



neptronic®

SKRO

Reverse Osmosis Water Treatment Unit

Modbus Communication Module User Guide



Intertek

4011008



Introduction

The SKRO Modbus Communication Module User Guide provides information for using Neptronic® communication feature. The controller uses Modbus communication protocol over serial line in the RTU mode and provides a Modbus network interface between client devices and Neptronic SKRO devices.

The SKRO Modbus Guide assumes that you are familiar with Modbus terminology.

The following are the requirements for Modbus:

- **Data Model.** The SKRO Modbus server data model uses only the Modbus Registers table.
- **Register Address:**
 - As per Protocol Address (base 0); for PLC add 1 to protocol base.
 - As per Convention Notation (base 400001).



Note: Ensure that the Modbus communication software used does not have a limit on the range of the register addresses that can be viewed and supports 6-digit holding registers.

- **Function Codes.** The SKRO Modbus server supports a limited function codes subset comprising:
 - Read Holding Registers (0x03)
 - Write Single Register (0x06)
 - Write Multiple Registers (0x10)
- **Exception Responses.** The SKRO Modbus server supports the following exception codes:
 - Illegal data address
 - Illegal data value
 - Slave device busy
- **Serial Line.** The SKRO Modbus over serial line uses RTU transmission mode over a two-wire configuration RS485 (EIA/TIA-485 standard) physical layer.
 - The physical layer can use fixed baud rate selection or automatic baud rate detection (default) as per the **Modbus Auto Baud Rate** device menu item or holding register index 1.
 - The supported baud rates are 9600, 19200, 38400, and 57600.
 - The physical layer also supports variable parity control and stop bit configuration as per the **Modbus Comport Config** device menu item or holding register index 2.
 - In auto baud rate configuration, if the device detects only consecutive bad frames (2 or more) for one second with any given baud rate, it will reinitialize itself to the next baud rate.
- **Addressing.** The SKRO device only answers at the following address:
 - The device's unique address (1 to 246) that can be set through the device menu or through holding register index 0.

Modbus Registers

Table Glossary

Name	Description	Name	Description
W	Writable Register	ASCII	For registers containing ASCII (8-bit) characters
RO	Read Only Register	MSB	Most Significant Byte
Unsigned	For range of values from 0 to 65,535, unless otherwise specified	LSB	Least Significant Byte
Signed	For range of values from -32,768 to 32,767, unless otherwise specified	MSW	Most Significant Word
Bit String	For registers with multiple values using bit mask (example, flags)	LSW	Least Significant Word

Modbus Registers Table

Protocol Address	Convention Notation	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
0	400001	Modbus Address and Product Type	Unsigned	MSB = Product type, not writable LSB = Modbus Address (1 to 247), writable	W	
1	400002	Device Baud Rate	Unsigned <i>Scale 100</i>	0, 9600, 19200, 38400, and 57600, 0 = Auto Baud <i>Rate Detection Value/100 (e.g. 38400 baud = 384)</i>	W	19200
2	400003	Modbus Slave Communication Port Configuration	Unsigned	0 = No parity, 2 Stop bits 1 = Even parity, 1 Stop bit 2 = Odd parity, 1 Stop bit	W	No parity, 2 Stops bits
3	400004	Product Name (characters 8 & 7)	ASCII	MSB = char 6, LSB = char 7	W	
4	400005	Product Name (characters 6 & 5)	ASCII	MSB = char 4, LSB = char 5	W	
5	400006	Product Name (characters 4 & 3)	ASCII	MSB = char 2, LSB = char 3	W	
6	400007	Product Name (characters 2 & 1)	ASCII	MSB = char 0, LSB = char 1	W	



