	-	-	-
56	Deceleration time after lose enable	0.000~9.999[msec](0.001 Scale)	0.001	All the time
57	For manufacturer setting	-	-	-
58	Overload alarm sensitivity	0.0~1.0	0.5	Outage
59	For manufacturer setting	-	-	-
60	Given location filter coefficient	0~100.00[rad~sec](0.01 Scale)	0.00	All the time
61	Under-voltage (LU) value adjustment	DC 150~220 V	160	All the time
62	Overheating (AH) alarm temperature	40~110 °C	80	All the time
63	Fan-on temperature	20~70 °C	40	All the time
64	Motor code	0~120	120	Outage
65	Motor code password	-	0	Outage
66	Torque reference switching	0: External analog set; 1: Internal parameters (Pn-89) set	0	Outage

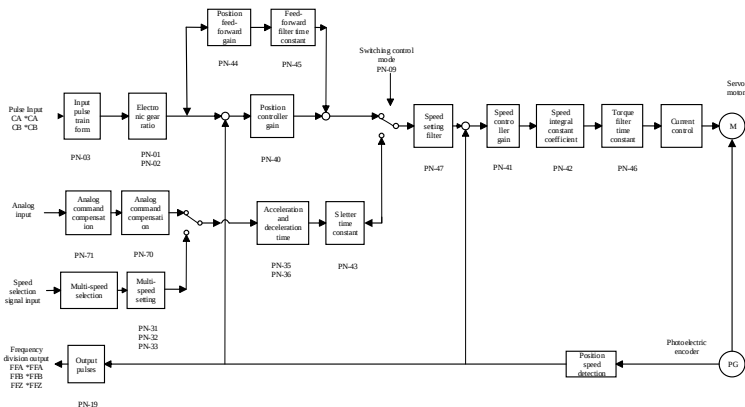
67~69	For manufacturer setting	-	-	-
70	Analog command	$\pm 0.00 \sim \pm 1.50$ (0.01 Scale)	1.00	All the time
71	Analog command compensation	-2000~+2000	-	All the time
72~73	For manufacturer setting	-	-	-
74	CONT is effective all the time 1	0~21	0	Outage
75	CONT is effective all the time 2		0	Outage
76	CONT is effective all the time 3		0	Outage
77	CONT is effective all the time 4		0	Outage
78	Command pulse compensation $\alpha 1$	1~32767 (1 Scale)	1	All the time
79	Command pulse compensation $\alpha 2$		1	All the time
80	Command pulse compensation $\alpha 3$		1	All the time
81~88	For manufacturer setting	-	-	-
89	Power segment selection	0~20	-	Outage
90	The maximum speed limit of torque loop	0~3000 rpm	0	All the time
91	Test current given	0~3.00 (times)	1.00	All the time
92	Test speed given method FN-10FN-10	0.0~ Maximum speed [r/min]	200.0	All the time
93	Test Run method	1: speed 2: torque	1	All the time
94	Given inching speed FN-01	0.00~ Maximum speed [r/min]	50.0	All the time
95	For manufacturer setting	-	-	-
96	Current regulator differential time	0~100 (Units: 0.01ms)	5	All the time
97	Current regulator cut-off frequency	100~3000 Hz	650	All the time
98	Current regulator integration time	1~1000 (Units: 0.1ms)	18	All the time

99	SpdFedFilter	0.01ms	0	All the time
A0	Switching frequency selection	12、16	16	Outage
A1	Torque reference blind area	0.00~2.00	0.1	All the time
A2	Torque reference filter parameters	0.00~20.00	0	All the time
A3	Motor rated speed	100~5000	/	Outage
A4	Motor rated current	10~150	/	Outage
A5	Motor torque coefficient	0~5	/	Outage
A6	Motor line-line inductance	0.5~80	/	Outage
A7	Motor electrical time constant	0.5~20	/	Outage
A8	Motor rotor inertia	0~20	/	Outage
A9	Motor pole pairs	1~6	/	Outage
B0	Motor rated voltage	0~220	/	Outage
B1	Encoder lines	1000~5000	/	Outage

All the time: Effect immediately after modification;

Outage: Restart power to take effect after the modification;

Control block diagram:



CHAPTER 5

THE MAIN OPERATION FUNCTIONS OF SERVO

5.1 Touch panel introduction

Seven-Segment Display:



Key:



Changing MODE (MODE).
Delete (ESC).



