



CD3D™ CONNEX 3D

FLEXIBLE PROCESS MONITOR



Quickstart Guide

Introduction

Please read carefully! No liability can be accepted for damage caused by improper use or installation of the CONNEX 3D™ Flexible Process Monitor

CONNEX 3D™ flexible process monitor provides sensors/field device connectivity from standard analog inputs to RS-485 Modbus communications inputs that are wired to the CONNEX 3D CPU module and communicated to a host of devices; ie: CONNEX 3D display module, eXmod relay expansion module, CONNEX 3D data logger, CONNEX 3D Radio Module, CONNEX 3D TCP/IP Ethernet Module, CONNEX 3D CELLULAR module. With the selection of modules, the CONNEX 3D provides the user flexibility to configure any analog or digital input into a stand-alone or distributed monitoring and control system. The system communicates over a standard RS-485 Modbus™ data highway for remote monitoring through PC communications port (USB) or TCP/IP Ethernet or Cellular or Radio and local monitoring through the CONNEX 3D Display.

THE CONNEX 3D SYSTEM is pre-engineered, pre-wired and pre-configured (programmed) to the user's specifications at time of order. When unpacking the system, make sure all wiring connections are connected and tight as the connections or wires may have come loose or loosened during shipping.

Safety Precautions

If you are unsure of the suitability of a CONNEX 3D™ for installation, please consult your FLO-CORP representative for further information.

Electrical Shock Hazard

It is possible to contact components that carry high voltage, causing serious injury or death. All power to the CONNEX 3D™ and (where applicable) the relay circuit it controls should be turned OFF prior to working on the CONNEX 3D™. If it is necessary to make adjustments during powered operation, use extreme caution and use only insulated tools. Making terminal block adjustments or installation adjustments to a powered CONNEX 3D™ is not recommended by FLO-CORP.

Flammable or Explosive Applications

FLO-CORP manufactures several different display models with different mounting and internal configurations. It is the user's responsibility to select a controller model that is appropriate for the application, install it properly, perform tests on the installed system, and maintain all components.

Disclaimer

The information contained in this document is subject to change without notice. FLO-CORP makes no representations or warranties with respect to the contents hereof and specifically disclaims any implied warranties of merchantability or fitness for a particular purpose.

Incorrect Wiring

FLO-CORP assumes no responsibility for users incorrectly wiring their CONNEX 3D™ Flexible Process Monitor.

PROGRAMMING INSTRUCTIONS

DISPLAY MODULES PUSH BUTTONS AND DISPLAY PROGRAMMING INSTRUCTIONS

MENU- From the Run mode pressing enters the Menu mode. If in the Menu mode when pressed will escape from the Menu mode and enter into the Run mode.

UP - Advances Up through the Menu mode or Up through value (depending on position in the programming mode.)

DOWN - Advances Down through the Menu mode or Down through value (depending on position in the programming mode.)

ENTER - Enters into the Programming functions and Programming Values. Once functions and/or values are entered in, the program auto advances to next function. To quite programming, push the MENU button twice, display will read STORE and automatically advance to the Run mode.

FROM THE RUN MODE PRESS THE MENU BUTTON TO ENTER INTO THE PROGRAMMING MODE

PROGRAMMING OF RELAYS

Configuration of the relays will activate the relays LED located above the 6 digit, 7 segment display screen. When the relay set point has been reached or exceeded, the LED will light acknowledging the relay activation. The LED will extinguish once the relay has returned to its normal state. The relays are mounted in the CONNEX 3D Relay Module and is connected by the RS485 communication terminal (TB3) located on the lower left hand corner of the Relay Module.

1. Press: Menu

1.1 Display will read: rELAY

2. Press: Enter

2.1 Display will read: rELAY1 - If relay #1 is the relay to be configured, press enter. Otherwise press the DOWN button to advance to relay # 2 and so on.

3. Press: Enter

3.1 Display will read: Act - The actuation of the relay should be selected.

4. Press: Enter

4.1 Display will read: OFF - This is the factory default. The relay is turned off and relay display LED will not illuminate and relay will not actuate until relay is turned to one of five actuation options.

