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## Hardware Instruction for Y7S-series Advanced Servo Drive (EtherCAT)

### 1 Preface

Thank you for purchasing Y7-series servo drive. This manual mainly describes the safety use, installation and wiring for Y7-series EtherCAT servo drive. For more details, please refer to <User Manual for Y7 Series EtherCAT Servo Drive>.



Confirm the following items when unpacking:

Item	Name	Quantity
1	Y7S-series advanced servo drive	1
2	STO terminal <sup>*</sup>	1
	Brake terminal <sup>*</sup>	1
	50pin terminal (CN1)	1
3	Hardware Instruction for Y7S-series Advanced Servo Drive (EtherCAT)	1
4	Qualified certificate	1

- Power supply input terminal \*1 and power output terminal \*1 for 3kw and below models.
- General N models do not have STO terminal and 50pin terminal (CN1 interface).
- Fully functional Model F includes second encoder terminal (CN4 interface).
- Check if there are some damages to the products during transportation.
- Any questions, please contact the HCFA Technology.

### Safety precautions

#### Safety symbols

Please pay attention to the following safety precautions anywhere and anytime during acceptance inspection, installation, wiring, operation and maintenance. In this manual, the safety precautions are ranked as "DANGER" and "CAUTION".

	Indicates that incorrect handling may result in death or severe injury.
	Indicates that incorrect handling may result in medium or slight personal injury or physical damage.
	Indicates "Prohibition" (Indicates what must not be done).
	Indicates "Strict Enforcement" (Indicates what must be done.)

About Installing and wiring	
	Do not connect the motor to the commercial power. To prevent fire or malfunction.
	Do not place the combustibles around the servo motor or drive. To prevent fire.
	Be sure to protect the drives through the case, and leave specified clearances between the case or other equipment and the drive. To prevent electric shock, fire or malfunction.
	Install it at the place free from excessive dust and dirt, water and oil mist. To prevent electric shock, fire, malfunction or damage.
	Install the equipment to incombustibles, such as metal. To prevent fire.
	Any person who is involved in wiring and inspection should be fully competent to do the work. To prevent electric shock.
	FG terminal of motor and drive must be grounded. To prevent electric shock.
	Perform the wiring correctly after cut off the breaker. To prevent electric shock, fire, malfunction or damage.
	Have the insulation processing when connecting cables. To prevent electric shock, fire or malfunction.

About operation and running	
	During operation, never touch the internal parts of the drive. To prevent burns or electric shock.
	The cables should not be damaged, stressed loaded, or pinched. To prevent electric shock, malfunction or damage.
	During operation, never touch the rotating parts of the servo motor. To prevent injury.
	Do not immerse the cable in oil or water when operation. To prevent fire.
	Operate the switches and wiring with dry hand. To prevent electric shock, injury or fire.
	Do not touch the keyway directly when using the motor with shaft-end keyway. To prevent injury.
	Do not touch the surface of motor, drive and radiator. To prevent burns or parts damaged.
	Do not drive the motor by external drive. To prevent fire.
About other safety instructions	
	Confirm the equipment's safety after the earthquake happens. To prevent electric shock, injury or fire.
	Installing and setting correctly to prevent the fire and personal injury when earthquake happens. To prevent injury, electric shock, fire, malfunction or damage.
	Provide an external emergency stop circuit to ensure that operation can be stopped and power switched off immediately. To prevent injury, electric shock, fire, malfunction or damage.
About maintenance and inspection	
	Before wiring or inspection, turn off the power and wait for 5 minutes or more. And it's not allowed to disassemble the servo drive. To prevent electric shock.

About installing and wiring	
	Please follow the specified combination of the motor and drive. To prevent fire or malfunction.
	Do not touch the terminals of connector directly. To prevent electric shock or malfunction.
	Do not block intake and prevent the foreign matters from entering into the drive. To prevent electric shock or fire.
	Fix the motor and have the test run away from the mechanical system. After confirming the operation, the motor can be securely mounted to the mechanical system. To prevent injury.
	The servo motor must be installed in the specified direction. To prevent injury or malfunction.
	Install the equipment correctly in accordance with its weight and rated output. To prevent injury or malfunction.
About operation and running	
	Do not stand on servo equipment. Do not put heavy objects on equipment. To prevent electric shock, injury, fault or damage.
	The parameter settings must not be changed excessively otherwise, the operation of the servo will be unstable. To prevent injury.
	Keep it away from the direct sunlight. To prevent malfunction.
	Do not subject the motor and motor shaft to strong impacts. To prevent malfunction.
	The electromagnetic brake on the servo motor is designed to hold the servo motor shaft and should not be used for ordinary braking. To prevent injury or malfunction.
	When power is restored after an instantaneous power failure, keep away from the machine because the machine may be restarted suddenly (design the machine so that it is secured against hazard if restarted). To prevent injury.
	Do not install or operate a faulty servo motor or drive. To prevent injury, electric shock or fire.
	Check the power specification. To prevent fault.
	The electromagnetic brake may not hold the servo motor shaft. To ensure safety, install a stopper on the machine side. To prevent injury.
	A sudden restart is made if an alarm is reset with the run signal on. To prevent injury.
	Connect the relay for emergency stop and for brake in series. To prevent injury or malfunction.
About transportation and storage	
	Do not subject the equipment to the place with rain, waterdrop, poisonous gases or liquids. To prevent malfunction.
	Do not carry the servo motor by the cables, shaft or encoder during transportation. To prevent injury or malfunction.

	Do not drop or dump the motor during transportation and installation. To prevent injury or malfunction.
	When long-term storage is required, please consult HCFA Technology. To prevent malfunction.
	Store the unit in a place in accordance with the instruction manual. To prevent malfunction.

	About other safety instructions
	Please dispose the battery according to your local laws and regulations. To prevent injury or malfunction.
	When disposing of the product, handle it as industrial waste. To prevent injury or malfunction.

	About maintenance and inspection
	Do not disassemble and/or repair the equipment on customer side. To prevent malfunction.
	Do not turn on or switch off the main power frequently. To prevent malfunction.
	When the drive become faulty, switch off the control circuit and main power. To prevent fire.
	If the servo motor is to be stored for a long time, switch off the power. To prevent misoperation and injury.

	About maintenance and inspection
	<Warranty period> The term of warranty for the product is 18 months from the date of manufacture. It's exceptional to brake motors as they are warranted when acceleration/ deceleration times is not beyond the specified service life.
	<Warranty coverage> This warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are stated in the instruction manual and user manual for the Product. However, even during warranty period, the repair cost will be charged on customer in the following cases.

- 1) A failure caused by improper storing or handling, repair and modification.
- 2) A failure caused by the parts which have dropped down or damaged after acceptance.
- 3) A failure caused when the products have been used beyond the product specification.
- 4) A failure caused by external factors such as inevitable accidents, including but not limited to fire, earthquake, lightning stroke, windstorm disaster, flood, salt damage, abnormal fluctuation of voltage and other natural disaster.

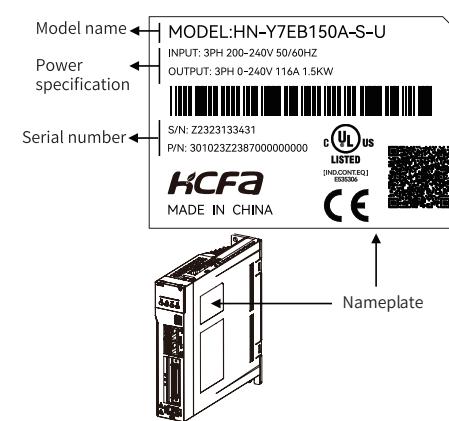
5) A failure caused by the intrusion of water, oil, metal and other foreign matters. The warranty coverage is only for the product itself. We assume no responsibilities for any losses of opportunity and/or profit incurred by customer due to a failure of the product.