Shift the setting to the right (SHIFT).
Confirm the model and numerical (ENT).
Push this button for 1 more than second when confirming.



Choose servo model.
Reduce digital value (-1).



Choose Servo mode.
Add digital value (+1).

5.2 Parameter settings

Power on after the wiring properly connected and set parameters if no alarm occurs.

1. Press key repeatedly until the panel display: Pn-01;
2. Press key for 1 second or more, panel displays the parameter value of Pn-01;
3. Press key to change the value, press key to shift position. Press key for more than one second after changing value. Value is written successfully when Pn-01 is displayed;
4. Press key, panel display: Pn-02, Repeat step 2 to set the second parameter.
5. Set other parameters in the same way.

Note: Be sure to turn off the power after setting all the parameters and then on again.

5.3 Function list

Settings can be changed on the model of Parameters compilation and location data compilation.

Mode	Subschema	Select subschema	Expressions and setting examples
Sequence monitoring mode	Sequence mode	SN-01	P-SOF
	The current alarm	SN-02	EC
	Alarm record	SN-03	1-EC
	Display station number	SN-04	Ad01
Monitoring mode	Feedback speed	ON-01	1000
	Command speed	ON-02	1000
	Average torque	ON-03	1.00
	Feedback current position	ON-04	H0100
	Command the current position	ON-05	L1000
	Position offset	ON-06	10000
	Dc bus voltage	ON-07	100
	Electrical angle	ON-08	10.0
	Drive internal temperature	ON-09	25
	Analog voltage value	ON-10	10.0
	Input signal	ON-11	10001
	Output signal	ON-12	1001
		ON-13	Reserved
	Peak torque	ON-14	3.00
	Pulse sequence input frequency	ON-15	10.0
	Motor code	ON-16	dJ-06
	Software version number	ON-17	-
		ON-18~24	Reserved
Parameters edit mode	Parameters editor	PN-01~PN-B9	
Trial mode operation	Manual operation	FN-01	JOG
	Clear the current command and feedback pulse	FN-02	PRT
	Clear integrating pulse	FN-03	CPCR
	Alarm reset	FN-04	RT
	Clear alarm record	FN-05	ALRT
	Parameters initialization	FN-06	PART
	Automatic adjustment compensation	FN-07	OFFT
	Manufacturers reserved	FN-08、FN-09	
	Test operation	FN-10	ESY.1

CHAPTER 6 SERVO ALARM

6.1 Alarm content

The contents of the alarm detection:

After detection of alarm, the servo drive alarm codes flash automatically on the touch panel.

If there are detections of multiple alarms, the touch panel displays the alarms in the following order of priority.

Priority order	Display	Name
1	OC1	Overcurrent 1
2	OC2	Overcurrent 2
3	OS	Overspeed
4	HU	Overvoltage
5	EH	Current sampling loop damage
6	DE	Storage error
7	EC	Encoder communication
8	RH1	Regeneration resistance
9	OL	Overload
10	OF	Exceed permissible deviation
11	AH	Drive overheating
12	ND	Motor code does not set
13	CE	Motor code error

6.2 Alarm explanation and handling

Alarm code	Alarm name	Running statue	Probable cause	Handling
OS	Over Speed	When the drive is on power	Drive circuit fault	Replace the drive
		When the motor first starts	Encoder fault	Replace the servo motor
			Excessive load inertia	1.Reduce the load inertia 2.Replace more powerful drive and servo motor
			Encoder zero error	1.Replace servo motor 2.Send back to the manufacturers to readjust back to the encoder zero
			Motor U, V, W phase sequence error	Check the wiring and connect the wiring correctly

