Nederman

Operational manual

Control systems

Nederman SAVE

Original User manual
EN USER MANUAL

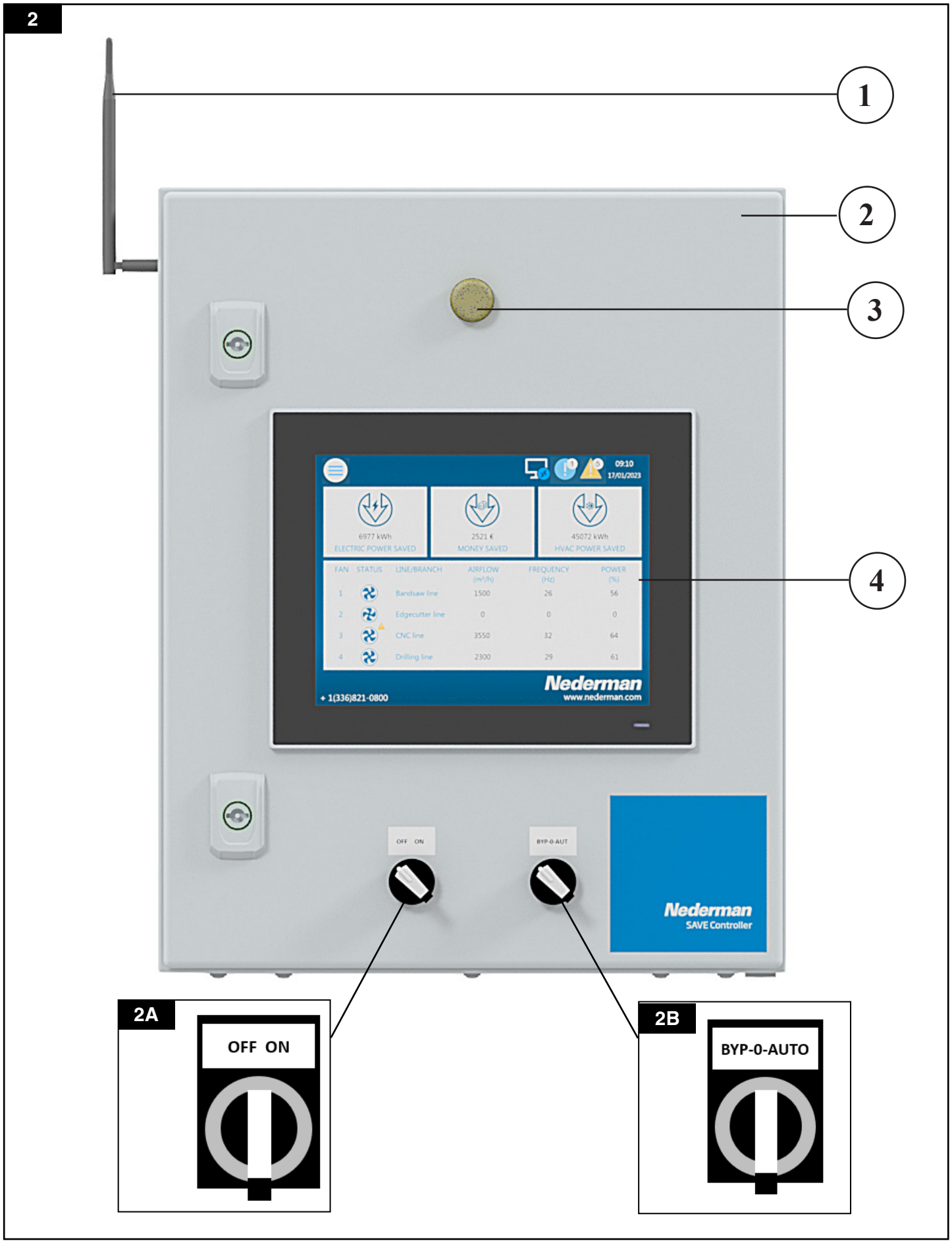
2023-11-20

QCM004(A)

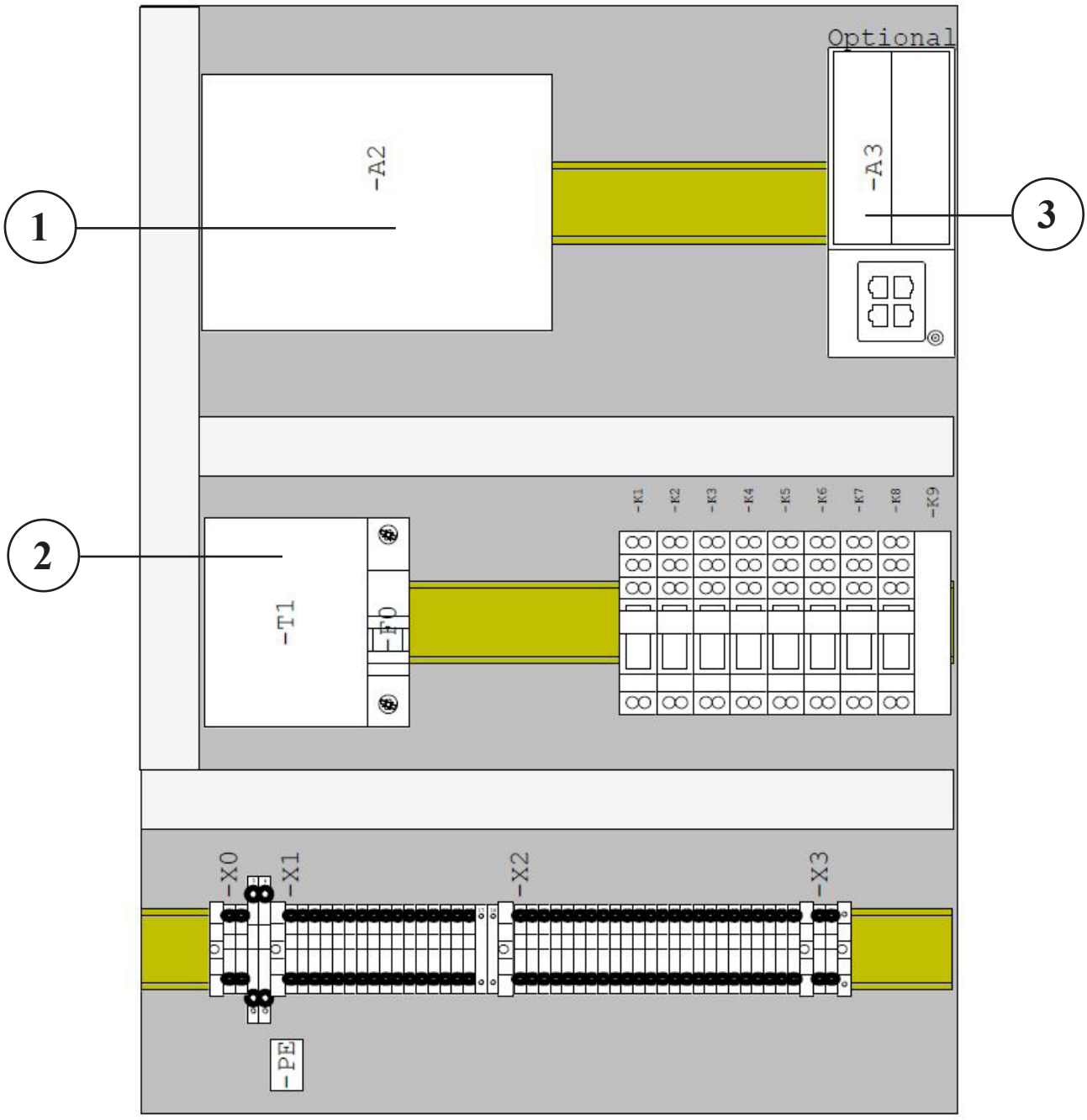
Figures

1

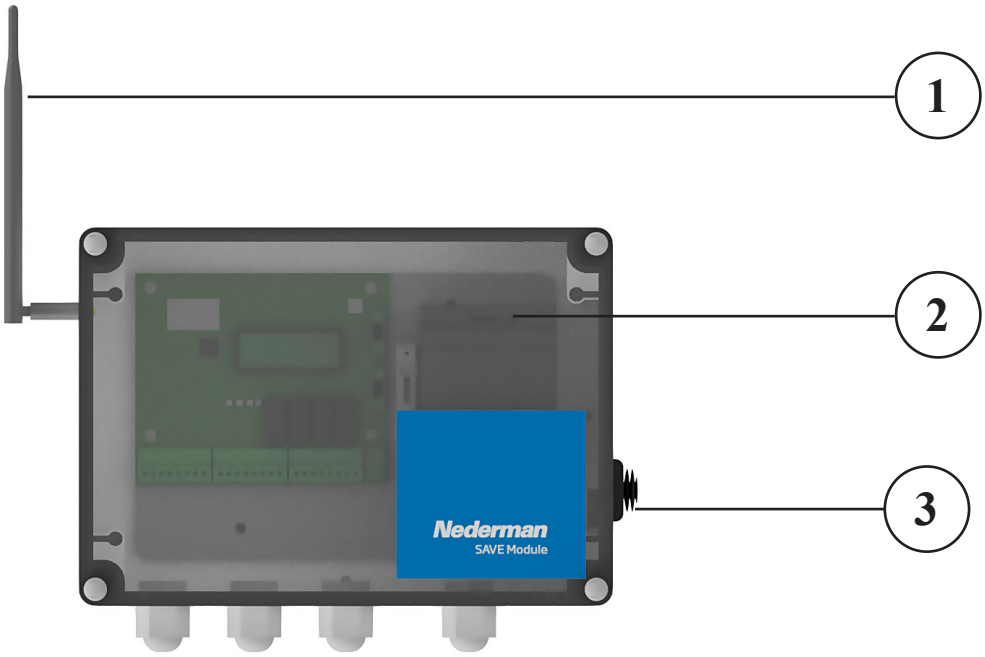

1
2
3
Nederman
SAVE Controller
Nederman
SAVE Module
Nederman
SAVE Sensor


2
1
2
3
4
09:10
17/01/2023
6977 kWh
ELECTRIC POWER SAVED
2521 €
MONEY SAVED
45072 kWh
HVAC POWER SAVED
FAN
STATUS
LINE/BRANCH
AIRFLOW
FREQUENCY
POWER
1
Bandsaw line
1500
26
56
2
Edgecutter line
0
0
0
3
CNC line
3550
32
64
4
Drilling line
2300
29
61
+ 1(336)821-0800
Nederman
www.nederman.com
OFF ON
BYP-0-AUT
Nederman
SAVE Controller
2A
OFF ON
2B
BYP-0-AUTO

