

AIBUS-MODBUS Protocol Converter Operational Manual



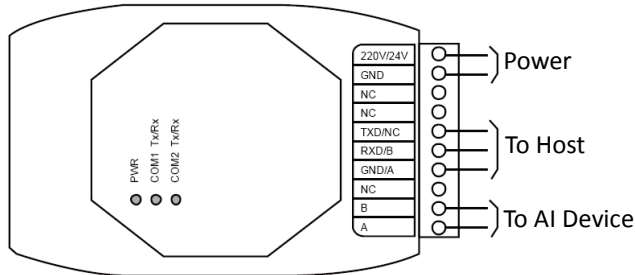
1. Introduction

AI-MODBUS Protocol converter supports 4 commands under MODBUS protocol, to be widely compatible with other MODBUS devices. To ensure the speed, the converter use MODBUS RTU (binary) mode, supporting 03H, 04H, 06 and 10H commands. Maximum 36 instruments (or channels) of data collection and maximum length 8-bit is possible. The type of instruments linked is not limited but includes programmable type, single channel type, multi-channel indicator and single channel indicator. The address falls from 1 to 36.

1.1 Model Selection

AI-MODBUS -□-□ V2.0		Description
Model		AIBUS-MODBUS Protocol Converter
Terminal Type	R	Device: RS485; Host: RS232
	S	Device: RS485; Host: RS485
Power Option		Default 100~240VAC
	24V	24VDC Supply Power

1.2 Wire Connection



1.3 DIP Switches

DIP switches determines the convertor its own address. By default is 1. The range is 1~32.

Range of ADDR	DIP1	DIP2	DIP3	DIP4	DIP5
1	OFF	OFF	OFF	OFF	OFF
2	ON	OFF	OFF	OFF	OFF
3	OFF	ON	OFF	OFF	OFF
~	~	~	~	~	~
32	ON	ON	ON	ON	ON

1.4 Serial Port Format

The port between device and host are set in default format: Baud rate: 9600bps; no error check; 8-bit data; 1 stop bit

2. Command Function

2.1 03H Command Function (Read Holding Register)

As international standard MODBUS RTU, each data reading length is 1~127 bit. To ensure the real-time accuracy of the measured value, the send and receive command are as below:

Function	Address	Com-mand	Initial Read Address	Read Data Length			CRC16	
Bit	1	1	2	2			2	
Send Frame	ADDR	03H	0000H~1988H	00H	01~7FH		CRC L	CRC H

Return Component	Address	Com-mand	Return Bit	Data 1	Data 2	Data 3	Data N	CRC 16
Bit	1	1	1	2	2	2	2*N	2

2.2 04H Command Function (Read Input Register)

Function	Address	Com-mand	Initial Read Address	Read Data Length			CRC16	
Bit	1	1	2	2			2	
Send Frame	ADDR	04H	0000H~0048H	00H	01~48H		CRCL	CRCH

Return Component	Address	Com-mand	Return Bit	Data 1	Data 2	Data 3	Data N	CRC16
Bit	1	1	1	2	2	2	2*N	2

2.3 06H Command Function (Write Single Register)

Function	Address	Com-mand	Write Address	Write Data		CRC16		
Bit	1	1	2	2		2		
Send Frame	ADDR	06H	00H	00H~1988H	Write High	Write Low	CRCL	CRCH

Function	Address	Com-mand	Write Address	Write Data		CRC16	
Bit	1	1	2	2		2	
Return Frame	ADDR	06H	00H~1988H	Write High	Write Low	CRCL	CRCH

2.4 10H Command Function (Write Multiple Register)

Function	Address	Com-mand	Write Initial Address	Write Quantity	Write Data		CRC16	
Bit	1	1	2	1	N(1<=N<=8)		2	
Send Frame	ADDR	10H	00H	0000H~1988H	01~08H	Write High	Write Low	CRC L CRC H

Function	Address	Com-mand	Write Initial Address	Write Data Quantity	CRC16	
Bit	1	1	2	2	2	
Return Frame	ADDR	10H	0000H~1988H	0001~0018H	CRCL	CRCH

3. Register Distribution

Write Register (0001~0072)

Write register, attribute as read-only. Data type is 16 bits SHORT int.

Register Range	Description
0001~00036	PV measured value of device of address 1 to 36. The data will become 32767 if the communication is lost.
00037~00072	

Single Register (1~6550)

Attribute as read/write. Data type is 16 bits SHORT int.

Register Range	Description
0001~00036	SV set value of device of address 1 to 36. The data will become 32767 if the communication is lost.

Other Parameters Register Table				
Device Address	Register Range	Device Address	Register Range	Remarks for code
1	0037~0214	19	3241~3418	00H~15H 17H~18H 1AH~B3H
2	0215~0392	20	3419~3596	
3	0393~0570	21	3597~3774	
4	0571~0748	22	3775~3952	16H and 19H are not included. Please refer sector 4 for code definition.
5	0749~0926	23	3953~4130	
6	0927~1104	24	4131~4308	
7	1105~1282	25	4309~4486	
8	1283~1460	26	4487~4664	
9	1461~1638	27	4665~4842	
10	1639~1816	28	4843~5020	
11	1817~1994	29	5021~5198	
12	1995~2172	30	5199~5376	
13	2173~2350	31	5377~5554	
14	2351~2528	32	5555~5732	
15	2529~2706	33	5733~5910	
16	2707~2884	34	5911~6088	
17	2885~3062	35	6089~6266	
18	3063~3240	36	6267~6444	

