



TOTALFLOW

Technical Bulletin 136

X Series Flow Computers

Configuring Quad AO Modules

Totalflow Technical Bulletin

Version 1.0, Revision AB (6 February 2006)

ABB Inc.

ABB Inc.
7051 Industrial Blvd
Bartlesville, Oklahoma
74006 USA

Telephone
Domestic 800 442-3097
International (918) 338-
4880
Telefax (918) 338-4607

Internet
www.abb.com/totalflow

1. Purpose

To inform customers about the versatility of the Quad AO module and how to properly configure the flow computer for output.

2. Description

TFIO Modules are used to aid customers in sending and receiving data to and from a Totalflow. These modules are compatible with our X series flow computer (XFC) and our X series controller (XRC). The Analog Output module or Quad AO sends an analog signal out of the flow computer to some other device. This signal is a 4 to 20 ma signal that the receiving equipment uses.

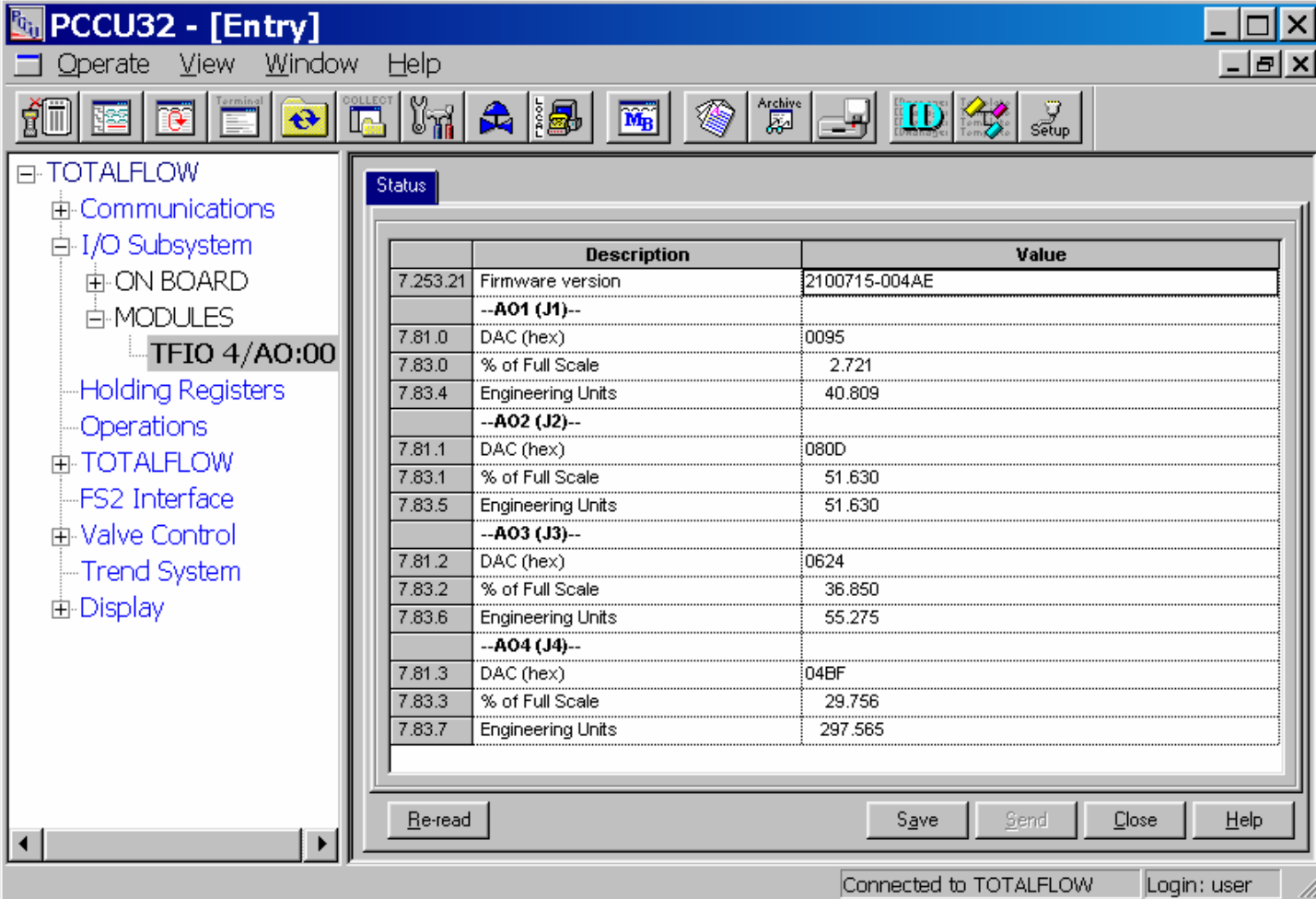
In this example the configuration has been setup to emulate a common 6600 Quad AO setup.

