



Safety Cabinet

Herasafe 2030i / Maxisafe 2030i

Service Instructions

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General Notes

Safety instructions for service work

Please note that any repairs to the device must be carried out only by personnel with appropriate qualification. Prior to installing spare parts or performing repairs, read these service instructions and the operating instructions carefully.

- The replacement of defined spare parts must be performed only by the Technical Service of Thermo Electron LED or by authorized service personnel that has been trained by Thermo Electron LED.
- Electrical work must be carried out only by electrical expert personnel.
- Work to gas supply lines and to gas supply system components must be carried out only by trained gas and air conditioning expert personnel.
- Service work must be carried out in accordance with the applicable national regulations.

Applicability of the instructions

- The contents of the service instructions are subject to change without further notice.
- For translations into foreign languages, the German version of these operating instructions is binding.
- Keep these service instructions close to the device so that safety instructions and important information are always accessible.
- Should you encounter problems that are not detailed adequately in these operating instructions, please contact Thermo Electron LED immediately for your own safety.

Warranty

Thermo Electron LED warrant the operational safety and functions of the safety cabinet only under the condition that:

- The device is operated and serviced exclusively in accordance with its intended purpose and as described in these operating instructions, the device is not modified. For safety reasons, unauthorized modifications or alterations to the device are not permitted.
- Only original spare parts and accessories that have been defined and approved by Thermo Electron LED are used. The use of other parts presents unknown hazards and

must therefore be refrained from inspections and maintenance are performed at the specified intervals.

- A repeat test is conducted after any inspections and repairs.

The warranty is valid from the date of delivery of the device to the operator.

Explanation of symbols

Symbols used in the service instructions:



Warning

Is used if non-observance may cause serious or even lethal injuries.



Caution

Is used if non-observance may cause medium to minor injuries or damage.



Note

Is used for hints and useful information.



Recycling

Valuable raw materials can be reused.



Electric shock hazard!



Biohazard!



Hazardous gases!

Symbols on the device



Observe operating instructions (switchbox ceiling)



Biohazard (left front of the device)



Cytostatic agents (left front of the device)



T5A fusing for sample chamber outlets (switchbox front)

RS-232 interface (switchbox front)



Armrest installation (right side of light cover)



CE Conformity Symbol: Confirms conformity in accordance with EU Guidelines

Additional symbols on the device (EN version):



Safety-tested (light cover)

Safety instructions for repairs

The general safety instructions point out potential hazards during repairs. To prevent constant repetitions, the following safety instructions are not mentioned explicitly in the individual sections; instead, the sections contain only references to the general safety instructions.

Prior to repairs, read the general safety instructions carefully.



WARNING: Toxic hazard / infection hazard!



- Infectious substances
- Cytostatic agents, toxic substances

Therefore, the device or device components may be contaminated.



Always observe the hygiene regulations of the operator.

Prior to beginning service work, cytostatic, infectious or other toxic substances or residues thereof must always be removed completely from the sample chamber:

1. Prior to repairs, enquire the contamination hazard and make sure that the device has been cleaned and disinfected.
2. A certificate of non-objection from the operator is required.



WARNING: Dangerous gases!



If the safety cabinet is supplied with gases, the external gas supply must be shut off prior to repairs:

1. Make sure that the workrooms are sufficiently ventilated.
2. If equipped, activate the exhaust system.
3. Observe safety data sheets.
4. Report damaged or faulty supply lines or connections to the operator of the device.



WARNING: Electric shock hazard!



Contact with current-carrying components may cause a lethal electric shock.

Motor-driven moving device components may cause injuries when switched on accidentally. Prior to repairs, disconnect the device from the power supply system:

1. Isolate the device electrically.
2. Protect the device from accidental reconnection.
3. Make sure the device is de-energized.
4. Ground and short the device.
5. Cover or barrier adjacent components that are under voltage.



Note: Start-up

If safety devices were removed or disabled during repairs, the unit must not be started up before the safety devices have been reinstalled and checked for proper operation!

Before the unit is started up and operated, a test run must be performed.



Note: Recycling

All device components except the filters can be recycled.



If the device was used to process cytostatic, toxic or infectious substances, the required decontamination measures must be taken prior to disposal or shipping.

If contaminated components are to be discarded during service work, they must be labeled in accordance with their grading as cytostatic, microbiological or otherwise toxic special waste.



Note: ESD Electronic discharge

During main board replacement protect against ESD Electronic discharge by wearing the ESD kit ground wire during unpacking and installation.



Note: ESD Electrical safety check

Prior to the commissioning of the unit:

- Perform a test run.
- Safety-check according to VDE 0701-1 or IEC 61010-1.

Standards and safety regulations

The device complies with the safety requirements of the following standards and directives:

USA / Canada

- UL 61010-1
CAN/CSA-C22.2 No.61010-1
- NSF / ANSI 49 - only Maxisafe version

Europe / Middle East / Africa

- IEC 61010-1 / EN 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements.
- EN 61326-1 Electrical equipment for measurement, control and laboratory use - EMC requirements – Part 1: General requirements.
- EN 12469
- Only Maxisafe version: DIN 12980
- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU

Tools and Auxiliaries

Auxiliaries

Screw connections:

All screw connections have metric threads.

Screw lockings:

All retaining screws with a diameter of 3 mm or less must be installed with a separable adhesive (medium tight) before they are tightened. Recommended product: Loctite 586.

Torques:

All retaining screws must only be tightened torque down (without leverage).

Sealant:

Recommended product:

Sista F 109 (Item 190, sealant)

Teflon sealing tape (for drain valve)

Cleaner:

Commercial dish-washing agents based on soap suds.

Recommended product: Liquinox.

Disinfectant:

For the standard wipe/spray disinfection, a broad-range disinfectant can be used.

Recommended product: Barrycidal 36 or Microcide SQ.

Personal safety protective equipment

Chemical protective suit

Safety goggles

Nitrile chemical safety gloves

Breathing equipment

List of required tools:

Multimeter	U / I / Ohm
Allen key set	1.5 - 6 mm
Open-end wrench set	6 - 32 mm
Phillips screwdriver set	magnetic
Slot-head screwdriver set	2 - 6 mm
Socket wrench set	6 - 32 mm
Diagonal cutter	small
Wire stripper	
Flat connector pliers	
Needle nose pliers	small
Tweezers	
Starter punch	small
Level	small
Heat gun	
Soldering iron	
Solder	
Cable ties	small, black
Screw locking adhesive	medium tight, solvable, from M3
Shrink tube	d = 6 mm
Shrink tube with sealant	d = 6 mm
Flat connectors	6.3 mm
Wire end ferrules	1 mm ²
Scraper	

Accessories



Note: Item numbers

The item numbers refer to the spare parts list at the end of these service instructions.

Exhaust system accessories

Item 1380 (filter)

Item 1540 (exhaust cooler)

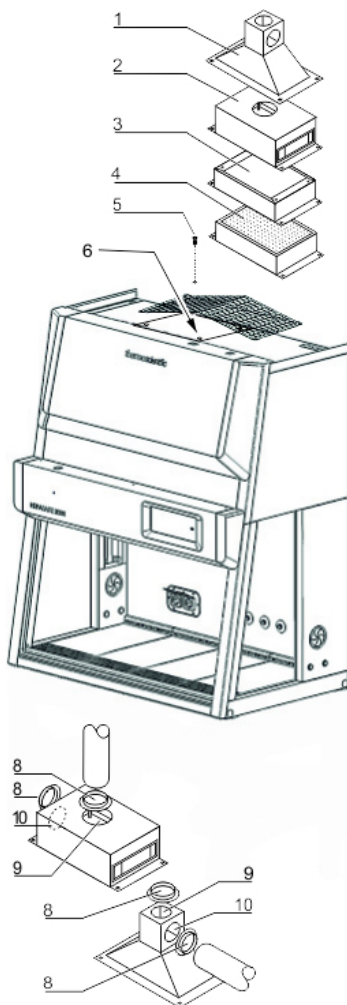


Figure 1. Exhaust system accessories

Figure 1: The safety cabinet can be equipped with the following exhaust system accessories.

Accessories for exhaust system:

- Exhaust manifold [1] for the direct connection to an on-site exhaust system.

- Draft interrupter [2] for the direct connection to an on-site exhaust system with blower.

Accessories for down-flow operation:

- Supplementary filter AEF [3] for exhaust air
- Supplementary filter AFC [4] with carbon insert for exhaust air

Installing exhaust system accessories

Item 190 (sealant)

Figure 1: The exhaust system components [1-4] are installed to the exhaust aperture [6] at the device ceiling. The four thread inserts, for the retaining screws [6] are pre-installed in the device ceiling.

To install the supplementary filter AEF, additional holes must be drilled. For hole dimensioning and positioning, refer to the drilling template supplied with the separate installation instructions for supplementary filter AEF.

Installation:

1. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
2. Thoroughly clean the contact surfaces around the exhaust aperture and of the accessory to be installed to ensure that they are absolutely grease- and dust-free.
3. Apply sealant onto the contact surfaces.
4. Secure the accessory by tightening the supplied four retaining screws (M 5) torqued down.
5. Remove any sealant coming out of the joint.

Connection to technical ventilation:

6. The exhaust manifold and the draft interrupter are installed between the safety cabinet and the exhaust pipe of the on-site exhaust system.
7. The supplied adapter [8] (Diameter 200 mm) is screwed onto the aperture of the exhaust manifold or draft interrupter.
8. The pipe fitting can be installed to the exhaust manifold either at the top [9] or at the side aperture [10].

Recommendations for exhaust system

Two types of connection can be used:

The indirect connection via a Thimble duct connector and the direct tight connection via a Direct Duct Connector.

Both methods are used as an additional safety mean in order to prevent undetected unlikely failure of the exhaust filter system can cause a contamination risk, or to exhaust odors released throughout work inside cabinet to the outside.

Safety Remarks:

- Both methods need to feed back the exhausted amount of air into the laboratory. The resupply of room air has to be conditioned in order to avoid failure of the installed system and to avoid inconvenient work conditions.
- The exhaust air of both systems can carry contaminated Aerosol in case of failure.
- Therefore the air system shall not be coupled with other "normal" ventilation in order to prevent backwash of contaminants into other areas.
- It is of paramount importance to avoid any negative impact on the "inflow" of the safety cabinet in order to keep safe work conditions.

At least once a year safe operation of the whole system, Cabinet and Exhaust Connection / -system has to be re-certified.

Controls

The units are coming with a "volt-free" contact which signalizes the reduced and full speed operation mode of it's ventilation system.

With this information's an external HVAC - system can additionally be controlled.

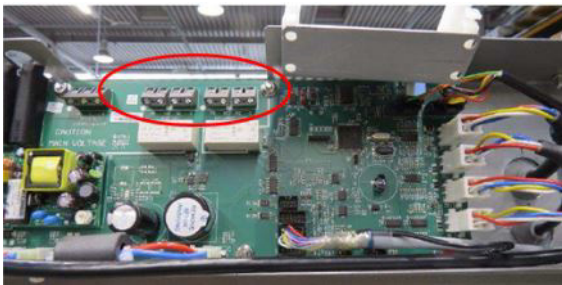


Figure 2. Clamp X21 on main board for ext. ventilator

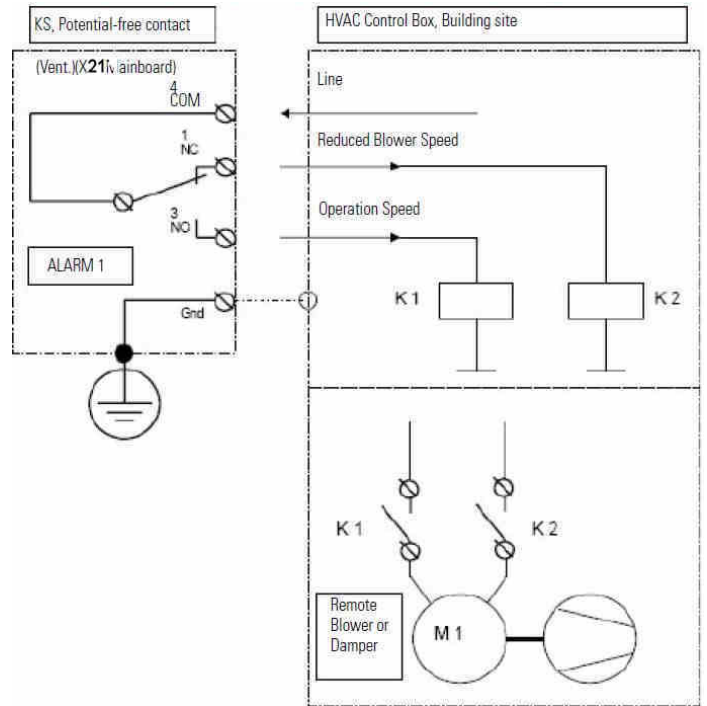


Figure 3. Sketch, control information, principle



Note:

The "COM" supply can additionally be interlocked by a "non flow" detector located inside duct system on building site in order to switch off external blower supply when system is not used.

The "Reduced Speed" level is not a demand. It has to be considered on a case-by-case basis, how to save energy consumption / how HVAC system is controlled.

Thimble Duct Connection

In order to have an additional safety mean, often the Thimble Duct Connection of the Cabinet exhaust to the outside is used.

The major benefits are:

- Building site duct system is under negative pressure;
- In case of malfunction of the building site system or,
- If the air flow rate is not well balanced or
- Its not foreseen to exhaust 100 % of the cabinet exhaust, a major "sniffing" portion only, in order to save energy, the cabinet's personal protection is not influenced by the external system.

The Safety cabinet in this cases operates as a recirculation cabinet back into the room or a portion of the exhaust is recirculated back into the room only.

The negative is, the Thimble Duct Connection type needs approx. 20-30 %, more air flow rate compared to a Direct Duct Connection.

Anyhow, from a safety point of view, the Thimble Duct Connection is the fail safe way to duct Safety Cabinets exhaust to the outside.

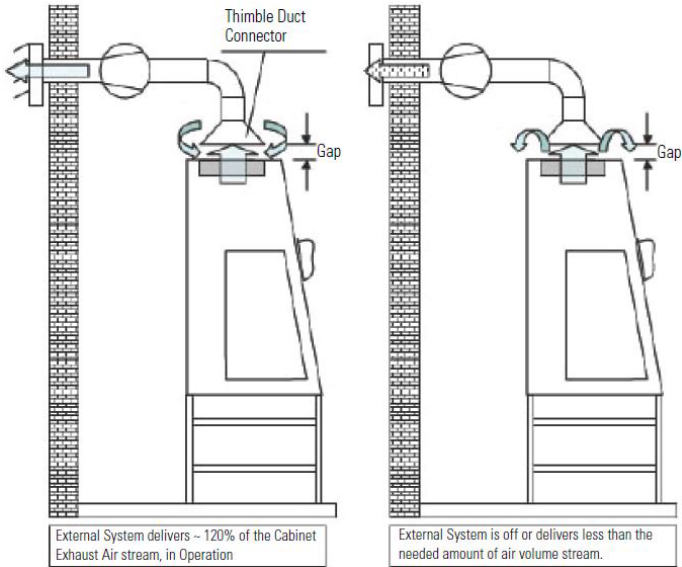


Figure 4. Sketch, Thimble Ducting, principle

Recommendation:

Air volume of additional external blower: exhaust volume air of cabinet + app. 20-30 %

KTD - Connector

Using the adaptor **KTD** (accessory) for the Thimble Duct Connection can make installation easier.

The adaptor fits on the foreseen threats for installation on top of the exhaust outlet.

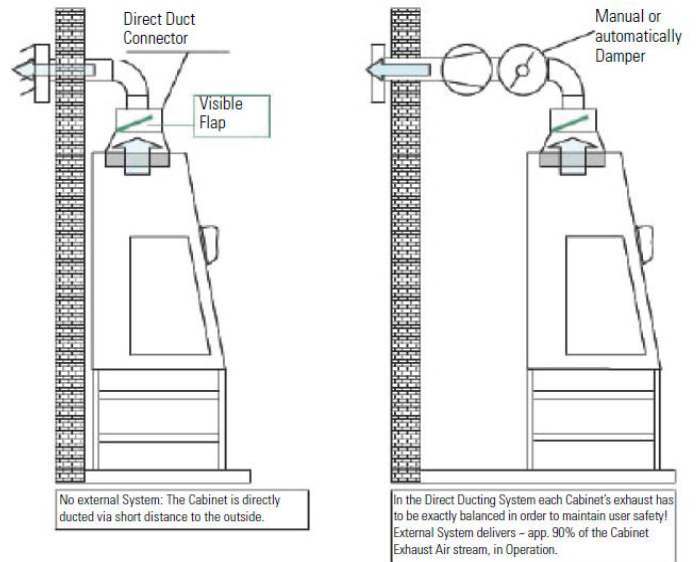
The connection top box **KTD** is made of zinc steel metal sheet and additionally powder coated grey-white. It has an adjustable outlet / inlet for bypass air towards the electric top box on top of the unit.

The duct (flange) can be connected either to the left or to the top. The other outlet has to be blocked (parts included).

Direct Duct Connection

With the Direct Duct Connection you can couple the cabinet via short distance directly to the outside or, using a remote blower system, it is also possible to go over a long distance to the outside.

Sketch, Direct Ducting, principle



Note:

A Direct Duct Connection with a remote blower system allows maintaining a long distance ducting.

Recommendation:

Air volume of additional external blower: exact same exhaust air volume of the cabinet or app. 10% less.

Further Safety Remarks for Direct Duct Connection:

- It is of paramount importance that the outside end of the duct system is protected against any blockage.
- The customer has to make sure, that all personnel working at and with the cabinet is informed about the circumstances of the direct ducting system. Means, it is allowed only to work with dangerous agents inside, work safely, when visible flap shows "right" exhaust air flow.
- The installation has to be carried out in such way, that the exhaust air flow of the Cabinet in nominal set point is app. 100 % exactly exhausted via the remote system.
- To less exhaust air volume stream can have negative impact on the personal protection the Cabinet in nominal set point "normally" delivers.
- Way to much exhaust air flow delivered by the external system can have negative impact to the product protection the Cabinet "normally" in nominal set point delivers!
- Using a remote blower to operate Direct Duct Connection means always to install a suitable damper in order to accomplish right exhaust air flow conditions!
- At least once a year the safety of Cabinet and Direct Duct system interaction must be re-certified.
- The air flow via the Direct Duct system shall be monitored during operation. Alarm(s) shall occur if the air flow values

are not in secure level. Operators shall be trained about the functional aspects of the special system. Open handling of hazardous material shall be not allowed if an alarm occurs.

- The U.S. Standard NSF/ANSI 49 defines such connection as a B3-Type connection to work with minute quantities of hazardous chemicals which have to be exhausted to the outside. The standard requires higher in-flow velocities compared to the European state-of-the-art EN 12 469. Therefore other exhaust air amounts are required!

KDD - Connector

For Direct Ducting the Cabinet to the outside as an additional safety mean, Thermo recommend to use the **KDD** adaptor (accessory) in order to ease installation.

The duct (flange) connection can be made either on the top or on the left of the adaptor.

The adaptor is made of transparent plastic material. It has to be fitted on top of the air outlet of the Safety Cabinet and has to be sealed. Inside the transparent outlet box of the adaptor a colored flap shows status of exhaust flow. If the air flow is right, the flap is open, close to 90° angle vertical. If the air flow is not o.k. the flap is closed in horizontal position.

Flap positions in between total open or less can be safe as well. In this cases it is of importance to inform users, safety officers and laboratory managers about operation conditions found to be safe even the flap is not totally open.

On one side of the transparent outlet box the **KDD** adaptor has a port / thread intended to use in case of disinfection / fumigation of the Cabinet.

Herewith the Flap can be pressed down to the gasket inside and the outlet can be sealed during disinfection / fumigation in order to prevent loss of disinfectant. This thread has to be sealed during normal operation with the bolt delivered with or with a comparable metric screw.

Fixed rack



CAUTION: Tipping over

In order to guarantee the stability of the device, only laboratory tables with sufficient stability and load-bearing capacity (double the weight of the device) or such racks as are available as coordinated accessories are approved for use.

In the event of doubt, an anchoring brace (securing the device to the wall) must be provided in order to eliminate the danger of tipping over.

Item 1370 (stand)

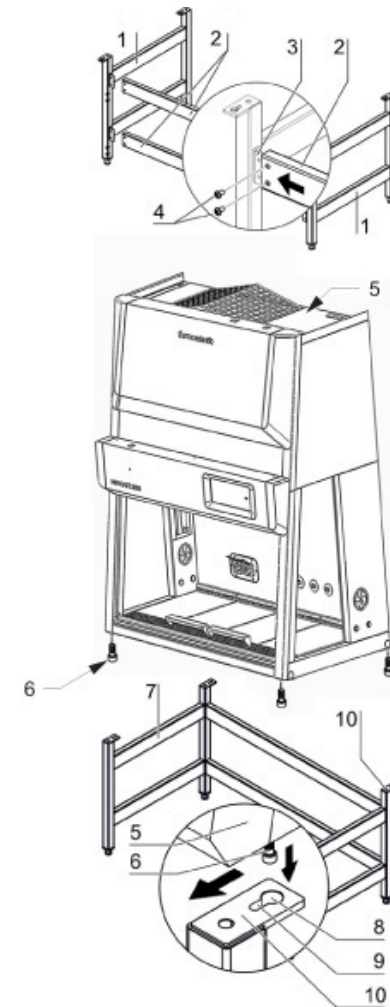


Figure 5. Installing the **HERASAFE 2030i** racks

1. **Figure 5:** Slide the two cross-members [2] onto the retaining angles [3] of the side panels [1], then secure the cross-members to the two side panels using the screws [4].
2. To install the device frame [5] to the rack [7], install four Allen screws [6] loosely into the threaded holes at the bottom of the device frame.
3. Place the safety cabinet onto the rack so that the Allen screws [6] are routed through the holes [8] of the retaining tabs [10].
4. Slide the device frame [5] into the retaining tab grooves [9] all the way to the stop.
5. Tighten the four Allen screws [6].
6. Level the device. Insert the work-plate(s) and place a bubble level onto the plate(s).
7. Rotate the stands [11] of the rack so that the work-plate is exactly horizontal in all directions. Perform the height adjustment of the device stands from left to right and from rear to front.

Height-adjustable rack

Item 1350 (plug for rack side-members)

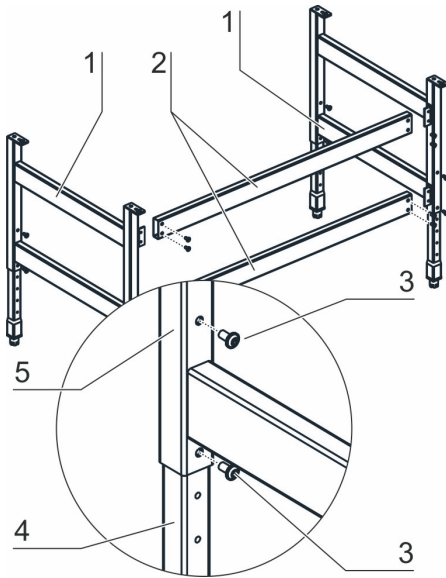


Figure 6. Installing the electrical **HERASAFE 2030i** rack

Figure 6: To assemble the rack, push the two crossbars [2] to the fastening brackets of the side frames [1] and screw them together.

1. The height of the height-adjustable rack can be set within a range of 680-880 mm:
 - Set the rack to the desired height
 - Extract the height-adjustable legs [4] from the channels of the side frames [5] to the desired height
 - Fix the height adjustments
 - Screw 2 cylinder-head screws [3] each per channel [5] into the height-adjustable leg [4]
2. Secure the device to the rack using screws
3. Level the device (see **Assembling the footrest**).

Height-adjustable rack with electric drive

Item 1400 (lift unit left)

Item 1410 (lift unit right)

Item 1420 (control 230 V)

Item 1550 (small parts kit floor stand)

Figure 7: The height of the electrically height-adjustable rack [10] can be set within a range of 680-880 mm. Both side-members [1] have their own electromagnetic drive [8] that is controlled by the synchronizer module [6].

1. **Figure 7:** Connect the crossbars [4] with the two side frames [1]. To do so, set the fastening brackets [5] of the crossbars at the threaded holes of the side frames and screw in the fastening screws [3].
2. Hang the delivery plate [7] onto the crossbars and set the synchronization control [6] onto the delivery plate.
3. Attach each of the self-adhesive cable conduits left and right of the synchronization control to the upper bar of the crossbars.
4. Clean the points of adhesion thoroughly; the surfaces must be free of dust and oily residues.
5. Remove the cover from the cable conduits, remove the protective film from the rear wall and firmly press the cable conduits onto the assembly position.
6. Lay the connection cable through the cable conduits.
7. Connect the connection cable [9] of the left power drive [8] to the plug socket [12] of the synchronization control [6] and connect the connection cable [10] of the right power drive [11] to the plug socket [13] of the synchronization control [6].
8. Connect the connection cables to both the right and left power drives, [8] and [11].
9. Replace the cover onto the cable conduits.

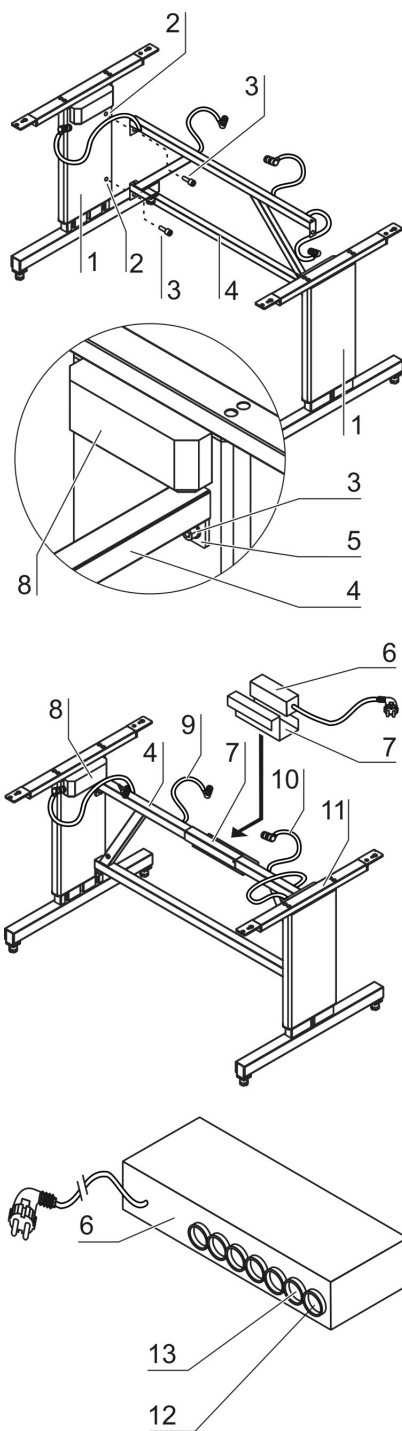


Figure 7. Assembling the electric rack



Note: Climatic effects!

In order to ensure perfect functioning of the synchronization control, the place where the safety workbench is set up must be selected so that the synchronization control is not subjected to any direct influence of heat or moisture.

Leveling the device

Upon completion of all the modifications to the device rack, the working area of the sample chamber must be leveled.

The adjustment process is conducted in the same manner for all rack models:

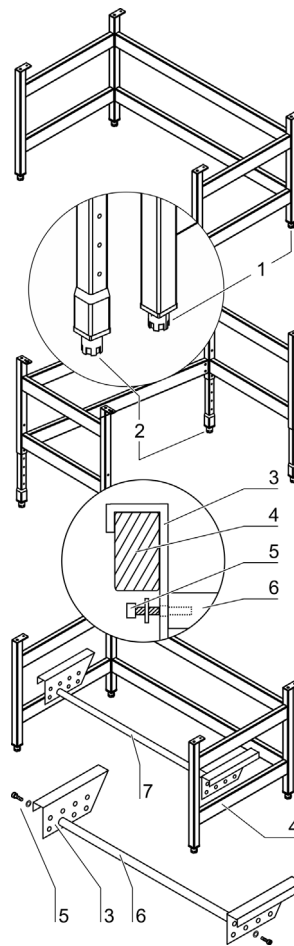


Figure 8. Leveling the device

1. Insert the work-plate(s) and place a bubble level onto the plate(s).
2. **Figure 8:** Rotate the stands [1] of the rack using a 24 mm wrench so that the work-plate is exactly horizontal in all directions. Perform the height adjustment of the device stands from left to right and from rear to front.

Assembling the footrest

Figure 8: The footrest [7] is attached to the two mounting brackets at the sides [3] in each of the lower crossbars [4] of both side frames. The height position and leg width of the support bar can be determined with the choice of the borings in the mounting brackets.

1. Threaded holes have been provided in the front ends of the bar [6]. Position the mounting brackets on the side [3] so that each of the splays point outwards.
2. Use the enclosed screws [5] to attach the mounting brackets on the side through the desired borings to the front ends of the bar.
3. Attach the footrest [7] so that the bevel of the mounting brackets at the side is facing toward the rear wall of the device.

Installation Maxisafe 2030i



Note: Shipping protection

The shipping protection [11] on the rack side members must be removed only after the device frame has been installed to the rack.

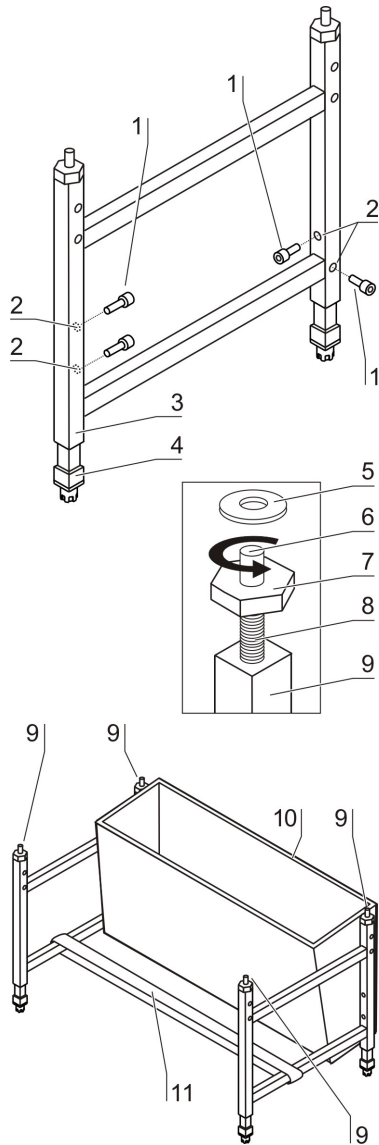


Figure 9. Installaion Maxisafe 1

1. Set the rack height: Pull the stands [4] out of the side member guides [3] to the desired height. Secure the height setting: At each pillar, insert the screws [1] fitted with their wedge lock washers through the openings [2] and tighten them.
2. Unscrew the threaded rods [8] using the hexagon disks [7] for approx. 10 cm until the stand height is identical at all four pillars.
The required wrench (size 24 mm) is part of the standard equipment.
3. Check the surrounding seal [10] of the prefilter housing.



Note: Seal condition

Do not use a damaged seal as otherwise the prefilter housing may not be sealed airtight against the safety cabinet floor. Make sure that the cross joints are absolutely tight against each other.

4. At each pillar insert a washer \varnothing 37 mm [5] into the locating pin [9]. The washers are part of the standard equipment.
5. Position the device frame into the threaded rods. Check to see if the locating pins [1] are exactly flush with their retainers at the lower device frame.

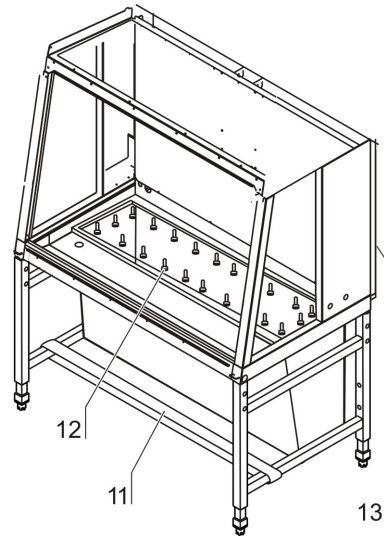


Figure 10. Installation Maxisafe 2

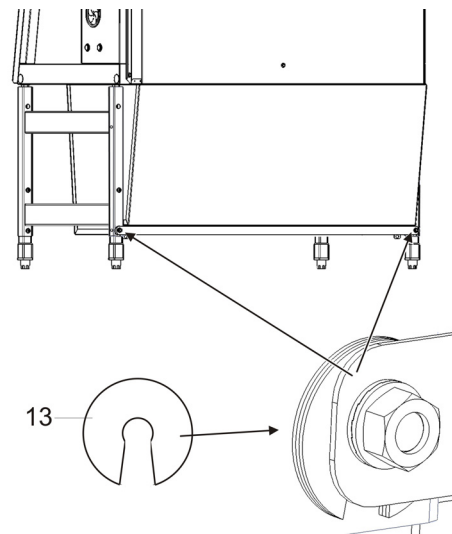


Figure 11. Installation Maxisafe 3

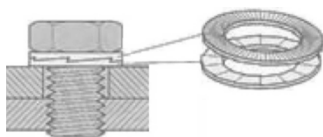
6. Screw the threaded rods into their columns in short, even rotations until they are located approx. 2 mm above the hexagon disk stop.

7. Install the retaining screws [12] loosely to the floorpan through the holes on the prefilter housing contact surface.
8. lower the lifting mechanism threaded rods all the way to the stop.
9. To assemble the prefilter housing swing open the front window manually.
10. Tighten the screws to seal the prefilter housing against the floorpan. The number of screws depends on the device version.
11. Insert 3 discs D35 [13] at each side under the rearside fixing rail.
12. Remove the shipping protection [11]



Note: Wedge lock washers

Wedge lock washers for the screws [1] should always be used in pairs of two as shown in the figure below.



Media connections

Installation points for media valves (optional) at the sample chamber rear panel



Note: Gas Lines

Work may only be conducted on the gas lines and gas components by qualified expert gas and air-conditioning personnel!

In order to avoid static charges, the supply connections (e.g., gas, water) must be attached to the integrated potential equalizer if needed.

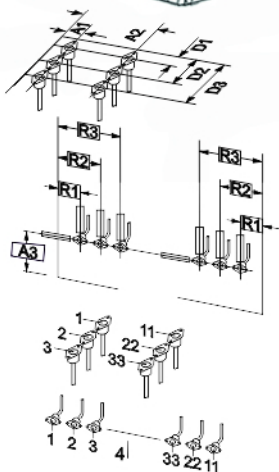
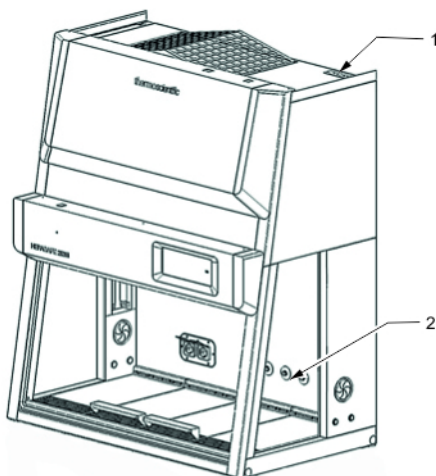


Figure 12. Installation points at the rear panel

Figure 12: The supply lines for media connections are pre-installed to the device frame and are routed to the sample chamber rear panel through the ceiling openings [1].

The connections can be positioned to the left [2] or right [3] of the rear panel.

The connections have been designed for the on-site connection of 3/8" threads.

The connections are suitable for the installation of laboratory fittings R 3/8". Upon delivery of the device, the connections are sealed with plugs and screwed-on bezels.

Distances at the device ceiling

A1	25 mm
A2	70 mm
D1	50 mm
D2	105 mm
D3	160 mm

Distances at the device rear panel

A3	150 mm
R1	370 mm
R2	470 mm
R3	570 mm

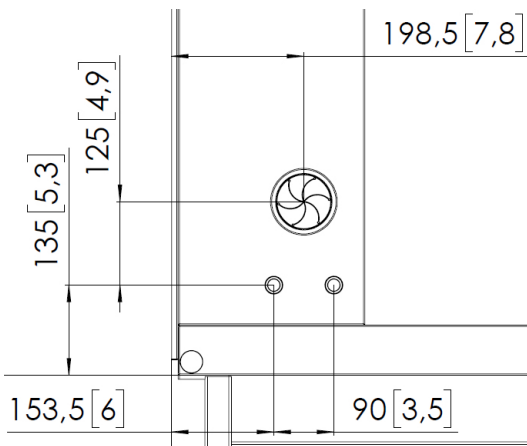
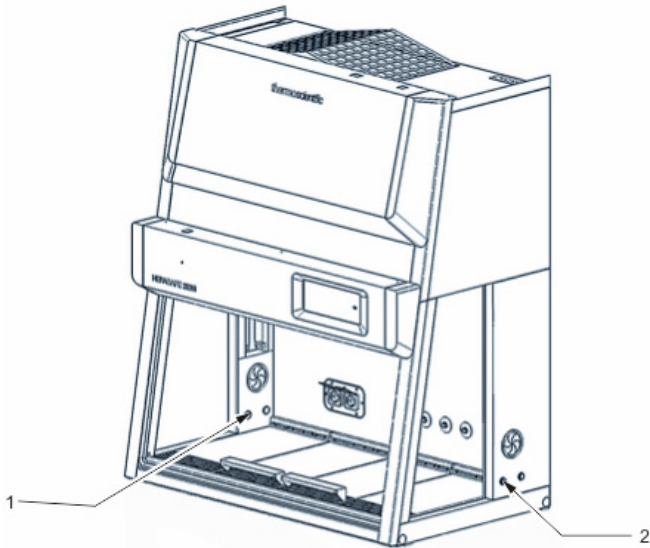
The media connection inlets and outlets are assigned according to a fixed pattern as shown in item [4].

Installation points at the sample chamber sidewalls

Item 170 (plug for lead-ins)

Item 180 (flat gasket for screw plug USA)

Item 310 (3/8" plug)



Dimensions: mm [inch]

Figure 13. Installation points at the sidewall

Figure 13: The standard equipment of the device comprises two lead-ins [1] and [2] per side-member. They can also be used for installing laboratory fittings R 3/8".

Upon delivery of the device, the lead-ins are capped tightly.

- Application in USA/Canada:
Interior plug and exterior safety glass screw connection
- Application in EU:
Exterior plug



Note: Media routing

The lead-ins must only be used for the installation of media valves if said installation is in accordance with the applicable national regulations.

Installing media valves

Item 320 (bezel)

Item 910 (wall bezel for media valve)

Installing media valves to the rear panel:

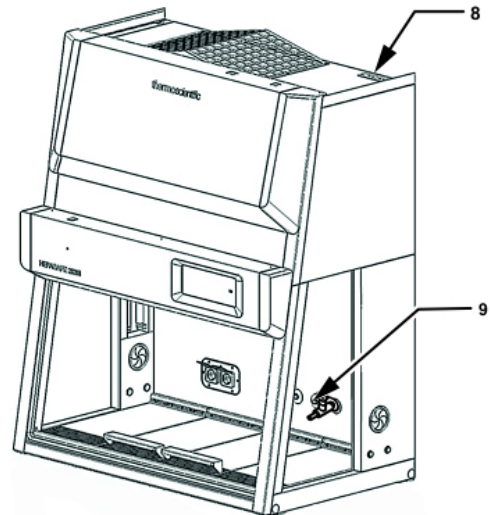
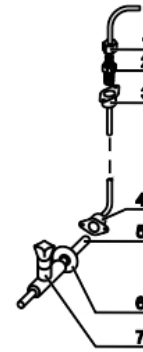


Figure 14. Media valve installation at the rear panel

The media valves at the device rear panel are screwed into the pre-installed connections.

1. Move the front window to the maximal opening position.
2. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
3. **Figure 14:** Unscrew the plug from the supply line at the rear panel of the sample chamber [9].
4. Slide the gasket [6] onto the threaded pipe [5] of the media valve [7].

5. Wrap the threaded pipe [5] of the media valve with sealing tape.
6. Screw the media valve into the threaded sleeve [4].
7. Check the screw connection for tightness.
8. Unscrew the plug from the supply line at the device ceiling [8].
9. Screw a threaded pipe with hexagon [2] into the receptacle [3] at the device ceiling and connect it to the media supply line using a union nut [1].

Installing media valves to the sidewall:

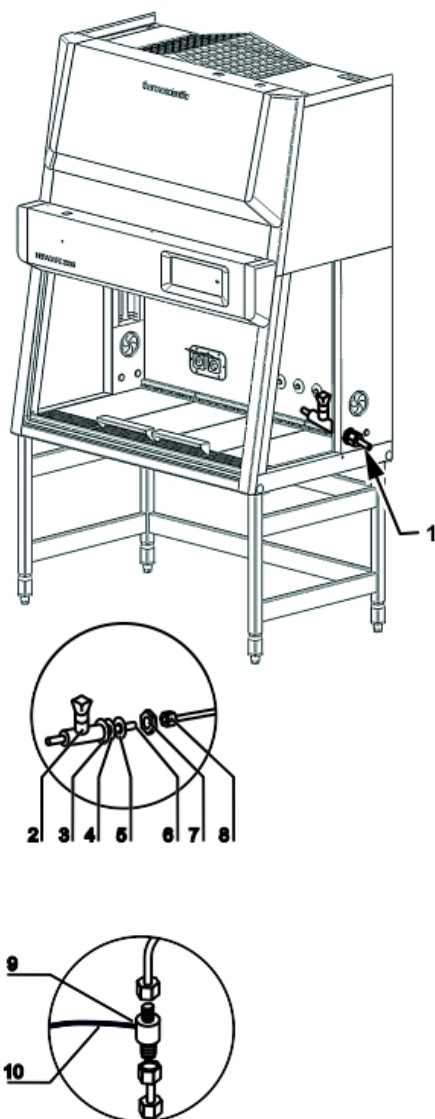


Figure 15. Installing media valves to the sidewall



Note: Media valves

This work may only be carried out by qualified personnel in accordance with the applicable national regulations.

Figure 15: The media valves are installed to the pre-installed lead-ins [1].

1. Move the front window to the maximal opening position.
2. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
3. Remove the plug from the sidewall lead-in or remove the plug and disconnect the PG screw connection.
4. Slide the gasket [4] and the bezel [3] onto the threaded pipe of the media valve [2].
5. From the inside of the sample chamber, push the media valve through the lead-in.
6. From the outside, slide the other gasket [5] onto the threaded pipe of the media valve.
7. Secure the media valve to the sidewall lead-in using the nut [7].
8. Connect the media supply line using a union nut [8].



CAUTION: Combustible gas

If combustible gas is to be supplied into the sample chamber, the media valve solenoid must be integral to the device control. The gas supply is controlled in a way that the gas supply is activated when the device is operational. The annex of these service instructions contains wiring diagrams for integrating the solenoid into the device control.

Installing the solenoid:

The solenoid is installed externally, either to the sidewall supply line or to the supply lines at the device ceiling.

1. Install the solenoid [9] into the supply line.
2. Connect the connecting cables [10] to the device control (see wiring diagrams in the annex).

Exchanging Smart Ports

Item 320 (bezel)



WARNING: Contamination

In order to prevent contaminated particles escaping from the utility chamber, the unit must be switched on in order to exchange the SmartPorts.

The SmartPorts are removed inwards into the utility chamber.

1. First, remove the inner grommet of the SmartPort in the utility chamber inwards from the side panel opening.
2. Then remove the outer grommet of the SmartPort in the utility chamber inwards from the side panel opening.
3. Disinfect both grommets in the utility chamber and take them out of the utility chamber.
4. Insert new outer grommet in the side panel opening from the outside.
5. Insert new inner grommet in the side panel opening from the inside.

Lamps

Replacing the LED tubes

Item 820 (LED tube)

Item 870 (light cover box)

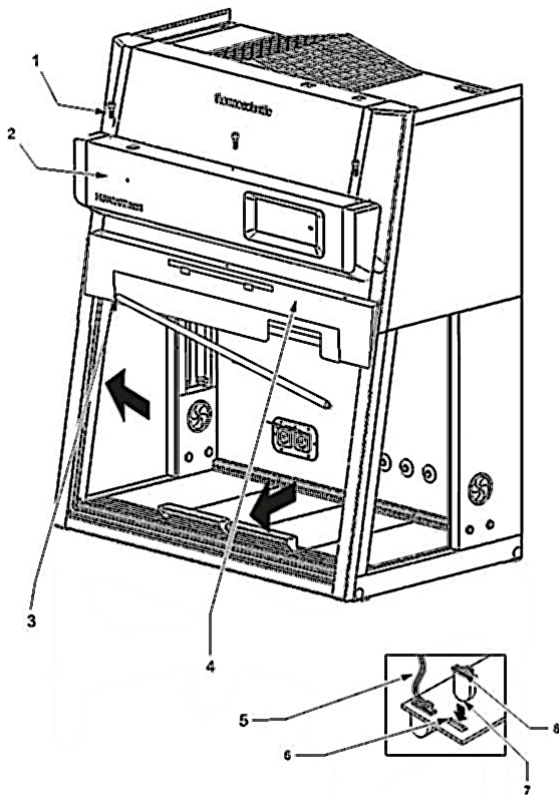


Figure 16. LED tube and socket replacement

The sample chamber is illuminated by two LED tubes [3]. The sprung tube sockets are installed at the front door mounting frame [4].

1. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
2. Remove the retaining screws [1] from the light cover box [2], disconnect the grounding cable and remove the cover box.
3. The LED tubes are mounted in rotating sockets. Rotate the tube carefully into the removal position, then remove it from the socket.
4. Insert the new tube and rotate it into the working position.
5. Position the light cover box at the mounting frame, connect the grounding cable and secure it using the retaining screws.

Replacing the LED tube sockets

Items 440, 450 (LED tube sockets)

Figure 16: The sockets [7] of the LED tubes are secured to the recesses [6] in the mounting frame by the retainers [8].

1. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
2. Remove the retaining screws [1] from the light cover box [2], disconnect the grounding cable and remove the cover box.
3. Disconnect the wires of the socket (see Annex C, Wiring Diagrams).
4. Remove the LED tubes.
5. Disengage the retainer [8] from the recess [6] and lift the socket up through the recess.
6. To install, insert the new socket through the mounting frame recess and push the socket retainer [8] into the recesses so that the socket is secured to the panel.
7. Connect the connecting cable [5] to the socket.
8. Install the LED tubes.
9. Position the light cover box at the front door mounting frame, connect the grounding cable and secure it using the retaining screws.

Replacing UV lamps

Item 110 (UV lamp)

Item 950 (bezels)

Item 100 (rotating socket UVC)

Figure 17: The optional, device-integral UV lamps [1] are installed in two units [2] each behind the bezels [3] at the sample chamber sidewalls.

To ensure consistent UV radiation, always replace the entire lamp unit.

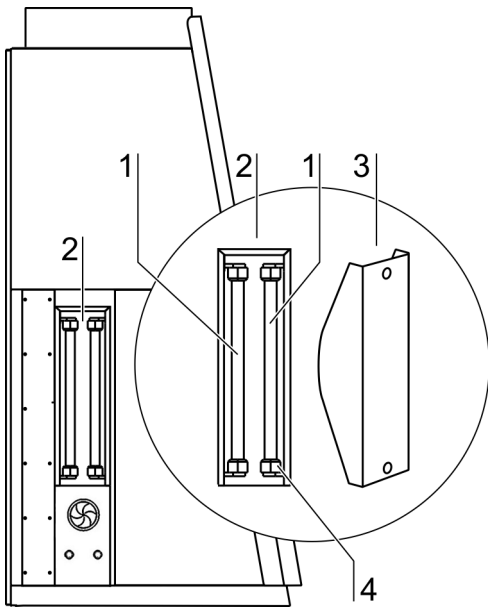


Figure 17. UV lamp replacement

1. Unlock the front window and turn it up.
2. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
3. Remove the bezels [3] from the sample chamber sidewalls.
4. The UV lamps are installed in rotating sockets [4]. To remove, rotate the lamp counterclockwise to disengage the latch and remove the lamp from the sockets.
5. To install, slide the lamp pins into the groove of the rotating socket and rotate the lamp clockwise to engage the latch.

Replacing the UV lamp power supply unit

Item 40 (power supply units)

Item 50 (terminal)

Items 60, 70 (interior chamber shrouds)

Items 1110, 1120 (work-plates)

Item 190 (sealant)

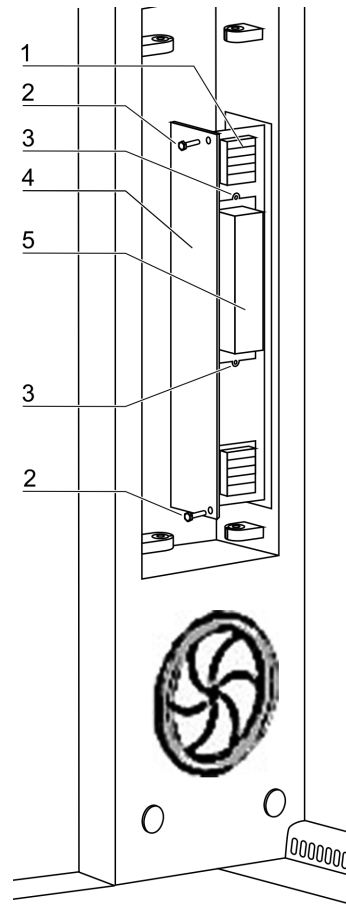


Figure 18. UV lamp power supply unit replacement

Figure 18: The two power supply units [5] for the device-integral UV lamps are installed to the insert bezels [4].

1. Unlock the front door and turn it up.
2. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
3. Remove the UV lamp.
4. Remove the two retaining screws [2] of the insert bezel [4] and slide the insert bezel out only so far that the power supply unit [5] is accessible.
5. Disconnect the wiring from the terminal [1], remove the two power supply unit retaining nuts [3] and remove the power supply unit from the insert bezel.
6. Secure the new power supply unit to the insert bezel using the nuts and connect the wiring.
7. Push the insert bezel back into the slot and secure it using the two screws.
8. Install the UV lamp.

Internal outlets

Replacing outlets for accessories

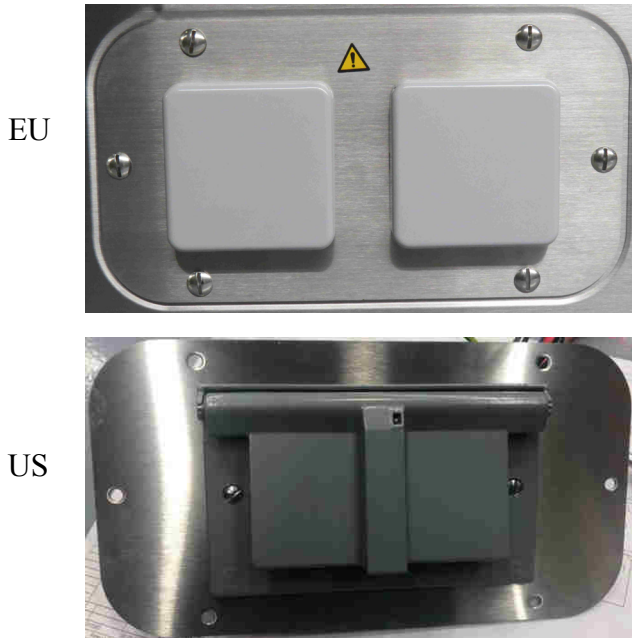


Figure 19. Internal Outlets

Items 80, 90 (outlet)

Item 190 (sealant)

Figure 19: Inside the sample chamber are two outlets (max. overall current 5 A) installed for the power supply of accessories.

1. Unlock the front door and turn it up.
2. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
3. Remove the 6 screws and take out the outlet box.
4. Remove the connecting plug.
5. Connect the plug to the new outlet box.
6. Insert the new outlet box and screw it with the 6 screws.



Figure 20. Outlet rear side

Display panel

Replacing the Display (GUI)

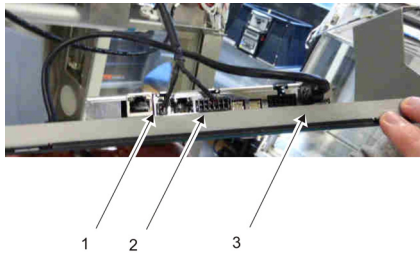
Item xxx (Display - GUI)

1. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection
2. Remove the light cover (see **Replacing the LED tubes**).

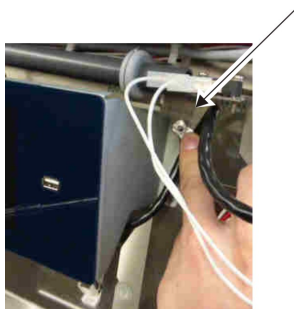


Figure 21. GUI replacement

3. Remove the 4 screws.



4. Disconnect the bus cables [1], [2] and [3].
5. Take new GUI and plug-in the cables [1] to [3].



6. Screw-in the for screws and take care that the connecting link is screwed properly.
7. Install the light cover (see **Replacing the LED tubes**).



Figure 22. Display rear side



Note: Software GUI / Touch Display

For Thermo Direct Service: The current Software-Version could be downloaded on PSM database.

For authorized dealer and distributor service: The current Software-Version could be downloaded on Basic Knowledge base (Talisma).

Non-Thermo Direct Service have to contact the national Thermo service organization.

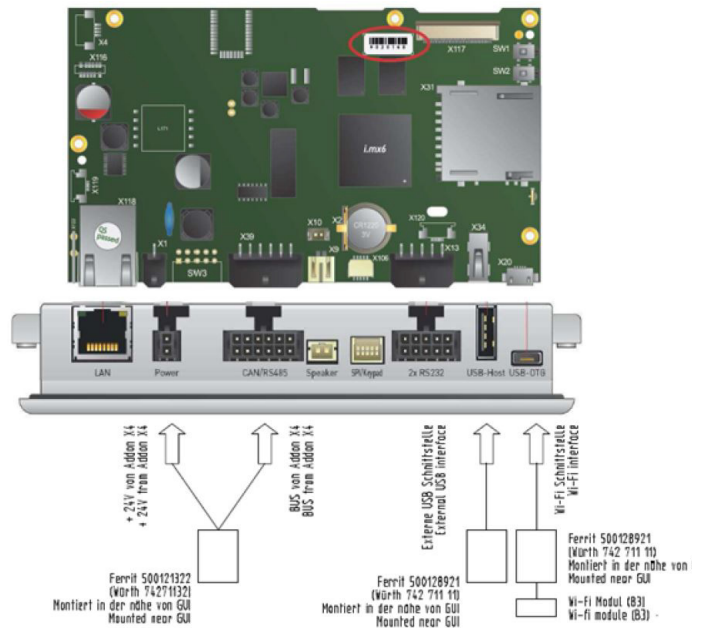


Figure 23. Display connections

Replacing the rocker switch

Item 770 (rocker switch)

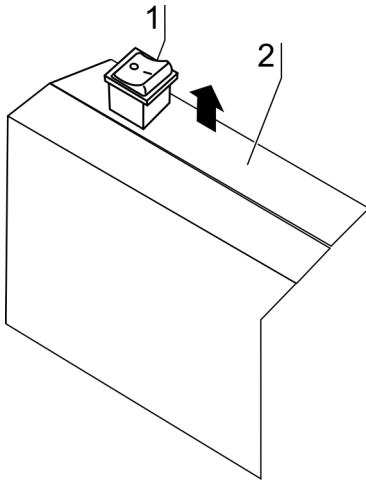


Figure 24. Pilot switch replacement

1. Lower the front window completely.
2. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
3. Remove the light cover (see **Replacing the LED tubes**).
4. Disconnect the connecting cable pins.
5. **Figure 24:** The switch [1] is merely plugged into the mounting frame [2] and can be lifted off.



Figure 25. Rocker switch

Side window

Replacing the side window

Item 30 (side window)

Item 190 (sealant)

Item 900, 910 (metal shroud)

Item 920 (adhesive tape)

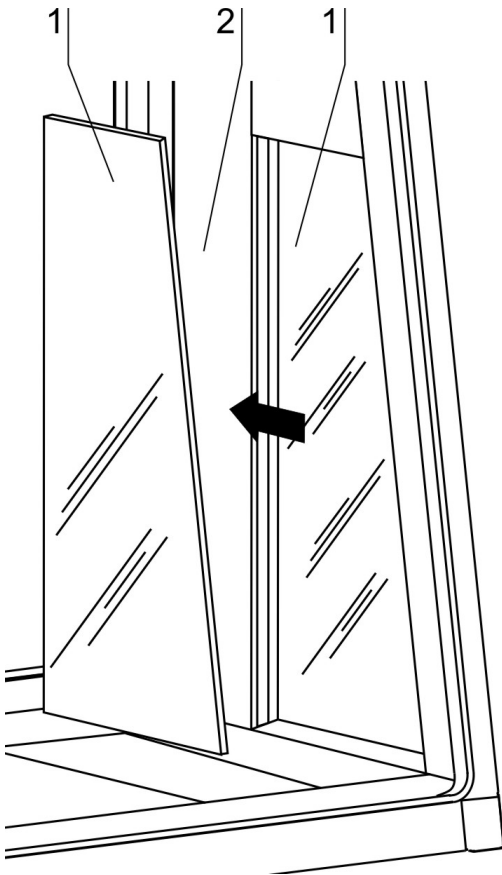


Figure 26. Side window replacement

Figure 26: The side window [1] is secured to the housing frame using sealant.

Use only compound glass for glazing the side window.

1. Turn the front door up.
2. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
3. Remove the work-plates from the sample chamber and remove the perforated plate (filter protection) from the sample chamber ceiling (see **Filter application**).
4. Remove the sample chamber cover retaining screw (above the perforated plate projection).

5. Separate the joint at the sample chamber side cover [2] at the housing frame using a thin blade and remove the cover.
6. Separate the joint at the side member and at the housing frame around the window.
7. Pull the window rearward out of the side-member bevel.
8. Clean the side-member and housing frame edges thoroughly and remove any sealant residues. The contact surfaces of the glass window must be grease and dust-free.
9. The window must be fixed at several points to ensure that it will not shift when sealed during the installation. Fix the window at the lower edge and at the beveled edge at several points using double-backed adhesive tape.
10. Push the window into the bevel cover and press it on at the fixing points. Ensure that the window contacts the frame evenly and is not canted.
11. Seal the inner and outer joints at the housing frame first, then position the sample chamber cover [2], secure it using the screws and seal it on the inside against the housing frame.
12. Remove any excess sealant from the joints.
13. Allow the sealant to cure.

Filter components

Filter application

The procedures and measures that have to be considered for filter replacement depend on the application of the device and on the substances processed within the safety cabinet.



CAUTION: Caution: Toxic substances

If toxic substances were processed, the device has to be decontaminated properly prior to any filter replacement. In this case, none of the filters can be reused and must, therefore, be discarded in accordance with the applicable national regulations for the disposal of special waste.

If the device was used for harmless applications (e.g. dust protection), the suction filter can be reused after it has been cleaned.



CAUTION: Competence certificate

As filter replacement is regarded as an interference with the safety system of the device, this work must only be carried out by the Technical Service of Thermo Electron LED or by specially trained and authorized service personnel.



Note: Certificate of non-objection

If disposal of the device is delegated to a third party, the operator must make sure that this third party is in possession of the applicable licenses or permissions. The operator must receive a certificate of non-objection as a confirmation of proper disposal, including the proper disinfection of the device.



CAUTION: Contamination hazard!

As the safety cabinet can be used for processing infectious substances and materials, the device or device components may become contaminated.

Observe the hygiene regulations of the operator:

- Prior to inspections or repairs, check to see if the device has been cleaned and disinfected.
- Wear safety gloves.
- Wear safety goggles.
- Wear mouth and nose protection to protect the mucous membranes.
- Prior to repairs, inquire about potential infection hazards.
- Toxic or pathogenic substances or any residues thereof must have been removed completely.
- Ask the operator for a certificate of non-objection with indications to the execution of the decontamination measures.



Note: Correct transport of HEPA filters

- The filters must always be stored and transported upright vertical especially during transport in the service vehicle. Never transport or store flat.
- Please handle the filter carefully

Transportation only upright!



Installing/removing the perforated panel (filter protection)

Items 960-990 (perforated panel)

Items 970, 980 (screw with locking)

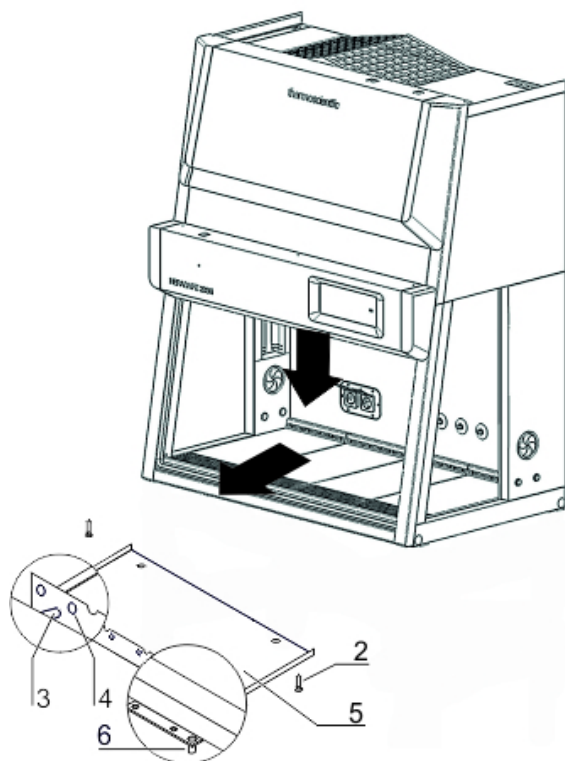


Figure 27. Perforated panel (filter protection) installation/removal

The perforated panel [5] protects the down-flow filter at the sample chamber ceiling [1] from damage and controls the flow behavior of the air that flows from the down-flow filter into the sample chamber.

The front end of the panel is attached to several locating pins, the rear end toward the sample chamber rear panel is secured with two screws to the housing frame.

1. **Figure 27:** Remove the two screws [2], tilt the perforated panel [5] slightly, disengage its front end from the locating pins [3] and remove the panel.
2. To install, align the six holes [4] at the panel front end with the locating pins [3].
3. Secure the perforated panel to the threaded bushings [6] of the panel retainers using the two screws [2].

Removing/installing the front cover

Item 830 - 860 (cover)

Item 350 (gaskets)

The assemblies of the device electronic system and of the sample chamber illumination as well as the filter and plenum blower assemblies (blower chamber) are accessible only from the front.

To access the assemblies, the following covers must be removed:

1. Remove the front cover
2. Remove the plenum cover

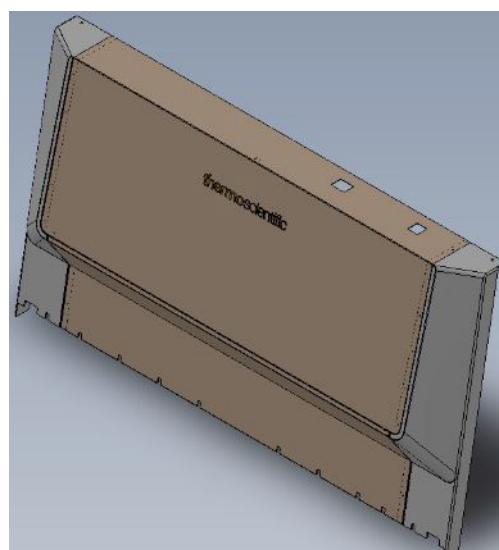


Figure 28. Front cover

1. Lower the front window completely.
2. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
3. Remove the light cover as required (see **Replacing the LED tubes**).
4. **Figure 28:** Remove the screws at the upper side of the plenum.
5. Disconnect the grounding cable.
6. Remove cover panel.
7. When re-installing the cover panel, check that the hooks [1] and the cut-outs [2] fit.
8. Screw-in the screws at the upper side.

Removing/installing the front cover

Item 830 - 860 (cover)

Item 350 (gaskets)

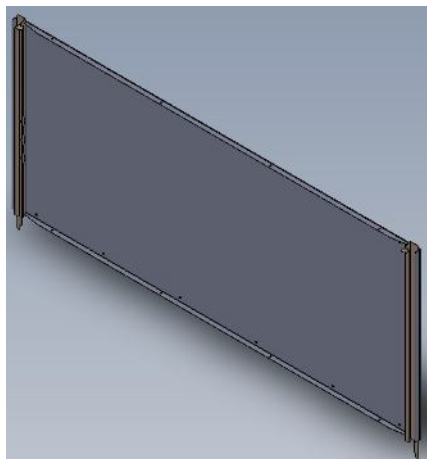


Figure 29. Front cover

1. Remove the cover retaining screws [2] and remove the cover panel.



Note: Seal condition!

Prior to installing the cover panel, check the flat seal for damage and replace it as required.

2. Clean the contact surfaces of the seal at the cover panel.
3. Install the plenum cover panel and tighten the retaining screws by hand.

Replacing the front cover seal:

4. Remove the old seal using a putty knife.
5. Thoroughly clean the contact surfaces of the seal at the device frame.
6. Remove the backing tape from the self-adhesive flat seal, then attach the new flat seal so that the joints are absolutely tight in the corners.

Replacing the exhaust filter

Item xxx (exhaust filter)

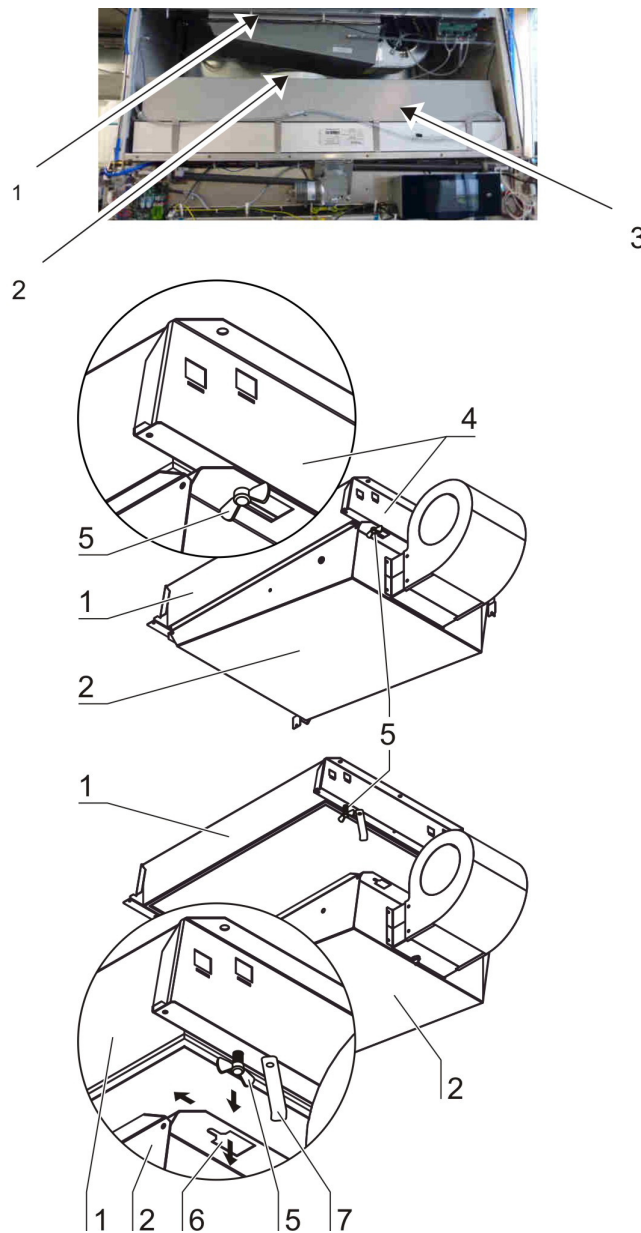


Figure 30. Exhaust filter replacement

The exhaust filter [1] is installed immediately onto the exhaust plenum [2]. The exhaust plenum is secured with four wing nuts [5] to the two ceiling moldings [4].

When the exhaust plenum is removed, spring plates [7] retain the exhaust filter in its mounting position.

1. Switch the device off, disconnect it from the power supply system, and protect it against accidental reconnection.
2. Remove the light cover.
3. Remove the front cover.
4. Remove the plenum cover.

- Remove the exhaust blower and place it onto the down-flow plenum [3].
- Remove the wingnuts [5] so that the exhaust plenum [2] can be shifted below the ceiling moldings [4].
- Slide the exhaust plenum slightly forward so that the wingnuts can be routed through the notches [6] and the exhaust plenum can be lowered. Remove the exhaust plenum from the safety cabinet.
- Turn the spring plates [7] that retain the exhaust filter aside, lower the exhaust filter, and remove it.



CAUTION: Crushing hazard

The spring plates are made of pressed sheet metal. Their edges may cause cuts.

Wear safety gloves!

- Discard the exhaust filter properly.
- Check the replacement filter seal for perfect condition. Insert the replacement filter into the ceiling mouldings [4] and secure it using the spring plates.
- Install the exhaust plenum to the wing nuts and push it backward. Tighten the wing nuts on all sides. The filter seal must be level at the exhaust guide upper frame and at the exhaust plenum frame.
- Install the exhaust blower.
- Install the covers.

Replacing the down-flow filter

Item 290 (down-flow filter)

Item 250 (pressure profile)

Item 205 (screws)

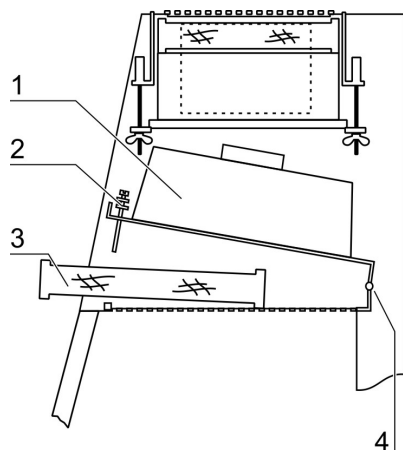


Figure 31. Down-flow filter replacement

Figure 31: The down-flow filter [3] is located below the down-flow blower plenum. The plenum has a hinge [4] at its back and can be swivel upward with the blower after the exhaust plenum has been removed (see **Replacing the exhaust filter**).

- Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
- Remove the plenum cover and the front door bezel (see **Removing/installing the front cover**).
- Remove the down-flow plenum [1] retaining screws [2].
- Remove the pressure profiles, lift the down-flow plenum, then pull the down-flow filter [3] forward and discard it properly.
- Disconnect the pressure mouldings [5], then tilt the downflow plenum [2] up and secure it by inserting e.g. a screwdriver [10] through the holes of the U-shaped moulding [9] into the side panel openings [8].

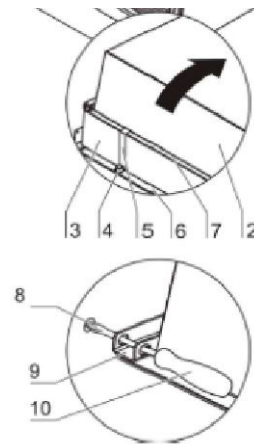


Figure 32. Down-flow plenum

- Insert the new filter so that the side with the filter description is visible. Check to see if the filter gasket is OK.
- Install the pressure profiles and secure them using the retaining screws. The filter gaskets must be flush with the lower sealing frame [1] and with the down-flow plenum frame [2].
- Install the plenum cover and the front door bezel (see **Removing/installing the front cover**).



CAUTION: Correct transport of the HEPA filters

- The filters must always be stored and transported upright vertical especially during transport in the service vehicle. Never transport or store flat.
- Please handle the filter carefully

Transportation only upright!



Figure 33. HEPA filter transportation

Replacing the pre-filter

Item 3790 (pre-filter elements)



Note: Filter set

When replacing pre-filters, always replace the entire pre-filter element set.

Figure 34: Each pre-filter element [1] is retained in the recess [3] of the floor-pan by two frontal retaining clips [7]. When the filters are to be replaced, a sufficient number of suited disposal containers [2] for the contaminated pre-filter elements must be available.

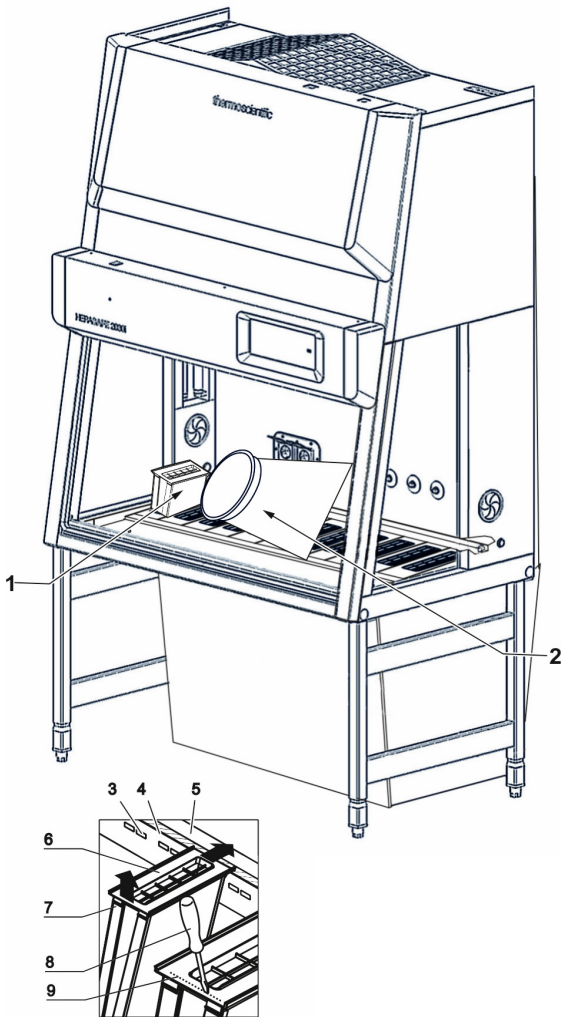


Figure 34. Pre-filter replacement



CAUTION: Contamination hazard

If contaminated with cytostatic agents:

- Seal filter openings using foils and tape.
- Stow the pre-filter elements in the sample chamber into the disposal container and store them temporarily in the external cytostatic agent container.

If contaminated with microbiological substances:

- Store the pre-filter elements temporarily directly in the external disposal container.

When removing the pre-filter elements, proceed from left to right.

1. Remove the work-plate(s) from the sample chamber.
2. **Figure 34:** Remove the first pre-filter element [1] at the left side of the sample chamber: Press the filter plate [6] against the rear panel so that the retaining clips [7] on the opposite side disengage from the recess and the filter element can be lifted. If the clamping force is excessive, disengage the first pre-filter element: Perforate the rupture joint [9] at the filter plate [6] using a screwdriver [8] (or a similar suited instrument) so that the retaining clips can be pushed out of the recesses [3].
3. To remove the remaining pre-filter elements, press the retaining clips out of the floor-pan recess and lift the pre-filter elements out of the floor-pan.
4. Seal the filter plate opening tightly using foil and tape. Stow all pre-filter elements individually air-tight into the disposal container in the sample chamber.
5. Check the surrounding seal [4] for damage or wear.
6. Replace the seal if required: Remove the self-adhesive seal from the floor-pan and remove sealing foil residues completely.
7. Clean the contact surface for the seal at the floor-pan mounting frame [5] so that the surrounding sealing surface is dust- and grease-free.
8. Remove the backing tape, attach the seal and press it on.
9. Attach the additional seal strip [11] at filter plate level to the sample chamber right sidewall so that the corresponding long side of the right pre-filter element is sealed against the sidewall.
10. Insert new pre-filter elements. The filter plates [6] are must be installed in an pattern from right to left: Press the pre-filter elements against the floor-pan so that the retaining clips [7] engage in the recesses [3].
11. Install the work-plate(s).

Installing and Replacing the Pre-Filter Sealing Tape

Item C Adhesive sealing tape roll 6.5 M

Item D Adhesive sealing tape roll 10 M

Construction sealing tape

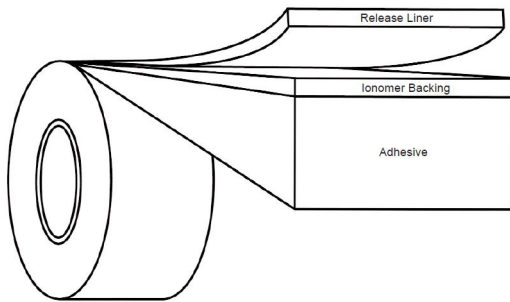


Figure 35. Construction sealing tape

Construction	Description
Release Liner	Matte, translucent polyester film
Ionomer Backing	Acrylic and ethylene copolymer
Adhesive	Multi-purpose acrylic



Note: Release liner

The release liner must be removed after bonding and before pasting over the sealing tape.

Storage

Store in original cartons at 40-100°F (4-38°C) and 0-95% relative humidity. Optimum storage conditions are 72°F (22°C) and 50% relative humidity.

Shelf Life

When stored under proper conditions, product retains its performance and properties for 24 months from date of shipment (US), 12 Months from date of delivery (DE).

Preparing the surface

The first step in making a successful seal is to prepare the surface for bonding. At a minimum, this means making sure the bonding surface is clean of all contaminants. For most surfaces, cleaning with a 50:50 mixture of isopropyl alcohol* (IPA) and water works well. If the substrate is contaminated with heavy oils or grease, a degreaser or strong solvent may be used to remove the oil, but a final wipe of IPA/water should be used.

Application Temperature

Ideal tape application is accomplished when temperature is between 70° and 100°F (21° and 38°C). The tape generally reaches full bond strength after 24 hours but provides a seal immediately. Tape application to surfaces at temperatures below 50°F (10°C) is generally not recommended. Once properly applied, low temperature holding is generally satisfactory.

Applying the Sealing Tape



Note

Wear gloves to keep the adhesive surface grease-free.

The sealing tape has a release liner on the backing side of the tape. To avoid over-stretching, this liner is usually left on while laying down the tape.

Order of bonds

1. Cleaning



Figure 36. Cleaning surface

- Clean all filter and metal surface

2. Outside between wall and pre-filter



Figure 37. Outer sealing

- Place seal tape so that it do not cover the silicone sealing.
- Push with a scraper the sealing tape to the edge of the pre-filter



Figure 38. Scraper

- Press with the scraper the sealing tape on the pre-filter without encased bubbles.



Figure 39. Remove outer release liner

- Remove release liner.

3. Between the filters

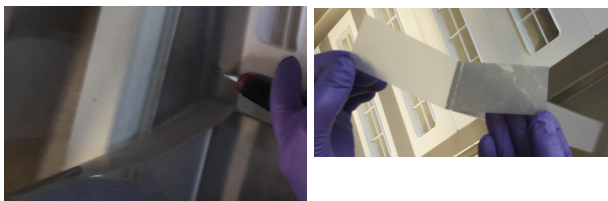


Figure 40. Apply inner release liner

- Place the sealing tape in the middle between 2 pre-filters and cut the tape so, that the metal surface is not damaged
- Remove release liner.
- Repeat the step for all pre-filters.

4. Above and below the pre-filters



Figure 41. Apply upper sealing

- Place the sealing tape so that it overlaps tight in the corner.



Figure 42. Apply upper sealing

- Place the sealing tape that it covers pre-filter and metal surface each 15 mm.

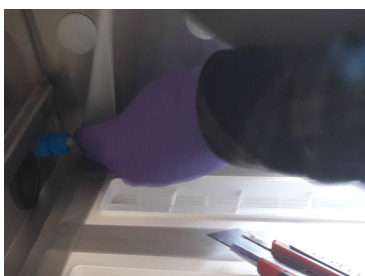


Figure 43. Apply upper sealing

- Cut the sealing tape so that the sealing overlaps in the corner.

- Push with a scraper the sealing tape to the edge of the pre-filter.



Figure 44. Apply lower sealing

- Press with the scraper the sealing tape on the pre-filter without encased bubbles.



Figure 45. Remove release liner

- Remove release liner from upper and lower sealing tape.



Figure 46. Pre-filter sealed

Following disinfection agents can be used for cleaning taped sections after installation:

Ethanol 70%

Iso-Propanol

Barrycidal respectively Fermacidal (Trade names - means contain quaternary ammonium compounds)

Na-Hypochlorite 0,5% (chlorine-containing disinfectant)

Hydrogen peroxide 30% (H₂O₂ - strong oxidizing or bleaching agent)



Note: UV-C light

If UV-C light is used to disinfect the working space it is recommended to let the floor pan installed.

Also following agent or similar can be used:



Figure 47. Cleaning agent

- Remove the rest of the sealing tape partly by stretching the tape pulling it in angle of approx. 30% and grab forward after certain length.



Figure 52. Remove sealing tape

Removing the sealing tape

Cut the sealing tape around the entire pre-filters.



Figure 48. Cut sealing tape around pre-filters

- Cut the sealing tape between the pre-filters.



Figure 49. Cut sealing tape between pre-filters

- Remove the pre-filters and put them in a tight closed bag.
- Move back and forth until clips are free



Figure 50. Take out the pre-filters

- or bounce out the lids and loosen the clips with a screw driver.



Figure 51. Take out the pre-filters

Blowers

Replacing the exhaust blower

(only Maxisafe 2030i)

Item 200 (exhaust blower)

Item 205 (screw)

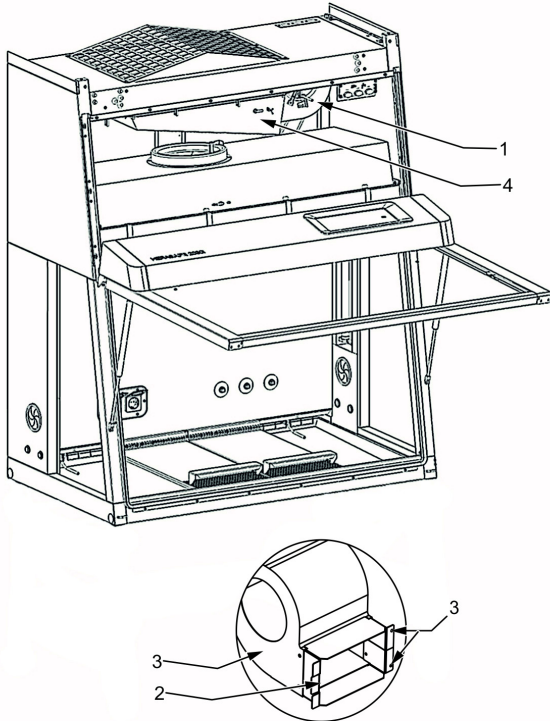


Figure 53. Exhaust blower replacement

Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.

1. Remove the front door cover and the plenum cover (see **Removing/installing the front cover**).
2. Disconnect the blower wiring in the control box and remove it from the control box.
3. Remove the four retaining screws [3] and remove the exhaust blower from the exhaust plenum housing [4].
4. Install the exhaust blower [1] into the exhaust plenum housing so that the lower edge of the exhaust connection plate is placed inside the plenum.
5. Secure the exhaust blower to the housing using the three screws.
6. Route the wiring through the recesses to the control box and connect it. Make sure that the lead-in seals are tight in the recesses.

7. Install the front door bezel and the plenum cover (see **Removing/installing the front cover**).



Note: Exhaust blower replacement

The exhaust blower is installed into the exhaust plenum housing so that the upper edge of the exhaust connection plate is placed inside the plenum and secure blower using 4 screws. For blower replacement, only 3 screws must be used.

The upper screw behind the blower is not needed anymore!

Blower Calibration

- Needed after each board or blower replacement!
- This function must be performed after the blower or main PCB replacement. The function is selected via Field Certification screen. After the functional level has been selected, the test starts automatically and the blowers are disabled. After a waiting period of 1 minute, the display shows calibration complete.
- If this display is confirmed, the currently measured value is saved and the blowers are re-enabled.



Note: Blower calibration with an external exhaust system

The external exhaust system has to be shut-off prior to blower calibration.



Note: Noise reducing filter grid

In Maxisafe 2030i 1.8 versions a noise reducing filter grid is installed

Replacing the down-flow blower

Item 240 (down-flow blower)

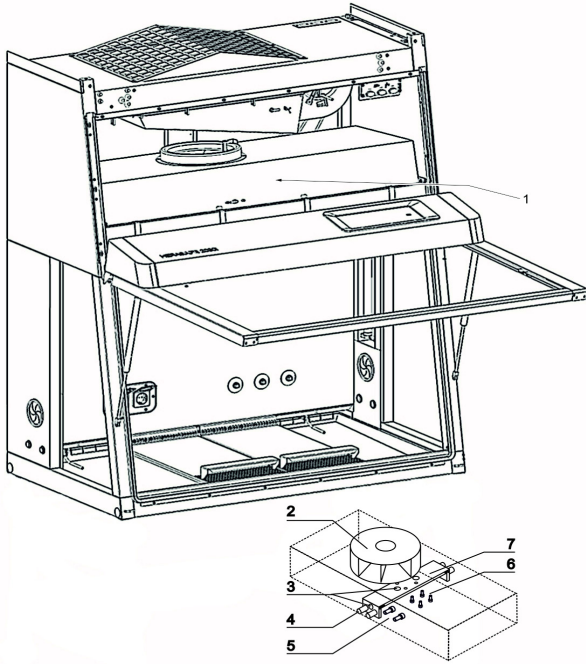


Figure 54. Down-flow blower replacement

Figure 54: The down-flow blower [2] is mounted to a cross-member [7] in the down-flow plenum [1].

1. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
2. Remove the front door cover and the plenum cover (see **Removing/installing the front cover**).
3. Disconnect the blower cable in the control box and remove it from the control box.
4. Remove the down-flow filter and the exhaust filter (see **Replacing the exhaust filter** and **Replacing the exhaust filter**).
5. Swivel the down-flow plenum upward, remove the four retaining screws [5] from the threaded sleeves [4] and remove the blower/cross-member assembly from the plenum.
6. Secure the new blower to the cross-member using the four retaining screws [6] and install the cross-member to the inner side of the down-flow plenum.
7. Install the down-flow filter and the exhaust filter (see **Replacing the exhaust filter** and **Replacing the exhaust filter**).
8. Route the cable through the recesses [3] to the control box and connect it. Make sure that the cable lead-in seals are tight in the recesses.

9. Install the front door cover and the plenum cover (see **Removing/installing the front cover**).



Note: Exhaust blower replacement

The exhaust blower is installed into the exhaust plenum housing so that the upper edge of the exhaust connection plate is placed inside the plenum and secure blower using 4 screws. For blower replacement only 3 screws must be used.

The upper screw behind the blower is not needed anymore!



Note: Blower calibration with external exhaust system

The external exhaust system has to be shut-off prior blower calibration.

Flow grid Maxisafe 2030i 1.8

For noise reduction the Maxisafe 2030i 1.8 has 2 flow grids installed.

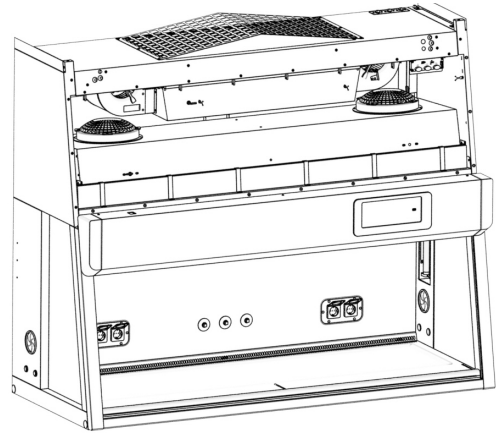


Figure 55. Flow grid positions

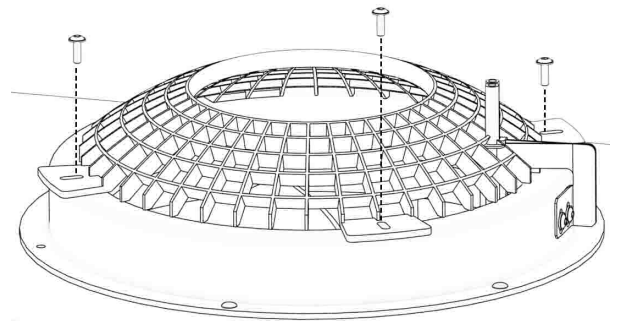


Figure 56. Flow grid Maxisafe 2030i 1.8

The flow grid is fixed with 3 screws at the downflow fan.

Pressure sensors

Replacing pressure sensors

Item 260 (pressure sensor)

Item 270 (test hose plug)

Item 275 (test hose plug connection)

Item 280 (label set, Exhaust/Supply)

Item 990 (hose)

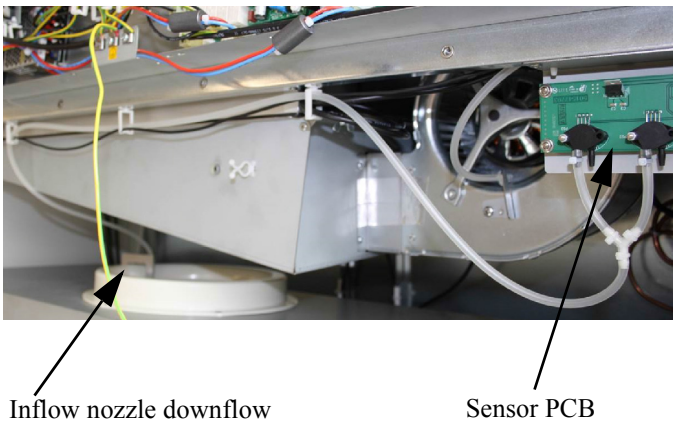


Figure 57. Pressure sensor replacement

Figure 57: The pressure switches for the exhaust air [4] and for the down-flow air [2] are installed to a plate at the plenum chamber ceiling [9].

