



**TECNIPLAST**



**DVC**<sup>®</sup>  
DIGITAL VENTILATED CAGE

DVC<sup>®</sup> Master EVO  
Instruction Manual



Please keep in mind that all the instruction manuals and release notes are available at the following web address:

<https://digitalcage-tecniplast.com/en/manuals.html>

**Original instructions for use**

In case of a disagreement between the translation and the original version of this manual or a notice or disclaimer, the original English version will prevail.

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**Technical Support**

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Please refer to the link below to download Tecniplast Environmental Responsibility Policy:

<http://www.tecniplast.it/en/environmental-responsibility.html>



## 1 PREFACE

Dear Customer,

This manual aims to provide the user with all the information and safety standards required for the correct and safe installation, use and maintenance of the machine you have purchased.

Keep the manual in an easily accessible place known by the Installer, the Operator, the Supervisor, and the Service Technician, who should carefully read it to have a clear understanding of the installation, use, maintenance procedures, and hazardous applications to avoid.

This manual is an integral part of the system and should follow it, even in the event of a change of ownership, until final decommissioning.

Should the manual get damaged or lost, a copy can be requested from TECNIPLAST.

To receive technical assistance, spare parts, or optional extras not required on order, contact TECNIPLAST and give the machine serial number, version, and year of manufacture (see label on the machine).

The Operator, the Supervisor, and the Service Technician must know all the standards reported in this manual before using the machine or carrying out maintenance procedures.

### COMPANY CONFORMITY TO ENVIRONMENTAL POLICIES

At TECNIPLAST, both our production facilities and our end products reflect our commitment towards environmental policies in terms of:

- Compliance with the principles and contents of current laws and regulations concerning the environment;
- Reduction of the environmental impact deriving from our activities, maintaining the right balance between environmental, social and economic responsibilities;
- On-going requests for innovative applications to reduce the environmental impact of waste materials and energy consumption and improve the use of natural resources and raw materials.
- Preventive evaluation of the environmental impact of new plants and processes and improvement of existing ones using all possible and economically sustainable solutions to increase our environmental performances.
- Incentivisation and co-responsibility of employees towards this policy using adequate training
- Use of practical tools to communicate the principles and goals of such an environmental policy to our dealers during meetings and training courses;
- Defining the correct use and dismantling instructions during the design and development of new products to minimise environmental impact.

Please refer to the link below to download Tecniplast Environmental Responsibility Policy:  
<http://www.tecniplast.it/en/environmental-responsibility.html>



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## 2 DVC® MASTER EVO DEFINITIONS AND REQUIREMENTS

The DVC® Master EVO is the device designed to power and exchange data with the DVC® boards installed on the DVC® Rack(s) on one side and the DVC® server on the other side.

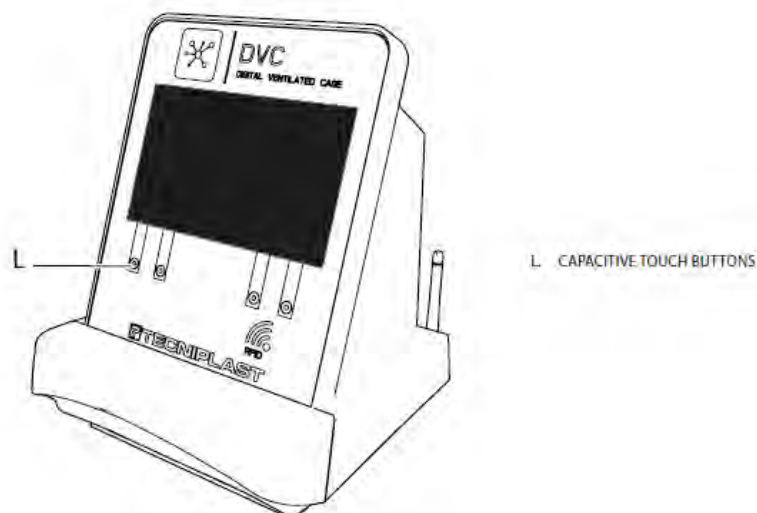
It is a LINUX machine, with a specific distribution developed by the DVC® software team, preferably installed on top of the Tecniplast AHU (or below the Tecniplast SkyFlow Unit).

The DVC® Master EVO is physically placed in the Animal room and requires a hardwired connection to reach the DVC Server. We highly avoid wifi connections because we need a stable 24/7 connection.

The frontal part of the device is composed by a touchscreen area where the user can interact with the interface.

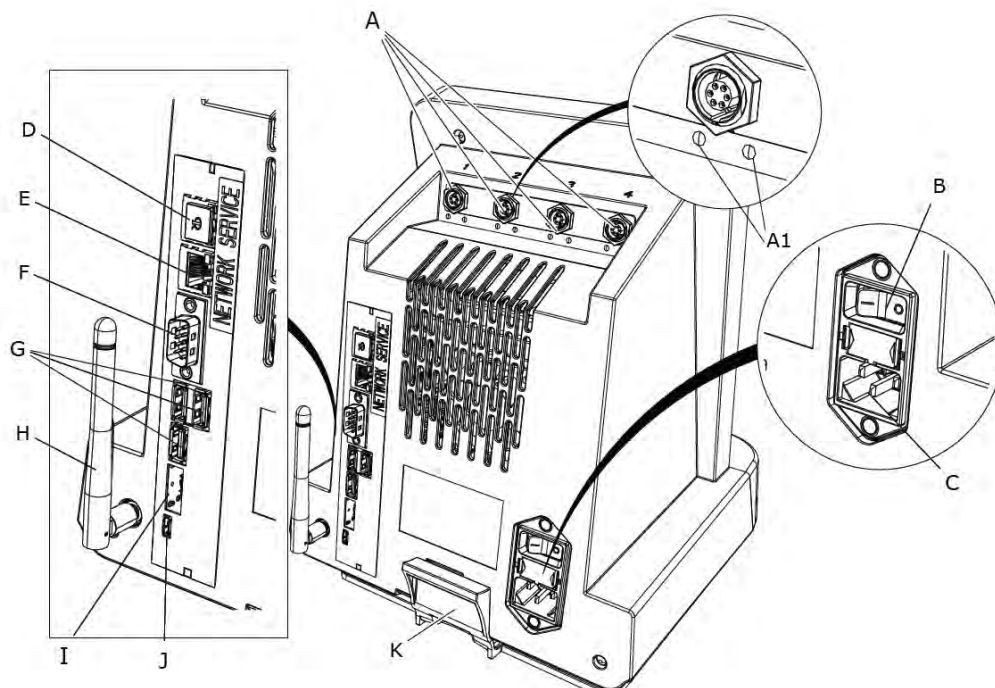
Just below the touchscreen area there are 4 capacitive buttons that help the users to click the corresponding below areas of the interface.

On the bottom right side there is an RFID area designed potentially to read badges in the future (not enabled yet).



On the rear side of the device, on the left part, there are 2 different Ethernet sockets available on the device:

- SERVICE is purely dedicated to the Service activities (DO NOT USE IT)
- NETWORK is the physical ethernet port to plug the ethernet cable into.



- A. RACK CONNECTION PORT\*
- A1. POWER AND COMMUNICATION LEDS
- B. ON/OFF SWITCH
- C. POWER SUPPLY
- D. RJ45 PORT (SERVICE)
- E. RJ45 PORT (NETWORK)
- F. SERIAL PORT
- G. USB PORTS
- H. WIFI ANTENNA
- I. HDMI CONNECTION PORT
- J. USB C PORT
- K. SUPPORT PLATE



\* Each port (e) is available for 1 rack side.

Up to 4 single sided racks/2 double sided racks (or a combination of them) may be connected to one DVC® master.

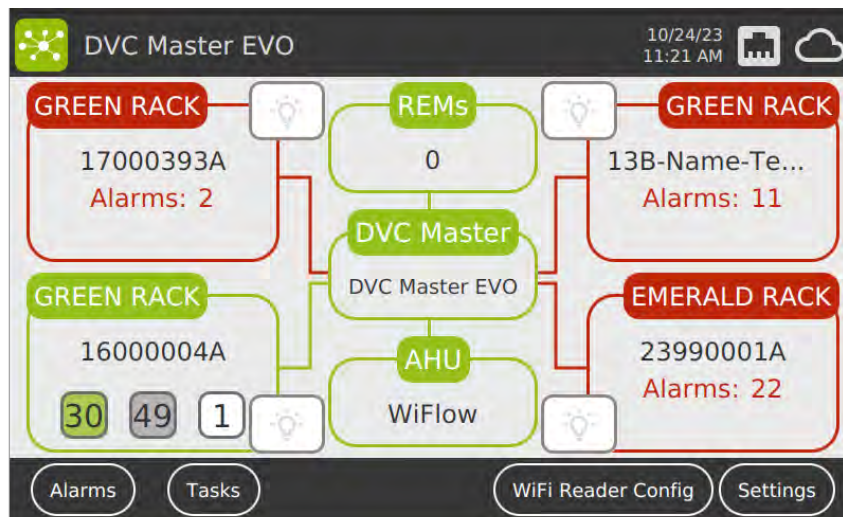
Moreover, on top of the rear side, there are 4 different CAN PORTS to connect the DVC® racks (up to 4) through specific custom-made cables (the DVC CABLE). Please pay attention to the fact that a double-sided DVC® Rack is “considered” as 2 individual DVC® Racks (side A and side B), and therefore, it requires to use 2 CAN PORTS.

There is no specific requirement to which port to connect the DVC® Rack. It has “just” a graphical consequence on how the DVC® Rack is displayed on the graphical interface.



### 3 DVC® MASTER EVO HOME PAGE

Once the DVC Master EVO is switched on, if properly configured and connected to the DVC® Server, after a while, it displays the following page:



This home page recaps:


- The name of the DVC® Master ("DVC Master" in this example)
- All the different DVC® Racks attached to it (4 in this example)
- The type of AHU attached to it (Wiflow in this example)
- The # of REMs attached to it (0 in this example)

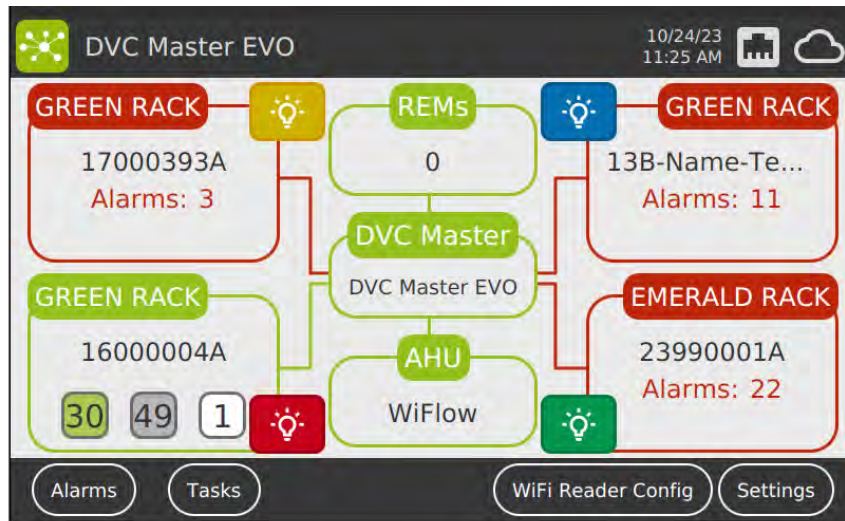
Each DVC® Rack block displays:

- Type of the Rack (GREEN – EMERALD – ISO)
- The Rack name (usually the S/N assigned to it)
- The number of active alarms (if any)
- If there are no alarms: the number of registered cages (green), not registered cages (grey) and empty cage slots (white).



