waterflo

Intelligent Mold Water Flow Monitoring System

WaterFlo OPERATING MANUAL

International Temperature Control, Inc.

P.O. Box 805, 2415 E. Huron Rd., Au Gres, MI 48703

Tel: (989) 876-8075 Fax: (989) 876-6640

E-mail: sales@itc-controls.com Web: www.itc-controls.com

This manual is designed to maximize the benefits and features of the ***Waterflo*** Mold Water Cooling Monitoring System

WARNING

Risk of Metallic Corrosion

Galvanic corrosion will occur when different metals are used in the same water installation. This will potentially shorten the life of the product.

Be aware that insufficient grounding machine parts in contact with the water system can increase the corrosion of metal parts.

Corrosion will occur very rapidly if the liquid in the system has a PH value higher than 8 or lower than 5. This will potentially shorten the life of the product.

It is well established that high temperatures (in excess of 190° F (90° C) will increase the corrosion rate of Aluminum there-by decreasing the life of the product.

Corrosion will in time cause leakage. Frequent inspection and maintenance of the Smart Manifold will help prevent this.

Frequently check the quality of the cooling fluid for proper PH, particle contaminates and dissolved compounds.

GENERAL SAFETY

Safety and Maintenance procedures of this unit remain the sole responsibility of the operating company and their employees. Failure to comply with proper safety procedures can result in serious injury or death.

General Safety:

- ◊ Injection Molding Machines & associated equipment include electrical elements, molten plastic at elevated pressure and high temperatures and cooling system liquids. To protect the operator in the work place, ensure that all safety devices are in stalled, and that safety procedures are in place and followed.
- ◊ Be aware of all warning labels attached to the mold and machine & auxiliary equipment.
- ◊ Refer to the machine & auxiliary user manuals for safety procedures not included here in this manual.

System Start-up:

- ◊ Only licensed electricians should install and maintain the system.
- ◊ Only persons with a through knowledge of the equipment should operate the system.
- ◊ Read all instructions prior to connection power to he system and turning it on.
- ◊ Use only the specified input supply voltage indicated on the identification label
- ◊ Improper voltage or grounding can result in electrical shock. Use only with proper voltage and a proper earth ground.
- ◊ Ensure all guards and safety devices are in place and operational prior to starting equipment.

System Operation:

- ◊ Ensure that extreme caution is practiced in the operation and maintenance of this system, the injection molding machine, and all other equipment in the area.
- ◊ There must be a proper ground present at all times between the mold, the temperature control system and machine or serious injury/death and damage may result.
- ◊ Do not operate the equipment with unconfined long hair, loose clothing or jewelry, including, neckties, etc. These may get caught by the moving mechanism and can cause death or serious injury.
- ◊ Never disable or bypass a safety device.
- ◊ Do not operate equipment with covers or panels removed or open.
- ◊ It is highly recommended that all operators wear face shields, use heat resistant gloves when working around injection molding equipment.
- ◊ Check frequently for possible oil /water leaks. Water and or hydraulic fluid on the mold may be in close proximity to electrical connections and equipment. Water leakage may cause an electrical short circuit. Hydraulic fluid leakage may cause a fire hazard. Always keep water and /or hydraulic hoses and fittings in good condition to avoid leaks.

System Operation:

- ◊ Unplug and lockout the controller before performing any maintenance work.
- ◊ Electric power must be shut off prior to installing or removing any cables.
- ◊ All maintenance should only be performed by properly trained personnel, and based on local law and regulations.
- ◊ Use only original fuses with the prescribed amperage
- ◊ Electrical equipment may not be grounded when they are moved from their normal operating state. Ensure proper grounding of all electrical items before performing any type of maintenance to avoid potential risk of electrical shock.

Operating the Mold

- ◊ Never operate any injection molding equipment with guards or safety devices removed.
- ◊ Check the condition of all coolant & hydraulic hoses as well as electrical cables for wear or damage.
- ◊ Ensure that they will not interfere with moving parts.
- ◊ The hoses must be of sufficient length so that they will not be under any strain or become pinched when the mold opens or closes.

ATTENTION! RISK OF ELECTRIC SHOCK.

This equipment is not to be used with any of the access doors or covers open or removed.

Always user Lock-Out procedures prior to working on system.

Introduction:

Thank you for purchasing the **ITC *Waterflo*** - Mold Water Flow & Temperature Monitoring System with ITC *Smart Manifold*. We are sure that this equipment will give you many years of high performance monitoring your mold's water cooling system. However, in order to get the maximum performance out of the ***Waterflo*** system we recommend that you read this manual to familiarise yourself with its many advanced features.

Table Of Contents:

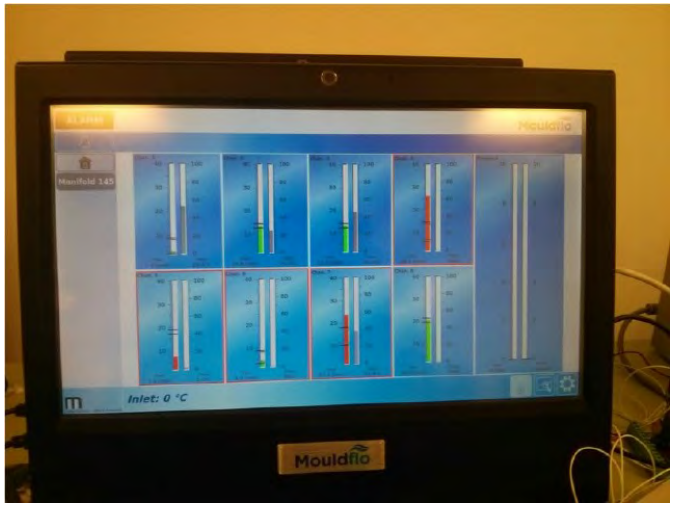
Waterflo Computer

An all-in-one solution with built in touchscreen.

Comes with the following:

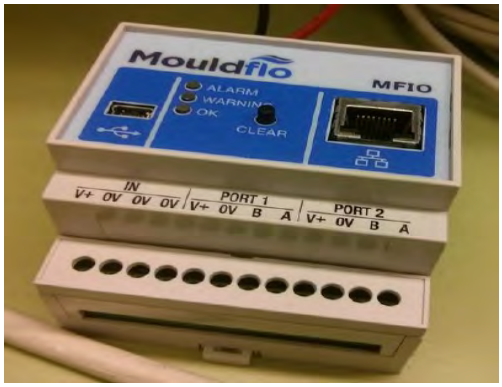
- Power Cable
- Touch-Pen (found behind the screen on the top left)

The WaterFlo Computer is designed to be run without a keyboard, and with the WaterFlo Software pre-installed. It is supposed to be connected with the Interface Unit through a USB cable.



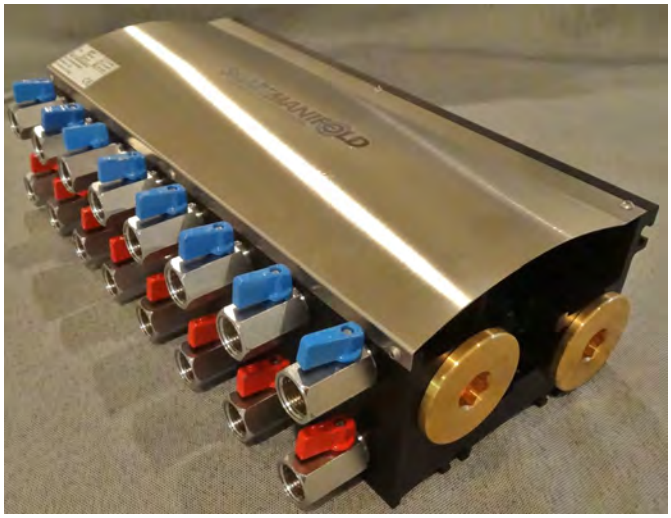
Waterflo Interface Unit

The Interface Unit is designed to monitor up to four (4) Smart Manifolds.
The *Waterflo* Interface Unit is to be connected to the *Waterflo* Computer through a USB Cable.
Please note that the USB cable does not supply power to the Interface Unit. An external power supply is required
Finally, the connection to the *Waterflo* Computer can be checked easily when the *Waterflo* Software starts, as the yellow LED on the module within the Interface Box will blink.



ITC Smart Manifold

The Manifolds are connected to the Interface Unit. Up to (4) four manifolds can be daisy chained to an Interface Unit.



Log Screen

The Log Screen is designed to present the user with all relevant logs in the ***Waterflo*** system. These include Alarms, Warnings, Changes to settings. This is a complete record of any changes that the user should know of. It is identified by the highlighted "Log Icon" on the bottom right of the screen.

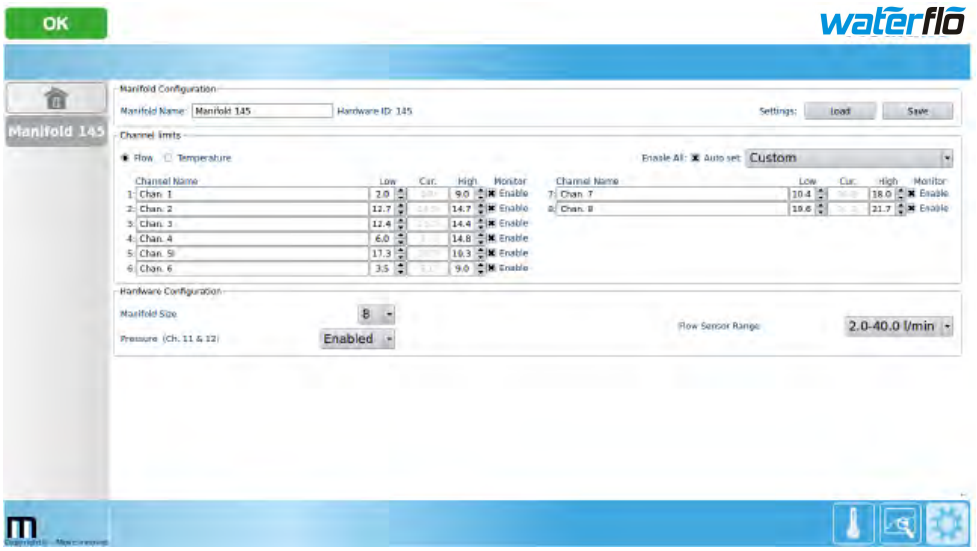
Options here include:

- Auto scroll (should be set to off if you want to scroll in the log)
- Show Debug (additional messages, mostly to identify possible bugs in the software, should be left off)
- Clear Log (clears the log)

