Application Note

Modbus TCP Host Utility

For use with GW66 Gateway

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1 Modbus TCP Host Utility

1.1 Introduction

- For use with the FLIR GW66 Gateway
- Port: 502 (default), programmable
- Modbus TCP ID: 1 (default), programmable
- Up to ten (10) vibration sensors can be monitored

1.2 Register the Sensor Locations

Every sensor has 59 registers (36 fields). Each register has 16 bits.

Sensor	1	2	3	4	5
Register	0 to 58	59 to 117	118 to 176	177 to 235	236 to 294
Sensor	6	7	8	9	10
Register	295 to 353	354 to 412	413 to 471	472 to 530	531 to 589

1.3 Sensor Fields and Registers

Field	record_ time	iso_x	iso_ state_x	iso_y	iso_ state_y	iso_z	iso_ state_z
Register	0-1	2-3	4	5-6	7	8-9	10
Length	2	2	1	2	1	2	1

Field	rms_x	rms_ state_x	rms_y	rms_ state_y	rms_z	rms_ state_z	peak_x
Register	11-12	13	14-15	16	17-18	19	20-21
Length	2	1	2	1	2	1	2

Field	peak_ state_x	peak_y	peak_ state_y	peak_z	peak_ state_z	cf_x	cf_ state_x
Register	22	23-24	25	26-27	28	29-30	31
Length	1	2	1	2	1	2	1

Field	cf_y	cf_ state_y	cf_z	cf_ state_z	kurt_x	kurt_y	kurt_z
Register	32-33	34	35-36	37	38-39	40-41	42-43
Length	2	1	2	1	2	2	2

Field	skew_x	skew_y	skew_z	stdev_x	stdev_y	stdev_z	temp
Register	44-45	46-47	48-49	50-51	52-53	54-55	56-57
Length	2	2	2	2	2	2	2

Field	temp_ state
Register	58
Length	1

A sensor has 36 fields. Some of the fields use one register (16-bit) for data value, and the others use two registers (32-bit). When registers are combined to represent a 32-bit data value, the lower 16 bits belong to the first register and the higher 16 bits belong to the second. (ex : register[0], register[1])

1.4 4. Data Type and Value (all fields)

Field	Data type	Data value
record_time	Uint32	high register x 2^{16} + low register
iso_x	Int32	(high register x 2^{16} + low register) / 1000
iso_state_x	Int16	register
iso_y	Int32	(high register x 2^{16} + low register) / 1000
iso_state_y	Int16	register
iso_z	Int32	(high register x 2^{16} + low register) / 1000
iso_state_z	Int16	register
rms_x	Int32	(high register x 2^{16} + low register) / 1000
rms_state_x	Int16	register
rms_y	Int32	(high register x 2^{16} + low register) / 1000
rms_state_y	Int16	register
rms_z	Int32	(high register x 2^{16} + low register) / 1000
rms_state_z	Int16	register
peak_x	Int32	(high register x 2^{16} + low register) / 1000
peak_state_x	Int16	register
peak_y	Int32	(high register x 2^{16} + low register) / 1000
peak_state_y	Int16	register
peak_z	Int32	(high register x 2^{16} + low register) / 1000
peak_state_z	Int16	register
cf_x	Int32	(high register x 2^{16} + low register) / 1000
cf_state_x	Int16	register
cf_y	Int32	(high register x 2^{16} + low register) / 1000
cf_state_y	Int16	register
cf_z	Int32	(high register x 2^{16} + low register) / 1000
cf_state_z	Int16	register
kurt_x	Int32	(high register x 2^{16} + low register) / 1000
kurt_y	Int32	(high register x 2^{16} + low register) / 1000

kurt_z	Int32	(high register x 2^{16} + low register) / 1000
skew_x	Int32	(high register x 2^{16} + low register) / 1000
skew_y	Int32	(high register x 2^{16} + low register) / 1000
skew_z	Int32	(high register x 2^{16} + low register) / 1000
stdev_x	Int32	(high register x 2^{16} + low register) / 1000
stdev_y	Int32	(high register x 2^{16} + low register) / 1000
stdev_z	Int32	(high register x 2^{16} + low register) / 1000
temp	Int32	(high register x 2^{16} + low register) / 1000
temp_state	Int16	register