Special Register	Description	Remarks for "Version"
6500	Quantity of devices connected, with maximum 36 and minimum 1.	70: version 7.x 80: version 8.x 77: version 7.x / 30 steps programmable controller
6501~6537	The firmware version of devices of address 1~36	85: version 8.x / 30 steps programmable controller
6538~6550	Reserved	87: version 8.x / 50 steps programmable controller

4. Reference Table of Instrument Parameter vs Parameter Code

Parameter Code	Parameter in AI-series instrument	Description
00H	SV : Set Value	Same unit as PV
01H	HiAL: High limit alarm	Same unit as PV
02H	LoAL: Low limit alarm	Same unit as PV
03H	dHAL: Deviation high alarm	Same unit as PV
04H	dLAL: Deviation low alarm	Same unit as PV
05H	AHYS: Alarm hysteresis	Same unit as PV
06H	Ctrl: Control mode	0: ONOFF 1: APID 2: nPID 3: PoP 4: SoP Refer to instrument manual for details
07H	P: Proportional band	Same unit as PV
08H	I: Time of Integral	Unit is second
09H	D: Time of Derivative	0.1 second
0AH	Ctl: Control period	0.1 second
0BH	InP: Input specification Code	Refer to instrument manual for details
0CH	dPt: Decimal Place Display Resolution	0: 0 1: 0.0 2: 0.00 3: 0.000 If data is read as +128, PV value (and others having same unit) must be divided by 10 and then round off. E.g. dPt=128+1=129. If value (equ. to) 1000, the actual display should be 10.0. If dPt=1, the actual display should be 100.0. This parameter can be written but not adding 128. The range of write in is 0~3.
0DH	ScL: Signal scale low limit	Same unit as PV
0EH	ScH: Signal scale high limit	Same unit as PV
0FH	ALP: Alarm output allocation	Refer to instrument manual for details
10H	Sc: Input Shift Adjustment	Same unit as PV

11H	oP1: Main output type	0: SSR 1: rELy 2: 0~20 3: 4~20
12H	OPL: Output low limit	%
13H	OPH: Output upper limit	%
14H	CF: CF Function	Refer to instrument manual for details
15H	Instrument ID	5180: AI-518 5187: AI-518P
17H	FILT: PV input filter	
18H**	AMAn: Manual/Auto Switch	0: MAN 1: Auto 2: FMAN 3: FAut
1AH**	MV: Manual Output %	
1BH	Srun: Running Status	0: run 1: StoP 2: HoLd
1CH	CHYS: Control Hysteresis	Same unit as PV
1DH	At: Auto-Tuning	0: OFF 1: on 2: FoFF
1EH	SPL: Low limit of SV	Same unit as PV
1FH	SPH: Upper limit of SV	Same unit as PV
20H	Fru: Power frequency / temperature scale	0: 50C 1: 50F 2: 60C 3: 60F
21H	Work range of OPH	Same unit as PV
22H	Act: Acting method	0: rE 1: dr 2: rEbA 3: drbA
23H	AdIS: Alarm display	0: off 1: on
24H	Auxiliary output type	0: SSR 1: rELy 2: 0~20 3: 4~20
25H	P2: 2 nd Proportional band	Same unit as PV
26H	I2: 2 nd Time of Integral	Unit in second
27H	d2: 2 nd Time of Derivative	0.1 second
28H	Ctl2: 2 nd Control period	0.1 second
29H	Et: Event input type	0: none 1: ruSt 2: SP1.2 3: Pld2
2AH*	SPr: Ramp Slope limit (Programmable controller only)	Same unit as PV/minute (same treatment as PV)
28H*	Pno: No. of Program step (Programmable controller only)	Integer

2CH*	PonP: Program run mode after power restart (Programmable controller only)	0: Cont 1: StoP 2: run1 3: dAst 4: HoLd
2DH*	PAF: Program Running mode (Programmable controller only)	Refer to instrument manual for details
2EH*	STEP: Current program STEP	Integer
2FH*	STEP Time: Time run in program	0.1 minute or 0.1 hours, determined by PAF
30H*	Event Output Status	0: No event output 1: Event 1 (AL1) active 2: AL2 active 3: AL1 & AL2 active
31H**	OPrt: Input soft starting time when power on	
32H**	Strt: Valve running time	
33H**	Scale low limit of external Set Point	When external setpoint terminal is used to measure valve feedback, please set valve value as 1.
34H**	Scale high limit of external Set Point	When external setpoint terminal is used to measure valve feedback, please set valve value as 2.
35H**	Ero: Output when out of range	Ero defines the output value when it is out of range (usually it is caused by sensor error or broken)
36H**	Advanced Function 2	Advanced Function 2
37H~3FH	Reserved	
40H~47H	EP1~EP8 Field parameter definition	
48H**	Valve Position (READ only)	Value 0~25600 refers as 0~100%. The value must be divided by 256 to become a percentage.
49H~4FH	Reserved	
50H	SP1: Set point 1	
51H	t1: Step Time 1	
52H~82H	SP2~program step data....	Determined by Pno parameter

Remarks:

* Parameters effective to programmable controllers (including but not limited to AI-516P, AI-526P, AI-716P, AI-756P)

** Parameters effective to controllers with auto-manual output feature (including but not limited to AI-519, AI-719)

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