Manifold Settings Screen

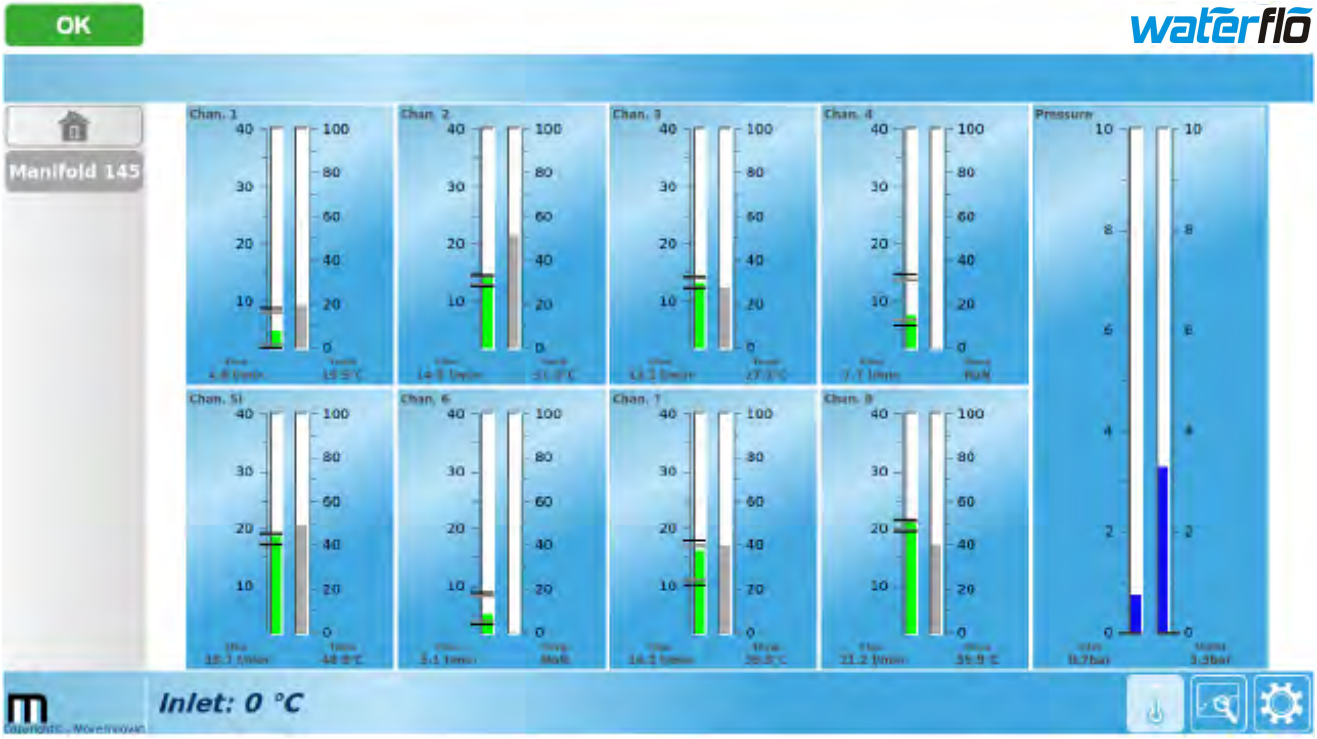
The Manifold Screen is used for controlling each Manifold. It is accessed by clicking on the relevant Manifold's name in the panel on the left side of the screen, followed by clicking on the icon highlighted in the bottom right.
As can be seen, there are plenty of options to customize the manifold:

- Manifold Name the name as it appears in the left panel)
- Load/Save settings (load or save settings to/from another file)
- Flow/Temperature (choose whether to edit flow or temperature)
- Channel Name (name for each channel)
- Channel Low (the lowest accepted value before error [the last 5% of the interval is a warning])
- Channel Cur (current value of the channel)
- Channel High (the highest accepted value before error [the last 5% of the interval is a warning])
- Channel Monitor (choose whether or not you want this channel to be monitored)
- Manifold Size (number of channels)
- Pressure (use channel 11 & 12 as a pressure pump)
- Flow Sensor Range (set the range of the flow sensor)



Plot Screen

The plot screen is used to easily monitor the current operating condition of all Smart Manifold cooling channels. It is



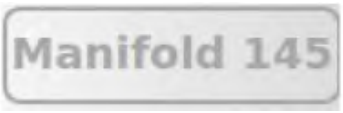
accessed by clicking on the relevant Manifold's name in the panel on the left side of the screen, followed by clicking on the "Icon" highlighted in the bottom right.

Here we see a Manifold with (8) cooling channels (that was the number of channels enabled in the setting screen), and an (Optional Pressure Sensor). As can be seen, the color coding is the same as is used in most of the program (red, green, yellow, gray).

This is the most informative screen about the current status of the Manifold. As can be seen, the error and warning limits appear on the screen. Warning limits are shown in "Gray" the error limits in "Black".

Buttons

Below is a table shows all relevant buttons found in the ***Waterflo*** Software, as well as their meaning.

	At least one cooling channel is in the Alarm State. Please check all channels.
	At least one cooling channel is in the Warning State. Please check all channels.
	All operations are within set parameters.
	Access Manifold Screen - Check for manifold with the name “Manifold 145”.
	Access “Home” Screen
	Dismiss Alarm Warning
	Access ***Waterflo*** Software Settings
	Access Manifold Settings for current manifold
	Exit the ***Waterflo*** Software. (This will trigger a restart, but is useful for up grading)
	Access the ***Waterflo*** Manual
	Access the Log.

	Access the Trend Graphs for the Current selected Manifold.
	Access the Plots of the current status for the selected Manifold.

Main Screen

The main screen is the first screen you'll see when starting you ***Waterflo*** Computer.

The idea behind the main screen is to provide a quick overview of all connected manifolds. Should there be more than just one, they'll appear as a list.

In this screen you see the status of each cooling channel on the manifold. The status is color-coded:

Green - OK

Yellow - Warning (should be checked)

Red - Error (must be checked)

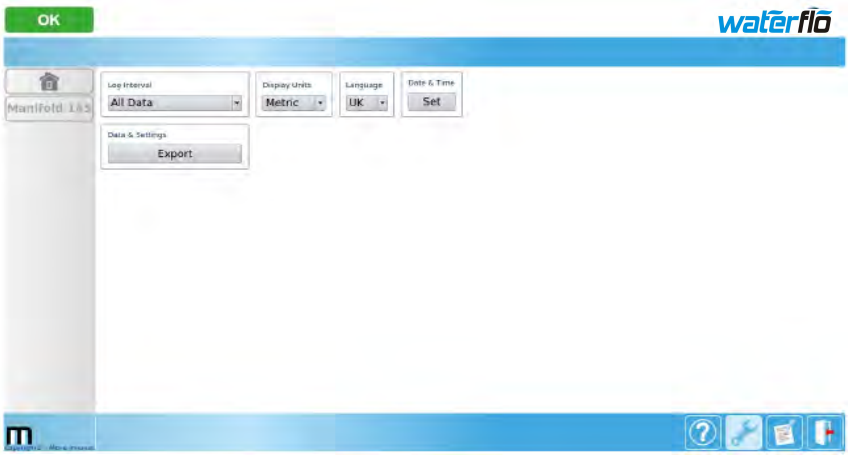
Gray - Ignored (this is set by the user

Setting Screen

The Setting Screen is where all general settings are changed for the ***Waterflo*** software. It is accessed by pressing the "Setting Icon", which can be highlighted at the bottom right corner.

It is here you set the following options:

- Log Interval (I.E., how often files are written to disc)
- Display units (Inch, Metric) (when changing it requires a restart)
- Language (when changing it requires a restart)
- Date & Time



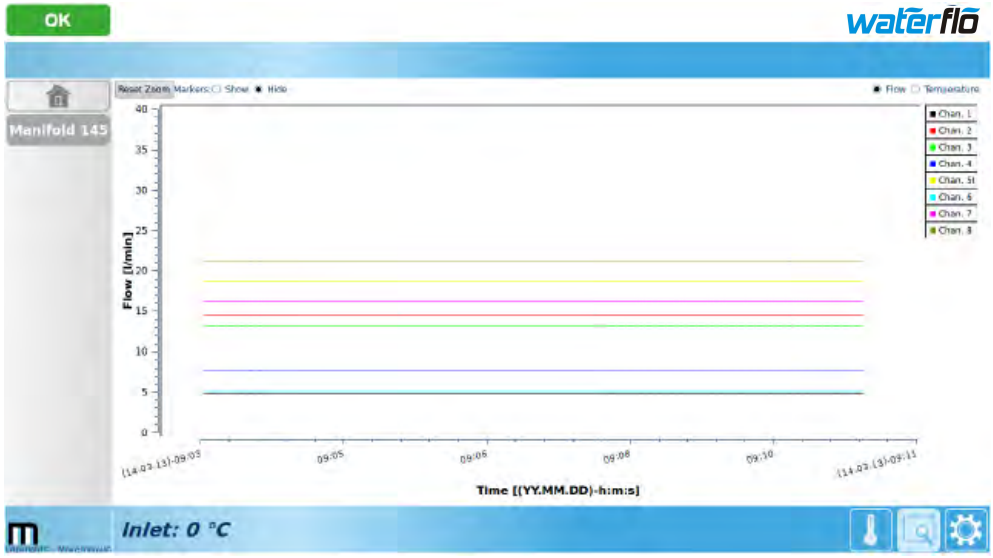
Furthermore, you have the option of exporting data. This is done to a series CSV file in the directory you choose (a popup dialog will appear)

After you've chosen a folder in this popup, a progress bar will indicate progress. After successful completion, a question will appear asking if you want to delete files. There are (3) Three option:

- NO: All files will remain on the ***Waterflo*** computer
- YES: All CSV data files will be deleted from the on board storage
- YES TO ALL: All local storage files will be deleted (settings for current manifold will remain)

Trend Graph Screen

The Trend Graph Screen is designed to show the status of cooling channels of a given Manifold over time. As such, it is useful for detecting trends not easily detected otherwise. It is accessed by clicking on the relevant Manifold name in the panel on the left side of the screen, followed by clicking on the "Icon" which is highlighted on the right bottom of the screen.



Shown is an example of a Manifold with (8) cooling channels, in a very static environment, and over a short period of time.

