



# User Manual HortiMaX-Go!



Helping you grow  
**your way**



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# 1 Introduction to this manual

Welcome to the User Manual for the HortiMaX-Go!. This manual was originally published in Dutch and English.

## 1.1 Introduction

The HortiMaX-Go! is an easy-to-use and affordable control computer designed specifically for the horticultural sector. With the HortiMaX-Go!, you can control both the climate and irrigation inside your greenhouse. The HortiMaX-Go! is easy to customize by selecting the 'Smart Switches' that meet your individual needs. These Switches provide simple plug-and-play installation.

The HortiMaX-Go! is also a breeze to operate using its touchscreen display. By using the CloudBox and the HortiMaX-Go! app, you can even operate the HortiMaX-Go! remotely with your smartphone. You can manage your Cloudboxes, controllers and app users on our CloudPortal.

## 1.2 Purpose

The purpose of this manual is to instruct you on how to use the HortiMaX-Go!.

## 1.3 Target group

This manual is intended for users.

## 1.4 Symbols and method of notation

This manual uses specific symbols and methods of notation. This section explains the main symbols and methods of notation used.

### 1.4.1 Symbols

This document may contain the following symbols:



Note: This notice provides important information or a warning. Ignoring this information may result in product damage or personal injury.



Note: This notice provides important information or a warning.



Information: This notice provides additional information or a brief explanation.



Tip: A tip provides a useful suggestion, such as a preference setting or a recommended course of action.

## 1.4.2 Method of notation

The following method of notation is used in the user instructions:

- » A button is indicated as follows: the Start button.
- » A field is indicated as follows: the `Connect string` field.
- » A setting is indicated as follows: the *Current time zone* setting.
- » A window is indicated as follows: the **Log On** window.

## 1.5 Documentation overview

For more information, please consult the online help or the following manuals:

- » HortiMaX-Go! Installation Manual
- » CloudPortal User Manual
- » CloudBox Quick Start Guide
- » Smart Switch wiring diagrams
- » Smart Switch inserts
- » The OEM (Original Equipment Manufacturer) documentation provided

Scan the QR code to access the online help.



[help.hortimax-go.com](http://help.hortimax-go.com)

## 1.6 Disclaimer

Ridder Growing Solutions has done its best to include up-to-date images and screenshots in this manual. However, the images and screenshots used may differ from the actual ones shown.

## 2 Product information

This chapter contains more information about the HortiMaX-Go!.

### 2.1 What is the HortiMaX-Go!?

The HortiMaX-Go! is an easy-to-use and affordable control computer designed specifically for the horticultural sector. With the HortiMaX-Go!, you can control both the irrigation and the climate inside your greenhouse. The HortiMaX-Go! is easy to customize by choosing unique 'Smart Switches' that can be installed in a plug-and-play manner.

### 2.2 Associated components

This sections provides an overview of the various components of the HortiMaX-Go!.



#### HortiMaX-Go! control cabinet

Panel cabinet with a built-in HortiMaX-Go! panel PC, which runs the controller software.



#### FertiMiX-Go!

Dosing unit for mixing fertilizers, including HortiMaX-Go! control cabinet.



#### HortiMaX-Go!

Individual HortiMaX-Go! panel PC running the controller software. Installation dimensions: H118 x W196 mm.



**HortiMaX-Go! Smart Switch**

Switch for the automatic (computerized) control and manual control of connected equipment. Various versions available.



**Meteo-Go!**

All-in-one weather station for measuring the solar radiation, outside temperature, outside humidity, wind direction and wind speed. It is also capable of detecting rain and its GPS location.



**MTV-Go!**

Sensor unit for measuring the ambient temperature and humidity inside the greenhouse.



**MTV-Go! Smart Switch**

Individual sensor unit board for MTV-Go!.



**HortiMaX-Go! CloudBox**

The HortiMaX-Go! CloudBox enables you to link your controllers to the Internet.



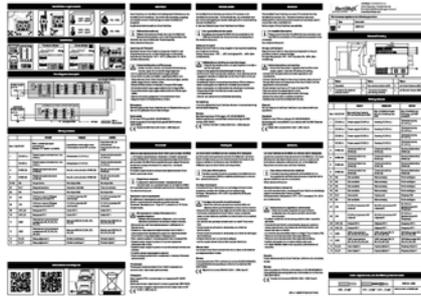
**Terminal resistor**

120Ω resistor for closing the fieldbus.



### Motor control boxes (MCB)

Switch boxes for increasing the power level of motors and other equipment or devices. May contain various versions of Smart Switches.



### Product insert

The insert included with the product. This contains essential information about the correct use of the product.



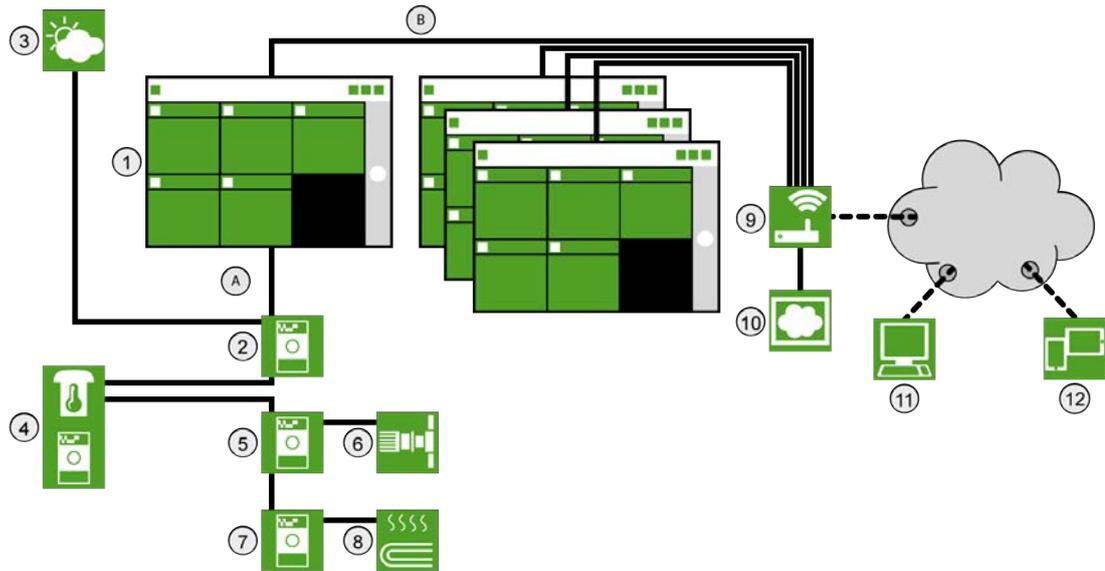
### Address list

List allowing you to specify which Smart Switches have been assigned to which addresses in the system.

## 2.3 System architecture

The HortiMaX-Go! features a modular design. Every system is different in terms of the number and types of Smart Switches as well as the number of HortiMaX-Go! controllers. The FertiMiX-Go! is always equipped with a dedicated controller.

The illustration below is an example of a HortiMaX-Go! configuration that includes a limited number of Smart Switches.



No.	Description
1	HortiMaX-Go! controller
2	Meteo-Go!/Alarm Smart Switch
3	Meteo-Go! weather station
4	MTV-Go! sensor unit for measuring the temperature and humidity level
5	Ventilation Smart Switch
6	Ventilation motor
7	Heating Smart Switch
8	Pipe heating
9	Router with DHCP
10	HortiMaX-Go! CloudBox
11	CloudPortal
12	Tablet device or mobile phone running the HortiMaX-Go! app
A	Fieldbus network (RS485)
B	Local network - LAN Backbone

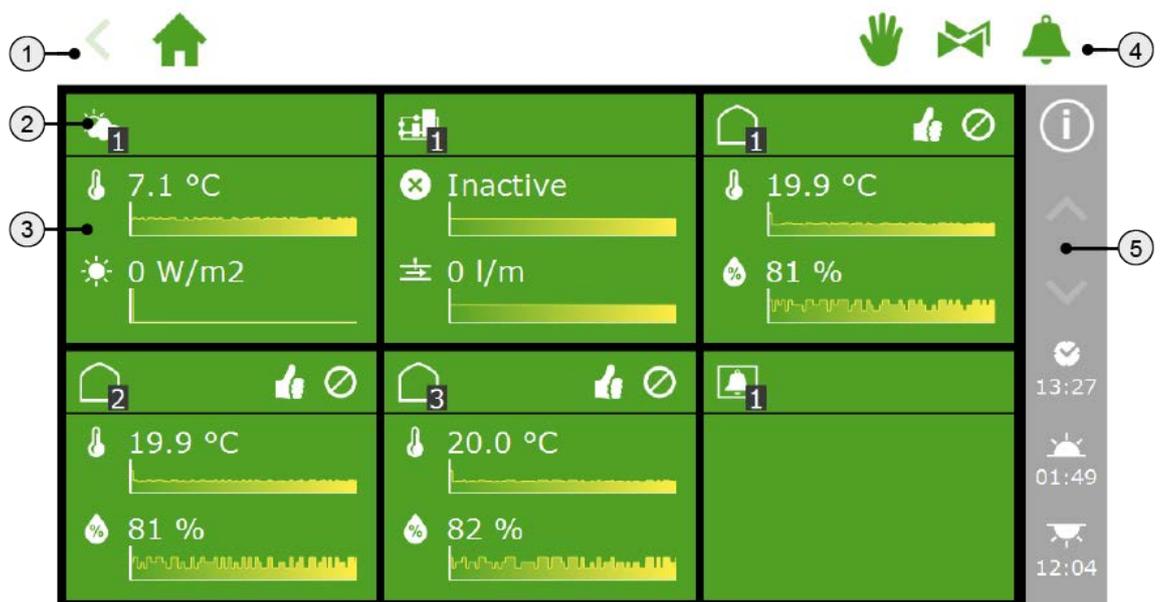
## 3 Introduction and how to operate the HortiMaX-Go!

