



TOTALFLOW

Technical Bulletin 103

Configuring an AGA-7 Application for Liquid Measurement with Turbine or Positive Displacement Meters

Totalflow Technical Bulletin

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Outline for Configuring an AGA-7 Application for Liquid Turbine or PD Use

- 1) Insure AGA-7 application is available or instantiate one.
- 2) Wire turbine with pre-amp to a high-speed pulse input in the XFC or XRC.
- 3) Assign App/Array/Register of PI chosen to Pulse Input in Calibration-Setup Tab.
- 4) Configure AGA-7 measurement application in PCCU-32.
- 5) Add and configure display group for turbine readings.

Insure AGA-7 Application is available or instantiate one

The AGA-7 Application is instantiated in Applications 11 through 18. If the desired application is not present, add the AGA-7 Application in the next available slot of Application 11 through 18.

Application	Type	Start Parameters	Revision
0.3.1 Application 0	System		2108170-000
0.3.2 Application 1	Communications	Port = COM0	2108099-000
0.3.3 Application 2	Communications	Port = COM1	2108081-000
0.3.4 Application 3	Communications	Port = COM2	2108081-000
0.3.5 Application 4	Spares		
0.3.6 Application 5	Spares		
0.3.7 Application 6	Spares		
0.3.8 Application 7	IO Subsystem	Dv = AGA3.1	2108172-000
0.3.9 Application 8	XMV Interface	NumXMV = 1	2108180-000
0.3.10 Application 9	Holding Registers		2108185-000
0.3.11 Application 10	Operations	File = 0800000-808	2108044-004
0.3.12 Application 11	TOTALFLOW Measurement	Dv = AGA7-1	2108181-000
0.3.13 Application 12	Spares		
0.3.14 Application 13	Spares		
0.3.18 Application 14	Spares		
0.3.16 Application 15	Spares		
0.3.17 Application 16	Spares		
0.3.16 Application 17	Spares		
0.3.19 Application 18	EC-11.31		2108190-000
0.3.20 Application 19	Spares		
0.3.21 Application 20	Spares		
0.3.22 Application 21	Trend System		2108187-000
0.3.23 Application 22	Alarm System		2108183-000
0.3.24 Application 23	Display		2108171-000

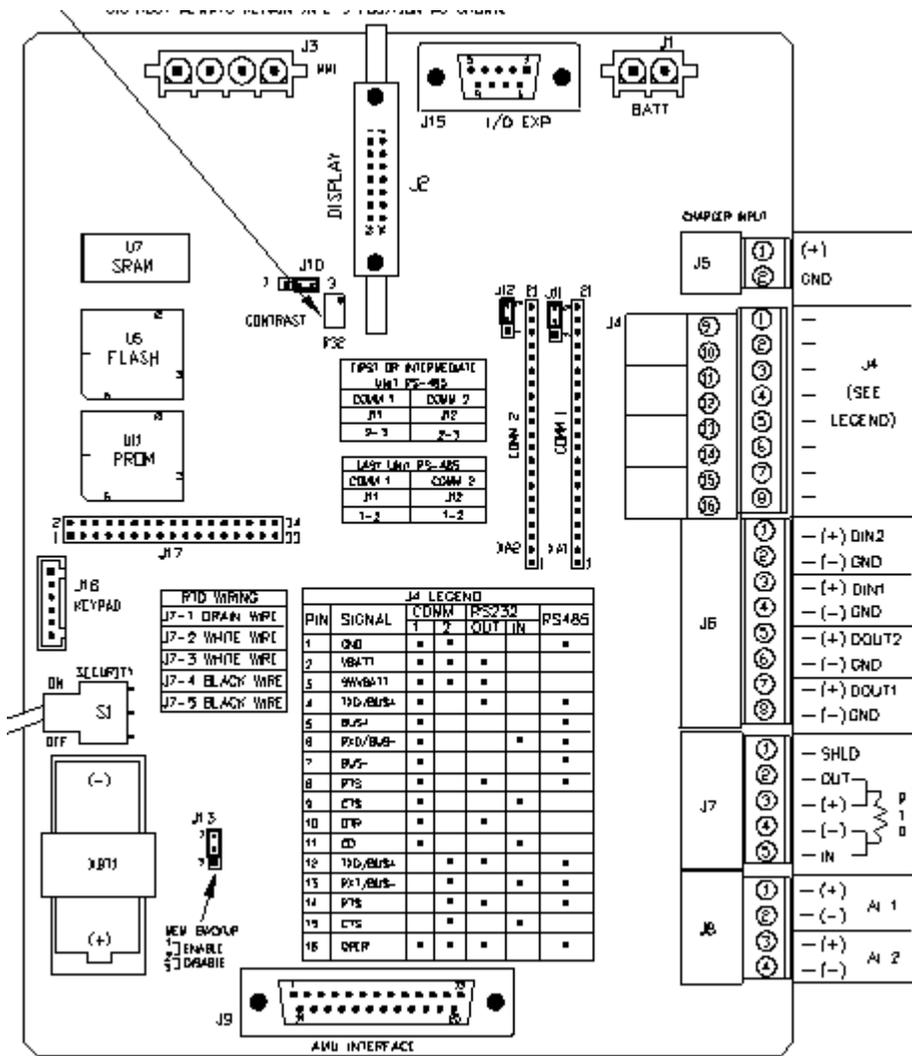


Wire turbine with pre-amp to a high-speed pulse input in the XFC or XRC

XFC

Wire + & - leads to J6 Pins 3 & 4 (DI-1) or J6 Pins 1 & 2 (DI-2) of the XFC board.

Provide external power for pre-amp or supply power from XFC. Positive is wired to Vbatt J4 Pin 2 or SwBatt J4 Pin 3 (with zero listen cycle) while negative is wired to Ground J4 Pin 1. Using SwBatt will turn power off to pre-amp when XFC is in sleep mode, protecting the battery. Negative is wired to Pin 1.

