S Series
Sensorless Driver Manual

Foreword

Thank you for choosing Shenzhen Rtelligent Mechanical Electrical Technology CO., LTD BLDC series sensorless driver. This manual provides the knowledge and precautions required to use this system.

- **Improper operation may cause accidents. Before using this system, be sure to read this manual carefully.**

Due to the continuous improvement of the drive, the information provided by our company is subject to change without notice.

Our company will not bear any responsibility for any changes made by the user, and the product warranty will be voided.

Contents

第一章 Product information

1.1 Introduction to drive

1.1.1 Overview

BLDC series of non-inductive drives, is a general-purpose brushless DC motor speed drive developed by

Rtelligent. equipped with 485 communication interface to realize the communication control of the drive.

The driver board USB turns TTL serial port chip, which is convenient for customers to use general

Micro-USB line monitoring / modification parameters.

1.1.2 Product Model Description

S 400

① ②

Identification	Note
①	Series Name S： Ritter S Series No Sense Brushless DC Motor Driver
②	rated power 200:200 W 400：400W

1.1.3 Product characteristics

- Operating voltage:

  S200： DC input voltage 18 VDC~48 VDC, Recommended working voltage 24 VDC~48 VDC;

  S400： DC input voltage 18 VDC~48 VDC; Recommended working voltage 24 VDC~48 VDC;

- With over-current, over-voltage, under-voltage protection functions, and optional output alarm

  warning;

- On board USB turn serial chip, use common Micro-USB data line can connect debugging;

- The speed instruction can be set.

- Using FOC magnetic field location technology and SVPWM technology;

- Support potentiometer speed regulation or 0~5 V analog input signal;

- Configurable function of 3 digital input /1 digital output interface;

1.1.4 **Product Size**
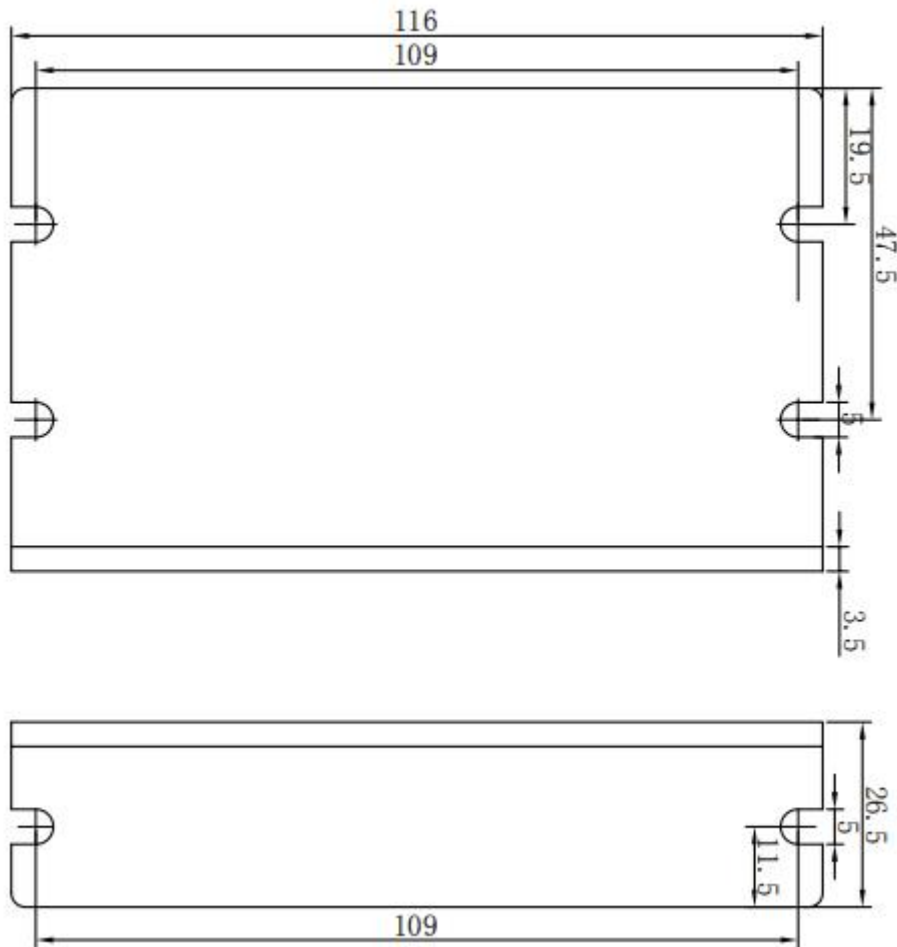
第二章 Installation instructions

2.1 Installation of drives

2.1.1 Installation sites

- Please install in the sun-free installation cabinet;

- Do not use this product near corrosive and flammable gas environment such as hydrogen sulfide, chlorine gas, ammonia, sulfur, chlorinated gas, acid, alkali, salt, etc.

- Do not install in high temperature, wet, dusty, metal dust environment;

- No vibration;

- Pollution rating at installation site: PD2.

2.1.2 Environmental conditions

Table 2-1 Driver Installation Environment

Project	Description
Use of ambient temperature	℃0~55(ambient temperature above 45℃, average load rate not exceeding 80%)(not frozen)
Environmental humidity	90% RH less (no dew)
Storage temperature	-20~85℃(not frozen)
Storage humidity	90% RH less (no dew)
Vibration	m/s 4.9^{2}Below
Impact	m/s 19.6^{2}Below
Protection level	IP10

Altitude	Below 1000 m

2.2 **Installation of motor**

2.2.1 **Installation sites**

● Do not use this product near corrosive and flammable gas environment such as hydrogen sulfide, chlorine gas, ammonia, sulfur, chlorinated gas, acid, alkali, salt, etc.

● In grinding fluid, oil mist, iron powder, cutting and other places, please choose the type with oil seal;

● Keep away from heat sources such as stoves;

● Do not use motor in closed environment. Closed environment will cause high temperature of motor and shorten service life.

2.2.2 **Environmental conditions**

Table 2-2 Motor Installation Environment

Project	Description
Use of ambient temperature	-20~50℃(not frozen)
Environmental humidity	20%~90% RH less (no dew)
Storage temperature	-20~60℃(maximum temperature guarantee :80℃72 hours)
Storage humidity	20%~90% RH less (no dew)
Vibration	m/s 49^{2}Below
Impact	m/s 490^{2}Below
Protection level	IP54
Altitude	Below 1000 m

第三章 Connection

3.1 Wiring definition

3.1.1 Power input port

Identification	Note
VDC	Positive input DC power supply :+24 V~+48 V
GND	Input DC source: V 0

3.1.2 Motor line ports

Identification	Note
U	Electrical power line U phase
V	Electrical power line V phase
W	Electrical power line W phase

3.1.3 Control signal port

Identification	Note
COM24V	24V control signal input common ● **Note 24 V and 5 V Inputs can only be selected**
EN /(IN1)	External Instruction Pulse Input Port/(Universal Digital Input Port 1)
F/R /(IN2)	External Instruction Direction Input Port/(Universal Digital Input Port 2)
BREAK /(IN3)	External Enable Input Port/(Universal Digital Input Port 3)
COM0V	Control signal output common V :0
ALM /(OUT1)	Alarm Output Port/(Universal Digital Output Port 1)

3.1.4 **RS485 Communications Port**
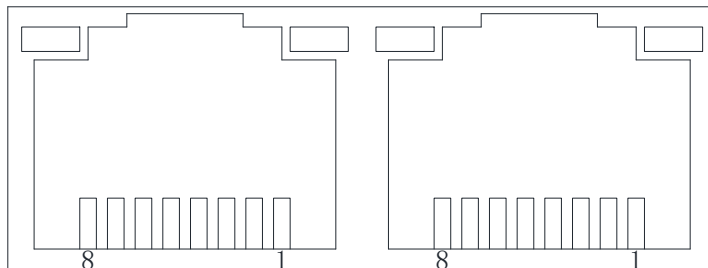
Name of signal		Needle pin	Function
Communication signal	RS485+	1	RS485 communication port
	RS485-	2	
	GND	3	
	Reservations	4	Reserved, not connected
		5	
		6	
		7	
		8	

3.2 Principle of digital input/output interface

3.2.1 Digital Input Interface
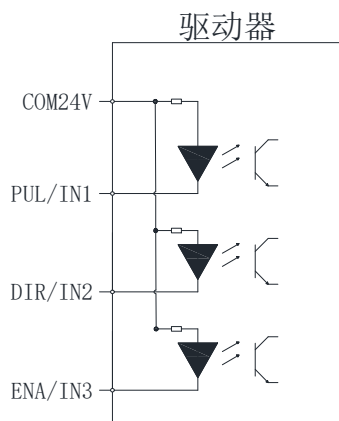
Figure 3-1 Digital Input Interface Principle

- **the driver can receive 24 V or 5 V of input signals (only one can be selected), use the COM24V common end if the input signal is 24 V, and COM5V common end if the input signal is 5. Incorrect wiring can cause driver damage!**

