DIGICHEM Series III

NEW !!

- Alarm relay as standard
- Remote power failure detection
- Tower circulating/condenser pump override facility with delay-off timer
- Manifold flow indicator
- Configurable flow switch function

Instruction **Manual**

- **DIGICHEM®**
- **DIGICHEM®-A2-V**
- **DIGICHEM®-A2-CABG-V**
- **DIGICHEM®-AB2-V**
- **DIGICHEM®-AB2-CABG-V**
- **DIGICHEM®-X/2S-EMEC2-V**
- **DIGICHEM®-X/3S-EMEC3-V**

COOLING TOWER DOSING PACKAGES

Supplied by:

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Manufacturer: Convergent Water Controls Pty Ltd, Sydney Australia.

Note: On-going product development at Convergent Water Controls may lead to changes in the specifications of this product.

Warranty: This product is guaranteed for a period of 12 months from installation date. The warranty applies to manufacturing or component defects which may cause the unit to malfunction under specified conditions. The guarantee does not cover damage due to abuse, tampering or improper installation.

Disclaimer: Convergent Water Controls will not be held liable for any consequential damage or loss arising resulting from product malfunction.

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1. INTRODUCTION

Designed for cooling tower water treatment, the DIGICHEM electronic controller incorporates:

- Conductivity bleed control
- Inhibitor pump dosing control
- Dual Biocide pump control (via 10 independent 7-day timer programs)
- Tower circulating/consenser pump override facility with delay-off timer

1.1 Features

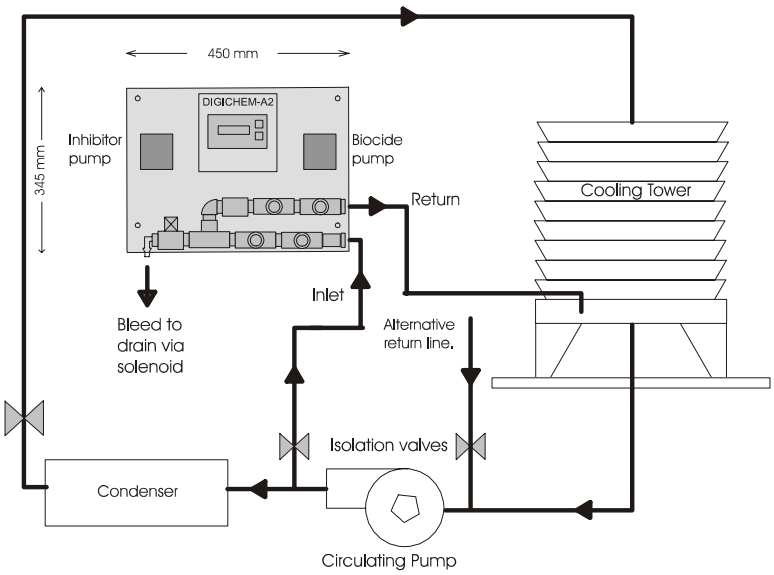
- Simultaneous conductivity and setpoint readout.
- Display in µS or TDS.
- LED indication for POWER ON, BLEED and ALARM.
- Simple programming.
- Pumps A, B & C can be individually primed.
- Inhibitor Dosing Control - disabled when no flow.
- Up to 10 biocide dosing programs.
- Pre-bleed and Bleed lock-out functions.
- Independent operation of 2 biocide pumps (ie. A and B).
- Programmable bleed lock-out override.
- High TDS, Timer, Flat Battery & Power Failure Alarms.
- Intelligent electronic probe cleaning.
- Battery back-up for real-time clock.
- All programmed parameters are stored in non-volatile memory (EEPROM).
- Facility to drive the cooling tower circulating/condenser pump during and after biocide dosing.

2. INSTALLATION

2.1 Mounting the Controller

1. Screw the 2 hosetails provided into the Inlet and Return ports on the right hand side of the manifold (if not supplied fitted). The Inlet port is located immediately below the Return port.
2. Unless already fitted, screw the bleed solenoid valve into the left hand side of the manifold.
3. Mount the DIGICHEM panel on a flat vertical surface near the cooling tower. Allow sufficient space on the sides for the solenoid valve and the hosetails.
4. Mount the panel such that the DIGICHEM electronic controller is at eye-level to allow for good visibility of the LCD display.

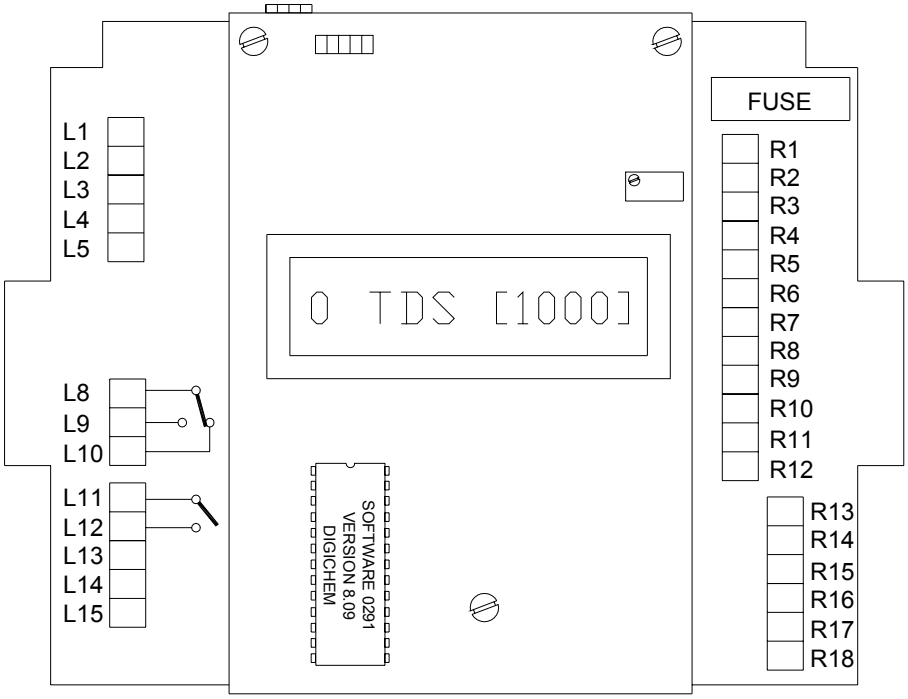
5. Connect into the water system as indicated in the illustration below:



6. Plumb a water line from the pressure side of the circulating/condenser pump to the Inlet hosetail of the manifold via a hose.
7. In a similar fashion, fit a hose to the bleed solenoid valve hosetail and run to drain.
8. The return line of the manifold is to be plumbed to the tower basin. The complete DIGICHEM panel should be mounted higher than the water level in the tower basin to ensure that water drains out of the manifold when the tower is not operating. When this occurs, the controller detects “no-flow” on the probe and stops Inhibitor dosing until the probe becomes immersed in water again. If the DIGICHEM cannot be mounted in such a fashion, it is recommended to use a flow switch to detect “no-flow” (ordering option AF04).
9. The return line can alternatively be returned to the circulating/condenser pump suction line. However, the pressure on the manifold must not exceed the pressure rating of the pump.
10. When the DIGICHEM panel is fully installed and the tower is running, open the valve in the water supply line to the DIGICHEM and check that the water flows through the manifold without any leaks. Also ensure that the maximum pressure rating of the pumps is not exceeded. This pressure can be measured by temporarily screwing a pressure gauge into the sample valve port. (The flow can be viewed through the manifold flow indicator).
11. Fit the tubes supplied to the pumps and to the foot valves.
12. Insert the tubes with foot valves into the Biocide and Inhibitor tanks.
13. **Plug the power lead of the DIGICHEM into a 240VAC mains socket which MUST be continuously powered.**
14. Switch on. The green POWER ON LED should illuminate.
15. Prime the pumps as outlined in section 3.4.
16. Set the correct time and day as outlined in section 4.9. Allow 24 hours for the internal backup battery to charge up fully.
17. If the DIGICHEM has not been pre-programmed, please program as outlined in Sections 3 & 4.

2.2 Electrical Wiring Information

The diagram below shows the connections to the DIGICHEM controller circuitry.



L1 & L2:	Water Meter (not polarity sensitive)
L3:	Conductivity Probe PR+ (brown)
L4:	Conductivity Probe PR- (yellow)
L5:	Conductivity Probe CM+ (blue)
L8+ L9:	Alarm Relay N/O volt-free
L8+ L10:	Alarm Relay N/C volt-free
L11 + L12:	O/P ON Relay N/O volt-free
L13 + L14:	Flow switch link to enable Biocide A & Biocide B Pumps
L13 + L15:	Flow switch link to enable Inhibitor C Pump & Solenoid valve

R1:	Mains Active 240VAC (power supply)
R2:	Mains Neutral
R3:	Auxiliary Active 240VAC (eg. for AF09 4-20mA card)
R4:	Auxiliary Neutral
R5:	Biocide B Active 240VAC
R6:	Biocide B Neutral
R7:	Biocide A Active 240VAC
R8:	Biocide A Neutral
R9:	Solenoid Valve Active 240VAC
R10:	Solenoid Valve Neutral
R11:	Inhibitor C Active 240VAC
R12:	Inhibitor C Neutral
R13 – R18:	Earth

Fuse: 2A/250VAC (M205, 20mm x 5mm diameter)

Notes on Alarm Relay Contacts :

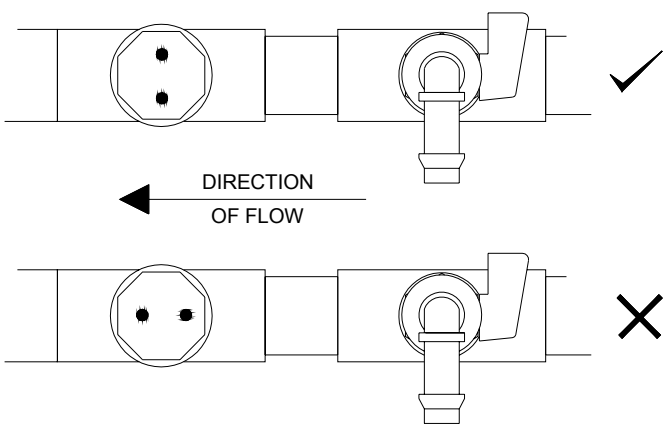
1. Alarm relay is energised (ie. L8 connected to L9) during normal operation of the unit.
2. Alarm relay de-energises (ie. L8 connected to L10) when an alarm is raised or when the unit loses power.

Notes on Flow Switch Connections (switch fitted with ordering option AF04):

1. The unit is supplied with a link between L13 & L14 and a separate link between L13 & L15.
2. To disable Biocide pumps A & B only on no flow, remove link only between L13 & L14 and replace with N/O flow switch (ie. Flow switch contact closes when there is flow).
3. To disable Inhibitor pump C & Solenoid only on no flow, remove link only between L13 & L15 and replace with N/O flow switch (ie. Flow switch contact closes when there is flow)..
4. To disable all outputs on no flow (A, B, C & Solenoid), remove links between L13 & L14 and L13 & L15, connect new link between L14 & L15 and connect N/O flow switch between L13 & L14.

2.3 Conductivity Probe Installation

The probe is supplied screwed into the manifold such that the electrode tips are submerged in the water flowing through the manifold. The probe should be positioned with the black markers on the probe aligned with the black markers on the manifold Tee. This ensures that the 2 electrodes of the probe are positioned symmetrically with respect to the direction of water flow. See the photograph and diagrams below:



2.4 Conductivity Probe Maintenance

The probe's electrodes should periodically be cleaned to maintain accurate TDS measurements. The frequency of cleaning required will vary from one application to another. In a new installation, it is recommended that the probe be cleaned after 2 weeks of service.