AO 1 = Static Pressure

AO 2 = Differential Pressure

AO 3 = Temperature

AO 4 = Flow Rate



PCCU32 - [Entry]

Operate View Window Help

Terminal COLLECT MB Archive Setup

TOTALFLOW

- Communications
- I/O Subsystem
 - ON BOARD
 - MODULES
 - TFIO 4/AO:00**
- Holding Registers
- Operations
- TOTALFLOW
- FS2 Interface
- Valve Control
- Trend System
- Display

Status

	Description	Value
7.253.21	Firmware version	2100715-004AE
--A01 (J1)--		
7.81.0	DAC (hex)	0095
7.83.0	% of Full Scale	2.721
7.83.4	Engineering Units	40.809
--A02 (J2)--		
7.81.1	DAC (hex)	080D
7.83.1	% of Full Scale	51.630
7.83.5	Engineering Units	51.630
--A03 (J3)--		
7.81.2	DAC (hex)	0624
7.83.2	% of Full Scale	36.850
7.83.6	Engineering Units	55.275
--A04 (J4)--		
7.81.3	DAC (hex)	04BF
7.83.3	% of Full Scale	29.756
7.83.7	Engineering Units	297.565

Re-read Save Send Close Help

Connected to TOTALFLOW Login: user

The screenshot shows the PCCU32 - [Entry] software interface. The left pane displays a tree view with the following structure:

- TOTALFLOW
 - Communications
 - I/O Subsystem
 - ON BOARD
 - MODULES
 - TFIO 4/AO:00
 - Holding Registers
 - Operations
 - TOTALFLOW** (highlighted)
 - FS2 Interface
 - Valve Control
 - Trend System
 - Display

The right pane shows the 'Current Values' tab with the following table:

	Description	Value	Units
11.3.0	Static Pressure	41.001	PSIA
11.7.0	Diff. Pressure	51.645	inH2O
11.3.3	Temperature	55.292	Deg F
11.7.19	Flow Rate	297.492	MCF/DAY
11.7.22	Today's Volume	0.454	MCF
11.7.23	Yesterday's Volume	0.003	MCF
11.7.21	Accumulated Volume	0.458	MCF
11.7.20	Last Calc Period Volume	206.588	SCF

At the bottom of the interface, there are buttons for 'Re-read', 'Save', 'Send', 'Close', and 'Help'. The status bar at the bottom indicates 'Ready' and 'Connected to TOTALFLOW Login: user'.

PCCU32 Entry Mode, Measurement

The far right hand tab shows the values we are using in this example to send to the Quad AO module. Take note of the register number for the item being sent to the AO module. The register number is to the left of the item description and will appear in an x.x.x format throughout PCCU entry mode. It is this number that actually tells the module where to find the data and what AO will use the data.

