

# **Uponor Smatrix Move PRO Controller** X-159 Modbus RTU interface

PRODUCT INFORMATION



The controller can be connected and integrated to a building management system (BMS) through a Modbus-RTU interface over RS-232.

#### **Connector pins**

The illustration below shows the pinout of the RJ45 connector on the controller.



Pin:

- 1. Data transmission (Tx) to system master
- 2. Ground
- 3. Data reception (Rx) from system master
- 4. Ground
- 5. Ground
- 6. +5 V DC output
- 7. Ground
- 8. Ground

#### **RS-232 settings**

Configure the RS-232 interface as follows:

- Bitrate: 19200 bps
- Data bits: 8
- Stop bits: 1
- Parity bit: No
- Flow control: No

#### Connecting the BMS cable

The illustration below shows how to connect a BMS to the Modbus RTU interface on the controller.





#### WARNING!

Electrical installation and service behind secured 230 V AC covers must be carried out under the supervision of a qualified electrician.

To connect a BMS to the controller:

- 1. Ensure that the power is disconnected from the controller.
- 2. Study the wiring diagrams of the controller to locate the connector position.
- 3. Connect the BMS cable to the Move PRO controller using a RJ-45 contact.

See separate documentation for more information about BMS integration.

#### Supported Modbus-RTU functions

The Move PRO controller supports the following functions for Modbus-RTU communication.

Description	Function code (hex)
Read Holding Registers	03
Write Single Register	06
Write Multiple Registers	10

- Analogue variables are coded with 32 bits mapped into 2 holding registers (read only variables also).
- Binary variables are coded with 16 bits mapped into 1 holding register (read only variables also).

The most significant byte is sent first.

01 (hex) is always used by the Move PRO controller always as the slave device address.

#### FRAME FORMAT: READ HOLDING REGISTERS

Request (Analogue/binary variables)					
Slave Address (01h)	Function code (03h)	Starting register address	Amount of registers (0002h/0001h)	CRC	
1 byte	1 byte	2 bytes	2 bytes	2 bytes	

Response (Analogue/binary variables)					
Slave Address (01h)	Function code (03h)	Byte count (04h/ 02h)	Read value (MSB first)	CRC	
1 byte	1 byte	1 byte	4 bytes	2 bytes	

Response in case of error			
Slave Address (01h)	Error code (83h)	Exception code	CRC
1 byte	1 byte	1 byte	2 bytes

#### FRAME FORMAT: WRITE SINGLE REGISTER

 
 Request

 Slave Address (01h)
 Function code (06h)
 Register address
 Register value
 CRC

 1 byte
 1 byte
 2 bytes
 2 bytes
 2 bytes

Response				
Slave Address (01h)	Function code (06h)	Register address	Register value	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Response in case of error				
Slave Address (01h)	Error code (86h)	Exception code	CRC	
1 byte	1 byte	1 byte	2 bytes	

#### FRAME FORMAT: WRITE MULTIPLE Registers

Request						
Slave Address (01h)	Function code (10h)	Starting register address	Amount of registers (N)	Byte count (2N)	Register value	CRC
1 byte	1 byte	2 bytes	2 bytes	1 byte	2N bytes	2 bytes

Request example (write to 1 Move PRO analogue variable)						
01h	10h	Variable address	0002h	04h	Value (MSB first)	CRC
1 byte	1 byte	2 bytes	2 bytes	1 byte	4 bytes	2 bytes

Response				
Slave Address (01h)	Function code (10h)	Starting register address	Amount of registers	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Response example (write to 1 Move PRO analogue variable)					
01h	10h	Variable address	0002h	CRC	
1 byte	1 byte	2 bytes	2 bytes	2 bytes	

Response in case of error				
	Slave Address (01h)	Error code (90h)	Exception code	CRC
	1 byte	1 byte	1 byte	2 bytes

### Heating Application - Available variables

These variables are available when communicating with the Move PRO controller (with the heating application installed).

