

# **CPU-3**

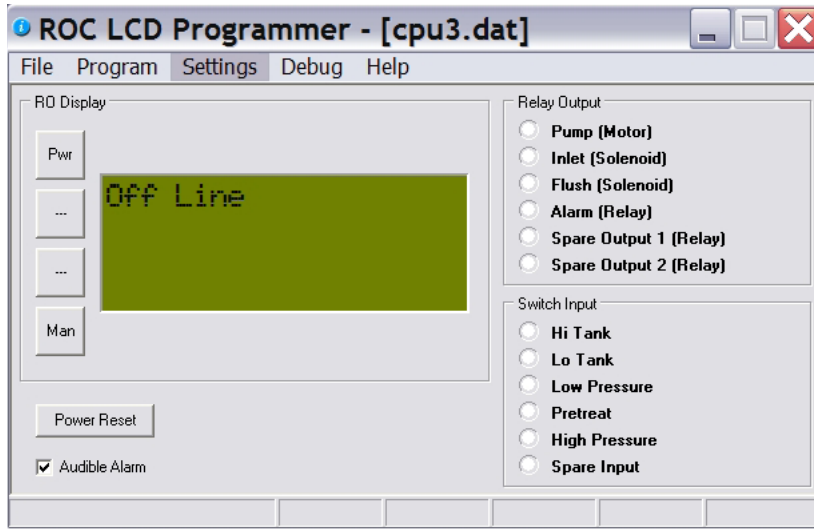
## **Prog-1 USB**

### **Interface cable and software**

# **Guide to customizing the software for ROC-2 and ROC-3 controllers.**

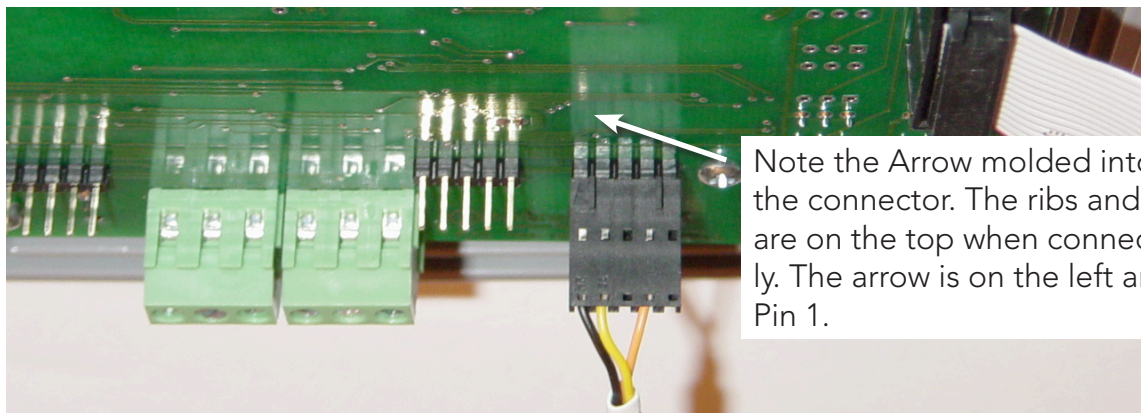
**Setting up the CPU-3 Programming Software.**

1. Double Click the CPU-3 icon to launch the ROC LCD Programmer. The screen should look like the one below. Note the "Off Line" message displayed in the "LCD" area.



