FLTA Wireless Room Transmitter Control Modules

TEFL/TEU-FL/KLU-FL wireless system operates in 868.30MHz range. The system has been designed for reliable operation in wide range of environments using the latest RF technology. The communication between the TEFL and x-FL sensors and the FLTA control module is two-way. The measurement readings are transmitted on change, or at least every hour.

The FLTA control module has 8 x 0..10Vdc outputs that can be configured for temperature, humidity, setpoint, digital contact, 5-position switch, lux level or for 0..10Vdc input signal. The FLTA can also be configured to work with LA-FL wireless occupancy sensor and with RY-FL wireless IO-modules. FLTA module acts as a Modbus Communication interface for measurements and wireless IOs. FLTA is often connected using Modbus to BMS systems. Using FLTA modules temperature readings can be made available, for example, on the WebBiter web-browser interface.

The FLTA control module monitors the room units for any malfunctions and for the low battery level.

Each FLTA control module can have up to 99 sensors/transmitters in its operating area. Up to 63 FLTA control modules (networks)

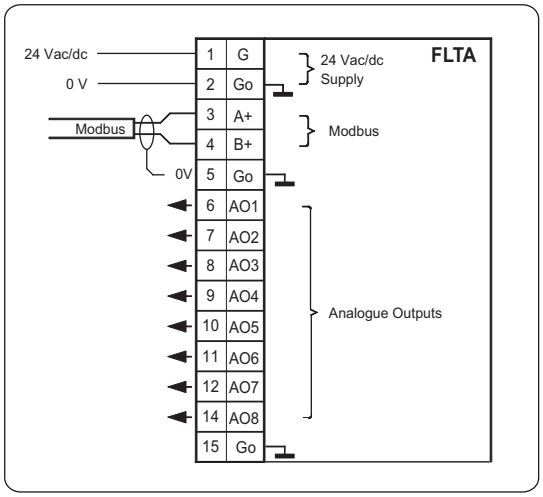
can operate in the same wireless area. Total maximum of 6,237 sensors/transmitters can be connected to the system in a single system.

Model Type	Model	Description
	FLTA	Wireless Control Module, Modbus Communication, 8 x 0..10Vdc Output Signals
	FLAN	Antenna for the Wireless FLTA Control Module
Technical Data	Power supply	24Vac/dc
	Transmission Frequency	868.30 MHz
	Transmission Power	+8 dBm
	Reception Sensitivity	-109 dBm
	Modulation Technology	FSK
	Transmission Range	Line of sight: Up to 500m In buildings: 20..100m, depending on the wall materials FLREP and FLREP-U modules can be used to extend the transmission range in difficult environments.
	FLTA Module Outputs	8 x 0..10Vdc Outputs Error Signal Output (if Modbus is disabled) For TEFL Sensors Temperature 0...50°C = 0…10V Humidity 0...100% = 0...10V Setpoint 17.5...24.5°C = 0...10V 5-Position Switch 1...5V (e.g.. position 3 = 3V) Digital Input: 1V (Open), 5V (Closed) For TEU-FL Sensors Temperature -50...+150°C = 0…10V Analogue Input: 0..10Vdc = 0..10Vdc (wireless signal transmission e.g. for HDH CO2 transmitters) For KLU-FL Sensors Temperature -50...+150°C = 0…10V Humidity 0...100% = 0...10V

FLTA Communication	Modbus RTU (RS485)
Error Signal (If Modbus is disabled)	0V = no error 5V = low battery, or no signal in 62 minutes
Operating Temperature	-25°C...+65°C
Ambient Humidity	0...100%rh (non-condensing)
Enclosure	IP20 ABS Plastics
Dimensions	53W x 90H x 58D mm

NOTE: RY-FL requires FLTA version 2.2 or later and FLSER service tool version 2.2 or later.