1.5 Verify Modbus Broker

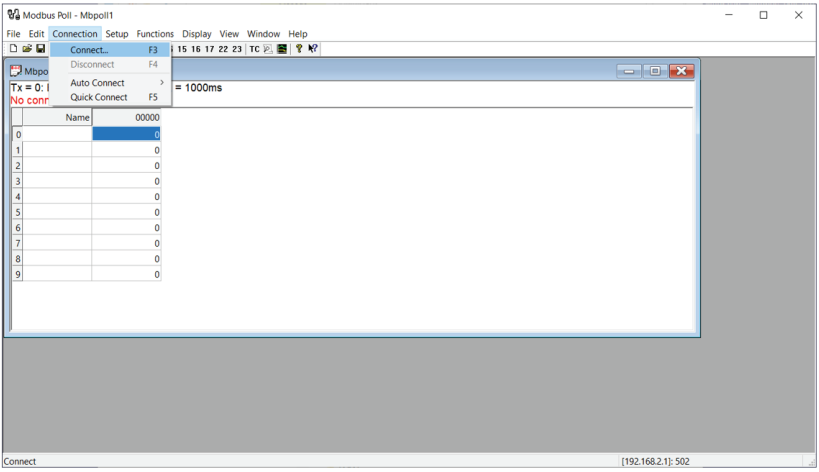
Modbus is enabled by default. In the GW66 user interface, set the Port number and then click Save & Apply.

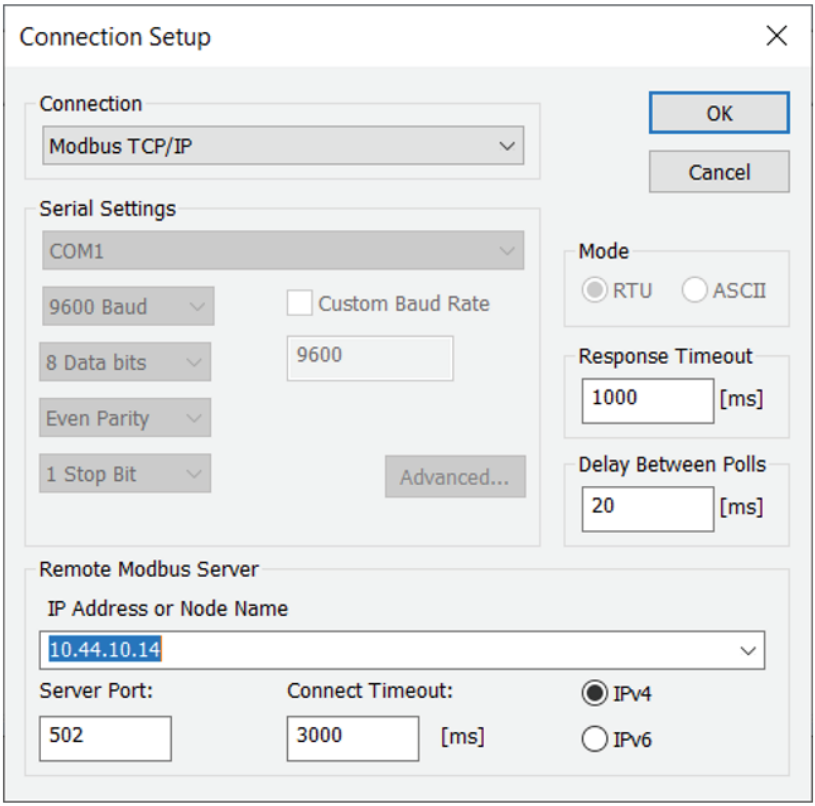
1.6 Download the Modbus Client Server

Use the link below to download the Modbus Master Simulator, the software utility for testing Modbus slave devices (dxp.pl)

