

General

This document is to provide details for using the Modbus RS485 RTU version of KryoControl 810. The AQUA unit can be controlled and monitored by a Modbus master if the optional Modbus module (XN03) is factory fitted with the KryoControl 810.

The Modbus master can Read & Write: Heat recovery and Cooling signal (details see next page).
 The Modbus master can Read: Alarm and running status (by de-coding of a value, details please see next page) and two temperature values (BT2, BT4).

Important notes!

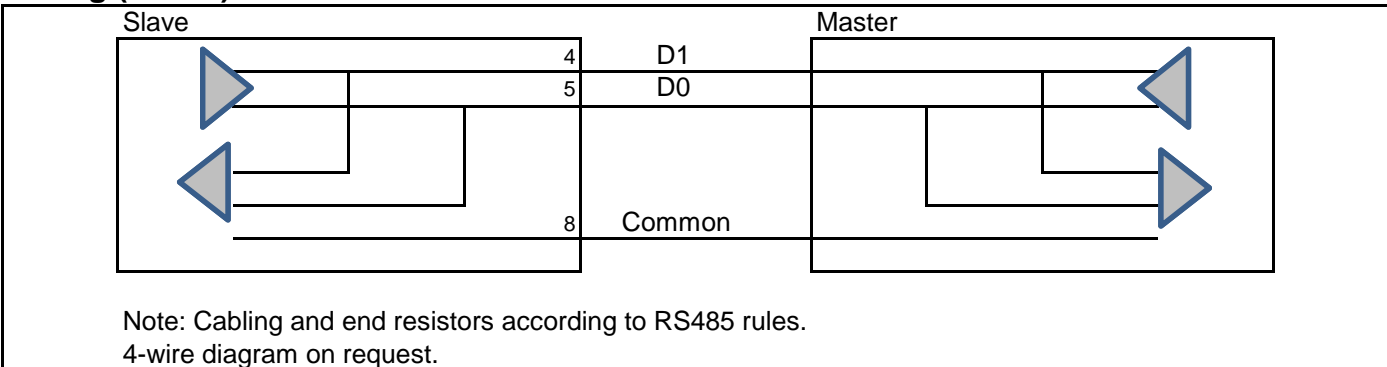
The fan interlock ("Förregling över fläkt") has to be a physical closing switch even if control by Modbus master is used since no input for that function is included.

If controlling the AQUA by using the Modbus inputs for "Heat Recovery" and "Cooling" it is recommended that the physical inputs (0-10V) for "Heat Recovery" and "Cooling" are connected to signal earth (24V DC minus) since the resulting control signal for the AQUA is the sum of the 0-10V signal and the Modbus signal.

RJ45 socket and LED's

<p>LED1 ("COM") OFF No network comm Flash Yellow Reception Flash green Transmission</p> <p>LED2 ("PWR") OFF No power Green Power and program Flash red Power but no program Red Internal Fault (bit T = 1 on staus)</p> <p>Note: Transmission has priority over reception.</p>	<p>KryoControl 810 with Modbus module XN03.</p>	<p>RJ45 socket</p>	<table border="1"> <thead> <tr> <th>2-Wire</th> <th>4-wire</th> </tr> </thead> <tbody> <tr><td>1 - NC</td><td>RXD0</td></tr> <tr><td>2 - NC</td><td>RXD1</td></tr> <tr><td>3 - NC</td><td>NC</td></tr> <tr><td>4 - D1</td><td>TXD1</td></tr> <tr><td>5 - D0</td><td>TXD0</td></tr> <tr><td>6 - NC</td><td>NC</td></tr> <tr><td>7 - NC</td><td>NC</td></tr> <tr><td>8 - Common</td><td>Common</td></tr> </tbody> </table> <p>RS485 network connection (shielded female connector RJ45)</p>	2-Wire	4-wire	1 - NC	RXD0	2 - NC	RXD1	3 - NC	NC	4 - D1	TXD1	5 - D0	TXD0	6 - NC	NC	7 - NC	NC	8 - Common	Common
2-Wire	4-wire																				
1 - NC	RXD0																				
2 - NC	RXD1																				
3 - NC	NC																				
4 - D1	TXD1																				
5 - D0	TXD0																				
6 - NC	NC																				
7 - NC	NC																				
8 - Common	Common																				

Wiring (2-wire)



Addressing etc

Wiring	Frame format	Network Address	Transmission Rate baud	Parity
2-wire only	RTU	1-247	1200-9600, 19200, 28800, 38400, 57600	None, Even, Odd
Default setting:		1	19200	Even

Frame Modbus RTU

Adress	Function	Data	CRC
1byte	1 byte	0 to 252 bytes	2 bytes. CRC low / CRC Hi

Register map

Modbus Type	Reference	Description
Holding Register	4xxxx	Read write Holding registers, 16bit

Function Codes

Function Code	Function	Description
03	Read Holding Register (R)	Read single Holding register, Nx16bit (Word)
06	Write Holding Register (W)	Write single Holding register, 16bit (Word)

