Connecting an Emerson[®] Wireless Gateway to the ABB Totalflow XRC 6490

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1.1 Purpose

This document describes how to connect an Emerson Smart Wireless Gateway to a ABB Totalflow XRC6490using serial Modbus[®].

1.2 Emerson WirelessHART[®] Gateway

- ABB Totalflow XRC6490 with PCCU configuration software
- Emerson Smart Wireless Gateway1420/1410
- A computer setup to connect to the Gateway

1.3 Assumptions

- 1. The user of this document has a fundamental understanding of the ABB Totalflow PCCU software.
- 2. A comm port has been added in the Totalflow configuration for Modbus communications.
- 3. The user of this document has a fundamental understanding of the Gateway.





1.4 Wiring

1. Wire the modbus terminals.

Note

The Smart Wireless Gateway 1420 wiring diagram is shown below.

Figure 1-1. Standard Terminal Block



2. Connect the modbus "A" wire to pin 6 and "B" wire to pin 8. In this case we are connecting to Comm Port 2.

Figure 1-2. Connecting to Comm Port 2



1.5 Configuration

1. Configure the 1420 for serial modbus communication. This can be done using the web browser. In this case we are using the following communication settings, Baud Rate = 9600, Start Bit = 1, Data Bit = 8, Parity = None, Stop Bit = 1.

Figure 1-3. 1420 Settings for serial Modbus communications

EMERSON. Process Management	Smart Wireless Gateway	
	Modbus Communication	후 🕲 💼 admin
	One Modbus Address Multiple Modbus Addresss Modbus TCP Port Baud Rate Parity Stop Bits Response delay time (ms) Unmapped register write response? Unmapped register write response? Unmapped register write response? Floating point representation Use swapped floating point format? Incorporate value's associated status as error? Value reported for error (floating point) Value reported for error (floating point) Scaled floating point maximum integer value Use global scale gain and offset? Global scale gain Global scale gain	1 502 9600 • None • Even • Odd • 1 • 2 • 0 K • Illegal data addr • 0 K • Float • No • Yes • No
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Figure 1-4. 1420 Settings for serial Modbus Register Map Smart Wireless Gateway

	Modbus Register	Мар			🔍 🕲 📔 👩 admin	
to reve					Show/Hide System Registers	
10 De Magillos des	Register	A Po	int Name		State	Invert
- miner	30002	2051-WPT1.PV				
P Setup	30004	2051-WPT1.SV				
B - Trivetwork	E 30006	2051-WPT1 TV				0
Ethernet protocol	EI 30008	2051.WET1 (0/				
B G Security	E 30010	DIFICULT DU				1
Log Settings	0000	30515WIV1N51.PV				
Time	30012	3051SMV-INST.SV				
B System Backup	30014	3051SMV4NST.TV	-			
Page Options	30016	3051SMV4NST.QV				
Restart Apps						
Einnware Options	Isk First Isk Prev	ious Search		Page 1 of 1	Ne	ot>> Last>>
E A HART						
Changes	New entry					
E M Modbus	C. D. Linearity and	and an and a second				
Communication	Delete selected	Select All None Chors				
MTMapping	Submit					
import/Export						
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B MOPCOPC						
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© Emerson, 2013		Feedback		Terms Of Use	FW Rev:	4.4.30

2. Configure the Totalflow by starting the PCCU software. Click the **Entry** button to connect to the Totalflow XRC 6490 hardware.

PCCU37 - [Local Connect]	Entry	
Operate Wew Window Help	Linuy	- @ ×
1	/	
		4
	Station Device A	
	TOTALFLOW Measurement and Control FOU	
)<	
	Collect Historical Data Calibrate	
	Ently	
	Monitor Registry	
		Ciose Help
	#Folis 0 #Errors 0 Connecto	ed to TOTALR.OW Logini user

Figure 1-5. Starting the PCCU software

- 3. In this case we have renamed Comm Port 2 to RSMT Modbus. Select the Comm Port configured for modbus communications.
- 4. In the "Setup" tab, set the **Baud Rate** and the **Register Format** values. The Baud Rate must match with the Gateway modbus parameter settings.

Note

The value entered in "Register Format" will depend on what modbus registers you are reading in the Gateway.

- 5. Based on what you chose in the Gateway Modbus communication web page for "Use swapped Floating Point format", enter in correct **Register Format** value.
 - a. For Gateways not using swapped floating point format, select the "16 BIT Modicon".
 - b. If using the swapped format, then choose "16 Bit Word Swapped" in the Totalflow.