- 1) Motor overload protection not provided and intended to be used with external or remote overload protection.
  - 2) Motor temperature protection setting is required.
  - 3) Internal solid state short-circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.
- CAUTION-Risk of Electric Shock:  
To discharge the Bus Capacitor or indicating the time required (5 minutes) for Bus Capacitor to discharge to a level below 50 Vdc.  
AVERTISSEMENT-Risque Du Choc Electrique:  
Le temps nécessaire pour décharger le condensateur de bus ou pour indiquer la décharge du condensateur de bus en dessous de 50 Vdc (5 minutes).

## 2 Product introduction and model selection

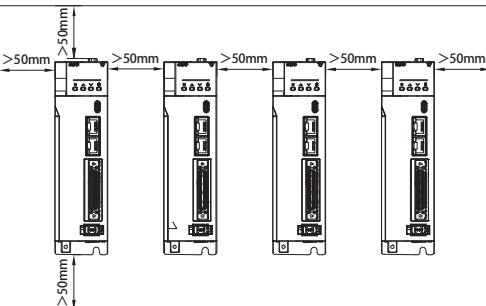
### Introduction for servo drive nameplate

#### Description of side labels of Y7Smart series servo drives.



## Basic specifications for models of 380V AC

Items	Specifications											
Models HN-Y7 ***T-S-U ***	100	150	200	300	500	600	750	111	151	221		
Maximum applicable motor capacity (kW)	1	1.5	2.0	3.0	5.0	6.0	7.5	11	15	22		
Continuous output current (Amps)	4.7	5.4	8.4	11.9	16.5	20.8	25.7	37.2	52			
Instantaneous max. output current(Amps)	16.9	17	24	31	44	52	65	70	88	105		
Main circuit Power voltage (Amps)	3-phase 330 ~ 440VAC, 50/60Hz											
Current (Amps)	2.9	4.3	5.8	8.6	14.5	17.4	21.7	23.2	29.6	43.4		
Control power	Share the main circuit power supply			3-phase 330 ~ 440VAC, 50/60Hz								
Regenerative resistor	Built-in Resistance (Ω)	50	50	40	40	20	20	—	—	—		
	Capacity (W)	80	80	100	100	100	100	100	100	100		
	External mini. allowable resistance (Ω)	40	40	40	35	25	20	20	15	10	10	
Overtoltage level	III											



Note 1) When using an external regenerative resistor at a normal rated load factor, be sure to lower the operating before using the resistor when the temperature of the resistor reaches 200°C to 300°C. For the load characteristics of the resistor, please consult HCFA Technology.

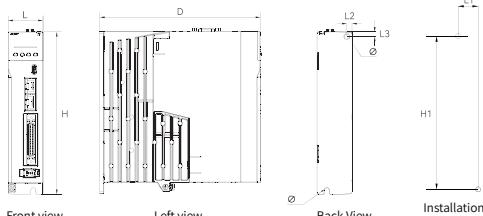
Note 2) For safety, it is recommended to use an external regenerative resistor with a temperature switch.

## 4 Installation and size of servo drive

### Y7Smart series drive configuration table

Servo drive (AC220V)	SIZE A		SIZE B		SIZE D	
	HN-Y7 □□ 040A-S-U	HN-Y7 □□ 075A-S-U	HN-Y7 □□ 100A-S-U	HN-Y7 □□ 150A-S-U	HN-Y7 □□ 200A-S-U	HN-Y7 □□ 221T-S-U
Servo drive (AC380V)	HN-Y7 □□ 100T-S-U	HN-Y7 □□ 200T-S-U	HN-Y7 □□ 300T-S-U	HN-Y7 □□ 500T-S-U	HN-Y7 □□ 600T-S-U	HN-Y7 □□ 111T-S-U
	HN-Y7 □□ 150T-S-U	HN-Y7 □□ 300T-S-U	HN-Y7 □□ 750T-S-U	HN-Y7 □□ 151T-S-U	HN-Y7 □□ 221T-S-U	HN-Y7 □□ 221T-S-U

### Y7Smart series drive mounting dimension



Structure	SIZE A	SIZE B	SIZE C	SIZE D (AC220V)	SIZE D (AC380V)	SIZE E	SIZE F	SIZE G
L(mm)	37.0	47.0	55.0	70.0	90.0	90.0	90.0	194.0
H(mm)	172.0	172.0	172.0	172.0	182.8	243.3	243.3	260.0
D(mm)	170.0	170.0	180.0	180.0	192.5	205.2	205.2	205.0
L1(mm)	21.3	31.3	39.7	54.7	76.0	76.0	76.0	
L2(mm)	5.5	5.5	5.5	5.5	7.0	7.0	7.0	
L3(mm)	5.0	4.5	5.0	5.0	6.0	6.0	6.0	
H1(mm)	162.8	162.8	163.0	163.0	168.0	227.5	227.5	
Aperture(Φ)	5.5	5.5	5.5	5.5	6.0	6.0	6.0	
Screw hole	2-M5	2-M5	2-M5	2-M5	3-M5	4-M5	4-M5	
Locking torque (Nm)	3.5N·M	3.5N·M	3.5N·M	3.5N·M	3.5N·M	3.5N·M	3.5N·M	
Weight (kg)	0.76	1.01	1.21	1.45	1.5	2.2	3.6	8.77

### Cabinet installation instructions

#### Attention

- During installing servo drive, please do not seal the suction vent, and do not dumping place the servo, otherwise it will cause malfunction.
- In order to make the cooling fan can have low windage, to effectively discharge quantity of heat, please follow the installation distance recommended value when install one or more servos.
- Please avoid arrange servos up and down, because of the heat from the bottom operational drive, easy to cause under drive unnecessary temperature increase.

## 5 Wiring

### Recommended cables

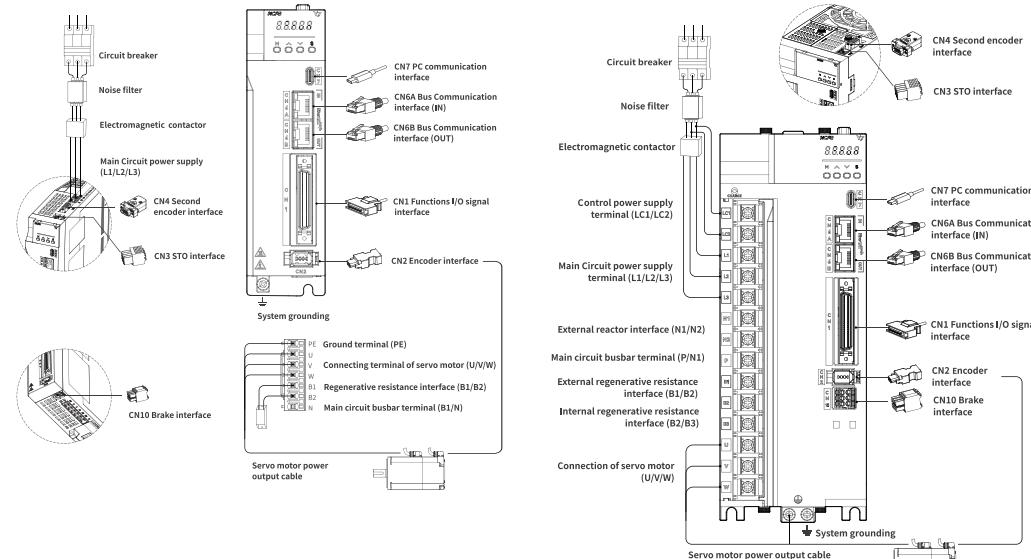
Terminals	Name	Models HN-Y7 □□□□□ A-S-U				
		040	075	100	150	200
LC1, LC2	Control power input terminal	—	—	—	—	—
L1, L2, L3	Main circuit power input terminal	0.82mm <sup>2</sup> (AWG18)	1.318mm <sup>2</sup> (AWG16)	2.627mm <sup>2</sup> (AWG13)	4.17mm <sup>2</sup> (AWG11)	2.075mm <sup>2</sup> (AWG14)
U, V, W	Terminal for servo motor	0.82mm <sup>2</sup> (AWG18)	1.318mm <sup>2</sup> (AWG16)	2.627mm <sup>2</sup> (AWG13)	4.17mm <sup>2</sup> (AWG11)	2.075mm <sup>2</sup> (AWG14)
B1, B2	Terminal for external regenerative resistor	Determined according to the actual power of the external resistor, you can consult the resistor manufacturer or our technicians				
	Ground terminal	≥ 2.5mm <sup>2</sup> (<AWG14)				

