P91 1-3 Modbus Protocol

Protocol in P91

1. Warning item

Hex	Dec	Size	Content	Bit value	type
0x0000	0	bit15	bit15 = Reservation		
		bit14	bit14 = Reservation		
		bit13	bit13=Alarm:Bypass frequency unstable	0:FALSE/1:TRUE	Read only
		bit12	bit12=Alarm:Battery low	0:FALSE/1:TRUE	Read only
		bit11	bit11=Alarm:Charger fail	0:FALSE/1:TRUE	Read only
		bit10	bit10 = Reservation		
		bit9	bit9 = Reservation		
		bit8	bit8 = Reservation		
		bit7	bit7 = Reservation		
		bit6	bit6 = Reservation		
		bit5	bit5 = Reservation		
		bit4	bit4 = Reservation		
		bit3	bit3 = Reservation		
		bit2	bit2 = Reservation		
		bit1	bit1 = Reservation		
		bit0	bit0 = Reservation		
0x0001	1	bit15	bit15-bit0 = Reservation		
0x0002	2	bit15	bit15-bit7 = Reservation		
		bit6	bit6 = Reservation		
		bit5	bit5 = Reservation		
		bit4	bit4 = Reservation		
		bit3	bit3 = Reservation		R
		bit2	bit2=Alarm:P1 cut off pre-alarm	0:FALSE/1:TRUE	Read only
		bit1	bit1 = Reservation		
		bit0	bit0=Alarm:Battery open	0:FALSE/1:TRUE	Read only
0x0003	3	bit15	bit15 = Reservation		
		bit14	bit14=Alarm:IP site fail	0:FALSE/1:TRUE	Read only
		bit13	bit13=Alarm:Battery over charge	0:FALSE/1:TRUE	Read only
		bit12	bit12=Alarm:Overload warning	0:FALSE/1:TRUE	Read only
		bit11	bit11=Alarm:Fan lock warning	0:FALSE/1:TRUE	Read only
		bit10	bit10=Alarm:EPO active	0:FALSE/1:TRUE	Read only
		bit9	bit9 = Reservation		
		bit8	bit8=Alarm:Over temperature	0:FALSE/1:TRUE	Read only
		Bit7	bit7-bit0 = Reservation		

2. Capability setting （look for Application example 1）

Hex	Dec	Size	Content	Bit value	Register value	type
0x00 0E	14	bit15	bit15=Enable/disable audible alarm A	0:FALSE/1:TRUE	E:8000/D:7FFF	Read/Write
		bit14	bit14=Enable/disable battery mode audible warning B	0:FALSE/1:TRUE	E:4000/D:BFFF	Read/Write
		bit13	bit13=Enable/disable battery open status check D	0:FALSE/1:TRUE	E:2000/D:DFFF	Read/Write
		bit12	bit12=Enable/disable Site fault detect L	0:FALSE/1:TRUE	E:1000/D:EFFF	Read/Write
		bit11	bit11=Set hot standby master/slave, PEM means master, PD M	0:FALSE/1:TRUE	E:800/D:F7FF	Read/Write
		bit10	bit10=Enable/disable auto-Restart.R	0:FALSE/1:TRUE	E:400/D:FBFF	Read/Write
		bit9	bit9=Enable/disable battery deep discharge protect S	0:FALSE/1:TRUE	E:200/D:FDFF	Read/Write
		bit8	bit8=Enable/disable battery low protect T	0:FALSE/1:TRUE	E:100/D:FEFF	Read/Write
		bit7	bit7=Enable/disable code start C	0:FALSE/1:TRUE	E:80/D:FF7F	Read/Write
		bit6	bit6=Enable/disable bypass forbidding F	0:FALSE/1:TRUE	E:40/D:FFBF	Read/Write
		bit5	bit5=Enable/disable short restart 3 times H	0:FALSE/1:TRUE	E:20/D:FFDF	Read/Write
		bit4	bit4=Enable/disable inverter short clear function I	0:FALSE/1:TRUE	E:10/D:FFEF	Read/Write
		bit3	bit3=Enable/disable bypass when device turn off. O	0:FALSE/1:TRUE	E:8/D:FFF7	Read/Write
		bit2	bit2=Enable/disable bypass audible warning P	0:FALSE/1:TRUE	E:4/D:FFFB	Read/Write
		bit1	bit1=Enable/disable high efficiency mode E	0:FALSE/1:TRUE	E:2/D:FFFD	Read/Write
		bit0	bit0=Enable/disable energy saving G		E:1/D:FFFE	Read/Write
0x000F	15	bit15	bit15=Enable/disable Output socket1 when the delay release J	0:FALSE/1:TRUE	E:8000/D:7FFF	Read/Write
		bit14	bit14=Enable/disable Output socket2 when the delay release K	0:FALSE/1:TRUE	E:4000/D:BFFF	Read/Write
		bit13	bit13=Enable/disable deep high efficiency mode N	0:FALSE/1:TRUE	E:2000/D:DFFF	Read/Write
		bit12	bit12=Enable/disable converter modeV	0:FALSE/1:TRUE	E:1000/D:EFFF	Read/Write
			bit0 – b11 =Reservation			