Wiring Diagram

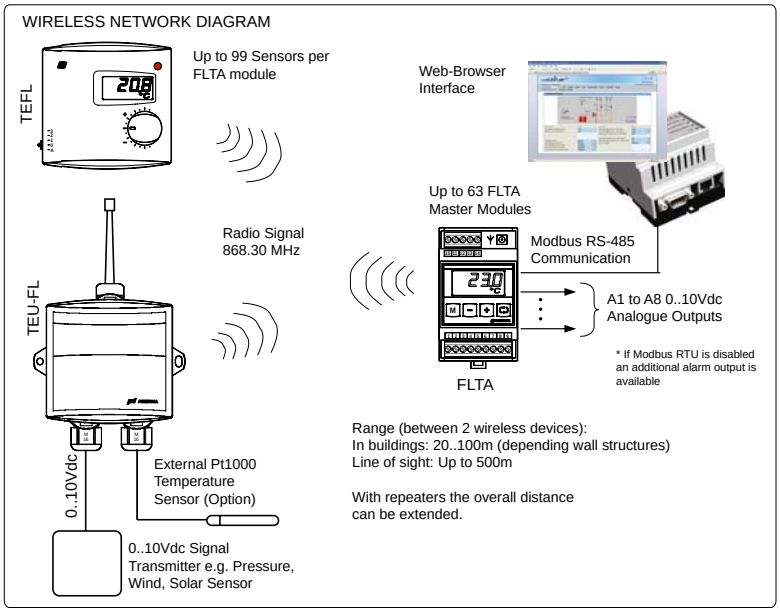


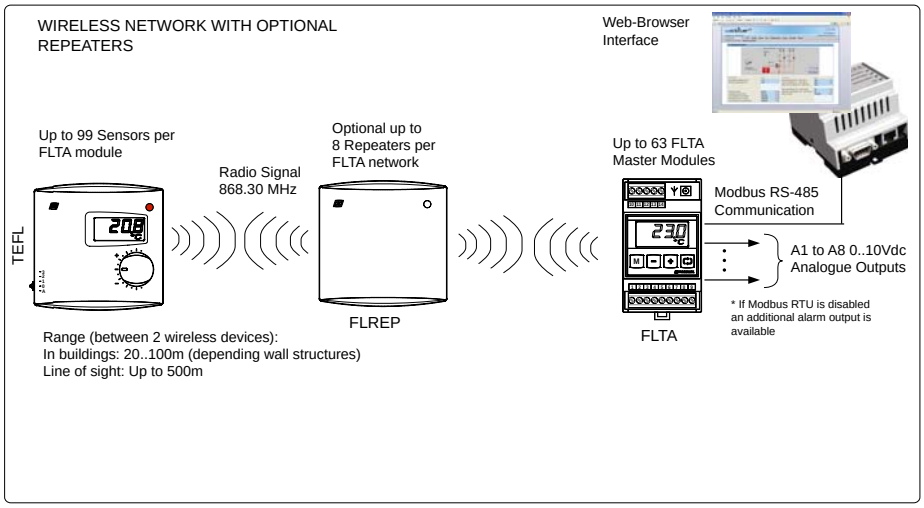
System Examples

The diagrams below illustrate the typical system examples. The system can have up to 99 sensors/transmitters per FLTA and up to 63 FLTAs. During the commissioning each FLTA is configured with unique ID (MID = Master ID). This is programmed through the keypad and the display of the FLTA.

For any sensor, transmitter or repeater needs to configured with the matching Master ID for it to operate within the corresponding FLTA. This is done using FLSER Service Tool.

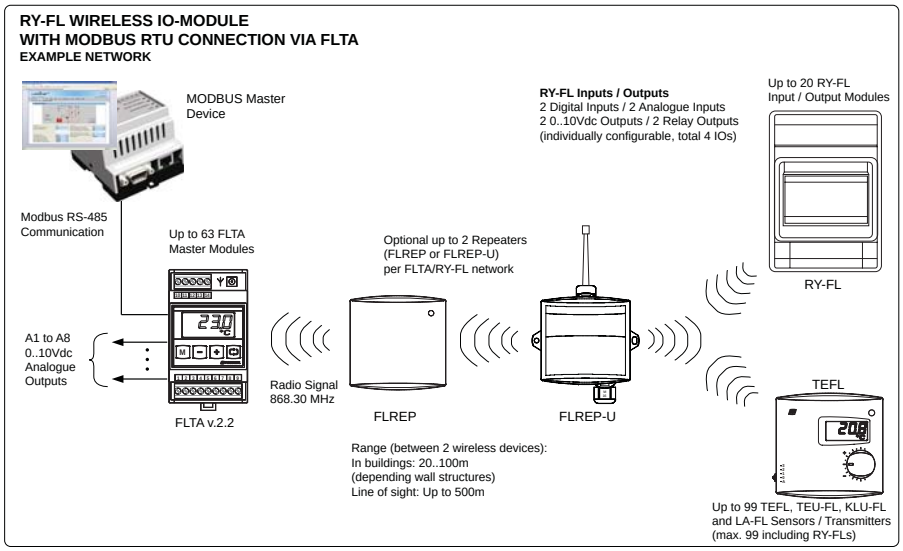
If FLTA has not received a wireless message for one hour from a sensor/trasmitter configured to its memory, a loss of sensor alarm is raised.





MAXIMUM WIRELESS SYSTEM SIZE PER NETWORK - WITHOUT RY-FL I/O MODULES

No. of Devices	Up to 99 (including TEFL, KLU-FL, TEU-FL and LA-FL)
No. of Repeaters	Up to 8.

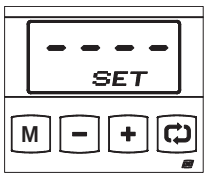


MAXIMUM WIRELESS SYSTEM SIZE PER NETWORK - WITH RY-FL I/O MODULES

No. of Devices	Up to 99 (including TEFL, KLU-FL, TEU-FL and LA-FL)
No of RY-FL Modules	Max. 20
No. of Repeaters	Max 2 when RY-FL modules are used (otherwise 8)

Commissioning Instructions

Connect supply voltage to the FLTA receiver. If the receiver has not been configured it has still the factory default configuration and the following will be displayed:-



Factory Default Display

- first the version number
- then flashing text *SET*, which means that the receiver has not been commissioned to the network

FLTA receiver's default settings can be changed by entering to programming mode. Press the **M** button for 5 seconds to enter programming mode. Continue pressing **M** button to move from one parameter to another. Use +/- buttons to change value. The diagram below illustrates the available settings.