			Encoder lead error	
		during motor operating	The entered command pulse frequency is too high	Upper computer sets inputted command pulse frequency correctly
			Electronic gear ratio is too large	Set the appropriate electronic gear ratio correctly
			Acceleration and deceleration time constant is too small, so that exceed constant speed is overshoot(speed controlling)	1.Increase the acceleration and deceleration time constant (parameter PN-35, PN-36) 2.S word time constant (parameter PN-43) set larger 3.Speed of answer (parameter PN-41) set a little higher
			Encoder fault	Replace servo motor
			Servo system parameters are not adjusted well, causing overshoot	1. Reset the gain related to the regulator 2.If gain is difficult to set a suitable value, replace the suitable motor
HU	Main circuit overvoltage	Only control power (S1, S2) are connected and the main power (L1, L2, L3) are not connected	Drive internal circuit board fault	Replace servo drive
		Both control power (S1, S2) and main power (L1, L2, L3) are connected	Drive internal circuit board fault	Replace servo drive
			Power supply voltage is too high	View the drive value of ON-07 is greater than the 380V or not, check the power supply is too large or not.
		during motor operating	Disconnect the brake resistor wiring	Connection again
			Damage to the brake resistor	Under the condition of power off, checking the measurement of the brake resistor is consistent with the label, if judged it's damaged, replace the brake resistor
			Damage to the drive internal brake transistor	Replace servo drive

			Damage to the drive internal brake circuit	
			Braking resistor doesn't enough capacity.	1.Reduce the frequency of start and stop 2.Increase the acceleration / deceleration time constant 3.Reduce the current limit amplitude 4.Reduce the load inertia 5.Reduce speed 6.External braking resistor capacity sufficient
			Servo motor inertia is not enough	Replace servo motor with greater inertia
LU	Main circuit under-voltage	When power is connected	The main power wire contact badly	Terminal drive power between the main power lights is bright, if not bright, check whether connection is right or not
			Unstable power supply, power supply voltage is low	View the drive ON-07 value is less than reference value or not, determine whether the stability of power supply or not
			20ms or more power outages	Check the power supply
			Drive internal components fault	Replace servo drive
		During motor operating	Power capacity not enough	Check the power supply
			Power break down instantaneously	
OF	Position deviation exceeds	When connected to control power	Drive circuit board fault	Replace servo drive
		When the motor starts	Motor U, V, W down-lead error	Correct wiring
			Encoder Lead error	
			Position percentage gain is too small	Increase the position percentage gain
			Less output torque	1. Check the torque limit value 2. Reduce the load capacity 3. Replace high-power servo drive and servo motor

			Pulse command frequency is too high	When differential input, view ON-15 is less than 500 or not, and when open collector input, view ON-15 is less than 200 or not, if not, reduce the pulse frequency
			Drive power circuitry failure	Replace servo drive
			Drive parameters are not adjusted well	Increase the position gain
			Pulse command frequency is too high	When differential input, view ON-15 is less than 500 or not, and when open collector input, view ON-15 is less than 200 or not, if not, reduce the pulse frequency
			Input supply voltage is lower	below the operating voltage, select the correct transformers and install voltage regulators
AH	Drive overheat	Power-on, and the servo drive stopped working 1 hour or more, the ambient temperature is normal	Internal circuit and the servo drive fault	Replace servo drive
		During motor operating	Cooling fan does not work	View ON-09 show temperature, over 40° C confirms the cooling fan does not switch on. replace the servo drive
			Environment temperature high, heat dissipation can't work well.	To maximize the ventilated effect in the environment
			Renewable electricity can't be consumed.	Extend the deceleration time
EC	Encoder communication error	When turn on the power.	Encoder cables error	Check the encoder cable wiring is correct or not, and whether there is broken
		During motor operating.	Encoder cable bad contact	Check the encoder cable is contact well or not
			Encoder damaged	Replace servo motor