Holding Register

Adress	Description	Values	Note																																		
4x0017	Heat recovery signal	0-100(%)	Integer type, Read & Write Control signal for heat recovery from controller to AQUA.																																		
4x0018	Cooling signal	0-100(%)	Integer type, Read & Write Control signal for cooling from controller to AQUA.																																		
4x0021	Running modes etc <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">Value</th> <th style="text-align: left;">Bit</th> </tr> </thead> <tbody> <tr><td>1 = KM1 On</td><td>0</td></tr> <tr><td>2 = KM2 On</td><td>1</td></tr> <tr><td>4 = KM3 On</td><td>2</td></tr> <tr><td>8 = KM4 On</td><td>3</td></tr> <tr><td>16 = KM5 On</td><td>4</td></tr> <tr><td>32 = P2 On</td><td>5</td></tr> <tr><td>64 = P3 On</td><td>6</td></tr> <tr><td>128 = Starting</td><td>7</td></tr> <tr><td>256 = Cooling</td><td>8</td></tr> <tr><td>512 = Heat exchanging</td><td>9</td></tr> <tr><td>1024 = Heat Pump</td><td>10</td></tr> <tr><td>2048 = Neutral</td><td>11</td></tr> <tr><td>4096 = Night operation</td><td>12</td></tr> <tr><td>8192 = Defrosting</td><td>13</td></tr> <tr><td>16384 = Stop due to -10C</td><td>14</td></tr> <tr><td>Not used</td><td>15</td></tr> </tbody> </table>	Value	Bit	1 = KM1 On	0	2 = KM2 On	1	4 = KM3 On	2	8 = KM4 On	3	16 = KM5 On	4	32 = P2 On	5	64 = P3 On	6	128 = Starting	7	256 = Cooling	8	512 = Heat exchanging	9	1024 = Heat Pump	10	2048 = Neutral	11	4096 = Night operation	12	8192 = Defrosting	13	16384 = Stop due to -10C	14	Not used	15	0-32768	Integer type, Read only Value from slave contains the sum of all "active" values (se examples below). Examples: Value = 4 --> KM3 On Value = 516 --> KM3 On & Heatexchanging (4 + 512) Value = 517 --> KM1 On & KM3 On & Heatexchanging (1 + 4 + 512) Tip: Use a DEC/BIN decoder to convert value into Bit 0 to 14 "0" or "1"
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4x0022	Alarms etc <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">Value</th> <th style="text-align: left;">Bit</th> </tr> </thead> <tbody> <tr><td>1 = KM1 Alarm</td><td>0</td></tr> <tr><td>2 = KM2 Alarm</td><td>1</td></tr> <tr><td>4 = KM3 Alarm</td><td>2</td></tr> <tr><td>8 = KM4 Alarm</td><td>3</td></tr> <tr><td>16 = KM5 Alarm</td><td>4</td></tr> <tr><td>32 = P2 Alarm</td><td>5</td></tr> <tr><td>64 = P3 Alarm</td><td>6</td></tr> <tr><td>128 = EXP Alarm</td><td>7</td></tr> <tr><td>256 = Total alarm</td><td>8</td></tr> <tr><td>512 = Fan Stop</td><td>9</td></tr> <tr><td>1024 = (Heatexch. delay)</td><td>10</td></tr> <tr><td>2048 = Hand operation</td><td>11</td></tr> <tr><td>4096 = Capacity Control</td><td>12</td></tr> <tr><td>8192 = Extra Alarm</td><td>13</td></tr> <tr><td>16384 = KM start delayed</td><td>14</td></tr> <tr><td>Not used</td><td>15</td></tr> </tbody> </table>	Value	Bit	1 = KM1 Alarm	0	2 = KM2 Alarm	1	4 = KM3 Alarm	2	8 = KM4 Alarm	3	16 = KM5 Alarm	4	32 = P2 Alarm	5	64 = P3 Alarm	6	128 = EXP Alarm	7	256 = Total alarm	8	512 = Fan Stop	9	1024 = (Heatexch. delay)	10	2048 = Hand operation	11	4096 = Capacity Control	12	8192 = Extra Alarm	13	16384 = KM start delayed	14	Not used	15	Pos 0-32768	Integer type, Read only Value from slave contains the sum of all "active" values (se examples below). Examples: Value = 4 --> KM3 Alarm Value = 4608 --> Fan Stop & Capacity control (512 + 4096) Value = 296 --> KM4 Alarm & P2 Alarm & Total Alarm (4 + 32 + 256) Tip: Use a DEC/BIN decoder to convert value into Bit 0 to 14 "0" or "1"
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4x0023	BT2 sensor (Return temp. exhaust air coil)	-50 to 50	Integer type, Read only °C																																		
4x0024	BT4 sensor (Return temp. supply air coil)	-50 to 50	Integer type, Read only °C																																		