There are a few option available to use:

- Zoom (it is possible to zoom in on the screen by clicking and dragging on it.
- Reset Zoom (resets zoom if any is used)
- Show/Hide Markers (show or hide markers. These are markers that are used to point out important events in time (errors mostly).
- Flow/Temperature (choose whether to display Flow Rate or Temperature)
- Chn. 1-8 On/Off (the labels on the right are clickable and are used to toggle channels on/off on the plot

Furthermore, the time seen on the bottom will automatically adjust as time goes on.

Dialogs

The ***Waterflo*** system currently contains four (4) Dialogs. All are designed to be integrated into the ***Waterflo*** software. Clicking on anything else than a Dialog, will cause the dialog to disappear.

There are four (4) dialogs in the current system:

- Save Manifold
- Load Manifold
- Set Data
- Save Data

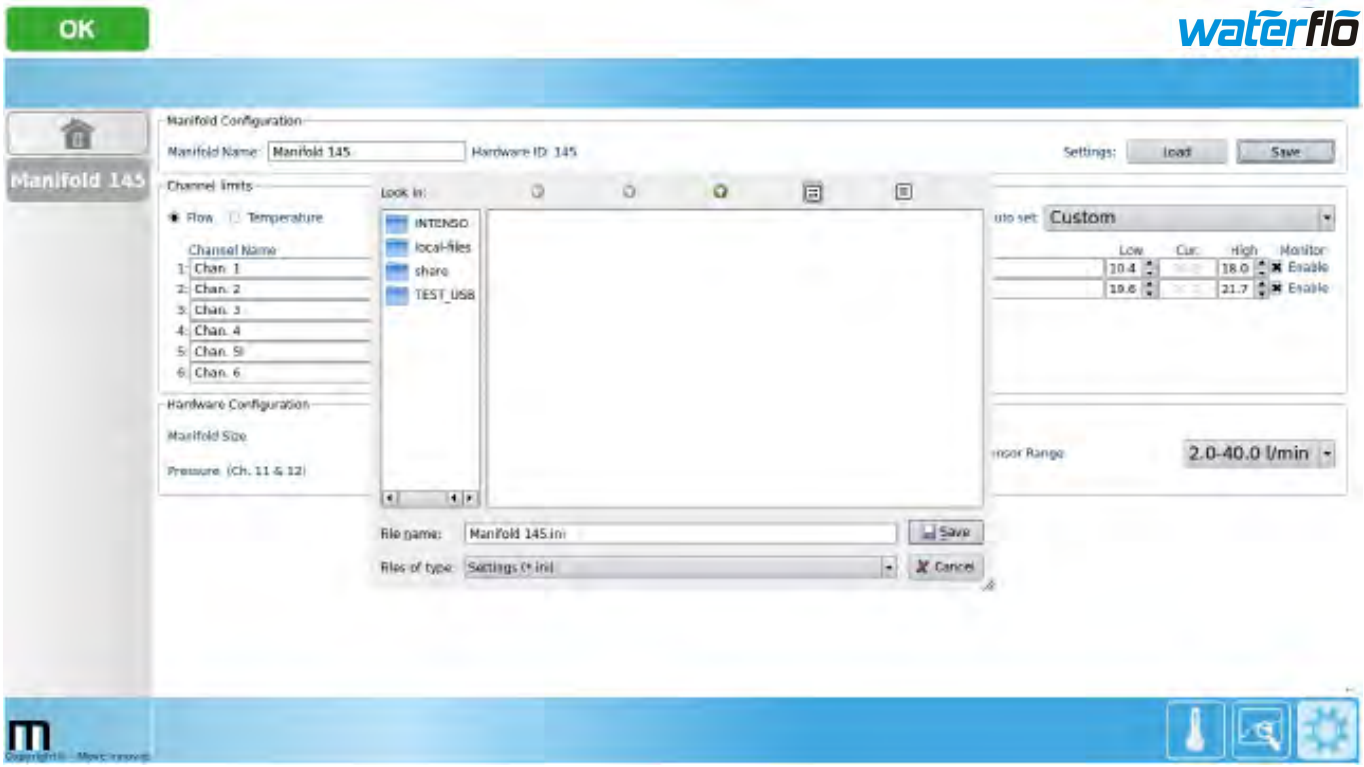
File dialogs have been modified to be touch friendly, as such, clicking on a directory in a file dialog, will enter it.

Furthermore, in the left panes of a file dialog, all USB pendrives will appear by name, as well as "local files", which are used for local storage on the ***Waterflo*** system.

Information on each is found on the following pages,

Save Manifold Dialog

This Dialog id accessible through the Manifold Setting Screen, by clicking on “Save”, in the top right hand corner. Doing this will result in the dialog box appearing as in the screen shot.



In the dialog, all attached USB pendrives will be shown with their name in the panel on the left part of the dialog screen. Furthermore, it is guaranteed that there'll always be a folder named “Local Files”, here. The “Local Files”, folder represents local storage within the ***Waterflo*** system.

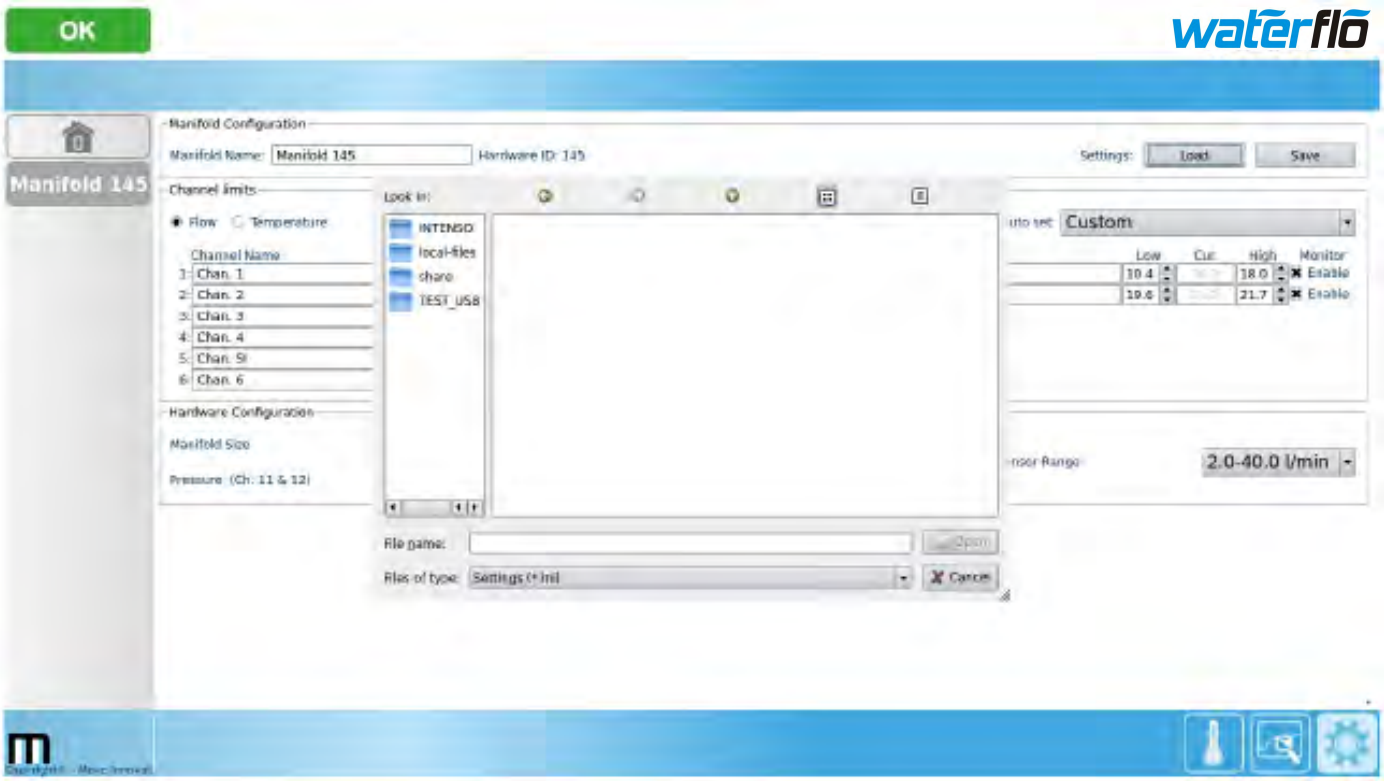
All Manifold files are in .ini format. This is easily readable, and can be opened in a text editor (notepad on Windows), but we recommend to leave this to the ***Waterflo*** system.

Pressing “Save”, will save the file in the current selected directory.

In the current version of the software it is not possible to create new directories through the dialogs. This will be implemented at a later date.

Load Manifold Dialog

This dialog is accessible through the “Manifold Settings Screen”, by clicking “Load”, on the top right hand corner. Doing this will result in the dialog appearing as shown in the screenshot.



In the dialog, all attached USB pendrives will be shown with their name in the panel on the left part of the dialog screen. Furthermore, it is guaranteed that there'll always be a folder named “Local Files”, here. The “Local Files”, folder represents local storage within the ***Waterflo*** system.

All Manifold files are in .ini format. This is easily readable, and can be opened in a text editor (notepad on Windows), but we recommend to leave this to the ***Waterflo*** system.

Pressing “LOAD”, will load the file in the current selected directory.

In the current version of the software it is not possible to create new directories through the dialogs. This will be implemented at a later date.