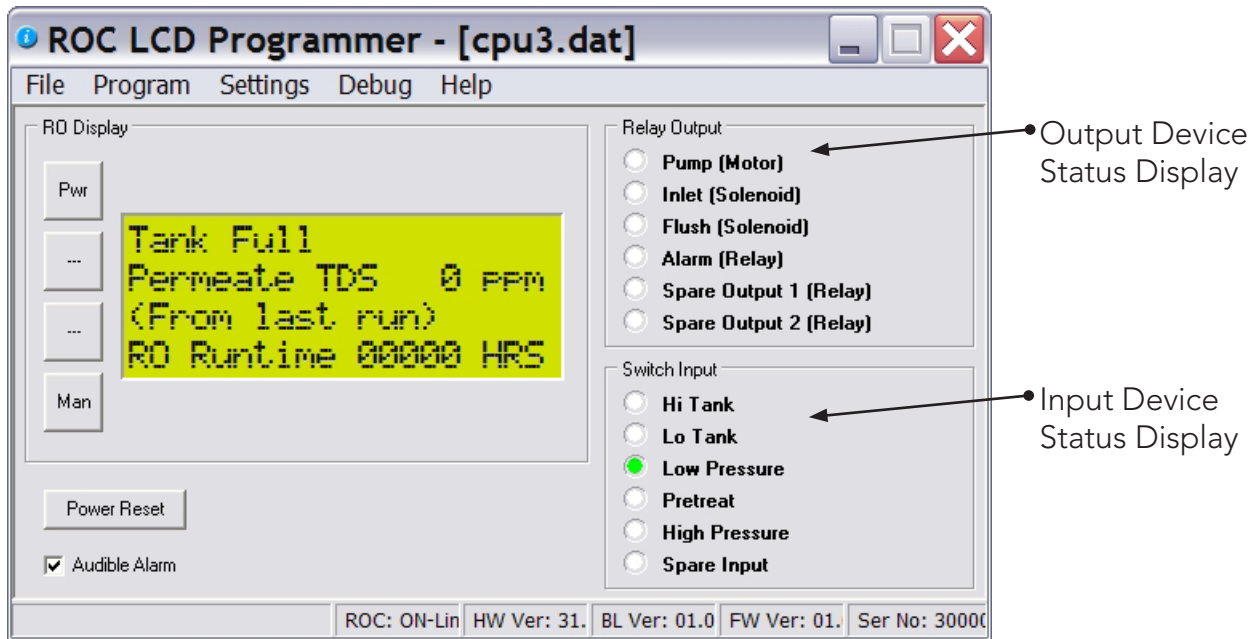
**Setting up communications with a CPU-3.**

1. If you haven't already installed the drivers for the programming cable, do so now and return to this step.
2. If the drivers are installed, connect the cable to the USB port.
3. Connect the other end of the cable to the CPU-3 as shown below.
4. Turn the Power On to the controller.
5. The display on the ROC LCD Programmer display should change to match the display shown on the CPU-3.
6. If the display on the CPU-3 still displays "Off Line", go to the Program Menu and scroll down to Comm Port. Select "USB1:ICP01T9P" and Click OK.



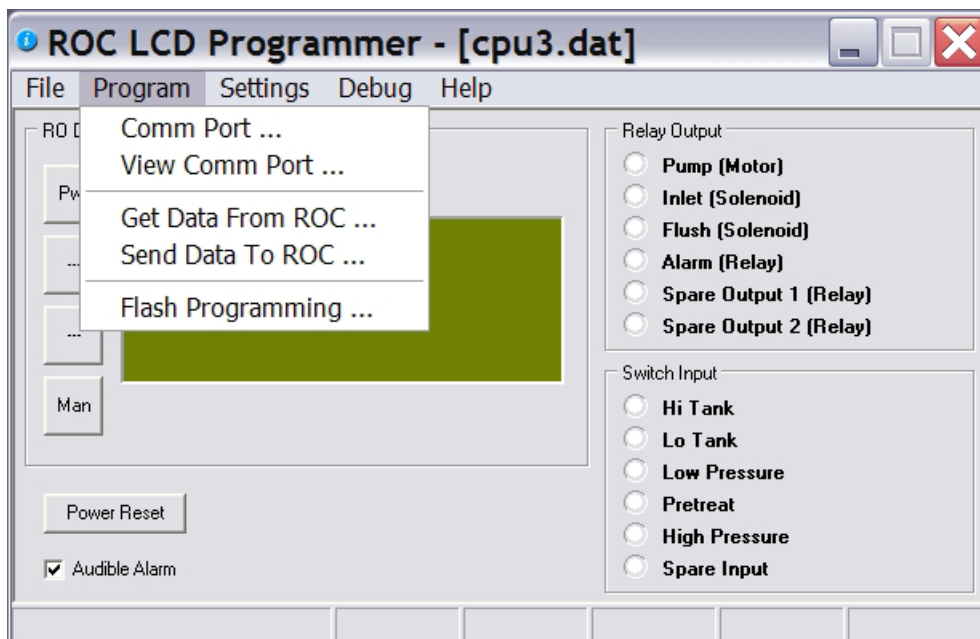
7. If the display on the CPU-3 changes from "Off Line" to a display that matches that of the CPU-3, the Comm setup is complete.