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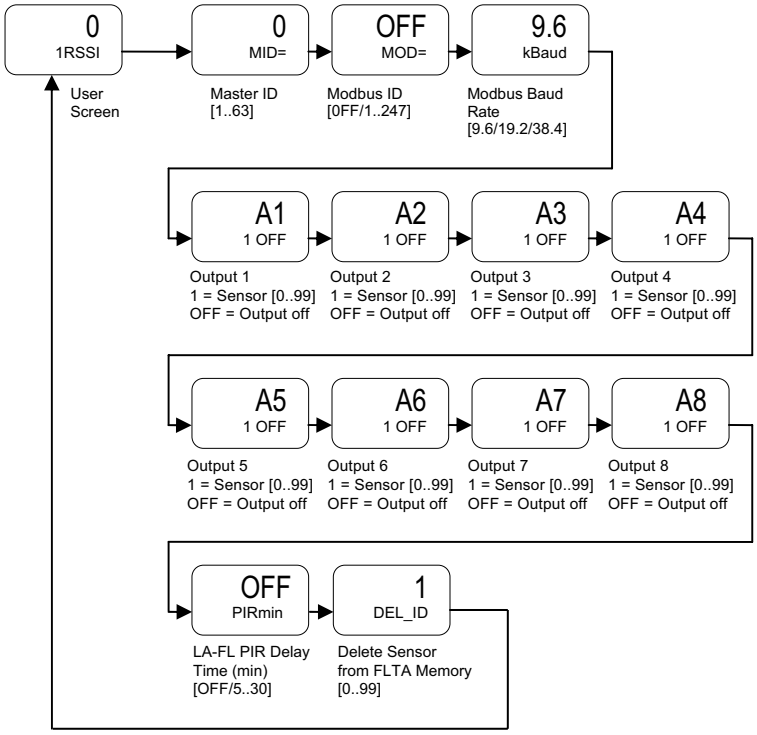


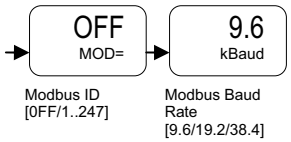
MASTER ID (MID)

Each wireless network has one FLTA master with unique Master ID (MID). Each sensor, transmitter and repeater uses this ID to identify the destination of its messages. The Master ID can be 1..63. Each wireless network (MID) can have one FLTA, 99 sensors / transmitters (of which max 20 RY-FL IO-modules) and 8 repeaters (max. 2 repeaters when RY-FL IO-modules are used).

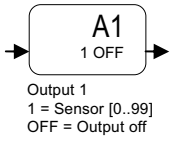
MODBUS (MOD)

Modbus communication is available with communication speed of 9.6/19.2/38 kbaud and with address 1..247 (maximum 128 devices in the Modbus RS-485 network).

As default the Modbus setting is Off - Modbus disabled. When Modbus is Disabled terminal 4B- becomes as an alarm output.



ANALOGUE OUTPUTS (A1 to A8)



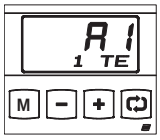
Each of the analogue outputs can be configured to output the desired measurement. Eg. sensor 1 temperature reading can be sent to A1, and sensor 4 setpoint to A2 and sensor 80 humidity reading to A3. Each of the outputs are fully configurable. It is also possible to send the same measurement to multiple analogue outputs.

To configure each analogue output:

1. Press [M] button to select appropriate output (A1 or A8)
2. Press [−] [+] buttons to select the TEFL/KLU-FL/TEU-FL transmitter address (1-99)
3. Press [⟲] button to associate measurement (OFF, TE, SP, RH, FAN)
4. Continue until all analogue outputs have been defined

Analogue outputs can be configured to have any of the following:-
OFF = not in use
TE = temperature reading 0..50°C = 0..10Vdc
SP = setpoint 18..24°C = 0..10Vdc
RH = relative humidity 0..100%rH = 0..10Vdc
FAN = 5-position switch A-0-1-2-3 = 1V - 2V - 3V - 4V -5V

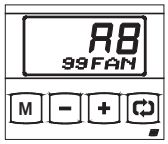
Example 1



A1 analogue output 1 has been configured to receive temperature (TE) signal from the sensor 1 (SID=1).

Factory Default: All Outputs = OFF

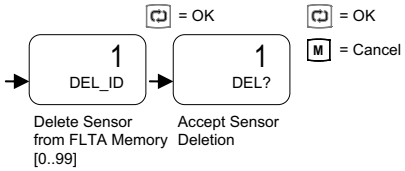
Example 2



A8 analogue output 8 has been configured to receive 5-Position switch signal (FAN) from the room sensor 99 (SID=99).

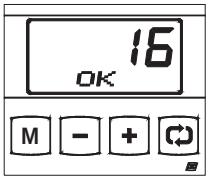
DELETING UNNECESSARY WIRELESS SENSORS (DEL_ID)

Transmitter/sensor can be removed from the memory of the receiver via DEL_ID option. This is necessary if a sensor is removed from the network as otherwise the system will create "communication lost" alarm.