Protocol Address	Convention Notation	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
7	400008	Product Actual Firmware Version (in Integer x100)	Unsigned Scale 100	1 to 65535 (e.g. 100)	RO	
8	400009	Product Actual EEPROM Version (in Integer x100)	Unsigned Scale 100	1 to 65535 (e.g. 100)	RO	
2000	402001	Inlet Signal	Unsigned Scale 1000	Units: Volt (V), Range: 0V to 10V Value x 1000 (e.g. 2V = 2000)	RO	0V
2001	402002	Permeate Signal	Unsigned Scale 1000	Units: Volt (V), Range: 0V to 10V Value x 1000 (e.g. 2V = 2000)	RO	0V
2002	402003	Concentrate Signal	Unsigned Scale 1000	Units: Volt (V), Range: 0V to 10V Value x 1000 (e.g. 2V = 2000)	RO	0V
2003	402004	Permeate Pulse	Unsigned Scale 1	Unit: No Units, Range: 0 to 300 Value x 1 (e.g. 20 = 20)	W	0
2004	402005	Concentrate Pulse	Unsigned Scale 1	Unit: No Units, Range: 0 to 300 Value x 1 (e.g. 20 = 20)	W	0
4000 to 4003	404001 to 404004	Reserved				
6000	406001	Inlet Pressure	Unsigned Scale 1	Unit: psi, Range: 0 to 10,000 psi Value x 1 (e.g. 2000psi = 2000)	RO	0 psi
6001	406002	Permeate Pressure	Unsigned Scale 1	Unit: psi, Range: 0 to 10,000 psi Value x 1 (e.g. 2000psi = 2000)	RO	0 psi
6002	406003	Concentrate Pressure	Unsigned Scale 1	Unit: psi, Range: 0 to 10,000 psi Value x 1 (e.g. 2000psi = 2000)	RO	0 psi
6003	406004	TDS Sensor	Unsigned Scale 1	Unit: PPM, Range: 0 to 1000 PPM Value x 1 (e.g. 2PPM = 2)	RO	1 PPM
6004 to 6015	406005 to 406016	Reserved				



Protocol Address	Convention Notation	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6016	406017	Modbus TCP IP Keep Alive Time Out_0	Unsigned Scale 1	Unit: Minutes (min), Range: 1 to 1440 min Value x 1 (e.g. 1min = 1)	W	5 min
6017	406018	Modbus TCP IP Keep Alive Time Out_1	Unsigned Scale 1	Unit: Minutes (min), Range: 1 to 1440 min Value x 1 (e.g. 1min = 1)	W	5 min
6018 to 6029	406019 to 406030	Reserved				
6030	406031	Network Timeout Delay_0	Unsigned Scale 1	Unit: Seconds (sec), Range: 30 to 600 sec Value x 60 (e.g. 60sec = 60)	W	60 sec
6031	406032	Network Timeout Delay_1	Unsigned Scale 1	Unit: Seconds (sec), Range: 30 to 600 sec Value x 60 (e.g. 60sec = 60)	W	60 sec
6032 to 6264	406033 to 406265	Reserved				
6265	406266	Run Time_0	Unsigned Scale 100	Unit: Hours (h), Range: 0 to 21474836.47 h Value x 100 (e.g. 1h = 100)	RO	0h
6266	406267	Run Time_1	Unsigned Scale 100	Unit: Hours (h), Range: 0 to 21474836.47 h Value x 100 (e.g. 1h = 100)	RO	0h
6267	406268	On Time_0	Unsigned Scale 100	Unit: Hours (h), Range: 0 to 21474836.47 h Value x 100 (e.g. 1h = 100)	RO	0h
6268	406269	On Time_1	Unsigned Scale 100	Unit: Hours (h), Range: 0 to 21474836.47 h Value x 100 (e.g. 1h = 100)	RO	0h
6269	406270	Regulator Pressure	Unsigned Scale 1	Unit: psi, Range: 100 to 275 psi Value x 100 (e.g. 1psi = 100)	W	150 psi
6270	406271	Pump On Fast Flush Delay	Unsigned Scale 1	Unit: Seconds (sec), Range: 15 to 120 sec Value x 10 (e.g. 10sec = 100)	W	60 sec
6271	406272	Idle Drain Time	Unsigned Scale 1	Unit: Hours (h), Range: 0 to 24 h Value x 11 (e.g. 8h = 8)	W	8h



Protocol Address	Convention Notation	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
6272	406273	Damaged Membrane Delay	Unsigned Scale 1	Unit: Seconds (sec), Range: 6 to 200 sec Value x 1 (e.g. 60sec = 60)	W	60 sec
6273	406274	Permeate Flow	Unsigned Scale 1	Unit: l/min, Range: 0 to 50 l/min Value x 1 (e.g. 10l/min = 10)	W	0 l/min
6274	406275	Concentrate Flow	Unsigned Scale 1	Unit: l/min, Range: 0 to 50 l/min Value x 1 (e.g. 10l/min = 10)	W	0 l/min
11000	411001	Motor	Unsigned	0 = Off 1 = On	RO	Off
11001	411002	Inlet Valve	Unsigned	0 = Closed 1 = Open	RO	Closed
11002	411003	Fast Flush Valve	Unsigned	0 = Closed 1 = Open	RO	Closed
11003	411004	Alarm	Unsigned	0 = Off 1 = On	RO	Off
11004	411005	Work Signal	Unsigned	0 = Off 1 = On	RO	Off
11005	411006	Alarm LED	Unsigned	0 = Off 1 = On	RO	Off
11006	411007	Power LED	Unsigned	0 = Off 1 = On	RO	Off
12000 to 12002	412001 to 412003	Reserved				
12003	412004	High Level Float	Unsigned	0 = Off 1 = On	RO	Off
12004	412005	Low Level Float	Unsigned	0 = Off 1 = On	RO	Off
12005	412006	Alarm Level Float	Unsigned	0 = Off 1 = On	RO	Off

