NG500A-MH

High Voltage Servo Drive

User's Manual

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I. Product Introduction

1. Overview

NG500A-MH has three working modes: position, speed and torque. It can set internal parameters and start/stop control in three working modes through ModBUS-RTU communication.

2. Technical features

- Adopting advanced servo control technology;
- Adopting a highly integrated solution to achieve a smaller size;
- With Regenerative resistor and integrated dynamic braking function, applicable to more industries;
- With software filtering and hardware filtering, anti-high-frequency interference capability is greatly enhanced;
- Support 220V AC input, greatly reducing wiring requirements;
- With digital screen, offline modification of drive parameters without connecting to PC;
- Support Modbus communication protocol, position speed and torque control mode.

3. Application fields

Widely used in small and medium-sized automation equipment and instruments, such as: screw rod, synchronous belt, reducer, rack and pinion, etc., but also accept customer-specific function customization, Truly achieving industry customization.

II.Electrical,mechanical and environmental indicators

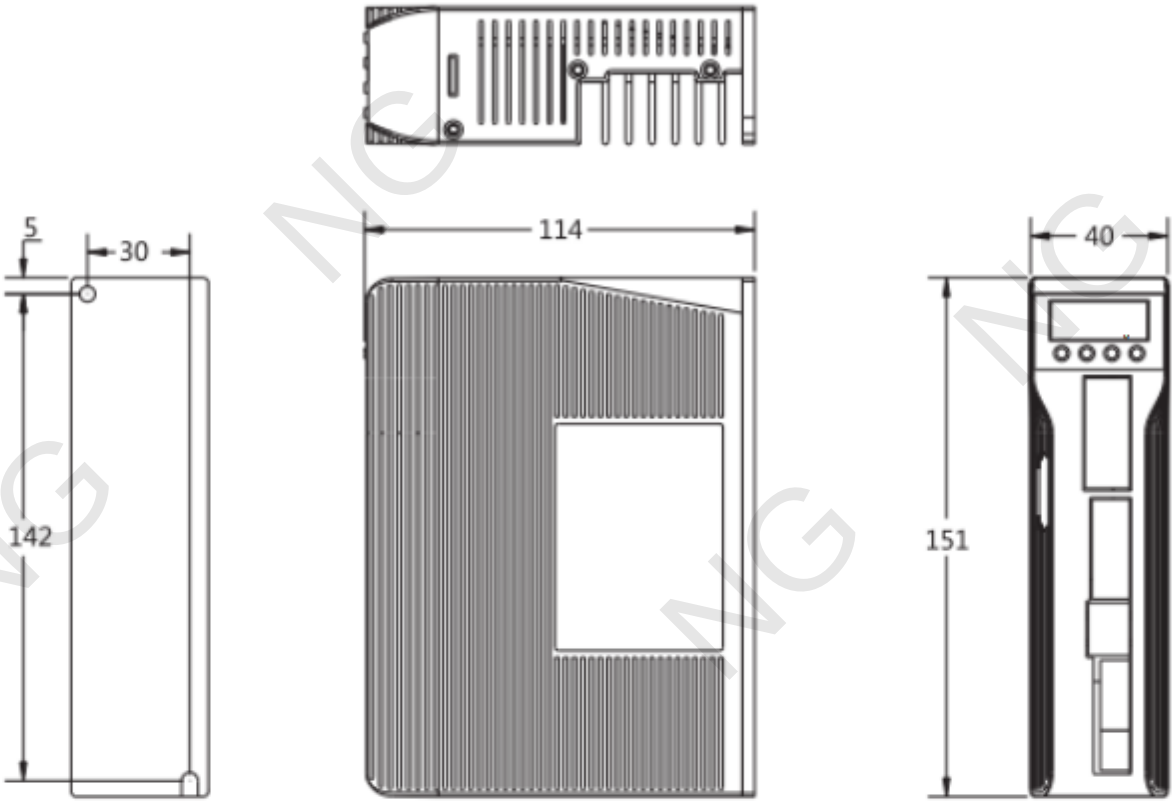
1. Electrical indicators

Parameters	NG500A-MH		
	Minimum value	Maximum value	Unit
Continuous output current		20	A
AC input supply voltage	180	220	V_{AC}
Pulse frequency	0	150 (5V) 100 (24V)	KHz
Insulation Resistance	100	/	MΩ
Alarm output current	7	16	mA
Alarm output voltage		0/24	V

2. Use of the environment and parameters

Cooling method	Natural cooling or external heat sink	
Operating environment	Use Environment	Avoid oil mist, dust
	Temperature.	-20°C to 70°C
	Humidity	40-90%RH
	Vibration	10~55Hz/0.15mm
Storage Temperature	-20°C-65°C	
Weight	Approx. 750g	

3. Mechanical Installation Dimension Drawing



(1) Reliable operating temperature is usually within 60°C for the driver and 80°C for the motor;
(2) When installing the drive, please use an upright side installation. If necessary, install a fan close to the drive to force heat dissipation and ensure that the drive works within the reliable operating temperature range

