TOTALFLOW
Technical Bulletin 97

ABB MultiVariable Setup

Totalflow Technical Bulletin

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Purpose

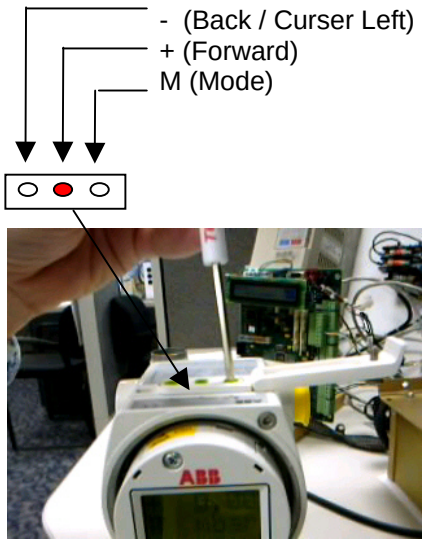
This bulletin describes the setup of an ABB Multivariable Transmitter (XMV) in Section 1(this page), the setup of the X-Series XFC or XRC flow computer in Section 2 (page 5), and the interconnection wiring in Section 3 (page 12).

Section 1 – XMV Setup

The ABB XMV measures Static Pressure, Differential Pressure and Process Temperature in a gas, vapor or liquid media. The XMV is a 2-wire RS 485 Modbus device with two additional wires required for power. It has a permissible terminal voltage range of 10.5 – 30 VDC. The current draw is 10 mA per XMV. The unit must be setup to operate with the XFC or XRC flow computers.

A. XMV Setup for Part# 1641020-xxx (XMV with Display & Keys)

An optional "Push Button Key Unit" is located at the top of the XMV. It is used to setup the configuration parameters in the XMV. To make the keys accessible, release the screw and flip protective cap aside. Pushing the key down with an instrument screwdriver activates the key. See the menu tree below.



With the mode key "M", you can start the menu-controlled programming. To call the next menu item, press the "+" key. To call the previous menu item, press the "-" key. Submenu items / selection list are activated via the mode "M" key. A numerical value can be changed using the "+" key to increment the value by 1 and the "-" key to move the curser to the left. The mode "M" key is used to accept the changes. When setup is finished, go to the menu "Exit" screen and press the mode "M" key.

XMV Menu Tree

Enter program menu With Mode Key "M"

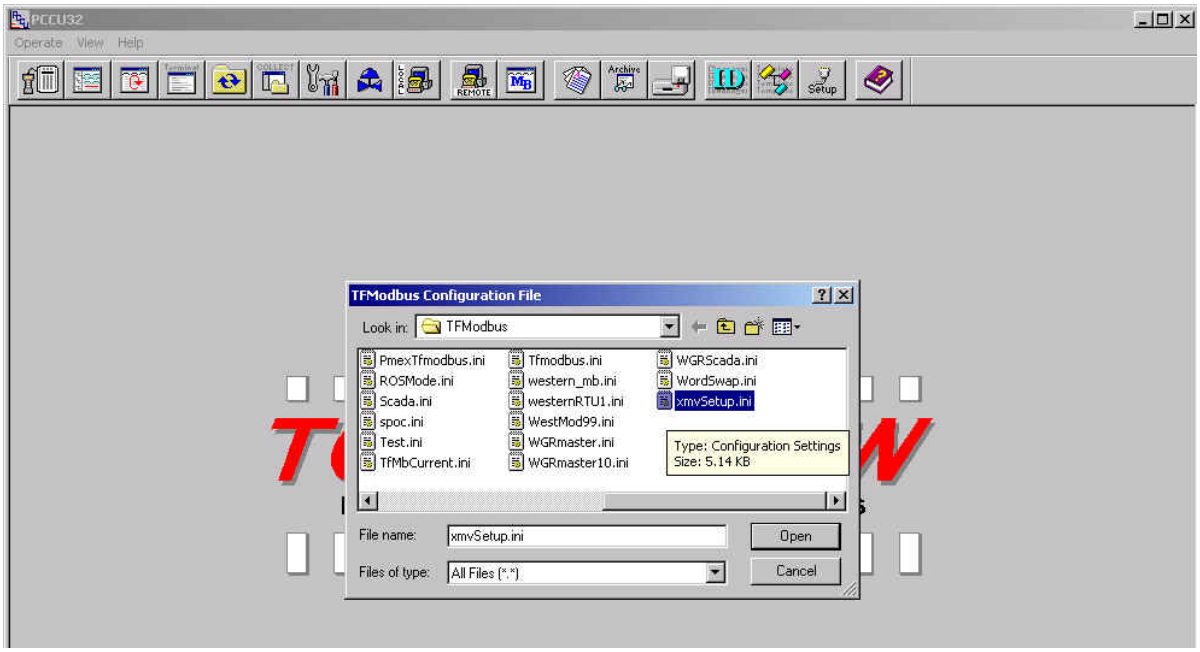
-- Exit	
-- View	Typical Setting – Any (Not Used)
-- Shift Zero	Typical Setting – None (Not Used)
-- Damping	Typical Setting – 0.125 Seconds
-- Device Mode	Typical Setting – Operate
-- Baud Rate	Typical Setting – 9600
-- Bus Address	Typical Setting – 1 (Set 1-8 as required)
-- Resp-Delay	Typical Setting – 20 Ms
-- Display	Typical Setting – User Text (Note 1)
-- Exit	

Note: Upon exit from the XMV setup mode, the display will show SP, DP, or Temperature from the X-Series if communications are operational OR the message "User-Text" will appear indicating the XMV is waiting on the X-Series to write the display data.