Date Dialog

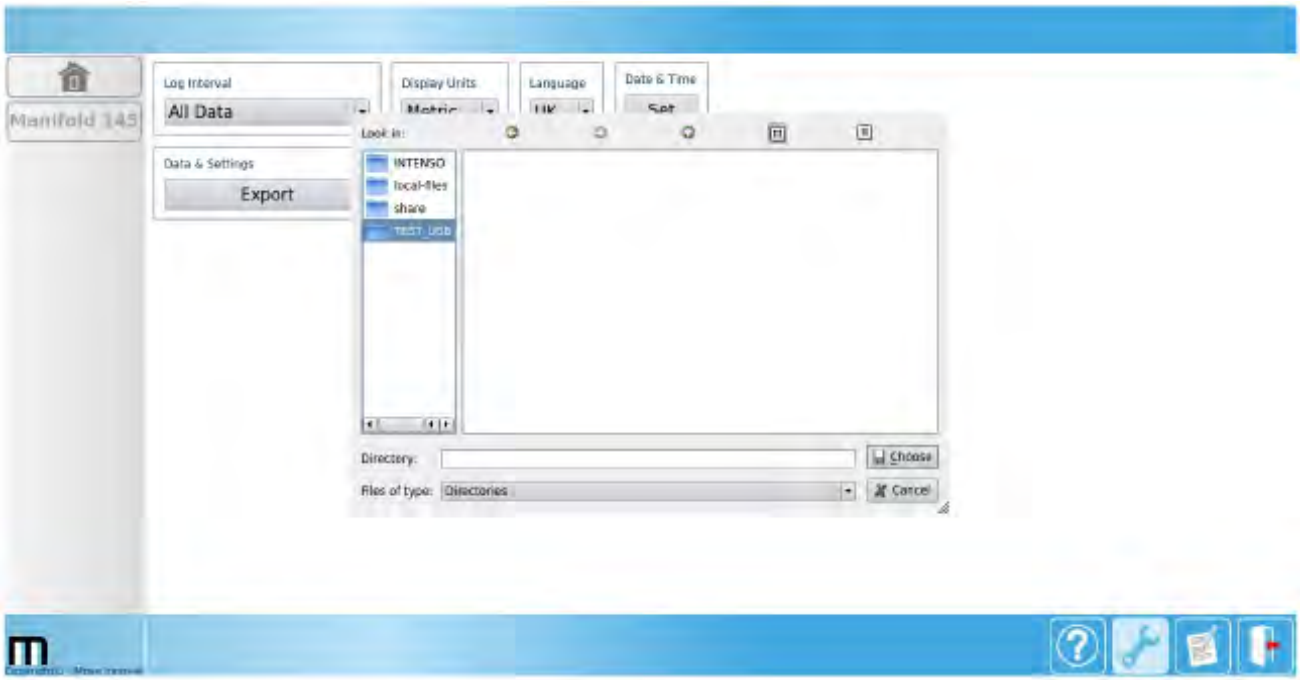
The date dialog is used to set the proper date within the ***Waterflo*** system.

The “Date Dialog” screen is accessed through the “Settings Screen”, by clicking “Set Date”.

Pressing “OK”, will set the selected date.

Exporting Dialog

Exporting Dialog is designed to export data recorded by the ***Waterflo*** system to a USB pen drive. The "Export Dialog" is accessed through the "Settings Screen", by clicking on "Export".



In the Export Dialog you're asked to select a directory. The data is stored in multiple .CSV files, and as such, we ask for a directory to place them in, instead of a file name.

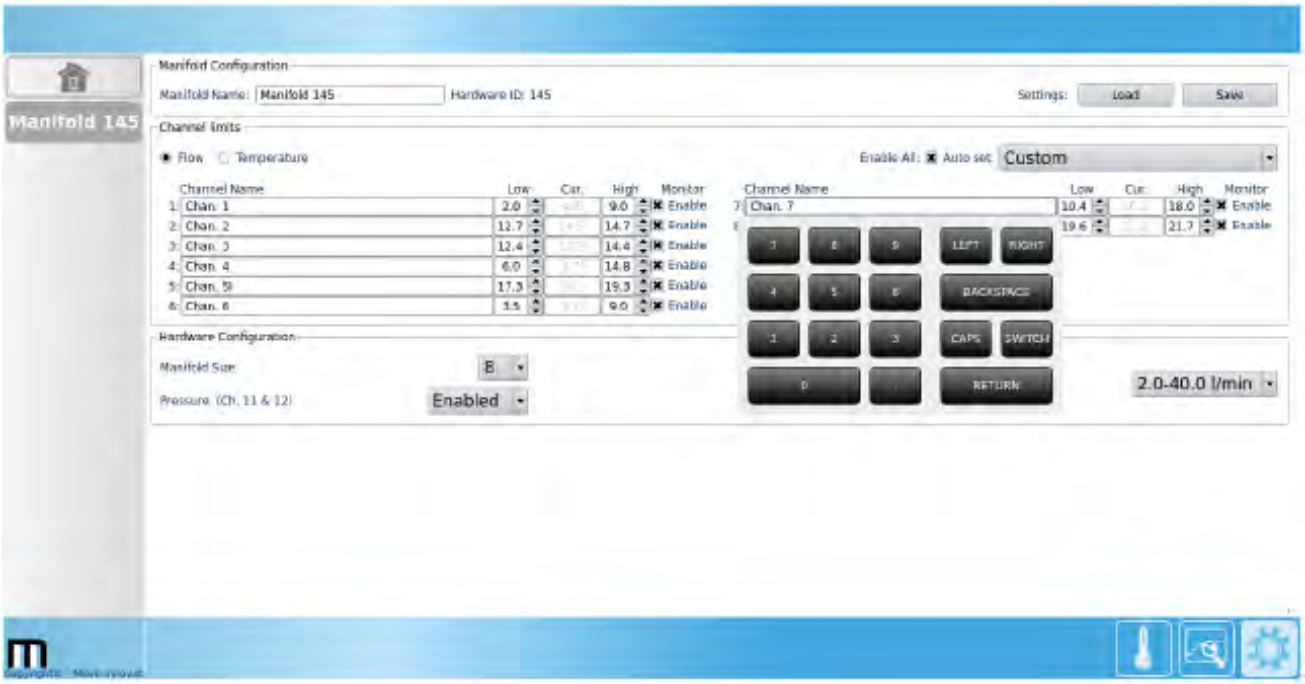
You should enter the directory where you want to store the .CSV files. After that, click 'Choose'. A file transfer dialog will appear, and this may take while. Please be patient.

On the left of the Dialog all USB pendrives will be shown by name. Please select the one you want to export to.

On-Screen Keyboard

The on-screen keyboard is designed to be easy to use. It's used throughout the entire system instead of a physical keyboard. NOTE; physical keyboards may not work alongside the on-screen keyboard.

To Access the Numbers pad, press "Switch" found just above the return button on the right of the keyboard.



The key features of the on screen keyboard, is that it should appear when the user presses any textbox or similar that requires user input.

Updating *Waterflo* Software

The *Waterflo* Software is designed to be able to handle updates. Updates are given in signed packages (".deb,, files). To update a *Waterflo* System, you should simply create a folder on your USB pen drive called "*Waterflo* Upgrades," (please ensure that this is the exact name).

After you've created this folder, place the desired update in this folder. This will probably be named "Mouldflo_XXX.deb," where XXX refers to the version.

The upgrade process is automatic. To start, insert the USB pen drive in the *Waterflo* System and exit the Software. The system will most likely restart during this process.

Once this is done, remove the USB pen drive from the system. We recommend that you delete the "Mouldflo_XXX.deb," file on your USB pen drive now, as to ensure the software won't try to upgrade again if you use the USB pen drive for exporting data.

Errors

The *Waterflo* system is designed to be able to handle selected error-cases. This list will expand for newer versions of the software, as more error-cases are found.

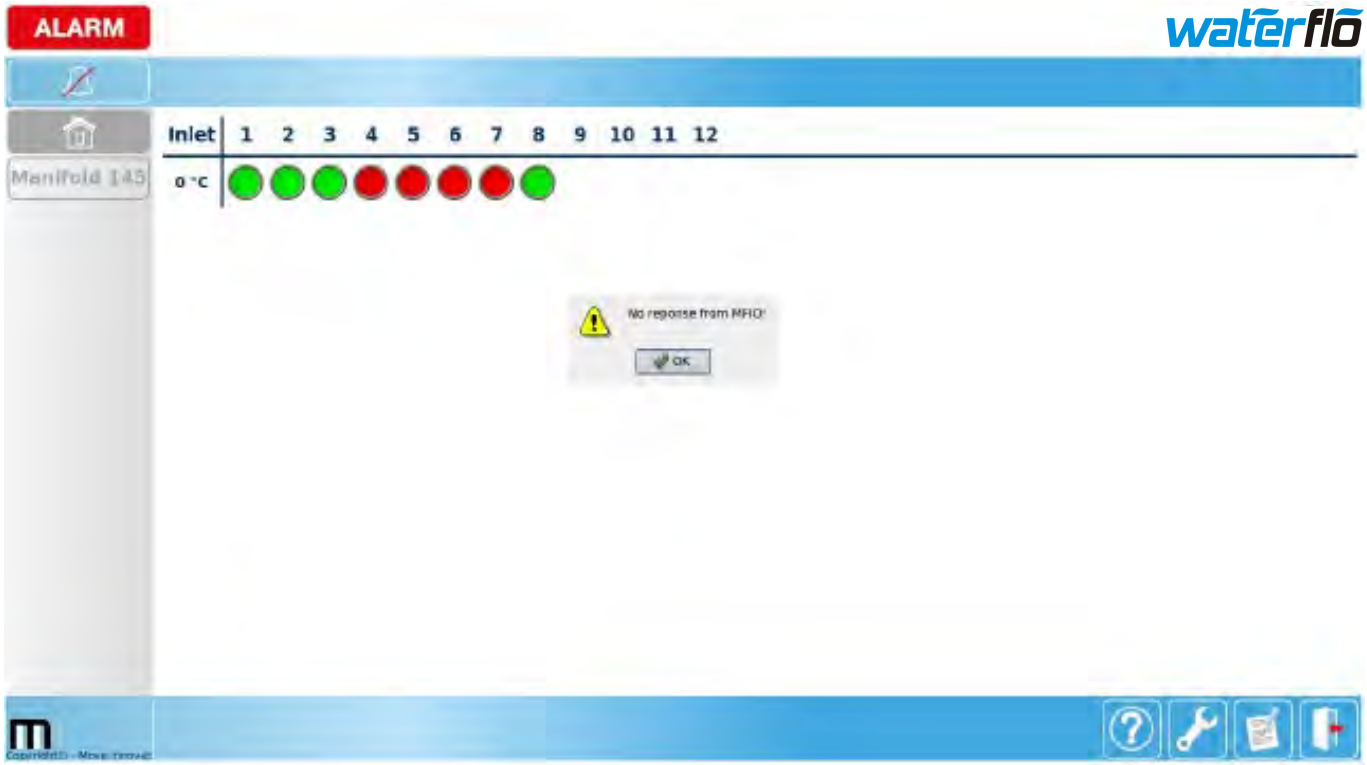
Currently, we have implemented safe-guards against the following error-cases:

- MFIO connection lost
- Manifold connection lost

Each case is described in the following pages.

MFIO Interface Connection Lost

This error will occur it the system is unable to communicate with the MFIO interface. There can be a few reasons for this to occur. It is represented to the user through a warning as shown in the following screenshot:



Most likely causes:

- The USB cable between the computer and the MFIO Interface is loose or cable may be damaged. Check connections and try another cable.
- The MFIO Interface has lost power. Check that the LED's on the MFIO Interface are on.