III. Interface and wiring of the drive

1. Interface Definition

(1) Motor and power input port

Pin number	Symbol	Name	Description
1	U	U-phase motor winding	
2	V	V phase motor winding	
3	W	W phase motor winding	
4	AC	Input AC power supply	AC 150V-220V
5	AC	Input AC Power supply	AC 150V-220V

2) Encoder signal input port

Symbol	Description	Description	Symbol
A	Absolute encoder RS485+	Absolute encoder RS485-	B
NC			NC
GND	Encoder power supply negative	Encoder power supply positive	5V
EZ-	Incremental encoder Z-phase negative	Incremental encoder Z-phase positive	EZ+
EB-	Incremental encoder B phase negative	Incremental encoder B phase positive	EB+
EA-	Incremental encoder A negative	Incremental encoder A positive	EA+

3) Control signal port

Pin number	Symbol	Name	Description
1	PUL+24	Pulse positive input	Pulse input 24V+
2	PUL+5	Pulse positive input	Pulse input 5V+
3	PUL -	Pulse negative input	Pulse input -
4	DIR+24	Direction positive input	Direction input 24V+
5	DIR+5	Direction positive input	Direction input 5V+
6	DIR-	Direction negative input	Direction input -
7	ALM+	Alarm positive	Triode OC gate collector
8	ALM-	Alarm Negative	Triode OC gate emitter
9	EN+	Enable Positive	Supports 5-24V input
10	EN-	Enable negative	Supports 5-24V input
11	VR+	Potentiometer positive	In potentiometer speed control

12	VR-	Potentiometer negative	mode, external install a 4.7K potentiometer, adjust the potentiometer to change the speed.
13	O+	Output Port	Output port positive, triode OC gate collector
14	B-	Brake negative	Brake negative
15	B+/24V+	External 24V power supply positive	External 24V power supply positive/Holding brake positive
16	O-/24V-	External 24V power supply negative	External 24V power supply negative/output port negative (tristate OC gate emitter)

4）USB input port

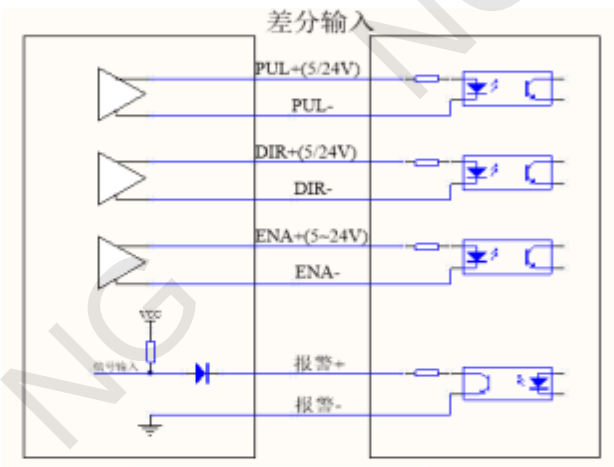
The interface adopts TypeC, which can be connected to our specialized software for parameter debugging.

