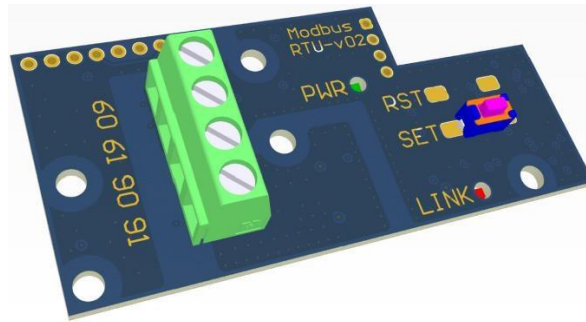




TECHNICAL DESCRIPTION USER MANUAL



MODBUS PROTOCOL FOR IFK AND IFX-MX-04



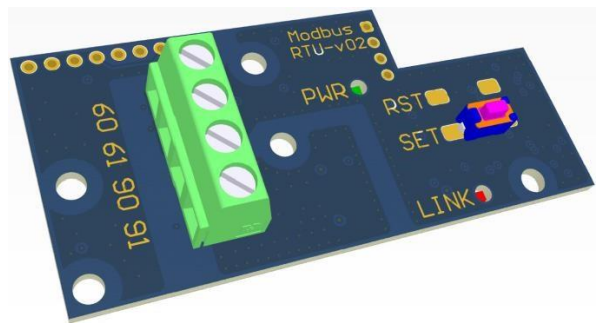
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Modbus RTU Module for IFK and IFX-Mx-04 heat meters.

Applications

The Modbus RTU module is destined to heat meters in order the heat meters to Modbus RTU network using EIA-485 channel



Features

- Galvanic isolation EIA-485 network interface used for easy and safe connection up to 256 devices in one network bus
- Modbus RTU Slave protocol is realized according to specifications by Modbus Organization

Power supply

Polarity independent connection for SELV power supply – connectors 60 and 61

Voltage	12-24 V DC
Maximum power consumption	2 W max.
Typical supply current	50 mA

Communication interface

Connectors	90 (noninverting, +) and 91 (noninverting, -)
Communication protocol	Modbus RTU
Baud rate (bits per second)	1200, 2400, 4800, 9600-default, 38400, 56000, 57600, 115200
Data format	8E1 (8 data bits, even parity bit, 1 stop bit) 8O1 (8 data bits, odd parity bit, 1 stop bit) 8N2 (8 data bits, none parity bit, 2 stop bits)

Status LED and Status Button functionality

Status LED is signaling every Modbus communication event. Status LED is blinking on during request and response sending.

Press the button, then power on the module and hold the button pushed longer than 15seconds to reset device to factory settings (set Modbus Slave ID to default value 1, the Update Rate parameter to default 10 minutes, the communication interface RS485 to defaults parameters – 9600 bps baud rate and 8E1 data format and the communication interface Mbus to defaults parameters – 2400 bps baud rate and 8E1 data format).