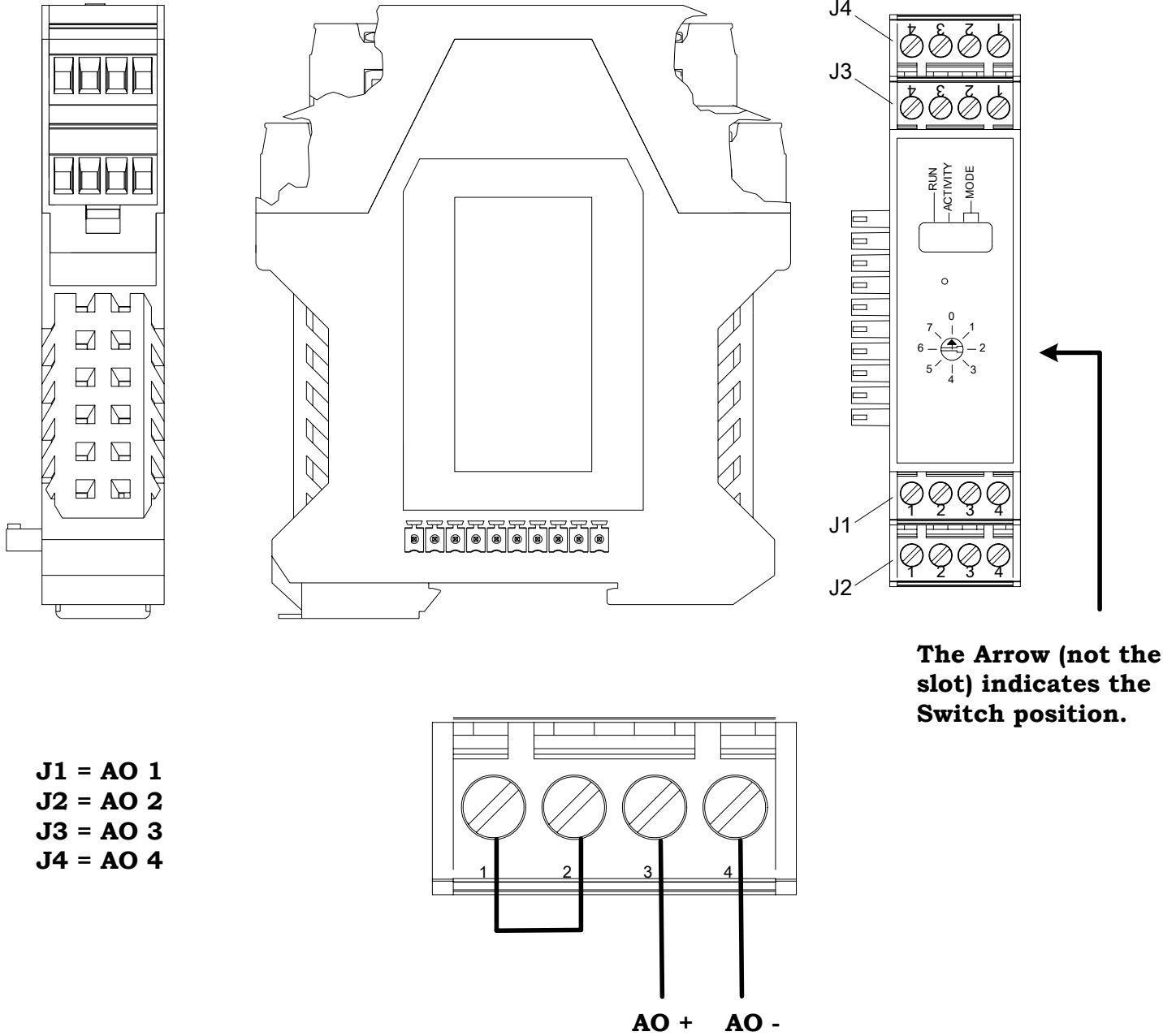