5. Press: Enter

5.1 Display will read: AtorSt - This is how the relay should act: choose between AtorST Auto Reset - The relay will automatically change back to normal state once the set point is NOT exceeded. Press enter to choose Auto Reset or Down to select ManrSt (Manual Reset - this is a non-latching relay action that when the set point is reached, the relay will trip and stay tripped until the reset push button has been actuated either locally or remotely (DigaLink) regardless if the process value is normal or has been reached or exceeded the set point value. The LED is always off unless the set point value has been reached or exceeded. The LED will stay on until the set point has been manually reset. Press enter to choose Manual Reset or Down to select LtchCL. Latching with Clear is a latching relay action that when the set point is reached, the relay will trip and stay tripod until the reset push button has been actuated. Manually resetting the relay will not occur if the process value is at or exceeded the set point value. The relay can only be reset after the alarm condition has cleared. The LED is always off unless the set point value has been reached or exceeded. The LED will stay on until the alarm condition has cleared and the reset button has been pushed. Press enter to select Latching with Clear or down to select ALtnAt. Pump Alternation: For pump control applications where two or more similar pumps are used to control the level of a tank or a sump, it is desirable to have all the pumps operate alternately to prevent excessive wear on the pumps.

Example of pump alternation operation:

Relay (pump 1) #1 is programmed to turn on when level reaches 50.00, when level drops below 10.00 relay (pump 1) #1 turns off.

The next time level reaches 50.00 relay #2 (pump 2) turns on, when level drops below 10.00 relay #2 (pump 2) turns off.

This is how the relay set points will be programmed: Relay # 1 set point on = 50.00 off = 10.00

Relay # 2 set point on = 55.00 off = 5.00

If pump #1 cannot keep the level below 55.00 pump # 2 will turn on at 55.00, then as the level drops to 10.00 pump #1 will turn off, pump # 2 will not turn off until level drops below 5.00

The next time level reaches 50.00 relay #2 (pump 2) turns on, when level exceeds 55.00 relay #1 (pump 1) will turn on until level drops below 10.00, then relay # 2 will turn off and relay # 1 will turn off when level drops below 5.00 - alternately

Press enter to select Pump Alternation or press down to select rAttot. Rate or Total allows you to select if you choose to program the relay to actuate on the rate value or the total value. Select Rate if you want the relay to actuate on a level application or flow rate limit application or any application when a rate will be exceeded. Select Total if you would like the relay to act as a batch controller. By programming total limits you can turn a pump on/off at defined Batch Amounts or Volume.

6. Press: Enter

6.1 Display will read: FLSAFE - Fail Safe is the state you want the relay in if the power is lost to the control system.

7. Press Enter

7.1 Display will read: OFF - With fail safe off the relay will change to its normally open when no power is applied.

8. Press: Enter

8.1 Display will read: Relay # (Relay 1 or Relay 2 etc.) ON - Press enter to enter in the programmed value that the relay should turn on. OR - Press down to program the relay off value.

9. Press: Enter

9.1 Display will read: The next relay number after the relay that was just programmed. Follow the instructions above for each of the four relays.

Once the selected relays have been programmed to satisfaction, press the MENU button to go back to the main menu selection in the programming mode. The display should read RELAY. By pressing the DOWN button you can advance to the ConFig (Configuration) menu. Press Enter to continue.

Note 1.: When communicating to the Relay Module, program the RS-485 to the relay setting. See programming RS-485 instructions.

Configuration of Display

The Display Module can be configured to display Rate, Total, or both Rate and Total. To configure these settings, follow the instruction set below.

1. Press: Menu

1.1 Display will read: ConFig (Configure)

2. Press: Enter

2.1 Display will read: diSPLA (Display)

3. Press: Enter

3.1 Display will read: rATE (Rate)

4. Press: Enter to select Rate to display or Press: Down to scroll between: Rate, Total, or Both (Both Rate and Total to display).

5. Once desired Display setting is indicated Press: Enter

5.1 Display will read: totUnt (Total Units)

6. Press: Enter

6.1 Display will read: dAy - Press enter to select the DAY unit or press Down to select Hour or press Down to select Min (Minute) or press Down to select SEC (Seconds)

7. Press: Enter

7.1 Display will read: 9-tot (Grand Total) - To display a grand total which is an accumulated total in addition to the standard totalizer in step number 4.

8. Press: Enter

8.1 Display will read: 9t OFF - Press enter to turn the Grand Total off or press down button to turn the Grand Total on. If Grand Total is selected, CLr 9t (Clear Grand Total) will be displayed.

8.2 Press Enter: Display will read no for not clearing Grand Total data. Press Down button: Display will read yES Press Enter to clear Grand Total data.

9. Press: Enter

9.1 Display will read: CUTOFF - Low Flow Cutoff is used for flow applications mostly. Most flow meters reach a flow rate at the very bottom of their flow range that is very unstable. CUTOFF provides a numeric value that can be programmed in to cut this unstable reading out so the display will read 0.00.

- Press Enter - The Display will read 00000.0 - Press the numeric value in at the point of low cut off. If 0.0 is desired.