			Detection drive internal circuit fault	Replace servo drive
EH	Current sampling loop damage.	When turn on the power	The drive internal current sampling circuit damaged	Replace servo drive
DE	Storage error	When turn on the power	Storage devices damaged	Replace servo drive
			Communication between storage with the main chip memory abnormal	
OL	Overload	When turn on the power	Drive internal circuit board fault	Replace servo drive
		During motor operating	Exceed the rated torque operation	1. Check the load 2. Reduce the start-stop frequency 3. Replaced by more powerful drive and servo motor
			Drive to power lines U, V, W connect wrong	Check the wiring and confirm U, V, W correct wiring
			Motor operates with oscillation and unstable	1. Increase the gain 2. Increase the acceleration and deceleration time 3. Reduce the load inertia
			Servo motor abnormalities	Replace servo motor
OC1	Over-current 1	When turn on the power	Internal circuit of drive fault	Replace servo drive
		During motor operating	Drive power lines U, V, W short-circuit	Check power line
			Acceleration and increase time too short	Increase the acceleration and deceleration time (PN-35, PN-36)
			Excessive rigidity of the control loop parameters	Reduce the rigidity, which reduces the position gain(PN-40), speed gain(PN-41)
			Output current is too large	Reduce the maximum current limit parameter PN-25
			Poorly grounded, external interference	Properly grounded
			Drive internal circuit damage, lack phase, and so on	Replace servo drive

OC2	Over-current 2	During motor operating	Drive fault	Replace servo drive
ND	Motor code does not set	When turn on the power	Set corresponding motor code before using drive	Motor code setting method: First set Pn-65:11, then Pn-64 motor code. Please check instructions or motor nameplate to get motor code
CE	Motor code error	After modifying the motor code	The setting motor code not match drive	Re-confirm motor code

Annex 1: Servo drive and motor selection table

No.	Servo motor							Corresponding	
	Type	Rated power (KW)	Rated current (A)	Rated torque (N.m)	Rated speed (r/min)	Rotor inertia (Kg.m ²)	Weight (Kg)	Type	ON-16 (Code)
1	40ST-M001D2*	0.05	0.4	0.16	3000	0.025x10 ⁻⁴	0.32	DHE3201-VT	83
2	40ST-M003D2*	0.1	0.9	0.32	3000	0.051x10 ⁻⁴	0.47	DHE3201-VT	81
3	60ST-M006D2*	0.2	1.2	0.637	3000	0.175x10 ⁻⁴	1.16	DHE3201-VT	4
4	60ST-M013D2*	0.4	2.8	1.27	3000	0.29x10 ⁻⁴	1.6	DHE3202-VT	5
5	60ST-M019D2*	0.6	3.5	1.91	3000	0.39x10 ⁻⁴	2.07	DHE3204-VT	6
6	80ST-M013D2*	0.4	2	1.27	3000	1.05x10 ⁻⁴	1.78	DHE3202-VT	11
7	80ST-M024D2*	0.75	3	2.39	3000	1.82x10 ⁻⁴	2.9	DHE3204-VT	12
8	80ST-M035B2*	0.73	3	3.5	2000	2.63x10 ⁻⁴	3.9	DHE3204-VT	13
9	80ST-M035D2*	1.05	4.5	3.5	3000	2.63x10 ⁻⁴	3.9	DHE3205-VT	17
10	80ST-M040C2*	1.0	4.4	4	2500	2.97x10 ⁻⁴	4.1	DHE3205-VT	14
11	90ST-M024B2*	0.5	3	2.4	2000	2.45x10 ⁻⁴	3.1	DHE3204-VT	21
12	90ST-M024D2*	0.75	3	2.4	3000	2.45x10 ⁻⁴	3.1	DHE3204-VT	22
13	90ST-M035B2*	0.73	3	3.5	2000	3.4x10 ⁻⁴	3.9	DHE3204-VT	23
14	90ST-M040C2*	1.0	4	4	2500	3.7x10 ⁻⁴	4.2	DHE3205-VT	24
15	110ST-M020D2*	0.6	2.5	2	3000	3.1x10 ⁻⁴	4.5	DHE3202-VT	31
16	110ST-M040B2*	0.8	3.5	4	2000	5.4x10 ⁻⁴	6	DHE3205-VT	32
17	110ST-M040D2*	1.2	5	4	3000	5.4x10 ⁻⁴	6	DHE3205-VT	33
18	110ST-M050D2*	1.5	6	5	3000	6.3x10 ⁻⁴	6.8	DHE3206-VT	34
19	110ST-M060B2*	1.2	4.5	6	2000	7.6x10 ⁻⁴	7.9	DHE3206-VT	35
20	110ST-M060D2*	1.8	6	6	3000	7.6x10 ⁻⁴	7.9	DHE3206-VT	36
21	130ST-M040C2*	1.0	4	4	2500	0.85x10 ⁻³	6.2	DHE3205-VT	41
22	130ST-M050C2*	1.3	5	5	2500	1.06x10 ⁻³	6.6	DHE3205-VT	42
23	130ST-M060A2*	0.9	4.3	6	1500	1.26x10 ⁻³	7.4	DHE3205-VT	43
24	130ST-M060C2*	1.5	6	6	2500	1.26x10 ⁻³	7.4	DHE3206-VT	44
25	130ST-M060D2*	1.9	7.5	6	3000	1.26x10 ⁻³	7.4	DHE3206-VT	101
26	130ST-M077C2*	2.0	7.5	7.7	2500	1.53x10 ⁻³	8.3	DHE3206-VT	45
27	130ST-M100E2*	1.0	4.5	10	1000	1.94x10 ⁻³	10.2	DHE3205-VT	46
28	130ST-M100A2*	1.5	6	10	1500	1.94x10 ⁻³	10.2	DHE3206-VT	47
29	130ST-M100C2*	2.6	10	10	2500	1.94x10 ⁻³	9.8	DHE3210-VT	48

