MGI CONTROLS®
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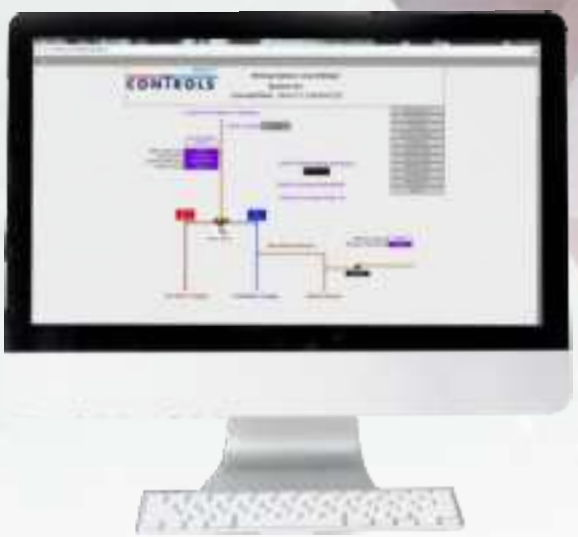
BASyC®

MODEL NO. ABMV

DIGITAL MIXING VALVE AND MONITORING SYSTEM

INSTALLATION&MAINTENANCEGUIDE



BASyC® Operating Overview Screen

BASyC® Control Panel

Touchscreen User Interface

Belimo Acuator

Command Station upgraded with BASyC®

MGI CONTROLS

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GENERAL DESCRIPTION OF BASyC®

- Non-proprietary Honeywell NiagaraAX framework hardware and software to achieve stand-alone computerized control of the recirculating domestic hot water system.
- Web browser capability and can be accessed via:
    1) the user's LAN
    2) the portable handheld touchscreen display
    3) the integral BAS adapters and/or
    4) the internet using VPN or cellular interface. In all cases, no special software is required.
- Real-time temperature, pressure and flow monitoring.
- Alarms and Alerts to multiple users via email and/or text.
- Data logging with data transfer capabilities through the user's LAN or BAS interface.
- A highly customizable report generator with the ability to export the data to a pdf, HTML, TEXT or CSV file for analysis beyond BASyC's powerful internal capabilities
- Internal BAS adapters for BACnet, Lonworks, ModBus or oBIX without external adapters or gateways.
- Primary and Secondary LAN adapters with full isolation from each other
- Two Internal RS-485 adapters for BAS connection with a third for system expansion/custimization
- Micro USB connection for optional tablet
- The capability of 34 inputs/outputs: 16 universal inputs, 10 relay outputs, and 8 analog outputs
- One BASyC® system can control up to 4 valves in one or two separate temperature loops.
- Temperature control per ASSE 1017 during: power failure, outlet sensor failure, electric actuator or thermostatic sensor failure and/or software/system reboot.
- Based on an MV17 control valve included as part of a Command Station or SFMMV Supply Fixture assembly. If not ordered initially with BASyC®, Command Stations and SFMMV Supply Fixtures are upgradeable to BASyC® at a minimal cost.
- User-programmable sanitization with available email alarm includes "Safe Start" confirmation to minimize the risks associated with high sanitization temperatures.
- BASyC's open architecture allows for cost-effective customization. Any input or output not used for the recirculation LTHW application can be assigned to monitor and activate or control 3rd party devices. Contact **MGI CONTROLS®** for details and a price quotation.
- BASyC® offers calculated flow and HW energy consumption data that's accurate and reliable for identifying user demand for flows ranging from 1 psid to the maximum pressure drop/flow.
- A flow sensor option gives BASyC® the capability to provide the most accurate flow and energy data at all user demand requirements.
- BASyC® units are shipped with a standard 120vac/60hz cord/plug. The unit is capable of being hardwired but this can be done after installation and start-up, thereby eliminating the need for electrical coordination/timing.
- Available with optional Lead/lag pump controls

Special note to all users of MGI CONTROLS® Command Stations and multi-valve supply fixtures installed without BASyC® capabilities:

MGI CONTROLS® Command Stations or Multi-Valve (SFMMV) supply fixtures installed without **CONTROLS®** BASyC® can be upgraded at a later date to include any of its capabilities. This is done by ordering a BASyC® upgrade kit and requires no change in plumbing, piping or system operation. Simply install the items included in the kit and your system is ready to go. This is an exclusive benefit to purchasers of these systems who decide after-the-fact that they would benefit from the capabilities of **CONTROLS®** BASyC®.

BASyC® Mixing Valve Assembly Command Station (shown) or SFMMV Multi-Valve Supply Fixture.

BASyC® **Controls®** Cabinet - includes capability for 2 loops (temp. zones) and up to 4 Mixing Valves.

BASyC® System with SFMMV Dual-Valve Supply Fixture installed and operational at Lake Forest Medical Center, Lake Forest, IL

SAFETY WARNINGS AND NOTICES

This document uses the following warning and caution conventions:

Cautions remind the reader to be careful. They alert readers to situations where there is a chance that the reader might perform an action that cannot be undone, might receive unexpected results, or might lose data. Cautions contain an explanation of why the action is potentially problematic.

Warnings alert the reader to proceed with extreme care in situations where there is a chance that the reader might do something that can result in personal injury or equipment damage. Warnings contain an explanation of why the action is potential dangerous.

Safety Precautions

The following are warnings relating to the installation and start-up of the controller. Be sure to heed these warnings to prevent personal injury or equipment damage.

- The controller is wired with 120vac/60hz power. Disconnect power before servicing or doing any work within the control cabinet to prevent electrical shock and/or equipment damage.
- Make all connections in accordance with national and local electrical codes. Use copper conductors only.
- To reduce the risk of fire or electrical shock, install in a controlled environment relatively free of contaminants.
- This device is only intended for use as a monitoring and control device. To prevent data loss or equipment damage, do not use it for any other purpose.

WEEE (Waste of Electrical and Electronic Equipment)

Recycling of Electronic Products: (International Installations)

In 2006 the European Union adopted regulations (WEEE) for the collection and recycling of all waste electrical and electronic equipment. It is no longer allowable to simply throw away such equipment. Instead, these products must enter the recycling process. To properly dispose of this product, please take it to a local recycling center. If a local recycling center cannot be found, please return it to:

Acorn Engineering Company® / 15125 Proctor Avenue / City of Industry, CA 91746 USA

WHAT'S INCLUDED

- (A) CONTROL CABINET
- (B) MIXING VALVE
- (C) Electronic Actuator
- (D) *Inlet HW temperature/pressure sensors
- (E) *Inlet CW temperature/pressure sensors
- (F) *Recirculation Pump
- (G) *Bypass Valve
- (H) *Outlet Temperature/Pressure Sensors
- (J) *Test Port

** Inclusion and quantity varies by order*

PRE-INSTALLATION GUIDELINES

WARNING

Use qualified tradespeople to install the **CONTROLS**® BASyC® system and follow all manufacturer's instructions, local codes, and regulations. The **CONTROLS**® BASyC® system should be installed in an area that is secure from unauthorized personnel. Only allow trained personnel to access and/or work with the **CONTROLS**® BASyC® System. It is the responsibility of the system owner/user to determine the appropriate temperatures and settings. Refer to Appendix A (Page 30) for the list of default values and applicable adjustment ranges.

Important:

CAUTION

Flush supply lines of all foreign material such as pipe dope, chips or solder prior to connecting to mixing valve.

Review the installation and maintenance manual thoroughly before beginning any work.

Installation and field adjustment are the responsibility of the installer. Optional pre-configured units and/or start-up assistance are available, please contact **MGI CONTROLS**® for details.

INSTALLATION

Mixing Valve Hardware

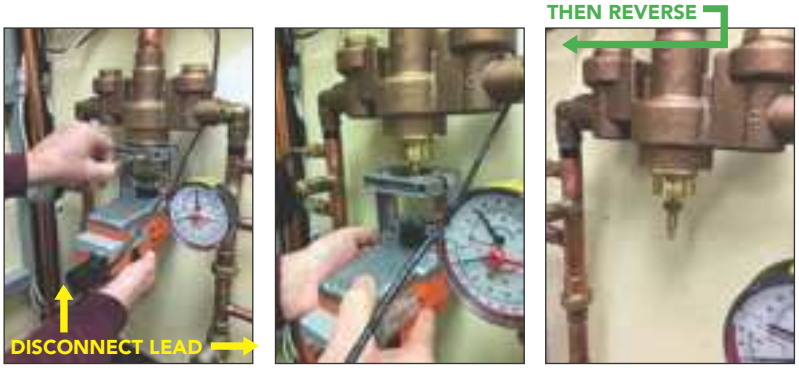
For more information on capabilities, options, installation/maintenance and piping requirements for the **CONTROLS**® Command Stations or Multi-Valve Supply Fixtures provided as a part of your **CONTROLS**® BASyC® system. Please go to the **MGI CONTROLS**® website at: **www.mgicontrols.com**

If Upgrading System:

CAUTION

- The Temperature probe should be inserted into the compression fitting so that the tip just reaches the inside diameter of the tubing. This ensures the probe senses the temperature properly. Install sensors using coding as defined in Appendix B to ensure that temperature sensors are installed properly in a multi-valve and/or multi-loop assembly.