3. Support Capability list

Hex	Dec	Size	Content	Bit value	Type
0x0010	16	bit15	Support: Enable/disable audible alarm	0:FALSE/1:TRUE	Read Only
		bit14	Support: Enable/disable battery mode audible warning	0:FALSE/1:TRUE	Read Only
		bit13	Support: Enable/disable battery open status check	0:FALSE/1:TRUE	Read Only
		bit12	Support: Enable/disable Site fault detect	0:FALSE/1:TRUE	Read Only
		bit11	Support: Set hot standby master/slave, PEM means master, PD	0:FALSE/1:TRUE	Read Only
		bit10	Support: Enable/disable auto-Restart.	0:FALSE/1:TRUE	Read Only
		bit9	Support: Enable/disable battery deep discharge protect	0:FALSE/1:TRUE	Read Only
		bit8	Support: Enable/disable battery low protect	0:FALSE/1:TRUE	Read Only
		bit7	Support: Enable/disable code start	0:FALSE/1:TRUE	Read Only
		bit6	Support: Enable/disable bypass forbidding	0:FALSE/1:TRUE	Read Only
		bit5	Support: Enable/disable short restart 3 times	0:FALSE/1:TRUE	Read Only
		bit4	Support: Enable/disable inverter short clear function	0:FALSE/1:TRUE	Read Only
		bit3	Support: Enable/disable bypass when device turn off.	0:FALSE/1:TRUE	Read Only
		bit2	Support: Enable/disable bypass audible warning	0:FALSE/1:TRUE	Read Only
		bit1	Support: Enable/disable high efficiency mode	0:FALSE/1:TRUE	Read Only
		bit0	Support: Enable/disable energy saving	0:FALSE/1:TRUE	Read Only
0x0011	17	bit15	Support: Enable/disable Output socket1 when the delay release	0:FALSE/1:TRUE	Read Only
		bit14	Support: Enable/disable Output socket2 when the delay release	0:FALSE/1:TRUE	Read Only
		bit13	Support: Enable/disable deep high efficiency mode	0:FALSE/1:TRUE	Read Only
		bit12	Support: Enable/disable converter mode	0:FALSE/1:TRUE	Read Only
			bit0 – bit11 =Reservation		