### CPU-3 Programming Interface Overview.



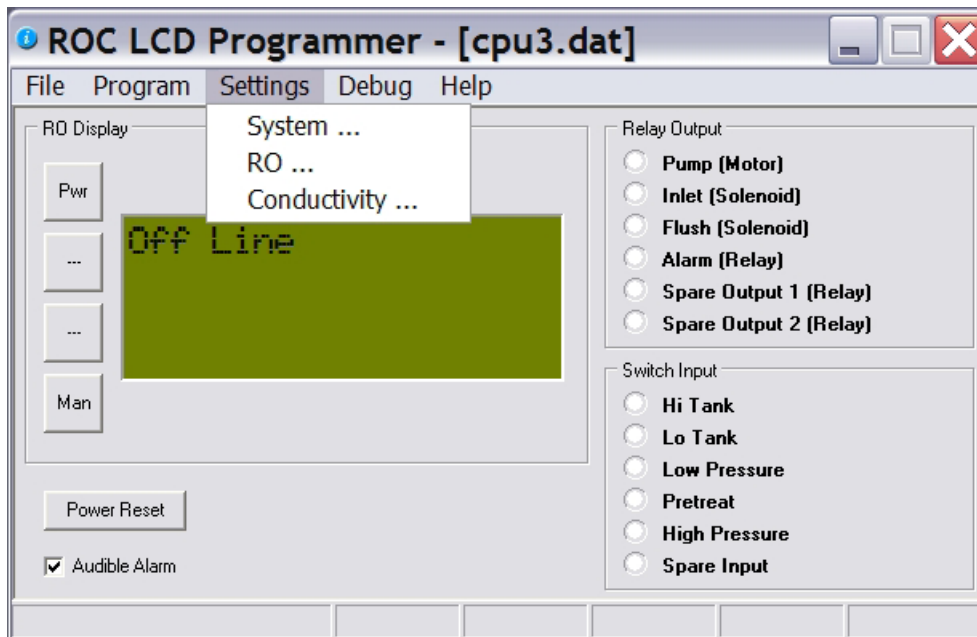
The Programming Interface opens up in the Monitor Mode as shown in the display above. This display mirrors the LCD display on the remote system and displays the status of all of the inputs and outputs.

### CPU-3 Programming Interface Overview: Program Menu



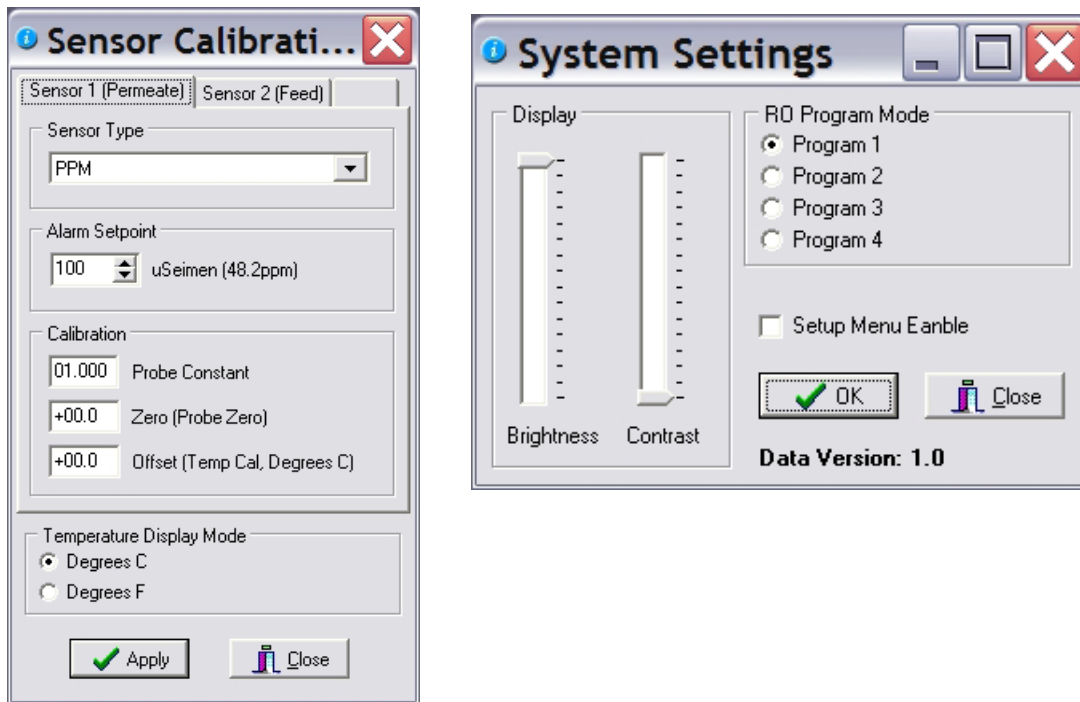
The Program Menu provides access to the Comm Port settings as well as the setting used for sending data to the ROC (Programming).