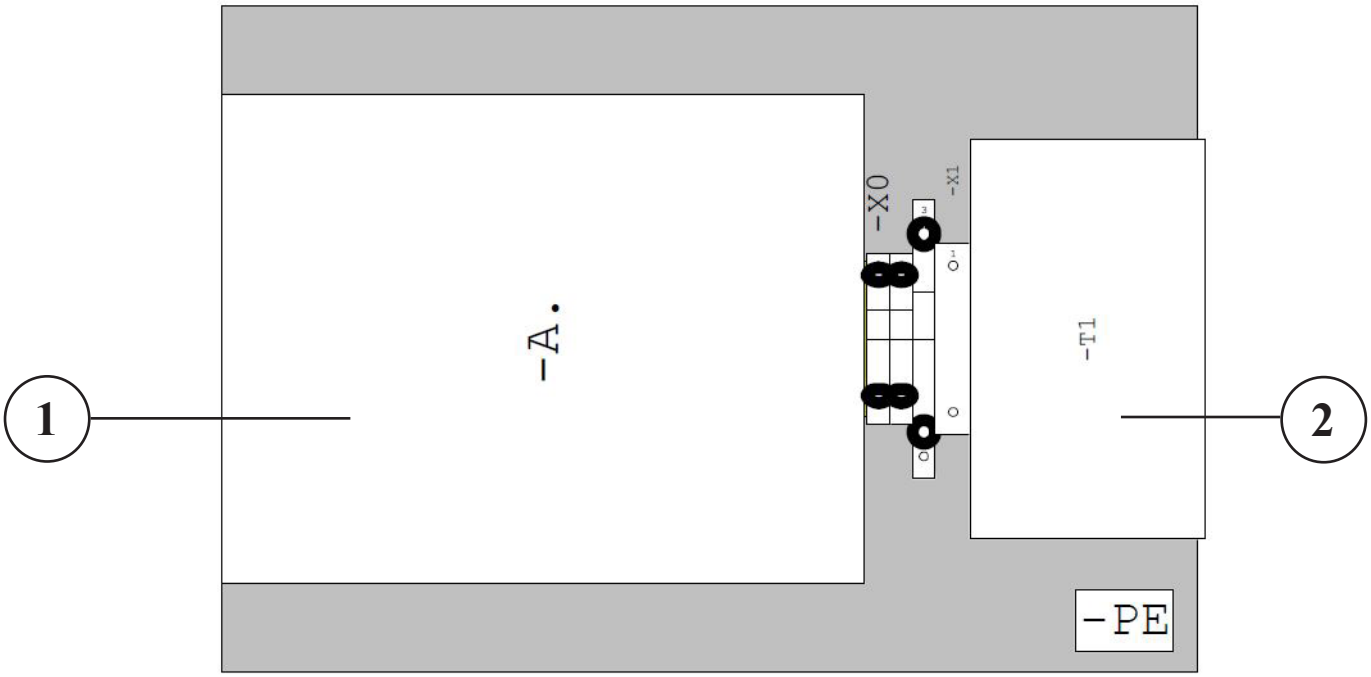
3



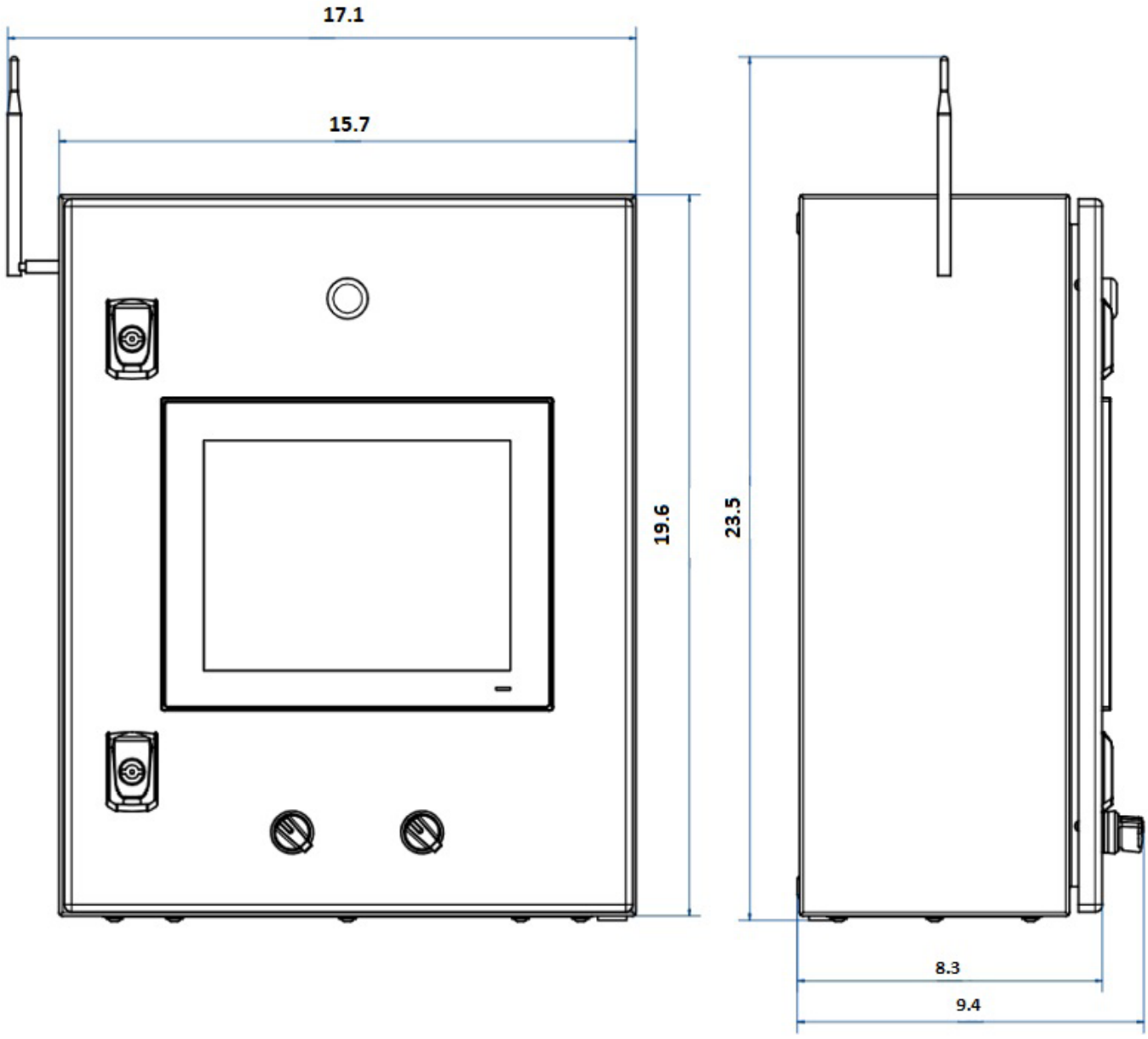
4



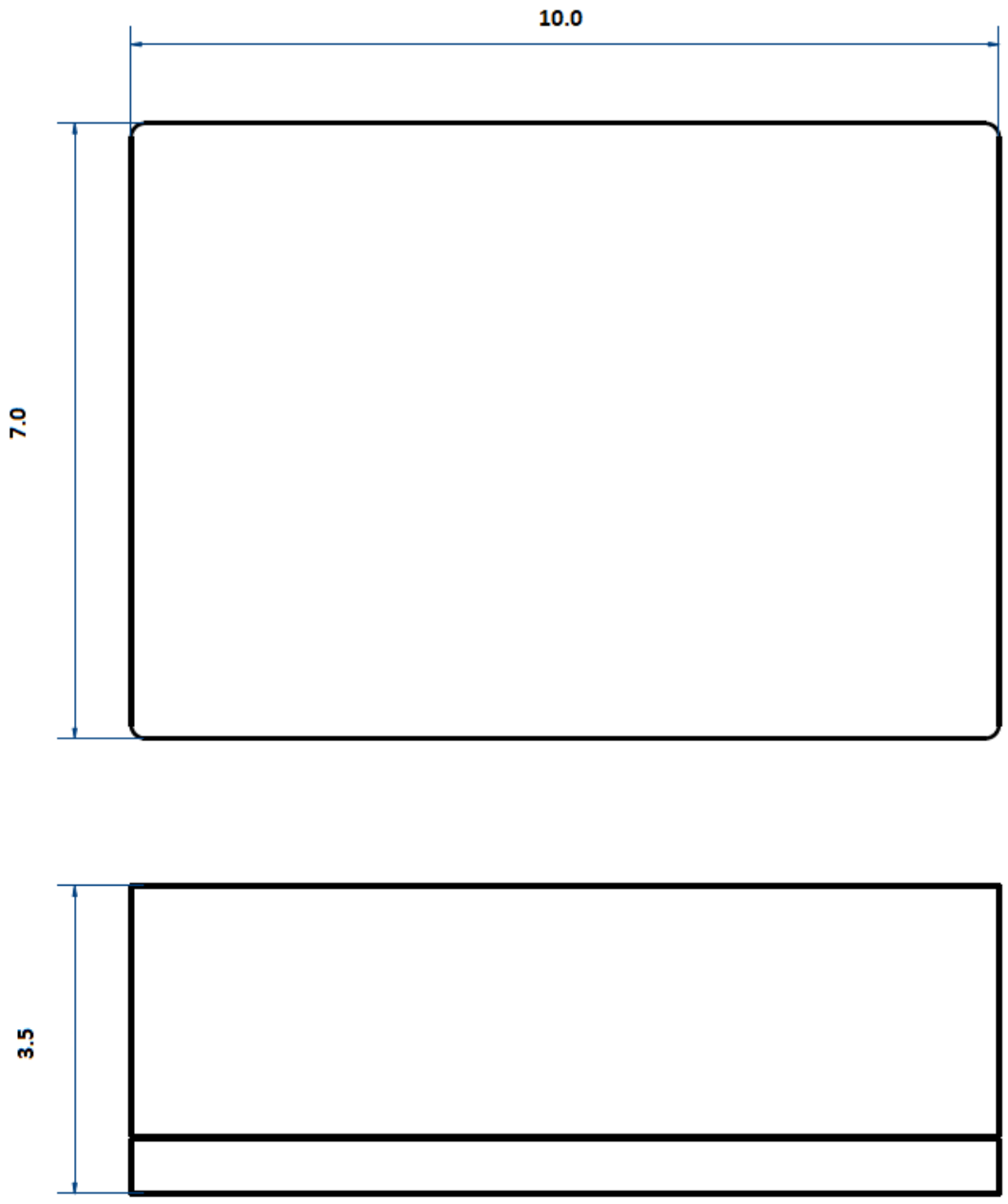
5



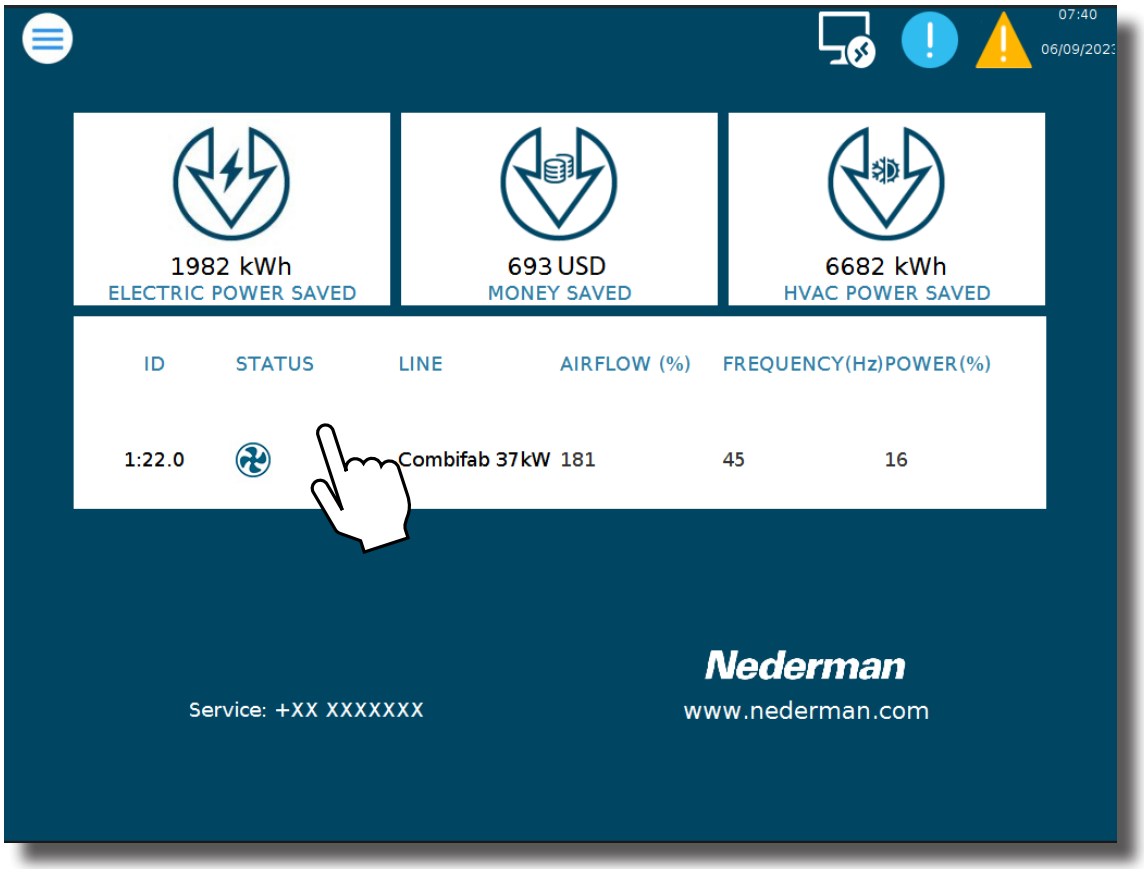
6

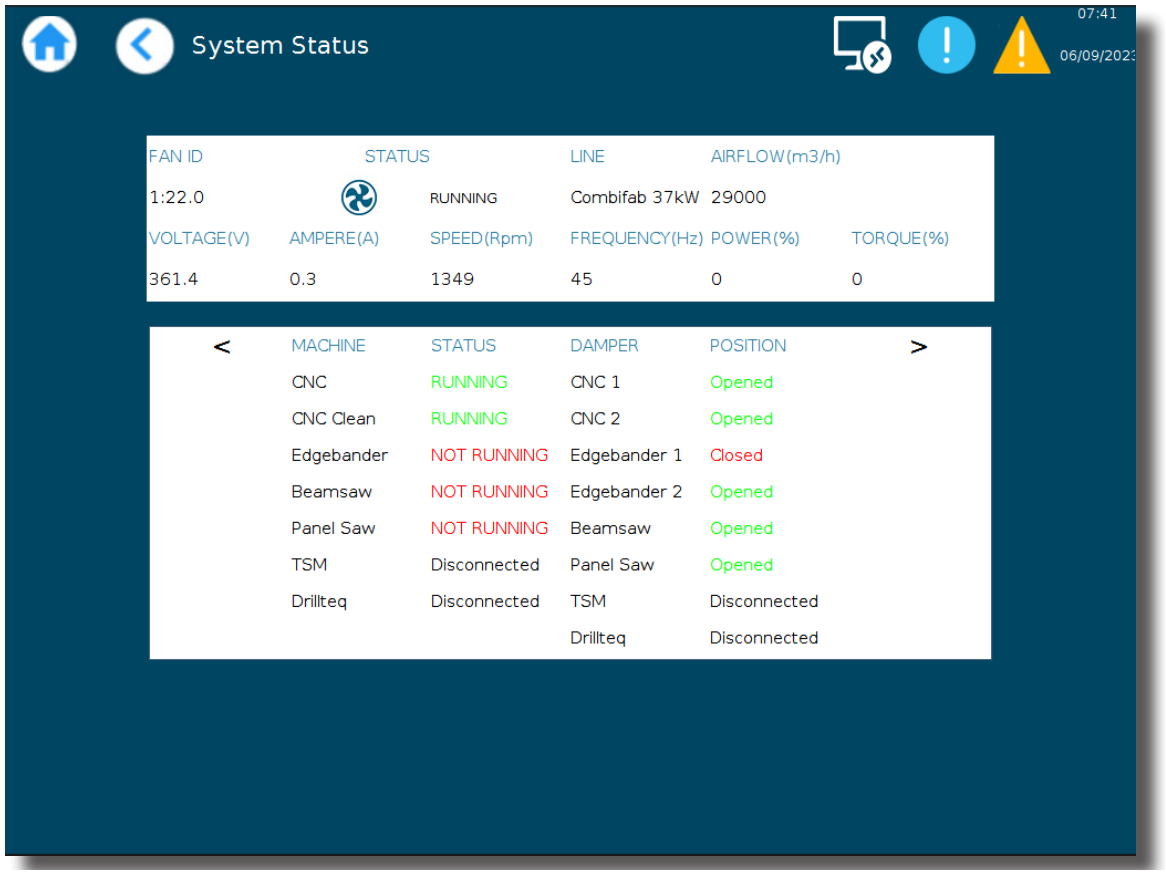


7

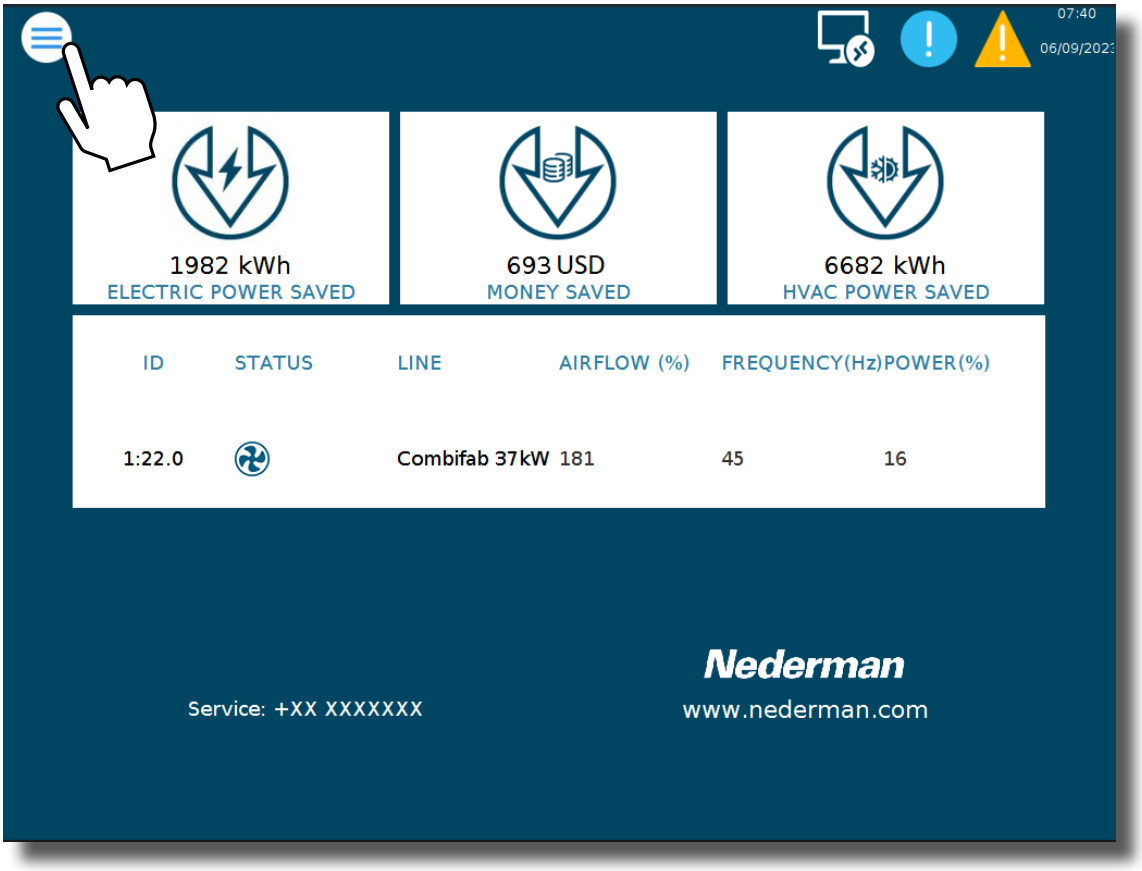


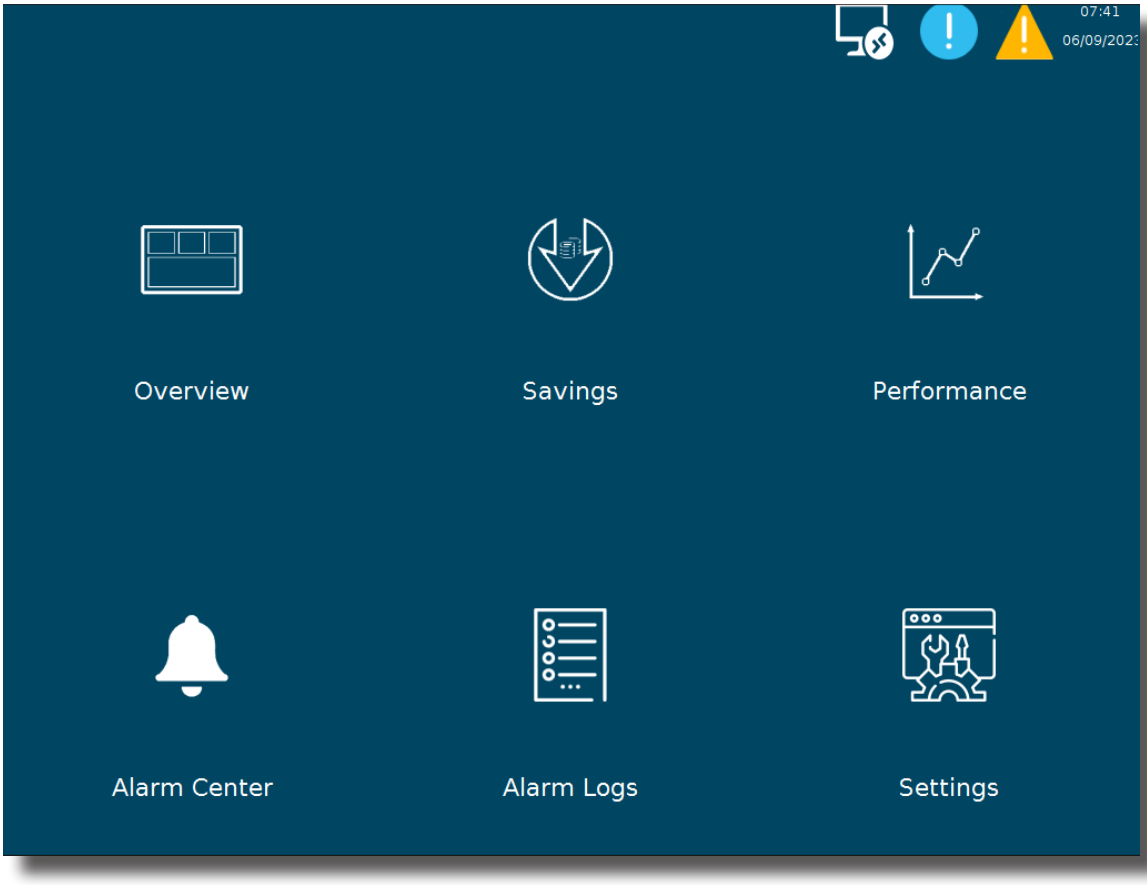
8


07:40
06/09/202
1982 kWh
ELECTRIC POWER SAVED
693 USD
MONEY SAVED
6682 kWh
HVAC POWER SAVED
ID STATUS LINE AIRFLOW (%) FREQUENCY(Hz) POWER(%)
1:22.0 Combifab 37kW 181 45 16
Nederman
Service: +XX XXXXXXX
www.nederman.com

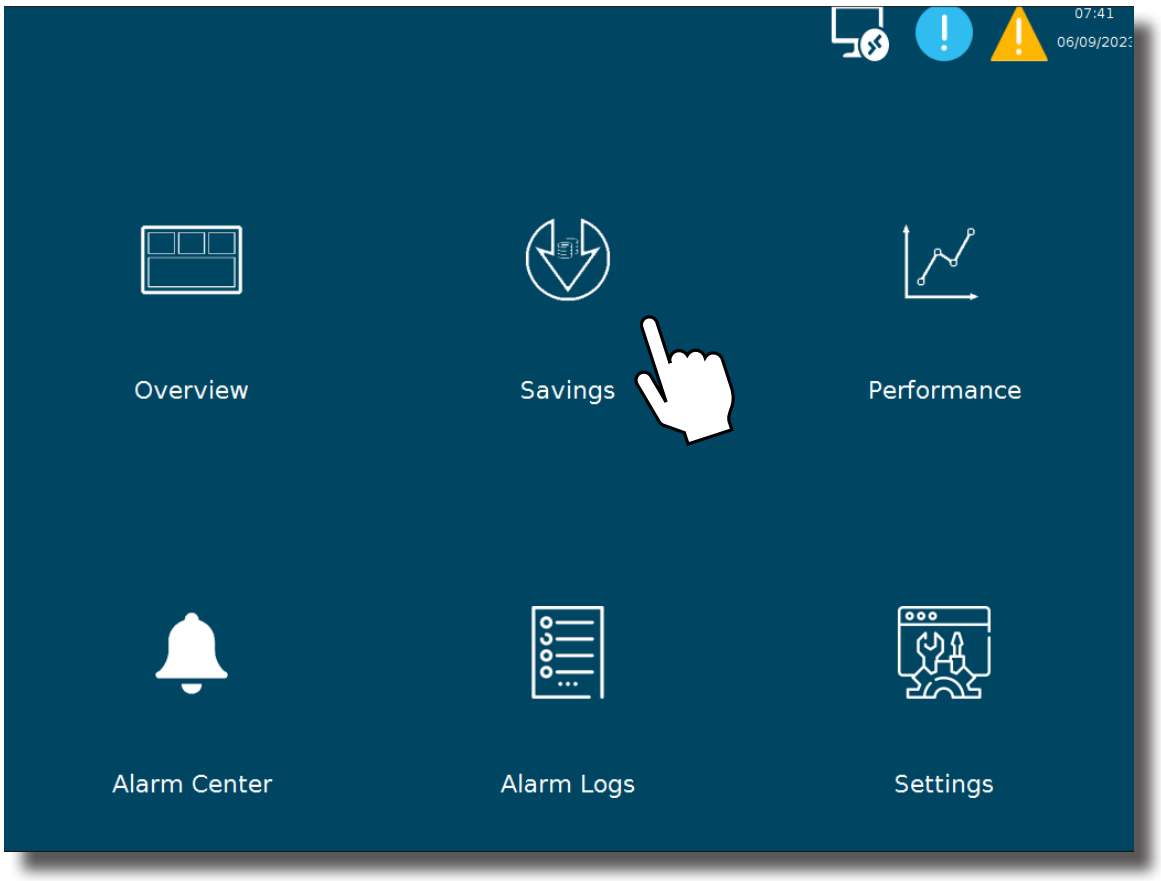

System Status
07:41
06/09/202
FAN ID STATUS LINE AIRFLOW(m3/h)
1:22.0 RUNNING Combifab 37kW 29000