4. Control item （look for Application example 2）

Hex	Dec	Size	Content	Bit value	Register value	Type
0x001A	26	bit15	bit15=Silence buzzer beep	0:FALSE/1:TRUE	Y:8000	Write only

		bit14	bit14=buzzer beep open	0:FALSE/1:TRUE	Y:4000	Write only
		bit13	bit13=Test until battery low	0:FALSE/1:TRUE	Y:2000	Write only
		bit12	bit12=Remote turn off UPS	0:FALSE/1:TRUE	Y:1000	Write only
		bit11	bit11=Remote turn on UPS	0:FALSE/1:TRUE	Y:800	Write only
		bit10	bit10=Cancel shutdown	0:FALSE/1:TRUE	Y:400	Write only
		bit9	bit9=Cancel test	0:FALSE/1:TRUE	Y:200	Write only
		bit8	bit8=10 seconds test	0:FALSE/1:TRUE	Y:100	Write only
		bit7	bit7=Remote turn on UPS output socket 1	0:FALSE/1:TRUE	Y:80	Write only
		bit6	bit6 = Reservation			
		bit5	bit5=Remote turn off UPS output socket 1	0:FALSE/1:TRUE	Y:20	Write only
		bit4	bit4 = Reservation			
			b3-b0 = Reservation			

5. The result of control

Hex	Dec	Size	Content	Bit value	Type
0x0025	37	bit15	bit15=Flag:Silence buzzer beep	0:FAIL/1:SUCCESS	Read only
		bit14	bit14=Flag:buzzer beep open	0:FAIL/1:SUCCESS	Read only
		bit13	bit13=Flag:Test until battery low	0:FAIL/1:SUCCESS	Read only
		bit12	bit12=Flag:Remote turn off UPS	0:FAIL/1:SUCCESS	Read only
		bit11	bit11=Flag:Remote turn on UPS	0:FAIL/1:SUCCESS	Read only
		bit10	bit10=Flag:Cancel shutdown	0:FAIL/1:SUCCESS	Read only
		bit9	bit9=Flag:Cancel test	0:FAIL/1:SUCCESS	Read only
		bit8	bit8=Flag:10 seconds test	0:FAIL/1:SUCCESS	Read only
		bit7	bit7=Flag:Remote turn on UPS output socket 1	0:FAIL/1:SUCCESS	Read only
		bit6	bit6 = Reservation	0:FAIL/1:SUCCESS	Read only
		bit5	bit5=Flag:Remote turn off UPS output socket 1	0:FAIL/1:SUCCESS	Read only
		bit4	bit4 = Reservation	0:FAIL/1:SUCCESS	Read only
			b3-b0 = Reservation	0:FAIL/2:SUCCESS	Read only

6. Setting Parameter to default value

Hex	Dec	Size	Content	Bit value	Type
0x0030	48	bit15	bit15=Seting control parameter to default value	0:FAIL/1:SUCCESS	Write only
			b14-b0 = Reservation		

0x003B	59	bit15	bit15=Flag:Seting control parameter to default value	0:FAIL/1:SUCCESS	Read only
			b14-b0 = Reservation		

7. UPS working status

Hex	Dec	Size	Content	units	Type
0x00AA	170	1	Input voltage	0.1V	ReadOnly
0x00AB	171	1	Input frequency	0.1Hz	ReadOnly
0x00AC	172	1	Output voltage	0.1V	ReadOnly
0x00AD	173	1	Output frequency(AC output frequency)	0.1Hz	ReadOnly
0x00AE	174	1	Output current	0.1A	ReadOnly
0x00AF	175	1	Output load percent	1%	ReadOnly
0x00B0	176	1	Positive BUS voltage (P BUS voltage)	0.1V	ReadOnly
0x00B1	177	1	Negative BUS voltage(S BUS voltage)	0.1V	ReadOnly
0x00B2	178	1	P Battery voltage	0.1V	ReadOnly
0x00B4	180	1	Max Temperature of the detecting pointers	0.1℃	ReadOnly
0x00B5	181	2	Ups status	Note1	ReadOnly

8. UPS battery information

0x00BC	188	1	Battery voltage	0.1V	ReadOnly
0x00BD	189	1	Battery piece number		ReadOnly
0x00BE	190	1	Battery group number		Read/Write
0x00BF	191	1	Battery capacity	%	ReadOnly
0x00C0	192	1	Battery remain time	minutes	ReadOnly