5）Communication network port

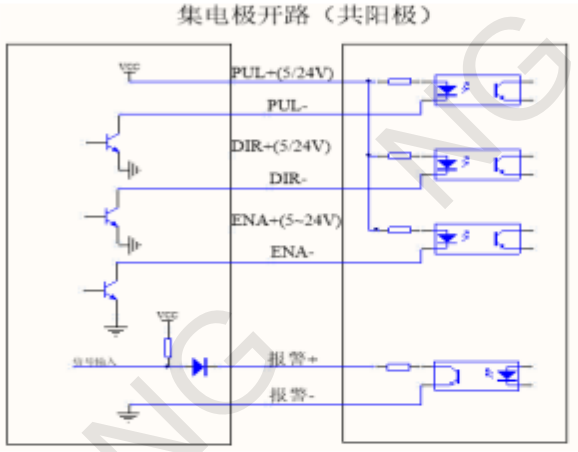
BUS IN	RS485 Input
BUS OUT	RS485 output

2. Control signal interface circuit diagram

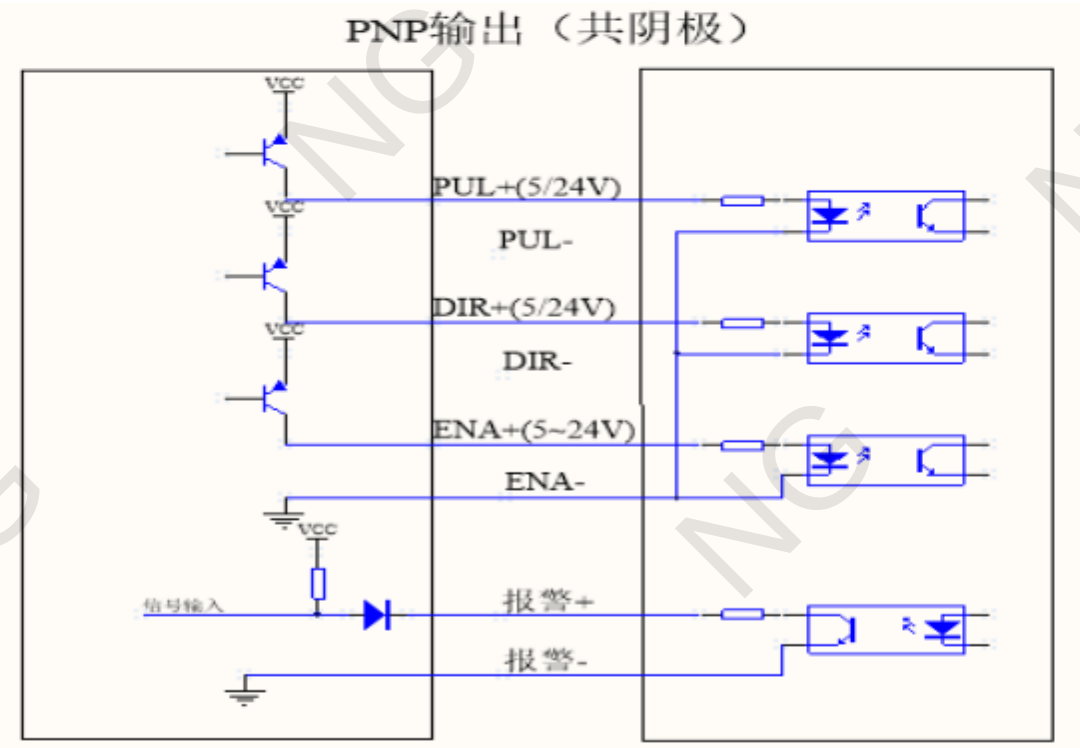
The control signal and input/output interface circuit diagram is as follows



Differential Input



Common Anode



Common Cathode

3. Control signal timing diagram

In order to avoid some malfunctions and deviations, PUL, DIR and ENA should meet certain requirements, as follows

shown in Figure 4:

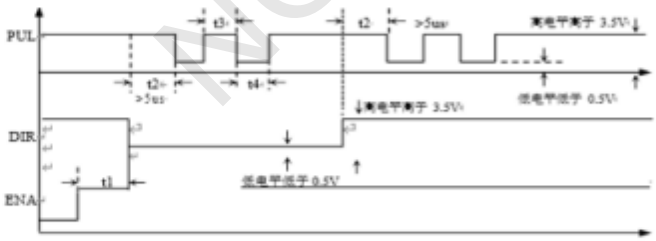


图 4 控制信号时序图

Notes:

(1) t1:ENA enable signal is at least 5us ahead of DIR, and it is generally recommended to suspend.

(2) t2:DIR determines its state high or low at least 5us in ahead of the falling edge of PUL.

(3) t3:Pulse width greater than 2.5us.

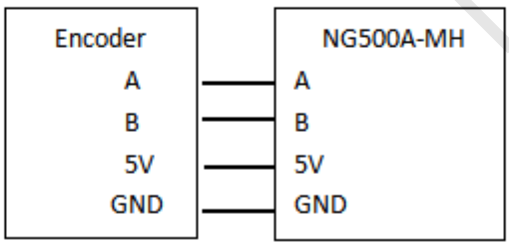
(4) t4:Low width greater than 2.5us.

4. Control signal mode setting

Pulse Trigger Edge and Single/Double Pulse Selection: Rising or falling edge triggering is valid by driver parameter (Pn) mode or PC software; single pulse or double pulse can also be set.

5. Encoder Wiring

The motor encoder provided by MASH can be powered directly by SVD75-RS, and can be connected to the driver port according to the corresponding wiring sequence. External 5V power supply can also be connected, at this time, it can also connect the external power supply and NG500A-MH common ground, the specific wiring is shown in the following figure.



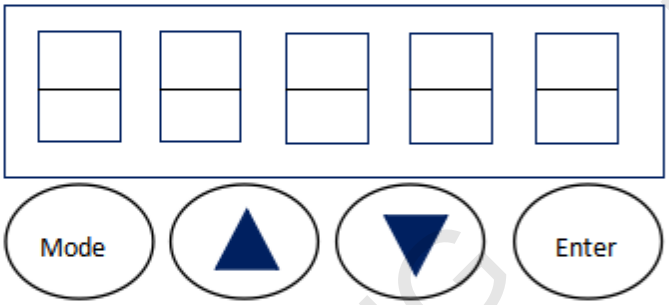
6. USB port wiring

Parameter debugging wiring

Note: Please go to the download center of the website to download the debugging software of the upper computer.

IV. Operating Panel

Digital tube screen below the key from left to right is the mode selection key Mode, up key, down key and confirm the key Enter.



The functions of the keys on the display board are shown in the table below:
Compared with the same type of drive on the market, NG500A-MH has a more friendly HMI design, the drive will automatically store the parameters after setting, and when adjusting larger data (e.g., from 0 to 10,000), you can use the switch key to switch the number to the 10,000 digit directly and set it to 1 through the up key, instead of having to press the up key all the time, which greatly optimizes the process of parameter setting.

