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LOX - Low Oxygen System

User Manual

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Inhoudsopgave

1 Introduction

1.1 The Goals of the installation

Fires can cause very great damage to the environment and to property. In addition, there is a high potential risk to humans. The primary goal of the LOX system is to prevent fire in a specific area or to drastically reduce the risk of fire. A fire that does start, despite of the precautions, will remain limited and will develop less quickly. This significantly increases the escape time of those present and the intervention time for the emergency services.

The LOX system works on the basis of permanent oxygen reduction by supplementing additional nitrogen. The air around us consists of approximately 20.8% oxygen, 78% nitrogen and 1% other gases. The LOX H.P. LOW OXYGEN system changes the balance between oxygen and nitrogen. The optimum oxygen percentage depends on the nature of the flammable substances.

In the LOX system, a nitrogen generator is used. In this generator compressed air is separated into oxygen and nitrogen. The oxygen is relieved into the surrounding area. The nitrogen is used to regulate the mixture of oxygen and nitrogen in the protected room. The required compressed air is produced by means of a compressor.

Only FX Prevent or an authorized party is allowed to modify the installation. The installation should only be used for the purpose for which it was designed. The system is designed and tuned for specific operating parameters. These may only be changed by FX Prevent or its authorized party. The operating pressure of the installation is between 0 and 8 bar. The design pressure is 10 bar. This pressure may not be exceeded under any circumstances. The temperature of the room where the system is installed should be no lower than +3 °C and no higher than +40 °C.

1.2 Redundancy

The LOX system, like all other technical installations, has the risk of malfunctioning. When this happens, the prevention of fire in a specific area can no longer be guaranteed. In order to still be able to give this guarantee, the concept of *redundancy* is very important in the design of the LOW OXYGEN systems. FX-Prevent follows the Master/Slave principle for this.

A master version of the LOX system controls a complete single system. This can consist of a compressed air production system, nitrogen generator system, sensors and a measurement and control module. The capacity is calculated in such a way that the installation can independently control the percentage of the protected area.

A slave version of the LOX system controls a complete or partially complete installation. This can consist of a compressed air production system, nitrogen generator system, sensors and a measurement and control module. The machine is designed in such a way that it can independently maintain the percentage in the protected area if there is a problem in the master system.

The composition of the Master and Slave system and the level of redundancy are tailored to the user's requirements and can therefore be different for each installation.

2 Precautions and safety instructions for nitrogen generators

2.1 General safety standards

When working with the nitrogen generator of FX Prevent, there are some safety risks that have to be considered. The risks involve subjects such as dangerous voltage, high pressure and dangerous gas to inhale. This is addressed in this chapter. It is highly recommended that the safety risks are observed before work on the devices is commenced.

2.2 Working with the nitrogen generator

The nitrogen generator is commonly located in the technical room of the facility. When operating or when working on the nitrogen generator, the following hazards should be considered.

Symbool	Omschrijving	Geldt voor
	HIGH PRESSURE, Relief pressure from components before work is conducted.	The external components of the nitrogen generator which are: • Valves; • Hoses; • PSA vessels.
	DANGEROUS VOLTAGE, Forbidden to work on the system if the power is on.	The internal parts of the control cabinets, UPS control cabinets, junction boxes and sensors. These parts are: • PCB's within the control cabinets; • PCB of UPS control cabinet; • DC batteries of UPS control cabinet; • The applied voltages are: 24V AC, 24V DC, 230V AC, 380V AC.
	DANGER OF INHALATION, danger of asphyxiation if breathing high concentration of nitrogen. Avoid the specified area to avoid health hazards.	The nitrogen output connection. The mixture produced by the nitrogen generator consists of 95% or more nitrogen. Inhalation directly from the output connection may cause intoxication. The nitrogen quickly mixes with the ambient air so that at a distance of >0.5m from the nitrogen output connection it no longer poses a health risk.

2.3 Description of hazard symbols

In addition to the identified risks for the nitrogen generator, the following symbols can also be applied within the system of which the nitrogen generator is part of. When a hazard symbol is encountered, please observe its meaning carefully before further commencing the work.

Symbool	Omschrijving	Symbool	Omschrijving
	1. OVERPRESSURE VALVE, Be aware of the sudden relief of overpressure.		7. HIGH PRESSURE, Relief pressure from components before work is conducted.
	2. DANGEROUS VOLTAGE, Forbidden to work on the system if the power is on.		8. HOT PARTS, Do not touch parts with bare hands. Use heat-resistant clothing.
	3. DANGEROUS TO INHALE GAS, Avoid the specified area or wear appropriate breathing equipment.		9. SUFFOCATION, If the oxygen concentration is to low then do not enter the room, risk of suffocation.
	4. MACHINE WITH AUTOMATIC START, Machine stops and starts automatically when it is operating normally. Turn off the machine completely before working on it.		10. ROTATING FAN, Risk of getting stuck or injuries to limbs. Turn the machine off completely before working on it.
	5. NOISE, Wear ear protection to prevent hearing damage.		11. ATTENTION, Special situation occurs, follow additional instructions.
	6. READ THE OPERATING AND MAINTENANCE INSTRUCTIONS, It is advised that the maintenance instructions are read before continuing work.		12. MOVING PARTS, Risk of getting stuck or injuries to limbs. Turn the machine off completely before working on it.

For the precautions and safety instructions of miscellaneous components that are related to the nitrogen generator, please refer to the enclosed instructions of those components that are provided by the respected manufacturers. These can be found with the specific components upon delivery or are included within the technical file of system of which the nitrogen generator is part of.

3 The LOX installation

3.1 The LOX system basics

The LOX oxygen reduction system is delivered as a complete installation. On the next page a schematic overview of the complete system and its components can be found. The drawing also shows that a distinction can be made between the LOX unit and the area('s) to be protected.

The LOX system is usually installed separately from the room(s) to be protected, for example in the technical room. A complete LOX system consists of:

- Compressed air facility;
- Water and oil separators;
- Compressed air buffer tank;
- One or more air dryers;
- Liquid and residual dust filters;
- Moisture detection sensor;
- The nitrogen generator(s);
- Dust filter(s);
- Nitrogen flow and purity measurement;
- Control cabinet;
- Piping for nitrogen supply;
- Flashing light;
- Acoustic alarm (slowwhoop / evacuation alarm);
- Door display at each access door;
- Communication equipment for communication with the supplier's failure department;
- Electrical cabling for the control centre(s), oxygen measuring equipment, alarm detectors and access control equipment.

The LOX oxygen reduction system serves a maximum of 24 rooms. The following components are installed in each of these rooms:

- Supply points for nitrogen;
- 3 oxygen sensors (minimum 3 according to EN 16750);
- Flashing light;
- Acoustic alarm (slowwhoop / evacuation alarm);
- Door display at each entrance door except for automatic sluices.

If the LOX oxygen reduction system is used to protect a refrigerated area where the temperature is below 0 °C, an alternative assembly is used. In this application, the following components are placed outside the protected areas:

- Flashing light;
- Acoustic alarm (slowwhoop / evacuation alarm);
- Door display at each entrance door except for automatic sluices.

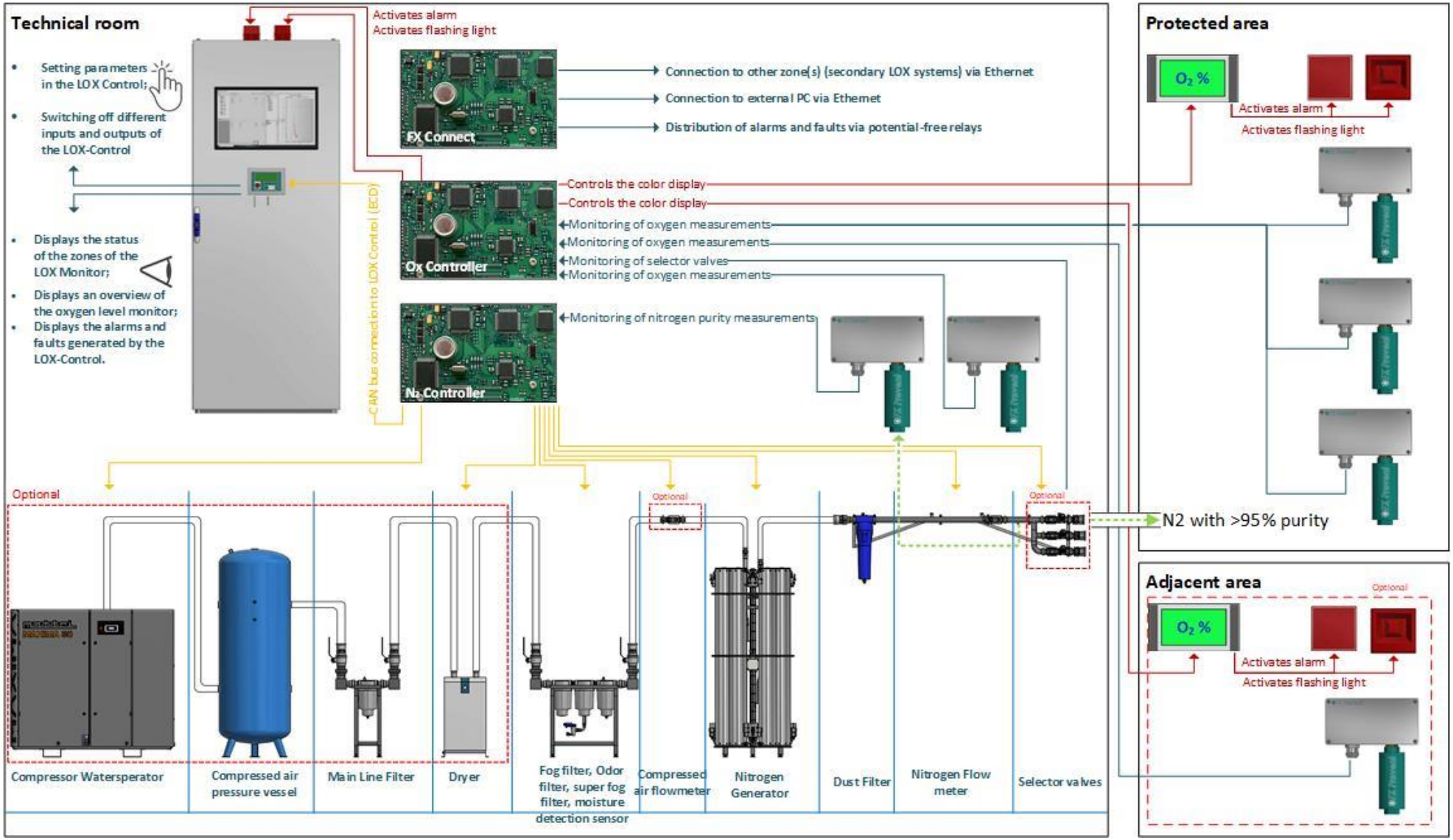

Figure 1: Schematic setup of the LOX system basics.

3.2 System description

3.2.1 Compressor

For the operation of the nitrogen generator, a compressor with the necessary compressed air conditioning is available. The compressor produces compressed air for the nitrogen generator. The compressor must be able to provide sufficient capacity and keep the compressed air pressure in the buffer tank at the required level at all times to keep the system operational.

As soon as there is a temporary voltage drop, the compressor must be activated manually. The compressor switches off for safety reasons and may not be switched on automatically. The LOX system switches itself on again and reports a power failure in the log.

For further explanations on the operation of the compressor, please refer to the respective instructions.

3.2.2 Compressed air conditioning

Compressed air conditioning components are installed between the compressor(s) and the nitrogen generator set(s). These are selected depending on the situation of the respective installation. The functioning of the LOX system depends on the quality of the supplied compressed air. FX Prevent sets high demands on the compressed air quality in order to guarantee the lifespan of the nitrogen generators. If condensate forms in the compressed air supply, this will lead to damage to the nitrogen generators of the installation. FX Prevent has taken measures to permanently monitor the quality of the compressed air by using a moisture detection sensor. The compressed air conditioning section consists of the following components, depending on the installation:

- Water separator (per compressor)
- Compressed air buffer tank
- Oil and water filtration
- Dryer(s)
- Oil, water and fine dust filtration

3.2.3 Nitrogen generator

The nitrogen generator produces nitrogen using PSA (Pressure Swing Absorption) techniques.

High Performance PSA nitrogen generator

A High Performance PSA set consists of two vessels filled with activated carbon. The active carbon has the ability to absorb oxygen molecules at a high pressure, meanwhile the nitrogen molecules will pass through.

The process operates as follows:
One of the two PSA vessels is in operation. The nitrogen is produced until the activated carbon in the HP-PSA vessel is saturated with the oxygen molecules. When this is achieved, the control system will automatically switch to the second PSA vessel so that both tubes are equalised with compressed air. The first PSA vessel is relieved of its pressure which causes the active carbon to lose its ability to absorb oxygen molecules. The oxygen molecules that are released will be vented into the surrounding. This cycle can repeat itself as many times as necessary.

3.2.4 LOX setup

Depending on the requirements, a single system or a redundant system with several HP-PSA units is used. The diagram below shows both systems.