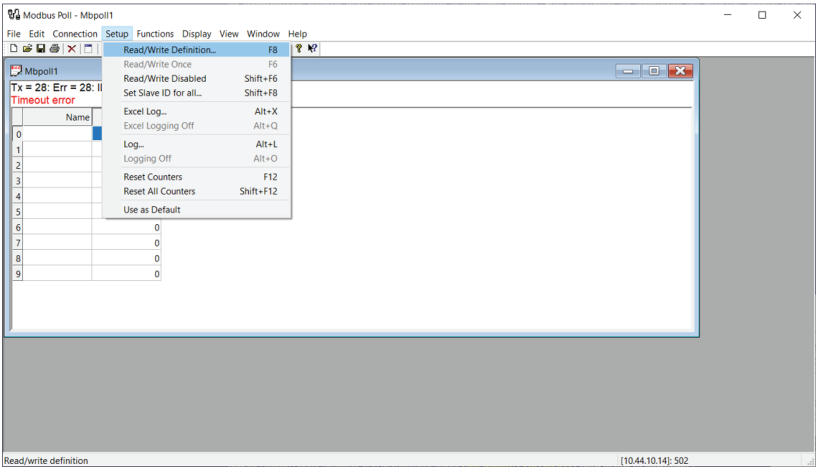
https://en.radzio.dxp.pl/modbus-master-simulator/

1.7 Set up the Modbus Client Server Connection

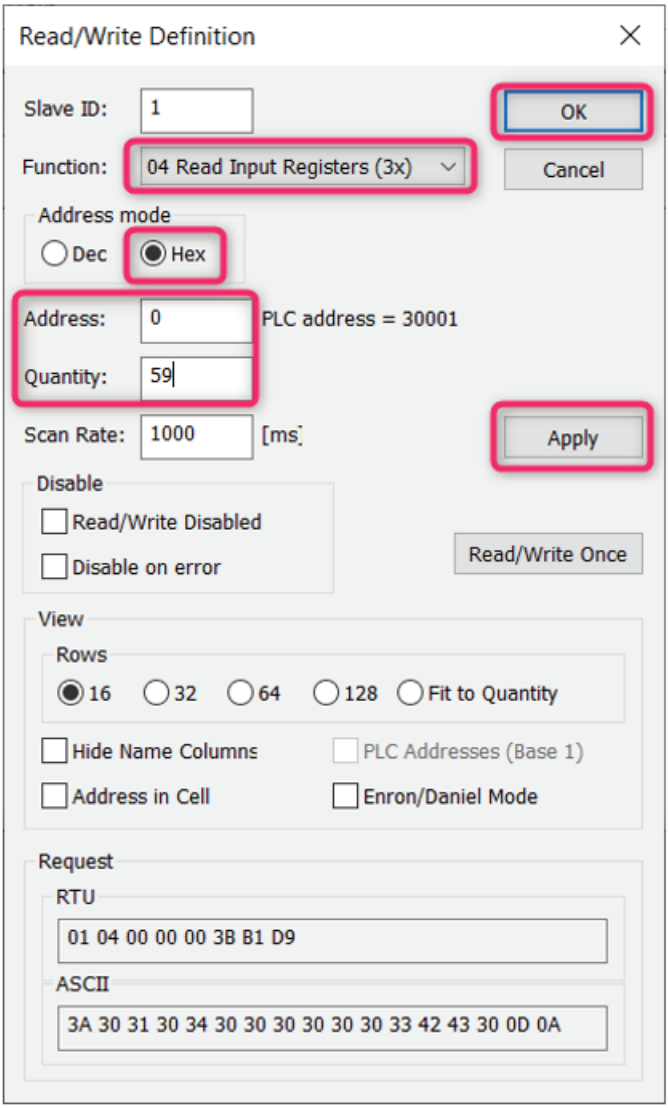



Connection Setup
Connection
Modbus TCP/IP
OK
Cancel
Serial Settings
COM1
9600 Baud
Custom Baud Rate
8 Data bits
9600
Even Parity
1 Stop Bit
Advanced...
Mode
RTU
ASCII
Response Timeout
1000
[ms]
Delay Between Polls
20
[ms]
Remote Modbus Server
IP Address or Node Name
10.44.10.14
Server Port:
Connect Timeout:
IPv4
502
3000
[ms]
IPv6