- **schematic diagram of the wiring of the upper computer when it is the relay output**
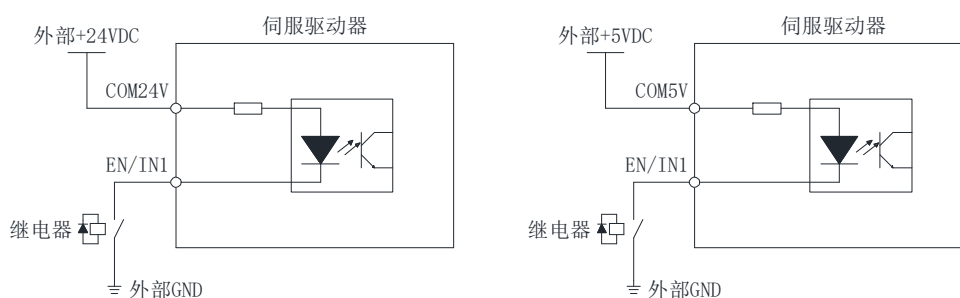
Fig .5-2 Schematic diagram of relay output connection for upper computer

- **A schematic diagram of the connection of the upper computer to the open circuit output of the collector**
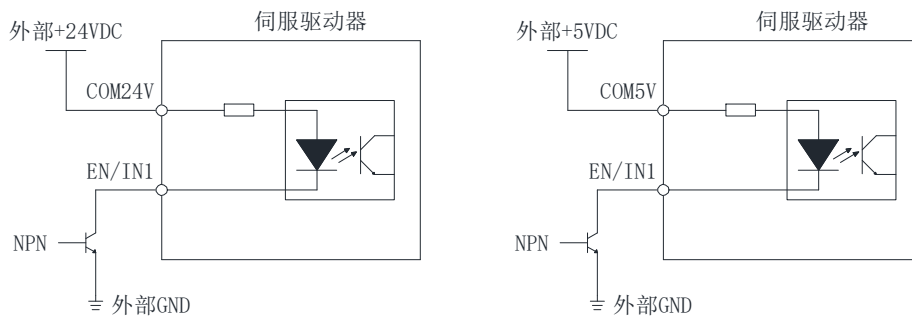
Fig .5-3 Schematic diagram of open circuit output of collector

- **Attention: PNP input not supported**

3.2.2 **Digital Output Interface**

DRV series contains a photoelectric isolation output signal:

- ALM/OUT1 output current capacity of 30 mA
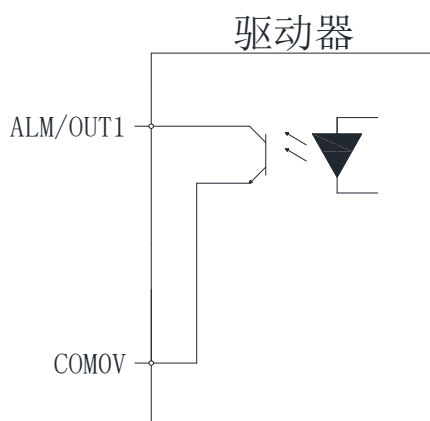
Figure 5-4 Principle of Digital Output Interface

- **When the upper computer device is input into the relay**

  Correct wiring:
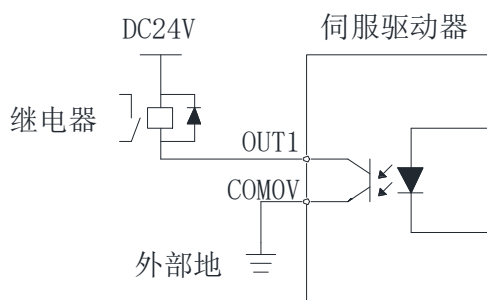
Fig .5-5 Schematic diagram of the correct connection of the relay input of the upper computer

Wrong wiring:

未接入继电器

DC24V　伺服驱动器

OUT1

COMOV

外部地

续流二极管极性错误

DC24V　伺服驱动器

继电器

OUT1

COMOV

外部地
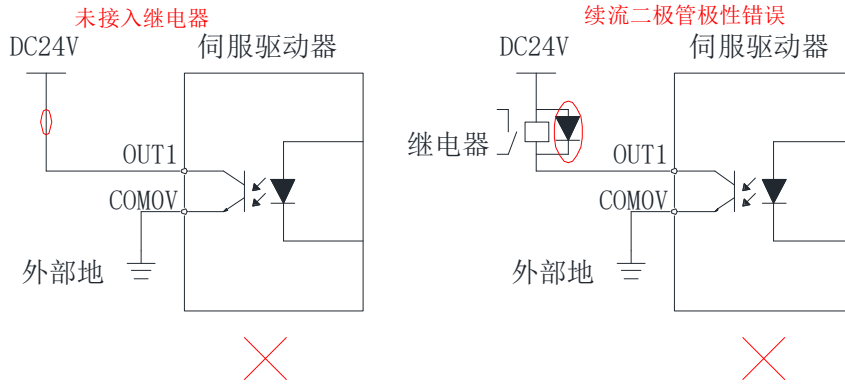
Fig .5-6 Schematic diagram of wrong wiring of relay input of upper computer

● When the upper computer device is optocoupler input:

DC24V　伺服驱动器

光耦

OUT1

COMOV

外部地

DC24V　未接入限流电阻　伺服驱动器

光耦

OUT1

COMOV

外部地
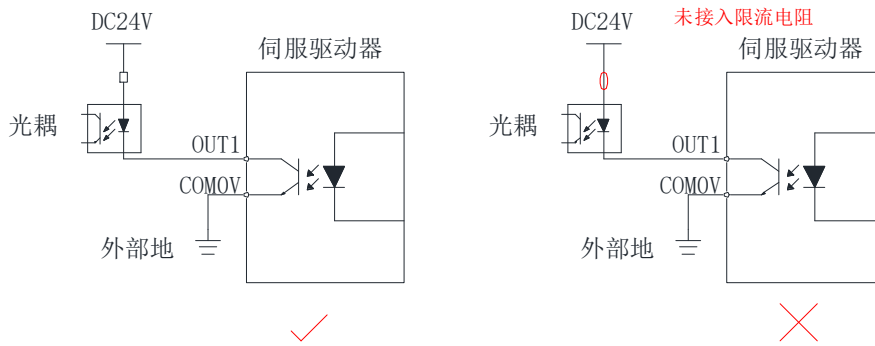
Fig .5-7 Schematic diagram of optocoupler input wiring of upper computer

第四章 Running

4.1 Basic set

4.1.1 Pre-operational inspection

A check is required before the drive and motor are operated:

Records	Serial number	Content
		Connection
□	1	Drive power input terminals (VCC、GND) must be properly connected and distinguish between positive and negative.
□	2	Drive motor power line output terminals (U、V、W) and motor power line cables (U、V、W) must be in phase consistent and properly connected.
□	3	The driver control signal cable connection is correct: lock, limit protection, emergency stop and other external signals have been reliably connected.
□	4	Drive and motor must be reliably grounded.
□	5	The force of all cables is within the specified range.
□	6	wiring terminals have been insulated.
		Environment and Machinery
□	1	Inside and outside of the drive will not cause signal lines, power lines short-circuit wire head, metal chips and other foreign bodies.
□	2	the drive is not placed on the combustible body.
□	3	The installation of the motor, the connection of the shaft and machinery must be reliable.
□	4	The motor and the connected machinery must be in a condition that can be operated.
		Power supply voltage
□	1	the voltage between the input VCC and GND of the driver supply must be within the rated

		range.

4.2 Motor parameters identification

S400 when adapting a motor, it is necessary to use the pole logarithm, inductance, resistance, inverse EMF coefficient of the motor, which can be operated by the following steps:

1、 Ask the user to set the pole logarithm parameter of the motor correctly Pn1, the wrong set value will cause the running speed to be incorrect;

2、 Set the rated current of the motor Pn15, set the resistance of the motor, inductance estimated current Pn13、Pn14, generally set to 25% of the rated current;

3、 Pn29 set to 0 to enable parameter identification function;

4、 Save the parameters by Pn90 write 1, after 2 s clock, power off restart drive;

5、 The driver restart, Pn23 write 0, after 2 s clock, Pn23 write 1, then write 1, this time start parameter identification;

6、 At this point Pn36 will quickly become 3, the electrical opportunity to hear a slight beep, also indicating that the calibration has begun;

7、 When the value of the Pn37 is greater than 3, the motor starts to rotate, and the motor stops during the whole calibration process are not allowed. If the motor stops, please stop the calibration immediately through the Pn23 write 0, and consult after-sale;

8、 When the motor does not stop, when the Pn37 value is 13, the motor calibration ends, at this time the motor in normal rotation, through the Pn24 write 0 to stop the operation of the motor;

9、 Write Pn58/Pn59 parameters to the Pn4/Pn5;

10、 Write Pn62/Pn63 parameters to the Pn6/Pn7;

11、 Write Pn64/Pn65 parameters to the Pn8/Pn9;

12、 Write Pn66/Pn67 parameters to the Pn10/Pn11;

13、 Pn29 set to 1;

14、 Save the parameters by Pn90 write 1, after 2 s clock, power off restart drive;

15、 At the end of the calibration, the motor can run normally; if the driver is suitable for the same type of

motor, only the parameter import can be carried out.

