

# **Application Note**

### Modbus TCP Host Utility

For use with GW66 Gateway





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#### 1.1 Introduction

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- 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

<b>\$</b> FLIR					
Deebboard	Settings	Log Messages			
Sensors	Port				
Protocols					
Modbus TCP MOTT				Save 8 Apply	Reset
OPC UA					
Logout					

#### 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

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
	-						

#### 1.3 Sensor Fields and Registers

Field	temp_ state
Register	58
Length	1
Longui	•

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])

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

1.4 4. Data Type and Value (all fields)

kurt_z	Int32	(high register x 2 <sup>16</sup> + low register) / 1000
skew_x	Int32	(high register x 2 <sup>16</sup> + low register) / 1000
skew_y	Int32	(high register x 2 <sup>16</sup> + low register) / 1000
skew_z	Int32	(high register x 2 <sup>16</sup> + low register) / 1000
stdev_x	Int32	(high register x 2 <sup>16</sup> + low register) / 1000
stdev_y	Int32	(high register x 2 <sup>16</sup> + low register) / 1000
stdev_z	Int32	(high register x 2 <sup>16</sup> + low register) / 1000
temp	Int32	(high register x 2 <sup>16</sup> + 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/

ଷ୍ମ୍ର Modbu	is Poll - Mbpoll1			-	×
File Edit	Connection Setup	Function	is Display View Window Help		
0 📽 🖬	Connect	F3	1 15 16 17 22 23 TC 🗵 🖀 😵 🛠		
Mbpo	Disconnect	F4			
Tx = 0: I	Auto Connect Quick Connect	, F5	= 1000ms		
	Name	00000			
1		0			
2		0			
4		0			
5		0			
6		0			
/ 8		0			
9		0			
<u> </u>					
Connect			[192.168.2.1]: 502		

#### 1.7 Set up the Modbus Client Server Connection

Connection		
Modbus TCP/IP	~	ОК
		Cancel
Serial Settings		
COM1	$\sim$	Mode
9600 Baud $\sim$	Custom Baud Rate	● RTU ○ ASCII
8 Data bits $\sim$	9600	Response Timeout
Even Parity $\sim$		1000 [ms]
1 Stop Bit 🗸 🗸	Advanced	Delay Between Polls
	, availed an	20 [ms]
Remote Modbus Serve	r	
IP Address or Node Na	ame	
10.44.10.14		~
Server Port:	Connect Timeout:	IPv4
502	3000 [ms]	O IPv6

Modbus Poll - Mbpoll1				_	×
File Edit Connection Se	etup Functions Display View	Window	Help		
□ @ Wbpoll1           Tx = 28: Err = 28: II	Read/Write Definition Read/Write Once Read/Write Disabled Set Slave ID for all	F8 F6 Shift+F6 Shift+F8			
Name	Excel Log Excel Logging Off	Alt+X Alt+Q			
1	Log Logging Off	Alt+L Alt+O			
3 4	Reset Counters Reset All Counters	F12 Shift+F12			
5	Use as Default				
6 7	0				
9	0				
J					
Read/write definition			[10.44.10.14]: 502		

#### 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	e Definitior	ו			×					
Slave ID:	1	]		ОК						
Function: 04 Read Input Registers (3x) V Cancel										
Address m	• Hex									
Address:	0	PLC ad	dress = 30001	L						
Quantity:	59	J								
Scan Rate:	1000	[ms]		Apply						
Disable Read/V Disable	Write Disable e on error	d		Read/Write Once	e					
View Rows (16)	○ 32	)64 (	)128 () Fit	to Quantity						
Hide Na	ame Column	s	PLC Addre	esses (Base 1)						
Request RTU 01 04 0 ASCII 3A 30 3	o 00 00 3B 8	31 D9 30 30 30	Enron/Dar 30 30 33 42 4	13 30 0D 0A						

Modb	us Poll - Mbpoll1									-	×
File Edit	Connection Se	tup Functions	Display View V	/indow Help							
D 🧀 🖬	ax II	≜  05 06 1	5 16 17 22 23 1	rc 🖻 📰 🤋 💖							
Mbpr											
$T_X = 38$	0: Err = 0: ID =	1' F = 04' SB	= 1000ms								
	0. 211 0.10		10001110								
	Name	0000	Name	0010	Name	0020	Name	0030	^		
0		22758		0		3801		-16			
1		25745		5		0		-1			
2		56		0		0		8			
3		0		0		4337		0			
4		0		11		0		6			
5		36		0		0		0			
6		0		0		-62		5			
7		0		8		-1		0			
8		63		0		-54		23260			
9		0		0		-1		0			
A		0		8		-1		0			
В		8		0		-1					
C		0		0		0			~		
or Help, p	ress F1.								[10.44.10.14]: 502		