To debug, please start out by checking the above list. Should the system still not operate, it is advised to shutdown and restart the system. If there is a connection through the USB cable, the MFIO Interface will bling "yellow" while the system is starting up. If this does not happen, contact ITC for support.

Smart Manifold Connection Lost

This error message will occur if the MFIO Interface is unable to communicate with the Smart Manifold. There can be a few causes for why this will occur. It is represented to the user through a warning as shown in the following screen-shot:

Most likely cause:

- The cable between the Smart Manifold and the MFIO Interface is loose or damaged. Check connections and re-place cable.

To debug, please start out by checking the above list. Should the system still not operate, it is advised to shutdown and restart the system. If there is a connection through the USB cable, the MFIO Interface will bling “yellow” while the sys-tem is starting up. If this does not happen, contact ITC for support.

Data Log Files

All data logs are stored in ".csv," format.

The system software is designed to log the following, per channel, per manifold:

- Flow Rate
- Water Temperature

Furthermore each Smart Manifold can also stores the following (OPTIONAL):

- Inlet Pressure
- Outlet Pressure
- Inlet Temperature

The file format is as follows:

The first line is for headers, and will have the form:

> Timestamp Flow1 Flow2 Flow3 Flow4 Flow5 Flow6 Flow7
> Flow8 Flow9 Flow10 Flow11 Flow12 Temp1 Temp2 Temp3 Temp4
> Temp5 Temp6 Temp7 Temp8 Temp9 Temp10 Temp11 Temp12
> PRES_INLET PRES_OUTLET TEMP_INLET

Each subsequent line will have the corresponding date for the headers. These are in the form:
Timestamp: YYYY-MM-DD hh-mm-ss-mmm
Flow %: floating point value
Temp %: floating point value
Press Inlet/Outlet: floating point value
Temperature Inlet: floating point value

The floating point values can also assume the value "NaN," that is, not a number. If so, they should be ignored.
All values are separated by eighter "tab," or a new line.

NOTE:
Currently there is a bug in the file format. If PRES_OUTLET is "NaN,,, there is no separation between it and the value of TEMP_INLET. This can be fixed by doing a search and replacing the "csv,, file of "NaN,, with "NaN".

Import CSV Files - Microsoft Office

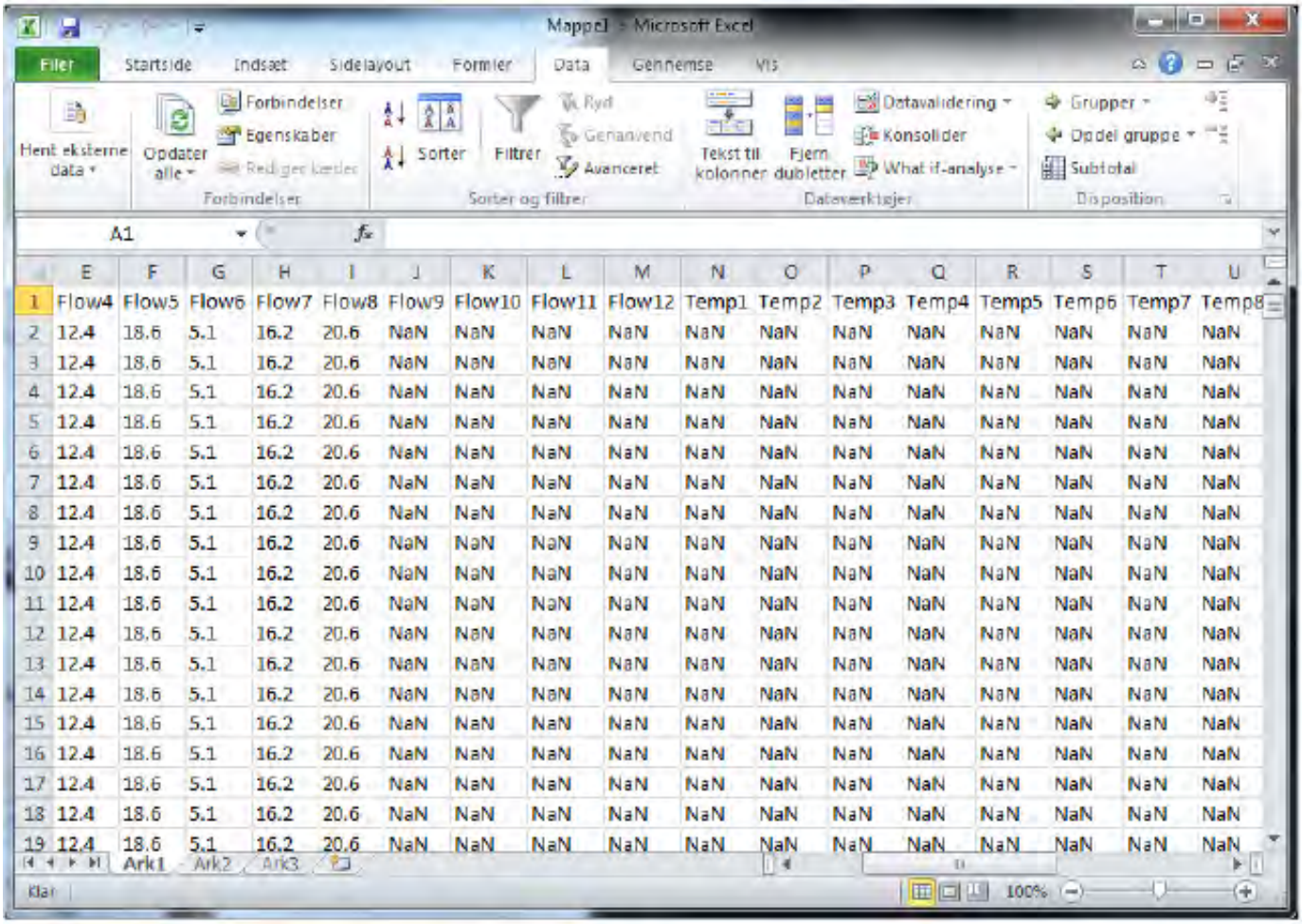
The file format ".csv,, (Comma Separated Values) is a file format much like "xls,, (Microsoft Office Excel) or ".odt,, (Open/ Libre Office Calc).

We chose this format for exporting, as it's easy to integrate with other systems.

Below is a guide for importing a ".csv,, file in Microsoft Excel:

http://www.hesa/ac.uk/index.php?option=com_content&task=view&id=1639&itemid=291

Please ensure you use "Tab,, as a delimiter alongside "Colon,, in this guide. Once you've followed the guide, you should have a table like below: (in this example, the Temperatures were disabled)



	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	Flow4	Flow5	Flow6	Flow7	Flow8	Flow9	Flow10	Flow11	Flow12	Temp1	Temp2	Temp3	Temp4	Temp5	Temp6	Temp7	Temp8
2	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
3	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
5	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
6	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
7	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
8	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
9	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
10	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
11	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
12	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
13	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
14	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
15	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
16	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
17	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
18	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
19	12.4	18.6	5.1	16.2	20.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

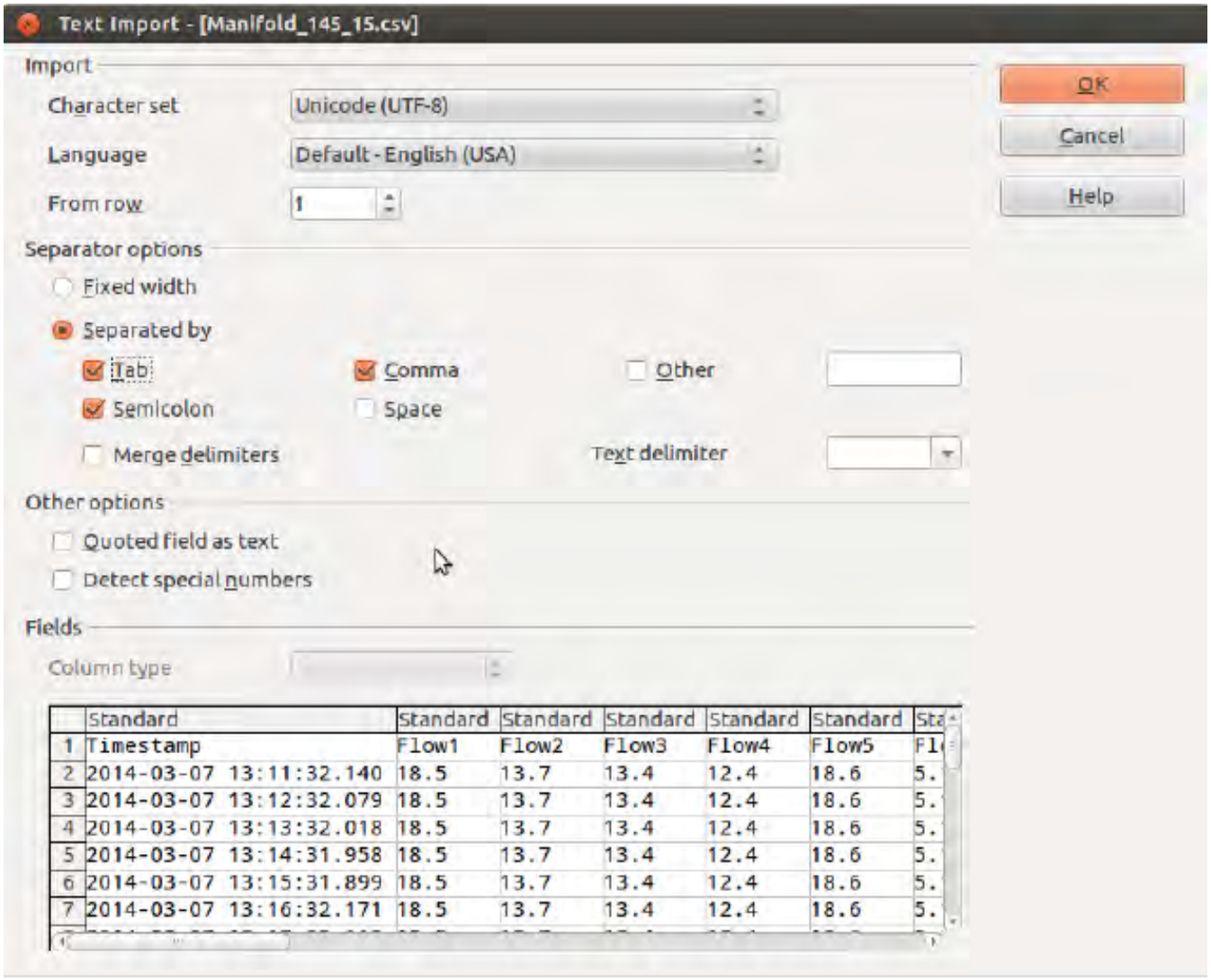
Import CSV Files - Libre Office

The file format ".csv,, (Comma Separated Values) is a file format much like "xls,, (Microsoft Office Excel) or ".odt,, (Open/Libre Office Calc).