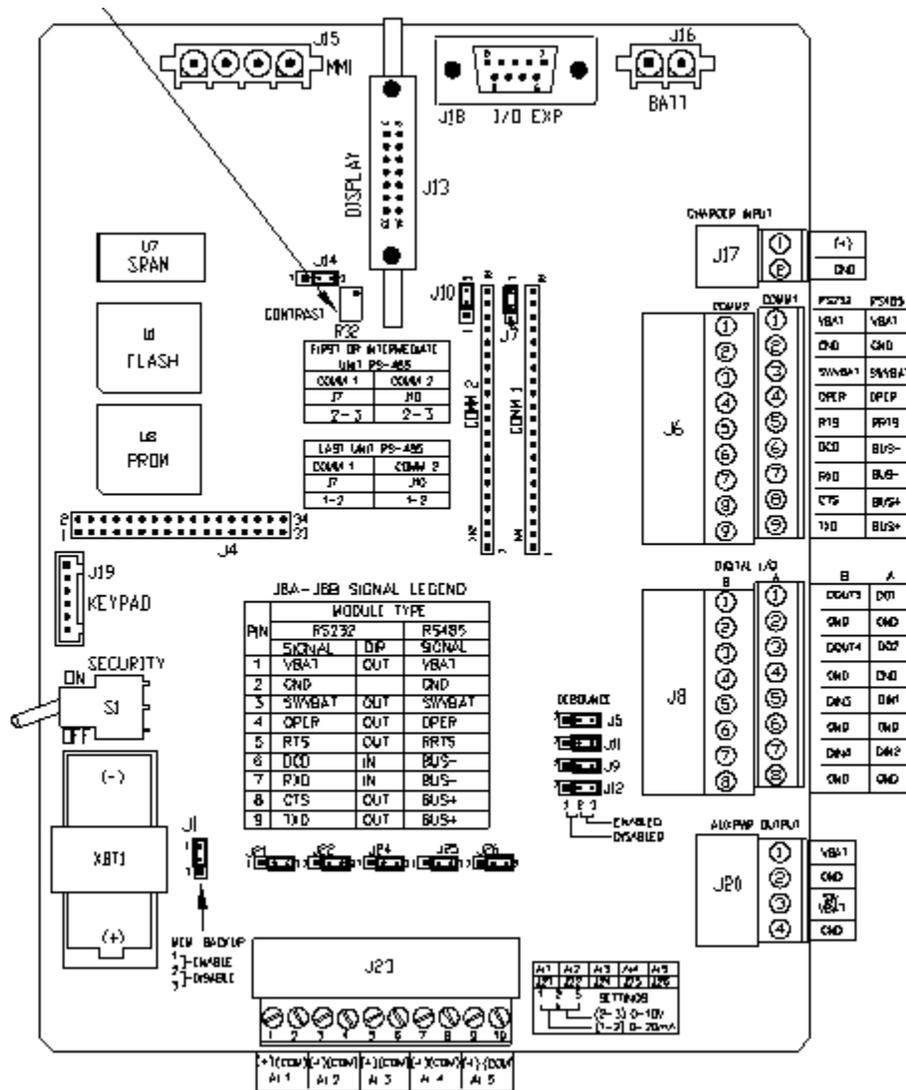


XFC

XRC

Wire + & - leads to J8 Pins 5 & 6 (DI-1) or J8 Pins 7 & 8 (DI-2) of the XRC board. DO NOT use DI3 or DI4, as these are digital inputs only

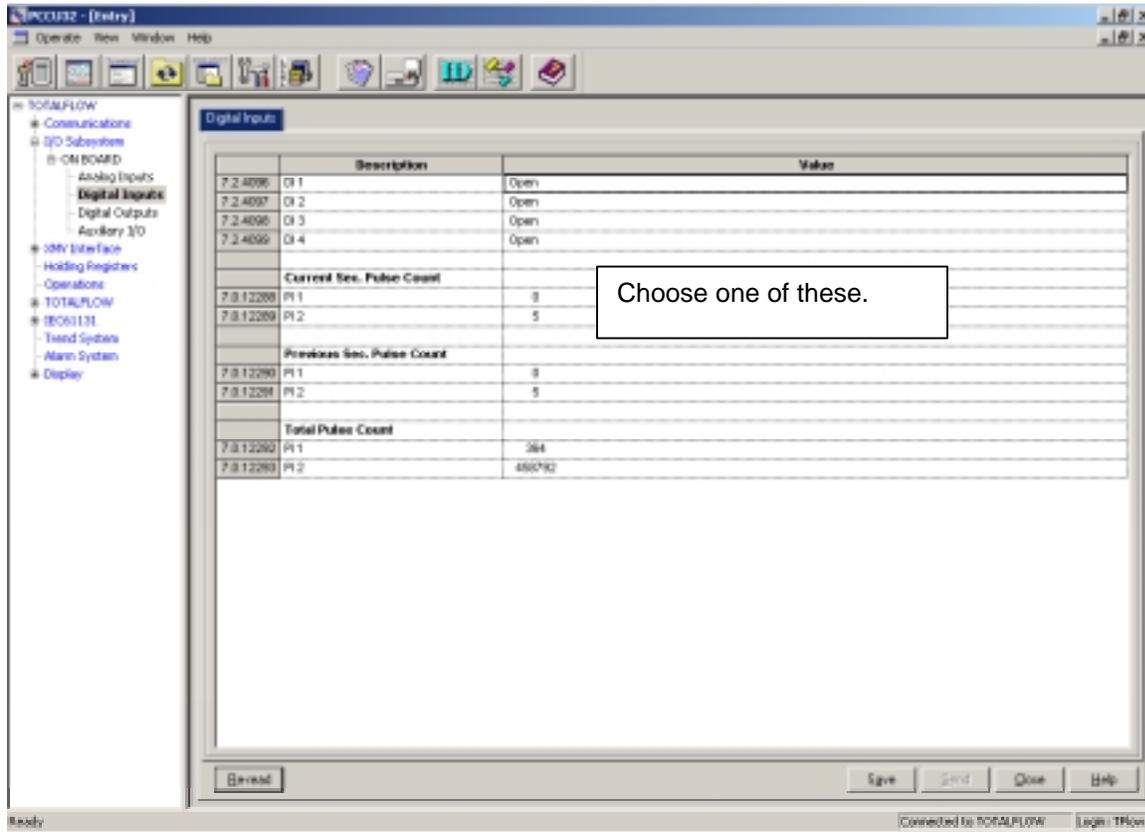
Provide external power for pre-amp or supply power from XRC. Positive is wired to Vbatt J6 Pin 1 or SwBatt J6 Pin 3 (with zero listen cycle) of either Comm 1 or 2. Using Swbatt will turn power off to pre-amp when XRC is in sleep mode, protecting the battery. Negative is wired to Pin 2.