On the bottom area, there are 4 different buttons:

- **Alarms:** it recaps all the active alarms generated by the cages inserted in the attached DVC® Racks.
- **Tasks:** it recaps all the tasks generated today for all the cages inserted in the attached DVC® Racks.
- **Wifi Reader Config:** Setting feature capable of setting the RFID Readers to connect to the DVC® Master
- **Settings:** general settings.

Then, it is possible to illuminate the first two top rows of each DVC® Rack shown in the home page by clicking the corresponding icon: 

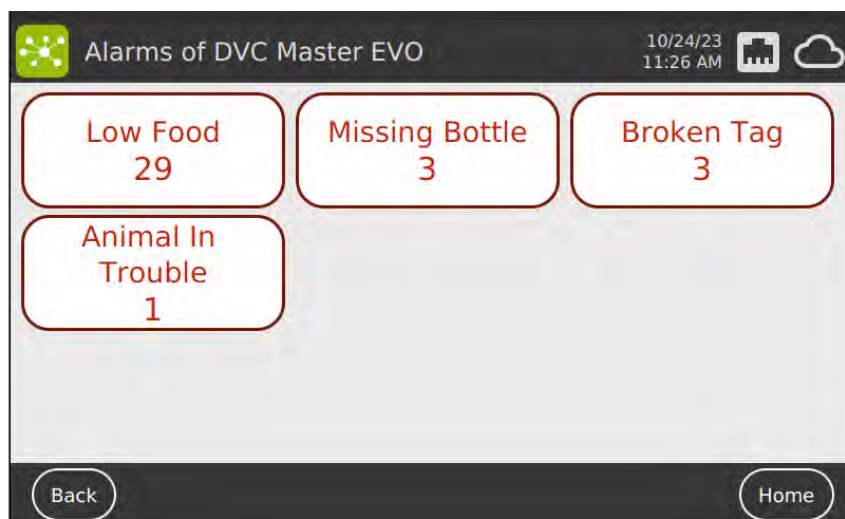


Finally, on the top right side part of the touchscreen, there is some important information:

- Date and time of the day
- Icon to confirm that the DVC® Master is correctly connected to the network 
- Icon to confirm that the DVC® Master is communicating with the DVC® Server 

### 3.1 ALARMS

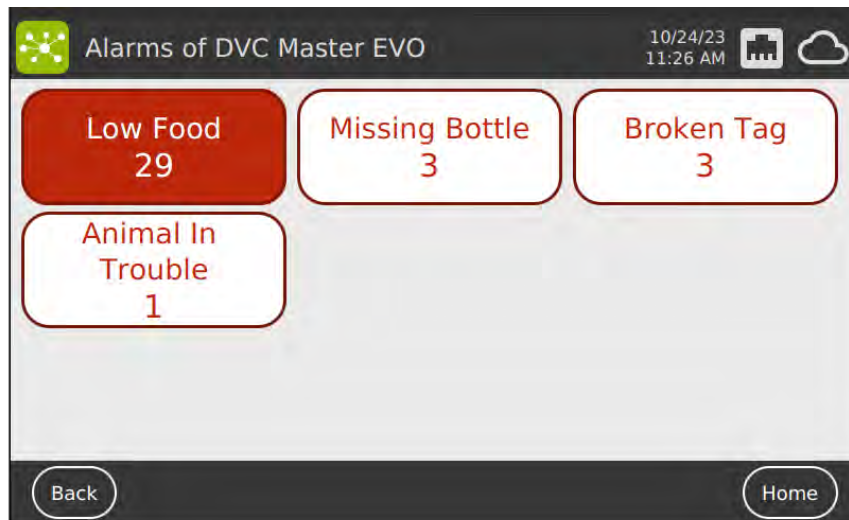
As described above, when the user clicks on the ALARM button while in the Home Page area, the DVC® Master displays all the currently active alarms generated by the cages connected to this DVC® Master:





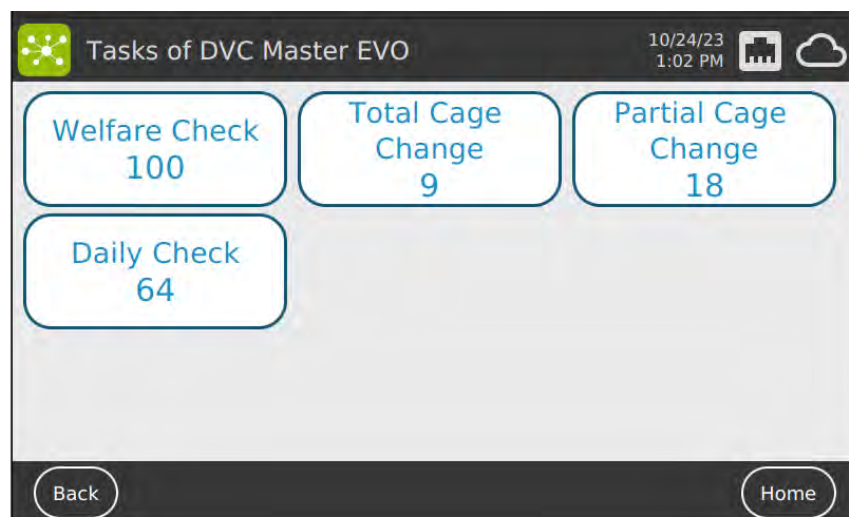


By clicking one of these alarms (and only one at a time), the corresponding cages with the selected alarm will be physically illuminated at the DVC® Rack level.



### 3.2 TASKS

The same simple workflow is applied to the whole tasks generated by the DVC® System for the registered cages managed by this DVC® Master:



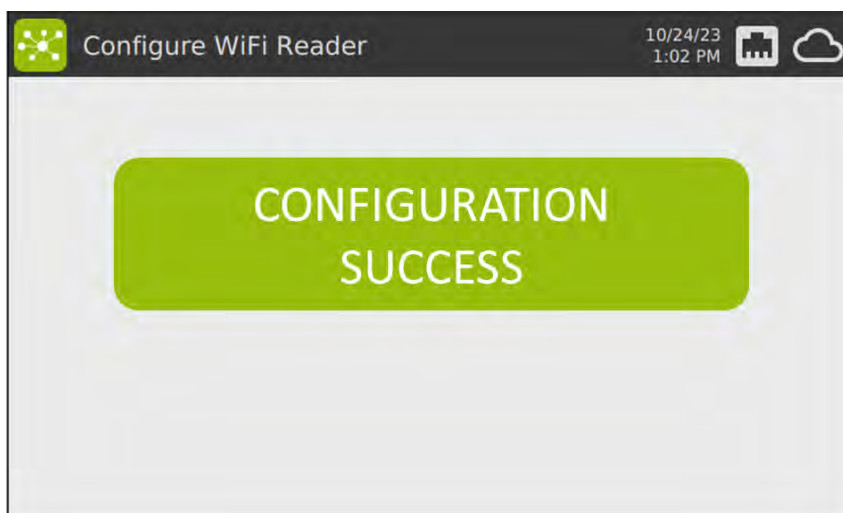
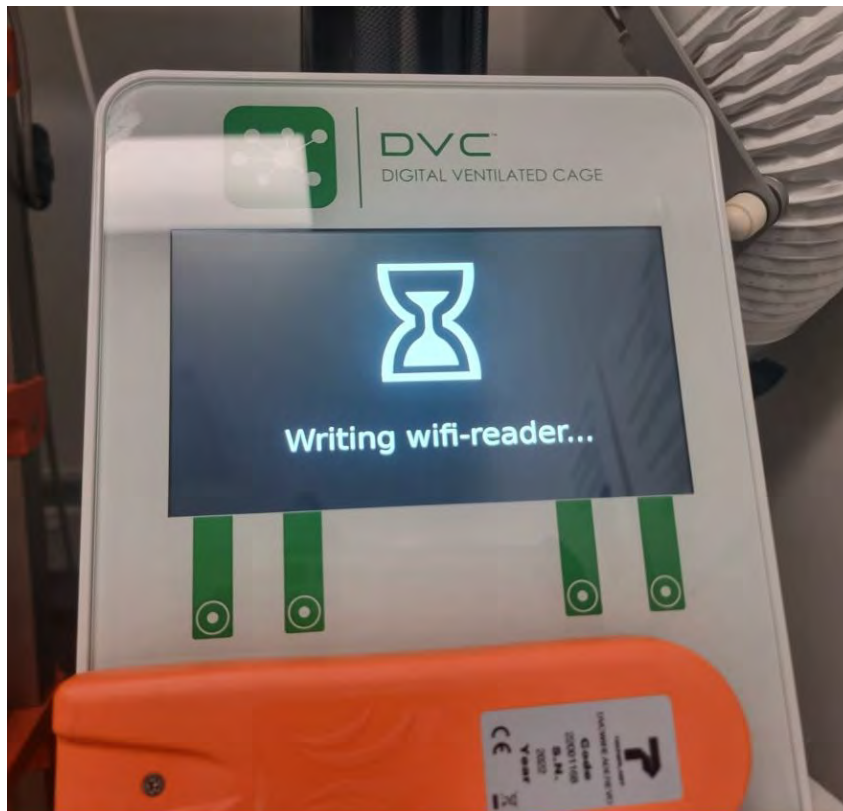
By clicking one task type (and only one at a time), the corresponding cages will be physically illuminated at the DVC® Rack level.