Key Name	Symbol	Function
Toggle Key	Model	Used for mode switching and parameter digit switching
Up key	▲	For submenu switching and digit increase
Down key	▼	For submenu switching and digit decrease
OK button	Enter	Used to enter submenu and numeric confirmation

1. Mode Introduction

The complete parameters of each mode are shown in the following table. The drive has three kinds of functions: Fn000 belongs to the historical alarm code view, after pressing the confirmation key to enter, you can view the code record of the previous alarm of the drive through the up key; Fn001 belongs to the restoration of factory settings, after pressing the confirmation key to enter and long-pressing the confirmation key, if the screen displays 'done' imply need to restart the power, then the drive successful initialization; Fn002 belongs to the trial run, after pressing the confirmation key to enter, you can long-pressing the up key and the down key to let the motor rotate.

Mode Name	Symbol	Function Introduction
Monitor Mode	RUN	Used for monitoring the status of various data (e.g., speed) of the motor and driver.
Parameter mode	Pn	Setting of the drive's internal parameters, excluding EtherCAT-related parameters.
Function mode	Fn	The drive has the functions of trial run, factory settings restoration and alarm code view.

2. Monitoring parameters

Monitoring parameters	Symbol	Function
Speed	SPEEd	For monitoring the motor speed in r/min
Encoder low	Enc_L	For monitoring the motor encoder position, this bit is low
Encoder high bit	Enc_H	Enc_H for monitoring the motor encoder position, this bit is high.
Input pulse low bit	Pul_L	For monitoring the number of pulses input to the driver, this bit is low
Input pulse high	Pul_H	High bit for monitoring the number of pulses to the input driver.
Position deviation low bit	PErr_L	Position deviation of the motor, this bit is low
Position deviation high	PErr_H	Position deviation of the motor, this bit is high.
IO status	Io_Io	Used to monitor the status of the drive IOs
Bus voltage	V_buS	Used to monitor the bus voltage of the motor in V
Current electrical angle	AngLE	For monitoring the current electrical angle
Torque monitoring	Trq-	For monitoring the torque percentage
Drain time	P-duty	Used to display the Regenerative resistor working time

3. Drive internal parameters

Parameter number	Parameter name	Parameter value	Parameter range	Explanation
Pn000	Motor model	1330A	1330A 2430A 3330A	1330A. 400W servo motor 2430A: 750W servo motor 750W servo motor 3330A. 1000W servo motor
Pn001	Pulses per revolution	1000	200-65535	Number of pulses per revolution of the motor
Pn002	Default motor steering	0	0~1	0: Forward rotation 1: Reverse rotation
Pn003	Motor Rigidity	5	1~10	For setting motor rigidity
Pn004	Inertia Ratio	5	1~30	Used to set the load motor inertia ratio
Pn005	Position loop Kp	7	1~100	For position PID setting
Pn006	Position feedforward	0	0~500	For position PID setting
Pn007	Current filter	20	0~65535	For current filtering
Pn008	Speed Filter	100	0~65535	For speed filtering
Pn009	FilterSmoothing Time	0	0~65535	Unit: us Command in place time, after setting, note that there may be a slight delay in place.
Pn010	Enable control signal polarity selection	1	0~1	0: high level 1: low level
Pn011	Fault output polarity selection	1	0~1	0: low level 1: high level
Pn012	Pulse input mode	0	0~1	0: pulse + direction 1: double pulse
Pn013	Pulse input edge selection	0	0~1	0: Rising edge, 1: Falling edge active
Pn014	Overload alarm detection time	20	0~65535	Overload alarm delay setting
Pn015	Number of position overrun turns	5	0~65535	Used to adjust the sensitivity of overload alarm, the alarm will be activated when the real-time deviation exceeds the set value
Pn016	Number of encoder lines for positioning completion	20	0~2500	In place accuracy
Pn017	Maximum speed limit	3500	3000~4000	Maximum speed
Pn018	Positive torque limit	210	0~250	For forward torque limit

Pn019	Reverse torque limit	210	0~250	For reverse torque limit
Pn020	Acceleration time constant	0	0~65535	For internal control
Pn021	Deceleration time constant	0	0~65535	For internal control
Pn022	Manual speed	200	1~3000	For trial run
Pn023	Control mode	0	0~5	P-PUL : External pulse mode S -Io: IO speed mode S-Vr: Potentiometer speed mode P-485: RS485 position mode S-485: RS485 speed mode t-485: RS485 Torque Mode
Pn024	Monitor Display Adjustment	0	0~12	Power-on default display. 0: Main interface. 1: Rotation speed. 2, 3: Encoder low and high. 4, 5: Pulse low, high bit . 6, 7: Deviation pulse low, high bit. 8: Input and output I/O status. 9: Bus voltage. 10: Current electrical angle. 11: Current motor torque. 12: Regenerative resistor work duty cycle
Pn025	485 communication baud rate	3	1~6	1：4800 2：9600 3：19200 4：38400 5：57600 6：115200
Pn026	485 communication address	1	1~255	For communication address setting
Pn027	Encoder battery alarm	0	0~1	0: enable 1: disable
Pn028	Overheat alarm threshold setting	95	0~150	For Overheat alarm threshold setting
Pn029	OUT1 output function Setting	0	0~1	0: In place 1: Z signal

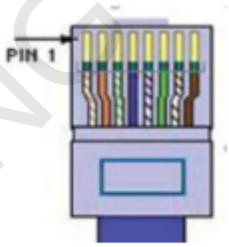
The internal parameters of the drive can be set offline through the drive parameter (Pn) mode, and can also be set online by connecting the MASH servo drive software on the PC through the USB cable.

