Irrigation Moisture Control V2 Manual

Table of contents

1.0 Overview
1.0.1 Connections2
Top
1.1 Main page
2.1.1. Overview
2.2 Logbook
2.3.1 Moisture sensors
2.4 Device settings
2.4.1 General
Config Relay Port
2.4.2 Groups
Group duration
2.4.5 Warmup and Cooldown
Delay release after frost monitoring14 First irrigation moment after frost monitoring14
3.1 IMC Network configuration15
3.1.1 the IMC Box 15 3.1.2 IMC App/Site 16 3.1.3 IMC IP use 16
4.0 FAQ 17 5 Possible messages 18 6 Declaration of conformity NEN-EN-10204 19

1.0 Overview



1.0.1 Connections

Тор		
WAN	-	This is the main Ethernet port
LAN	-	This Ethernet port is used to connect multiple IMC boxes
		to connect each other .
USB	-	This port is used by a USB stick containing the software
		is being executed.
Button	-	This button is used to start a manual measurement.
LED	-	This is a status LED
Config Relay	-	This is a configurable relay.
Power in	-	This is the power supply. 24VAC
Common	-	This is the 0 for the valves.
Control output	t -	These are the outputs for the valves.
Middle		
Serial number		This is a unique number to identify each iMC box.
Project name		Reference to the project.
Bottom		
Flow	-	This is the port for the flow sensor.
Pressure	-	This is the port for the pressure sensor.
Temperature	-	This is the port for the temperature sensor
Interrupt	-	This gate allows us to interrupt an irrigation program.
•		When the circuit is completed it automatically interrupts any active
		irrigation program.
NO / NC 1 2 3	3 -	This port can be configured to provide a warning for
		a specific status.
Moisture input	t -	These ports are for the moisture sensor. These are linked to the valves

1.1 Main page

Go to <u>https://www.hbwt-imc.nl/login</u> to open the IMC portal. Or open the IMC app on your Android or IOS device. Go to the App Store to download the iMC app.



After you have opened the app or gone to the web portal, you can log in with your login details. These are provided via your distributor or via <u>imc@hbwt.nl</u>

After logging in you will see the home page. Here you can see all your IMC devices and the status of that device.



Green = Device online

If you are looking for a specific device, you can use the search bar.

You can also change your account-related settings on the home page. To do this, click on the main menu at the top left.

If you click on the 'Settings' button at the top left of the screen, you can change the language of the software, the temperature scale (Farenheit or Celcius) and the pressure unit (Bar or PSI). You can also choose here how you want to be informed of notifications from the iMC. Do you want a daily status update or individual notifications? After changes have been made, always press 'Save'.

2.1 Device specific

Select the device you want to view or change from the list.

2.1.1. Overview

In the dashboard you can see the details of the specific device;

- Latest sensor data
- Groups and moisture values
- Pressure
- Temperature
- Make 1
- Make 2
- Make 3

At the top of the dashboard you will see three icons.



Logbook

- A- Sensordata
- છ
- Device settings

2.1.2. Example dashboard details

In this example, we have changed the name "Make 1" to "Nutriton", to indicate the presence of nutrient fluid in the nutrient tank. "Make 2" has been renamed to "Hybrid Tank" and "Make 3" to "Citerne". In this case we added a mechanical float switch to each of the contacts.

In this example, you will see that S01 has an orange bar on the left side of the screen. When this bar is visible, it means that the moisture level is below or above the set threshold value. The threshold value can be changed, see chapter 2.4.1.

2.1.3. Group status

You can also view the details of each of the valve groups (referred to here as S01 to S08).

White	Means the valve is not active.
Blue	Means the valve is active.
Yellow	Means the valve is waiting to
	become active.