XRC

Assign App/Array/Register of PI chosen to Pulse Input in Calibration-Setup Tab

Find the Application/Array/Register of the PI wired to the turbine pre-amp. Choose one of the Current Sec. Pulse Count registers. The onboard IO Subsystem is shown below. If a remote TFIO module is used, open this folder and choose the Current Sec. Pulse Count register.

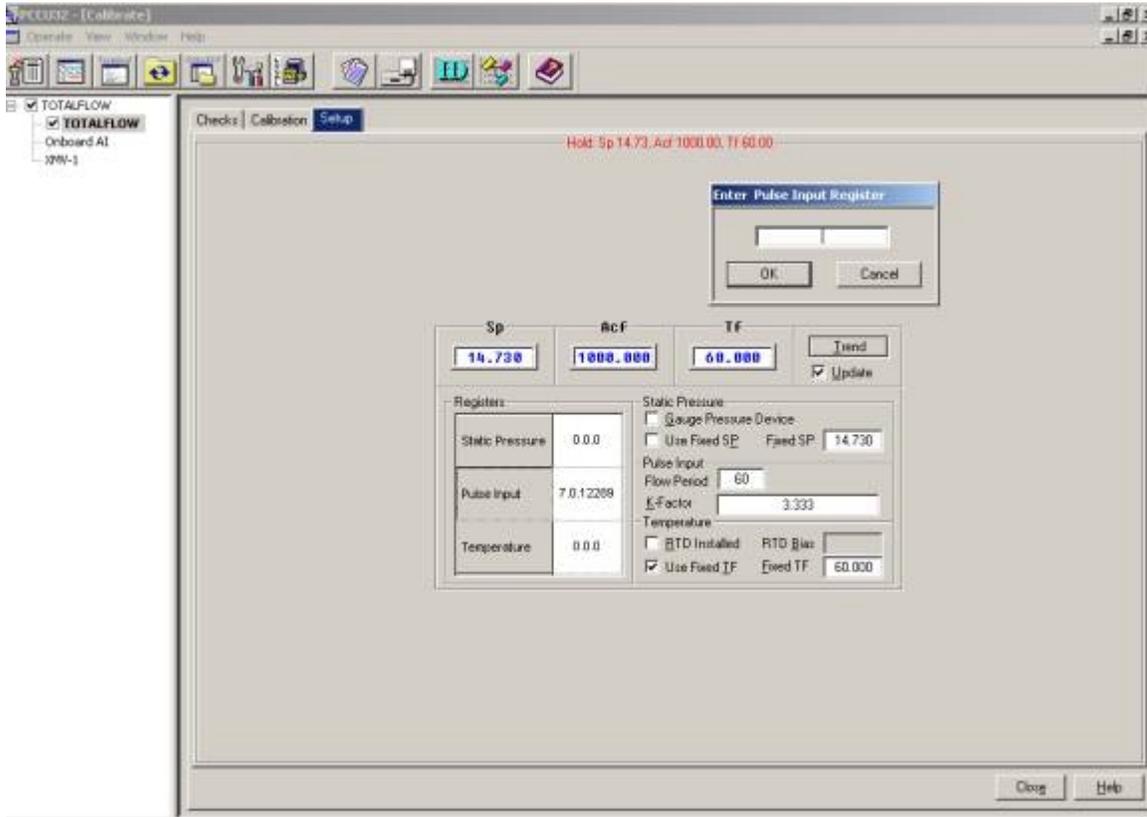


The screenshot shows the PCCU32 software interface. The main window is titled "Digital Inputs" and contains a table with the following data:

	Description	Value
7.2.4096	DI 1	Open
7.2.4097	DI 2	Open
7.2.4098	DI 3	Open
7.2.4099	DI 4	Open
Current Sec. Pulse Count		
7.0.12288	PI 1	0
7.0.12289	PI 2	5
Previous Sec. Pulse Count		
7.0.12290	PI 1	0
7.0.12291	PI 2	5
Total Pulse Count		
7.0.12292	PI 1	0
7.0.12293	PI 2	48092

