



FLEXTROL

SINGLE INPUT CHANNEL

DUAL OUTPUT

pH/ORP CHEMICAL FEED CONTROLLER

Operation Manual

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Functional Description

The CHEM-FLOW Model **FlexTrol 32** is a self-contained single input channel water probe monitor/controller designed for the specific application of measuring and controlling water quality. The micro-controller based unit accepts one probe input, either pH or ORP and, in turn, can control one or two chemical feed pumps or solenoid valves. Either proportional or ON/OFF control can be selected by the user. The unit is field programmed to perform either pH or ORP control functions. A bright eight digit LED alpha-numeric display provides the user with instantaneous readout of probe level together with setup prompts during operation. A computer is not necessary to program the unit.

Additional features include a second control output channel capable of being programmed for one of the following:

- A. None
- B. Acid wash output control
- C. Alarm output signal
- D. pH control opposite of Output #1 pH control for pH Up-Down control

Total feed times for outputs #1 and #2 are separately recorded in totalized minutes to facilitate monitoring chemical usage. Either timer may be reset to zero as necessary.

The wall mounted controller will operate on 100 to 264 VAC 47/64 Hertz input power without internal changes. Units supplied by the factory to operate on 115 VAC are prewired with a five foot, 3-wire cord and molded plug. The ORP or pH probe with BNC connector plugs into the unit, and the pump or solenoid valve is either wired directly or plugged into the pigtail 3-wire receptacles. Overfeed time is selectable to disable feed output in event of continuous feed conditions. The unit is responsive to a liquid flow signal using an optional cable assembly to disable both feed outputs in event of low or non-existent process flow.

P/N 38899 cable assembly is available as an optional item to connect a pH and ORP configured units together to provide ORP pump disable when the pH controller alarm set points are activated.

CHEM-FLOW P/N 38903 flow switch assembly is available as an optional item to disable the feed outputs when flow through the sample cell is disabled. The flow switch connections also disable ORP feed when pH level is out of range as set by the pH alarm points. The flow switch may be used with a single or dual controller installation.

Probes, pumps and other associated accessory items are supplied by others.

All setup programming and calibration is performed through a label embedded panel mounted three-button keypad. Upon setup completion, the controller will easily and reliably take over the task of accurate chemical control. Default program setups allow operation immediately upon initial powering up. All setup parameters are saved in memory during input power disruption.

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Functional Description

Applications:

- General ORP, pH water control applications
- Cooling tower water quality control
- Oxidant Feed
- Dechlorination
- pH Neutralization
- Chemical process control

Specifications:

- ORP Range: -1000 to +1500 millivolts
- pH Range: 0.0 to 14.0

Proportional feed with adjustable proportional band: 0.0 to 1.0 pH, 0 to 50 mv ORP.

ON/OFF feed with adjustable dead band, 0.2 pH, 25 mv ORP.

Selectable feed up, feed down, overfeed time: proportional or ON/OFF control.

Output #2 acid feed can be preset for 1 to 24 hour delay before the acid wash feature will repeat every 24 hours. The datalogger feature allows quickly reading the time to next acid wash. Acid wash duration is settable from 1 to 5 minutes.

Total feed times for outputs #1 and #2 are separately recorded in totalized minutes to facilitate monitoring chemical usage. Either timer may be reset to zero as necessary.

Display: Eight (8) digit alpha-numeric red LED. Resolution +/- one digit. Temporary or long term power loss does not affect program setups.

Control output: Two solid state relays with zero cross-over AC switching contact closure, SPST, 5 ampere N.O. connected for proportionally controlling a motor driven, electronic pulsing type chemical addition pump or solenoid valve. Cycle reset time in the ON/OFF mode is one minute.

Controller Operating Voltage: 100 to 264 VAC, 47/64 Hertz. Fuse, external fuse holder 3AG, 5 ampere Slo-Blo.

NOTE: Chemical addition pump voltage or other controlled device must match input voltage level.

Programming: Keypad data input for user programming desired operation. Unique keypad sequence necessary for changing parameter setups to prevent unauthorized or accidental program changes.

Enclosure: PVC, 5" x 5"x2". Vertical mount using two tabs on enclosure. Unit does not have to be opened for installation or programming.