Hannover Maxime Tower unit Planters 🛜

Last Measurement: 05-09-2023 13:47	Temp: 27.2°C	
Pressure: 4.4 Bar	Water: 🥝	
Nutrition: !	Citerne: 🥝	
S01 level 5 (rechts) ↓0% - 14m 0s		
S02 level 4 (rechts)		
S03 level 3 (rechts) 53%		
S04 level 2 (rechts) 43%		
S05 level1/2 (links) 56%		
S06 level 3/4 (links)		
S07 level 5 (links) 49%		
S08 level 6 (links) 51%		
START PROGRAM		
! STOP ALL		

2.1.4. Stop irrigation

If it is necessary to force stop a watering program, you can do so using the "Stop all" button at the bottom of the screen. This will also clear the queue list.

2.1.5. Manual start of irrigation

To initiate a manual start, you can swipe any of the groups to the left. After you choose how long you want to start this group, press the start button at the bottom of the screen. You can also run a complete irrigation program via the blue Start program button.



2.1.6. Smart irrigation

When smart irrigation is enabled, the device will shorten or lengthen the watering time based on the data from the moisture sensors. This option can be found in further detail in chapter 2.4.3.

2.1.7. Display of moisture measurement

The dashboard shows various meters of measurements per sensor per group. The meters can be set yourself under "Device settings". The temperature and pressure sensor values can be set by dragging the blue ball to the left or right. After pressing "Save", the dashboard will show that the green part of the meter has been adjusted. When the pointer moves to the red part, it means that the moisture values are too high or too low.

All readings from the past hour are indicated by the arrow next to the pointer. If at least two measurements are taken per hour, the average is calculated. When the last value is higher than the average, it is an uptrend. The arrow then points upwards. When the value is lower than the average, it becomes a downtrend. This is represented by an arrow pointing down. If the values are the same (for example with a sensor that constantly measures 0 or 100), there is no arrow. Even if there have not been at least 2 measurements in the past hour, no arrow is displayed.



2.2 Logbook 💵

In this log you can see every single action that the device performs, either using the program or performed by a specific person. You can also use the search filter to search for a specific date/time or action.

Overview of various actions

Ö	Program action
	Automated action
VL.	Manual action
*	Frost protection action (when active)

2.3 Sensor data 4.

In the sensor data screen you can see the details of the moisture, temperature, pressure and flow sensors. These are separated into groups; Moisture (moisture sensors), Miscellaneous (temperature, pressure and flow sensors) and Flow. You can use different filters via the filter button



2.3.1 Moisture sensors







The red line is a cumulative addition of flow, sometimes it is reduced to 0 to prevent infinite addition.



2.3.3 Flow

In this screen you can read the daily water consumption. The daily total purchases are shown by means of a bar chart. The line diagram shows the water consumption of individual irrigation groups per day.

2.4 Device settings

 \odot

In this screen you can change the details of the device. After changes have been made, always press save.

Depending on the admin rules associated with your account, these settings may be "display only." Confirm your account level with your distributor.

2.4.1 General

On the general tab you can change the device name and project name. You can also change the operating range of the temperature/pressure sensor. As soon as the sensor drops below or above the operating range, you will receive an email.

Config Relay Port

Here you can change the 'Config Adjust Relay ' port in the application. If you click to the right of "Config Port" you will arrive at a menu with four different options.

None: no use of the port

Frost: use with automatic frost monitoring

Master: use of a master valve or pump start control (24VAC)

Error-out: use as fault output NO/NC for linking building management system (BMS)

Config Port

\bigcirc	None		
\bigcirc	Frost		
	Master		
\bigcirc	Error-Out		
	CANCEL	OK	

Make contacts

Here you can change the name of the make contacts, enable notifications per make contact and change the way the contact works. With high or low active.

High active : Normal state = contact made / alarm state = contact broken

Low active: Normal state = contact broken / alarm state = contact made

2.4.2 Groups

A group is a combination of a valve and a moisture sensor. Group number 1 is always connected to moisture sensor 1, group number 2 is always connected to moisture sensor 2, etc.

Here you can enable or disable a station, change the name of a group, enable alerts, (de)activate readings for a sensor and choose the desired moisture threshold levels for each station.

