

Communication Protocol (ATO-NJL-305)

Version V2.3

Default Factory Communication Configuration

Parameter	Value
Device Address	1
Baud Rate	115200 bps
Timeout Wait	300 ms
Transmit Delay	0 ms

Overview

- The communication frame format supports only N81/E71/O71; the system automatically identifies the format with no user configuration required. Note that the Modbus RTU protocol exclusively uses the N81 frame format.
- Three communication protocols are supported simultaneously with automatic system recognition, eliminating manual setup: Modbus ASCII / Modbus RTU / SCPI
- SCPI Protocol Specifications
 1. Fixed starting symbol: Asterisk *
 2. Two supported terminators: Carriage Return + Line Feed (\r\n) and Line Feed (\n). \r\n is recommended.
 3. All command letters must be lowercase.

Description of Modbus Communication Registers

Content	Register Address	Type	Length	Decimal Places	Mode	Remarks
Torque (Nm)	0	Float	32 Bits	—	Read-only	—
	4	Signed Decimal	32 Bits	3	Read-only	—
Rotational Speed (RPM)	2	Float	32 Bits	—	Read-only	—
	6	Unsigned Decimal	16 Bits	0	Read-only	—
Power (kW)	20	Float	32 Bits	—	Read-only	—
	22	Signed Decimal	32 Bits	3	Read-only	—
Communication Test	16	Float	32 Bits	—	Read-only	Fixed value: 3.14
	16	Hexadecimal	32 Bits	—	Read-only	Fixed value:

						0x4048F5C3
	16	Hexadecimal	16 Bits	—	Read-only	Fixed value: 0xF5C3
	17	Hexadecimal	16 Bits	—	Read-only	Fixed value: 0x4048
Write Protection	84	Hexadecimal	16 Bits	—	Read/Write	Register write protection switch
Device Address	376	Unsigned Decimal	16 Bits	0	Read/Write	※1 Saved after power cycle
Communication Baud Rate	353	Unsigned Decimal	16 Bits	0	Read/Write	※1 Saved after power cycle
Response Timeout	355	Unsigned Decimal	16 Bits	0	Read/Write	※1 Saved after power cycle
Transmit Delay	354	Unsigned Decimal	16 Bits	0	Read/Write	※1 Saved after power cycle

※1

1. Device address range: 1–254
2. Communication speed range: 0–6 (0: 2400, 1: 4800, 2: 9600, 3: 19200, 4: 38400, 5: 57600, 6: 115200 bps)
3. Response timeout range: 10–999 ms
4. Transmission delay range: 0–99 ms
5. Write-protection register: Writing to power-loss retentive registers is permitted only when register 84 equals 4.

SCPI Basic Commands

	Transmit	Response	Remarks
Communication Test	*ping	*ok ping	—
Soft Reset & Reboot	*reset	*ok reset	Soft reset
Read Torque, Speed	*measure?	*1.123 654	The values for torque, rotational

& Power		4.567	speed, and power are separated by spaces.
Read Torque	*measure:torque?	*1.123	Unit: Nm
Read Rotational Speed	*measure:speed?	*654	Unit: RPM (Revolutions Per Minute)
Read Power	*measure:power?	*4.567	Unit: kW
Enable Auto-Transmit	*autosend 10 999	*ok	10 - Transmission interval, in ms ※
		autosend	1 999-Batch transmission, 999+1 measurement data points ※ 2
Disable Auto-Transmit	*autosend stop	*ok autosend	stop can be replaced with -1 or off

※ 1 If set to 0, data is sent in batches without time intervals; in RS485 communication, if the interval is too short, the bus remains occupied by transmissions, preventing data reception!

※ 2 This parameter cannot be set to 0; however, it can be left unset (blank) to enable continuous transmission of measurement data.

SCPI Auto-Transmit

Step	Transmit	Receive
Auto-transmit enabled	*autosend 10 999	*ok autosend
Trigger torque transmission	*measure:torque?	*1.123
Torque auto-transmission in progress 2	—	*1.124
Torque auto-transmission in progress ...	—
Torque auto-transmission in progress 1000	—	*1.122
Auto-transmit disabled	*autosend stop	*ok autosend

SCPI Communication Configuration

Transmit	*comport?-t	Read Communication Configuration (with Text)
Receive	*address=1 baudrate=115200 timeout=300 tdelay=0	
Transmit	*comport?	Read Communication Configuration
Receive	*1 115200 300 0	
Transmit	*comport:address?	Read Device Address

Receive	*1	
Transmit	*comport:baudrate?	Read Baud Rate
Receive	*115200	
Transmit	*comport:timeout?	Read Wait Timeout
Receive	*300	
Transmit	*comport:tdelay?	Read Transmission Delay
Receive	*0	
Transmit	*comport:address 1	Write Device Address
Receive	*ok comport	
Transmit	*comport:baudrate 115200	Write Baud Rate
Receive	*ok comport	
Transmit	*comport:timeout 300	Write Wait Timeout
Receive	*ok comport	
Transmit	*comport:tdelay 0	Write Transmission Delay
Receive	*ok comport	

Notes:

1. Device address range: 1–254
2. Supported baud rates: 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
3. Response timeout range: 10–999 ms
4. Transmit delay range: 0–99 ms

SCPI Extended Commands

Transmit	*measure?-%f	Single shared data format
Receive	*1.123446 654.345546	6 decimal places reserved
Transmit	*measure?-%e	Single shared data format
Receive	*1.123446e+00 6.543455e+02	Output in exponential format
Transmit	*measure?-%f-%e	Separate data formats; rotational speed
Receive	*1.123446 6.543455e+02	adopts exponential format
Transmit	*measure?-%0.3f-%0.1f	Separate data formats
Receive	*1.123 654.3	Specified number of decimal places
Transmit	*measure?-torque:%0.3fNm-speed:%0.0fRPM	Separate data formats, output with
Receive	*torque:1.123Nm speed:654RPM	prompt text information

Notes:

1. The ``measure`` command supports only the ``-%f`` and ``-%e`` data types.
2. The ``-`` output format can be used with ``measure``, ``measure:torque``, and ``measure:speed``.
3. For specific usage details, please refer to the C library function ``printf``.