Installation

Select a location for installing the controller on a vertical wall, pole, or panel with good visual accessibility and away from direct sunlight. Operating power must be supplied together with the selected probe input. The chemical addition pump and liquid flow switch signal (optional) must be connected as required for specific applications. A customer supplied external power disconnect switch with ground fault interruption (GFI) protection must be provided as a power switch or GFI protection is not provided within the controller.

To mount the controller module, use the top and bottom enclosure tabs. The unit is now ready to connect power, the probe, low flow signal connector (if necessary), and pumps. Next, apply power for initial setup and operation. The unit will start up with the factory default parameters installed. The unit must be configured and calibrated for the specific application and selected probe (pH or ORP).

When power is first applied, the display will show the operating software version number and programmed setup parameters before operating.

Control Panel Overview

Eight Digit Alpha-numeric Display

- When operating, the display shows real-time water quality as ORP or pH values and/or unit status.
- During programming mode, the display shows the programmed information for the input.

Keypad



ENTER - Used to enter/exit the programming mode, or to reset the overfeed timer



ARROWS (up and down) - Used to scroll through the various parameter settings. All menu selections are "wrap around" allowing selection with either arrow keypad.

Set Up

User programmable options for setup are accessed by pressing the **UP** arrow and **DOWN** arrow keys simultaneously for one (1) second.

Use **UP/DOWN** separately to scroll through the menu options and press **ENTER** to activate the selected option. If the keypad sees no activity for sixty seconds, the unit will time out and automatically revert to normal operating mode.

The setup flow chart included on page 13 will assist in the programming procedure.

Upon entering the setup mode, the following selections are available continually by scrolling using the arrow keys:

Config	(Configuration)
Output #2	(Output #2)
OverFeed	(Over Feed)
Cal.	(Calibration)
Ext Dis	(External Disable)
Feed Mod	(Feed Mode)
D/P Band	(Dead Band, Proportional Band)
Lo Alarm	(Low Alarm Setpoint)
Hi Alarm	(High Alarm Setpoint)
Beep Opt	(Beep Option)
Fact RST	(Factory Reset)
Operate	(Unit Starts Operating)

Set Up

CONFIG

Select by pressing the **ENTER** key, and then scroll through the following:

ORP Fd U	(ORP Feed Up)
ORP Fd D	(ORP Feed Down)
pH Fd U	(pH Feed Up)
pH Fd D	(pH Feed Down)

Feed up or down (**FdU, FdD**) determines the direction unit will activate feed pump or solenoid valve to satisfy the set point value. Press **ENTER** to activate selected option. The proper probe must be utilized to match the pH or ORP selection.

NOTE: The unit must be calibrated if the configuration is changed from the previous calibrated configuration or if factory defaults are installed.

Selecting ORP will enter another menu **Disp Opt**. Pressing **ENTER** allows selecting **ORP**, **ORP/ppm**, or **ppm**. Selecting **ORP** will provide a ORP reading in millivolts during operation. Selecting either **ORP/ppm** or **ppm** will allow ppm readings at particular pH readings as selected for 7.2, 7.4, or 7.6 pH.

Note the ORP does not receive a pH signal level but depends upon a pH controller and chemical feed system to maintain the pH level at preset 7.2, 7.4, or 7.6 pH levels. The selected pH level must be selected before exiting the ORP configuration setup.

OUTPUT #2

Allows configuring the second controlled output for any one of the following:

- **None**
Output #2 has no programmed feature and remains unpowered.
- **Wash**
Output #2 can power a chemical pump to inject an acid wash into the probe flow stream for periodic (24 hour) probe cleaning. If selected, a delay **DLY** is programmed to set the first acid wash time from 1 to 24 hours after the unit is placed in operation. Next, the acid pump duration **DURA** is programmed to set the ON time from 1 to 5 minutes. Next, **TEST Y/N** is selected if the Output #2 is operated for a test 30 seconds after the unit is placed in operation.

After the wash has been completed, all feed will be suspended for 30 minutes to allow probe stabilization.

The initial delay procedure allows starting the 24-hour repeat to occur when the system is most dormant.

Continued on next page →

Set Up

OUTPUT #2

Alarm

Output #2 will be activated during Lo Flow, Lo Alarm, or Hi Alarm conditions. A delay with range of 1 to 99 seconds can be programmed to prevent nuisance alarms due to transient fault conditions.