Terminals	Name	Models HN-Y7 □□□□□ T-S-U									
		100	150	200	300	500	600	750	111	151	221
LC1, LC2	Control power input terminal	—	—	—	—	—	—	—	—	—	—
L1, L2, L3	Main circuit power input terminal	0.82mm <sup>2</sup> (AWG18)	1.646mm <sup>2</sup> (AWG15)	3.332mm <sup>2</sup> (AWG12)	4.17mm <sup>2</sup> (AWG11)	5.26mm <sup>2</sup> (AWG10)	6.63mm <sup>2</sup> (AWG9)	8.37mm <sup>2</sup> (AWG8)	10.55mm <sup>2</sup> (AWG7)	13.3mm <sup>2</sup> (AWG6)	10.55mm <sup>2</sup> (AWG7)
U, V, W	Terminal for servo motor	1.026mm <sup>2</sup> (AWG17)	1.646mm <sup>2</sup> (AWG15)	2.627mm <sup>2</sup> (AWG13)	3.332mm <sup>2</sup> (AWG12)	4.17mm <sup>2</sup> (AWG11)	6.63mm <sup>2</sup> (AWG9)	8.37mm <sup>2</sup> (AWG8)	10.55mm <sup>2</sup> (AWG7)	13.3mm <sup>2</sup> (AWG6)	10.55mm <sup>2</sup> (AWG7)
B1, B2	Terminal for external regenerative resistor	Determined according to the actual power of the external resistor, you can consult the resistor manufacturer or our technicians								≥ 2.5mm <sup>2</sup> (<AWG14)	
	Ground terminal	—								—	

- Note 1) If used in a closed pipe, wire groove, etc., or the ambient temperature higher than 55°C, please increase the size of the wires.
- Note 2) The cross-sectional area of the grounding conductor is at least 2.5 mm<sup>2</sup>. When the cross-sectional area of the phase conductor is less than or equal to 16 mm<sup>2</sup>, the cross-sectional area of the grounding conductor should be equal to the cross-sectional area of the grounding conductor.

### Connector type terminal driver port definition and wiring

### Fence type terminal driver port definition and wiring description



## CN1 Terminal arrangement

2	SG	GND	1	SG	GND	26	OUT3-	Output signal (Assignable)
4	SEN	SEN signal input	3	PL1	Open collector instruction with internal power supply 12V	27	OUT4+ (Non-assignable output signal)	High speed output (Non-assignable output signal)
5	V-REF	Analog speed input instruction	29	OUT1+	Output signal (Assignable)	28	OUT4-	High speed output (Non-assignable output signal)
6	SG	GND	7	N/A	N/A	31	ALM+	Servo alarm output
8	N/A	N/A	9	T-REF	Analog torque input instruction	33	PAO	The number of encoder frequency division pulse output - A phase
10	SG	GND	11	N/A	N/A	35	PBO	The number of encoder frequency division pulse output - B phase
12	N/A	N/A	13	PL2	Open collector instruction with internal power supply 12V	37	OUT5+ (Non-assignable output signal)	High speed output (Non-assignable output signal)
14	CLR	Collector clear input	15	N/A	N/A	39	DAC0	Analog output 1
16	N/A	N/A	17	N/A	N/A	40	SI0	Homing signal input
18	PL3	Open collector instruction with internal power supply 12V	19	PCO+	The number of encoder frequency division pulse output - C phase	41	SI1	Probe 1
20	/PCO	The number of Encoder frequency pulse	21	N/A	N/A	42	SI2	Forward Drive Prohibit
22	N/A	N/A	23	N/A	N/A	43	SI3	Reverse Drive Prohibit
24	N/A	N/A	25	OUT3+	Output signal (Assignable)	44	SI4	Probe 2
						45	N/A	N/A
						46	N/A	N/A
						47	DI (COM)	External 24V power input
						48	DAC1	Analog output 2
						49	OCZ	Z signal Open collector instruction output
						50	TH	External temperature detection

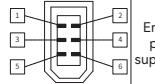
Note 1) Only full-function type F supports high-speed output, analog input and pulse frequency division output.

Note 2) 21,22 pin function only for FB models over 5kW;

Note 3) 4,27,28,37,38 pin functions only for FB models.

Note 4) Generic N-type without CN1.

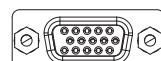
## Encoder signal (CN2)

Interface layout	Pin1	Pin2	Pin3	Pin4	Pin5	Pin6	Shell
	Encoder power supply +5V	Encoder power supply 0V	—	—	Serial data (+)	Serial data (-)	—

## STO signal (CN3)

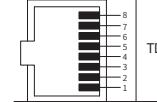
Driver STO interface		STO safety connector		Interface layout			
Pin1	Pin2	Pin3	Pin4	Pin5	Pin6	Pin7	Pin8
NC+	NC-	HWBB1-	HWBB1+	HWBB2-	HWBB2+	EDM- EDM+	EDM+ EDM-
—	—	Input 1-	Input 1+	Input 2-	Input 2+	Output-	Output +

## Secondary encoder signal (CN4)

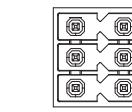
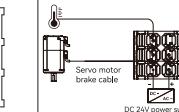


Pin	Incremental ABZ encoder with differential Sin and cos encoder with differential Hall sensor	BISS encoder	TAMAGAWA encoder
1	+5V output current output ≤ 300mA	+5V output current output ≤ 300mA	+5V output current output ≤ 300mA
2	0V output	0V output	0V output
3	Hall U+	Hall U+	—
4	Hall U-	Hall U-	—
5	Hall V+	Hall V+	—
6	Increment encoder A-	Sin encoder Sin -	BISS-C CLK-
7	Increment encoder B-	Sin encoder Cos -	BISS-C DATA-
8	Increment encoder Z-	Increment encoder Z-	—
9	Hall W+	Hall W+	—
10	Hall V-	Hall V-	—
11	Increment encoder A+	Sin encoder Sin +	BISS-C CLK+
12	Increment encoder B+	Sin encoder Cos +	BISS-C DATA+
13	Increment encoder Z+	Increment encoder Z+	—
14	Hall W-	Hall W-	—
15	Temperature sensor signal	Temperature sensor signal	Temperature sensor signal
Shell	Shield	Shield	Shield

## Communication interface (CN6)

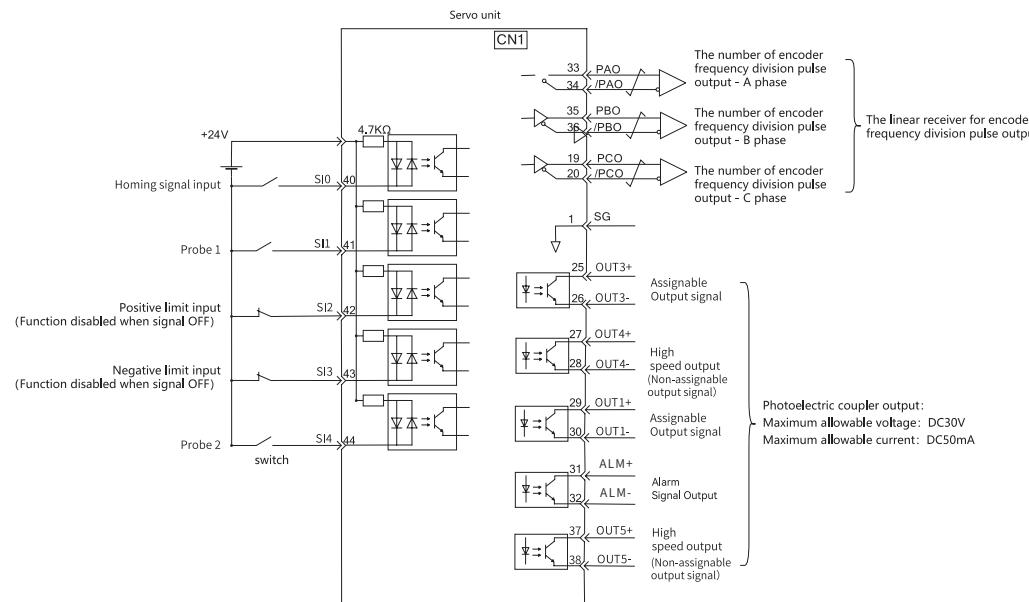
Interface layout	Pin1	Pin2	Pin3	Pin4	Pin5	Pin6	Pin7	Pin8
	TD+	TD-	RD+	—	—	RD-	—	—