COMPLETING COMMISSIONING

By pressing the **M** button once more the commissioning is now completed.

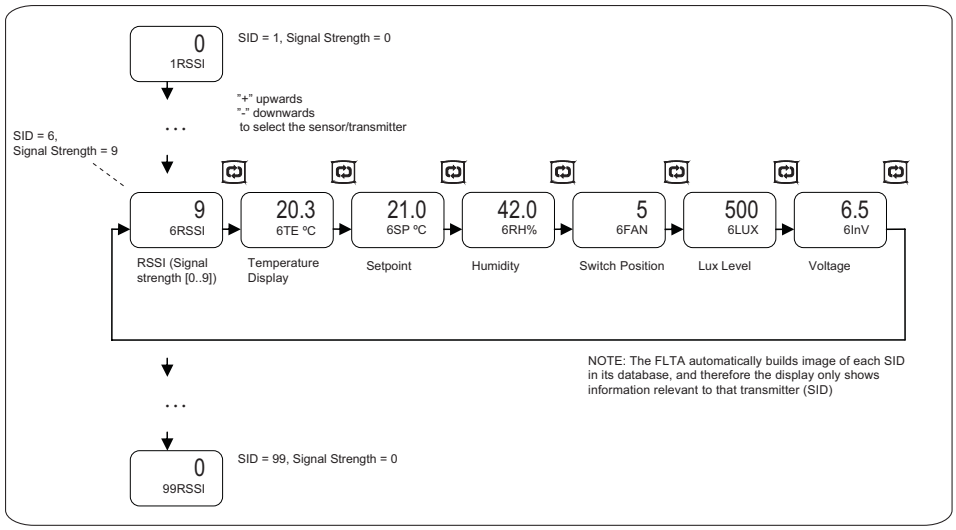


The FLTA displays "OK" and the configured MASTER ID (MID).

If the Modbus has been selected, the FLTA receiver starts immediately the communication with the possible Modbus master, and all measurements from the wireless sensors/transmitters can be seen with via FLTA LCD display.

Using LCD Display

FLTA display can be used to display the current measurements from each wireless transmitter and to analyse the signal strengths. Use "Rotation" button to rotate between readings and +/- buttons to select the appropriate sensor/transmitter (by the sensor/transmitter ID).



NOTE: The **M** button is only used for the commissioning of the FLTA.

After power failure the FLTA receiver goes to the local display mode and shows the signal strength (RSSI) for sensor 1 (SID = 1). FLTA receiver remembers the last measurement in its memory.

Fault Diagnostics and Alarm Acknowledgement

The FLTA monitors each sensor for a battery fault (low battery) or if the communication has been lost to the sensor. The fault signals are available via the MODBUS network or locally on the display. If the MODBUS network has not been enabled, a physical alarm output is also available on the FLTA unit.

ALARM DISPLAY

In case of an alarm, the FLTA display shows the current alarm condition on its display, for example A1 LOST or A1 BATT (where A1 is sensor address, LOST means communication problem and BATT means low battery alarm for sensor).

Alarms is acknowledged by pressing the ROTATE button continuously more than 5 seconds or via Modbus network. It is necessary to reset the alarm display by acknowledging the alarm before the normal display mode resumes.

Note: When BATT (low battery) alarm is displayed for wireless sensors/transmitters, this typically means that the battery has about 5% left of charge. For example in case of TEFL battery has sufficient energy for an other 3 months.

VIA THE MODBUS NETWORK

For each wireless sensor a separate MODBUS register is available to display the battery alarm or the communications alarm.

Alarms are stord in the FLTA and can be reset aither via MODBUS network or by pressing the ROTATE button in the local display mode continuously over >5 seconds

IF MODBUS NETWORK IS DISABLED

If the Modbus network is not operational, a common alarm signal can be read from connector 4 (B-). This I/O connector gives 0/5V status information. The 0V means a normal stage and the 5V means a stage, where there comes an alarm from one or several sensors. The status information can be forwarded to a BMS/Controller or for example to the RY 1-U voltage relay.

FLSER Service Tool

During the installation FLSER service tool can be used to facilitate the wireless network set up. The service tool can be used to measure the signal strength from sensors to the tool, or from the FLTA to the service tool.

1. After commissioning FLTA Receiver / Master Module, set selection switch on the FLSER service tool to RSSI position.

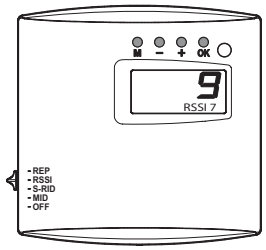
2. FLTA will display "On Care" and the red receiver LED is flashing rapidly.

3. Now with the FLSER tool the position of the transmitters / sensors can be located by monitoring the signal strength on the FLSER display.

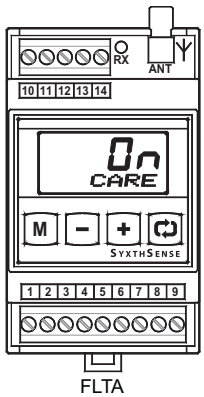
NOTE: To identify true signal strength it is NOT recommended to keep the FLSER tool in hand because it will distort the radio transmission.