9. UPS working Mode

0x00D0	208	1	UPS Mode inquiry	Note2	ReadOnly

10. UPS fault information

0x02A3	675	1	Fault kind	Note3	ReadOnly
0x02A4	676	1	Battery voltage before fault	0.1V	ReadOnly
0x02A5	677	1	I/P frequency before fault	0.1Hz	ReadOnly
0x02A6	678	1	I/P voltage before fault	0.1V	ReadOnly

0x02A7	679	1	Inverter O/P frequency before fault	0.1Hz	ReadOnly
0x02A8	680	1	Inverter O/P voltage before fault	0.1V	ReadOnly
0x02A9	681	1	Negative Bus voltage before fault	0.1V	ReadOnly
0x02AA	682	1	Positive Bus voltage before fault	0.1A	ReadOnly
0x02AB	683	1	O/P load before fault	%	ReadOnly
0x02AC	684	1	O/P current before fault	0.1A	ReadOnly
0x02AD	685	1	Temperature before fault	0.1℃	ReadOnly
0x02AE	686	1	UPS running status before fault	Note4	ReadOnly

11. Output Socket

Hex	Dec	Size	Content	Bit value/ units	Type
0x0346	838	Bit15	b0=Output socket 1 status inquiry	0:OFF / 1:ON	ReadOnly
		bit14	b1=Output socket 2 status inquiry	0:OFF / 1:ON	ReadOnly
			b13-b0 = Reservation		
0x038B	907	1	Output socket release1 delay time inquiry in battery mode	minutes	Read/Write

12. Loss point

Hex	Dec	Size	Content	Units	Type
0x034A	842	1	High efficiency modeVoltage high loss point	V	Read/Write
0x034B	843	1	High efficiency modeVoltage low loss point	V	Read/Write
0x034E	846	1	The bypass Freq high loss point	0.1Hz	Read/Write
0x034F	847	1	The bypass Freq low loss point	0.1Hz	Read/Write
0x0350	848	1	The bypass Voltage high loss point	V	Read/Write
0x0351	849	1	The bypass Voltage low loss point	V	Read/Write

13. Setting Parameter item

0x034A	842	1	High efficiency mode Voltage high loss point	V	Read/Write
0x034B	843	1	High efficiency mode Voltage low loss point	V	Read/Write
0x034E	846	1	The bypass Freq high loss point	0.1Hz	Read/Write
0x034F	847	1	The bypass Freq low loss point	0.1Hz	Read/Write
0x0350	848	1	The bypass Voltage high loss point	V	Read/Write
0x0351	849	1	The bypass Voltage low loss point	V	Read/Write

14. Setting Parameter succeed or fail

Hex	Dec	Size	Content	Bit value	type
0x0385	901	bit15	Flag: High efficiency mode Voltage high loss point	0:FALSE/1:TRUE	Read only
		bit14	Flag: High efficiency mode Voltage low loss point	0:FALSE/1:TRUE	Read only
		bit13	Flag: Reservation	0:FALSE/1:TRUE	Read only

		bit12	Flag: Reservation	0:FALSE/1:TRUE	Read only
		bit11	Flag: The bypass Freq high loss point	0:FALSE/1:TRUE	Read only
		bit10	Flag: The bypass Freq low loss point	0:FALSE/1:TRUE	Read only
		bit9	Flag: The bypass Voltage high loss point	0:FALSE/1:TRUE	Read only
		bit8	Flag: The bypass Voltage low loss point	0:FALSE/1:TRUE	Read only
			bit7-bit0 = Reservation		