We chose this format for exporting, as it's easy to integrate with other systems.

Below is a guide for importing a ".csv,, file in LiberOffice Cal:

Liberoffice has very good support for ".csv,, files, and as such, opening a ".csv,, file in LiberOffice will result in the following dialog. Ensure that "Tab,, is checked. Click "OK" and you're ready to edit the file.



	Standard	Standard	Standard	Standard	Standard	Standard	Sta
1	Timestamp	Flow1	Flow2	Flow3	Flow4	Flow5	Fl
2	2014-03-07 13:11:32.140	18.5	13.7	13.4	12.4	18.6	5.
3	2014-03-07 13:12:32.079	18.5	13.7	13.4	12.4	18.6	5.
4	2014-03-07 13:13:32.018	18.5	13.7	13.4	12.4	18.6	5.
5	2014-03-07 13:14:31.958	18.5	13.7	13.4	12.4	18.6	5.
6	2014-03-07 13:15:31.899	18.5	13.7	13.4	12.4	18.6	5.
7	2014-03-07 13:16:32.171	18.5	13.7	13.4	12.4	18.6	5.

Change Log

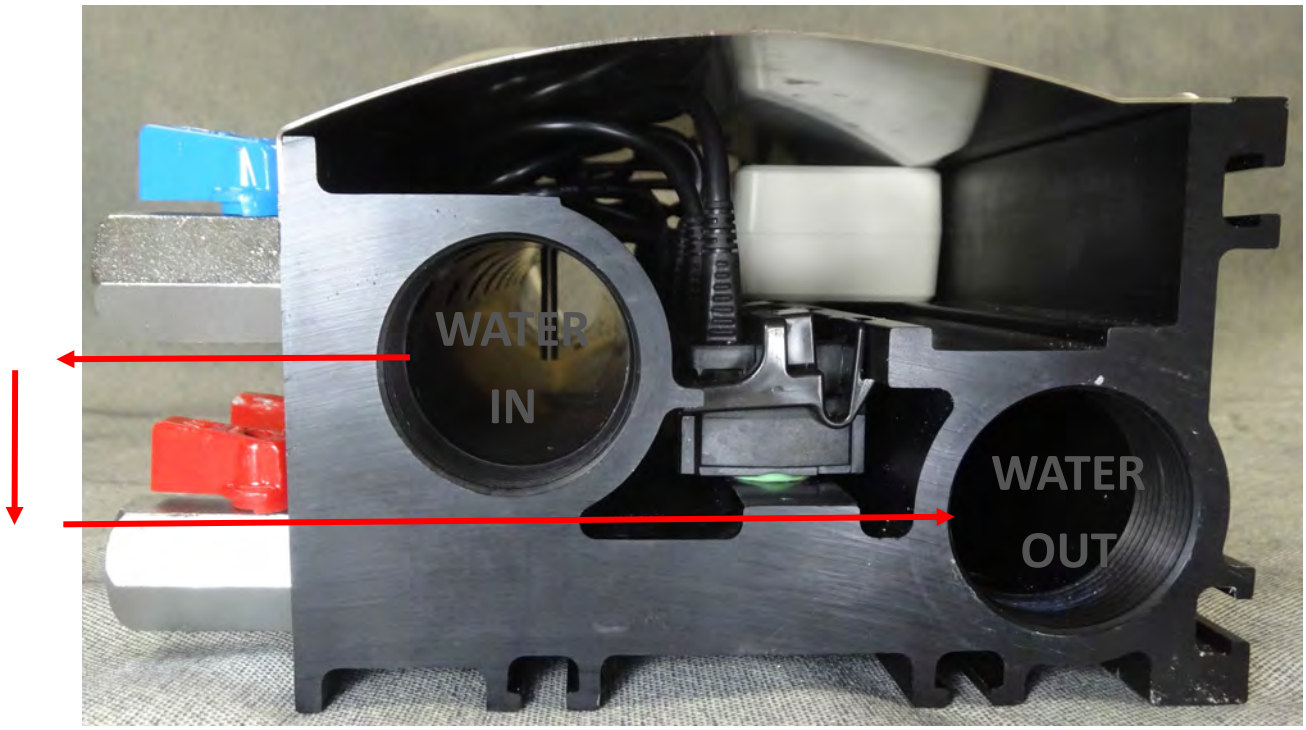
VERSION 1.0.0

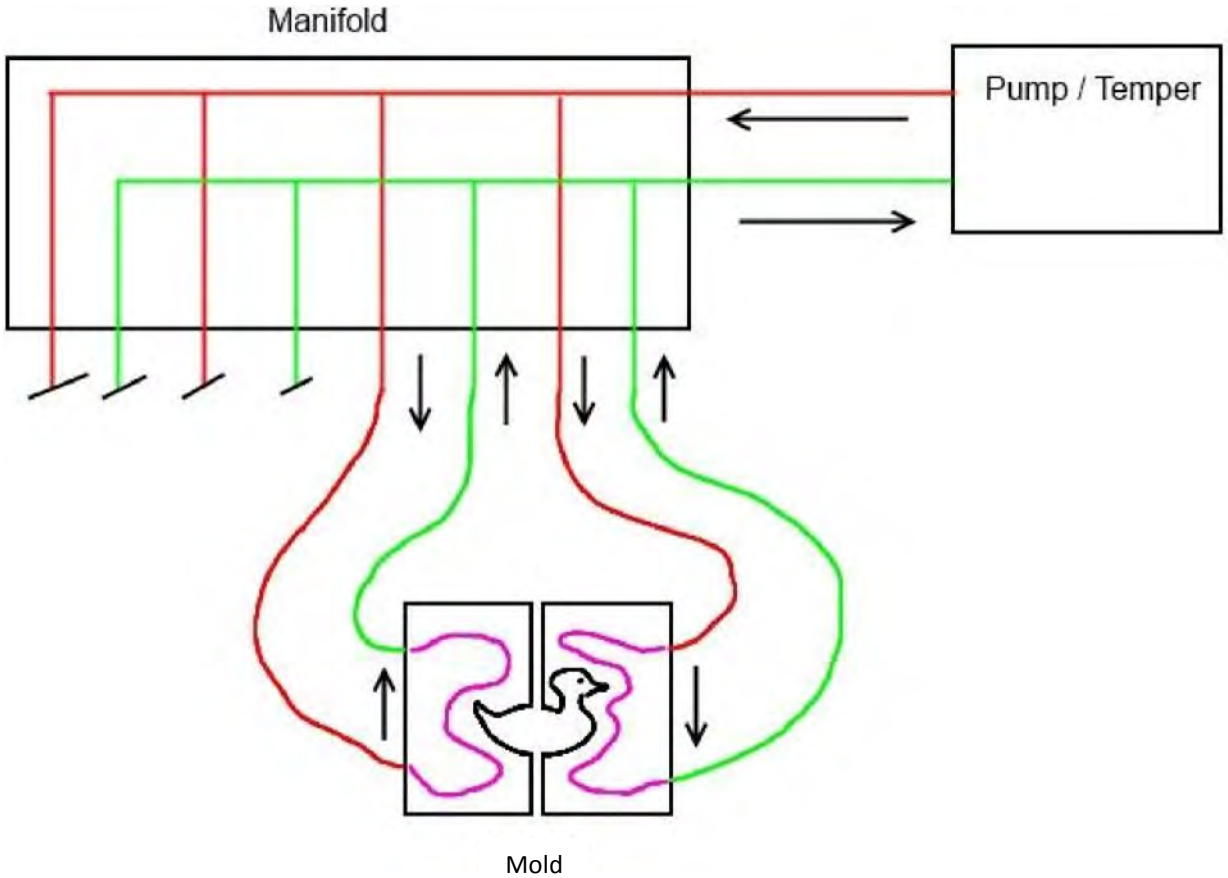
PURPOSE:
A milestone update of the software. After installing the debian package the machine will boot up directly into the operating software. An update mechanism is put in place that allows the system to be updated by plugging in an USB and rebooting.

NEW / FIXES:
Ubuntu Desktop disabled.
Automatic future updates using a USB stick.
Channels #11 & #12 can be used for pressure sensors (inlet & outlet).
EXPORT function copies/moves local data to user selected USB device.
Better Touch Screen support.
Trend graphs optimized.
Improved Error reporting, “MFIO Interface communications error”.
System can reestablish communications with both MFIO Interface & nodes if disconnected.
Node size can be dynamically adjusted between 4, 8 & 12 channels.
New formatting in Log files (.csv), tabular delimited with headers). Makes log files easier to work with using Excel/Cal.
User had been limited to local-data directory & USB devices when traversing files system.

Smart Manifold Maintenance

Water Circulation in *ITC Smart Manifold*

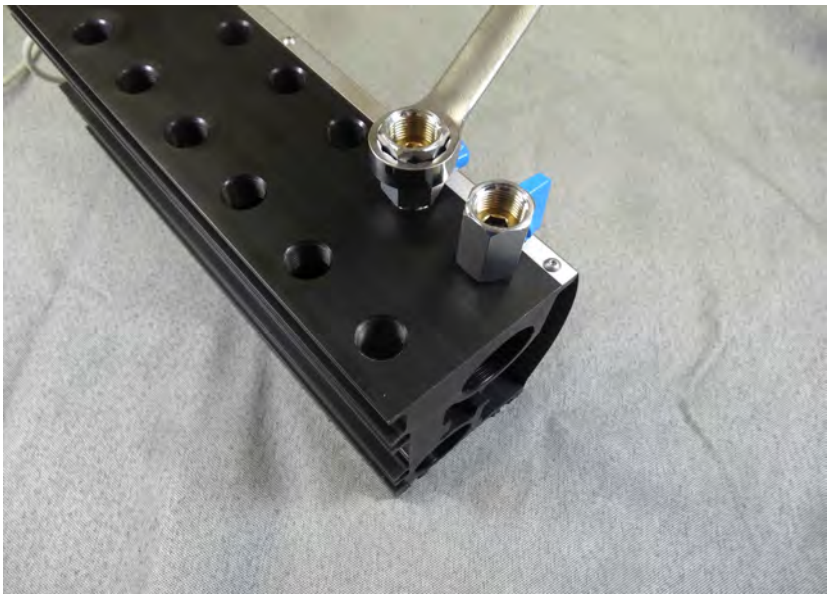




Installation of Valves on *ITC Smart Manifold*:

Start by installing the first valve at one end of the top row.