4. Fault alarm and treatment

alarm code	Problem	Solution
Err_gL	Overcurrent	Disconnect the motor winding wire from the drive and restart the drive, if there is no alarm, please check the motor and motor power wire for any abnormality; if the alarm is still there, the drive has been damaged.
Err_CC	Exceeds the Position deviation	Check whether the motor power line wire sequence and encoder line are abnormal. Or whether the load is overloaded.
Err_gy	Overvoltage	Restart the drive and if the alarm persists, check if the supply voltage is too high
Err_dy	Low voltage	Restart the drive and if the alarm persists, check if the supply voltage is too low.
Err_SJ	Data error	Enter Fn001 interface after power on, long press enter key, power on again when 'done' appears.
Err_En	Encoder alarm	Check whether the encoder wiring is abnormal.
Err_CS	Overspeed	Power off and restart, reduce speed
Err_g2	Overload	Check if load is overloaded, then power off and restart
Err_gr	Overheat	Regenerative resistor is overheated, adjust the acceleration and deceleration.
Note: After solving the alarm or eliminating the causes of the alarm, the drive needs to be power on again to resume normal operation.		

V. Control mode and communication protocol

1.Communication interface



Communication interface	485A	485B	Isolated GND
RJ45 network port	1	2	5
It is recommended to use twisted shielded wire to ensure the quality of communication.			

2.Control mode setting

2.1 Conventional position control mode (Pn023=0, panel display P-PUL)
In regular mode, the driver only receives external signals (pulse, direction, enable) to control the motor operation, and can read the internal operation parameters through the 485 bus.
2.2 External IO speed control mode (Pn023=1, panel display S- Io)
Adopting internal self-generated pulse, only need to connect the corresponding level in PUL port and DIR port to control the motor running.
2.3 External potentiometer speed control mode (Pn023=2, panel display S- Vr)
Adopting internal self-generated pulse, only need to connect 4.7kΩ speed potentiometer to VR+ and VR- port to control the motor running.
2.4 Modbus position control mode (Pn023 = 3, panel display P-485)
Modbus speed control mode (Pn023 = 4, panel display S-485)
Modbus torque control mode (Pn023 = 5, panel display t-485)

Adopting Modbus protocol RTU mode, default communication parameters: baud rate 9600, parity bit: odd parity (none), data bit 8, stop bit 1. To modify the 485 communication baud rate and address you can adjust the following parameters:

Pn025	485 communication baud rate	2	1-6	1:4800 2: 9600 3: 19200 4: 38400 5:57600 6：115200
Pn026	485 communication address	1	1-255	For communication address setting

For 485 communication, parameter area, monitoring area, reserved area, and control area are set inside the driver, and the corresponding object dictionaries are as follows:

Area	Register address (Hexadecimal)	Data type/length	Data type/length
Parameter area	0x0000-0x0063	Parameter area	uint16
Monitor area (read-only, not	0x0064	Alarm code	uint16

modifiable)	0x0065	Rotation speed	int16
	0x0066 (low 16 bits) 0x0067 (high 16 bits)	Current singleturn encoder reading information	int32
	0x0068 (low 16 bits) 0x0069 (high 16 bits)	Current lap encoder readout information	int32
Monitor Area (read-only, not modifiable)	0x006A (low 16 bits) 0x006B (high 16 bits)	Number of pulses	int32
	0x006C (low 16 bits) 0x006D (high 16 bits)	Position error	int32
	0x006E (low 16 bits) 0x006F (high 16 bits)	Test	int32
	0x0070	Voltage	uint16
	0x0071	Torque Percentage	int16
	0x0072 (low 16 bits) 0x0073 (high 16 bits)	Encoder angle	int32
	0x0074-0x00C7	Remaining address	uint16
Reserved area	0x00C8-0x0383	Reserved area	uint16
Control Area	0x0384	Start-stop control	uint16

Control Area	0x0385	Position mode speed	uint16
	0x0386 (low 16 bits) 0x0387 (high 16 bits)	Number of pulses to run	int32
	0x0388	Speed mode speed	int16
	0x0389	Torque mode torque	int16
	0x038A	Torque Arrival	uint16
	0x038B	Position Arrival	uint16
	0x038C (low 16 bits) 0x038D (high 16 bits)	Position Mode Speed	int32
	0x0390	EEPROM storage	uint16
	0x0392 (low 16 bits) 0x0393 (high 16 bits)	Position Mode Acceleration	int32
	0x0394 (low 16 bits) 0x0395 (high 16 bits)	Position mode deceleration	int32

3. Communication position control mode (Pn23 = 3)

3.1: The user can control the servo to run at the set position via Modbus_RTU protocol 485 half-duplex communication.

Execute relative position movement, i.e. take the actual motor position when the position instruction trigger takes effect plus the position data in the position register as the next target position.

