MEITAVTEC LTD, 04.04.2024

Modbus Object List **CTU4501-P2-H3-SUPER-ST-01-IAI_K22** (ID=24201602)

Applied microcontroller PIC18F46K22.

Modbus RTU Mode, Address Slave 1-247, Minimum Time Out for reply = 150 ms;
Maximum Time Out for reply = 200 ms.

Baud rate 9600, 19200, 38400. Default = 9600. No parity, 8 bits, 1 stop.

CTU supports only one type of data - Holding registers, signed Integer 16-bit word.

Supported commands: 0x03 = Read Holding Registers
0x06 = Write Single Register
0x10 = Write Multiple Registers
0x2B = Read Device Identification (Basic = 0x01, Regular = 0x02)

Function 0x2B (Encapsulated Interface Transport)

MEI Type 0x0E (Read Device Identification)

Read Dev ID code 0x01 (request to get the Basic Device Identification)

ObjectId	Object Name / Description	Type	M/O	Category
0x00	VendorName	ASCII String	Mandatory	Basic
0x01	ProductCode	ASCII String	Mandatory	Basic
0x02	MajorMinorRevision	ASCII String	Mandatory	Basic

VendorName = " Meitav-Tec Ltd "

ProductCode = “CTU4501 P2 H3 SUPER ST1 IA"

MajorMinorRevision = "V0.1”

Function 0x2B (Encapsulated Interface Transport)

MEI Type 0x0E (Read Device Identification)

Read Dev ID code 0x02 (request to get the Regular Device Identification)

ObjectId	Object Name / Description	Type	M/O	Category
0x03	VendorUrl	ASCII String	Optional	Regular
0x04	ProductName	ASCII String	Optional	Regular
0x05	ModelName	ASCII String	Optional	Regular
0x06	UserApplicationName	ASCII String	Optional	Regular

VendorUrl = “www.meitavtec.com”

ProductName = “24201602.5713”

ModelName = “CTU4501 P2 H3 SUPER ST1 IA”

UserApplicationName = “24201602.5713”

Reg	Address	Name	Range, Value, Units	Default
1	0x000	T1_RoomTemperature	7...32°C	(R)***
2	0x001	T2_ChangeOverSensorTemperature	-40...89°C	(R)***
3	0x002	T3_IndoorCoilTemperature	-40...89°C	(R)***
4	0x003	AI1_ Input	0...10000 mV	(R)***
5	0x004	AI2_Input	0...10000 mV	(R)***
6	0x005	AO_Cool	0...10000 mV	0 mV ***
7	0x006	AO_Heat	0...10000 mV	0 mV ***
8	0x007	SW2_1_TestOccupancySensor	0 - Off, 1 - On	(R)
9	0x008	SW2_2_BinaryHeat	0 - Off, 1 - On	(R)
10	0x009	SW2_3_StartStop	0 - Off, 1 - On	(R)
11	0x00A	DI8_OccupancySensor 0-Close, 1-Open (if polarity=0).	0, 1	(R)
12	0x00B	DI1: 0-Close, 1-Open (if polarity=0)	0, 1	(R)
13	0x00C	DI2: 0-Close, 1-Open (if polarity=0)	0, 1	(R)
14	0x00D	DI3: 0-Close, 1-Open (if polarity=0)	0, 1	(R)
15	0x00E	DI4: 0-Close, 1-Open (if polarity=0)	0, 1	(R)
16	0x00F	DI5: 0-Close, 1-Open (if polarity=0)	0, 1	(R)
17	0x010	DI6: 0-Close, 1-Open (if polarity=0)	0, 1	(R)
18	0x011	DI7: 0-Close, 1-Open (if polarity=0)	0, 1	(R)
19	0x012	Fan_low	0 - Off, 1 – On	0-Off (R)
20	0x013	Fan_medium	0 - Off, 1 - On	0-Off (R)
21	0x014	Fan_high	0 - Off, 1 - On	0-Off (R)