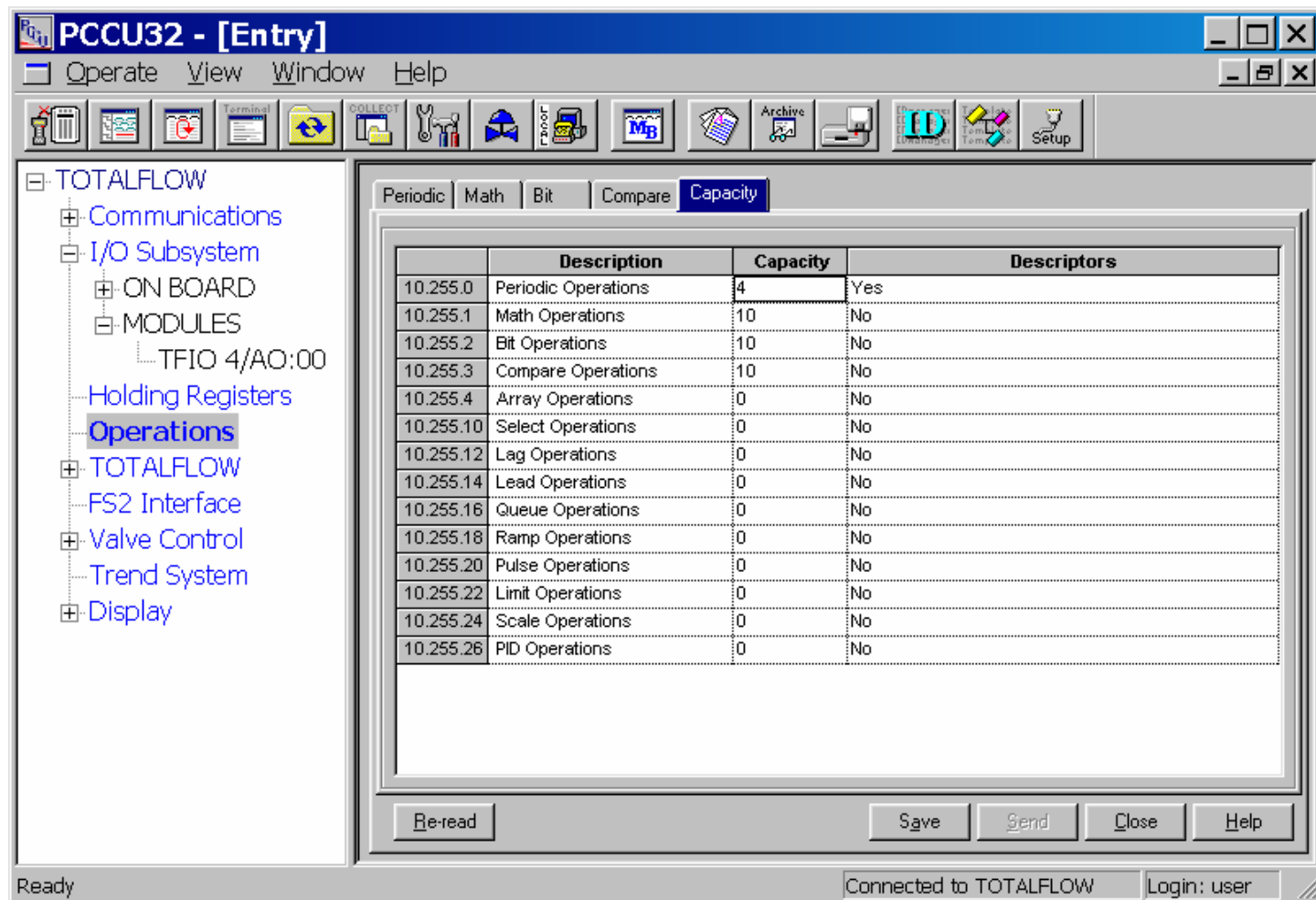