This chapter contains more information about the HortiMaX-Go!.

### 3.1 Screen layout

The main screen of the HortiMaX-Go! is the home screen. The home screen displays a number of fixed elements, such as the tiles, the top bar and the right sidebar.

The exact layout of the home screen depends on your configuration. The screenshot below shows what the home screen may look like on your system.



1. Top bar with the breadcrumb trail on the left-hand side.
2. Tile header
3. Tile body with information
4. Top bar with direct access to manual control, valves and alarms on the right-hand side.
5. Right sidebar

#### 3.1.1 Breadcrumb trail on top bar

The breadcrumb trail shows your current location within the software. Every icon in the breadcrumb trail represents a particular control function of the software. Examples are irrigation control and humidity control. If an icon has a number, this indicates which zone or control you are looking at.



The meanings of the various icons are explained in the Appendix: "Icons" on page 48.

**EXAMPLE**

The breadcrumb trail leading to the stage control settings for the roof screen might look like this:



In words, this reads: Home screen > Zone 1 > Roof screen 1 > Stage control.

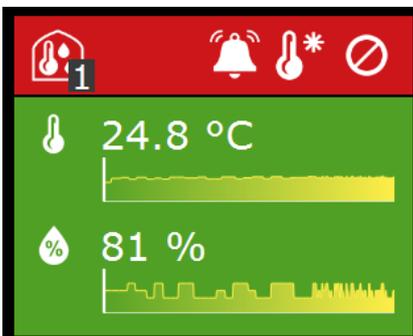
If you tap an icon in the breadcrumb trail, you will be taken directly to the corresponding tile. If you tap the arrow on the far left of the breadcrumb trail, you will move one step back in the breadcrumb trail.

**3.1.2 Tile header**

The tile header contains the following information:

- » **Type of tile** There are four types of tiles: weather, irrigation, climate and alarm.
- » **Control mode** The icons on the right-hand side indicate the current operating mode of a control.
- » **Control status indicated by colour** The tile header can have one of three colours: green, orange and red.
- » **Stage information** The tile header shows information about the active stage.

On the left-hand side of the tile header, you will see the icon of that particular control together with the zone number.



**Type of tile**

	<p>Meteo-Go!</p>	<p>The tile in the upper left corner displays data from the weather station.</p>
	<p>Irrigation unit</p>	<p>If an irrigation unit is present, data from the unit will be displayed on the second tile. Under this tile, you will find all the settings relating to irrigation control.</p>

	Climate zone	Each climate zone (also known as a greenhouse block or compartment) has its own tile on the home screen. The zone number is indicated in the black box at the bottom right of the icon. Under a zone tile, you will find all the control that are available for that zone.
	Alarm	The Alarm tile provides direct access to the Alarm contact settings. The Alarm contact is a shared function for all climate zones.

### Control mode

On the right-hand side of the tile header, icons may be displayed with the following meanings:

	The control is set to automatic mode. This means that the system will control that function automatically based on the preprogrammed software settings.
	The control is set to a fixed position.
	No connection could be established with the hardware associated with that control. This is a serious situation that will trigger an alarm.

### Colours

The tile header can have one of three colours: green, orange and red.

	Green	If the header is green, then the control is active and the situation is normal. Control can be set to automatic mode or set to a fixed position.
	Orange	If the header is orange, then a system in one of the underlying levels has been set to manual control. As a result, the controller is unable to control the connected equipment automatically. This could cause a hazardous situation, because overrides (e.g. rain or gale overrides) will not be applied.
	Red	If a tile header turns red, it means that an alarm has been triggered. In that case, a bell icon will also appear on the right-hand side.

### Stage information

The tile header shows the active temperature stage.

	Heating stage	The zone temperature is below the desired temperature; the zone needs to be heated.
	Neutral stage	This is the desired temperature.

	Cooling stage	The zone temperature is above the desired temperature; the zone needs to be cooled.
---	---------------	---

### 3.1.3 Tile body

The tile body shows readouts and trend graphs. The readouts show the main readout values for the control in question. If you tap the tile and then open the readout screen , you can view all the current readouts for that control.

The trend graphs show the relative trend over the last 2 hours. For more detailed information on a certain readout value, open the graphs program by tapping this icon: .

In the irrigation program, the tile bodies show other information. At the top, information on the next irrigation cycle (date and time) is displayed. At the bottom, information on the last irrigation cycle (volume or time) is displayed:

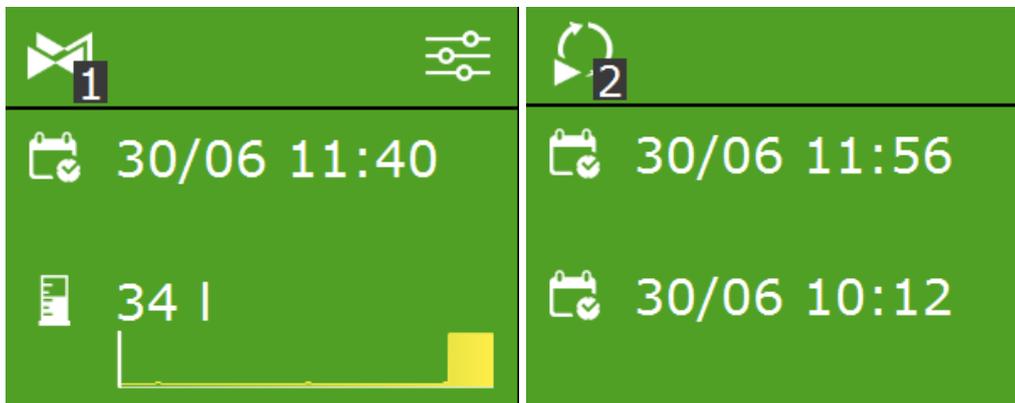


Figure 3-1: Irrigation tiles

### 3.1.4 Icons on top bar

A number of icons are shown on the right-hand side of the top bar. If you tap one of these icons, you will be taken directly to the corresponding screen. The following icons may be shown here:

	Fixed position control	The fixed position screen provides an overview of the control that are available for the zone selected. Here you can opt for a fixed position or automatic control. If you select automatic control, the controller will use the stage control settings.
	Valve group (manual start control)	The manual valve group control screen displays information about the status of the valves in each valve group. It also includes a start button to activate a valve group immediately (this is called a 'manual start').
	Alarm screen	The alarm screen shows all active alarms. The bell icon shows the number of active alarms and whether the system bell is active.

### 3.1.5 Right sidebar

The bar on the right-hand side of the screen always contains the same information and enables you to access a number of basic settings.

	<p><b>Help</b></p> <p>This is the help button. It enables you to do the following:</p> <ul style="list-style-type: none"> <li>» If you tap the help button, a help screen with a QR code will appear. Scan the QR code to access our online help.</li> <li>» If you tap and hold the help button, a pop-up window will appear with information about your controller.</li> </ul>
	<p><b>Arrow up</b></p> <p>If this button is active (white), more information is available above the information displayed.</p> <ul style="list-style-type: none"> <li>» Tap the arrow to move one screen up.</li> <li>» Tap and hold the arrow to go back to the first screen.</li> </ul>
	<p><b>Arrow down</b></p> <p>If this button is active (white), more information is available below the information displayed.</p> <ul style="list-style-type: none"> <li>» Tap the arrow to move one screen down.</li> <li>» Tap and hold the arrow to go to the last screen.</li> </ul>
	<p><b>System time</b></p> <p>This button displays the current time. It enables you to do the following:</p> <ul style="list-style-type: none"> <li>» If you tap the system time icon, the configuration screen will open. This screen allows you to change the system settings, such as language, location and system time.</li> <li>» If you tap and hold the system time button, the system menu will slide over the right sidebar. See "System menu" on the next page for more information.</li> </ul>
	<p><b>Sunrise</b></p> <p>The time that the sun will rise today.</p>
	<p><b>Sunset</b></p> <p>The time that the sun will set today.</p>

**EXAMPLE**

If you tap and hold the help button, a pop-up window will appear showing information about your controller. This information consist of the serial number (the controller code), the version number and the QR codes for registering your product.



Figure 3-2: Pop-up window with information about your controller.

## 3.2 Key features of top bar and right sidebar

The right sidebar also serves as a system menu that enables you to access the USB menu and the Cloud menu.

The top bar gives you quick access to:

- » Fixed position control
- » Manual valve group control
- » The alarm screen

These software elements are discussed in the next few sections.

### 3.2.1 System menu

The appearance of the right sidebar can change. By holding down the system time for three seconds, the system menu will slide over the bottom part of the right sidebar. The system menu enables you to open the USB menu and the Cloud menu.

- » Tap and hold the system time icon .