4.3 **Application pattern**

4.3.1 **potentiometer speed regulation function**

In this control mode, the speed instruction is given by the potentiometer or the external analog input of the user. It reads as follows:

★ Noun explanation:

zero drift: refers to the value of the driver sampling voltage relative to the GND when the analog channel input voltage is zero.

Bias: after zero drift correction, the sampling voltage is zero corresponding to the analog channel input voltage value.

Dead zone: indicates that the sampling voltage is zero, corresponding to the analog channel input voltage interval.
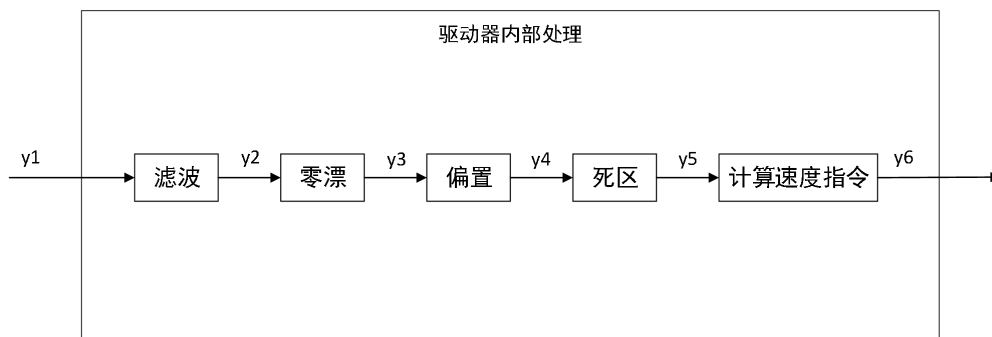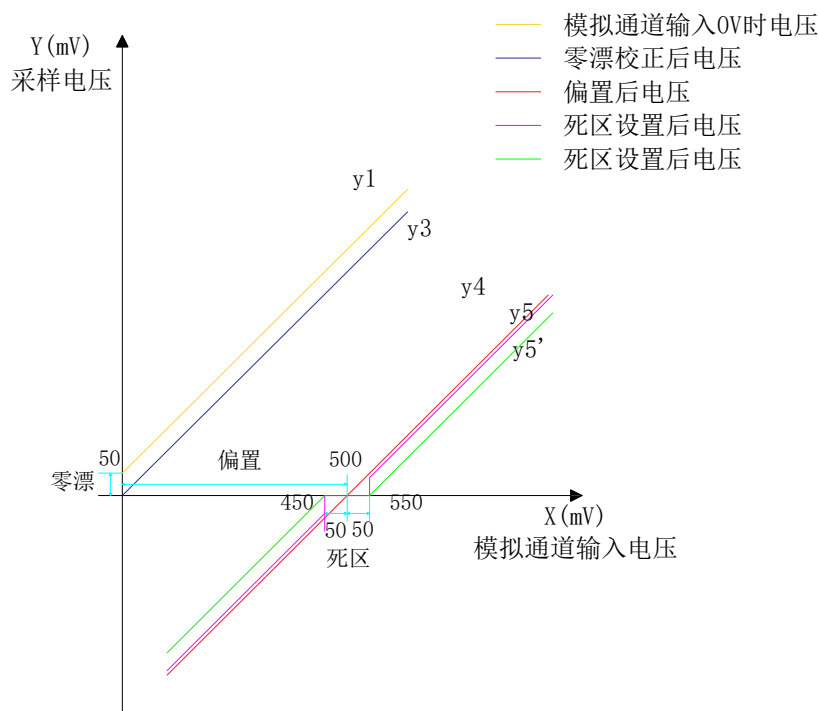
- Filtering:

driver provides analog filtering function by setting parameters Pn123 analog channel low pass filter cutoff frequency. It can prevent the motor instruction fluctuation caused by the instability of analog input voltage, and can also weaken the motor error action caused by interference signal. The filtering function has no effect on zero drift and dead zone.

- Zero drift correction:

- when the actual input voltage is corrected to V 0, the analog channel output voltage deviates from the value of V 0.

An analog channel output voltage, such as y, that is not processed inside the drive$_1$As shown. A large low-pass filter cut-off frequency is set and the y of the filtered sampling voltage can be assumed$_2$y$_1$Consistent.

Visible, when the actual input voltage is x=0, the output voltage y_1=50 mV, at this time 50 mV is called zero drift.

Manually set Pn125=50 mV, after zero drift correction, sampling voltage such as y.$_3$As shown. y_3=y_1-50.

The zero drift value of the analog channel can be calculated by setting the bias and dead V to 0 and the

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analog input to 0 V.

● Offset:

set the sampling voltage to 0 V, the corresponding analog input voltage value.

As shown, pre-set sampling voltage $y_4=0$, the corresponding actual input voltage x=500 mV, This 500 is called bias.

Manually set Pn122=500 mV, after bias, sampling voltage $y_4=x-500=y_3-500$.

● Dead zone correction:

limit the effective input voltage range when the driver sampling voltage is not 0.

when the bias setting is complete, the input voltage x within 450 mV and 550 mV, and the sampling voltage values are all 0. this 50 mV is called dead zone.

Set Pn124=50 mV, after dead time correction, sampling voltage such as y_5(Pn131=00) or y_5'(Pn131=1).

At 0 Pn131=:

$$y_5 = \begin{cases} 0 & 450 \le x \le 550 \\ y_4 & 0 \le x < 450 \ 或 \ 550 < x \le 5000 \end{cases}$$

At 1 Pn131=:

$$y_5' = \begin{cases} 0 & 450 \le x \le 550 \\ y_4 - Pn202 & 0 \le x < 450 \ 或 \ 550 < x \le 5000 \end{cases}$$

● Speed instruction:

When zero drift, bias, dead zone setting is completed, the corresponding speed instruction value of 5.0 V in the sampling voltage at this time should be set by Pn126, and the actual speed instruction y_6:

$$y_6 = \frac{y_5}{5000} \times Pn204$$

When the correct setting is completed, the sampling voltage value of the analog input channel can be viewed in real time by Pn128, or the corresponding speed instruction value of the analog voltage can be viewed by Pn129.

The potentiometer control mode has two operation modes:

● A mode of operation in which an input controls the starting and stopping + an input controlling direction

● By one input control positive turn, one input control reverse: positive turn + reverse operation mode

★ Description of associated parameters

Parameters	Name of name	Scope of setting	Units	Function	Setting Mode	Entry into force	Factory setting
Pn122	Analog input bias	0～65535	mV	Setting the bias of the analog input channel	Running settings	Next run	0
Pn123	Analog input low pass filter cutoff	0～65535	Hz	Setting the analog input channel low pass filter cutoff frequency	Running settings	Next run	100
Pn124	Analog input dead zone	0～65535	mV	Setting the dead voltage of analog input channel	Running settings	Immediate effect	50
Pn125	Analog Input Zero Drift	0～65535	mV	Set analog input channel input zero drift voltage	Running settings	Next run	0
Pn126	5V corresponding speed instructions	0～32767	RPM	A speed instruction when the analog input channel input voltage is set to 5 V.	Running settings	Immediate effect	3500
Pn127	DSP actual sampled voltage values	Display	mV	Display DSP sampling to obtain the input voltage of analog input channel after low pass filter	-	-	-
Pn128	Voltage values after zero drift, dead zone, bias	Display	mV	Display voltage values after filtering, zero drift, bias, dead time	-	-	-
Pn129	Velocity corresponding to current input voltage	Display	RPM	Displays the speed instruction value corresponding to the current input voltage	-	-	-
Pn130	Analog Force Startup Command	0～3	-	Set the start-up command that does not require input control or use a communication control analog to start the run:	Running settings	Immediate effect	0

				0： downtime 1： start - up + direction mode 2： turn on 3： reversal mode start			
Pn131	Analog Dead Zone Processing Mode	0～1	-	Set the drive dead mode ● Please refer to the analog part of the graphic description	Running settings	Immediate effect	0
Pn49	Add or subtract	1～5000	r/s^2	Set the speed of adding and subtracting motor analog operation	Running settings	Next run	50

Stop and stop control mode:

● + operation mode:

1、 The motor is operated by setting IN terminal function as FunIN.26(FUNC6: potentiometer start and stop), FunIN.18(SpdDirSel: speed instruction direction setting);

2、 the motor start and stop is realized by setting the IN terminal function as FunIN.18(spd dirsel: speed instruction direction setting), communication mode or pre-set parameter Pn130=3(start, stop need write Pn130=0)(note: in this mode, if preset Pn130=1, the motor will run after drive enable, i.e. motor start and stop is controlled by drive enable).

note: the speed Pn126 number parameter can be modified by communication during operation, and the driver responds instantly. The symbol indicates the direction of the motor:

● Forward + reverse mode:

1、 Through setting IN terminal function as FunIN.24(FUNC4: potentiometer positive turn),

FunIN.25(FUNC5: potentiometer reverse), realize motor operation;

2、 After the drive is enabled, write Pn130=1(positive turn)/ Pn130=2(reverse turn) to realize the motor.

note: the speed Pn126 number parameter can be modified by communication during operation, and the driver responds instantly. The symbol indicates the direction of the motor:

4.3.2 **PWM speed regulation function:**

this control mode, the duty cycle signal is input through the IN1(en) digital input port of PWM servo driver. the frequency of the PWM signal is required to be more than 100 Hz and is controlled below 10 KHz as far as possible. The duty cycle of the PWM signal is between 0%~100%, and the reference value is the speed set by the Pn47 parameter, that is, the driver speed instruction =Pn47x PWM the signal duty cycle.

