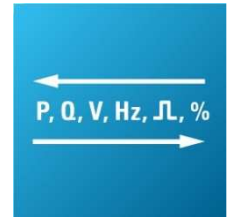


MODBUS POWER CONTROL BLUE'LOG XC

Item no.: 557.008



Modbus interface for real-time process data exchange with the grid operator

LICENSE DESCRIPTION

The Modbus Power Control interface is an open Modbus TCP interface. It facilitates the real-time process data exchange with the grid operator. If telecontrol protocols (IEC 60870-5-101 /-104, IEC 61850 or DNP3) are used, the interface is the ideal connection between a protocol converter (e.g. Programmable logic controller (PLC)) and the telecontrol system of the grid operator. The License Modbus Power Control activates this function on the controller blue'Log XC.

FEATURES

- + Modbus TCP interface
- + Setpoint commands given by the grid operator (active power curtailment, power factor ($\cos \varphi$) control, reactive power control)
- + Interface for protocol converter of telecontrol protocols (IEC 60870-5-101 /-104, IEC 61850 or DNP3)
- + Switching between different methods for active / reactive power management
- + Setting of reference voltage for parallel shift of the characteristic curve Q (V)
- + Feedback (acknowledgement) of setpoint commands for signal monitoring
- + Feedback of electrical parameters measured at Point of Common Coupling (e.g. P, Q, $\cos \varphi$, f, V, I)

REQUIREMENTS

- + blue'Log XC
- + Licence Modbus Power Control¹⁾
- + Firmware \geq 10.0.8
- + Configuration is done in the menu „Power Control“
 - + For active power the setting must be done via web frontend that setpoint command will be transmitted via Modbus
 - Setting in the menu „Power Control“ – „Active power“
 - Setpoint command method: Variable fixed value P_{var} , Modbus
 - + For reactive power the setting must be done via web frontend if $\cos \varphi$ or Q will be used for control
 - Setting in the menü „Power Control“ – „Reactive power“
 - Setpoint command method: Variable fixed value Q_{var} , Modbus or Variable fixed value $\cos \varphi_{var}$, Modbus
 - + For setting of reference voltage for parallel shift of the characteristic curve Q (V)
 - Setting in the menu „Power Control“ – „Reactive power“
 - Setpoint command method: Characteristic curve Q (V)
 - Menu “Option” for “Characteristic curve Q(V)”: Activate “Parallel shift” and “Transmissino type” Modbus

¹⁾ The licence is linked to a specific device. When ordering, please provide the 14-digit hardware serial number of the controller.

MODBUS SPECIFICATION

Communication parameter

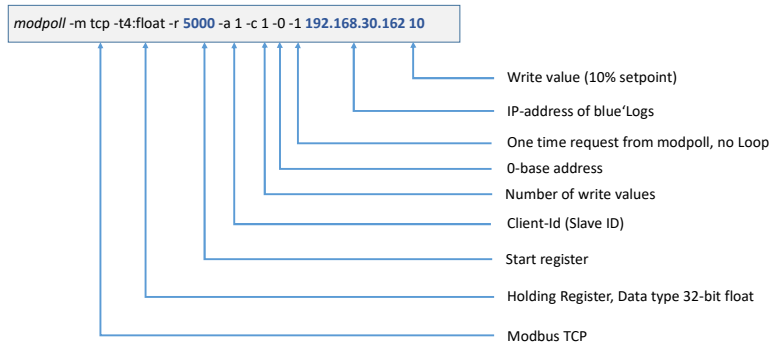
- + Slave-Adresse (Client ID): 1
- + Port: 502
- + Delay: 1.000 ms

General register definition

- + Data type: float 32
- + Missing value: 0x7FC00000
- + Function Code 03 - Read Holding Registers must be used to read the values.
- + Function Code 16 - Preset Multiple Registers must be used to write the values
- + Register- and Byteorder
 - The word order is low register before high register (Little Endian)
 - The byte order is high byte before low byte (Big Endian)
→ 0xCCDDAABB

Write of 10% setpoint command for active power

Following write command is built with the open source tool modpoll



WRITE VALUES

Address	Designation	Description	Unit	Read / Write	Value range
5000	PPC_P_SET_GRIDOP_REL	Relative active power setpoint (grid operator)	%	Read / Write	0.000 ... 100.000 %
5002	PPC_PF_SET	Power factor setpoint	-	Read / Write	-0.999 ... 1.000 ²⁾
5004	PPC_Q_SET_REL	Actual valid reactive power setpoint	%	Read / Write	-100.000 ... 100.000 % ³⁾
Don't write to register 5006 to 5009					
5010	PPC_P_SET_METHOD	Active power setpoint command method	-	Read / Write	1: Variable fixed value P_{var} fix 2: Variable fixed value P_{var} DI 3: Variable fixed value P_{var} AI 4: Variable fixed value P_{var} Modbus
5012	PPC_Q_SET_METHOD	Reactive power setpoint command method	-	Read / Write	1: Variable fixed value $\cos \varphi_{var}$ fix 2: Variable fixed value $\cos \varphi_{var}$ DI 3: Variable fixed value $\cos \varphi_{var}$ AI 4: Variable fixed value $\cos \varphi_{var}$ Modbus 5: Characteristic curve $\cos \varphi_{var}$ (P) 6: Characteristic curve $\cos \varphi_{var}$ (V) 7: Variable fixed value Q_{var} fix 8: Variable fixed value Q_{var} DI 9: Variable fixed value Q_{var} AI 10: Variable fixed value Q_{var} Modbus 11: Characteristic curve Q (P) 12: Characteristic curve Q (V) 13: Characteristic curve Q ($\tan \varphi$)
Don't write to register 5014 to 5015					
5016	PPC_V_REF_Q_V_SHIFT	Setting of reference voltage for parallel shift of the characteristic curve Q (V))	V	Read / Write	-16,800.00 ... 24,200.00 V