2.4.3 Flow

In this screen you can set alarms for different water consumption per group.

2.4. 4 Program

The program tab allows you to create a new program or edit an existing program.

A program is a watering schedule that is set to water on a specific day and time. If a program enables multiple groups, the program will start with group 1 and queue the remaining groups.

Press the + icon to start creating a program.

Press the pencil icon to change an existing program.

A program name is always required. Select what time you want your program to start. Select the desired interval for the program, if an interval is required. Also set which day(s) of the week you want to run this program.

Group duration

Here you can set the duration that each individual station will be active.

Always take your interval and total running time into account. For example, a watering program that runs for 70 minutes while the interval is used every 60 minutes will inadvertently fill the queue list.

Program	×
Name	test
Enabled	
Start Time	08:00
Repeat (times)	4
Repeat (interval)	03:00
Days	Tuesday, Thursday, Saterday 👻
Station times	
S01	0m 0s
S02	8m 0s
S03	0m 0s

Smart irrigation

If this option is activated for your project, you will see the options for setting smart irrigation at the bottom of the program settings.

Mode: Choose here how the smart irrigation should function

- 1) Off: smart irrigation is inactive
- 2) Change group times: irrigation duration is automatically adjusted
- 3) Change repetitions #: irrigation frequency is automatically adjusted

Stations: Select the stations (groups) here to which smart irrigation applies

Increase #/% Choose the amount for the increase here, if too dry (lower limit)

Limit low % Select the limit value below which the smart irrigation becomes active

Decrease #/% Select the quantity for the decrease here, if too wet (upper limit)

Limit high % Select the limit value above which the smart irrigation becomes active

Smart Irrigation	
Mode	Change repeat # 👻
Stations	S02, S04, S06, S08 -
Increase by #	1
When below (%)	35
Decrease by #	1
When above (%)	65

2.4. 5 Warmup and Cooldown

The number of seconds between the start and stop time of the Master and group 1/8 can be set manually. Click on the number to the right of "Master warmup " or "Master cooldown ". You can use the arrows to increase or decrease the number. You can also set the number manually using the keyboard.

When "Warmup" is set to 20, it means that only the Master is active for 20 seconds before valve 1 becomes active.

When "Cooldown " is set to 20, it means that the Master will wait 20 seconds before switching off after the last valve has been active.

Program	×	
Name	Project Program	
Enabled	-	
Start Time	11:03	
Repeat (times)	5	
Repeat (interval)	00:06	
Master warmup (s)	20	
Master cooldown (s)	20	
Days	Monday, Tuesday, Wednes… 👻	

2.4.5 Frost monitoring – Expansion module 🛛 🎇

The frost module is an optional extension. This module works by applying compressed air to the distribution set and shutting off the pump's water supply. On this tab you can change the operating temperature of the frost module.

The frost monitoring works as follows;

- 1. Enable frost protection to be active.
- 2. Protect below: choose at what temperature frost protection should be active. We recommend a set temperature of approximately 2 or 3 degrees Celsius.
- 3. Safe Above: Choose at what temperature conditions are safe to resume automatic irrigation. We recommend a set temperature of approximately 4 or 5 degrees Celsius.
- 4. We recommend a minimum distance of 2 degrees between the two to prevent the system from switching between states within a short time.
- 5. For each group, select the duration it needs to get rid of enough water. We recommend setting this up by running a test program and timing how long it takes to blow out the irrigation station lines until the air is audible at the end of a group.
- 6. If no station running time is entered, this station will not be blown out and protected by the frost control system. This may be intentionally the case for indoor groups on a combined outdoor and indoor group irrigation system .

After changes have been made, always press save.

To test a frost control program, enable it by clicking the Test Program button.

Frost Protection		
Enable Frost Protection	•	
Protect Below	2	°C
Safe Above	4	°C
Station times		
S01	5m 0s	
S02	5m 0s	
S03	5m 0s	
S04	5m 0s	
S05	5m 0s	
S06	5m 0s	
S07	5m 0s	
S08	5m 0s	

TEST PROGRAM 🕸

√ SAVE

Delay release after frost monitoring

The behavior of the iMC box after the temperature exceeds the set value is adjustable. If you want to set a delay, you can do so via "delay frost end" in 10-minute increments.