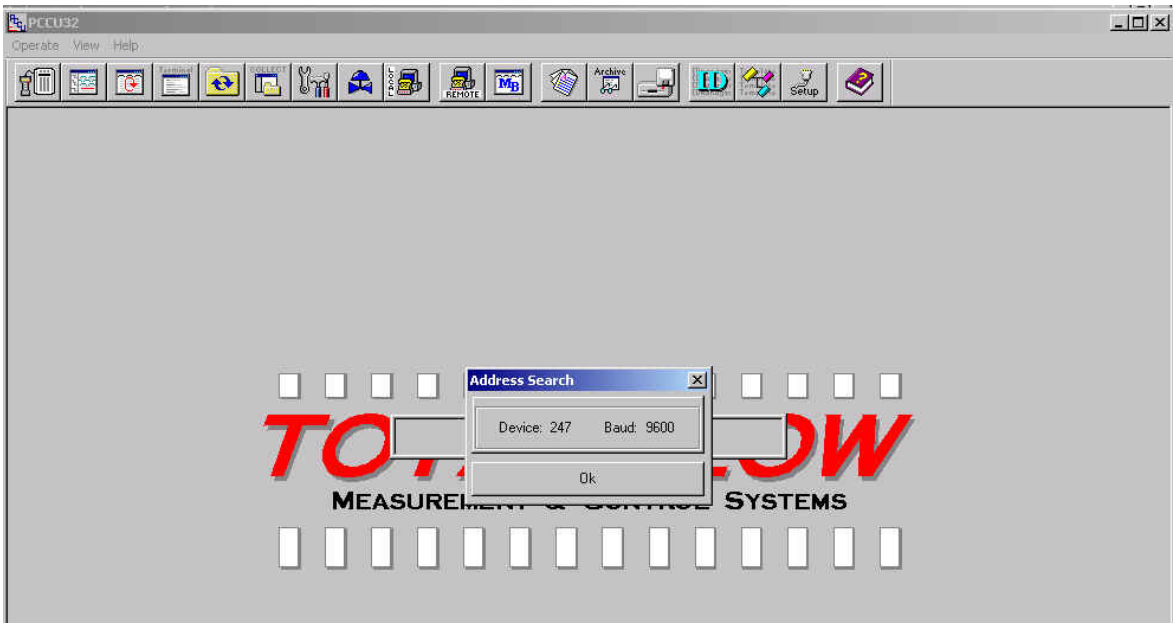
B. XMV Setup for Part# 1641021-xxx (XMV without Display & Keys)

An XMV without a Display & Keys may be setup using a PC running PCCU software with a RS485 communication link to the XMV. Use a RS-232 to RS-485 converter assembly Totalflow #2100241-002 and adapter cable #2100248-001 to make this connection. The PC signal "TX A" connects to XMV "Com –" terminal and "TX B" connects to XMV "Com +" terminal. The XMV must be powered up from an external power source during this setup sequence.

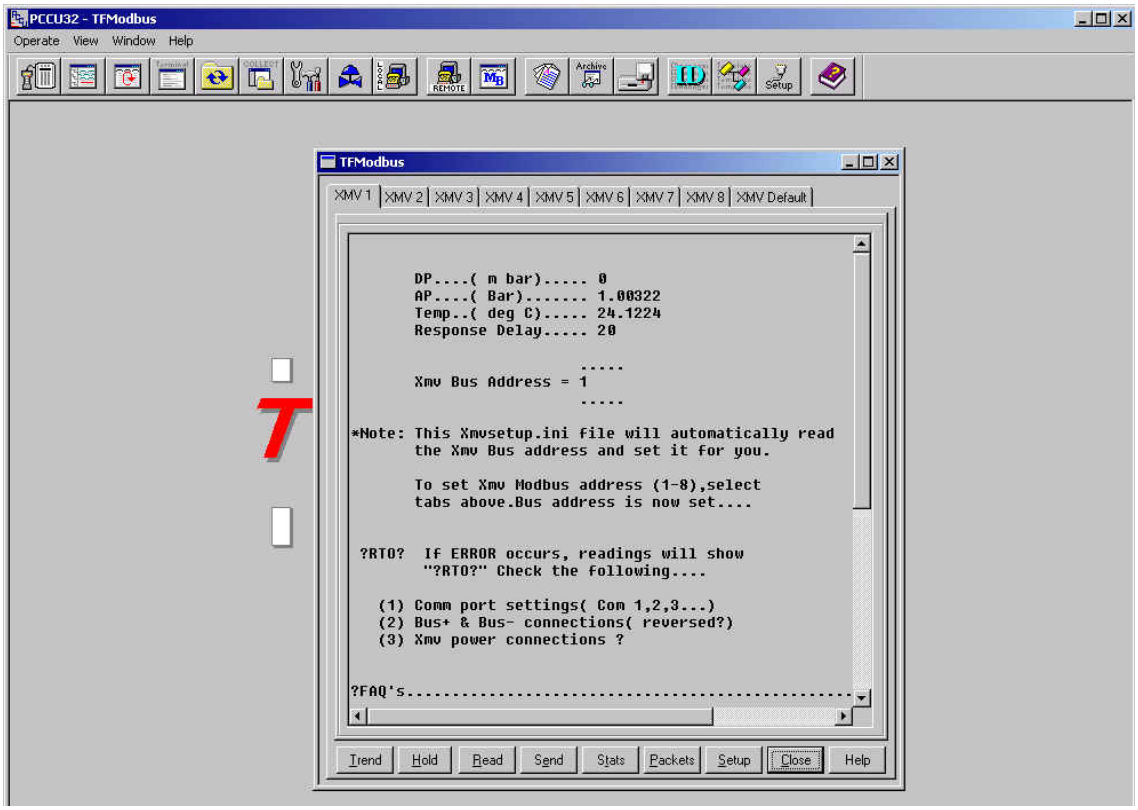
Enter the "TFModbus" utility in PCCU. Open "XmvSetup.ini".



The INI program will cycle through the Modbus addresses and baud rates until it communicates with the XMV. The address search will stop when the XMV responds. The current Modbus address and baud rate of the XMV are displayed in the address search box. Enter 'OK'.



Select the address tab with the Modbus address found in the address search above.(The Default Tab is Modbus address 247). The process data from the XMV should now be displayed. If a different address is required, select the Tab with the required address. The Xmvsetup.ini will re-address the XMV to the address specified and all other XMV setup parameters will be set. The process data will be read and displayed from the XMV using the new address and setup parameters.