Reg	Address	Name	Range, Value, Units	Default
22	0x015	FreshAirDamper_Out (15)	0 - Close, 1 – Open	0-Off (R)
23	0x016	Heat1	0 - Off, 1 – On	0-Off (R)
24	0x017	Heat2	0 - Off, 1 – On	0-Off (R)
25	0x018	Heat3	0 - Off, 1 – On	0-Off (R)
26	0x019	G1_Light_Off	0 - Off, 1 – On	0-Off (R)
27	0x01A	OnOff	0 - Off, 1 – On	0-Off (RW)
28	0x01B	UnOccupancy	0 - Off, 1 - Unoccupied	0-Off (R)
29	0x01C	AutoFan	0 - Off, 1 - On	0-Off (RW)
30	0x01D	Celsius	1-Celsius, 0-Fahrenheit	1-Celsius (R)
31	0x01E	RestoreDefault	0 - Off, 1 - Restore	0-Off (RW)
32	0x01F	PanelTemperatureDisplay	0 - Off, 1 - On	1-On (RW)
33	0x020	EnableOverrideInputOutput	0 - Disable, 1 - Enable	0- Disable (RW)
34	0x021	ViewFloatValue	0 - Off, 1 - View	0-Off (RW)
35	0x022	DisableOccupancySensor	0 - Off, 1 - Disable	0-Off (RW)

36	0x023	DI8_OccupancySensor_Polarity
		if “0” – N. Open polarity of DI8, then
		DI8 open = 1 (5 VDC); DI8 short = 0 (0 VDC).
		If “1” – N. Close polarity of DI8, then
		DI8 open = 0 (5 VDC); DI8 short = 1 (0 VDC).
			0 - N.Open, 1 - N.Close	0 (RW)

37	0x024	DI1_Polarity:
		if “1” – N. Open polarity of DI1, then
		DI1 open = 1 (5 VDC); DI1 short = 0 (0 VDC).
		If “0” – N. Close polarity of DI1, then
		DI1 open = 0 (5 VDC); DI1 short = 1 (0 VDC).
			0 - N.Close, 1- N.Open	0 (RW)

38	0x025	DI2_Polarity	0 - N.Close 1 - N.Open	0 (RW)
39	0x026	DI3_Polarity	0 - N.Open, 1 - N.Close	0 (RW)
40	0x027	DI4_Polarity	0 - N.Open, 1 - N.Close	0 (RW)
41	0x028	DI5_Polarity	0 - N.Open, 1 - N.Close	0 (RW)
42	0x029	DI6_Polarity	0 - N.Open, 1 - N.Close	0 (RW)
43	0x02A	DI7_Polarity	0 - N.Open, 1 - N.Close	0 (RW)
44	0x02B	LockRoomModule	0 - Unlock, 1 - Lock	0-Unlock (RW)
45	0x02C	LockRoomModuleMode	0 - Unlock, 1 – Lock	0-Unlock (RW)
46	0x02D	LockRoomModuleSetPoint	0 - Unlock, 1 – Lock	0-Unlock (RW)
47	0x02E	LockRoomModuleFanSpeed	0 - Unlock, 1 – Lock	0-Unlock (RW)
48	0x02F	LockRoomModuleOnOff	0 - Unlock, 1 – Lock	0-Unlock (RW)
49	0x030	LockRoomModuleBeeper	0 - Unlock, 1 – Lock	0-Unlock (RW)
50	0x031	DamperOpen	0 - Close, 1 – Open	0 (R)
51	0x032	Shabbat	0 - Off, 1 – On	0 (RW)
52	0x033	Mode 0–Fan Only; 1–Cool; 2–Heat; 3–Auto Change	0…3	1-Cool (RW)
53	0x034	FanSpeed 0 – AutoSpeed; 1 – Low; 2 – Medium; 3 – High	0…3	1-Low (RW)
54	0x035	SetPoint	10…30°C	22°C (RW)