10. Press Enter:

10.1 Display will read: FACtor -(Exponential Factor) - The display can be configured with a Totalizer Multiplier of 1, 10, 100, 1000 or .01 and .1. To implement a Totalizer Multiplier follow the instruction set below. Example: If user would like the display value of 100 on the rate display equal the count of 100 on the totalizer, enter in Totalizer Multiplier of 1. If user would like the display of 100 on the rate display to equal the count of 10 on the totalizer, enter in Totalizer Multiplier of 10.

11. Press Enter: Display will read ConFig.

12. Press: Menu to exit Configuration and enter Run mode OR Press Down button to advance to the Scale section of the program menu.

Totalizer Reset

To reset the Totalizer on the display follow the instruction set below.

1. While in Run Mode: Simultaneously Press: both Menu and Enter at the same time

1.1 Display will read: t-rSEt (Totalizer Reset)

2. The Totalizer is now reset

Reset of the Grand Totalizer

To reset the Grand Totalizer follow the instruction set below.

1. Press: Menu

1.1 Display will read: ConFig (Configure)

2. Press: Enter

2.1 Display will read: diSPLA (Display)

3. Press: Down

3.1 Display will read: g-tot (Grand Total)

4. Press: Down
4.1 Display will read: CLr gt (Clear Grand Total)
5. Press: Enter
5.1 Display will read: no
6. Press: Up
6.1 Display will read: YES
7. Press: Enter
7.1 Display will read: FACtor (Exponential Factor)
8. Press: Menu to exit Reset Grand Total Menu
8.1 Display will read: Config (Configure)
9. Press: Menu to exit Configuration Menu and enter into Run mode.

Programming SCALE Settings

The display can be programmed so the 4-20 mA signal will equal a desired engineering unit. To Scale the display follow the instruction set below.

1. Press: Menu
1.1 Display will read: Relay
2. Press: Down
2.1 Display will read: ConFig
3. Press: Down
3.1 Display will read: SCALE
4. Press: Enter
4.1 Display will read: dEc Pt (Decimal Point)
5. Press: Enter
5.1 Display will read: 000000
5.2 Decimal point can be programed using the Up or Down buttons to read up to 5 full numbers to the right of the decimal point. example: 0.00000
6. Press: Enter
6.1 Display will read n-PntS (Number of Linearization Points - 16 maximum)
7. Press: Enter
7.1 Display will read: 02
8. Press: Up to adjust the first numerals value
9. Press: Down to scroll to the next numeral
10. Press: Enter once desired number of points is indicated
10.1 Display will read: InPt 1
11. Press: Enter
11.1 Display will read: 4.00 (4mA)
12. Press: Down to scroll to the desired numeral that needs adjusted
13. Press: Up to adjust the numerals value

14. Press: Enter once desired low input analog signal is indicated
 - 14.1 Display will read: dSP 1 - Display 1 - enter the value that should correspond with the low analog input. EX: 4mA = 0 (0 is factory default. If another number is indicated, display has been previously programed with a display variable to equal the 4 mA input)
 15. Press: Enter
 - 15.1 Display will read: 000000
 16. Press: Up to adjust the first numerals value
 17. Press: Down to scroll to the next numeral
 18. Repeat steps 14 and 15 until desired Display 1 Value is indicated
 19. Press: Enter once desired Display 1 Value is indicated
 - 19.1 Display will read: InPt 2 (Input 2)
 20. Press: Enter
 - 20.1 Display will read: 020.00 (20mA)
 21. Press: Up to adjust the first numerals value
 22. Press: Down to scroll to the next numeral
 23. Press: Enter once desired Input 2 Value is indicated
 - 23.1 Display will read: dSP 2 (Display 2)
 24. Press: Enter
 - 24.1 Display will read: 20 (20 is factory default. If another number is indicated, display has been previously programed with a display variable to equal the 20 mA input)
 25. Press: Up to adjust the first numerals value
 26. Press: Down to scroll to the next numeral
 27. Press: Enter once desired Display 2 Value is indicated
 28. Press: Menu to exit Scale Configuration
 - 28.1 Display will read: SCALE
 29. Press: Menu to exit Configuration and enter into Run Mode
- *Note 1: Display will read: SCALE if sufficient 4-20mA Span is captured. If insufficient span is configured the display will read Error.
- * Note 2: Minimum Scale setting is 0.1 mA input

Configuration 4-20mA Output

The CONNEX 3D Flexible Process Monitor can output specific values preconfigured with a specific mA input rating. These parameters are used to span the 4-20mA output with respect to the displayed rate or tank level values.

For example: If you want the 4-20mA output to output 4mA at 0 flow or level, and 20 mA at 1000 flow or level, enter 0 for the 4mA parameter, and 1000 for the 20mA parameter.