1. Remove the front door cover and the plenum cover (see **Removing/installing the front cover**).
2. Disconnect the connecting cable [1] and the air hoses [6] and [7].
3. The pressure sensors are merely inserted into the mounting [3] and must be lifted for removal.
4. Insert the new pressure sensor into the mounting, connect the exhaust air hose [6] to the connecting sleeve [5] and the down-flow air hose [7] to the connecting sleeve [8].
5. Connect the connecting cable connector to the plug-in contacts.
6. Install the front door cover and the plenum cover (see **Removing/installing the front cover**).



Note: Airflow alarm

When an airflow alarm occurs, first turn off the fans, wait a few minutes and then restart.

Sensor PCB

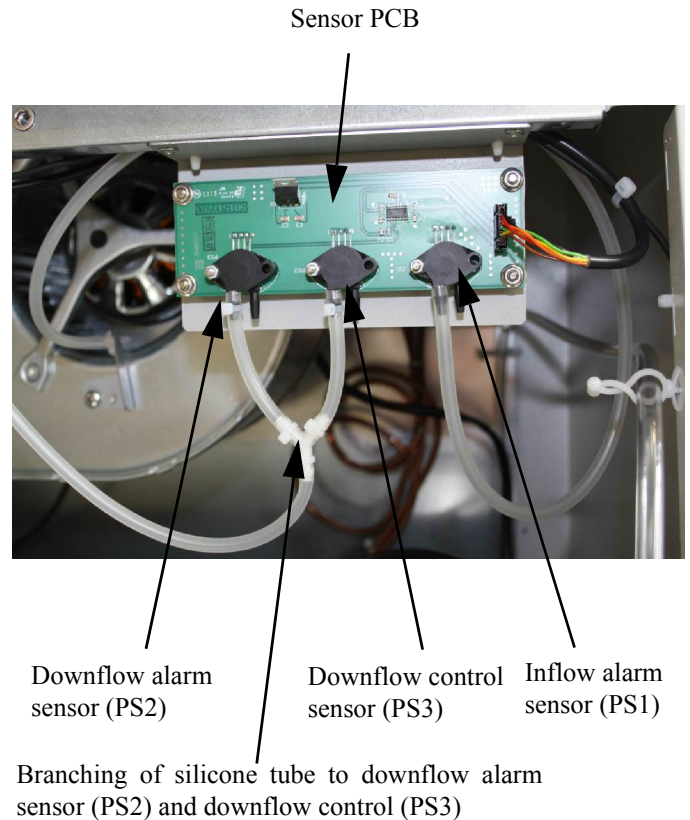


Figure 58. Sensor PCB

Inflow alarm sensor

Assembly of silicone tube (to PS1) and pipe tip on IF-blower. metal bracket is clinched.

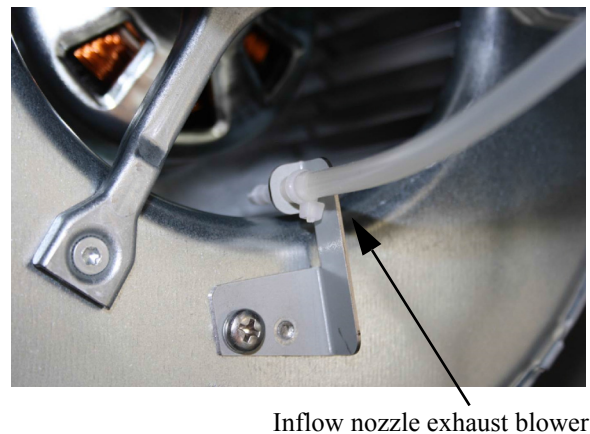
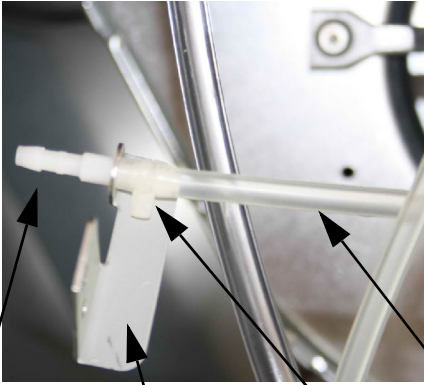


Figure 59. Inflow alarm sensor

Pipe tip

Mounting of silicone tube (to PS1) and pipe tip on metal bracket for inflow blower.



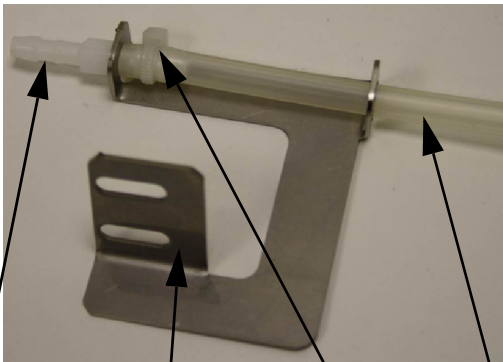
Pipe tip Exhaust metal bracket Cable strap Silicone tube

Figure 60. Pipe tip

Rectangular cutting edge of tube, Mount all 3 parts together without clearance, Fasten tube with a small cable strap.

Pipe tip downflow

Assembly of silicone tube (to PS2 and PS3) and pipe tip on DF-bracket fastened with cable strap.

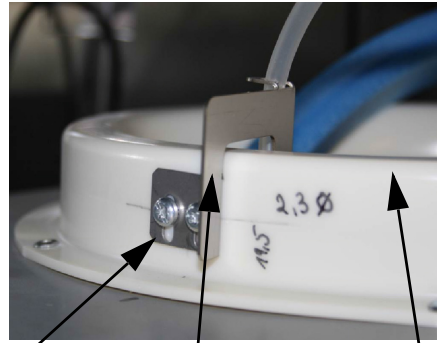


Pipe tip Downflow metal bracket Cable strap Silicone tube

Figure 61. Pipe tip downflow

Downflow nozzle

Mounting of DF bracket assembly at Df-fan nozzle.



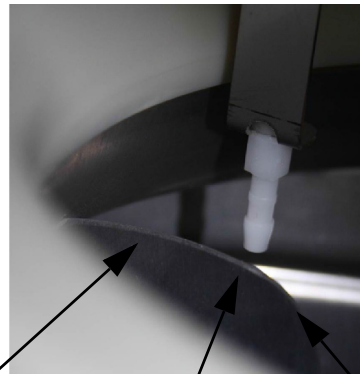
Long holes Downflow metal bracket Inflow nozzle of downflow blower

Figure 62. Downflow nozzle

Adjust DF-bracket by using long holes for precise positioning of pipe tip. Bend upper hose guide flap manually.

Pipe tip downflow impeller fan blade

Positioning of tube tip close to the DF impeller blade with clearance of approximately 2mm, not more than 3mm.



Pipe tip Clearance up to 3 mm max. Downflow impeller fan blade

Figure 63. Pipe tip downflow impeller fan blade

Fan blades must not get in contact with pipe tip. Check for proper position by rotating impeller manually.

Front door components

Replacing the front door assembly

Item 370 (sleeve)

Item 380 (hinge bolt)

Item 390 (bearing shell shim ring)

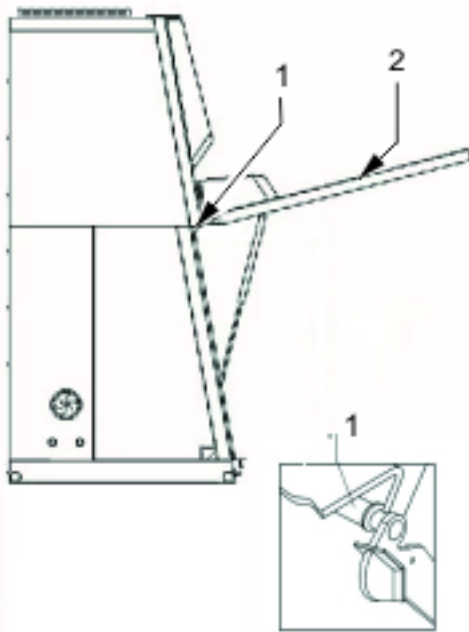


Figure 64. Front door hinge

Figure 64: The hinge bolts secure the front door [2] to the two hinges [1] of the device frame. The hinge bolts are offset and installed from the inside out into the hinge. To remove the front door, the wiring must be disconnected from any component installed to the front door mounting frame.



Note: Front window

To remove the front door, the front window must always be removed first (see **Adjusting the front window**).

To remove the front door:

1. Lower the front window all the way.
2. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
3. Remove the front door cover and the plenum cover (see **Removing/installing the front cover**).

4. Remove the light cover (see **Replacing the LED tubes**).
5. Remove the two LED tubes (see **Replacing the LED tubes**).
6. Disconnect the wiring from any component installed to the mounting frame and mark the cable assignment to the individual components.



CAUTION: Front door weight

The front door/window assembly is very heavy! The front door must be supported before the hinge bolts are removed from the hinge.



Note: Front door position switches

The switches at the hinge may warp when the front door is removed. Remove the switches (**Figure 64** [3] and [4]).



Note: Gas struts

Before the bolts can be removed from the hinge, the gas struts on both sides of the front door must be removed as otherwise the strut pressure will press the front door away from the housing frame.

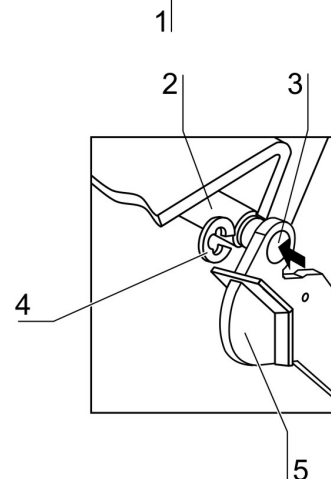
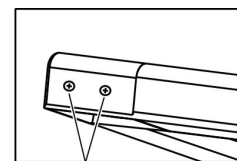


Figure 65. Hinge bolt removal

7. Remove the two gas struts (see **Replacing the gas struts**).

8. **Figure 65:** Remove the front door side covers. The covers are secured with screws to the frame and to the lower cross-member [1].
9. Remove the front window (see **Replacing the gas struts**).
10. The hinge bolts [3] are secured to the hinge [2] with cir-clips [4]. Remove the cir-clips and remove the hinge bolts inwards from the hinge.
11. Remove the front door.

To install the front door:

1. Place the front door onto the device frame and push the two hinge bolts from the inside out into the hinge.
2. Secure the hinge bolts on both sides using the cir-clips.
3. Install the front window (see **Replacing the gas struts**).
4. Install the two gas struts (see **Replacing the gas struts**).
5. Connect the wiring of the front door electrical components to the mounting frame.



Note: Cable routing

When routing the cables, make sure that they are not subjected to tensile forces when the front door is opened. The routing must ensure that the cables will not be trapped or damaged by mechanical components.

6. Check the traveling motions of the front window using the pilot switch.
7. Secure the front door side covers using the screws.
8. Install the light cover (see **Replacing the LED tubes**).
9. Install the front door cover and the plenum cover (see **Removing/installing the front cover**).

Replacing the gas struts

Item 720 (gas strut complete)

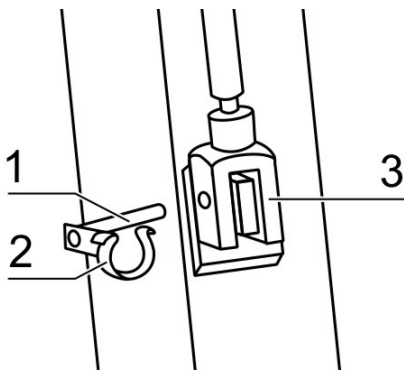


Figure 66. Gas strut removal

Figure 66: Each of the upper and lower retaining bolts [1] of the gas strut is secured with a spring clip [2].

1. Unlock the bolt, remove the spring clip from the gas strut base [3] and push the bolt from the inside out of the mounting. Remove the gas strut.



Note: Gas strut alignment

The gas strut pressure cylinder must be facing upward.

2. To install, insert the gas strut into the front door mounting. From the inside, insert the bolt outward into the mounting and secure it using the spring clip, then install the gas strut linkage to the device frame mounting.

Replacing the front door seal

Item 360 (front door seal)

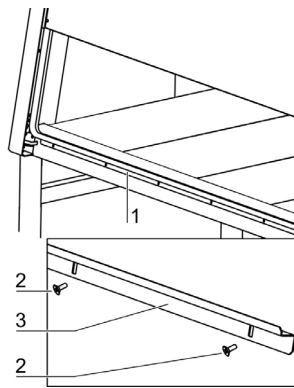


Figure 67. Front door seal replacement

Figure 67: If the front door seal [1] shows visible signs of wear, the seal must be replaced.

The seal is merely pushed onto the device frame and is secured additionally at the upper and lower side of the sample chamber opening by a retaining rail.

1. Remove the retaining screws [2] and remove the retaining rail [3].
2. Pull the seal [1] off the retaining lip at the device frame.
3. Push the groove of the replacement seal onto the retaining lip and press the seal on to ensure that it is positioned flush along the entire length of the contact surface.
4. Install the retaining rail.

Installation distance gliding block

Item AH (distance gliding block)

1. Remove front cover
Unscrew the 2 screws (1) and take front cover out.

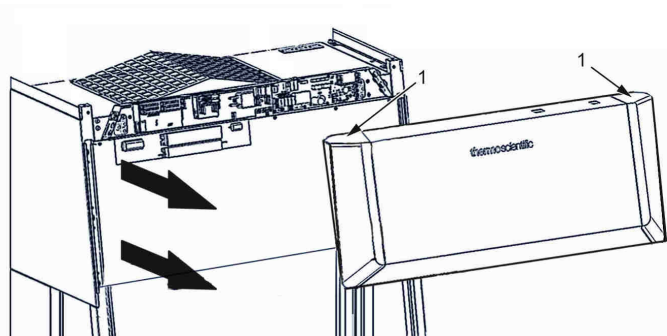


Figure 68. Removing front cover

2. Check, whether old or new upper fixing angle (sealing) is installed.
Old version L-shape, new version U-shape. If old version installed, replace with new one.
3. Move glass window to lowest position and open front window.

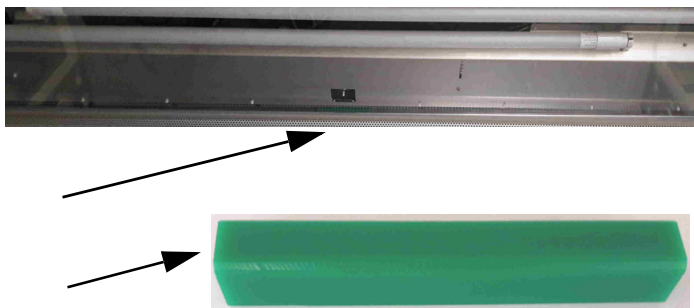


Figure 69. Cleaning the gliding block

4. Apply the strip double-sided adhesive tape at the bevels side of the gliding block and remove protective cover of the strip.



Figure 70. Taping the gliding block

5. Place the distance gliding block in the center of the upper fixing angle and press it firmly.



Figure 71. Gliding block position

6. Apply silicone at the left and right side of the gliding block.

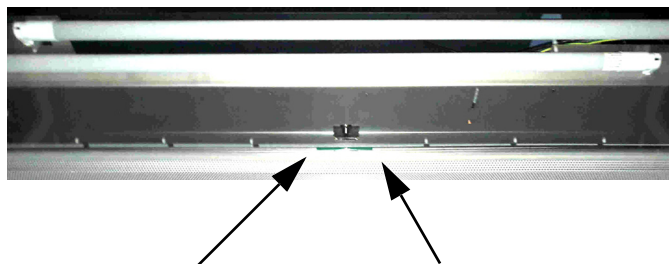


Figure 72. Siliconing the gliding block

7. Close front window.
8. Move the front window in several positions and check the gliding block for correct placement.
9. Replace front cover.

Replacing the front frame latch

Item 400 (front frame latch)

Item 410 (slide for hinge window latch)

Item 420 (bolt M 4 x 30 for slide)

Items 640, 650 (cable retainer)

Item CC (windscreen folding safety device)

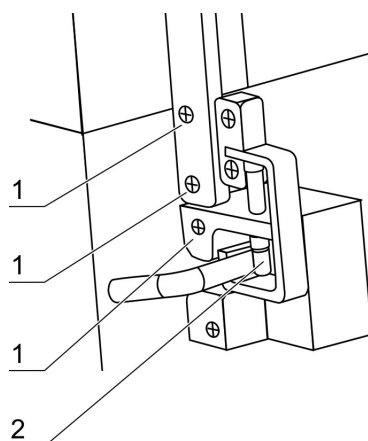


Figure 73. Front frame latch

The latch is secured to the front door with two screws.

1. Lower the front window all the way.
2. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
3. Remove the front door side covers. The covers are secured with screws to the frame and to the lower cross-member (see **Figure 73**).
4. Remove the cross-member (see **Figure 73**).
5. **Figure 73:** Remove the retaining screws [1] and remove the latch.
6. Position the latch housing at the frame and secure it using the screws.
7. Install the cross-member.
8. Install the front door side covers.

Replacing the front window

Item 700 (front window)

Item 710 (front window cross-section)

Items 640, 650 (cable retainer)

The front window [4] is removed forward or downward from the front door frame.

To remove the front window:

1. Lower the front window all the way.
2. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
3. Remove the front door cover (see **Removing/installing the front cover**).
4. Remove the light cover (see **Replacing the LED tubes**).
5. Remove the following position switches (see **Replacing the front window drive, Figure 78**):
 - work aperture [6]
 - reduced ventilation [7]
6. **Figure 74:** Remove the front door covers [3]. The covers are secured with screws to the lower cross-member [2] at the side of the frame and at the corner [2].

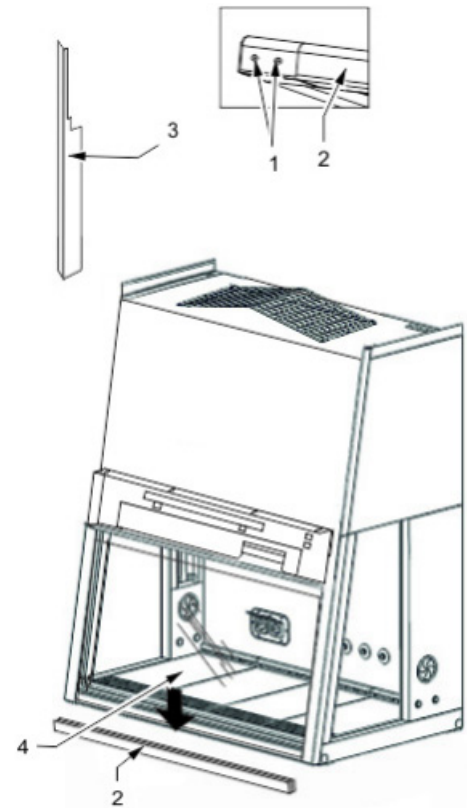


Figure 74. Remove the front window



Note: Front window support

To prevent the accidental separation of the front window from the frame, the window must be supported from below before the two cable retainers are removed.

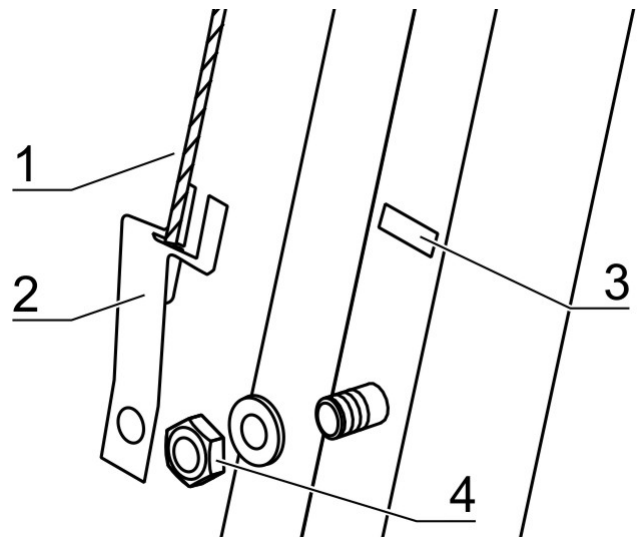


Figure 75. Cable retainers

7. **Figure 75:** Remove the cable retainers [2] on both sides of the front window. Remove the nuts [4] and remove the cable retainer from the recess [3] on the frame.

8. Disconnect the cable [1] from the cable retainer guide slot [2].
9. Use suction cups with handles to pull the window forward or downward off the frame.

To install the front window:

10. Push the new window from the front into the frame.
11. Connect the cables to the cable retainers on both sides. Insert the tab into the recess [3] on the frame and secure the retainer using the screw.
12. Reinstall and adjust the position switches for work aperture and reduced ventilation (see **Replacing the front window drive**).
13. Install the side covers.
14. Install the front door cover (see **Removing/installing the front cover**).
15. Install the light cover (see **Replacing the LED tubes**).

Adjusting the front window

The front window is self-adjusted by the tension of the window drive [2].

1. **Figure 76:** Loosen the motor mounting bracket [3] at the mounting frame. Loosen the four retaining screws [1] so far that the retainer is free to move.

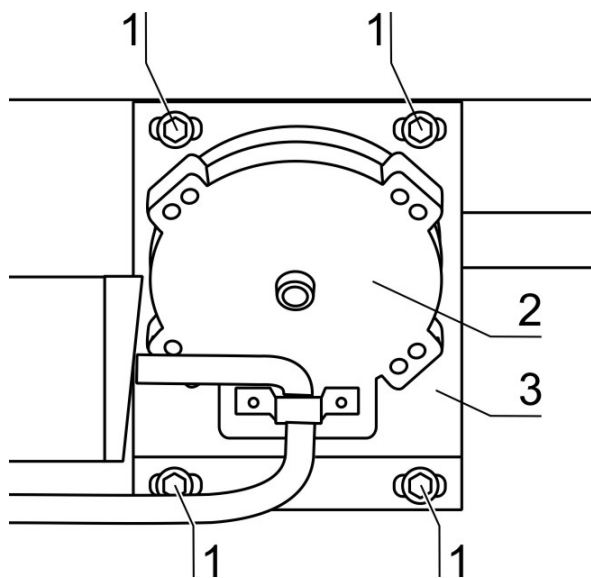


Figure 76. Window drive mounting bracket

WARNING: High voltage!



Contact with current-carrying components may cause a lethal electric shock. To test the traveling motions, the device must be connected to the power supply system with the protective covers removed. Observe electrical safety regulations!

- Wear protective gloves.
- Use only approved electrical tools for the adjustment.



Note: Traveling motion control

During the adjustment, use only the pilot switch to control the traveling motions.

When failures occur, the traveling motion may not be controllable using the remote control so that the front window may collide with other components.

2. Move the window up temporarily using the pilot switch.
3. Secure the motor mounting bracket using the screws.
4. Check the traveling motion of the window for possible sources of collision or friction by raising and lowering the window.

Adjusting the switch points

Items 660-690 (switch actuator set)

Items 610-630 (position switch)

Item 1250 (PCB)

Device functions that depend on individual front window positions are controlled by position switches. The position switches are actuated by switch contacts on the front window.

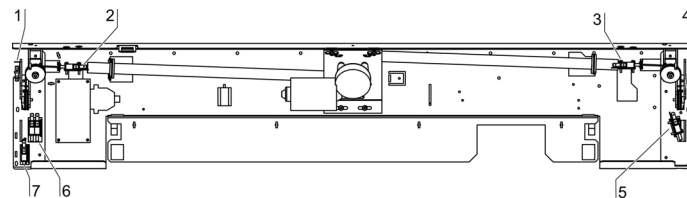


Figure 77. Position switches

Checking the stop and function contacts:

1. Use the pilot switch to move the window to the individual working positions.
2. The position switches are secured with screws to a pivot point and to a slot on the mounting frame. Loosen both screws and reposition the switch to adjust the switching points.
3. **Figure 77:** Upon closing contact (traveling motion stops), the left and right bearings [1] must be seated completely in the recesses of the upper guide rails [2] (installed to the plenum cover panel).
4. Check the constant direction of travel of the front window and the stop positions repeatedly along the entire length of the guide rails.
5. Remove the front door side covers, the light cover and the front door cover to see / check the correct function of the micro switches.

5. Remove the motor mounting bracket [5] from the mounting frame. Remove the four retaining screws [1] so that the cable reel can be separated from transmission and motor from the rear of the mounting bracket.
6. Remove the cable reel guard. Twist the metallic tabs [2] using pliers to release them from the recesses in the motor mounting bracket.
7. The left and right cables of the front window are secured with screws [14] in the reel. To remove the cable, remove the screws.
8. Remove the circlip [9] from the transmission shaft and remove the cable reel from the shaft [13].
9. Remove the three retaining screws [11] of the transmission [6] and remove the motor/transmission assembly from the motor mounting bracket [5].

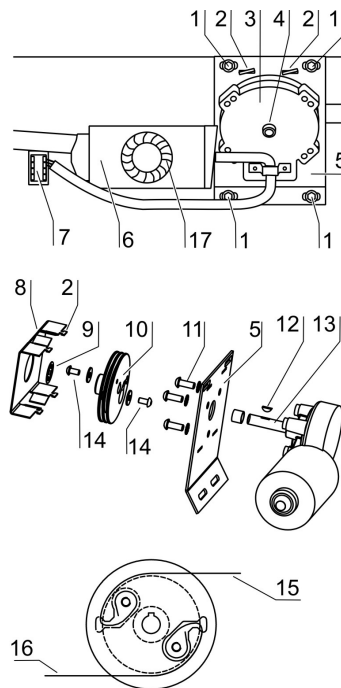


Figure 78. Window drive replacement

To install the window drive:

10. Position the new motor/transmission assembly at the motor mounting bracket and install the three retaining screws [11] from the rear of the mounting bracket.
11. Insert the key [12] into the shaft spline and slide the cable reel onto the shaft.
12. When installing and securing the cables, make sure to install the right cable to the rear guide and the left cable to the front guide of the cable reel. Secure the cables with the screws to the cable reel.
13. Install the circlip [9] to the shaft.
14. Install the guard to the mounting bracket and twist the tabs [2] with pliers so that the guard is attached tightly to the motor mounting bracket [5].
15. Install the motor mounting bracket to the mounting frame and secure it USING the screws.

Switching functions of the position switches:

1	Front door position monitoring
2	Slack cable monitoring left
3	Slack cable monitoring right
4	Front door position monitoring (Herasafe 2030i 1.5 and 1.8 only)
5	Front window max. opening position (power supply)
6	Work opening
7	Reduced ventilation

Replacing the front window drive

Items 480-550 (window drive)

Item 450 (grommet)

Items 460, 470 (deflection roller)

Items 560-600 (stainless-steel cable)

Item 1260 (cable control)

Figure 78: The front window drive is supplied as an assembly that consists of motor [6] and transmission [3].

To remove the window drive:

1. Lower the front window all the way.
2. Switch the device off, disconnect it from the power supply system, and protect it from accidental reconnection.
3. Remove the light cover (see **Replacing the LED tubes**).
4. Disconnect the motor wiring.

16. Connect the motor wiring.
17. Adjust the front window (see **Adjusting the front window**).
18. Install the light cover (see **Replacing the LED tubes**).

Replacing the front window safety feature storage battery

Item 1140 (storage battery)

Item 1150 (storage battery with connecting cable)

To replace the storage battery:

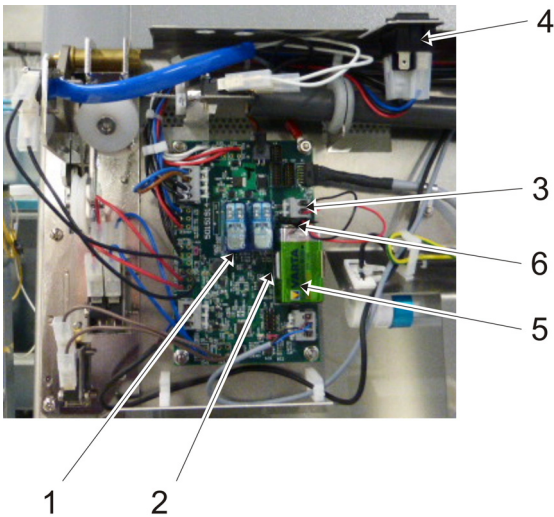


Figure 79. Storage battery/Connecting cable

Figure 79: The storage battery [5] is secured with a clamp [2] to the PCB [1].

1. Remove the light cover (see **Replacing the LED tubes**).
2. Remove the old storage battery [5] from the clamp [2].
3. Disconnect the connector [6] from the storage battery.
4. Connect the connector to the new storage battery:
 - + red
 - black
5. Put the storage battery in the clamping.
6. Install the light dome (see **Replacing the LED tubes**).



Note: Retrofitting kit

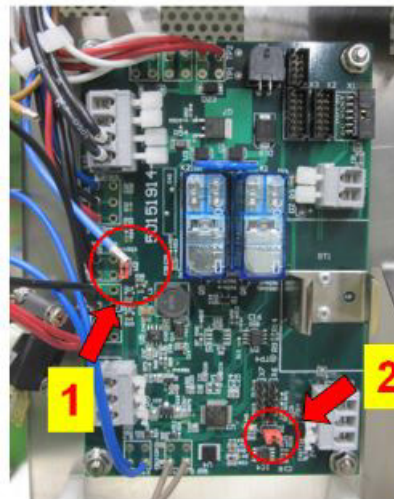
The power supply for the front window safety features can be retrofitted for devices operated with software version 2.1 or higher (see parameter levels P1 in **Parameter Lists**).

The retrofitting kit consists of a connecting cable with connector, a wiring kit, and the battery.

Lifetime of the storage battery 2.5 years

To retrofit the battery:

1. Remove the light cover (see **Replacing the LED tubes**).
2. Connect the connector [6] to the storage battery.
3. Connect the connecting cable connector [3] to the receptacle of the PCB:
 - + red
 - black
4. Connect the wiring kit to the pilot switch [4] and to the PCB [1] (see Wiring Diagrams).
5. Secure the storage battery with the clamp.
6. Install the light dome (see **Replacing the LED tubes**).



Jumpers on Micro switch board

1. For add. switch 1.5 + 1.8
2. Only for Software update

Figure 80. Jumpers on micro switch board

Ferrite

Item 260 (ferrite TDK ZCAT 2035-0930A)

Ferrite are placed on different locations:

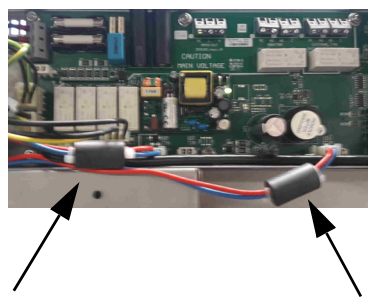
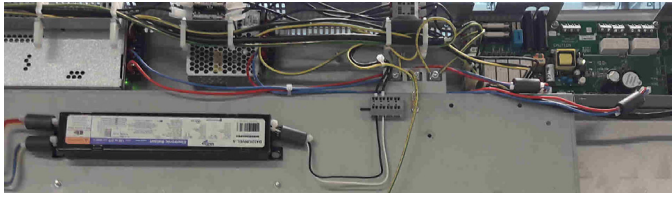


Figure 81. Position of the ferrite Herasafe 2030i

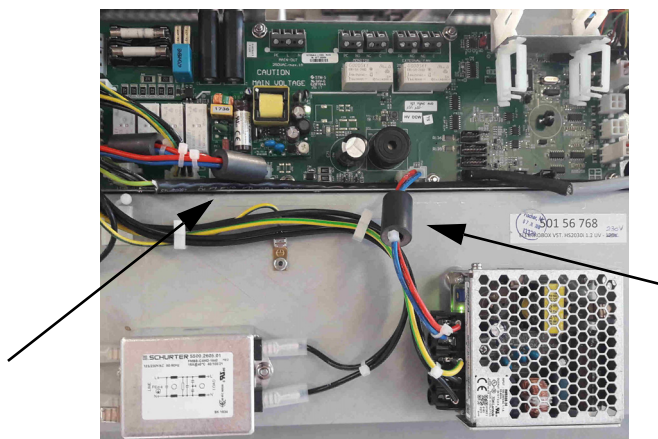


Figure 82. Position of the ferrite Maxisafe 2030i

See also wire harness drawings in appendix.

Control box components

Replacing control box electrical components

Item 1170 (control box cover)
Item 1190 (master PCB)
Items 1200-1210 (power supply units)
Item 1240 (fuses)
Items 1230, 1260 (fuse holder)
Item 1220 (terminal strip)
Items 1280-1330 (wiring kits)
Item 330 (power supply cables)
Item 280 (cable retainer)

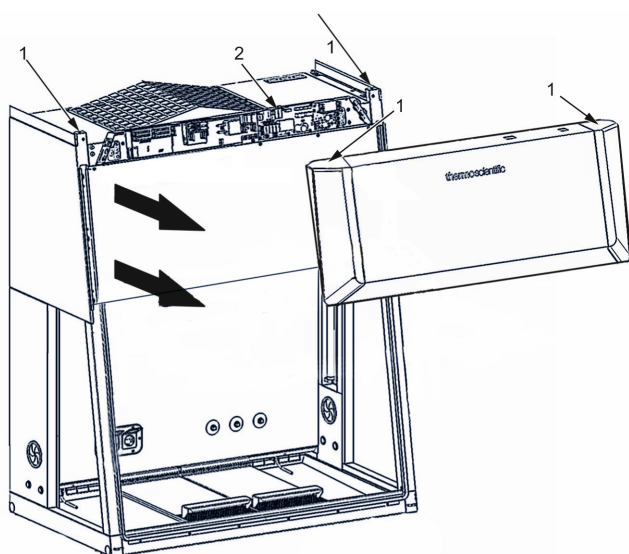


Figure 83. Control box

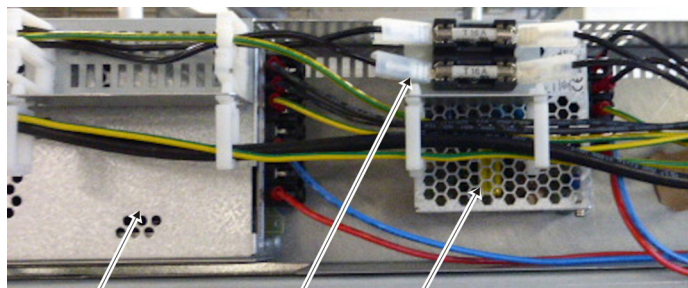


Figure 84. Control box electrical components

Figure 84: The control box [2] is installed to the device ceiling. The control box cover [1] is secured with 6 screws.

Each of the power units for the 230 V voltage variations are installed on the motherboard:

- Herasafe 2030i / Maxisafe 2030i 1.5 and 1.8 are equipped with 2 power units [3] and [4].
- Herasafe 2030i / Maxisafe 2030i 0.9 and 1.2 are operated with 1 power unit [7].

The face of the control box has an USB connector [5] and the two fuses [6] for the device-integral power supply.

Application in USA/ Canada:	UL61010-1:
Power supply connection	115 V ~ / PE 60 Hz
On-site protection	T1 5A

Application in EU:	IEC 61010-1 / EN 61010-1:
Power supply connection	230 V ~ / PE 50 Hz
On-site protection	T1 6A

Connecting the alarm contact

The device can be connected to two different configurations of an external alarm system (wiring diagrams see annex H).

Potential-free contact (Vent.)

(X21 Main board LP1)

Control of external exhaust air systems.

- Contact open: The device does not deliver exhaust air.
- Contact closed: The device delivers exhaust air.

Potential-free contact (monitor alarm)

(X20 Main board LP1)

This external alarm signal that is connected to the safety cabinet control can only be activated when the device is in the secured work mode. When failures occur in the air system circuits, a blower alarm message is issued to the connected monitoring system.

This contact is also used when a solenoid valve for the internal gas supply of the safety cabinet is to be connected.

USB interface connection

There are 2 USB connectors at the workbench:

- One beside the display area normally for customer use to log data
- One at the top side for service activities.

The USB interface has been designed for a cable connection with an A1 connector. The USB connector [1] is installed at the top of the device in the right section of the plenum cover.



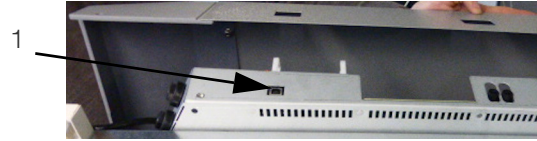
CAUTION: Limited current

Maximum USB connection load 2 x 500 mA



USB formatting

USB-Stick must be formatted FAT 32.



Pin	Name	Description
1	USB_H1_VBUS	Power supply
2	USB_H1_DN	Data minus (D-)
3	USB_H1_DP	Data plus (D+)
4	GND	Ground

Header: USB Type A

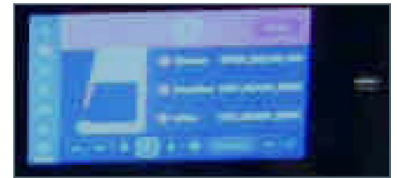
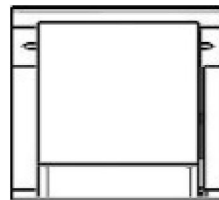


Figure 85. USB interface

Connection of the device:

1. Turn the PC off.
2. **Figure 85:** Connect the serial interface cable connector (not part of the standard equipment) to the connection of the safety cabinet.
3. Connect the USB cable to an unassigned USB slot at the PC.
4. Turn the PC on.

Replacing the main board

Item



Figure 86. main board

No-load current calibration, etc.
 Convey default values, operating hours, certification date, etc.

Read and write down all parameters before changing the main board / Eprom / Software, if possible.

Check country version.
 See initialization routine inside the user manual.

Blower Calibration
 Needed after each board or blower replacement!

- This function must be performed after the blower or main PCB replacement. The function is selected via Field Certification screen.
- After the functional level has been selected, the test starts automatically and the blowers are disabled. After a waiting period of 1 minute, the display shows calibration complete.
- If this display is confirmed, the currently measured value is saved and the blowers are re-enabled.



Note: Blower calibration

The external exhaust system has to be shut-off prior to a blower calibration.

Finally reinstall the unit according to regulations.
 On completion a new calibration is necessary. Also adjust the blower and alarm limits.



Note: ESD Electronic discharge

During main board replacement protect against ESD Electronic discharge by wearing the ESD kit ground wire during unpacking and installation.



Note: Electrical safety check

Prior to the commissioning of the unit:

- Perform a test run.
- Safety-check according to VDE 0701-1 or IEC 61010-1.

Jumper on the main board



Figure 87. Jumper on the main board

Replacing the Add-on board

Item

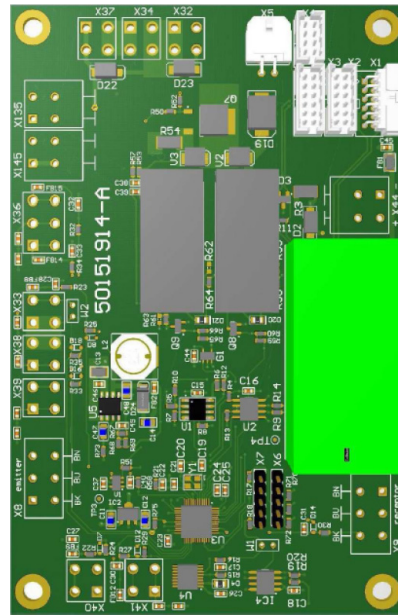


Figure 88. Add-on board

Read and write down all parameters before changing the main board / Eprom / Software, if possible.

Check country version.
 See initialization routine inside the user manual.

Finally, reinstall the unit according to regulations
 On completion a new calibration is necessary. Also adjust the blower and alarm limits.



Note: ESD Electronic discharge

During main board replacement protect against ESD Electronic discharge by wearing the ESD kit ground wire during unpacking and installation.



Note: Electrical safety check

Prior to the commissioning of the unit:

- Perform a test run.
- Safety-check according to VDE 0701-1 or IEC 61010-1.



Note: Software update

For Thermo Direct Service: The current Software-Version could be downloaded on the PSM database.

For authorized dealer and distributor service: The current Software-Version could be downloaded on the Basic Knowledge base (Talisma).

Non-Thermo Direct Service have to contact the national Thermo service organization.

Device Control

Beside the GUI screen in the operating manual with following settings the advanced functions for service applications are possible:

1	Factory setting	
	Factory resetting	
	Firmware	
2	Field certification	
Service		
	Air speed adjustment	
	Alarm test	

Settings

This section explains how a service technician set/up the unit using the Settings screen.

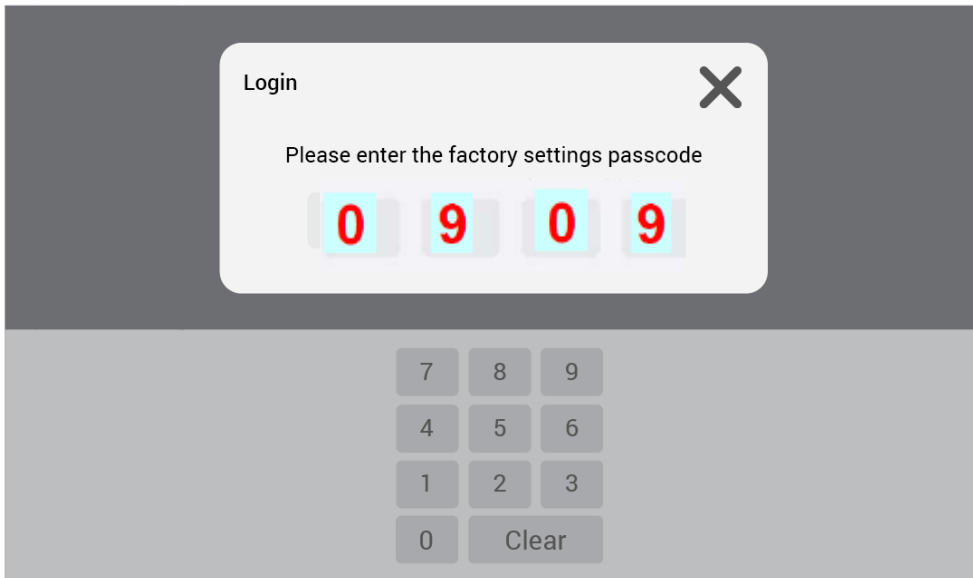
After completing the initial set-up process, you can further set-up and customize the unit by using the options of the setting screen, shown below:



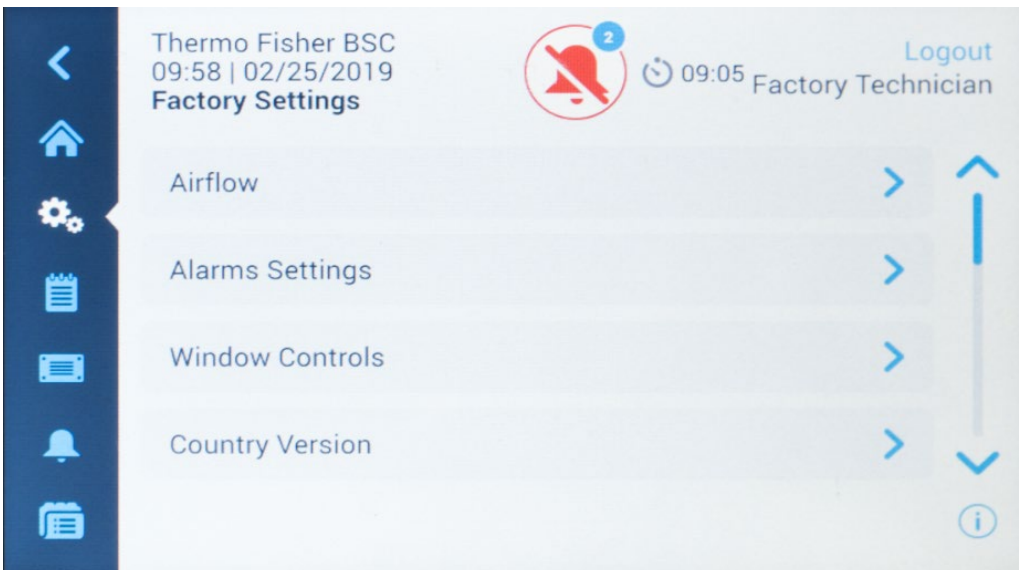
Factory Settings

Use the Factory Settings that relate to the security functions of the device. The Factory Settings are preset and do not need to be changed during operation and certification of the cabinet. Further more the acoustical alarm can be modified.