30	130ST-M120C2*	3.1	12	12	2500	2.77×10^{-3}	12	DHE3210-VT	79
31	130ST-M150E2*	1.5	7.3	15	1000	2.77×10^{-3}	12.6	DHE3206-VT	53
32	130ST-M150A2*	2.3	9.5	15	1500	2.77×10^{-3}	12.6	DHE3210-VT	49
33	130ST-M150C2*	3.8	13.5	15	2500	2.77×10^{-3}	11.7	DHE3220-VT	50
34	130ST-M170B2*	3.5	14	17	2000	2.77×10^{-3}	14.4	DHE3220-VT	51
35	130ST-M230B2*	4.8	16.5	23	2000	3.77×10^{-3}	18	DHE3220-VT	52
36	150ST-M150B2*	3.0	14	15	2000	3.88×10^{-3}	15	DHE3210-VT	96
37	150ST-M180B2*	3.6	17	18	2000	4.6×10^{-3}	17	DHE3220-VT	95
38	150ST-M230B2*	4.7	21	23	2000	5.8×10^{-3}	20.4	DHE3220-VT	90
39	150ST-M270B2*	5.5	24	27	2000	6.8×10^{-3}	22.7	DHE3220-VT	72
40	180ST-M172A2*	2.7	10.5	17.2	1500	3.4×10^{-3}	19.5	DHE3210-VT	61
41	180ST-M190A2*	3.0	12	19	1500	3.8×10^{-3}	20.5	DHE3210-VT	62
42	180ST-M215B2*	4.5	16	21.5	2000	4.7×10^{-3}	22.2	DHE3220-VT	63
43	180ST-M270E2*	2.9	12	27	1000	6.1×10^{-3}	25.5	DHE3210-VT	64
44	180ST-M270A2*	4.3	16	27	1500	6.1×10^{-3}	25.5	DHE3220-VT	65
45	180ST-M350E2*	3.7	16	35	1000	8.6×10^{-3}	30.5	DHE3220-VT	66
46	180ST-M350A2*	5.5	24	35	1500	8.6×10^{-3}	30.5	DHE3220-VT	67

Annex 2: Motor code setting method

If the motor code is not set, the drive will be displayed "ND" alarm after power on, then need to set the motor code;

First Set Pn-65:11, Then set Pn-64: motor code, Specific motor code need to check instructions or code item on motor nameplate.

Notes: After setting required power off and restart