- The sensors are all labeled per appendix B, make sure to connect them in the correct positions so that the software receives the proper data.



Bonnet Upgrade-to-BASyC® Installation Instructions

- Isolate the mixing valve's inlets and outlet using the ball valves included with every Command Stations or other ungradable **CONTROLS**® Mixing Station.
- Unthread the existing bonnet. Make sure all internal components remain in the valve. There's no need to remove or change any internal component.
- Install the upgrade bonnet, noting the longer stem that's designed to accept the Belimo Actuator provided in the upgrade kit.

Electronic Actuator Installation Instructions

- Ensure that the actuator stem is manually adjusted fully up as shown in picture. See page 29 for operating the actuator manually.
- Slide the actuator over the stem and make sure it's flush with the bonnet.
- Be sure there is no gap between the actuator base and bonnet stem.
- Using a 4mm hex wrench, tightened the cap screws that secure the actuator to the bonnet.
- Slide the black-colored clip on the actuator adapter toward the valve to secure the adapter to the stem of the bonnet.
- You've completed the bonnet upgrade/conversion and need to "auto-range" the bonnet to the valve.

Auto-Ranging (Adapting) the Actuator:

- Turn on power to the system.
- Push the "Adapt" button on the actuator and hold for 3 seconds.
- A steady yellow "Status" LED confirms the actuator is in adapter mode. When Adapting is complete, approx. 3 minutes, only solid green Adapt LED remains lit.

Existing Bonnet

DO NOT remove any internal parts

New, BASyC® Capable, Bonnet Installed

Stem clamp in full up position—see page 29 for manual adjustment instructions.

These surfaces will the flush with each other when installation is correct.

Cap Screws

Make sure there is no gap between valve stem and actuator adapter—manually move, if necessary.

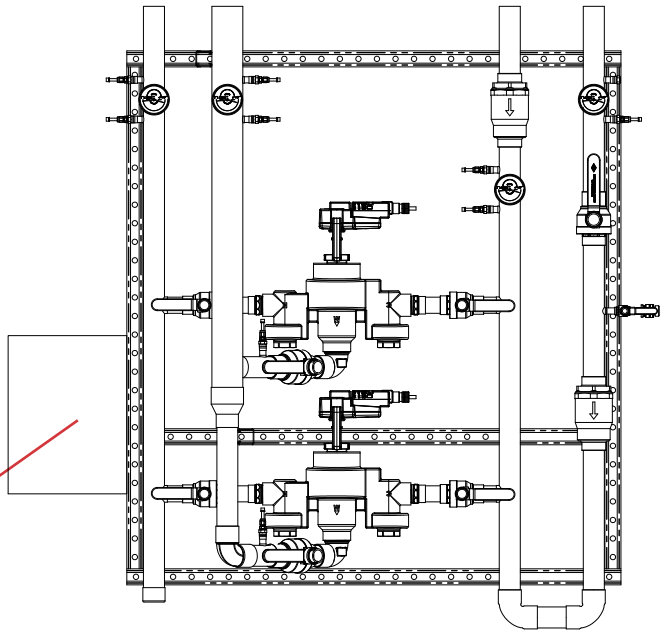
Clip shown in the down (connected-to-valve-stem) position.

"Adapt" Button/LED

"Status" LED

CONTROL CABINET ASSEMBLY

BASyC® systems are either pre-wired or ungradable and the control cabinet needs to be mounted as shown. The Controller is provided mounted on a custom SS bracket and is shipped with the mounting hardware required to attach it to the strut framing. The bottom of each control cabinet should be positioned so it is in line with the lowest, leftmost valve hot & cold inlet. If you're required to mount in another location due to space limitations or convenience, extensions and/or custom brackets can be provided, please contact **MGI CONTROLS®**.



SENSOR LEAD CONNECTIONS

CAUTION

Connect male/female plugs of all sensors and/or components. Each of the male and female connectors is labeled to ensure the proper connections are made. Refer to appendix B for a cross reference list of labels and connections. If this is an **CONTROLS**® BASyC® upgrade, sensors and/or actuator(s) will first need to be installed into the mixing valve assembly appropriate installation methods. Refer to sketch in cabinet to help determine where the sensors should be installed.

Important:

Observe coding to insure proper mating – ex: male connector #1 with female connector #1.

The standard, highly accurate, stainless steel encased outlet temperature probe is reinstalled. The exact number of temperature probes provided varies, depending on the configuration of your single or multi-valve mixing assembly.

NETWORK COMMUNICATIONS

CONTROLS® BASyC® includes several different types of network interfaces to ensure both versatility and adaptability. Each controller includes two Ethernet ports (primary & secondary) and two RS-485 ports as shown below. Connections to the primary and secondary Ethernet ports are via standard category 5/6 wiring with male RJ45 connectors. The RS-485 port utilizes a 3-position connector jack. In all cases, it is recommended to refer to the communication protocols documentation in order to configure and wire these properly. It is beyond the scope of this document to describe all the considerations for this.

Available communication options:

-Ethernet TCP/IP
-BACnet TCP/IP
-BACnet MSTP
-Lonworks
-Modbus RTU/ASCII
-Modbus TCP/IP
-oBIX

Ethernet adapters (primary shown on right) and RS-485 serial ports.

BASyC® CONFIGURATOR

Refer to this diagram for the model number of your BASyC® system. Available features will be explained on the following pages.

ORDERING CODE FOR BASyC® Systems

ABMV - [1st Cell] - [2nd] - [3rd] - [4th] - [5th] -

Complete cells 6 - 11 on next page

INSTRUCTIONS: Create your custom ABMV ordering code using this guide to complete **11 cells**, the first 5 on this page, the rest on the next page. Single temp. (Zone One) systems require a "0" response to digits that apply to Zone Two.

1st CELL - 4 DIGITS

Valve(s) Sizes

Use 0, 00, or 000 as needed (see examples)	0
MV17-2	2
MV17-3	3
MV17-4	4
MV17-5	5

Up to 4 Valves, One or Two Temp. Zones, IN ANY COMBINATION

EXAMPLES FOR CELLS 1 and 2

One MV17-4 Valve, Single Zone System.....	**4000**	2nd position =	**1**
Two MV17-4 Valves, both in Zone One.....	**4400**	2nd position =	**2**
Two MV17-4 Valves, 1 in each Zone.....	**4004**	2nd position =	**1**
Three MV17-4 Valves in Zone One.....	**4440**	2nd position =	**3**
Three MV17-4 Valves, (2) Zone One, (1) Zone Two...	**4404**	2nd position =	**2**
Four MV17-4 Valves, 2 in each Zone.....	**4444**	2nd position =	**2**
Four MV17-4 Valves, (3) Zone One,(1) Zone Two.....	**4444**	2nd position =	**3**
Four MV17-4 Valves in Zone One.....	**4444**	2nd position =	**4**

2nd CELL - 1 DIGIT

Number of Valves in Zone One

One (1)	1
Two (2)	2
Three (3)	3
Four (4)	4

3rd CELL - 2 DIGITS

Return Pipe Size - Zone One and Zone Two

Do Not Include Return Piping	0
1/2"	C
3/4"	D
1"	E
1-1/4"	F
1-1/2"	G
2"	H

If you include recirculation pump (4th digit is 1,2 or 3) then return pipe size

If you include a recirculation pump (4th digit is 1,2 or 3) then return pipe size must be provided.

Return piping includes check valves, ball valves, drain valve a nd circuit setter.

EXAMPLES FOR CELL 3

Include Return 1" Piping in Zone One, Single Zone System.....**E0**.....___

Include Return 1" Piping in Zone One and Zone Two.....**EE**.....___

4th CELL - 2 DIGITS

Recirc Pump, Pump Cntrl, Zone One & Zone Two

No Pump and No Pump Control Pump	0
with AquaStat Control	1
Pump and Pump Control Relay Pump	2
with No Control	3
No Pump, Include Pump Control Relay	4

EXAMPLES FOR CELL 4

Incl. Pump,Cntrl Relay, Single Zone..... **20**

Incl. Cntrl Relay Only, Two Zones..... **44**

Incl. Pump w/AquaStat, Zone Two..... **01**

PUMP DETAILS:

MAKE/MODEL_____

OR

_____GPM @ _____FT. HEAD

5th CELL - 2 DIGITS

Not used

No Automatic Balancing Valve	00

ORDERING CODE FOR BASyC™ Systems (Continued)

ABMV - **Complete cells 1 - 5 on previous page** -

1st Cell		-	2nd		-	3rd	-	4th	-	5th
		-			-		-		-	
6th		-	7th		-	8th	-	9th	-	10th	-	11th

INSTRUCTIONS: Create your custom ABMV ordering code using this guide to complete 11 cells, the first 5 on this page, the rest on the next page. Single temp. (Zone One) systems require a "0" response to digits that apply to Zone Two.