★ Description of associated parameters

Parameters	Name of name	Scope of setting	Units	Function	Setting Mode	Entry into force	Factory setting
Pn47	Speed given	-32768～32767	RPM	Set the speed of the motor ● **The velocity is a signed value, a positive number means a positive turn, a negative number means a reversal**	Running settings	Immediate effect	2000
Pn49	Add or subtract	1～5000	r/s^2	Set the speed of motor operation	Running settings	Next run	50
Pn120	PWM output pulse duty cycle	Display	0.01%	Displays the duty cycle of the current input PWM signal	-	-	-
Pn131	PWM duty cycle signal polarity	0 or 2	-	0： normal polarity 2: reverse polarity (e.g .0： 20% duty cycle ,1:80% duty cycle)	Running settings	Immediate effect	0

PWM duty cycle input: set IN1 terminal function to 0-normal input (only set IN1 terminal to PWM duty cycle input);

Stop and stop control mode:

● + operation mode:

The motor is operated by setting IN terminal function as FunIN.29(FUNC9: PWM start and stop),

FunIN.18(SpdDirSel: speed instruction direction setting);

● Forward + reverse mode:

The motor is operated by setting IN terminal function as FunIN.27(FUNC7: PWM forward) and FunIN.28(FUNC8: PWM reverse);

4.3.3 **Communication control functions:**

During the control mode, the motor can start and stop by RS485 communication mode, and the motor running speed can be modified:

★ Description of associated parameters

Parameters	Name of name	Scope of setting	Units	Function	Setting Mode	Entry into force	Factory setting
Pn47	Speed given	-32768～32767	RPM	Set the speed of the motor ● **The velocity is a signed value, a positive number means a positive turn, a negative number means a reversal**	Running settings	Immediate effect	2000
Pn49	Add or subtract	1～5000	r/s^2	Set the speed of motor operation	Running settings	Next run	50
Pn24	Communication control instructions	0～5	-	Instruction to control motor start and stop	Running settings	Immediate effect	5

Stop and stop control mode:

Write values	Note
0	write: motor deceleration shutdown, driver response instructions after the Pn24 is modified to 5 Read: motor waiting for response instruction
1	Write: The motor starts running, the direction of operation is determined by the symbol of the Pn47, and the Pn24 is modified to 5 after the driver responds to the instruction

	Read: motor waiting for response instruction
2	Writer: The motor is running and the driver changes the Pn24 to 5 after responding to the instruction Read: motor waiting for response instruction
3	Write: The motor starts running, the direction of operation is determined by the symbol of the Pn47, and the Pn24 is modified to 5 after the driver responds to the instruction Read: motor waiting for response instruction
4	Writer: The motor stops and the driver changes the Pn24 to 5 Read: motor waiting for response instruction
5	Write: Meaningless Read 0: Motor waits for response instruction

第五章 Parameter description

● **Modify the drive parameters by communication, just send the parameter values to the RAM area of the drive, after the drive restarts, the parameter values will be restored back to the values before the modification. If you need to permanently save the parameters (still valid after power down restart), write the value 1 by Pn90(save parameters button on the sharp technical debugging software) so that the parameter values are saved to the FLASH sector of the drive.**

● **Non-specific parameters are effective immediately (no permanent saving is required after power-down restart).**

5.1 List of parameters

Number	Name of name	Scope	Default	Units
Pn0	Type of motor	0～1	1	-
Pn1	Motor pole logarithm	1～50	4	Counterpoint
Pn2/3	Motor rotor resistance	1～2147483648	0	0.001 mΩ
Pn4/5	Motor stator resistance	1～2147483648	309200	0.001 mΩ
Pn6/7	Motor stator D shaft inductance	1～2147483648	335235	0.001 uH
Pn8/9	Motor stator Q shaft inductance	1～2147483648	335235	0.001 uH
Pn10/11	Motor Back EMF Coefficient	1～2147483648	70352	0.001 mV/Hz
Pn12	Reservations	-	-	-
Pn13	Resistance estimate current	0～65535	2500	mA
Pn14	Inductor Estimated Current	0～65535	2500	mA
Pn15	Motor rated current	0～65535	7500	mA
Pn16	Flux estimation	20～50	20	Hz
Pn17	Motor R/L estimation frequency	100～300	300	Hz
Pn18	Maximum ID reference current	0～65535	3750	mA
Pn19	Zero angular frequency	0～1000	50	Hz 0.01
Pn20	Forced angular frequency	0～2000	100	Hz 0.01
Pn21～Pn22	Reservations	-	-	-
Pn23	Enable control	0～1	1	-
Pn24	Communication Control Command	0～5	5	-
Pn25	Reservations	-	-	-
Pn26	Enable open loop start	0～1	-	-

Pn27	Reservations	-	-	-
Pn28	Re-calibration of stator resistance	0～1	0	-
Pn29	Enable user parameters	0～1	1	-
Pn30	Enable bias calibration	0～1	1	-
Pn31～Pn32	Reservations	-	-	-
Pn33	Prohibition PI self-identification	0～1	0	-
Pn34	Reservations	-	-	-
Pn35	Running state	Display	-	-
Pn36	Controller State	Display	-	-
Pn37	State of the estimator	Display	-	-
Pn38	Control mode	Display	-	-
Pn39	Error code	Display	-	-
Pn40～Pn42	Reservations	-	-	-
Pn43	D current given	Display	-	A 0.01
Pn44	D axis current feedback	Display	-	A 0.01
Pn45	Q current given	Display	-	A 0.01
Pn46	Q axis current feedback	Display	-	A 0.01
Pn47	Speed given	-32768～32767	2000	RPM
Pn48	Speed feedback	Display	-	RPM
Pn49	Add or subtract	1～5000	50	r/s^2
Pn50～Pn53	Reservations	-	-	-
Pn54	Estimated torque	Display	-	0.001 Nm
Pn55	Reservations	-	-	-
Pn56/57	Estimate rotor resistance	Display	-	0.001 mΩ
Pn58/59	Estimate stator resistance	Display	-	0.001 mΩ
Pn60/61	Reservations	-	-	-
Pn62/63	Estimate stator D axis inductance	Display	-	0.001 uH
Pn64/65	Estimate stator Q axis inductance	Display	-	0.001 uH
Pn66/67	Estimation of back EMF	Display	-	0.001 mV/Hz
Pn68	Bus voltage	Display	-	V 0.01
Pn69	A phase current	Display	-	A 0.01
Pn70	B phase current	Display	-	A 0.01
Pn71	C phase current	Display	-	A 0.01
Pn72	A phase voltage	Display	-	V 0.01
Pn73	B phase voltage	Display	-	V 0.01
Pn74	C phase voltage	Display	-	V 0.01
Pn75	A phase current bias	Display	-	mV
Pn76	B phase current bias	Display	-	mV
Pn77	C phase current bias	Display	-	mV

Pn78	A phase voltage bias	Display	-	V 0.01
Pn79	B phase voltage bias	Display	-	V 0.01
Pn80	C phase voltage bias	Display	-	V 0.01
Pn81	A phase current sampling values	Display	-	-
Pn82	B phase current sampling values	Display	-	-
Pn83	C phase current sampling values	Display	-	-
Pn84	A phase voltage sampling values	Display	-	-
Pn85	B phase voltage sampling values	Display	-	-
Pn86	C phase voltage sampling values	Display	-	-
Pn87	VDC sampling values	Display	-	-
Pn88	Reservations	-	-	-
Pn89	Driver version number	Display	-	-
Pn90	Save parameters	0～1	0	-
Pn91	Resume factory setting	0～2	0	-
Pn92	**Retention: Do not use**	-	-	-
Pn93	Kp speed proportional gain	0～65535	0	-
Pn94	Ki of velocity integral gain	0～65535	1	-
Pn95	Current proportional gain Kp	0～65535	0	-
Pn96	Ki of velocity integral gain	0～65535	100	-
Pn97	RS485 station number	0～127	1	-
Pn98	RS485 baud rate	0～5	5	-
Pn99	RS485 data format	0～5	0	-
Pn100	Input port 1 function, polarity	0～63	58	-
Pn101	Input port 2 function, polarity	0～63	50	-
Pn102	Input port 3 function, polarity	0～63	52	-
Pn103	Input port 4 function, polarity	0～63	53	-
Pn104	Input port 5 function, polarity	0～63	54	-
Pn105	Output port 1 function, polarity	0～63	33	-
Pn106	Output port 2 function, polarity	0～63	36	-
Pn107	Output port 3 function, polarity	0～63	43	-
Pn108	Input mandatory	0～31	0	-
Pn109	Output force	0～7	0	-
Pn110	Driver ID Number	Display	-	-
Pn111	Alarm code	Display	-	-
Pn112	Input Port Status Register	Display	-	-
Pn113	Output Port Status Register	Display	-	-