## Brake interface (CN10)

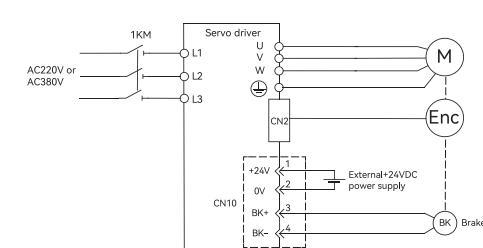
Driver brake interface	STO connector	Interface layout
		T- 6 5 T+ BK- 4 3 BK+ 0V 2 1 24V
Pin1	Pin2	Pin3
24V	0V	Pin5
24V power supply	Servo brake wire	Pin6
		Temperature control+
		Temperature control-

Note 1) The brake DC24V power supply is not to be shared with the CN1 control circuit power supply. The NTC specification is KTY84.

## Connection example of input and output signals (bus type)



## Brake wiring



# 6 Y7SmartSeries servo alarm table

## Reason of error alarm and handling method

Error No.: Error Name (Content)	Reason	Confirmation method	Handling method
A.020: Parameter and check are abnormal (Abnormal data of internal parameters of servo unit)	The power supply voltage drops instantaneously	Measuring power supply voltage; Confirm the time of the power outage	Set the power supply voltage within the specification range and initialize the parameter Settings (Fn005).
	The power is turned off during parameter writing		After the initial parameter setting (Fn005), write the parameters again.
	The number of write parameter exceeded the maximum value	Verify that frequent parameter changes have been made from the upper device	It could be a servo unit failure. Replace the servo unit.
	Malfunction is caused by noise from AC power supply, grounding, and static electricity	When the alarm still occurs after multiple power connections, noise may be the reason	Take measures to prevent noise interference.
	The components inside the servo unit fault due to gas, water droplets or cutting oil	Confirm the installation environment	It could be a servo unit failure. Replace the servo unit.
	Servo unit fault	When the alarm still occurs after multiple power connections, a servo fault may have occurred	It could be a servo unit failure. Replace the servo unit.
A.021: Parameter formatting error (Data form of internal parameters of servo unit is abnormal)	The software version of the written parameter is newer than the software version is the same. If the version is different, an alarm may occur	Use Fn012 to check whether the software version is the same. If the version is different, an alarm may occur	Write the parameters of other servo units with the same software version and model, and then switch on the power.
	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.
A.022: The system and verification are abnormal (Data of internal parameter of servo unit is abnormal)	The power supply voltage drops instantaneously	Measuring supply voltage	It could be a servo unit failure. Replace the servo unit.
	The power was turned off when setting the auxiliary function	Confirm the time of the power off	It could be a servo unit failure. Replace the servo unit.
	Servo unit fault	When the alarm still occurs after multiple power connections,	It could be a servo unit failure. Replace the servo unit.
A.030: The main circuit is detected faulty	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.
A.040: Parameter setting abnormal (Beyond the set range)	The servo unit capacity does not match the servo motor capacity	Confirm the capacity and combination of servo unit and servo motor	Make the servo unit and servo motor capacity match each other.
	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.
	Outside the parameter setting range	Confirm the range of parameters	Changed parameter the value within the set range.
	The set value of the electronic gear ratio is outside the set range	Verify that the electronic gear ratio is $0.001 < (Pn78C/Pn78E) < \text{Encoder resolution} * 0.4$	Set the electronic gear ratio to $0.001 < (Pn78C/Pn78E) < \text{encoder division resolution} * 0.4$ .
A.041: Frequency division pulse output setting is abnormal	The number of frequency division pulse of encoder (Pn212) does not satisfy the set range and set conditions	Confirm Pn212	Set Pn212 to the appropriate value.
A.042*: Parameter combination abnormal	The speed of the program JOG running (Fn004) is not within the set range due to changing the electronic gear ratio (Pn78C/Pn78E) or servo motor	Check whether the formula *1 is valid	Reduce the value of electronic gear ratio (Pn78C/Pn78E).
	The program JOG running speed (Fn004) does not satisfy the set range due to the change of program JOG moving speed (Pn533)	Check whether the formula *1 is valid	Increase the value of the program JOG speed (Pn533).
	The movement speed of advanced automatic tuning is not satisfying the set range due to change of electronic gear ratio (Pn78C/Pn78E) or servo motor	Check whether the formula *1 is valid	Reduce the value of electronic gear ratio (Pn78C/Pn78E).
A.044: Semi-closed loop/full closed loop parameter setting error	The fully closed loop module is inconsistent with the setting of Pn002.3	Confirm the Settings for Pn002.3	Make the full closed-loop module conform to the setting of Pn002.3.
A.050: Combination error (Outside capacity range of combinable motors)	The capacity of the servo unit does not match the capacity of the servo motor	Confirm $\frac{1}{4} \leq \text{the capacity of the motor} \leq 4$ * Check out when switch on the main circuit power supply	Make the servo unit and servo motor capacity match each other.
	Encoder fault	Replace with other servomotors to ensure the alarm does not occur again	Replace the servo motor (Encoder).
	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.
A.051: The product does not support alarm	The unsupported serial conversion unit, encoder, and external encoder are connected to the servo unit	Confirm the product	Change to a matching combination.
A.060: Servo ON instruction invalid alarm	After performing the auxiliary function to energise the motor, the Servo ON input (S-ON) signal is input from the host. (S-ON) signal is input from the host.	—	Power on the servo unit again or perform software reset.