### 3.3 WIRELESS CONFIGURATION

This button must be pressed when the Wifi Reader has to be configured. The proper workflow is the following:

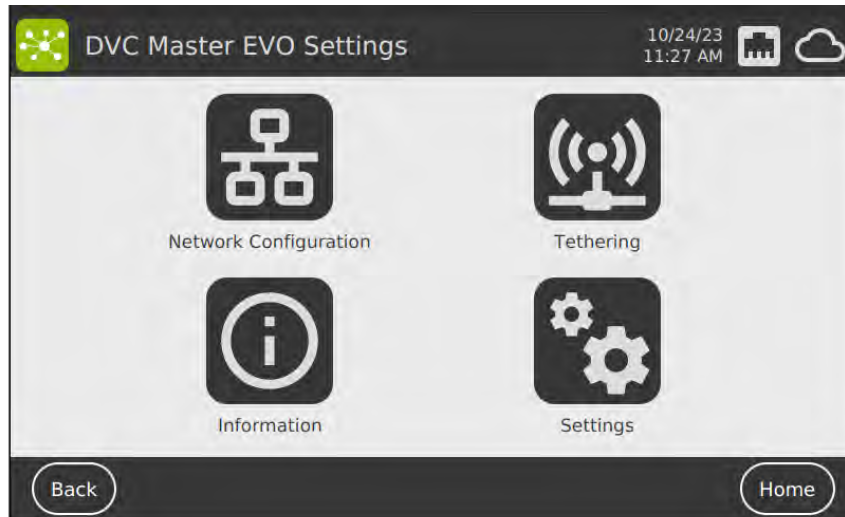
- Click the "Wireless Configuration" button
- Place the Wi-Fi reader in the proper position, as shown in the below picture
- If performed correctly, the DVC® Master shows the "Success" message.





## 3.4 SETTINGS

In case the setting button has been pressed, the user enters into another menu:



The "Network Configuration" button is secured under a password because it is dedicated to the IT configuration of the device and must be used by authorised personnel only.

Vice versa, the other buttons can be clicked to enter on other pages. When clicking "Tethering", you access a page where some information is displayed:

- Tethering Status: ON (or OFF)
- Tethering SSID: Name of the Wi-Fi network (Tecniplast in this example)
- Tethering Password: password of the network (12345 in this example)

PLEASE NOTE that this network is needed to connect the DVC® WIREADER and/or the DVC® Top Holder EVO devices to the DVC® Server (through the DVC® Master that acts like a gateway).

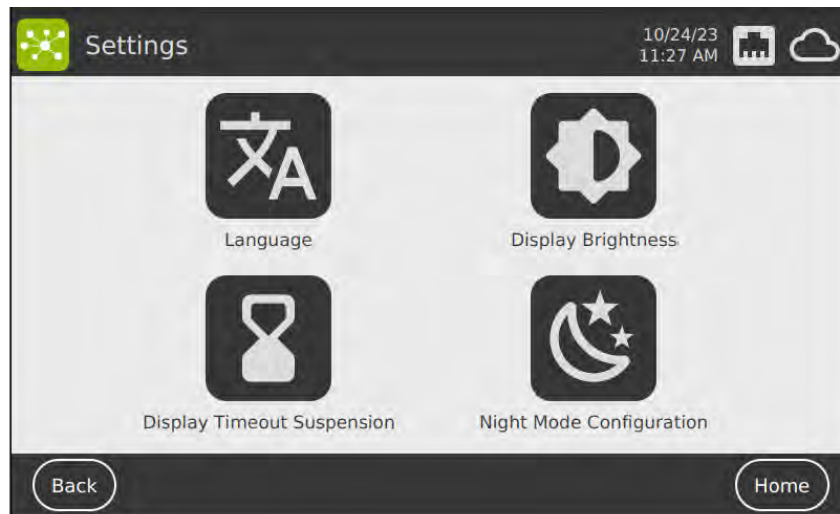


| Tethering           |            |
|---------------------|------------|
| Tethering Status:   | ON         |
| Tethering SSID:     | Tecniplast |
| Tethering Password: | 12345      |

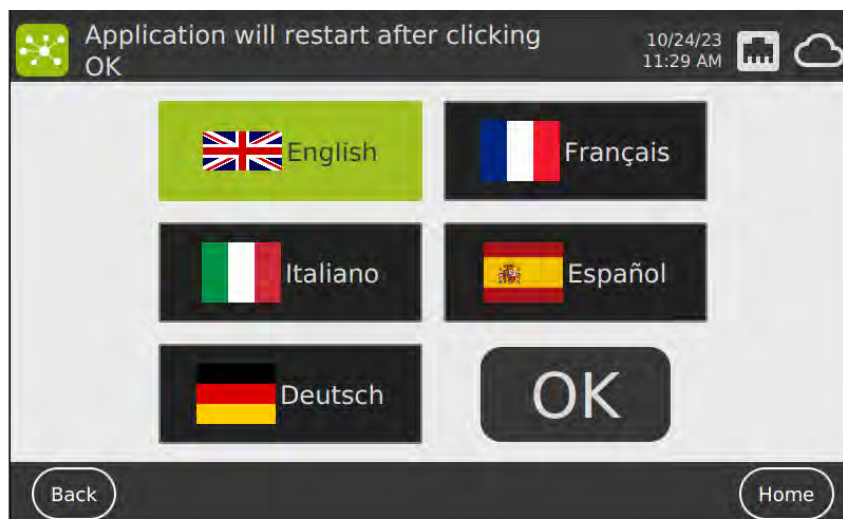
By clicking the button "Information", the information shown is mainly regarding the DVC® Master release versions and some alarm status (if enabled or disabled).

| Device Information        |   |
|---------------------------|---|
| DVC Master GUI Version:   | UNKNOWN                                 |
| DVC Master Version:       | UNKNOWN                                 |
| Broker IP Address:        | UNKNOWN                                 |
| Time Zone:                | Europe/London                           |
| Connected Rack Serials:   | 17000393A 16000004A 23200521A 23990001A |
| Connected Readers Count:  | 0                                       |
| Flooding Type:            | UNKNOWN                                 |
| Bottle Alarms Enabled:    | UNKNOWN                                 |
| EM Bottle Alarms Enabled: | UNKNOWN                                 |
| Food Alarms Enabled:      | UNKNOWN                                 |

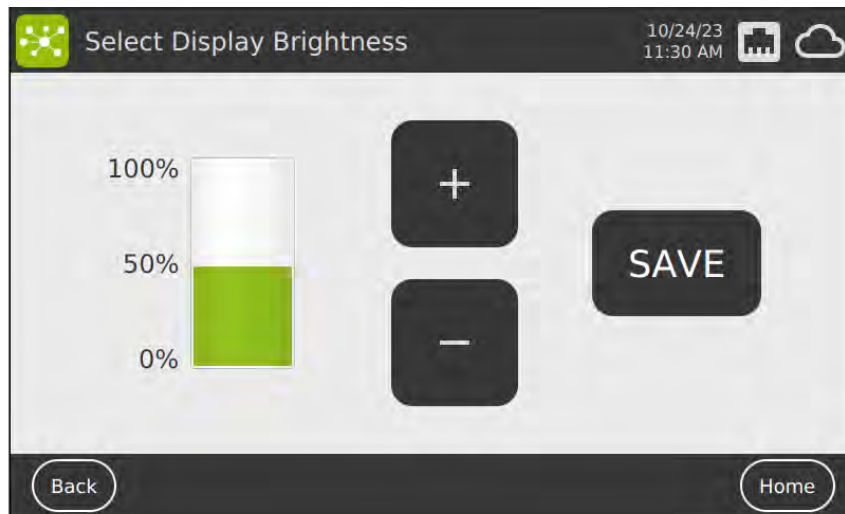
Lastly, by clicking the button "Settings" it is possible to set different features:



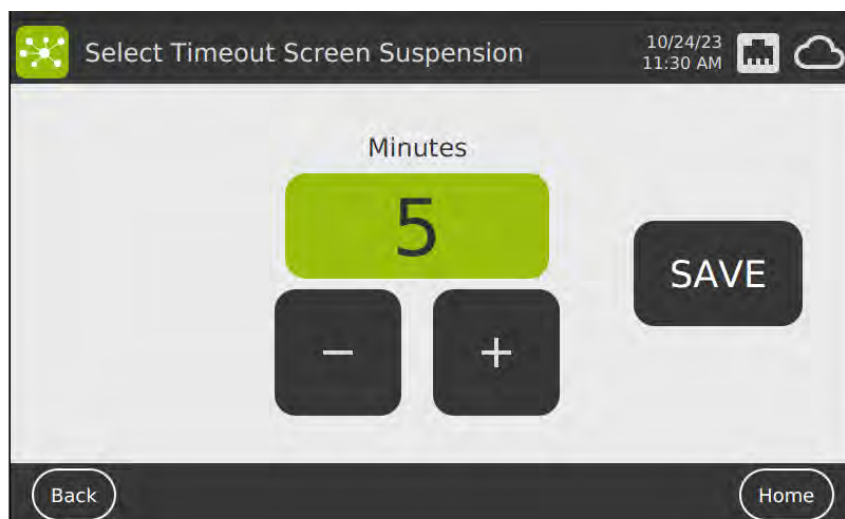
The supported languages are the following:



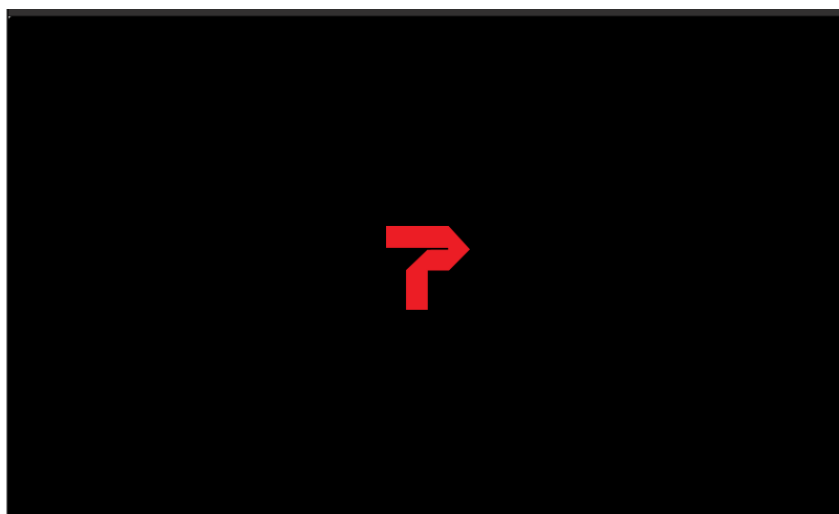
The display brightness can be set by clicking the corresponding button:



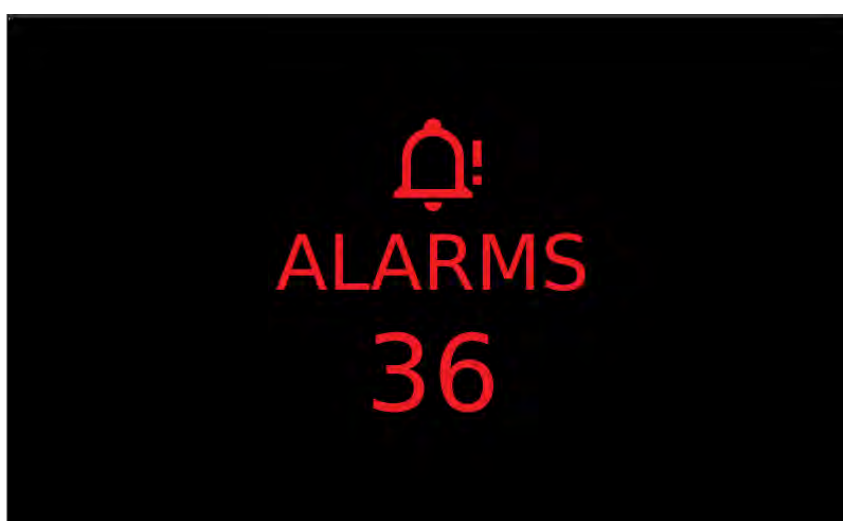
The screen saver time is 5 min by default and, it can be modified here:



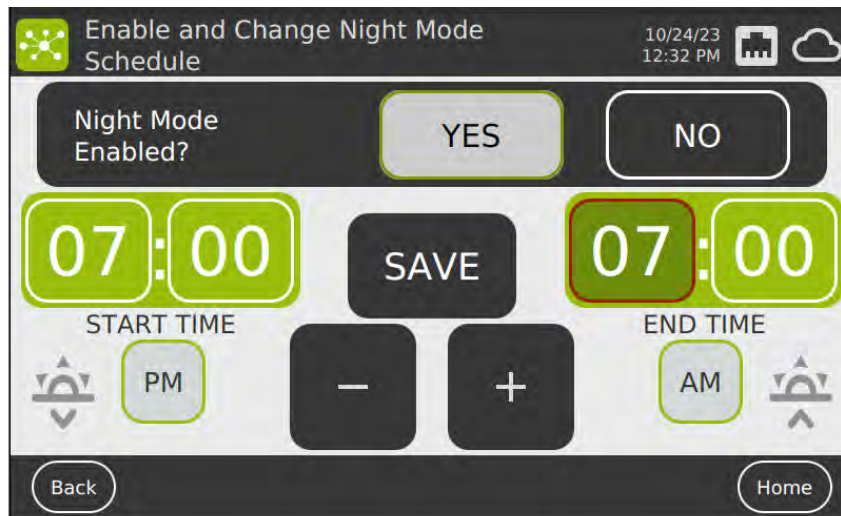
After this time-out, the DVC® Master interface moves to the following page:



If there are active alarms (36 in this example) while it is in screen-saver mode, it is displayed as follows:



And lastly, the preferred night mode settings can be defined by clicking the corresponding button "Night Mode":



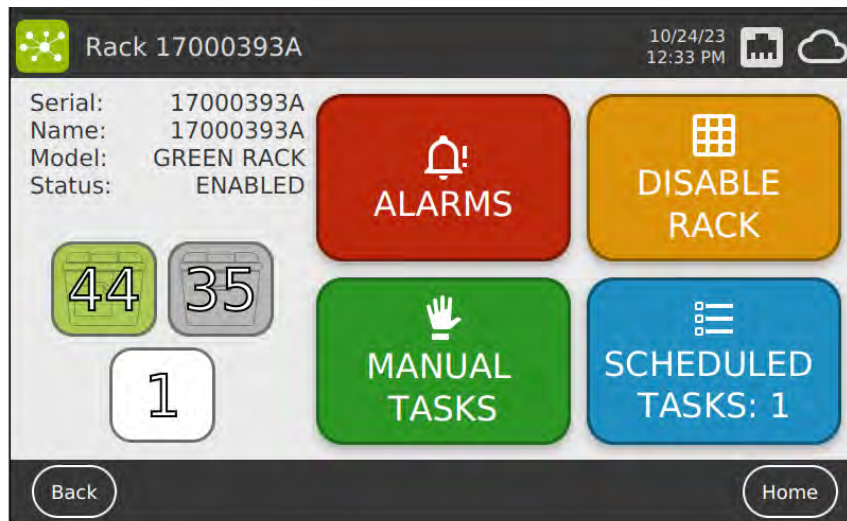
When the DVC® Master is in night mode, it displays the same views previously shown as screen-savers. If the touchscreen is touched, the DVC® Master interface goes out from the night mode.

#### 4 INDIVIDUAL RACK FEATURES

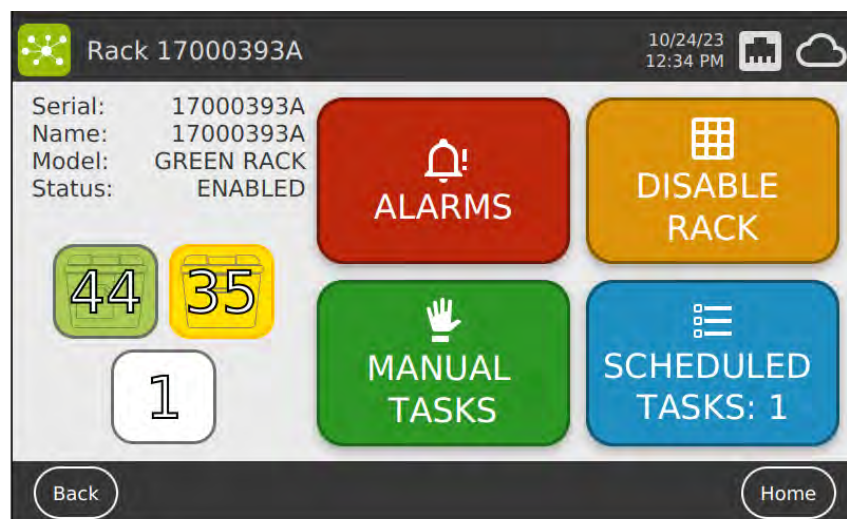
When the user clicks a specific DVC® Rack from the Home Page, the interface shows more details about it:

- Serial Number
- Name of the DVC® Rack (that usually is the same of the S/N)
- Model of the DVC® Rack selected (GREEN RACK in this example)
- Status of the DVC® (ENABLED/DISABLED).
- Number of cages registered (44 in this example)
- Number of cages not registered (35 in this example)
- Number of empty cage slots (1 in this example)





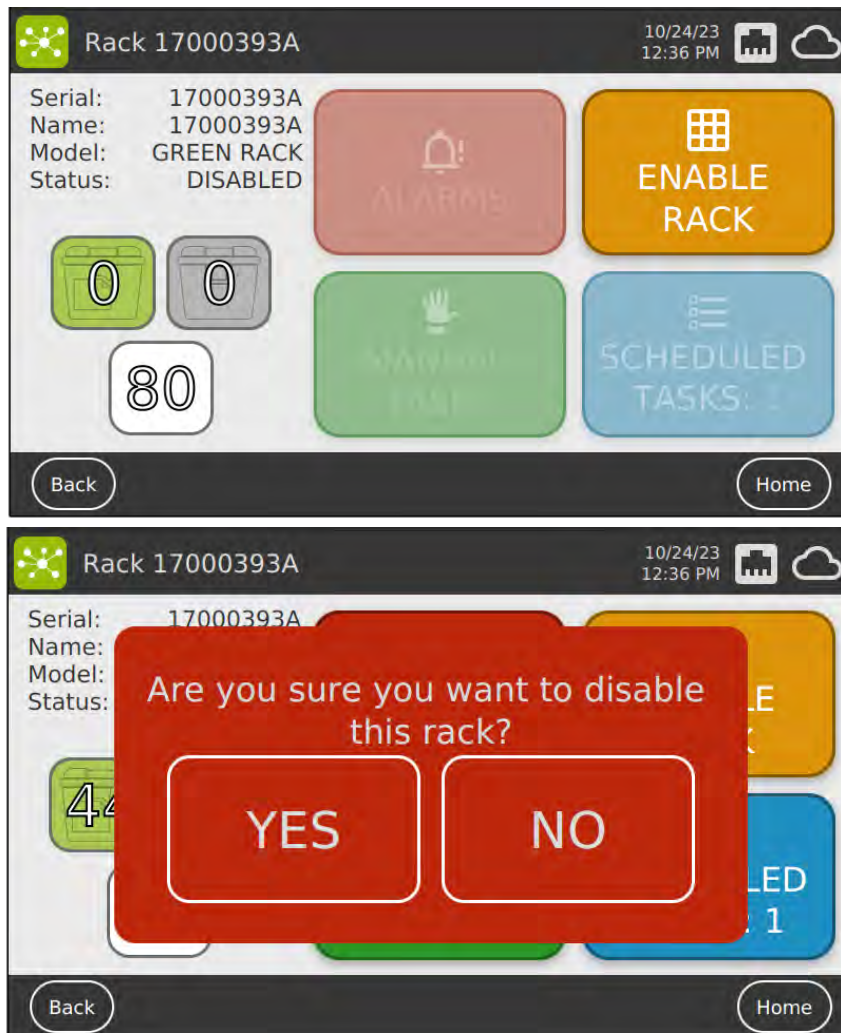
Suppose the user clicks on one of the buttons. In that case, the corresponding cages (registered/not registered or the empty slots) are illuminated by the green LEDs at the DVC® Rack level (35 not registered cages in this example).



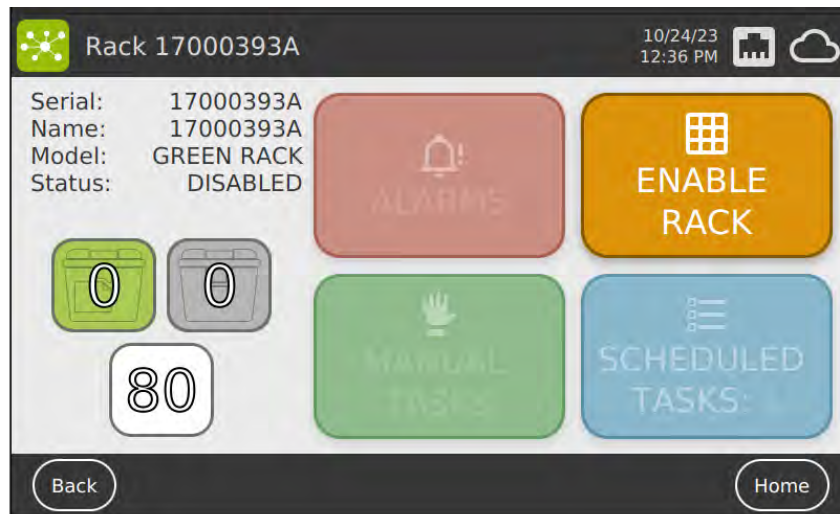
Then, there are other functional buttons related to other features:

#### 4.1 DISABLE/ENABLE RACK

This button is fundamental to avoid false alarms if the DVC® Rack is physically disconnected from the DVC® Master EVO. This button must be pushed before disconnecting the DVC® Rack and be confirmed in the consequent pop-up window.