Operate Wew Window Help						- 6 X
1 🗖 🗖 🗖 😖	1	5	🗖 🖼 📾 🞯	T 🚽 🎹 🛠 🏭 🧶		
E TOTALPLOW E Communications - Local-COMD	Set	¢ /	Advanced Statistics			1
- Remote COU-COMI			Description		Value	
KSPIT Plodbus	4	4.4	Port Name	MSMT Modeux		
a do previous		0.0	Protocol	Moribus Host (RTU)		
Picking Registers		0.2	Deux Pate	9600		~
Operations		0.12	Register Format	1200		
Trend system				2400		
				4900		
iii Display				9900		8
i Display				19200		
i Display						
i Display				30400		

Figure 1-6. Select the Comm Port configured for Modbus communications

6. In this window, setup the **Data Bits**, **Parity** and **Stop Bits** to match the configuration of the 5300.

Note

It was found during our testing that the "Xmit Key Delay" and "Unkey Delay" should be set no higher than 10. If it is set to something higher, the Total Flow will not see the modbus responses. You can set the "Retries" to a value that will suit your requirements.



7. Click the **Save and Restore Utility** to launch the utility window.



- 8. Expand the "R" folder and then navigate to the Modbus comm Port.
- 9. Go to **Operate**, right click, and select **File Utilities**, and then select **Modbus Host Request Block Editor**.

Figure 1-9. Expand the "R" folder and then navigate to the Modbus comm port



- 10. This window is where the Modbus register mapping is set. This block will be set up to read any device variables that are floats. You will need to use Modbus Function code 4 (Read Input Registers).
 - a. Select the correct "Slave Address".
 - b. Enter in the Modbus register configured in the 1420 in the "Starting Register" field.
 - c. Enter in the number of registers needed to be read in "# Register".
 - d. Set the "Register Type" to float.
 - e. Set the "Type" to Interval.

Note

"Interval" is how often it should request the information.

- f. The Destination field contains the number of Registers shown and depends on the number of Registers requested. Start with 9.0.0 then increment by 1, the nest Destination register would be 9.0.1 and so on.
- g. When finish click **Send** and then save it.
- h. Enter in name for the MRB block.

20_MB.MRB			
e Edit View	Help		
Modbus Function	1	Destinati	on
4 - Read Inpul	:Registers 🔽		Register
Cl		1	9.0.0
Slave Addresss	1	2	9.0.1
Starting Registe	2	3	9.0.2
		4	9.0.3
# Registers	8	5	9.0.4
Register Tune	Elect at	6	9.0.5
riegister rype	Fillat 💌	7	9.0.6
Trigger		8	9.0.7
Type Inte	arval 🔽		
Interval 00:	00:03 😂		
Response Status		-	
Register	0.0.0		

- 11. In this block we are requesting Modbus registers mapped to Statuses which are integer
- 12. When finish click on **Send** and then save it.

values. Note here the "Register type" we used is Int16.

13. Enter in name for the MRB block.

20_ST.MRB	
ile Edit View Help	
Modbus Function	Destination
4 - Read Input Registers 🛛 🗸	Register
Slave Addresse 1	1 9.2.0
Siave Addresss	2 9.2.1
Starting Register 100	3 9.2.2
# Registers 3	
Register Type Int16 🗸	
Trigger	
Type Interval 💌	
Interval 00:00:02	
Response Status	
Register 0.0.0	

Figure 1-11. Modbus registers mapped to statuses

- 14. In this block we are requesting Modbus registers mapped to Statuses which are integer values. Note here the "Register type" we used is Int16.
- 15. When finish click on **Send** and then save it.
- 16. Enter in name for the MRB block.

20_b.mnb		2
e Edit View Help		_
fodbus Function	Destination	
1 - Read Coil Status 🛛 🗸	Register	
Elaus Addresse d	1 9.1.0	
Diave Addresss	2 9.1.1	
Starting Register 1	3 9.1.2	
	4 9.1.3	
#Registers 4		
Register Type 🛛 🛛 🗸		
rigger	_	
Type Interval 🗸		
nterval 00:00:03		
esponse Status		
Register 0.0.0		

Figure 1-12. Modbus registers mapped to statuses (cont.)

17. Click the **Save Station Files** button on the bottom of the screen. Make sure the "All Setup or Or Configuration Files" check box is checked, then click **OK**.

Figure 1-13. Save Station Files

PCCU32 - [Save and Restore]				- 0 X
Contratos View Window Help				- # X
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8.3	File Spites Free Space. 25064	1 2000		Louis
COM-D	Title Harris	5124	Last Modified	Attr
- COM-1	and Table if a	792	07/31/13 13 53 27	
- COM-2	Commented obj	98	07/31/13 13:53:35	0
Holding	System.cfg	90	07/31/13 13:54:09	0
- Conversions ⇒ Ri - COM-0 - COM-1 ⊕ COM-2 - Pedate - Pedate - Pedate - Pedate - Distance - Operations	Save Station Files		Dem	Heb
				- meh
	#Pols: 0 #En	ors: 0 Connected to	TOTALFLOW Logn	i user

- 18. Either Backup the existing station file or delete it.
- 19. Click **OK**. This will save the information of the "R" directory.