Protocol Address	Convention Notation	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
12006	412007	Interlock	Unsigned	0 = Open 1 = Closed	W	Open
12007 to 12020	412008 to 412021	<i>Reserved</i>				
12021	412022	AI8 Polarity	Unsigned	0 = Direct 1 = Reverse	W	Direct
12022	412023	Notify Alarm	Unsigned	0 = Off 1 = On	W	Off
12023	412024	Notify Warning	Unsigned	0 = Off 1 = On	W	Off
12024	412025	Notify App Msg	Unsigned	0 = Off 1 = On	W	Off
12025	412026	Network Timeout Failsafe	Unsigned	0 = OK 1 = Timeout	W	OK
12026	412027	Modbus Network Timeout	Unsigned	0 = Off 1 = On	W	Off
12027 to 12062	412028 to 412063	<i>Reserved</i>				
12063	412064	Memory Status	Unsigned	0 = Ok 1 = Fail	RO	Ok
12064	412065	Inlet Low Pressure Warning	Unsigned	0 = Off 1 = On	RO	Off
12065	412066	Fast Flush Blocked Warning	Unsigned	0 = Off 1 = On	RO	Off
12066	412067	Inlet Valve Open Warning	Unsigned	0 = Off 1 = On	RO	Off

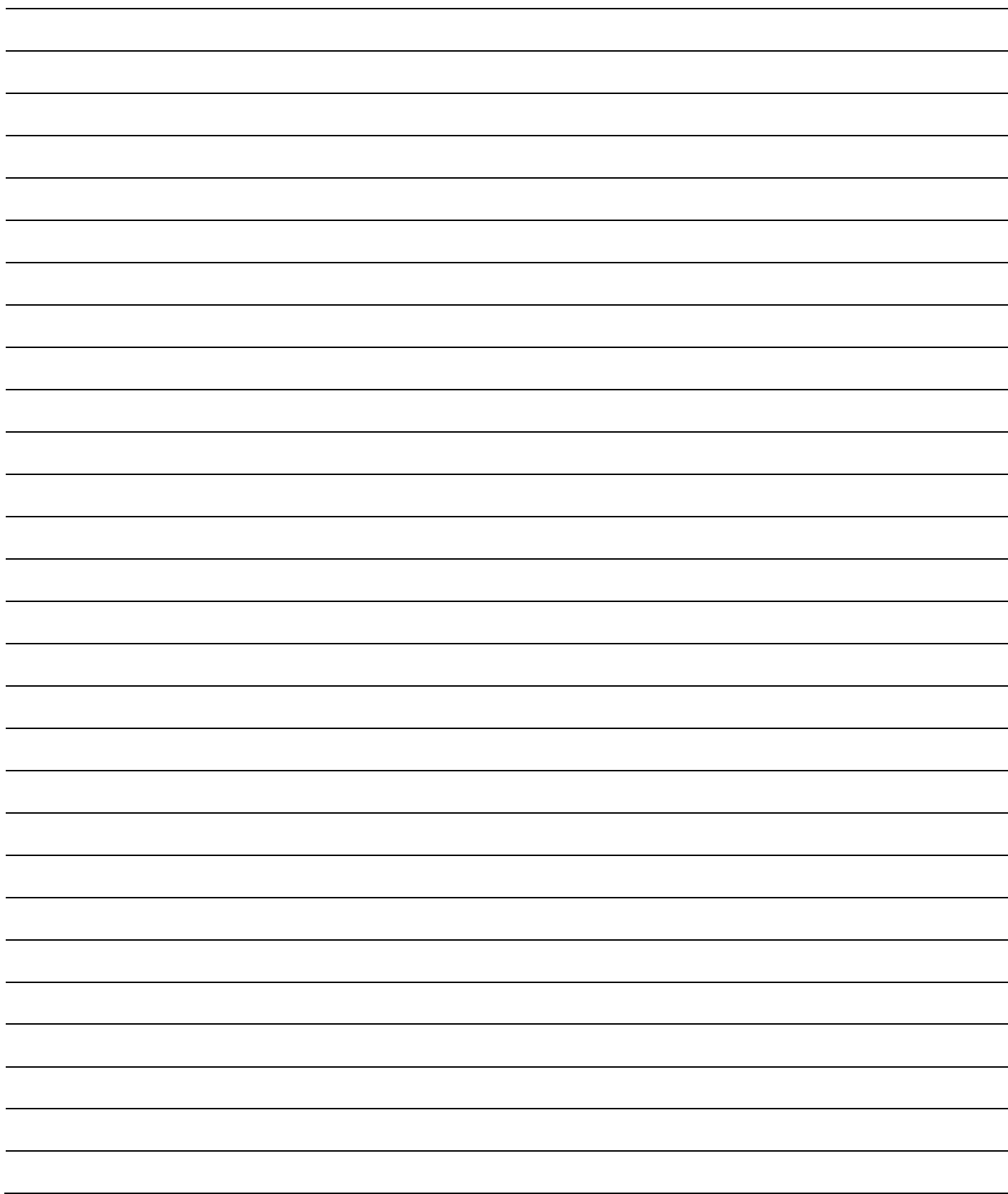


Protocol Address	Convention Notation	Description	Data Type	Units, Limits, State Texts	Writable	Default Value
12067	412068	Insufficient Osmosis Warning	Unsigned	0 = Off 1 = On	RO	Off
12068	412069	Clogged Membrane Service Warning	Unsigned	0 = Off 1 = On	RO	Off
12069	412070	TDS Sensor Fail Warning	Unsigned	0 = Off 1 = On	RO	Off
12070	412071	Over Usage Warning	Unsigned	0 = Off 1 = On	RO	Off
12071	412072	RO Tank Profile	Unsigned	0 = Atmospheric 1 = Pressurized	W	Pressurized
15000	415001	System Power State	Unsigned	0 = Off 1 = On	W	Off
15001	415002	SystemLogVerboseLevel	Unsigned	0 = None 1 = Emergency 2 = Alert 3 = Critical 4 = Error 5 = Warning 6 = Notice 7 = Info 8 = Debug	W	Debug