4. FLSER display shows the signal strengths measured by FLTA (small number) and by the FLSER (large number). Signal strength readings: 1-2 = poor, 3-5 = statisfactory, 6-9 = good.

5. After testing switch FLSER to "OFF" position, the FLTA receiver returns back to its normal operation in 30 seconds.



FLSER



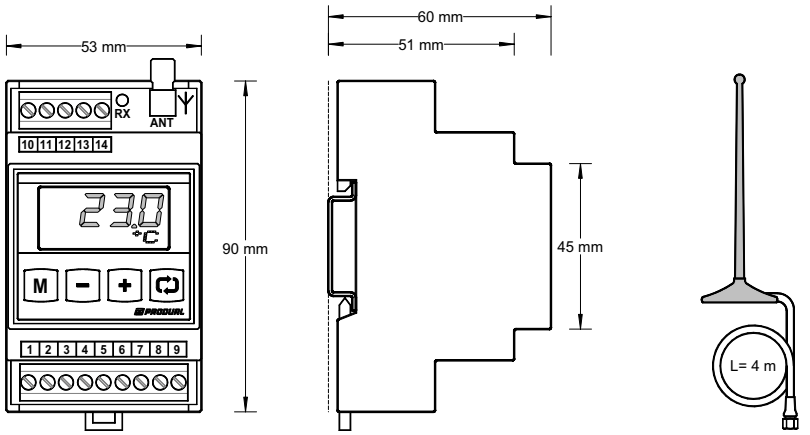
FLTA

Firmware Version

TEFL wireless sensors and FLTA receivers supplied after date code 10.11.07 use version 2 software. Version 2 is not compatible with version 1. If you require extensions to version 1 network (products supplied before Nov 2007), please state this at the time of ordering.

RY-FL requires FLTA version 2.2 or later and FLSER service tool version 2.2 or later.

FLTA Dimensions



MODBUS Registers (FLTA version 2.2)

The FLTA supports the following Modbus registers and function codes (FLTA version 2.2). The default communication speed is 9600 bps. The other settings for the Modbus communication are: 8 data bits, Parity None and 1 Stop Bit.

NOTE: It is necessary to enable the MODBUS during the commissioning before the FLTA starts to respond to the MODBUS queries.

Register	Parameter Description	Modbus Function Code	Data Type	Range
	FUNCTION CODE 01 - READ COILS			
	DIGITAL OUTPUT 1 MODBUS REGISTERS			
1	Device 1 DO1 (RY-FL)	01 - Read Coils	Bit0	On - Off
2	Device 2 DO1 (RY-FL)	01 - Read Coils	Bit1	On - Off
	...etc...			
99	Device 99 DO1 (RY-FL)	01 - Read Coils	Bit2	On - Off
	DIGITAL OUTPUT 2 MODBUS REGISTERS			
101	Device 1 DO2 (RY-FL)	01 - Read Coils	Bit4	On - Off
102	Device 2 DO2 (RY-FL)	01 - Read Coils	Bit5	On - Off
	...etc...			
199	Device 99 DO2 (RY-FL)	01 - Read Coils	Bit6	On - Off
201	Common Alarm Signal	01 - Read Coils	Bit 0	On - Off
	FUNCTION CODE 02 - READ DISCRETE INPUTS			
	LOW BATTERY REGISTERS			
1000**1**	Device 1 Low Battery	02 - Read Discrete Inputs	Bit 0	On - Off
1000**2**	Device 2 Low Battery	02 - Read Discrete Inputs	Bit 1	On - Off
	...etc...			
100**99**	Device 99 Low Battery	02 - Read Discrete Inputs	Bit 2	On - Off
	COMMUNICATION LOST REGISTERS			
10**101**	Device 1 Communication Lost	02 - Read Discrete Inputs	Bit 3	On - Off
10**102**	Device 2 Communication Lost	02 - Read Discrete Inputs	Bit 4	On - Off
	..etc...			
10**199**	Device 99 Communication Lost	02 - Read Discrete Inputs	Bit 2	On - Off
	PIR STATUS REGISTERS			
10**201**	Device 1 PIR	02 - Read Discrete Inputs	Bit 8	On - Off
10**202**	Device 2 PIR	02 - Read Discrete Inputs	Bit 9	On - Off
	..etc...			
10**299**	Device 99 PIR	02 - Read Discrete Inputs	Bit 10	On - Off
	DIGITAL INPUT 1 REGISTERS			
10**301**	Device 1 DI1 (RY-FL)	02 - Read Discrete Inputs	Bit 12	On - Off
10**302**	Device 2 DI1 (RY-FL)	02 - Read Discrete Inputs	Bit 13	On - Off