Display name – General	Register address (decimal)	Туре	Analogue/ Binary	Coding
Outdoor Temperature	1578	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Display name – Zone 1	Register address (decimal)	Туре	Analogue/ Binary	Coding
Supply temp.	1387	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Calculated supply temp.	318	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Heating curve > setting	1330	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0.1 – 1.6
Heating curve > offset	1338	Read/Write	Analogue	32 bit, Signed Integer. Range: -8 – +8
Max supply temp.	400	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 70
Min supply temp.	398	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 35
Mixing valve	242	Read	Analogue	32 bit, Signed Integer. Range: 0 – 100
Pump	254	Read	Binary	16 bit, Unsigned Integer (binary variable coded into 16 bit unsigned integer)
Indoor temperature	1362	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
ECO-Comf. status	13620	Read	Binary	16 bit, Unsigned Integer, ECO = 0; Comfort =1
Indoor setpoint	432	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 5 – 35
ECO setback	430	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0 – 10

Display name – Zone 2	Register address (decimal)	Туре	Analogue/ Binary	Coding
Supply temp.	1389	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Calculated supply temp.	452	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Heating curve > setting	1332	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0.1 – 1.6
Heating curve > offset	1340	Read/Write	Analogue	32 bit, Signed Integer. Range: -8 – +8
Max supply temp.	694	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 70
Min supply temp.	692	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 35
Mixing valve	244	Read	Analogue	32 bit, Signed Integer. Range: 0 – 100
Pump	256	Read	Binary	16 bit, Unsigned Integer (binary variable coded into 16 bit unsigned integer)
Indoor temperature	1646	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
ECO-Comf. status	13982	Read	Binary	16 bit, Unsigned Integer, ECO = 0; Comfort =1
Indoor setpoint	495	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 5 – 35
ECO setback	497	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0 – 10
DHW - Circ return temp.	1233	Read	Analogue	32 bit, Signed Integer

Display name – Zone 3	Register address (decimal)	Туре	Analogue/ Binary	Coding
Supply temp.	1393	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Calculated supply temp.	326	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Meltaway - Calculated supply temp.	1211	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Heating curve > setting	1334	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0.1 – 1.6
Heating curve > offset	1342	Read/Write	Analogue	32 bit, Signed Integer. Range: -8 – +8
Max supply temp.	512	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 70
Min supply temp.	510	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 35
Mixing valve	246	Read	Analogue	32 bit, Signed Integer. Range: 0 – 100
Pump	258	Read	Binary	16 bit, Unsigned Integer (binary variable coded into 16 bit unsigned integer)
Indoor temperature	1417	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
ECO-Comf. status	14344	Read	Binary	16 bit, Unsigned Integer, ECO = 0; Comfort =1
Indoor setpoint	499	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 5 – 35
ECO setback	501	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0 – 10
Meltaway - Return temp	384	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Meltaway - Ground temp	1419	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Meltaway - Ground moisture	771	Read	Binary	16 bit, Unsigned Integer, No = 0; Yes =1
Meltaway – Primary return temp	1401	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Meltaway - Status	618	Read	Analogue	32 bit, Signed, Stop = 0; Idle =1; Melting = 2; Protection = 3

Display name – Zone 4	Register address (decimal)	Туре	Analogue/ Binary	Coding
Supply temp.	1423	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Calculated supply temp.	481	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Meltaway - Calculated supply temp.	1213	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Heating curve > setting	1336	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0.1 – 1.6
Heating curve > offset	1344	Read/Write	Analogue	32 bit, Signed Integer. Range: -8 – +8
Max supply temp.	1196	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 70
Min supply temp.	1194	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 35
Mixing valve	248	Read	Analogue	32 bit, Signed Integer. Range: 0 – 100
Pump	260	Read	Binary	16 bit, Unsigned Integer (binary variable coded into 16 bit unsigned integer)
Indoor temperature	1638	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
ECO-Comf. status	14706	Read	Binary	16 bit, Unsigned Integer, ECO = 0; Comfort =1
Indoor setpoint	600	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 5 – 35
ECO setback	602	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0 – 10
Meltaway - Return temp	388	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Meltaway - Ground temp	1640	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Meltaway - Ground Moisture	224	Read	Binary	16 bit, Unsigned Integer, No = 0; Yes =1
Meltaway – Primary return temp	1411	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Meltaway - Status	641	Read	Analogue	32 bit, Signed, Stop = 0; Idle =1; Melting = 2; Protection = 3

## Heating/Cooling Application - Available variables

These variables are available when communicating with the Move PRO controller (with the heating/cooling application installed).