Figure 3 – TFIO Quad AO Module

Figure 3 above shows the TFIO module itself. It is important to note that the address selector goes in the “0” position for the first Quad AO module connected to the Totalflow. Once the module is on address position 0 and wired to the Totalflow go to the “Operations” in entry mode.



The screenshot shows the PCCU32 - [Entry] software interface. The left sidebar displays a tree view with the following structure:

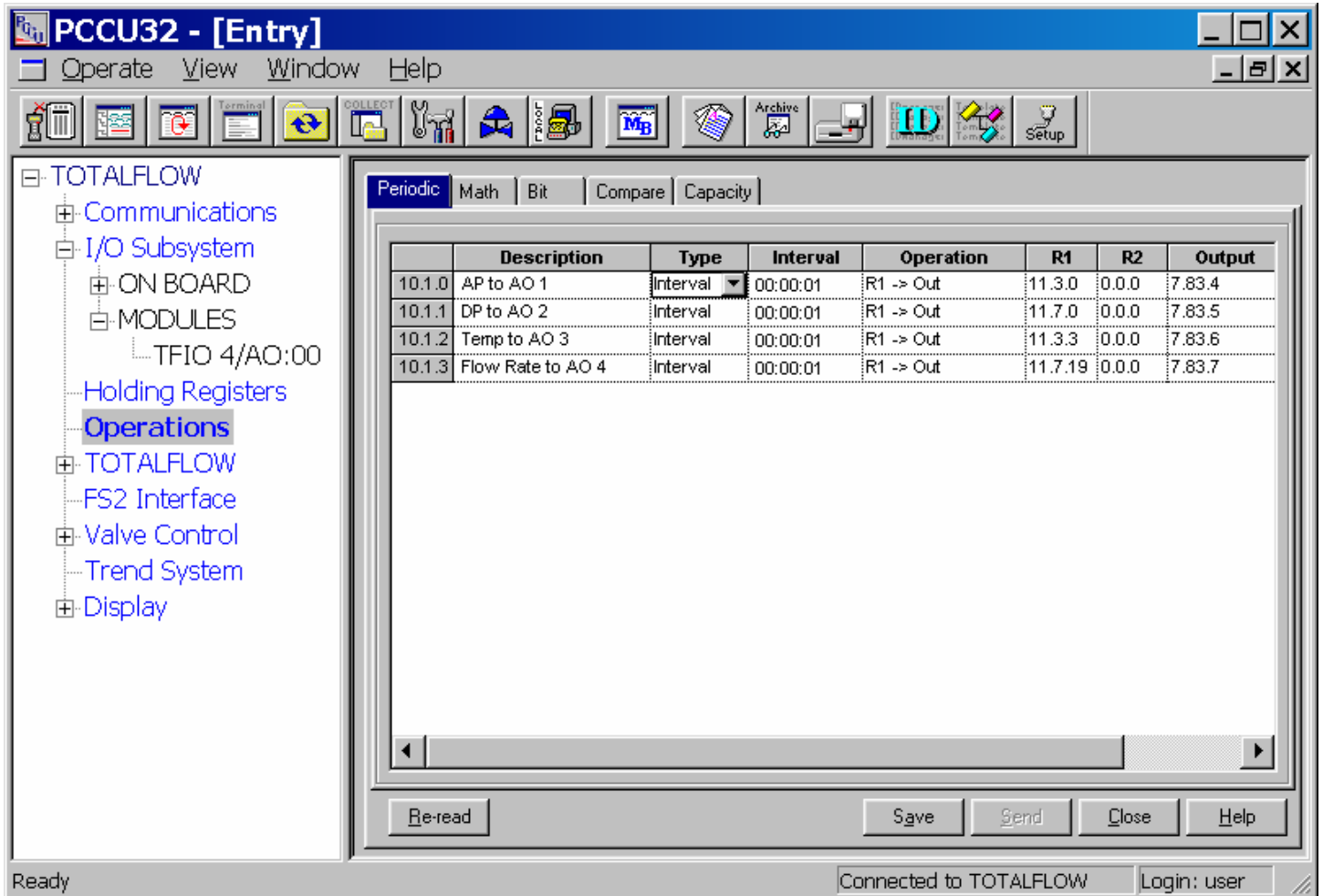
- TOTALFLOW
 - Communications
 - I/O Subsystem
 - ON BOARD
 - MODULES
 - TFIO 4/AO:00
 - Holding Registers
 - Operations**
 - TOTALFLOW
 - FS2 Interface
 - Valve Control
 - Trend System
 - Display