VOLTAGE(V) AMPERE(A) SPEED(Rpm) FREQUENCY(Hz) POWER(%) TORQUE(%)
361.4 0.3 1349 45 0 0
< MACHINE STATUS DAMPER POSITION >
CNC RUNNING CNC 1 Opened
CNC Clean RUNNING CNC 2 Opened
Edgebander NOT RUNNING Edgebander 1 Closed
Beamsaw NOT RUNNING Edgebander 2 Opened
Panel Saw NOT RUNNING Beamsaw Opened
TSM Disconnected Panel Saw Opened
Drillteq Disconnected TSM Disconnected
Drillteq Disconnected

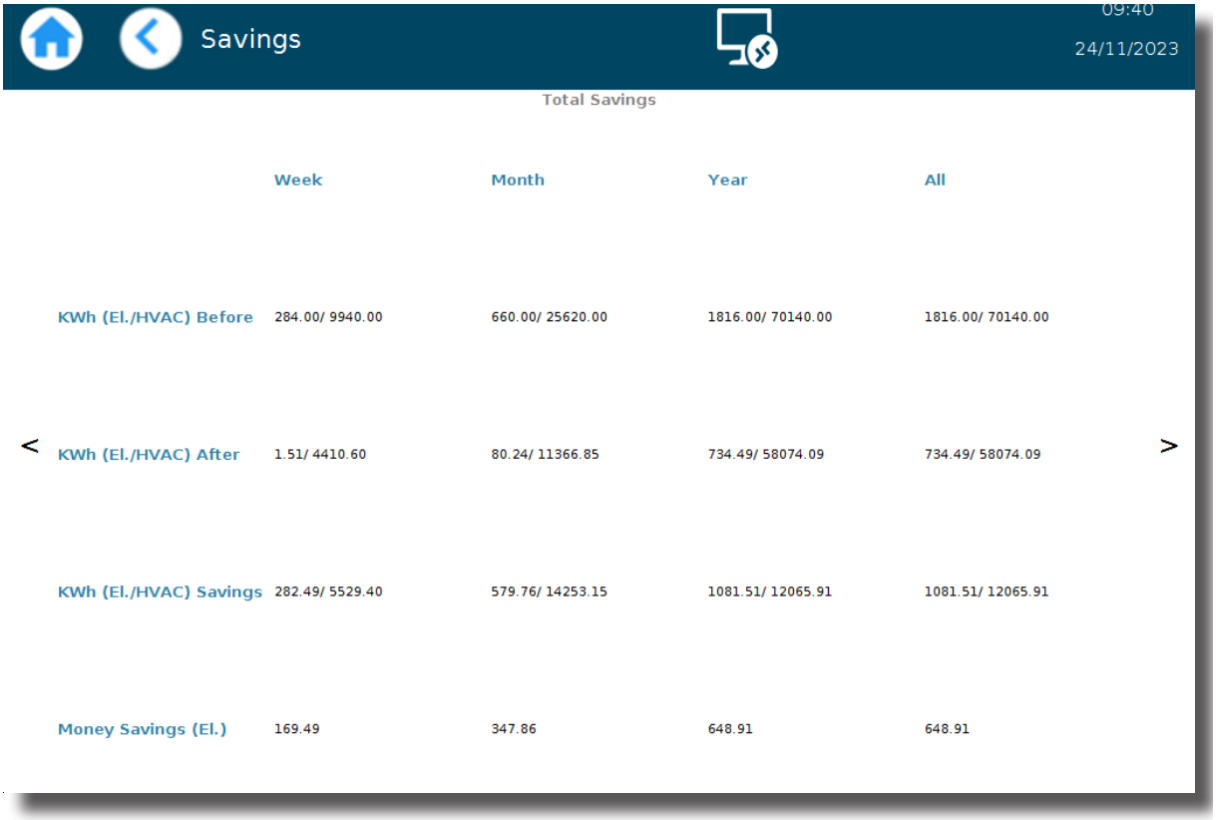
9


07:40
06/09/2023
1982 kWh
ELECTRIC POWER SAVED
693 USD
MONEY SAVED
6682 kWh
HVAC POWER SAVED
ID
STATUS
LINE
AIRFLOW (%)
FREQUENCY(Hz)
POWER(%)
1:22.0
Combifab 37kW
181
45
16
Service: +XX XXXXXXX
Nederman
www.nederman.com