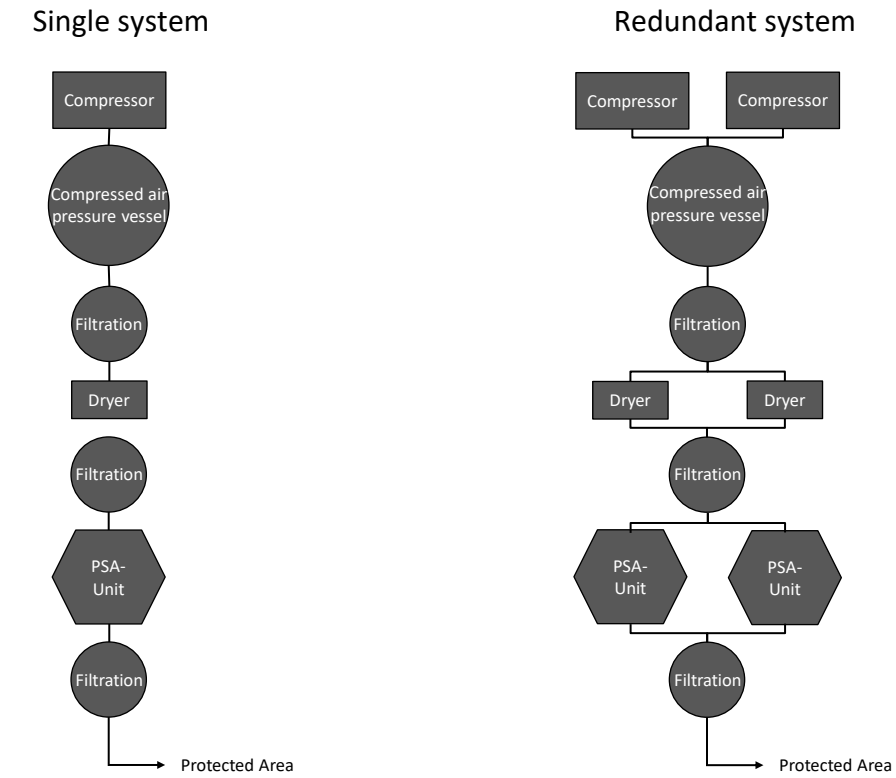

Figure 2: Basic set-up of a nitrogen generator. Single set-up and redundant Master/Slave set-up.

3.2.5 Nitrogen inlet

For optimum fire safety, it is important that the necessary oxygen content is achieved throughout the protected area. Depending on the dimensions, the shape of the room and the objects present, nitrogen is injected at one or more locations. If several rooms are protected with one LOX installation, the distribution is regulated by means of valves.

The supply of nitrogen is automatically controlled via the LOX control software and is not described separately in this manual.

LOX controller

The LOX controller is the nerve center of the installation. The basic functions of the controller are:

- the control of the nitrogen production units;
- taking care of the communication between the various components;
- registering and correcting any deviations.

The LOX controller can be connected in a number of ways.

- The installation functions as a stand-alone unit. The control takes place via the ECD display;
- The installation is connected to, for example, a PC and/or network. This offers the possibility to collect data about the functioning of the installation and to carry out extensive analyses with the help of the LOX studio software;
- The LOX controller is linked to other fire protection systems and/or a building management system. Via this connection it is possible to send messages to, for example, the own technical service, an external alarm centre and/or the FX Prevent service.

3.2.6 N_2 Control

The N2 Control monitors and controls the devices related to the production of nitrogen, such as the nitrogen generator and the compressor. The N2 Control receives information from the Ox Control that determines whether nitrogen is needed in the protected area. The N2 Control reacts to this signal by activating the nitrogen generator and the compressor. It also controls the valves in the nitrogen supply lines, so that the nitrogen is blown into the right room. During nitrogen production, the N2 Control monitors whether production is proceeding as it should. For example, it measures the flow of compressed air to the nitrogen generator (when used) and measures the nitrogen flow to the protected room. It also checks for errors in the related devices such as the compressor, dryer, filters and humidity sensor by means of sensors and switches.

The N2 controller can control up to three nitrogen generators. If it is necessary to control several nitrogen generators, this is done with additional N2 controllers.

3.2.7 Ox Control

The Ox Control monitors and controls the devices in and around the protected space that are related to the oxygen reduction process. It receives its information from the Oxysensors located in the protected space. According to the measurements of the Oxysensors, the Ox Control determines how much nitrogen is required to maintain the oxygen-reduced atmosphere. This nitrogen demand is then communicated to the N2 Control. The Ox Control also uses the measurements from the Oxysensors to monitor deviations. If the oxygen level becomes too high or too low, the Ox Control generates an error or alarm message that is visible on the ECD display and indicated by a flashing light and/or a slow whoop. The Ox Control also checks the status of the power supply. The Ox Controls installed as a leading or redundant controller are not different from each other and are always constructed in the same way.

3.2.8 Oxygen sensors

Accurate monitoring of the oxygen concentration in the protected area is essential. On the one hand, the oxygen content must not become too low because of accessibility for people. On the other hand, the oxygen content must not become too high in order to ensure fire safety.

High-quality oxygen sensors are used to measure the oxygen content. The measuring principle is based on zirconium elements that measure the oxygen content.

Depending on the size, shape of the room and the objects in the protected area, several oxygen sensors are used. The measuring signal is sent to the Ox controller(s). There are always at least three sensors applied.

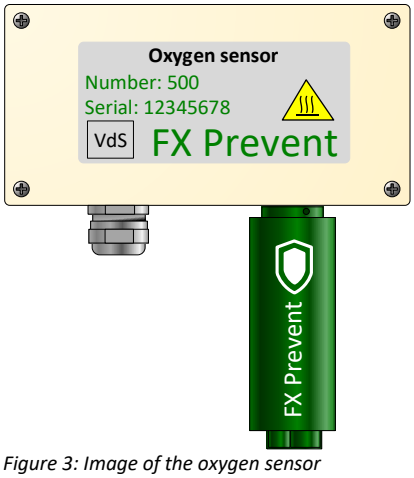

Figure 3: Image of the oxygen sensor

The oxygen measurement is registered and interpreted by the Ox controller. If the oxygen percentage in the protected area rises above the trigger level, additional nitrogen is blown in. The oxygen percentage is controlled within an adjustable bandwidth.

If a single sensor shows a large deviation, this may indicate an abnormal oxygen content or a defect. This is immediately indicated by an alarm message.

The oxygen sensors are part of the LOX installation and are therefore not described separately in this manual. Operation takes place via the LOX controller.

3.2.9 Informing and alerting

If an abnormal atmosphere (low oxygen atmosphere) is created in the protected area, those present must be informed. To ensure that those present are informed, a number of safety measures have been taken:

- Door display with actual oxygen content indication;
- Flashing light and acoustic signal;
- Door registration (door open or closed)(when applied);
- Email notifications to relevant persons.

The safety devices are specifically selected per installation on the basis of regulations and user requirements.

3.2.10 The Color Display

The Color Display is a software-based display that is placed at an entrance to the protected area. It is equipped with a main PCB (JGA1063C) with input, output and CAN-bus connections. Via the CAN-bus connection it receives information from the LOX Control (ECD) about the situation in the protected room. The LOX Control collects this information with the help of the Oxysensors that are located in the protected area. Via the CAN bus connection, the LOX Control also monitors the availability of the colour display. The Color Display has a redundant CAN bus connection, so that it can also receive the necessary information from the redundant LOX Control in the event of a fault in the master controllers.

The Color Display monitors and controls the accessibility of the entrance to the protected room. Via switches at the entrance door, the Color Display can detect if the entrance door is opened and notify the user when it is opened to long.

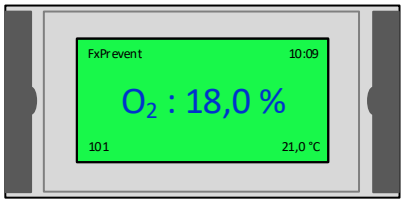

Figure 4. Color Display landscape for 1 protected room

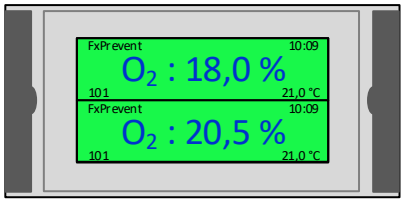

Figure 5. Color Display landscape for 2 protected rooms.

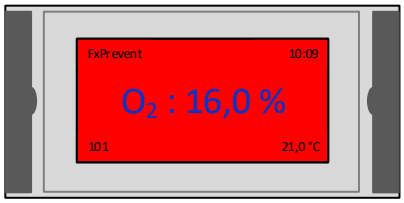

Figure 6. Color Display with warning color.

Via the outputs on the main PCB of the Color Display it is optional to lock the access door. If, for example, both the leading and the redundant LOX Controllers are not available, the Color Display will malfunction. If a user then wants to enter the protected area, the "Door Open" button must be pressed. For this purpose a separate button has to be connected to the Color Display inputs. If the “Door Open” button is pressed, the Color Display determines whether the protected area is safely accessible. Assuming that the LOX-controllers are not available, the Color Display does not receive any information about the protected room and locks the entrance because there might be an unsafe environment. Assuming that the Color Display receives good information from the LOX controllers about a safe environment in the protected room, the entrance door is unlocked as soon as the "Door Open" button is pressed. The Color Display also has an additional input connection for a manual emergency button. This allows the user to unlock the access door directly in case of emergency, without having to consider the hazardous situation.

The digital display of the Color Display informs the user about the situation in the protected area by showing a value of the measured oxygen level and temperature. Depending on the measured oxygen value, the display can change colour to inform the user of a hazardous situation. It turns green during normal operation and red when a hazardous situation such as a low oxygen level occurs. The Color Display can also notify the user by activating a flashing light or slowwhoop via the outputs on the display's circuit board.

Door switch

For the proper functioning of the system, it is important that the access doors are kept closed as much as possible. To register the use of the access doors and to warn the people present if a door is left open, it is optional to equip these with door contacts. If a door is left open for longer than the set time, an alarm will activate.

The door switch monitoring is part of the LOX system and is therefore not described separately in this guide. It is operated via the LOX controller.

Flashlight and acoustic alarm

The flashing light and the acoustic signal generator are located in the protected area, with the exception of refrigerated areas where the temperature is below 0 °C. If the flashing light and the acoustic signal generator cannot be placed in the protected area, an equivalent alternative location will be determined. With the flashing light and the acoustic signal generator it is possible to give a low and high level alarm.

- The low level alarm (flashing light only) means that there is a fault in the installation, but that the deviation from the set oxygen level remains small.
- The high level alarm (flashing light and acoustic signal) means that the oxygen content is threatening to decrease too much. The room should be evacuated.

The flashing light and acoustic signal are part of the LOX basic system and are not described separately in this manual. Operation takes place via the LOX controller.

A second possibility is that the LOX system is connected to the fire alarm system or is part of a quick release system. In these cases, the details are given in the relevant manual.

3.2.11 Emergency stop

The LOX system can be equipped with an emergency stop facility as an option. It is not a requirement for the LOX system to have an emergency stop as stopping the system does not immediately create a safe situation in the protected area. In order to create a safe situation, ventilation is required to increase the oxygen level to its normal value. If it is still desired, it is possible to apply an emergency stop device to the system. This ensures that the whole LOX system can be stopped by pressing the emergency stop button once. When the user does this, the following will happen:

- The power supply to the LOX nitrogen generator is interrupted;
- The power supply to the compressors for the LOX system is interrupted;
- The LOX Control panels, Oxysensors, Color Displays and the nitrogen generator switch to the 'Uninterrupted Power Supply' (UPS). These components are supplied with power by the UPS for 24 hours until the batteries are empty.
- The compressed air supply to the nitrogen generator of the LOX system falls silent and eventually drops to 0 bar (g).
- The LOX nitrogen generator will continue to function and will stop proportional to the compressors when the compressed air pressure has dropped to 0 bar (g).

3.2.12 Humidity sensor

The humidity detection sensor has a humidity reservoir that contains a humidity sensor. As soon as an unwanted amount of condensate arises in the compressed air supply, the reservoir fills with moisture and the moisture sensor detects this. The moisture sensor then generates a visual signal in the form of a red LED and sends an external signal via a potential-free contact. The LOX system responds with an alarm signal. To prevent further damage from the moist compressed air, the LOX system switches off the nitrogen generators. When the formation of the condensate has been resolved, the moisture detection sensor can be drained and the alarm signal can then be reset.

The Moisture Detection Sensor is usually located in the filtration section of the compressed air supply, in front of the nitrogen generators. Every LOX installation has a filtration line which consists of at least one super mist filter, odour filter or a multiple thereof. The Moisture Detection Sensor is mounted under the super mist filter whenever possible.

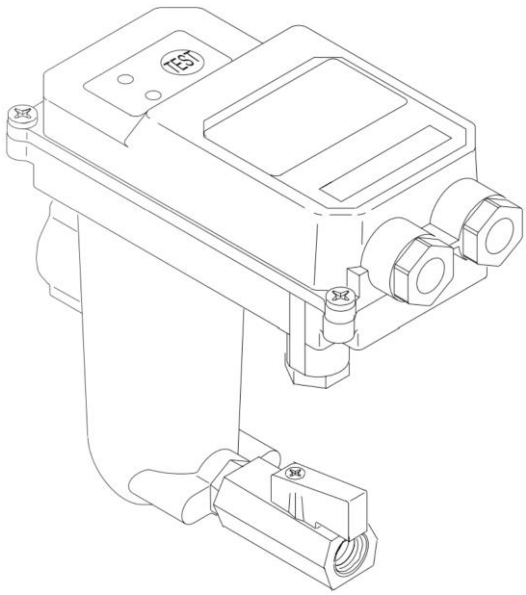

Figure 7. Humidity sensor

4 Operation of the installation

4.1 ECD Display

The ECD Display is the main control device that the operator can use to work with the LOX system. It is included in the leading N2 Controller and is connected to the LOX Control (ECD) components. With the ECD display, the user can do several things, such as view the status of the LOX system, view active measurements, view settings and adjust settings with the buttons on the display. If something goes wrong with the LOX system, for example a defective component, alarms are generated and shown on the display. Below the display there are also two rows of LED lights that give a more direct indication of the status of the LOX system. This makes it possible to immediately inform the user of the presence of a malfunction, alarm or special status without having to navigate through the ECD display program.

4.1.1 ECD Display front

The following figure shows the appearance of the ECD display. The display and the columns of LEDs are both part of the PCB.