Booster

Output #2 will operate when the ORP configuration is selected, to provide additional feed volume. When selected, Output #2 will turn on at the low alarm point and stay on continuously until the ORP set point is reached. Output #2 will not turn on again until the low alarm point is reached again. Low flow, failsafe and pH lockout will disable both #1 and #2 ORP feeds.

pH

Output #2 will be setup to operate a second pH pump to allow both up and down control. The set point will be maintained with the programmed dead band or proportional band settings.

OVERFEED

Allows selecting the preset time the controller will feed continuous before the unit turns off for protection against continuous feed conditions such as low flow, chemical depletion, chemical feed pump failure, etc.

Use the arrow keys to select **OFF, 5, 15, 30, 60, 120, 240** minutes. Press **ENTER** to enter the selected value and return to normal operating mode.

When **OFF** is selected, no overfeed protection exists. Continuous overfeed condition indicates system problem, i.e. chemical pump too low, demand too high.

Press **ENTER** to restore the unit operation if an **OVERFEED** condition during operation is shown on the display.

Set Up

Cal

Two point input calibration.

NOTE: Calibration can only be accomplished with the use of a millivolt source or known buffer solutions. If using a millivolt source or probe simulator, remove the probe connection to the controller. Input the proper precision voltage source to the BNC connector. If channel is configured as pH the unit will display **P1 7.0**. Apply 7.0 pH signal, wait at least two (2) seconds and press **ENTER**. The unit will display **P2 10.0**. Apply 10.0 pH signal, wait at least two (2) seconds and press **ENTER**. The unit will now display **Cal? No**.

The **No/Yes** can be scrolled by depressing an arrow key for the proper response before pressing **ENTER** to complete calibration and return to normal operating mode. If **Yes** is selected, the unit will briefly display **UPDATING** indicating successful calibration. If **No** is selected, the previous calibration will be retained. The ORP calibration is accomplished in a similar manner. Calibration will be maintained during power off conditions.

If buffer solutions are utilized for calibration, follow the above sequence but adjust the P1 and P2 values using the Up/Down arrows to match the buffer values. Distilled water must be used to rinse the probe between the different buffer solutions.

NOTE: Although default calibration values will be installed, the unit must be recalibrated if the configuration is changed from the previous calibrated configuration.

EXT DIS

Select for **external disable** signal to disable the feeds in event of low flow or liquid level. For (default setting) the external contacts will be normally open (N.O.) for operation and the contacts will close to disable the feed. If the external contacts are normally closed (N.C.) for operation the contacts will open to disable the feed.

Use Up/Down arrows to select required state. Press **ENTER** to save and return to normal operation. When the external flow or level switch operates, the display will indicate **LO FLOW!**

The flow/level detector is connected using the supplied five pin mating connector. Depending on the selected disable signal sense, the external detector must be connected as follows:

**** N.O. **:** (Default setting) Connect normally open (N.O.) signal to connector Pins 1 and 2. No connection on Pin 3,4,5.

**** N.C. **:** Connect normally closed (N.C.) signal to connector Pins 1 and 2. No connection on Pin 3,4,5.

Continued on next page →

Set Up

EXT DIS

CHEM-FLOW P/N 38899 cable assembly is available as an optional item to connect a pH and ORP configured units together to provide ORP pump disable when the pH controller alarm set points are activated.

CHEM-FLOW P/N 38903 flow switch assembly is available as an optional item to disable the feed outputs when flow through the sample cell is disabled. The flow switch connections also disable ORP feed when pH level is out of range as set by the pH alarm points. The flow switch may be used with a single or dual controller installation.

FED MOD

Select for changing **feed mode** between proportional (**Prop**) feed action and **ON/OFF** feed action. Use the arrow keys to select the desired feed mode, and then press **ENTER** to enter the selection.

D/P BAND

Allows setting the **dead band** when **ON/OFF** control mode is selected or the proportional band when proportional feed control mode is selected. Use the arrow keys to select the desired value, then press **ENTER** to save.

LO ALARM & HI ALARM

Setting the **alarm points** will signal when the input is either below or above the programmed alarmed values. Use the arrow keys to select the desired alarm points.