Be sure to use Teflon tape or thread sealer on the threads of all valves and ensure that no debris enters the flow channel.



Once all the valves have been installed on the top row, proceed to install the valves on the bottom row.

Be sure to locate the valve handles so they are easily accessible and do not interfere with other valves or

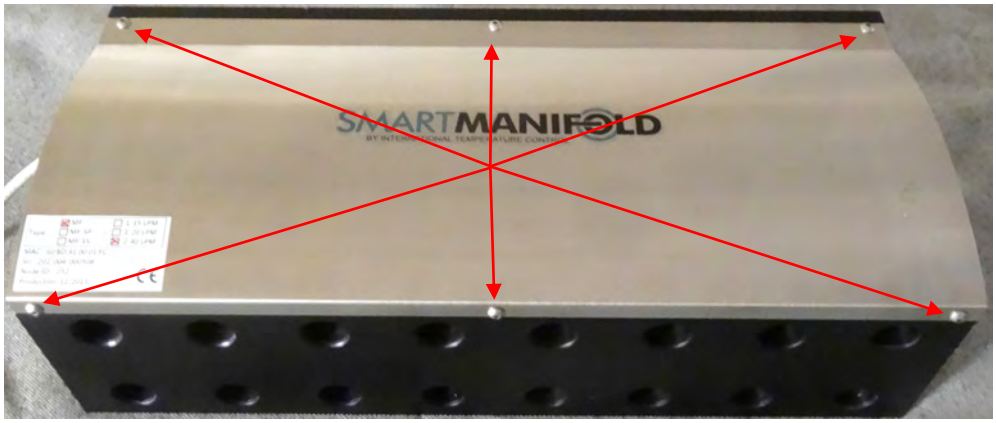
Service & Maintenance

Warning!! Before working on or dissembling any part of the ***Waterflo*** System:

First - Physically disconnect & lockout electrical power supply

Second - Physically disconnect water supply

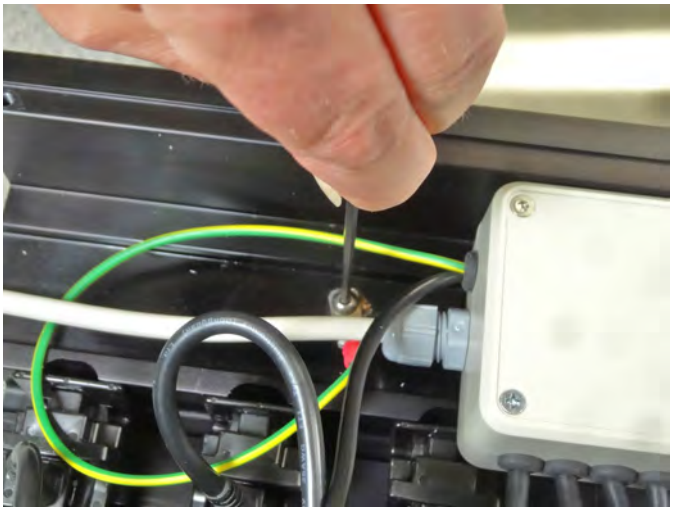
First remove the (6) cover screws, then lift off the cover.



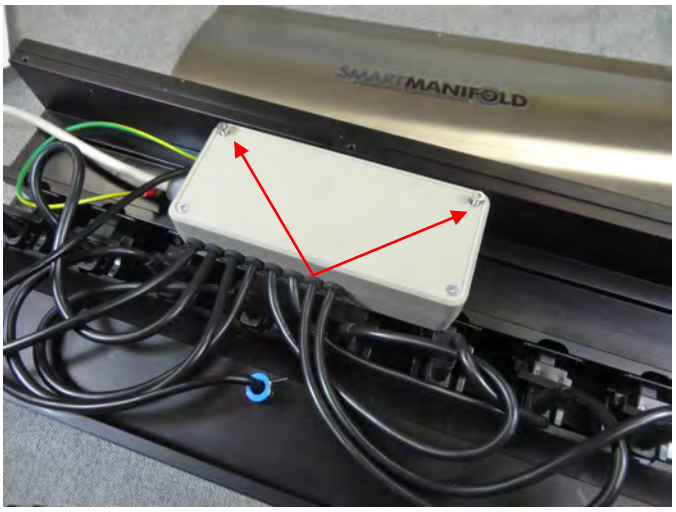
If you have to remove the Sensor Box, from the ITC Smart Manifold use the following

Once the cover is removed from the *ITC Smart Manifold*, you will see a white plastic unit which is the sensor box.

First - Remove Ground Wire by removing the screw which attaches the ground wire to the manifold.



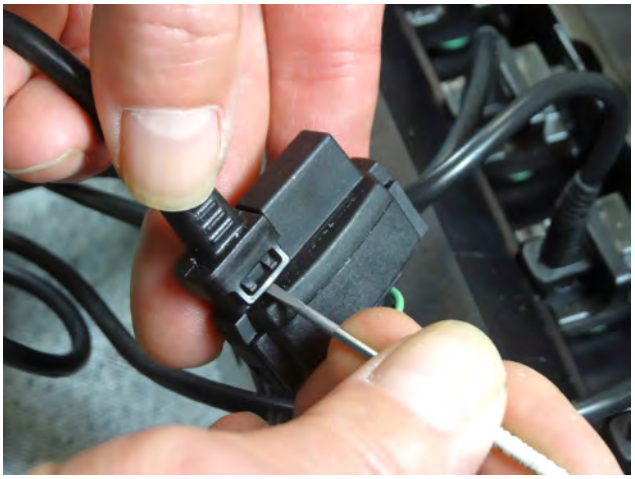
Second - Remove the (2) hex countersunk (M3 x 45) screws from the sensor box

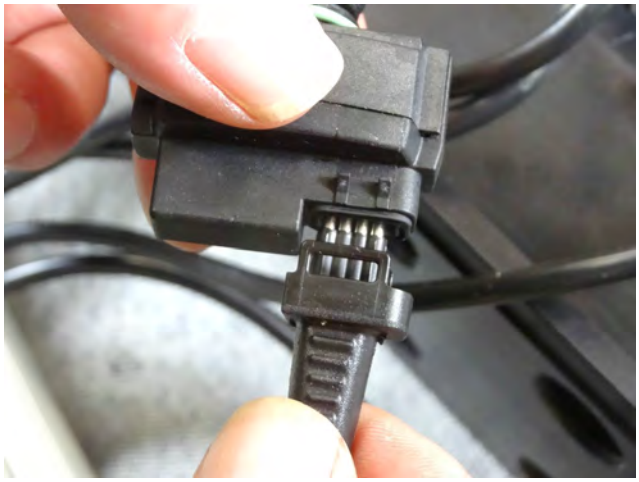


Third - Carefully lift the Sensor Box from the manifold, being careful not to damage or put a strain on wires or apparatus.

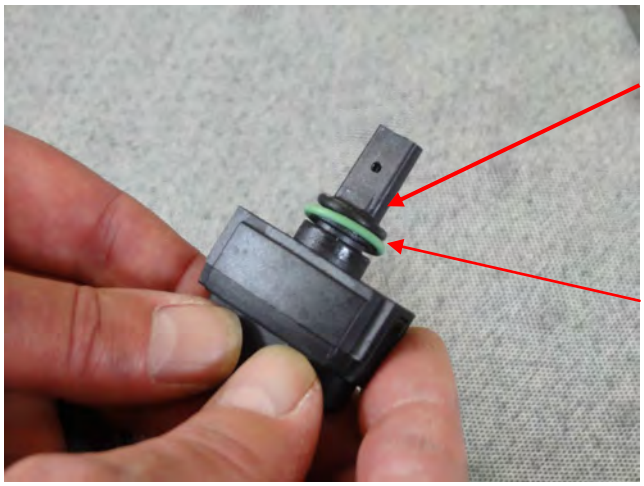
Remove the retaining clip.

Gently un-snap the wire plug with a small straight screwdriver on each side and gently remove the plug from the sensor.



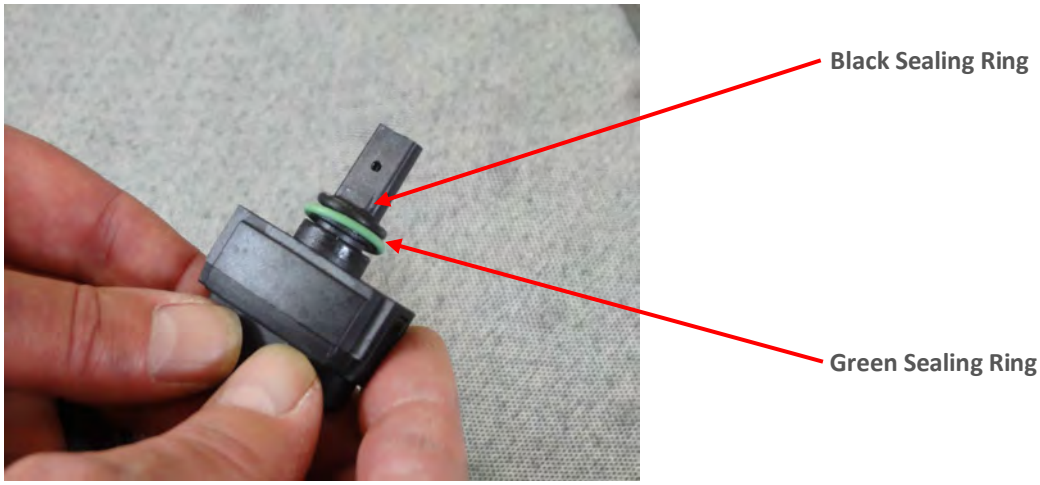


Check to ensure the sealing rings have not been left in the sensor hole on the manifold.



Re-installing the Sensor in the ITC Smart Manifold

Check to ensure the (2) sealing rings are installed on the new sensor.