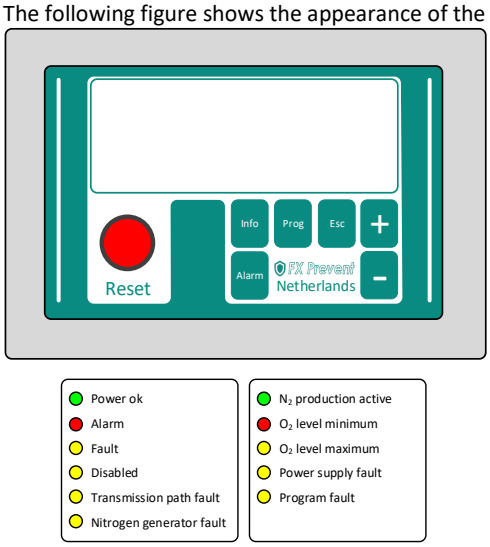

Figure 8. ECD Display

4.1.2 Buttons on the ECD Display

Reset button

The reset button is used for restoring the LOX Control (ECD) back to its normal operation after the occurrence of a fault or alarm. The reset button is provided with a light bulb behind the button which will light up when a fault or alarm occurs. Once the fault or alarm has been fixed, the reset button is pressed to discharge the fault and alarm messages and the LOX Control (ECD) is restored to its normal operation conditions.

Figure 9. Reset button

The light bulb behind the reset button can indicate various statuses. The following applies to the light bulb behind the reset button.

- Light is on continuously : There is a fault- or alarm message on the display that was notified;
- Light is flashing : There has occurred a new fault- or alarm message on the display.

Keyboard with control buttons

Next to the reset button on the ECD Display there is a keypad with six control buttons. These buttons are used for navigating through the software of the ECD Display and for adjusting the parameters.

Figure 10. Control buttons

4.1.3 Button functionality

Each button on the ECD display can be pressed in two different ways. A button can be pressed shortly or a button can be held down. The way in which a button is pressed results in a different reaction on the ECD Display. In general, the following applies:

Action	Description
Button pressed shortly	The button is pressed for approximately 1 second and then released immediately.
Button held down	The button is held down for approximately 3 to 5 seconds without releasing it. The display generates two short bleeps and then the secondary functionality is utilized.

Although this functionality applies to all buttons on the ECD display, not all buttons will have 2 or more functions programmed to it.

Overview of primary and secondary functionalities

The following table gives an overview of the functionalities that the buttons have. With some buttons, the Guest menu, Operator menu and Factory menu are mentioned. These three menus are basically the same but are renamed and expanded each time that the user is logged in into a higher access level via the ECD display. The higher the access level gets, the more settings become available in this menu.

Button	Action	Description
Reset	Pressed shortly	Only the internal buzzer of the ECD display is silenced.
	Held down	If the user is logged in into access level 1 it is not possible to reset the current faults and alarms. The message 'Reset not allowed in access level 1!' is shown on the display. If the user is logged in into access level 2 or 3 then after 2 seconds, the message 'Reset errors in … 3 s' is shown on the display. The reset button must be pressed down. The display will then continue to count down the seconds that are displayed. If the counter has reached 0 seconds all current fault and alarm messages are discharged.
Prog	Pressed shortly	**At the main screen:** Press this button once to enter the Guest menu, Operator menu or Factory menu. **At the Guest, Service and Factory menu:** Press this button once to enter one of the sub-menus of the Guest, Operator or Factory menu. **At the sub-menu:** Press this button once to start adjusting a setting in one of the sub-menu's. **When adjusting a setting:** Press this button once to confirm the adjustment of a setting.
	Held down	No secondary action is programmed.

Button	Action	Description
Esc	Pressed shortly	**At the Guest, Operator, Factory menu or in one of the sub-menu´s:** Press this button once to leave the current menu and return to the previous menu. By repeating this action, the main screen is eventually reached. **When adjusting a setting:** Press this button once to cancel the adjustment of a setting.
	Held down	**At the Guest, Operator, Factory menu or in one of the sub-menu´s:** If a user is logged in into access level 2 or 3 then the user is logged out from these access levels. The message 'User logged out' is displayed on the screen for 3 seconds after which the display is returned to the main screen. **When adjusting a setting:** The user is also logged out from access level 2 or 3. But because the user was in the process of adjusting a setting, the message 'configuration not saved' is displayed instead of 'User logged out'. The display is also returned to the main screen during this action.
Alarm	Pressed shortly	Press this button shortly to directly access the 'Alarm / fault's' menu where the active error messages can be viewed.
	Held down	No secondary action is programmed.
Info	Pressed shortly	General company information of FX Prevent is shown. Information such as: Company name, system type, telephone number and website.
	Held down	No secondary action is programmed.
+	Pressed shortly	**At the main screen:** The Guest menu, Operator menu or Factory menu is accessed and the first line of that menu is selected directly. **At the Guest, Operator, Factory menu or a sub-menu:** Press this button once the select the next menu screen. **When adjusting a setting:** Press this button once the increase a value or to select the next possible setting during adjustment of a parameter.
	Held down	**At the Guest, Operator, Factory menu or a sub-menu:** The next menu screen or submenu is selected sequentially. If the button is held down longer, the scrolling speed is increased. **When adjusting a setting:** The value that is adjusted is increased sequentially. If the button is held down longer, the increasing speed is increased.
-	Pressed shortly	**At the main screen:** The Guest menu, Operator menu or Factory menu is accessed and the last line of that menu is selected directly. **At the Guest, Operator, Factory menu or a sub-menu:** Press this button once the select the previous menu screen. **When adjusting a setting:** Press this button once to decrease a value or to select the next possible setting during adjustment of a parameter.
	Held down	**At the Guest, Operator, Factory menu or a sub-menu:** The previous menu screen or submenu is selected sequentially. If the button is held down longer, the scrolling speed is increased. **When adjusting a setting:** The value that is adjusted is decreased sequentially. If the button is held down longer, the decreasing speed is increased.

4.1.4 Status LED's

Below the ECD display there are 2 columns of LED lights which give the user direct information on the status of the LOX system. Which LED lights are featured at the ECD display and what their functions are is described in the following table.

LED	Col.	Description
Power OK		If this LED is on then the power supply from the UPS Schrack Control to the LOX Control (ECD) is in order. If this LED is off then the power supply has been interrupted.
N2 production active		If this LED is on then the nitrogen generator is activated and nitrogen is produced.
Alarm		If this LED is on then one or more alarms have occurred within the LOX system.
O2 level minimum		If this LED is on then the oxygen level has become lower than the minimum allowed concentration. This is considered to be a dangerous situation which is indicated as an alarm.
Fault		If this LED is on then one or more faults have occurred within the LOX system.
O2 level maximum		If this LED is on then the oxygen level has become higher than the maximum allowed concentration. This means that the prevention of fire by oxygen reduction is no longer guaranteed.
Disabled		If this LED is on then there has been one or more inputs or outputs manually disabled. Once there are no more inputs or outputs disabled then this LED is off.
Power supply fault		If this LED is on then the main power supply to the UPS Schrack Control has failed. The main power, batteries or a fuse of the UPS Schrack Control has failed. The LOX Control (ECD) is still provided with power through the main power line or backup batteries.
Transmission path fault		If this LED is on then one or more of the monitored transmission paths within the LOX Control (ECD) have failed. The line is broken or shorted.
Program fault		If this LED is on then there is a problem within the software of the LOX Control (ECD). The software has crashed or a bug has occurred.
Nitrogen generator fault		If this LED is on then there is a fault or defect detected within the nitrogen generator or one of its peripherals. The fault or defect prevents the production of nitrogen or has reduces the capacity.

5 Assembly instructions

The LOX system uses a nitrogen generator. The nitrogen generator uses the air from the environment and separates the oxygen and nitrogen, leaving a high concentration of nitrogen. The nitrogen is used to condition the area to be secured. The oxygen is released into the immediate surroundings and then ventilated to the outside. Active fans must be used if the natural air circulation is not sufficient.

Het LOX systeem is een samenstel van meerdere machines. Het gezamenlijke doel van de samengestelde machines is het conditioneren van de te beveiligen ruimte doormiddel van suppletie van stikstof. Om het doel van zuurstofreductie te bereiken is het noodzakelijk om het systeem op de juiste manier te monteren. Hiervoor zijn er een paar voorschriften van toepassing:

The LOX system is a combination of several machines. The joint purpose of the combination of machines is to condition the room that needs to be secured by means of nitrogen supplementation. To achieve the goal of oxygen reduction, it is necessary to assemble the system in the right way. For this purpose, a few regulations apply:

- The ventilation capacity of the technical room in which the LOX system is installed must be considered. Sufficient ventilation of oxygen-enriched air is necessary to avoid a fire hazardous atmosphere.
- The assembly and positioning of the components of the LOX system must be in accordance with the pre-fabricated installation drawing. The installation drawing is worked out specifically for each system and is available in the technical file of the system.
- Part of the connections between the components can be fixed pipe connections. Fixed pipe connections must always be manufactured in accordance with the manufacturer's specifications.

6 Measures during decommissioning

The moment that the LOX Low Oxygen system is decommissioned, the oxygen content in the protected area will gradually increase to the regular atmospheric value. This means that the fire protection by oxygen reduction is no longer functional.

It is advisable for the user to take appropriate (organisational) measures for such situations in order to ensure fire safety in an alternative way. These precautions could be included in the emergency response plan.

In addition to restoring the LOX system, one or more of the following measures can be taken:

- Lock the secured section to make sure that the oxygen reduced atmosphere is maintained as long as possible;
- Maintain the reduced oxygen atmosphere by connecting an external nitrogen provision (by example a tank truck);
- Extra checking rounds by fire guards;
- Prohibiting work that could result in an increased fire risk;
- Keeping the emergency response organization and / or the fire brigade continually on standby.

7 Errors

The LOX Controllers (ECD) are software-controlled devices. This means that in case of a defect, error or alarm, a message is generated to inform the user that something is wrong. If an error or alarm occurs, there are several ways in which the LOX system will inform the user. The LOX Control (ECD) is equipped with an ECD display that shows the error messages on a screen as soon as they occur. It has 11 LED indicators. The error messages are also displayed in the LOX studio software if there is a Windows device on which the software is running and which is connected to the LOX Control (ECD). In addition, the LOX Control (ECD) also has a flashing light and a slow-warning light that indicate an error or alarm.

7.1 Errorlevels

These warnings and fatal errors are subdivided into 4 error levels. How the system reacts and which outputs are controlled depends on the error level.

Error Level	Message	Responds of the system
1	Warning	Warning is shown on the display: • The alarm relay of the N2 or OX controller reacts.
2	Warning	Warning is shown on the display: • The alarm relay of the N2 or OX controller reacts. • The flashlight on the Section controller is on.
3	Fatal error	Error is shown on the display: • The alarm relay of the N2 controller reacts; • The flashlight on the Section controller is on; • The system stops with providing nitrogen to the room.
4	Fatal error	Error is shown on the display: • The alarm relay of the N2 controller reacts; • The flashlight on the Section controller is on; • The system stops with providing nitrogen to the room. • A text message / alarm message is send or other notification is activated.

7.1.1 Error messages in general

The following table shows which error messages can be generated in general.

No.	Error message display row 1	Error message display row 2	Description	Source message
0	No ECD display message		No connection to device	ERROR_DEVICE_NOTAVAILABLE
1	AnIN01: sensor fault		Analogue sensor 1 fault	ERR_ANALOGIN_SENSOR01
2	AnIN02: sensor fault		Analogue sensor 2 fault	ERR_ANALOGIN_SENSOR02
3	AnIN03: sensor fault		Analogue sensor 3 fault	ERR_ANALOGIN_SENSOR03
4	AnIN04: sensor fault		Analogue sensor 4 fault	ERR_ANALOGIN_SENSOR04
5	AnIN01: disabled		Analogue sensor 1 disabled	ERR_ANDISABLED_SENSOR01
6	AnIN02: disabled		Analogue sensor 2 disabled	ERR_ANDISABLED_SENSOR02
7	AnIN03: disabled		Analogue sensor 3 disabled	ERR_ANDISABLED_SENSOR03
8	AnIN04: disabled		Analogue sensor 4 disabled	ERR_ANDISABLED_SENSOR04
9	Analog sensor(s)	span fault	Error at span points	ERR_SENSOR_SPANERROR
10	HardwareFault extAdc	communication fault	Communication error with ADC on print. Error in print / software	ERR_EXTADC_COMM
11	DcIN01: cable fault		Transmission path error input 1	ERR_TPFAULT_INPUT01
12	DcIN02: cable fault		Transmission path error input 2	ERR_TPFAULT_INPUT02
13	DcIN03: cable fault		Transmission path error input 3	ERR_TPFAULT_INPUT03
14	DcIN04: cable fault		Transmission path error input 4	ERR_TPFAULT_INPUT04
15	DcIN05: cable fault		Transmission path error input 5	ERR_TPFAULT_INPUT05
16	DcIN06: cable fault		Transmission path error input 6	ERR_TPFAULT_INPUT06
17	DcIN07: cable fault		Transmission path error input 7	ERR_TPFAULT_INPUT07
18	DcIN08: cable fault		Transmission path error input 8	ERR_TPFAULT_INPUT08
19	DcIN09: cable fault		Transmission path error input 9	ERR_TPFAULT_INPUT09
20	DcIN10: cable fault		Transmission path error input 10	ERR_TPFAULT_INPUT10
21	DcIN11: cable fault		Transmission path error input 11	ERR_TPFAULT_INPUT11
22	DcIN12: cable fault		Transmission path error input 12	ERR_TPFAULT_INPUT12
23	DcIN01: disabled		Transmission path input 1 disabled	ERR_TPDISABLED_INPUT01
24	DcIN02: disabled		Transmission path input 2 disabled	ERR_TPDISABLED_INPUT02
25	DcIN03: disabled		Transmission path input 3 disabled	ERR_TPDISABLED_INPUT03
26	DcIN04: disabled		Transmission path input 4 disabled	ERR_TPDISABLED_INPUT04
27	DcIN05: disabled		Transmission path input 5 disabled	ERR_TPDISABLED_INPUT05
28	DcIN06: disabled		Transmission path input 6 disabled	ERR_TPDISABLED_INPUT06
29	DcIN07: disabled		Transmission path input 7 disabled	ERR_TPDISABLED_INPUT07
30	DcIN08: disabled		Transmission path input 8 disabled	ERR_TPDISABLED_INPUT08
31	DcIN09: disabled		Transmission path input 9 disabled	ERR_TPDISABLED_INPUT09
32	DcIN10: disabled		Transmission path input 10 disabled	ERR_TPDISABLED_INPUT10
33	DcIN11: disabled		Transmission path input 11 disabled	ERR_TPDISABLED_INPUT11
34	DcIN12: disabled		Transmission path input 12 disabled	ERR_TPDISABLED_INPUT12