The system menu appears. You will see the following:

	<p><b>USB menu</b></p> <p>This button opens the USB menu. The USB menu includes a number of options, such as saving your data on a USB stick.</p>
	<p><b>Cloud menu</b></p> <p>This button opens the Cloud menu. Here you can label your CloudBox or view status information.</p>

	<p><b>Close</b></p> <p>This button closes the sub-menu. The standard right sidebar reappears.</p>
---	---

 The USB menu is available from firmware version 1.2.8 onwards.

**USB menu**

The USB menu looks as follows:

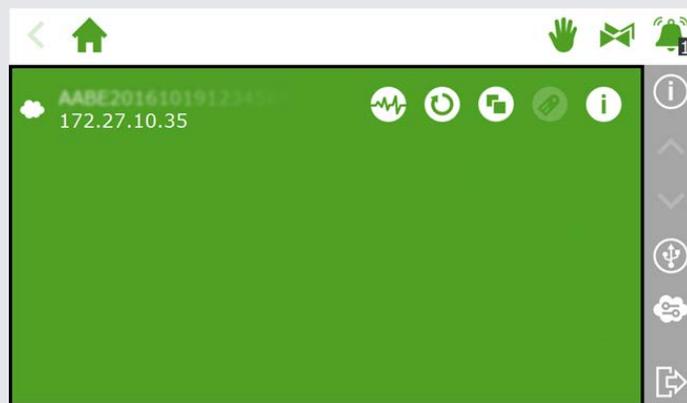
	<p><b>USB help</b></p> <p>This button opens a help screen with a QR code. If you scan the QR code, the corresponding online help page will open.</p>
	<p><b>Save to USB</b></p> <p>This button enables you to save settings and log data on a USB stick.</p>
	<p><b>Load files</b></p> <p>This button enables you to load the settings saved on a USB stick onto the controller. These settings will overwrite your current settings.</p>
	<p><b>Firmware update</b></p> <p>This button enables you to update your firmware.</p>
	<p><b>Close</b></p> <p>This button closes the USB menu. The system menu will reappear.</p>

**Cloud menu**

The Cloud menu contains information about your CloudBox or Boxes.

**EXAMPLE**

The Cloud menu looks as follows:



*Figure 3-3: Cloud menu with a CloudBox*

The Cloud menu icons have the following meanings:

	<p><b>CloudBoX</b></p> <p>This is a CloudBoX. Here you will find the box code and network settings.</p> <p>A warning icon will appear when your CloudBoX licence has expired.</p>
	<p><b>Status CloudBoX</b></p> <p>Tap this button to bring up status information relating to your CloudBoX, such as its version number and the controller that the CloudBoX is linked to.</p>
	<p><b>Reset CloudBoX</b></p> <p>If there are connection problems, this button enables you to reset the CloudBoX.</p>
	<p><b>Link CloudBoX to current controller</b></p> <p>Use this button to link the controller to the CloudBoX. If this button is inactive, then the link has already been created.</p>
	<p><b>Name controller</b></p> <p>Use this button to name the controller.</p>
	<p><b>Display CloudBoX QR code</b></p> <p>Tap this icon to display the QR code of your CloudBoX.</p>

If the 'Link CloudBoX to current controller' and 'Name controller' icons are inactive, then your CloudBoX has not been authorized.

### 3.2.2 Fixed position control

The various climate control are set to a fixed position (0 or off) by default. You can manage the fixed position settings on the fixed position screen.

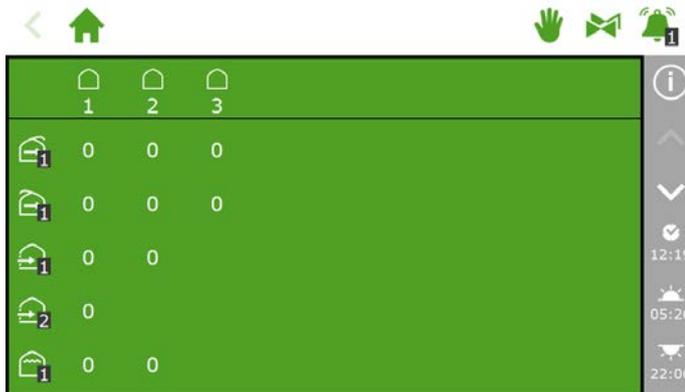


Figure 3-4: Fixed position screen

To open the fixed position screen, tap the fixed position icon '

- » A fixed position  
If you select this option, you can set a fixed position or operating mode.

- » Control mode  
The controller will use the stage control settings.

### Configuring fixed position settings

To configure the fixed position settings, proceed as follows:

- » Tap a value. A pop-up window appears.
- » Select an option:
  - » Enter a fixed position (for example, 40%) or a fixed operating mode (for example, on).
  - » Tap the control mode icon .
- » Tap confirm .

You have now configured the fixed position settings.



Figure 3-5: Configuring fixed position settings



Fixed positions are not adjusted for the climate conditions inside your greenhouse and they apply for the entire day. The fixed position function enables you to adjust a system to a particular position quickly without altering any of the other software settings.

### 3.2.3 Manual valve group control

If a manual valve group start is executed, the irrigation program will activate the valves assigned to the group and apply the preprogrammed recipe. You can activate a valve group manually on the **Manual valve group control** screen.

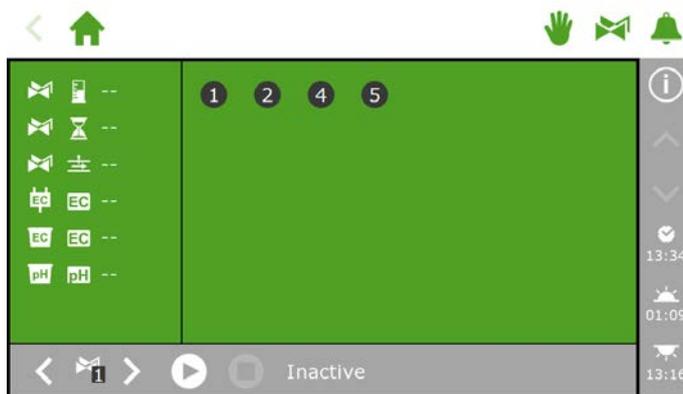


Figure 3-6: The **Manual valve group control** screen

- » Tap the manual valve group control icon '👉' on the top bar.
- » Select a valve group (bottom left).
- » Tap the activate icon '▶'.

You have activated a valve group.

The **Manual valve group control** screen displays the valve group details, such as the volume, the duration and which valves are active.

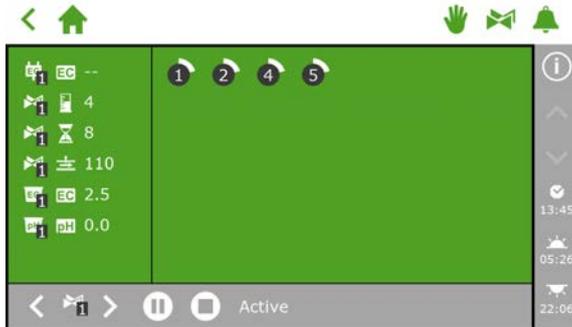


Figure 3-7: Active valve group



If you want a different recipe to be applied for a manual valve start, you can change the EC, pH and volume settings of the valve group. Don't forget to change the settings back afterwards. An alternative method is to assign the desired valves to a group that is still 'free'. You can program different recipe settings for this group without changing your standard recipes.

### 3.2.4 Alarm screen

On the top bar, there is a bell icon '🔔' that enables you to access the alarm screen. When this bell is active, it means that an alarm is currently present.

- » Tap the (active) bell '🔔'. The alarm screen opens.

The alarm screen contains information about your current alarms and your alarm history. If you open the alarm screen and no alarms are currently present, then the following text will be shown: No alarms present!



Figure 3-8: The alarm screen

The alarm screen lists the following for each alarm: status, location, time and corresponding message.

If you tap an alarm, a pop-up will appear with detailed information on the alarm. This is also where you can acknowledge the alarm. If you acknowledge an alarm, it will be reset. However, if the cause of the alarm has not yet been resolved, then the alarm will probably return almost immediately.

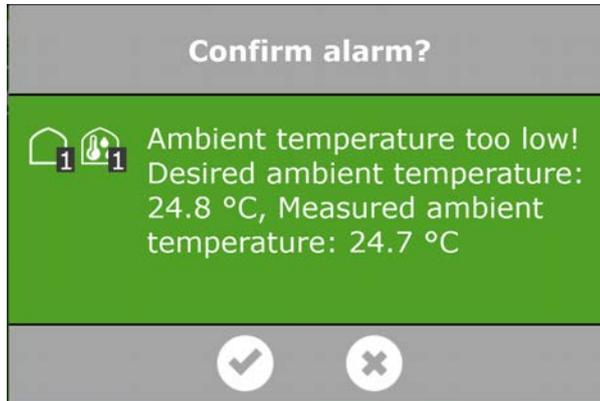


Figure 3-9: Alarm

 If you want to acknowledge more than one alarm simultaneously, proceed as follows:

- » Tap and hold the alarm condition icon .

The alarms have been acknowledged.

At the bottom of the alarm screen, you will find the following buttons:

	<p>Switch alarm off</p> <p>This enables you to disable the bell of an active alarm.</p>
	<p>Alarm condition</p> <p>This button is selected by default. The current situation is displayed.</p>
	<p>Historical alarms</p> <p>This enables you to view historical alarms. If you tap this button, you can use the arrow keys to select the desired date. Historical alarms are saved up to one year.</p>

Alarm values can be set for various controls. These alarm limits can be found under the tiles with the alarm limits icon .