The Factory Settings section can only be accessed by typing in the Factory Settings passcode. If any user taps on the Factory Settings button from the main Settings screen the user must be prompted to enter a passcode as shown in this login screen:






Once the user has successfully logged in to the system, the Factory Settings screen will be displayed. In the Factory setting screen the following different Setting screens can be selected by scrolling:





- | | | |
|---------------------|------------------------|--------------------|
| 1. Airflow | 5. BSC version | 9. UV installed |
| 2. Alarm settings | 6. Device size | 10. Firmware GKI |
| 3. Windows controls | 7. Auto Param Function | 11. Factory Reset |
| 4. Country version | 8. Alarm relay | 12. Event log data |


Thermo Fisher BSC
10:01 | 02/25/2019
Factory Settings




 06:04 [Logout](#)
Factory Technician




- BSC version: MSC 
- Device Size: Heraguard Eco
- Auto Param Function: MSC Plus
- Alarm Relay: Gas control 


Thermo Fisher BSC
10:01 | 02/25/2019
Factory Settings




 05:49 [Logout](#)
Factory Technician



- BSC version: Maxi Gust 
- Device Size: 0.9 m 
- Auto Param Function: 1.2 m
- Alarm Relay: Gas control 

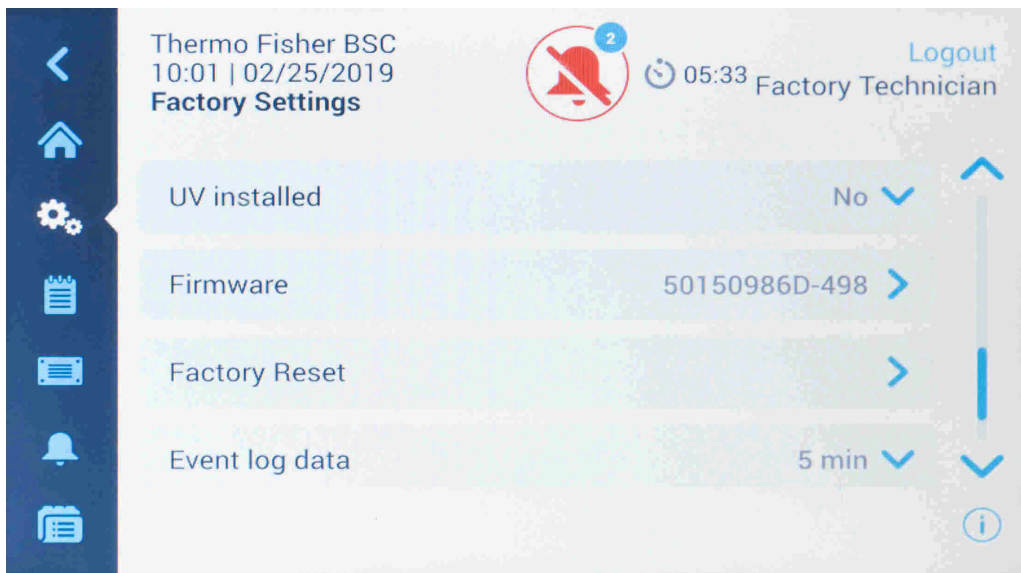
  

Thermo Fisher BSC
10:01 | 02/25/2019
Factory Settings

 05:45 [Logout](#)
Factory Technician

- BSC version: Maxi Gust 
- Device Size: 1.2 m 
- Auto Param Function: Disabled 
- Alarm Relay: Full AutoCal



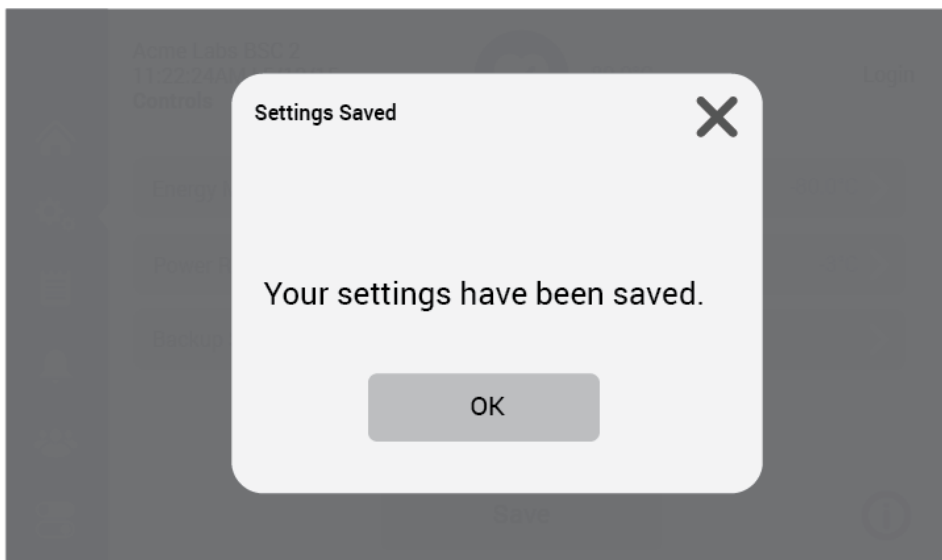
Save button at the bottom of screen

The save button is reserved for saving changes if the user makes a change to any of the screens. By default, the Save button must be hidden on the screen.

If the user has made a change, they must tap the Save button at the bottom of the screen to commit the changes to the system.

Once the user taps the Save button, a pop-up window overlay screen must appear stating:

Your settings have been saved.



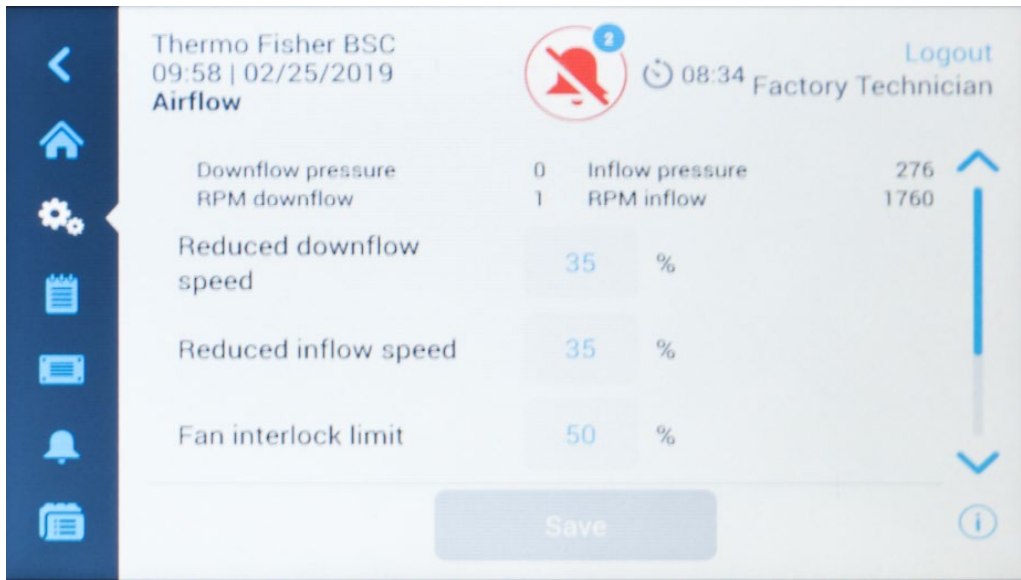
The pop-up window overlay must have an OK button which will close the window if tapped, an X icon in the top right corner which will close the window if tapped, and a header in the top left corner that states: Settings Saved


Pop-up Window Overlay must auto-close after 5 seconds.

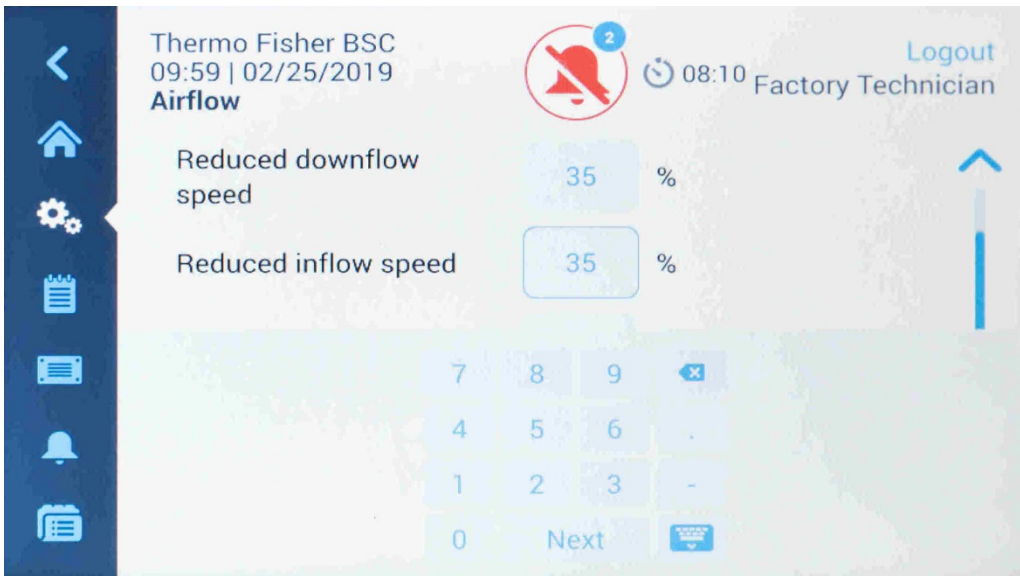
Regardless of the window auto-closing or the user manually closes the window, the user must be returned to the main Factory Settings screen.

Airflow

The Airflow screen must be displayed:



	<p>Note</p> <p>The scrollbar to scroll to form fields and controls that are not visible in the main part of the screen.</p>
---	--

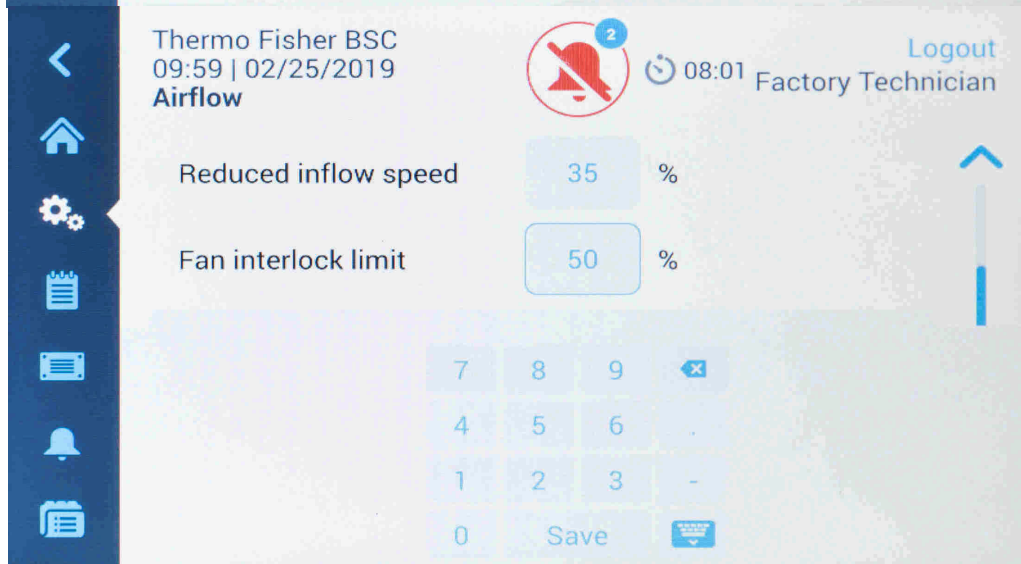
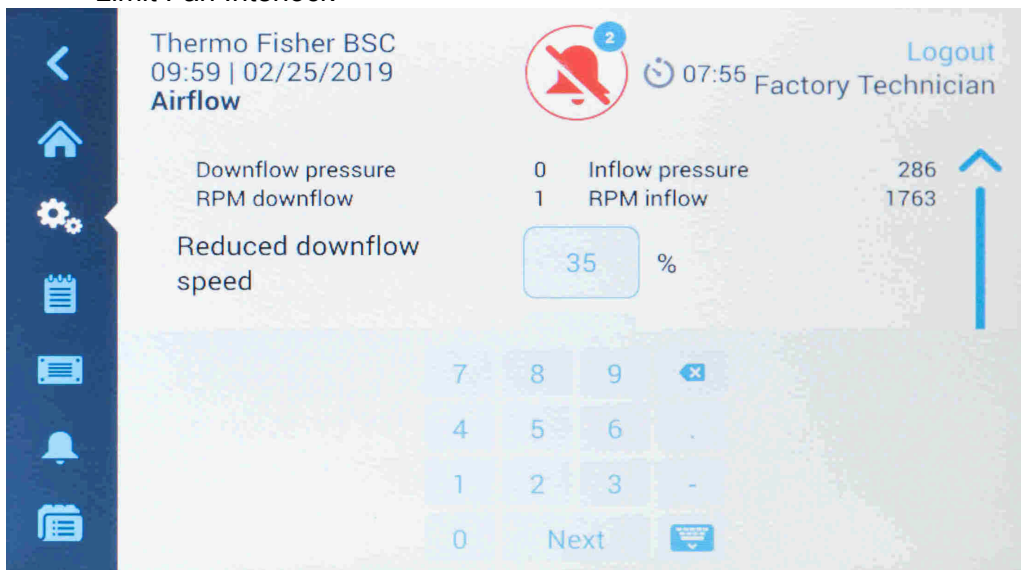


The 3 parameters listed below are editable. Users must tap on the individual form fields to bring up the calculator-style keyboard.

Setting Reduced Downflow

Setting Reduced Inflow

Limit Fan Interlock

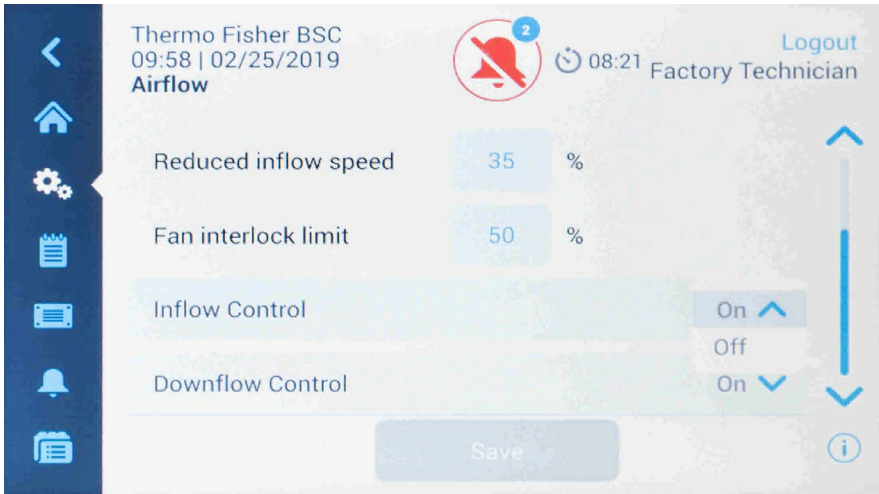


Inflow Control / Downflow Control

User may change the Inflow Control setting directly on the main Airflow Settings screen as by tapping on the dropdown list labeled Control Inflow and selecting one of the following:

- On
- Off

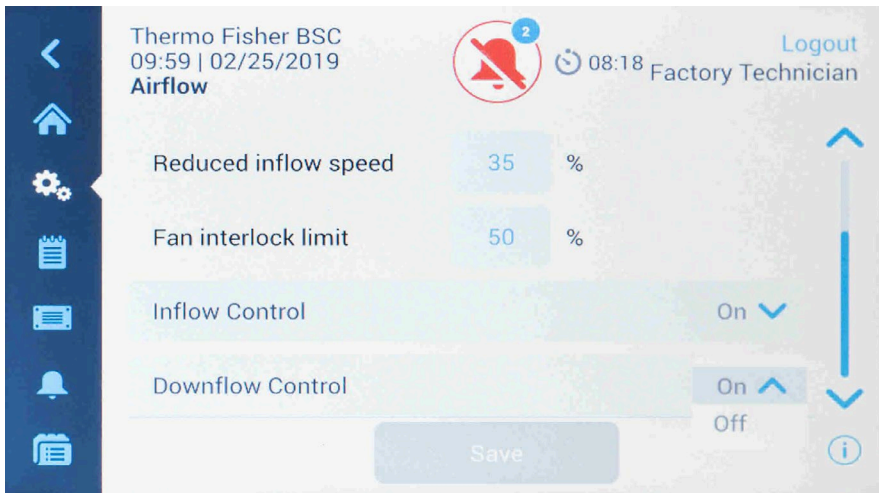
Dropdown to reference this selection:




User may change the Downflow Control setting directly on the main Airflow Settings screen by tapping on the dropdown list labeled Control Downflow and selecting one of the following:

- On
- Off

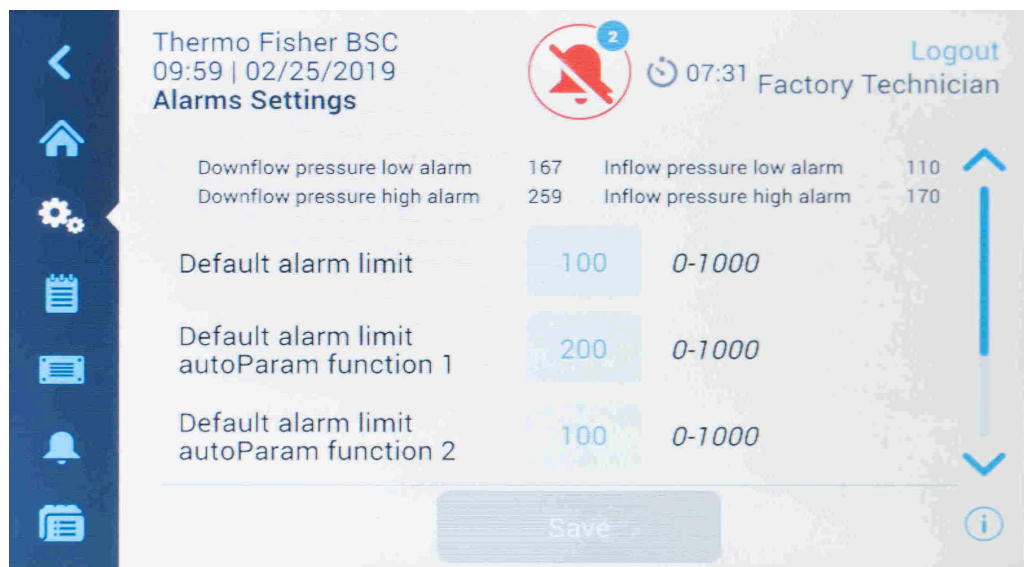
Dropdown to reference this selection:



	Note: Control setting – Default value
	Inflow and downflow control always set to “On”.

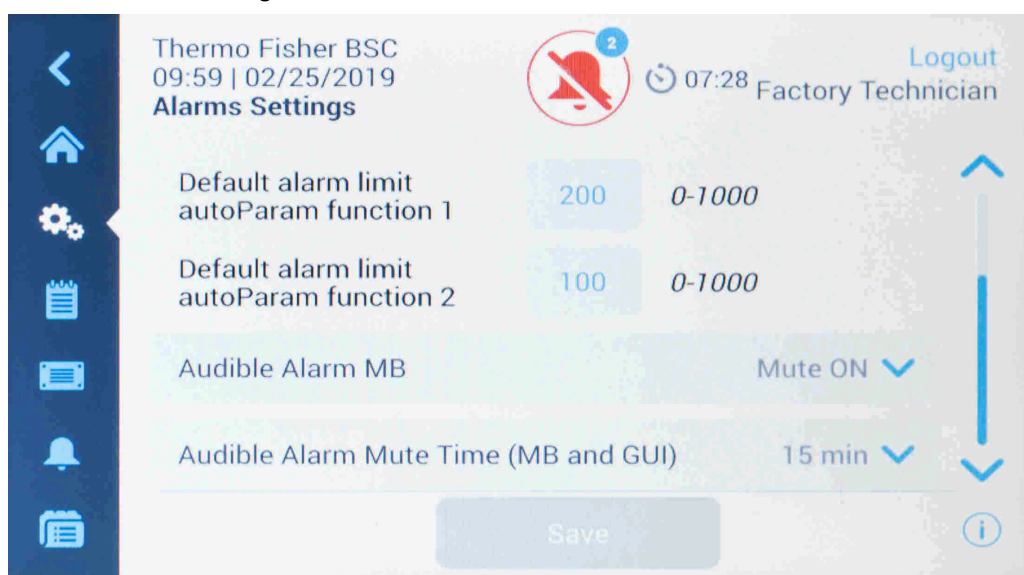
Alarms Settings

The Alarms Settings screen must be displayed:



The 4 parameters shown at the top of the screen are display-only:

- Pressure Low Alarm Downflow
- Pressure High Alarm Downflow
- Pressure Low Alarm Inflow
- Pressure High Alarm Inflow



☞	Note: Control setting – Default value
	The scrollbar to scroll to form fields and controls that are not visible in the main part of the screen.

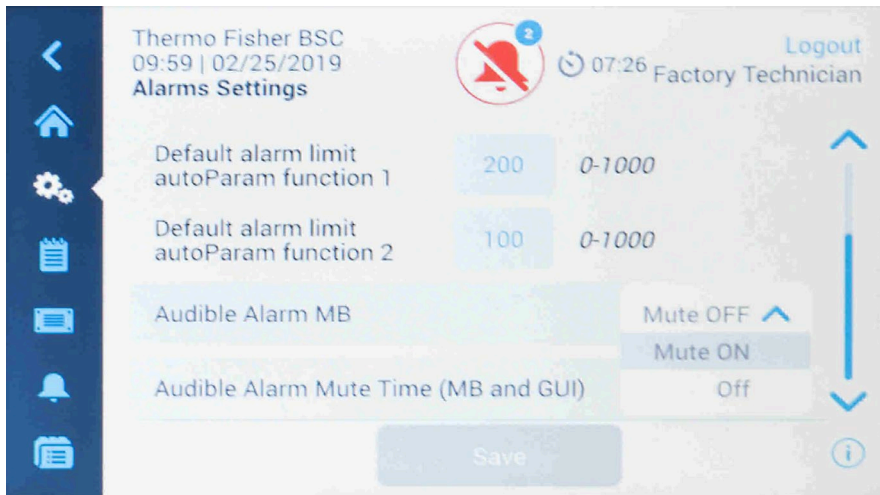
The 3 parameters listed below are editable. Users must tap on the individual form fields to bring up the calculator-style keyboard.

- Default Alarm Limit
- Default Alarm Limit autoParam Function 1
- Default Alarm Limit autoParam Function 2

User may change the Acoustical Alarm MB setting directly on the main Alarms Settings screen by tapping on the dropdown list labeled Acoustical Alarm MB and selecting one of the following:

- Mute Disabled
- Mute Enabled
- Off

Dropdown to reference this selection:




User may change the Mute Time Acoustical Alarm (MB and GUI) setting directly on the main Alarms Settings screen by tapping on the dropdown list labeled Mute Time Acoustical Alarm (MB and GUI) and selecting one of the following:

- 1 min
- 5 min
- 15 min (default value)

Dropdown to reference this wireframe mockup:



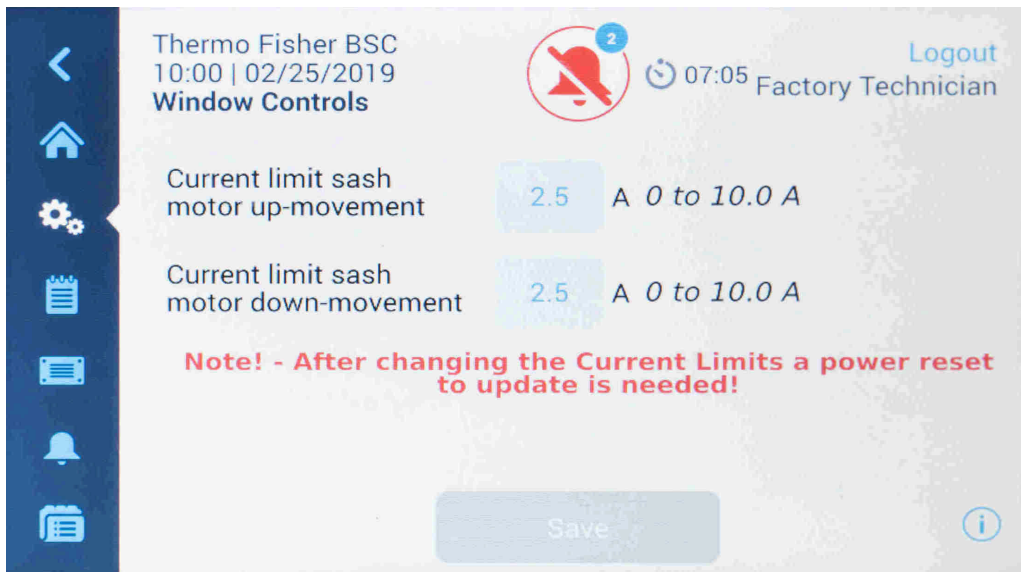
Once the user has made changes, they must tap the Save button at the bottom of the screen to commit the changes to the system.

	<p>Note: Default values</p> <p>The settings of the acoustic alarm may possibly contradict the requirements of the respective national valid standards.</p>
---	---

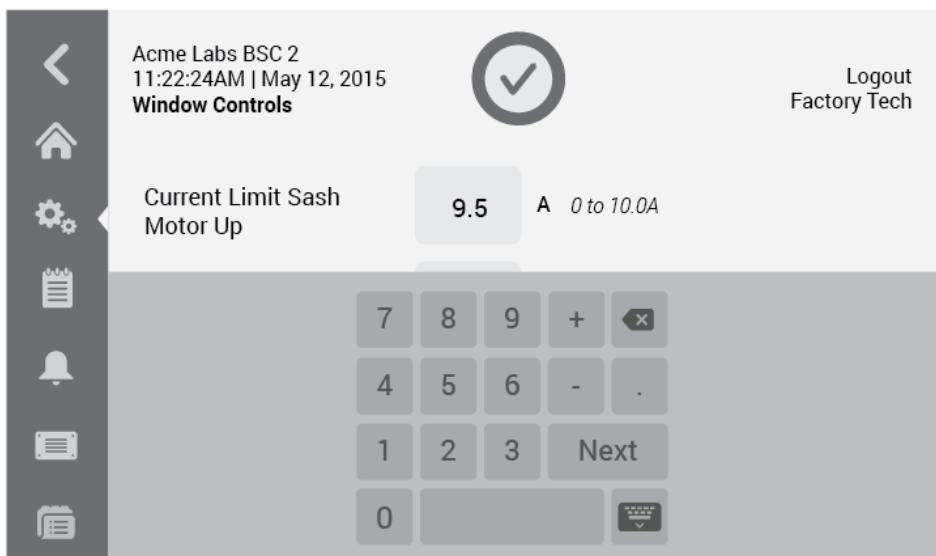
According to EN 12469 / DIN 12980 the acoustic alarm is set to “Mute Off”, to NSF 49 set to “Mute On”.

Window Controls

The Window Controls screen must be displayed:



If a user taps in any of the fields, the calculator-style keyboard must appear:

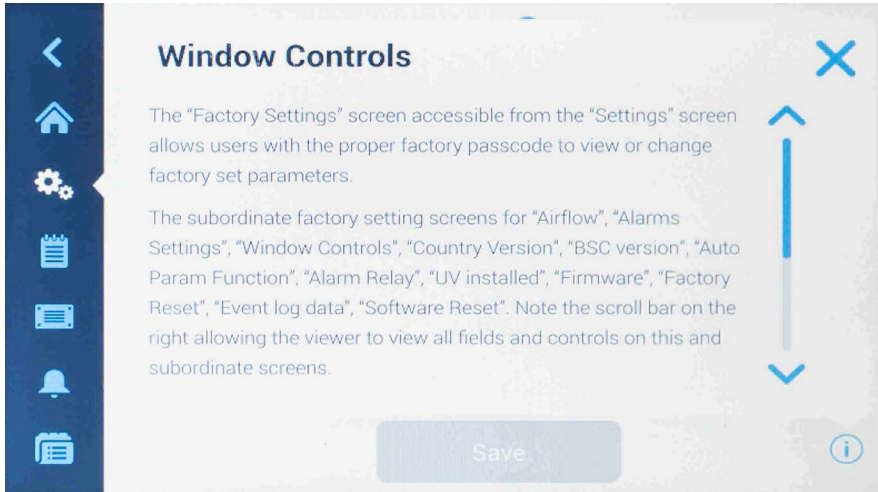


	<p>Note: Default values</p> <p>3.5 A</p> <p>2.5 A</p>
--	--

	<p>Note: Important</p> <p>After changing the current limit sash values, a mains reset must always be carried out! Otherwise the values will not be accepted!</p>
--	--

	<p>Note: Context info screen</p> <p>On each touch screen the user can press the info icon to get more info of the current screen function.</p>
--	---

For example: Windows control Info screen



Country Version

The user may change the Country Version by selecting from 5 options in a wheel picker format:



The options listed in the wheel picker are:

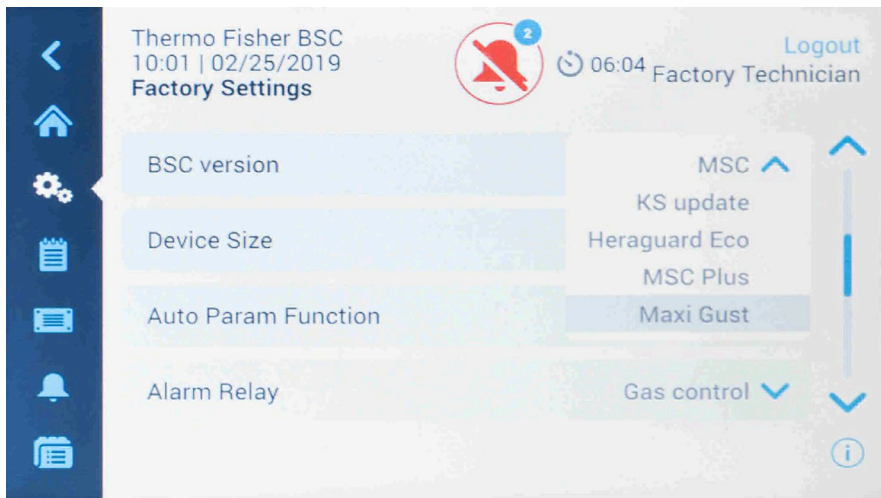
- EU
- France 1
- France 2
- USA
- China

Once the user has made a change, they must tap the Save button at the bottom of the screen to commit the changes to the system.

BSC Version

User may change the BSC version setting on the main Factory Settings screen by tapping on the dropdown list labeled BSC Version and selecting one of the following:

- KS Update
- 1300 Plus
- MSC
- MSC ADV
- MSC Plus
- Heraguard ECO
- Herasafe 2030i
- Maxisafe 2030i
- Maxi Gust

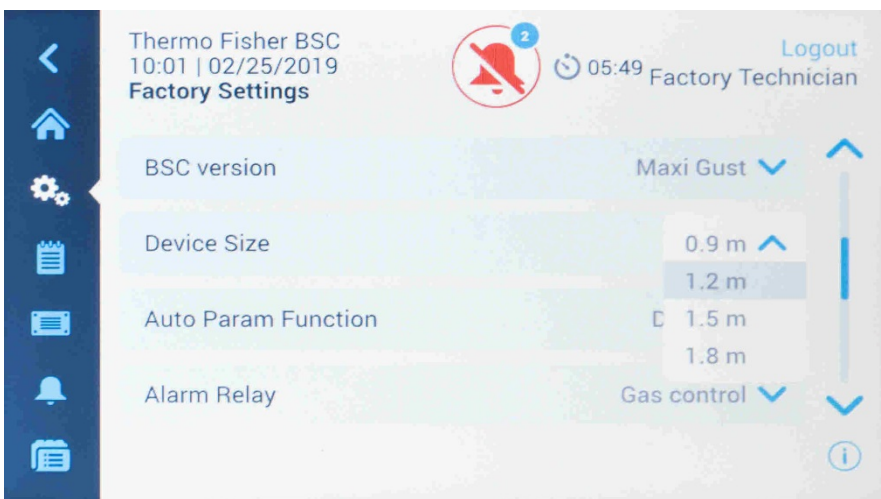


Once the user has made a change, they must tap the Save button at the bottom of the screen to commit the changes to the system.

Device size

Following sizes of the cabinets are available:

- 0.9 90 cm width
- 1.2 120 cm width
- 1.5 150 cm width
- 1.8 180 cm width



Once the user has made a change, they must tap the Save button at the bottom of the screen to commit the changes to the system.

Auto Parameter Function

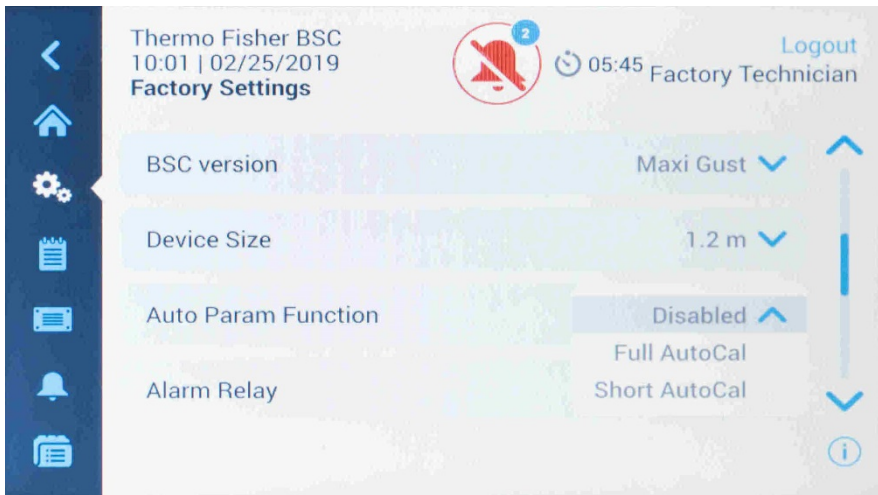
User may change the Auto Parameter Function setting directly on the main Factory Settings screen by tapping on the dropdown list labeled Auto Param. Func. (truncated for space) and selecting one of the following:

Disabled

Full Autocal

Short Autocal

Dropdown to reference this selection:



	Note: Default value
	Disabled.

Once the user has made a change, they must tap the Save button at the bottom of the screen to commit the changes to the system.

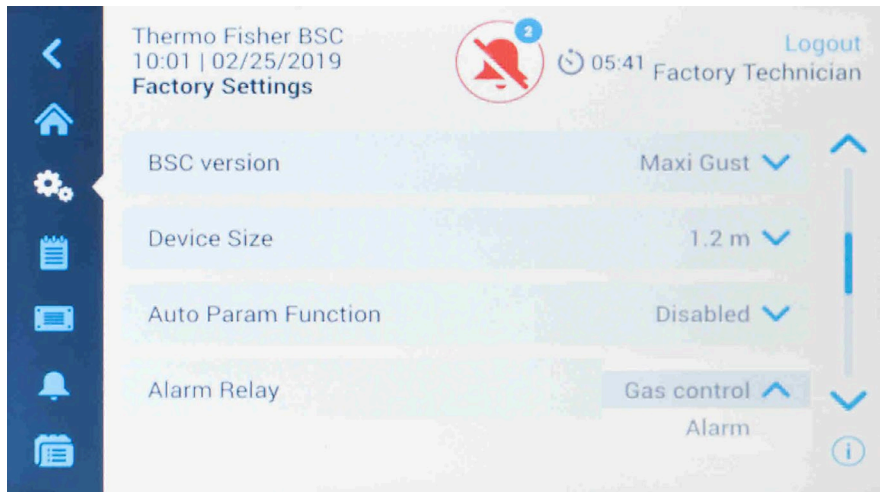
Alarm Relay

User may change the Alarm Relay setting directly on the main Factory Settings screen by tapping on the dropdown list labeled Alarm Relay and selecting one of the following:

Gas Control

Alarm

Dropdown to reference this selection:



Once the user has made a change, they must tap the Save button that has appeared at the bottom of the screen to commit the changes to the system.

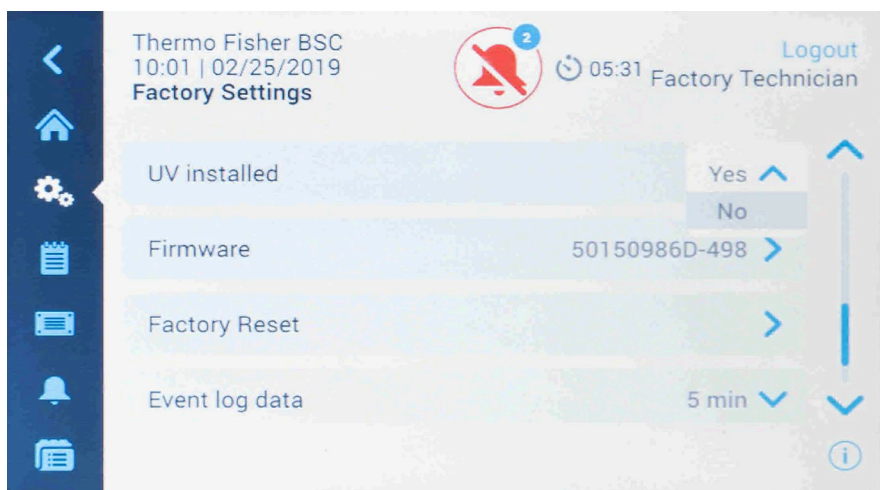
UV Installed

User may change the UV Installed setting directly on the main Factory Settings screen by tapping on the dropdown list labeled UV Installed and selecting one of the following:

Yes

No

Dropdown to reference this selection:



Once the user has made a change, they must tap the Save button that has appeared at the bottom of the screen to commit the changes to the system.

Firmware

The Firmware screen must be displayed as in this selection:



The following information must be displayed:

- Build Number
- Display OS
- Display GUI
- Display Comm
- Main Code
- Main Code Location
- Bus Code
- HID
- Algorithm

Tapping the Upload Firmware button will start the install process of firmware which may be a newer or an older version of the firmware.

The workflow for uploading a new firmware version is detailed below in the following screens:

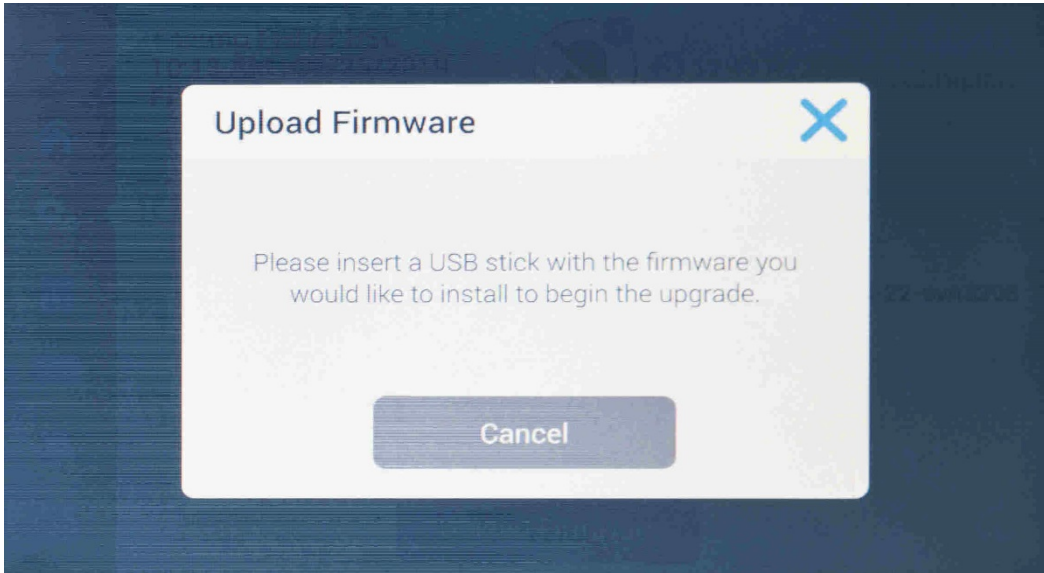
If a USB stick is not automatically detected, display a pop-up window overlay:

“Please insert a USB stick with the Firmware you would like to install to begin the upgrade.”

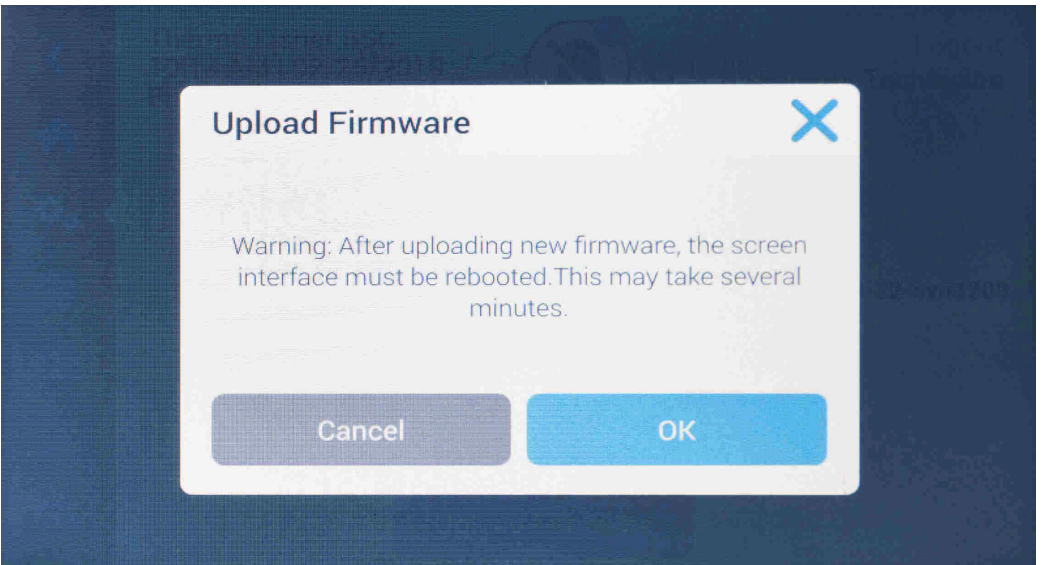
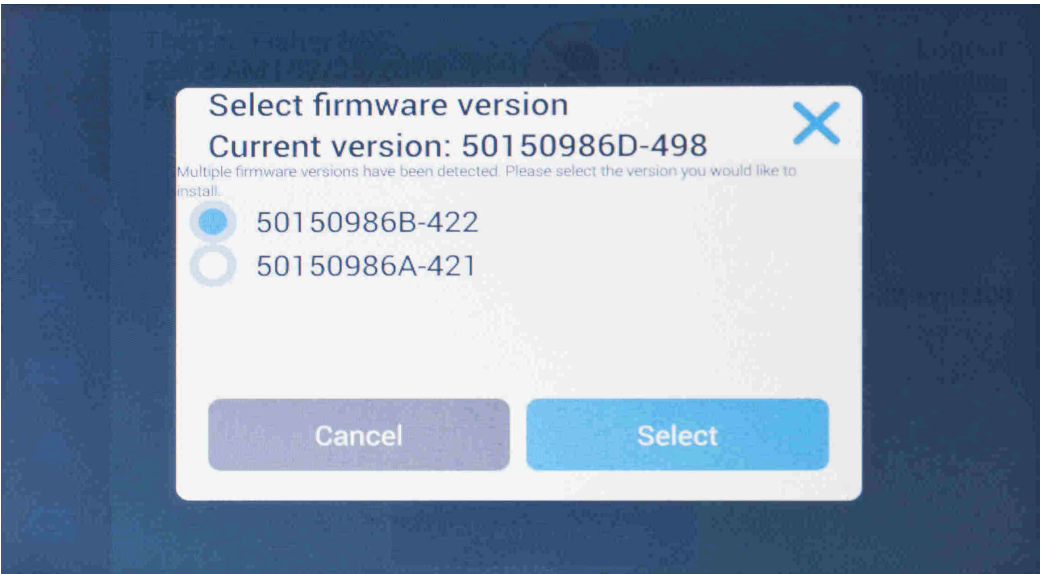
Once USB drive has been recognized, auto-close this window.