Modbus data register list for IFK heat meter

Designation	Modbus Register	Modbus Register Type	Modbus Address	Data Value Range	Unit	Read only (RO) Read/write (R/W)
Energy 1	30001 or 40001	Input or Holding	0	Int32	-	RO
Energy 1 (Unit factor)	30003 or 40003	Input or Holding	2	UInt16	-	RO
Energy 1 (Unit)	30004 or 40004	Input or Holding	3	4 char ASCII	-	RO
Energy 1 (Float)	30006 or 40006	Input or Holding	5	IEEE754	-	RO
Energy 2	30008 or 40008	Input or Holding	7	Int32	-	RO
Energy 2 (Unit factor)	30010 or 40010	Input or Holding	9	UInt16	-	RO
Energy 2 (Unit)	30011 or 40011	Input or Holding	10	4 char ASCII	-	RO
Energy 2 (Float)	30013 or 40013	Input or Holding	12	IEEE754	-	RO
Energy 3	30015 or 40015	Input or Holding	14	Int32	-	RO
Energy 3 (Unit factor)	30017 or 40017	Input or Holding	16	UInt16	-	RO
Energy 3 (Unit)	30018 or 40018	Input or Holding	17	4 char ASCII	-	RO
Energy 3 (Float)	30020 or 40020	Input or Holding	19	IEEE754	-	RO
Not used	30022 or 40022	Input or Holding	21	Int32	-	RO
Not used	30024 or 40024	Input or Holding	23	UInt16	-	RO
Not used	30025 or 40025	Input or Holding	24	4 char ASCII	-	RO
Not used	30027 or 40027	Input or Holding	26	IEEE754	-	RO
Volume 1	30029 or 40029	Input or Holding	28	Int32	-	RO
Volume 1 (Unit factor)	30031 or 40031	Input or Holding	30	UInt16	-	RO
Volume 1 (Unit)	30032 or 40032	Input or Holding	31	4 char ASCII	-	RO
Volume 1 (Float)	30034 or 40034	Input or Holding	33	IEEE754	-	RO
Volume 2	30036 or 40036	Input or Holding	35	Int32	-	RO
Volume 2 (Unit factor)	30038 or 40038	Input or Holding	37	UInt16	-	RO
Volume 2 (Unit)	30039 or 40039	Input or Holding	38	4 char ASCII	-	RO
Volume 2 (Float)	30041 or 40041	Input or Holding	40	IEEE754	-	RO
Volume 3	30043 or 40043	Input or Holding	42	Int32	-	RO
Volume 3 (Unit factor)	30045 or 40045	Input or Holding	44	UInt16	-	RO
Volume 3 (Unit)	30046 or 40046	Input or Holding	45	4 char ASCII	-	RO
Volume 3 (Float)	30048 or 40048	Input or Holding	47	IEEE754	-	RO
Power 1	30050 or 40050	Input or Holding	49	Int32	-	RO
Power 1 (Unit factor)	30052 or 40052	Input or Holding	51	UInt16	-	RO
Power 1 (Unit)	30053 or 40053	Input or Holding	52	4 char ASCII	-	RO
Power 1 (Float)	30055 or 40055	Input or Holding	54	IEEE754	kW	RO
Flow 1	30057 or 40057	Input or Holding	56	Int32	-	RO

Designation	Modbus Register	Modbus Register	Modbus	Data Value	Unit	Read only
Flow 1 (Unit factor)	30059 or 40059	Input or Holding	58	UInt16	-	RO
Flow 1 (Unit)	30060 or 40060	Input or Holding	59	4 char ASCII	-	RO
Flow 1 (Float)	30062 or 40062	Input or Holding	61	IEEE754	-	RO
Temperature 1 (Fixed)	30064 or 40064	Input or Holding	63	Int32	0.01°C	RO
Temperature 1 (Float)	30066 or 40066	Input or Holding	65	IEEE754	°C	RO
Temperature 2 (Fixed)	30068 or 40068	Input or Holding	67	Int32	0.01°C	RO
Temperature 2 (Float)	30070 or 40070	Input or Holding	69	IEEE754	°C	RO
Not used	30072 or 40072	Input or Holding	71	Int32	-	RO
Not used (Float)	30074 or 40074	Input or Holding	73	IEEE754	-	RO
Heat Meter Serial Number (Fixed)	30076 or 40076	Input or Holding	75	UInt32	-	RO
Meter Serial Number (ASCII)	30078 or 40078	Input or Holding	77	8 char ASCII	-	RO
Σ Error	30082 or 40082	Input or Holding	81	UInt32	-	RO