Reg	Address	Name	Range, Value, Units	Default
55	0x036	SetPointLimitCool	10…30°C	23°C (RW)
56	0x037	SetPointLimitHeat	10…30°C	23°C (RW)
57	0x038	SetPointEffective	10…30°C	22°C (R)
58	0x039	DeadZoneForCool Actual value = 0.5 * DeadZoneForCool	(0…5) * 0.5°C	1 = 0.5°C (RW)
59	0x03A	DeadZoneForHeat Actual value = 0.5 * DeadZoneForHeat	(0…5) * 0.5°C	1 = 0.5°C (RW)
60	0x03B	HeatRelayTimeDelayOnNext	0…60 sec	1 sec (RW)
61	0x03C	HeatRelayTimeDelayOffNext	0, 1 sec	1 sec (RW)
62	0x03D	ReturnAirSensorCalibration	-6…6°C	0°C (RW)
63	0x03E	CoolProportionalLimitOn	0…50%	40% (RW)
64	0x03F	CoolProportionalLimitOff	0…20%	10% (RW)
65	0x040	CoolDemand	0…100%	0% (RW) ***
66	0x041	CoolProportionalBand	1…10°C	2°C (RW)
67	0x042	CoolProportionalHighLimit	0…100%	100% (RW)
68	0x043	CoolProportionalLowLimit	0…100%	0% (RW)
69	0x044	HeatDemand	0…300%	0% (RW) ***
70	0x045	HeatProportionalBand	1…10°C	2°C (RW)
71	0x046	HeatProportionalHighLimit	0…100%	100% (RW)
72	0x047	HeatProportionalLowLimit	0…100%	0% (RW)
73	0x048	CoolFanOnDelay	0…300 seconds	0 sec (RW)
74	0x049	CoolFanOffDelay	0…300 seconds	0 sec (RW)
75	0x04A	Not in use	0…0 seconds	0 sec (R)
76	0x04B	HeatFanOffDelay	0…300 seconds	30 sec (RW)
77	0x04C	TimeSwitchingToUnOccupiedMode	0…3600 seconds	1200 sec (RW)
78	0x04D	UnOccupancyModeSelect 0 – On/Off Light and HVAC 1 – Start/Stop Light and HVAC 2 – On/Off Light only 3 – Economy Setpoints 4 – On/Off HVAC only 5 - Start/Stop HVAC only	0…5	0 (RW)
79	0x04E	StartStop	0-On/Off, 1-Start/Stop	0-On/Off (RW)
80	0x04F	CO2_FromPanel	0…5000 ppm	0 ppm (R)
81	0x050	CO2_MinimumValue	0…5000 ppm	0 ppm (RW)
82	0x051	CO2_MaximumValue	0…5000 ppm	1800 ppm (RW)
83	0x052	CO2_EffectiveValue	0…10000 ppm	0 ppm (R)
84	0x053	CO2_Alarm 0-No Alarm 1-CO2 Alarm 2-CO2 Fault	0…2	0-No Alarm (R)
85	0x054	HumidityMinimumValue	0…100%	20% (RW)
86	0x055	HumidityMaximumValue	0…100%	90% (RW)

Reg	Address	Name	Range, Value, Units	Default
87	0x056	HumidityFromPanel	0…100%	0% (R)
88	0x057	HumidityEffectiveValue	0…100%	0% (R)
89	0x058	HumidityAlarm 1 – Sensor is not connected, or Humidity is lower than “HumidityMinimumValue” or higher than “HumidityMaximumValue”	0-No Alarm, 1-Alarm	(R)
90	0x059	PanelTimeChangeDisplay: 0 – temperature indication only, 5 – 5 sec. humidity, 5 sec. temperature, 10 – humidity indication only.	0…10 sec	0 sec (RW)
91	0x05A	CoolOutputsThresholdTime	0…100 sec	60 sec (RW)
92	0x05B	Not in use	0	0 (R)
93	0x05C	CoolIntegralTime	0…600 sec	240 sec (RW)
94	0x05D	CoolIntegralValue	0…100%	10% (RW)
95	0x05E	Not in use		
96	0x05F	Not in use		
97	0x060	Not in use		
98	0x061	HeatOutputsThresholdTime	0…100 sec	60 sec (RW)
99	0x062	Not in use	0	0 (R)
100	0x063	HeatIntegralTime	0…600 sec	240 sec (RW)
101	0x064	HeatIntegralValue	0…100%	10% (RW)
102	0x065	Not in use	0	0 (R)
103	0x066	Not in use	0	0 (R)
104	0x067	Not in use	0	0 (R)
105	0x068	PI_Enable	0 - Disable, 1 - Enable	0-Disable (RW)
106	0x069	Heater1_CutIn (% of HeatDemand)	0…200%	40% (RW)
107	0x06A	Heater1_CutOut (% of HeatDemand)	0…200%	10% (RW)
108	0x06B	Heater2_CutIn (% of HeatDemand)	0…200%	80% (RW)
109	0x06C	Heater2_CutOut (% of HeatDemand)	0…200%	40% (RW)
110	0x06D	Heater3_CutIn (% of HeatDemand)	0…200%	120% (RW)
111	0x06E	Heater3_CutOut (% of HeatDemand)	0…200%	80% (RW)
112	0x06F	CO2_SetPoint	250…4000 ppm	750 ppm (RW)
113	0x070	CO2_DeadZone	50…1000 ppm	100 ppm (RW)
114	0x071	CO2_unReliableValue	0…4000 ppm	200 ppm (RW)
115	0x072	CO2_Value_ExternalSensor	0…10000 ppm	0 ppm (R)
116	0x073	CO2_Enable_ExternalSensor	0 - Disable, 1 - Enable	0 (RW)
117	0x074	Cool1_Out (16)	0 - Off, 1 – On	0-Off (R)
118	0x075	UnOccupancyTimeAction	0…100%	50% (RW)
119	0x076	UnOccupancyChangeSetpoint	0…10°C	0°C (RW)