C. Adding a Display and Keys to an XMV

A display and keys may be added permanently to an XMV. They can also be added temporarily under power for XMV setup. The following parts are required.

Item	Part #	Description
1	1801000-001	LCD Display
2	1801001-001	Mounting Screws for Display (2) required
3	1801002-001	LCD Glass Cover
4	1801003-001	Keys for programming

Notes:

1. If adding “keys” to an XMV that was shipped WITHOUT keys, a 3/32 inch Allen wrench (not shipped with transmitter) is needed to remove the blank cover. Additionally, a #10 Torx driver is needed to secure the keys properly to the transmitter base.
2. The 2.5 mm and 3 mm allen wrenches shipped with the XMV are used for the “Head Lock” and “Cover Lock”.

D. Adjusting the XMV Static Pressure Response Time.

The standard response time for the XMV to fully reach the applied Static Pressure is 4 seconds. Refer to Totalflow Technical Bulletin #113 if the XMV Static Pressure response time needs to be adjusted.

Section 2 – X-Series Setup to support the ABB XMV

A. X-Series Configuration Files

Totalflow has standard configuration files that have all the setup parameters and support files for use with the ABB XMV. Totalflow recommends using these released files when possible. If XMV support needs to be added to existing configuration files, reference Section 2B-2F below.

A few of the standard configuration files for use with the X-Series and ABB XMVs are shown below. Contact Totalflow for other available configurations.

Part #	Description
2100961-xxx	XFC with AGA3 support for 1-3 ABB XMVs
2100922-xxx	XRC with AGA3 support for 1 ABB XMV
2100962-xxx	XRC with AGA3 support for 1-4 ABB XMVs
2101469-xxx	XRC with AGA3 support for 1-6 ABB XMVs with Station totals for pod applications

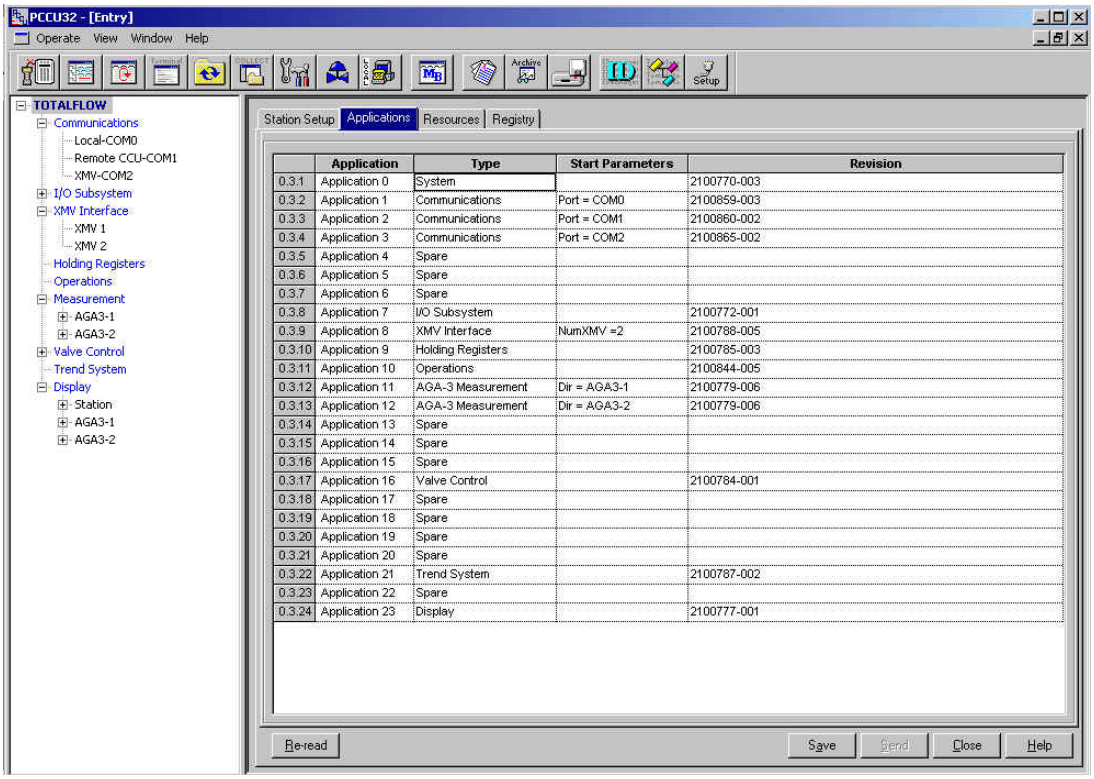
Notes:

1. All standard XMV configuration files are built to support the XMV with display. If the display is not used, the user should delete the “MVxxTXT.mrb” files in the Modbus folder under the XMV communications port.
2. If one of the multi-tube XMV configurations are used, the actual number of XMVs must be entered in the “Entry Mode / XMV Interface / Setup Tab”. The user should un-instantiate any unused measurement tubes by setting the application to “Spare” in “Entry Mode / Station ID / Application Tab”. The user should also delete the associated display group in “Save and Restore / R: Drive / Display Folder” to customize the configuration files for a specific configuration.