To clean the probe, first unplug the probe lead and unscrew the probe from the manifold. The probe can normally be cleaned using a cloth or paper towel. Occasionally the probe's carbon electrodes may be coated with substances which requires more vigorous cleaning (this coating may not always be visible). To clean a coated electrode, use a fine grit abrasive, such as emery paper.

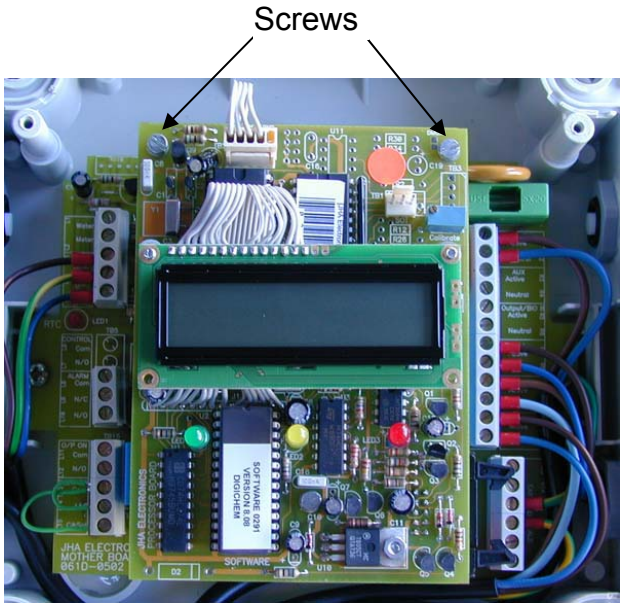
After cleaning, apply more Teflon® tape to the probe thread and screw back into the manifold. The controller should always be calibrated after probe cleaning.

2.5 Adding Optional 4-20mA Card (ordering code AF09)

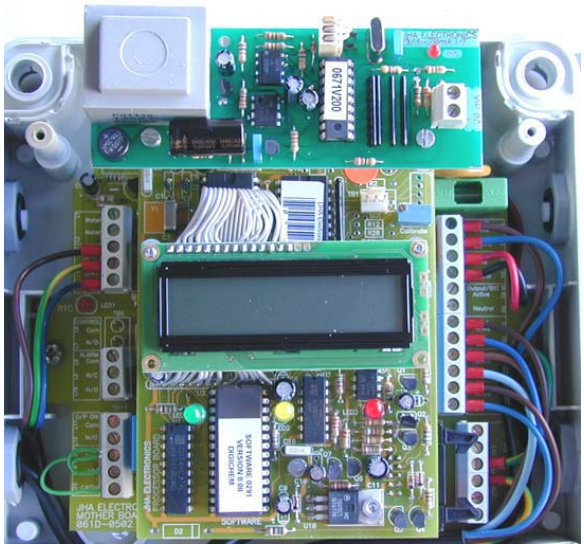
The DIGICHEM can be fitted with an optically isolated 4-20mA interface card to provide an output to a data logger, chart recorder or building management system. The interface card is an ordering option and can be retro-fitted to the DIGICHEM, or can be supplied factory fitted.

The AF09 optional kit consists of the following:
1. Optically isolated 4 – 20mA card
2. Interconnecting communications cable.
3. 2 x 15mm metal spacers.

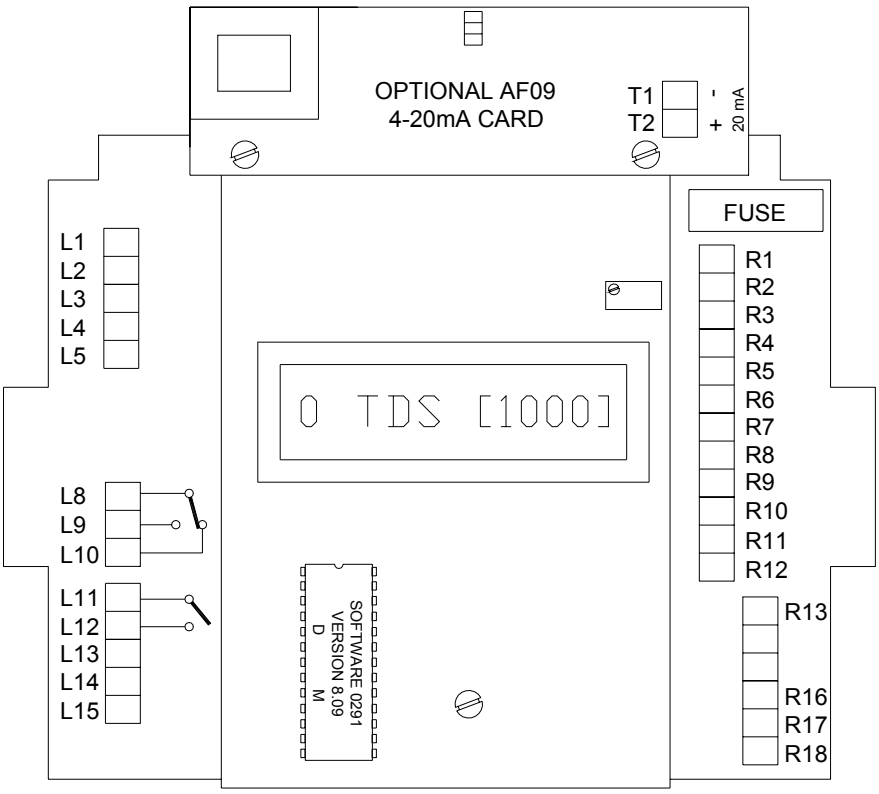
You may skip this section if the card is factory fitted.



CIRCUIT WITHOUT THE 4-20mA CARD



CIRCUIT WITH THE 4-20mA CARD



T1: 4-20mA output –ve
T2: 4-20mA output +ve

Max 4-20mA O/P impedance: 750 Ω

R3: 4-20mA card Active 240VAC
R4: 4-20mA card Neutral

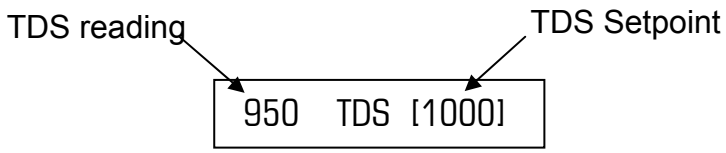
1. Make sure that the power is switched off and the controller is unplugged from mains power.
2. Remove cover of enclosure.
3. Locate the two screws as indicated in the diagram and photographs above and remove. Do not discard these screws.
4. Remove the interconnecting cable supplied with the controller. This is connected between the RTC socket on the motherboard and the USB socket on the processor board.
5. Plug the new interconnecting cable into the RTC and USB sockets.
6. Screw the 2 metal spacers into space where the screws were removed.
7. Locate the two mounting holes on the interface card.
8. Use the screws removed in step 3 and fasten the card to the 2 metal spacers (installed in step 6).
9. Connect the RED wire of the interface card to R3.
10. Connect the BLACK wire of the interface card to terminal R4.
11. Connect the +ve and –ve terminal of the 4-20mA card to your chart recorder, data logger or building management system. It is important to observe the correct polarity of these connections.
12. Replace cover of enclosure, ensuring that the seal is in place and no wires are trapped between the lid and the base.
13. Plug into mains and switch on.

NOTE: The 4-20mA signal transmitted spans the conductivity range of 0 to twice the TDS setpoint. For instance, if the setpoint=1000TDS, 4-20mA spans the conductivity range: 0-2000TDS.

3. COMMISSIONING

3.1 Start-Up

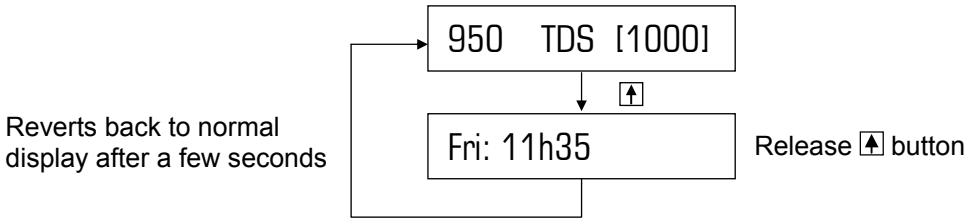
After power-up, the DIGICHEM controller is ready to perform conductivity (TDS or μS) indication and control. All the relevant information is displayed on the LCD display as explained below.



If the backup battery has gone flat, the internal clock will reset to Sunday midnight (ie. 00h00) and the display above will alternate with the display below:

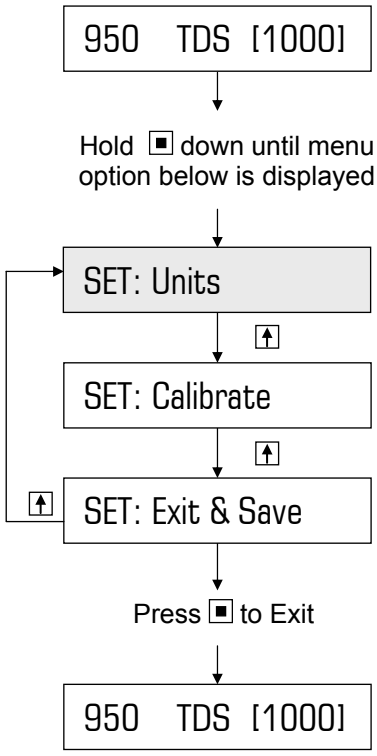
It is recommended, for ease of setup and programming, that at this stage the correct time & day is set as outlined in section 4.9. Allow 24 hours for the internal backup battery to charge up fully.

At any time during normal operation, the time and day can be viewed by holding down the scroll button. As soon as the time is displayed this button should be released. (see procedure below).



Status	Display
Normal operation:	**Measured TDS** & **TDS Setpoint**, as shown above
Programming mode:	Programming information (eg. "SET: Setpoint")
When dosing starts:	Which pump activates (eg. "**Pump A Activated**")
During Pre-bleed:	**Measured TDS**, **Reduced TDS setpoint** (ie. 87% of normal setpoint & "**P/B!**" (ie. "Pre-Bleed")
During biocide dosing and bleed-lockout:	**Measured TDS**, Increased TDS setpoint (ie. **L/O Setpoint**) & "**L/O!**" (ie. "Bleed Lock Out")
Alarm is activated:	Displays alarm activated, eg. "**Alarm !! [HIGH]**"

3.2 Select Displayed Units (ie. TDS or μS)



Item flashing on display:

- ▲ Press to Scroll/Toggle
- ▣ Press to Select/Enter

Note: Shading represents flashing

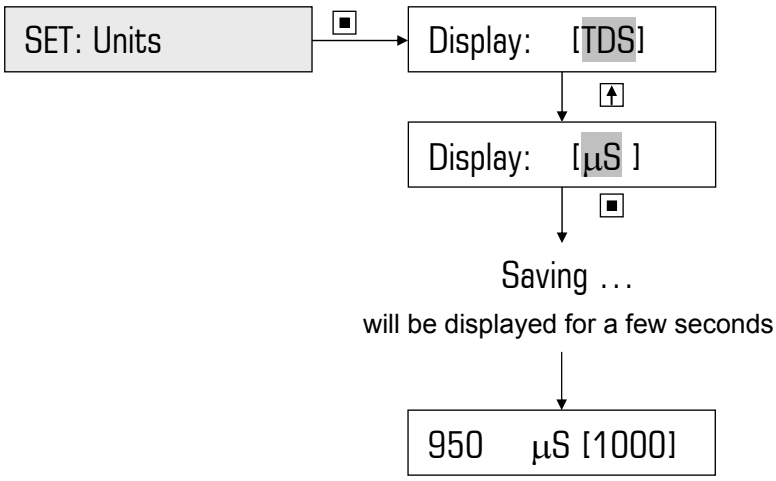
Conductivity can be displayed in either:

TDS (ie. Total Dissolved Solids), or
μS (ie. microsiemens)

The displayed units, ie. either TDS or μS should be selected before performing calibration and before programming conductivity setpoint.

