

B.1 Appendix B Summary

Safety:

Sensors are installed in, and pumps inject into pressurized piping. Loose or improperly assembled fittings may leak water or chemicals.

Do not leave the controller turned ON unless you have configured it for the site's water treatment program & verified that the pumps and solenoid are operating.

FYI: inserts 'For Your Information' explanations.

Here's what we're going to do:

Startup walks you through controller set-up step by step. We'll start by verifying each sensor and then we'll adjust blowdown and feed setpoints and limit alarms. We'll check that the bleed solenoid is operating and that the pumps are pumping.

You'll need to know and be able to do the following:

You'll need to be able to measure the cooling water conductivity. You'll need to know the target conductivity for the cooling tower and the feed rate for the inhibitor.

You'll need to know the biocide feed program; when each biocide is fed and for how long.

FYI: Estimating the total volume of water in the tower & it's piping & knowing your target biocide concentration and biofeed pump GPH rating, make feed time easy to calculate.

If you've installed one or more water meters, you'll need to know the Gallons/contact for each meter. If they are turbine meters you'll need to know the 'K' factor.

Knowing the expected tower make-up volume per day and the nominal hours of tower operation, if not 24/7, will help you set the inhibitor feed rate and biocide timing.

First time users:

Have the controller user manual available to step you through the calibrate, configure and setpoint sequences.

If you have the '**LB**' LAN-browser option installed, you can use a notebook PC & Ethernet crossover cable to startup. Refer to Appendix 'C' of the user manual if you haven't set-up your notebook to browse the controller

FYI: Your controller may have been pre-configured for this site. Skip steps that involve setpoint adjust, feed mode & biocide timing.

B.2 Minimum Startup Sequence

Unplug Pumps. Valve OFF Bleed. Valve ON flow.: 1

If not hardwired, unplug the chemical pumps and solenoid.

If solenoid hardwired, close the upstream isolation valve.

Open the downstream isolation valve on the sensor – chemical injection piping and then the upstream isolation valve.

FYI: Always OPEN in this order & CLOSE upstream first.

Check for leaks: 2

Inspect the chemical injection points and the sensor entries for leaks & correct.

If you've just installed water meters make sure they are not bypassed & that the installation fittings are not leaking.

Verify Flowswitch: 3

Plug-in or power up the controller. Scroll **UP** or **DOWN** to the 'S' Flowswitch_S display and ensure that within 30 seconds of power ON the flowswitch shows ON.

Don't proceed until the flowswitch shows ON.

FYI: Thermal flowswitches take time to respond. The CTF type responds within 30 seconds at 1GPM.

Check Temperature: 4

Scroll **UP** or **DOWN** to the sensor 'B' Temperature_B display & check that it's displaying the approximate temperature, +/-10F.

FYI: Temperature doesn't need to be accurate. We're only using it to compensate conductivity, so it has to track, changing when the cooling water changes temperature.

Calibrate Conductivity: 5

Scroll **UP** or **DOWN** to the sensor 'A' Conductivity_A display
Measure the tower water conductivity at the sensor sample valve and calibrate the conductivity sensor.

Correct for Time Zone: 6

Key **EXIT** to the Day – Time display.

If necessary, key **ENTER** scroll to **Time&Date** & adjust the time for your time zone.

FYI: Sets the time & date stamp correctly for timed biocide feeds, alarms & data logging.

Configure Water Meters: 7

FYI: Skip 7 if you don't have a make-up or bleed meter

Scroll **UP** or **DOWN** to the meter 'O' Makeup_O display

It's currently a contact head meter @ 100 Gallons/contact.

Key **ENTER** to **Configure** if you need to modify the meter type or gallons per contact.

Scroll **UP** or **DOWN** to the meter 'P' Bleedmeter_P display

It's currently a contact head meter @ 100 Gallons/contact.

Key **ENTER** to **Configure** if you need to modify the meter type or gallons per contact.

Note both water meters current volume display.

B.2 Minimum Startup Sequence *continued*

Set Bleed Setpoints: 8

Scroll **UP** or **DOWN** to the '2' Bleed_2 display.
Key **ENTER** to **Setpoints** and adjust the **Turn ON** & **TurnOFF** setpoints for your treatment program and make-up chemistry. Typically the two setpoints are 10uS apart.

Verify Bleed & Meters: 9

Plug-in the bleed solenoid in the plug labeled **2** and/or open the upstream solenoid isolation valve.
If '2' Bleed_2 is not ON, key **ENTER** and **Test-Prime** for 15 minutes.
If you can view the tower drain, verify there's flow when the bleed solenoid is ON.
If you have a 'P' Bleed Meter installed, it should measure volume within the **Test-Prime** time.

Monitor sensor 'A' Conductivity_A. Its value should fall as the tower float drops and turns ON the tower make-up.
If you have an 'O' Makeup_O meter installed, you'll see it measure increased volume as the tower makes up.

Select Inhibitor Feed Mode: 10

Scroll **UP** or **DOWN** to the '1' Inhibitor_1 display.
It's currently set to feed based on the tower make-up meter volume.
If you don't have a make-up meter key **ENTER** to **Configure** & **Special Control** & then select **Bleed thenFeed**.

Set Feed Setpoints: 11

2.1 Chemical Feed 101, outlines estimating setpoints for typical feed modes to get a target ppm of inhibitor.
Approximate & correct based on your wet ppm testing after a week of run time.

If this tower has no inhibitor in it now, estimate its volume & use **Prime-Test** to get to initial ppm levels.

Scroll **UP** or **DOWN** to the '1' Inhibitor_1 display & key **ENTER** to **Setpoints**.
If you are using a meter based feed, you'll enter meter volume & pump ON time setpoints.
If you are using **Bleed thenFeed**, you'll setpoint the % of every 5 minutes of bleed time.