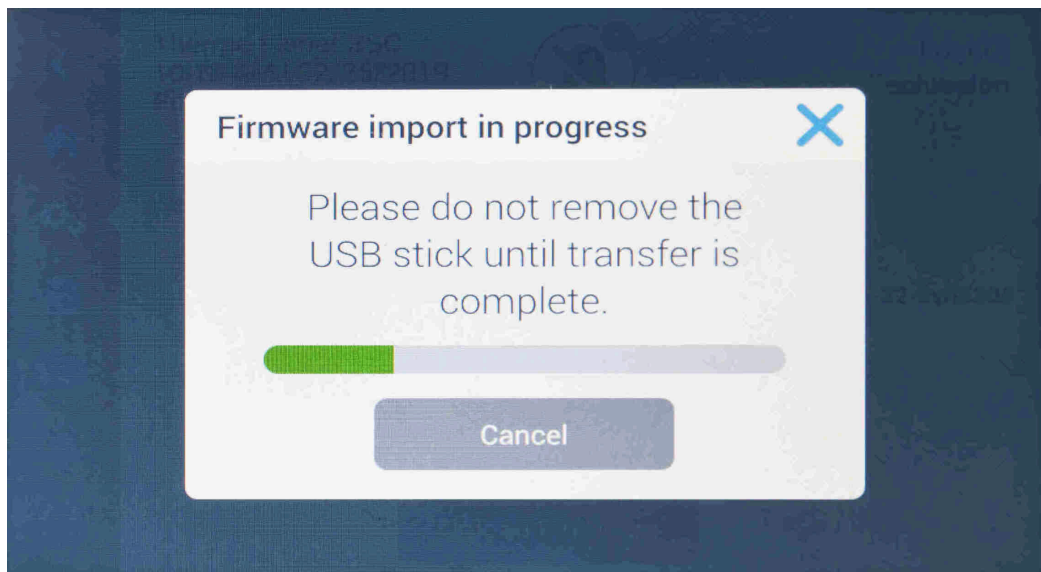
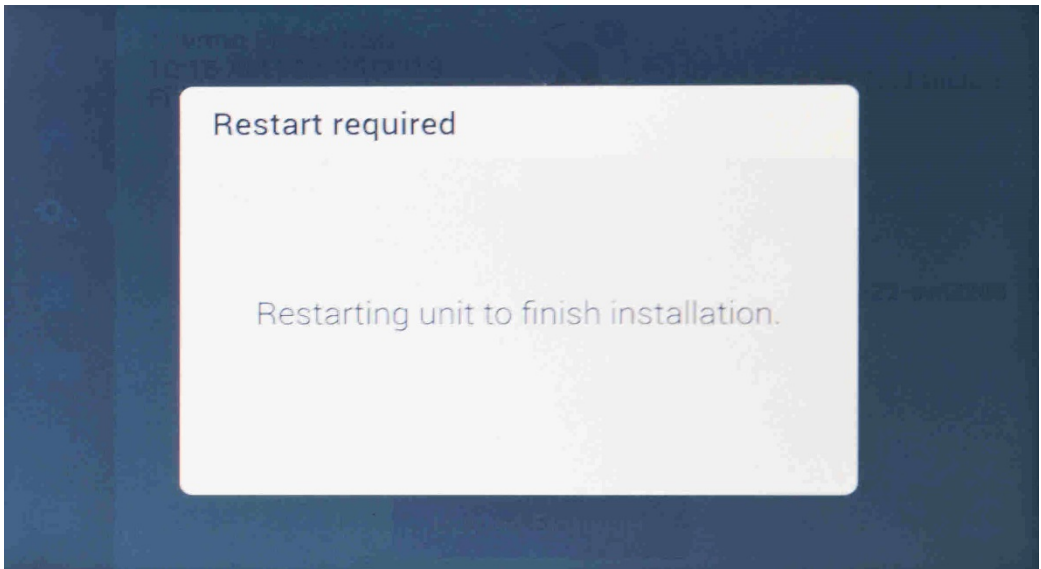
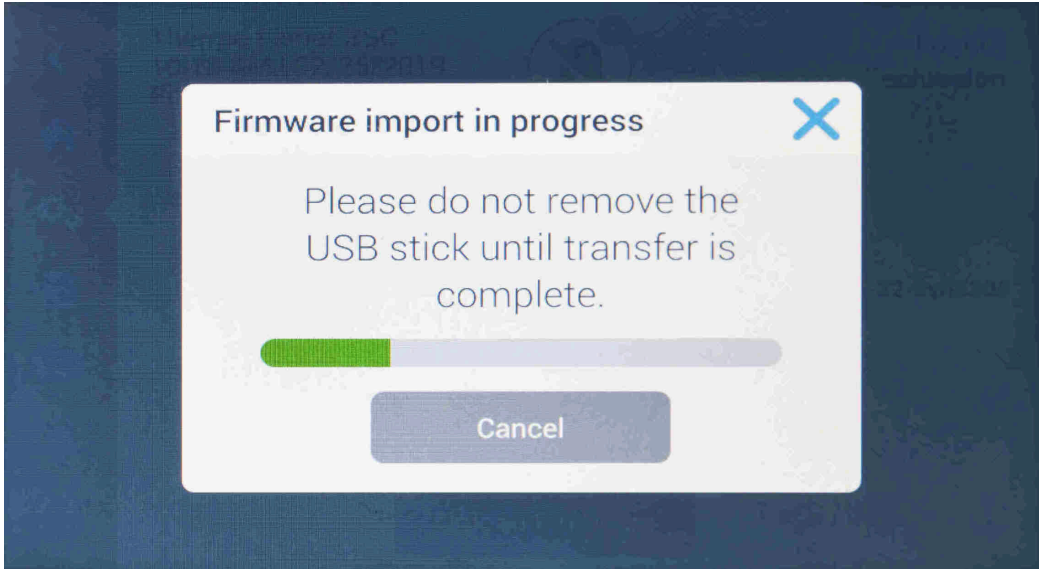
	Note: USB stick
	Minimum size of the USB stick is 500 MB. The USB stick must be formatted in FAT32 format.

	Note: Newest firmware
	The newest and current firmwares could be downloaded from the PSM database (only by Thermo technician) or from the Basic Knowledge database Talisma (for dealer/distributors).

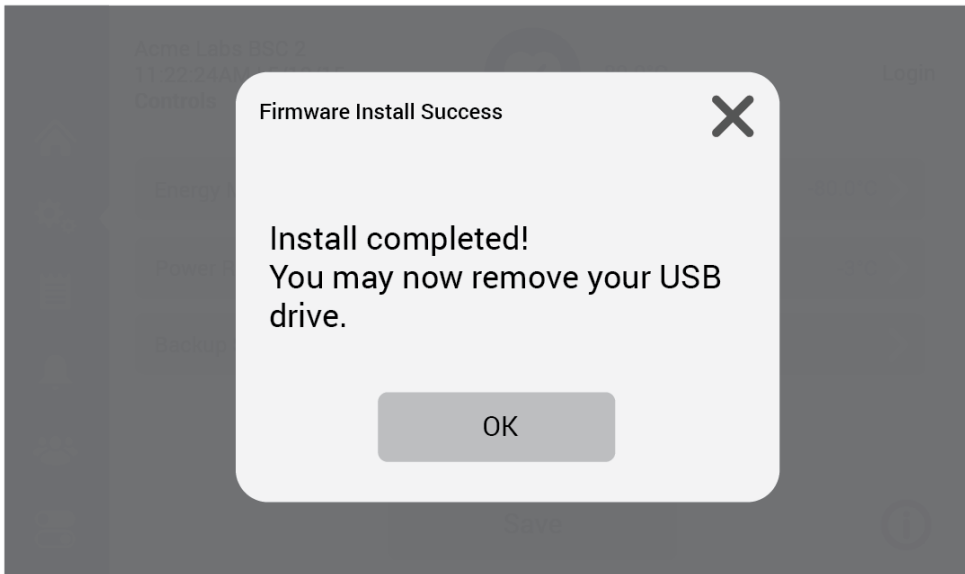


If multiple versions are available, show as a list and let user choose. If only one is available skip this screen and show the next screen instead.



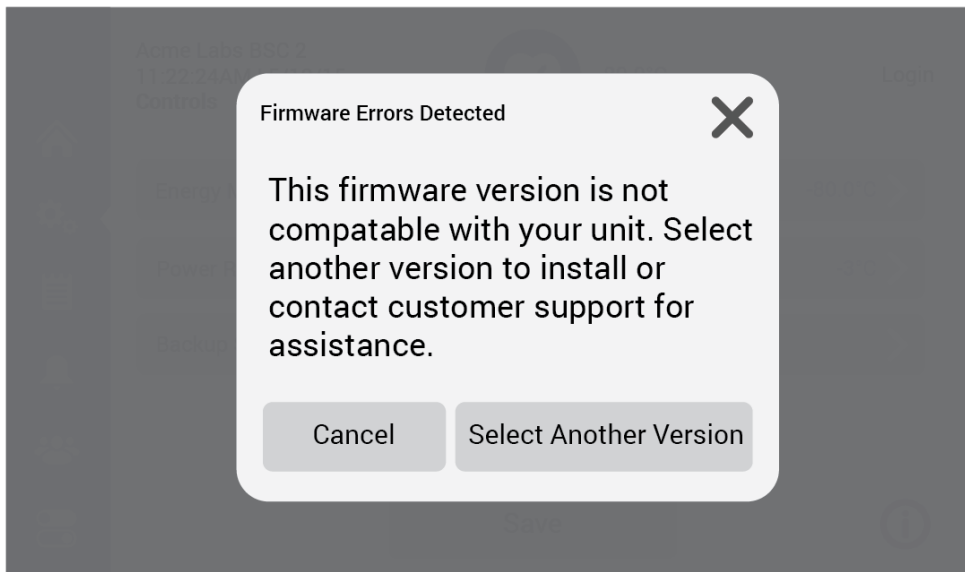


Once installed, start up unit and bring user to the home screen but show a pop-up window overlay for a brief period (5 seconds) confirmation of install.



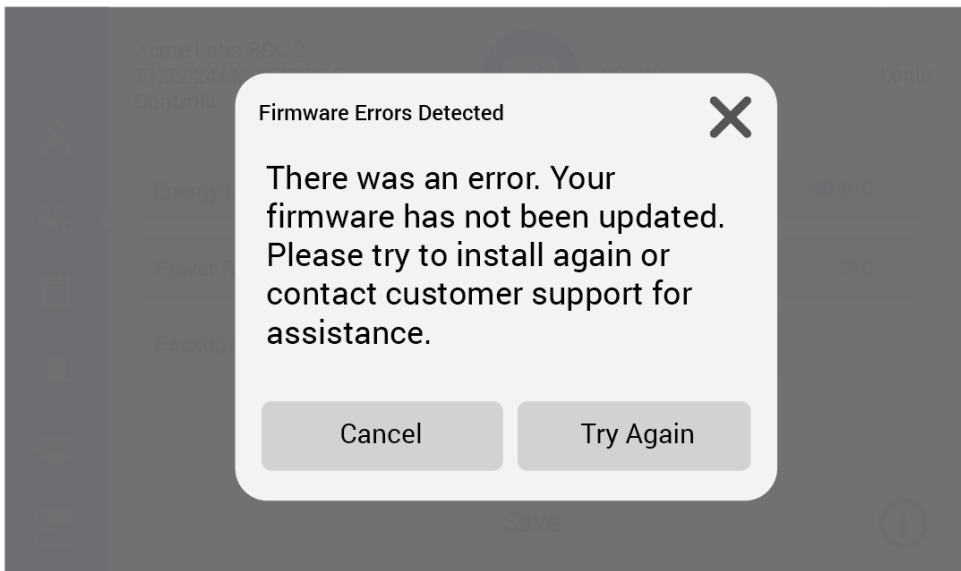
Error messages must be displayed as the following screens:


If the firmware version is not compatible, display the message shown on the screen below:




If multiple versions are available, bring the user back to the multi-select pop-up window when they tap on Select Another Version.

If there was any other type of error with install, display the message shown on the screen below:



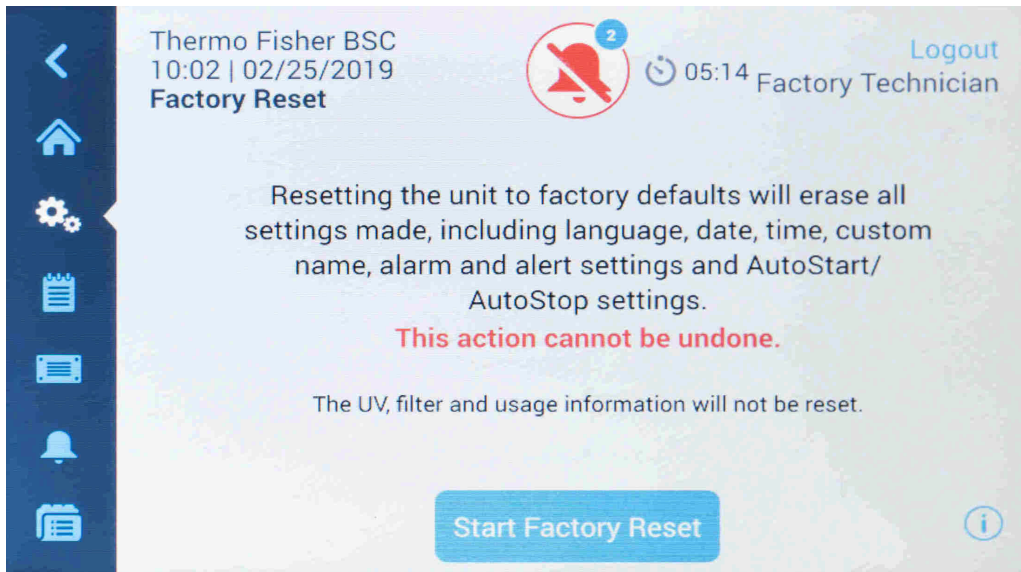
	Note: Check date plate
	After Firmware update check correct version of the data plate.



	Note: Firmware update
	A main power reset must be performed after firmware update!

Factory Reset

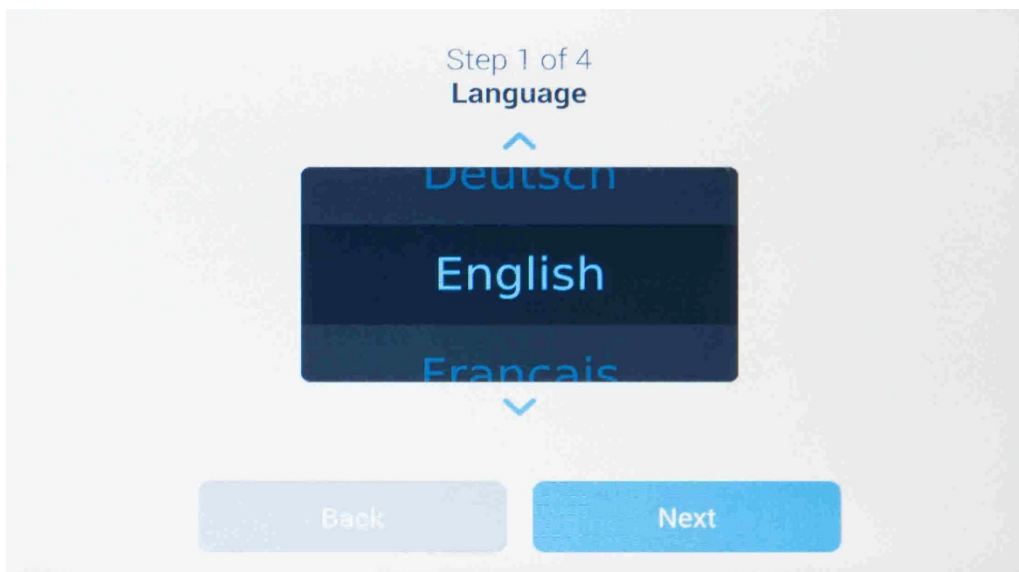
The Factory Reset screen must be displayed as in this wireframe mockup:

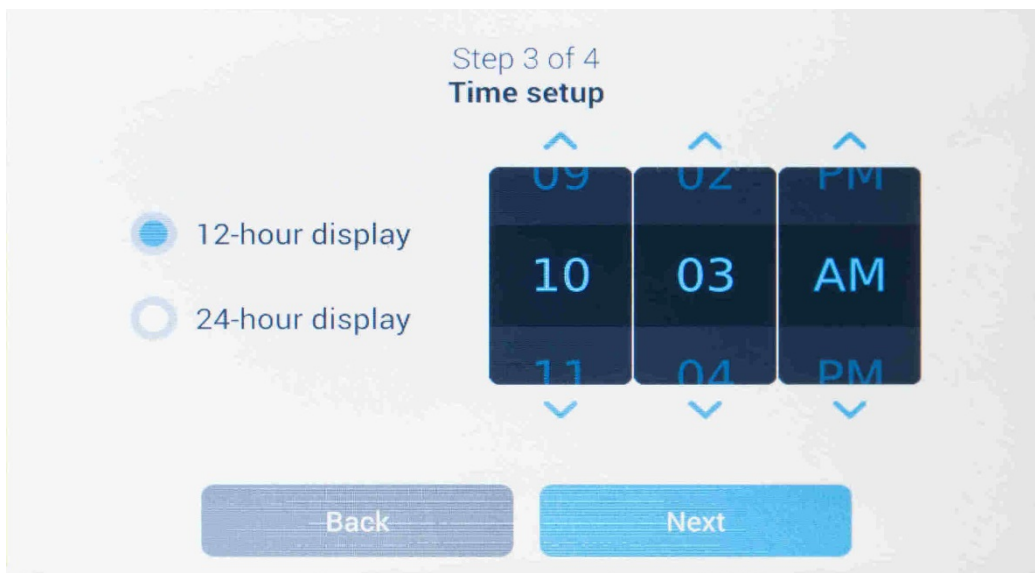
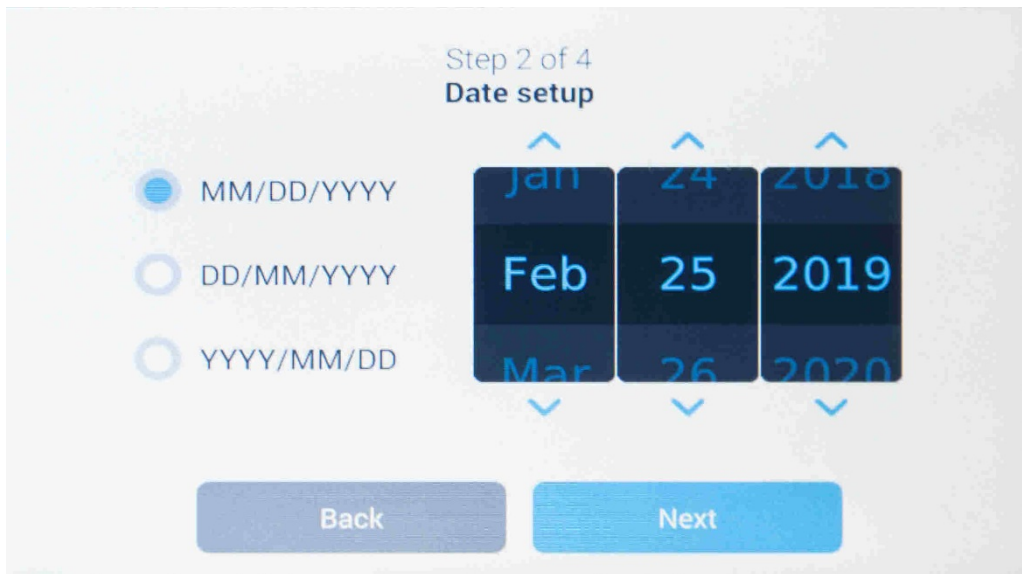


In order to begin the factory, reset, the user must tap the Start Factory Reset button at the bottom of the screen.

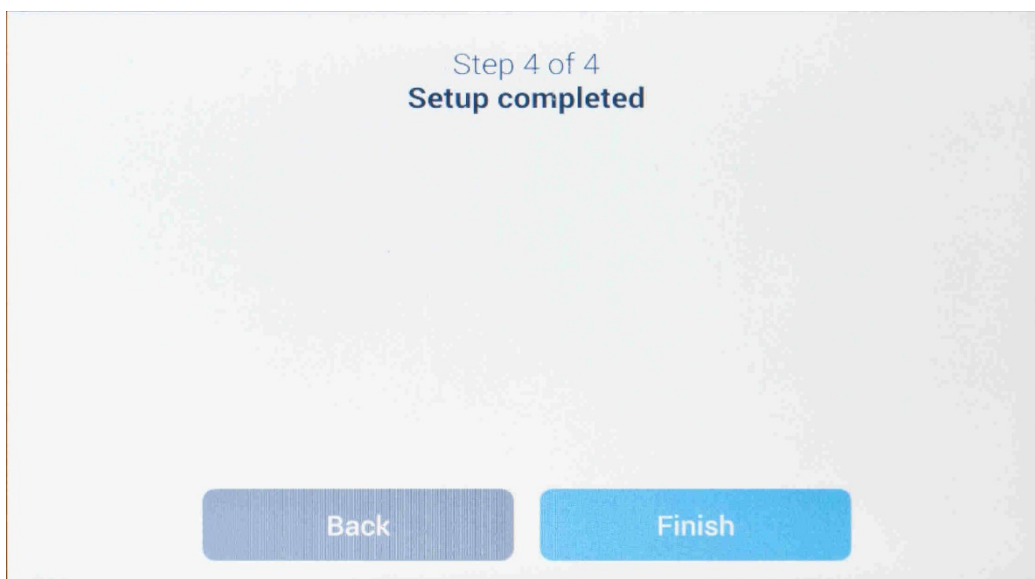
Features to be reset during the factory settings:

- Language
- Date
- Time
- BSC Name
- Alarm and Alert Settings (user changed)
- Reset the default pin code
- AutoStart/AutoStop settings

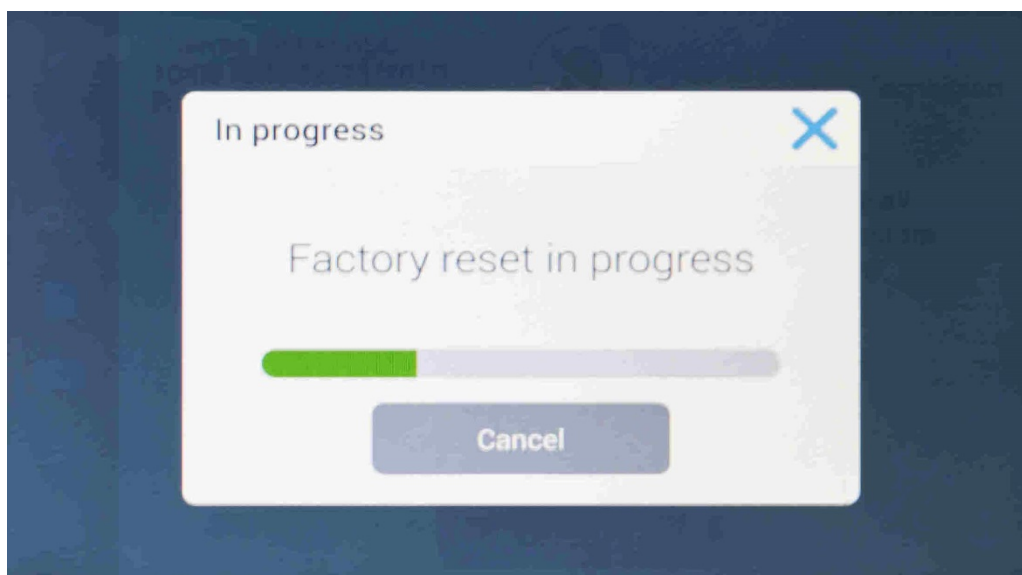




UV, filter, and usage information will not be reset as part of the factory reset.

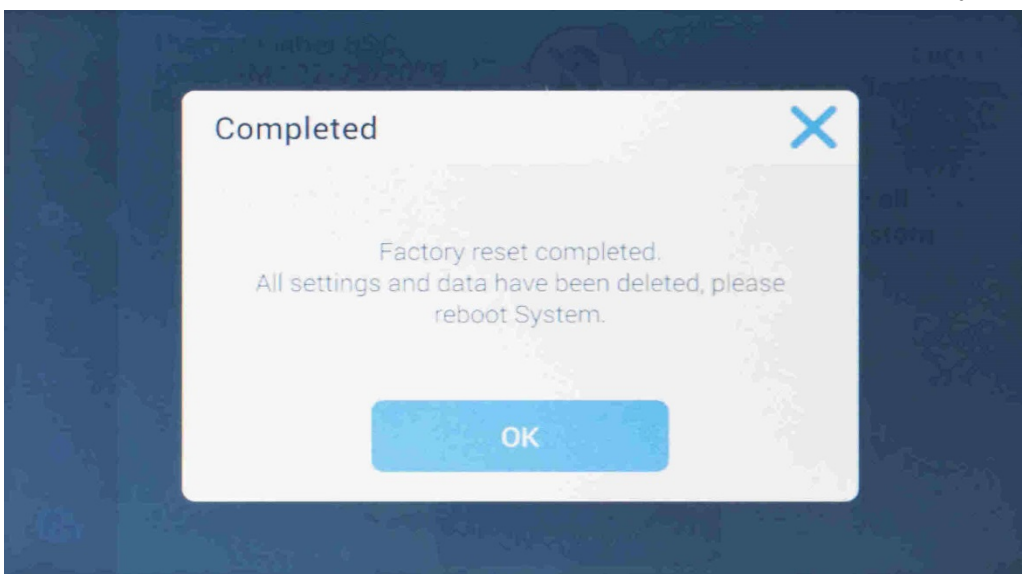


A pop-up window overlay with a progress bar must be displayed showing the factory reset in process:



If the user taps the cancel button or the X icon in the top right corner, the factory reset process must be aborted and the user must be taken back to the main Factory Reset screen.

Once the reset process is complete, a confirmation pop-up window overlay must appear:



This message must auto-close after 5 seconds. The user may also tap either the OK button at the bottom of the screen or the X icon in the top right corner to close the window.

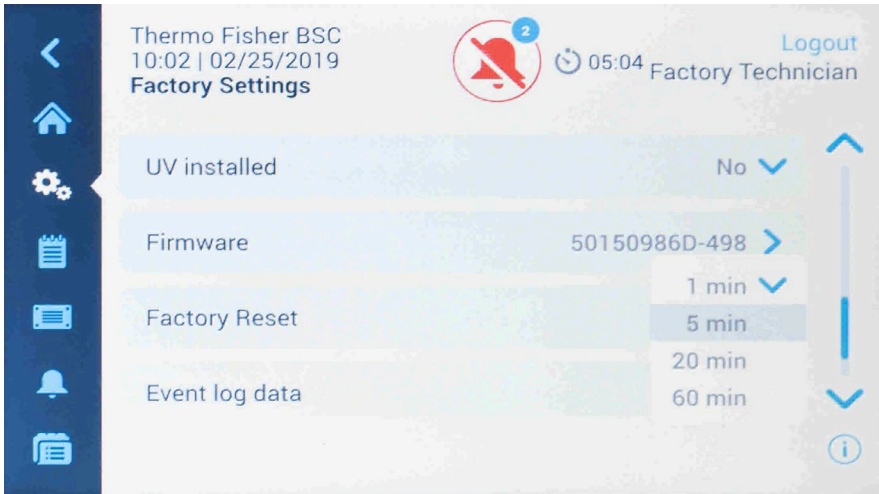
Regardless of the window auto-closing on the user tapping, the system must return the user to the Setup Wizard.

Event Log Data

User may change the interval time to capture event log data directly on the main Factory Settings screen by tapping on the dropdown list labeled Event Log Data and selecting one of the following:

- 1 min
- 5 min
- 20 min
- 60 min

Dropdown to reference this selection:

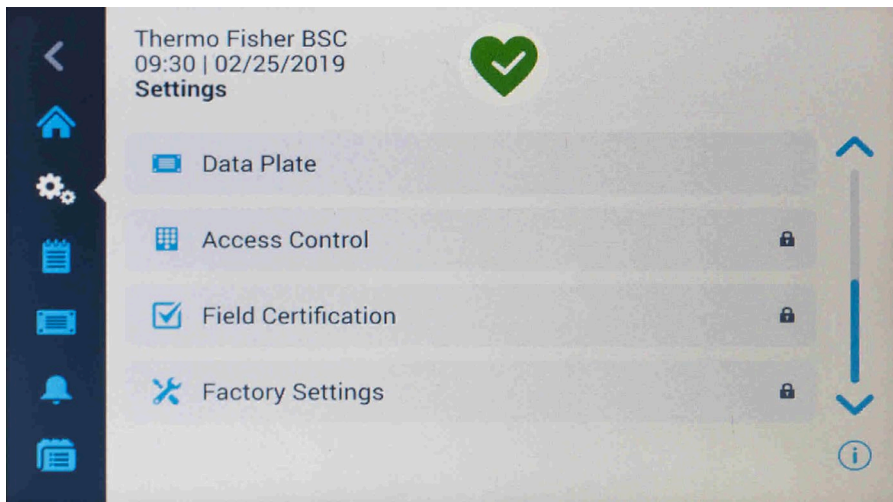


	Note: Default value
	Default is 1 min.

Once the user has made a change, they must tap the Save button that has appeared at the bottom of the screen to commit the changes to the system.

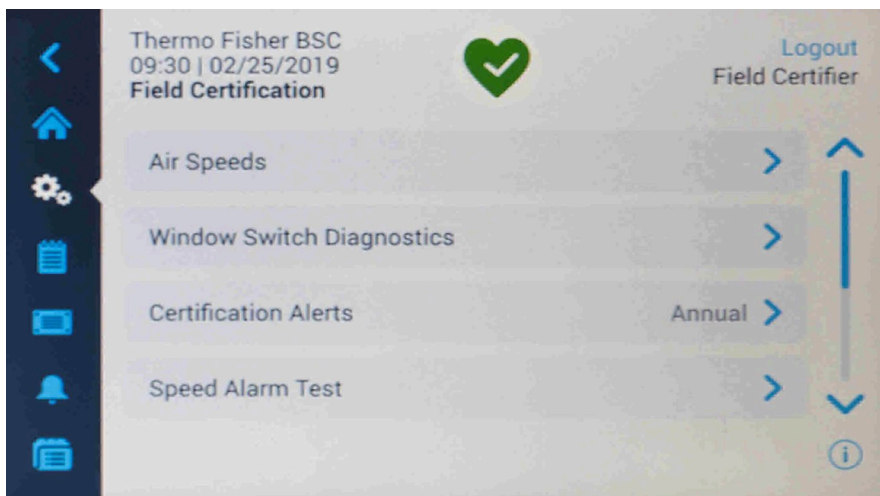
Field Certification

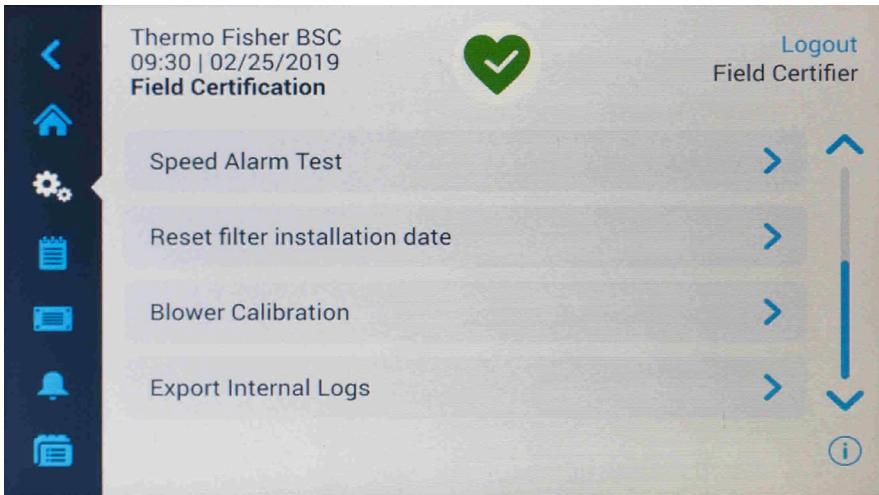
The Field Certification screen must be displayed as follows:



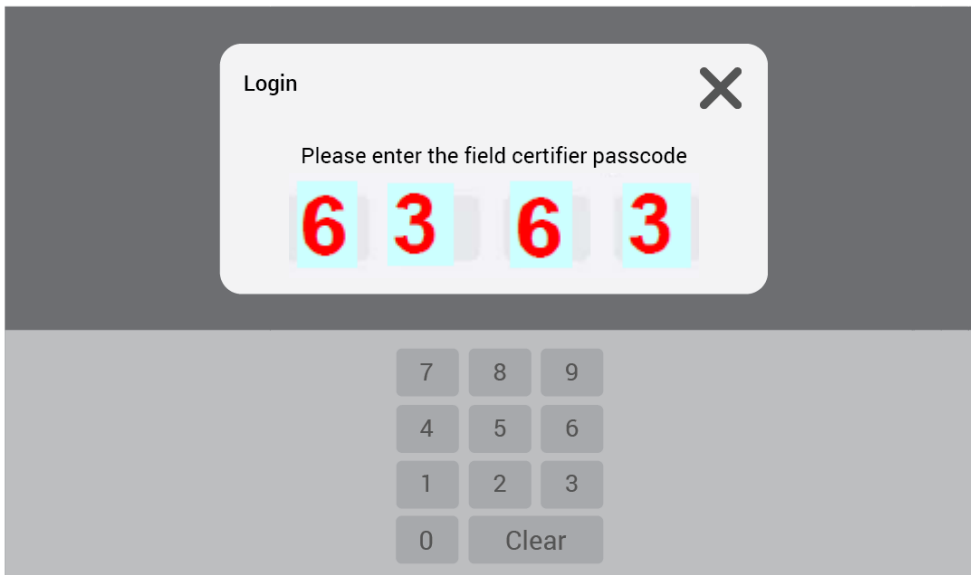
In the Field Certification screen the user can scroll through following different setting screens:

- Air speeds
- Windows Switch Diagnostic
- Certification Alerts
- Speed Alarm Test
- Reset filter installation date
- Blower Calibration
- Export Internal logs





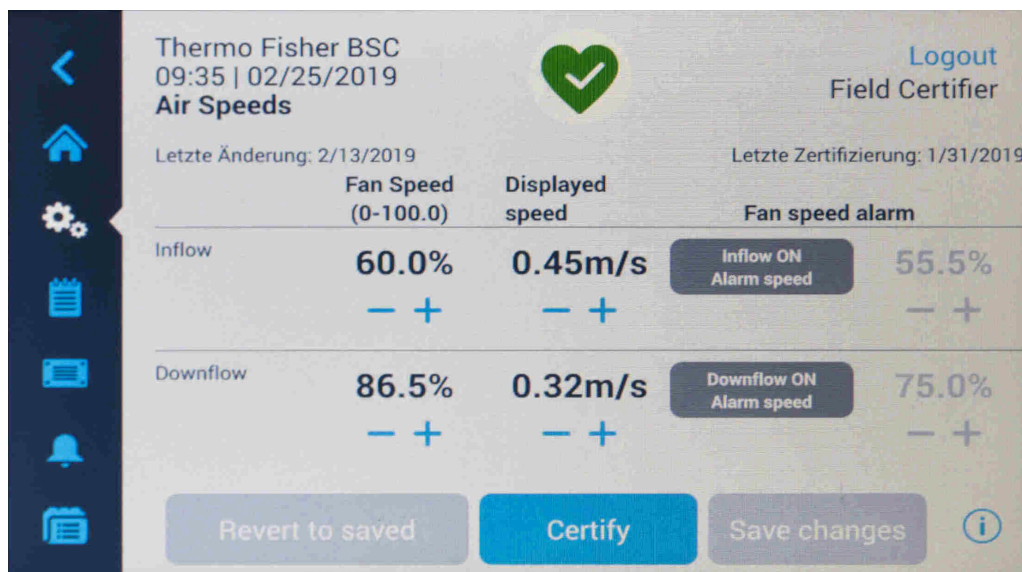
The Field Certification section can only be accessed by typing in the Field Certification passcode. If any user taps on the Field Certification button from the main Settings screen the user must be prompted to enter a passcode as shown in this wireframe mockup example:



Once the user has successfully logged in to the system, the Field Certifier screen may be displayed.

Air Speeds

The Adjust Air Speeds screen must be displayed as in this visual mockup:

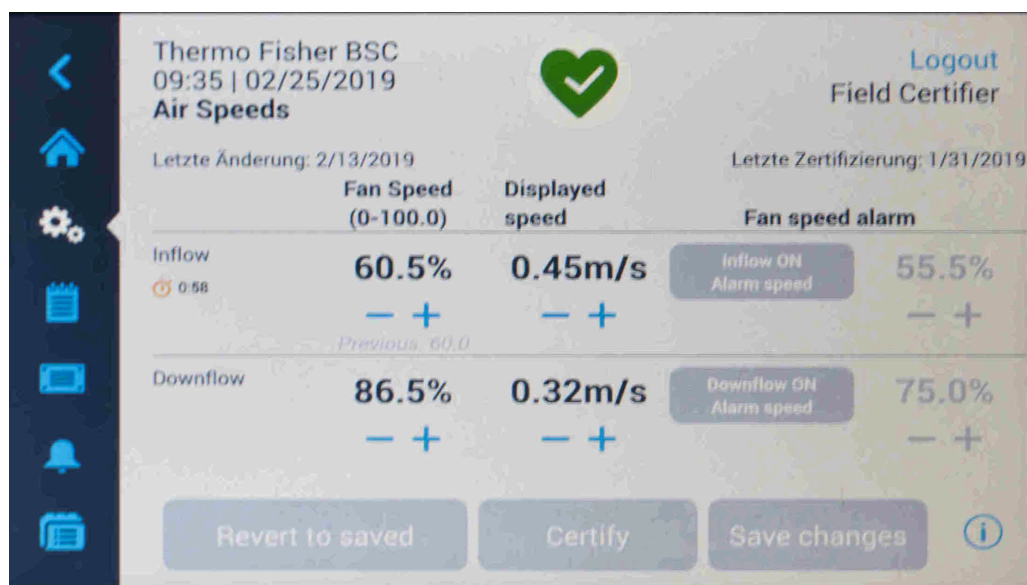


Audible alarms are silenced while on this screen as the BSC is now in Service Mode. Flow compensation and acoustical alarm is turned off.

Fan speed / Displayed speed


Typically, before editing anything on this screen, the technician will place an airflow device inside the main compartment of the biosafety cabinet, turn the fans on and then test to make sure the values displayed on the screen shown above, match the values on their separate equipment.

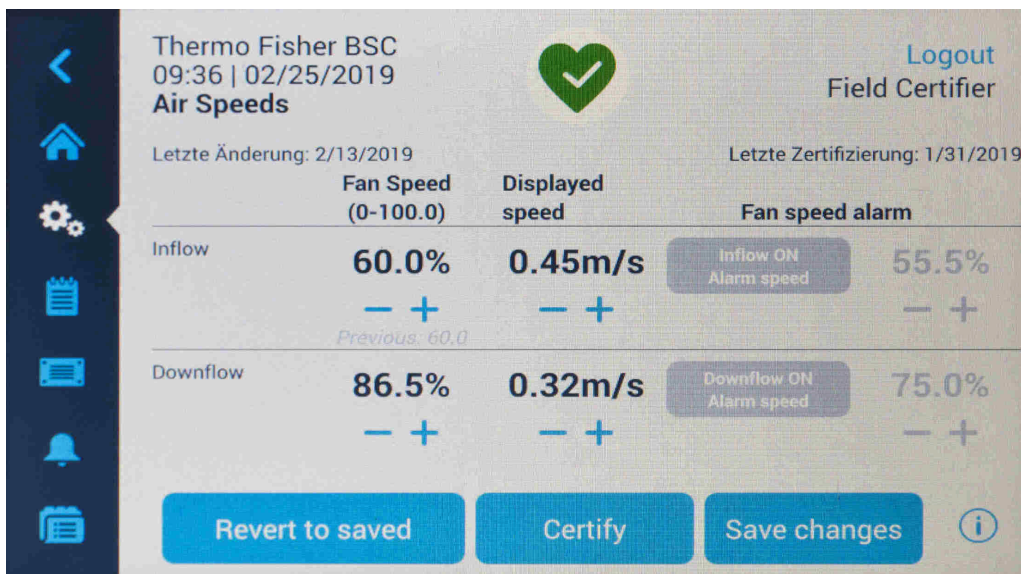
If the values match, the technician does not need to make any changes. If the values do not match then the technician may tap any of the blue - or + icons underneath the fan speed and displayed velocity settings for both inflow and downflow to change the onscreen values.



If the tech makes a change, the previous saved setting must be displayed directly below the setting they have changed. An animated timer icon and a 1-minute countdown timer appear in the row they are editing directly under the row label (example below shows the Inflow Fan Speed has been changed from 85.0% to 86.0%.) The Certify and Save Changes buttons are inactive lighter grey.

When the timer has completed, the following screen must be displayed:

	Note: Displayed speed adjustment
	If the display air speed must be adjusted/changed, then a complete blower air speed and fan speed adjustment is necessary!



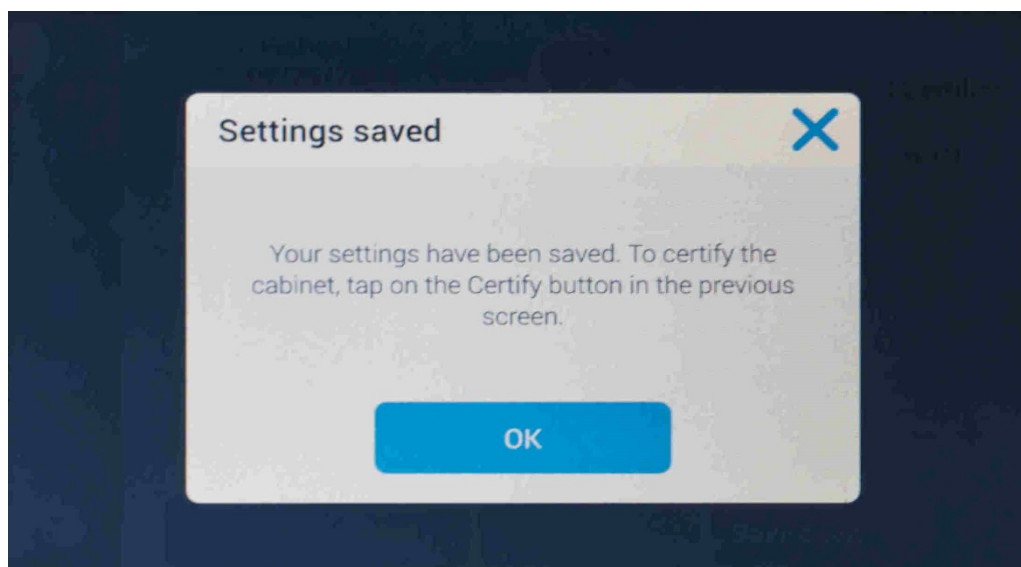
The animated timer icon has changed to a green checkmark and the timer is now reading 0:00. The Certify and Save Changes buttons are now Blue Action.

Technicians can continue to make adjustments and the timer/checkmark/inactive/active buttons sequence will repeat as they make changes on screen.

When the technician is finished, they may:

1. Tap the Save Changes button to save their settings
2. Tap the Certify button to save the date of the completed certification.

Once the user taps the Save Changes button, a pop-up window overlay screen must appear stating:



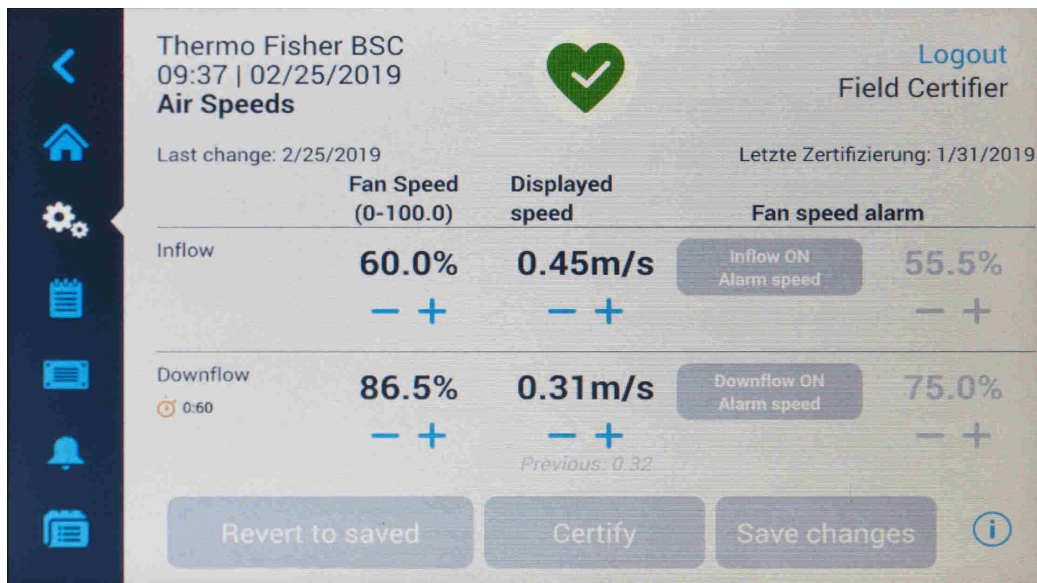
The pop-up window overlay must have an OK button which will close the window if tapped, an X icon in the top right corner which will close the window if tapped, and a header in the top left corner that states: Settings Saved

Pop-up Window Overlay must auto-close after 5 seconds.

