

1. Overview

The controller provides a Modbus-RTU communication protocol that follows the Modbus RTU protocol, enabling remote operation with the controller via RS232 serial port and TCP.

Note:

- You can switch to the Modbus protocol by going to "System Settings -> Network Settings -> Protocol".

1.1 Communication Configuration

To configure serial communication, go to "System Settings -> Communication -> RS232".

- baud rate: 4800, 9600, 14400, 19200, 38400, 57600, 115200, default 9600.
- Data bits: 8
- Check bits: None
- **Stop bits:** 1 or 2 (optional)
- **Address:** 1 (fixed, no interface configuration available for now).
- **TCP communication:** Default port number is **8000**.

1.2 Data format

The following function codes are supported:

Codes	Description
0x03	Reading one or more registers
0x06	Writing one register
0x10	Writing multiple registers

All data is stored in big-endian byte order, and the following data types are supported:

Data type	Length	Number of registers	Description
FLOAT	Float, 4 bytes	2	Conversion example:

			Floating-point number: 101.324, its big-endian byte order (HEX): 42 CA A5 E3, is directly split into two registers (HEX): 42 CA and A5 E3.
UINT16	Unsigned integer, 2 bytes	1	Consistent with the register.

2. Register List

Register address	Register name	Register type	Data type	Read/Write	Description
0x000A-0x000B	Real-time Pressure	Holding Register	FLOAT	Read-only	
0x000C	Pressure Unit	Holding Register	UINT16	Read/Write	See "Pressure Unit ID List" in the appendix
0x000D	Control Status	Holding Register	UINT16	Read/Write	Control Status: Measurement = 0 Control = 1 Vent = 2
0x000E	Setpoint (Control Pressure Target Value)	Holding Register	FLOAT	Read/Write	
0x0010	Stable State	Holding Register	UINT16	Read-only	Unstable: 0 Stable: 1
0x0011-0x0012	Zeroing	Holding Register	FLOAT	Write-only	A zeroing command is sent after the pressure is emptied and stabilized. In gauge pressure mode, the register value is ignored; in absolute pressure mode, it cannot be zeroing.
0x0013	Control Mode	Holding Register	UINT16	Read/Write	Control Pressure Mode: Fast=0 Standard=1 Custom=2
0x00F0	Fault Query	Holding Register	UINT16	Read-only	0 No fault System Diagnosis - Pneumatic Version Fault Code

					System Diagnosis - Hydraulic Version Fault Code
0x00F1	Screen Lock	Holding Register	UINT16	Read/ Write	Unlocked: 0 Locked: 1 Note: Added in version V1.1.9.27

3. Example of function commands

3.1 Read pressure + unit

- Tx: 01 03 00 0A 00 03 25 C9
- Rx: 01 03 06 36 8B 32 03 00 02 FF 85
- Explanation: 36 8B 32 03 is a big-endian byte array of the real-time pressure floating-point number, which is converted to a floating-point number according to IEEE 754 as: 0.000004148344942223048. 00 02 is the pressure unit Id (MPa), see the appendix for details.

3.2 Read control status

- Tx: 01 03 00 0D 00 01 15 C9
- Rx: 01 03 02 00 01 79 84
- Explanation: 00 01 indicates that the system is currently under control.

3.3 Write control status

- Tx: 01 06 00 0D 00 02 99 C8
- Rx: 01 06 00 0D 00 02 99 C8
- Explanation: 00 02 indicates that the control state is switched to the drain state.

3.4 Read set point (pressure control target)

- Tx: 01 03 00 0E 00 02 A5 C8
- Rx: 01 03 04 3F 80 00 00 F7 CF

- Explanation: 3F 80 00 00 corresponds to the floating-point number 1.0, representing the currently set setpoint.

3.5 Write the setpoint (pressure control target).

- Tx: 01 10 00 0E 00 02 04 3F 80 00 00 7F DF
- Rx: 01 10 00 0E 00 02 20 0B
- Explanation: 3F 80 00 00 is a floating-point number indicating that the setpoint is set to 1.0.

3.6 Reading steady state

- Tx: 01 03 00 10 00 01 85 CF
- Rx: 01 03 02 00 00 B8 44
- Explanation: 00 00 corresponds to the unsigned integer 0, indicating instability.

3.7 Set lock screen status

Lock

- Tx: 01 06 00 F1 00 01 19 F9
- Rx: 01 06 00 F1 00 01 19 F9

Un-lock

- Tx: 01 06 00 F1 00 00 D8 39
- Rx: 01 06 00 F1 00 00 D8 39

3.8 Read lock screen status

- Tx: 01 03 00 F1 00 01 D5 F9

The screen does not lock and return.

- Rx: 01 03 02 00 00 B8 44

The screen lock and return.

- Rx: 01 03 02 00 01 79 84

3.9 Read/write pressure control mode

- Tx: 01 06 00 13 00 02 F9 CE
- Rx: 01 06 00 13 00 02 F9 CE
- Explanation: Set custom pressure control mode

- Tx: 01 03 00 13 00 01 75 CF
- Rx: 01 03 02 00 00 B8 44
- Explanation: Reading from pressure control mode returns to fast mode.

1. Appendix

4.1 List of pressure unit IDs

Unit Id	Unit
1133	kPa
1130	Pa
1131	GPa
1132	MPa
1134	mPa
1135	μPa
1136	hPa
1137	bar
1138	mbar
1139	torr
1140	atm
1141	psi
1142	psia
1143	psig
1144	gf/cm2
1145	kgf/cm2
1147	inH2O@4°C
1148	inH2O@68°F
1150	mmH2O@4°C
1151	mmH2O@20°C
1153	ftH2O@4°C
1154	ftH2O@68°F
1156	inHg@0°C
1158	mmHg@0°C
2001	mtorr
2002	lb/ft2
2003	tsi
2004	psf
2005	inH2O@60°F
2006	ftH2O@60°F
2007	cmH2O@4°C
2008	mH2O@4°C
2009	cmHg@0°C
2010	mHg@0°C
2011	kgf/m2

2012	oz/in2
2013	cmH2O@68°F
2014	mH2O@68°F
2015	mmH2O@15°C
2020	inH2O@39°F
2021	inH2O@68°F
2022	ftH2O@39°F
2023	ftH2O@68°F
2024	inHg@60°F
2025	mmH2O@39°F
2026	mmH2O@68°F
2027	cmH2O@39°F
2028	cmH2O@20°C
2029	mH2O@39°F
2030	mH2O@20°C
2998	m
2999	ft