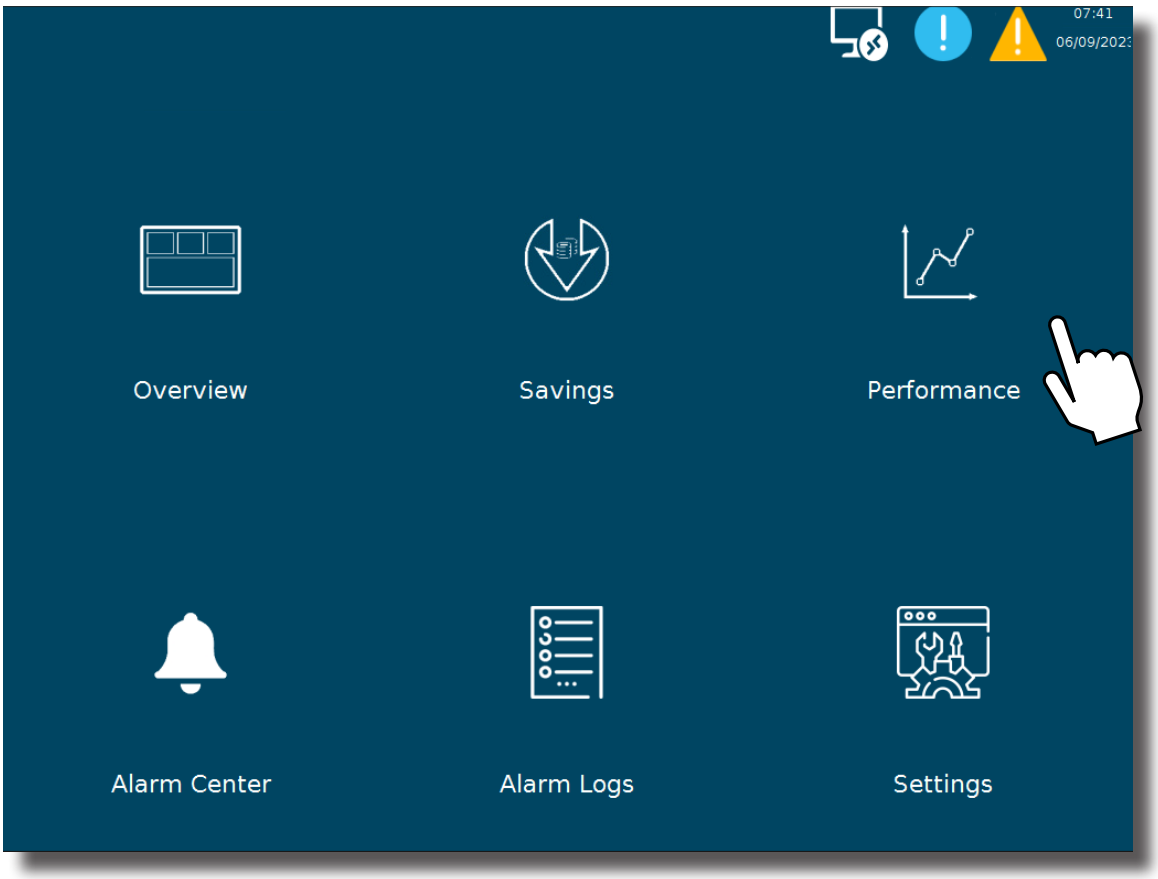

07:41
06/09/2023
Overview
Savings
Performance
Alarm Center
Alarm Logs
Settings

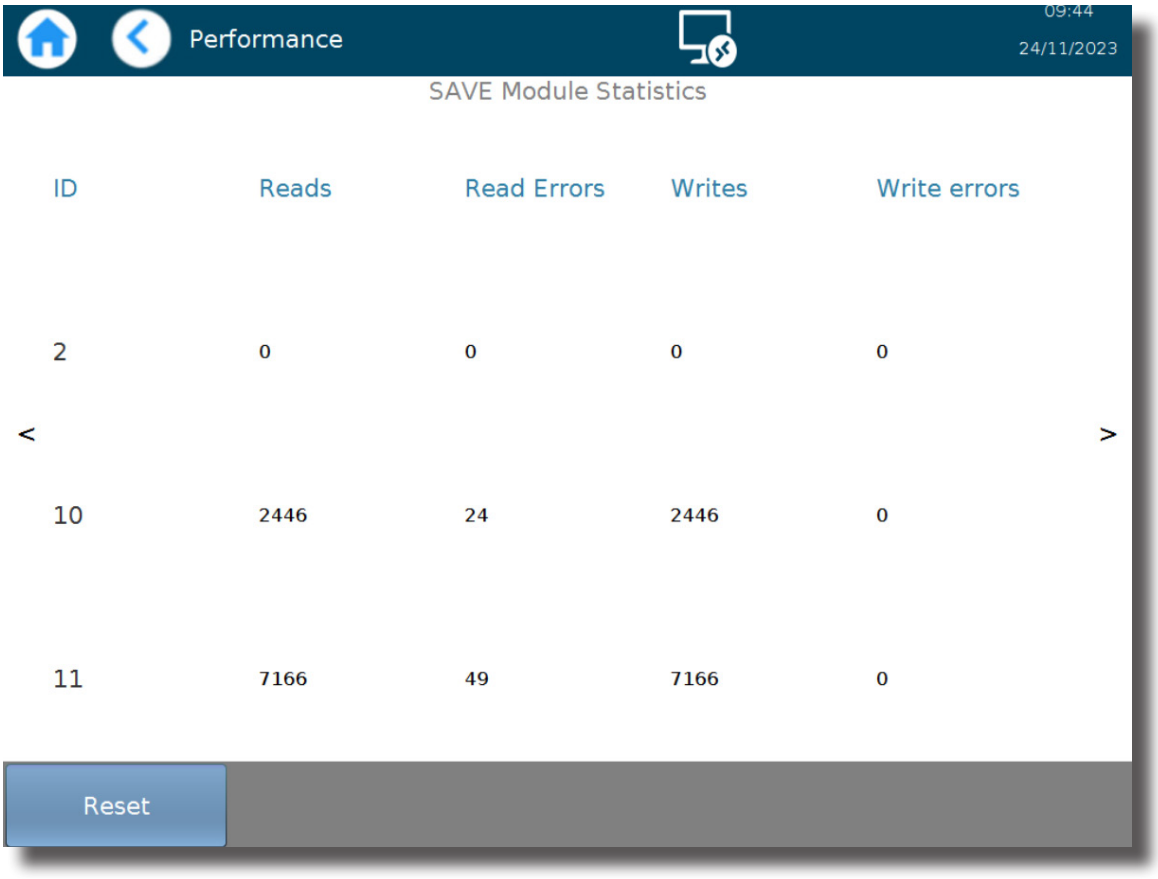
10


07:41
06/09/202
Overview
Savings
Performance
Alarm Center
Alarm Logs
Settings

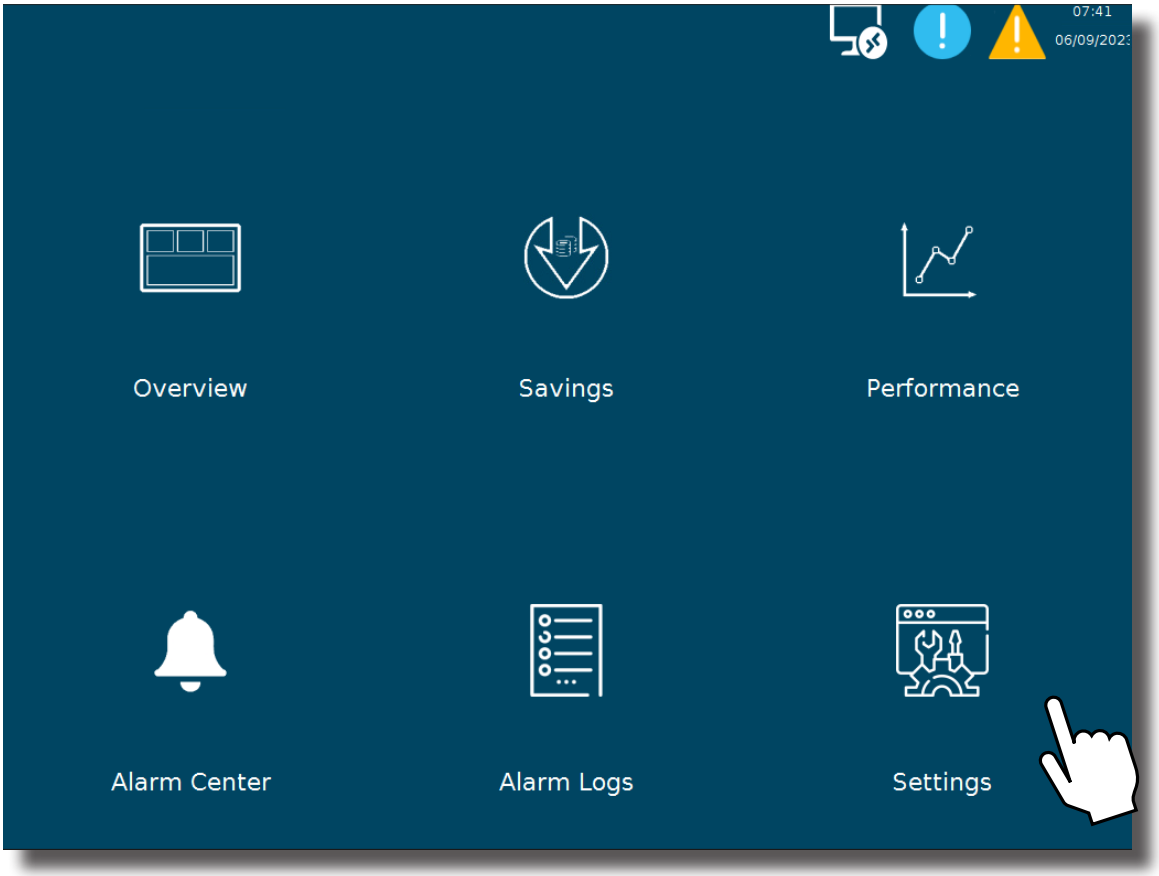

Savings
09:40
24/11/2023
Total Savings
Week
Month
Year
All
KWh (El./HVAC) Before
284.00/ 9940.00
660.00/ 25620.00
1816.00/ 70140.00
1816.00/ 70140.00
KWh (El./HVAC) After
1.51/ 4410.60
80.24/ 11366.85
734.49/ 58074.09
734.49/ 58074.09
KWh (El./HVAC) Savings
282.49/ 5529.40
579.76/ 14253.15
1081.51/ 12065.91
1081.51/ 12065.91
Money Savings (El.)
169.49
347.86
648.91
648.91