15. Remote shutdown and test

Hex	Dec	Size	Content	Units/Bit value	Type
0x03AB	939	1	Shutdown	minutes(ASCII)	Read/Write
0x03AC	940	1	Test for specified time	minutes(ASCII)	Read/Write
0x03AD	941	1	Shutdown and restore(N)	minutes(ASCII)	Read/Write
0x03AE	942	2	Shutdown and restore(M)	minutes(ASCII)	Read/Write
0x03DA	986	bit15	B15=flag:Shutdown	0:FAIL/1:SUCCESS	Read only
		bit14	B14=flag:Test for specified time	0:FAIL/1:SUCCESS	Read only
		bit13	B13=flag:Shutdown and restore	0:FAIL/1:SUCCESS	Read only
			b12-b0=Reservation		

16. CPU information

Hex	Dec	Size	Content	Units	Type
0x03E0	992	1	Protocol ID Inquiry	ASCII	Read only
0x03E1	993	10	Main CPU Firmware version	ASCII	Read only

17. UPS model and rating information

0x03EB	1003	7	Main Production type	ASCII	Read only
			Sub Production type	ASCII	Read only
			VA type	ASCII	Read only

			H/LV type	ASCII	Read only
			Year	ASCII	Read only
			Month	ASCII	Read only
			Manufacturer ID	ASCII	Read only
			Serial number	ASCII	Read only
0x03F2	1010	1	Battery Piece Number		Read only
0x03F3	1011	1	Battery standard voltage per unit	0.1V	Read only
0x03F4	1012	1	Input phase		Read only
0x03F5	1013	1	Output phase		Read only
0x03F6	1014	1	Nominal I/P Voltage	V	Read only
0x03F7	1015	1	Nominal O/P Voltage	V	Read only
0x03F8	1016	1	Output power factor		Read only
0x03F9	1017	2	Output rated VA	W	Read only
0x03FB	1019	8	Device model	ASCII	Read only
0x048A	1162	1	Battery Voltage	0.1V	Read only
0x048B	1163	1	Rating Output Current	0.1A	Read only
0x048C	1164	1	Rating Output Frequency	0.1Hz	Read only
0x048D	1165	1	Rating Output Voltage	0.1V	Read only

Note

Modbus Protocol for P01

1. Note1

Note 1:	
0x00B5H	Bit9-bit8: 00: standy; Bit9-bit8: 01: line-interactive; Bit9-bit8: 10: on-line.
0x00B5L	bit 7: Utility Fail bit 6: Battery Low bit 5: Bypass/Boost Active bit 4: UPS Failed bit 3: EPO bit 2: Test in Progress bit 1: Shutdown Active bit 0: bat silence
0x00B6H	Bit15: Bat test fail Bit14: Bat test OK

2. Note2

Note 2:		
0x00D0H	0x50	Power on mode
	0x53	Standby mode
	0x59	Bypass mode
	0x4C	Line mode
	0x42	Battery mode
	0x54	Battery test mode
	0x46	Fault mode
	0x45	HE/ECO mode
	0x43	Converter mode
	0x44	Shutdown mode

3. Note3

Fault Kind	Fault Number	Fault Name
Bus fault	0x01	Bus start fail
	0x02	Bus volt over
	0x03	Bus volt under
	0x04	Bus volt unbalance
	0x05	Bus short
	0x06	PFC over current
Inverter fault	0x11	Inverter soft fail
	0x12	Inverter volt high
	0x13	Inverter volt low
	0x14	L1 inverter short
	0x15	L2 inverter short
	0x16	L3 inverter short
	0x17	L1L2 inverter short
	0x18	L2L3 inverter short
	0x19	L3L1 inverter short
	0x1A	L1 inverter negative power
	0x1B	L2 inverter negative power
	0x1C	L3 inverter negative power
Electric link fault	0x21	Bat SCR short fault
	0x22	Line SCR short fault
	0x23	Inverter relay open fault
	0x24	Inverter relay short fault
	0x25	Wiring fault
	0x26	Battery reverse fault
	0x27	Battery too high
	0x28	Battery too low
	0x29	Battery Fuse
	0x30	Open-Circuit Fault
Parallel system fault	0x31	CAN communication fault
	0x32	Host line fault
	0x33	Synchronization line fault
	0x34	Synchronization pulse line fault
	0x35	Parallel communication line loss
	0x36	Output circuit fault
Others	0x41	Over temperature
	0x42	CPU communication fault