### 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

22233         0         3801         -16           25745         Format         ✓         Signed         -16           56         Read/write Definition         F8         Unsigned         Alt+Shift+5         -1           0         Cut         Cut+X         Alt+Shift+4         0         0           0         Cut         Cut+X         Alt+Shift+4         0         0           36         Parse         Cut+X         22-bit Signed         Big-enclain         0           0         Colors         Alt+Shift+6         Alt+Shift+6         Big-enclain         Big-enclain           63         Forts         Cut+At+Shift+6         Signed         >         Big-enclain           0         Scaling         Cut+At+Shift+6         Alt+Shift+6         Alt+Shift+6         Big-enclain           0         Link to-Cut+         32-bit Float         >         Big-enclain byte swap         Big-enclain byte swap           0         0         0         0         0         0         0	22758				rioning	0030		
25745         Grantal         2         Signed         Alt-Shift-S         -           56         Read/write Definition         F8         Unipleed         Alt-Shift-S         -           6         Cut         Cut         Cut         Alt-Shift-S         -         -           6         Cut         Cut-K         Alt-Shift-S         -         -         -           7         Cut-K         Alt-Shift-F         Alt-Shift-F         -         -         -           8         Signed         Alt-Shift-F         Alt-Shift-F         -         -         -           0         Colors         Alt-Shift-F         Solt bigged         -         Big-endian         -           6         Stating         Cut-H-Shift-F         Solt bingged         -         Big-endian         -           0         Colors         Alt-Shift-F         64-bit Signed         Big-endian byte map         -           0         0         -         0         -         -         -			0	3801		-16		
56         Read/write Definition         F8         Unsigned         Alt-Shift-U         8           0         Cut         Cut+X         Alt-Shift-U         8         0           36         Paste         Cri+X         Alt-Shift-H         0         0           36         Paste         Cri+X         32-bit Signed         30         0         0           37         Select All         Cri+X         32-bit Signed         32-bit Signed         Big-enclain           36         Font.         Alt-Shift-F         43-bit Signed         Big-enclain         10           36         Font.         Alt-Shift-F         64-bit Unsigned         Big-enclain         10         10         64-bit Dusigned         Utite enclain byte swap           38         Bit Not         0         0         0         0         0         0	25745	Format	>	<ul> <li>Signed</li> </ul>	Alt+Shift+S	-1		
Image: constraint of the	56	Read/write Definition	F8	Unsigned	Alt+Shift+U	8		
0         Copy         Ctrl-C         ASUE - Hex         Aste-Shift-A         6           36         Paste         Ctrl-C         Big-endian         0           0         Select All         Ctrl-A         32-bit Signed         >         Bg-endian           0         Colors         Alt-Shift-C         4-bit Signed         >         Bg-endian           0         Scaling         Ctrl-Shift-S         4-bit Signed         >         Bg-endian byte swap           0         Scaling         Ctrl-Shift-S         4-bit Rold         >         Utrl-endian byte swap           0         Scaling         Ctrl-Shift-S         4-bit Rold         >         0           0         0         0         0         0          0         Viete-endian byte swap	0	Cut	Ctrl+X	Hex	Alt+Shift+H	0		
36         Plaste         Chi V         num         n           0         Select All         Chi V         32-bit Unsigned         Big-enclan           0         Colon         Alt-Shift-F         32-bit Unsigned         Uttlet-enclan           65         Font         Alt-Shift-F         64-bit Unsigned         Big-enclan           0         Link to Chart         >         22-bit Note         64-bit Unsigned         Uttlet-enclan byte swap           0         Link to Chart         >         64-bit Duolab         >         0           0         0         0         0         V         V         V	0	Сору	Ctrl+C	ASCII - Hex Binany	Alt+Shitt+A	6		
0         Select All         Ctrl-A         Select Signed         Big-enclain           0         Colors.         Alt-Shift-E         Select Mill         Big-enclain           63         Font.         Alt-Shift-E         Gel Signed         Big-enclain byte map           0         Scaling.         Ctrl-Shift-E         Gel Signed         Big-enclain byte map           0         Little-enclain         Scaling.         Ctrl-Shift-E         Gel Signed         Big-enclain byte map           0         Little-enclain         Scaling.         Ctrl-Shift-E         Gel Signed         Big-enclain byte map           0         Little-enclain         Scaling.         Ctrl-Shift-E         Gel Signed         Difference           0         Little-enclain         Scaling.         Ctrl-Shift-E         Gel Signed         Difference           0         Difference         Scaling.         Ctrl-Shift-E         Gel Signed         Difference	36	Paste	Ctrl+V	22 bit Classed		0 D'a andian		
0         Colors         Alt-Shift-C         Colors Signed         Difference           63         Fort         Alt-Shift-C         Signed         Big-enclose           0         Scaling         Ctrl+Shift-S         Signed         Big-enclose         Big-enclose           0         Scaling         Ctrl+Shift-S         Signed         Difference         Big-enclose           0         Link to Chart         2         64-bit Double         D         0           0         0         0         0         V         V         V	0	Select All	Ctrl+A	32-bit Uprigned	,	big-endian		
63         Font         Alt-Shift-F         64-bit Unsigned         Dig-enclain byte swap           0         List to Chart         32-bit To att         >         0         List enclain byte swap           0         List to Chart         -         -         0         -         0           0         0         0         0         0         -         0         -	0	Colors	Alt+Shift+C	64-bit Signed	,	Dia andia lata avan		
0         Saling         Cht+Shift+S         Saling         Cht+Shift+S         Saling         Cht+Shift+S         Cht+Shift+Shift+S         Cht+Shift+S         Cht+Shift+S         Cht+Shift+S         Cht+Shift+Shift+S         Cht+Shift+Shift+S         Cht+Shift+	63	Font	Alt+Shift+F	64-bit Unsigned	>	Little-endian byte swap		
0 Link to Chart → 64-bit Double → 0 0 0 √	0	Scaling	Ctrl+Shift+S	32-bit Float	>	o		
		Link to Chart	>	64-bit Double	>	0		
	0		0	0				
				1 1			· ·	