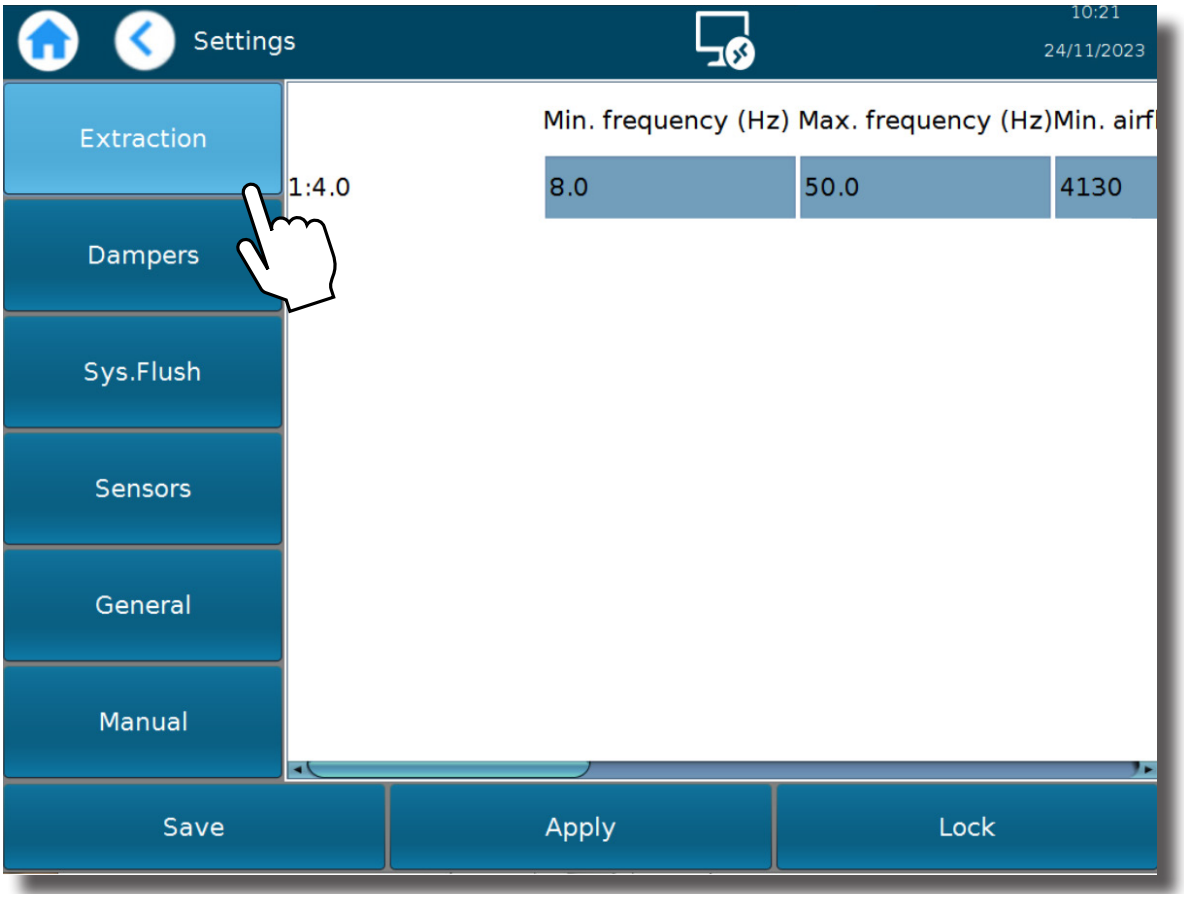
11


07:41
06/09/2023
Overview
Savings
Performance
Alarm Center
Alarm Logs
Settings

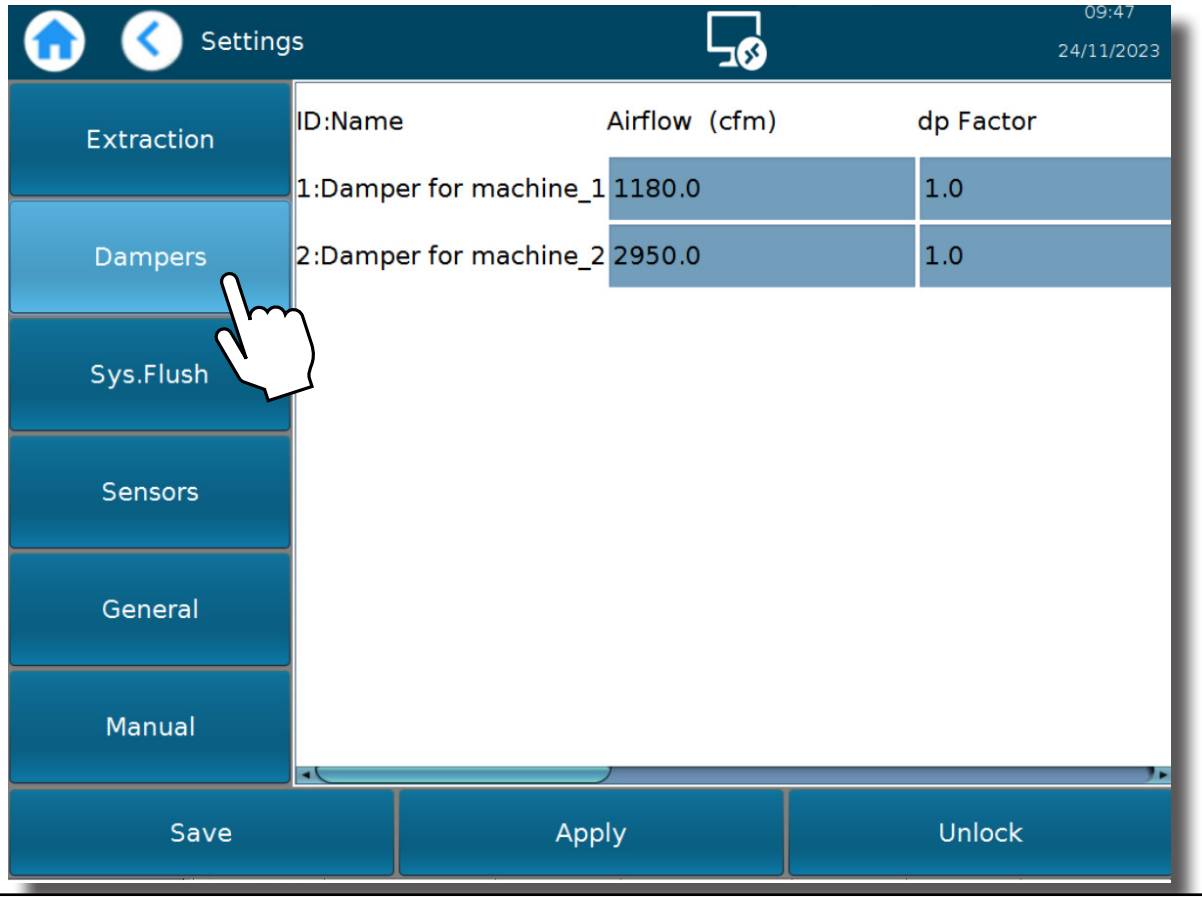

Performance
09:44
24/11/2023
SAVE Module Statistics
ID
Reads
Read Errors
Writes
Write errors
2
0
0
0
0
<
>
10
2446
24
2446
0
11
7166
49
7166
0
Reset

12

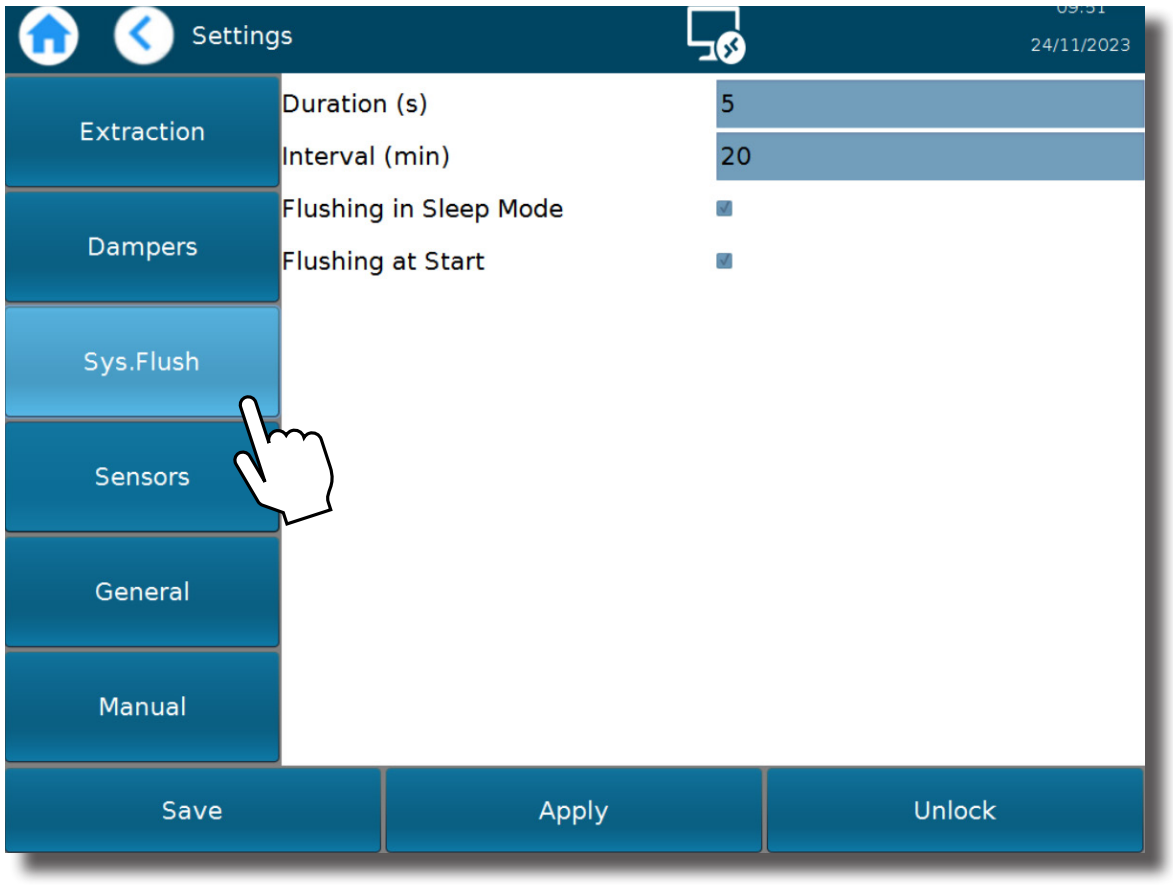

07:41
06/09/2023
Overview
Savings
Performance
Alarm Center
Alarm Logs
Settings


Settings
10:21
24/11/2023
Extraction
Dampers
Sys.Flush
Sensors
General
Manual
Min. frequency (Hz)
Max. frequency (Hz)
Min. airf
1:4.0
8.0
50.0
4130
Save
Apply
Lock