6th CELL - 2 DIGITS

Flow/BTU Data - Zone One and Zone Two

Do Not Include	0
Calculated BTU and Flow Data	8
Flowmeter with Flow/BTU Data	9

EXAMPLES FOR CELL 6

Calculated Flow/BTU, Single Zone System..... **80**

Flowmeter for Flow/BTU Data, Both Zones..... **99**

Choosing 8 for either zone, requires choice "C" for 7th digit. Choosing "9'" eliminates the choice of "C" for 7th digit.

7th CELL - 1 DIGIT

Inlet Temperature and/or Pressure Sensors

Standard Outlet Sensor(s) only	0
Inlet Temp. Sensors	B
Inlet Temp. and Inlet/Outlet Press. Sensors	C

Outlet temp. sensor is included on all systems. With multi-valve systems, outlet temp. sensors for each valve and another for their common outlet is standard. Inlet temp. sensors are installed on the supply piping common to all valves in a multi-valve system as well as multi-zone systems utilizing a single mixing station. See note for cell 6 regarding limitations affecting this selection.

8th CELL - 2 DIGITS

Return Temp Data - Zone One and Zone Two

Do Not Include	0
Sensor on Return Line at Recirc Pump	1
Lead/Lag Pump Control	3

If ordered, the Return Sensor temp. data typically controls the pump relay based on a target temperature. This is configurable within BASyC™. Please contact your local Acorn Representative for more information and a quote on the Final Fixture Sensor.

9th CELL - 1 DIGIT

Touchscreen Display

Do Not Include	0
Include	T

The Touchscreen display is portable. It can be used with multiple BASyC™ systems.

10th CELL - 1 DIGIT

BAS Protocol Adapter

Do Not Include	0
BACNet I/P	M
BACNET MTSP	N
Modbus MSTP	P
Lonworks MSTP	R
OBIX	S

Two RS-485 ports and a Primary & Secondary LAN are standard with BASyC™

11th CELL

SPECIAL FEATURES - If applicable

Inlcudes Special Features	SP
No Special Features Included	Blank

If **SP** is selected, the Special Features included with this system must be detailed below.

Details on Special Features:

AquaStat Pump Control

If so equipped, the AquaStat should be set in accordance with the design engineer's instructions. According to the CDC, running recirculation pumps continuously helps prevent legionella growth. **MGI CONTROLS**® agrees with this for many reasons and recommends that AquaStats be used as a high temp safety shutdown in the event that something goes wrong with the system. We recommend setting this 10 degrees above the mixing station set point.

Relay Pump Control

If equipped with this feature, your BASyC® Mixing Valve Assembly includes recirculation pump control via a relay output. This function is displayed, programmed and controlled through the BASyC® software and is typically in lieu of the AquaStat option available with the Command Station assembly. **MGI CONTROLS**® typically provides a relay rated for the recirculation pump provided by Acorn. If Acorn did not provide the recirculation pump, data on the pump must be provided upon ordering for this feature to be active. See details later in this document on user-adjustable settings under "*RECIRCULATION PUMP CONTROL*" later in this document.

BASyC® systems with Recirculation Pump by Others

If your BASyC® system as provided by Acorn does not include the recirculation pump, it should be provided by others. Relay pump control may or may not, be included with BASyC® regardless of whether **MGI CONTROLS**® supplies the pump.

Inlet Temperature Sensor

If equipped with the inlet temperature sensors option, your BASyC® system includes CW and HW inlet sensors. Data from these sensors will be stored by BASyC® and available for history reports and alerts.

Return Temperature Sensor

If equipped with the return temperature sensor option, your BASyC® Mixing Valve Assembly includes a temperature sensor in the return line. Data from this sensor will be stored and available for Data Reports and available to trigger alerts.

Pressure Sensor

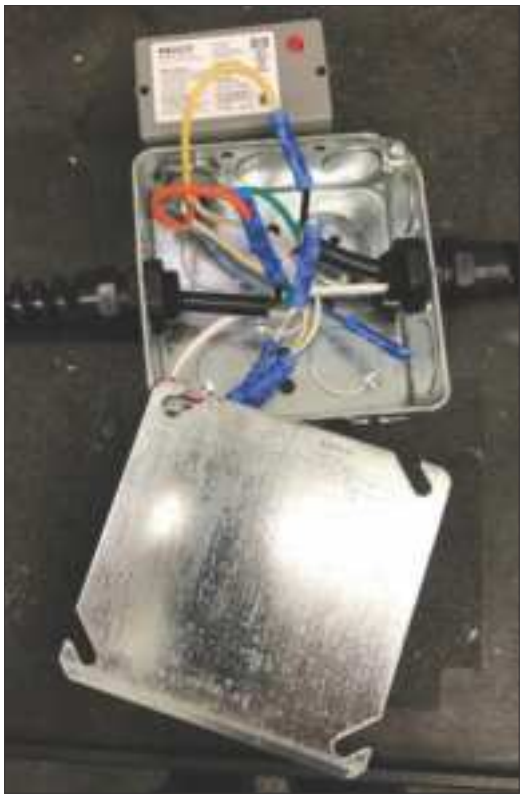
Data from the pressure sensors is captured and stored by BASyC® and used to calculate and display mixing station HW energy and flow as well as used for data Reports and to trigger alerts and alarms.

Flow and Hot Water BTU Data

If equipped with the Flow and BTU data capability, this data will be displayed on the portable operator interface or operating overview screen. These values may be reset by clicking on the flow or BTU values at the Operating Overview Screen and using the links that appear.

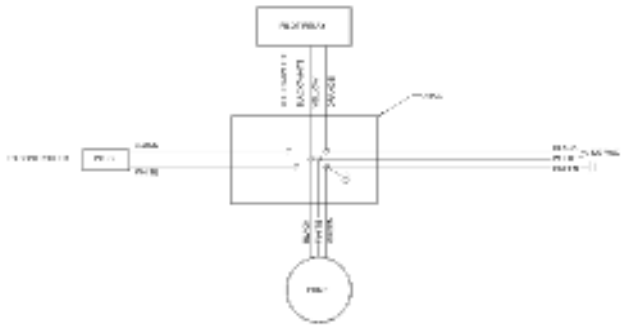
RECIRCULATION PUMP CONTROL

If equipped with a recirculation pump option, your BASyC® Mixing Valve Assembly may have been ordered with recirculation pump control. This function is displayed, programmed and controlled through the BASyC® software, in lieu of the AquaStat option available with the Command Station assembly. **MGI CONTROLS®** provides a relay rated for the recirculation pump provided by **MGI CONTROLS®**. If **MGI CONTROLS®** did not provide the recirculation pump, data on the pump must be provided upon ordering for this feature to be active. See details later in this document on user-adjustable settings under "*RECIRCULATION PUMP SETTINGS*."



WARNING

Ensure to use a qualified electrician and wire to local codes and standards.



FLOW SENSOR

If equipped with flow sensor capability, a clamp-on flow meter is installed on the outlet of your mixing station, as shown. The data from this flow meter is used to calculate and display mixing station HW energy and flow, in lieu of calculated flow using pressure sensors, as described earlier.