Register	Parameter Description	Modbus Function Code	Data Type	Range
	..etc...			
10**399**	Device 99 DI1 (RY-FL)	02 - Read Discrete Inputs	Bit 14	On - Off
	DIGITAL INPUT 2 REGISTERS			
10**401**	Device 1 DI2 (RY-FL)	02 - Read Discrete Inputs	Bit 0	On - Off
10**402**	Device 2 DI2 (RY-FL)	02 - Read Discrete Inputs	Bit 1	On - Off
	..etc...			
10**499**	Device 99 DI2 (RY-FL)	02 - Read Discrete Inputs	Bit 2	On - Off
	FUNCTION CODE 04 - READ INPUT REGISTERS			
	DISCRETE INPUTS READ AS 16 BIT			
3000**2**	Discrete Inputs 16-01	04 - Read Input Registers	16 bit	
3000**3**	Discrete Inputs 32-17	04 - Read Input Registers	16 bit	
3000**4**	Discrete Inputs 48-33	04 - Read Input Registers	16 bit	
3000**5**	Discrete Inputs 64-49	04 - Read Input Registers	16 bit	
3000**6**	Discrete Inputs 80-65	04 - Read Input Registers	16 bit	
3000**7**	Discrete Inputs 96-81	04 - Read Input Registers	16 bit	
3000**8**	Discrete Inputs 112-97	04 - Read Input Registers	16 bit	
3000**9**	Discrete Inputs 128-98	04 - Read Input Registers	16 bit	
300**10**	Discrete Inputs 144-129	04 - Read Input Registers	16 bit	
300**11**	Discrete Inputs 160-145	04 - Read Input Registers	16 bit	
300**12**	Discrete Inputs 176-161	04 - Read Input Registers	16 bit	
300**13**	Discrete Inputs 192-177	04 - Read Input Registers	16 bit	
300**14**	Discrete Inputs 208-193	04 - Read Input Registers	16 bit	
300**15**	Discrete Inputs 224-209	04 - Read Input Registers	16 bit	
300**16**	Discrete Inputs 240-225	04 - Read Input Registers	16 bit	
300**17**	Discrete Inputs 256-241	04 - Read Input Registers	16 bit	
300**18**	Discrete Inputs 272-257	04 - Read Input Registers	16 bit	
300**19**	Discrete Inputs 288-273	04 - Read Input Registers	16 bit	
300**20**	Discrete Inputs 304-289	04 - Read Input Registers	16 bit	
300**21**	Discrete Inputs 320-305	04 - Read Input Registers	16 bit	
300**22**	Discrete Inputs 336-321	04 - Read Input Registers	16 bit	
300**23**	Discrete Inputs 352-337	04 - Read Input Registers	16 bit	
300**24**	Discrete Inputs 368-353	04 - Read Input Registers	16 bit	
300**25**	Discrete Inputs 384-369	04 - Read Input Registers	16 bit	
300**26**	Discrete Inputs 400-385	04 - Read Input Registers	16 bit	
300**27**	Discrete Inputs 416-401	04 - Read Input Registers	16 bit	
300**28**	Discrete Inputs 432-417	04 - Read Input Registers	16 bit	
300**29**	Discrete Inputs 448-433	04 - Read Input Registers	16 bit	
300**30**	Discrete Inputs 464-449	04 - Read Input Registers	16 bit	
300**31**	Discrete Inputs 480-465	04 - Read Input Registers	16 bit	
300**32**	Discrete Inputs 496-481	04 - Read Input Registers	16 bit	
300**33**	Discrete Inputs 512-497	04 - Read Input Registers	16 bit	
	COILS READ AS 16 BIT			
300**34**	Coils 16-01	04 - Read Input Registers	16 bit	
300**35**	Coils 31-17	04 - Read Input Registers	16 bit	
300**36**	Coils 48-33	04 - Read Input Registers	16 bit	
300**37**	Coils 64-49	04 - Read Input Registers	16 bit	
300**38**	Coils 80-65	04 - Read Input Registers	16 bit	
300**39**	Coils 96-81	04 - Read Input Registers	16 bit	
300**40**	Coils 112-97	04 - Read Input Registers	16 bit	
300**41**	Coils 128-113	04 - Read Input Registers	16 bit	
300**42**	Coils 144-129	04 - Read Input Registers	16 bit	
300**43**	Coils 160-145	04 - Read Input Registers	16 bit	
300**44**	Coils 176-161	04 - Read Input Registers	16 bit	