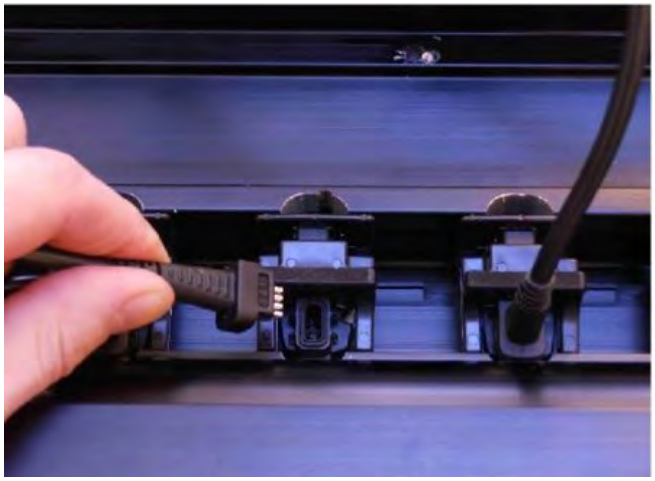


Gently reinstall the sensor in the manifold sensor hole, making sure sealing rings are not pinched.

Push down on the sensor, so the sealing rings are tightly seated.

Push down on the retaining clip so it snaps & locks on both sides.

Gently connect the plug, being careful not to bend any of the sensor pins on the socket.

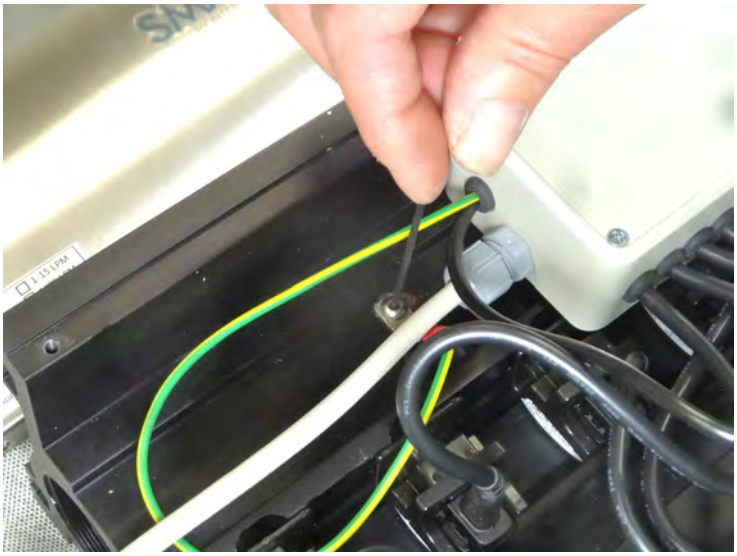


Re-install the Sensor Box

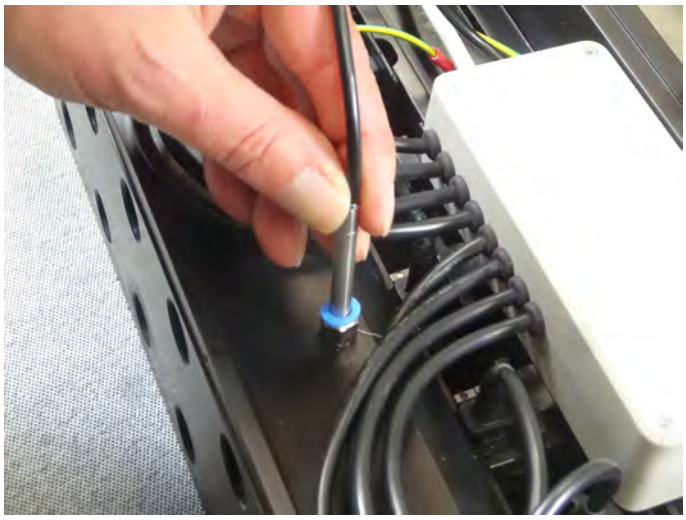
Place the Sensor Box over the mounting holes on the Manifold…

Install the (2) hex countersunk (M3 x 45) screws.

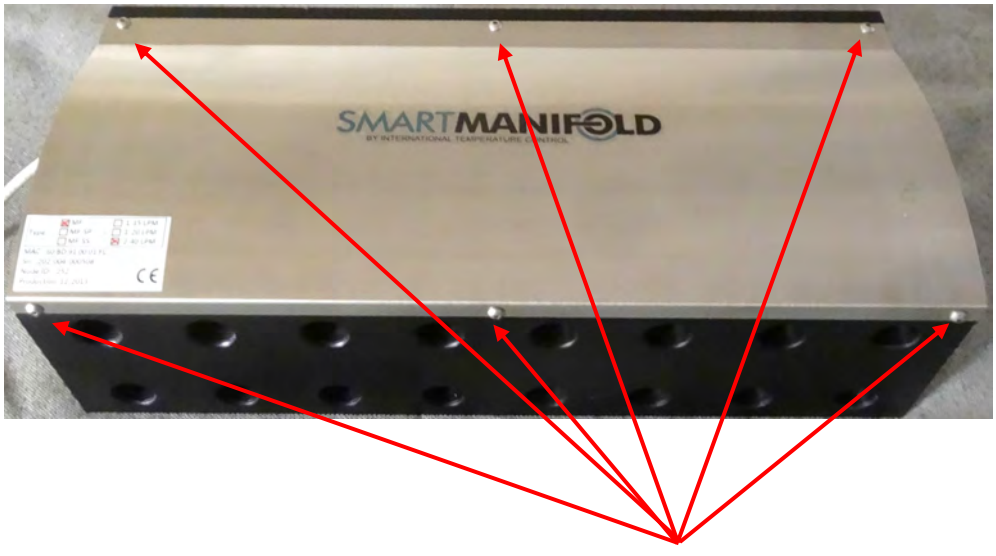
Re-connect the ground wire to the manifold and tighten screw to secure a good ground connection.



Push the temperature sensor into the blue fitting.

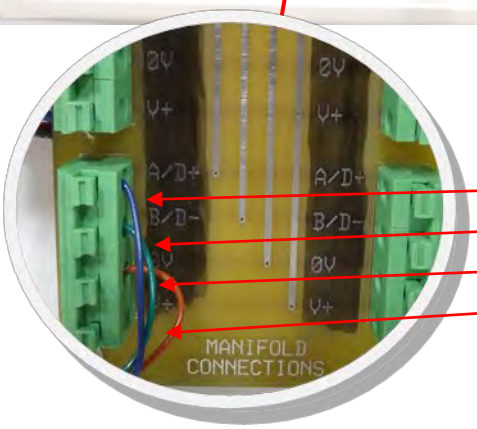


Re-Install the cover back on the manifold



(6) Pan Head Screws

Use This Section if the ITC Smart Manifold Was Not Factory Installed



INSIDE THE INTERFACE JUNCTIION BOX

Gray—2 Wire Power Cable from VISIONS 3000 Top Box:

- Connect "RED" wire to 1st "IN –OV" on left bottom of Interface.
- Connect "BLUE" wire to 2st "IN –OV" on left bottom of Interface.

Black—USB Cable from VISIONS 3000 Top Box:

- Plug in to USB port on left side of Interface.

Manifold Cable—4 Wire; (there are eight sets of wire connectors, which will handle up to eight ITC Smart Manifolds. It makes no difference with connectors are used.

- Attach "A/D+" wire to "A/D+" wire port
- Attach "A/D–" wire to "A/D–" wire port
- Attach "OV" wire to "OV" wire port
- Attach "V+" wire to "V+" wire port

TECHNICAL SPECIFICATIONS:

ITC Smart Manifold	
Manifold Water Feed & Discharge Ports	1-1/2" NPT
Manifold Water Channel Ports	1/2" NPT
Number or Water Channel Ports	4, 8, & 12 (Other sizes on request)
Valves (OPTIONAL)	Color coded ball valves per channel (Red & Blue)
Operating Temperature Range	32° F - 220° F (0° - 105° C)
Operating Pressure (Max)	140 PSI
Temperature Sensing	Per Channel (Return) (Combination Pressure/Temperature)
Flow Sensing (Vortex)	Per Channel (Return) (Combination Pressure/Temperature)
Temperature Sensing Main Water Inlet	Yes (OPTIONAL)
Pressure Sensing Main Water Inlet/Outlet	Yes (OPTIONAL)
Power Supply	12 - 24 Vdc

Sensors	
Flow / Temperature	Vortex
Range (Flow Rate)	Series 1 = 4 gal/min (15 liters/min_ Series 2 = 10 gal/min (40 liters/min)
Accuracy (Flow Rate)	1.5% Full Scale
Range (Temperature)	32° F - 220° F (0° - 105° C)
Resolution (Temperature)	.5°
Accuracy (Temperature(	1.5% Full Scale
Sensor Signal	0.35 - 3.5 Vdc
Response Time	< 1 Sec.
Power Supply	5 Vdc
Burst Pressure	200 PSI @ 100° F

Control	
Display / Control	15" Touch Screen
Communications Ports	Ethernet / USB
communications System	ASCII (USB) / HTML
Protocols	USB Serial / TCP/IP
Storage (Log & Settings)	Internal (OPTIONAL) USB (OPTIONAL)
Remote Access via Internet/Network	Yes (OPTIONAL)
Number of Channels (Flow & Temperature)	12 Channels per Manifold / Manifolds Expandable
Number of Manifolds	Multiple (Daisy Chained - Plug & Play)
Display Units (Flow)	Gallons / Liters
Display Units (Temperature)	Fahrenheit or Celsius
Warning Units (Temperature)	10% of Alarm Limits (OPTIONAL)
Alarm Limits	User Definable per Channel (OPTIONAL)
Alarm Output	Potential Free Output Warning / Alarm
Power Supply	12 - 24 Vdc

Item #	Item Description
WF-SM4-1	WaterFlo - Smart Manifold - 4 Channel - 4 gpm
WF-SM4-2	WaterFlo - Smart Manifold - 4 Channel - 10 gpm
WF-SM8-1	WaterFlo - Smart Manifold - 8 Channel - 4 gpm
WF-SM8-2	WaterFlo - Smart Manifold - 5 Channel - 10 gpm
WF-SM12-1	WaterFlo - Smart Manifold - 12 Channel - 4 gpm
WF-SM12-2	WaterFlo - Smart Manifold - 12 Channel - 10 gpm
WF-INT	WaterFlo - Interface Module MFIO
WF-IOPS	WaterFlo - In/Out Water Pressure (OPTION)

Compliances:

All ITC products conform to the requirements of the following European Directives:

- 2002/95/EC (Rohs)
- 89/223/EEC (EMC)
- 73/23/EEC (LVD)

WaterFlo OPERATING MANUAL

International Temperature Control, Inc.

P.O. Box 805, 2415 E. Huron Rd., Au Gres, MI 48703

Tel: (989) 876-8075 Fax: (989) 876-6640

E-mail: sales@itc-controls.com

Web: www.itc-controls.com