To leave the display in TDS, ie. factory default setting, proceed to section 3.3.

Example:
Changing the factory default of TDS to μS



3.3 Calibration

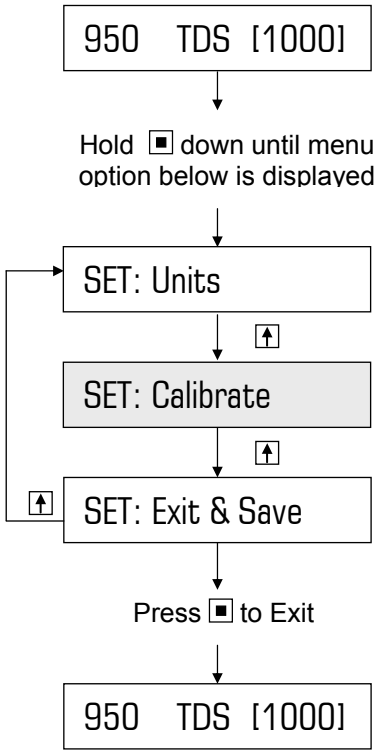
Take a sample of water from the sample valve on the manifold and measure the TDS with a hand-held conductivity meter. Should the TDS readout on the display differ from the sample taken, calibrate the controller as follows:

<u>Option 1</u>: The displayed TDS requires a large adjustment (> 50%).

(For optimum performance, this should be performed on first installation. Thereafter, option 2 should be sufficient).

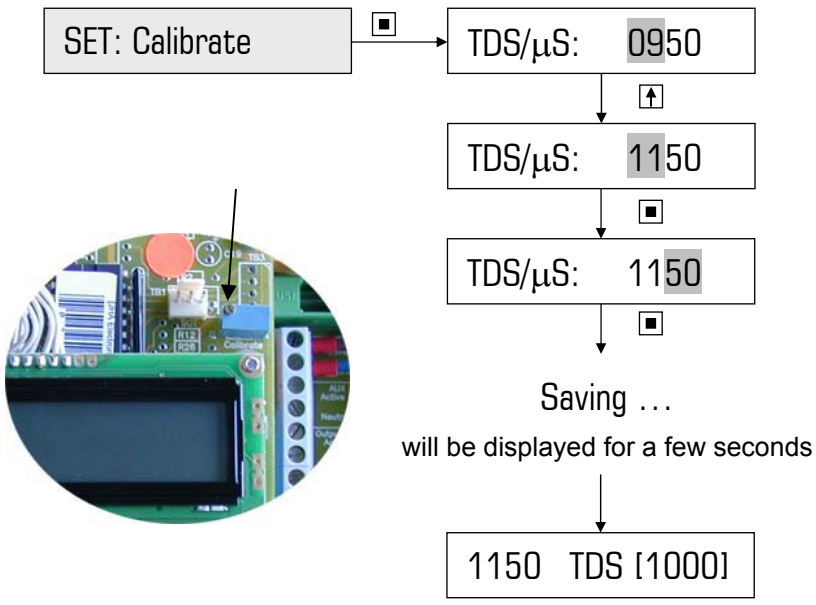
The following can be performed, BUT only by a qualified technician.

IMPORTANT: AS THE UNIT NEEDS TO BE POWERED, BE VERY CAREFUL NOT TO TOUCH ANY OF THE SCREW TERMINALS OR THE CIRCUIT BOARDS, AS THEY MAY BE LIVE, AND CAN RESULT IN ELECTRIC SHOCK, OR EVEN DEATH.



1. Remove the lid of the controller
2. Turn the calibration potentiometer (see picture below) with an insulated miniature screwdriver until the desired reading is obtained.
3. Replace the lid of the controller, ensuring that the seal is in place and no wires are trapped between the lid and the base.

<u>Option 2</u>: The displayed TDS requires a small adjustment (< 50%)
(Set to 0000 to reset software calibration)



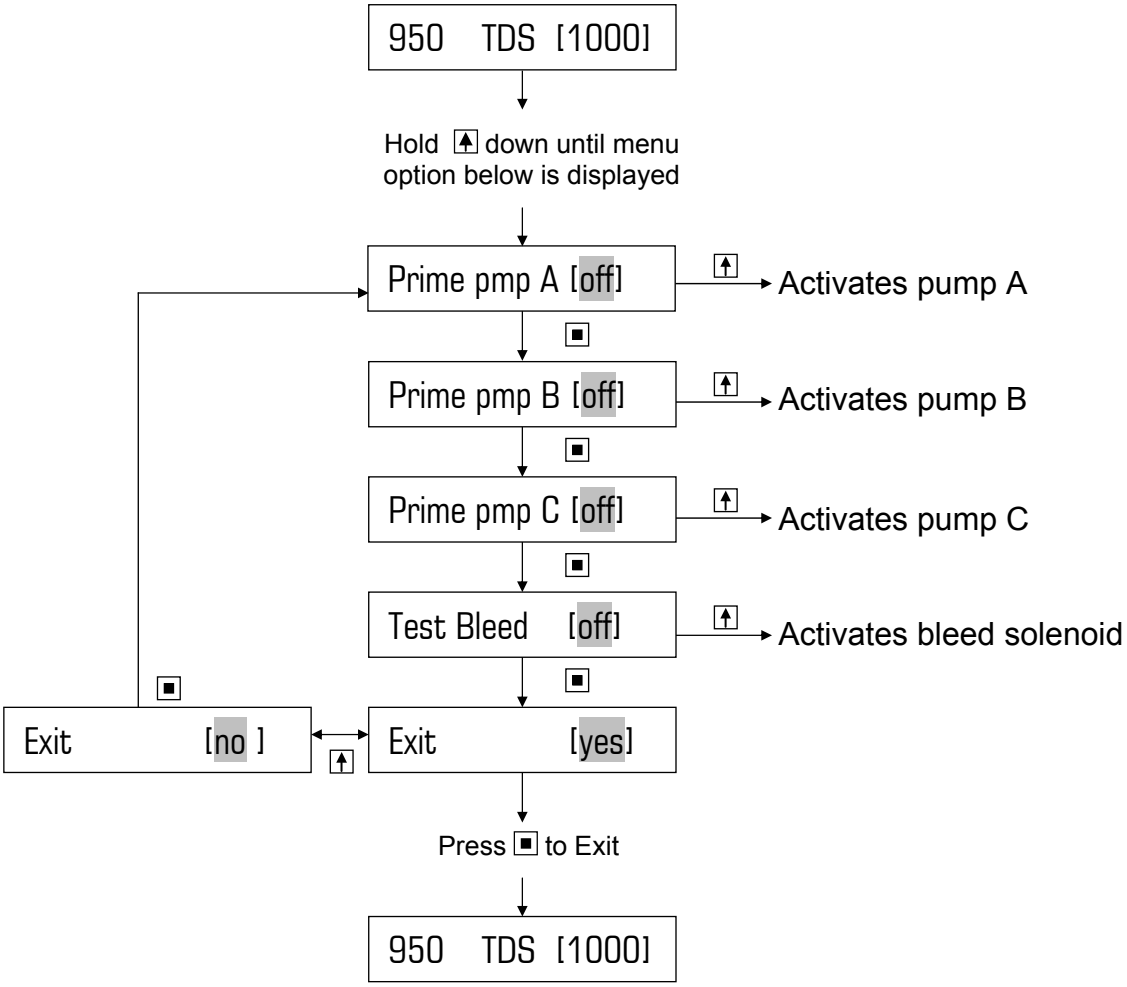
Item flashing on display:

▲ Press to Scroll/Increment
▣ Press to Select/Enter

Note: Shading represents flashing

3.4 Priming Pump / Testing Solenoid Valve

Biocide pumps A & B, Inhibitor pump C and bleed solenoid valve can be individually primed/tested (see menu steps below).



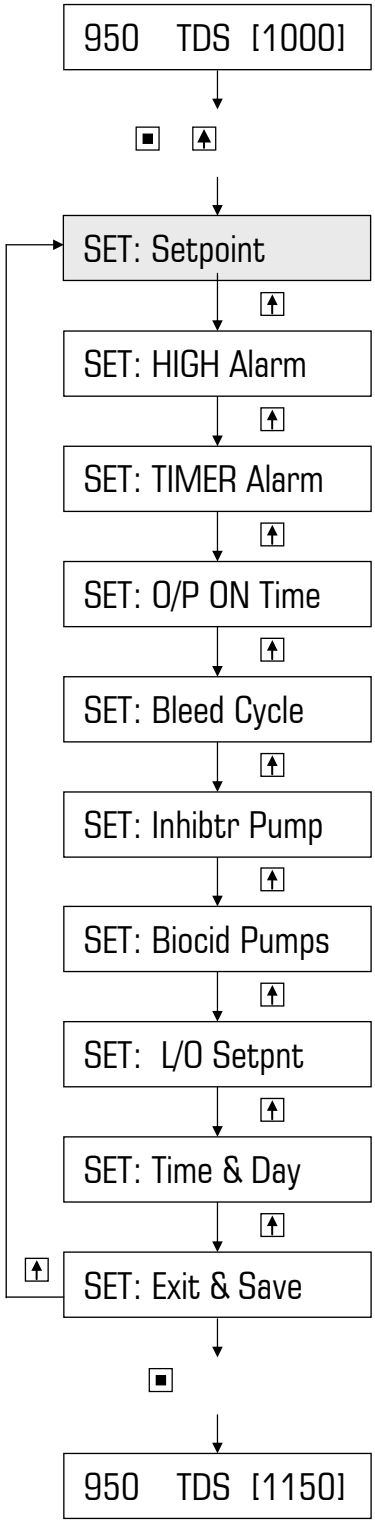
Item flashing on display:

▲ Press to Toggle
■ Press to Select/Enter

Note: Shading represents flashing

4. PROGRAMMING STEPS IN DETAIL

4.1 Set Conductivity Setpoint



Item flashing on display:

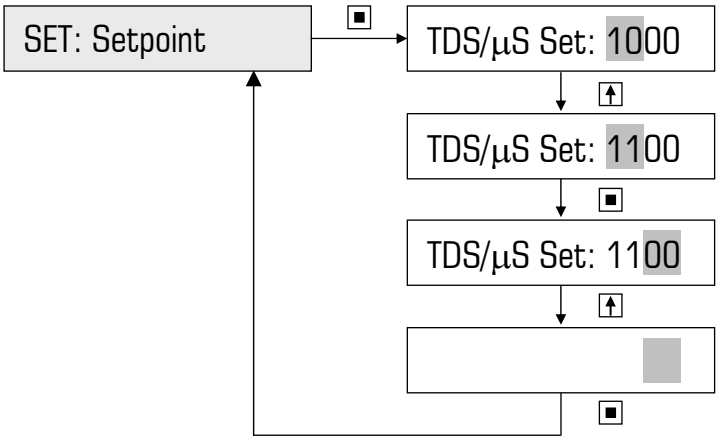
Press to Scroll/Increment

One of the main functions of the DIGICHEM is conductivity control, ie. the solenoid valve opens (ie. bleeds) when the TDS rises above the setpoint. When this occurs, the system water is flushed to drain and fresh make-up water dilutes the system, thus lowering the conductivity of the cooling tower water.

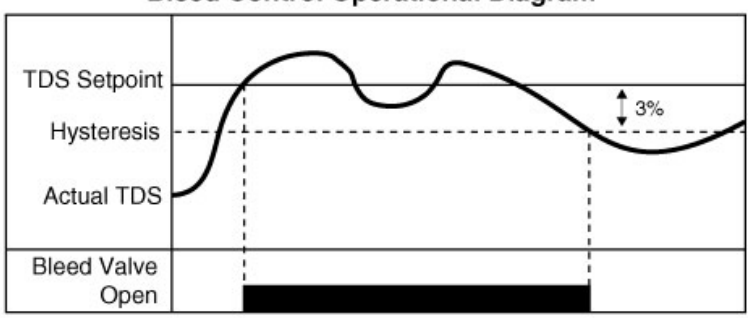
The setpoint is entered as an actual number (eg. 1000 TDS).