Register	Parameter Description	Modbus Function Code	Data Type	Range
300**45**	Coils 192-177	04 - Read Input Registers	16 bit	
300**46**	Coils 208-193	04 - Read Input Registers	16 bit	
	ANALOGUE OUTPUT VALUES (READ ONLY)			
300**50**	Device 1 AO1 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
300**51**	Device 1 AO2 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
300**52**	Device 2 AO1 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
300**53**	Device 2 AO2 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
	...etc...			
30**244**	Device 98 AO1 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
30**245**	Device 98 AO2 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
30**246**	Device 99 AO1 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
30**247**	Device 99 AO2 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
	DEVICE MEASUREMENTS (TE, AI, RH, DI - see Notes for more details)			
30**248**	Device 1 TE / AI1	04 - Read Input Registers	Signed 16	See Note 2
30**249**	Device 1 SP / AI2 / Uin / LUX	04 - Read Input Registers	Signed 16	See Note 3
30**250**	Device 1 RH	04 - Read Input Registers	Signed 16	See Note 4
30**251**	Device 1 FAN / PIR STATUS	04 - Read Input Registers	Signed 16	See Note 5
30**252**	Device 2 TE / AI1	04 - Read Input Registers	Signed 16	See Note 2
30**253**	Device 2 SP / AI2 / Uin / LUX	04 - Read Input Registers	Signed 16	See Note 3
30**254**	Device 2 RH	04 - Read Input Registers	Signed 16	See Note 4
30**255**	Device 2 FAN / PIR STATUS	04 - Read Input Registers	Signed 16	See Note 5
	.			
30**256**	Device 3 TE / AI1	04 - Read Input Registers	Signed 16	See Note 2
30**257**	Device 3 SP / AI2 / Uin / LUX	04 - Read Input Registers	Signed 16	See Note 3
30**258**	Device 3 RH	04 - Read Input Registers	Signed 16	See Note 4
30**259**	Device 3 FAN / PIR STATUS	04 - Read Input Registers	Signed 16	See Note 5
30**260**	Device 4 TE / AI1	04 - Read Input Registers	Signed 16	See Note 2
30**261**	Device 4 SP / AI2 / Uin / LUX	04 - Read Input Registers	Signed 16	See Note 3
30**262**	Device 4 RH	04 - Read Input Registers	Signed 16	See Note 4
30**263**	Device 4 FAN / PIR STATUS	04 - Read Input Registers	Signed 16	See Note 5
30**264**	Device 5 TE / AI1	04 - Read Input Registers	Signed 16	See Note 2
30**265**	Device 5 SP / AI2 / Uin / LUX	04 - Read Input Registers	Signed 16	See Note 3
30**266**	Device 5 RH	04 - Read Input Registers	Signed 16	See Note 4
30**267**	Device 5 FAN / PIR STATUS	04 - Read Input Registers	Signed 16	See Note 5
	...etc..			
30**640**	Device 99 TE / AI1	04 - Read Input Registers	Signed 16	See Note 2
30**641**	Device 99 SP / AI2 / Uin / LUX	04 - Read Input Registers	Signed 16	See Note 3
30**642**	Device 99 RH	04 - Read Input Registers	Signed 16	See Note 4
30**643**	Device 99 FAN / PIR STATUS	04 - Read Input Registers	Signed 16	See Note 5
	FUNCTION CODE 05 - WRITE SINGLE COIL			
	DIGITAL OUTPUT 1 MODBUS REGISTERS			
1	Device 1 DO1 (RY-FL)	05 - Write Single Coil	Bit0	On - Off
2	Device 2 DO1 (RY-FL)	05 - Write Single Coil	Bit1	On - Off
	...etc...			
99	Device 99 DO1 (RY-FL)	05 - Write Single Coil	Bit2	On - Off
	DIGITAL OUTPUT 2 MODBUS REGISTERS			
101	Device 1 DO2 (RY-FL)	05 - Write Single Coil	Bit4	On - Off
102	Device 2 DO2 (RY-FL)	05 - Write Single Coil	Bit5	On - Off
	...etc...			
199	Device 99 DO2 (RY-FL)	05 - Write Single Coil	Bit6	On - Off

Register	Parameter Description	Modbus Function Code	Data Type	Range
201	Common Alarm Signal Acknowledgement	05 - Write Single Coil	Bit 0	On - Off
	FUNCTION CODE 06 - WRITE HOLDING REGISTER			
	WRITING COILS AS A SINGLE 16-BIT MESSAGE			
400**34**	Coils 16-01	06 - Write Holding Register	16 bit	
400**35**	Coils 31-17	06 - Write Holding Register	16 bit	
400**36**	Coils 48-33	06 - Write Holding Register	16 bit	
400**37**	Coils 64-49	06 - Write Holding Register	16 bit	
400**38**	Coils 80-65	06 - Write Holding Register	16 bit	
400**39**	Coils 96-81	06 - Write Holding Register	16 bit	
400**40**	Coils 112-97	06 - Write Holding Register	16 bit	
400**41**	Coils 128-113	06 - Write Holding Register	16 bit	
400**42**	Coils 144-129	06 - Write Holding Register	16 bit	
400**43**	Coils 160-145	06 - Write Holding Register	16 bit	
400**44**	Coils 176-161	06 - Write Holding Register	16 bit	
400**45**	Coils 192-177	06 - Write Holding Register	16 bit	
400**46**	Coils 208-193	06 - Write Holding Register	16 bit	
	ANALOGUE OUTPUT MODBUS REGISTERS			
400**50**	Device 1 AO1 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
400**51**	Device 1 AO2 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
400**52**	Device 2 AO1 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
400**53**	Device 2 AO2 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
	...etc...			
40**244**	Device 98 AO1 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
40**245**	Device 98 AO2 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
40**246**	Device 99 AO1 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
40**247**	Device 99 AO2 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
	FUNCTION CODE 16 - WRITE MULTIPLE REGISTERS			
	ANALOGUE OUTPUT MODBUS REGISTERS			
400**50**	Device 1 AO1 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
400**51**	Device 1 AO2 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
400**52**	Device 2 AO1 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
400**53**	Device 2 AO2 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
	...etc...			
40**244**	Device 98 AO1 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
40**245**	Device 98 AO2 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
40**246**	Device 99 AO1 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%
40**247**	Device 99 AO2 (RY-FL)	06 - Write Holding Register	Signed 16	0..100%

Data Register Scaling and Notes

Different sensor/transmitter types have different active ranges. Depending on the configured sensor the Modbus registers raw data values scale to match the corresponding sensor type.