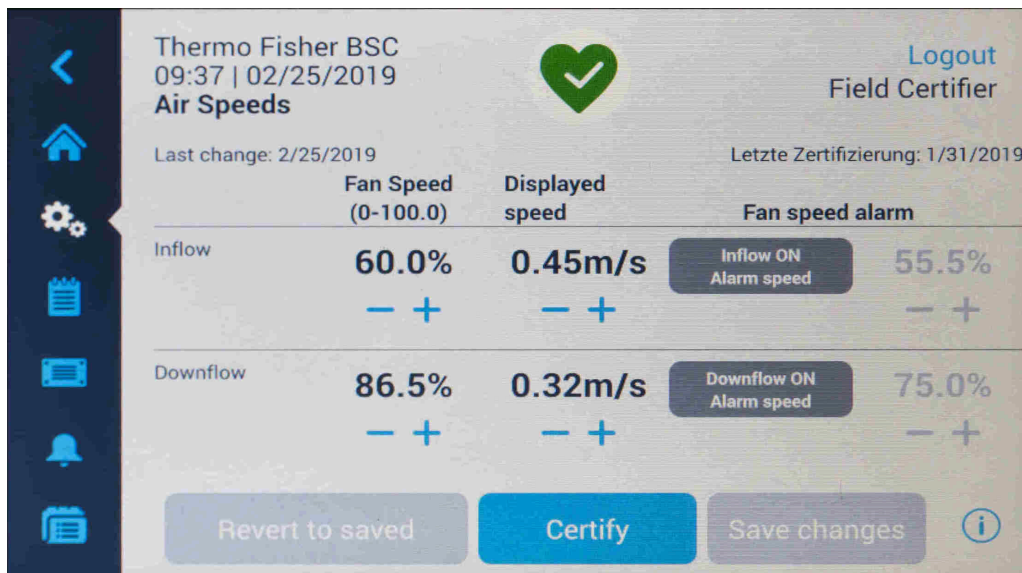
Regardless of the window auto-closing or the user manually closes the window, the user must be returned to the main Field Certification screen which now reflects today’s date in the “Last Change” section.

Fan Speed Alarm

Technicians may adjust the alarm fan speed of either the inflow or downflow. In the following example, the user has already tapped the “Activate inflow alarm speed” button. The button has changed to read “De-activate inflow alarm speed” and the button below for downflow is now shown as inactive. The % measurement to the right of the button is now fully editable with - and + icons below the measurement. To the left under the main inflow header is an animated countdown timer icon and countdown timer. When the timer is finished, the “Save Changes” button at the bottom of the screen turns to Blue Action allowing the user to save any changes they have made.



The following screen shows the countdown timer finished and the alarm fan speed changes with previous setting.



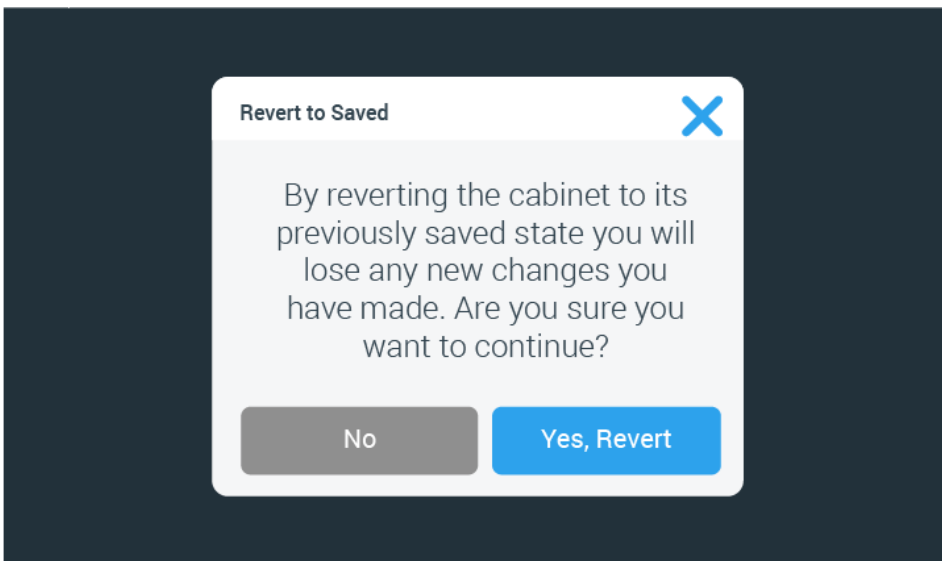
If the user would like to now edit the downflow in the example above, they must first de-active the inflow, allowing both buttons to turn to darker gray. The same timer workflow will be displayed for the downflow alarm speed.

The previously noted Save and Certify settings apply during this alarm fan speed procedure.

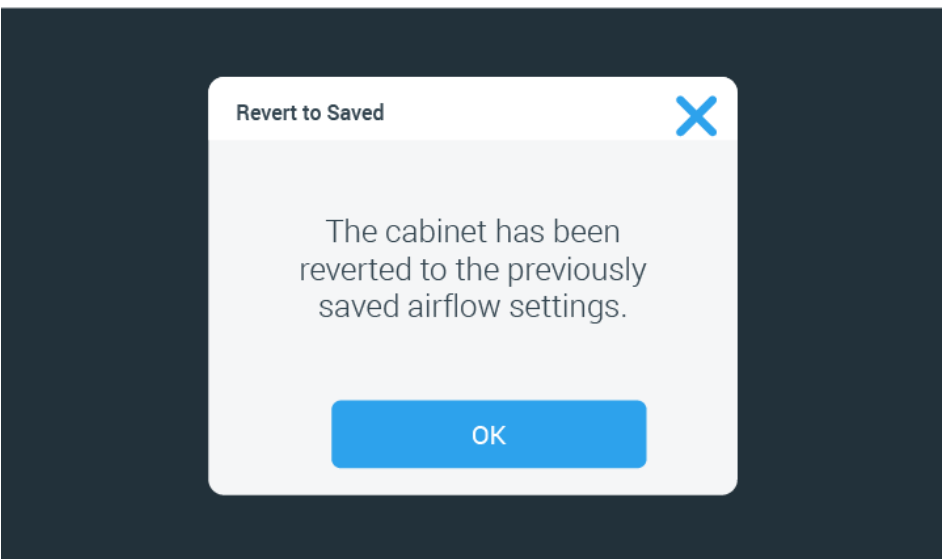
Note that certifications and saving settings are two separate items. A technician may adjust settings but not certify the cabinet as the cabinet may not need to be certified. A technician may also not need to change any settings to certify the cabinet.

At any time, if the technician needs to navigate away from the main airflow screen, they may tap the back icon in the left nav.

The “Revert to Saved” button will revert the cabinet to the last saved state. This is in case the technician has made a mistake during editing and wants to easily revert. A pop-up window overlay must be displayed if this button is tapped:

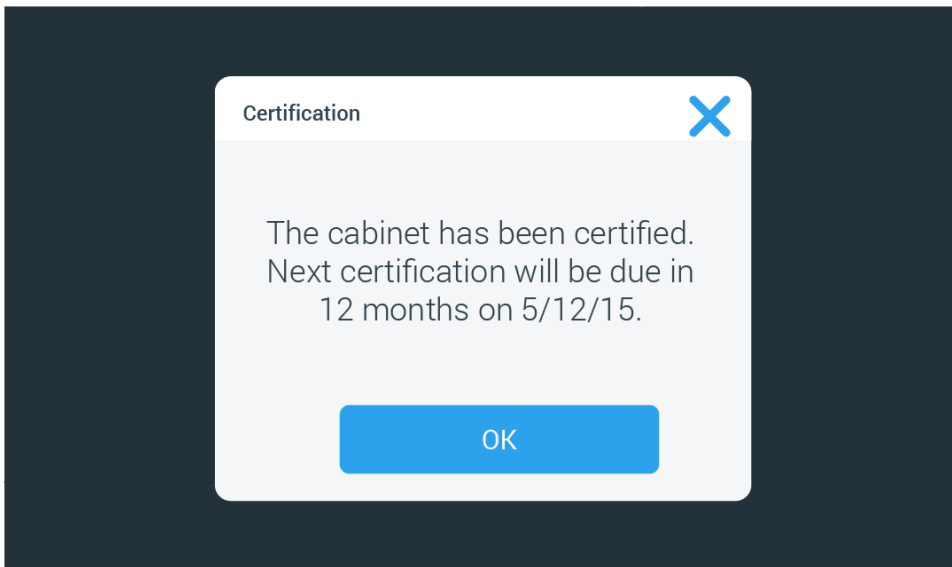


Tapping yes, revert will revert the settings to the previously saved settings and show a confirmation pop-up window overlay as shown below. Tapping no will close this window and return the user to the previous screen without any changes.

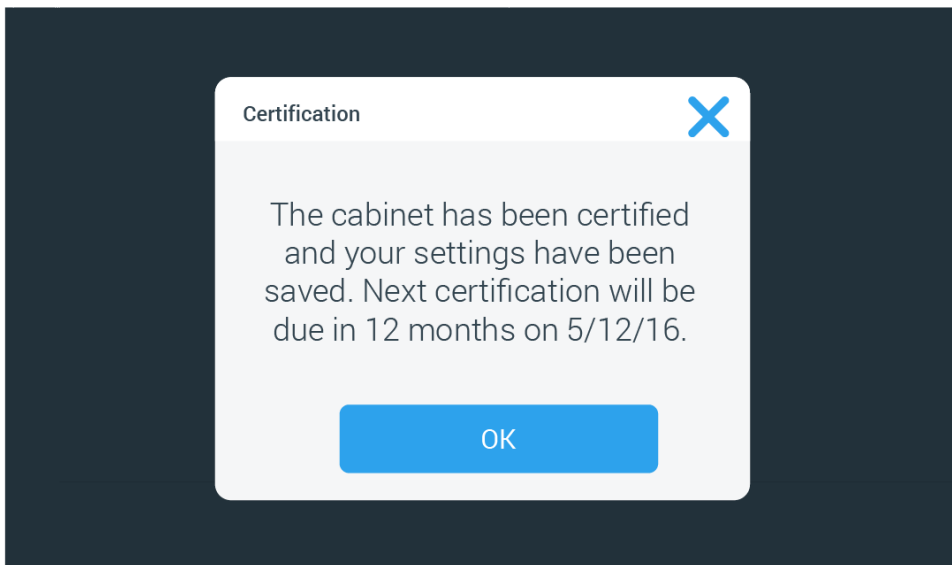


Certifying

The technician may certify the cabinet at any time (excluding while the countdown timer is active on screen.) Certifying the cabinet will update the certification date shown at the top of the screen to today's date. If no changes to the inflow/downflow have been made, once the user taps the "Certify" button, the following pop-up window overlay must be displayed:



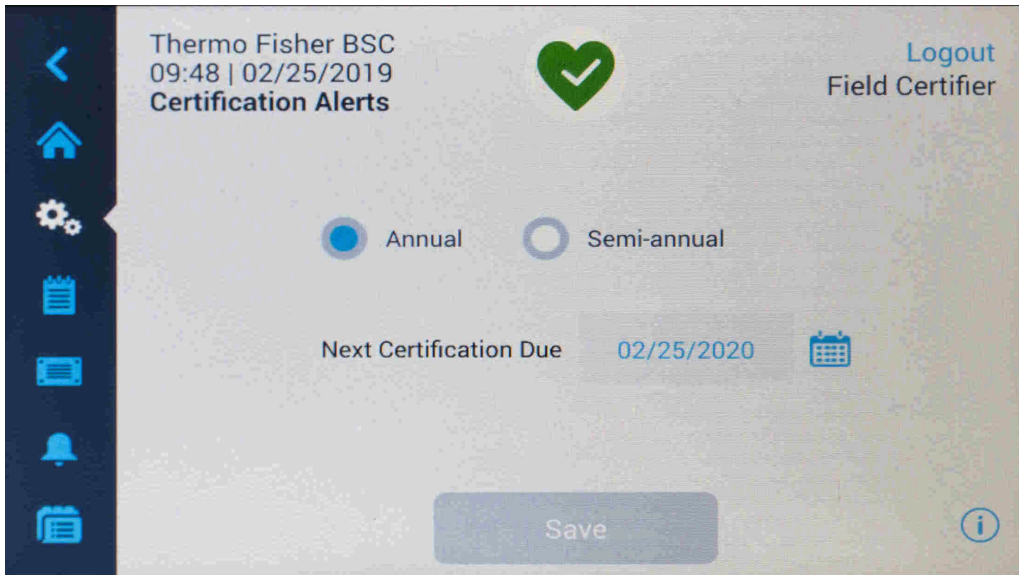
Tapping the Certify button will also save any changes if any have been made. If the user has made changes to the inflow/downflow and tap "Certify" before tapping the "Save Changes" button, the following pop-up window overlay must be displayed:



Regardless of saving settings or certifying, the main Air Velocities screen must auto-update and reflect the last saved date and the last certification date.

Certification Alerts

The certification alerts allow the technician to change the timeframe of certification, which in turn changes when the cabinet will alert the user it is time for certification (yellow warning status.)



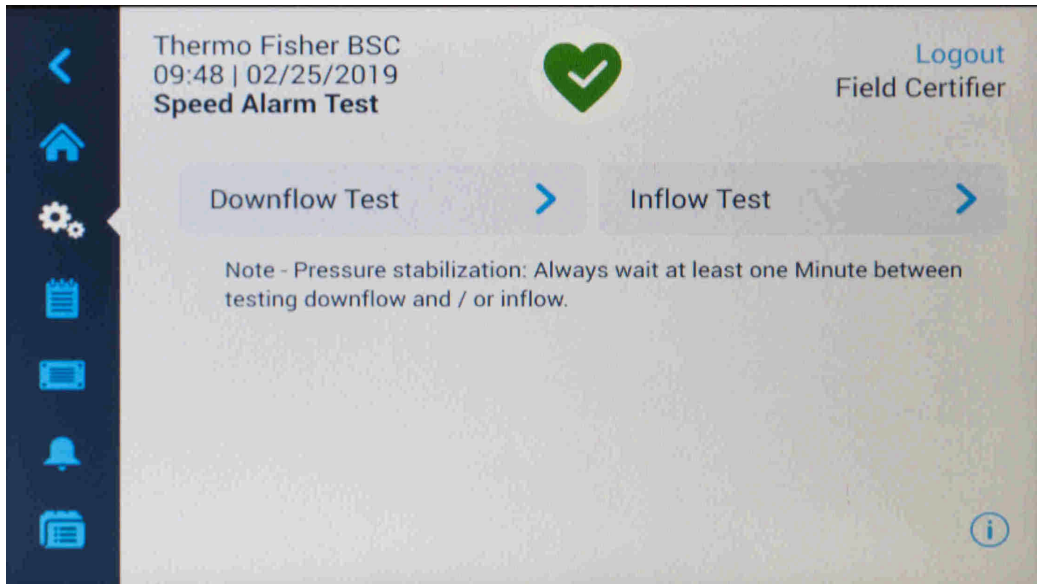
The default setting is Annual, and the default date in the case of a brand new cabinet just being set-up for the first time would be the date the cabinet was first turned on.

Users may change the start date of the alerts by tapping into the date field and selecting from the wheel picker the date they would prefer. For example, the user has just received a brand new cabinet on March 3, 2017. By default, the first notification to the user to have the cabinet certified would be two weeks before March 3, 2018. But the technician always does the certification in December. The technician can change the date to December 1, 2017 so the user is notified certification is due at his regularly scheduled visit.

In addition, the technician can change the frequency to semi-annual.

Speed Alarm Test

If the technician taps the Speed Alarm Test from the main Field Certification screen, the following screen must be displayed:



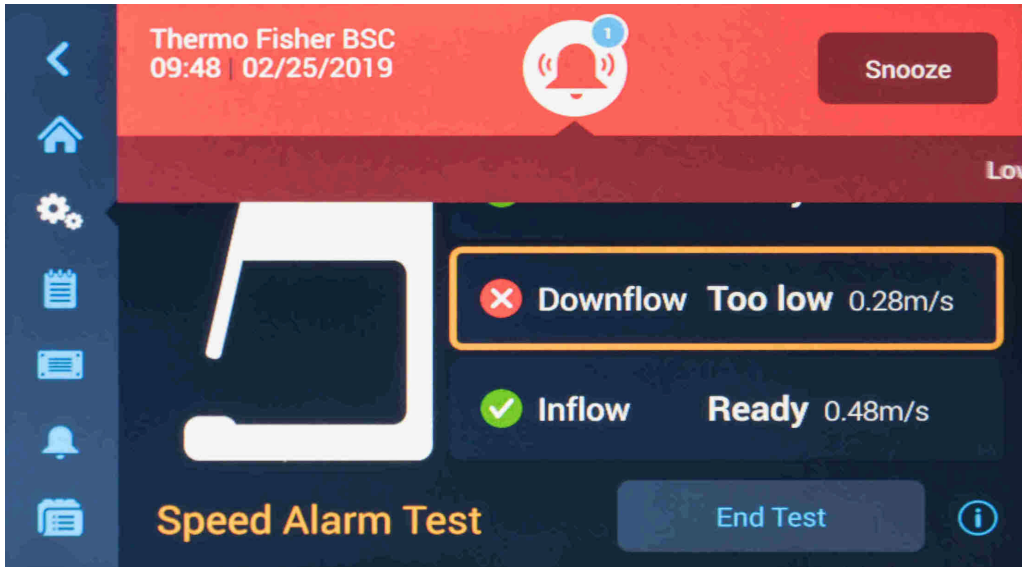
User must choose if they would like to perform a downflow or inflow test by tapping on one of the two buttons displayed. Directly below the two buttons is descriptive copy explaining to the technician the steps involved with performing this test. An instructional text will be provided at a later date by the product manager.

The following workflow assumes the user has tapped the “Test Downflow” button.

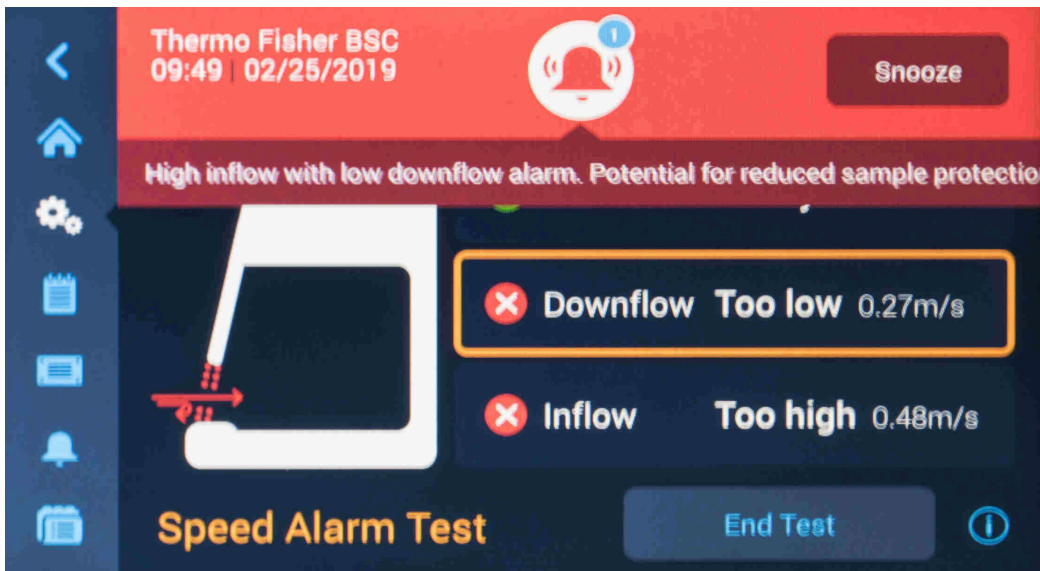
The home screen must be displayed with a prominent “Velocity Alarm Test” in Yellow Warning to signify the cabinet is in a test state. The buttons to control the unit are temporarily hidden and have been replaced with an “End Test” button. Tapping the End Test button will bring the user back to the main Velocity Alarm Test screen shown above.

As this a downflow test, the downflow box is highlighted with a yellow warning border.

	Note: Pressure stabilization
	Wait always min. 1 min between testing Downflow and/or inflow velocity test.



The fans which were on for the test start to slow down to simulate an alarm. The m/s or fps reading slowing lowers and when it reaches the alarm point the following screen must be displayed:

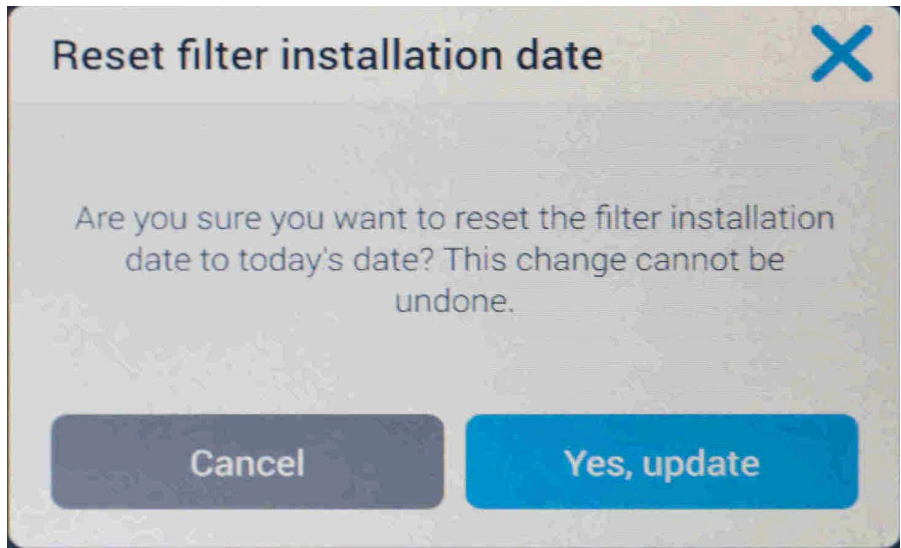


Users can snooze the alarm or press the end test button.

The same procedure will be followed for an inflow test with the proper fields highlighted.

Reset Filter Install Date

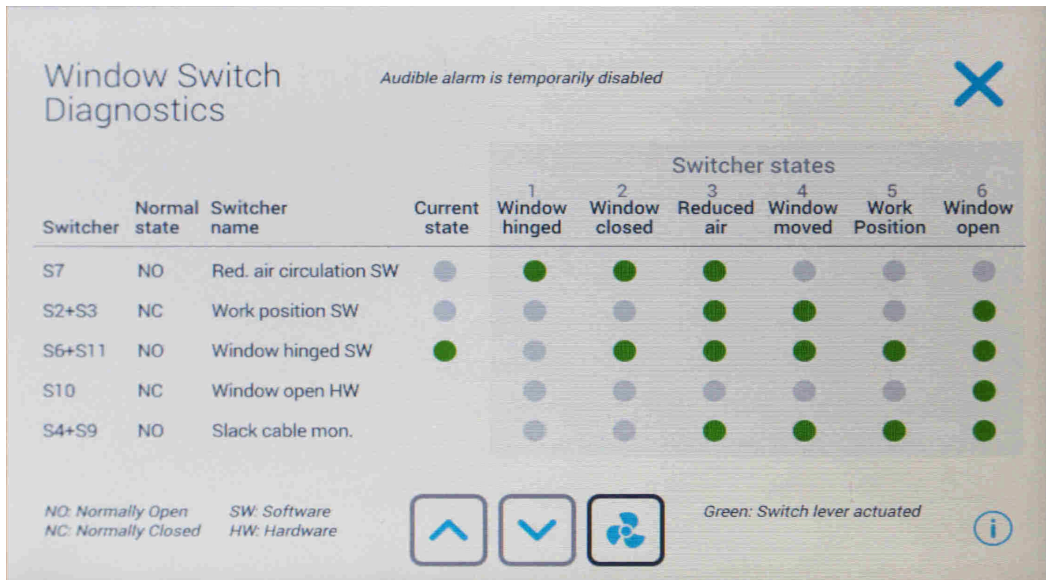
If the user taps the Reset Filter Install Date button from within the Field Certification section, the following prompt must appear as in the wireframe image below:



Tapping the Yes, Update button at the bottom of the screen will update the install date to today's date and will reset all of the other information associated with the Filter usage (total hours and last cycle.) Users may also tap the cancel button or the X icon to discard the changes and be brought back to the previous screen.

Window Diagnostics

The Window Diagnostics screen must be displayed as in this wireframe mockup:



☞	Note: Fans on
	The fan button has a dark-blue border to signify the fans are on.

About this screen

Window Diagnostics

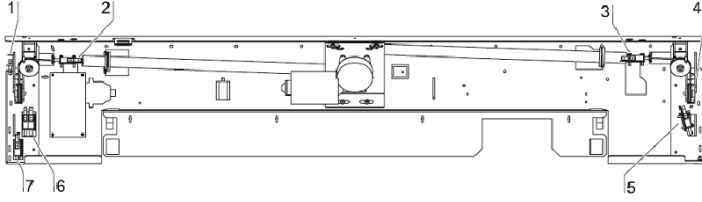
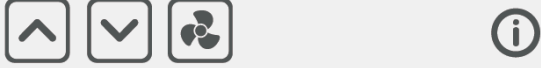


Fig. 36 Position switches

Descriptive text here in this space, can include graphics and links to other pages. Scroll bar on the right if needed. Product Manager to provide all content for info overlays for all screens. Users can tap the X icon or the i icon again to close the overlay.

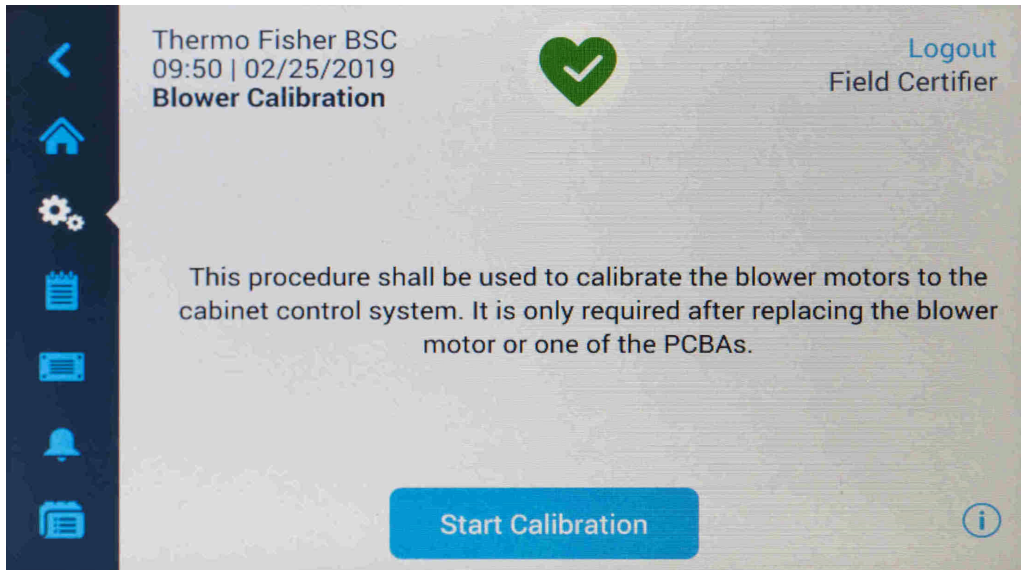
NO: Normally Open SW - Software
 NC: Normally Closed HW - Hardware



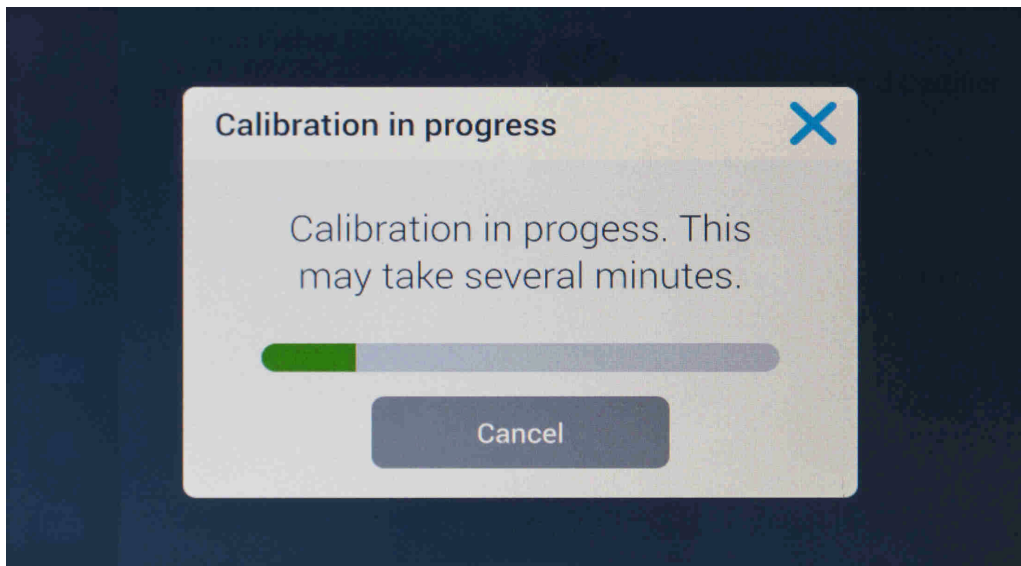
Technicians will be raising and lowering the window to activate different switches. The gray circles will turn green to signify which switcher states are active. Techs may also turn the fans on/off from this screen.

Calibrate Blowers

The main calibrate blowers screen must be displayed as in the following:

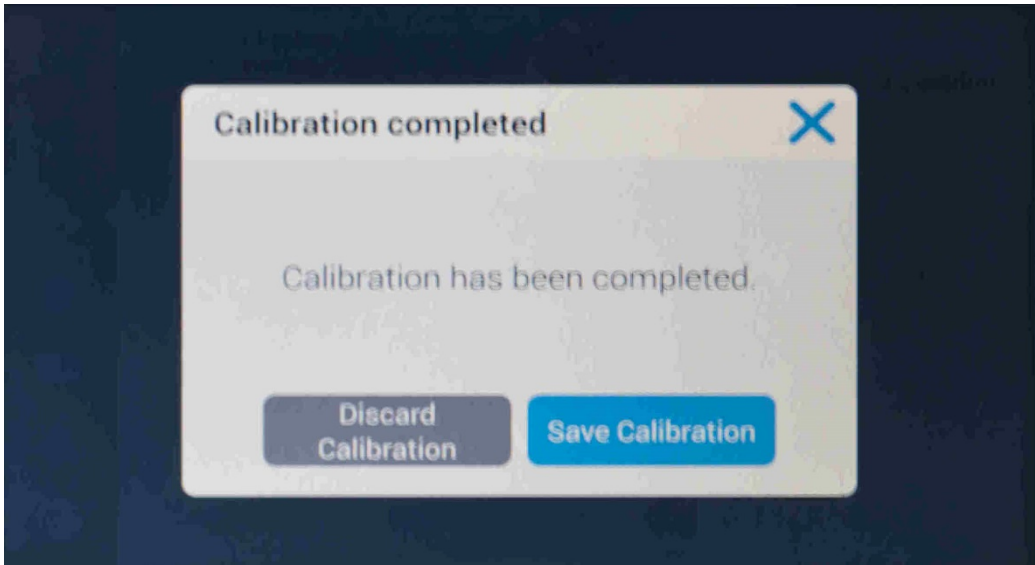


Users must tap the start calibration to begin. A pop-up window overlay will appear as in the following:

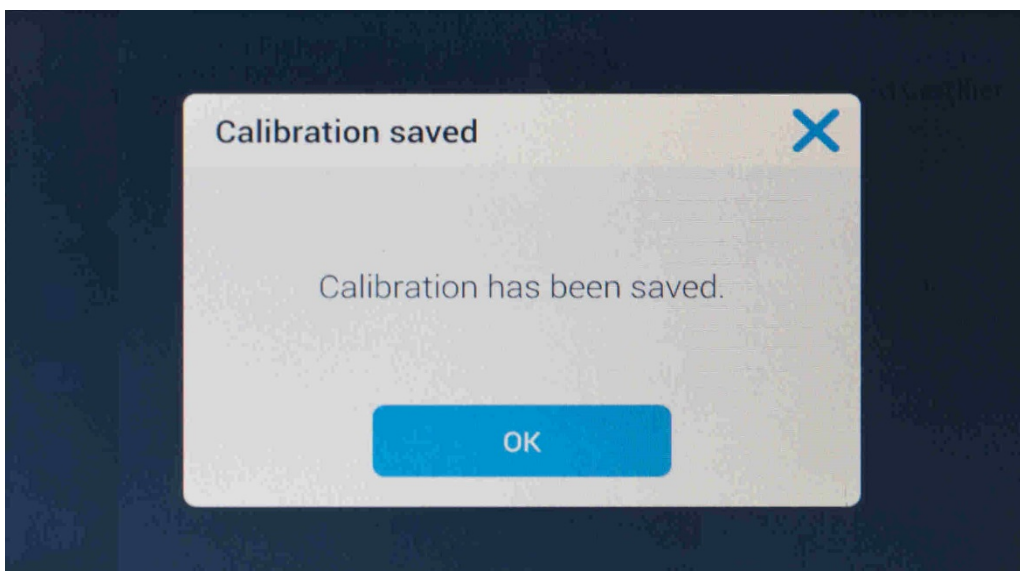


The user may tap the cancel button or the X icon in the top right corner to cancel the calibration and be returned to the main Calibrate Blower screen.


When the calibration is complete, the following screen must be displayed:



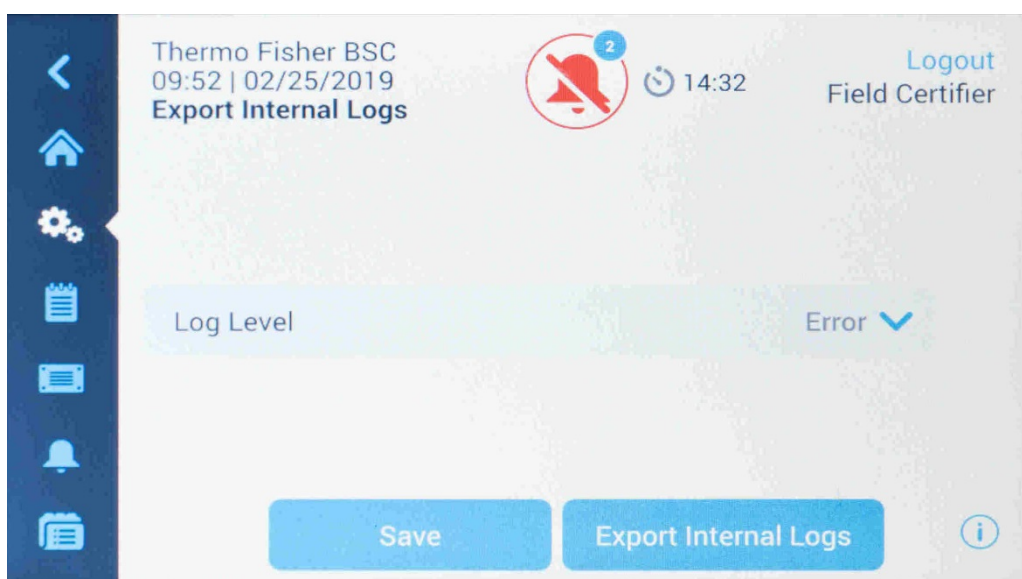
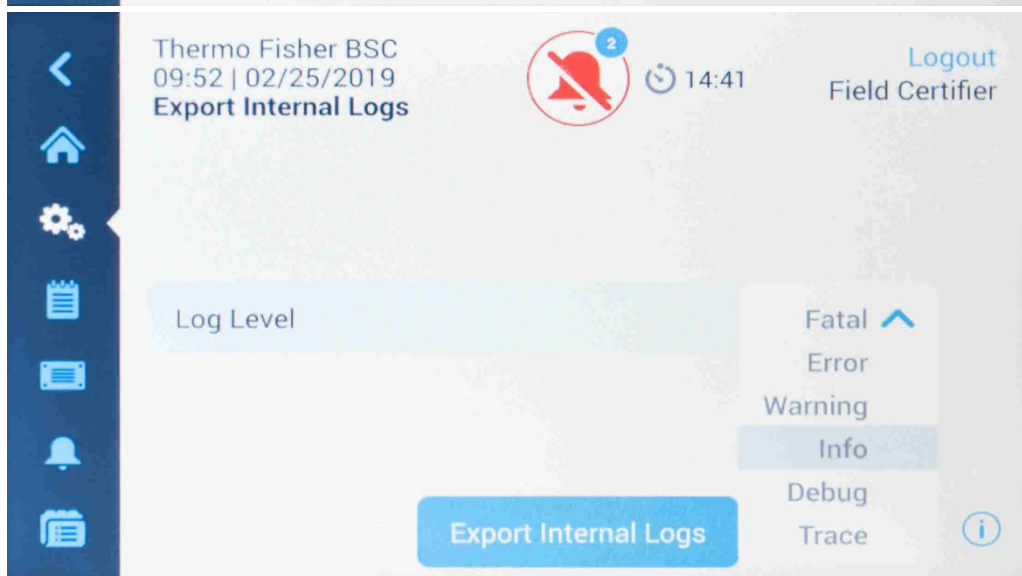
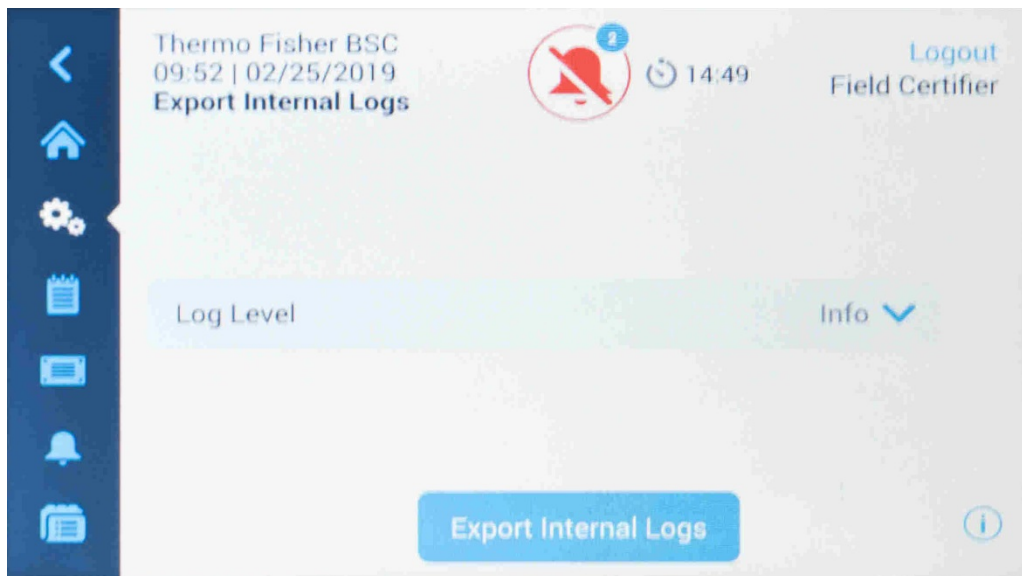
Users may save the calibration or discard the calibration. Tapping the Save Calibration button will display a "Calibration Saved" pop-up window overlay.

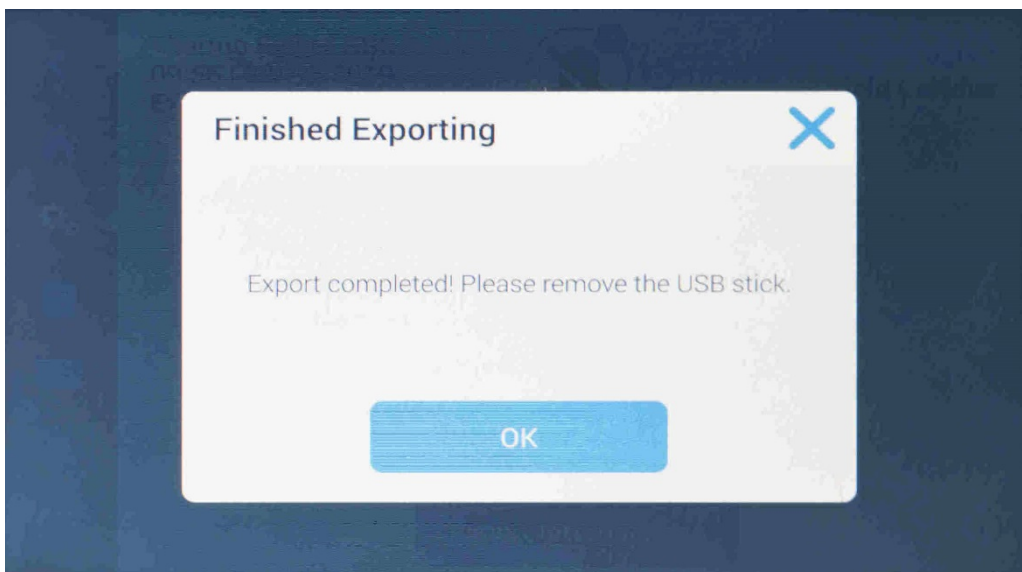
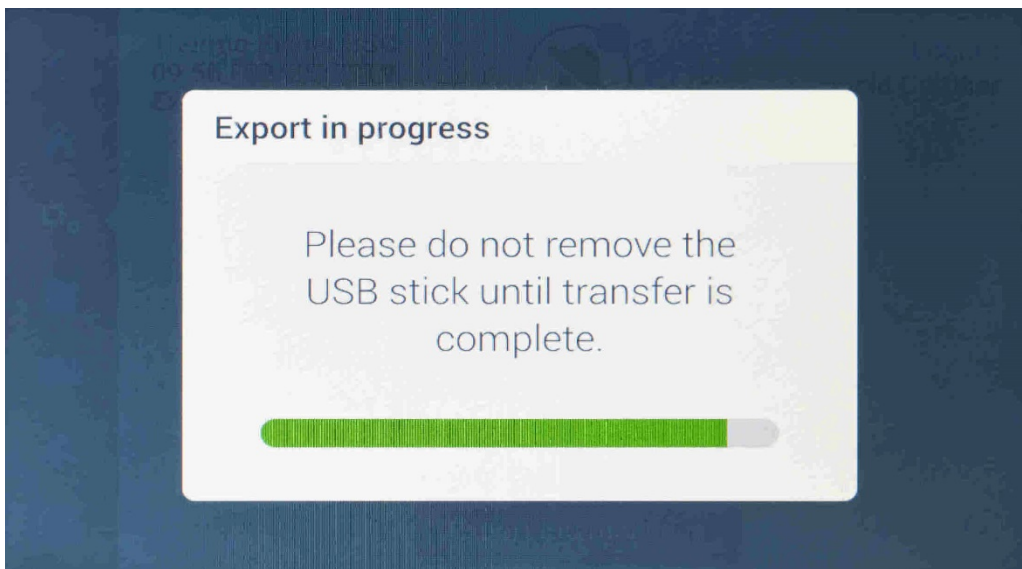
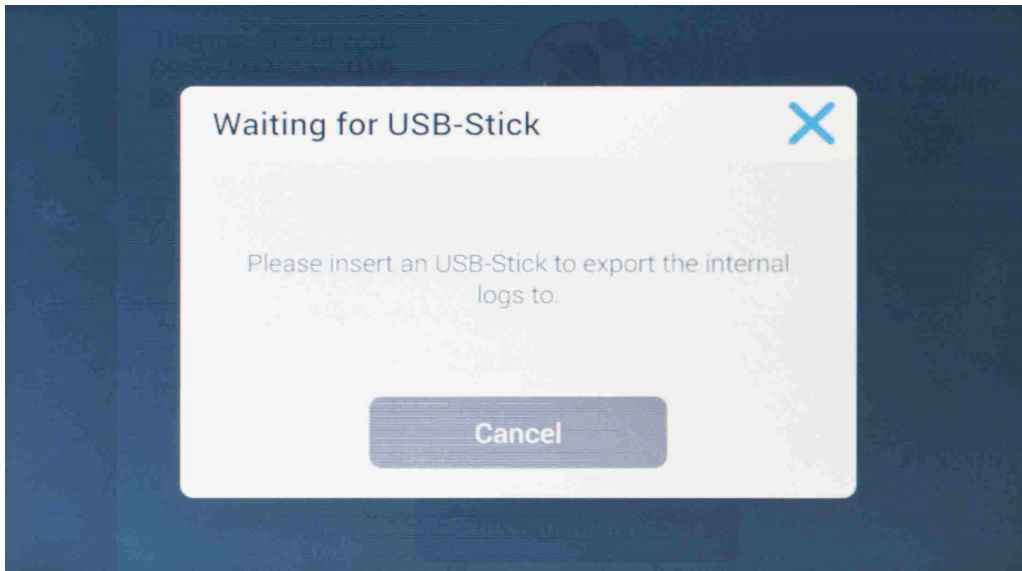


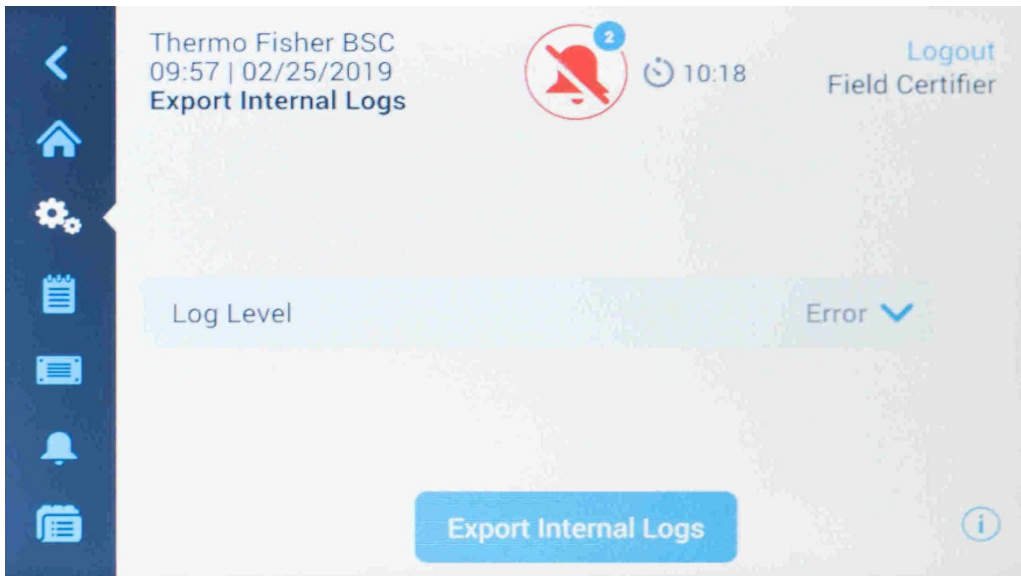
Tapping the Discard Calibration button will take the user back to the main Calibrate Blowers screen.