Pn114	Input port conduction trigger state	Display	-	-
Pn115	Input port disconnect trigger state	Display	-	-
Pn116	Input flag register	Display	-	-
Pn117	Output flag register	Display	-	-
Pn118	System state	Display	-	-
Pn119	Analog channel input sampling values	Display	-	-
Pn120	PWM input pulse duty cycle	Display	-	0.01%
Pn121	PWM output motor speed duty cycle	Display	-	0.01%
Pn122	Analog input bias	0～65535	0	mV
Pn123	Analog Input Filter Frequency	1～65535	100	Hz
Pn124	Analog input dead zone	0～65535	50	mV
Pn125	Analog Input Zero Drift	0～65535	0	mV
Pn126	5V corresponding speed instructions	0～32767	3500	RPM
Pn127	DSP actual sampled voltage values	Display	-	mV
Pn128	Value of treated voltage	Display	-	mV
Pn129	Velocity corresponding to current input voltage	Display	-	RPM
Pn130	Analog speed forced start	0～3	0	-
Pn131	Dead zone processing mode	0～1	0	-
Pn132	Default parameter ID	0～65535	0	-
Pn133	Default motor ID	0～65535	23019	-
Pn134	Source of speed instructions	0～10	0	-
Pn135	Current step test percentage	0～100	30	%
Pn136	Data sampling channel 1	0～20	0	-
Pn137	Data sampling channel 2	0～20	0	-
Pn138	Data sampling interval	0～65535	1	us 62.5
Pn139	Data sampling flags	0～2	0	-
Pn140	Current step test mark	0～2	0	-
Pn141	Dial status	Display	-	-

5.2 **Parameters**

5.2.1 **Motor parameters**

● **note: unless specifically noted, the following motor parameters need to be written to the value 1 by Pn90(the "save parameters" button on the sharp technical debugging software) so that the parameter values are saved to the FLASH sector of the drive after restarting the drive takes effect.**

Pn0	Name of name	Type of motor				Relevant models	-
	Scope of setting	0～1		Units	-	Factory setting	1

Set set	Type of motor
0	Reserved, do not set
1	Synchronous motor

Pn1	Name of name	Motor pole logarithm				Relevant models	-
	Scope of setting	1～50		Units	Counterpoint	Factory setting	4

Pn2/3	Name of name	Motor rotor resistance				Relevant models	-
	Scope of setting	1～2147483648		Units	0.001 mΩ	Factory setting	0

Pn4/5	Name of name	Motor stator resistance				Relevant models	-
	Scope of	1～2147483648		Units	0.001 mΩ	Factory	309200

		setting				setting	

	Name of name	Motor stator D shaft inductance			Relevant models		-
Pn6/7	Scope of setting	1～2147483648	Units	0.001 uH	Factory setting		335235

	Name of name	Motor stator Q shaft inductance			Relevant models		-
Pn8/9	Scope of setting	1～2147483648	Units	0.001 uH	Factory setting		335235

	Name of name	Motor Back EMF Coefficient			Relevant models		-
Pn10/11	Scope of setting	1～2147483648	Units	0.001 mV/Hz	Factory setting		70352

a motor back EMF coefficient is set to characterize the back EMF size when the motor rotation frequency is 1 Hz.

	Name of name	Reservations			Relevant models		-
Pn12	Scope of setting	-	Units	-	Factory setting		-

	Name of name	Resistance estimate current			Relevant models		-
Pn13	Scope of setting	0～65535	Units	mA	Factory setting		2500

	Name of name	Inductor Estimated Current			Relevant models		-
Pn14							

	Scope of setting	0～65535	Units	mA	Factory setting	2500

Pn15	Name of name	Motor rated current			Relevant models	-
	Scope of setting	0～65535	Units	mA	Factory setting	7500

Pn16	Name of name	Flux estimation			Relevant models	-
	Scope of setting	20～50	Units	Hz	Factory setting	20

Pn17	Name of name	Motor R/L estimation frequency			Relevant models	-
	Scope of setting	100～300	Units	Hz	Factory setting	300

Pn18	Name of name	Maximum ID reference current			Relevant models	-
	Scope of setting	0～65535	Units	mA	Factory setting	3750

Pn19	Name of name	Zero angular frequency			Relevant models	-
	Scope of setting	0～1000	Units	Hz 0.01	Factory setting	50

Pn20	Name of name	Forced angular frequency			Relevant models	-

	Scope of setting	0～2000	Units	Hz 0.01	Factory setting	100

	Name of name	Reservations			Relevant models	-
Pn21～ Pn22	Scope of setting	-	Units	-	Factory setting	-

5.2.2 **Control parameters**

	Name of name	Enable control			Relevant models	-
Pn23	Scope of setting	0～1	Units	-	Factory setting	1
for starting and stopping control of the motor, the Pn23 must be set to 1 to enable the drive.						

	Name of name	Communication Control Command			Relevant models	-
Pn24	Scope of setting	0～5	Units	-	Factory setting	5
Communication control motor start and stop, positive and negative operation, the specific value represents the function, please refer to the "communication control function :" section						

	Name of name	Reservations			Relevant models	-
Pn25	Scope of setting	-	Units	-	Factory setting	-

Pn26	Name of	Enable open loop start			Relevant	-

	name				models	
	Scope of setting	0～1	Units	-	Factory setting	1

	Name of name	Reservations			Relevant models	-
Pn27	Scope of setting	-	Units	-	Factory setting	-

	Name of name	Re-calibration of stator resistance			Relevant models	-
Pn28	Scope of setting	0～1	Units	-	Factory setting	0

Set whether to estimate the stator resistance of the motor at each start run. Stator estimation takes a certain amount of time, if you need to start fast, set to 0.

	Name of name	Enable user parameters			Relevant models	-
Pn29	Scope of setting	0～1	Units	-	Factory setting	1

set whether to use Pn2~Pn11 set resistance, inductance, back EMF coefficient as the motor parameters of the current motor. set to 0 if you need the driver to estimate the motor parameters, and after the driver estimation motor parameters step is completed, set the corresponding parameters in the Pn56~Pn67 to the Pn2Pn56~Pn67Pn11, and set the Pn29 to 1. restart the driver after saving the parameters by writing Pn90 to 1. the driver can run normally.

	Name of name	Enable bias calibration			Relevant models	-
Pn30	Scope of setting	0～1	Units	-	Factory setting	1

set at each start whether to recalibrate the current sampling, voltage sampling bias of the drive.

Pn31～ Pn32	Name of name	Reservations			Relevant models	-
	Scope of setting	-	Units	-	Factory setting	-

Pn33	Name of name	Prohibition PI self-identification			Relevant models	-
	Scope of setting	0～100	Units	r/min	Factory setting	0

set whether to use the user-set current, speed PI parameters as the control gain of the driver. if the driver

self-identification gain can not reach the performance requirement, when the PI gain needs to be manually adjusted, it

needs to be set to 100 to prohibit PI self-identification parameters. Invalid set to other values.

Pn34	Name of name	Reservations			Relevant models	-
	Scope of setting	-	Units	-	Factory setting	-

5.2.3 Display parameters

Pn35	Name of name	Running state			Relevant models	-
	Scope of setting	Display	Units	-	Factory setting	-

Pn36	Name of name	Controller State			Relevant models	-

	Scope of setting	Display	Units	-	Factory setting	-

	Name of name	State of the estimator			Relevant models	-
Pn37	Scope of setting	Display	Units	-	Factory setting	-

	Name of name	Control mode			Relevant models	-
Pn38	Scope of setting	Display	Units	-	Factory setting	-

	Name of name	Error code			Relevant models	-
Pn39	Scope of setting	Display	Units	-	Factory setting	-

	Name of name	Reservations			Relevant models	-
Pn40～ Pn42	Scope of setting	-	Units	-	Factory setting	-

	Name of name	D current given			Relevant models	-
Pn43	Scope of setting	Display	Units	-	Factory setting	A 0.01

	Name of name	D axis current feedback			Relevant models	-
Pn44						

	Scope of setting	Display	Units	-	Factory setting	A 0.01

	Name of name	Q current given			Relevant models	-
Pn45	Scope of setting	Display	Units	-	Factory setting	A 0.01

communication reset driver fault status: a communication reset driver fault is performed by writing "1" to this parameter.

This parameter value becomes 0 after reset is complete.