### Alarm notification upon restarting

The Meteo-Go! is not immediately fully operational after a restart. As a result, the following alarm messages will appear: 'wind speed offline' and 'wind direction offline'. You can acknowledge these alarms when the Meteo-Go! starts sending new measurement data. This takes at least five minutes. If there is hardly any wind (< 0,5m/s), then this will take longer. For safety purposes, the HortiMaX-Go! will use the windward side for the roof and side ventilation.

### 3.3 Common icons

As you browse through the screens of the various control (e.g. climate, irrigation and weather), you will come across icons representing certain settings and readouts. The table below explains the meaning of these icons.

What information is available / which icons are displayed varies for each control.

	General settings	Tapping this icon will take you to the general settings. Here you can view and modify the settings of a particular control.
	Alarm limits	Tapping this icon will take you to the alarm limits. Here you can specify when an alarm should be generated. You can set the limits, and check and adjust them.
	Readout screen	This screen displays the readouts available for a particular control, for example, the status of the control or the last time that the control was activated. You can only view the current data on this screen; you cannot modify any of the data.
	Historical information	Here you can view the historical data of a particular control. This 'report' contains relevant data taken over a 24-hour period, for example, the average ambient temperature.
	Access to graphs	The graph shows the trend of the data associated with that control.
	Advanced settings	A number of control include advanced settings. This means that these control use the readout values of other control. Example: the outside temperature measured by the weather station.
	Statistical information	This displays the following statistical information: average, maximum and minimum values.
	Configuring stage control ----- Settings screen for irrigation control	<p>This enables you to set up stage control. To do this, you first need to determine:</p> <ul style="list-style-type: none"> <li>» The desired temperature and humidity levels</li> <li>» How the temperature and humidity levels should be controlled</li> <li>» When the above settings should apply</li> </ul> <p>For more information, please see "Stage control" on page 24.</p> <p>-----</p> <p>Here you can set the following for irrigation control:</p> <ul style="list-style-type: none"> <li>» Periods</li> <li>» Duration and volume</li> <li>» Dosing fertilizers</li> <li>» Start conditions</li> </ul> <p>For more information, please see "Irrigation control" on page 36.</p>

	Access to sensor calibration	Tapping this icon will open the calibration menu. This enables you to calibrate the EC and pH sensors.
	Assigning valves to valve groups	Tapping this icon will open a pop-up window where you can assign valves to a valve group. See also: "Assigning valves to valve groups" on page 36.
	Valve group status	Here you will find information about a valve group, such as status, current volume and duration.
	Manual valve start	This enables you to select valves manually and instruct them to open immediately (also referred to as a 'manual valve start'). See also: "Manual starts" on page 39.

## 4 Climate control

This chapter contains more detailed information about the climate control program.

By default, all connected equipment associated with climate control is set to a safe, fixed position. Vents and screens are set to 0%; various other equipment such as heaters and the cooling system are switched off. Before you can start using the climate control program, you need to configure certain settings and control.

» Settings

Each component of the climate control program has its own group of settings. For example, the leeward side includes the *Maximum position rain* setting, and the hot air heater includes the *Minimum time on* setting. You can find a component's settings under settings  or advanced settings  depending on the component.

» Controls

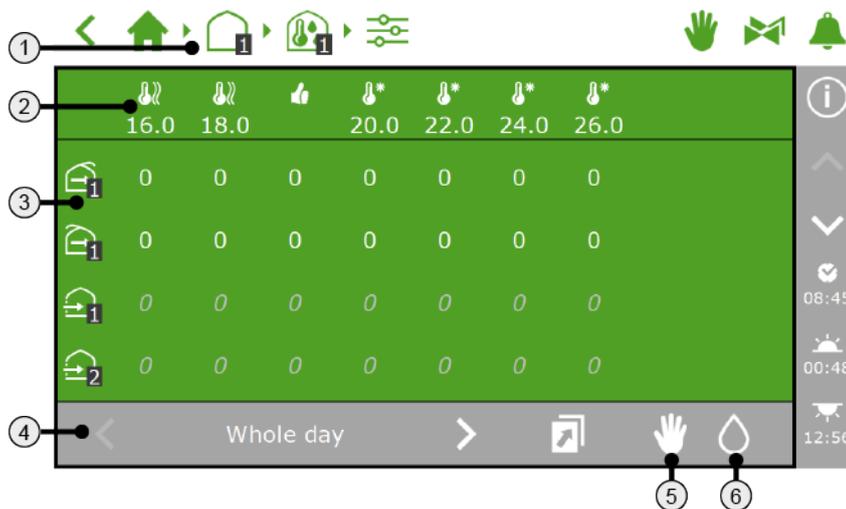
The climate control program consists of the following control:

- » Stage control
- » Fixed position control
- » Humidity control
- » Automatic control
- » Screen control
- » Thermal inversion control

### 4.1 Stage control

The HortiMaX-Go! controls the climate in your greenhouse based on predefined stages.

This means that the stage settings form the basis of the automatic climate control program. You can program the stage settings on the stage screen. To open the stage screen, you can navigate this path for example:      .



1. **Breadcrumb trail** You can also open the stage screen directly from various control screens.
2. **Stages** There are three types of stages: a heating stage, a neutral stage and a cooling stage. By setting the limit value of a stage, you can specify when the settings of that stage should be applied.
3. **Control with specific settings** The icons represent the control that you can program for the zone selected. You can set the position or operating mode of a control for each stage.
4. **Periods** This displays the period during which the climate will be controlled automatically based on the predefined stages. This is called 'stage control'.
5. **Fixed position control** The fixed position function determines whether stage control is in effect or not. Tap this icon to display how the fixed position function has been programmed.
6. **Humidity control** The stage screen enables you to program the humidity settings. Tap this icon to program the humidity settings.

#### 4.1.1 Breadcrumb trail

To open the stage screen, you can navigate this path for example:



The stage settings are programmed for each zone individually. The number in the zone icon  indicates which zone has been selected.

#### 4.1.2 Stages

You can set up three types of stages:

- »  Neutral stage  
This is the desired ambient temperature in the zone selected.
- »  Heating stage  
If the ambient temperature drops below the limit value, then it is too cold in the zone in question. This means that the zone will need to be heated.
- »  Cooling stage  
If the ambient temperature rises above the limit value, then it is too warm in the zone in question. This means that the zone will need to be cooled.

##### EXAMPLE



The desired ambient temperature is between 18.0 and 20.0°C. The first heating stage starts when the temperature drops below 18.0°C. The first cooling stage starts when the temperature rises above 20.0°C.

### Setting number of stages

You can set multiple heating stages (up to 2) and multiple cooling stages (up to 6). This enables you to control the ambient temperature in the zones even more accurately.

Use the *Number of heating stages* and *Number of cooling stages* settings to program the number of stages. To access these settings, you can navigate this path on the

display: 

### Setting limit value

You can adjust the limit value (temperature) of a stage.



Make sure that the limit values are not too close together. This may result in erratic control behaviour due to the stages changing too frequently.

Bear in mind the following when setting the limit values:

- » The heating stages are activated once the measured ambient temperature drops below the set limit values.
- » The cooling stages are activated once the ambient temperature rises above the set limit values.

Complete the following steps to set a limit value:

- » Tap the stage icon for which you want to adjust the limit value. A pop-up window appears.
- » Set the desired limit value.
- » Tap confirm .

You have set the limit value.

### Disabling a stage

You can disable a stage.

- » Tap the stage icon of the stage that you want to disable. A pop-up window appears.
- » Tap the disable stage icon .
- » Tap confirm .

All control associated with a disabled stage are deactivated.



Figure 4-1: A disabled cooling stage

### 4.1.3 Control with specific settings

On the stage screen, you can set the desired position or action for each control.

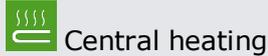
The icons of the control are arranged vertically, one below the other, on the left-hand side of the stage screen. You can set the desired position or action for each of these control (icons). What you can set depends on the control. This may be:

- » A position between 0 and 100% (this is the case for control with open/close outputs, such as roof ventilation, side ventilation, indoor screening and outdoor screening).
- » On or off (for example, for cooling, humidification and hot-air heating).
- » Automatic control (how the automatic mode works is specific to each control and depends on the equipment associated with that control).
- » A value (for example, for central heating and CO<sub>2</sub> valves).

For each control, the fixed position option needs to be set to control mode . If this is not the case, the stage settings will be greyed out and will not be used.



The controller does not check whether the programmed stage settings make sense. If the stages are not set correctly, the system may, for example, simultaneously cool and heat your greenhouse under certain conditions. That is why you should always check the stage settings that you have programmed carefully.

**SETTING VALUE**

Central heating

You can set a value (in °C) for the pipe temperature or select automatic mode. If you select automatic mode, the pipe temperature will vary in order to achieve the preset stage temperature.

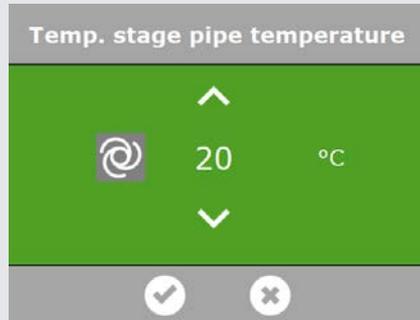


Figure 4-2: Setting pipe temperature

CO<sub>2</sub> valve

You set a maximum value in parts per million (ppm). Once this value is exceeded, CO<sub>2</sub> supplementation will stop.