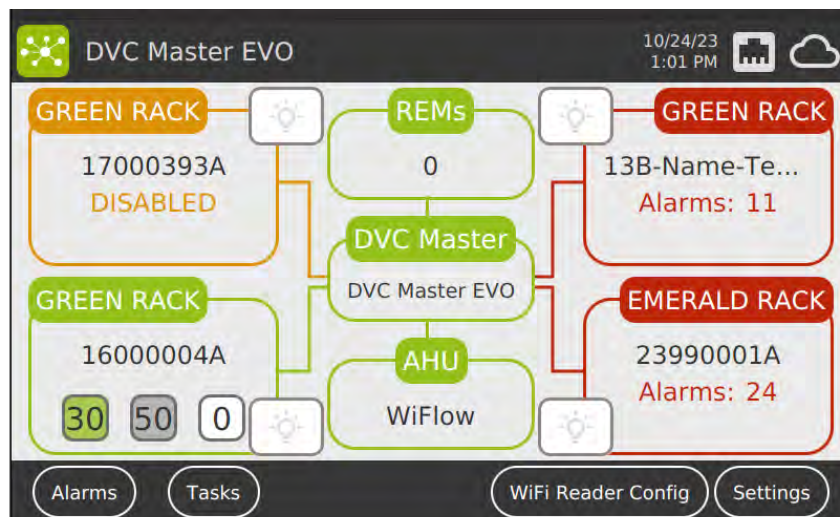
When a DVC® Rack is disabled, all the cages are “released”, and it appears as empty (all the registered cages should be moved to another enabled DVC® Rack to keep generating data)



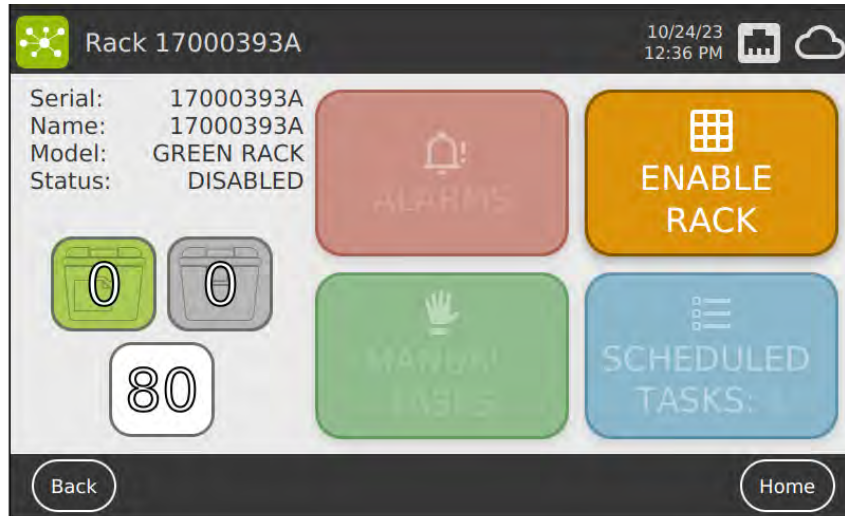
Now, the DVC® Rack can be physically disconnected by the user and moved to the washing area, where it can be disinfected (washed and autoclaved).

After disinfection, move the disabled DVC® Rack back to the Animal room and physically connect to an active DVC® Master.

The disabled DVC® Rack appears on the home page as follows:

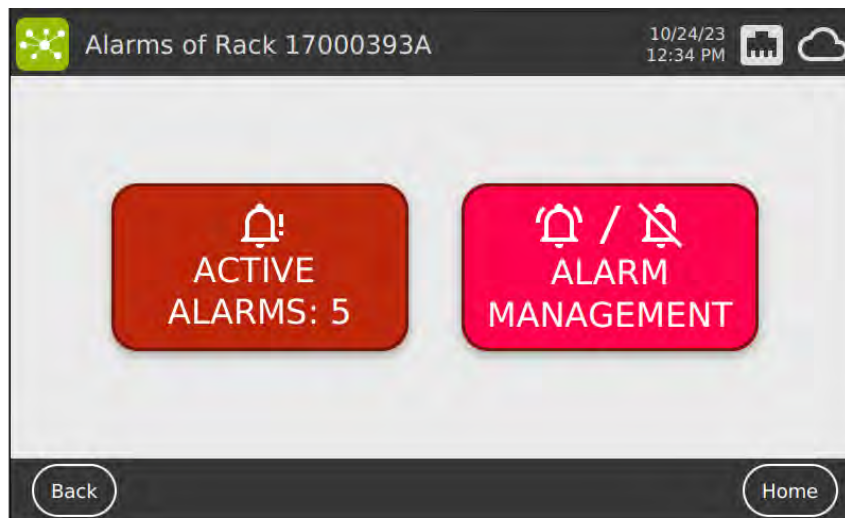


To enable it back, click again on the Rack area and then click the "Enable Rack" button:



## 4.2 ALARMS

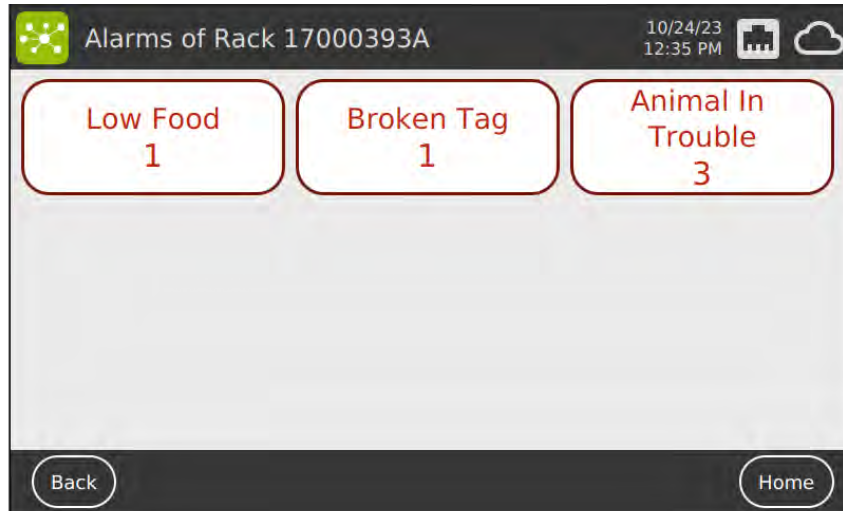
By clicking this button, the user enters another menu page listing all the active alarms (5 in this example) and where it is possible to selectively disable some alarms generated by the DVC® system (ALARM MANAGEMENT).



More specifically:

### 4.2.1 ACTIVE ALARMS

In the case of active alarms, by clicking it, only the active alarms on this specific DVC® Rack are displayed by type, and the user can click on a specific type to illuminate the corresponding cages with their LEDs.

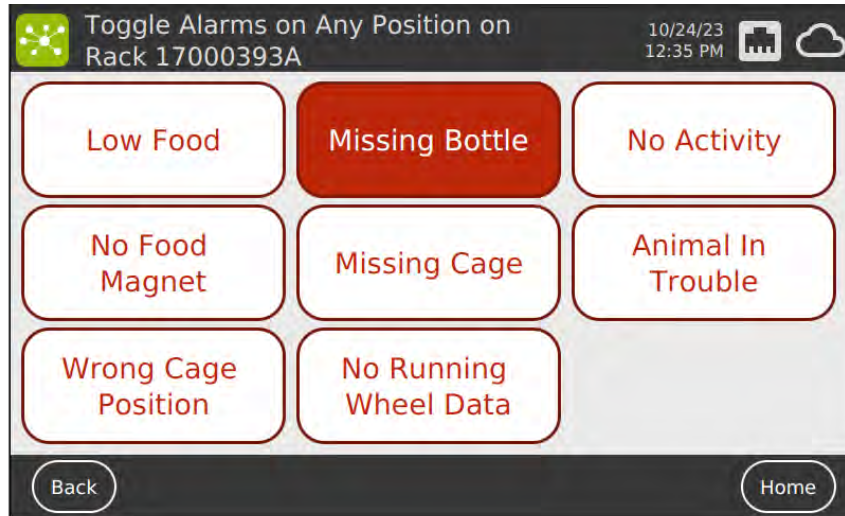


## 4.2.2 ALARM MANAGEMENT

This new functionality allows users to turn specific registered cages on/off to generate alarms.

More in detail, it follows the following workflow:

- The interface changes by clicking the "Alarm Management" button to show the possible Alarm types to be disabled.
- It is possible to click only one alarm type at a time
- By clicking one alarm type ("Missing Bottle" alarm in this example), all the registered cages in the DVC® Rack are illuminated as:
  - o Green: the alarm is currently active
  - o Red: the alarm is currently inactive (disabled previously)
- By pressing the DVC® Board capacitive button for 3 seconds, the status of the alarm and the LED's corresponding colour changes.
- The settings are saved by confirming at the end of the process (multiple cages can be managed during the process, but one at a time, not simultaneously).
- Please note that the status refers to the specific cage, wherever it will be inserted later. It can only be switched back following the same workflow (or terminating the cage itself).



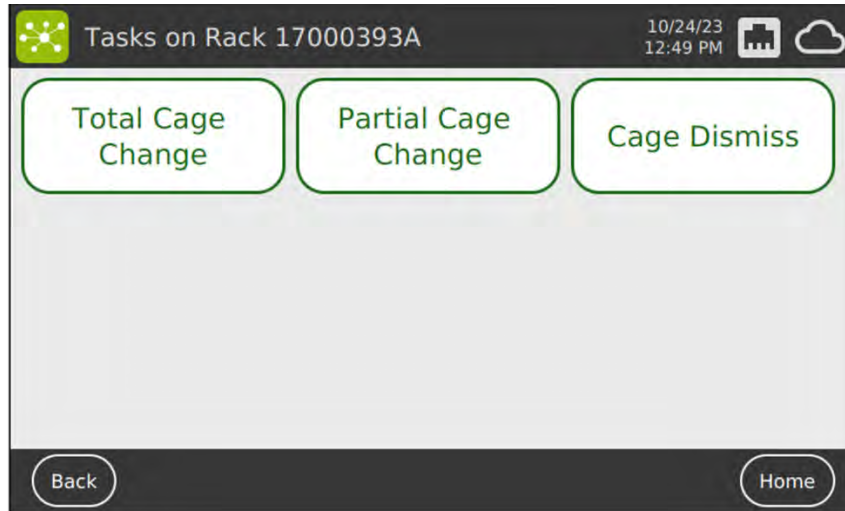
### 4.3 MANUAL TASKS

By clicking this button, the user can communicate to the DVC<sup>®</sup> system that the selected manual task will be performed.