BEEP OPT

Allows turning the **internal beeper** ON/OFF. When enabled the beeper will sound to alert the alarm operation. When disabled the beeper is turned OFF. Select the desired operation with the arrow keys and press **ENTER** to save.

Set Up

FACTORY RESET

In the event the factory default values must be reloaded into the controller, press the **UP** arrow and **DOWN** arrow keys simultaneously when **FACT RS** is displayed for 3 seconds.

The unit will momentarily display **RESTORE!** The unit is now ready for new programming, or ready as programmed to the default values as shown on the attached set-up work sheet. However, the unit must be calibrated using a millivolt source or buffer solution as previously explained for optimum operation.

In the unlikely condition the program becomes locked up or scrambled, the factory reset procedure will prepare the unit for proper operation.

The unit must be recalibrated after the factory defaults are reloaded as explained above.

OPERATE

Selection places the unit in normal operation. Overfeed timers start and the output power is cycled as necessary for control action. The display will show the input value and output mode plus any alarm conditions.

During operation, several parameter features are available by depressing the **ENTER** keypad:

Setpoint

To enter feed control set point, press **ENTER** long enough to enter.

With **Set Point** indicated, press **ENTER** again to display the current value and change to the desired value using the arrow keys.

Press **ENTER** when the selected value is reached to enter the value and place the unit back in operation.

Continued on next page →

OPERATE

Stdize

Standardization allows a shift up or down in the displayed reading to correct the reading when compared to a buffer solution or other standard. To enter the standardize function press **ENTER** and using arrow keys. With **Stdize** indicated, press **ENTER** again to display the current value and change to the desired value using the arrow keys. Press **ENTER** when the selected value is reached to enter the value and place the unit back in operation.

Note: **Stdize** is reset to zero offset when unit is recalibrated.

Out #1 RT

Indicates the **total run time for the primary or #1 output in minutes**. Can be used to calculate total chemical pumped. The time can be set to zero by depressing both arrow keys simultaneously.

Out #2 RT

Indicates the **total run time for #2 output in minutes**. Can be used to calculate total chemical pumped. The time can be set to zero by depressing both arrow keys simultaneously.

NEXT WSH

Indicates **time to next acid wash** event in hours. If the wash feature is not setup, the display will show **NO WASH**.

All the above options can be viewed while the unit is operating. If keystrokes do not occur for 60 seconds, the display will revert to the normal operating mode.