		Type	Address	Range		(RO) Read/write (R/W)
Data and time	30084 or 40084	Input or Holding	83	UInt32	-	RO
Battery operation time	30086 or 40086	Input or Holding	85	UInt32	-	RO
Working time without error 1	30088 or 40088	Input or Holding	87	UInt32	-	RO
Working time without error 2	30090 or 40090	Input or Holding	89	UInt32	-	RO
Volume 4	30092 or 40092	Input or Holding	91	Int32	-	RO
Volume 4 (Unit factor)	30094 or 40094	Input or Holding	93	UInt16	-	RO
Volume 4 (Unit)	30095 or 40095	Input or Holding	94	4 char ASCII	-	RO
Volume 4 (Float)	30097 or 40097	Input or Holding	96	IEEE754	-	RO
Volume 5 Energy	30099 or 40099	Input or Holding	98	Int32	-	RO
Volume 5 (Unit factor)	30101 or 40101	Input or Holding	100	UInt16	-	RO
Volume 5 (Unit)	30102 or 40102	Input or Holding	101	4 char ASCII	-	RO
Volume 5 (Float)	30104 or 40104	Input or Holding	103	IEEE754	-	RO
-Volume 2	30106 or 40106	Input or Holding	105	Int32	-	RO
-Volume 2 (Unit factor)	30108 or 40108	Input or Holding	107	UInt16	-	RO
-Volume 2 (Unit)	30109 or 40109	Input or Holding	108	4 char ASCII	-	RO
-Volume 2 (Float)	30111 or 40111	Input or Holding	110	IEEE754	-	RO
Power 2	30113 or 40113	Input or Holding	112	Int32	-	RO
Power 2 (Unit factor)	30115 or 40115	Input or Holding	114	UInt16	-	RO
Power 2 (Unit)	30116 or 40116	Input or Holding	115	4 char ASCII	-	RO

Power 2 (Float)	30118 or 40118	Input or Holding	117	IEEE754	kW	RO
Power 3	30120 or 40120	Input or Holding	119	Int32	-	RO
Power 3 (Unit factor)	30122 or 40122	Input or Holding	121	UInt16	-	RO
Power 3 (Unit)	30123 or 40123	Input or Holding	122	4 char ASCII	-	RO
Power 3 (Float)	30125 or 40125	Input or Holding	124	IEEE754	kW	RO
Flow 2	30127 or 40127	Input or Holding	126	Int32	-	RO
Flow 2 (Unit factor)	30129 or 40129	Input or Holding	128	UInt16	-	RO
Flow 2 (Unit)	30130 or 40130	Input or Holding	129	4 char ASCII	-	RO
Flow 2 (Float)	30132 or 40132	Input or Holding	131	IEEE754	-	RO
Flow 3	30134 or 40134	Input or Holding	133	Int32	-	RO
Flow 3 (Unit factor)	30136 or 40136	Input or Holding	135	UInt16	-	RO
Flow 3 (Unit)	30137 or 40137	Input or Holding	136	4 char ASCII	-	RO
Flow 3 (Float)	30139 or 40139	Input or Holding	138	IEEE754	-	RO
Flow 4	30141 or 40141	Input or Holding	140	Int32	-	RO
Flow 4 factor)	30143 or 40143	Input or Holding	142	UInt16	-	RO
Flow 4 (Unit)	30144 or 40144	Input or Holding	143	4 char ASCII	-	RO
Flow 4 (Float)	30146 or 40146	Input or Holding	145	IEEE754	-	RO
Flow 5	30148 or 40148	Input or Holding	147	Int32	-	RO
Flow 5 (Unit factor)	30150 or 40150	Input or Holding	149	UInt16	-	RO
Flow 5 (Unit)	30151 or 40151	Input or Holding	150	4 char ASCII	-	RO
Flow 5 (Float)	30153 or 40153	Input or Holding	152	IEEE754	-	RO
Temperature 3(Fixed)	30155 or 40155	Input or Holding	154	Int32	0.01°C	RO
Temperature 3 (Float)	30157 or 40157	Input or Holding	156	IEEE754	°C	RO
Temperature 4 (Fixed)	30159 or 40159	Input or Holding	158	Int32	0.01°C	RO
Temperature 4 (Float)	30161 or 40161	Input or Holding	160	IEEE754	°C	RO
Temperature 5 (Fixed)	30163 or 40163	Input or Holding	162	Int32	0.01°C	RO
Temperature 5 (Float)	30165 or 40165	Input or Holding	164	IEEE754	°C	RO
Pressure 1	30167 or 40167	Input or Holding	166	Int32	-	RO
Pressure 1 (Unit factor)	30169 or 40169	Input or Holding	168	UInt16	-	RO
Pressure 1 (Unit)	30170 or 40170	Input or Holding	169	4 char ASCII	-	RO
Pressure 1 (float)	30172 or 40172	Input or Holding	171	IEEE754	0.1kPa	RO
Pressure 2	30174 or 40174	Input or Holding	173	Int32	-	RO
Designation	Modbus Register	Modbus Register Type	Modbus Address	Data Value Range	Unit	Read only (RO) Read/write (R/W)
Pressure 2 (Unit factor)	30176 or 40176	Input or Holding	175	UInt16	-	RO
Pressure 2 (Unit)	30177 or 40177	Input or Holding	176	4 char ASCII	-	RO
Pressure 2 (float)	30179 or 40179	Input or Holding	178	IEEE754	0.1kPa	RO