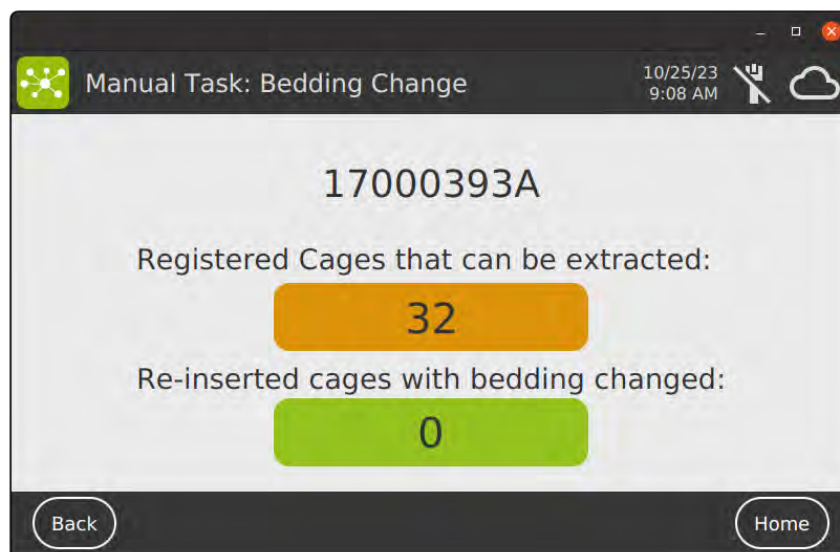
Currently, the DVC<sup>®</sup> Master EVO manages 3 different types of manual tasks.

- Total Cage Change: the animals are transferred from a dirty cage to a completely new one.
- Partial Cage Change: the animals are transferred from a dirty cage to a new cage bottom, and the cage top is transferred from the original dirty cage to the new cage bottom.
- Cage Dismiss: all the registered cages are illuminated, and those to be dismissed can be physically removed from the DVC<sup>®</sup> Rack.

In all the three manual tasks all the registered cages are illuminated by the yellow LEDs at the DVC<sup>®</sup> Rack level, and they can be removed to perform the task.



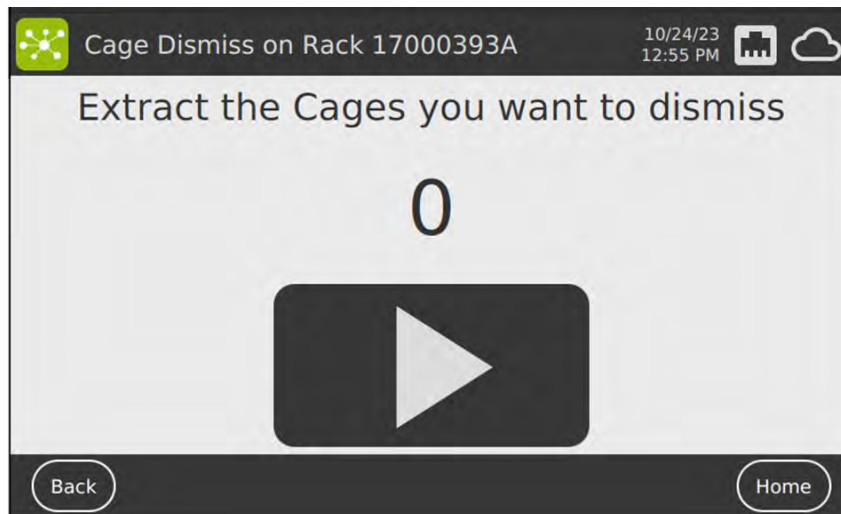
While performing the selected task, specific counters show the status of the task in real time.



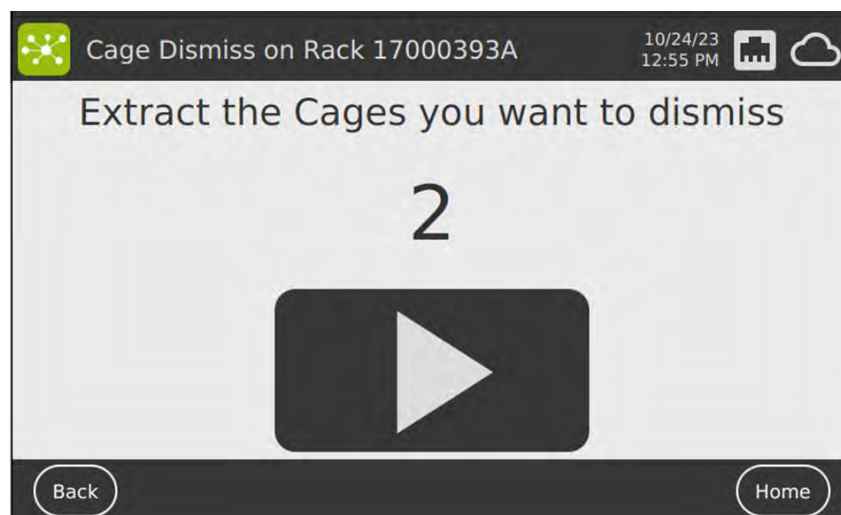
How many cages can be changed (32 in this example), and how many are currently performed (0 in this example).

Then, for the Dismiss functionality, the workflow is the following:

- Click on the "Cage Dismiss" button

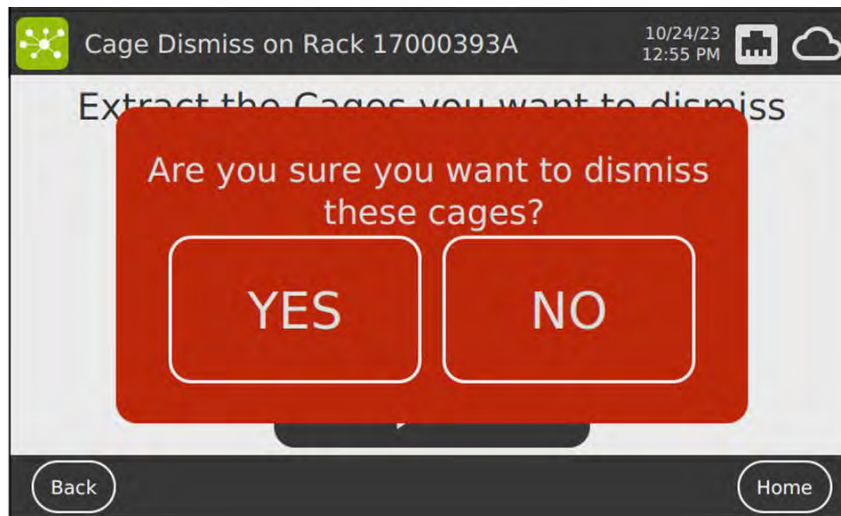


- Physically remove all the cages to be dismissed:

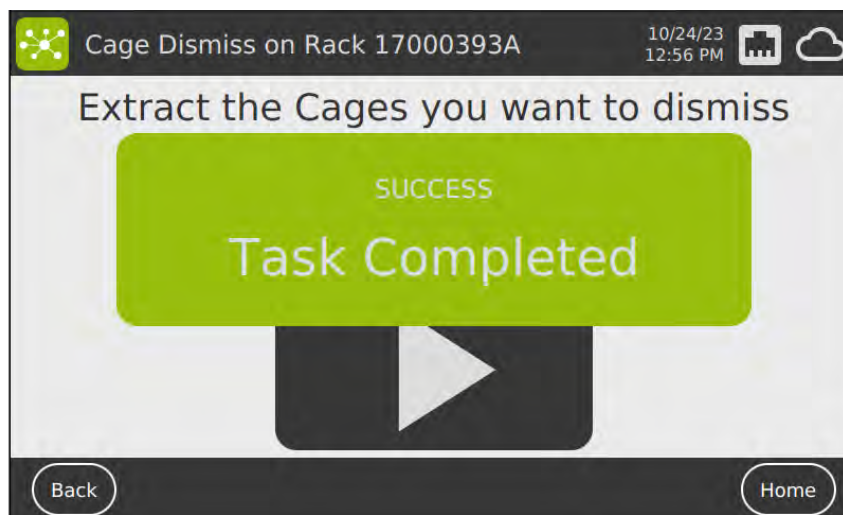


- Once done, click the play button and confirm the pop-up view.



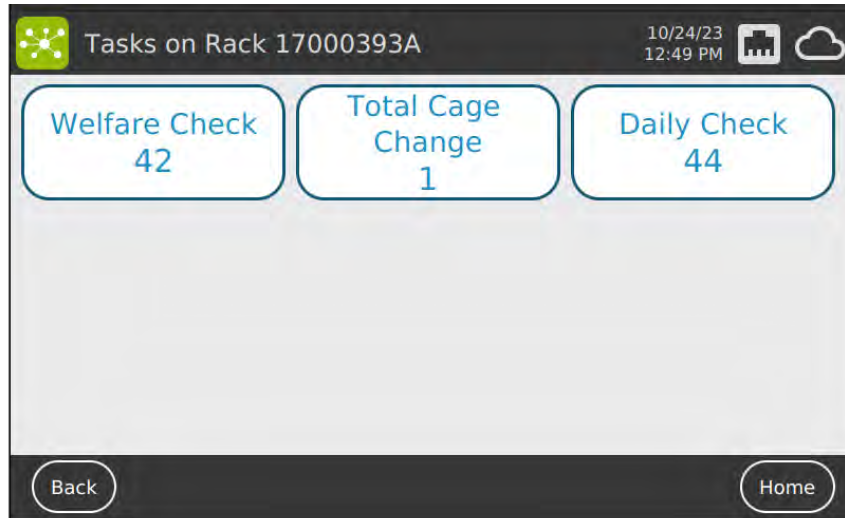


- The DVC® confirms that the task has been accomplished.

