Modbus Protocol Implementation Conformance Statement

Document Revision: 1.2
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Firmware Version: 1.0 (and higher)
Product Model Number:
Protocol: ModBus TCP/IP
Physical interface:LAN

Introduction:

Specifically, the protocol is Modbus RTU using an Ethernet (LAN) physical layer with Foxtrot acting as a slave device. The device address can be configured in the field. Control points that include all basic and extended information are available through the interface.

Modbus Protocol Details

The protocol used is Modbus TCP/IP with 8 bit encoding and 16 bit CRC error checking. The device operates as a slave on the Modbus network.
Modbus protocol implementation complies with the document:
Modicon Modbus Protocol
Reference Guide
March 1992, PI-MBUS-300 Rev. D
This document is available from the web site: www.modbus.org.

The following Modbus functions are implemented:

Tab. 1

Function code	Function	Description
~~01~~	~~Read Output Status (Coil)~~	~~Read digital variables~~
~~02~~	~~Read Discrete Input Status~~	~~Read digital variables~~
03	Read Output Registers (Holding)	Read analog / integer variables
~~04~~	~~Read Input Registers~~	~~Read analog / integer variables~~
~~05~~	~~Force Single Coil~~	~~Write digital variable~~
06	Force Single Register	Write analog / integer variable
~~15~~	~~Force Multiple Coils~~	~~Write multiple digital variables~~
16	Preset Multiple Registers	Write multiple analog / integer variables

The error messages returned by the device conform to the Modbus specification.
Specifically, when an error occurs, the packet sent back to the master contains the original function code with the most significant bit set to 1, followed by a byte containing the error code number

Tab. 2

Error code	Description
01	Illegal Function
02	Illegal Data Address
03	Illegal Data Value

If the device receives a packet with an incorrect check sum, no error message will be returned to the master. If the master requests a register value that does not exist in the device, the value will be returned as 0.

ModBus data format
ModBus data types are 1-bit values and 16-bit values.

Tab. 3

ModBus Type	Description	Reference
~~Coil Status~~	~~Discrete Output~~	~~0x~~
~~Input Status~~	~~Discrete Input~~	~~1x~~
Holding Register	16-bit Output Register	4x
~~Input Register~~	~~16-bit Input Register~~	~~3x~~

Network ID Number (physical address) –It can be set to any address from 1 to 247.
The factory default setting is 1.

Control Points Mapping

The device Modbus interface provides control points that include all basic status information and set points for the FitCraft system. There are two types of points available, analog, integer. Part of analog values are multiplied by 10 before being sent through the Modbus interface. For example, a return temperature of 25.3 will be sent through the Modbus interface as 253. Integer values are sent directly through the interface without modification. The following table lists the available points along with their address offsets and types.

Logical Analog Value –(Holding Reg) 16-bit integer – Little Endian – LSB first

Tab. 6

Register Name	Address offset	Units	Access Type	Description	Desc.
TypPerif	1		R	Oznaceni druhu datove struktury	Default 19
OnLine	2		R	0->OffLine, 1->OnLine	0/1
TypID	3		R	Oznaceni typu datove struktury	Default 1
Accu_Count	4		R	Celkovy pocet accu v konfiguraci	
Accu_Ok	5		R	Pocet online accu se statusem <= 4 (OK)	
Accu_U	6	[mV]	R	Aktualni napeti akumulatoru [mV]	
Accu_I (LSB)	7	[mA]	R	Aktualni suma proudu accu [mA] (+) -> Nabijeni, (-) -> vybijeni	signed
Accu_I (MSB)	8	[mA]	R		
Accu_CCProc	9		R	Stupen nabiti accu v procentech (energie v ok accu v proc z celeho accu)	0..100
Hybin_Count	10		R	Celkovy pocet menicu v konfiguraci	
Hyb_Ok	11		R	Pocet online menicu	
Hyb_Ac_U	12	[x0.1V]	R	Vystup AC (smer spotrebice)- U [x0.1V]	
Hyb_Ac_I	13	[x0.01A]	R	Vystup AC (smer spotrebice)- I [x0.01A]	
Hyb_Ac_I_Max	14	[x0.01A]	R	Vystup AC (smer spotrebice) - vystupni proud nejvice zatizeneho menice [x0.01A]	
Chac_Count	15		R	Celkovy pocet nabijecu v systemu	
Chac_Ok	16		R	Pocet online nabijecu	
Chac_U	17	[x0.1V]	R	Vystup DC - napeti [x0.1V]	
Chac_I (LSB)	18	[x0.01A]	R	Vystup DC - suma proudu [x0.01A]	signed
Chac_I (MSB)	19	[x0.01A]	R		
L1_Grid_In_I	20	[x0.01A]	R	Faze L1, proud odebirany ze site	
L2_Grid_In_I	21	[x0.01A]	R	Faze L2, proud odebirany ze site	
L3_Grid_In_I	22	[x0.01A]	R	Faze L3, proud odebirany ze site	
L1_Grid_Out_I	23	[x0.01A]	R	Faze L1, proud dodavany do site	
L2_Grid_Out_I	24	[x0.01A]	R	Faze L2, proud dodavany do site	
L3_Grid_Out_I	25	[x0.01A]	R	Faze L3, proud dodavany do site	
L1_Ac_Out_I	26	[x0.01A]	R	Faze L1, vyst. proud (do spotrebicu)	
L2_Ac_Out_I	27	[x0.01A]	R	Faze L2, vyst. proud (do spotrebicu)	
L3_Ac_Out_I	28	[x0.01A]	R	Faze L3, vyst. proud (do spotrebicu)	
L1_Control	29		W	Faze L1 – 0=vybijeni,1=nabijeni, 2=sell	0..2
L2_Control	30		W	Faze L2 – 0=vybijeni,1=nabijeni, 2=sell	0..2
L3_Control	31		W	Faze L3 – 0=vybijeni,1=nabijeni, 2=sell	0..2
L1_Charge_Power	32	[%]	W	Faze L1, nabijeci vykon 0..100%	0..100
L2_Charge_Power	33	[%]	W	Faze L1, nabijeci vykon 0..100%	0..100
L3_Charge_Power	34	[%]	W	Faze L1, nabijeci vykon 0..100%	0..100
L1_Sell_Power	35	[%]	W	Faze L1, vykon do site 0..100%	0..100
L2_Sell_Power	36	[%]	W	Faze L2, vykon do site 0..100%	0..100
L3_Sell_Power	37	[%]	W	Faze L3, vykon do site 0..100%	0..100
Disable_Transfer*	38		W	System, 1=ostrovni provoz, 0=grid	0/1

Note:

R/W-Read and write registers, **R**-Read-direction SaveBOX->MB_Device, **W**-Write-direction SaveBOX<-MB_Device
***Disable_Transfer** can only be activated in Mode # 0 (ie Discharge mode). In other modes, the device does not respond to this command.
Registers **29-38** are for communication to SaveBOX, ignored by default setup in SaveBOX.