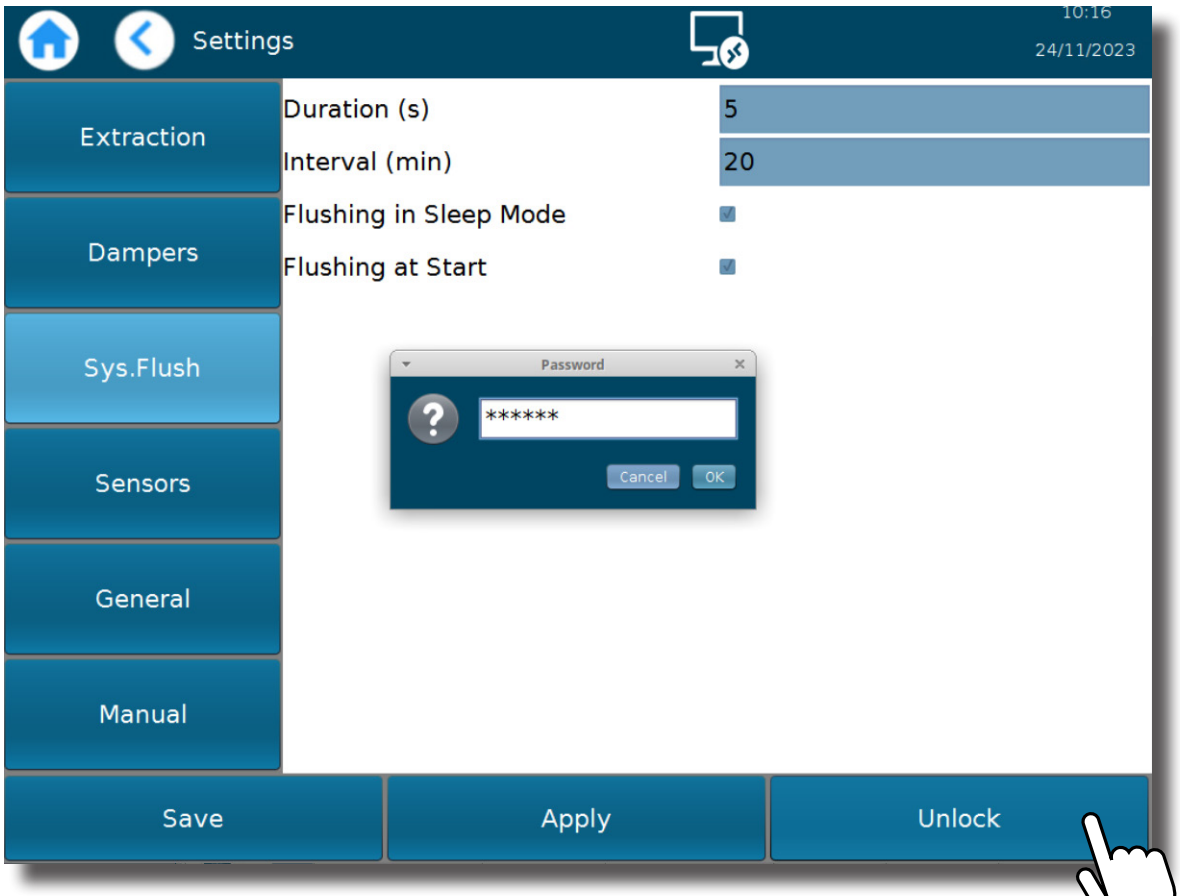
13

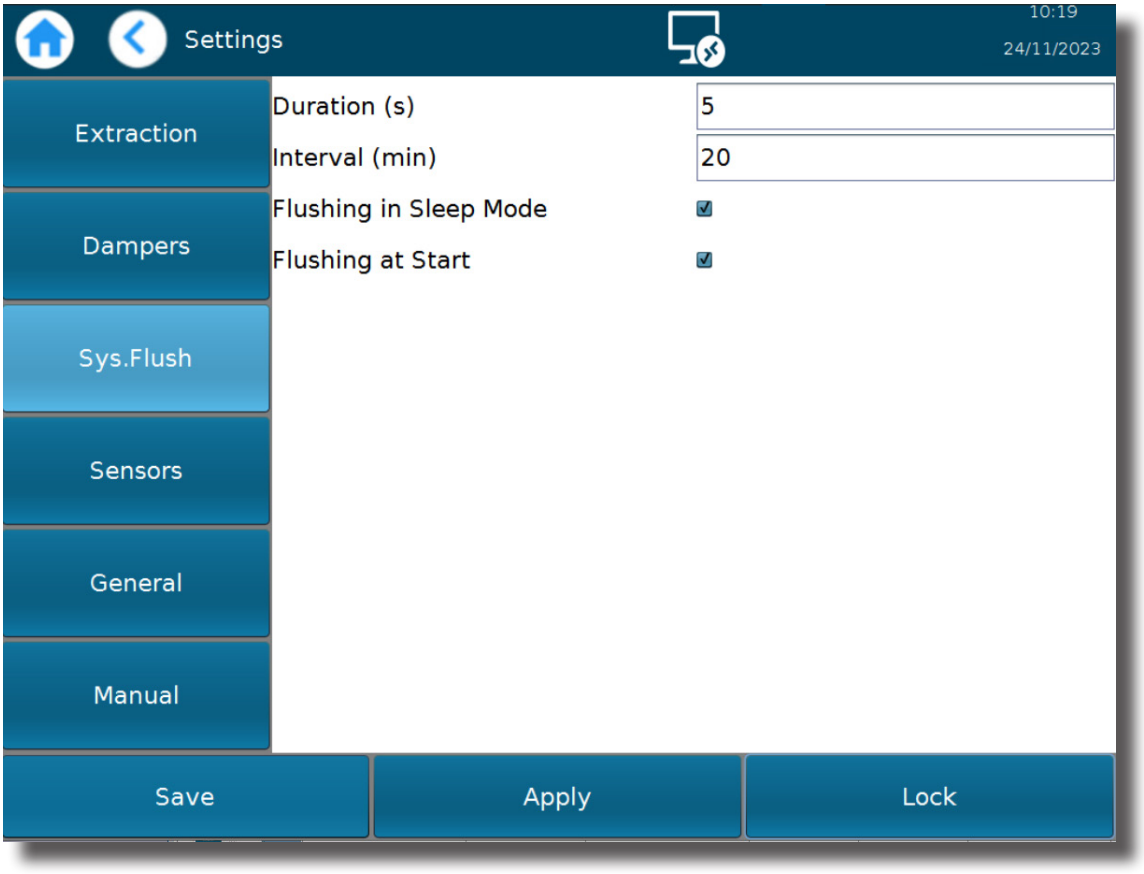

Settings
09:47
24/11/2023
Extraction
Dampers
Sys.Flush
Sensors
General
Manual
ID:Name
Airflow (cfm)
dp Factor
1:Damper for machine_1
1180.0
1.0
2:Damper for machine_2
2950.0
1.0
Save
Apply
Unlock

14

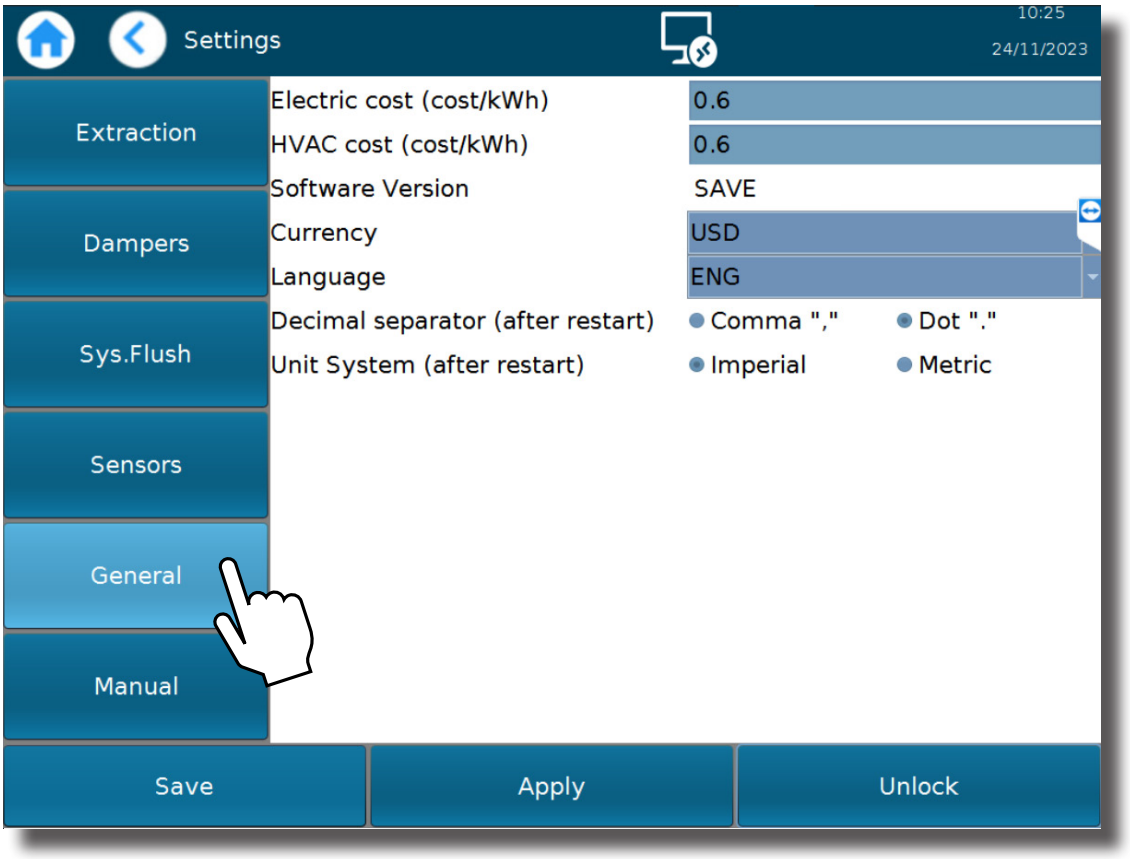

Settings
24/11/2023
Extraction
Dampers
Sys.Flush
Sensors
General
Manual
Duration (s)
5
Interval (min)
20
Flushing in Sleep Mode
Flushing at Start
Save
Apply
Unlock

15

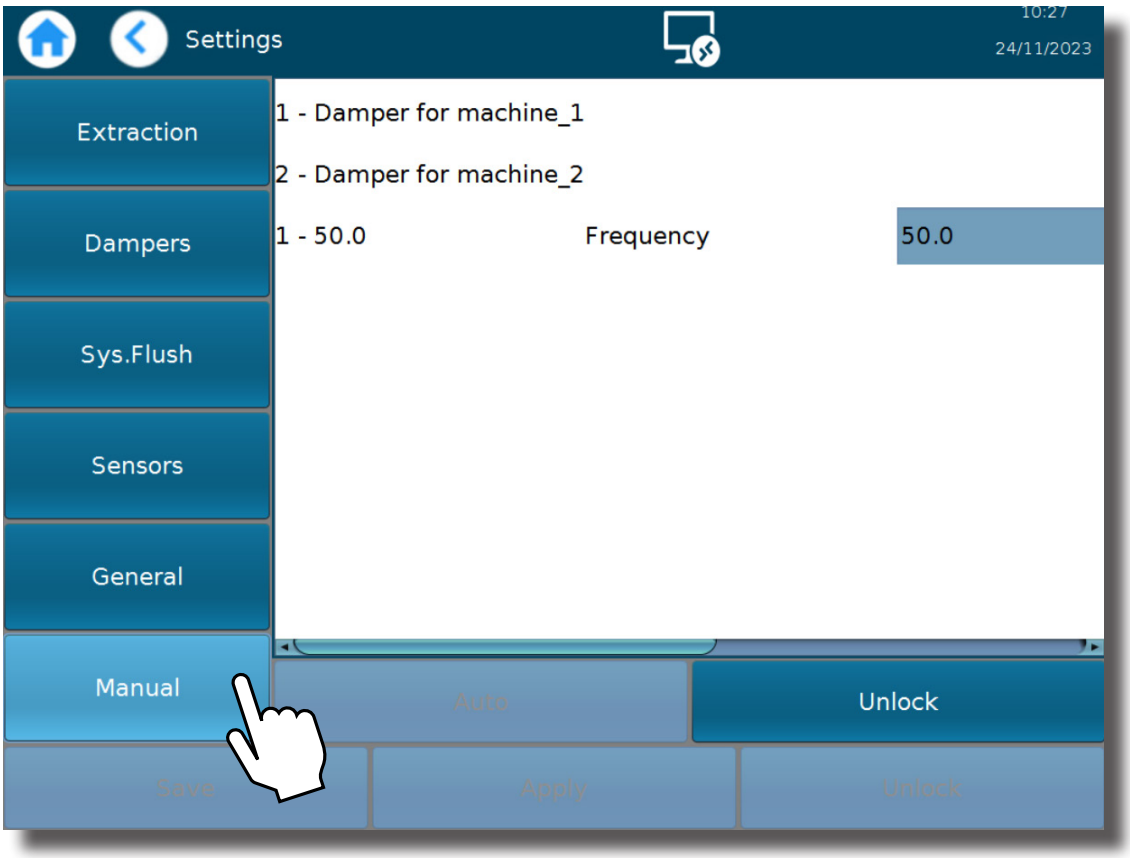

Settings
10:16
24/11/2023
Extraction
Dampers
Sys.Flush
Sensors
General
Manual
Duration (s)
5
Interval (min)
20
Flushing in Sleep Mode
Flushing at Start
Password
******
Cancel
OK
Save
Apply
Unlock


Settings
10:19
24/11/2023
Extraction
Dampers
Sys.Flush
Sensors
General
Manual
Duration (s)
5
Interval (min)
20
Flushing in Sleep Mode
Flushing at Start
Save
Apply
Lock