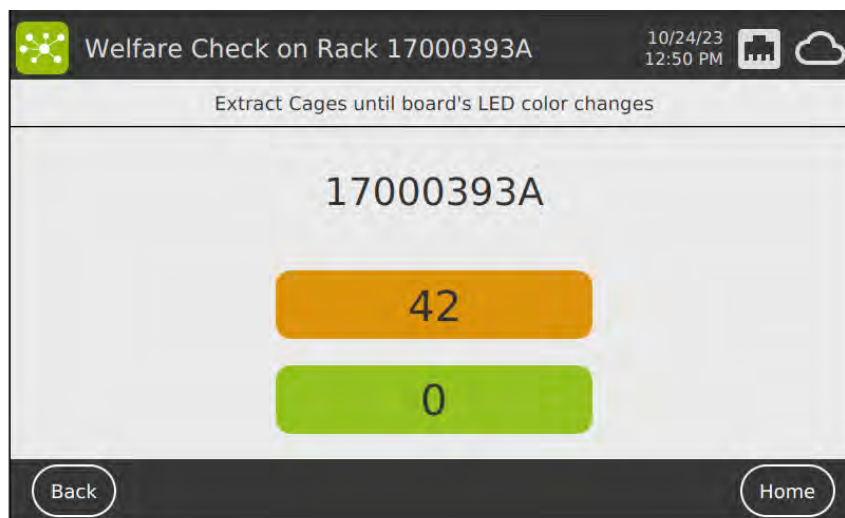


#### 4.4 SCHEDULED TASKS

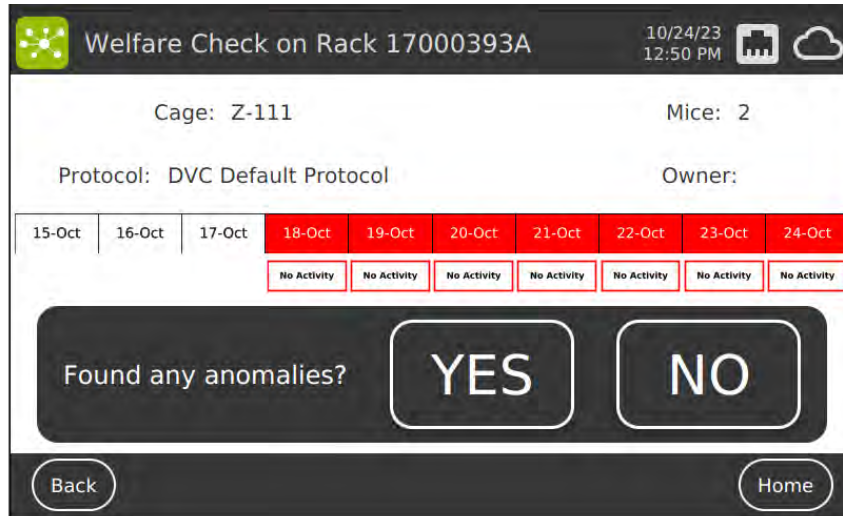
If the DVC® generated a list of today's tasks, these are grouped under the corresponding "Scheduled Task" button of the selected DVC® Rack. When clicked, they show a recap of the generated DVC® tasks:



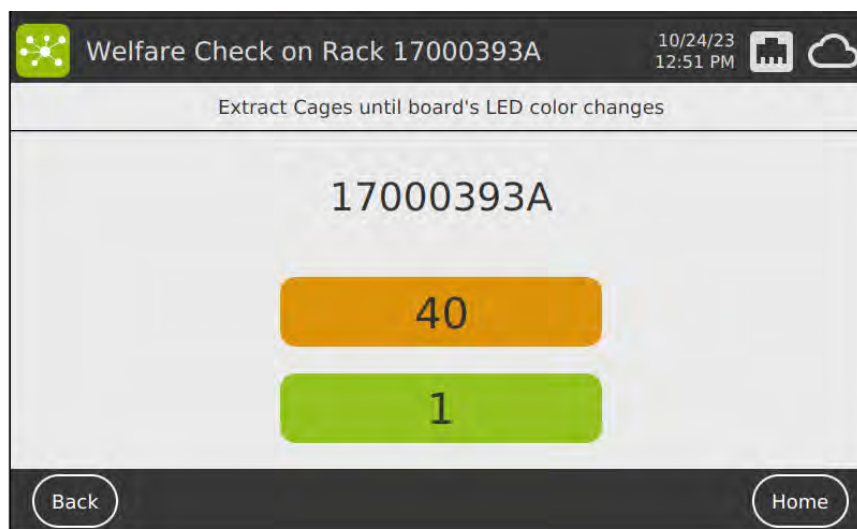
When the “Welfare Check” button is pressed, all the cages that need “attention” are illuminated by the yellow LED, and the user must extract one by one for a specific interval of time to accomplish the task.



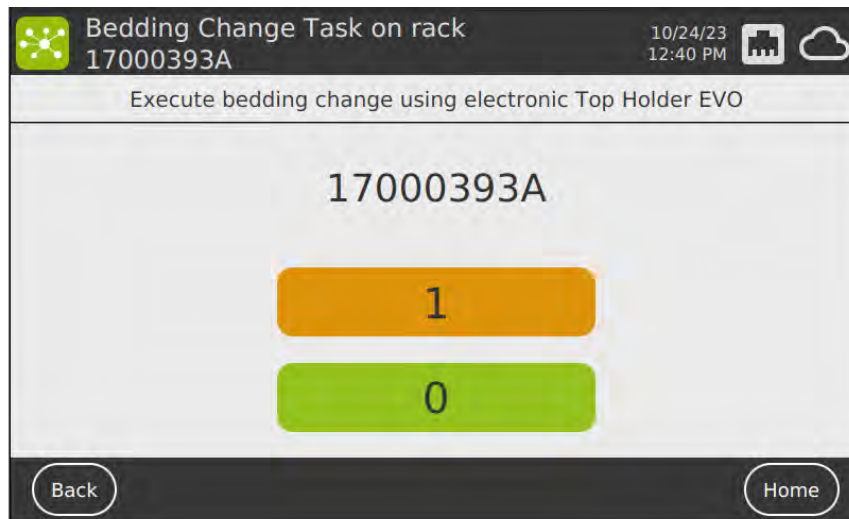
While removing from the DVC® Rack a specific illuminated cage (Z-111 in this example), its graphical interface pops up to explain a reason for this task (no activity in this case). The user can eventually leave feedback if an anomaly is found (this is needed for statistical analysis only).



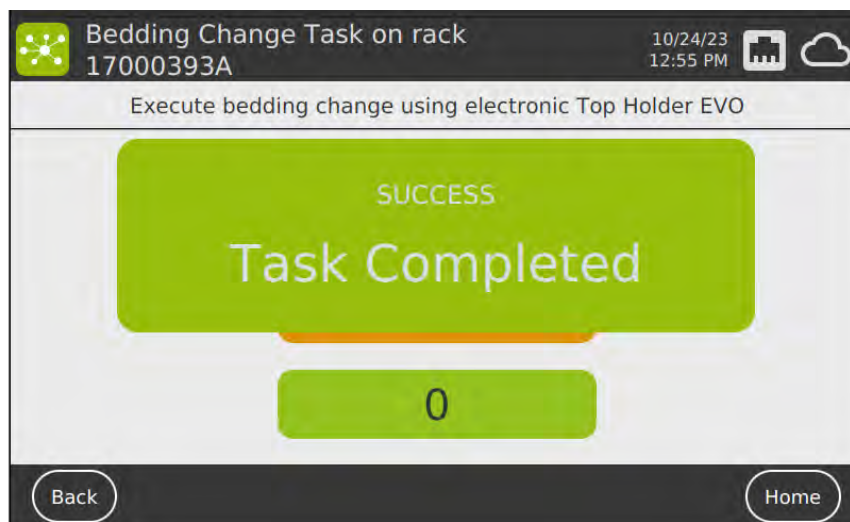
When the cage is inserted back in the DVC® Rack (after the colour of the LED is changed from yellow to green), the corresponding counter is updated.



Similarly, if the “cage change” buttons are pressed, the dirty cages detected by the DVC® are illuminated by the yellow LEDs. The user can change them one by one following the specific procedure (total or partial).

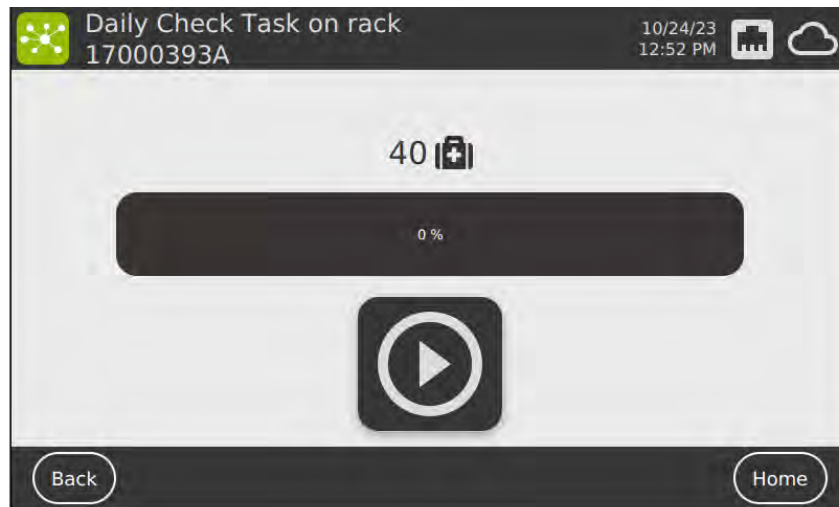


When the last task is performed, the overall status of the task type is updated:

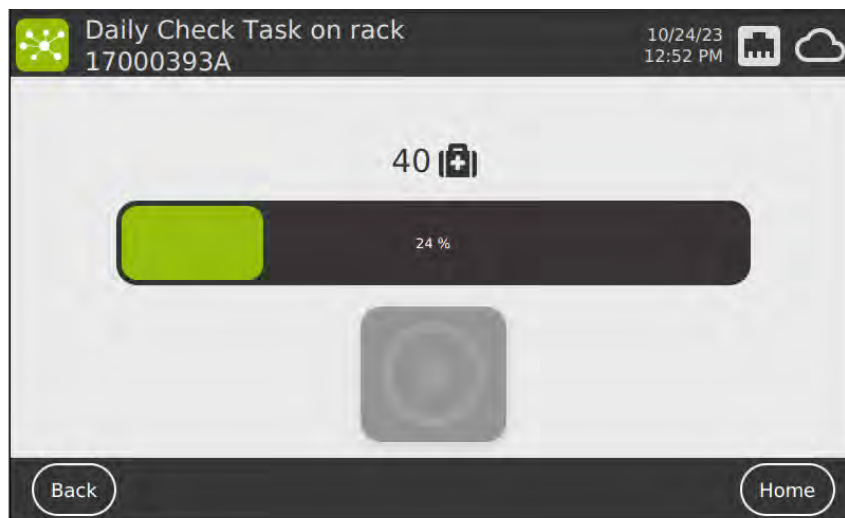


Lastly, if the “Daily Check” button is pressed, all the registered cages are requested to be “visually” checked so the yellow LEDs illuminate all the registered cages. Combining the “Daily Check” task with the “Welfare Check” task is possible. In this specific case, the “Daily Check” cages are illuminated by yellow LEDs (they “only” need a visual inspection from a DVC® perspective), while red LEDs illuminate the “Welfare Check” cages.