Out Test

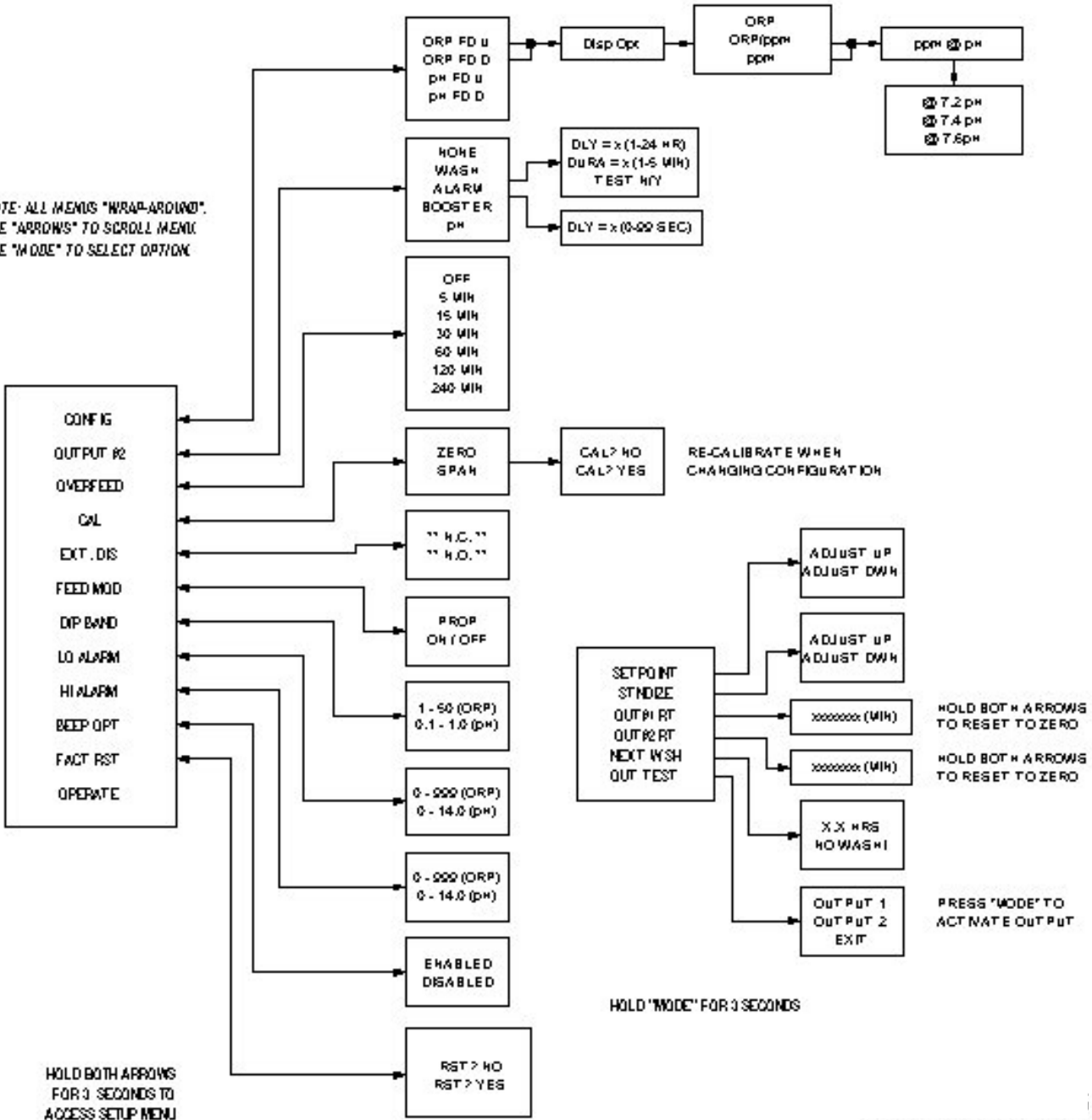
Allows turning ON the outputs for testing or pump priming. Select Output 1 or Output 2 and depress **ENTER**. The selected output will stay ON as long as the **ENTER** key is depressed. After testing, select EXIT to return to normal operation.

A worksheet form is included on page 14 to assist setup and recording selected values for future reference.

Set Up Flow Chart

Setup Flow Chart

NOTE: ALL MENUS "WRAP-AROUND".
USE "ARROWS" TO SCROLL MENU.
USE "MODE" TO SELECT OPTION.



Set Up Work Sheet

SETUP WORKSHEET

OPTION	FACTORY DEFAULTS	DATE	DATE	DATE
CONFIG	ORP FD U			
OUTPUT #2	NONE			
OVERFEED	120 MIN			
CAL	ZERO = 550 SPAN = 850			
EXT. DIS	**N.O.**			
FEED MOD	PROP			
D/P BAND	25mV			
LO ALARM	550			
HI ALARM	850			
BEEP OPT	DISABLED			
SETPOINT	700			
STNDIZE	0			

Warranty

The **Flextrol Controller** is warranted to be free from defects in materials and workmanship under normal use and service for twenty-four (24) months from date of shipment unless otherwise specified. Batteries have no warranty. **Chem-Flow** obligation under this warranty is limited to repairing or replacing defective products at **Chem-Flow's** option.

The customer shall assume all costs of removing, reinstalling and shipping defective products to **Chem-Flow**. **Chem-Flow** will return such products by surface carrier prepaid. The warranty shall not apply to any **Chem-Flow** products subjected to modification, misuses, neglect, accidents of nature or shipping damage. The warranty is in lieu of all other warranties, expressed or implied, including warranties of merchantability or fitness for a particular purpose. **Chem-Flow** is not liable for special, indirect, incidental or consequential damages.

Products may not be returned without prior authorization. To obtain a Returned Materials Authorization (RMA), contact **Chem-Flow**, telephone number 630-543-1911. After an applications engineer determines the nature of the problem, an RMA number will be issued together with return shipping instructions. Please write the RMA number clearly on the outside of the shipping container together with specific contact person and telephone number.

Chem-Flow does not accept collect calls. Non-warranty products returned for repair should be accompanied by a purchase order to cover the repair.



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