The controller can be programmed to bleed continuously (ie. factory default), or on a duty cycle (as outlined in section 4.5), when the system TDS > setpoint.

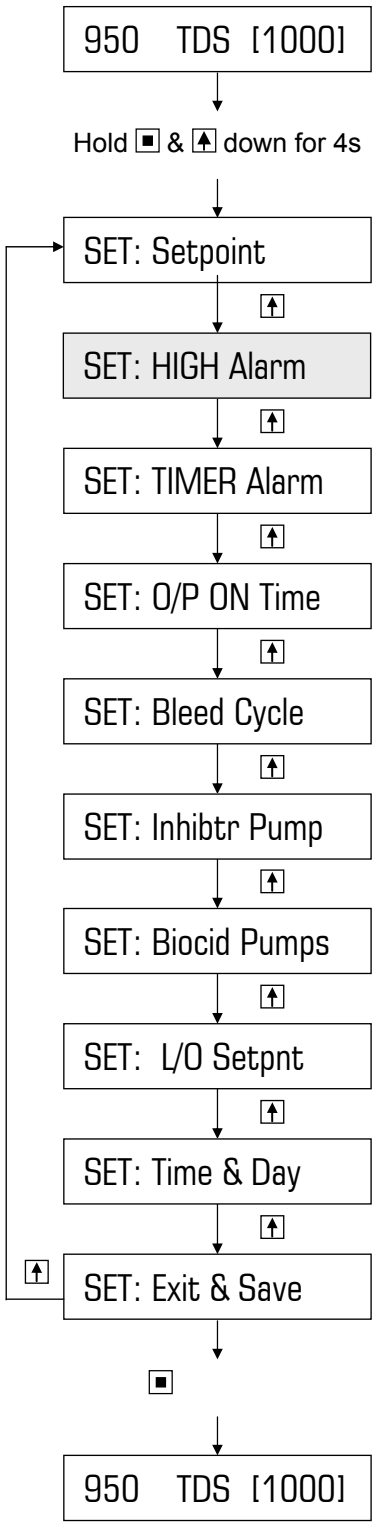
Example:
Increasing factory default setpoint of 1000 TDS to a new setting of 1150 TDS



Bleed Control Operational Diagram



4.2 Set HIGH Conductivity Alarm



Item flashing on display:

↑ Press to Scroll/Increment
■ Press to Select/Enter

Note: ▒▒ represents flashing

To leave the alarm in its disabled state, ie. factory default setting of 0000, proceed to section 4.3.

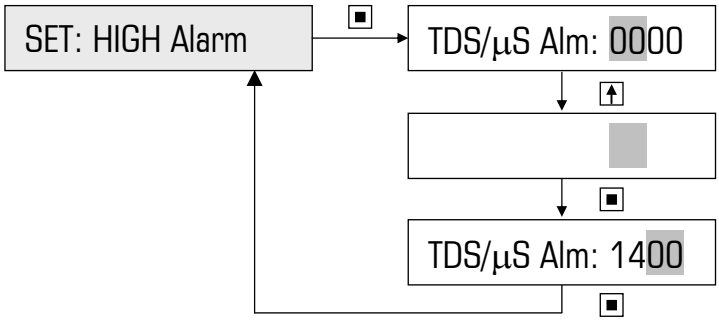
Enabling the alarm requires you to program a HIGH TDS value that is higher than the programmed setpoint.

If the TDS rises above the HIGH alarm level, the high alarm will be reported on the display and the alarm LED will illuminate.

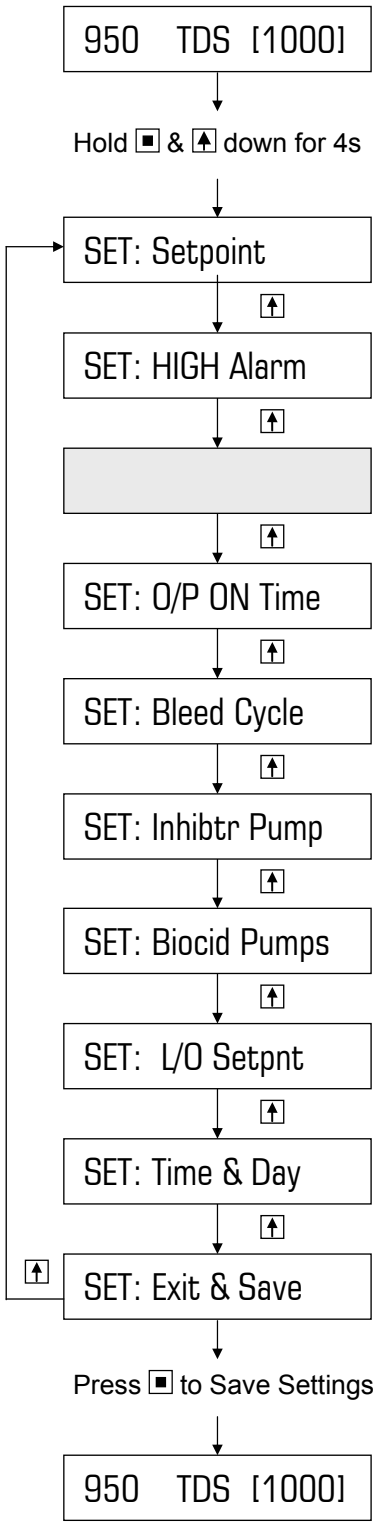
The HIGH alarm condition can be reset by pressing & holding the ENTER button (until the Alarm LED switches off) or will automatically cancel once the conductivity drops to a level below the HIGH alarm level.

When an alarm is reported, the display will alternate between the alarm and the normal display. For instance, if HIGH Alarm = 1400TDS, the display will alternate between "Alarm !! [HIGH]" and "1450 TDS [1000]", assuming 1450TDS is the measured conductivity.

Example:
Change factory default of 0000 to 1400
(ie. alarm reported when conductivity > 1400)



4.3 Set TIMER Alarm (ie. Max continuous bleed time)



Item flashing on display:

▲ Press to Scroll/Increment
■ Press to Select/Enter

Note: Shading represents flashing

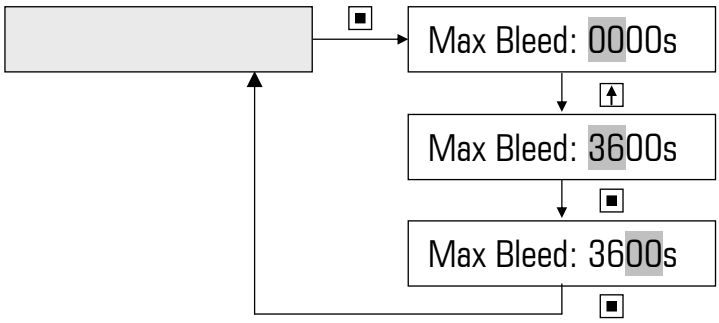
The TIMER alarm activates when the maximum permissible continuous bleed time is exceeded. This alarm is designed to protect the system from excessive bleeding and/or excessive Inhibitor dosing (if set to dose Inhibitor on bleed). Should there be a problem with make-up water not entering the tower, the solenoid valve will continue to bleed indefinitely as no dilution takes place. Alternatively, a faulty TDS probe may read a high TDS when in fact the TDS is low, and the solenoid valve will continue to bleed indefinitely. The TIMER alarm prevents these excessive conditions.

To leave the alarm in its disabled state, ie. factory default setting of 0000s, proceed to section 4.4

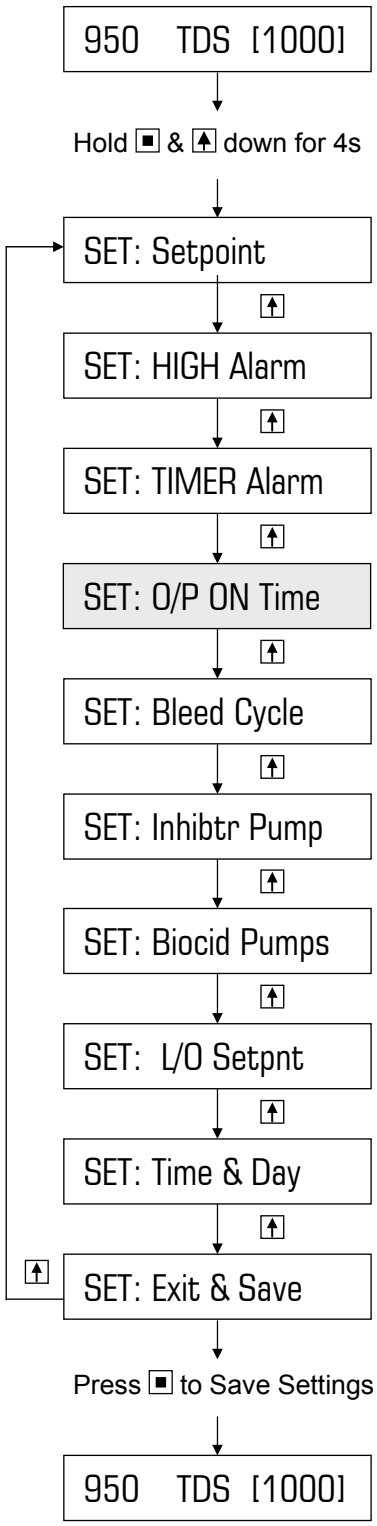
If the TDS drops below the setpoint within the programmed time, the timer resets. However, if the timer times out before the TDS reaches the setpoint, the bleed solenoid valve switches off and is disabled until the unit is manually reset by holding down the ENTER button, or until the TDS drops below the setpoint. Until then, the alarm will be reported on the display and the alarm LED will illuminate.

When an alarm is reported, the display will alternate between the alarm and the normal display. For instance, the display will alternate between "Alarm !! [Timer]" & "1100 TDS[1000]", assuming the TDS reading from the probe is 1100TDS.

Example:
Factory default: 0000s (ie. alarm disabled)
Change to: 1 hour, ie. 3600s



4.4 Set O/P ON Time (ie. Tower circulating/condenser pump override facility)



Item flashing on display:

▲ Press to Scroll/Increment
■ Press to Select/Enter

Note: Shading represents flashing

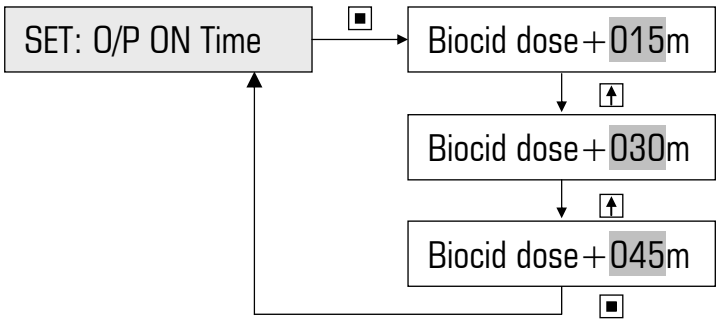
Often when biocides are dosed into the manifold of the DIGICHEM panels, the circulating/ condenser pump of the cooling tower is not running. This causes problems of corrosion in the manifold as well as biocide not being dosed into the cooling tower water.

The DIGICHEM has an on-board relay contact (N/O) which can be wired into the condenser pump contactor (see wiring diagram in section 2.2).