You can set a different value for each temperature stage. For example: During warm weather, ventilation will be high (the cooling stage will be active). This means that supplementing CO<sub>2</sub> in the greenhouse will be expensive. It is usually unnecessary to supplement CO<sub>2</sub> at night. During this period, either disable CO<sub>2</sub> supplementation or select a very low target value.

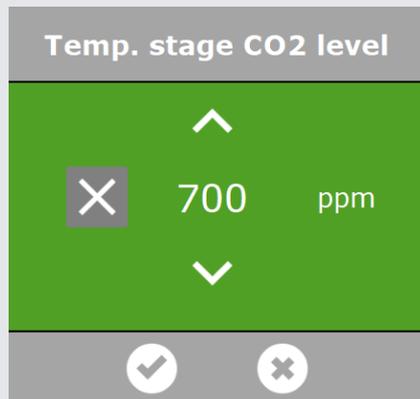


Figure 4-3: Setting the desired CO<sub>2</sub> level

**4.1.4 Periods**

Use periods to vary target values throughout the day. You can set up to four periods (for each zone) per day.

To set periods, tap the period at the bottom of the stage screen. The **Set periods** screen will appear.

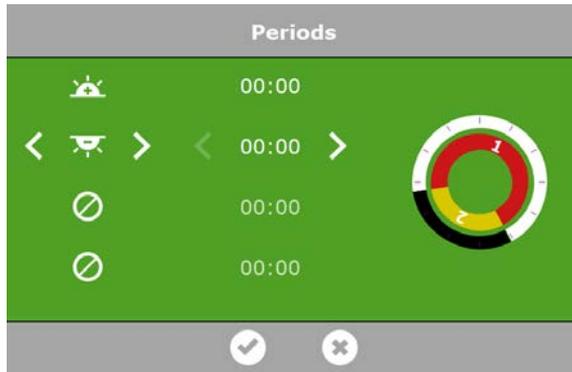


Figure 4-4: Setting periods

On the left-hand side of the **Set periods** screen, you can select the type of start time for a period. You can select a start time based on clock time, sunrise or sunset. The icons displayed have the following meaning:

	Start time based on clock time		
	Start time before sunrise (e.g. 1 hour before sunrise)		Start time after sunrise (e.g. 1 hour after sunrise)
	Start time before sunset		Start time after sunset

The circles on the right-hand side represent the 24-hour clock. The outer circle displays the day period in white and the night period in black. The inner circle displays the set time periods. Each period is represented by a coloured section containing a number.

**!** If periods overlap, the highest period number will apply.



Figure 4-5: Periods in 24-hour clock

To set a period, proceed as follows:

- » Select a time indication (clock time, sunrise or sunset).
- » If applicable, enter a time.

- » Tap confirm '☑'.

You have set a period.

**!** If you delete periods and then add them again, the corresponding settings will be retained. Check whether the values set for all the periods are correct.

**EXAMPLE**

Setting day and night periods

- » For period 1, select a start time after sunrise '☀'.
- » For period 2, select a start time before sunrise '🌙'.
- » Tap confirm '☑'.



*Figure 4-6: Setting day and night periods*

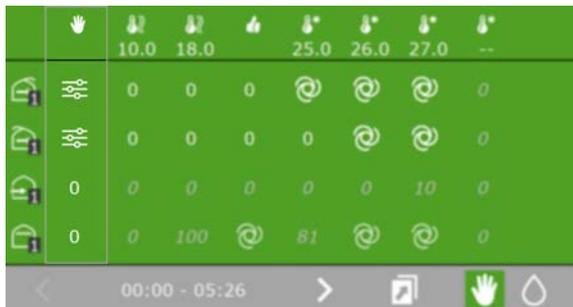
### 4.1.5 Fixed position control

The stage screen displays whether a fixed position is currently being applied or not.

**💡** Open the fixed position screen (see "Fixed position control" on page 18) to view the fixed position settings of all zones on the same screen.

The fixed position icon is displayed on the grey bar of the stage screen.

- » **👁️** Invisible: fixed position settings are not displayed.
- » **👁️** Visible: fixed position settings are displayed on the left-hand side of the stage screen.



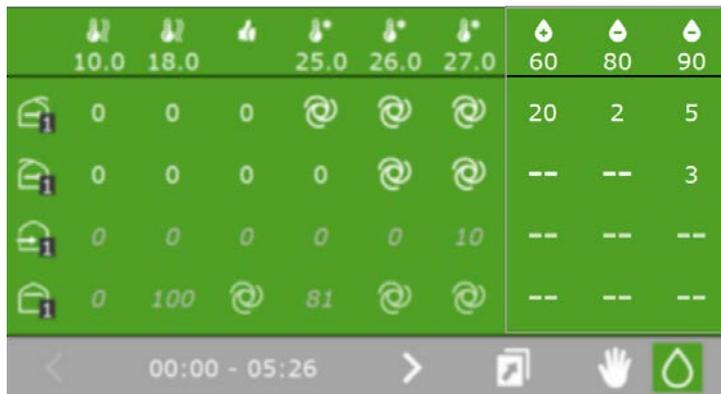
*Figure 4-7: The fixed position settings on the stage screen*

If a control is set to a fixed position, then the settings on the stage screen will not be applied. To apply these settings, the fixed position option must be set to control mode .

### 4.1.6 Humidity control

The stage screen enables you to program the settings for humidity control inside the greenhouse. The humidity control icon is displayed on the grey bar on the stage screen.

- »  Invisible: the humidity settings are not displayed.
- »  Visible: the humidity settings are displayed on the right-hand side of the stage screen.



	10.0	18.0		25.0	26.0	27.0	60	80	90
	0	0	0				20	2	5
	0	0	0	0			--	--	3
	0	0	0	0	0	10	--	--	--
	0	100		81			--	--	--

Figure 4-8: The humidity settings on the stage screen

Humidity control consists of two stages:

- »  The humidification stage: this means that it is too dry.
- »  The dehumidification stage: this means that it is too humid.

As with the temperature stages, you can set a limit value (in this case, the relative air humidity (RH) in %) and you can disable a stage.

The humidity settings are programmed for each control individually.

 The humidity settings for ventilation and screening are limit values. In other words, these values set the minimum or maximum positions of the vents or screens. For example: A higher or lower value may be desirable based on the current temperature, but the vent or screen position is being limited because of the current humidity level.

**EXAMPLE**

When it is too dry or too hot in your greenhouse, you can switch on the humidification system if you have one.

10.0	18.0		25.0	26.0	27.0	60	80	90

Figure 4-9: The settings programmed for humidification control

The settings above mean that the humidification system will switch on when the temperature rises above 25°C and the relative humidity (RH) drops below 60%. If the RH rises too high (above 90%), the humidification system will switch off.

## 4.2 Automatic control

An automatic control mode is available for a number of climate control (such as, screen, pad valve, side ventilation). If you intend to use the automatic control mode, you do not need set any positions or operating modes manually; this is done by the HortiMaX-Go!.

The stage screen enables you to program the automatic control mode for each climate control. This is done for each stage individually.

**EXAMPLE**

You want to set the side ventilation to automatic control for the first cooling stage.

- » Open the stage screen. Navigate this path, for example:



- » Select side ventilation in the first cooling stage. A pop-up window appears.
- » Tap the automatic control icon '@'.
- » Tap confirm '✓'.

You have programmed the side ventilation to be controlled automatically during the first cooling stage.



In order to use the automatic control mode, the fixed position function '' must be set to control mode '.

### AUTOMATIC VENTILATION CONTROL

The automatic ventilation function adjusts the vent position based on the ambient temperature in the greenhouse. This means that as the temperature rises, the further the vents open. The automatic ventilation function takes into account the outdoor conditions such as wind speed and temperature. This enables the controller to maintain the ideal climate in the greenhouse.



Figure 4-10: Automatic ventilation control on leeward side from 22°C.

## 4.3 Screen control

The HortiMaX-Go! provides screen control that combines various functions. These functions are:

- » an energy-saving function based on the outside temperature (thermal screening).
- » a shading function based on the solar radiation level (shade screening).
- » a blackout function based on clock time (blackout screening).

To use these functions, you need to program the screen control settings. You can find the screen settings by navigating this path on the display:

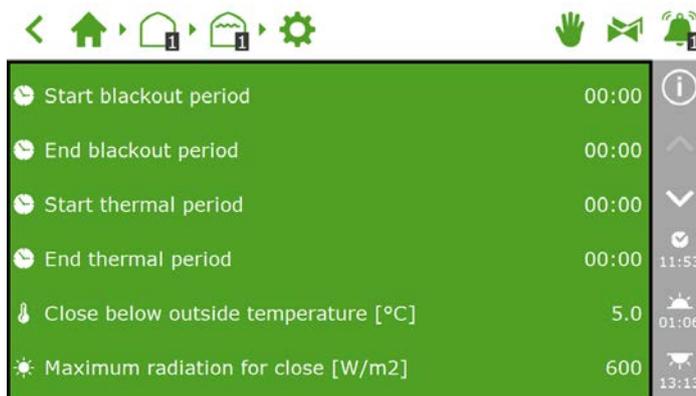


Figure 4-11: Screen settings

### 4.3.1 Blackout screening

Use these settings: *Start blackout period* and *End blackout period*.