²⁾ Negative values = underexcited, positive values = overexcited (e.g. $\cos \varphi = -0.95 = 0.95$ underexcited, $\cos \varphi = 0.95 = 0.95$ overexcited).

³⁾ Negative values = underexcited, positive values = overexcited (e.g. $Q = -32.868 = 32.868$ underexcited, $Q = 32.868 = 32.868$ overexcited).

READ VALUES

Address	Designation	Description	Unit	Read / Write	Value range
50	PPC_P_SET_GRIDOP_REL	Relative active power setpoint (grid operator)	%	Read	0.000 ... 100.000 %
52	PPC_P_SET_ABS	Absolute active power setpoint (grid operator)	W	Read	-1,000,000,000.000 ... 1,000,000,000.000 W ⁴⁾
54	PPC_P_SET_RPC_REL	Relative active power setpoint (3rd party)	%	Read	0.000 ... 100.000 %
56	PPC_P_SET_REL	Actual valid active power setpoint	%	Read	0.000 ... 100.000 %
58	PPC_P_SET_MODUS	Actual active power mode for setpoint setting	-	Read	0: No configuration found 1: Variable fixed value P_{var} fix 2: Variable fixed value P_{var} DI 3: Variable fixed value P_{var} AI 4: Variable fixed value P_{var} Modbus 5: Remote Power Control (RPC) 6: Manual operation 7: Control intervention (fast stop) 8: Fail-safe operation (hold last setpoint) 9: Fail-safe operation (default setpoint) 10: Fail-safe operation (System fallback value)
60	PPC_PF_SET	Power factor setpoint	-	Read	-0.999 ... 1.000 ²⁾
62	PPC_Q_SET_REL	Actual valid reactive power setpoint	%	Read	-100.000 ... 100.000 % ³⁾
64	PPC_Q_SET_ABS	Absolute reactive power setpoint	var	Read	-1,000,000,000.000 ... 1,000,000,000.000 var ⁵⁾
66	PPC_Q_SET_MODUS	Actual reactive power mode for setpoint setting	-	Read	0: No configuration found 1: Variable fixed value $\cos \varphi_{var}$ fix 2: Variable fixed value $\cos \varphi_{var}$ DI 3: Variable fixed value $\cos \varphi_{var}$ AI 4: Variable fixed value $\cos \varphi_{var}$ Modbus 5: Characteristic curve $\cos \varphi$ (P) 6: Characteristic curve $\cos \varphi$ (V) 7: Variable fixed value Q_{var} fix 8: Variable fixed value Q_{var} DI 9: Variable fixed value Q_{var} AI 10: Variable fixed value Q_{var} Modbus 11: Characteristic curve Q (P) 12: Characteristic curve Q (V) 13: Characteristic curve Q ($\tan \varphi$) 14: Reactive power compensation 15: Manual operation 16: Fail-safe operation (hold last setpoint) 17: Fail-safe operation (default setpoint) 18: Fail-safe operation (System fallback value)
Don't read register 68 to 89					

⁴⁾ Negative values = import (demand), positive values = export (generation).

⁵⁾ Negative values = underexcited, positive values = overexcited (e.g. $Q = -1,000,000.000$ var = 1.0 Mvar underexcited).

Address	Designation	Description	Unit	Read / Write	Value range
90	PPC_P_AC	Actual active power	W	Read	Value from power analyzer ⁴⁾
92	PPC_PF	Actual power factor $\cos \varphi$	-	Read	Value from power analyzer ²⁾
94	PPC_Q_AC	Actual reactive power	var	Read	Value from power analyzer ⁵⁾
96	PPC_S_AC	Actual apparent power	VA	Read	Value from power analyzer
98	PPC_F_AC	Actual grid frequency	Hz	Read	Value from power analyzer
100	PPC_V_PHASE_AB	Actual phase voltage $V_{PhA-PhB}$	V	Read	Value from power analyzer
102	PPC_V_PHASE_BC	Actual phase voltage $V_{PhB-PhC}$	V	Read	Value from power analyzer
104	PPC_V_PHASE_CA	Actual phase voltage $V_{PhC-PhA}$	V	Read	Value from power analyzer
106	PPC_I_PHASE_A	Actual current I_{PhA}	A	Read	Value from power analyzer
108	PPC_I_PHASE_B	Actual current I_{PhB}	A	Read	Value from power analyzer
110	PPC_I_PHASE_C	Actual current I_{PhC}	A	Read	Value from power analyzer