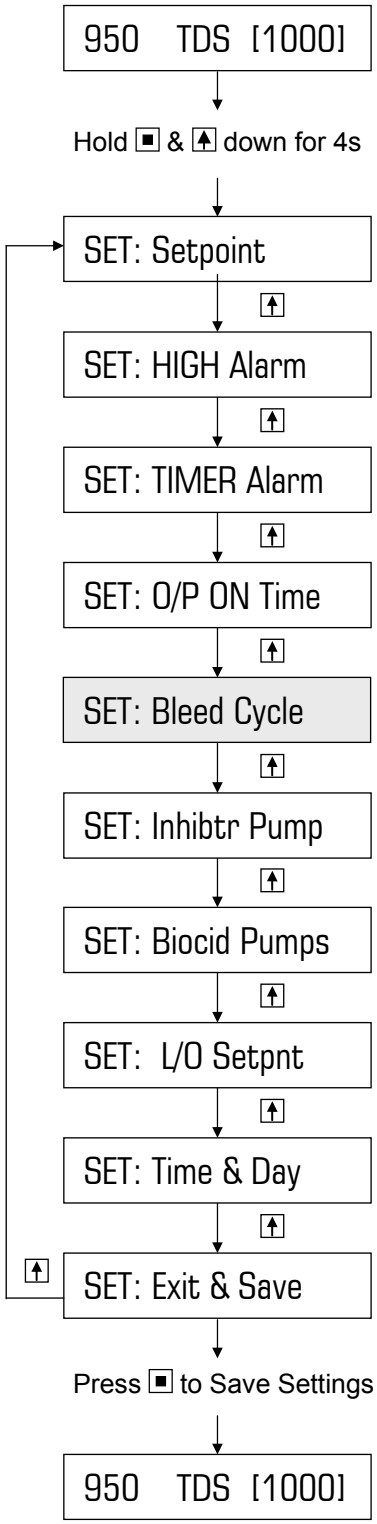
When either biocide pump starts dosing, the N/O contact closes, powering the contactor which in turn starts the condenser pump. The condenser pump will continue to run while the biocide is dosing, as well as for a period of time after biocide dosing. This ensures continuous water circulation and effective mixing of the biocide chemical.

This time that the pump runs after a biocide dose, is programmed here as the O/P ON Time.

Example:
Changing factory default of 15 minutes to 45 minutes after biocide dosing.



4.5 Set Bleed Cycle



To leave the Bleed Cycle in its disabled state proceed to section 4.6. This is the factory default setting of ON/OFF=00s/00s which means that the solenoid valve will bleed continuously when the measured TDS > the TDS Setpoint.

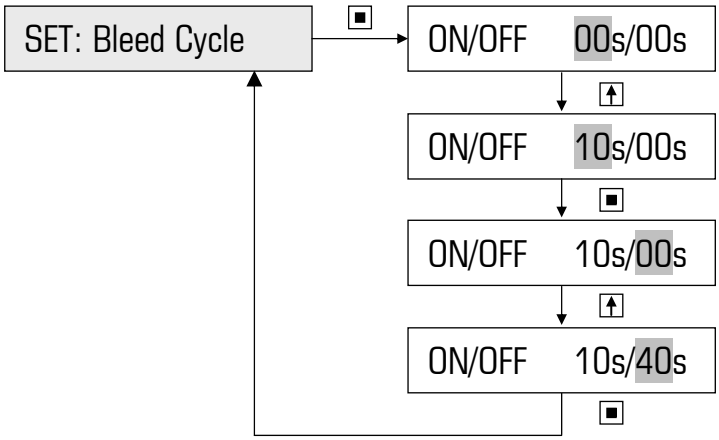
Alternatively, once the TDS is above the setpoint, the bleed solenoid valve can be programmed to cycle ON and OFF until the TDS is corrected.

This action prevents excessive tower drainage and allows the make-up to efficiently mix with the cooling tower water.

This ability to cycle is also useful because it prevents flooding by slowing down the flow rate into a blocked drain.

Example:

Factory default:	00s/00s (ie. bleed solenoid activated continuously when TDS > TDS setpoint).
Change to:	10s/40s (ie. 20% duty cycle), calculated as 10/(10+40).

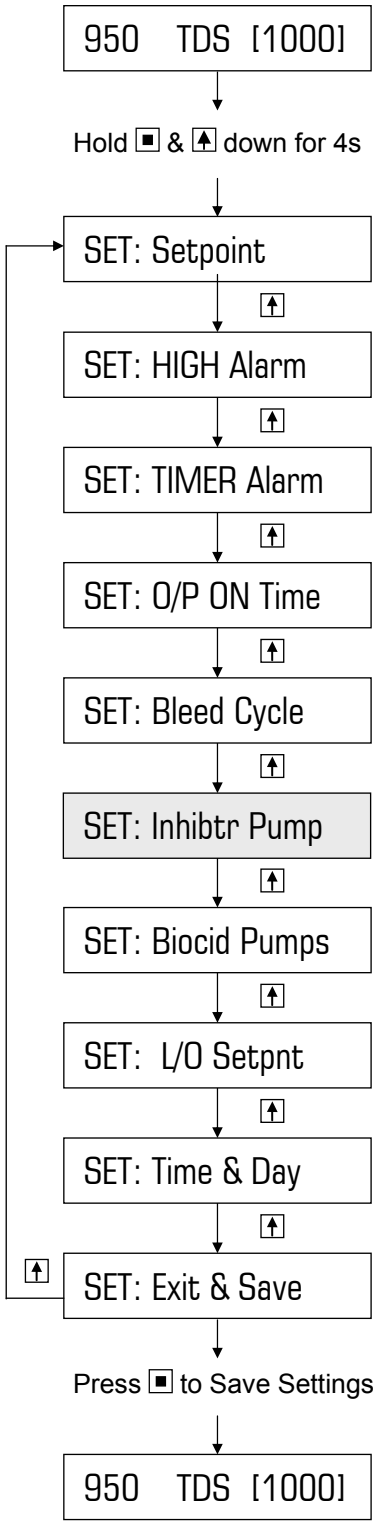


Item flashing on display:

▲ Press to Scroll/Increment
■ Press to Select/Enter

Note: Shading represents flashing

4.6 Set Inhibitor Pump



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■ Press to Select/Enter

Note: Shading represents flashing

There are 4 **Possible Inhibitor Feed Pump Modes** to select from:

1. **Continuous on Bleed**
2. **% of Time on Bleed**
3. **% of Time on Flow (24 hours/day)**
4. **Water Meter Pulse**

1. Continuous on bleed

Pump doses continuously when measured TDS > Setpoint, regardless of any bleed cycle programmed.

2. % of Time on Bleed:

Pump doses on a duty cycle when measured TDS > Setpoint, independent from any bleed cycle programmed. Duty cycle is repeating ON and OFF times, eg ON=30sec, followed by OFF=30sec & repeating (ie. 50% duty cycle).

3. % of Time on Flow (24 hours/day)

Pump doses on a continuous duty cycle as long as the manifold is flooded. Duty cycle is repeating ON and OFF times, eg ON=20sec, followed by OFF=60sec & repeating (ie. 25% duty cycle). If the manifold is still flooded on no-flow, flow switch option AF04 should be fitted.

4. Water Meter Pulse

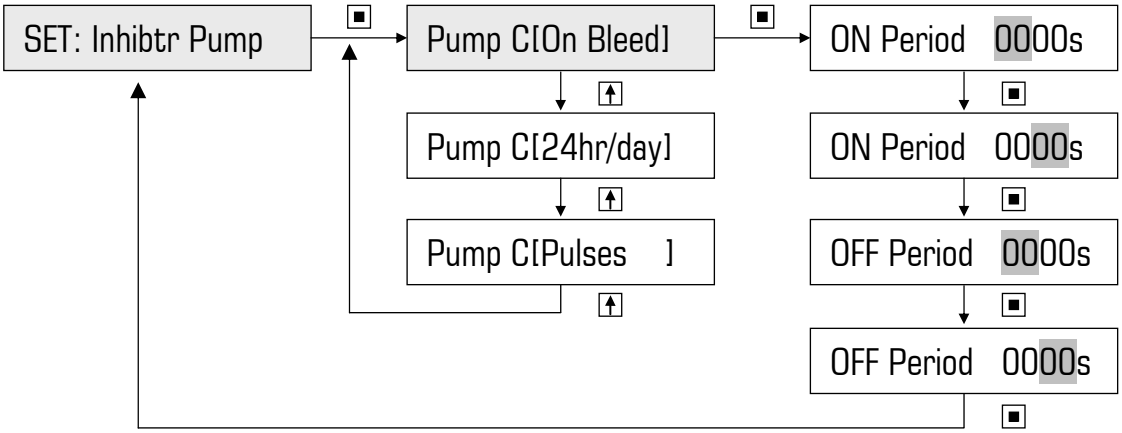
Pump doses proportional to pulses received from a water meter fitted in the make-up line. The DIGICHEM activates the pump for a set time once a pre-determined number of pulses is counted. For example, the pump may dose for 30 seconds (ie. programmed dose time) every 100 litres of make-up water (ie. programmed pulse count of 100).

4.6 Set Inhibitor Pump (continued)

4.6.1 Continuous on Bleed Mode

Pump doses continuously when the measured TDS > Setpoint, regardless of any bleed cycle programmed. The ON and OFF times are both pre-set to 0 seconds. This is the factory default setting.

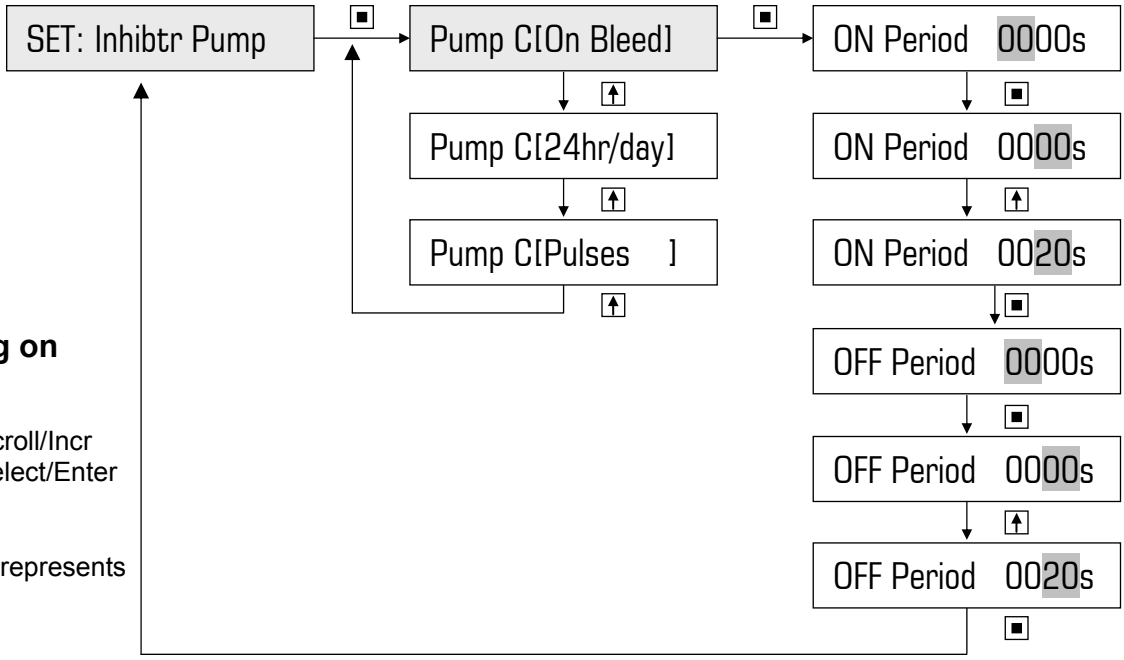
Example: Factory setting of dosing inhibitor continuously on bleed.



4.6.2 % of Time on Bleed Mode

Pump doses on a duty cycle (ie. Dose cycle) when the measured TDS > Setpoint. This duty cycle is totally independent from any bleed cycle programmed. By varying the duty cycle, you are effectively turning down the dose rate of the pump.