Reg	Address	Name	Range, Value, Units	Default
120	0x077	HeatProportionalLimitOn	0…50%	40% (RW)
121	0x078	HeatProportionalLimitOff	0…20%	10% (RW)
122	0x079	BaudRate: 0 – 9600; 1 - 19200; 2 - 38400	0…2	0 - 9600 (RW)
123	0x07A	LightOff If On – binary output "G1_Light_Off" = 1 If Off – binary output "G1_Light_Off" = 0	0 - Off, 1 – G1_LightOff	0-Off (RW)
124	0x07B	FanEffectiveValue 0 – Off, 1-Low, 2- Medium, 3 - High	0...3	1-Low (R)
125	0x07C	CO2_RangePPM_ExternalSensor	0…10000 ppm	2000 ppm (RW)

***-writable only if a value of the Register 33 ("EnableOverrideInputOutput") is 1.

Attention!

CO2 Alarm indication

If CO2_Effective less than CO2 unReliable Value: CO2-Alarm register = 2 (CO2_Fault).
If CO2_Effective more than CO2 unReliable Value but less than CO2_MinimumValue or more than CO2_MaximumValue: CO2-Alarm register =1 (CO2_Alarm).

CO2 Alarm indication

If CO2_Effective less than CO2_unReliable Value: CO2_Alarm register = 2 (CO2_Fault).
If CO2_Effective more than CO2_unReliable Value but less than CO2_MinimumValue or more than CO2_MaximumValue: CO2_Alarm register =1 (CO2_Alarm).

CO2 Effective calculation

1. Register "CO2_EnableExternalSensor" = 1.
CO2_Effective = CO2 from External sensor (always).

2. Register "CO2_EnableExternalSensor" = 0 (Default).

If CO2 from panel value more than CO2 unReliable Value: CO2_Effective = CO2 from panel.
If CO2 from panel value less or equal to CO2 unReliable Value:CO2_Effective = CO2 from External sensor.

CO2 from external sensor calculation

Register "ValueFromExternalCO2Sensor" = AI1_Input * CO2_RangePPM_ExternalSensor / CO2_RangeVolt_ExternalSensor.

Attention! CO2_RangeVolt_ExternalSensor always 10000 mV DC and can't be changed.

Example: External sensor CO2 has range 4000PPm, proportional output 0…10 Vdc.

Voltage on AI1,0 – 1100 mV.

ValueFromExternalCO2Sensor = 1100mV * 4000 PPM/10000mV = 440 PPM.

Commissioning purposes

When the technician writes into registers 63*** (“CoolDemand”) and 67*** (“HeatDemand”), the OnOff outputs (registers 22…25) and proportional outputs (registers 6, 7) response.

After commissioning the technician must make Restore Default operation – write “1” to register 31 (“RestoreDefault”)**.**

Registers 1…5* have range -32655…32655 during override. After the break of power all overridden registers return to values, measured by analog inputs.**

While register 36 (“ViewFloatValue”) is “1”, all the registers of units °C (temperature) are presented in format

Integer (Real value * 10, Meitav-tec OEM ”floating point” format).

Read value examples:

Register 1 “T1_RoomTemperature = 221” represents a real value = 22.1°C.

Register 52 “SetPoint = 150” represents a real value = 15.0°C. Register 56 “DeadZoneForCool = 10” represents a value = 1 * 0.5 °C = 0.5°C

Write value examples:

To write 20°C to the “SetPoint”, send “200” to the Register 52.

To write 25°C to the “SetPointLimitHeat”, send “250” to the Register 54.

To write 1.5 °C to the “DeadZoneForCool”, send 3 * 10 = “30” to the Register 56.

Attention! If PI is enabled, then writing to any register causes clearing of the Integral correction Value (used to compensate the static error) of HeatDemand and CoolDemand.