B. XMV Support Applications

To support an ABB XMV with an X-series flow computer, the following applications are required:

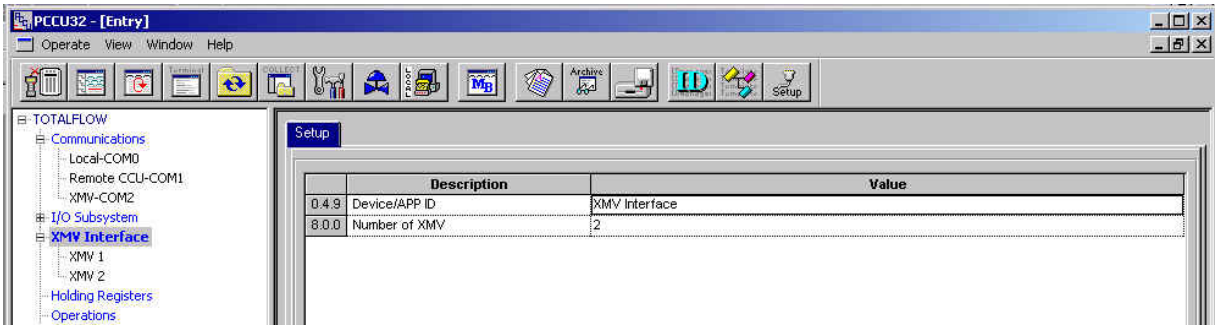
1. XMV Interface Application – Typically instantiated at app# 8. See Section 2C.
2. Communications Application – Typically COM 2 instantiated at app# 3. See Section 2D.
3. Measurement Tube Application - Typically instantiated at app# 11-18 as required. See Section 2E.
4. Display Application – Typically instantiated at app#23 with a display group for each measurement tube. See Section 2F.



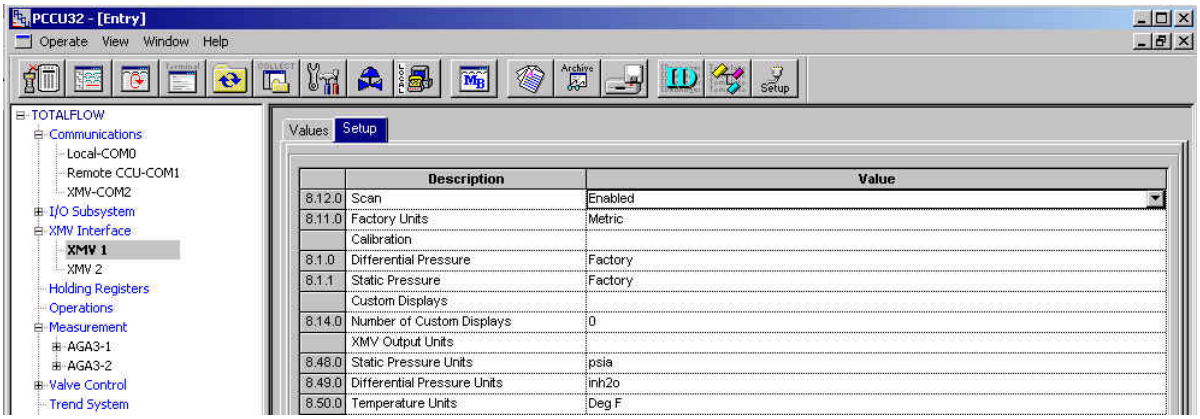
	Application	Type	Start Parameters	Revision
0.3.1	Application 0	System		2100770-003
0.3.2	Application 1	Communications	Port = COM0	2100859-003
0.3.3	Application 2	Communications	Port = COM1	2100860-002
0.3.4	Application 3	Communications	Port = COM2	2100865-002
0.3.5	Application 4	Spare		
0.3.6	Application 5	Spare		
0.3.7	Application 6	Spare		
0.3.8	Application 7	I/O Subsystem		2100772-001
0.3.9	Application 8	XMV Interface	NumXMV =2	2100788-005
0.3.10	Application 9	Holding Registers		2100785-003
0.3.11	Application 10	Operations		2100844-005
0.3.12	Application 11	AGA-3 Measurement	Dir = AGA3-1	2100779-006
0.3.13	Application 12	AGA-3 Measurement	Dir = AGA3-2	2100779-006
0.3.14	Application 13	Spare		
0.3.15	Application 14	Spare		
0.3.16	Application 15	Spare		
0.3.17	Application 16	Valve Control		2100784-001
0.3.18	Application 17	Spare		
0.3.19	Application 18	Spare		
0.3.20	Application 19	Spare		
0.3.21	Application 20	Spare		
0.3.22	Application 21	Trend System		2100787-002
0.3.23	Application 22	Spare		
0.3.24	Application 23	Display		2100777-001

C. XMV Interface

Enter the number of XMVs in the system under the “XMV Interface / Setup tab”.