Register Address	Name of register	Parameter Range	Unit	Effective mode
0x0385	Position validation trigger	0,1		0 to 1 rising edge
0x0386 (low 16 bits) 0x0387 (high 16 bits)	Position	0x80000000- 0x7FFFFFFF	Number of pulses	
0x038B	Position reached	0: not in place 1: in place		
0x038C (low 16 bits) 0x038D (high 16 bits)	Speed	0x80000000- 0x7FFFFFFF	Pulses per second	
0x0392 (low 16 bits) 0x0393 (high 16 bits)	Acceleration	0x80000000- 0x7FFFFFFF	Pulses/sec^2	
0x0394 (low 16 bits) 0x0395 (high 16 bits)	Deceleration	0x80000000- 0x7FFFFFFF	pulses/sec^2	

3.2: Example

Pulses per revolution: 10 000 (Pn001=10 000)

Rotation speed: 20 rpm, i.e. 200 000 pulses/second

Acceleration: 500 000 pulses/sec^2

Acceleration: 500,000 pulses/sec^2

Bit shift: 100 turns positive. (Address 0x038C is positive for positive rotation, negative for negative rotation).

Slave number: 1

Modbus command control is shown in the table below:

Step 1: Panel set Pn023=4 (communication position mode), panel set station number to 1 (Pn026=1), power off and restart

Step 2: Set running speed 200 000 pulses/sec, (200 000=0x30D40).

Communication address 0x038C write 0x0D40.

Host sends data to servo 01 06 03 8C 0D 40 4D 05

Communication address 0x038D writes 0X0003.

Host sends data to servo 01 06 03 8D 00 03 59 A4

Step 3: Set the running acceleration 500 000 pulses/sec^2, (500 000=0x7A120).

Communication address 0x0392 writes 0xA120.

Host sends data to servo 01 06 03 92 A1 20 50 2B

Communication address 0x0393 writes 0x0007.

Host sends data to servo 01 06 03 93 00 07 38 61

Step 4: Set the running deceleration 500 000 pulses/sec^2, (500 000=0x7A120).

Communication address 0x0394 writes 0xA120.

Host sends data to servo 01 06 03 94 A1 20 B0 2A

Communication address 0x0395 writes 0x0007.

Host sends data to servo 01 06 03 95 00 07 D8 60

Step 5: Set the running position to 100 revolutions. (100*10 000 pulses/revolution = 1 000 000 = 0x000F 4240).

Communication address 0x0386 writes 0x4240.

Host sends data to servo 01 06 03 86 42 40 59 37

Communication address 0x0387 writes 0x000F.

Host sends data to servo 01 06 03 87 00 0F 79 A3

Step 6: Position register effective departure start stop. Write 0 to communication address 0x0385 followed by 1 to start.

Host sends data to servo 01 06 03 85 00 00 98 67

Host sends data to servo 01 06 03 85 00 01 59 A7

4. Communication Speed Control Mode(Pn23 = 4)

4.1: The user can control the servo to run at the set speed via Modbus_RTU protocol 485 half-duplex communication.

Object dictionary:

Register address	Name	Parameter range	Unit	Effective mode
0x0014	Acceleration time constant	0x0000~0xFFFF		
0x0015	Deceleration time constant	0x0000~0xFFFF		
0x0017	Control mode	0x0000~0x0004		Power failure effective
0x0384	Start Stop	0x0000~0x0001		
0x0388	Speed	0xF448~0x0BB8	r/min	
0x0390	EEPROM memory	0x0000~0x0001		

4.2:Example:

The motor is running positively at 100r/min. (Positive rotation if 904 running speed is positive, reverse rotation if target speed is negative). Assuming that the slave station number is 1, the Modbus command control is shown in the table below:

Rotation speed: 100r/min Positive operation

Slave station number: 1

The Modbus command control is shown in the following table:

Step 1: Panel set Pn023=4 (communication position mode), panel set station number as 1 (Pn026=1), power off and restart

Step 2: Set running speed 100r/min, (100=0x0064).

Communication address 0x0388 write 0x0064.

Host sends data to servo 01 06 03 88 00 64 08 4F

Step 3: Start operation.

Communication address 0x0384 write 1 to start.

Host sends data to servo 01 06 03 84 00 01 08 67

Step 4: Stop operation.

Communication address 0x0384 write 0 to stop.

Host sends data to servo 01 06 03 84 00 00 C9 A7

5. Communication torque control mode (Pn23 = 5)

5.1: The user can control the servo to run at the set torque via Modbus_RTU protocol 485 half-duplex communication.

Object Dictionary:

Register Address	Name	Parameter Range	Unit	Effective mode
0x0014	Acceleration time constant	0x0000~0xFFFF		
0x0015	Deceleration time constant	0x0000~0xFFFF		
0x0017	Control mode	0x0000~0x0004		Power failure effective
0x0384	Start Stop	0x0000~0x0001		
0x0388	Speed	0xF448~0x0BB8	r/min	
0x0389	Percentage of torque	0x0000~0x0064	%	
0x038A	Torque Arrival	0x0000~0x0001		
0x0390	EEPROM storage	0x0000~0x0001		

5.2:Example:

The motor is running at 100r/min positive speed. (Positive rotation if the 904 running speed is positive, and reverse rotation if the target speed is negative.) Assuming that the slave station number is 1, the Modbus command control is shown in the table below:

Rotation speed: 100r/min Positive operation

Slave station number: 1

The Modbus command control is shown in the following table:

Step 1: Panel set Pn023=4 (communication position mode), panel set station number as 1 (Pn026=1), power off and restart

Step 2: Set running speed 100r/min, (100=0x0064).