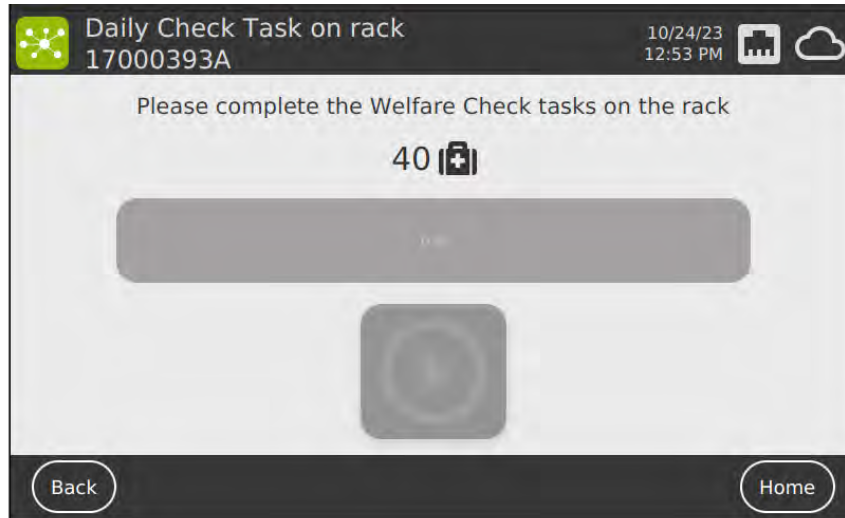
The entire task can only be completed if the two sub-tasks are entirely performed. For instance, in the following example, there are 44 cages to be visually inspected and 40 cages with Welfare issues to be physically removed (one by one). The Daily Check task can be either started by pushing the play button in the interface or by physically touching the DVC® Board capacitive button.



The Daily Check time bar progresses automatically, assuming that the cages are visually inspected (by default, the timer is set to 3 sec per cage to be visually inspected).



Till the last one (with now 40 welfare cages to be physically removed one by one from the DVC® Rack.



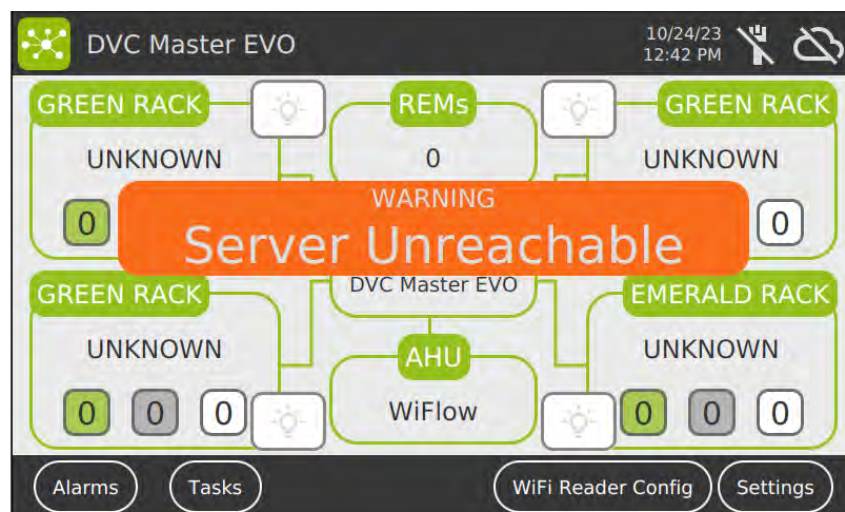
## 5 TROUBLESHOOTING

The DVC® Master continuously checks the network connection and the possibility of reaching the DVC® Server.

There are 3 different potential issues:

### 5.1 NETWORK FAILURE

In case of a network issue, the connection with the DVC® Server is lost (obviously):

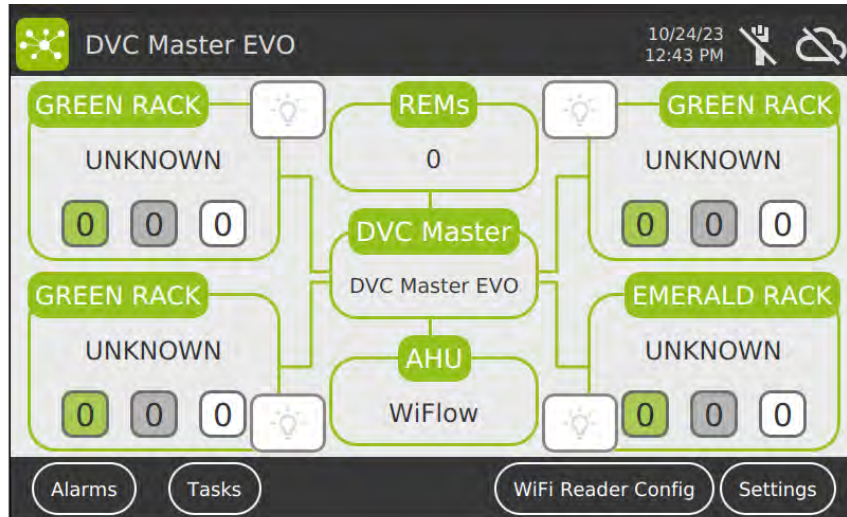


And the corresponding icons display the issue.



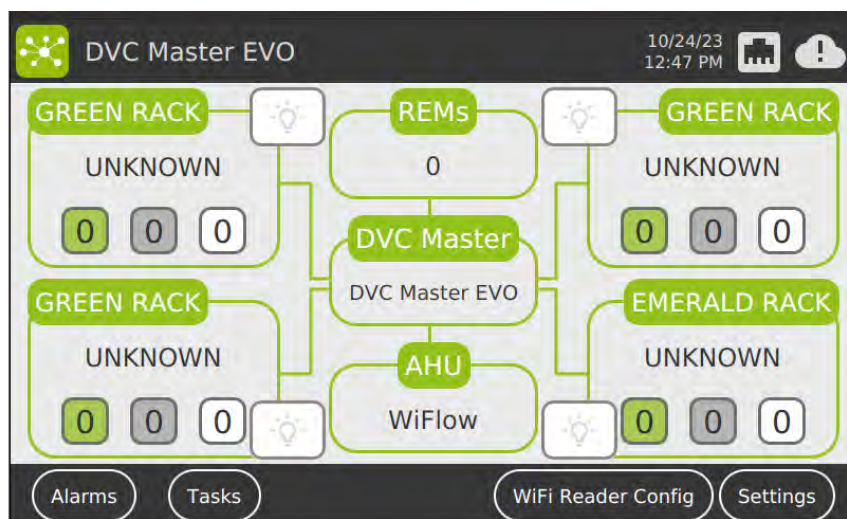


All cages are “virtually “removed from the DVC® Racks.



## 5.2 WRONG/MISSING DVC® MASTER SETTINGS

Vice versa, if the network connection is fine but the DVC® Server is experiencing some missing authorisation or settings, and it cannot properly allow the DVC® Master to communicate, only the icon of the cloud is changing its status:



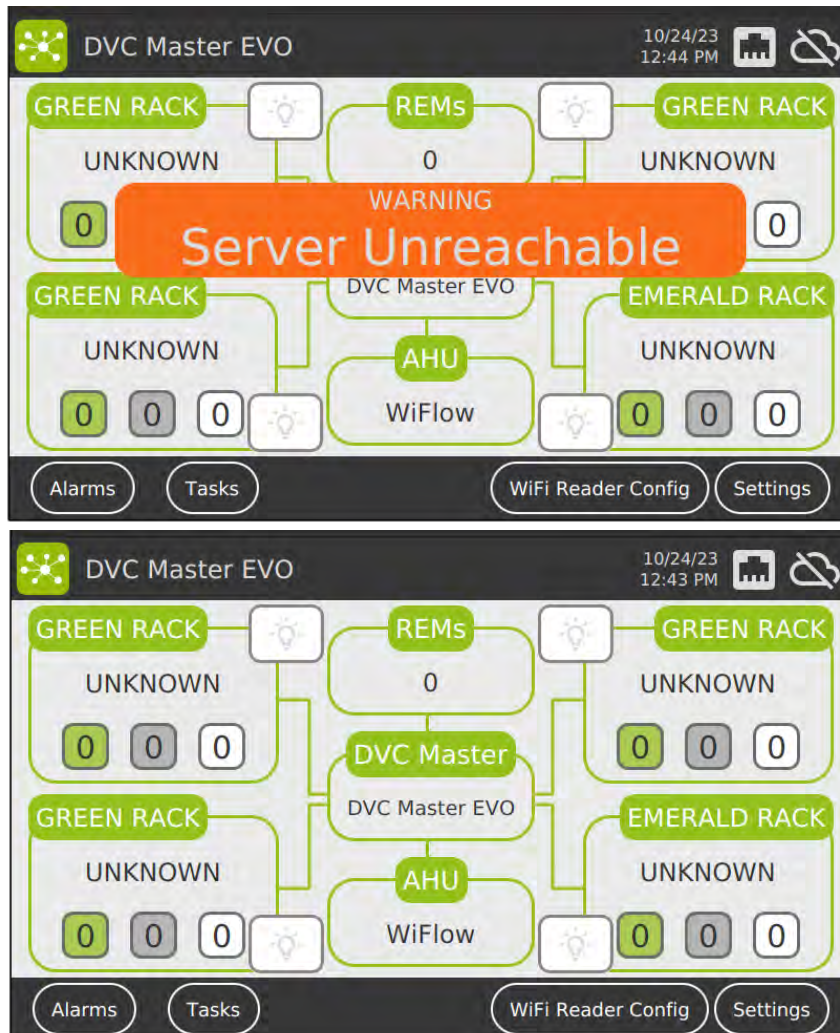


### 5.3 DVC® SERVER IS DOWN

Finally, if the network connection is fine but the DVC® Server is experiencing some issues and cannot correctly communicate with the DVC® Master, the icon of the cloud is as follows:



The DVC® Master shows an error message "Server Unreachable"; all cages are "virtually" removed from all the DVC® Racks.









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