The main window displays the 'Capacity' tab for operations. The table below shows the configuration for various operation types:

	Description	Capacity	Descriptors
10.255.0	Periodic Operations	4	Yes
10.255.1	Math Operations	10	No
10.255.2	Bit Operations	10	No
10.255.3	Compare Operations	10	No
10.255.4	Array Operations	0	No
10.255.10	Select Operations	0	No
10.255.12	Lag Operations	0	No
10.255.14	Lead Operations	0	No
10.255.16	Queue Operations	0	No
10.255.18	Ramp Operations	0	No
10.255.20	Pulse Operations	0	No
10.255.22	Limit Operations	0	No
10.255.24	Scale Operations	0	No
10.255.26	PID Operations	0	No

At the bottom of the window, there are buttons for 'Re-read', 'Save', 'Send', 'Close', and 'Help'. The status bar at the bottom indicates 'Ready' and 'Connected to TOTALFLOW Login: user'.

Once in operations click on the “capacity” tab and make sure that the periodic operations have a capacity of at least 4. Once this is done click send and proceed to the “Periodic” tab under operations. You may also want to set “descriptors” for yes if you would like to setup your own description for each operation.



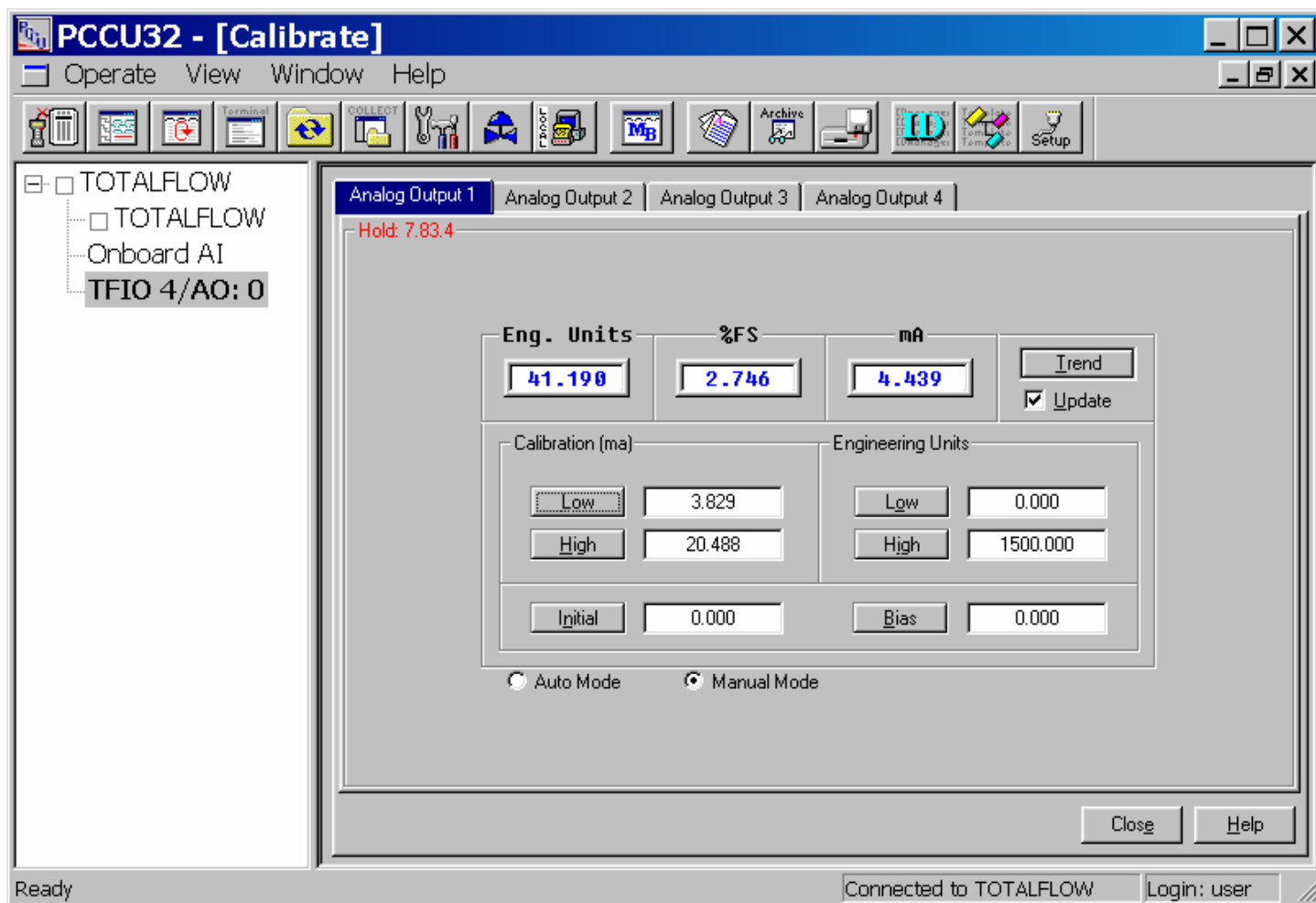
The screenshot shows the PCCU32 software interface. The title bar reads "PCCU32 - [Entry]". The menu bar includes "Operate", "View", "Window", and "Help". The toolbar contains various icons for file operations and system functions. The left sidebar shows a tree view with "TOTALFLOW" expanded, and "Operations" selected. The main window displays a table of periodic operations under the "Periodic" tab.