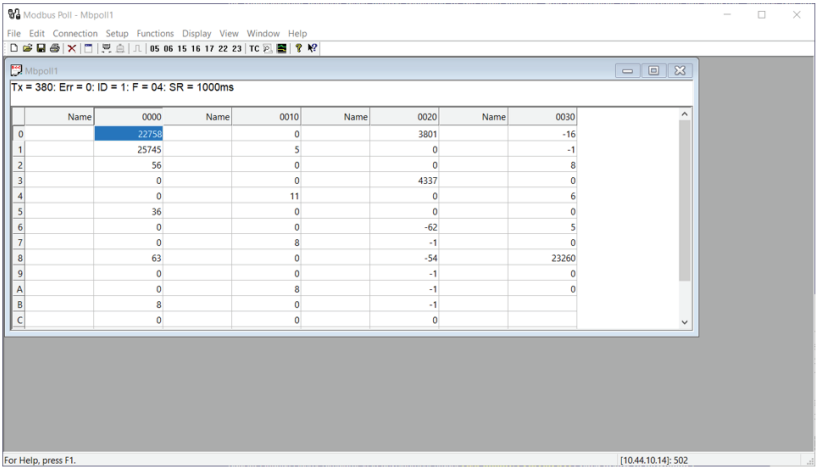
1.8 Read/Write Definition Setup



1. Function: 04 Read Input Registers (3x)
2. Address mode: Hex
3. Address: 0 (1st sensor: 0 to 58)
4. Quantity: 59 (1st sensor: 0 to 58)
5. Click **Apply**
6. Click **OK**


Read/Write Definition
Slave ID: 1
OK
Function: 04 Read Input Registers (3x)
Cancel
Address mode
Dec
Hex
Address: 0
PLC address = 30001
Quantity: 59
Scan Rate: 1000 [ms]
Apply
Disable
Read/Write Disabled
Disable on error
Read/Write Once
View
Rows
16 32 64 128 Fit to Quantity
Hide Name Columns
PLC Addresses (Base 1)
Address in Cell
Enron/Daniel Mode
Request
RTU
01 04 00 00 00 3B B1 D9
ASCII
3A 30 31 30 34 30 30 30 30 30 30 33 42 43 30 0D 0A

1.9 Get all Data for 1st Sensor (CH3)

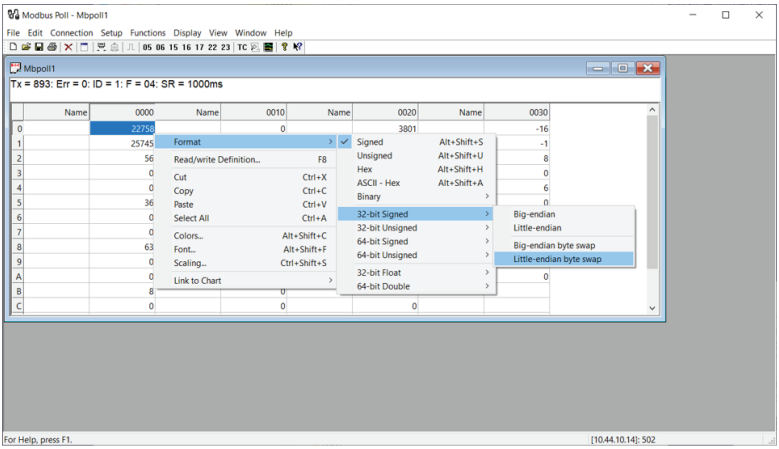


1.10 Sensor Fields and Registers. Combine and Transfer Hex to Reading Data (CH3)

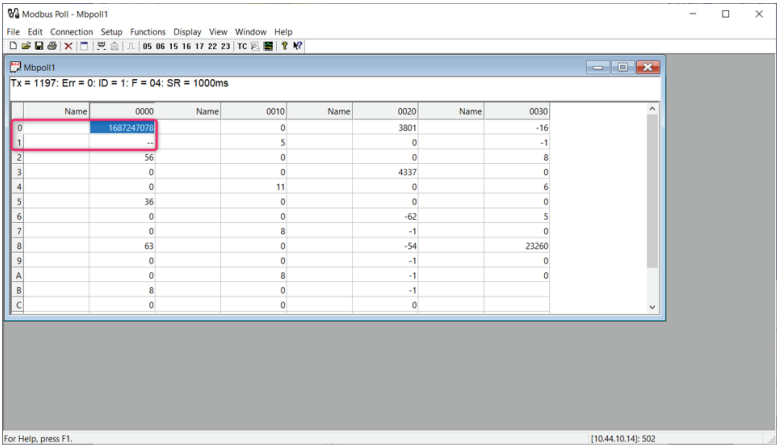
Example 1: record_time (Register 0–1, Length 2)

Field	record_time	iso_x	iso_state_x	iso_y	iso_state_y	iso_z	iso_state_z
Register	0-1	2-3	4	5-6	7	8-9	10
Length	2	2	1	2	1	2	1