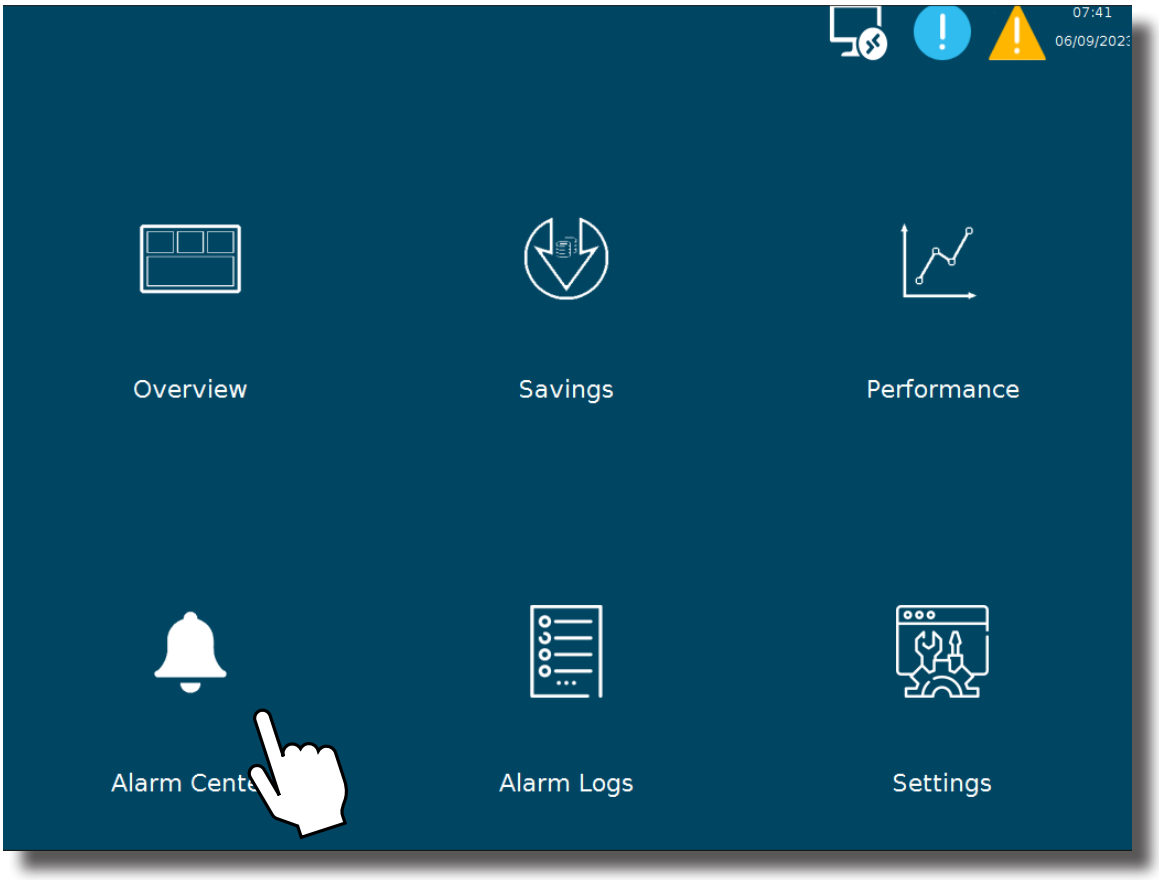
16

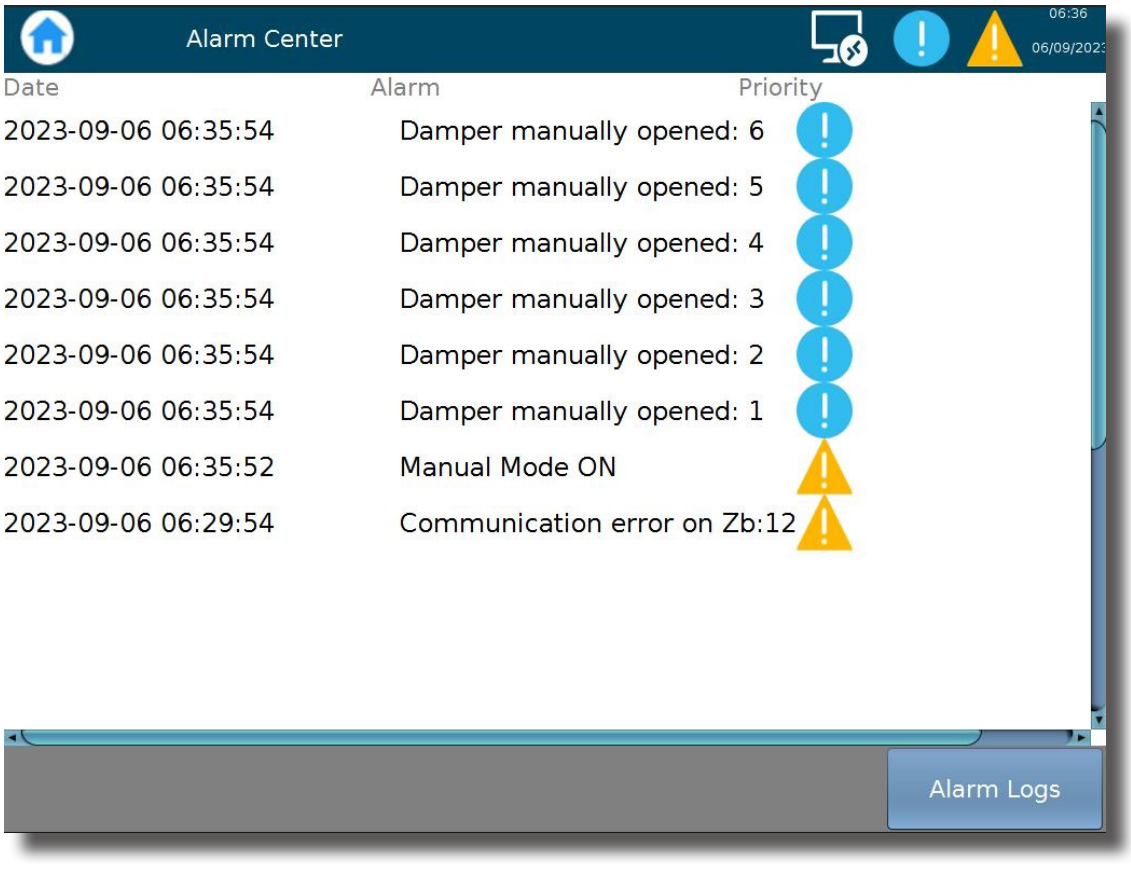

Settings
10:25
24/11/2023
Extraction
Dampers
Sys.Flush
Sensors
General
Manual
Electric cost (cost/kWh)
0.6
HVAC cost (cost/kWh)
0.6
Software Version
SAVE
Currency
USD
Language
ENG
Decimal separator (after restart)
Comma ","
Dot "."
Unit System (after restart)
Imperial
Metric
Save
Apply
Unlock

17

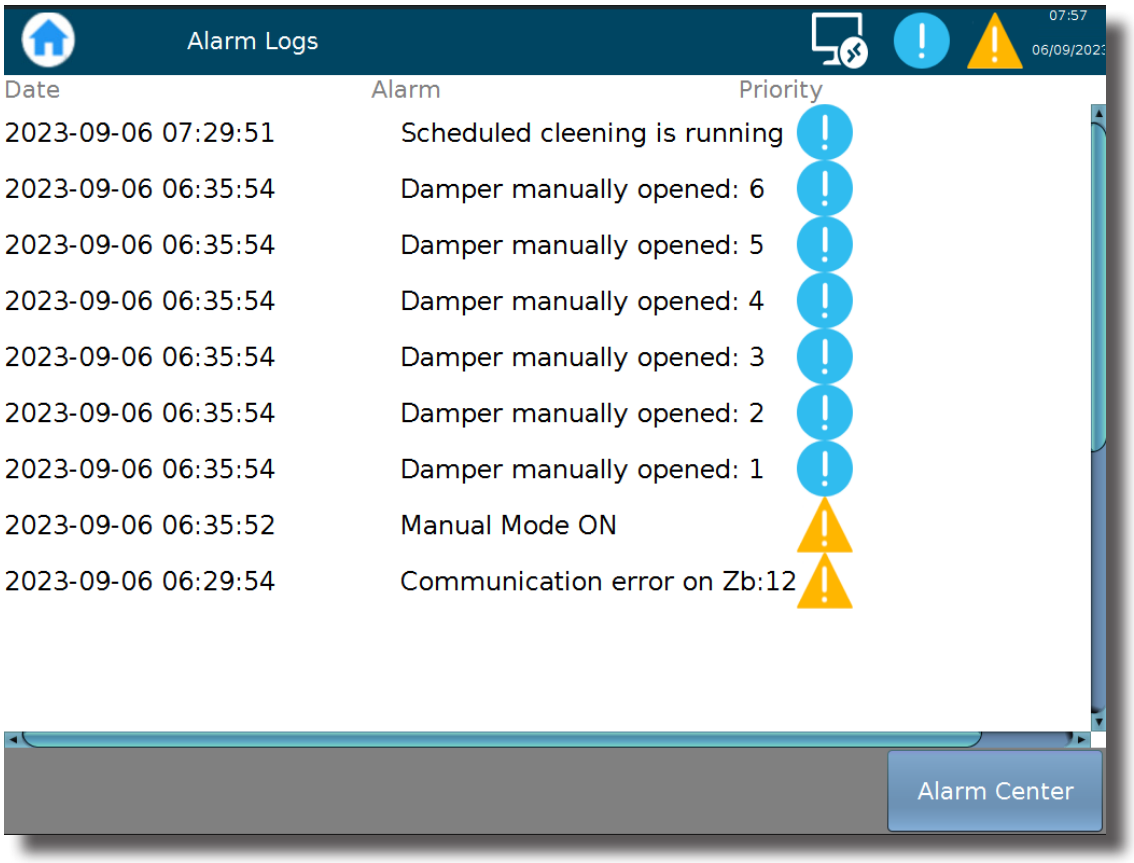

Settings
10:27
24/11/2023
Extraction
Dampers
Sys.Flush
Sensors
General
Manual
1 - Damper for machine_1
2 - Damper for machine_2
1 - 50.0
Frequency
50.0
Auto
Unlock
Save
Apply
Unlock

18


07:41
06/09/2023
Overview
Savings
Performance
Alarm Cente
Alarm Logs
Settings


Alarm Center
06:36
06/09/2023
Date
Alarm
Priority
2023-09-06 06:35:54 Damper manually opened: 6
2023-09-06 06:35:54 Damper manually opened: 5
2023-09-06 06:35:54 Damper manually opened: 4
2023-09-06 06:35:54 Damper manually opened: 3
2023-09-06 06:35:54 Damper manually opened: 2
2023-09-06 06:35:54 Damper manually opened: 1
2023-09-06 06:35:52 Manual Mode ON
2023-09-06 06:29:54 Communication error on Zb:12
Alarm Logs

19


Alarm Logs
07:57
06/09/2023
Date
Alarm
Priority
2023-09-06 07:29:51
Scheduled cleening is running
2023-09-06 06:35:54
Damper manually opened: 6
2023-09-06 06:35:54
Damper manually opened: 5
2023-09-06 06:35:54
Damper manually opened: 4
2023-09-06 06:35:54
Damper manually opened: 3
2023-09-06 06:35:54
Damper manually opened: 2
2023-09-06 06:35:54
Damper manually opened: 1
2023-09-06 06:35:52
Manual Mode ON
2023-09-06 06:29:54
Communication error on Zb:12
Alarm Center

20

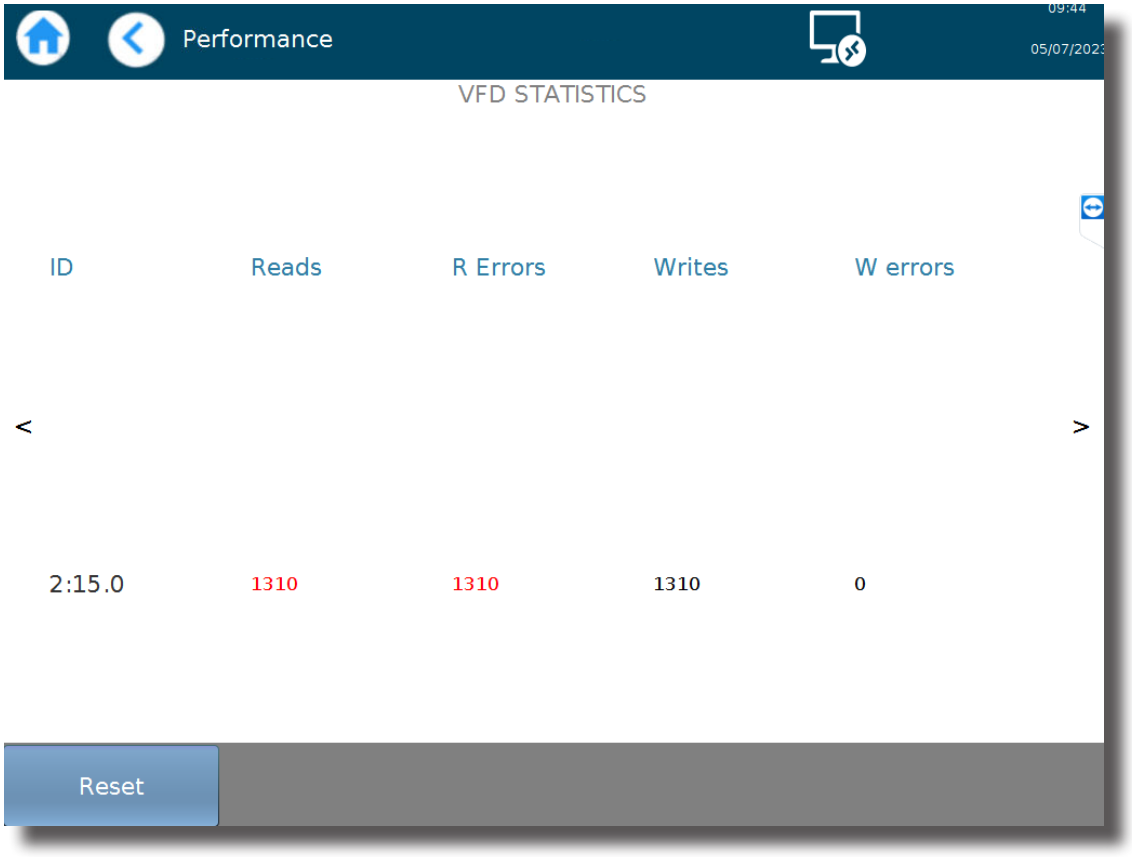

Performance
09:44
05/07/2023
VFD STATISTICS
ID
Reads
R Errors
Writes
W errors
<
>
2:15.0
1310
1310
1310
0
Reset

Table of contents

1 Declaration of conformity

The formal declaration of conformity for your specific product is supplied separately.

1.1 Compliance with requirements for North America

1.1.1 FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The device has been certified to use only up to 5mW transmission power. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

1.1.2 ISED

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

1.This device may not cause interference.

2.This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de license contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de license. L'exploitation est autorisée aux deux conditions suivantes:

1.L'appareil ne doit pas produire de brouillage;

2.L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This radio transmitter IC ID: 31444-7945167 has been approved by Innovation, Science and Economic Development Canada to operate up to 5mW transmission power and with the 915 MHz LPWA/ISM antenna, with the maximum permissible gain of 3dBi. Antenna types that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

2 Preface

Read this manual carefully before installation, use and service of this product. Replace the manual immediately if lost. Nederman reserves the right, without previous notice, to modify and improve its products including documentation.

This product is designed to meet the requirements of relevant EC directives. To maintain this status, all installation, maintenance and repair is to be done by qualified personnel using only Nederman original spare parts and accessories. Contact the nearest authorized distributor or Nederman for advice on technical service and obtaining spare parts. If there are any damaged or missing parts when the product is delivered, notify the carrier and the local Nederman representative immediately.

Your SAVE System has been produced by:

NEDERMAN Manufacturing Poland Sp. z o.o.

ul. Okólna 45 A

05-270 Marki, Poland

phone: +48 22 7616000

www.nederman.com.pl

3 Safety

This document contains important information that is presented either as a warning, caution or note. See the following examples:

WARNING! Type of injury
Warnings indicate a potential hazard to the health and safety of personnel, and how that hazard may be avoided.

CAUTION! Type of risk
Cautions indicate a potential hazard to the product but not to personnel, and how that hazard may be avoided.

NOTE! Notes contain other information that is important for personnel.

3.1 General

WARNING! Risk of electric shock
Even when the product's main switch is turned off, there may still be live components in the cabinet, such as external control signals.