First irrigation moment after frost monitoring

As soon as the irrigation system is released, another program starts running. This program is designed to fill the pipes of the system. This program runs by default as soon as the frost monitoring is switched off, but you can choose to run this program via the next irrigation program.

For large projects involving multiple iMC boxes, it is important that the start times are taken into account so that not all boxes are turned on at the same time.

Delay frost end	0 mea	asurements (10 min)
Run Frost Resume Program		Immediately -
Station times after frost		
S01 level 5 (rechts)	0m 0s	
S02 level 4 (rechts)	0m 0s	
S03 level 3 (rechts)	0m 0s	
S04 level 2 (rechts)	Om Os	
S05 level1/2 (links)	0m 0s	
S06 level 3/4 (links)	0m 0s	
S07 level 5 (links)	0m 0s	
S08 level 6 (links)	0m 0s	
TEST PROGRAM 🛞 🗸 SAVE		

3.1 IMC N etwork configuration

The IMC irrigation system consists of multiple parts that communicate via the public Internet. The diagram below provides a simple overview of the components.



Figure 2Network overview

3.1.1 the IMC Box

The IMC Box is the main control unit of the system. The system requires an Internet connection to be configured and reports data back to the IMC servers for reporting and alerting. For the best IMC experience, a reliable Internet connection is preferred, but if the Internet connection is unavailable, the box will continue to operate on the configured schedule but will not be able to forward data to the server.

The connection from the IMC Box is based on the standard Ethernet protocol. The device can only connect to the Internet if it is connected to a DHCP server/router with an active Internet connection.

The IMC box data connection is established using an industry standard MQTT protocol over port 8883. The connection is secured by TLS. It is important that the network configuration allows an outgoing connection via this port (8883).

For software updates, outbound HTTPS (port 443) must also be allowed.

No incoming connections are required, so it is possible to place the IMC box behind a NAT router.

3.1.2 IMC App/Site

The IMC app or website can be used to configure, control and monitor the IMC box. All connections from the app or site are made over secure HTTPS connections, so outbound connections over port 443 must be allowed. For a better user experience, web sockets via HTTPS are also used to display real-time updates in metrics.



3.1.3 IMC IP usage

To work correctly, the IMC box uses an internal IP range, which is 192.168.1.x. This IP range cannot be the same range as that used by the DHCP server/router. If the IP ranges used are similar, an IP conflict may be caused and the IMC box will not work properly. In this case, contact your distributor or adjust the IP range of your router accordingly.

4.0 FAQ

• How many groups does IMC support ?

There are three versions; 2 groups, 4 groups and 8 groups. You can also connect multiple iMC boxes together by connecting the LAN to the WAN.

• How many programs does it support? What about program schedule dates and start times?

The IMC box supports unlimited programs. Each program allows: 1) an individual running time for each station; 2) weekday schedule; 3) one start time for each program and repeating start times (e.g. start at 8:30 am, repeat every 45 minutes for 8 times).

- Does IMC have built-in wireless internet? IMC currently only supports wired Ethernet connections. However, wireless is possible using a powerline Ethernet adapter or a WiFi adapter.
- What types of valves does IMC work with? IMC works with standard 24V AC valves
- How do I connect a main valve or pump start? The configuration relay can be pre-configured as a main valve or pump start. If you would like a master valve or pump start pre-configured, please contact your distributor.
- **Can I plug two group cables into the same terminal port?** Yes. But keep in mind that doing this will always open or close the two zones at the same time.
- What happens if the power goes out? IMC stores all programs and settings in non-volatile memory, ensuring data is preserved during power outages.
- **Can IMC be run offline without an internet connection?** Once programmed, iMC can work offline without a network connection. The controller has a built-in real-time clock and battery for keeping time.
- How do I set a static IP address? The recommended way to set a static IP address is to use your router's DHCP reservation, or the "Bind IP to MAC" feature.
- How do I access IMC remotely? Once the IMC is online, you can log in to the portal using the application or website with your details.
- **How does IMC's smart irrigation work?** Smart irrigation can be enabled by your distributor. You can set up smart irrigation in the program settings. It works using the data from the moisture sensors. 1) If the high threshold value is exceeded, the smart irrigation adapts the irrigation program by reducing the running time or the number of intervals (configurable). 2) If the low threshold value is exceeded, the smart irrigation adjusts the irrigation program by increasing the running time or the number of intervals (configurable).