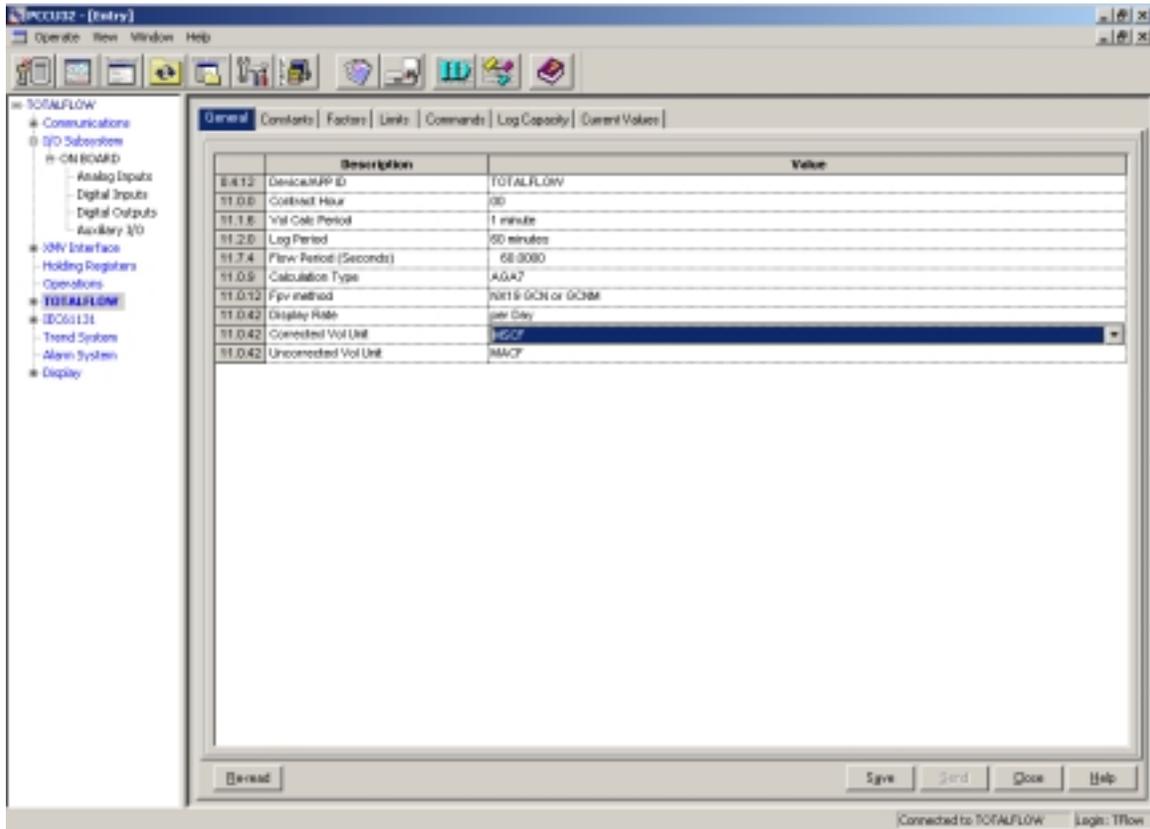
A callout box with the text "Choose one of these." is positioned over the 'Current Sec. Pulse Count' section of the table.

Assign this App/Array/Register to the PI. Choose Setup tab in calibration screen of desired AGA-7 tube, then click in white area to right of “Pulse Input” to cause a pop-up screen to enter App/Array/Register.



Configure AGA-7 measurement application in PCCU-32

In the General tab of measurement AGA-7 application, assign “Contract Hour”, “Vol Calc Period”, “Log Period”, “Flow Period”, “Display Rate”, “Corrected Vol Unit”, and “Uncorrected Vol Unit”. USE MSCF and MACF respectively for the volume units. Since the WINCCU reports are fixed using MCF, choosing MSCF will insure the volume stored in WINCCU has the correct decimal place.



The screenshot shows the PCCU32 - [Entry] software interface. The left sidebar shows a tree view with 'TOTALFLOW' selected. The main window displays the 'General' tab of the configuration for the TOTALFLOW application. The configuration is shown in a table with columns for 'Description' and 'Value'.

Description	Value
8.1.12 Device/APP ID	TOTALFLOW
11.0.0 Contract Hour	00
11.1.8 Vol Calc Period	1 minute
11.2.0 Log Period	60 minutes
11.7.4 Flow Period (Seconds)	60000
11.0.9 Calculation Type	AGA7
11.0.12 Fpy method	NWIS GCN or GCNM
11.0.42 Display Rate	per Day
11.0.42 Corrected Vol Unit	MSCF
11.0.42 Uncorrected Vol Unit	MACF

Buttons at the bottom of the window include 'Cancel', 'Save', 'Send', 'Close', and 'Help'. The status bar at the bottom right indicates 'Connected to TOTALFLOW' and 'Login: TFlow'.



In the Constants tab of measurement AGA-7 application, enter the K Factor. SINCE MSCF WAS CHOSEN FOR THE VOLUME UNITS, USE THE FOLLOWING METHOD TO DETERMINE THE K FACTOR.

$(\text{Pulses/Gallon} \times 42) = \text{Pulses per Barrel}$.

Take the reciprocal of Pulses per Barrel to arrive at Barrels per Pulse.

$(1 / \text{Pulses per Barrel}) = \text{Barrels per Pulse}$

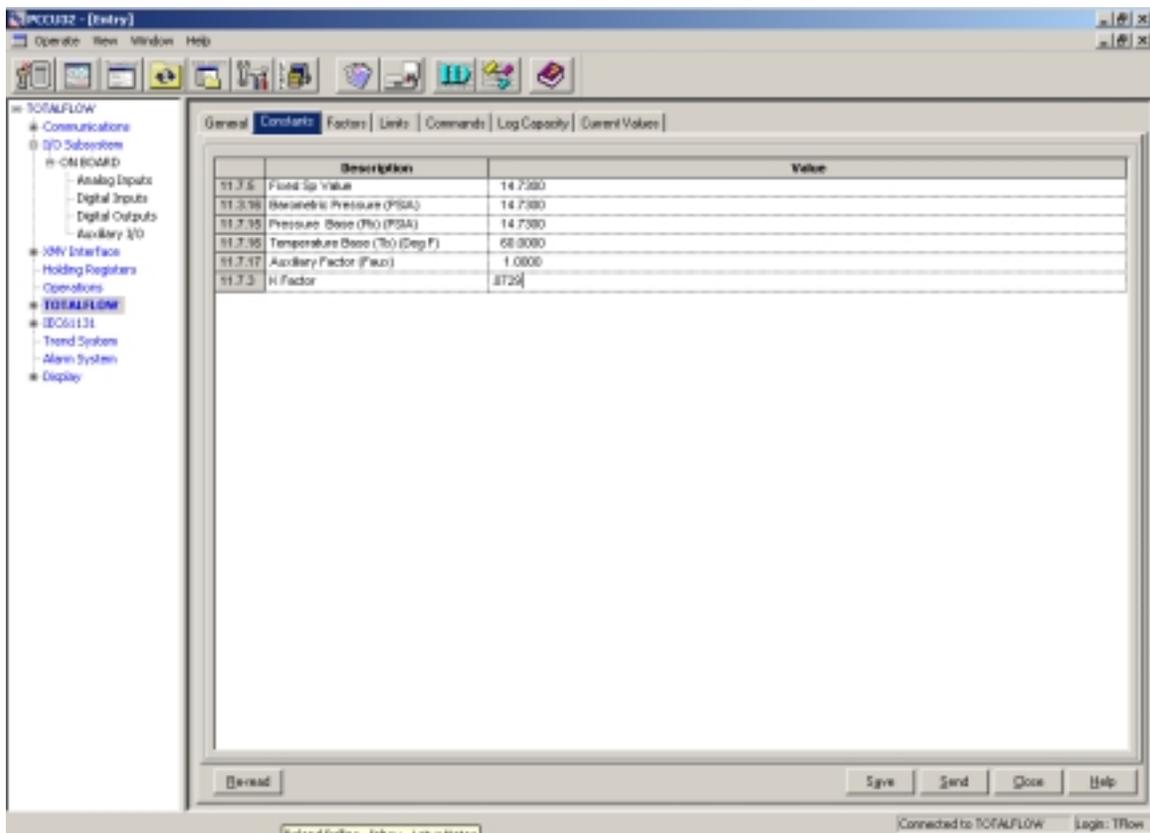
THEN MULTIPLY BY 1000. This is done because the XFC/XRC will divide the answer by 1000 to obtain MSCF volume units.