Error No.: Error Name (Content)	Reason	Confirmation method	Handling method
A.100: Overcurrent detection (Overcurrent flows through the power transistor or heat sink overheating)	The main circuit cable is connected incorrectly or in poor contact	Check whether the cable connection is correct	Modify cable connections.
	A short circuit or ground fault occurs inside the main circuit cable	Check whether short circuit occurs between UVW phases and the grounding of the cable.	The cable may be short-circuited. Replace the cable.
	Short circuit or ground short circuit occurs inside the servo motor	Check whether there is short circuit between the UVW phase and the grounding of the motor terminal.	It could be a servo motor failure. Replace the servo motor.
	Short-circuit or grounding occurs inside the servo unit	Confirm whether short circuit occurs between UVW phase and UVW and ground of the servo motor connection terminal of the servo unit.	It could be a servo unit failure. Replace the servo unit.
	Regenerator resistor wiring error or poor contact	Check whether the cable connection is correct	Modify cable connections.
	Dynamic brake (emergency stop due to DB, servo unit) is used frequently, or DB overload alarm occurs	Check the DB resistance power consumption (Un008) to determine the DB frequency. Or use the display of alarm record (Fn000) to confirm whether DB overload alarms A.730, A.731 have occurred.	Change the selection, operation method and mechanism of servo unit to reduce DB usage frequency.
	The regenerative resistance value is too high and exceeds Regenerative processing capacity	Use the regenerative load rate (Un00A) to confirm the frequency of the regenerative resistance.	Considering the operating conditions and load, then confirm regenerative resistance value again.
	The regenerative resistance value of servo unit is too small	Use the regenerative load rate (Un00A) to confirm the frequency of the regenerative resistance.	Change the regenerative resistance value to a value above the minimum allowable resistance value of the servo unit.
	High load is borne when the servo motor stops or runs at low speed	Verify that the operating conditions are outside the specifications of the servo drive.	Reduce the load on the servo motor or operate at a higher speed.
	Abnormal movements caused by noise	Take measures to prevent noise, such as correct FG wiring. In addition, the size of FG wire should be the same as the size of 'servo unit main circuit wire'.	Improve wiring, installation, and other noise environment, confirm whether the effect
A.300: Regenerative error	Servo unit fault	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
		Set the regenerative resistance capacity (Pn600) to a value other than "0" without an external regenerative resistor	Connect an external regenerative resistor, or set Pn600 to 0 when a regenerative resistor is not required.
		There is no external regenerative resistor, and the jumper of the power terminal B2-B3 of the servo unit is loose	Verify that the power terminal jumper is connected
		The external regenerative resistor is poorly connected or disconnected	Confirm the wiring of the external regenerator resistor
A.320: Regenerative overload	Servo unit fault	—	In the state of not connected to the main circuit power supply, connected to the control power supply, still occur alarm, it could be a servo unit failure. Replace the servo unit.
		The power supply voltage exceeds the specification range	Measuring supply voltage
		External regenerative resistance value or regenerative resistance capacity is insufficient, or in the state of continuous regeneration	Reconfirm the running condition or capacity
		Continuous load bearing, in a state of continuous regeneration	Discuss the system including servo, machinery and operating conditions.
		The capacity set in parameter Pn600 is smaller than that of the external regenerative resistor	Confirm the regenerator resistor connection and Pn600 value
		The external regenerative resistance value is too large	Correct the set value of parameter Pn600.
A.330: The main circuit power supply is incorrectly connected	Servo unit fault	—	Verify that the regenerative resistance value is correct
		The power supply voltage inside the servo unit is too high, and the regenerative resistor is disconnected	Replace the servo unit when using the regenerative resistor built in the servo unit. When using an external regenerative resistor, replace the regenerative resistor.
		When setting the AC power input, the DC power is input	Check whether the power supply is DC
		When setting the DC power input, the AC power is input	Check whether the power supply is AC
		Set the regenerative resistance capacity (Pn600) to a value other than "0" without an external regenerative resistor	Confirm the connection of the external regenerator resistor and the value of Pn600
		There is no external regenerative resistor, and the jumper of the power terminal B2-B3 of the servo unit is loose	Verify that the power terminal jumper is connected
		Servo unit fault	It could be a servo unit failure. Replace the servo unit.

Note 1) Alarm is detected when either of the following condition formulas is established.

$$Pn533 [\text{rmp}] \times \frac{\text{Encoder Resolution}}{6 \times 10^5} \leq \frac{Pn20E}{Pn210}$$

$$\text{Maximum motor speed} [\text{rmp}] \times \frac{\text{Encoder Resolution}}{3.66(\text{approx.}) \times 10^{12}} \geq \frac{Pn20E}{Pn210}$$

Error No.: Error Name (Content)	Reason	Confirmation method	Handling method
A.400: overvoltage (Overvoltage is detected through the power supply section of the main circuit of the servo unit)	· AC200V servo unit and AC power supply voltage above 290V, or AC400V servo unit detects power supply voltage above AC580V · The servo unit and DC power supply voltage of AC200V are above 410V, and the DC power supply voltage of over 830V is detected by the servo unit of AC400V	Measure voltage of power supply	Adjust the AC/DC power supply voltage to range of the product specifications.
	The power supply is unstable or affected by lightning strikes	Measure voltage of power supply	Improve the power supply condition, set the surge suppressor, etc., and then switch on the power again, still occur alarm, it could be a servo unit failure. Replace the servo unit.
	When the AC power supply voltage is higher than the specification range, the acceleration and deceleration motion is carried out	Confirm the power supply voltage and the speed and torque in operation	Adjust the AC power supply voltage to range of the product specifications.
	The external regenerative resistance value is larger than the operating condition	Confirm operating conditions and regenerative resistance values	Considering the operating conditions and load, the regenerative resistance value should be discussed again.
	Operating in a state with an inertia ratio which above the allowable value	Verify that the moment of inertia ratio is within the allowable value	Extend the deceleration time, or reduce the load.
	Servo unit fault	—	In the state of not connected to the main circuit power supply, connected to the control power supply, still occur alarm, it could be a servo unit failure. Replace the servo unit.

A.410: undervoltage (Check the undervoltage through the power supply section of the main circuit of the servo unit)	AC200V servo unit, AC power supply voltage below 120V AC400V servo unit, AC power supply voltage is below 220V	Measure voltage of power supply	Adjust the supply voltage to the normal range.
	The power supply voltage drops during operation	Measure voltage of power supply	Increase the power capacity.
	Instantaneous power cut	Measure voltage of power supply	If the instantaneous outage hold time (Pn509) is changed, set it to a smaller value.
	The fuse of the servo unit has blown	—	Replace the servo unit and connect the reactor before using the servo unit.
	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.

A.450: Main circuit capacitor overvoltage	Servo unit fault	—	Replace the servo unit.
	The U, V, W phase sequence of the motor connection is wrong	Confirm the connection of servo motor	Confirm whether there is any problem with motor wiring.

A.510: Overspeed (motor speed above maximum speed)	The instruction input value exceeded the overspeed value	Confirm input instruction	Decrease the command value, or adjust the gain.
	The motor speed exceeds the maximum speed	Confirm motor speed waveform	Reduce speed instruction input gain, adjust servo gain, or adjust operating conditions.
	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.
	Abnormal motor speed vibration is detected	Confirm the abnormal sound of the motor and the speed and torque waveform during operation	Reduce motor speed.

A.511: Frequency division pulse output overspeed	The output frequency of the frequency division pulse is too large and exceeds the limit value	Confirm the output Settings of the frequency division pulse	Decrease the frequency division pulse number (Pn212) setting for encoder.
	The motor speed is too high, and the output frequency of the frequency division pulse exceeds the limit value	Confirm the output setting and motor speed of the frequency division pulse	Reduce motor speed.

A.520: Vibration alarm	Abnormal motor speed vibration is detected	Confirm the abnormal sound of the motor and the speed and torque waveform during operation	Reduce motor speed. Or reduce the speed loop gain (Pn100).
	The value of the moment of inertia ratio (Pn103) is larger than the actual value or has a large change	Confirm the moment of inertia ratio	Set the moment of inertia ratio correctly (Pn103).

A.521: Advanced automatic tuning alarm (Vibration detected in single parameter tuning and EasyFFT, no adjustment power)	The motor vibrates greatly when using the free adjustment function	Confirm motor speed waveform	Reduce the load below the allowable moment of inertia ratio, or raise the load value of the free adjustment value setting (Fn200), or reduce the rigidity value.
	In the process of single parameter tuning and EasyFFT, the motor vibrates greatly	Confirm motor speed waveform	Implement the handling measures in each functional operation step.

A.710: overload (Instantaneous maximum load) A.720: overload (Continuous maximum load)	Motor wiring, encoder wiring or connection are abnormal	Confirm wiring	Confirm whether there is any problem with motor wiring and encoder wiring.
	Motor operation exceeds the overload protection characteristic	Confirm the overload characteristics of the motor and running instructions	The load condition and operation condition should be discussed again or redecide motor capacity.
	The motor is not operated due to mechanical factors, resulting in excessive load during operation	Confirm running instructions and motor speed	Improve mechanical factors.
	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.