15002	415003	Modbus Server Units	Unsigned	0 = Metric 1 = Imperial	W	Metric
15003 to 15058	415004 to 415059	<i>Reserved</i>				
15059	415060	Update Process Status	Unsigned	0 = Ok 1 = CRC 2 = Device 3 = Failed	RO	Ok
15060	415061	Request	Unsigned	0 = None 1 = ResetAlarms 2 = FastFlush 3 = ResetService	W	None
15061	415062	State	Unsigned	0 = Off 1 = Idle 2 = Purifying 3 = FastFlush 4 = Alarm	RO	Off



Protocol Address	Convention Notation	Description	Data Type	Units, Limits, State Texts		Writable	Default Value
15062	415063	System Alarm	Unsigned	0 = Normal 1 = InHiPress 2 = DmgMembrane 3 = BlocMembrane 4 = ConcOpen 5 = LoPumpPress 6 = InletClog	7 = PressReg 8 = NoPureWater 9 = TankClosed 10 = FloatOff 11 = InletSensor 12 = PermeatSensor 13 = ConcentSensor	RO	Normal
16000	416001	Database Version_0	ASCII	-	-	RO	-
16001	416002	Database Version_1	ASCII	-	-	RO	-
16002	416003	Database Version_2	ASCII	-	-	RO	-
16003	416004	Database Version_3	ASCII	-	-	RO	-
16004	416005	Database Version_4	ASCII	-	-	RO	-
16005	416006	Database Version_5	ASCII	-	-	RO	-
16006	416007	Database Version_6	ASCII	-	-	RO	-
16007	416008	Database Version_7	ASCII	-	-	RO	-
16008	416009	Database Version_8	ASCII	-	-	RO	-
16009	416010	Database Version_9	ASCII	-	-	RO	-
16010	416011	Database Version_10	ASCII	-	-	RO	-
16011	416012	Database Version_11	ASCII	-	-	RO	-
16012	416013	Database Version_12	ASCII	-	-	RO	-
16013	416014	Database Version_13	ASCII	-	-	RO	-
16014	416015	Database Version_14	ASCII	-	-	RO	-
16015	416016	Database Version_15	ASCII	-	-	RO	-

Notes





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