Blackout screening is controlled based on time. The programmed start and end times determine when the screen will be closed to prevent external light from entering the greenhouse.

### 4.3.2 Thermal screening (energy saving)

Use these settings: *Start thermal period*, *End thermal period* and *Close below outside temperature*.

The screen will close when the outside temperature drops below the preset value. The thermal screening program is enabled throughout the day unless you have:

- » programmed the *Start thermal period* and *End thermal period* settings to different values.
- » opted for fixed screen positions. You can check whether you have set fixed screen positions on the stage screen.



The controller does not check whether the start and end times overlap. In particular when combining normal clock times and astronomical times (i.e. times in relation to sunrise or sunset), there is a risk that the start time will move past the end time (over time). If the start time is later than the end time, it may result in an unwanted control period.

### 4.3.3 Solar radiation (shade screening)

Use the *Maximum radiation for close setting*.

Shade screening is designed to prevent too much solar radiation (sunlight) from entering your greenhouse. If the radiation level rises too high, it can cause damage to your crops or flowers. The shade screening program is enabled continuously and will monitor the radiation level measured by the weather station.

If the radiation level exceeds the preset value, the screen will close completely.

## 4.4 Thermal inversion control

Use the thermal inversion function to increase the indoor temperature using outdoor air.

The thermal inversion function will open the vents automatically if:

1. The associated settings in the HortiMaX-Go! have been configured correctly.
2. The conditions are right.

### 4.4.1 Settings

If you want to start using the thermal inversion function, you need to program the following:

- I. The *Use thermal inversion override* setting needs to be set to 'Yes'.

- » Navigate the path: .
- » Set the *Use thermal inversion override* setting to 'Yes'.

- II. Heating stage 1 or 2 needs to be set to automatic control.

» Open the stage screen. Navigate this path on the display:



» Set the vents in heating stage 1 or 2 to automatic control .

#### 4.4.2 Conditions

Once you have programmed the HortiMaX-Go!, the thermal inversion function will be applied if:

- » The indoor temperature is lower than the preset heating temperature.
- » The outdoor temperature is at least two degrees higher than the measured indoor temperature.

Under these conditions, the vents are open. Once these conditions no longer exist, the vents will close.



The wind, rain and gale overrides take precedence over the thermal inversion function.

## 5 Irrigation control

This chapter contains more detailed information about the automatic irrigation program.

To control irrigation automatically, you need at least the following Smart Switches: Alarms (includes weather), System Pump and Valves.

You also need to set up the following in the software:

- » Assigning valves to valve groups
- » Duration and volume
- » Dosing fertilizers
- » Start conditions



Just like the climate control program, the irrigation program works with user-definable periods. These can be found at top of the settings screen. To get to this screen, you can navigate this path (for example):

. Tap a period to open the **Set periods** screen. See "Periods" on page 28 for more information.

### 5.1 Assigning valves to valve groups

The irrigation program works based on valve groups. A valve group consists of one or more valves including the start conditions and irrigation settings set for those valves.

To assign valves to a valve group, navigate the following path (for each valve group):

- » Tap assign valves to valve groups . A pop-up window appears.
- » Select the valves that you want to assign to the valve group by tapping them. A white border appears around the selected valves.
- » Tap confirm

You have assigned valves to a valve group.

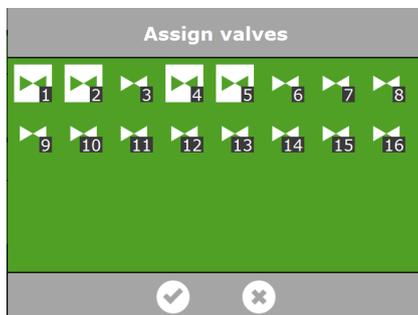


Figure 5-1: Assigning valves



The irrigation program enables you to use a separate valve group for each valve. This means that you can program fertigation recipes for each individual valve.

## 5.2 Duration and volume

To start using the irrigation program, you need to set at least one of these values for the valve group:

- » Volume: the desired volume of irrigation (in litres). To set this value, the system must be equipped with a flow meter.
- » Duration: the amount of time that the valves will be open (in seconds).

You can set the volume and the duration in the settings screen for automatic irrigation. To get to this screen, navigate the following path:

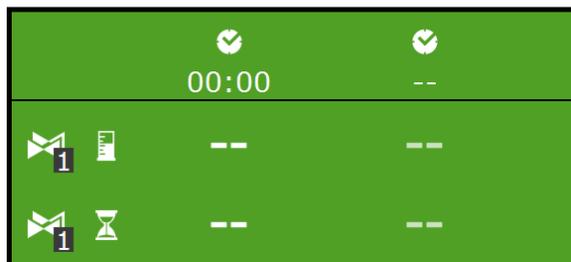


Figure 5-2: You can set the volume and the duration for each predefined period.

- » Tap volume (or duration) in a period. A pop-up window appears.
- » Set the volume in litres in (or the duration in seconds).
- » Tap confirm

You have set the volume (or duration).

## 5.3 Dosing fertilizers

In order for the system to dose fertilizers, you need to set the desired EC value for each valve group.

You can set the volume and the duration on the settings screen for automatic irrigation. To get to this screen, navigate the following path:



The EC (and pH) settings are listed at the bottom; use the arrow down button to get to these settings.



Figure 5-3: You can set the EC (and the pH) for each predefined period.

- » Tap EC (or pH) in a period. A pop-up window appears.
- » Set the desired EC value in mS/cm (or the pH).
- » Tap confirm '☑'.

You have set the EC dose (or pH dose).

### 5.3.1 Dosing ratio

If more than one fertilizer is used, you can set the dosing ratio of each fertilizer. To set the dosing ratios, navigate the following path:

By default, the irrigation program uses the same ratio for all available fertilizers.

- » Tap one of the *Fertilizer dosing ratio* settings (for example, Dosing ratio 1). A pop-up window appears.
- » Enter a percentage.
- » Tap confirm '☑'.

You have entered a fertilizer ratio.



Figure 5-4: Dosing ratio of fertilizers

The HortiMaX-Go! supports up to four fertilizer dosing channels. To set the number of fertilizers, navigate this path:

## 5.4 Start conditions

You can activate a valve or valve group manually or preprogram the start conditions.

### 5.4.1 Manual starts

The irrigation program includes two types of manual starts:

- » Manual valve start  
Use the manual valve start to select valves that need to open.
- » Manual valve group start  
Use the manual valve group start to activate a valve group (with predefined recipes/valves).

#### Manual valve start

- » Navigate the path: <    .
- » Tap the manual valve start icon ''. A pop-up window appears.
- » Select the valves. A white border appears around the selected valves.
- » Tap the activate icon '.

The irrigation program will activate the selected valves using the recipe of the valve group from which you opened the screen and that applies for the current period. The manual valve start tile '' will display when the last manual start was performed.

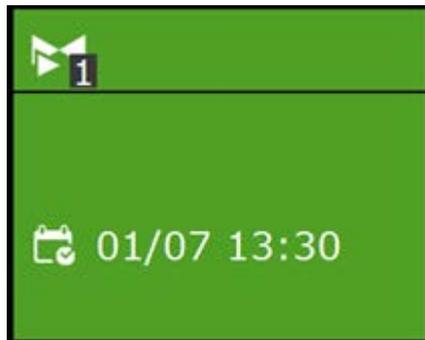


Figure 5-5: Manual valve start tile

#### Manual valve group start

If a manual valve group start is executed, the irrigation program will activate the valves assigned to the group and apply the preprogrammed recipe. You can activate a valve group manually on the **Manual valve group control** screen.

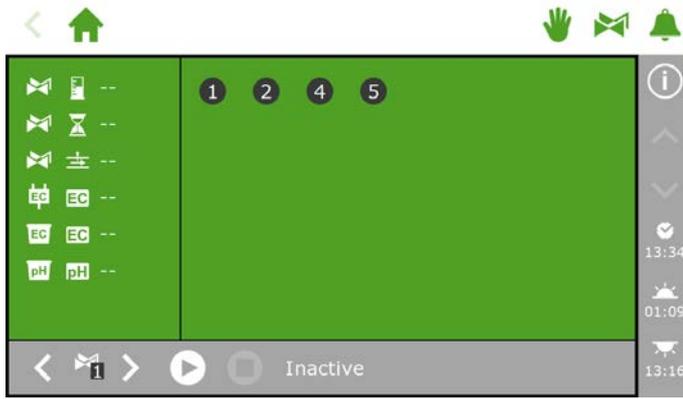


Figure 5-6: The **Manual valve group control** screen

- » Tap the manual valve group control icon '🔌' on the top bar.
- » Select a valve group (bottom left).
- » Tap the activate icon '▶'.

You have activated a valve group.

The **Manual valve group control** screen displays the valve group details, such as the volume, the duration and which valves are active.