No.	Error message display row 1	Error message display row 2	Description	Source message
35	Dc_OUT01: cable fault		Transmission path error output 1	ERR_TPFAULT_OUTPUT01
36	Dc_OUT02: cable fault		Transmission path error output 2	ERR_TPFAULT_OUTPUT02
37	Dc_OUT03: cable fault		Transmission path error output 3	ERR_TPFAULT_OUTPUT03
38	Dc_OUT04: cable fault		Transmission path error output 4	ERR_TPFAULT_OUTPUT04
39	Dc_OUT05: cable fault		Transmission path error output 5	ERR_TPFAULT_OUTPUT05
40	Dc_OUT06: cable fault		Transmission path error output 6	ERR_TPFAULT_OUTPUT06
41	Dc_OUT07: cable fault		Transmission path error output 7	ERR_TPFAULT_OUTPUT07
42	Dc_OUT08: cable fault		Transmission path error output 8	ERR_TPFAULT_OUTPUT08
43	Dc_OUT09: cable fault		Transmission path error output 9	ERR_TPFAULT_OUTPUT09
44	Dc_OUT10: cable fault		Transmission path error output 10	ERR_TPFAULT_OUTPUT10
45	No ECD display message		Reserved error	ERR_TPFAULT_RESERVED45
46	No ECD display message		Reserved error	ERR_TPFAULT_RESERVED46
47	DcOUT01: disabled		Transmission path output 1 disabled	ERR_TPDISABLED_OUTPUT01
48	DcOUT02: disabled		Transmission path output 2 disabled	ERR_TPDISABLED_OUTPUT02
49	DcOUT03: disabled		Transmission path output 3 disabled	ERR_TPDISABLED_OUTPUT03
50	DcOUT04: disabled		Transmission path output 4 disabled	ERR_TPDISABLED_OUTPUT04
51	DcOUT05: disabled		Transmission path output 5 disabled	ERR_TPDISABLED_OUTPUT05
52	DcOUT06: disabled		Transmission path output 6 disabled	ERR_TPDISABLED_OUTPUT06
53	DcOUT07: disabled		Transmission path output 7 disabled	ERR_TPDISABLED_OUTPUT07
54	DcOUT08: disabled		Transmission path output 8 disabled	ERR_TPDISABLED_OUTPUT08
55	DcOUT09: disabled		Transmission path output 9 disabled	ERR_TPDISABLED_OUTPUT09
56	DcOUT10: disabled		Transmission path output 10 disabled	ERR_TPDISABLED_OUTPUT10
57	No ECD display message		Reserved error	ERR_TPDISABLED_RESERVED57
58	No ECD display message		Reserved error	ERR_TPDISABLED_RESERVED58
59	Rel01: disabled		Relay 1 disabled	ERR_TPDISABLED_RELAY01
60	Rel02: disabled		Relay 2 disabled	ERR_TPDISABLED_RELAY02
61	Rel03: disabled		Relay 3 disabled	ERR_TPDISABLED_RELAY03
62	Rel04: disabled		Relay 4 disabled	ERR_TPDISABLED_RELAY04
63	Rel05: disabled		Relay 5 disabled	ERR_TPDISABLED_RELAY05
64	Rel06: disabled		Relay 6 disabled	ERR_TPDISABLED_RELAY06
65	Serial uart 2	receive fault	Serial connection 2 receive error	ERR_UART2_RX
66	Serial uart 2	transmit fault	Serial connection 2 send error	ERR_UART2_TX
67	Serial uart 2	frame length	Serial connection 2 message length	ERR_UART2_FRAMELEN
68	Serial uart 2	frame check	Serial connection 2 message check error	ERR_UART2_FRAMEBCC
69	Serial uart 2	frame buffer	Serial connection 2 message buffer full	ERR_UART2_FRAMEBUFF
70	Serial uart 3	receive fault	Serial connection 3 receive error	ERR_UART3_RX
71	Serial uart 3	transmit fault	Serial connection 3 send error	ERR_UART3_TX
72	Serial uart 3	frame length	Serial connection 3 message length	ERR_UART3_FRAMELEN
73	Serial uart 3	frame check	Serial connection 3 message check error	ERR_UART3_FRAMEBCC

No.	Error message display row 1	Error message display row 2	Description	Source message
74	Serial uart 3	frame buffer	Serial connection 3 message buffer full	ERR_UART3_FRAMEBUFF
75	Serial uart 7	receive fault	Serial connection 7 receive error	ERR_UART7_RX
76	Serial uart 7	transmit fault	Serial connection 7 send error	ERR_UART7_TX
77	Serial uart 7	frame length	Serial connection 7 message length	ERR_UART7_FRAMELEN
78	Serial uart 7	frame check	Serial connection 7 message check error	ERR_UART7_FRAMEBCC
79	Serial uart 7	frame buffer	Serial connection 7 message buffer full	ERR_UART7_FRAMEBUFF
80	Serial uart 8	receive fault	Serial connection 8 receive error	ERR_UART8_RX
81	Serial uart 8	transmit fault	Serial connection 8 send error	ERR_UART8_TX
82	Serial uart 8	frame length	Serial connection 8 message length	ERR_UART8_FRAMELEN
83	Serial uart 8	frame check	Serial connection 8 message check error	ERR_UART8_FRAMEBCC
84	Serial uart 8	frame buffer	Serial connection 8 message buffer full	ERR_UART8_FRAMEBUFF
85	CAN-bus 1	transmit buffer	CAN-bus 1 send buffer full	ERR_CAN1_TXFIFO
86	CAN-bus 1	bus fault	CAN-bus 1 bus error	ERR_CAN1_BUSERROR
87	CAN-bus 1	message lost	CAN-bus 1 message missed	ERR_CAN1_MSGLOST
88	CAN-bus 2	transmit buffer	CAN-bus 2 send buffer full	ERR_CAN2_TXFIFO
89	CAN-bus 2	bus fault	CAN-bus 2 bus error	ERR_CAN2_BUSERROR
90	CAN-bus 2	message lost	CAN-bus 2 message missed	ERR_CAN2_MSGLOST
91	Eeprom memory	base check	Eeprom memory error	ERR_EEPROM_BASE
92	Eeprom memory	address out of range	Eeprom memory address fault	ERR_EEPROM_ADDRESS
93	Eeprom memory	read/write error	Eeprom memory read / write fault	ERR_EEPROM_READWRITE
94	Configuration	base check	Configuration fault	ERR_CONFIG_BASE
95	Configuration	checksum check	Configuration check fault	ERR_CONFIG_CHECKSUM
96	Configuration	first boot	Configuration first boot	ERR_CONFIG_FIRSTBOOT
97	Configuration	settings	Configuration settings fault	ERR_CONFIG_SETTINGS
98	CAN-bus network	double devicenr	Double device number found on CAN-bus	ERR_NETWORK_DOUBLEDEVICENR
99	CAN-bus network	unknown device	Unknown device detected	ERR_NETWORK_UNKNOWNDEVICE
100	CAN-bus network	softwareversion	Software version of other device does not match	ERR_NETWORK_SOFTWAREVERSION
101	Main power	rebooted	Print has rebooted	ERR_POWER_BOOTED
102	PSE mainpower backup	power down	Mainpower was lost, system runs on backup power	ERR_POWER_POWERDOWN
103	PSE mainpower backup	pse failure / fault	PSE power supply gives an error	ERR_POWER_FAULT
104	PSE mainpower backup	battery fault	PSE battery gives an error	ERR_POWER_BATTERY
105	Clock	communication fault	Communication with the RTC goes wrong	ERR_RTC_COMM
106	Clock	not set	Clock not set	ERR_RTC_NEW
107	Software fault	timer handler	Fault at internal timer	ERR_TIMER_HANDLER
108	Software fault	ppg handler	Fault at internal pulse generator	ERR_PPG_HANDLER
109	No ECD display message		Reserved error	ERR_RESERVED109
110	Device	disabled	Device is disabled	ERR_DEVICEDISABLED
111	No ECD display message		Reserved error	ERR_RESERVED111

No.	Error message display row 1	Error message display row 2	Description	Source message
112	No ECD display message		Reserved error	ERR_RESERVED112
113	No ECD display message		Reserved error	ERR_RESERVED113
114	No ECD display message		Reserved error	ERR_RESERVED114
115	No ECD display message		Reserved error	ERR_RESERVED115
116	No ECD display message		Reserved error	ERR_RESERVED116
117	No ECD display message		Reserved error	ERR_RESERVED117
118	No ECD display message		Reserved error	ERR_RESERVED118
119	Test error		Test error for programming purposes	ERR_TESTERROR

7.1.2 Error messages from the N_2 Control

The following table shows which error message can be generated by the N2 Control.

No.	Error message display row 1	Error message display row 2	Description	Source message
120	No ECD display message		Start of device specific error	ERR_N2DEVICEBASE
121	CAN-bus extension	not available	Communication with CAN-extension print fault	ERR_N2EXTENSION_NA
122	No ECD display message		N2Control is in manual mode	ERR_N2MANUALMODE
123	No ECD display message		Reserved error	ERR_N2RESERVED_123
124	CAN-bus 3	bus fault	CAN-bus 3 bus fault	ERR_N2CAN3_BUSERROR
125	CAN-bus 4	bus fault	CAN-bus 4 bus fault	ERR_N2CAN4_BUSERROR
126	No ECD display message		Reserved error	ERR_N2RESERVED_126
127	No ECD display message		Reserved error	ERR_N2RESERVED_127
128	No ECD display message		Reserved error	ERR_N2RESERVED_128
129	No ECD display message		Reserved error	ERR_N2RESERVED_129
130	N2 master detects	a compressor error	There is a compressor within the system with a fault	ERR_N2COMPRESSOR_ERROR
131	Compressor	not ready	The compressor of this N2Control is not ready	ERR_N2COMPRESSOR_NOTREADY
132	Compressor	fault input active	The compressor of this N2Control has a fault (according to fault input)	ERR_N2COMPRESSOR_FAULTINPUT
133	Compressor	not available	There is no compressor available within the system	ERR_N2COMPRESSOR_NONEAVAILABLE
134	Compressor	active timeout	The compressor has not become active	ERR_N2COMPRESSOR_ACTIVETIMEOUT
135	Compressor	producing timeout	The compressor is not producing	ERR_N2COMPRESSOR_PRODUCINGTIMEOUT
136	Compressor	unload timeout	The compressor runs to long in idle (no load)	ERR_N2COMPRESSOR_UNLOADTIMEOUT
137	Compressor	disabled	The compressor is disabled	ERR_N2COMPRESSOR_DISABLED
138	No ECD display message		Reserved error	ERR_N2RESERVED_138
139	No ECD display message		Reserved error	ERR_N2RESERVED_139
140	N2 master detects	a Psa error	There is a PSA generator within the system with a fault	ERR_N2PSAGENERATOR_ERROR
141	Psa generator	no sync received	PSA generator has missed to many synchronization messages	ERR_N2PSAGENERATOR_NOSYNCRECEIVED
142	Psa generator	dryer fault	PSA generator dryer fault	ERR_N2PSAGENERATOR_DRYERFAULT
143	Psa generator	compressorpressure	PSA generator compressor pressurevalve fault	ERR_N2PSAGENERATOR_COMPAIRPRESSURESWITCH
144	Psa generator	beko(moisture) fault	PSA generator bekoguard fault	ERR_N2PSAGENERATOR_BEKOGUARDSENSOR
145	Psa generator	Dust filter fault	PSA generator dustfilter fault	ERR_N2PSAGENERATOR_DUSTFILTERSENSOR
146	Psa generator	Dewpoint sensor	PSA generator dew point sensor fault	ERR_N2PSAGENERATOR_DEWPOINTSENSOR
147	Psa valve set 1	settings	Settings of the master do not match with PSA 1	ERR_N2PSAVALVE_SETTINGS01
148	Psa valve set 2	settings	Settings of the master do not match with PSA 2	ERR_N2PSAVALVE_SETTINGS02
149	Psa valve set 3	settings	Settings of the master do not match with PSA 3	ERR_N2PSAVALVE_SETTINGS03
150	Air flow in	Sensor error	Flow in sensor is not found	ERR_N2AIRFLOWIN_NOSENSOR
151	Air flow in	minimal	Flow in is set lower than value at this production	ERR_N2AIRFLOWIN_MIN
152	Air flow in	maximal	Flow in is set higher than value at this production	ERR_N2AIRFLOWIN_MAX
153	N2 flow out	Sensor error	Flow out sensor is not found	ERR_N2N2FLOWOUT_NOSENSOR
154	N2 flow out	minimal	Flow out is set lower than value at this production	ERR_N2N2FLOWOUT_MIN