EXAMPLE: 1.5" Turbine has a 326.51 Pulse per gallon from turbine manufacture.

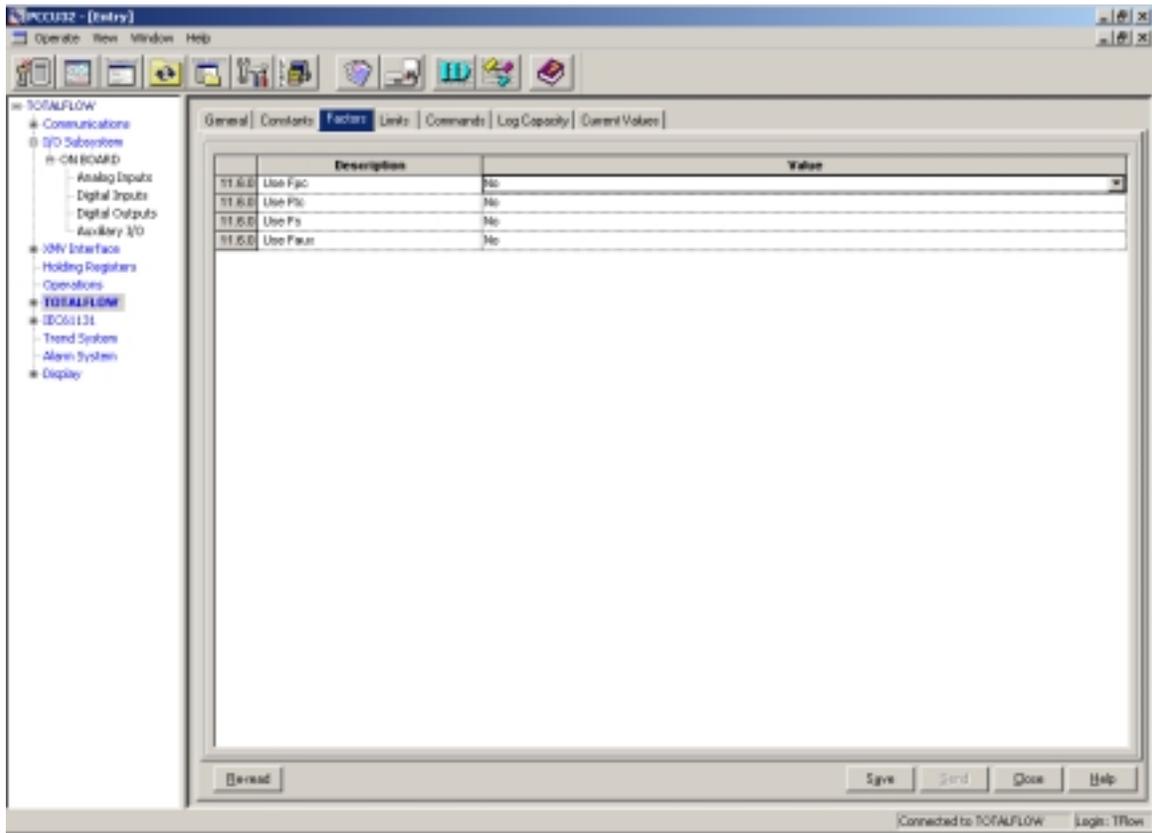
$326.51 \times 42 = 13713.42$ >>> $1/13713.42 = .0000729$ Barrels per Pulse >>> $.0000729 \times 1000 = .0729$

In one step:

$(1 / (326351 \times 42)) \times 1000 = .0729$

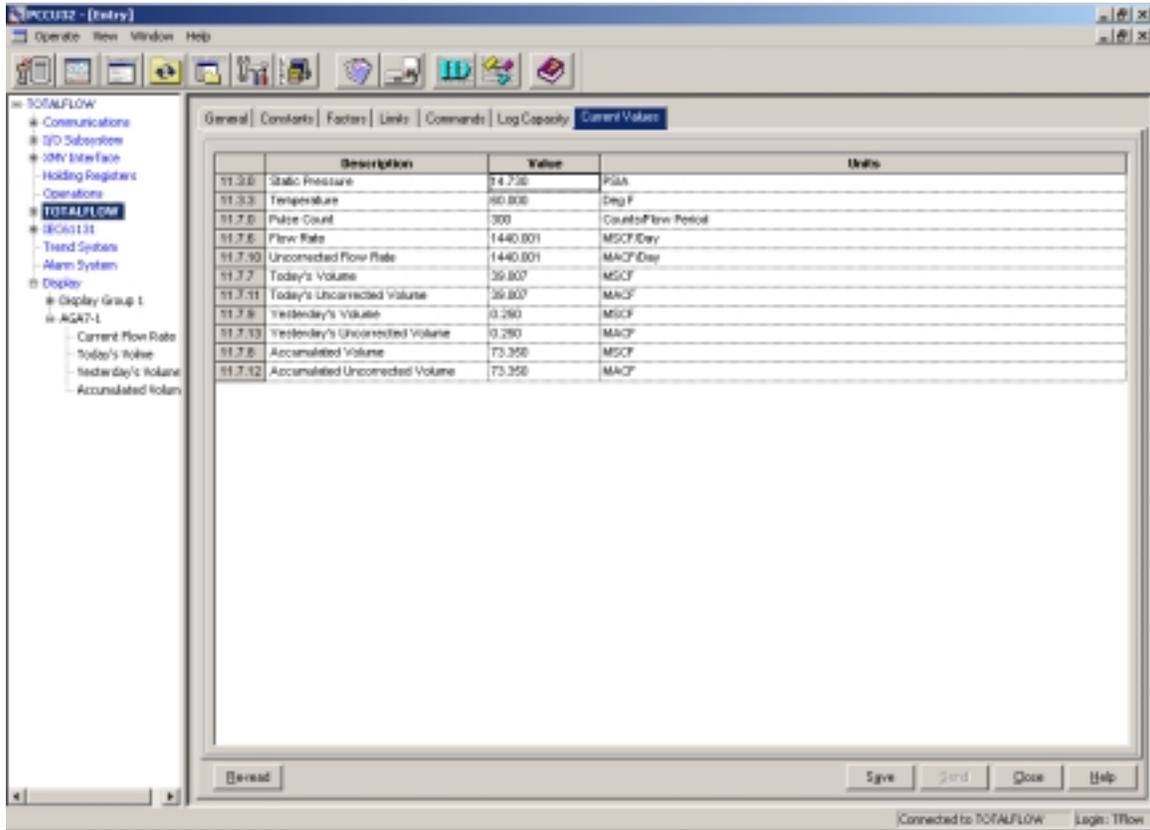


In the Factors tab of measurement AGA-7 application, leave all the factors defaulted to “no”.



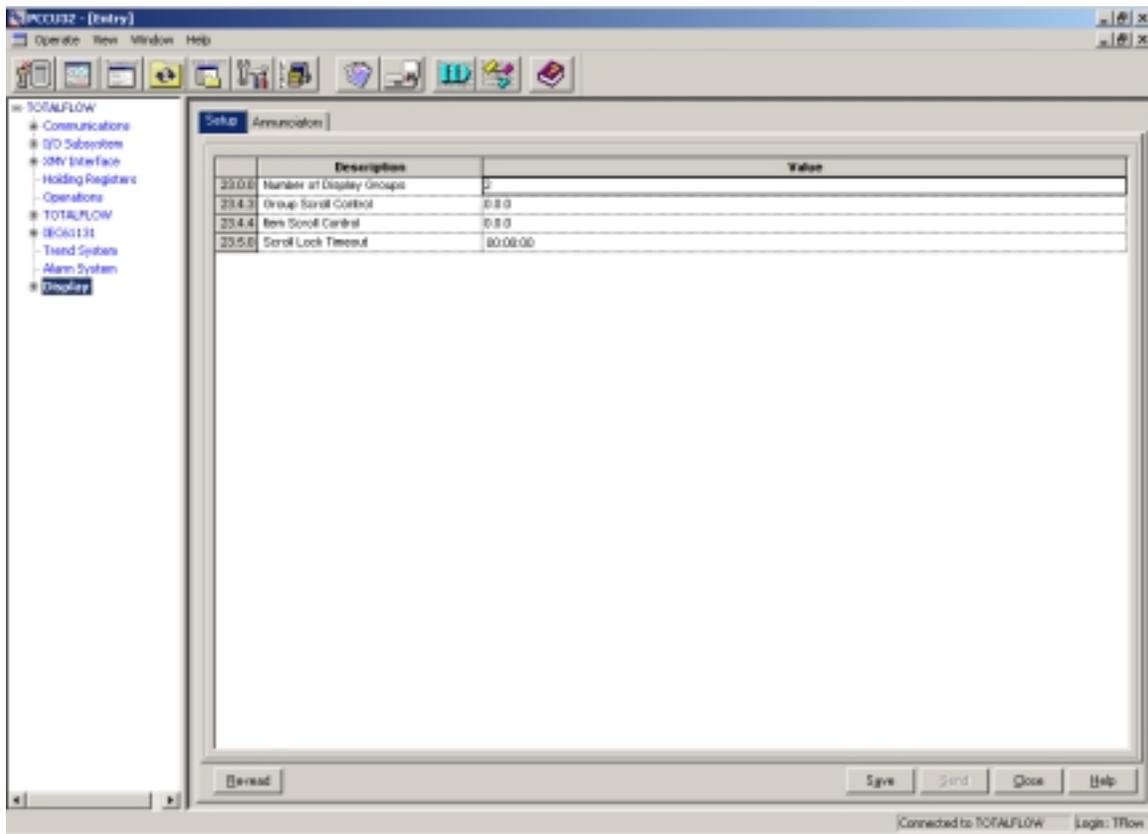
Add and configure display group for turbine readings

Obtain the App/Array/Register numbers for the turbine group to be added from the AGA-7 measurement application, Current Values tab (Shown Below). Note the units are MSCF and MSCF/Day, though the volumes are Barrels and Barrels/Day.