Example: Change Factory default of dosing inhibitor continuously on bleed to a 50% duty cycle on bleed (ie. 20 seconds ON & OFF times chosen).



Item flashing on display:

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Press to Select/Enter

Note: Shading represents flashing

4.6.3 % of Time on Flow Mode (24 hours/day)

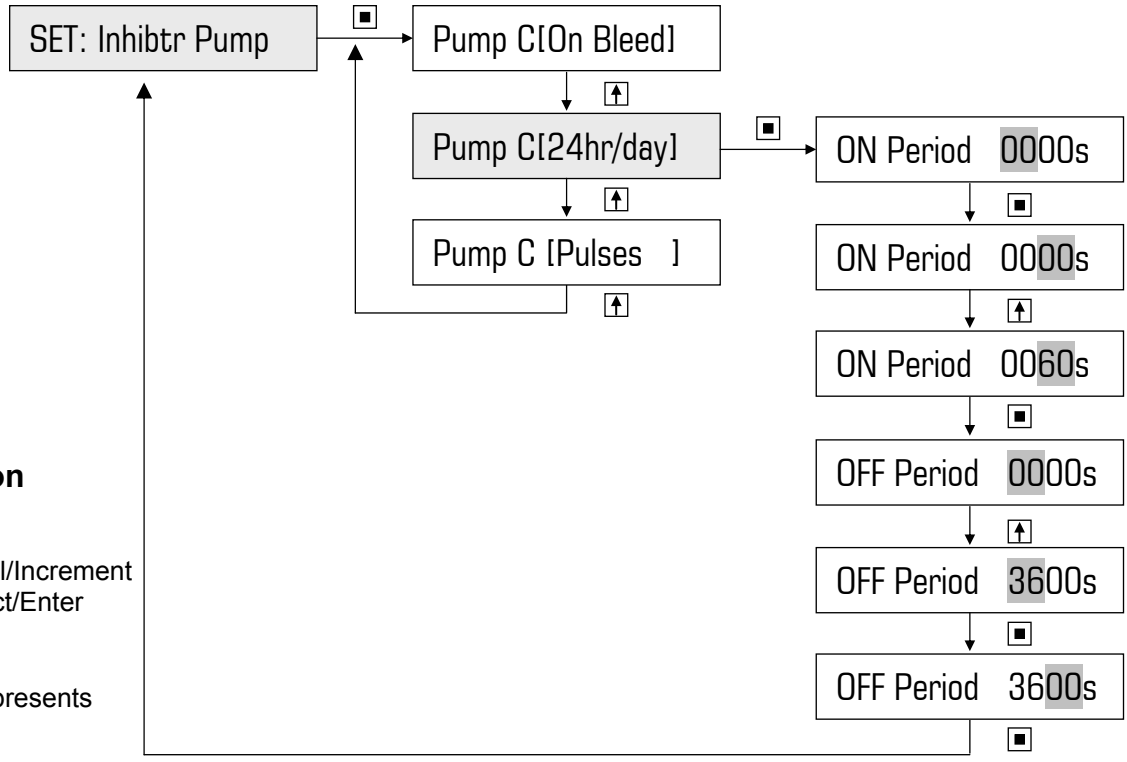
Pump doses on a continuous duty cycle as long as the manifold is flooded. Duty cycle is repeating ON and OFF times, eg ON=60sec, followed by OFF=3600sec & repeating (ie. 1.6% duty cycle). If the manifold is still flooded on no-flow, flow switch option AF04 should be fitted.

Example: **Change Factory default of dosing inhibitor continuously to a 1.6% duty cycle.**

Dosage required = 0.5 litres/day
Pump dose rate = 1.3 litres/hr = 31.2 litres/day
Duty cycle = 0.5 / 31.2 = **1.6%**

Hence, to dose 0.5 litres/day, the pump needs to dose 1.6% of the time.
1.6% of 24 hours is approx 23 minutes (ie. 58 sec every hour)

Set ON time = 60 sec (ie. 58 sec rounded off)
Set OFF time = 3600 sec (ie. 1 hour)



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■ Press to Select/Enter

Note: Shading represents flashing

4.6.4 Water Meter Pulse

Pump doses proportional to pulses received from a water meter in the make-up line. The DIGICHEM activates the pump for a set time once a pre-determined number of pulses is counted.

Example: **Dose for 30 seconds every 100 litres of make-up water**

Water meter pulse rate = 1 pulse / litre
Desired concentration = 100 p.p.m.

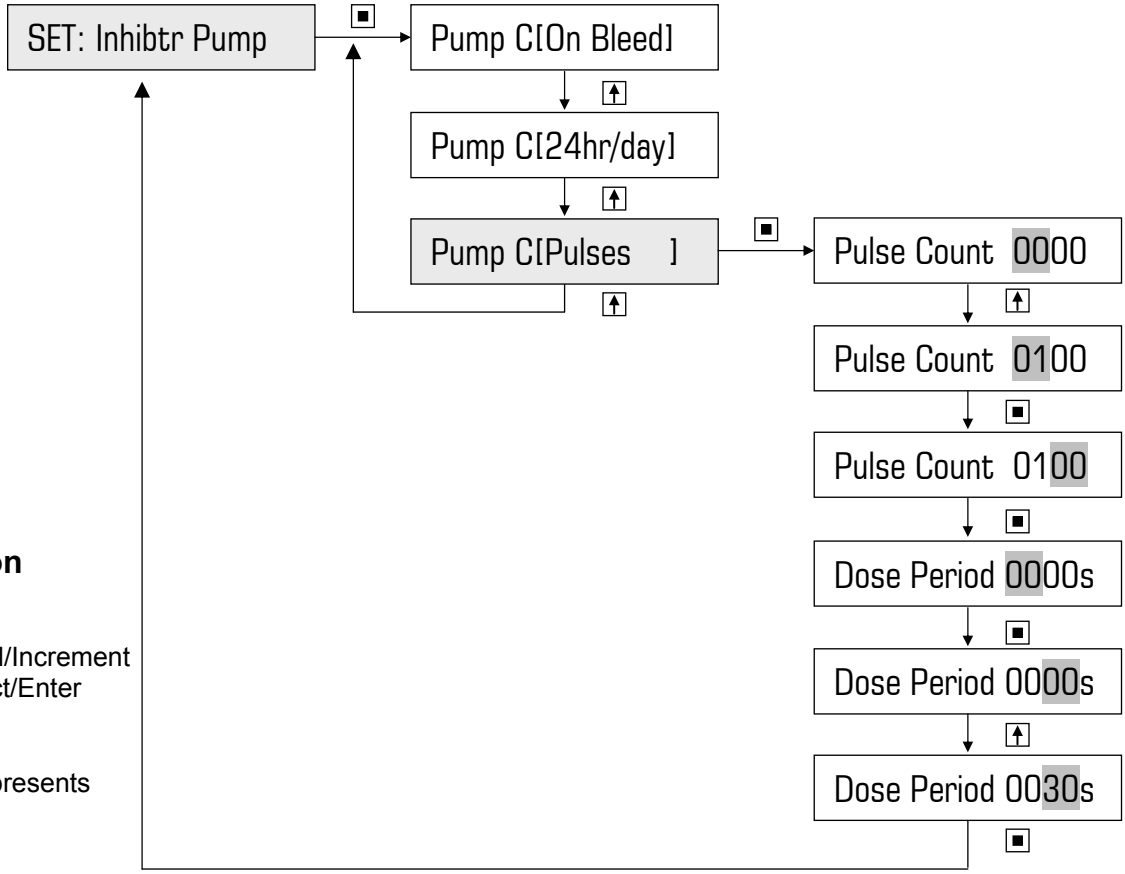
100 p.p.m. = 10 ml chemical / 100 litres flow
= 10 ml chemical / 100 pulses

Hence, we require the pump to dose 10ml every 100 pulses counted.

How long does the pump need to dose to deliver 10ml?

Pump dose rate = 1300 ml/hr = 0.36 ml/sec
Dose time = 10 ml / 0.36 ml/sec
= 27.8 seconds (ie. approx. 30 sec)

Set PULSE COUNT = 100
Set DOSE PERIOD = 30 seconds



Item flashing on display:

▲ Press to Scroll/Increment
■ Press to Select/Enter

Note: Shading represents flashing

4.7 Set Biocide Programs

Biocide is dosed into the manifold according to **timer programs** set up by the user. There are 10 independent programs which can be programmed to operate daily, once per week, or on any number of days per week. A typical biocide program, which will operate at the same time on the specified days of the week, consists of 3 consecutive time durations:

Pre-bleed: This reduces the system conductivity to 87% of the normal setpoint prior to biocide dosing in order to allow for a longer Bleed Lock-out duration without the risk of entering scaling conditions. Pre-bleed duration is programmable from 0 to 250 minutes.

Biocide dosing: The biocide pump (Pump A or Pump B) doses chemical into the manifold. Dose duration is programmable from 1 to 250 minutes and commences immediately after Pre-Bleed. Bleed-off is disabled (ie. locked out) during dosing provided the lock-out TDS setpoint is not exceeded.

Bleed Lock-out: After biocide dosing, bleed-off continues to be disabled for the lock-out duration, programmable from 0 to 999 minutes, provided the lock-out TDS setpoint is not exceeded.

During Pre-bleed, the displayed setpoint eg. [1000], alternates with [P/B !]

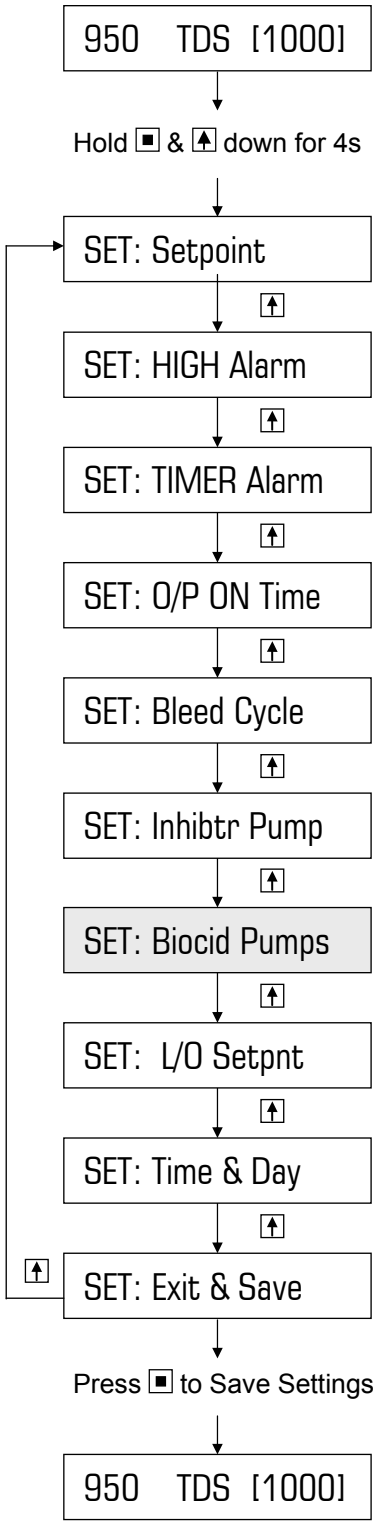
During Biocide dosing and Bleed lock-out, the displayed Lock-out setpoint eg. [1500] alternates with [L/O !]

By preventing bleed-off during and after biocide dosing, the system is ensured of receiving maximum benefit from the dosed biocide, as no biocide will be lost during this time via bleed-off. Furthermore, because the conductivity is reduced during Pre-Bleed, the system has a longer retention period. As a result, a highly effective “kill” is achieved without resulting in high scaling conditions.

Each of the 10 Biocide Dosing programs can be set up to operate Biocide pump A or Biocide pump B. In other words, the programs can be allocated in any combination to either of the two biocide outputs, A and B.