No.	Error message display row 1	Error message display row 2	Description	Source message
155	N2 flow out	maximal	Flow out is set higher than value at this production	ERR_N2N2FLOWOUT_MAX
156	N2 pressure	Sensor error	Pressure sensor not found	ERR_N2PRESSURE_NOSENSOR
157	N2 pressure	minimal	Pressure sensor set lower than value at this production	ERR_N2PRESSURE_MIN
158	N2 pressure	maximal	Pressure sensor set higher than value at this production	ERR_N2PRESSURE_MAX
159	No ECD display message		Reserved error	ERR_N2RESERVED_159
160	N2 production		Production error, there has a fault occured through which the N2 production is switched off	ERR_N2PRODUCTION
161	Psa valve set 1	disabled	PSA valveset 1 disabled	ERR_N2PSAVALVE_DISABLED01
162	Psa valve set 2	disabled	PSA valveset 2 disabled	ERR_N2PSAVALVE_DISABLED02
163	Psa valve set 3	disabled	PSA valveset 3 disabled	ERR_N2PSAVALVE_DISABLED03
164	Drain valve 1	disabled	Drainvalve 1 disabled	ERR_N2DRAINVALVE_DISABLED01
165	Drain valve 2	disabled	Drainvalve 2 disabled	ERR_N2DRAINVALVE_DISABLED02
166	No ECD display message		Reserved error	ERR_N2RESERVED_166
167	No ECD display message		Reserved error	ERR_N2RESERVED_167
168	Flow sensor error		Fault within flow sensor	ERR_N2RESERVED_168
169	No ECD display message		Reserved error	ERR_N2RESERVED_169
170	Air flow in	timeout	Measurement timeout flow in	ERR_N2AIRFLOWIN_TIMEOUT
171	N2 flow out	timeout	Measurement timeout flow out	ERR_N2N2FLOWOUT_TIMEOUT
172	N2 pressure	timeout	Measurement timeout N2 pressure	ERR_N2PRESSURE_TIMEOUT
173	Flow out fault		Fault in output flow	ERR_N2RESERVED_173
174	No ECD display message		Reserved error	ERR_N2RESERVED_174
175	Air flow in	disabled	Flow in disabled	ERR_N2AIRFLOWIN_DISABLED
176	N2 flow out	disabled	Flow uit disabled	ERR_N2N2FLOWOUT_DISABLED
177	N2 pressure	disabled	N2 pressure disabled	ERR_N2PRESSURE_DISABLED
178	No ECD display message		Reserved error	ERR_N2RESERVED_178
179	No ECD display message		Reserved error	ERR_N2RESERVED_179
180	Wrong sensor fault		Fault in the number or type of sensor	ERR_N2RESERVED_180
181	No ECD display message		Reserved error	ERR_N2RESERVED_181
182	No ECD display message		Reserved error	ERR_N2RESERVED_182
183	No ECD display message		Reserved error	ERR_N2RESERVED_183
184	No ECD display message		Reserved error	ERR_N2RESERVED_184
185	No ECD display message		Reserved error	ERR_N2RESERVED_185
186	No ECD display message		Reserved error	ERR_N2RESERVED_186
187	No ECD display message		Reserved error	ERR_N2RESERVED_187
188	No ECD display message		Reserved error	ERR_N2RESERVED_188
189	No ECD display message		Reserved error	ERR_N2RESERVED_189
190	No ECD display message		Reserved error	ERR_N2RESERVED_190
191	No ECD display message		Reserved error	ERR_N2RESERVED_191
192	No ECD display message		Reserved error	ERR_N2RESERVED_192

No.	Error message display row 1	Error message display row 2	Description	Source message
193	No ECD display message		Reserved error	ERR_N2RESERVED_193
194	No ECD display message		Reserved error	ERR_N2RESERVED_194
195	No ECD display message		Reserved error	ERR_N2RESERVED_195
196	No ECD display message		Reserved error	ERR_N2RESERVED_196
197	No ECD display message		Reserved error	ERR_N2RESERVED_197
198	No ECD display message		Reserved error	ERR_N2RESERVED_198
199	No ECD display message		Reserved error	ERR_N2RESERVED_199
200	No ECD display message		Reserved error	ERR_N2RESERVED_200
201	No ECD display message		Reserved error	ERR_N2RESERVED_201
202	No ECD display message		Reserved error	ERR_N2RESERVED_202
203	No ECD display message		Reserved error	ERR_N2RESERVED_203
204	No ECD display message		Reserved error	ERR_N2RESERVED_204
205	No ECD display message		Reserved error	ERR_N2RESERVED_205
206	No ECD display message		Reserved error	ERR_N2RESERVED_206
207	No ECD display message		Reserved error	ERR_N2RESERVED_207
208	No ECD display message		Reserved error	ERR_N2RESERVED_208
209	No ECD display message		Reserved error	ERR_N2RESERVED_209
210	N2 system	service warning	System servicecounter warning	ERR_N2SYSTEM_SERVICEWARNING
211	Psa generator	service warning	N2Generator servicecounter warning	ERR_N2N2GENERATOR_SERVICEWARNING
212	Compressor	service warning	Compressor servicecounter warning	ERR_N2COMPRESSOR_SERVICEWARNING
213	Psa valve set 1	service warning	PSA generator 1, service counter warning	ERR_N2PSA1_SERVICEWARNING
214	Psa valve set 2	service warning	PSA generator 2, service counter warning	ERR_N2PSA2_SERVICEWARNING
215	Psa valve set 3	service warning	PSA generator 3, service counter warning	ERR_N2PSA3_SERVICEWARNING
216	N2 system	service alarm	System service counter alarm	ERR_N2SYSTEM_SERVICEALARM
217	Psa generator	service alarm	N2Generator service counter alarm	ERR_N2N2GENERATOR_SERVICEALARM
218	Compressor	service alarm	Compressor service counter alarm	ERR_N2COMPRESSOR_SERVICEALARM
219	Psa valve set 1	service alarm	PSA generator 1, service counter alarm	ERR_N2PSA1_SERVICEALARM
220	Psa valve set 2	service alarm	PSA generator 2, service counter alarm	ERR_N2PSA2_SERVICEALARM
221	Psa valve set 3	service alarm	PSA generator 3, service counter alarm	ERR_N2PSA3_SERVICEALARM
222	No ECD display message		Reserved error	ERR_N2RESERVED_222
223	No ECD display message		Reserved error	ERR_N2RESERVED_223
224	No ECD display message		Reserved error	ERR_N2RESERVED_224
225	No ECD display message		Reserved error	ERR_N2RESERVED_225
226	No ECD display message		Reserved error	ERR_N2RESERVED_226
227	No ECD display message		Reserved error	ERR_N2RESERVED_227
228	No ECD display message		Reserved error	ERR_N2RESERVED_228
229	No ECD display message		Reserved error	ERR_N2RESERVED_229
230	N2Control	device count fault	Number of N2Controls in network do not match	ERR_N2DEVICELIST_N2CONTROLCOUNT
231	OxControl	device count fault	Number of OxControls in network do not match	ERR_N2DEVICELIST_OXCONTROLCOUNT

No.	Error message display row 1	Error message display row 2	Description	Source message
232	ECD Display	device count fault	Number of EcdDisplays in network do not match	ERR_N2DEVICELIST_ECDDISPLAYCOUNT
233	FxConnect	device count fault	Number of FxConnects in network do not match	ERR_N2DEVICELIST_FXCONNECTCOUNT
234	Compressor	device count fault	Number of Compressors in network do not match	ERR_N2DEVICELIST_COMPRESSORCOUNT
235	Psa generator	device count fault	Number of PSA generators do not match	ERR_N2DEVICELIST_PSAGENERATORCOUNT
236	No ECD display message		Reserved error	ERR_N2RESERVED_236
237	No ECD display message		Reserved error	ERR_N2RESERVED_237
238	No ECD display message		Reserved error	ERR_N2RESERVED_238
239	No ECD display message		Reserved error	ERR_N2RESERVED_239

7.1.3 Error messages from the ECD Display

The following table shows which error message can be generated by the ECD display.

No.	Error message display row 1	Error message display row 2	Description	Source message
120	No ECD display message		Start of device specific errors	ERR_ECDDEVICEBASE
121	No ECD display message		Will be lapsed	ERR_LOGEVENT_FAILEDLOGIN_CODE2
122	No ECD display message		Will be lapsed	ERR_LOGEVENT_LOGIN_CODE2_0
123	No ECD display message		Will be lapsed	ERR_LOGEVENT_LOGIN_CODE2_1
124	No ECD display message		Will be lapsed	ERR_LOGEVENT_LOGIN_CODE2_2
125	No ECD display message		Will be lapsed	ERR_LOGEVENT_LOGIN_CODE2_3
126	No ECD display message		Will be lapsed	ERR_LOGEVENT_LOGIN_CODE2_ENCRYPTED
127	No ECD display message		Will be lapsed	ERR_LOGEVENT_FAILEDLOGIN_CODE3
128	No ECD display message		Will be lapsed	ERR_LOGEVENT_LOGIN_CODE3_0
129	No ECD display message		Will be lapsed	ERR_LOGEVENT_LOGIN_CODE3_1
130	No ECD display message		Will be lapsed	ERR_LOGEVENT_LOGIN_CODE3_2
131	No ECD display message		Will be lapsed	ERR_LOGEVENT_LOGIN_CODE3_3
132	No ECD display message		Will be lapsed	ERR_LOGEVENT_LOGIN_CODE3_ENCRYPTED
133	No ECD display message		Will be lapsed	ERR_LOGEVENT_BOOTED
134	No ECD display message		Will be lapsed	ERR_LOGEVENT_LOGOUT_TIMEOUT
135	No ECD display message		Will be lapsed	ERR_LOGEVENT_LOGOUT_MANUAL
136	No ECD display message		Will be lapsed	ERR_LOGEVENT_ERRORS_RESET
137	No ECD display message		Will be lapsed	ERR_LOGEVENT_LOG_CLEARED
138	No ECD display message		Will be lapsed	ERR_LOGEVENT_TARGETSET_DAY
139	No ECD display message		Will be lapsed	ERR_LOGEVENT_TARGETSET_NIGHT
140	No ECD display message		Will be lapsed	ERR_LOGEVENT_USERFLOW_RESET
141	No ECD display message		Reserved error	ERR_ECDRESERVED_141
142	No ECD display message		Reserved error	ERR_ECDRESERVED_142
143	No ECD display message		Reserved error	ERR_ECDRESERVED_143
144	No ECD display message		Reserved error	ERR_ECDRESERVED_144
145	No ECD display message		Reserved error	ERR_ECDRESERVED_145
146	No ECD display message		Reserved error	ERR_ECDRESERVED_146
147	No ECD display message		Reserved error	ERR_ECDRESERVED_147
148	No ECD display message		Reserved error	ERR_ECDRESERVED_148
149	No ECD display message		Reserved error	ERR_ECDRESERVED_149
150	OxControl A	N/A on CAN-bus 1	OxControl A not available on CAN1	ERR_OXCONTROLA_NA_CAN1
151	OxControl B	N/A on CAN-bus 1	OxControl B not available on CAN1	ERR_OXCONTROLB_NA_CAN1
152	N2Control	N/A on CAN-bus 1	N2Control not available on CAN 1	ERR_N2CONTROLA_NA_CAN1
153	No ECD display message		Reserved error	ERR_ECDRESERVED_153
154	Oxysensor	N/A on CAN-bus 1	OxySensor not available on CAN1	ERR_OXYSENSOR_NA_CAN1
155	EcdDisplay	N/A on CAN-bus 1	EcdDisplay not available on CAN1	ERR_ECDDISPLAY_NA_CAN1
156	FxConnect	N/A on CAN-bus 1	FxConnect not available on CAN1	ERR_FXCONNECT_NA_CAN1

No.	Error message display row 1	Error message display row 2	Description	Source message
157	ColorDisplay	N/A on CAN-bus 1	ColorDisplay not available on CAN1	ERR_COLORDISPLAY1_NA_CAN1
158	No ECD display message		Will be lapsed	ERR_COLORDISPLAY2_NA_CAN1
159	No ECD display message		Reserved error	ERR_ECDRESERVED_159
160	No ECD display message		Will be lapsed	ERR_COLORDISPLAY4_NA_CAN1
161	No ECD display message		Will be lapsed	ERR_COLORDISPLAY5_NA_CAN1
162	No ECD display message		Will be lapsed	ERR_COLORDISPLAY6_NA_CAN1
163	No ECD display message		Will be lapsed	ERR_COLORDISPLAY7_NA_CAN1
164	No ECD display message		Reserved error	ERR_ECDRESERVED_164
165	OxControl A	N/A on CAN-bus 2	OxControl A not available on CAN2	ERR_OXCONTROLA_NA_CAN2
166	OxControl B	N/A on CAN-bus 2	OxControl B not available on CAN2	ERR_OXCONTROLB_NA_CAN2
167	N2Control	N/A on CAN-bus 2	N2Control not available on CAN2	ERR_N2CONTROLA_NA_CAN2
168	No ECD display message		Reserved error	ERR_ECDRESERVED_168
169	Oxysensor	N/A on CAN-bus 2	OxySensor not available on CAN2	ERR_OXYSENSOR_NA_CAN2
170	EcdDisplay	N/A on CAN-bus 2	EcdDisplay not available on CAN2	ERR_ECDDISPLAY_NA_CAN2
171	FxConnect	N/A on CAN-bus 2	FxConnect not available on CAN2	ERR_FXCONNECT_NA_CAN2
172	ColorDisplay	N/A on CAN-bus 2	ColorDisplay not available on CAN2	ERR_COLORDISPLAY1_NA_CAN2
173	No ECD display message		Will be lapsed	ERR_COLORDISPLAY2_NA_CAN2
174	No ECD display message		Will be lapsed	ERR_COLORDISPLAY3_NA_CAN2
175	No ECD display message		Will be lapsed	ERR_COLORDISPLAY4_NA_CAN2
176	No ECD display message		Will be lapsed	ERR_COLORDISPLAY5_NA_CAN2
177	No ECD display message		Will be lapsed	ERR_COLORDISPLAY6_NA_CAN2
178	No ECD display message		Will be lapsed	ERR_COLORDISPLAY7_NA_CAN2
179	No ECD display message		Will be lapsed	ERR_COLORDISPLAY8_NA_CAN2
180	No ECD display message		Reserved error	ERR_ECDRESERVED_180
181	No ECD display message		Reserved error	ERR_ECDRESERVED_181
182	No ECD display message		Reserved error	ERR_ECDRESERVED_182
183	No ECD display message		Reserved error	ERR_ECDRESERVED_183
184	No ECD display message		Reserved error	ERR_ECDRESERVED_184
185	No ECD display message		Reserved error	ERR_ECDRESERVED_185
186	No ECD display message		Reserved error	ERR_ECDRESERVED_186
187	No ECD display message		Reserved error	ERR_ECDRESERVED_187
188	No ECD display message		Reserved error	ERR_ECDRESERVED_188
189	No ECD display message		Reserved error	ERR_ECDRESERVED_189
190	No ECD display message		Reserved error	ERR_ECDRESERVED_190
191	No ECD display message		Reserved error	ERR_ECDRESERVED_191
192	No ECD display message		Reserved error	ERR_ECDRESERVED_192
193	No ECD display message		Reserved error	ERR_ECDRESERVED_193
194	No ECD display message		Reserved error	ERR_ECDRESERVED_194
195	No ECD display message		Reserved error	ERR_ECDRESERVED_195