STARTUP

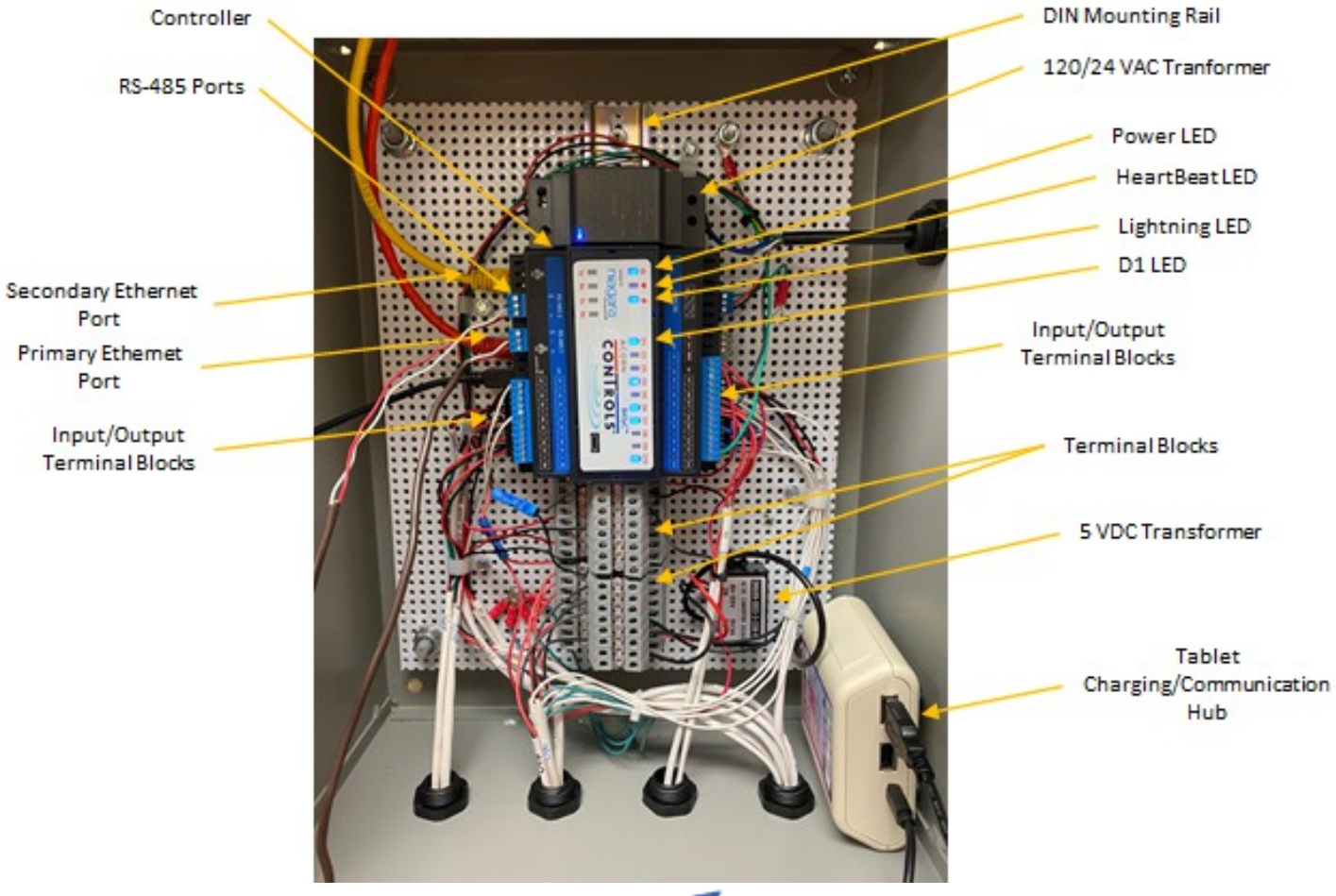
- Prior to starting up system make sure to flush pipes of debris.
- Open the isolation ball valves at the hot & cold inlets, the outlet and the return.
- Look at T/P gauges to make sure pressure is available at each.

WARNING

Plug the **CONTROLS**® BASyC® unit into a standard 120vac GFCI protected outlet. Each BASyC® unit is provided with a 6 ft. electrical plug/wire to aid in start-up. Care must be taken so that the plug doesn't get pulled out during operation. It is assumed and recommended that after the unit is in operation, a qualified electrician will hardwire the unit in accordance with any and all local codes and standards.

When power is applied, the blue power LED turns on and the heartbeat LED starts blinking. After about 30 seconds, the lightning volt LED lights up. After approximately 3 or 4 minutes the software should load and start to run which is indicated by D1 lighting up. There may be other LED's lit up at this point but D1 is the indicator that things are running properly and the system is functioning. If there are Ethernet or RS-485 connections and traffic, theses LED's will also blink and flash accordingly. If after 10 minutes these lights are not acting as described here, power down and wait 30 seconds before reapplying Power. If after anther reboot D1 still does not light up, contact **MGI CONTROLS**® for assistance.

If the **CONTROLS**® BASyC® is factory pre-configured or if your using factory default settings, please skip ahead to either the Web Browser Access or the Local Access Sections. If your system is not pre-configured and you're not intending to utilize the web browser capabilities of BASyC®, skip ahead to Local Access and Configuration.



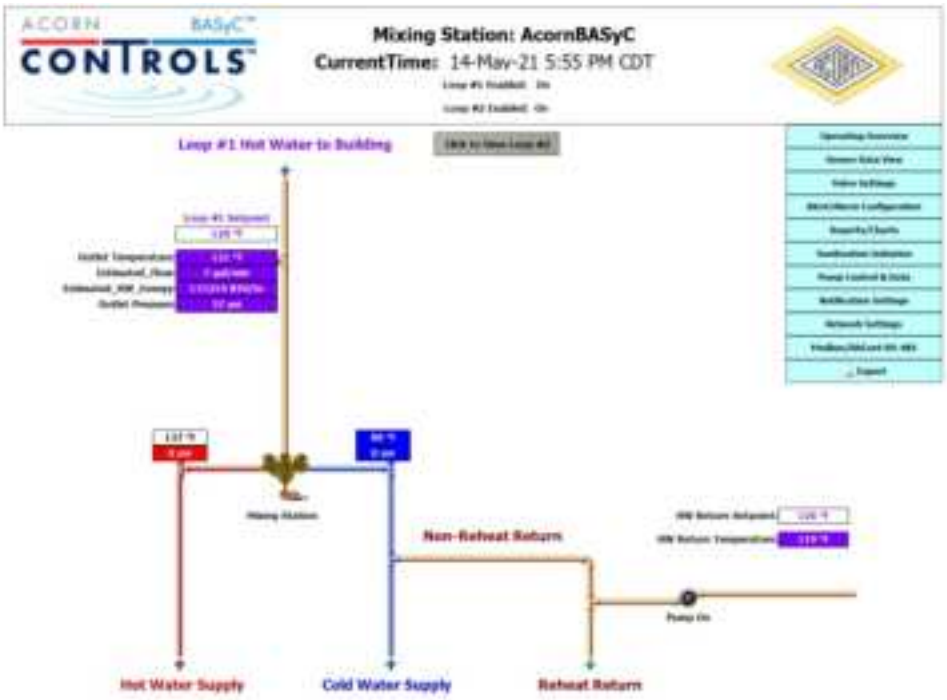
NOTE: The tablet is mounted in the cabinet and sits in a base unit (shown to the right). The Charging/Communication hub enables simultaneous charging/communication with BASyC®. The unit is meant to be plugged in so it is charged and ready to use all the time.

ADDING MGI CONTROLS BASyC® TO YOUR LOCAL AREA NETWORK

In order to utilize the email alarms & alerts, the BASyC® unit must be connected to an active LAN. Generally, you will need to work with the local IT staff to determine what the appropriate IP, subnet mask and default gateway addresses are. The easiest/most straightforward way to make these network settings is to use the optional handheld tablet. It can be also done with the web browser but is a little more complicated. The tablet comes pre-configured to work with BASyC® and ship factory preset with an IP address of 192.168.7.2. Using the Tablet Using the wire provided inside the box labeled 'to Tablet'. Plug the Micro USB into the tablet and Power it up. To access the tablet you must use a security PIN which is 0101. This takes you to the main screen where you will see the BASyC® icon/app which you click on shown below. The security PIN can be changed with the tablet by going to settings, security, screen lock.

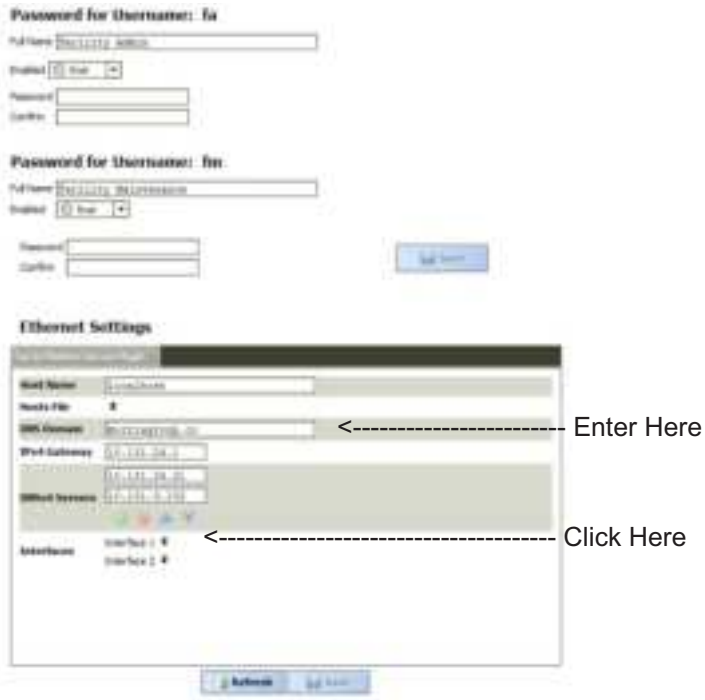
CONTROLS
BASyC®

The first time you log in to the system you will need to login with the appropriate username and password which are listed on page 22. For security reasons you will need to change the password(s). Write them down in the manual on page 22 and keep in a secure location. If you lose/forget the password you will need to contact your rep of the factory for access. After you login, you will see the main operation screen shown below. From here on, the software whether using the tablet or web browser will be the same. If learning to navigate with either please skip ahead to page 22.



<---Click Here

Click on the Network Settings button shown above and you will see both the primary and secondary Ethernet adapter configurations. To connect to the local area network, the facilities IT department will need to provide networking information for the DNS Domain, IPv4 Gateway & DNSv4 servers shown below. After this, click on the drop-down for Interface 1.



In the Interface drop-down you will need to fill in the appropriate IPv4 Address & the IPv4 Subnet Mask also provided by the IT department. Click Save to make the changes. The BASyC® controller will then shutdown and reboot to make the changes to the system. Now your BASyC® controller will be accessible via a web browsers connected to this same network.