1. Select Register 0
2. Right-click on Setup Format > 32–bit Signed > Little-endian byte swap



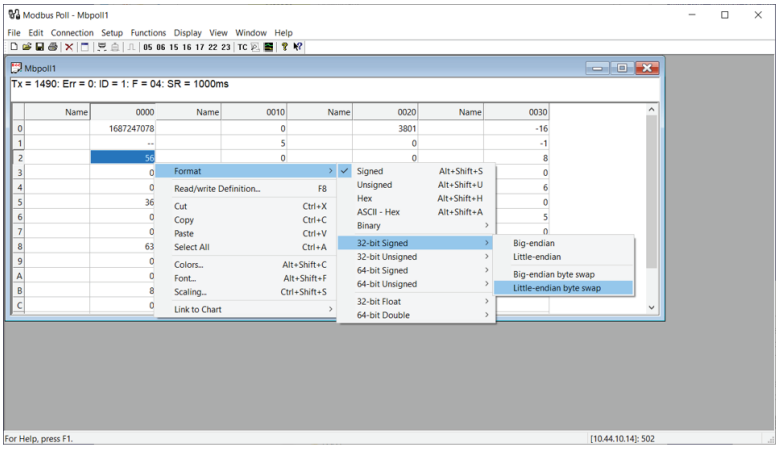
3. Register 0–1 will be combined as record_time reading data



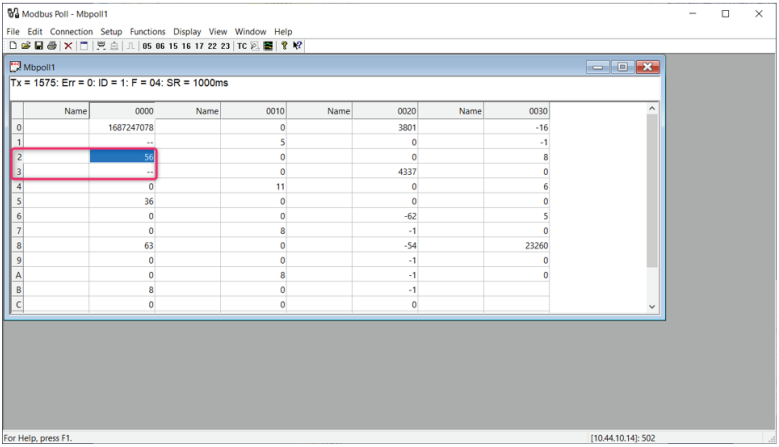
Example 2: iso_x (Register 2–3, Length 2)

Field	record_time	iso_x	iso_state_x	iso_y	iso_state_y	iso_z	iso_state_z
Register	0-1	2-3	4	5-6	7	8-9	10
Length	2	2	1	2	1	2	1

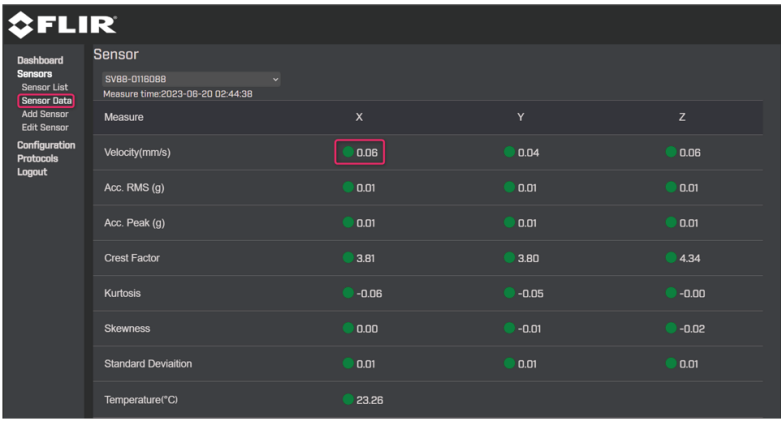
4. Select Register 2
5. Right-click on Setup Format > 32–bit Signed > Little-endian byte swap



6. Register 2–3 will be combined as iso_x reading data (56/1000 = 0.056 ~ 0.6g)



7. The data in Modbus should be the same as the Sensor data in the GW66 user interface



1.11 Customer Support

Customer Support Telephone List	https://support.flir.com/contact
Repair, Calibration, and Technical Support	https://support.flir.com

Website
http://www.flir.com

Customer support
http://support.flir.com

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