Verify Inhibitor Feed: 12

Scroll **UP** or **DOWN** to the '1' Inhibitor_1 display.
Plug in the Inhibitor pump to the plug labeled **1**.
Key **ENTER** to **Prime-Test** & feed for 5 minutes.
Verify that the inhibitor pump primes & feeds.

B.2 Minimum Startup Sequence continued

Set Inhibitor Feed Limits: 13

Scroll **UP** or **DOWN** to the '1' Inhibitor_1 display.

Key **ENTER** to **Alarms-Limits**.

Key **ENTER** & scroll to **Minutes/Day**. Adjust this feed limit to prevent overfeeding.

FYI: The Inhibitor feed limit is reset @ midnight so that the same amount of inhibitor is available for each day's treatment.

The Mins/Actuation limit is seldom used for inhibitor feeds.

Set BiocideA & BiocideB Cycle Days: 14

Scroll **UP** or **DOWN** to the '4' BiocideA_4 display.

Key **ENTER** & scroll to **Configure**. Key **ENTER** & scroll to **Event Cycle**.

A 28 Day cycle is the default. Adjust if your feed program requires a weekly program.

Repeat & set **Event Cycle** for '5' BiocideB_5.

FYI: Organic biocides are typically fed on a 28 day, 4 week cycle.

Biocides 'A' & 'B' may be alternated every week or during each week.

Oxidizing biocides like bleach are usually fed 1 to 3 days a week using the '7 Days' Event Cycle.

Set BiocideA & BiocideB Feed Events: 15

Scroll **UP** or **DOWN** to the '4' BiocideA_4 display.

Key **ENTER** & scroll to **Biofeed Event**. Key **ENTER** & **Add Event**.

Repeat & **Add Event** for '5' BiocideB_5.

FYI: The 'Add Event' display shows you how many feed events are set for this pump.

Once you set an event, the controller will prompt you for how often you wish to run the event.

Verify BiocideA Feed: 16

Scroll **UP** or **DOWN** to the '4' BiocideA_4 display.

Plug in the BiocideA pump to the plug labeled 4.

Key **ENTER** to **Prime-Test** & feed for 5 minutes.

Verify that the biocide pump primes & feeds.

Verify BiocideB Feed: 17

Scroll **UP** or **DOWN** to the '5' BiocideB_5 display.

Plug in the BiocideB pump to the plug labeled 5.

Key **ENTER** to **Prime-Test** & feed for 5 minutes.

Verify that the biocide pump primes & feeds.

Optional:End Prime-Tests: 18

Scroll **UP** or **DOWN** to each priming pump's display.

Key **ENTER** & **UP** or **DOWN** to **Alarms-Limits** & **ENTER**.

Scroll to **Clear Alarms** & **ENTER** to ending any active **Prime-Test**.

FYI: If you noted the make-up and/or bleed water meter volumes in Step 7, check that the current volumes on each meter reflect the make-up or bleed that has occurred during Start-up.

B.3 Startup Sequence Options

Not all sites will require or wish to do the following optional steps.
Refer to the user manual for guidance on selecting and setting.

Set Bleed Limit Alarms: A

Scroll **UP** or **DOWN** to the '2' Bleed_2 display.
Key **ENTER** to **Alarms-Limits** and adjust both **Min/Actuation** and **Minutes/Day** alarms to flag variation from the expected bleed operation.
FYI: The Bleed limit is set NOT to turn OFF on limit so you get the warning but bleed continues.
Use Min/Actuation to flag a partially blocked bleed and Minute/Day to flag an increase in make-up conductivity or bleed setpoints set too low.
Set limit times so that nuisance alarms do not occur.

Set Conductivity Alarms: B

Scroll **UP** or **DOWN** to the sensor 'A' Conductivity_A display
Key **ENTER** to **Alarms** and adjust both **High Alarm** and **Low Alarm**.
FYI: The Low conductivity alarm can flag a sump or circulation piping water loss.
The High conductivity alarm can flag a failed or blocked bleed.
Use the Delay on Alarm setting to block nuisance alarms.

Set Biocide Prebleed-Lockout: C

Scroll **UP** or **DOWN** to the '4' BiocideA_4 display.
Key **ENTER** & scroll to **Configure**. Key **ENTER** & scroll to **Special Control**.
Key **ENTER** & scroll to **Prebleed-Lock**.
Repeat for '5' BiocideB_5.
FYI: IF you able to schedule biocide feeds during the tower's low load period, you may not need Prebleed-Lock.
You don't need to set both PreBleed & Lock-out. Use either or both.

Set Biocide Feed Limits: D

Scroll **UP** or **DOWN** to the '4' BiocideA_4 display.
Key **ENTER** to **Alarms-Limits** and adjust the **Min/Actuation** alarm.
Repeat for '5' BiocideB_5.
FYI: The Biocide feed limit is set to turn OFF on limit since overfeeding biocide usually means an error in setting feed time or an extended Prime-Test period.

Set Make-up Meter Volume/Day Alarm: E

Scroll **UP** or **DOWN** to the meter 'O' Makeup_O display
Key **ENTER** to **Alarms** and adjust **High Alarm**.
Repeat for 'P' Bleedmeter_P.
FYI: If you have a 24/7 site, set the Low Alarm & flag meter failure.

24/7 Sites, Set Flowswitch Alarm: F

Scroll **UP** or **DOWN** to the 'S' Flowswitch_S display.
Key **ENTER** to **Alarms** and adjust **No Flow Alarm**.
FYI:A No Flow alarm indicates no flow past the measuring sensors & therefore no control.