	Note: Blower and mainboard replacement
	The No-load current blower calibration is always needed after blower and mainboard replacement.

Export Internal Logs








	Note: Manual
	For further information see also the user manual.

PC Service Software

Initial Software installation

The Service software is the PC program GUST2_V4_0.

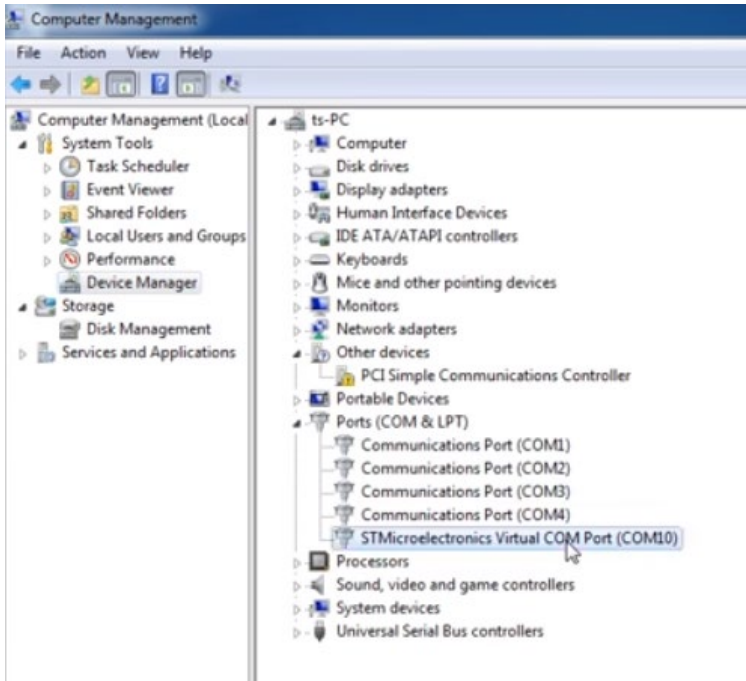
- All parameters read-only,
- All functions of the microswitches visible, only,
- A serial number can be inserted.

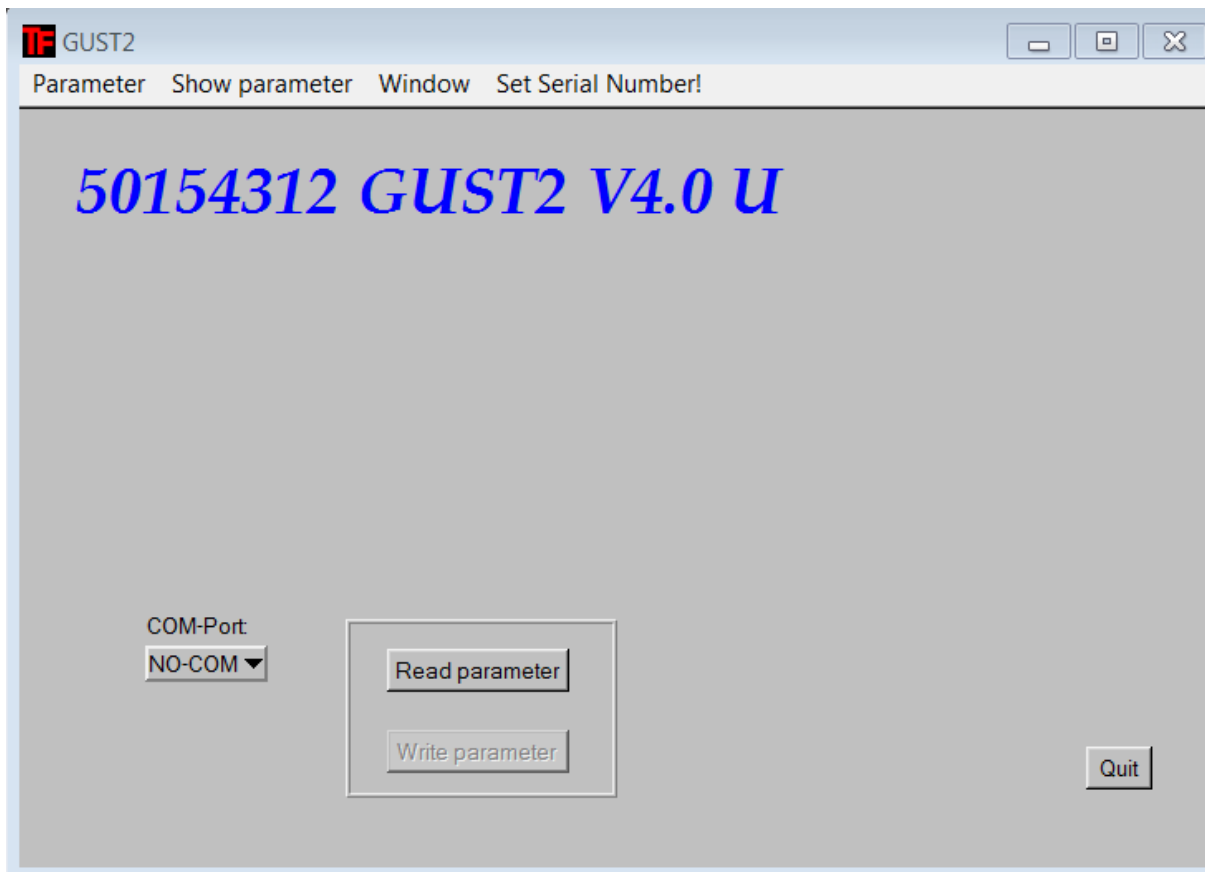
	Note: Unit description	
	GUST 1	New MSC Advantage (since 11/2018)
	GUST 2	Herasafe /Maxisafe 2030i

Procedure

1. Install service software on PC
2. Connect USB via USB-A cable on laptop and software program
3. Choose the correct COM port.

Check that virtual COM Port will appear in the Device Manager and is working properly.





TF Service level



Downflow		Inflow		Run time [h]		AutoParam activated	
S1	0.0	S2	0.0	S5	0.0 <input type="button" value="Set 0"/>	S7	off
Value pressure sensor downflow		Value pressure sensor inflow		Last run yymmddhhmm		S8	0.0
S1a	0	S2a	0	S18	0000000000	Cancel alarm	
Speed in work position [1/min]		Speed in work position [1/min]		Run time UV lamp [h]		S9	off
S1b	0	S2b	0	S6	0.0 <input type="button" value="Set 0"/>	Error time after fan start [min]	
Set value downflow low [%]		Set value inflow low [%]		Last UV cycle yymmddhhmm		S10	0
S3a	0.0	S4a	0.0	S19	0000000000	Scroll Display	
Value pressure sensor downflow low		Value pressure sensor inflow low		Last UV bulb installed yymmdd		S13	off
S3	0	S4	0	S20	000000	0 - Current Inflow 1	
Value pressure sensor downflow high		Value pressure sensor inflow high		Run time Filter [h]		S14	0.000
S3o	0	S4o	0	S17	0.0 <input type="button" value="Set 0"/>	0 - Current Inflow 2	
Serial No. (20 Chars)				Last filter installed yymmdd		S14a	0.000
S23	<input type="text"/>			Filter life time [h]		0 - Current Downflow 1	
Last Change (Air Velocities) yymmdd		Last Certification (Air Velocities) yymmdd		S21	000000	S16	0.000
S24	000000	S25	000000	Global activation fans		0 - Current Downflow 2	
				S22	0	S16a	0.000
				S26	off	Standby after UV / Fan off after UV	
						S15	off



Parameter level

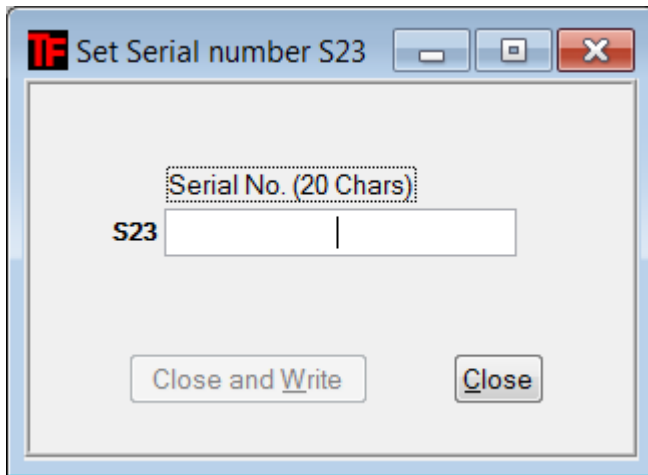


P1	Setting red. downflow [%] <input type="text" value="0.0"/>	P13	Faktor Current Inflow <input type="text" value="0.000"/>	P23	Accu circuit integrated /no switcher window open <input type="text" value="Off"/>
P2	Setting red. inflow [%] <input type="text" value="0.0"/>	P14	Options UI <input type="text" value="Europe"/>	P24	Alarm <input type="text" value="Gas control"/>
P5	Alarm limits AutoParam window 1 <input type="text" value="0"/>	P15	Pulses per rotation (DF) <input type="text" value="0"/>	P25	Window motor <input type="text" value="Off"/>
P6	Alarm limits AutoParam window 2 <input type="text" value="0"/>	P16	Pulses per rotation (IF) <input type="text" value="0"/>	P26	Size <input type="text" value="0.9"/>
P7	Display downflow unit <input type="text" value="m/s"/>	P17	Speed sash window up [%] <input type="text" value="0.0"/>	P27	Correction UV time <input type="text" value="Off"/>
P8	Speed Downflow <input type="text" value="0.000"/>	P18	Speed sash window down [%] <input type="text" value="0.0"/>	P28	Light barrier <input type="text" value="Off"/>
P9	Speed Inflow <input type="text" value="0.000"/>	P19	Device type <input type="text" value="MSC"/>	P29	GFI <input type="text" value="Off"/>
P10	Limit of fan monitoring [%] <input type="text" value="0"/>	P20	Acknowledged alarm recurrently after [min] <input type="text" value="0"/>		
P11	Stand. safety limits <input type="text" value="0"/>	P21	Current limit sash motor up [A] <input type="text" value="0.0"/>		
P12	UV - Time <input type="text" value="0"/>	P22	Current limit sash motor down [A] <input type="text" value="0.0"/>		

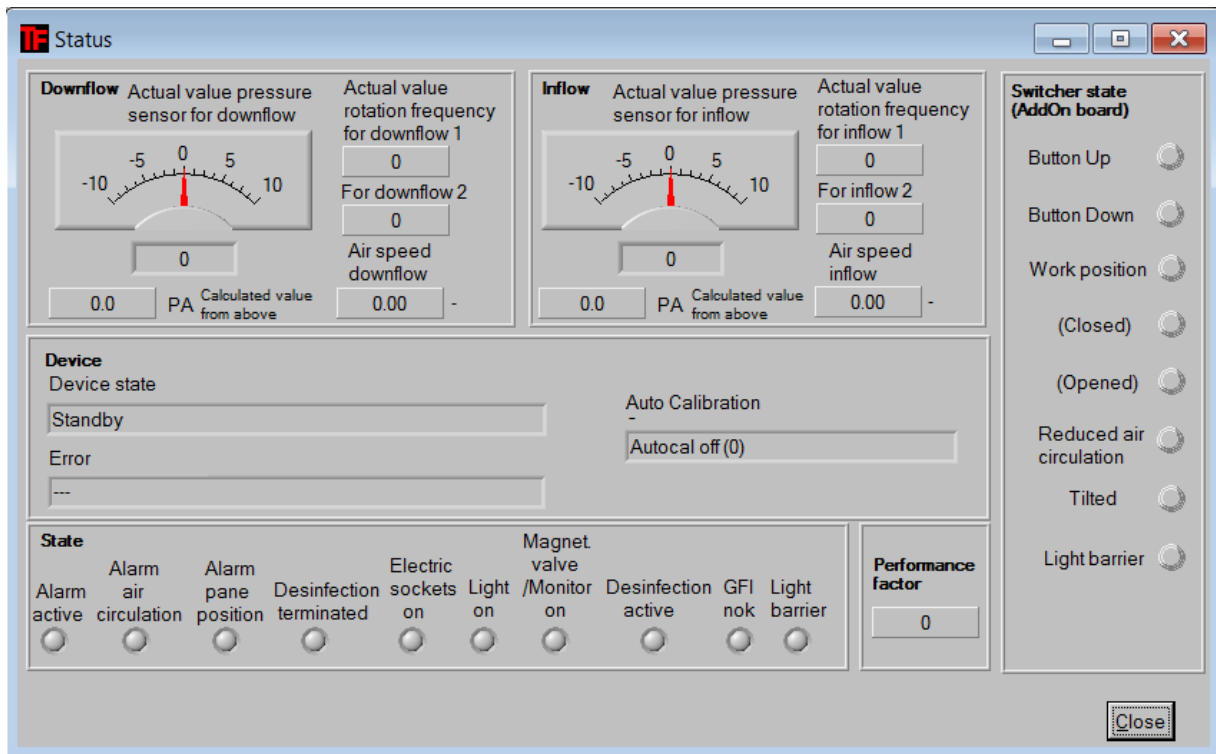
Close

TF Parameter Air Control Inflow/Downflow

Inflow		Downflow			
R0	<input type="text" value="off"/>	Volume control	R10	<input type="text" value="off"/>	Pressure control
R1	<input type="text" value="0.000000"/>	Factor	R11	<input type="text" value="0.00"/>	Calls per sec
R2	<input type="text" value="0"/>	Freq-Offset	R12	<input type="text" value="0"/>	Pressure [ADC]
R3	<input type="text" value="0.00"/>	Factor y	R13	<input type="text" value="0.00"/>	Factor y
R4	<input type="text" value="0.00"/>	Factor yP	R14	<input type="text" value="0.00"/>	Factor yP
R5	<input type="text" value="0.00"/>	Factor yI	R15	<input type="text" value="0.00"/>	Factor yI
R6	<input type="text" value="0"/>	Max y	R16	<input type="text" value="0"/>	Max y
R7	<input type="text" value="0"/>	Min y	R17	<input type="text" value="0"/>	Min y
R8	<input type="text" value="0"/>	Max Yi	R18	<input type="text" value="0"/>	Max Yi
R9	<input type="text" value="0"/>	Min Yi	R19	<input type="text" value="0"/>	Min Yi
R24	<input type="text" value="0.00"/>	Factor UV intensity drop	R20	<input type="text" value="0"/>	Max Yp
R25	<input type="text" value="0"/>	Count values average for pressure sensors	R21	<input type="text" value="0"/>	Min Yp
			R22	<input type="text" value="0"/>	Time Start Control IF/DF [s]
			R23	<input type="text" value="0.000000"/>	Factor K' for downflow calculation
R26	<input type="text" value="0"/>	Offset Pressure Sensor Inflow Alarm (Sensor 1)			
R27	<input type="text" value="0"/>	Offset Pressure Sensor Downflow Alarm (Sensor 2)			
R28	<input type="text" value="0"/>	Offset Pressure Sensor Downflow Control (Sensor 3)			



Note:
Between serial number and order number must be 2 empty blanks!



Note: Cabinet adjustment
The cabinet is good adjusted, if the actual values of the pressure sensor for the downflow and inflow are in the middle of the tacho.

Software-Update Mainboard and Display Herasafe 2030i and Maxisafe 2030i

1. READ FULL INSTRUCTION BEFORE EXECUTING UPDATE

- *Read the complete procedure before attempting to download data from
 - **Knowledge Base – Talisma (for dealer)** <https://kb.unitylabservices.com>
 - or **PSM database (only TFS employee)** <https://uls-spw.thermofisher.com/login.php>
- and upload the firmware to the main board.
- The software update can be downloaded from the Knowledge Base at document # **xxxxxx** or from the PSM in the Software folder of the MSC Advantage:
 - **Download Software - Thermo Scientific HERAsafe 2030i - Firmware Update Mainboard_Display.**

- The zip file should be saved to the root folder of the laptop.

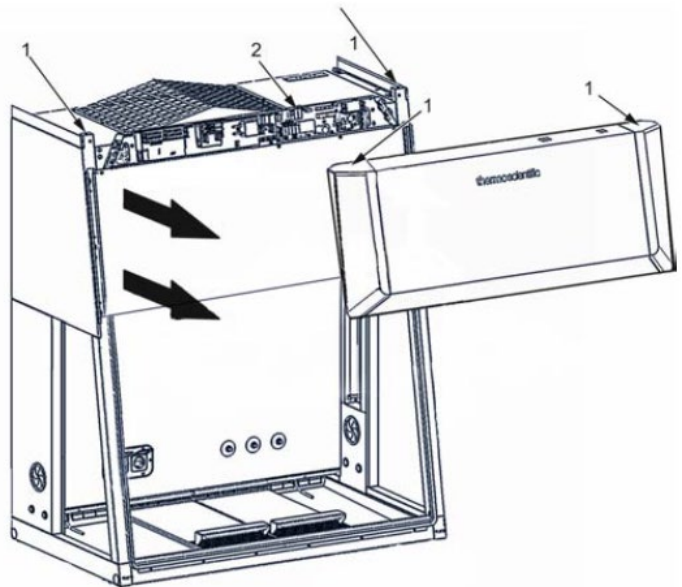
2. Requirements:

- **Laptop Windows 7 or higher**
- **Standard USB cable (USB-A to USB-B)**
- **Virtual COM Port driver VCP_V1.3.1_WIN7** or similar like: (not on **Windows 10** required) VCP_V1.4.0, VCP_V1.5.0 W7_x64bits / x32bits, VCP_V1.5.0 W8_x64bits / x32bits
- **Software DfuSe_Demo_V3.0.5** (for installation on laptop)
- Additional driver **dpinst_amd64.exe** for **Windows 8.1 to 10**, 64-bit, is may necessary, if STM32 bootloader problem appears. This Driver can be found on your Laptop:
C:\Program Files (x86)\STMicroelectronics\Software\DfuSe v3.0.5\Bin\Driver \Win8.1\x64
- **Current Firmware 50155736-XX file** (firmware for main board)
- **Current Firmware 50150986-XX file** (firmware for Touch-display/GUI)

3. Switch the device off, disconnect it from the power supply system, and protect it against accidental reconnection.

4. Remove the front cover (procedure see inside service manual).

- Remove the two retaining screws [2] at the upper splay of the control box.
- b. Remove the front cover [1].
- c. Disconnect the grounding cable.

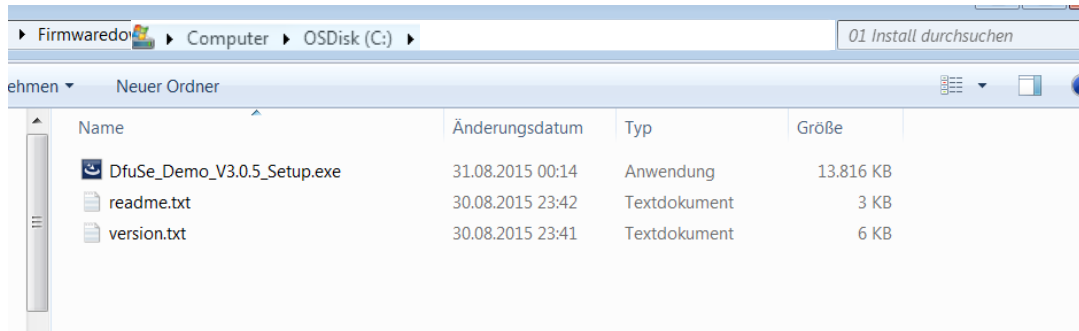


5. Ensure the Download Software **HERAsafe 2030i _Firmware Update Mainboard_Display.zip** file is expanded in the root directory of your laptop. These files should not be inside any subfolders. You will see four folders:

1. COM port Driver
2. Software DfuSe_Demo_V3.0.5.
3. Firmware Main board HERAsafe 2030i - 50155736-XX
4. Firmware Display / GUI HERAsafe 2030i - 50150986-XX
5. Software update instruction

Firmware Update Main board

1. Install Download-Software on Laptop **DfuSe_Demo_V3.0.5_Setup.exe**

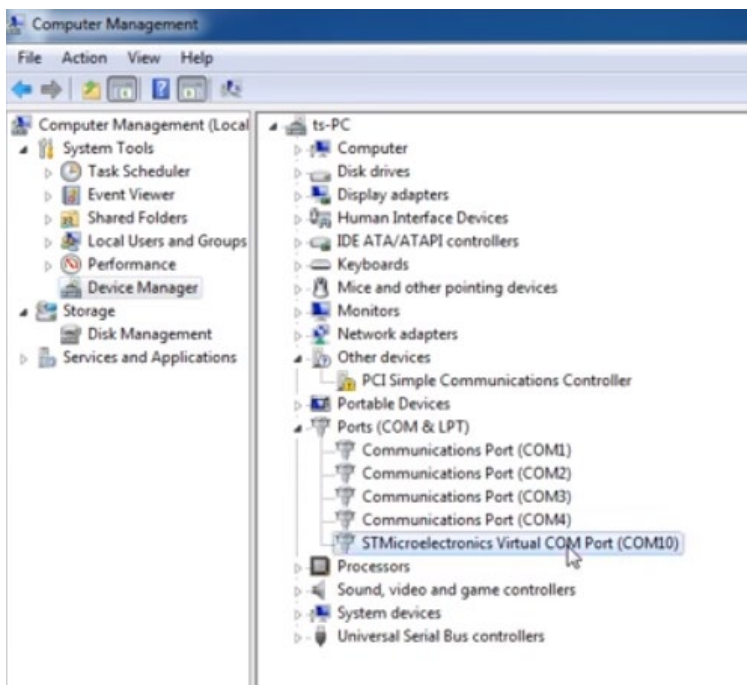


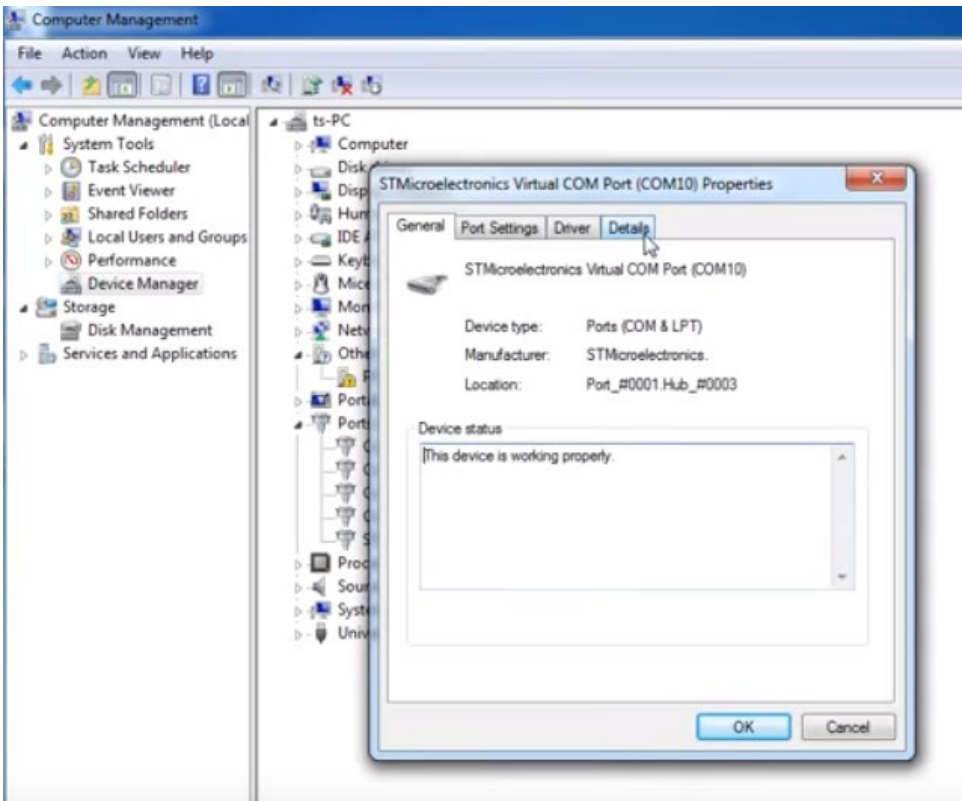
2. Install virtual COM Port driver software on Laptop (**VCP_V1.3.1_WIN7 or similar**).

3. Connect laptop to main board over **standard USB via cable** (USB-A to USB-B port).

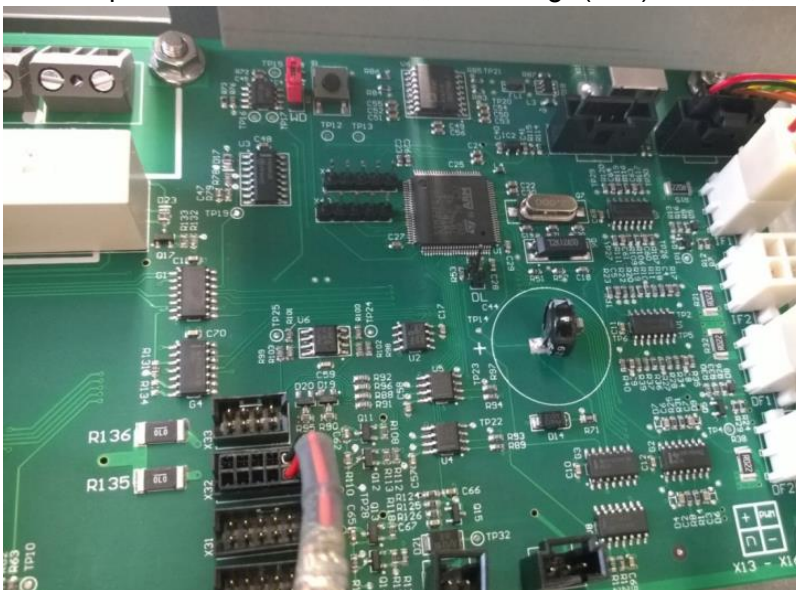
4. Switch the cabinet on.


5. Check that virtual COM Port will appear in the Device Manager and is working properly.





6. Save the new firmware Main board HERAsafe 2030i - **50155736-XX.dfu**- file on an easy reachable location on your Computer.
7. Disconnect unit from main power.
8. Set Jumper on main board from „Watchdog“ (**WD**) set to „Download“ (**DL**):



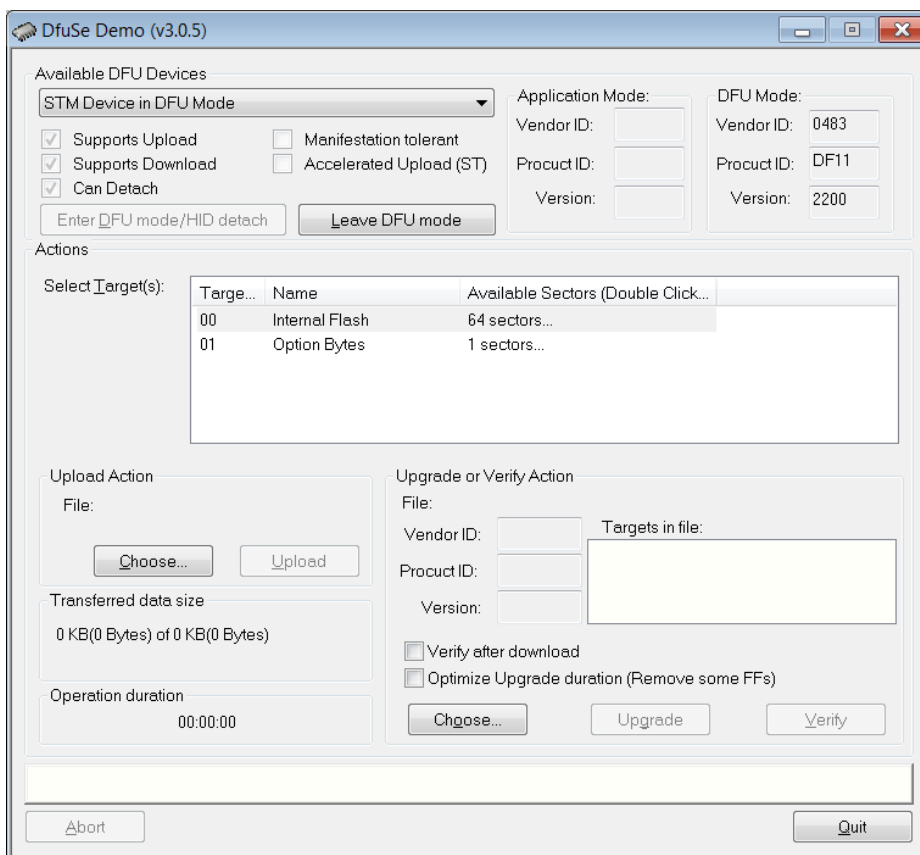
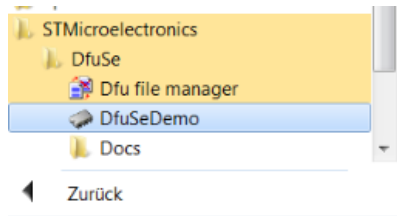
	<p>Note: Acoustical alarm</p> <p>Acoustical alarm will appear and will not be mutable!</p> <p>If you turn now ON the unit, then an acoustical alarm will appear and not mutable!</p> <p>Therefore the dfu-file should be quick and easy available.</p> <p>Save 50155736-XX.dfu file on an easy reachable location on your Computer</p>
---	---

9. Connect unit back to **main power** supply.

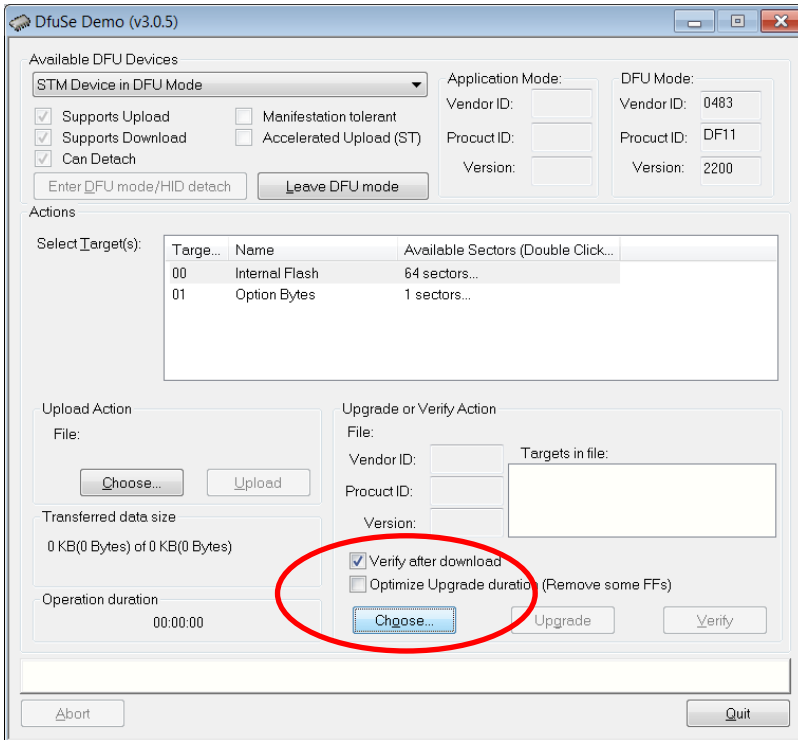
→ **An acustical will alarm appear !!!**

10. Wait for **USB driver** installation.

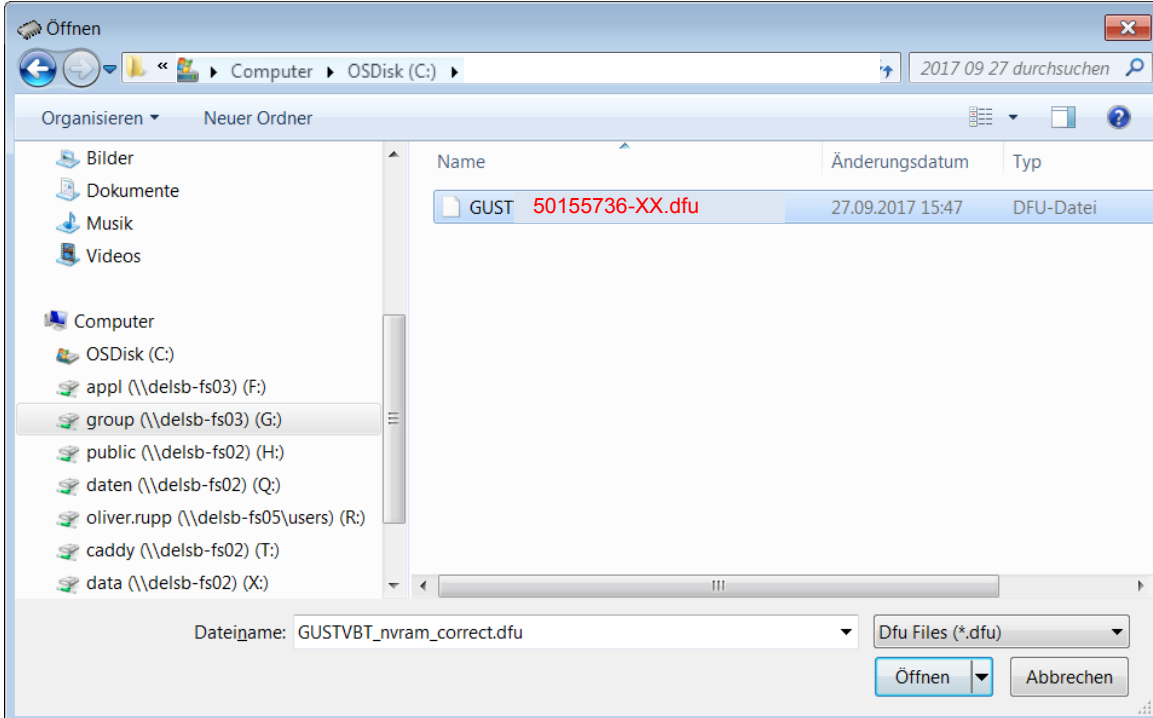
11. Start Program **DfuSe_Demo**



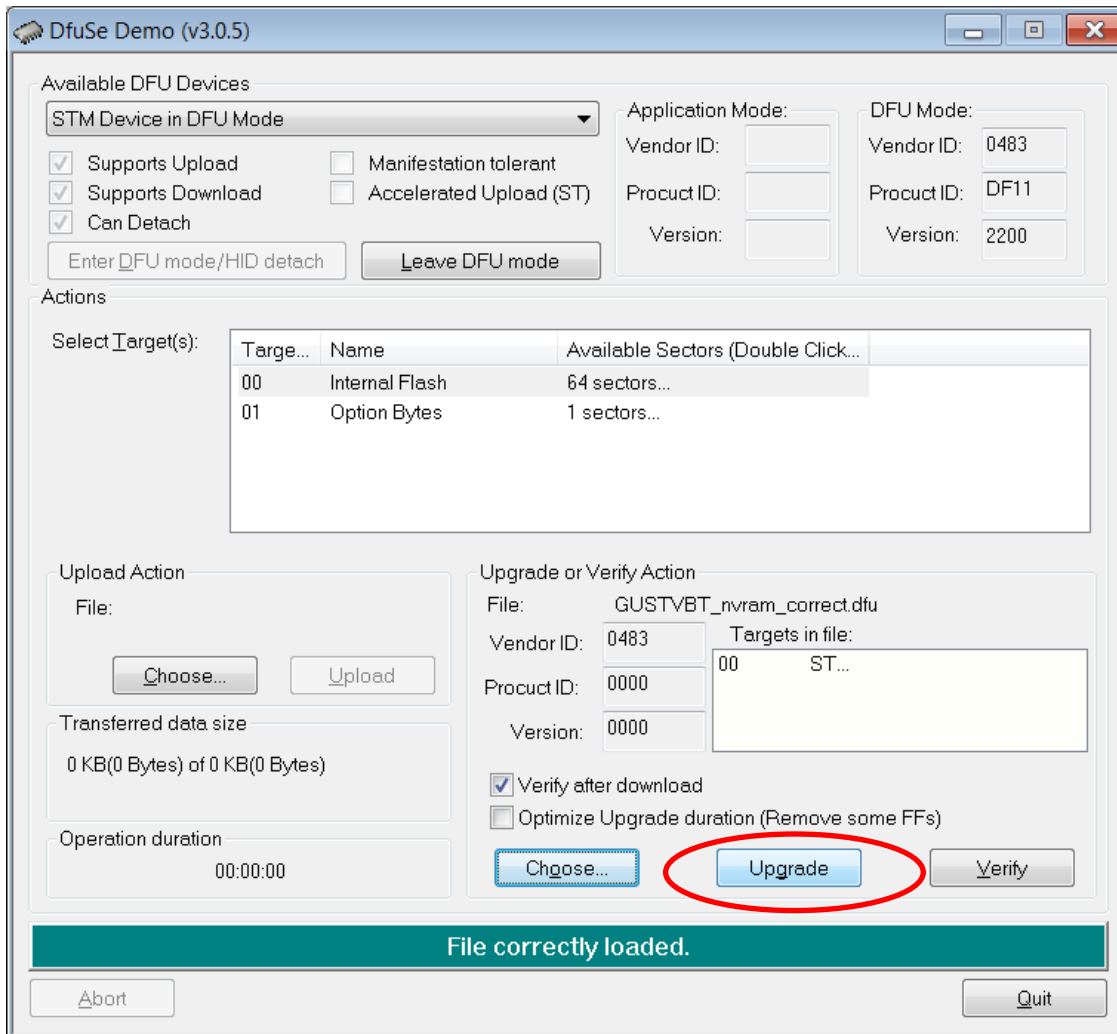
Check **Verify after download** and push **Choose** button:



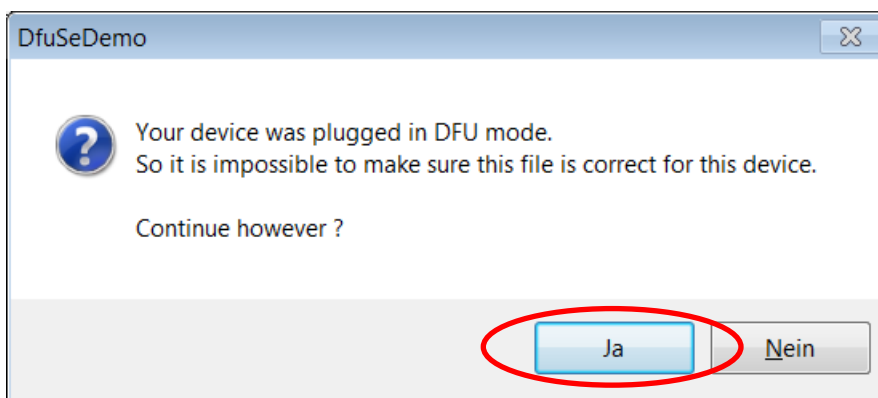
Select upload dfu-file: **50155736-XX.dfu**



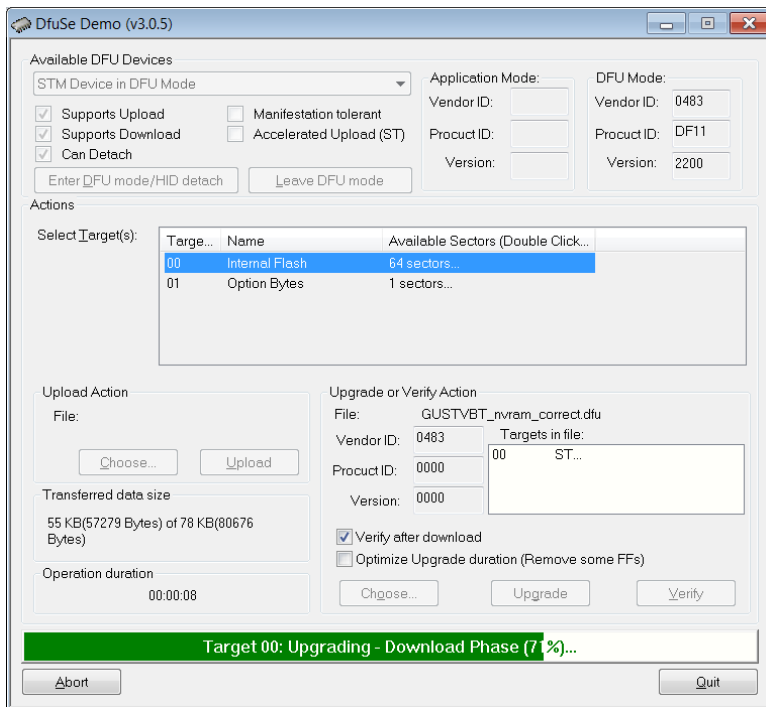
13. Press „Upgrade“ to start update software:



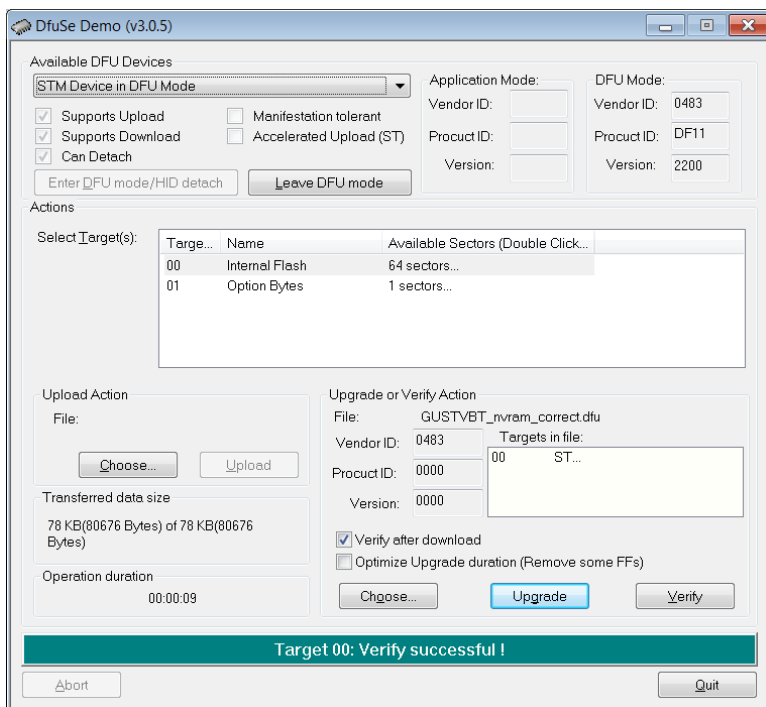
Press „JA“ = “Yes“) language setting of the OS to continue:



14. Upgrading process runs:



15. Update finish. Verify successful.



16. Finish **DfuSe_Demo** program.

17. Switch **unit OFF**.

18. Disconnect **USB cable**.

19. Set **jumper** from "DL" back to "WD".

20. Switch **unit ON**.

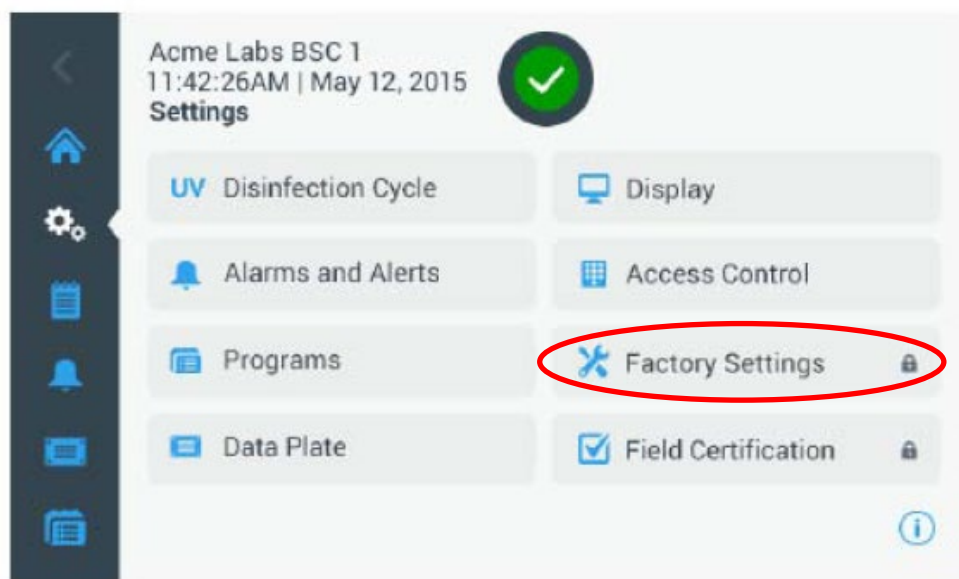
21. Newly save, in menu „field certification, current calibration and then air velocity of recirculated air and exhaust air.