	Name of name	Q axis current feedback			Relevant models	-
Pn46	Scope of setting	Display	Units	-	Factory setting	A 0.01

	Name of name	Speed given			Relevant models	-
Pn47	Scope of setting	-32768～32767	Units	RPM	Factory setting	2000

	Name of name	Speed feedback			Relevant models	-
Pn48	Scope of setting	Display	Units	RPM	Factory setting	-

	Name of name	Add or subtract			Relevant models	-
Pn49	Scope of setting	1～5000	Units	r/s^2	Factory setting	50

Pn50～ Pn53	Name of name	Reservations			Relevant models	-
	Scope of setting	-	Units	-	Factory setting	-

Pn54	Name of name	Estimated torque			Relevant models	-
	Scope of setting	Display	Units	0.001 Nm	Factory setting	-

Pn55	Name of name	Reservations			Relevant models	-
	Scope of setting	-	Units	-	Factory setting	-

Pn56/Pn57	Name of name	Estimate rotor resistance			Relevant models	-
	Scope of setting	Display	Units	0.001 mΩ	Factory setting	-

Pn58/Pn59	Name of name	Estimate stator resistance			Relevant models	-
	Scope of setting	Display	Units	0.001 mΩ	Factory setting	-

Pn60/Pn61	Name of name	Reservations			Relevant models	-
	Scope of setting	Display	Units	-	Factory setting	-

| Pn62/Pn63 | Name of name | Estimate stator D axis inductance | | | Relevant models | - |
| | Scope of setting | Display | Units | 0.001 uH | Factory setting | - |

| Pn64/Pn65 | Name of name | Estimate stator Q axis inductance | | | Relevant models | - |
| | Scope of setting | Display | Units | 0.001 uH | Factory setting | - |

| Pn66/Pn67 | Name of name | Estimation of back EMF | | | Relevant models | - |
| | Scope of setting | Display | Units | 0.001 mV/Hz | Factory setting | - |

| Pn68 | Name of name | Bus voltage | | | Relevant models | - |
| | Scope of setting | Display | Units | V 0.01 | Factory setting | - |

Pn69	Name of name	A phase current			Relevant models	-
	Scope of setting	Display	Units	A 0.01	Factory setting	-
In speed control mode, the motor running speed setting value when the speed instruction source is set to "0".						

| Pn70 | Name of name | B phase current | | | Relevant models | |
| | Scope of | Display | Units | A 0.01 | Factory | - |

	setting				setting	
	in speed control mode, the motor running acceleration setting value when the speed instruction source is set to "0".					

	Name of name	C phase current			Relevant models	
Pn71	Scope of setting	Display	Units	A 0.01	Factory setting	-
	In speed control mode, the motor running deceleration setting value when the speed instruction source is set to "0".					

	Name of name	A phase voltage			Relevant models	-
Pn72	Scope of setting	Display	Units	V 0.01	Factory setting	-

	Name of name	A phase voltage			Relevant models	-
Pn73	Scope of setting	Display	Units	V 0.01	Factory setting	-

	Name of name	A phase voltage			Relevant models	-
Pn74	Scope of setting	Display	Units	V 0.01	Factory setting	-

	Name of name	A phase current bias			Relevant models	-
Pn75	Scope of setting	Display	Units	mV	Factory setting	-

Pn76	Name of	B phase current bias			Relevant	-

	name				models	
	Scope of setting	Display	Units	mV	Factory setting	-

	Name of name	C phase current bias			Relevant models	-
Pn77	Scope of setting	Display	Units	mV	Factory setting	-

	Name of name	A phase voltage bias			Relevant models	-
Pn78	Scope of setting	Display	Units	V 0.01	Factory setting	-

	Name of name	B phase voltage bias			Relevant models	-
Pn79	Scope of setting	Display	Units	V 0.01	Factory setting	-

	Name of name	C phase voltage bias			Relevant models	-
Pn80	Scope of setting	Display	Units	V 0.01	Factory setting	-

	Name of name	A phase current sampling values			Relevant models	-
Pn81	Scope of setting	Display	Units	-	Factory setting	-

Pn82	Name of	B phase current sampling values			Relevant	-

	name				models	
	Scope of setting	Display	Units	-	Factory setting	-

	Name of name	C phase current sampling values			Relevant models	-
Pn83	Scope of setting	Display	Units	-	Factory setting	-

	Name of name	A phase voltage sampling values			Relevant models	-
Pn84	Scope of setting	Display	Units	-	Factory setting	-

	Name of name	B phase voltage sampling values			Relevant models	-
Pn85	Scope of setting	Display	Units	-	Factory setting	-

	Name of name	C phase voltage sampling values			Relevant models	-
Pn86	Scope of setting	Display	Units	-	Factory setting	-

	Name of name	VDC sampling values			Relevant models	-
Pn87	Scope of setting	Display	Units	-	Factory setting	-

	Name of	Reservations			Relevant	-
Pn88						

	name				models	
	Scope of setting	-	Units	-	Factory setting	-

	Name of name	Driver version number			Relevant models	-
Pn89	Scope of setting	Display	Units	-	Factory setting	-

5.2.4 **Parameter Management**

	Name of name	Save parameters			Relevant models	-
Pn90	Scope of setting	0～1	Units	-	Factory setting	0

Writing 1 to this parameter saves the parameter. When the parameter is saved successfully, the parameter value becomes 0

- **All parameters that need to be permanently saved (re-energized parameter settings are still valid) must be written to this parameter after modification**

- **Need to operate when the motor stops running, otherwise it will cause abnormal operation**

	Name of name	Resume factory setting			Relevant models	-
Pn91	Scope of setting	0～2	Units	-	Factory setting	0

write 1 to this parameter will resume the factory setting, all parameters will resume the factory setting. When the operation is complete, the parameter value becomes 0.

- **The drive factory settings can be restored by modifying certain parameters to cause an abnormal operation**

- **Need to operate when the motor stops running, otherwise it will cause abnormal operation**

- **When writing 1, the motor parameters in the Pn0~Pn19, as well as the RS485 communication parameters in the Pn97Pn0~Pn19Pn99, remain original and will not be modified (unless specified by the manufacturer), and the other parameters will be restored to the default value.**

- **When writing 2, all parameters of the drive are restored to default values.**

Pn92	Name of name	Retention: Do not use			Relevant models		-
	Scope of setting	-		Units	-	Factory setting	0

5.2.5 **Gain parameters**

Pn93	Name of name	Kp speed proportional gain			Relevant models		-
	Scope of setting	0～65535		Units	-	Factory setting	40960

Note: If the automatically identified PI parameters can not meet the performance requirements, you can set the Pn33 to 100 after manually setting the PI parameters.

Pn94	Name of name	Ki of velocity integral gain			Relevant models		-
	Scope of setting	0～65535		Units	-	Factory setting	256

Pn95	Name of name	Current proportional gain Kp			Relevant models		-
	Scope of setting	0～65535		Units	-	Factory setting	548

Pn96	Name of name	Current integral gain Ki			Relevant models	-
	Scope of setting	0～65535	Units	-	Factory setting	118

5.2.6 **RS485 parameters**

Pn97	Name of name	RS485 station number			Relevant models	-
	Scope of setting	1～247	Units	-	Factory setting	1

set the slave station number of the RS485 communication drive.

- **note: power down restart takes effect after you need to write 1 permanent save parameter through Pn90.**

Pn98	Name of name	RS485 baud rate			Relevant models	-
	Scope of setting	0～5	Units	-	Factory setting	5

Set baud rate for serial communication:

Set set	Note
0	bps 4800
1	bps 9600
2	bps 19200
3	bps 38400
4	bps 57600
5	bps 115200

- **note: power down restart takes effect after you need to write 1 permanent save parameter through Pn90.**

Pn99	Name of name	RS485 data format			Relevant models	-

	Scope of setting	0～5	Units	-	Factory setting	0

RS485 Communication Data Format:

Set set	Note
0	8 bit data ,1 bit stop, no check
1	8 bit data ,2 bit stop, no check
2	8-bit data ,1-bit stop, even check
3	8-bit data ,2-bit stop, even check
4	8-bit data ,1-bit stop, odd check
5	8-bit data ,2-bit stop, odd check

● **note: power down restart takes effect after you need to write 1 permanent save parameter through Pn90.**

5.2.7 **Digital input/output parameters**

Pn100	Name of name	Input port 1 function / polarity setting		Relevant models		-
	Scope of setting	0～63	Units	-	Factory setting	58

The 16-bit data register is defined as follows:
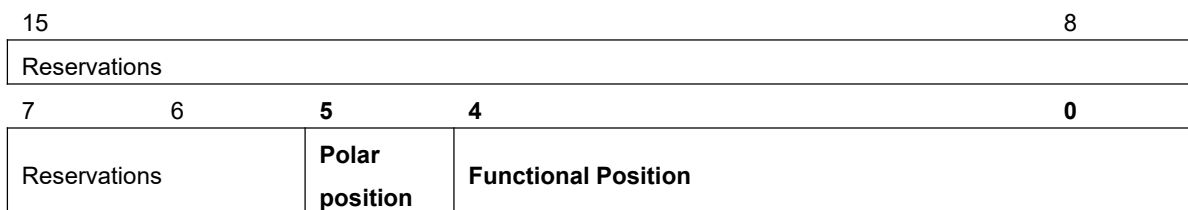
15					8
Reservations					

7	6	5	4		0
Reservations		Polar position	Functional Position		

Polar bit setting	Input polarity
0	Frequently closed
1	Regular

Function Bit Settings	Input function	Function Bit Settings	Input function
0	General	16	rsvd(reservations)
1	rsvd(reservations)	17	rsvd(reservations)
2	rsvd(reservations)	18	SpdDirSel(Speed Direction Setting)
3	rsvd(reservations)	19	rsvd(reservations)
4	rsvd(reservations)	20	rsvd(reservations)
5	rsvd(reservations)	21	FUNC1(point moving forward)
6	rsvd(reservations)	22	FUNC2(point reversal)
7	rsvd(reservations)	23	FUNC3(click start/stop)
8	rsvd(reservations)	24	FUNC4(potentiometer positive)
9	rsvd(reservations)	25	FUNC5(potentiometer start/stop)
10	rsvd(reservations)	26	FUNC6(potentiometer start/stop)
11	rsvd(reservations)	27	FUNC7(PWM forward)
12	rsvd(reservations)	28	FUNC8(PWM reversal)
13	rsvd(reservations)	29	FUNC9(PWM start/stop)
14	rsvd(reservations)	30	rsvd(reservations)
15	rsvd(reservations)	31	rsvd(reservations)