Communication address 0x0388 write 0x0064.

Host sends data to servo 01 06 03 88 00 64 08 4F

Step 3: Set torque percentage 50%, (50=0x0032).

Communication address 0x0389 writes 0x0032.

Host sends data to servo 01 06 03 89 00 32 D9 B1

Step 4: Start operation.

Communication address 0x0384 write 1 to start.

Host sends data to servo 01 06 03 84 00 01 08 67

Step 5: Stop operation.

Communication address 0x0384 write 0 to stop.

Host sends data to servo 01 06 03 84 00 00 C9 A7

When the driver detects that the torque has reached the set value, the servo will send a 1 to the host 0x038A address as well as a 1 output from the driver's O1 port to indicate that the torque has reached.

VI. IO Control Mode

6.1 IO control mode

Adopt internal self-generated pulse, only need to access the corresponding high level in the PUL port (PUL +24, PUL +5 corresponds to 24V and 5V) to run. The speed is controlled by Pn022 parameter, default is 200 revolutions per minute. The direction of operation is controlled by the DIR direction port as in pulse mode.

6.2 Examples of Position Mode, Speed Mode and Simple Torque Mode Settings

6.2.1 Example of simple position mode setting:

1. Position mode setting: Set Pn023 to 0 (factory default 0, position mode).
2. Connect the pulse input port: PUL+24/+5 to connect the positive pole of the pulse input port, and PUL- to connect the negative pole of the pulse input port.
3. Connecting direction input: DIR+24/+5 to connect pulse input positive, DIR- to connect direction input negative.
4. Setting driver enable: ENA+/- are connected to the controller enable port, factory default enable is on, you can not connect the control line.
5. Set the pulse number per revolution Pn001 parameter
6. Set the default direction Pn002
7. Adjust and set Pn003, Pn004, Pn0xx and other performance parameters.

6.2.2 Example of simple speed mode setting:

1. Speed mode setting: set Pn023 to 2
2. Set the value of rotation speed: Pn022 (unit: rpm)
3. Connect the start/stop control signal: PUL+24/+5 to connect the positive pole of the pulse input port, and PUL- to connect the negative pole of the pulse input port for start/stop control.
4. Connect the direction input port: DIR+24/+5 connects to the positive pole of the pulse input port, DIR- connects to the negative pole of the direction input port for steering control.
5. Setting acceleration, deceleration and other related performance parameters Pn020, Pn021.

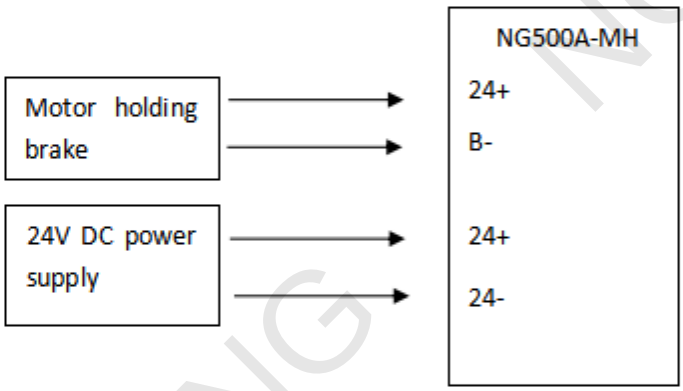
6.2.3 Example of simple fixed torque mode setting:

1. Torque mode setting: set Pn023 to 2

2. Setting the value of rotational speed: Pn022 (unit: rpm)
3. Set fixed forward/reverse torque, forward Pn018,reverse Pn019, unit is the percentage of motor rated torque
4. Connect start/stop control signal: PUL+24/+5 connects to the positive pole of pulse input port, PUL- connects to the negative pole of pulse input port for start/stop control.
5. Connecting direction input port: DIR+24/+5 connects to the positive pole of pulse input port, DIR- connects to the negative pole of direction input port for steering control.