Error 1	30181 or 40181	Input or Holding	180	UInt32	-	RO
Error 2	30183 or 40183	Input or Holding	182	UInt32	-	RO

Modbus data register list for IFX-MX-04 heat meter

Designation	Modbus Register	Modbus Register Type	Modbus Address	Data Value Range	Unit	Read only (RO) Read/write (R/W)
Σ Energy	30001 or 40001	Input or Holding	0	Int32	-	RO
Σ Energy (Unit factor)	30003 or 40003			UInt16	-	RO
Σ Energy (Unit)	30004 or 40004	Input or Holding Input or Holding	2 3	4 char ASCII	-	RO
Σ Energy (Float)	30006 or 40006	Input or Holding	5	IEEE754	-	RO
Energy 1	30008 or 40008	Input or Holding		Int32	-	RO
Energy 1 (Unit factor)	30010 or 40010	Input or Holding	7 9 10	UInt16	-	RO
Energy 1 (Unit)	30011 or 40011	Input or Holding		4 char ASCII	-	RO
Energy 1 (Float)	30013 or 40013	Input or Holding	12	IEEE754	-	RO
Energy 2	30015 or 40015	Input or Holding	14	Int32	-	RO
Energy 2 (Unit factor)	30017 or 40017	Input or Holding	16	UInt16	-	RO
Energy 2 (Unit)	30018 or 40018	Input or Holding	17	4 char ASCII	-	RO
Energy 2 (Float)	30020 or 40020	Input or Holding	19	IEEE754	-	RO
Not used	30022 or 40022	Input or Holding	21	Int32	-	RO
Not used	30024 or 40024	Input or Holding	23	UInt16	-	RO
Not used	30025 or 40025	Input or Holding	24	4 char ASCII	-	RO
Not used	30027 or 40027	Input or Holding	26	IEEE754	-	RO
Volume 1	30029 or 40029	Input or Holding	28	Int32	-	RO
Volume 1 (Unit factor)	30031 or 40031	Input or Holding	30	UInt16	-	RO
Volume 1 (Unit)	30032 or 40032	Input or Holding	31	4 char ASCII	-	RO
Volume 1 (Float)	30034 or 40034	Input or Holding	33	IEEE754	-	RO
Volume 2	30036 or 40036	Input or Holding	35	Int32	-	RO
Volume 2 (Unit factor)	30038 or 40038	Input or Holding	37	UInt16	-	RO
Volume 2 (Unit)	30039 or 40039	Input or Holding	38	4 char ASCII	-	RO
Volume 2 (Float)	30041 or 40041	Input or Holding	40	IEEE754	-	RO
Volume 3	30043 or 40043	Input or Holding	42	Int32	-	RO
Volume 3 (Unit factor)	30045 or 40045	Input or Holding	44	UInt16	-	RO
Volume 3 (Unit)	30046 or 40046	Input or Holding	45	4 char ASCII	-	RO
Volume 3 (Float)	30048 or 40048	Input or Holding	47	IEEE754	-	RO
Σ Power	30050 or 40050	Input or Holding	49	Int32	-	RO
Σ Power (Unit factor)	30052 or 40052			UInt16	-	RO
Σ Power (Unit)	30053 or 40053	Input or Holding Input or Holding	51 52	4 char ASCII	-	RO