1. Press: Menu
Display will read: rELAY
2. Press: Down
Display will read: SCALE

3. Press: Down

Display will read: OutPut (4-20mA Output)

4. Press: Enter

Display will read: 4 Out (4mA Output)

5. Press: Enter

Display will read: 0000.00

6. Enter the displayed rate or level that corresponds to an output current of 4mA. Press:
Up to adjust the numerals value.

Press: Down to scroll to the next numeral.

7. Repeat step six until desired 4mA Output value is configured

8. Press: Enter

Display will read: 20 Out (20mA Output Value)

9. Press: Enter

Display will read 0000.00

10. Enter the displayed rate or level that corresponds to an output current of 20mA.

Press: Up to adjust the first numerals value. Press: Down to scroll to the next numeral.

11. Press: Enter once desired 20mA Output value is indicated on the Display.

Configuration of Input Module 4-20mA INPUT Calibration using the Display Module for interface

Programming NOTE: All CONNEX 3D Input Modules come pre-calibrated at the factory.

The display can be calibrated to display the process variable in engineering units by applying the maximum mA signal that equals the calibrated mA input. Input calibration requires the use of a known calibrated mA generator. The display has been calibrated from the factory with a calibrated 4-20 mA signal generator.

1. Press: Menu

1.1 Display will read: rELAY

2. Press: Down

2.1 Display will read: ConFig

3. Press: Down

3.1 Display will read: SCALE

4. Press: Down

4.1 Display will read: USEr

5. Press: Enter

5.1 Display will read PASS

6. Press: Down

6.1 Display will read: rS-485 if display is programmed to communicate via RS-485 (See Configuration of Serial Output)

7. Press: Down

7.1 Display will read: AddrES

8. Press: Down

8.1 Display will read: dEFALT

9. Press: Down

9.1 Display will read: CALib (Calibrate)

10. Press: Enter
 - 10.1 Display will read: PASS ? (Password)
11. Press: Enter
 - 11.1 Display will read: 0000 - The first numeral to the left will be flashing. Press the UP button once - the display will read 1000 - Press the Down button - the second digit from the left will flash. Press the UP button so the digit reads 9. Press the Down button - the third digit from the left will flash. Press the Up button so the digit reads 8. Press the Down button - the fourth digit from the left will flash. Press the Up button so the digit reads 9. The factory default password is 1989.
12. Press: Enter
 - 12.1 Display will read: CAP-4 - Input 4ma into the display with a calibrated input signal generator.
13. Press: Enter
 - 13.1 Display will read: Numeric value representing current input. (value should be around 780 - 800)
14. Press: Enter
 - 14.1 Display will read: CAP-20
 - 14.2 Input 20mA into the display with a calibrated input signal generator.
15. Press: Enter
 - 15.1 Display will read: Numeric value representing current input. (value should be around 3500-3800)
16. Press: Enter
 - 16.1 Display will read: USEr
17. Press Menu to exit - Display will read: Store - briefly and return automatically to the run mode.

Configuration of Password Protection

1. Press: Menu
 - 1.1 Display will read: rELAy
2. Press: Down
 - 2.1 Display will read: ConFig
3. Press: Down
 - 3.1 Display will read: SCALE
4. Press: Down
 - 4.1 Display will read: USEr (User)
5. Press: Enter
 - 5.1 Display will read: PASS (Password)
6. Press: Enter
 - 6.1 Display will read: 0000
7. Press: Up to adjust the first numerals value
8. Press: Down to scroll to the next numeral
9. Repeat steps 7 and 8 until desired Password is indicated
10. Press: Enter
 - 10.1 Display will read: AddrES (Modbus Address)

11. Press: Menu
11.1 Display will read: USEr (User)

12. Press: Menu to exit Configuration and enter into Run Mode

Programming RS-485 Serial Communications Output

The CONNEX 3D Flexible Process Monitor Input Module includes RS-485 serial communications output which uses Modbus™ TCP/IP and Modbus™ RTU communications protocol and can be programmed to communicate as a HOST device or rELAY (SLAVE MODE). To assign how the display will communicate follow the instruction set below:

1. Press: Enter

1.1 Display will read: rELAY

2. Press: Down

2.1 Display will read: ConFig

2. Press: Down

2.1 Display will read: SCALE

3. Press: Down

3.1 Display will read: USEr

4. Press: Enter

4.1 Display will read: PASS

5. Press: Down

5.1 Display will read: RS-485 (Factory default)

6. Press: Enter to select rELAY or Down to select HOST

6.1 Display will read: selection

7. Press: Enter

8. To exit program mode and enter into run mode press: Menu twice.