No.	Error message display row 1	Error message display row 2	Description	Source message
196	No ECD display message		Reserved error	ERR_ECDRESERVED_196
197	No ECD display message		Reserved error	ERR_ECDRESERVED_197
198	No ECD display message		Reserved error	ERR_ECDRESERVED_198
199	No ECD display message		Reserved error	ERR_ECDRESERVED_199
200	Desired level day	value system a > b	Setting 'Instelling 'Desired level day' A > B	ERR_TARGETLEVELDAY_ABIGGERB
201	Desired level day	value system a < b	Setting 'Instelling 'Desired level day' B > A	ERR_TARGETLEVELDAY_BBIGGERA
202	Desired level day	value system a > b	Setting 'Instelling 'Desired level night' A > B	ERR_TARGETLEVELNIGHT_ABIGGERB
203	Desired level day	value system a < b	Setting 'Instelling 'Desired level night' B > A	ERR_TARGETLEVELNIGHT_BBIGGERA
204	No ECD display message		Reserved error	ERR_ECDRESERVED_204
205	No ECD display message		Reserved error	ERR_ECDRESERVED_205
206	No ECD display message		Reserved error	ERR_ECDRESERVED_206
207	No ECD display message		Reserved error	ERR_ECDRESERVED_207
208	No ECD display message		Reserved error	ERR_ECDRESERVED_208
209	No ECD display message		Reserved error	ERR_ECDRESERVED_209
210	No ECD display message		Reserved error	ERR_ECDRESERVED_210
211	No ECD display message		Reserved error	ERR_ECDRESERVED_211
212	No ECD display message		Reserved error	ERR_ECDRESERVED_212
213	No ECD display message		Reserved error	ERR_ECDRESERVED_213
214	No ECD display message		Reserved error	ERR_ECDRESERVED_214
215	No ECD display message		Reserved error	ERR_ECDRESERVED_215
216	No ECD display message		Reserved error	ERR_ECDRESERVED_216
217	No ECD display message		Reserved error	ERR_ECDRESERVED_217
218	No ECD display message		Reserved error	ERR_ECDRESERVED_218
219	No ECD display message		Reserved error	ERR_ECDRESERVED_219
220	No ECD display message		Reserved error	ERR_ECDRESERVED_220
221	No ECD display message		Reserved error	ERR_ECDRESERVED_221
222	No ECD display message		Reserved error	ERR_ECDRESERVED_222
223	No ECD display message		Reserved error	ERR_ECDRESERVED_223
224	No ECD display message		Reserved error	ERR_ECDRESERVED_224
225	No ECD display message		Reserved error	ERR_ECDRESERVED_225
226	No ECD display message		Reserved error	ERR_ECDRESERVED_226
227	No ECD display message		Reserved error	ERR_ECDRESERVED_227
228	No ECD display message		Reserved error	ERR_ECDRESERVED_228
229	No ECD display message		Reserved error	ERR_ECDRESERVED_229
230	N2Control	device count fault	Number of N2Controls in network do not match	ERR_ECDDEVICELIST_OXCONTROLCOUNT
231	OxControl	device count fault	Number of OxControls in network do not match	ERR_ECDDEVICELIST_N2CONTROLCOUNT
232	Oxysensor	device count fault	Number of Oxygensensors in network do not match	ERR_ECDDEVICELIST_OXYSENSORCOUNT
233	FxConnect	device count fault	Number of FxConnects in network do not match	ERR_ECDDEVICELIST_FXCONNECTCOUNT

No.	Error message display row 1	Error message display row 2	Description	Source message
234	ColorDisplay	device count fault	Number of ColorDisplays in network do not match	ERR_ECDDEVICELIST_COLORDISPLAYCOUNT
235	Compressor	device count fault	Number of Compressors in network do not match	ERR_ECDDEVICELIST_COMPRESSORCOUNT
236	Psa generator	device count fault	Number of PSA generators do not match	ERR_ECDDEVICELIST_PSAGENERATORCOUNT
237	Area monitor	device count fault	Number of Area monitors do not match	ERR_ECDDEVICELIST_LEVELMONITORCOUNT
238	No ECD display message		Reserved error	ERR_ECDRESERVED_238
239	No ECD display message		Reserved error	ERR_ECDRESERVED_239

7.1.4 Error messages from the Ox Control

The following table shows which error message can be generated by the OX control.

No.	Error message display row 1	Error message display row 2	Description	Source message
120	No ECD display message		Start of device specific error	ERR_OXDEVICEBASE
121	CAN-bus extension	not available	Communication with CAN-extension print fault	ERR_OXEXTENSION_NA
122	Desired level day	difference	Difference in setting 'Desired day'	ERR_OXO2TARGETDAYDIFF
123	Desired level night	difference	Difference in setting 'Desired night'	ERR_OXO2TARGETNIGHTDIFF
124	CAN-bus 3	bus fault	CAN-bus 3 bus fault	ERR_OXCAN3_BUSERROR
125	CAN-bus 4	bus fault	CAN-bus 4 bus fault	ERR_OXCAN4_BUSERROR
126	Nitrogen valve	timeout	Stikstof production not yet started	ERR_OXN2VALVETIMEOUT
127	Selector valve	not closed	Selectorvalve is not closed (although it is commanded to)	ERR_OXSELECTORVALVENOTCLOSED
128	Selector valve	not open	Selectorvalve is not opened (although it is commanded to)	ERR_OXSELECTORVALVENOTOPEN
129	Selector valve	open/close together	Selectorvalve is both opened and closed	ERR_OXSELECTORVALVEOPENANDCLOSED
130	OxySensor	disabled by softw.	There has been a sensor disabled by the software	ERR_OXSENSOR_SWDEACTIVATED
131	Zone Control	sensor timeout	Sensor timeout at ZoneControl	ERR_OXZONECONTROL_SENSORTIMEOUT
132	Zone Monitor	sensor timeout	Sensor timeout at ZoneMonitor	ERR_OXZONEMONITOR_SENSORTIMEOUT
133	Area monitor 1	sensor timeout	Sensor timeout at Area monitor 1	ERR_OXLEVELMONITOR01_SENSORTIMEOUT
134	Area monitor 2	sensor timeout	Sensor timeout at Area monitor 2	ERR_OXLEVELMONITOR02_SENSORTIMEOUT
135	Area monitor 3	sensor timeout	Sensor timeout at Area monitor 3	ERR_OXLEVELMONITOR03_SENSORTIMEOUT
136	Area monitor 4	sensor timeout	Sensor timeout at Area monitor 4	ERR_OXLEVELMONITOR04_SENSORTIMEOUT
137	Area monitor 5	sensor timeout	Sensor timeout at Area monitor 5	ERR_OXLEVELMONITOR05_SENSORTIMEOUT
138	Area monitor 6	sensor timeout	Sensor timeout at Area monitor 6	ERR_OXLEVELMONITOR06_SENSORTIMEOUT
139	Area monitor 7	sensor timeout	Sensor timeout at Area monitor 7	ERR_OXLEVELMONITOR07_SENSORTIMEOUT
140	Zone Control	heating timeout	1 or more sensors are heated to long at the ZoneControl	ERR_OXZONECONTROL_HEATINGTIMEOUT
141	Zone Monitor	heating timeout	1 or more sensors are heated to long at the ZoneMonitor	ERR_OXZONEMONITOR_HEATINGTIMEOUT
142	Area monitor 1	heating timeout	1 or more sensors are heated to long at the Area monitor 1	ERR_OXLEVELMONITOR01_HEATINGTIMEOUT
143	Area monitor 2	heating timeout	2 or more sensors are heated to long at the Area monitor 2	ERR_OXLEVELMONITOR02_HEATINGTIMEOUT
144	Area monitor 3	heating timeout	3 or more sensors are heated to long at the Area monitor 3	ERR_OXLEVELMONITOR03_HEATINGTIMEOUT
145	Area monitor 4	heating timeout	4 or more sensors are heated to long at the Area monitor 4	ERR_OXLEVELMONITOR04_HEATINGTIMEOUT
146	Area monitor 5	heating timeout	5 or more sensors are heated to long at the Area monitor 5	ERR_OXLEVELMONITOR05_HEATINGTIMEOUT
147	Area monitor 6	heating timeout	6 or more sensors are heated to long at the Area monitor 6	ERR_OXLEVELMONITOR06_HEATINGTIMEOUT
148	Area monitor 7	heating timeout	7 or more sensors are heated to long at the Area monitor 7	ERR_OXLEVELMONITOR07_HEATINGTIMEOUT
149	Zone Control	sensors not set	Not enough sensors at the ZoneControl	ERR_OXZONECONTROL_NOSENSORS
150	Zone Monitor	sensors not set	Not enough sensors at the ZoneMonitor	ERR_OXZONEMONITOR_NOSENSORS
151	Area monitor 1	sensors not set	Not enough sensors at the Area monitor 1	ERR_OXLEVELMONITOR01_NOSENSORS
152	Area monitor 2	sensors not set	Not enough sensors at the Area monitor 2	ERR_OXLEVELMONITOR02_NOSENSORS
153	Area monitor 3	sensors not set	Not enough sensors at the Area monitor 3	ERR_OXLEVELMONITOR03_NOSENSORS
154	Area monitor 4	sensors not set	Not enough sensors at the Area monitor 4	ERR_OXLEVELMONITOR04_NOSENSORS
155	Area monitor 5	sensors not set	Not enough sensors at the Area monitor 5	ERR_OXLEVELMONITOR05_NOSENSORS
156	Area monitor 6	sensors not set	Not enough sensors at the Area monitor 6	ERR_OXLEVELMONITOR06_NOSENSORS