NOTE: Do not use the Interface 2 or make any changes to these settings. This is used for support only and is not intended for permanent Ethernet communication.

USING WEB BROWSER to ACCESS BASYC®

The only difference between using the tablet vs. a web browser really boils down to the actual physical connection. The web browser (via computer or other device) can be accessed via either the primary or secondary ethernet port. It is advised to only use primary ethernet port for permanent connection. The secondary port is only for troubleshooting and/or temporary connection. We are going to describe connecting to the primary ethernet port but the secondary is the same other than the actual IP address used to connect.

- Plug the LAN cable into the primary network adapter. When you connect it will start blinking if the network is active. A solid green LED indicates that it is connecting and there is no network traffic. If it does not light up there is an issue with the network connection or wire. Troubleshoot the LAN connections accordingly.
- Open a command Prompt (Start, Run, cmd).
- Type in 'ping <IP Address>' and hit enter. For example: Ping 10.131.24.81 would try to establish a connection to the controller configured by the tablet above. The controller & computer IP addresses will need to be connected to the same network and the IT department provided appropriate information entered above to ensure this works.
- After you hit enter you will get a messages that indicates whether the controller and computer are communicating. If they are not, check all you settings above and if you still have issues, contact your IT department to verify settings.

Now that you have established communication, you will be able to access BASyC® via your web browser. The first time you set this up, BASyC® will put a Java app on your desktop. This requires your computer to have the latest Java JRE installed. Type the IP address of the controller in the browsers search bar, as in the examples above, type: 10.131.24.81 and hit enter. This will bring up the login screen shown below:

This will bring up the Java download file shown below. Click save and open/run from your download folder.

Doing this loads the software, creates a desktop icon and then reopens the browser login screen like before but without the Java Web Start options as shown below. Going forward you can just click on the icon to get to the login screen. The IP address is shown in the icon name in case there are more than one BASyC® systems on the local area network. These icons can be renamed to something more useful if desired.

Desktop icon

Login screen

Enter the Username and Password to log into the BASyC® system. If the unit is not pre-configured, it will be shipped with two username and password settings. One set will be for the facility manager and the other for the facility maintenance staff (has more limited access to settings).

Facility Admininstrator: Username = fa Password = Fa12345678

New Password = _____

Facility Maintenance: Username = fm Password = Fm12345678

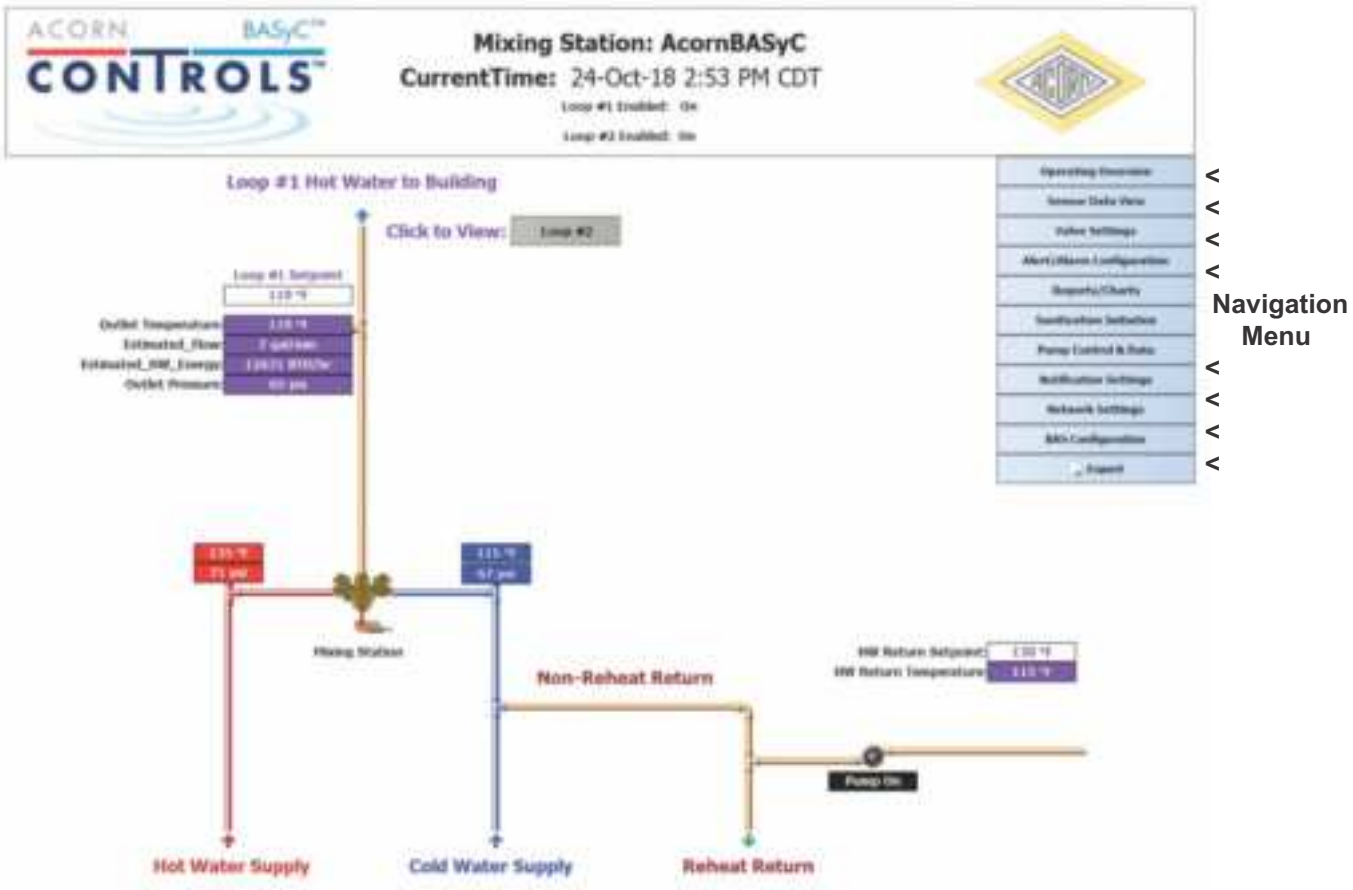
New Password = _____

WARNING

Use passwords that are not easily guessed to prevent unauthorized access to the system and keep the passwords safe. BASyC® requires 10 digits with at least on capital letter and one numeral.

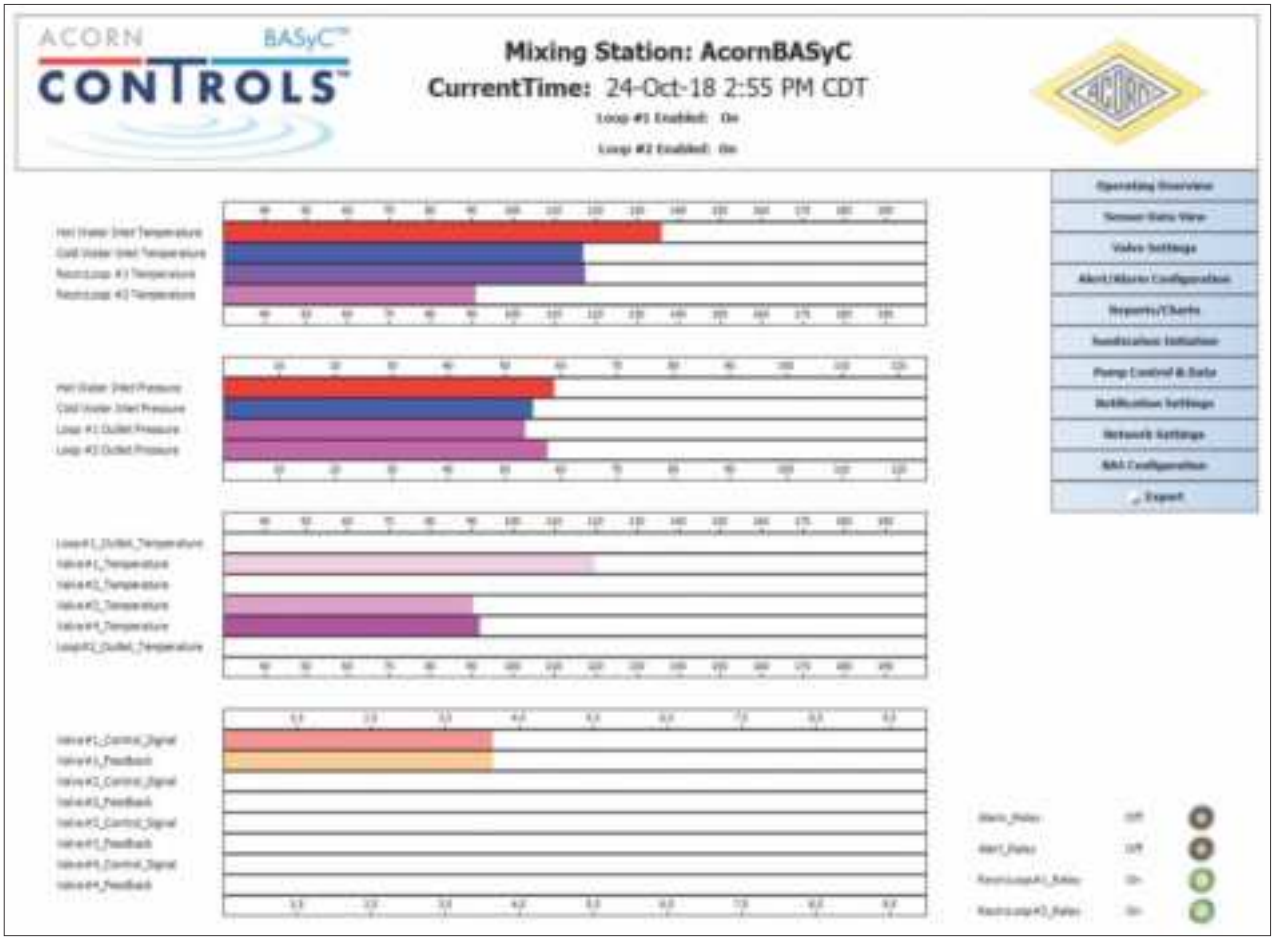
It is recommended that you log in with both usernames while setting up in order to reset these passwords. Both the username and password and case sensitive.