• Why can't I change certain settings?

Depending on the admin rules associated with your account, these settings may be "display only." Confirm your admin rules with your distributor.

• Why does the irrigation program provide continuous water? Always take your interval and total running time into account. For example, a watering program that runs for 70 minutes while the interval is used every 60 minutes will inadvertently fill the queue list. You can clear the queue list by pressing the "Stop All" button.

• Why does the sensor value indicate 0%?

First check whether the sensor is not too far from the green. If that is OK, it may be due to the polarity that the minus and plus are reversed. It may also be that there is a bad sensor connection, a broken wire or that the sensor is broken.

• Why does the sensor value indicate 100%? First check whether the sensor is not too far from the green. If this is OK, there may be a short circuit in the cabling, the connection is damp or a sensor is broken.

Alert	Reason	Action
IMC box "project name" has not received new measurement data for more than 4 hours.	The iMC box has been offline for more than 4 hours, the box's internet may have disappeared or the irrigation system's power is no longer working properly.	Contact the contact person and determine whether the system still has power; if this is the case, the irrigation system only works without data. Resume data to system ASAP. If irrigation system is de-energized, find out why and repair it. If iMC is broken, replace iMC.
Station " irrigation group " moisture is below the threshold.	iMC box measures on the soil moisture sensor of a certain irrigation group that the moisture value is below the set range.	Action: if soil moisture range is project specific (not the standard 35/90) check and update irrigation program if necessary If the soil moisture range is standard, check on location whether the irrigation group is indeed too dry or whether the sensor position does not correspond to the entire irrigation group. Adjust range or sensor position.
Sensor 'Water' is in alerted state.	Depending on settings, the water tank is empty or full.	If full, no action required. If empty; check water supply.
Sensor 'Nutrition' is in alerted state.	Depending on settings, the nutrient tank is empty or full.	If full, no action required. If empty; refill nutrient tank.
Sensor 'Rainwater' is in alerted state.	Depending on settings, the nutrient tank is empty or full.	If full, no action required. If empty; irrigation system switches (default) to tap water, no action required.

5 Possible notifications

Alert	Reason	Action
Pressure is above threshold.	iMC box measures that the pressure is above the set value, possible problem with the pump.	Check at project location and contact your distributor if necessary.
Pressure is below threshold.	iMC box measures that the pressure is below the set value, possible problem with the pump.	Check at project location and contact your distributor if necessary.
Temperature is above threshold.	iMC box measures that the temperature is above the set value, possibly placing the sensor directly in the sun.	Monitor the period and adjust the placement of the temperature sensor if necessary.
Temperature is below threshold.	iMC box measures that the temperature is below the set value, depending on the frost setting, the frost program may become active if the frost protection module is present.	If value equals expectations, no action necessary. Possible check whether winter maintenance has taken place on the project. If the value is not equal to expectations (negative temperature measurement in the summer, etc.), the temperature sensor may be defective. Contact your distributor.

6 Declaration of conformity NEN-EN-10204

irrigation Moisture Control (IMC) Proostwetering 27H 3543 AB Utrecht, The Netherlands Tel: (+31)(0)-348-444693 Fax: (+31)(0)-348-445073 <u>imc@hbwt.nl</u> <u>www.hbwt-imc.nl</u> K. Bouhuijzen, director, edition 10/2023