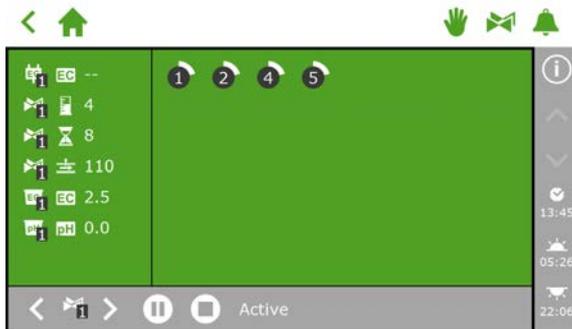


Figure 5-7: Active valve group



If you want a different recipe to be applied for a manual valve start, you can change the EC, pH and volume settings of the valve group. Don't forget to change the settings back afterwards. An alternative method is to assign the desired valves to a group that is still 'free'. You can program different recipe settings for this group without changing your standard recipes.

### 5.4.2 Pre-programming start conditions

The irrigation program includes a number of start conditions that can be preset or preprogrammed:

	<b>Cyclic start</b>	A cyclic start applies for a particular period and valve group. After the preset cycle time, the valve group will be reactivated (i.e. irrigation will start again). The cycle time will be reset after each start (of each type).
--	---------------------	--

	Contact start	The group will be activated when the selected contact is activated.
	Radiation sum start	The group will be activated once the preset radiation sum (J/cm <sup>2</sup> ) is reached. The radiation sum will be reset once the irrigation cycle has been completed and at midnight (0.00 hours).
	Time start - one-off	Start irrigation once on the preset date and time (with the recipe settings applicable at that time).
	Time start - daily	Start irrigation on the selected days at a preset time (with the recipe settings applicable at that time).
	Time start - interval	Start irrigation at the preset time with an interval of a predefined number of days.

To set a cyclic start, contact start or radiation start, navigate this path:

 . Here you can set the start conditions for each period.



		
	00:00	--
 	100	--
 	30	--
 	60	--
 	1	--
 	80	--

Figure 5-8: Irrigation start conditions

You can set the time starts on the **Time start array** screen. Complete the following steps to add a time start:

- » Navigate the path: .
- » Tap the settings icon . The **Time start array** screen will appear.

- » Tap the add icon '+」'.
- » Select the type of time start that you want to add.
- » Enter the associated data.
- » Tap confirm '☑」'.

You have set a time start.

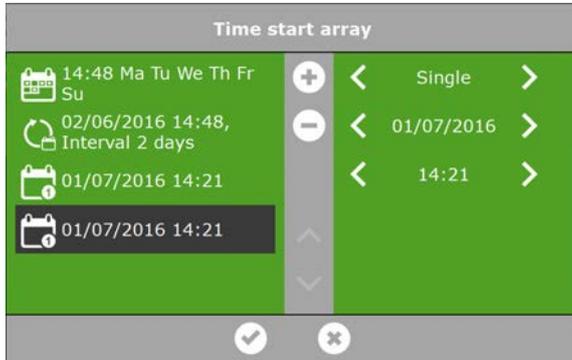


Figure 5-9: Time starts

**!** When automated irrigation starts are executed, the irrigation program will always use the recipe settings of the valve group during the active period. If no period is active, then irrigation will not start automatically.

## 6 Hardware

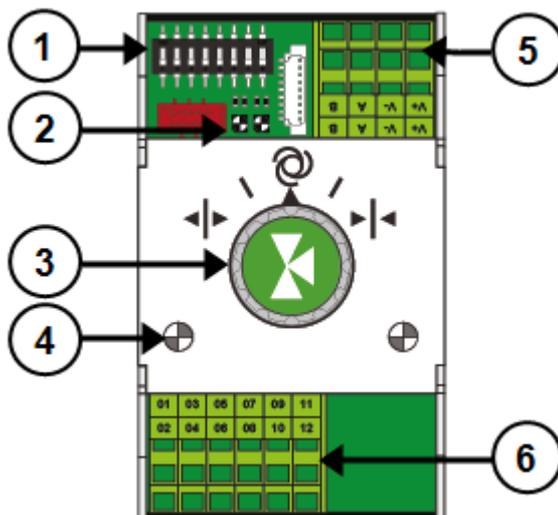
The HortiMaX-Go! uses various hardware:

- » **Smart Switches** Smart Switches are the manual control switches belonging to the HortiMaX-Go!.
- » **Meteo-Go!** The Meteo-Go! weather station is used to measure the solar radiation, outside temperature, outside humidity, wind direction and wind speed. The Meteo-Go! is also capable of rain detection and automatically determining its GPS coordinates.
- » **MTV-Go!** The MTV-Go! is the indoor sensor unit of the HortiMaX-Go!.

### 6.1 Smart Switches

Smart Switches are the manual control switches used for the HortiMaX-Go!. These switches feature an electrical circuit, a processor and software. The Smart Switches perform specific control actions for the equipment connected to them. The switches are advanced control devices that can process a wide range of information, such as status and position detection, and run and operating times. The installation engineer can also connect various contacts to the switches, such as end contacts, emergency stop contacts and thermal cut-out contacts (also called 'thermal protector contacts'). The Smart Switches can use the collected status information to control the equipment in your greenhouse, and can relay also that information to the central HortiMaX-Go! controller. This greatly enhances the reliability of the system. For example, the system will generate an alarm instantly should something go wrong with your equipment.

The main components of the Smart Switches are:



1. DIP switch for setting the Smart Switch address
2. LED indicators for bus communication
3. Manual control knob (optional)
4. LED indicators for control actions active

5. Power supply and bus connections
6. Connection for peripheral equipment

### 6.1.1 LED indicators for bus communication

The switches are connected to each other using a 'fieldbus system'. The fieldbus system enables digital communication between the switches and the controller via a network cable.

When the LED is lit green, it indicates that communication is occurring. When the LED is lit red continuously, it indicates that no communication is possible. This may have various causes:

- » Controller failure
- » Broken cable
- » Wrong cable used
- » Power failure at one of the connected switches
- » Failure of one or more switches
- » Disruption by an external factor such as a frequency controller or high-voltage cable
- » Incorrect ID address (DIP switch position)
- » Incorrect or duplicate terminal resistance installed.

When the LED is lit red, check whether a connection can be made.

Communication problems due to incorrect installation may sometimes only arise after some time or following a system expansion. To avoid such problems, make sure to follow the installation instructions carefully.

### 6.1.2 Manual control knob

The manual control knob on the Smart Switches can either be used to disable automatic control and operate the connected equipment manually, or it can be used to switch the equipment off. If you switch to manual control, the controller will continue to keep track of the status or position of your equipment. This unique feature means that the controller is able to monitor the current situation and the operating times of your equipment with much greater accuracy.

Depending on the Smart Switch, the manual control knob has:

- » Three positions (on/off/automatic), or
- » Five positions (on/off/automatic/open/closed).

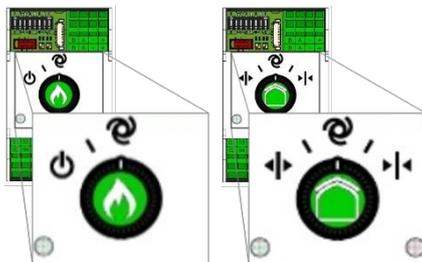


Figure 6-1: Smart Switches with three and five positions

If you use the switch to operate the equipment manually, then all automatic control will be disabled. The tile headers of the relevant control will turn orange and will display the following icon: .

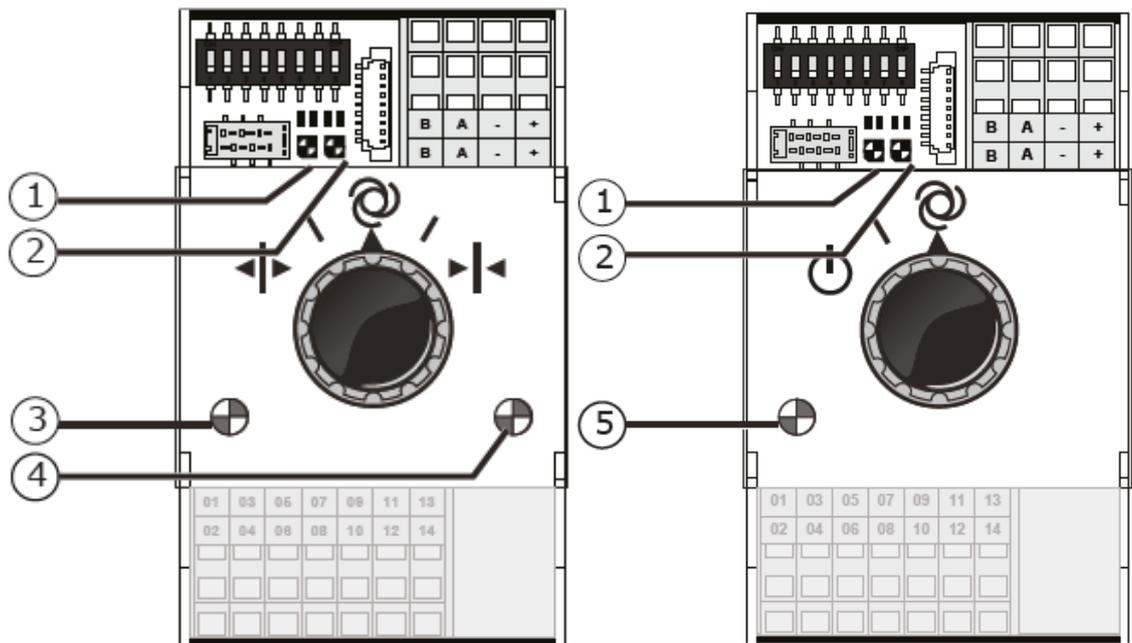
If you turn the control knob back from manual to automatic mode, then the controller will immediately adjust the equipment to the preprogrammed position(s). This is unlike conventional switches where the control first need to be reset or synchronized.