Note 1. Digital Ouput Coil Device n DOx = On Disables Analogue Output Device n AOx
Digital Ouput Coil Device n DOx = Off Enables Analogue Output Device n AOx

		Data Type	Raw Data	Scaled Data
Note 2.	TEFL and LA-FL: TE (Temperature)	Signed 16	0..500	0.0..50.0°C
	TEU-FL and KLU-FL: TE (Temperature)	Signed 16	-500..1500	-50.0..150.0°C
	RY-FL: AI1 (Analogue 0..10Vdc Input)	Signed 16	0..100	0..10.0V
Note 3.	TEFL: SP	Signed 16	175..245	17.5..24.5°C
	TEU-FL: Uin (Analogue 0..10Vdc Input)	Signed 16	0..100	0.0..10.0 V
	KLU-FL: LUX (Lux Level)	Signed 16	0..1000	0..1000 lux
	LA-FL: LUX (Lux Level)	Signed 16	0..2000	0..2000 lux
	RY-FL: AI2 (Analogue 0..10Vdc Input)	Signed 16	0..100	0..10.0V
Note 4.	TEFL, KLU-FL and LA-FL: RH (Humidity)	Signed 16	0..1000	0.0..100.0%
	TEU-FL and RY-FL: not used	Signed 16	0	0
Note 5.	TEFL: FAN (5-position switch)	Signed 16	1-2-3-4-5	1-2-3-4-5
	TEU-FL, KLU-FL AND RY-FL: not used	Signed 16	0	0
	LA-FL: PIR (PIR status)	Signed 16	0-1	0 (OFF) - 1 (ON)

Quick Reference for Input Registers

The table below has a quick reference to all measurements (Function Code 4 - Input Registers) for up to 99 sensors. Please note that with some Modbus master you will need to add 30000 to the register value.

FLTA v.2.2 Modbus Input Registers (Function Code 4)

RY-FL	AI1	AI2		
LA-FL	TE	LUX		PIR
KLU-FL	TE	LUX	RH	
TEU-FL	TE	Uin		
TEFL	TE	SP	RH	FAN
Device Address				
1	248	249	250	251
2	252	253	254	255
3	256	257	258	259
4	260	261	262	263
5	264	265	266	267
6	268	269	270	271
7	272	273	274	275
8	276	277	278	279
9	280	281	282	283
10	284	285	286	287
11	288	289	290	291
12	292	293	294	295
13	296	297	298	299
14	300	301	302	303
15	304	305	306	307
16	308	309	310	311
17	312	313	314	315
18	316	317	318	319
19	320	321	322	323
20	324	325	326	327
21	328	329	330	331
22	332	333	334	335
23	336	337	338	339
24	340	341	342	343
25	344	345	346	347

RY-FL		AI1	AI2		
LA-FL		TE	LUX		PIR
KLU-FL		TE	LUX	RH	
TEU-FL		TE	Uin		
TEFL		TE	SP	RH	FAN
	26	348	349	350	351
	27	352	353	354	355
	28	356	357	358	359
	29	360	361	362	363
	30	364	365	366	367
	31	368	369	370	371
	32	372	373	374	375
	33	376	377	378	379
	34	380	381	382	383
	35	384	385	386	387
	36	388	389	390	391
	37	392	393	394	395
	38	396	397	398	399
	39	400	401	402	403
	40	404	405	406	407
	41	408	409	410	411
	42	412	413	414	415
	43	416	417	418	419
	44	420	421	422	423
	45	424	425	426	427
	46	428	429	430	431
	47	432	433	434	435
	48	436	437	438	439
	49	440	441	442	443
	50	444	445	446	447
	51	448	449	450	451
	52	452	453	454	455
	53	456	457	458	459
	54	460	461	462	463
	55	464	465	466	467
	56	468	469	470	471
	57	472	473	474	475
	58	476	477	478	479
	59	480	481	482	483
	60	484	485	486	487
	61	488	489	490	491
	62	492	493	494	495
	63	496	497	498	499
	64	500	501	502	503
	65	504	505	506	507
	66	508	509	510	511
	67	512	513	514	515
	68	516	517	518	519
	69	520	521	522	523
	70	524	525	526	527
	71	528	529	530	531
	72	532	533	534	535
	73	536	537	538	539
	74	540	541	542	543
	75	544	545	546	547
	76	548	549	550	551
	77	552	553	554	555
	78	556	557	558	559
	79	560	561	562	563
	80	564	565	566	567
	81	568	569	570	571
	82	572	573	574	575
	83	576	577	578	579
	84	580	581	582	583