No.	Error message display row 1	Error message display row 2	Description	Source message
157	Area monitor 7	sensors not set	Not enough sensors at the Area monitor 7	ERR_OXLEVELMONITOR07_NOSENSORS
158	Zone Control	measure type fault	Measurement type difference in sensors of ZoneControl	ERR_OXZONECONTROL_MEASURETYPE
159	Zone Monitor	measure type fault	Measurement type difference in sensors of ZoneMonitor	ERR_OXZONEMONITOR_MEASURETYPE
160	Area monitor 1	measure type fault	Measurement type difference in sensors of Area monitor 1	ERR_OXLEVELMONITOR01_MEASURETYPE
161	Area monitor 2	measure type fault	Measurement type difference in sensors of Area monitor 2	ERR_OXLEVELMONITOR02_MEASURETYPE
162	Area monitor 3	measure type fault	Measurement type difference in sensors of Area monitor 3	ERR_OXLEVELMONITOR03_MEASURETYPE
163	Area monitor 4	measure type fault	Measurement type difference in sensors of Area monitor 4	ERR_OXLEVELMONITOR04_MEASURETYPE
164	Area monitor 5	measure type fault	Measurement type difference in sensors of Area monitor 5	ERR_OXLEVELMONITOR05_MEASURETYPE
165	Area monitor 6	measure type fault	Measurement type difference in sensors of Area monitor 6	ERR_OXLEVELMONITOR06_MEASURETYPE
166	Area monitor 7	measure type fault	Measurement type difference in sensors of Area monitor 7	ERR_OXLEVELMONITOR07_MEASURETYPE
167	No ECD display message		Reserved error	ERR_OXRESERVED167
168	Zone Monitor	oxygen level min	Oxygen minimal alarm ZoneMonitor	ERR_OXZONEMONITOR_OXLEVELMINALARM
169	Area monitor 1	oxygen level min	Oxygen minimal alarm Area monitor 1	ERR_OXLEVELMONITOR01_OXLEVELMINALARM
170	Area monitor 2	oxygen level min	Oxygen minimal alarm Area monitor 2	ERR_OXLEVELMONITOR02_OXLEVELMINALARM
171	Area monitor 3	oxygen level min	Oxygen minimal alarm Area monitor 3	ERR_OXLEVELMONITOR03_OXLEVELMINALARM
172	Area monitor 4	oxygen level min	Oxygen minimal alarm Area monitor 4	ERR_OXLEVELMONITOR04_OXLEVELMINALARM
173	Area monitor 5	oxygen level min	Oxygen minimal alarm Area monitor 5	ERR_OXLEVELMONITOR05_OXLEVELMINALARM
174	Area monitor 6	oxygen level min	Oxygen minimal alarm Area monitor 6	ERR_OXLEVELMONITOR06_OXLEVELMINALARM
175	Area monitor 7	oxygen level min	Oxygen minimal alarm Area monitor 7	ERR_OXLEVELMONITOR07_OXLEVELMINALARM
176	No ECD display message		Reserved error	ERR_OXRESERVED176
177	Zone Monitor	oxygen level max	Oxygen maximal alarm ZoneMonitor	ERR_OXZONEMONITOR_OXLEVELMAXALARM
178	Area monitor 1	oxygen level max	Oxygen maximal alarm Area monitor 1	ERR_OXLEVELMONITOR01_OXLEVELMAXALARM
179	Area monitor 2	oxygen level max	Oxygen maximal alarm Area monitor 2	ERR_OXLEVELMONITOR02_OXLEVELMAXALARM
180	Area monitor 3	oxygen level max	Oxygen maximal alarm Area monitor 3	ERR_OXLEVELMONITOR03_OXLEVELMAXALARM
181	Area monitor 4	oxygen level max	Oxygen maximal alarm Area monitor 4	ERR_OXLEVELMONITOR04_OXLEVELMAXALARM
182	Area monitor 5	oxygen level max	Oxygen maximal alarm Area monitor 5	ERR_OXLEVELMONITOR05_OXLEVELMAXALARM
183	Area monitor 6	oxygen level max	Oxygen maximal alarm Area monitor 6	ERR_OXLEVELMONITOR06_OXLEVELMAXALARM
184	Area monitor 7	oxygen level max	Oxygen maximal alarm Area monitor 7	ERR_OXLEVELMONITOR07_OXLEVELMAXALARM
185	No ECD display message		Reserved error	ERR_OXRESERVED185
186	Zone Monitor	oxygen level is low	Oxygen minimal warning ZoneMonitor	ERR_OXZONEMONITOR_OXLEVELMINWARNING
187	Area monitor 1	oxygen level is low	Oxygen minimal warning Area monitor 1	ERR_OXLEVELMONITOR01_OXLEVELMINWARNING
188	Area monitor 2	oxygen level is low	Oxygen minimal warning Area monitor 2	ERR_OXLEVELMONITOR02_OXLEVELMINWARNING
189	Area monitor 3	oxygen level is low	Oxygen minimal warning Area monitor 3	ERR_OXLEVELMONITOR03_OXLEVELMINWARNING
190	Area monitor 4	oxygen level is low	Oxygen minimal warning Area monitor 4	ERR_OXLEVELMONITOR04_OXLEVELMINWARNING
191	Area monitor 5	oxygen level is low	Oxygen minimal warning Area monitor 5	ERR_OXLEVELMONITOR05_OXLEVELMINWARNING
192	Area monitor 6	oxygen level is low	Oxygen minimal warning Area monitor 6	ERR_OXLEVELMONITOR06_OXLEVELMINWARNING
193	Area monitor 7	oxygen level is low	Oxygen minimal warning Area monitor 7	ERR_OXLEVELMONITOR07_OXLEVELMINWARNING
194	No ECD display message		Reserved error	ERR_OXRESERVED194
195	Zone Monitor	oxygen level is high	Oxygen maximal warning ZoneMonitor	ERR_OXZONEMONITOR_OXLEVELMAXWARNING

No.	Error message display row 1	Error message display row 2	Description	Source message
196	Area monitor 1	oxygen level is high	Oxygen maximal warning Area monitor 1	ERR_OXLEVELMONITOR01_OXLEVELMAXWARNING
197	Area monitor 2	oxygen level is high	Oxygen maximal warning Area monitor 2	ERR_OXLEVELMONITOR02_OXLEVELMAXWARNING
198	Area monitor 3	oxygen level is high	Oxygen maximal warning Area monitor 3	ERR_OXLEVELMONITOR03_OXLEVELMAXWARNING
199	Area monitor 4	oxygen level is high	Oxygen maximal warning Area monitor 4	ERR_OXLEVELMONITOR04_OXLEVELMAXWARNING
200	Area monitor 5	oxygen level is high	Oxygen maximal warning Area monitor 5	ERR_OXLEVELMONITOR05_OXLEVELMAXWARNING
201	Area monitor 6	oxygen level is high	Oxygen maximal warning Area monitor 6	ERR_OXLEVELMONITOR06_OXLEVELMAXWARNING
202	Area monitor 7	oxygen level is high	Oxygen maximal warning Area monitor 7	ERR_OXLEVELMONITOR07_OXLEVELMAXWARNING
203	Zone Control	Level diff. warning	Warning, to large difference between sensors in ZoneControl	ERR_OXZONECONTROL_OXLEVELDIFFWARNING
204	Zone Monitor	Level diff. warning	Warning, to large difference between sensors in ZoneMonitor	ERR_OXZONEMONITOR_OXLEVELDIFFWARNING
205	Area monitor 1	Level diff. warning	Warning, to large difference between sensors in Area monitor 1	ERR_OXLEVELMONITOR01_OXLEVELDIFFWARNING
206	Area monitor 2	Level diff. warning	Warning, to large difference between sensors in Area monitor 2	ERR_OXLEVELMONITOR02_OXLEVELDIFFWARNING
207	Area monitor 3	Level diff. warning	Warning, to large difference between sensors in Area monitor 3	ERR_OXLEVELMONITOR03_OXLEVELDIFFWARNING
208	Area monitor 4	Level diff. warning	Warning, to large difference between sensors in Area monitor 4	ERR_OXLEVELMONITOR04_OXLEVELDIFFWARNING
209	Area monitor 5	Level diff. warning	Warning, to large difference between sensors in Area monitor 5	ERR_OXLEVELMONITOR05_OXLEVELDIFFWARNING
210	Area monitor 6	Level diff. warning	Warning, to large difference between sensors in Area monitor 6	ERR_OXLEVELMONITOR06_OXLEVELDIFFWARNING
211	Area monitor 7	Level diff. warning	Warning, to large difference between sensors in Area monitor 7	ERR_OXLEVELMONITOR07_OXLEVELDIFFWARNING
212	Zone Control	Level diff. alarm	Alarm, to large difference between sensors in ZoneControl	ERR_OXZONECONTROL_OXLEVELDIFFALARM
213	Zone Monitor	Level diff. alarm	Alarm, to large difference between sensors in ZoneMonitor	ERR_OXZONEMONITOR_OXLEVELDIFFALARM
214	Area monitor 1	Level diff. alarm	Alarm, to large difference between sensors in Area monitor 1	ERR_OXLEVELMONITOR01_OXLEVELDIFFALARM
215	Area monitor 2	Level diff. alarm	Alarm, to large difference between sensors in Area monitor 2	ERR_OXLEVELMONITOR02_OXLEVELDIFFALARM
216	Area monitor 3	Level diff. alarm	Alarm, to large difference between sensors in Area monitor 3	ERR_OXLEVELMONITOR03_OXLEVELDIFFALARM
217	Area monitor 4	Level diff. alarm	Alarm, to large difference between sensors in Area monitor 4	ERR_OXLEVELMONITOR04_OXLEVELDIFFALARM
218	Area monitor 5	Level diff. alarm	Alarm, to large difference between sensors in Area monitor 5	ERR_OXLEVELMONITOR05_OXLEVELDIFFALARM
219	Area monitor 6	Level diff. alarm	Alarm, to large difference between sensors in Area monitor 6	ERR_OXLEVELMONITOR06_OXLEVELDIFFALARM
220	Area monitor 7	Level diff. alarm	Alarm, to large difference between sensors in Area monitor 7	ERR_OXLEVELMONITOR07_OXLEVELDIFFALARM
221	Zone Control	access not safe	Access to Zone control not safe	ERR_OXZONECONTROL_ACCESSNOTSAFE
222	Zone Monitor	access not safe	Access to Zone monitor not safe	ERR_OXZONEMONITOR_ACCESSNOTSAFE
223	Area monitor 1	access not safe	Access to Area monitor 1 not safe	ERR_OXLEVELMONITOR01_ACCESSNOTSAFE
224	Area monitor 2	access not safe	Access to Area monitor 2 not safe	ERR_OXLEVELMONITOR02_ACCESSNOTSAFE
225	Area monitor 3	access not safe	Access to Area monitor 3 not safe	ERR_OXLEVELMONITOR03_ACCESSNOTSAFE
226	Area monitor 4	access not safe	Access to Area monitor 4 not safe	ERR_OXLEVELMONITOR04_ACCESSNOTSAFE

No.	Error message display row 1	Error message display row 2	Description	Source message
227	Area monitor 5	access not safe	Access to Area monitor 5 not safe	ERR_OXLEVELMONITOR05_ACCESSNOTSAFE
228	Area monitor 6	access not safe	Access to Area monitor 6 not safe	ERR_OXLEVELMONITOR06_ACCESSNOTSAFE
229	Area monitor 7	access not safe	Access to Area monitor 7 not safe	ERR_OXLEVELMONITOR07_ACCESSNOTSAFE
230	N2Control	device count fault	Number of N2Controls in network do not match	ERR_OXDEVICELIST_N2CONTROLCOUNT
231	OxControl	device count fault	Number of OxControls in network do not match	ERR_OXDEVICELIST_OXCONTROLCOUNT
232	ECD Display	device count fault	Number of EcdDisplays in network do not match	ERR_OXDEVICELIST_ECDDISPLAYCOUNT
233	FxConnect	device count fault	Number of FxConnects in network do not match	ERR_OXDEVICELIST_FXCONNECTCOUNT
234	ColorDisplay	device count fault	Number of ColorDisplays in network do not match	ERR_OXDEVICELIST_COLORDISPLAYCOUNT
235	Oxysensor	device count fault	Number of Oxygensensors in network do not match	ERR_OXDEVICELIST_OXYSENSORCOUNT
236	No ECD display message		Reserved error	ERR_OXRESERVED_236
237	Measurement type	difference	Difference in setting 'Used measurement'	ERR_OXO2TARGETSELECTDIFF
238	ZoneControl	disabled	Zone control disabled	ERR_OXZONECONTROLDISABLED
239	ZoneControl	diff ZoneMonitor	Difference between ZoneControl and ZoneMonitor is to large	ERR_OXZONEDIFF

7.1.5 Error messages from the FX Connect

The following table shows which error message can be generated by the FX Connect.

No.	Error message display row 1	Error message display row 2	Description	Source message
120	No ECD display message		Start of device specific errors	ERR_FXDEVICEBASE
121	Xport	NTP fault	Timeserver cannot be reached by Xport	ERR_FXXPORT_NTP
122	Xport	DNS fault	DNS server cannot be reached by Xport	ERR_FXXPORT_DNS
123	Xport	IP conflict	IP conflict detected	ERR_FXXPORT_IPCONFLICT
124	Xport	Software fault	Combination of software version of Xport and micorcontroller incorrect	ERR_FXXPORT_SOFTWARE
125	Xport	UDP RxBuffer full	Receive buffer of UDP channel is full	ERR_FXXPORT_UDP_RXFULL
126	Xport	UDP TxBuffer full	Send buffer of UDP channel is full	ERR_FXXPORT_UDP_TXFULL
127	Xport	Tunnel timeout	A tunnelconnection generates a timeout	ERR_FXXPORT_TUNNELTIMEOUT
128	No ECD display message		Reserved error	ERR_FXRESERVED_128
129	No ECD display message		Reserved error	ERR_FXRESERVED_129
130	No ECD display message		Reserved error	ERR_FXRESERVED_130
131	Relais 1	timeout	Relay 1 has received information for to lang	ERR_FXRELAY1_TIMEOUT
132	Relais 2	timeout	Relay 2 has received information for to lang	ERR_FXRELAY2_TIMEOUT
133	Relais 3	timeout	Relay 3 has received information for to lang	ERR_FXRELAY3_TIMEOUT
134	Relais 4	timeout	Relay 4 has received information for to lang	ERR_FXRELAY4_TIMEOUT
135	Relais 5	timeout	Relay 5 has received information for to lang	ERR_FXRELAY5_TIMEOUT
136	Relais 6	timeout	Relay 6 has received information for to lang	ERR_FXRELAY6_TIMEOUT
137	No ECD display message		Reserved error	ERR_FXRESERVED_137
138	No ECD display message		Reserved error	ERR_FXRESERVED_138
139	No ECD display message		Reserved error	ERR_FXRESERVED_139
140	No ECD display message		Reserved error	ERR_FXRESERVED_140
141	No ECD display message		Reserved error	ERR_FXRESERVED_141
142	No ECD display message		Reserved error	ERR_FXRESERVED_142
143	No ECD display message		Reserved error	ERR_FXRESERVED_143
144	No ECD display message		Reserved error	ERR_FXRESERVED_144
145	No ECD display message		Reserved error	ERR_FXRESERVED_145
146	No ECD display message		Reserved error	ERR_FXRESERVED_146
147	No ECD display message		Reserved error	ERR_FXRESERVED_147
148	No ECD display message		Reserved error	ERR_FXRESERVED_148
149	No ECD display message		Reserved error	ERR_FXRESERVED_149
150	No ECD display message		Reserved error	ERR_FXRESERVED_150
151	No ECD display message		Reserved error	ERR_FXRESERVED_151
152	No ECD display message		Reserved error	ERR_FXRESERVED_152
153	No ECD display message		Reserved error	ERR_FXRESERVED_153
154	No ECD display message		Reserved error	ERR_FXRESERVED_154
155	No ECD display message		Reserved error	ERR_FXRESERVED_155