A.730: A.731: DB overload (The power consumption of dynamic brake is detected to be too high)	The motor is being driven by external forces	Confirm running status	Do not drive the motor through external forces.
	The rotational energy of the DB at stop exceeds the capacity of the DB resistance	Check the DB resistance power consumption (Un00B) to determine the DB frequency	Try the following measures · Reduce the command speed of the servo motor. · Reduce the moment of inertia ratio. · Reduce the number of DB stops.
	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.

Error No.: Error Name (Content)	Reason	Confirmation method	Handling method
A.740: Impulse current limiting resistor overload (The frequency of main circuit power supply is too high)	The number of times the impulse current limiting resistance exceeds the ON/OFF limit of the main circuit power supply	—	Reduce the ON/OFF frequency of the main circuit power supply.
	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.
	Ambient temperature is too high	Use a thermometer to measure the ambient temperature	Improve the installation condition of servo unit and reduce the ambient temperature.
	The operation was performed after resetting the overload alarm several times by turning off the power	The overload alarm is recognized by the display of the alarm record (Fn000)	Change the reset method of the alarm.
	The load is too large or exceeds the regenerative processing capacity at running	The load is confirmed by the cumulative load rate Un009, and the regenerative processing capacity is confirmed by the regenerative load rate (Un00A)	The load condition and operation condition should be discussed again.
	The mounting direction and spacing between servo unit and other servo units are unreasonable	Confirm the installation status of the servo unit	Install according to servo unit installation standards.
A.7A0: Heat sink overheating (Heat sink temperature of servo unit exceeds 100°C)	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.
	The fan inside the servo unit stops rotating	Confirm there's no foreign object stuck	If an alarm still occurs after the foreign object is removed, it could be a servo unit failure. Replace the servo unit.
	Power on the absolute value encoder for the first time	Check whether it is powered on for the first time	Perform the encoder setting operation (Fn008).
	The encoder cable was removed and then reconnected	Check whether it is powered on for the first time	Confirm the connection of the encoder and set up the encoder (Fn008).
	The control power supply (+5V) of the servo unit and the battery power supply are faulty * Check out on the encoder side	Verify that the battery and plug status of the encoder plug are correct	After restoring the power supply to the encoder (replacing the battery, etc.), set up the encoder (Fn008).
	Absolute value encoder fault	—	Replace the servo motor if the alarm cannot be disarmed even if the setting operation is performed again.
A.820: Encoder sum check alarm * Check out on the encoder side	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.
	Encoder fault	—	· Absolute encoder time. If the (Fn008) encoder is set again and alarms still occur frequently, it could be a servo unit failure. Replace the servo unit. · For rotary absolute encoder or incremental encoder, it could be a servo motor failure. Replace the servo motor.
	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.
A.830: Encoder battery alarm (Absolute encoder battery voltage below the specified value)	The battery is improperly connected or disconnected	Check the battery connection	Connect the battery properly.
	Battery voltage below the specified value (3.0V)	Measure the voltage of the battery	Replace the battery.
	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.
A.840: Encoder data alarm * Check out on the encoder side	Encoder malfunction	—	Switch on the power again, there is still an alarm, it could be a servo motor failure. Replace the servo motor.
	Encoder malfunction due to noise and other interference	—	Properly connect wiring of the encoder periphery. (Separate encoder cable from servo motor main circuit cable, grounding treatment, etc.)
	Encoder fault	—	Switch on the power again, there is still an alarm, it could be a servo motor failure. Replace the servo motor.
A.850: Encoder overspeed * Check when the control power is switched on * Check out on the encoder side	When the control power is switched on, the servo motor rotates at a speed of more than 200 rpm	Confirm the motor speed when powered on by the motor rotation speed monitor (Un000)	Adjust the servo motor speed to less than 200 rpm, and then switch on the control power +
	Encoder fault	—	Switch on the power again, there is still an alarm, it could be a servo motor failure. Replace the servo motor.
	Servo unit fault	—	Switch on the power again, there is still an alarm, it could be a servo unit failure. Replace the servo unit.
	The ambient temperature of the servo motor is too high	Measure the ambient temperature of the servo motor	Adjust the ambient temperature of the servo motor below 40°C.
A.860: Encoder overheating * Check only when absolute value encoder is connected * Check out on the encoder side	The servo motor operates at a load which exceed the rated value	Motor load is confirmed by cumulative load rate (Un009)	Adjust the load of the servo motor to within the rated value before running.
	Encoder fault	—	Switch on the power again, there is still an alarm, it could be a servo motor failure. Replace the servo motor.
	Servo unit fault	—	Switch on the power again, there is still an alarm, it could be a servo unit failure. Replace the servo unit.
	The ambient temperature of the servo motor is too high	Measure the ambient temperature of the servo motor	Adjust the ambient temperature of the servo motor below 40°C.
A.8A0: External encoder error	Motor running, absolute value external encoder origin setting failed.	Before setting the origin position, confirm that the motor is not running by the full closed-loop feedback pulse counter monitor (Un00E)	Stop the motor when setting the origin position.
	External encoder error	—	Replace the external encoder.
A.8A1: External encoder module error	External encoder error	—	Replace the external encoder.
	The serial conversion unit error	—	Replace the serial conversion unit.
A.8A2: External encoder sensor error (Incremental type)	External encoder error	—	Replace the external encoder.
	External encoder error	—	Replace the external encoder.

Error No.: Error Name (Content)	Reason	Confirmation method	Handling method
A.8A3: The external encoder position error (Absolute value)	Absolute external encoder error	—	It is possible that the absolute value external encoder fault. Please take corresponding measures according to the manufacturer's instruction manual.
A.8A5: External encoder overspeed error	Detected overspeed of external encoder	Confirm the maximum speed of the external encoder	Use the external encoder below its maximum speed.
A.8A6: External encoder overheating error	Detected overheating of external encoder	—	Replace the external encoder.
A.b31: Current detection error 1	U-phase current detection loop error	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
A.b32: Current detection error 2	V-phase current detection loop error	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
A.b33: Current detection error 3	The current detection loop error	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
	The main circuit cable of servo motor is disconnected	Confirm whether the main circuit cable of the servo motor is disconnected	Repair the motor cable.
A.bF0: System alarm 0	Servo unit fault	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
A.bF1: System alarm 1	Servo unit fault	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
A.bF2: System alarm 2	Servo unit fault	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
A.bF3: System alarm 3	Servo unit fault	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
A.bF4: System alarm 4	Servo unit fault	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
A.C10: Prevent out of control detection * Check out when the servo is ON	The U, V, W phase sequence of the motor connection is wrong	Confirm motor wiring	Confirm whether there is any problem with motor wiring.
	Encoder fault	—	If there is no problem with the motor wiring, switch on the power again. there is still an alarm, it could be a servo motor failure. Replace the servo motor.
	Servo unit fault	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
A.C80: Encoder clear abnormal (The upper limit of the number of turns is abnormal)	Encoder fault	—	Switch on the power again. there is still an alarm, it could be a servo motor failure. Replace the servo motor.
	Servo unit fault	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
A.C90: Encoder communication error	Poor contact of encoder connector, or wrong plug connection	Confirm the status of the port used by the encoder connection	Insert encoder plug again to confirm the encoder connection.
	Encoder cable breaks, short circuit, or uses a cable that exceeds the specified impedance	Confirm the status of the encoder cable	Use the encoder cable as required specification.
	Corrosion caused by temperature, humidity and gas; Short circuit caused by water drop and cutting oil; Poor plug contact due to vibration	Confirm the operating environment	Improve the operating environment and replace the cable. Even if there is no improvement, replace the servo unit.
	Malfunction caused by noise interference.	—	Correctly connect wiring of the encoder periphery (separate the encoder cable from the servo motor main circuit cable, ground treatment, etc.).
	Servo unit fault	—	If no alarm occurs when the servo motor is connected to other servo units and the control power is switched on, it could be a servo unit failure. Replace the servo unit.
A.C91: Encoder communication position data acceleration is abnormal	Encoder cable may be snagged, cladding damaged and signal line interfered	Confirm the status of encoder cables and access ports	Confirm whether there is a problem with the laying of encoder cables.
	Encoder cables are bundled or too close to high current wires	Confirm the setting status of the encoder cable	Lay the encoder cable in a position where it will not be subjected to surge voltage.
	The potential varies of FG due to the influence of the equipment (welding machine, etc.) at the motor side	Confirm the setting status of the encoder cable	Ground the machine to prevent shunt to the encoder side FG.
A.C92: The encoder communication timer is abnormal	The signal line of the encoder is interfered	—	Implement anti-jamming countermeasures for encoder wiring.
	Encoder withstand excessive vibration impact	Confirm service condition	Reduce the vibration of the machine. Or install the servo motor correctly.
	Encoder fault	—	Switch on the power again. there is still an alarm, it could be a servo motor failure. Replace the servo motor.
	Servo unit fault	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.