After resetting the passwords it will take you back to the login screen. Enter the username/password and hit login, assuming you are using the correct credentials the operating overview screen will open.



From this operating overview display, one can easily determine if the sensors are hooked up properly and are operational. Refer to Appendix A (Page 28) called BASyC® Users Setting Chart for a list of displayed values and the operational range of each.

The navigation menu is a point and click tool that will quickly and easily allow you to verify temperatures, settings, or alarm/alert conditions. Use the mouse to point and click on each of the eleven menu buttons. Another way to quickly see if sensors are functioning properly is to click on the sensor data view button in the navigation menu. This button will take you to the screen shown below. At each screen within the software you will see the navigation menu (except when generating history reports).



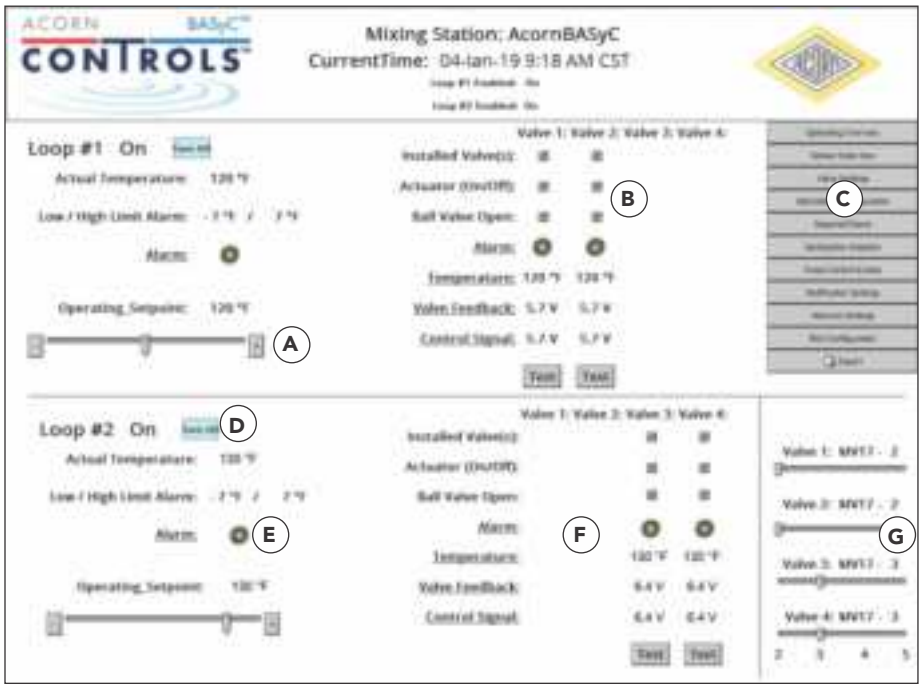
Between these first two screens you should be able to verify all the appropriate sensors are enabled and function-ing as expected. If you have two loops, you can toggle between the two loops in the operating overview screen by clicking on the button labeled click to view "Loop #2."

If any of the sensors are not functioning as expected: 1) check for proper connections at the connector and the input/output module and 2) verify there is no damage to the sensor or wiring. If the wiring and connections are not the problem, replace the sensor or contact **MGI CONTROLS**® for assistance.

VALVE SETTINGS

The "Valve Settings" screen is the place to assign the mixing valve or valves to a loop, or temperature zone. If your system is factory preset, then you would only access this screen if:

- You change or add-on to your system with additional mixing valves. • You need to reassign valves between 2 loops.
- You need to service/ troubleshoot your system.



If your system was not factory set, use the "Installed Valve" check boxes to assign your valve or valves to one or both loops you are putting into service. Please note than once a valve is assigned to a loop, it's removed from the list of valves available to be assigned to the other loop. Each BASyC® system can control, monitor and collect data for up to 4 valves. You can assign all 4 valves to one loop, 3 valves to one loop and 1 to the other loop or 2 valves to each loop.

Example of Two Temperature Loop – 120°F and 130°F (49°C and 54.4°C) showing valves 1 and 2 are assigned to Loop 1 and Valves 3 and 4 are assigned to Loop Two.

A: Setpoint Selection Slide

B: When Checked, Actuator is "on" and Ball Valves are "open"

C: Screen Navigation Menu

D: For Single Temperature Systems, click here to turn off Loop #2

E: Black Button indicates no alarm

F: Valves assigned to Loop #1 are automatically removed for Loop #2 assignment

G: Valve Size selection slides

CAUTION

To assign a valve to a temperature loop: slide the selector until the size (-2, -3, -4 or -5) reflects the valve installed at that position or positions. If no valve is assigned to a position, the position of the slide is irrelevant. Repeat for a second loop, if applicable.

Whenever you're servicing your actuator, uncheck the box next to the actuator to disable it electronically.

The valve remains under thermostatic control at the current set-point, or can be have its set-point manually readjusted, until your put the actuator back in service. When the manual override is used it is recommended to re-adapt the valve/actuator as the position is lost.

If you're servicing a mixing valve, uncheck the "installed valve" button next to that valve. If you want to reassign an installed back-up valve to the loop being controlled by the valve you just took out of service, install it using the check boxes. Please make sure that all sensors are properly connected so BASyC® is ready to access the sensors installed on you backup system. The coded connector leads make this changeover simple and easy.

CHANGING THE MIXING VALVE SET-POINT

From the "ALARM/ALERT SETTINGS SCREEN"

To change the set-point, use the "Loop #1 or Loop #2 Slide Bar at the Valve Settings Screen" or + or - buttons. Please note the set-point limit values also shown and adjustable from the Operating Overview Screen. If you do not stay within the allowable limits an alert (yellow graphic) will appear on screen and, if selected, email and/or text notification will be sent. Refer to appendix B for alert/alarm relay output connections.

RECIRCULATION PUMP CONTROL SETTINGS

If your BASyC® system is equipped with Recirculation Pump Control, a user adjustable temperature, used to cycle the pump on and off, has either been factory set or must be user set.

Go to the "Pump Control and Data" screen and the section titled "Recirc Pump Control Settings." Here you will set:

- The "pump off" set-point
- The pump relay dead band

The dead band represents the number of degrees the temperature must drop below the set-point before the pump is turned on again. Dead band prevents relay "chatter" and fast cycling of the pump, a condition that could result in a shorter pump life. Using the "+" and/or "-" button or slide bar, select the temperature BASyC® will use to turn off the relay that controls the recirculation pump. **MGI CONTROLS®** recommends a continuously operating recirculation pump for 1) optimal temperature control 2) Legionella control and 3) maximizing the life of the pump. The flow rate of the pump should meet or exceed the flow rate certified by IAPMO for the Acorn mixing valve or valves in use. Please consider setting any pump shut-off device installed (ex: AquaStat) to activate, i.e. stop the pump, prior to the return water reaching a temperature that indicates a high risk to the

IMPORTANT:

MGI CONTROLS® recommends at "pump off" set-point 5°F-10°F (-15°C to -12°C) below the Master Mixing Valve set-point. A minimum 3°F-5°F (-16°C to -15°C) dead band is recommended.