Moreover:

- It is necessary to have a permanent access to switches, controllers, electric current distribution boards, monitoring system, fire protection equipment, extinguishing media.
- Perform periodic inspections based on: checking the technical condition of the system and the environmental protection devices, checking the power supply system and the lightning protection system with regard to effective operation of the connections, fixtures, devices for protection against electric shock, resistance of conductor insulation and grounding of systems and apparatuses.
- Make sure that the safety signs are legible.

Table 3-1: Explanation of signs placed on the SAVE

Sign	Description	Sign	Description
	General warning sign		Electricity warning

3.2 Prohibited activities

It is prohibited to:

- Start-up the system while all valves (dampers) are closed.
- Perform any mechanical, electrical repairs during operation of the machinery.
- Arbitrary change of set values of programmable controllers without consultation with the product supplier or manufacturer.
- Performance of works with devices located outdoors during atmospheric discharges or rainfall/snowfall.
- Installing of temporary power connections and performance of repairs of the power supply systems by persons, who are not adequately qualified.

3.3 Personnel qualification requirements

All installations, repair and maintenance work must be carried out by qualified personnel using only original spare parts.

Electrical installation must be done by electrician having the appropriate qualifications and permissions.

3.4 Emergency situations

In case of a fire, explosion, electric shock or any other emergency or accident:

- Nederman SAVE should stop according to the stop conditions of the master system.
- Proceed strictly in accordance with the related plant procedure.

Prior to restart the system:

- Make sure there are no alarms present on control panel.

4 Description

4.1 Intended use

Nederman SAVE is a unique and patented system pioneered to enable users and owners of dust extraction systems, to significantly reduce their energy costs by the direct and intelligent control of system hardware used on a real time basis.

4.2 Function

SAVE Controller is the central control unit of system, with preinstalled optimization software. SAVE Module(s) use the radio frequency for communication with SAVE Controller; wired connection is also possible. By

collecting data from individual Modules, the system intelligently controls the inverter(s) and damper(s) to achieve correct extraction level with optimized energy savings. The data is directly displayed on the monitor on the main unit in real time.

4.2.1 Main parts

NEDERMAN continuously improves the products and their efficiency through the introduction of design modifications. We reserve the right to do this without introducing these improvements on previously supplied products. We also reserve the right, without previous notice, to modify data and equipment, as well as operating and maintenance instructions.

Nederman SAVE consists of three basic components: SAVE Controller (Fig. **1**, pos. **1**), SAVE Module(s) (Fig. **1**, pos. **2**), SAVE Sensor (Fig. **1**, pos. **3**) and Air Flow Sensor (as option).

Table 4-1: External main components of the SAVE Controller

Fig./pos.	Component	Function
2/1	Antenna	Exchange of information between SAVE Controller and SAVE Module(s) by radio communication.
2/2	Enclosure	Metallic enclosure, prevent from intrusion of particles such as dirt and water.
2/3	Lamp	Warning and alarm indication.
2/4	Monitor	Main operating panel.
2/5	Main switch	2-position switch: turn off / turn on.
2/6	3-position switch	Allows switching to BYP (Bypass mode) or AUTO (Auto mode). Position 0 is for safety passing between these two modes.

Table 4-2: Internal components of the SAVE Controller

Fig./pos.	Component
3/1	Electronic board
3/2	Main power supply
3/3	Gateway (optional)

Table 4-3: External main components of the SAVE Module

Fig./pos.	Component	Function
4/1	Antenna	Exchange of information between SAVE Controller and SAVE Module(s) by radio communication.
4/2	Enclosure	Plastic enclosure, prevent from intrusion from foreign bodies such as tools, dirt and liquid water.
4/3	Main switch	Allows turn off and turn on of the device.

Table 4-4: Internal components of the SAVE Module

Fig./pos.	SAVE Module
5/1	Electronic board
5/2	Main power supply

4.3 Technical data

Table 4-5: SAVE Controller and SAVE Module parameters

Parameter	SAVE Controller	SAVE Module
Power	100W (24VDC)	60W (24VDC)
Power supply	120/230VAC//1phase//50/60Hz	120/230VAC//1 phase// 50/60Hz
Nominal current	3A (120VAC); 1.6A (230VAC)	1.2A (120VAC); 0.8A (230VAC)
Ambient temperature range*	15°F - 120°F	15°F - 120°F
Protection category	IP65	IP65

*Indoor use only.

Table 4-6: SAVE Sensor parameters

Parameter	Value
Voltage rating	12-24 DC/115-400 VAC
Ambient temperature range	15°F - 120°F

4.4 SAVE Controller types

SAVE Controller is available in two versions:

- SAVE Controller - with built-in Ethernet communication.
- SAVE Controller - with built-in Ethernet communication and built-in GSM modem.

4.5 Dimensions and weight

Dimensions for the SAVE Controller show Fig. 3A and for SAVE Module show Fig. 3B.

Table 4-7: SAVE components weight

Component	Weight (lb)
SAVE Controller	22
SAVE Module	2.2
SAVE Sensor	1.1

5 Operation

The instruction in the following chapters assumes that the installation is complete and Nederman SAVE with associated equipment's have been commissioned and are ready for normal operation.

WARNING! Risk of personal injury
Only properly trained personnel are allowed to install, use and service this product.

5.1 Start / stop of the system (AUTO - mode)

AUTO - mode is selected by switching the 3-position switch on the SAVE Controller, see Fig. **2A**.

Correct operation of Nederman SAVE required an appropriate signal from the suction line or machine.

5.2 User login

To be able to configure most parameters and settings, a password is required. There are different user levels, each with its own password.

Together with other Nederman SAVE documentation there is a sealed envelope marked as:

"Confidential information enclosed. To be shared with Customer operator".

If lost, contact your Nederman Representative and ask for the passwords.

5.3 Display navigation

The Nederman SAVE has a capacitive display for navigation. It is possible to navigate around the various main screens as Overview, Savings, Performance, Alarm Center, Alarm Logs, Settings, by touch, see Fig. **8.** For a description of the screens, see the following sections.

5.3.1 System status

Through this view, the operator can see the fan status and also parameters like: voltage (V), ampere (A), speed (RPM), frequency (Hz), power [HP], airflow [CFM] and torque (%) (see Fig. **8** and **Table 5-1**).

By clicking on the fan status (Fig. **8**) we get a detailed picture of the status of machines and dampers, which is presented and described in **Table 5-2** and **Table 5-3**.

Table 5-1: Fan status

Status	Status description
Running	Fan is running.
Not running	Fan is not running.

Table 5-2: Machine status

Status	Status description
ON	Machine is On.
OFF	Machine is Off.
Idle	Machine is Off for a long time.
Disconnected	Machine is working and communication between SAVE Module and SAVE Controller is incorrect (interference occur).

Table 5-3: Damper status

Status	Status description
Closed	Damper is closed.
Opened	Damper is open.
Supplemental	Emergency damper is open to ensure min. airflow velocity.

5.3.2 Overview

The operator has an overview of the system savings on the main screen, see Fig. **9**. The view shows actual data for saved electrical power, HVAC power saved, and money saved.

Information about telephone number of Nederman Service is also available on the main screen.

5.3.3 Savings

An additional icon *Savings* has been created so that the user can see in detail how savings are generated in a given week, year or in total (see Fig. **10**). The values are also presented by chart.

5.3.4 Performance

On the System *Performance* page, you can check whether the correct communication between specific SAVE Modules (they are assigned an ID) and the SAVE Controller is ensured (see Fig. **11**). If the readings are highlighted in red, there is a problem with communication (see Fig. **20**). Check the communication requirements in the *Installation and Service Manual.*

Power consumption, frequency and other graphs are also presented.

5.3.5 Settings

The parameters are set during the first commissioning by installers. This view shows details about extraction, dampers, flushing, damper and general information (see Fig. **12-17)**.

The changes in some parameters can be done by clicking on "*Unlock*" button and write password (delivery in envelope with product), see Fig. **15**.

The user can change the value of the cleaning parameters (Fig. **15**), such as cleaning duration, delay time, and by unchecking or checking the check box of clean in sleep mode and clean on startup.

In 'General' tab (Fig. **16**) the user can provide actual electrical cost in kW, see the software version and change the language and currency if needed.

NOTE! Others parameters which cannot be unlock by *User password* can be changed only by Nederman Service.

5.4 Alarms

5.4.1 Alarm Center

Current list of alarms in the order in which they occurred (see Fig. **18**). Each alarm has a priority, date and description.

5.4.2 Alarm Log

Alarm history lists alarms in the order in which they occurred (see Fig. **19**). Each alarm has a priority, date and description.

5.4.3 Alarm list

Table 5-4: Alarm list

Code	Alarm name	Priority
101	SAVE Module # communication error	High
102	Extraction fan # Modbus communication error	High
103	Pressure sensor # Modbus communication error	High
201	Main Duct velocity is low	High

Code	Alarm name	Priority
202	Branch # velocity is low	High
301	System running in Bypass Mode	High
302	Damper # is in service (closed)	Info
303	Fan # in sleep mode	Info
304	Scheduled Cleaning is active	Info
401	Damper # is not open	High
402	Damper # is not closed	High

6 Maintenance

WARNING! Risk of electric shock
- Work on electric equipment is to be carried out by a qualified electrician.
- Cut off the power supply by switching off the main breaker of the incoming power and lock it in this position in order to avoid accidentally turning on the equipment before starting any work.
- Provide a sign “Service – do not turn on!” on the switch.

CAUTION! Risk of equipment damage
Use only Nederman original spare parts and accessories.

NOTE! During the warranty period, NEDERMAN must be notified of all abnormalities in functioning of the device.

6.1 Routine inspection and service

In addition to routine maintenance, Nederman also recommends that a standard service is performed by authorized Nederman technician. Standard service helps to prevent unexpected downtime, increase the life of the product, and ensure greater quality and efficiency. Contact your nearest authorized distributor or Nederman for more information.

Table 6-1: Maintenance

Description	Interval
Electrical connection	Annually
Settings of protections	Annually
Cables and wires condition	Annually
Remove dust and dirt from electrical panel	Annually

6.2 Re-start after repair

Launch in accordance with the normal start-up procedure, paying particular attention to the process. Control the proper functioning of the components of the installation, which have been fixed or regulated. In case if the defect is still observed, shut down the system immediately.

6.3 Spare parts

CAUTION! Risk of equipment damage
Use only Nederman original spare parts and accessories.

Contact your nearest authorized distributor or NEDERMAN for advice on technical service or if you require help with spare parts. See also:

www.nederman.com

Ordering spare parts

When ordering spare parts always state the following:

- Part number and control number (see the product identification plate).
- Position number and name of the spare parts (see www.nederman.com)
- Quantity of the parts required.

Other optional items

Please contact NEDERMAN Service Dept. for details related to nonstandard items.

Table 6-2: Spare part list

Fig./pos.	Description	Item number
2/4	Industrial PC panel 10.4”	73009253
2/1 and 4/1	Antenna*	7945188
1/2	SAVE Module	73009336
1/3	SAVE Sensor	73009060

* For SAVE Controller and SAVE Module

7 Recycling

The product has been designed for component materials to be recycled. Its different material types must be handled according to relevant local regulations. Contact the distributor or Nederman if uncertainties arise when scrapping the product at the end of its service life.

8 Troubleshooting

NOTE! All troubleshooting and fault remedying activities may be performed by skilled competent staff only, with knowledge of the plant function and build-up.

If there is an alarm or warning in the SAVE, the first step is to make sure that the system has been properly configured and that the installation settings made in the sections above are correct.

Table 8-1: Troubleshooting for alarm list

Code	Description	Possible cause	Recommended solution
101	SAVE Module # communication error	SAVE module loses communication with the main controller for more than 30 seconds.	Check the radio communication set-up - see *Installation and service manual*
102	Extraction fan # Modbus communication error	SAVE Controller loses communication with the VFD for more than 30 seconds.	Check the RS485 communication.
103	Pressure sensor # Modbus communication error	Some of pressure sensors in respective branch or duct - loses communication with the SAVE Controller when connected over Modbus for more than 30 seconds	Check the radio communication set-up - see *Installation and service manual*
201	Main Duct velocity is low	When main duct velocity is lower than the accepted threshold (Adjustable setpoint on UI) for more than 300 seconds	Check if system is free from leakage. Check if VFD is working on correct parameters.

Code	Description	Possible cause	Recommended solution
202	Branch # velocity is low	When Independent branch velocity is lower than the accepted threshold (Adjustable setpoint on UI) for more than 300 seconds.	Check if system is free from leakage. Check if VFD is working on correct parameters.
301	System running in Bypass Mode	Operator manually flip the toggle switch to Bypass when malfunctioning.	Check the system, if possible switch to AUTO mode.
302	Damper # is in service (closed)	Operator manually puts a specific damper in service from UI.	This is only Information, investigate if needed.
303	Fan # in sleep mode	No machines are active for certain amount of time and the extraction fan go to sleep mode.	This is only Information, investigate if needed.
304	Scheduled Cleaning is active	Scheduled cleaning is active.	This is only Information, investigate if needed.
401	Damper # is not open	Damper open, REED switch status is not satisfied.	Check Open position sensor.
402	Damper # is not closed	Damper close, REED switch status is not satisfied	Check Close position sensor

If this does not solve the problem, contact NEDERMAN.

9 Acronyms

Table 9-1: Acronyms

ID	Definition
HMI	Human Machine Interface
UI	User Interface
SAVE	Smart Air Ventilation Economics
VFD	Variable Frequency Drive

Nederman

www.nederman.com