Σ Power (Float)	30055 or 40055	Input or Holding	54	IEEE754	kW	RO
Flow 1	30057 or 40057	Input or Holding	56	Int32	-	RO
Flow 1 (Unit factor)	30059 or 40059	Input or Holding	58	UInt16	-	RO
Flow 1 (Unit)	30060 or 40060	Input or Holding	59	4 char ASCII	-	RO
Flow 1 (Float)	30062 or 40062	Input or Holding	61	IEEE754	-	RO
Temperature 1 (Fixed)	30064 or 40064	Input or Holding	63	Int32	0.01°C	RO
Temperature 1 (Float)	30066 or 40066	Input or Holding	65	IEEE754	°C	RO
Temperature 2 (Fixed)	30068 or 40068	Input or Holding	67	Int32	0.01°C	RO
Temperature 2 (Float)	30070 or 40070	Input or Holding	69	IEEE754	°C	RO
Not used	30072 or 40072	Input or Holding	71	Int32	-	RO
Not used (Float)	30074 or 40074	Input or Holding	73	IEEE754	-	RO
Meter Serial Number (Fixed)	30076 or 40076	Input or Holding	75	UInt32	-	RO
Meter Serial Number (ASCII)	30078 or 40078	Input or Holding	77	8 char ASCII	-	RO
Error 1	30082 or 40082	Input or Holding	81	UInt32	-	RO

Designation	Modbus Register	Modbus Register Type	Modbus Address	Data Value Range	Unit	Read only (RO) Read/write (R/W)
Data and time	30084 or 40084	Input or Holding	83	UInt32	-	RO
Battery operation time	30086 or 40086	Input or Holding	85	UInt32	-	RO
Working time without error	30088 or 40088	Input or Holding	87	UInt32	-	RO
Not used	30090 or 40090	Input or Holding	89	UInt32	-	RO
Volume 4	30092 or 40092	Input or Holding	91	Int32	-	RO
Volume 4 (Unit factor)	30094 or 40094	Input or Holding	93	UInt16	-	RO
Volume 4 (Unit)	30095 or 40095	Input or Holding	94	4 char ASCII	-	RO
Volume 4 (Float)	30097 or 40097	Input or Holding	96	IEEE754	-	RO
-Volume 2 Energy	30099 or 40099	Input or Holding	98	Int32	-	RO
-Volume 2 (Unit factor)	30101 or 40101	Input or Holding	100	UInt16	-	RO
-Volume 2 (Unit)	30102 or 40102	Input or Holding	101	4 char ASCII	-	RO
-Volume 2 (Float)	30104 or 40104	Input or Holding	103	IEEE754	-	RO
Not used	30106 or 40106	Input or Holding	105	Int32	-	RO
Not used	30108 or 40108	Input or Holding	107	UInt16	-	RO
Not used	30109 or 40109	Input or Holding	108	4 char ASCII	-	RO
Not used	30111 or 40111	Input or Holding	110	IEEE754	-	RO
Power 1	30113 or 40113	Input or Holding	112	Int32	-	RO
Power 1 (Unit factor)	30115 or 40115	Input or Holding	114	UInt16	-	RO
Power 1 (Unit)	30116 or 40116	Input or Holding	115	4 char ASCII	-	RO
Power 1 (Float)	30118 or 40118	Input or Holding	117	IEEE754	kW	RO
Power 2	30120 or 40120	Input or Holding	119	Int32	-	RO
Power 2 (Unit factor)	30122 or 40122	Input or Holding	121	UInt16	-	RO