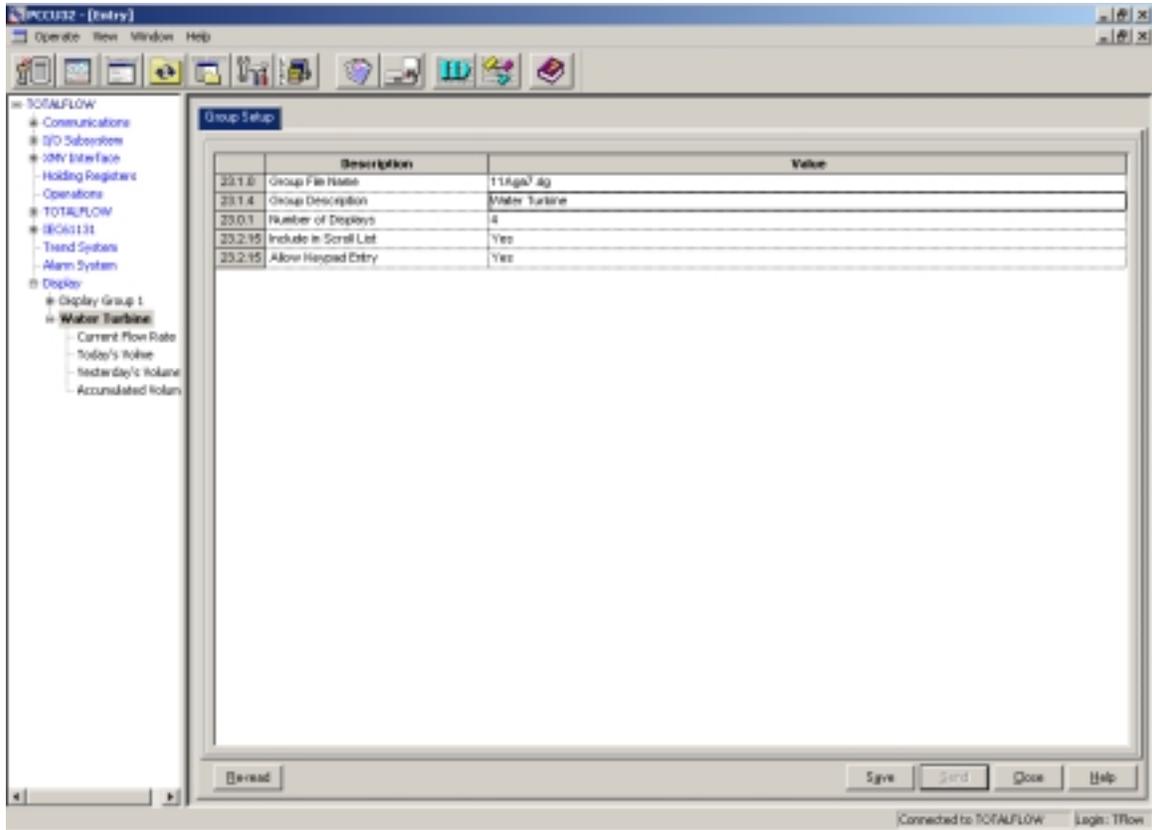


	Description	Value	Units
11.3.0	Static Pressure	14.738	PSIA
11.3.3	Temperature	60.808	Deg F
11.7.0	Pulse Count	300	Counts/Flow Period
11.7.6	Flow Rate	1440.001	MSCF/Day
11.7.10	Uncorrected Flow Rate	1440.001	MACF/Day
11.7.7	Today's Volume	36.807	MSCF
11.7.11	Today's Uncorrected Volume	36.807	MACF
11.7.8	Yesterday's Volume	0.290	MSCF
11.7.13	Yesterday's Uncorrected Volume	0.290	MACF
11.7.9	Accumulated Volume	73.358	MSCF
11.7.12	Accumulated Uncorrected Volume	73.358	MACF

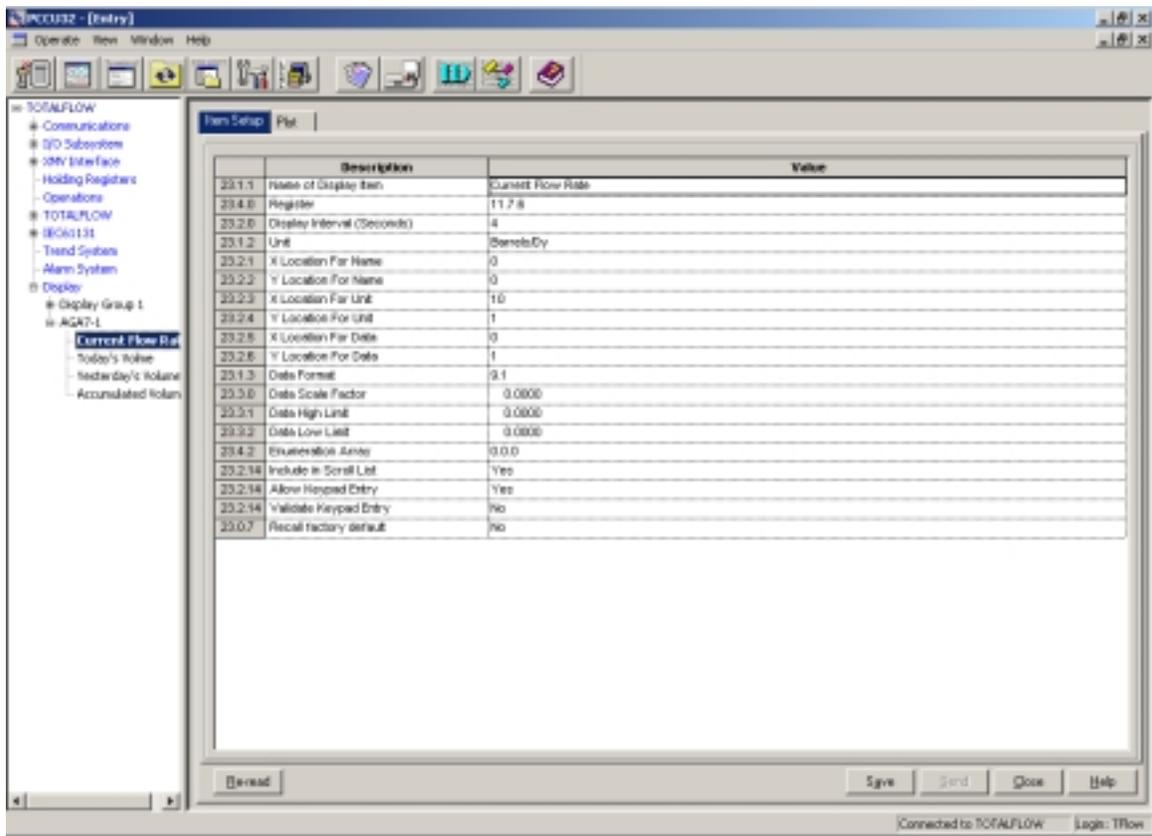
At the Display folder, increase the “Number of Display Groups” by one and send data.