3. Register 0–1 will be combined as record\_time reading data

Name	0000	Name	0010	Name	0020	Name	0030	^		
	1687247078		0		3801		-16			
			5		0		-1			
	56		0		0		8			
	0		0		4337		0			
	0		11		0		6			
	36		0		0		0			
	0		0		-62		5			
	0		8		-1		0			
	63		0		-54		23260			
	0		0		-1		0			
	0		8		-1		0			
	8		0		-1					
	0		U		0			~	<u> </u>	

#### 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

									_	
Name	0000	Name 0	010	Name	0020	Name	0030		^	
	1687247078		0		3801		-16			
			5		0		-1			
	56		0		0		8			
	0	Format		~ ~	Signed	Alt+Shift+S	0			
	0	Read/write Definition	F8		Hex	Alt+Shift+H	6			
	36	Cut	Ctrl+X		ASCII - Hex	Alt+Shift+A	0			
		Сору	Ctrl+C		Binary	>	3			
	63	Paste Select All	Ctrl+V		32-bit Signed	>	Big-endian			
	0	Colorr	Alta Shifta C		32-bit Unsigned	>	Little-endian			
	0	Font	Alt+Shift+F		64-bit Signed	>	Big-endian byte sv	ap		
	8	Scaling	Ctrl+Shift+S		64-bit Unsigned	>	Little-endian byte :	wap		
	0	Link to Chart		>	32-bit Float 64-bit Double	>			~	

		. SR - 1000ms							
Na	me 0000	Name	0010	Name	0020	Name	0030	^	
	1687247078		0		3801		-16		
			5		0		-1		
	50		0		4227		0		
	0		11		4557		6		
	36		0		0		0		
	0		0		-62		5		
	0		8		-1		0		
	63		0		-54		23260		
	0		0		-1		0		
	0		8		-1		0		
	8		0		-1				
	0		0		0			~	

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

\$FLI	R			
Dashboard Sensors Sensor List	Sensor sv88-0116088 ~ Measure time:2023-06-20 02:44:38			
Add Sensor Edit Sensor	Measure			
Configuration Protocols	Velocity(mm/s)	0.06	0.04	0.06
Logout	Acc. RMS (g)	0.01	0.01	0.01
	Acc. Peak (g)	0.01	0.01	0.01
	Crest Factor	<b>3</b> .81	0 3.80	<b>e</b> 4.34
	Kurtosis	-0.06	-0.05	<b>-</b> 0.00
	Skewness	0.00	<b>-</b> 0.01	9.02
	Standard Deviaition	0.01	0.01	0.01
	Temperature(*C)	23.26		

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### 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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