For instance, if pump A is set up in 6 programs, pump B can only have up to 4 programs controlling it. Not all of the programs need to be allocated. If only two of the programs are required, then the other 8 will remain disabled. Pump A and Pump B work totally independently and each program has its own START TIME, followed by its own consecutive PRE-BLEED, BIOCIDE DOSING and BLEED LOCK-OUT durations. **However, biocide programs should not overlap.**

4.7 Set Biocide Programs (continued)



Item flashing on display:

▲ Press to Scroll
■ Press to Select/Enter

Note: Shading represents flashing

Steps to setting up the biocide timer programs:

Step 1
Select the timer program (eg. 1, 2, etc, up to 10).

Step 2
Select the biocide pump, A or B, for that program.
(eg. A, for DIGICHEM-A2)

Step 3
Select days of the week to dose.

Step 4
4.1 Set pre-bleed start time (ie. time of day)
4.2 Set pre-bleed duration (in minutes)
4.3 Set dosing duration (in minutes)
4.4 Set bleed-lockout duration (in minutes)

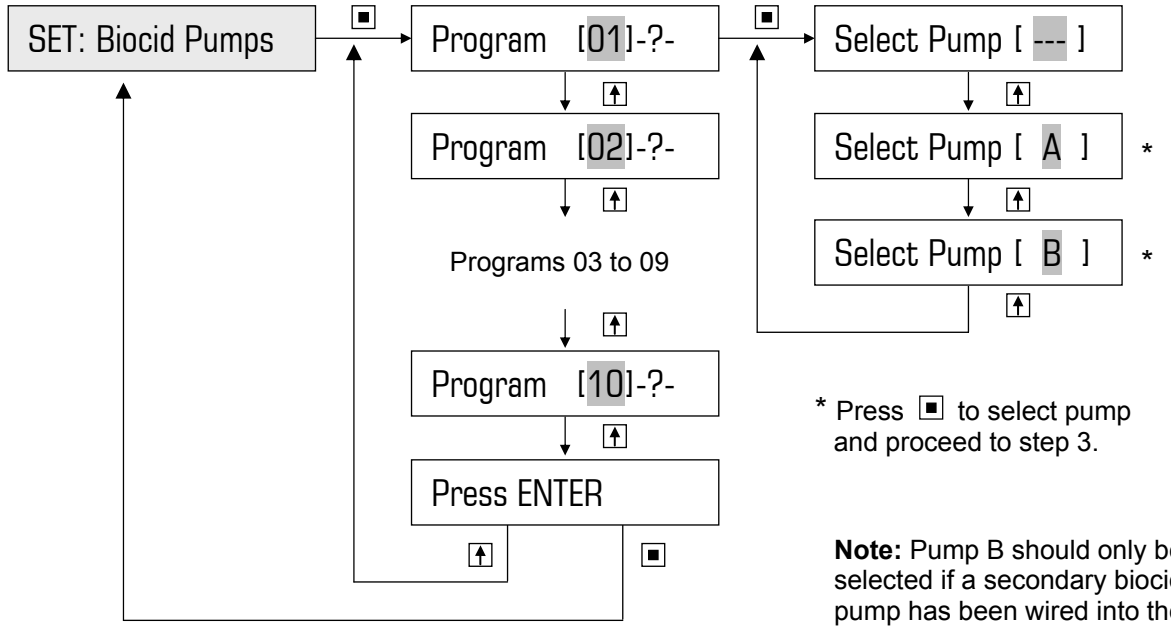
Step 5
Setup more programs (if required), reset any programs (if required) & exit biocide timer programs menu

Important Note:

Do not overlap 2 different biocide programs.

However, if the secondary biocide output B is used to power another controller (eg. ORP controller) for an extended period, a program controlling Biocide pump A at the same time is acceptable. Important: The program on pump A must start and finish within any program activating output B.

Step 1 & 2: Select the program and allocate biocide pump



Note: Pump B should only be selected if a secondary biocide pump has been wired into the DIGICHEM controller.

Item flashing on display:

▲ Press to Scroll/Toggle
▣ Press to Select/Enter

Note: Shading represents flashing

TO ERASE A BIOCIDE PROGRAM

To reset/erase an existing biocide program, see step 5

TO VERYIFY THE SETTINGS OF ANY BIOCIDE PROGRAM

When the program number & pump (eg. Program [02]-A-) is displayed, continually press the ENTER button and all the program settings will be successively displayed.

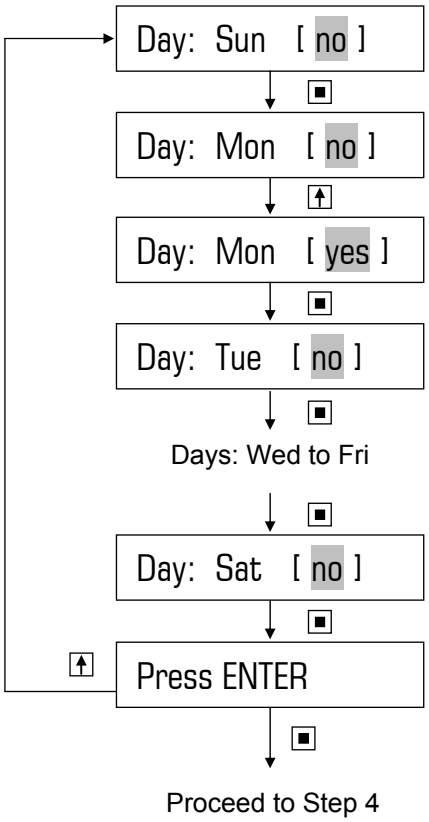
Continue pressing the ENTER button until the program number is displayed again (eg. Program [02]-A-).

Press SCROLL to go the next program (eg. Program [03]). Continuously press SCROLL to exit the biocide program part of the menu.

Step 3: Selecting days of week on which to dose.

Example: Settings already programmed
Program: 01
Pump: A

Example: Days to Dose
Monday only



Item flashing on display:

▲ Press to Scroll/Toggle
■ Press to Select/Enter

Note: Shading represents flashing

Step 4: **Setting pre-bleed start time, pre-bleed duration, biocide dosing duration & bleed lock-out duration.**

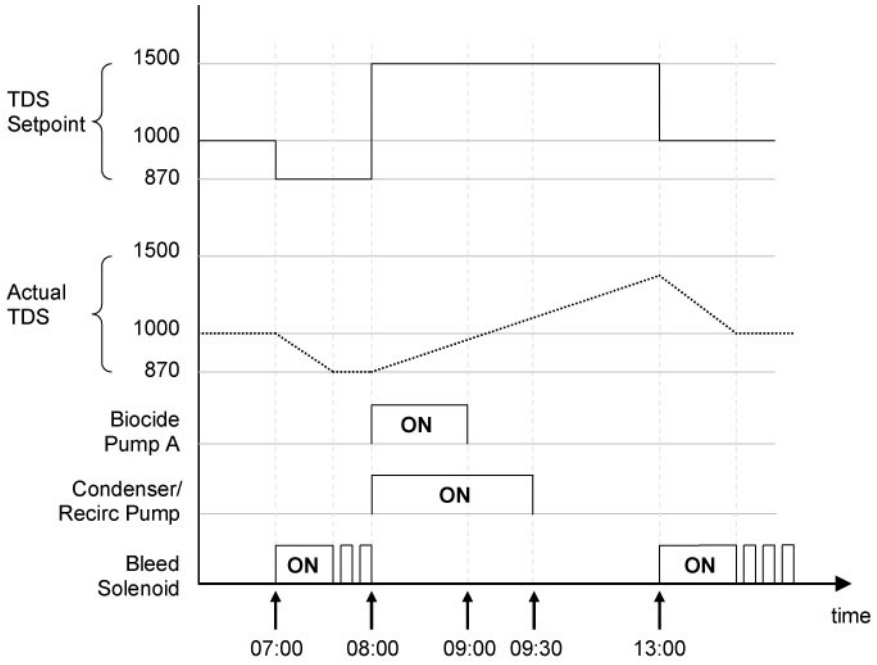
Example:

Start time: 07h00
Pre-Bleed (P/B): 0060m (ie. 07h00 to 08h00)
Dose for: 0060m (ie. 08h00 to 09h00)
Bleed L/O: 0240m (ie. 09h00 to 13h00)

Other Program Settings
Setpoint: = 1000 TDS
P/B Setpoint = Setpoint – 13% (ie. 870 TDS)
L/O Setpoint = Setpoint + 50% (ie. 1500 TDS)
Program = 01
Pump = A
O/P ON time = 30m (i.e. delay off time after A dose)

Note: Do not overlap 2 different biocide programs

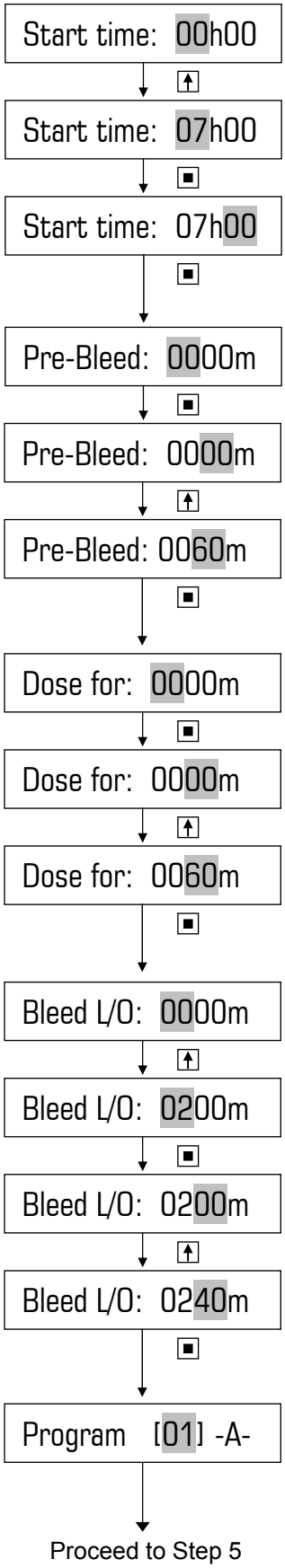
Diagram of Example



Item flashing on display:

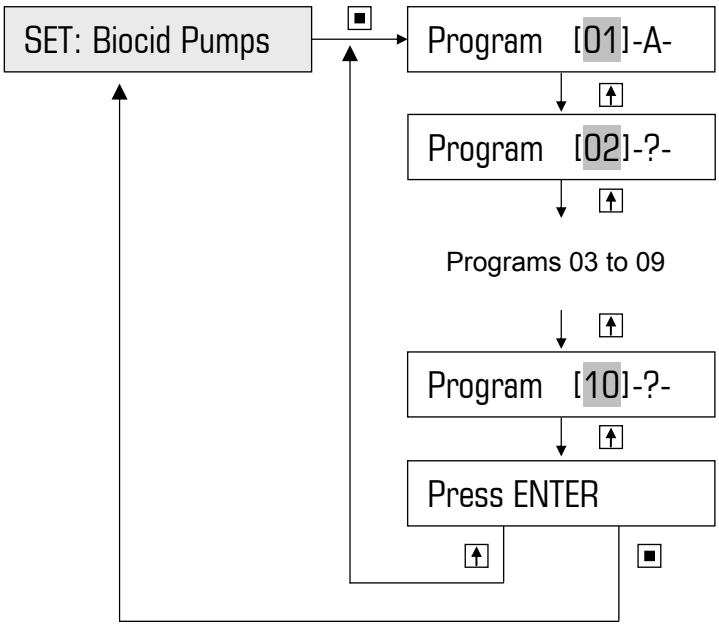
▲ Press to Scroll/Increment
■ Press to Select/Enter

Note: Shading represents flashing



Proceed to Step 5

Step 5: **Set the other timer programs (if required) and exit the biocide timer program menu.**