No.	Error message display row 1	Error message display row 2	Description	Source message
156	No ECD display message		Reserved error	ERR_FXRESERVED_156
157	No ECD display message		Reserved error	ERR_FXRESERVED_157
158	No ECD display message		Reserved error	ERR_FXRESERVED_158
159	No ECD display message		Reserved error	ERR_FXRESERVED_159
160	No ECD display message		Reserved error	ERR_FXRESERVED_160
161	No ECD display message		Reserved error	ERR_FXRESERVED_161
162	No ECD display message		Reserved error	ERR_FXRESERVED_162
163	No ECD display message		Reserved error	ERR_FXRESERVED_163
164	No ECD display message		Reserved error	ERR_FXRESERVED_164
165	No ECD display message		Reserved error	ERR_FXRESERVED_165
166	No ECD display message		Reserved error	ERR_FXRESERVED_166
167	No ECD display message		Reserved error	ERR_FXRESERVED_167
168	No ECD display message		Reserved error	ERR_FXRESERVED_168
169	No ECD display message		Reserved error	ERR_FXRESERVED_169
170	No ECD display message		Reserved error	ERR_FXRESERVED_170
171	No ECD display message		Reserved error	ERR_FXRESERVED_171
172	No ECD display message		Reserved error	ERR_FXRESERVED_172
173	No ECD display message		Reserved error	ERR_FXRESERVED_173
174	No ECD display message		Reserved error	ERR_FXRESERVED_174
175	No ECD display message		Reserved error	ERR_FXRESERVED_175
176	No ECD display message		Reserved error	ERR_FXRESERVED_176
177	No ECD display message		Reserved error	ERR_FXRESERVED_177
178	No ECD display message		Reserved error	ERR_FXRESERVED_178
179	No ECD display message		Reserved error	ERR_FXRESERVED_179
180	No ECD display message		Reserved error	ERR_FXRESERVED_180
181	No ECD display message		Reserved error	ERR_FXRESERVED_181
182	No ECD display message		Reserved error	ERR_FXRESERVED_182
183	No ECD display message		Reserved error	ERR_FXRESERVED_183
184	No ECD display message		Reserved error	ERR_FXRESERVED_184
185	No ECD display message		Reserved error	ERR_FXRESERVED_185
186	No ECD display message		Reserved error	ERR_FXRESERVED_186
187	No ECD display message		Reserved error	ERR_FXRESERVED_187
188	No ECD display message		Reserved error	ERR_FXRESERVED_188
189	No ECD display message		Reserved error	ERR_FXRESERVED_189
190	No ECD display message		Reserved error	ERR_FXRESERVED_190
191	No ECD display message		Reserved error	ERR_FXRESERVED_191
192	No ECD display message		Reserved error	ERR_FXRESERVED_192
193	No ECD display message		Reserved error	ERR_FXRESERVED_193
194	No ECD display message		Reserved error	ERR_FXRESERVED_194

No.	Error message display row 1	Error message display row 2	Description	Source message
195	No ECD display message		Reserved error	ERR_FXRESERVED_195
196	No ECD display message		Reserved error	ERR_FXRESERVED_196
197	No ECD display message		Reserved error	ERR_FXRESERVED_197
198	No ECD display message		Reserved error	ERR_FXRESERVED_198
199	No ECD display message		Reserved error	ERR_FXRESERVED_199
200	No ECD display message		Reserved error	ERR_FXRESERVED_200
201	No ECD display message		Reserved error	ERR_FXRESERVED_201
202	No ECD display message		Reserved error	ERR_FXRESERVED_202
203	No ECD display message		Reserved error	ERR_FXRESERVED_203
204	No ECD display message		Reserved error	ERR_FXRESERVED_204
205	No ECD display message		Reserved error	ERR_FXRESERVED_205
206	No ECD display message		Reserved error	ERR_FXRESERVED_206
207	No ECD display message		Reserved error	ERR_FXRESERVED_207
208	No ECD display message		Reserved error	ERR_FXRESERVED_208
209	No ECD display message		Reserved error	ERR_FXRESERVED_209
210	No ECD display message		Reserved error	ERR_FXRESERVED_210
211	No ECD display message		Reserved error	ERR_FXRESERVED_211
212	No ECD display message		Reserved error	ERR_FXRESERVED_212
213	No ECD display message		Reserved error	ERR_FXRESERVED_213
214	No ECD display message		Reserved error	ERR_FXRESERVED_214
215	No ECD display message		Reserved error	ERR_FXRESERVED_215
216	No ECD display message		Reserved error	ERR_FXRESERVED_216
217	No ECD display message		Reserved error	ERR_FXRESERVED_217
218	No ECD display message		Reserved error	ERR_FXRESERVED_218
219	No ECD display message		Reserved error	ERR_FXRESERVED_219
220	No ECD display message		Reserved error	ERR_FXRESERVED_220
221	No ECD display message		Reserved error	ERR_FXRESERVED_221
222	No ECD display message		Reserved error	ERR_FXRESERVED_222
223	No ECD display message		Reserved error	ERR_FXRESERVED_223
224	No ECD display message		Reserved error	ERR_FXRESERVED_224
225	No ECD display message		Reserved error	ERR_FXRESERVED_225
226	No ECD display message		Reserved error	ERR_FXRESERVED_226
227	No ECD display message		Reserved error	ERR_FXRESERVED_227
228	No ECD display message		Reserved error	ERR_FXRESERVED_228
229	No ECD display message		Reserved error	ERR_FXRESERVED_229
230	No ECD display message		Reserved error	ERR_FXRESERVED_230
231	No ECD display message		Reserved error	ERR_FXRESERVED_231
232	No ECD display message		Reserved error	ERR_FXRESERVED_232
233	No ECD display message		Reserved error	ERR_FXRESERVED_233

No.	Error message display row 1	Error message display row 2	Description	Source message
234	No ECD display message		Reserved error	ERR_FXRESERVED_234
235	No ECD display message		Reserved error	ERR_FXRESERVED_235
236	No ECD display message		Reserved error	ERR_FXRESERVED_236
237	No ECD display message		Reserved error	ERR_FXRESERVED_237
238	No ECD display message		Reserved error	ERR_FXRESERVED_238
239	No ECD display message		Reserved error	ERR_FXRESERVED_239

7.2 Troubleshooting

The system can be connected in various ways:

- The system operates in isolation.
  - The fault message appears in the ECD display.
- The system is connected to a PC and/or network.
  - The fault message appears on the ECD display and on a computer screen.
- The system is connected to other fire protection installations and/or a building management system.
  - Through this connection it is possible to forward messages to, for instance, the own technical service, an external alarm centre and/or the FX Prevent service. The malfunction report will appear on the ECD display and will be forwarded.

The LOX system is set by FX Prevent. In order to guarantee the safety of persons, all set values can only be changed by an authorised person. This means that in case of a malfunction, FX Prevent should always be contacted.

Only in the case of fault A35, Compressor fault, can it be tried to be solved by switching the compressor off and on manually. However, if this does not solve the problem, further action will be required.

The telephone number of FX Prevent is +31(0)174 64 83 00. The pohone number is also mentioned on various stickers in the vicinity of the installation. Always pass on the number and the error message. FX Prevent will initially try to solve the malfunction by phone. If this is not possible a service engineer will visit you. The findings shall be recorded in the logbook.

In case the installation is connected to the online monitoring service of FX Prevent, a notification will automatically be sent to FX Prevent in case of a malfunction. FX Prevent will initially try to solve the malfunction by means of the online connection or by phone. If this is not possible a service engineer will visit you. The findings shall be recorded in the logbook.

7.2.1 Reaction times

In order to minimise the outage of the LOX system, FX-Prevent offers a maintenance proposal with response times for troubleshooting each system. Although this will be drawn up specifically for each installation, the following times generally apply:

Priority	Reaction time	Repair time
1.	1 hour	4 hour
2.	4 hour	8 hour
3.	8 hour	24 hour
4.	8 hour	Appointment

Priority	Order in which 1 has the highest priority and 4 the lowest.
Reaction time	Time to come up with a diagnosis, solution and repair proposal.
Repair time	Time in which the failure should be fixed after it has been received.

Description of event	Priority
Maintenance	4
Failure N2 production system, valve set and control system	3
Failure compressor, repair or temporary replacement compressor	3
Failure protected room	3

8 Maintenance

8.1 FX Prevent

In order to keep the installation in good technical condition, so that it functions properly throughout its life, periodic maintenance must be carried out. Although the maintenance is specific to each installation and is offered separately, the following maintenance regulations generally apply.

8.1.1 Compressor

The compressor(s) should be maintained in accordance with the operation & maintenance manual provided by the compressor supplier.

8.1.2 LOX system

Maintenance on the nitrogen generator of the LOX system should be carried out according to the maintenance schedule below.

Work to be preformed	Performed by	Daily	Weekly	Each month	Every year	Every 2 years	Every 4 years	Each 2000 operating hours	Each 4000 operating hours	Each 8000 operating hours
Visual inspection of global technical state.	User	X								
Inspection of oxygen value	User	X								
Inspection of alarm and fault messages by means of the displays	User	X								
Inspection of operating hours	User	X								
Inspection of logbook for unusual appearance of alarms and faults	User			X						
Check output flow and purity	Maintenance mechanic				X					
Cleaning the equipment of the LOX system externally	Maintenance mechanic				X					
General technical inspection of the nitrogen generator, oxygen measurement	Maintenance mechanic				X					
Renew compressed air hoses.	Maintenance mechanic						X			
Replacement of the filters: • Micro mist • Super mist • Odor filter • Dust filter	Maintenance mechanic									X

8.1.3 Oxygen sensors

Maintenance of the oxygen sensors of the LOX system should be carried out according to the maintenance schedule below.

Work to be preformed	Performed by	Daily	Weekly	Each month	Every year	Every 2 years	Every 4 years	Each 2000 operating hours	Each 4000 operating hours	Each 8000 operating hours
Inspection of sensor measurements	User	X								
Inspection and calibration of oxygen sensors in the protected room	Maintenance mechanic				X					
Inspection and calibration of oxygen sensors in the LOX room	Maintenance mechanic				X					

8.1.4 Pressure Equipment, examination of commissioning and reinspection during using phase

According to the provisions resulting from the European directive 2014/68/EU (PED) for pressure equipment, it is determined that the rules for pressure equipment shall apply to the FX-Prevent LOX system. Pressure equipment which has been brought on the market in the Netherlands must meet the obligations arising from the Dutch Pressure Equipment Act.
The Dutch Pressure Equipment Act describes an inspection before putting into use and a periodic re-inspection, after every 4 years, of the pressure equipment. The Dutch Pressure Equipment Act describes the user as the responsible party for this. The user should take note of the prescribed inspections and re-inspections and should take care of this. FX-Prevent offers the possibility to take on a facilitating role in this.

For pressure equipment that is brought on the market outside The Netherlands, the obligations from the Dutch Pressure Equipment Act are not applicable. For pressure equipment that is brought on the market outside The Netherlands, the local laws and regulations concerning pressure equipment in that country must be complied with.

The inspection before commissioning of the pressure equipment, when applicable, consists of the following:

- The verification of the pressure equipment according to the manual and markings;
- The audit of the external condition of the pressure equipment;
- The audit of the safety devices and pressure accessories of the operation;
- The audit of the setup of the pressure equipment.

The requalification of the pressure equipment after 4 years, when applicable, consists of the following:

- Checking the internal condition of the pressure equipment by an internal investigation or other suitable research focused on the internal state;
- Checking of the external condition of the pressure device;
- Preparation of Report of Renewal and determination of validity;

Replacing of spring safety valves.

8.2 Maintenance contract

For each new system there is a proposal offered for a maintenance contract. The content of the maintenance contract is based on the abovementioned maintenance prescriptions and the specific characteristics of the system. In the maintenance contract there are the final maintenance intervals and prescriptions listed. The maintenance contract typically has an term of 1 year. The subscription price shall be adjusted annually with the new index number adopted by the Central Statistical work desk and / or adjusted based on the price increments of parts from the supplier.

9 Appendix

In addition to this document, the description of the content extends to the following appendixes:

Appendix ID	Description	Version
-	-	V0.0_R00

10 Document history

Version **1.0** to **2.0** indicates : **Modification**, in lay-out, structure or other major modifications;
Version **1.0** to **1.1** indicates : **Supplement**, a chapter of paragraph has been added to the document;
Revision **_R01** to **_R02** indicates : **Correction**, an image, language error or text error has been corrected.

Version	Date	Modification
2.1_R00	04-04-2016	First release of English translation. Translated from the Dutch version V2.1_R00.
2.2_R00	06-06-2016	Chapter 4.3.1. added about general reaction timings for failures Chapter 5.1.1. t/m 5.1.4. added about the typical maintenance prescriptions Chapter 5.3. Supplemented with text about the maintenance contract.
	13-06-2015	Chapter 5.1.2 & 5.1.3. added column for interval of 4 years and added line about the renewal of compressed air hoses.
3.1_R00	06-02-2019	Chapter 4. Added chapter about assembly instructions Chapter 6.1.4. Text corrected to 2014/68/EU guideline. 10 bar spring safety valve corrected to general spring safety valve.
3.2_R00	14-02-2019	Chapter 5. Measures during decommissioning added to the document.
3.3_R00	07-01-2020	Chapter. 2. Added chapter about precautions and safety instructions. Chapter. 3.2.10. Text supplemented to be more clear. Added description about the specific measures for each system. Chapter 3.2.11. 3rd paragraph corrected he description about slowwhoop. Chapter 3.2.12. introduction about the emergency stop corrected. The emergency stop is optional. Chapter 3.2.13. Functional description added about the BEKOGUARD.
4.0_R00	21-01-2021	Changes in lay-out, structure and other major changes to modernise the document

11 To conclude

This manual has been written in order to support the mechanic, installer or customer in adjusting, modifying or working with a product of FX Prevent. Its aim is to maintain and possibly improve the quality of its products. If additional information or support is requested then FX Prevent can be consulted through the following information.

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