Display name – General	Register address (decimal)	Туре	Analogue/ Binary	Coding
Outdoor Temperature	1757	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Display name – Zone 1	Register address	Туре	Analogue/	Coding

	(decimal)		Binary	
Supply temp.	1413	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Heating - Calculated supply temp.	318	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Cooling - Calculated supply temp.	473	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Heating curve > setting	1330	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0.1 – 1.6
Heating curve > offset	1338	Read/Write	Analogue	32 bit, Signed Integer. Range: -8 – +8
Cooling curve > setting	1346	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0.1 – 1.6
Cooling curve > offset	1354	Read/Write	Analogue	32 bit, Signed Integer. Range: -8 – +8
Heating - Max supply temp.	400	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 70
Heating - Min supply temp.	398	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 35
Cooling - Max supply temp.	595	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 70
Cooling - Min supply temp.	593	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 35
Mixing valve	668	Read	Analogue	32 bit, Signed Integer. Range: 0 – 100
Pump	389	Read	Binary	16 bit, Unsigned Integer (binary variable coded into 16 bit unsigned integer)
Indoor temperature	1362	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
ECO-Comf. status	13620	Read	Binary	16 bit, Unsigned Integer, ECO = 0; Comfort =1
Indoor setpoint	432	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 5 – 35
ECO setback	430	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0 – 10

Display name – Zone 2	Register address (decimal)	Туре	Analogue/ Binary	Coding
Supply temp.	1644	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Heating - Calculated supply temp.	452	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Cooling - Calculated supply temp.	1423	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Heating curve > setting	1332	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0.1 – 1.6
Heating curve > offset	1340	Read/Write	Analogue	32 bit, Signed Integer. Range: -8 – +8
Cooling curve > setting	1348	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0.1 – 1.6
Cooling curve > offset	1356	Read/Write	Analogue	32 bit, Signed Integer. Range: -8 – +8
Heating - Max supply temp.	694	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 70
Heating - Min supply temp.	692	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 35
Cooling - Max supply temp.	1546	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 70
Cooling - Min supply temp.	1544	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 35
Mixing valve	244	Read	Analogue	32 bit, Signed Integer. Range: 0 – 100
Pump	256	Read	Binary	16 bit, Unsigned Integer (binary variable coded into 16 bit unsigned integer)
Indoor temperature	1646	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
ECO-Comf. status	13982	Read	Binary	16 bit, Unsigned Integer, ECO = 0; Comfort =1
Indoor setpoint	495	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 5 – 35
ECO setback	497	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0 – 10
DHW - Circ return temp.	1379	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0 – 10

Display name – Zone 3	Register address (decimal)	Туре	Analogue/ Binary	Coding
Supply temp.	1415	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Heating - Calculated supply temp.	326	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Cooling - Calculated supply temp.	1450	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Meltaway - Calculated supply temp.	1211	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Heating curve > setting	1334	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0.1 – 1.6
Heating curve > offset	1342	Read/Write	Analogue	32 bit, Signed Integer. Range: -8 – +8
Cooling curve > setting	1350	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0.1 – 1.6
Cooling curve > offset	1358	Read/Write	Analogue	32 bit, Signed Integer. Range: -8 – +8
Heating - Max supply temp.	512	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 70
Heating - Min supply temp.	510	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 35
Cooling - Max supply temp.	1613	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 70
Cooling - Min supply temp.	1611	Read/Write	Analogue	32 bit, Signed Integer. Range: 5 – 35
Mixing valve	1190	Read	Analogue	32 bit, Signed Integer. Range: 0 – 100
Pump	1187	Read	Binary	16 bit, Unsigned Integer (binary variable coded into 16 bit unsigned integer)
Indoor temperature	1417	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
ECO-Comf. status	14344	Read	Binary	16 bit, Unsigned Integer, ECO = 0; Comfort =1
Indoor setpoint	499	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 5 – 35
ECO setback	501	Read/Write	Analogue	32 bit, Signed, 1 decimal (multiplied by 10). Range: 0 – 10
Meltaway - Return temp	384	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Meltaway - Ground temp	1419	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Meltaway - Ground moisture	771	Read	Binary	16 bit, Unsigned Integer, No = 0; Yes =1
Meltaway – Primary return temp	1411	Read	Analogue	32 bit, Signed, 1 decimal (multiplied by 10)
Meltaway - Status	618	Read	Analogue	32 bit, Signed, Stop = 0; Idle =1; Melting = 2; Protection = 3



Uponor reserves the right to make changes, without prior notification, to the specification of incorporated components in line with its policy of continuous improvement and development.