State State State COM-0 24 10/24/06 0/ COM-1 COM-0 24 10/24/06 0/ Obdous Predictions Tered Save Options Deprecisions Tered Deprecisions Example Display Save Options Mean Save Options VMC 6490 zip to VRC 6490 zip to VRC 6490_back6 zip Deemvie / Merge OK					-
2 Size Last Nor COM-0		File System Free Space: 468658			-
COM-0 COM-1 COM-1 COM-2 Modbus IDS Holding Operations Trend Display Save Options VRC 6490 zip station file is found. What would you like to do? Delete the existing station file. @ Backup XPC 6490 zip to XPIC 6490_back6.zip @ Deverwite / Merge OK Cancel	5300.4 MSB	File Name	24	10/24/06.00:01:58	-
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- 20. When the Upload is completed you will need to copy this to the "S" drive. Either you can select **Yes** in the window below. If you want to do this at a later time then select **No**.
- 21. Copy files to the "S" press **Restore Station Files** button on the bottom of the screen.

A vior pain	File System Free Space: 468658			
₽ Si	File llame	Size	Last Modified	Attr
	01StatFtu.dg	353	10/24/06 00:40:34	a
COM-2	11Aga3-1.dg	758	10/27/06 17:09:51	۵
L-Modhus	Display cfg	28	10/27/06 17:09:51	8
POS Poperations Poperations	Restore Station Files			

Figure 1-15. Restore Station Files

- 22. Return to the "Entry" mode to view the values.
- 23. Click **Holding Registers**, then the **Capacity** tab. In this window you can set how many registers are displayed in each Array and give the Array a name.



Operate View Window Help Operate View Window Help Operate View Window Help OTAUFLOW OTAUFLOW Communications UO Subsystem	HART Valiable	🌍 🛃 🛄	sing 🧶	scity			- 6 x
Holding Registers		Description	Capacity	Type	Persistence	Descriptors	Hame
Operations	9.255.255	Number of Arrays	3				
Trend System	9.255.0	Array 1	8	Float	Non-Persistent	Yes	HART Variables
i Display	9.255.1	Array 2	4	Dyte	Non-Persistent	Yes	Healtry Bits
	9.255.2	Array 3	3	Unt16	Non-Persistent	Yes	Varible Status
	Re-read)					Save Send Close Hep

- 24. Select the name of the tab you used in the above step.
- 25. Click **Reread** to get updates to the value.

Figure 1-17. Updates to the Values

PCCU32 - [Entry] Operate View Window Help PCU PCU PCU P	MB 22	i 🕸 🛃 🎹 🎿	@	
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- Holding Registers		Description		Value
Operations	9.0.0	1420_PV	1.0000	
Trend System	9.0.1	1420_SV	0.0000	
Display	9.0.2	1420_TV	32 5000	
	9.0.3	1420_QV	33.2500	
	9.0.4	648_PV	74.6796	
	9.0.5	648_SV	1.#GNB	
	9.0.6	648_TV	24.0000	
4	0.07	649 011	7 4 6 7 0	*********************

Note

This tab displays the Boolean values.

Figure 1-18. Boolean Values

🔄 PCCU32 - [Entry]					
🗌 Operate View Window Help					
fi 🔤 🖫 💽 💽	MB 32	i 🔍 🚽 🛄 2	up 🤣		
TOTALFLOW Generations Jense I/O Subsystem	HART Variables Healthy Bits Varible Status Capacity				
- Holding Registers		Description			Value
Operations	9.1.0	648 PV HEALTHY	1		
- Trend System	9.1.1	648 O_HEALTHY	1		
Image: Display	9.1.2	648 1 HEALTHY	1		
	9.1.3	AMBIENT TEMPERATURE FAIL	0		
		-			

Note

This tab displays the Integer values.

Figure 1-19. Integer Values



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Emerson Process Management

Rosemount Division 8200 Market Boulevard Chanhassen, MN 55317 USA T (U.S.) 1 800 999 9307 T (International) 952 906 8888 F 952 906 8889 www.rosemount.com

Emerson Process Management Latin America 1300 Concord Terrace, Suite 400 Sunrise Florida 33323 USA Tel + 1 954 846 5030 Rosemount Temperature GmbH Frankenstrasse 21 63791 Karlstein Germany T 49 6188 992 0 F 49 6188 992 112

Emerson Process Management Asia Pacific Private Limited

1 Pandan Crescent Singapore 128461 T 65 6777 8211 F 65 6777 0947 Enquiries@AP.EmersonProcess.com Emerson Process Managment No. 6 North Street Hepingli, Dong Cheng District Beijing 110013, China T 86 10 6428 2233 F 86 10 6422 8586