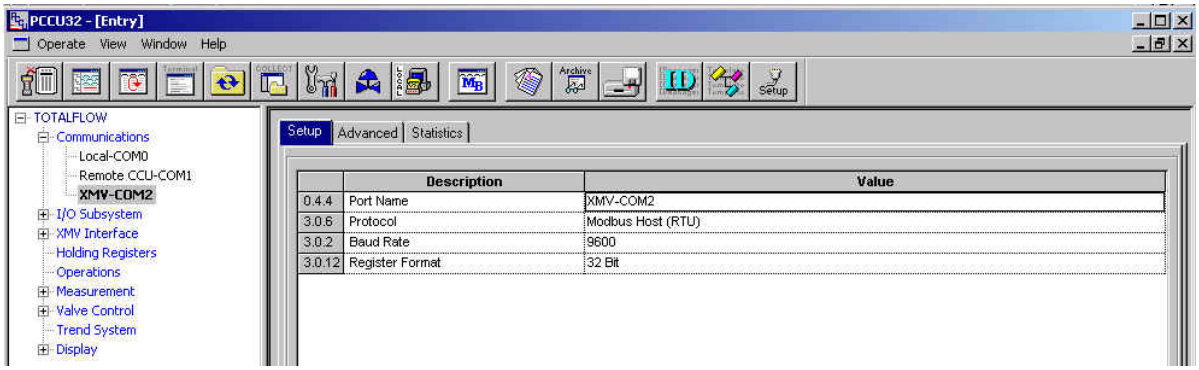


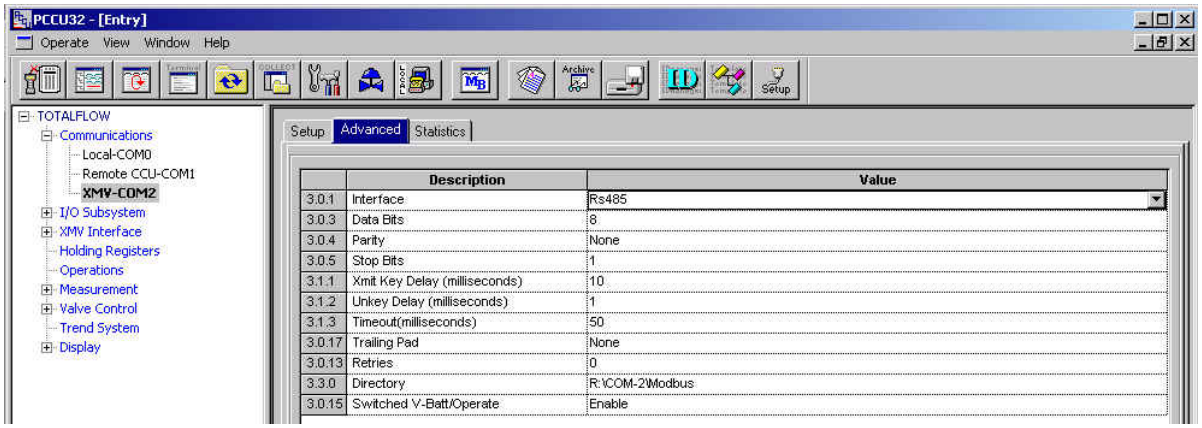
Enter the XMV setup parameters in “Entry mode / XMV Interface / XMV # / Setup Tab” as shown below.



D. XMV Communications Port

1) The 1st item to be setup on the communications port is the port parameters in “Entry Mode / Communications / XMV COM “. Setup parameters are as shown in the following screens.

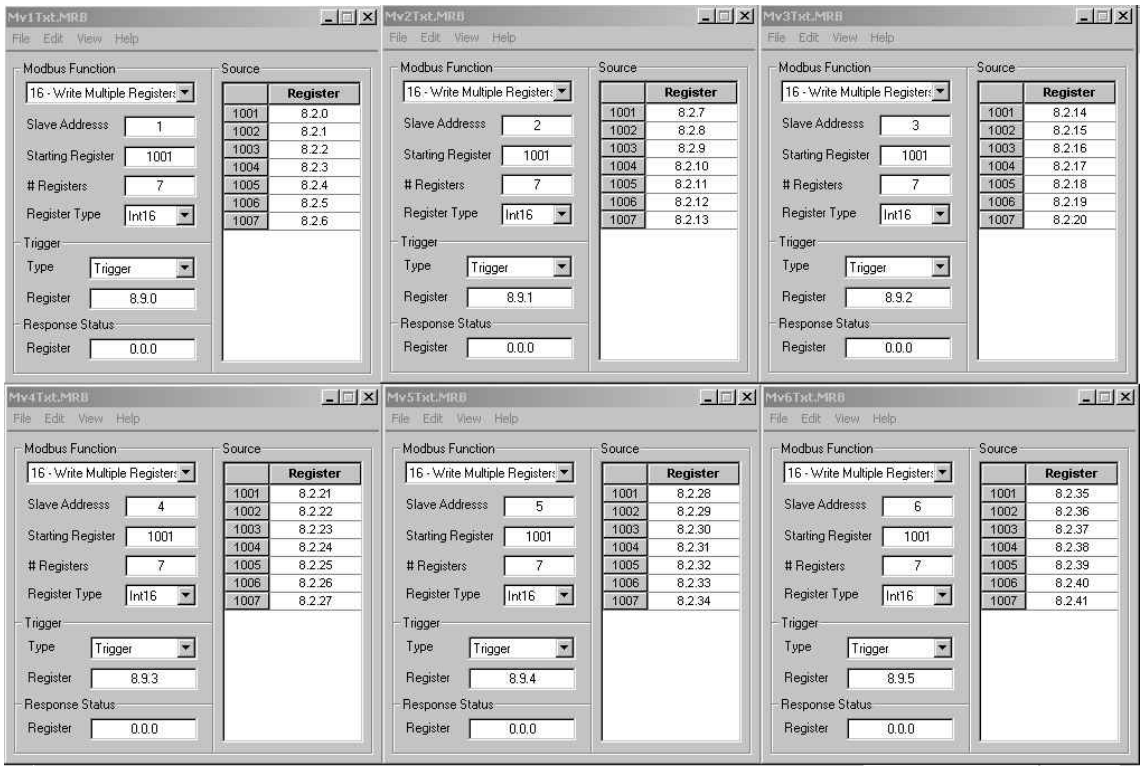




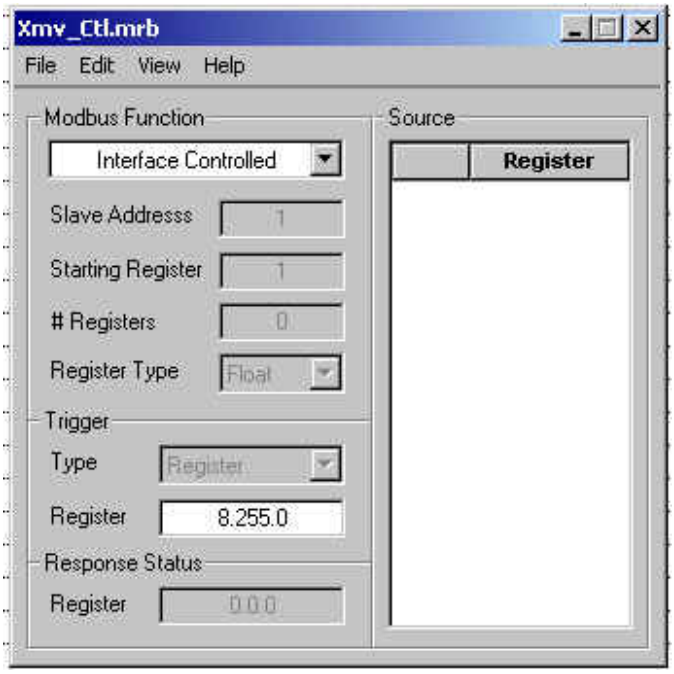
2) The 2nd item to setup on the communication port is the Modbus request blocks. A Modbus folder was created for the communications port when the Modbus protocol was selected in step 1. There are 2 versions of Modbus blocks supported for the XMV. The "Legacy Method" and the "Interface Controlled Method".

a) Legacy Method – The Legacy method uses 2 modbus blocks per XMV and is <u>supported by all versions of the Xseries Flash software.</u>

There are two Modbus request blocks (.MRB) that need to be created and stored in the Modbus folder for each XMV. One block(Mv1.MRB) is required for reading registers from the XMV and storing the raw values into the XMV application. The 2nd Modbus block(Mv1Txt.MRB) writes the SP, DP & Temperature data to the XMV display. The Modbus request blocks for XMV address 1 to 6 are shown below.