If the controller and/or bus communication are non-operational, the Smart Switches will be unable to control the equipment automatically. However, using the control knob, you will still be able to adjust the Smart Switches manually, so you can turn equipment on / off, or, open / close it. In this situation, the equipment positions and operating times shown by the controller may differ from their actual values.

### 6.1.3 LED indicators for operation

The Smart Switches feature two types of LEDs on the bottom circuit board and the switch covers. Listed below are the meanings of the different LED indications:



<b>1: Green continuous</b>	Communication has been established with the HortiMaX-Go!.	<b>1: Red continuous</b>	No communication has been established with the HortiMaX-Go!. Check whether a connection can be made.
<b>1: Green flashing</b>	Smart Switch control is active. The Smart Switch is controlling the device in question.	<b>1: Red flashing</b>	Smart Switch control is active, but the connected device has generated an alarm. Check the device and remedy the fault.
<b>2: Green</b>	The Smart Switch is receiving data via the bus.	<b>2: Red</b>	The Smart Switch is sending data via the bus.

<b>3: Green continuous</b>	The open output is active. (For example, a vent is being opened.)	<b>4: Red continuous</b>	The close output is active. (For example, a vent is being closed.)
<b>3: Green flashing</b>	The open end position has been reached. (For example: a vent is 100% open.)	<b>4: Red flashing</b>	The close end position has been reached. (For example, the vent is closed.)
<b>5: Green continuous</b>	The output is active. (For example: the pump is switched on.)	<b>3,4: Green and Red flashing</b>	Emergency contact (normally closed contact) active. (Example: Vent emergency stop.)

## 6.2 Meteo-Go!

The Meteo-Go! is the weather station of the HortiMaX-Go!. This compact device is installed outside and collects the weather data required to control the climate and irrigation in the greenhouse automatically. The Meteo-Go! provides the following readings: solar radiation, outside temperature, outside humidity, wind direction, wind speed, rain detection and GPS location detection.



Figure 6-2: Meteo-Go!

If you have more than one controller, then they can share the data from one Meteo-Go!.

**i** Throughout the control software, there are safety overrides that are triggered by key weather readings. The purpose of these overrides is to prevent damage to your greenhouse or crops. The overrides are set to safe default values, but can be adjusted by the user.

## 6.3 MTV-Go!

The MTV-Go! is the indoor sensor unit of the HortiMaX-Go!. It measures the ambient temperature and the relative humidity (RH) level inside the greenhouse. Each climate zone in the greenhouse requires a MTV-Go!. The ambient temperature and the RH level are essential measurements for managing your crop and are therefore critical to automatic climate control.



*Figure 6-3: MTV-Go!*

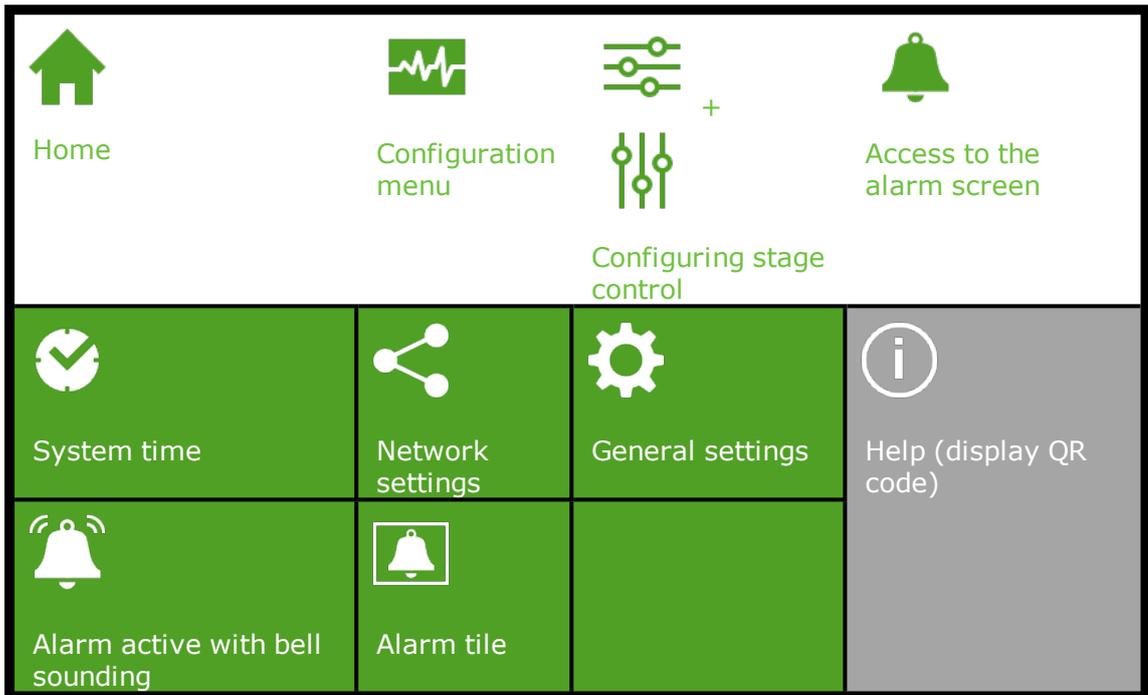
The sensor unit requires little maintenance. This is thanks to the special fan-less design of the MTV-Go! housing and the unit's electronic sensors. Although the housing has been designed to provide the internal sensors with a high degree of protection, do not spray chemicals directly into the housing.

# Appendix

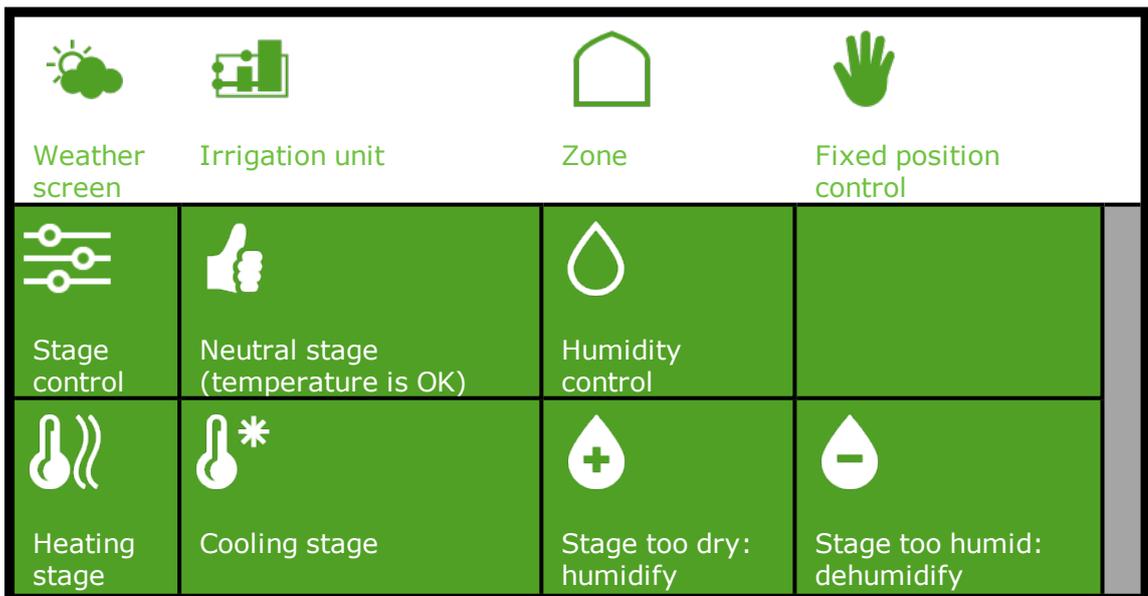
## 7.1 Icons

This section contains icons by topic.

### 7.1.1 System



### 7.1.2 Program components and shortcuts



 Set periods	 Graph	 Advanced settings	 Set counter
 Alarm limits	 Readout screen	 Statistical information	 Historical information

### 7.1.3 Climate controls

 Roof ventilation	 Windward side	 Leeward side	 Side ventilation
 Cooling	 Pad valve	 Pad and fan	 Screen
 Central heating	 Central heating mixing valve	 Standard zone measurements	 Inflation fan
 CO <sub>2</sub> valve	 Humidification (fogging)	 Recirculation fan	 Hot air heater
 MTV-Go! sensor unit	 CO <sub>2</sub> sensor unit	 Cyclic program	 Supplementary lighting

### 7.1.4 Irrigation controls

 System pump	 Filling pump	 EC pre-blending	 Irrigation valve
 Fertilizer dosing	 Acid dosing	 Valve group	
 Assign valves to group	 Valve group status	 Access to sensor calibration	 General settings
 Manual valve start	 Time start	 Radiation sum start	 Cyclic start
 Contact start	 Flow meter		

### 7.1.5 System menu

	 Save to USB	 Load files	 USB menu
 CloudBoX	 Display CloudBox status	 Reset CloudBox	 Cloud menu
 Link CloudBox	 Name controller	 Help (display CloudBox QR code)	 Close menu

**7.1.6 Other software components:**

 Measured flow	 Duration	 Volume	 System time
 Save	 Delete	 Before sunrise	 After sunrise
 Confirm	 Cancel	 Before sunset	 After sunset



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