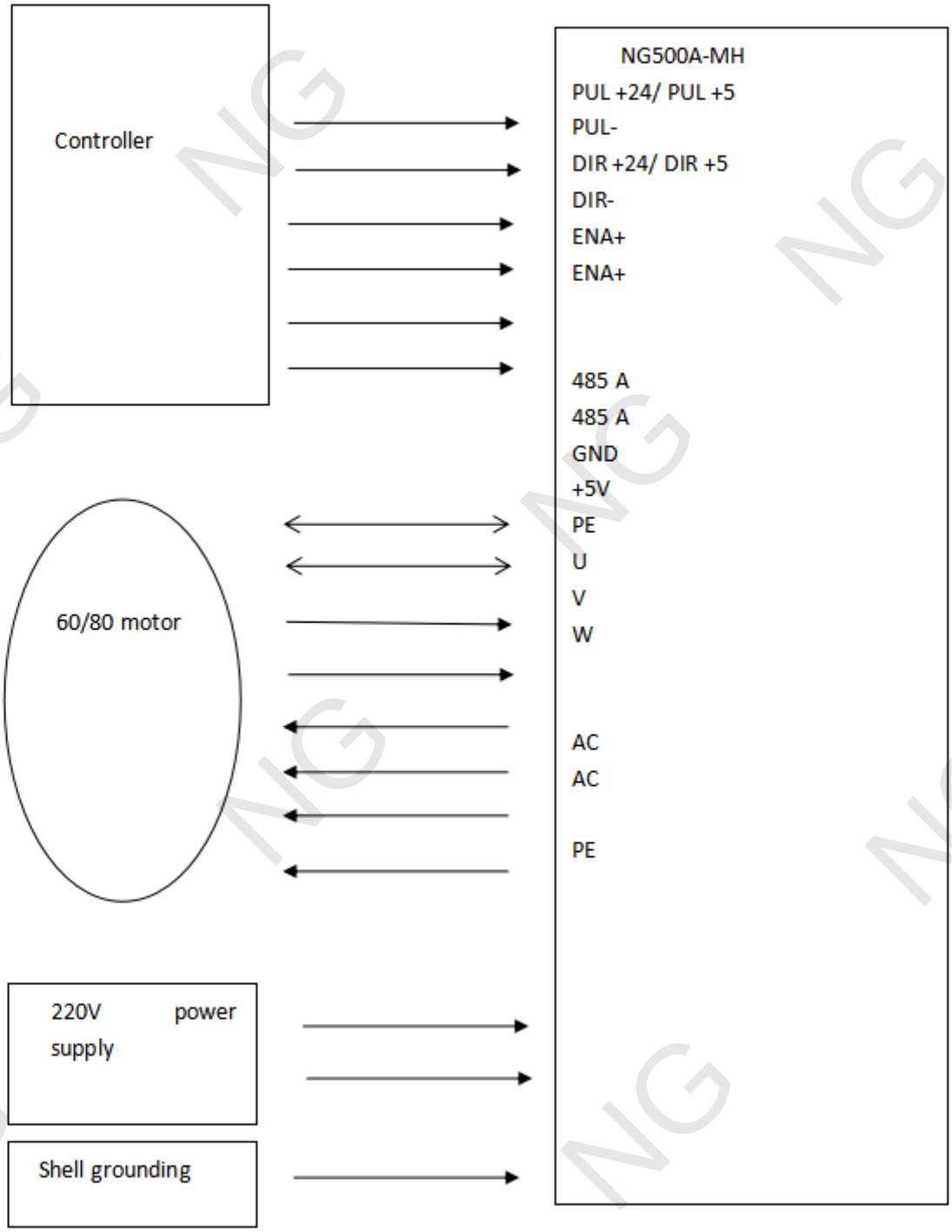
VII. Typical application wiring diagram

Typical wiring diagram of AC servo system composed of NG500A-MH driver is shown in the figure.



Typical Wiring Diagram for brake Motor

Note: The motor holding brake must be controlled by the driver, otherwise an unexpected situation such as a flying motor may occur. The freewheeling diode has been added inside the driver, no external diode is required.


Controller
60/80 motor
220V power supply
Shell grounding
NG500A-MH
PUL +24/ PUL +5
PUL-
DIR +24/ DIR +5
DIR-
ENA+
ENA+
485 A
485 A
GND
+5V
PE
U
V
W
AC
AC
PE

MASH Product Warranty Clause

1. One year warranty

MASH provides one year warranty on its products defects in raw materials and workmanship from the date of shipment. During the warranty period, MASH will provide free repair service for defective products.

2. Not included in the warranty

1) Improper wiring, such as power supply and motor cable mixed connection, and unplugging with electricity

2) Unauthorized alteration of internal components

3) Use beyond electrical and environmental requirements

3. Repair Process

If the product needs to be repaired, the following procedure will be followed:

1) Before shipment, you need to call MASH customer service personnel to obtain permission to return the product for repair;

2) A written description is sent with the shipment, describing the failure phenomenon of the returned drive; the voltage, current and the use of the environment at the time of failure; the name and telephone number of the contact person and mailing address and other information.

3) Send the prepaid postage to MASH ELECTRIC

4. Warranty Limitations

1) Warranty of MASH products is limited to the device and process (i.e., consistency), improper use of the damage is not Warranty

2) MASH does not guarantee that its products can be suitable for the customer's specific application, because whether it is suitable for the application of technical specifications and requirements and conditions of use and the environment.

Standard requirements and the use of conditions and the environment, due to improper selection of customers caused by inapplicability of the problem, does not belong to the warranty This product is not under warranty.

3) This product is not recommended for clinical medical purposes.

Release Note

Version	Date	Changes
V1.0	2022.08.25	
V1.1	2023.02.23	Add IO mode
V1.2	2023.03.26	Format optimization, fix several bugs
V1.3	2023.07.26	Add Pn parameter and control method
V1.4	2023.07.31	Adjust layout, change RS485 address from decimal to hexadecimal.
V1.5	2023.07.31	Add position mode, speed mode setting example
V2.0	2023.12.28	Modify the default value of Pn parameter table, upper and lower limits, etc.