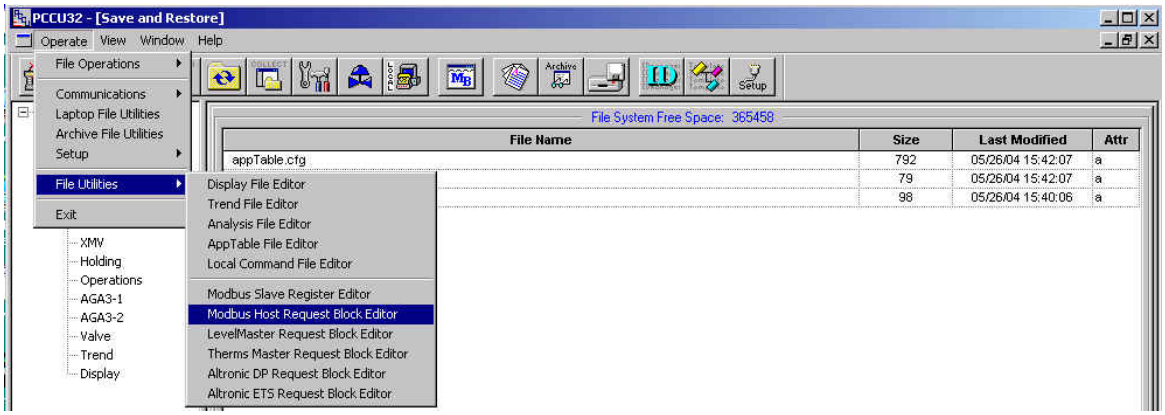


b) Interface Controlled Method – The Interface Controlled method uses 1 Modbus block regardless of the number of XMVs used. With this method, the XMV Interface creates the required Modbus blocks as needed. The Interface Controlled method is supported by all Xseries Flash software released after 4/21/2004. This includes XFC flash 2101050-011 and XRC flash 2101052-009 and all later revisions. The Interface Controlled Block is shown below.



The user needs to determine which method is desired and create the required Modbus request block. To create these blocks using PCCU 4.53 or later use the following steps.(If using PCCU 4.52 or earlier, the blocks must be created and saved to the users PC hard drive and then downloaded using the “Save and Restore” utility to the Modbus folder under the XMV com port.)

Go to “Save and Restore” utility. Select the Modbus folder under the XMV Com port. This will be the destination path when the Modbus file is saved. Select the Menu option “Operate / File Utilities / Modbus Host Request Block Editor”.

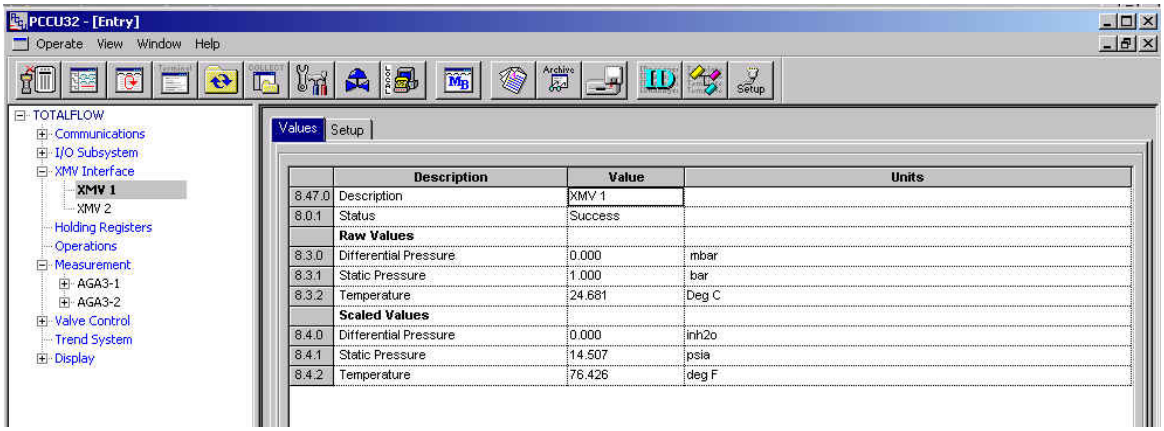


Create the required Modbus blocks using the sample blocks above. Use the “Send” button to load these blocks to the Modbus folder under the XMV Com Port on R:drive. (Note- If modifying an existing Modbus block to create a new Modbus block, you will need to use the “File / Send As” feature to rename and save the block to the Modbus folder.)

Note: Refer to Totalflow Technical Bulletin #118 or the PCCU help files for more details on creating and using the Modbus blocks.