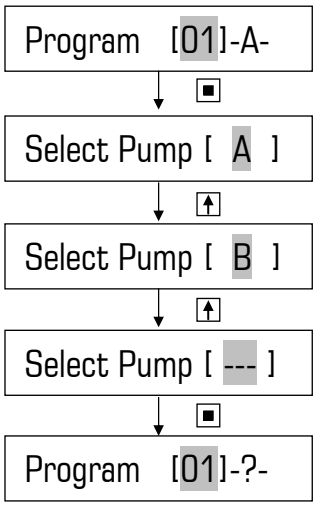
Item flashing on display:

▲ Press to Scroll
■ Press to Select/Enter

Note: Shading represents flashing

Resetting/disabling a timer program

To disable any timer program or to reset a program's settings, select pump to "---" (see example below)



Item flashing on display:

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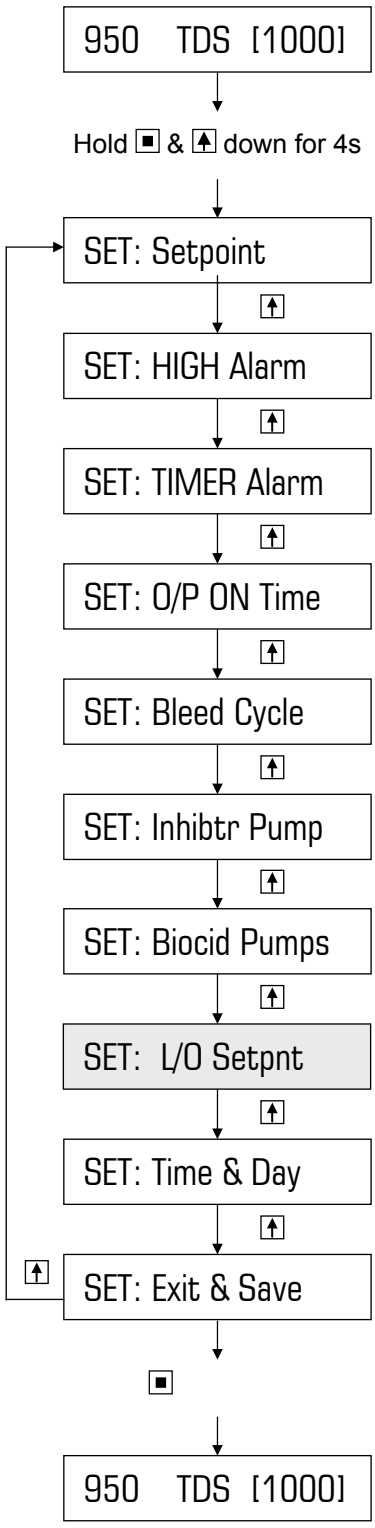
■ Press to Select/Enter

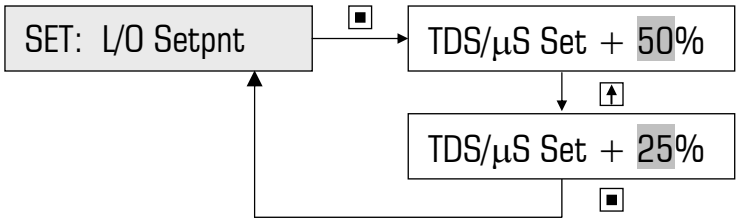
Note: Shading represents flashing

4.8 Set Bleed Lockout Setpoint



The DIGICHEM has a facility to prevent the system conductivity from increasing too much during biocide dosing and bleed lockout. If the measured conductivity rises above the Bleed Lockout Setpoint, the bleed solenoid valve will be activated. For example if the conductivity setpoint is 1000 TDS and the lock-out setpoint is set at 25%, the system will bleed during biocide dosing & bleed lock-out only if the conductivity rises above 1250 TDS.

Example
Changing factory default of 50% to 25%



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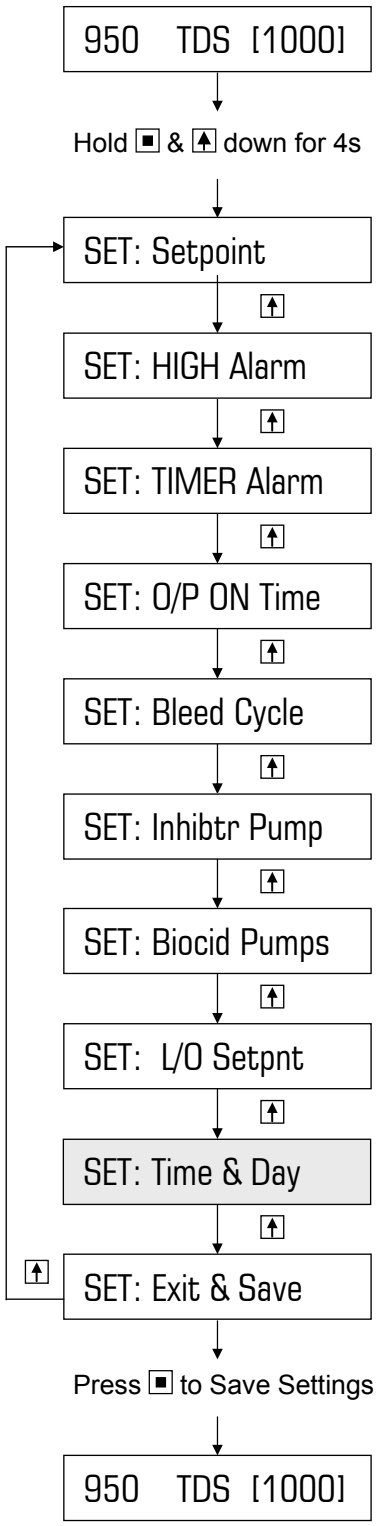
■ Press to Select/Enter

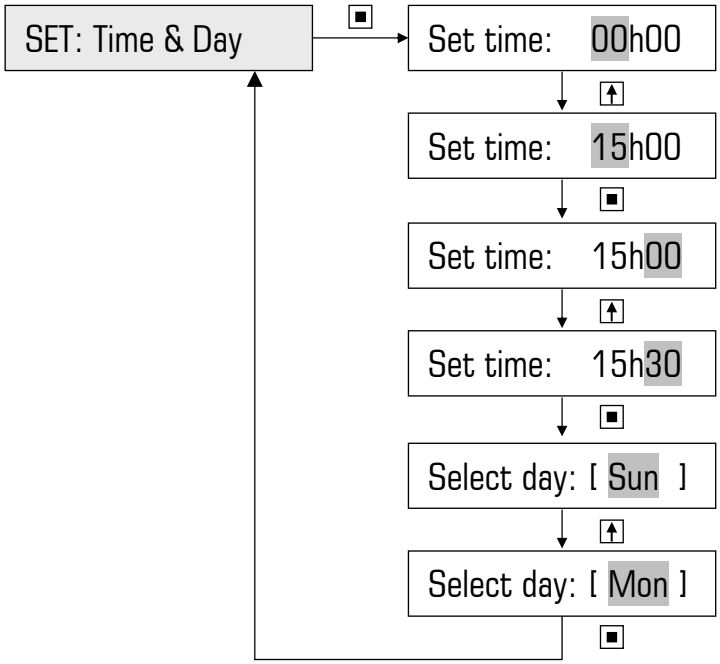
Note: Shading represents flashing

4.9 Set Time & Day



In order for the biocide control to function properly, the current time and day needs to be set.

Example
Current time setting: 00h00 on Sunday
Correct time setting: 15h30 on Monday



Item flashing on display:

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▣ Press to Select/Enter

Note: Shading represents flashing

5. FACTORY SETTINGS / PROGRAMMABLE OPTIONS

Item	Factory Setting	Option	Note
Setpoint	1000 TDS	1 – 10,000 μS	Determine the desired system TDS/μS
High Alarm	0000 TDS	0 – 10,000 μS	0000 = alarm disabled Otherwise HIGH alarm setting must be greater than Setpoint
Timer Alarm	0000 sec	0 – 9999 sec	0000 = alarm disabled
O/P ON Time	Biocide dose time set + 015 m	15, 30, 45, 60, 75, 90, 105 or 120 minutes	Time after biocide dosing for which O/P ON relay contact remains closed. Activates during & after Biocide A or B.
Bleed Cycle	00s/00s	ON = 0-99 sec OFF = 0-99 sec	00s/00s = continuous bleed when system TDS > Setpoint
Inhibitor Pump Mode	Continuous On Bleed:	1. Continuous on bleed 2. % of time on bleed 3. % of time on flow 4. Water Meter Pulse	Factory default to dose continuously on bleed. Slow down dose rate by entering ON and OFF times of duty cycle.
Inhibitor Duty Cycle (Modes 2 & 3 only)	0000s/0000s	ON = 0-9999 sec OFF = 0-9999 sec	Duty cycle programmed used for “On bleed” modes or “On flow 24hr/day” modes
Inhibitor Water Meter Settings (Mode 4 only)	Pulse count = 0000 Dose period = 0000s	Pulse Count = 1-9999 pulses Dose Period = 1-9999 sec	When programmed pulse count is counted, pump doses for dose period set.
Biocide Pump Timer Programs	All programs disabled	10 Timer programs (program which pump to dose and on which days of the week).	Example: Program: 01 Pump: A Dose days: Mon, Wed, Fri
Pre Bleed Duration	0000m	0-250 min	Controller controls TDS to 87% of setpoint programmed During the Pre-Bleed Duration.
Pre-Bleed Setpoint	Setpoint minus 13%	87% of setpoint programmed (87% is fixed setting)	
Biocide Dosing Duration	0000m	1-250 min	During the Biocide dosing and Bleed Lock-out durations, the controller controls TDS to setpoint + programmed %.
Bleed Lock-Out Duration	0000m	0-999 min	
Bleed Lock-Out Setpoint	Setpoint plus 50%	100 to 199% of setpoint programmed	Factory default of 50% would mean TDS setpoint during biocide dosing and lock-out is 150% of normal TDS setpoint
Time & Day	00h00 Sun	00h00–23h59, Sun-Sat	Clock has battery backup. However, DIGICHEM should be powered continuously, regardless of when towers are shut down.

6. SPECIFICATIONS

Power Supply:	220 – 240 VAC (50 / 60Hz)
Internal fuse:	2A/250VAC (M205, 20mm x 5mm diameter)
Inputs:	Conductivity Probe, model DCON-P10AT or DCON-P10ATS Water meter potential-free contact Flow switch input A&B (disables only A&B on no flow) Flow switch input C&Sol (disables only C&Solenoid on no flow) Note: Flow switch option AF04 required to operate flow switch inputs.
Standard Outputs:	1. Biocide A (switched 240VAC, 10A max resistive) 2. Biocide B (switched 240VAC, 10A max resistive) 3. Inhibitor C (switched 240VAC, 10A max resistive) 4. Solenoid (switched 240VAC, 5A max, with snubber) 5. O/P ON relay N/O potential free (240VAC, 10A max) 6. Alarm relay N/O & N/C potential free (240VAC, 2A resistive)
Optional Outputs	AF09: Isolated 4-20mA card to remotely monitor TDS level Maximum output impedance: 750 Ω AF10: 4-20mA for TDS, & 6 NPN event O/Ps: Pumps A, B & C, Bleed Valve, Alarm & Power Failure
Displayed TDS Resolution:	1 TDS
Hysteresis (ie. Dead band):	3% fixed
LED Indication:	Power ON, Solenoid Operate, Alarm
Controller Enclosure rating:	IP55 (ie. Completely weatherproof)
Biocide Battery Backup	50 hours (designed for power failure only)
EMC compatibility	C-tick approved
Operating Temperature:	0 - 50°C
Memory backup:	EEPROM. Data retention of 10 years min.