### CPU-3 Programming Interface Overview: Settings Menu



The settings menu provides access to the System settings (LCD contrast, etc) the RO and the Conductivity Settings. Selecting one of the settings opens a new window, while leaving the main window open.

### CPU-3 Programming Interface Overview: Conductivity Settings



The System and Conductivity settings are the defaults loaded when programming the system. These settings can also be changed via menus in the CPU-3.

## CPU-3 Programming Interface Overview: RO Settings Menu

Clicking on the ? opens a pop-up which provides info about the related settings, similar to the information found in the next section.

- The RO Settings Menus (Programs 1-4) determine the behavior of the RO.
- Unlike the System and Conductivity settings, these settings **can not** be changed via the menus in the CPU-3.
- The programming interface allows you to set up 4 completely independent RO behaviors. These behaviors **can be** selected via the menus (Program 1 - 4) in the CPU-3.
- The thinking behind this method was to provide the RO manufacturer with the flexibility to set-up behaviors that would accommodate any configuration/situation that may arise, without giving the end-user the ability to make changes that could render the RO inoperable and/or make troubleshooting difficult because of multiple interdependent variables.
- The RO Menus are explained in detail on the following pages.

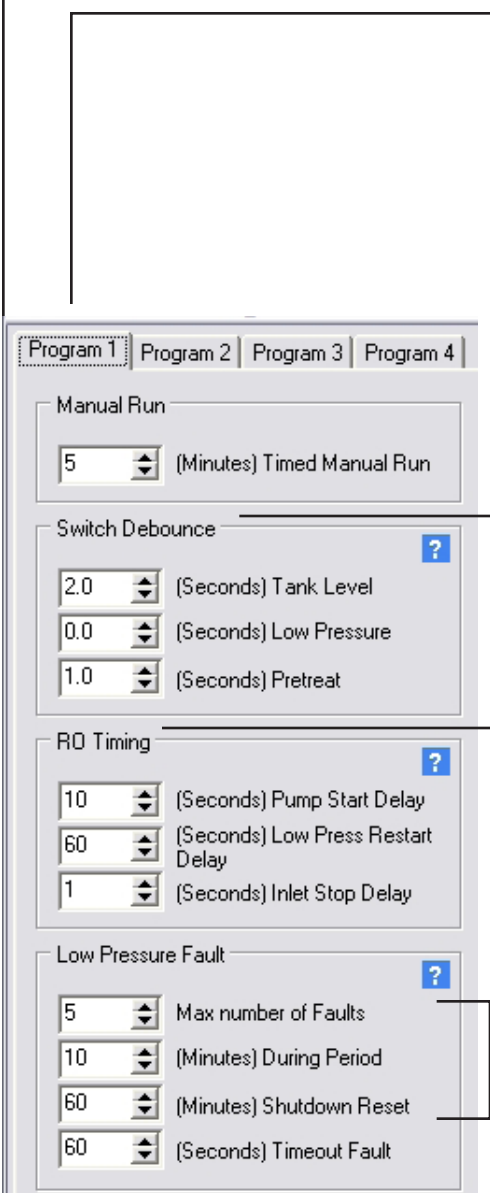
### Creating your own settings.