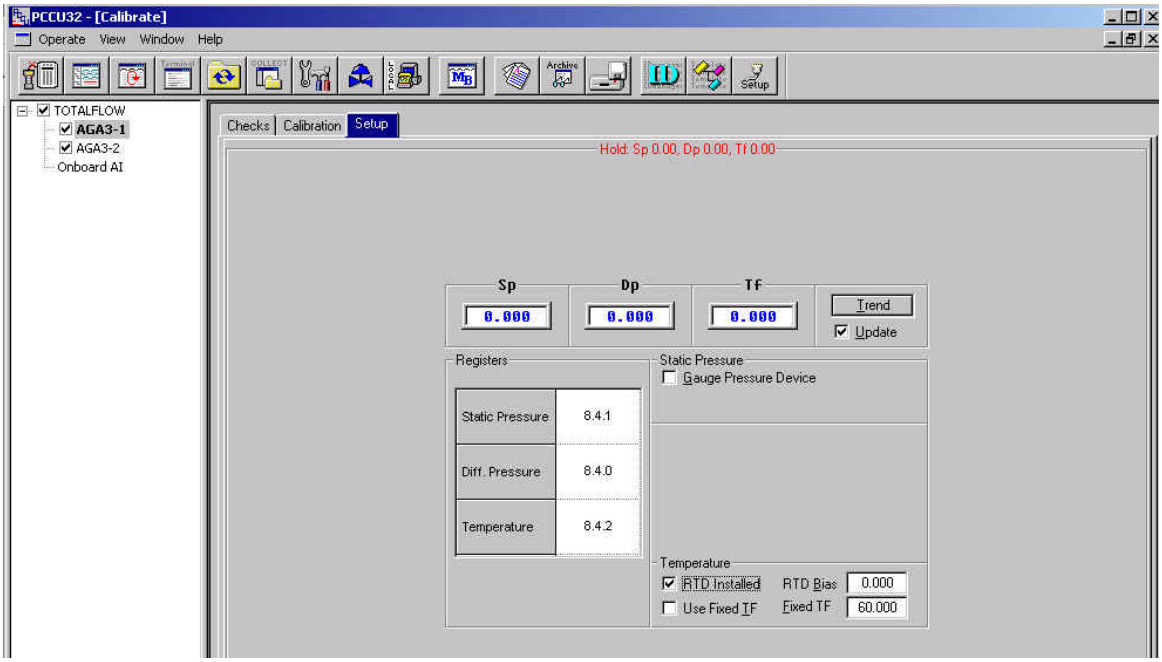
E. Assigning XMV’s to Measurement Tubes

The data inputs from the XMV’s can be assigned to any measurement tube. To assign the input, the user must note the App/Array/Register for the “Scaled Values” for each XMV.



Next go to Calibration:

Select the measurement tube to be configured from the tree view and then select the Setup Tab. Enter the appropriate App/Array/Register for Static Pressure, Differential Pressure & Temperature from the XMV Scaled Values on the XMV/Values tab.

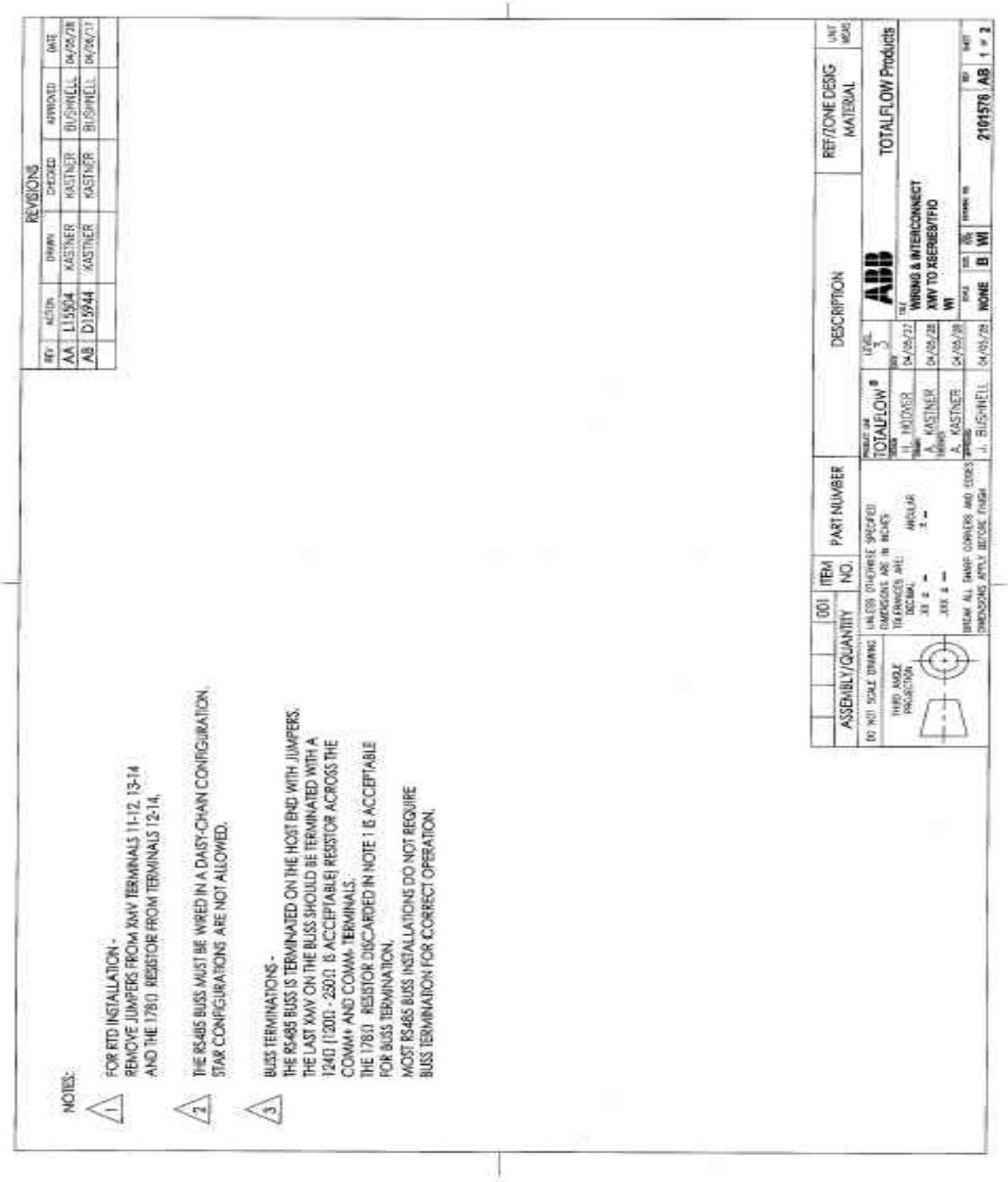


F. Displays for XMV

There are no actual displays in the X-Series for the XMV, rather the XMV is typically assigned to a measurement tube and the measurement tube has an associated display group. If a measurement tube has been added, then a display group for that tube needs to be added with the following procedure:

Enter the “Save and Restore” utility. Go to the Display folder on R: and double click on an existing display group for a measurement tube. Modify the group name, display names and display registers for the new measurement tube. Use the “File / Send As…” option to download the modified file with a new file name to the Display folder. Go to “Entry “ mode and check displays.