	Description	Type	Interval	Operation	R1	R2	Output
10.1.0	AP to AO 1	Interval	00:00:01	R1 -> Out	11.3.0	0.0.0	7.83.4
10.1.1	DP to AO 2	Interval	00:00:01	R1 -> Out	11.7.0	0.0.0	7.83.5
10.1.2	Temp to AO 3	Interval	00:00:01	R1 -> Out	11.3.3	0.0.0	7.83.6
10.1.3	Flow Rate to AO 4	Interval	00:00:01	R1 -> Out	11.7.19	0.0.0	7.83.7

Buttons at the bottom of the window include "Re-read", "Save", "Send", "Close", and "Help". The status bar at the bottom shows "Ready" on the left and "Connected to TOTALFLOW Login: user" on the right.

Now for our first “periodic” operation (register 10.1.0) lets setup the AO push from the Totalflow. Under type choose “interval” and under interval set the time for the register to update. For example a time of 00:00:01 means that register will update continuously one time per second. Ours is set to one second. For “Operation” choose **R1 > Out**. Now under R1 enter our register for static pressure. In this case its 11.3.0. Then enter the output register to AO 1. This register is 7.83.4. We have now told the flow computer to send the register info from 11.3.0 (static pressure) to 7.83.4 (AO1 on the module). It will do this every second as designated in the interval.

The last step is to calibrate and scale the analog outputs. Go into calibration mode (note you must have PCCU 4.54 or newer) and select TFIO 4/AO:0 from the tree on the left.



From here you can choose each AO one by one. Make sure that the AO's are in "manual mode". Then proceed to calibrate the AO using a multimeter or amp meter on pins 3 and 4 (+ and -) of each corresponding AO's. Make sure to enter the low and high value in milliamps for each AO. Then make sure the AO is scaled correctly. This is done in the engineering units portion of the screen. So if your SP had a low of 0 and a high reading of 1500 you would enter that under engineering units. This will allow the Totalflow to compute a corresponding milliamp value with static pressure.

Finally make sure you put check marks back in the boxes of the meter ID, found on the tree on the left hand side of the screen.

3. **Conclusion**

The Quad AO module is one of the most versatile modules available and is used in a wide range of applications. They are easily configurable and by getting the appropriate register in the Totalflow you can send virtually any data found in the Totalflow.