1. Select **File->Save As** and create a new data file. The display at the top of the main Programming interface will update to display the name of the new data file.
2. Select **Settings->RO** to open the RO settings window.
3. Select the Program Tab for the program you want to edit.
4. Select the field you want to edit and enter your desired value.
5. When you're finished with your editing, **Select Apply**.
6. **To Save your settings go the File Menu and Select Save.**

### **Programming the CPU-3**

1. Connect the computer to the CPU-3. Confirm that the computer is communicating with the CPU-3 by noting that the display on the Programming interface matches the display on the CPU. If it doesn't, check that the Power is On to the CPU-3, the Programming Interface Cable is connected correctly and the correct Comm Port is selected.
2. Select the data file you want to use for programming. (*File->Open . . .*)
3. Select *Program->Send Data To ROC . .*
4. **Select Start** and the data transfer will begin.
5. When the transfer is complete, turn the power to the CPU-3, OFF and then back ON. The new settings are now installed in the CPU-3.

**CPU-3 Programming Interface Overview: RO Settings Detail-1**



**Program Selector** There are 4 independent sets of programs which are field-selectable. Each program can be set-up with different behaviors to accommodate different operating conditions.

**Switch Debounce** These settings provide hysteresis for switches that don't. Longer time provides more hysteresis.

**Tank Level** This specifies the time that the tank switch must be closed or open before the controller accepts it as a valid condition. The function is to prevent nuisance tripping of the RO especially in small tanks or turbulent tanks, especially with reed switches with no hysteresis.

**Low Pressure** This specifies the time that the pressure switch must be closed or open before the controller accepts it as a valid condition. Since pressure switches usually have built-in hysteresis this value is set at 0.

**Pretreat Switch** This is the time that the pretreat switch must be OPEN before the controller accepts it as a valid condition. The function is to prevent nuisance tripping of the RO especially in small tanks or turbulent tanks

**RO Timing Field** These settings establish the basic timing for the relationship between the inlet pressure switch, inlet valve and the high pressure pump.

**Pump Start Delay** On RO start-up, after the tank switch closes, the inlet solenoid valve is energized. When the inlet pressure switch closes this begins the "Pump start delay". If the pressure switch remains closed, the pump will start after the time here.

**Low Pressure Restart Delay** This value sets the delay for the pump to be OFF following a Low Pressure Event before attempting a restart. The pressure switch must remain closed for the duration of the period shown before the pump will restart

**Inlet Stop Delay** This value sets the delay for the inlet solenoid valve to be de energized following the de-energizing of the motor on RO shut down. The purpose is to prevent the pump from operating against a closed suction as the pump spins down. (Note: to use longer values the inlet valve must be capable of operating at very low or zero differential pressure.)

**Low Pressure Fault** These three values work together to determine how the RO handles Low Pressure conditions. The first two values, "Max number of faults" and "(Minutes) During Period", sets the limit for the number of low fault conditions over time that are required to place the RO in "Low Pressure Fault Shutdown". The third value (Minutes) Shutdown Reset) sets the duration of the "Low Pressure Fault Shutdown" which is the period that the RO will remain idle before trying to restart. The purpose of the Low Pressure Fault Shutdown is to prevent an RO from turning OFF/ON repeatedly without any limit.

**Time-out Fault** If the inlet valve is open, but the pressure isn't sufficient to close the inlet pressure switch, the RO would run indefinitely on line pressure. This value sets the time limit for the RO to operate with the inlet valve open with Low Pressure (as indicated by an Open inlet pressure switch) before a Low Pressure Fault is added to the Low Pressure Fault counter.

**CPU-3 Programming Interface Overview: RO Settings Detail-2**

**Manual Flush.** Actuated by the Manual Run/Flush switch on the front panel.

**Manual Flush Duration.** RO will operate in the flush mode for duration selected here.

**Manual Flush Mode.** Selects one of 3 available flush types-High Pressure, Low Pressure (Inlet Valve Closed), Low Pressure (Inlet Valve Open)

**Periodic Flush.** Automatic High Pressure Flush with programmable frequency and duration.

**Periodic Flush Interval** Sets the time between flushes (Note: 0 value disables the periodic flush)

**Periodic Flush Duration** Sets the duration of the periodic flush.

**Flush on Shutdown** These settings allow customization of the behavior of a flush that occurs on a "tank full" or shutdown event.

**Time from last Flush** sets the minimum run time since the last flush to enable flush on shutdown. (A 0 value allows a flush to occur irrespective of the last flush.)