Error No.: Error Name (Content)	Reason	Confirmation method	Handling method
A.CA0: Encoder parameter abnormal	Encoder fault	—	Switch on the power again. there is still an alarm, it could be a servo motor failure. Replace the servo motor.
	Servo unit fault	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
A.Cb0: The encoder loopback check is abnormal	Encoder wiring error, poor contact	Check the encoder wiring	Check whether the cable to the encoder is faulty.
	Encoder cable specifications are different, subject to noise interference	—	Change the cable specifications to double stranded cable or double stranded overall shielded cable. The core wire is more than 0.12mm <sup>2</sup> and tinned soft copper stranded cable.
	The connection distance of encoder cable is too long, which is interfered by noise	—	The maximum connection distance is 50m.
	The potential varies of FG due to the influence of the equipment (welding machine, etc.) at the motor side	Confirm the setting status of the encoder cable	Ground the machine to prevent shunt to the encoder side FG.
	Encoder withstand excessive vibration impact	Confirm service condition	Reduce the vibration of the machine. Or install the servo motor correctly.
	Encoder fault	—	Switch on the power again. there is still an alarm, it could be a servo motor failure. Replace the servo motor.
A.CC0: The upper limit of the number of turns is inconsistent	Servo unit fault	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
	The upper limit for DD motor rotation (Pn205) is different from the upper limit for encoder rotation	Confirm Pn205	Set the Pn205 correctly (0 ~65535) .
	The upper limit of the number of revolutions of the encoder is different from the parameter of the servo unit, or this parameter is changed	Confirm the value of servo unit Pn205	Change the Setting Fn013 when an alarm is occurring.
A.CF1: Feedback Communication error of optional module (receiving error)	Servo unit fault	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
	Incorrect connection or poor contact of the cable between serial conversion unit and servo unit	Confirm the cables to the external encoder	Correctly connect cables between serial conversion unit and servo unit.
	No specified cable is used between serial conversion unit and servo unit	Confirm cable specifications for external encoder	Use the correct specified cable.
	The cable between the serial conversion unit and the servo unit is too long	Change the length of the cable connecting the serial conversion unit	Make the cable length between serial conversion unit and servo unit within 20m.
	The cable cladding between serial conversion unit and servo unit is damaged	Confirm that the serial conversion unit is connected to the cable	Replace the cable between serial conversion unit and servo unit.
A.d00: Excessive position deviation (When the servo is OFF the position deviation exceeds the position deviation alarm value (Pn520).)	The connection of U, V and W of servo motor is incorrect	Confirm the connection of main circuit cable of servo motor	Check whether the motor cable or encoder cable has poor contact and other problems.
	The frequency of the position instruction is too high	Try to decrease the command pulse rate before running	Reduce the position command pulse frequency or command acceleration, or adjust the electronic gear ratio.
	Position instruction acceleration is too large	Try to decrease the command acceleration before running	Add smoothing functions of the time constant of position instruction acceleration and deceleration (Pn216).
	The alarm value of 'excessive position deviation' (Pn520) is too low relative to the operating conditions	Verify that the position deviation alarm value (Pn520) is appropriate	Set the Pn520 parameter correctly.
	Servo unit fault	—	Switch on the power again. There is still an alarm, it could be a servo unit failure. Replace the servo unit.
A.d01: Excessive position deviation alarm when servo ON	When the position deviation is above the set value of Pn526, the servo ON	Confirm the position deviation of the servo ON (Un008)	To clear the position deviation when the servo ON or set the correct alarm value of excessive position deviation (Pn526) when the servo ON.
A.d02: Warning of excessive position deviation caused by speed limit when servo ON	When the servo is ON in the position deviation accumulation state, the speed is limited by the speed limit value (Pn529) when the servo is ON. Input a position command in this state exceeds the set value of the 'excessive position deviation' alarm (Pn520).	—	To clear the position deviation when the servo ON or set the correct alarm value of excessive position deviation (Pn526) when the servo ON or set the servo ON speed limit value (Pn529) to the correct value.
A.d10: Excessive position deviation between Motor - load	Motor rotation direction is opposite to the external encoder mounting direction	Confirm the motor rotation direction and the external encoder installation direction	Reverse the mounting direction of the external encoder, or set the rotation direction of the "Method of Using the External Encoder (Pn002.3)" to the opposite direction.
	The load position of the worktable, etc., and the installation failure of the external encoder junction	Confirm external encoder connection	Mechanical binding again.
A.E71: STO module Detect failure alarm	Poor connection between servo unit and STO module	Confirm the connection between the servo unit and the STO module	Properly connect STO modules.
	Removed the STO module	—	Run Fn014 (clear the optional module check out result) through the digital operator or SigmaWin+, then power on again.
	STO module is faulty	—	Replace STO module.
	Servo unit fault	—	Replace servo unit.

Error No.: Error Name (Content)	Reason	Confirmation method	Handling method
A.E72: Feedback optional module Detect failure alarm	Poor connection between servo unit and feedback optional module	Confirm the connection between the servo unit and the feedback optional module	Correctly connected feedback optional modules.
	Removed the feedback optional module	—	Run Fn014 (clear the optional module check result) and power on again.
	Feedback optional module is faulty	—	Replace the feedback optional module.
	Servo unit fault	—	Replace servo unit.
A.E74: Alarm for unsupported STO module	STO module is faulty	—	Replace STO module.
	An unsupported STO module is connected	Refer to the product catalog of connected servo units and STO modules	Connect the supported STO modules.
A.E75: Alarm for unsupported feedback optional module	Feedback optional module is faulty	—	Replace the feedback optional module.
	An unsupported feedback optional module connected	Refer to the product catalog of connected servo units and feedback optional modules	Connect the supported feedback optional modules.
A.Eb1: The signal input time of the security function is abnormal	The startup time difference between the input signals /HWBB1 and /HWBB2 of the hardwired base blocking function is more than 10 seconds	Measure the time difference between the two input signals	May be /HWBB1, /HWBB2 output signal loop fault, machine fault, servo unit input signal loop fault, input signal cable broken. Confirm the fault or disconnection.
A.F10: Power phase loss (In the ON state of the main power supply, the low voltage state of a phase in the R, S, T phase lasts for more than 1 second) when the main circuit power supply is switched on	The three-phase power cable is poor connected	Confirm power cables	Check whether the power cable is faulty.
	The three-phase power supply is unbalanced	Measure the voltage of each phase of the three-phase power supply	Correct unbalance of power supply (transpose phase).
	Without the parameter setting of single-phase input (Pn00B.2 = 1), the single-phase power supply is directly input	Confirm power and parameter Settings	Set power input and parameters correctly.
	Servo unit fault	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
A.F26	Torque and feedback deviation value too large	—	Properly connect the UVW power wires of the motor
A.F28	Position instruction abnormal	Check the values of 6064 and 607A	Input position instructions correctly
	Limit switch abnormality	Confirm limit signal	Confirmation of correct limit switch
	CST>CSP	—	Confirmation of switching after disabling
FL-1*2: System alarm	Servo unit fault	—	Switch on the power again. there is still an alarm, it could be a servo unit failure.
FL-2*2: System alarm	Servo unit fault	—	Replace the servo unit.