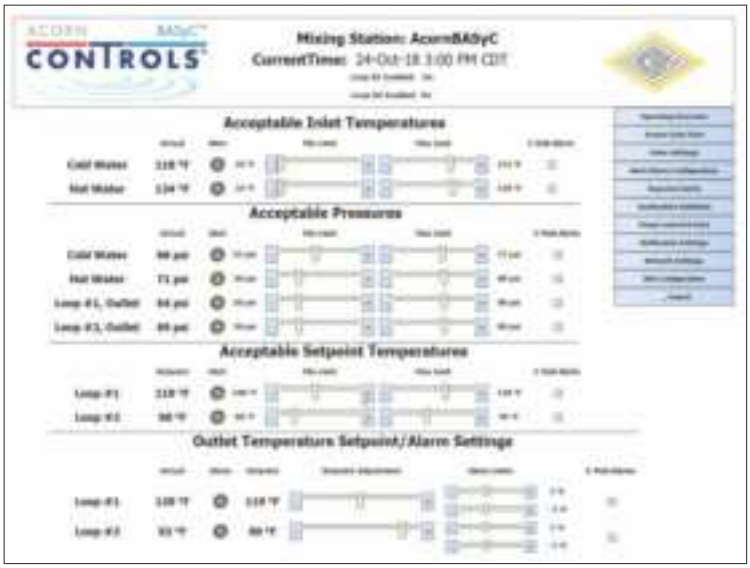
Example: If your Master Mixing Valve has a set-point of 130°F (54.4°C) a typically "pump off" set-point would be 123°F (50.6°C) with a 3°F (-16°C) dead band.

ALARMS, ALERTS and NOTIFICATIONS

Alert/Alarm Configuration Screen

The Alert/Alarm Configuration Screen is used to:

- Change the MV17 valve(s) set-point (see just above)
- Set minimum and maximum values to offer a range of acceptable settings.
- Both alarms and alerts can trigger relays and/or email/text notifications as a result of variations outside the user allowable limits.



Alert Example:

Assume we want an alert when the CW inlet temperature is less than 40°F (4.5°C) or above 110°F (37.8°C) (the latter being useful during periods of no actual user demand) and email notification of the alert.

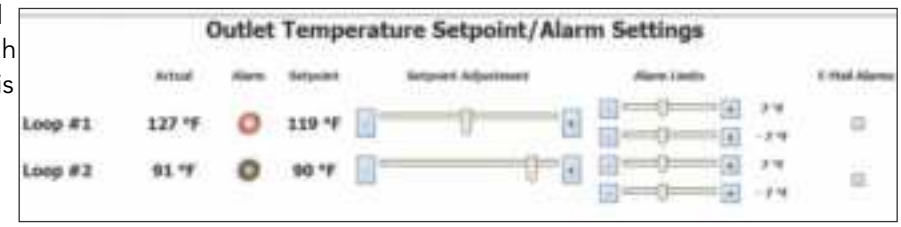
You would do the following:

- Go to the Alert/alarm Configuration screen.
- Click and hold the minimum CW slide bar, or "-" indicator until it's set to a temperature of 40°F (4.5°C). From the default of 35°F (1.7°C) you would drag the indicator right and let go of the mouse button at 40°F (4.5°C).
- Set the maximum acceptable CW Temperature using its slide bar or "+" button and setting it to a value of 110°F (43.3°C).

NOTE: Setting the maximum value below the minimum will trigger an alert and the indicator will change color from green (in range) to yellow (out of range). To enable an email alert, you check the email checkbox but you must configure the email account as explained in the "Notification Settings" section below. You can follow the same procedure for the HW inlet temperature or the inlet/outlet pressures.

Alarm Example:

To set an alarm for unacceptable variations in outlet temperature and trigger a relay output with email notification, do the following: **Go to the "Alert/Alarm Configuration Screen" screen.**



Below the slider for the set-point and two sliders that allow you to set a high and low deviation alarm. The range is 1°F to 15°F (-17.8°C to -9.4°C) and if set very low you will increase the potential for nuisance alarms that present no risk or discomfort to the bather, assuming that's the goal for using these alarms. Either alarm will activate a relay that can be used to activate a user supplied horn, warning light, solenoid or other device either directly (up to .5 amp) or through a user supplied power controller. The status of the alarm and the relay will be indicated by the adjacent button turning from gray (status when no alarm) to red.

DATE REPORTS/CHARTING YOUR DATA

Every BASyC® system features a very powerful report generating capability available at the "Data Reports and Chart" screen. Creating customized and detailed charts is easy. To generate a report, click on the '+' in the upper left hand corner of the display. Next expand the History & **MGI CONTROLS®** BASyC® drop downs. Click to select data points to include i n the graph (holding the controls key down while doing this allows for multiple data points to be graphed).

Click Here---->

Click Here----> <----------Click Here

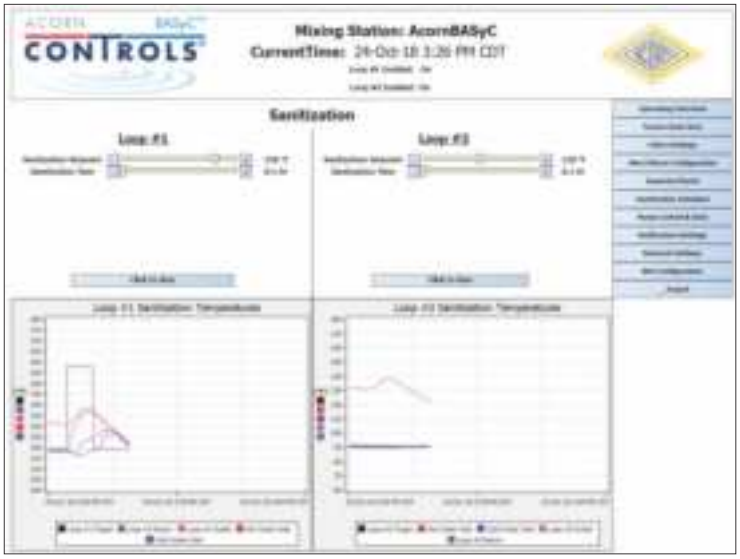
NOTE: Only those data points listed under Histories will show up in the graph. If you select any of the others under config, Home or Files you will not get any data.

After you've run your report you can export the data in many forms. You can change the scales, time range, data selections and many other things. The report generating feature are very customizable all of which cannot be listed here. We recommend you try the many options to figure out how these reports will work best for you and your facilities.

SANITIZATION

IMPORTANT: Activating sanitization will automatically generate a message Alert to the primary email address entered at the "Notification Settings" screen. If you have not already done so, please see the next topic for more information earlier in this document.

To begin, go to "Sanitization Initiation" Screen. Use the slide bars, or +/- buttons to select the desired temperature and time for sanitization. Then click then "activate sanitization" button. This will cause a critical warning to appear. If you're sure you're ready to raise the temperature of your LTHW to the sanitization temperature and time selected, acknowledge the warning and activate sanitization. If for any reason you aren't sure that all the fixtures served are not fully protected to insure the bather's safety during sanitization, select "cancel" and restart sanitization after the proper safety precautions have been taken.



WARNING

NOTIFICATION SETTINGS

Go to the "Notification Settings" screen. Please complete the information required to allow email alert and text alerts to be automatically be generated by BASyC® as necessary based on Alarm and Alert user selections elsewhere in BASyC®.

NOTE: Contact your IT Department for the information required and to ensure compatibility between **CONTROLS®** BASyC® and your mail server.

IMPORTANT: We strongly recommend you enter at least one email address. This will result in an automatic notification by email any time Sanitization is started. Email addresses are also required for alerts selected for other conditions, as defined by the user.

AFTER POWER FAILURE

During a power failure, the MV17 mixing valve will continue to thermostatically control, in accordance with ASSE 1017, to the set-point it was set to prior to the power loss. Upon return of power and once your BASyC® software has re-booted, all your functionality will return. The Actuator can be manually operated during a power failure using the hex key provided by Acorn with every BASyC® system.

AFTER TEMPERATURE SENSOR LOSS

During a loss of the outlet temperature sensor, the MV17 mixing valve will continue to thermostatically control, in accordance with ASSE 1017, to the set-point it was set to prior to the power loss. You will be unable to change the set-point until the outlet temperature sensor has been replaced. Upon replacement of the outlet sensor, all functionality will return.

OPERATING ACTUATOR MANUALLY

To operate the Acorn BASyC® electronic actuator manually:

CAUTION

1) Make sure there is flow through the valve by opening fixtures or using the drain valve, if provided, on your mixing valve assembly.
2) Insert 4 mm hex key provided by Acorn and hold button on actuator as shown:
3) DO NOT RELEASE THE BUTTON UNTIL YOU ARE FINISHED MANUALLY ADJUSTING THE SET-POINT.
4) Rotate the hex key clockwise to lower the set-point on the mixing valve, counter-clockwise to increase it. Use the mechanical temperature gauge supplied with all BASyC® systems to verify you have adjusted to the proper temperature.
5) Make small adjustments and give the mixing valve time to respond.
6) Release the button and remove the hex key when you have reached the desired set-point.
7) If a manual adjustment is made when there is no control signal to the actuator, due to lack of power or an outlet sensor signal, the control signal will determine the set-point when it returns.