Section 3 – X-Series to ABB XMV Wiring & Interconnect



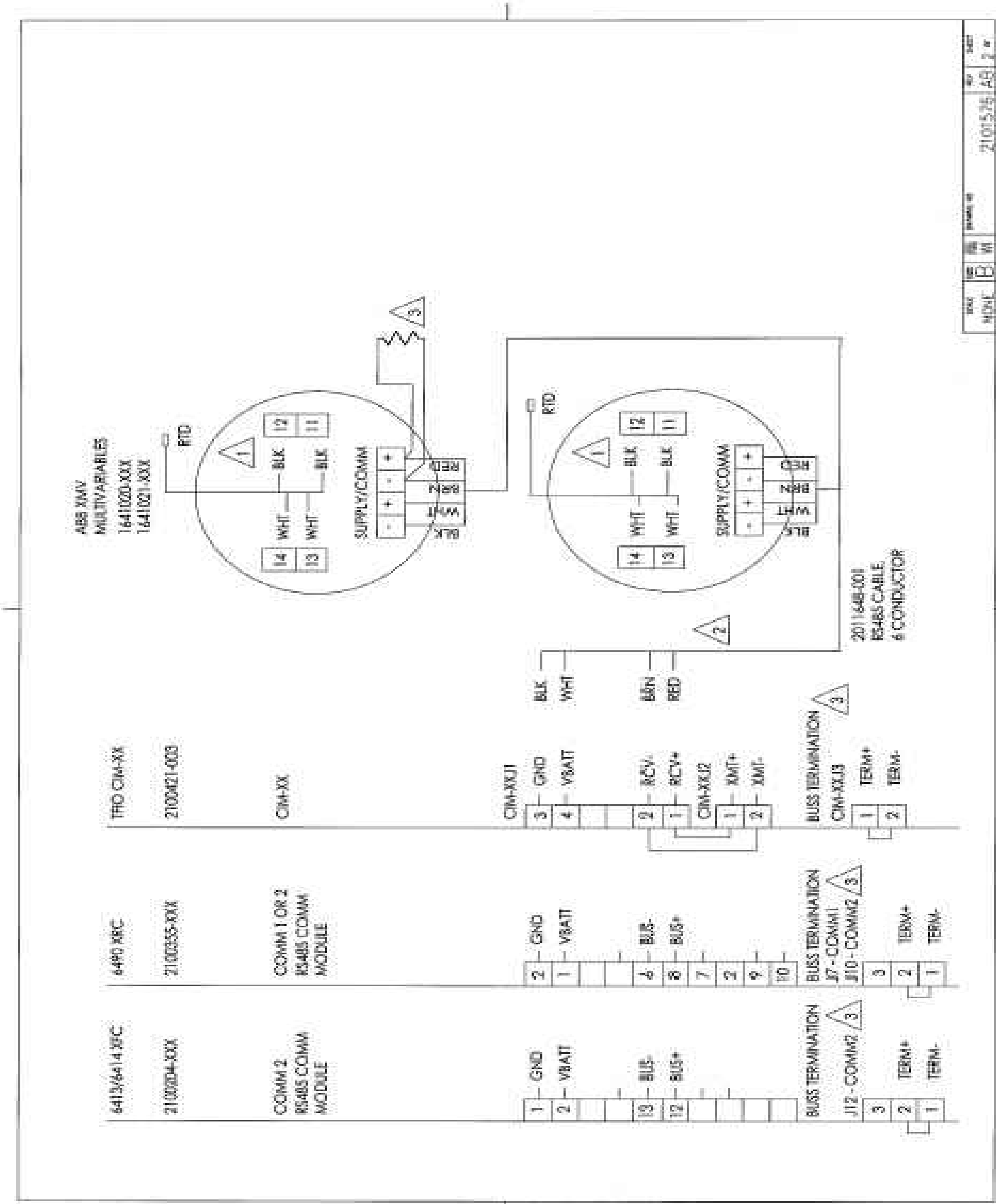


ABB XMV
MULTIVARIABLES
1641020-XXX
1641021-XXX
RTD
WHT
BLK
SUPPLY/COMM
RED
BRN
2011648-001
RS485 CABLE,
6 CONDUCTOR
TFIO CIM-XX
2100421-003
CIM-XX
CIM-XXJ1
GND
VBATT
RCV-
RCV+
CIM-XXJ2
XMT+
XMT-
BUSS TERMINATION
CIM-XXJ3
TERM+
TERM-
6490 XRC
2100355-XXX
COMM 1 OR 2
RS485 COMM
MODULE
BUS-
BUS+
BUSS TERMINATION
J7 - COMM1
J10 - COMM2
6413/6414 XFC
2100204-XXX
COMM 2
RS485 COMM
MODULE
BUSS TERMINATION
J12 - COMM2
NONE

Back view of the XMV.

Conclusion

At this point the XFC or XRC should be receiving data from the XMV. Data updates can be verified by viewing the data in “Entry / XMV Interface / XMV xx / Values Tab”. The data should be reflecting process conditions and be updating every second.

Communications success can be monitored in “Entry / Communications / COMxx / Host Status”. The “Number of Polls” should be incrementing without any change in the “Number of Errors”. For easier viewing, all data fields on the “Host Status Tab” can be reset to “0” by writing a “0” in the fields and using the “Send” button.

The Measurement Tube using the XMV inputs should be now be calibrated.

Note: Be sure and save the system configuration to the S: drive using the “Save and Restore” utility.