	0x43	Overload fault
	0x44	Fan fault
	0x45	Charger fault

4. Note4

	Bit	Remarks
0x02AEH	7	1:DCTODC on
	6	1:PFC on
	5	1: INVERTER on
	4	Reserved(always 0)
	3	1:input relay on
	2	1:O/P relay on
	1	Reserved(always 0)
	0	Reserved(always 0)

Modbus Protocol for P01

Application example

1. Audible alarm Enable or Disable

Look for Enable audible alarm, It in table address 0x000E bit15.Then you may write 0x8000 to 0x000E to Enable audible alarm or write 0xEFFF to 0x0E to disable audible alarm.

For example:

[XX 10 00 0E 00 01 02 80 00 CRCL CRCH]Mean: Enable audible alarm. [XX 10 00 0E 00 01 02 7F FF CRCL CRCH]Mean: Disable audible alarm.

Inquire the result of execute, you may read the follow address 0x10 bit15. For example:

[XX 03 00 10 00 01 CRCL CRCH]

[XX 03 02 80 00 CRCL CRCH]Mean: Execute success

[XX 03 02 00 00 CRCL CRCH]Mean: Execute fail

2. Setting buzzer beeps Silent.

Look for silence buzzer beep in address 0x001A bit 15 。Then you may write 0x8000 to 0x001A.

For example:

[XX 10 00 1A 00 01 02 80 00 CRCL CRCH]Silence buzzer beep.

Inquire the execution result. You may read 0x0025

[XX 03 00 25 00 01 CRCL CRCH] to inquire the results of command.

3. Setting control parameter to default value

Look for setting control parameter to default value it ,then write 0x8000 to 0x0030.If execute success then set 0x003B bit15 to 1;

For example:

[XX 10 00 30 00 01 02 80 00 CRCL CRCH]Setting control parameter to default value.

[XX 03 00 3B 00 01 CRCL CRCH]to inquire the results of command.

4. Get input voltage

Look for input voltage in address 0x00AA, when read 0x00AA to get input voltage and it units is 0.1V

For example:

PC:[XX 03 00 AA 00 01 CRCL CRH]

DEVICE:[XX 03 02 08 89 CRCL CRCH]

Mean: HEX [0x0889] to DEC[2185] .Input voltage:218.5V.

5. Output socket status

Inquire output socket status, Write socket number to 0x0345,then read 0x0346 to inquire socket status.

For example:

PC:[XX 10 03 45 00 01 02 01 00 CRCL CRCH] 01:Means inquire socket 1 status.

PC:[XX 03 03 46 00 01 CRCL CRCH]

DEVICE:[XX 03 02 01 00 CRCL CRCH] 01:Means socket1 was on.

6. Remote shut down the UPS

Remote shut down the UPS, then write is a number ranging from (.2, .3, ..., 01, 02,..., to 10)to the 0x3AB.If execute success then 0x003DA bit0 was set to 1.

For example:

PC:[XX 10 03 AB 00 01 02 2E 32]Mean: Shut down the UPS in 0.2 minutes

7. Shut down UPS and auto restart later

Cut UPS output off in <n> minutes and waiting for <m> minutes and then turn on UPS output again. Then write n to 0x03AD and write m to 0x003AE.

For example:

PC:[XX 10 03 AD 00 03 06 2E 32 30 30 30 32 CRCL CRCH]Mean: Shut down the UPS in 0.2 minutes and waiting
for 0002 minutes turn on the UPS.

8. Setting Parameter item

Set The bypass Voltage high loss point of UPS ,You want to Set the value 286V . Then write 0x011E to 0x0350 .

For example:

PC:[XX 10 03 50 00 01 02 01 1E CRCL CRCH]Mean: Set The bypass Voltage high loss point of UPS for 286V.