Power 2 (Unit)	30123 or 40123	Input or Holding	122	4 char ASCII	-	RO
Power 2 (Float)	30125 or 40125	Input or Holding	124	IEEE754	kW	RO
Flow 2	30127 or 40127	Input or Holding	126	Int32	-	RO
Flow 2 (Unit factor)	30129 or 40129	Input or Holding	128	UInt16	-	RO
Flow 2 (Unit)	30130 or 40130	Input or Holding	129	4 char ASCII	-	RO
Flow 2 (Float)	30132 or 40132	Input or Holding	131	IEEE754	-	RO
Flow 3	30134 or 40134	Input or Holding	133	Int32	-	RO
Flow 3 (Unit factor)	30136 or 40136	Input or Holding	135	UInt16	-	RO
Flow 3 (Unit)	30137 or 40137	Input or Holding	136	4 char ASCII	-	RO
Flow 3 (Float)	30139 or 40139	Input or Holding	138	IEEE754	-	RO
Flow 4	30141 or 40141	Input or Holding	140	Int32	-	RO
Flow 4 factor)	30143 or 40143	Input or Holding	142	UInt16	-	RO
Flow 4 (Unit)	30144 or 40144	Input or Holding	143	4 char ASCII	-	RO
Flow 4 (Float)	30146 or 40146	Input or Holding	145	IEEE754	-	RO
Not used	30148 or 40148	Input or Holding	147	Int32	-	RO
Not used	30150 or 40150	Input or Holding	149	UInt16	-	RO
Not used	30151 or 40151	Input or Holding	150	4 char ASCII	-	RO
Not used	30153 or 40153	Input or Holding	152	IEEE754	-	RO
Temperature 3(Fixed)	30155 or 40155	Input or Holding	154	Int32	0.01°C	RO
Temperature 3 (Float)	30157 or 40157	Input or Holding	156	IEEE754	°C	RO
Temperature 4 (Fixed)	30159 or 40159	Input or Holding	158	Int32	0.01°C	RO
Temperature 4 (Float)	30161 or 40161	Input or Holding	160	IEEE754	°C	RO
Not used	30163 or 40163	Input or Holding	162	Int32	-	RO
Not used	30165 or 40165	Input or Holding	164	IEEE754	-	RO
Pressure 1	30167 or 40167	Input or Holding	166	Int32	-	RO
Pressure 1 (Unit factor)	30169 or 40169	Input or Holding	168	UInt16	-	RO
Pressure 1 (Unit)	30170 or 40170	Input or Holding	169	4 char ASCII	-	RO
Pressure 1 (float)	30172 or 40172	Input or Holding	171	IEEE754	0.1kPa	RO
Pressure 2	30174 or 40174	Input or Holding	173	Int32	-	RO

Modbus module data register list

Designation	Modbus Register	Modbus Register Type	Modbus Address	Data Value Range	Unit	Read only (RO) Read/write (R/W)
Module Serial Number	32001	Input	2000	UInt32	-	RO
Module Model Number	32003	Input	2002	UInt32	-	RO
Firmware Version ¹	32005	Input	2004	UInt16	-	RO
Modbus Slave ID ^{2, 3}	41001	Holding	1000	UInt16	-	R/W

Update Rate Data from Meter	41002	Holding	1001	UInt16	100 ms	R/W
RS485 Baud Rate	41003	Holding	1002	UInt32	-	R/W
RS485 Data Bits ⁴	41005	Holding	1004	UInt16	-	R/W
RS485 Parity ^{4, 5}	41006	Holding	1005	UInt16	-	R/W
RS485 Stop Bits ⁴	41007	Holding	1006	UInt16	-	R/W
Mbus Baud Rate	41008	Holding	1007	UInt32	-	R/W
Mbus Data Bits ⁴	41010	Holding	1009	UInt16	-	R/W
Mbus Parity ^{4, 5}	41011	Holding	1010	UInt16	-	R/W
Mbus Stop Bits ⁴	41012	Holding	1011	UInt16	-	R/W

Higher byte of the register is major number of firmware version (0x##00). Lower byte of the register is minor number of firmware version (0x00##). ²

Lower byte of this register is Modbus address of the module in range 1-247 (01-F7 hex). ³ If the higher byte is set to 1, the Modbus address will be updated to the meter M-Bus address. If the higher byte is set to 0, the Modbus address is static. ⁴ The registers should be set only the values represent data format on the EIA-485 serial interface described in chapter Communication interface above. ⁵ This register is set by the ASCII char value – 'E' for Even parity (69 dec, 45 hex), 'O' for Odd parity (79 dec, 4F hex) and 'N' for None parity (78 dec, 4E hex).

More details about Modbus communication and data decoding you find in Modicon Modbus Reference Guide and MODBUS over Serial Line – Specification and Implementation Guide documents.

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