Pn101	Name of name	Input port 2 function / polarity setting		Relevant models	-
	Scope of setting	0～63	Units	-	Factory setting	50

Pn102	Name of name	Input port 3 function / polarity setting			Relevant models	-
	Scope of setting	0～63	Units	-	Factory setting	52

Pn103	Name of name	Input port 4 function / polarity setting			Relevant models	-
	Scope of setting	0～63	Units	-	Factory setting	53

Pn104	Name of name	Input port 5 function / polarity setting			Relevant models	-
	Scope of setting	0～63	Units	-	Factory setting	54

Pn105	Name of name	Output port 1 function / polarity setting			Relevant models	-
	Scope of setting	0～63	Units	-	Factory setting	33

The 16-bit data register is defined as follows:
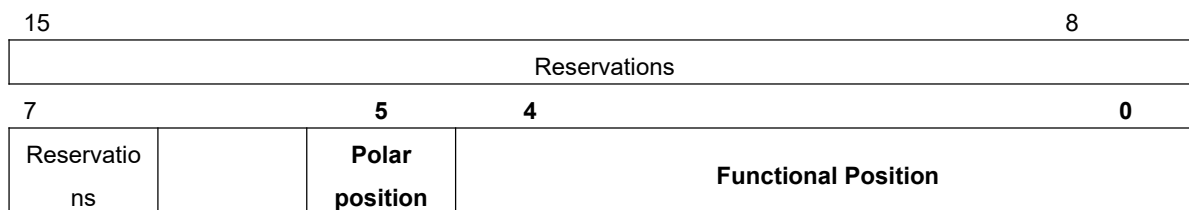
15						8
Reservations						

7		5	4			0
Reservations		**Polar position**	**Functional Position**			

Polar bit setting	Input polarity
0	Frequently closed
1	Regular

Function Bit Settings	Output function	Function Bit Settings	Output function	Function Bit Settings	Output function
0	General	5	rsvd(reservations)	10	rsvd(reservations)
1	Alarm	6	rsvd(reservations)	11	rsvd(reservations)
2	rsvd(reservations)	7	rsvd(reservations)	12	rsvd(reservations)
3	rsvd(reservations)	8	rsvd(reservations)	13	rsvd(reservations)
4	Rotational speed	9	rsvd(reservations)	Other	rsvd(reservations)

Pn106	Name of name	Output port 2 function / polarity setting			Relevant models	-
	Scope of setting	0～63	Units	-	Factory setting	36

Pn107	Name of name	Output port 3 function / polarity setting			Relevant models	-
	Scope of setting	0～63	Units	-	Factory setting	43

Pn108	Name of name	Input Port Force			Relevant models	-
	Scope of	0～63	Units	-	Factory	0

	setting				setting	

The software used to set the input port is mandatory valid / invalid. write a single register mainly through communication to control the validity/invalidity of all input ports of the drive.

15						8
			Reservations			

7		5	4	3		0
Reservations		Bit.IN6	Bit.IN5	Bit.IN4	Bit.IN3	Bit.IN2	Bit.IN1
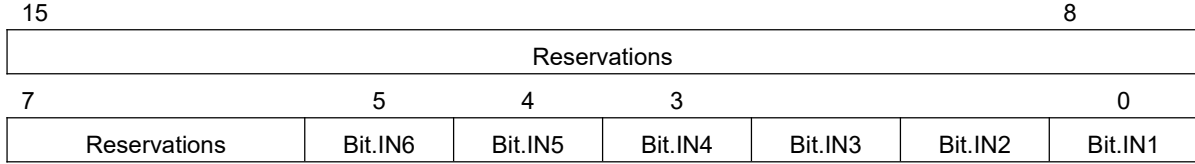
the corresponding bit Bit.INx of the Pn106 register is 1, which will force the function corresponding to this input port to be valid, otherwise invalid (controlled by the actual input signal of the drive).

● **Note: This input port will no longer be controlled by an external input signal with a corresponding bit of 1.**

Pn109	Name of name	Input Port Force			Relevant models	-
	Scope of setting	0～63	Units	-	Factory setting	0

The software used to set the output port is mandatory valid / invalid. write a single register mainly through communication to control the validity/invalidity of all output ports of the drive.

15				8
		Reservations		

7		5	4	3		0
Reservations				Bit.OUT4	Bit.OUT3	Bit.OUT2	Bit.OUT1
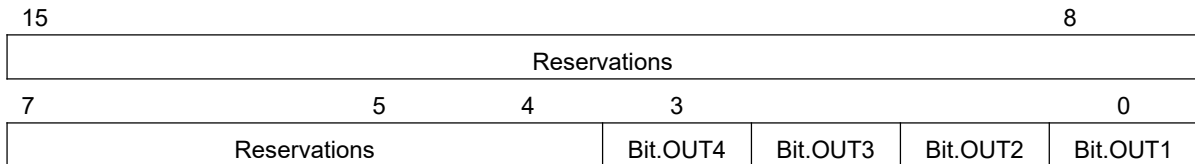
Pn107 the corresponding bit Bit.INx of the register is 1, the function corresponding to this output port will be forced to be valid, otherwise invalid (controlled by the actual output logic of the drive).

● **Note: This output port will no longer be controlled by the no longer be controlled by the drive output logic.**

5.2.8 **Display parameters**

Pn110	Name of name	Driver ID Number			Relevant models	-
	Scope of setting	Display	Units	-	Factory setting	-

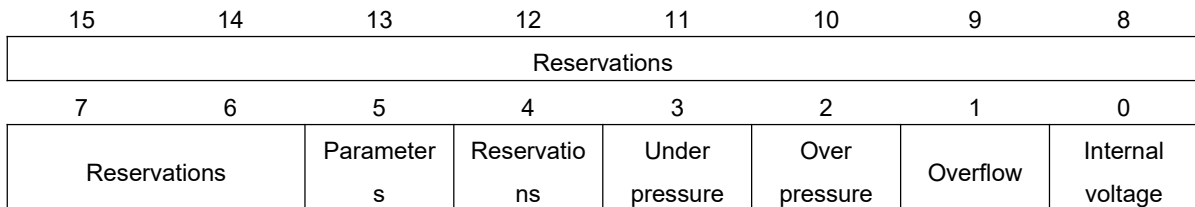| Pn111	Name of name	Driver fault code				Relevant models	-
	Scope of setting	Display	Units	-		Factory setting	-

For displaying drive fault code, you define the following:

15	14	13	12	11	10	9	8
			Reservations				

7	6	5	4	3	2	1	0
Reservations		Parameters	Reservations	Under pressure	Over pressure	Overflow	Internal voltage

Pn112	Name of name	Input port state				Relevant models	-
	Scope of setting	Display	Units	-		Factory setting	-

For displaying the status of the drive input port, you define the following:

15							8
			Reservations				

7	6	5	4	3	2	1	0
Reservations		IN6	IN5	IN4	IN3	IN2	IN1
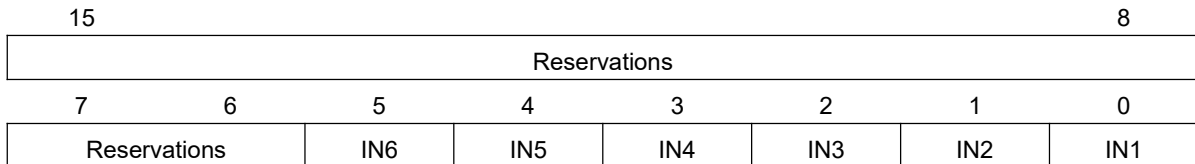
Bit Display Value	Note
0	Input optocoupler switched on
1	Input optical coupling conduction

Pn113	Name of name	Output port state				Relevant models	-
	Scope of setting	Display	Units	-		Factory setting	-

For displaying the state of the drive output port, you define the following:

15							8
Reservations							

7	6	5	4	3	2	1	0
Reservations				OUT4	OUT3	OUT2	OUT1
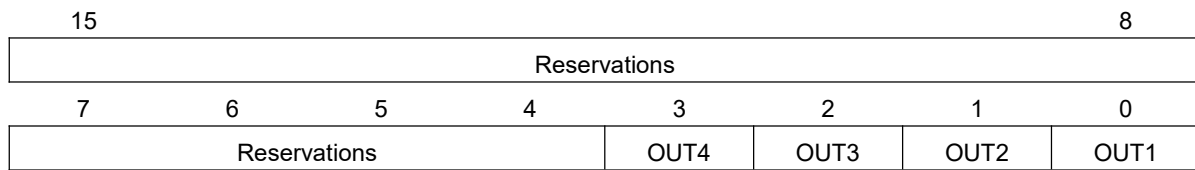
Bit Display Value	Note
0	Output optocoupler switched on
1	Output light-coupled conduction