APPENDIX A: USER SETTINGS CHART

VALVE SETTINGS SCREEN				
Parameter	**Range**	**Default Valve**	**Configured Value(1)**	**Notes**
Outlet Temp. Setpoint	60 to 180°F	120		Can also be changed at Alert/Alarm Screen
Installed Valves Assignment	Loop #1 or Loop #2	Per Order		Unless valves are added or deleted from the system, DO NOT change
Actuator On/Off	On (checked) or Off	Per Order		For Deactivating Actuator, turn "off" (typ. For replacement)
BV (Ball Valve) open	Open (checked) Or Closed	Checked	Checked	This confirms status of outlet ball valve. If you close it, e.g. to isolate fixtures or if valve is NOT in service, uncheck this box.
Valve(s) Selection Sliders		If supplied as a BASyC™, the software is preconfigured for valve model selection. If Upgrading, please make sure the sliders are selecting the correct model valves.		
ALERT/ALARM CONFIGURATION SCREEN				
CW Low Limit	35 to 200°F	35ºF		If the CW temp. goes below this value, an alert will result.(2)
CW High Limit	35 to 200°F	130°F		If the CW temp. goes above this value, an alert will result.(2)
HW Low Limit	35 to 200°F	110°F		If the HW temp. goes below this value, an alert will result.(2)
HW High Limit	35 to 200°F	180°F		If the HW temp. goes above this value, an alert will result.(2)
CW PSI Low Limit	0 to 125 PSI	0 PSI		If the CW press. goes below this value, an alert will result.(2)
CW PSI High Limit	0 to 125 PSI	80 PSI		If the CW press. goes above this value, an alert will result.(2)
HW PSI Low Limit	0 to 125 PSI	0 PSI		If the HW press. goes below this value, an alert will result.(2)
HW PSI High Limit	0 to 125 PSI	80 PSI		If the HW press. goes above this value, an alert will result.(2)
Outlet PSI Low Limit	0 to 125 psi	0 PSi		If the mixing station outlet press. goes below this value, an alert will result.(2)
Outlet PSI High Limit	0 to 125°F	80 PSI		If the mixing station outlet press. goes above this value, an alert will result.(2)
Outlet Temp. Setpoint Max. Limit	35 to 180°F	130°F		If setpoint is set above this value, an alert will result.

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USER SETTINGS CHART CONTINUED

ALERT/ALARM CONFIGURATION SCREEN				
Outlet Temp. Setpoint Min. Limit	35 to 180° F	110° F		If setpoint is set below this value, an alert will result.
Outlet Temp. Setpoint	60 to 180° F	120° F	N/A	Configure at Valve Settings Menu, above
Outlet Temp. Low Limit	-15 to -1° F	-7° F		If the outlet temp drops below the setpoint by this value, an alarm will result.(2)(3)
Outlet Temp. Low Limit	1 to 15° F	7° F		If the outlet temp goes above the setpoint by this value, an alarm will result.(2)(3)
SANITIZATION SCREEN				
Sanitization Setpoint	60 to 180° F	120° F		Setpoint changes after safe start confimation
Sanitization Time	.1 to 24 hours	.1 hours		At the end of the Sanitization Time, outlet temp. setpoint will return to previous setting
PUMP CONTROL AND DATA SCREEN				
Acceptable recirc. Loop Setting Min.	60 to 180o F	90° F		If the return temp. goes below this value an alert will result (2)
Acceptable recirc. Loop Setting Max.	60 to 180o F	130° F		If the return temp. goes above this value an alert will result (2)
Recirc Loop Setpoint	70 to 160o F	120° F		If the recirc loop is at or above this temp., the pump control relay will deactivate (4)
Deadband	1 to 15o F	3° F		After a pump relay deactivation, the return temp. must drop by this value before the relay reacti-vates.
Temperature Feedback	Return Sensor (checked) or unchecked	Return Sensor		Users that order a Final Fixture sensor will use that sensor for the pump control relay (5)
Customization for Automatically Alternating Recirculation Pumps (CONTACT ACORN FOR AVAILABILITY AND ADDITIONAL INFORMATION)				
Pump Make and Model:				
Pump Alternating Cycle	7, 30, 60 or 90 days	7 days		Pump control signal will alternative between control relays
Initiate Pump Alternation	Off or On	Off	N/A	If initiated, cycle for next alternation will restart

(1) If factory configured, the factory-set values will be entered here. If the user is configuring the system on startup, please enter the selected valves in this column.

(2) To simultaneously activate an email or text alert notification, check the appropriate box. **IMPORTANT NOTE**: To be able to send email notifications, BASYC® must be connected to a mail server, typically via the Ethernet LAN adapters included with every BASyC® system.

(3) An alarm for this parameter will result in a relay output. A common relay output is provided for alarms, another common relay output for alerts. If other configurations are required, please contact Acorn for a quotation.

(4) This capability eliminates any requirements for an AquaStat. On systems that are intended to operating with a constantly recirculating pump, it is recommended that this be used as a pump shut off in the event of an emergency, high temperature, condition.

(5) A Return Sensor is most common for the Pump Relay function. But if so equipped, a Final Fixture sensor is a more efficient option for pump relay control, plus it confirms that all fixtures on the system are at a desired LTHW temperature, a very critical point of data for bather safety and satisfaction.

APPENDIX B: CONNECTION DETAIL

			TERMINATION & WIRE COLOR					
INPUT DESCRIPTION	**SIGNAL TYPE**	**FUNCTION TYPE**	**BLACK**	**RED**	**WHITE**	**GREEN**	**BLUE JUMPER CONNECTIONS**	
SYSTEM DC PWR (RED WIRE)	24VDC	DC PWR SUPPLY	BUTT SPLICED TO TERMINALS T3:1 & D1					
RED WIRE JUMPER [PWR]				T2:1 & 1C2				
SYSTEM DC PWR (BLK WIRE)	24VDC	DC PWR SUPPLY	BUTT SPLICED TO TERMINALS T1:1 & T4:1					
TABLET PWR	5VDC	DC PWR	T4.8	T3.8				
ACTUATOR								
ACTUATOR 2	0-10 VDC	DC VOLTAGE	T1.6	T2.6	A02	D9	U14	9C10
ACTUATOR 4	0-10 VDC	DC VOLTAGE	T1.5	T2.5	A04	D10	U14	9C10
ACTUATOR 1	0-10 VDC	DC VOLTAGE	T1.8	T2.8	A01	D7	U13	7C8
ACTUATOR 3	0-10 VDC	DC VOLTAGE	T1.7	T2.7	A03	D8	U13	7C8
TEMPERATURE and PRESSURE SENSORS								
OUTLET PSI - LOOP 2	0-10 VDC	150 psi TRANSDUCER	T4.7	T3.7	U16	GRND		
RETURN TEMP. LOOP 2	0-5 VDC	THERMISTOR	0V	U15				
OUTLET PSI - LOOP 1	0-10 VDC	150 psi TRANSDUCER	T4.2	T3.2	U12	GRND		
CW INLET PRESSURE	0-10 VDC	150 psi TRANSDUCER	T4.3	T3.3	U11	GRND		
HW INLET PRESSURE	0-10 VDC	150 psi TRANSDUCER	T4.4	T3.4	U10	GRND		
RETURN TEMP. LOOP 1	0-5 VDC	THERMISTOR	0V	U9				
CW INLET TEMPERATURE	0-5 VDC	THERMISTOR	0V	U8				
HW INLET TEMPERATURE	0-5 VDC	THERMISTOR	0V	U7				
OUTLET TEMP. LOOP 2	0-5 VDC	THERMISTOR	0V	U6				
VALVE 4 TEMPERATURE	0-5 VDC	THERMISTOR	0V	U5				
VALVE 3 TEMPERATURE	0-5 VDC	THERMISTOR	0V	U4				
VALVE 2 TEMPERATURE	0-5 VDC	THERMISTOR	0V	U3				
VALVE 1 TEMPERATURE	0-5 VDC	THERMISTOR	0V	U2				
OUTLET TEMP. LOOP 1	0-5 VDC	THERMISTOR	0V	U1				
JUMPER 1	0V, BETWEEN U9 & U10 to T4.5							
JUMPER 2	0V, BETWEEN U11 & U12 to T4.6							
PUMP CONTROL								
LOOP 1 PUMP	24VDC	I/O RELAY	T1.2	D6	RED JUMPER: 5C6 TO T2.2			
LOOP 2 PUMP	24VDC	I/O RELAY	T1.3	D5	RED JUMPER: 5C6 TO T2.3			
ALERT/ALARM								
COMMON ALERT RELAY	< .5 AMPS @24V, AC or DC	I/O RELAY	3C4	D4				
COMMON ALARM RELAY	< .5 AMPS @24V, AC or DC	I/O RELAY	3C4	D3				

Highlighted Values Represent Connector Labels

NOTES: 1) 0V CONNECTIONS ARE MADE ADJACENT TO THE U# CONNECTION **2)** JUMPERS ARE DEVICE SPECIFIC

NOTES

MGI CONTROLS

NOTES

INNOVATIVE SPIRIT AND ENGINEERING FOUNDATION

"What sets us apart from competitors is our engineering and spirit. We have a 'can-do' spirit. If you ask us to do something, we will do it or figure out how to do it. That's the part our customers like, that's the part we like."

- Don Morris, President and CEO

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