**Minimum Operation** Sets the run time required to enable flush on shutdown (Note: 0 value allows a flush to occur irrespective of runtime)

**Flush Duration** Sets the duration of the periodic flush.

**Shutdown Flush Mode.** Selects one of 3 available flush types-High Pressure, Low Pressure (Inlet Valve Closed), Low Pressure (Inlet Valve Open)

**System Idle Flush** allows an automatic startup and run - in the flush mode after the RO is idle for a selected period. Intended for environments where leaving the RO idle for long periods would invite bio-fouling.

**System Flush Interval** sets a time after which the RO will start-up and run in the flush mode. This is disabled by default because of the danger of over-flowing a tank if not properly implemented. (0)=disabled

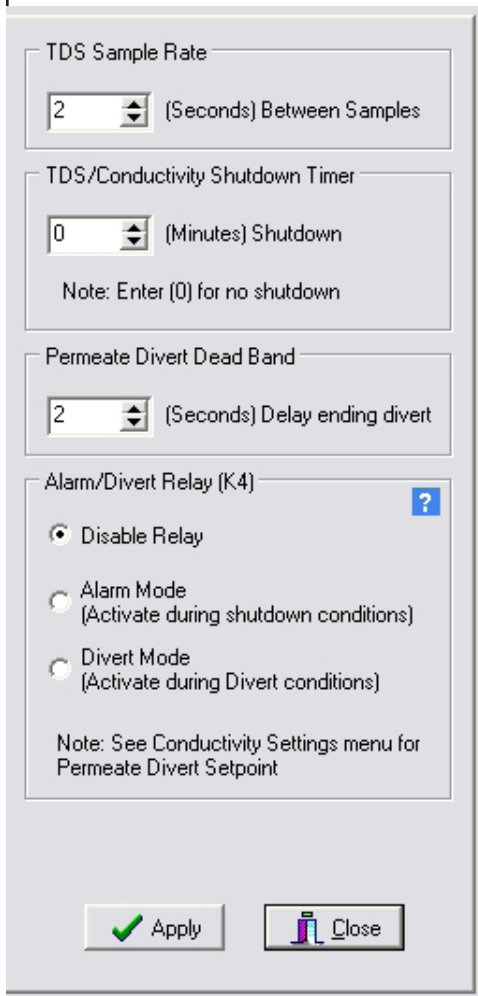
**Flush Duration** Sets the duration of the idle flush.

**Idle Flush Mode.** Selects one of 3 available flush types-High Pressure, Low Pressure (Inlet Valve Closed), Low Pressure (Inlet Valve Open)

**Flush Modes Explained**

	High Pressure	Low Pressure (Inlet Closed)	Low Pressure (Inlet Open)
Inlet Valve	ON	OFF	ON
Inlet Pressure Switch	Active	Ignore	Ignore
Hi Pressure Pump	ON	OFF	OFF
Hi Pressure Switch	Active	OFF	OFF
Flush Valve	ON	ON	ON
Divert Relay	User Select	User Select	User Select

## CPU-3 Programming Interface Overview: RO Settings Detail-3



TDS Sample Rate

2 (Seconds) Between Samples

TDS/Conductivity Shutdown Timer

0 (Minutes) Shutdown

Note: Enter (0) for no shutdown

Permeate Divert Dead Band

2 (Seconds) Delay ending divert

Alarm/Divert Relay (K4) ?

Disable Relay

Alarm Mode  
(Activate during shutdown conditions)

Divert Mode  
(Activate during Divert conditions)

Note: See Conductivity Settings menu for Permeate Divert Setpoint

Apply Close

**TDS Sample Rate.** Sets the sample frequency for conductivity measurement.

**TDS Conductivity Shutdown Timer.** Sets the cumulative time of the system operating over the Permeate Alarm SetPoint before the system will shut down.

**Permeate Divert Deadband.** Delay in dennergizing the divert relay (K4) following a Divert condition.

**Alarm/Divert Relay.** Selects whether the Alarm/Divert relay operates in the **Alarm mode** (on High Pressure Shutdown, Low Pressure Shutdown Water Quality Shutdown or Pretreat Lockout) or the **Divert mode** (Start-up, Flush and TDS/Conductivity reading greater than setpoint) or not at all.