Pn114	Name of name	Input port conduction along lock state			Relevant models	-
	Scope of setting	Display	Units	-	Factory setting	-

For displaying the on-off lock state of the drive input port, you define the following:

15							8
Reservations							

7	6	5	4	3	2	1	0
Reservations		IN6	IN5	IN4	IN3	IN2	IN1
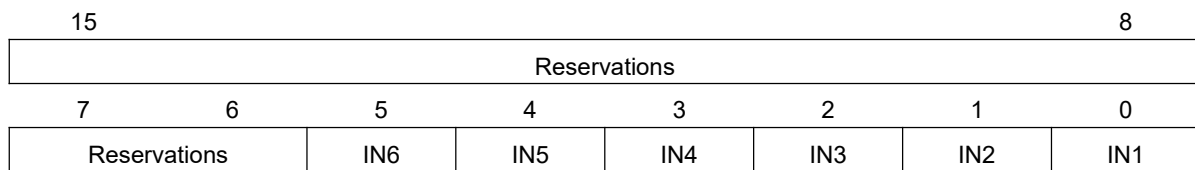
Bit Display Value	Note
0	Input port not on
1	At least one conduction trigger at the input port

● **Write any value to this parameter to zero the register value.**

Pn115	Name of name	Input port shutdown along lock state			Relevant models	-
	Scope of setting	Display	Units	-	Factory setting	-

For displaying the turn-off edge latch status of the drive input port, you define as follows:

15							8
Reservations							

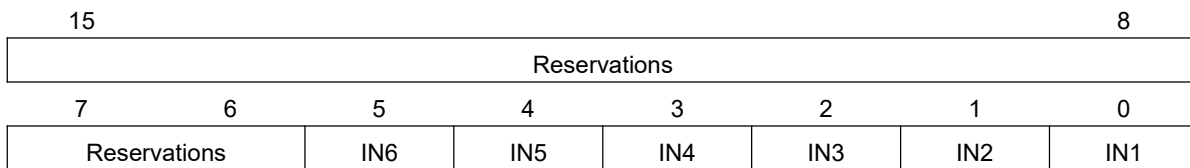| 7	6	5	4	3	2	1	0
Reservations		IN6	IN5	IN4	IN3	IN2	IN1

Bit Display Value	Note
0	Input port not turned off
1	The input port has been turned off at least once

● **Write any value to this parameter to zero the register value.**

Pn116	Name of name	Input status flag register			Relevant models	-
	Scope of setting	Display	Units	-	Factory setting	-

A low 16-bit flag register that displays whether the current input function of the drive is valid (the function of the input port is set by the Pn70~Pn76)

15							8

7	6	5	4	3	2	1	0
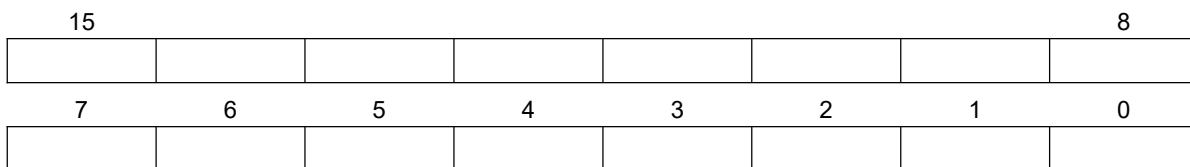
Pn117	Name of name	Output status flag register			Relevant models	-
	Scope of setting	Display	Units	-	Factory setting	-

The flag registers used to show whether the current output function of the drive is valid are defined as follows:

15							8

7	6	5	4	3	2	1	0
			Speed reached		Lock gate	Alarm	General
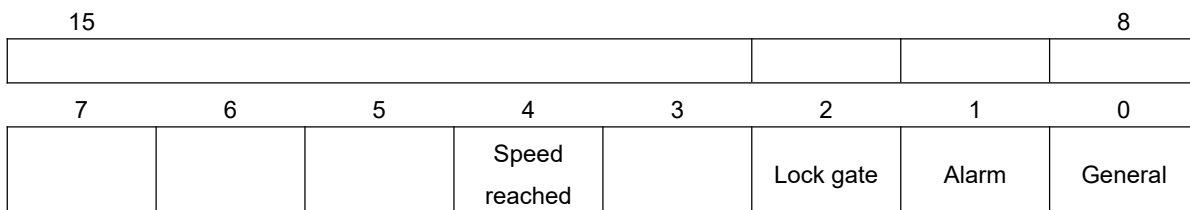
Pn118	Name of name	System state				Relevant models	-
	Scope of setting	Display	Units	-		Factory setting	-

Pn119	Name of name	Analog channel input sampling values				Relevant models	-
	Scope of setting	Display	Units	-		Factory setting	-

Pn120	Name of name	PWM input pulse duty cycle				Relevant models	-
	Scope of setting	Display	Units	0.01%		Factory setting	-

Pn121	Name of name	PWM output motor speed duty cycle				Relevant models	-
	Scope of setting	Display	Units	0.01%		Factory setting	-

5.2.9 Analog parameters

Pn122	Name of name	Analog input bias				Relevant models	-
	Scope of setting	0～65535	Units	mV		Factory setting	0
	for the setting instructions of analog related parameters, please refer to the analog part in chapter 4 operation.						

Pn123	Name of	Analog input low pass filter cutoff				Relevant	-

	name				models	
	Scope of setting	1～65535	Units	Hz	Factory setting	100

	Name of name	Analog input dead zone			Relevant models	-
Pn124	Scope of setting	0～65535	Units	mV	Factory setting	50

	Name of name	Analog Input Zero Drift			Relevant models	-
Pn125	Scope of setting	0～65535	Units	mV	Factory setting	0

	Name of name	5V corresponding speed instructions			Relevant models	-
Pn126	Scope of setting	0～32767	Units	RPM	Factory setting	3500

	Name of name	DSP actual sampled voltage values			Relevant models	-
Pn127	Scope of setting	Display	Units	mV	Factory setting	-

	Name of name	Voltage after zero drift, dead zone, bias			Relevant models	-
Pn128	Scope of setting	Display	Units	mV	Factory setting	-

	Name of	Velocity corresponding to current input voltage			Relevant	-
Pn129						

	name				models	
	Scope of setting	Display	Units	RPM	Factory setting	-

	Name of name	Analog Force Startup Command			Relevant models	-
Pn130	Scope of setting	0～3	Units	-	Factory setting	0

	Name of name	PWM duty cycle input signal polarity setting			Relevant models	PST
Pn131	Scope of setting	0 or 2	Units	-	Factory setting	0

5.2.10 Extension parameters

	Name of name	Default parameter ID			Relevant models	-
Pn132	Scope of setting	0～65535	Units	-	Factory setting	0

	Name of name	Default motor ID			Relevant models	-
Pn133	Scope of setting	0～65535	Units	-	Factory setting	23019

	Name of name	Source of speed instructions			Relevant models	-
Pn134	Scope of	0～10	Units	-	Factory	0

	setting				setting	

	Name of name	Current step test percentage			Relevant models	-
Pn135	Scope of setting	0～100	Units	%	Factory setting	30

	Name of name	Data sampling channel 1			Relevant models	-
Pn136	Scope of setting	0～20	Units	-	Factory setting	0

	Name of name	Data sampling channel 2			Relevant models	-
Pn137	Scope of setting	0～20	Units	-	Factory setting	0

	Name of name	Data sampling interval			Relevant models	-
Pn138	Scope of setting	0～65535	Units	us 62.5	Factory setting	0

	Name of name	Data sampling flags			Relevant models	-
Pn139	Scope of setting	0～2	Units	-	Factory setting	0

	Name of name	Current step test			Relevant models	-
Pn140	Scope of	0～2	Units	-	Factory	0

	setting		53		setting	

	Name of name	Dial status			Relevant models	-
Pn141	Scope of setting	Display	Units	-	Factory setting	-

第六章 Fault handling

6.1 **List of failures**

LED state	Note
🟢	Green light: drive not enabled
🟢🟢	green light flashing: drive enable, normal working condition
🟢🔴	1 green ,1 red: drive overcurrent
🟢🔴🔴	1 green ,2 red: drive overvoltage
🟢🔴🔴🔴	1 green ,3 red: internal voltage error
🟢🔴🔴🔴🔴	1 green ,4 red: encoder alarm
🟢🔴🔴🔴🔴🔴	1 green ,5 red: drive undervoltage
🟢🔴🔴🔴🔴🔴🔴	1 green ,6 red: parameter storage error
🟢🔴🔴🔴🔴🔴🔴🔴	1 green ,7 red: motor phase alarm
🟢🔴🔴🔴🔴🔴🔴🔴🔴	1 green ,8 red: encoder fault
🟢🔴🔴🔴🔴🔴🔴🔴🔴🔴	1 green ,9 red: limit input error warning
🟢🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴	1 Green ,10 Red: Motor Heat Overload Warning
🟢🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴	1 green ,11 red: motor instruction overload warning
🟢🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴	1 green ,12 red: motor output saturation timeout warning
🟢🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴🔴	1 green ,13 red: other undefined faults