At the new Display Group, rename the “Group Description” (NOT GROUP FILE NAME) to a useful name (Water turbine 1, Smith #1 Oil Turbine, etc.) and choose number of displays to add and enter.



Insert “Name of Display Item” Register from “Current Values” (See Last Page), “Display Interval”, “Unit Desired”, and “Data Format”.



The screenshot shows the 'Item Setup' dialog box for the 'Current Flow Rate' display item. The table below lists the configuration parameters and their values.

ID	Description	Value
23.1.1	Name of Display Item	Current Flow Rate
23.4.0	Register	11.7.8
23.2.0	Display Interval (Seconds)	4
23.1.2	Unit	Barrels/Dy
23.2.1	X Location For Name	0
23.2.2	Y Location For Name	0
23.2.3	X Location For Unit	10
23.2.4	Y Location For Unit	1
23.2.5	X Location For Data	0
23.2.6	Y Location For Data	1
23.1.3	Data Format	0.1
23.3.0	Data Scale Factor	0.0000
23.3.1	Data High Limit	0.0000
23.3.2	Data Low Limit	0.0000
23.4.2	Enumeration Ansis	0.0.0
23.2.14	Include in Scroll List	Yes
23.2.14	Allow Keypad Entry	Yes
23.2.14	Validate Keypad Entry	No
23.0.7	Recall factory default	No



There are several enhancements by using an AGA-7 Measurement Application to record liquid turbine volumes instead of trending & operations.

1. Regular collection instead of a trend collection
2. No need of setting operation application to arrive at daily volumes, resetting at contract hour.
3. Full data base, with editing and graphing functions available.
4. Turbine volumes available on poll WITHOUT custom reports and custom template required.

```
-----  
Station ID: TOTALFLOW  
Device ID : TOTALFLOW  
Location : Measurement and Control ACF: 1440.00 Current Flow: 1440.00  
Dev. type : FCU (Turbine) AP: 14.73 Yest. Volume: 0.00 aadd zbra tad ll amc  
Date/Time : 05/21/03 21:12:41 TF: 60.00 Lhrs. Volume: 1000.00 h|hl ffsc eee c| nge  
 BV: 10.75 Acom. Volume: 1306.38 --x- ---- -- x- ---
```

The screenshot shows a software window titled "TOTALFLOW - Measurement and Control". The window has several tabs: "Daily Flow Data", "Log Period Data", "Events", "Characteristics", "Daily Flow Detail", and "Log Period Detail". The "Daily Flow Data" tab is active, displaying a table with the following columns: Date, Counts, SP, IP, Corr. Vol, Energy, Speed Vol, FlowTime, Alarm, CPtime, CClear, BackFlow, and AVol Bk. The table contains three rows of data for dates 5/21/03, 5/20/03, and 5/21/03. Below the table is a large empty area, and at the bottom are buttons for "<< Previous Meter", "Next Meter >>", "Graph", "Close", and "Help".

Date	Counts	SP	IP	Corr. Vol	Energy	Speed Vol	FlowTime	Alarm	CPtime	CClear	BackFlow	AVol Bk
5/21/03	4780.800	14.730	80.080	15.930	15.930	15.930	100.800	UHLC PH	1.000	0	0.800	100.00
5/20/03	76.080	14.730	80.080	0.280	0.280	0.280	100.800	UHLC PH	1.000	0	0.800	100.00
5/21/03	432015.000	14.730	80.080	1440.050	1440.050	1440.050	100.800	UHLC PH	1.000	0	0.800	100.00
5/22/03	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0	0.800	0.80



TOTALFLOW - Measurement and Control

Daily Flow Data | Log Period Data | Events | Characteristics | Daily Flow Detail | Log Period Detail

Time	Counts	SP	IF	Core Vol	Energy	Uncor Vol	FlowTime	Alarm	Seq
00:00	18000.000	14.730	80.000	68.010	68.010	68.010	900.80	UHLC PH	149
01:00	18000.000	14.730	80.000	68.010	68.010	68.010	900.80	UHLC PH	150
02:00	17999.000	14.730	80.000	68.007	68.007	68.007	900.80	UHLC PH	151
03:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	152
04:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	153
05:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	154
06:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	155
07:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	156
08:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	157
09:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	158
10:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	159
11:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	160
12:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	161
13:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	162
14:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	163
15:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	164
16:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	165
17:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	166
18:00	18000.000	14.730	80.000	68.000	68.000	68.000	900.80	UHLC PH	167
19:00	18000.000	14.730	80.000	68.007	68.007	68.007	900.80	UHLC PH	168
20:00	18000.000	14.730	80.000	68.007	68.007	68.007	900.80	UHLC PH	169
21:00	18000.000	14.730	80.000	68.003	68.003	68.003	900.80	UHLC PH	170
22:00	18000.000	14.730	80.000	68.007	68.007	68.007	900.80	UHLC PH	171
23:00	18000.000	14.730	80.000	68.007	68.007	68.007	900.80	UHLC PH	172

Log Period Records for - 5/21/2003 (Contact hour = 0)

<< Previous Meter | Next Meter >> | << Previous Day | Next Day >> | Graph | Close | Help