Note2): This error is not saved in the alarm log. It is displayed only on the panel display.

#### Reason of error alarm and handling method

Warning No.: Warning name (Content)	Reason	Confirmation method	Handling method
A.900: Excessive position deviation	The connection of U, V and W of servo motor is incorrect	Confirm the connection of main circuit cable of servo motor	Check whether the motor cable or encoder cable has poor contact and other problems.
	The servo unit gain is low	Check if the gain of the servo unit is too low	Improve servo gain through advanced automatic tuning.
	The frequency of the position instruction pulse is too high	Try to decrease the command pulse rate before running	Reduce the position command pulse frequency or command acceleration, or adjust the electronic gear ratio.
	Position instruction acceleration is too large.	Try to decrease the command acceleration before running	Add smoothing functions of the time constant of position instruction acceleration and deceleration (Pn216/Pn217).
	The excessive position deviation alarm value (Pn520) is too low relative to the operating conditions	Verify that the excessive position deviation alarm value (Pn520) is appropriate	Set the Pn520 correctly.
	Servo unit fault	—	Switch on the power again. there is still an alarm, it could be a servo unit failure. Replace the servo unit.
A.901: Excessive position deviation when servo ON	When servo ON, the accumulated position deviation exceeds set ratio $Pn520 \times Pn51E$ 100	—	To clear the position deviation when the servo is OFF or set the appropriate position deviation excessive warning value when the servo is ON (Pn528).
A.910: Overload (Then Warning before it becomes overload alarm (A.710 A.720))	Motor wiring, encoder wiring or poor connection	Confirm connection	Confirm whether there is any problem with motor wiring and encoder wiring.
	Motor operation exceeds the overload protection characteristic	Confirm motor overload characteristics and operation instructions	Reconsider the load and operating conditions. Or, increase the motor capacity.
	The motor is not driven due to mechanical factors, resulting in excessive load during operation	Confirm instructions and motor speed	Improve mechanical factors.
	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.
A.911: Vibration	Detect abnormal vibration in motor operation	Confirm the abnormal sound of the motor and the speed and torque waveform during operation	Reduce motor speed or servo gain by single parameter tuning.
	The value of the rotary inertia ratio (Pn103) is larger than the actual value or it has a large change	Confirm the rotary inertia ratio	Set the rotary inertia ratio correctly (Pn103).

Warning No.: Warning name (Content)	Reason	Confirmation method	Handling method
A.920: Regenerative overload (The warning before it becomes regenerative overload alarm (A.320))	The power supply voltage exceeds the specification range.	Measure voltage of power supply +	Set the voltage of power supply within the specification range.
	External regenerative resistance value, servo unit capacity or regenerative resistance capacity is insufficient, or in continuous regenerative state	Reconfirm running conditions or capacity (capacity selection software HCServoWorks, etc.)	Change the regenerative resistance value, regenerative resistance capacity, or servo unit capacity. The operating conditions were adjusted again (capacity selection software HCServoWorks, etc.).
	Continuous bearing of negative load, in a state of continuous regeneration	Confirm the load applied to the running servo motor	Rediscuss the system including servo, machinery and operating conditions.
A.921: DB overload (The warning before it becomes DB overload (A.731))	The motor is being driven by external forces	Confirm operation status	Do not drive the motor through external forces.
	The rotational energy of the DB at stop exceeds the capacity of the DB resistance	Check the DB resistance power consumption (Un00B) to determine the DB frequency	Try the following measures - Reduce the command speed of the servo motor. - Reduce the moment of inertia ratio. - Reduce the number of DB stops.
	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.
A.930: Battery failure of absolute value encoder (Absolute value encoder battery voltage below the specified value) * Check out when connecting absolute value encoder only	The battery is improperly connected or disconnected	Check the battery connection	Connect the battery properly.
	Battery voltage below the specified value (3.0V)	Measure the voltage of the battery	Replace the battery.
	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.
A.941: Undervoltage	Changed the parameters that need to be repower	—	Repower servo drive
	200V servo unit, AC power supply voltage below 140V, 400V servo unit, AC power supply voltage below 280V	Measure voltage of power supply	Adjust the supply voltage to the normal range.
	The power supply voltage drops during operation	Measure voltage of power supply	Increase the power capacity.
	Instantaneous power cut	Measure voltage of power supply	If the instantaneous outage hold time (Pn509) is changed, set it to a smaller value.
	The fuse of the servo unit has blown	—	Replace the servo unit and connect the reactor before using the servo unit.
	Servo unit fault	—	It could be a servo unit failure. Replace the servo unit.
A.9A0: Overtravel (Overtravel status was detected.)	Overtravel was detected while the servo was ON.	Check the status of the overtravel signals on the input signal monitor(Un005).	The reason of error and handling method can be judged from the action and state of the servo motor*. In addition, if the overtravel signal cannot be confirmed with the input signal monitor (Un005), a transient overtravel may be detected. Take the following measures - Do not send instructions from the upper device to the position which is overtravel. - Confirm the signal connection of the overtravel signal. - Adopt anti-interference countermeasures.
	The setting of soft limit is incorrect.	Check whether the 607D value is correct	Set the value of 607D in the correct range
	The setting of origin offset is incorrect.	Check whether the 607D and 607C values are correct	Set the values of 607D and 607C in the correct range
A.9B2	Synchronization frame data is lost	Check whether the twisted-pair shielded communications cable is used. Check whether the driver is properly grounded;	1. Use twisted-pair shielded cables. 2. Connect cables according to standard wiring instructions; 3. After setting the pre-used synchronization period, switch the drive EtherCAT communication state machine to the running mode; 4. If the synchronization period of the master station has a large error, adjust the synchronization loss fault tolerance Pn785 of the master station or the slave station
	EtherCAT communication was interrupted	Check whether the twisted-pair shielded communications cable is used. Check whether the driver is properly grounded;	1. Use twisted-pair shielded cables. 2. Connect cables according to standard wiring instructions; 3. After setting the pre-used synchronization period, switch the drive EtherCAT communication state machine to the running mode; 4. If the synchronization period of the master station has a large error, adjust the synchronization loss fault tolerance Pn785 of the master station or the slave station
A.9B4	EtherCAT network initialization failed.	The device configuration file is not burned. The servo drive is faulty	Burn the corresponding xml file, or replace the servo drive
A.9B5	Current loop status alarm	The torque instruction is less than 30%, and the motor is stopping	Set torque instructions and maximum torque limits correctly
A.9B7	The enable condition is not satisfied	If the hardware base is not locked, the device cannot be enabled if the conditions are not satisfied. Or the bus voltage is undervoltage	Confirm whether the bus voltage supply is normal; Check whether the CN3 port is normal
A.9B8	Any input of security interface is not connected to +24V	Check whether the security function uses signal STO(CN3) properly	Restore the secure interface after ensuring that it is secure
A.9B9	Emergency stop warning	Check the Pn515.3 E-Stop signal allocation and whether the DI terminal logic is set to valid.	Check the operating mode and release the DI brake signal when it is safe

## Function code definition

Function Definition of the digital input terminal (DI)		
Function name	Name description	Function instruction
P-OT	Forward Drive Prohibit	When the mechanical movement exceeds the movable range limit switch action, enter the overtravel protection function Valid: Positive limit, positive motion is prohibited Invalid: Normal range, positive motion is allowed
N-OT	Reverse Drive Prohibit	When the mechanical movement exceeds the movable range limit switch action, enter the overtravel protection function Effective: Negative limit, negative motion is prohibited Invalid: Normal range, negative motion is allowed
/HomeSwitch	Homing signal	Invalid: Homing not completed Valid: Homing completed
EXT	Probe signal	Invalid: Position latch is not performed Valid: Position latch using probe
BK	Brake signal	Invalid: Brake action Valid: Brake does not act