Firmware Update Display / GUI

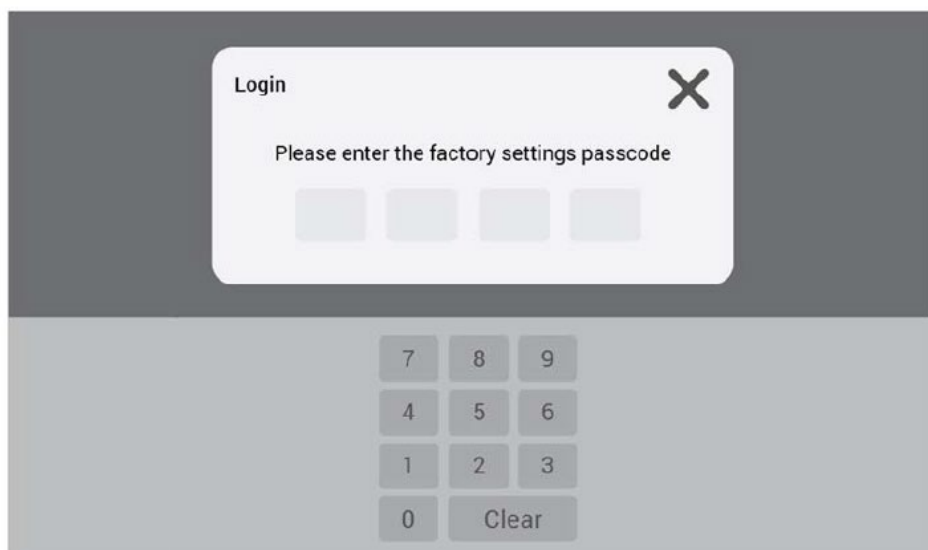
Procedure see inside current service manual, in the Chapter Device Control

- 1. Factory settings
- 2. Firmware

1. Store the Firmware **50150986-XX** of the Display / GUI in the main folder of your USB memory stick.
2. Go inside the GUI screen to the **Factory Settings**



3. Enter the **factory settings passcode** : **“0 9 0 9”**



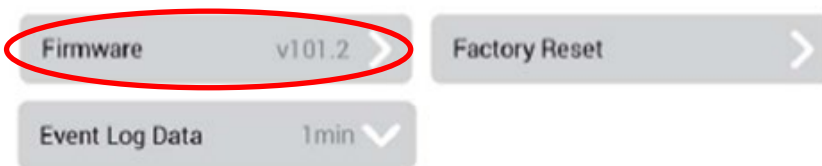
4. The **factory settings** screen must be displayed.



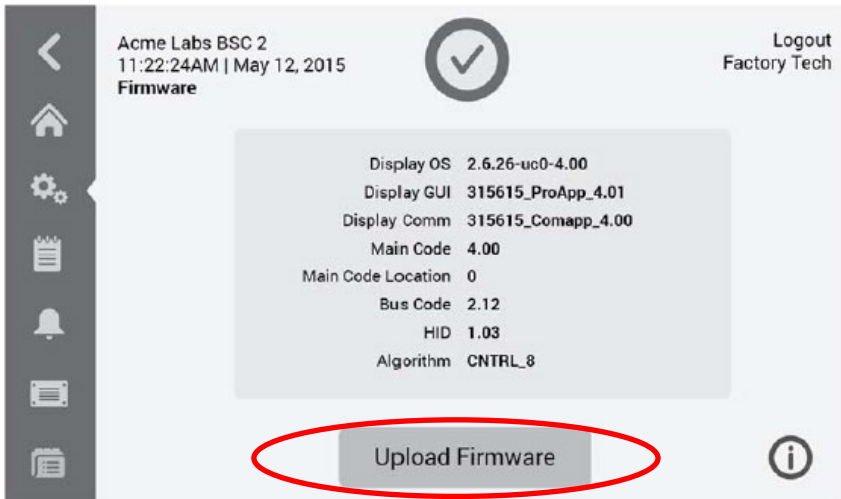
5. Scroll down to the **Firmware** screen



Off-screen controls (scroll to view):



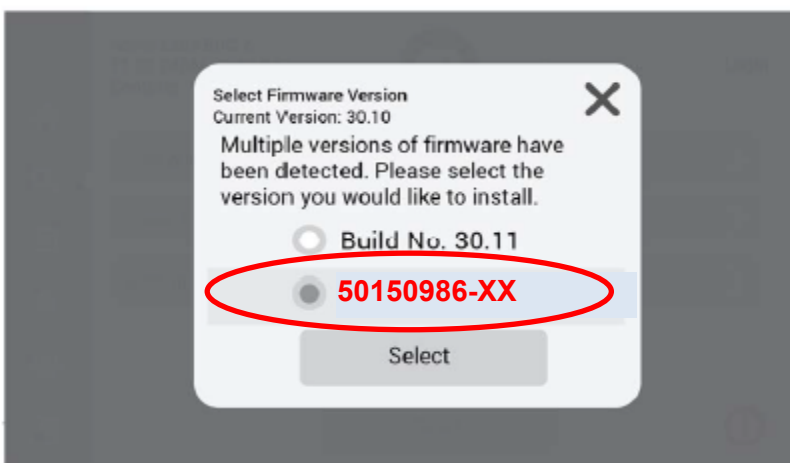
6. And press **Update Firmware**

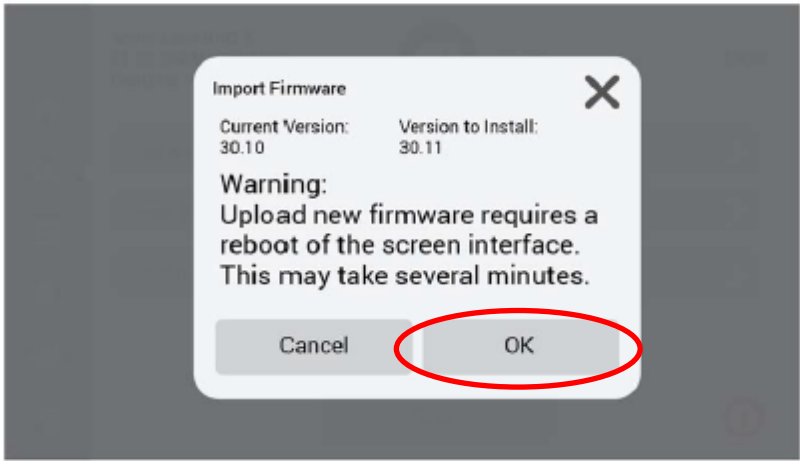


7. If a USB stick is not automatically detected, display a pop-up window overlay. And choose the correct firmware : **50150986-XX** and press Ok.

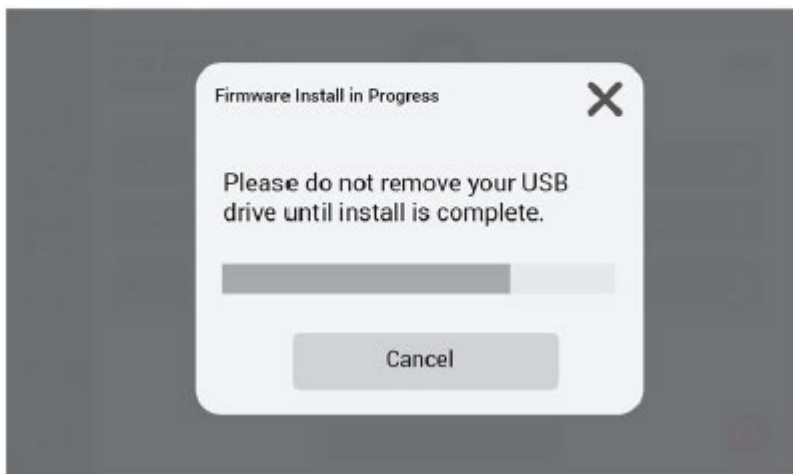
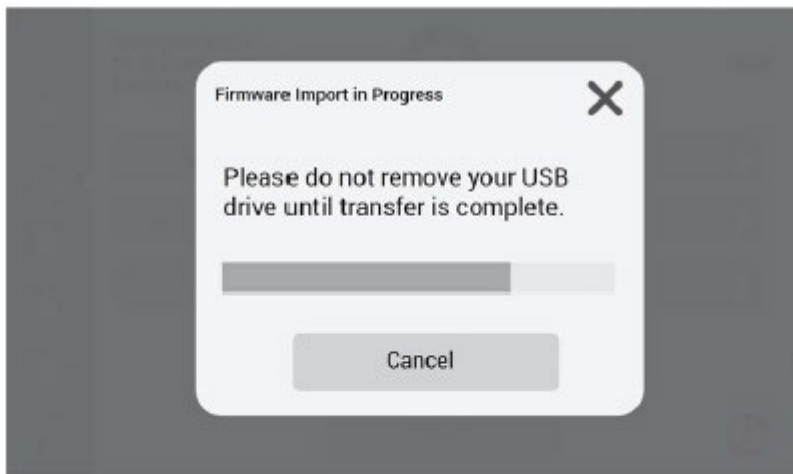


If multiple versions are available, show as list and let user choose. If only one is skip this screen and show the next screen instead.

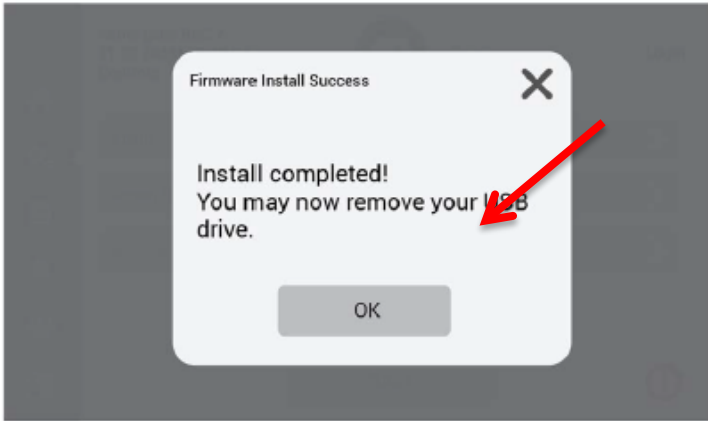




- Once installed, start up unit and bring user to the home screen but show a pop-up window overlay for 5 seconds confirmation of install.



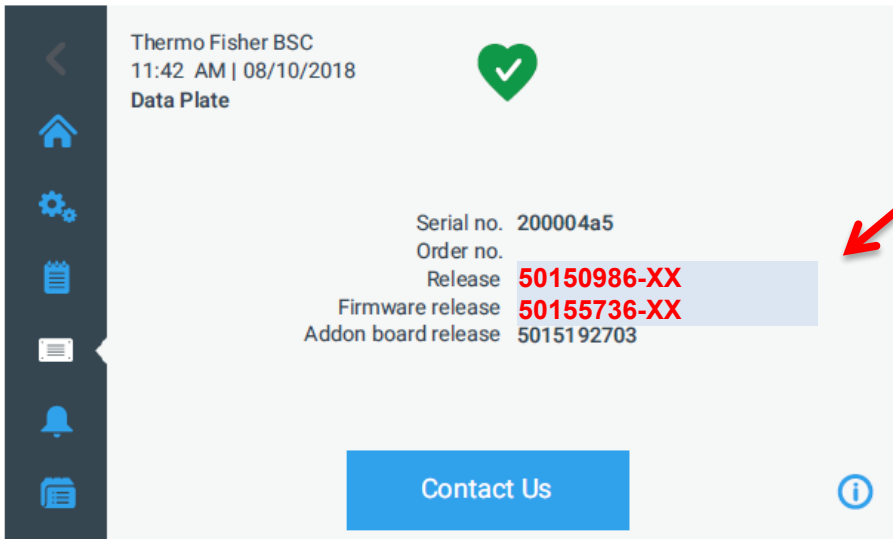
9. After install completed, you can now remove the USB drive.



10. Do a power reset and Switch **unit OFF/ON**.

11. Check after installation of the firmware the information on the data plate screen.

- Release GUI/Display : **50150986-XX**
- Firmware release MB: **50155736-XX**



Note Software Update inside **service test report**.

12. Install the **front cover** (procedure see inside service manual).

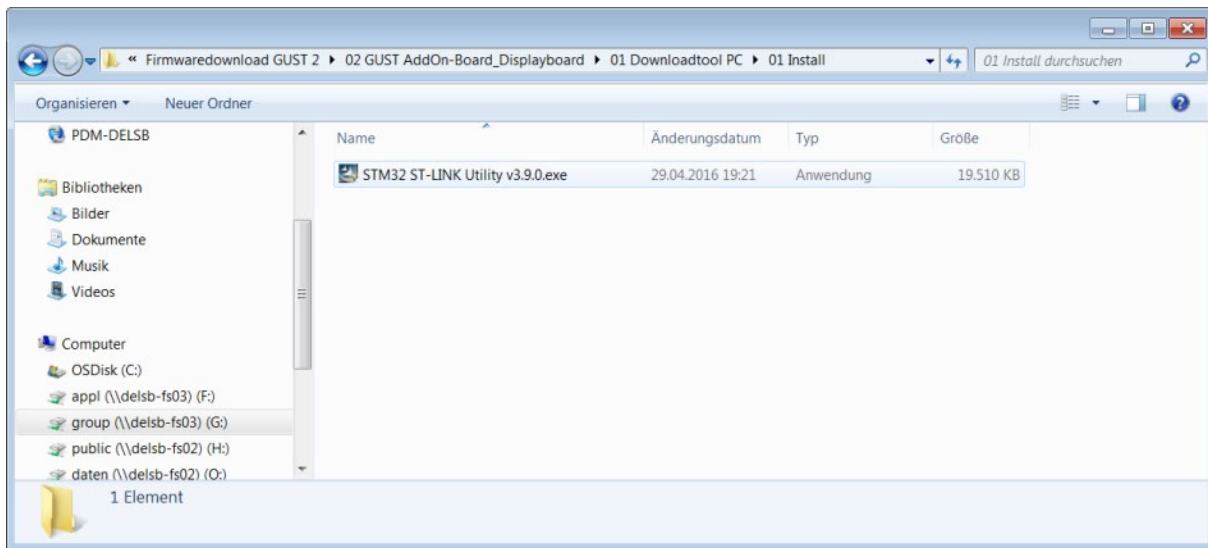
13. Electrical safety check

Perform a Safety-check according to IEC 61010-1 or VDE 0701-1.

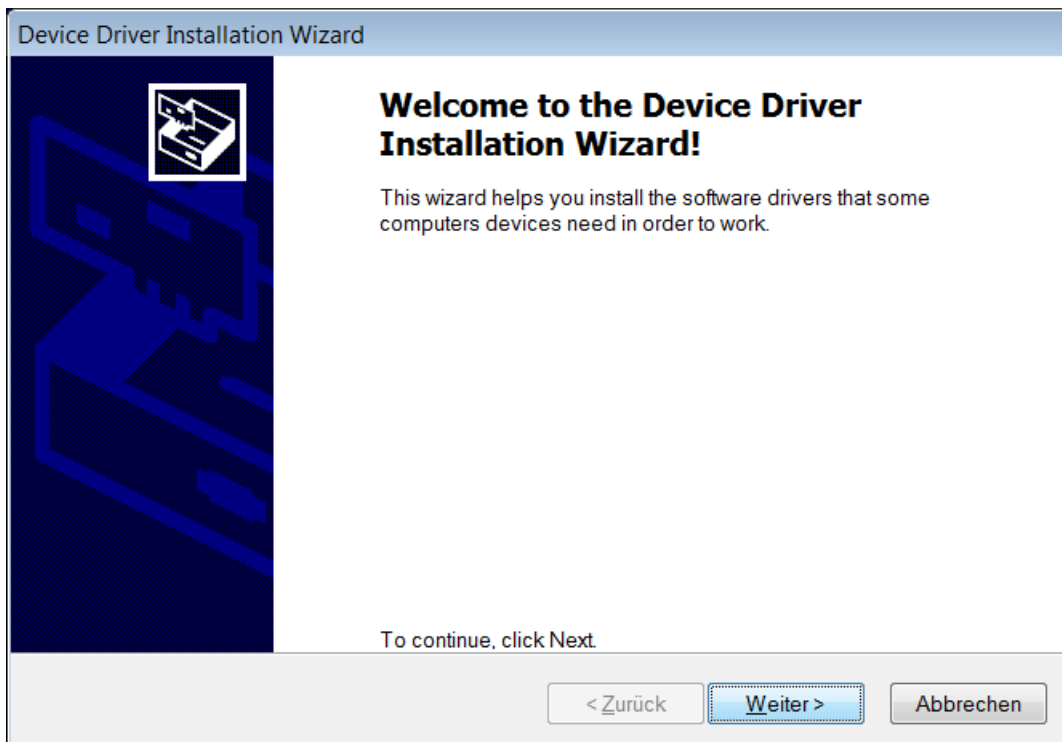
14. Note the firmware version in the service test report.

Update Display-Board / Add-on Board

1. Install software



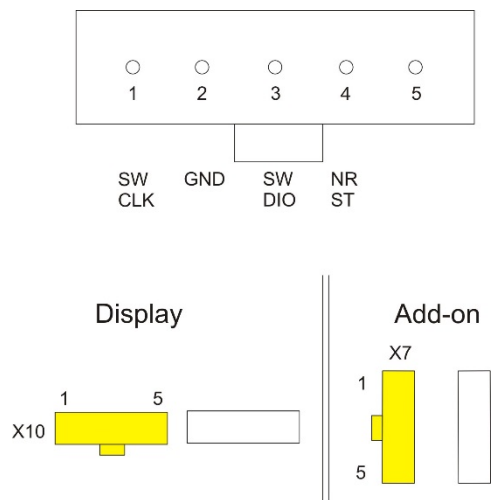
2. Install driver (starts automatically)



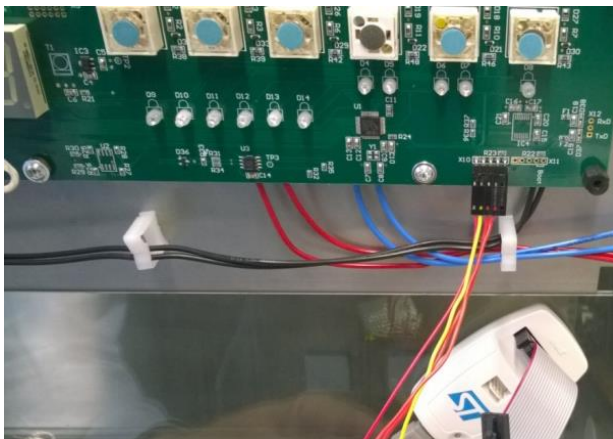
3. De-energize workbench
4. Remove jumper from „W1“

5. Connect ST-Link / v2 adapter to Display or Add-on Board via USB-B and program:

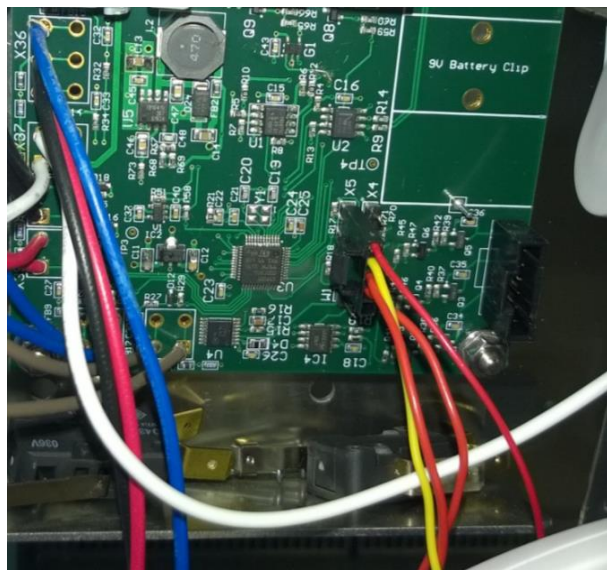
Pin assignment



Display

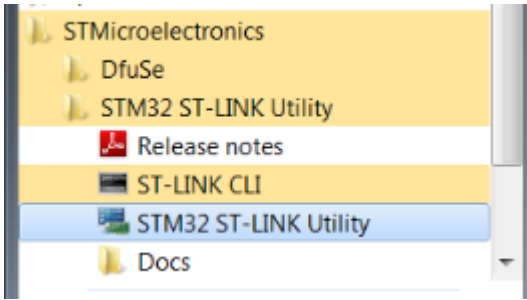


Add-on Board

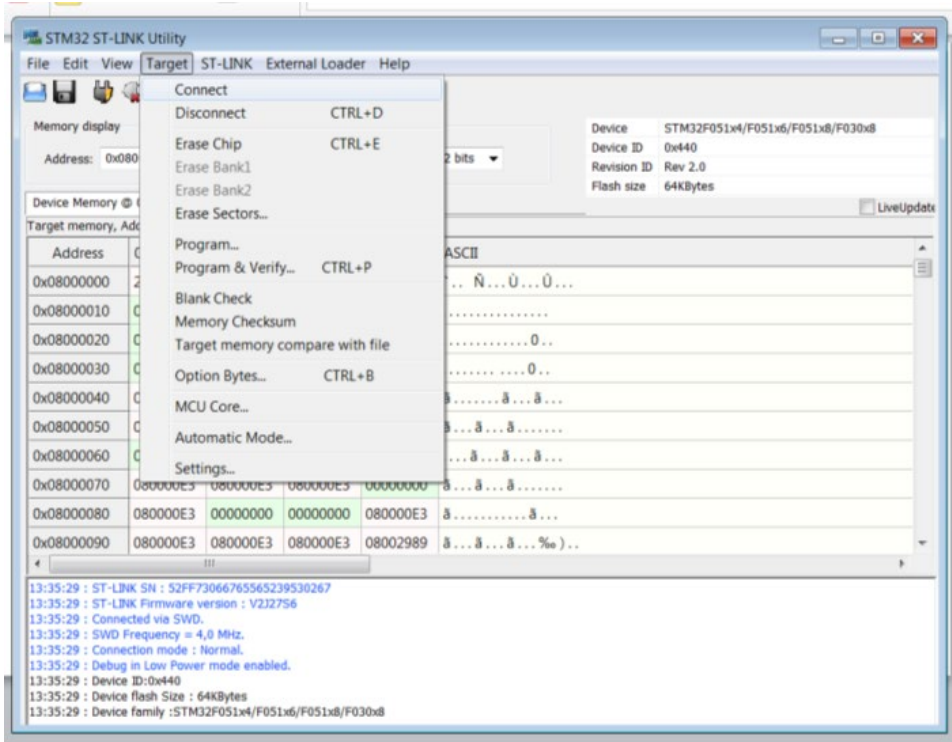


6. Turn on unit
7. Connect USB
8. Wait for driver installation

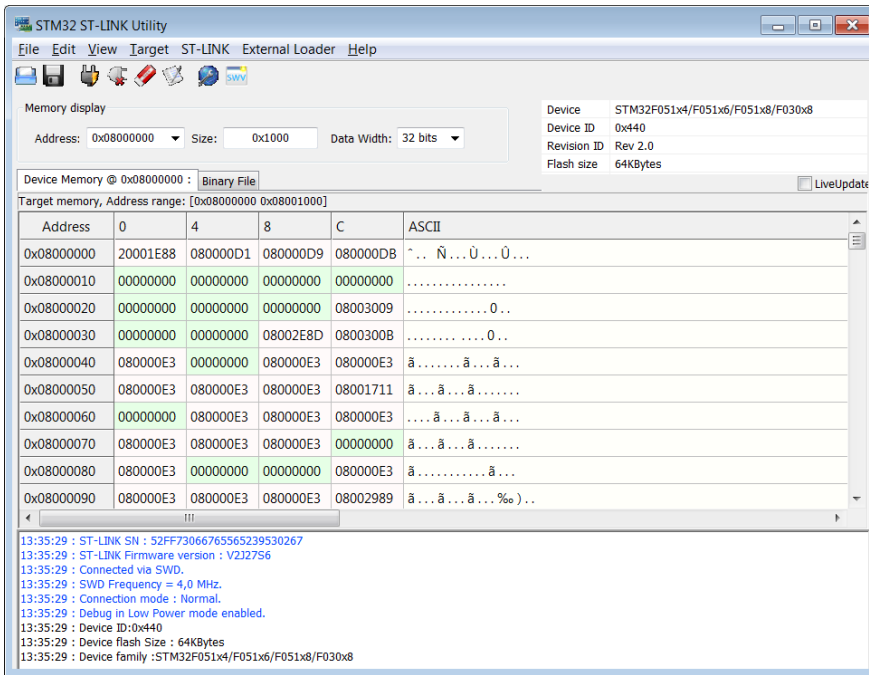
9. Start program



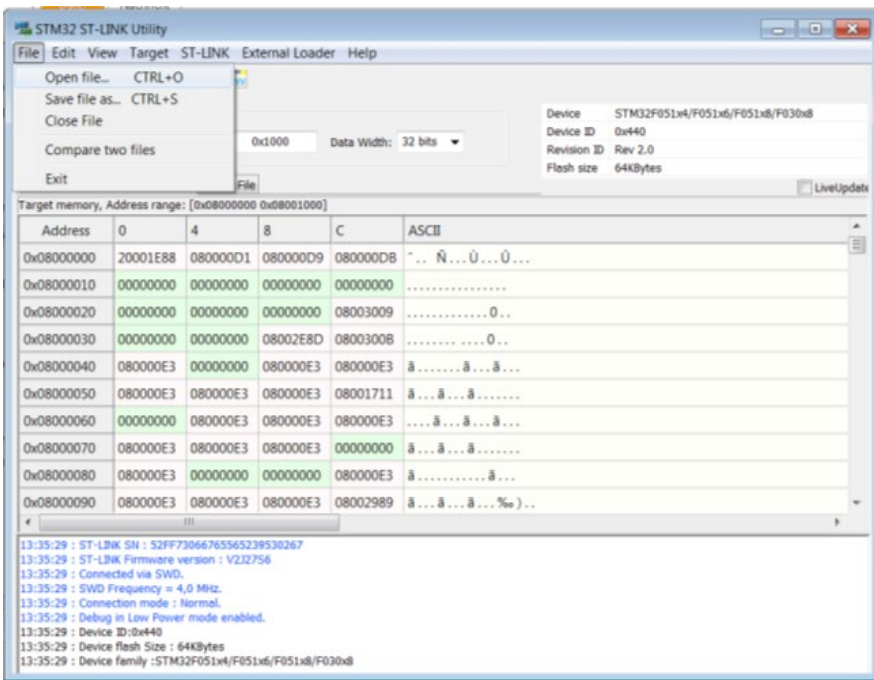
10. Target – select Connect:



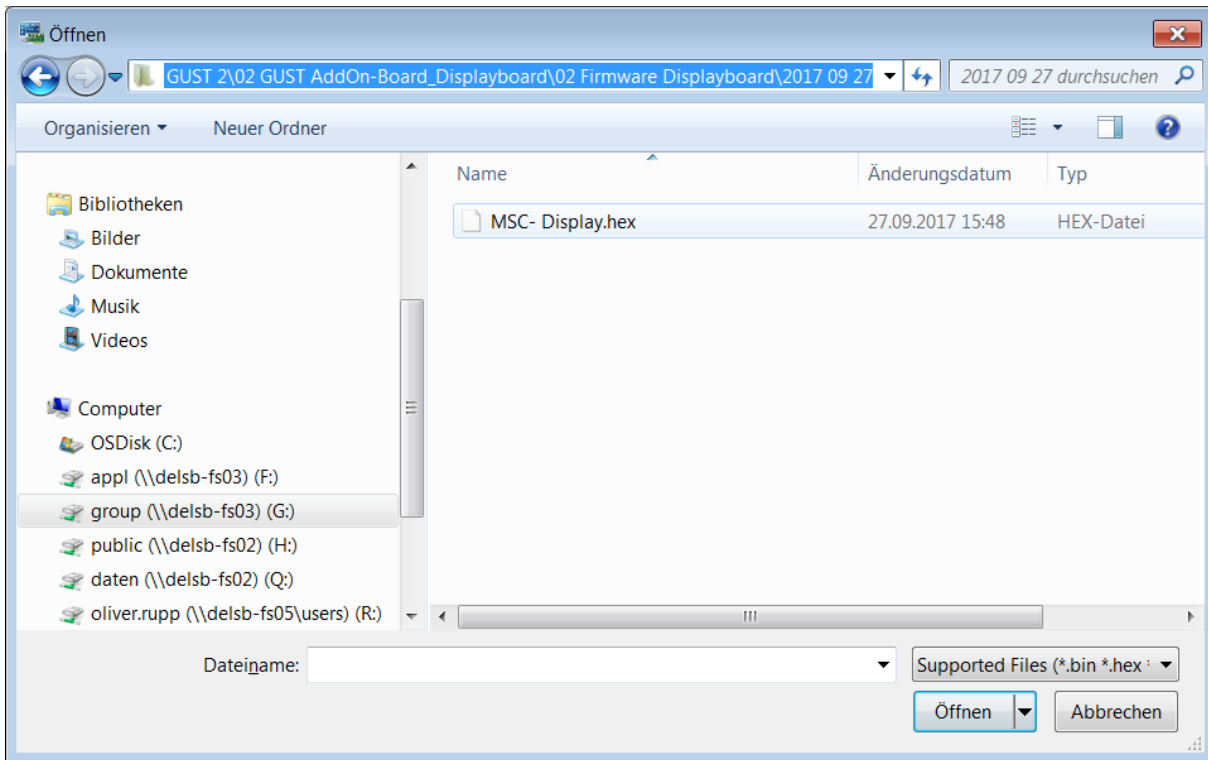
11. This screen should appear:



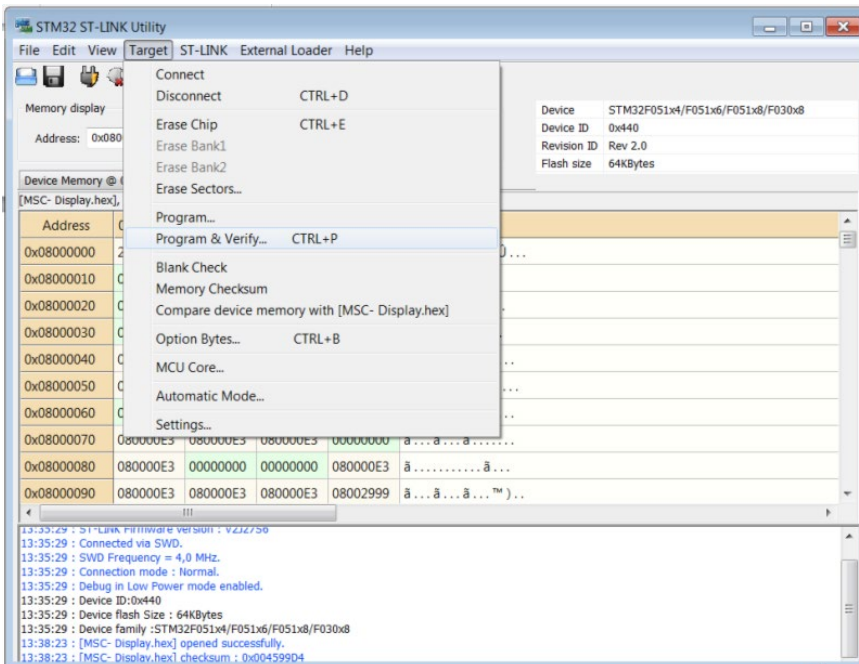
12. File – select Open file:



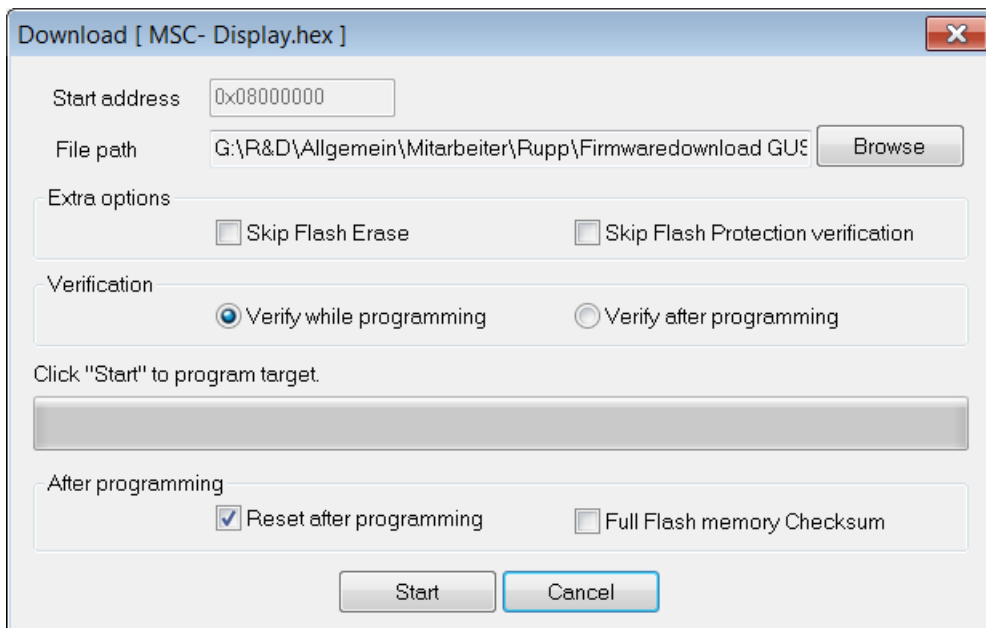
13. Select update file:



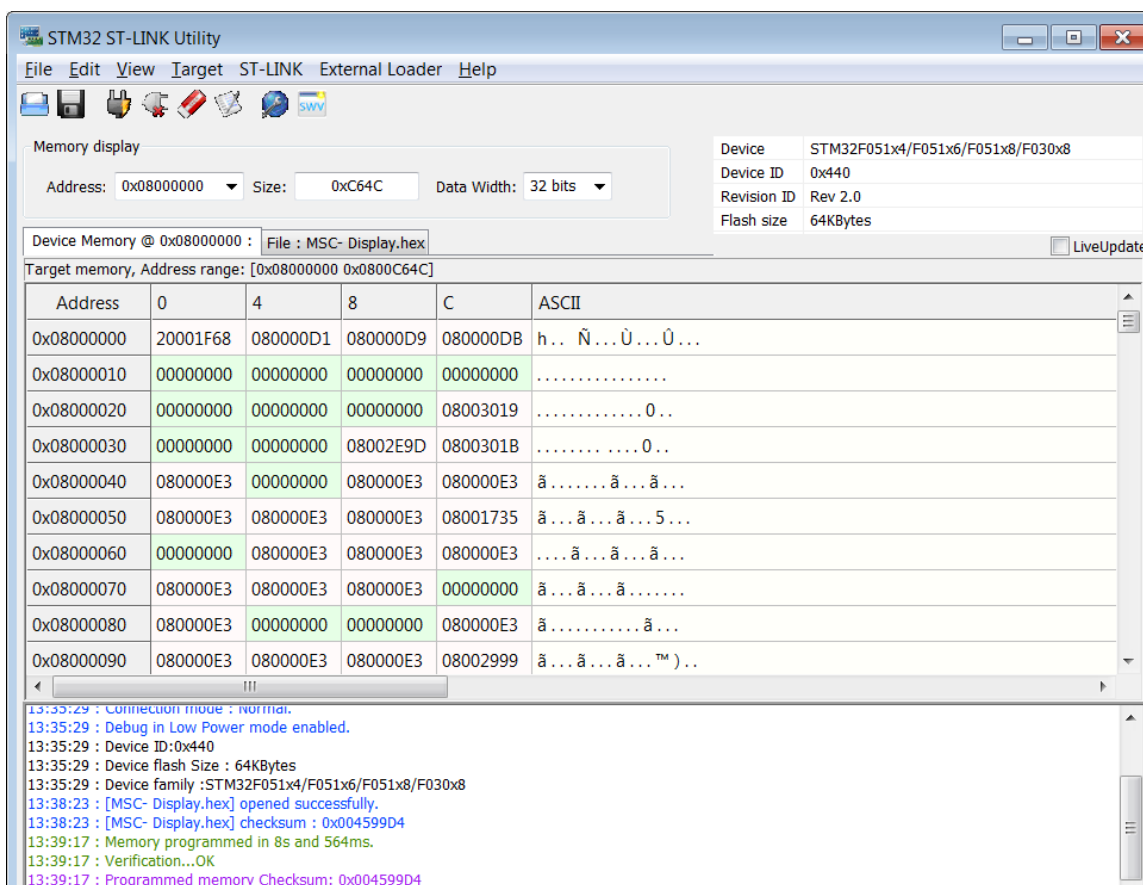
14. Select Target – Program & Verify:



15. Select following settings and click on „Start“:



16. After successful Update the screen should appear as follows:



17. End program
18. Switch off unit
19. Disconnect USB and adapter
20. Set jumper to „W1“
21. Switch on unit.

Installation test / Repeat test

Conducting the installation test

The measurements and calculations required for the installation test are described in Annex A.

Marking the device for its intended purpose

The device must be marked with one of the two safety symbols in accordance with its intended purpose:



Biohazard

or



Cytostatic agents

The safety symbol is attached at the left side of the device front.

Classification of the safety cabinet

For application in the EU, the device has been rated as a Class II microbiological safety cabinet in accordance with EN 12469.

For application in the USA and in Canada, the device has been laid out as a Class II safety cabinet, Type A2, in accordance with NSF Standard 49, for Herasafe 2030i size 1.2 and 1.8 with 10 in opening..

For operation as a device of said classifications, an installation test or repeat test in accordance with NSF Standard 49 or EN 12469 for Herasafe 2030i, DIN 12980 for Maxisafe 2030i and NF95 for Herasafe 2030i LNE version must be conducted:

- After the final installation before the safety cabinet is operated.
- During the annual inspection.
- After any replacement of the pre-filter elements Maxisafe 2030i version).
- After any replacement of the down-flow filter.

- After any replacement of the exhaust filter.
- After any repairs to the air distribution system.
- After any relocation of the device to a new location.

When working with safety-critical materials (toxic or slightly radio-active substances), the on-site tests should be conducted at shorter intervals (every three or six months).

Test terms

Nominal value:

Default value as specified by Thermo Electron LED.

Measured value:

Value measured at the location of the safety cabinet.

Tolerance:

Acceptable deviation from the nominal value.

Average value:

The sum of the measuring values divided by the number of tests. The average value is compared to the nominal value.

Set point:

Acceptable operating value for the inflow and down-flow velocities.

Inflow velocity (m/s, ft/min):

Velocity of the air entering the sample chamber opening.

Down-flow velocity (m/s, ft/min):

Velocity of the displacement flow circulating through the work chamber.

Exhaust velocity (m/s, ft/min):

Velocity of the airflow discharged through the exhaust filter opening.

Exhaust airflow volume (m³/s, cft/min):

The exhaust airflow volume discharged through the exhaust filter.

Extent of the tests

The tests cover all essential safety functions of the device as all values measured at the location of the device are compared to the nominal values. If required, device settings must be changed or the safety cabinet must be modified for the compliance with the nominal value tolerances. Possible measures are listed under **Troubleshooting** at the end of each section.

The tests should be conducted in the following sequence:

- Electrical safety test in accordance with applicable national regulations
- HEPA filter leakage test
- Pre-filter element test (Maxisafe 2030i version)
- Inflow velocity test
- down-flow velocity test
- Exhaust airflow volume test
- Airflow pattern test
- Noise level test (type test)
- Lighting intensity test (type test)
- Vibration test (type test)
- UV intensity test (type test)
- Monitoring device test

- Front window functional test



Note: Test report

All tests require a test report in duplicate. The operator must receive one copy of the report. A sample test report is attached at the end of this section.

Testing equipment

For the conduction of the tests, **Thermo Fisher Scientific** recommend testing equipment of the manufacturers listed below.

Manufactures in the USA

Testing equipment	Manufacturer	Application
Smoke tubes e.g. Model 458481 or similar	MSA Pittsburgh, Pennsylvania, 15230	Airflow pattern test
Thermo-anemometer, e.g. Model VelociCalc 9535 or similar	TSI Shoreview, Minnesota 55126	down-flow velocity test
Anemometer, e.g. Model VelociCalc 9535 or similar	TSI Shoreview, Minnesota 55126	Inflow velocity test
Digital Safety Inspector e.g. Model Hyamp III	Associated Research, Inc., Lake Forest, IL 60045	Electrical leakage and ground resistance tests
GFI Circuit Tester e.g. Model 61-051 or similar	Ideal Industries, Inc., Mulgrave VIC 3170, Australia	Electrical leakage, ground resistance, and polarity tests
Photometer, e.g. Model Aerosol Photometer 2H or similar	Air Techniques Owing Mills, Maryland, 21117	Filter leak test
Aerosol Generator, e.g. Model TDA-4B lite or similar	Air Techniques Owing Mills, Maryland, 21117	Generation of aerosol mist
Vibration Meter, e.g. Model VI-90 or similar	Quest Technologies, Inc., Kennesaw, GA 30144	Vibration test
Flow Hood Airdata Multimeter, e.g. Model ADM-850L or similar	Shorridge Instruments. Inc. Scottsdale, Arizona, 85260	Inflow air volume test

Manufacturers in Europe

Testing equipment	Manufacturer	Application
Smoke tubes	Dräger GmbH Lübeck, Germany	Airflow pattern test
Thermoanemometer, e.g. Model 9535 or similar	TSI / Technetics Freiburg, Germany	down-flow velocity test
Anemometer, e.g. Model 9535 or similar	TSI / Technetics Freiburg, Germany	Inflow velocity test
Electrical Safety Tester, e.g. Metraster 5+ or similar	Gossen-Metrawatt Nürnberg, Germany	Electrical leakage and ground resistance tests
Laser particle counter, ACS-Plus 328 or similar	KM-Optoelectronik Leonberg, Germany	Filter leakage test
Aerosol Generator, e.g. AG 250 or similar	KM-Optoelectronik Leonberg, Germany	Generation of aerosol mist
Dilution range, e.g. VD-100 or similar	KM-Optoelectronik Leonberg, Germany	Diluting of aerosol mist
UV meter, e.g. RM-12, sensor UVC or similar	UV-Elektronik GmbH Ettlingen, Germany	UV-light intensity test
Luxmeter, e.g. Pocket Lux 2 or similar	LMT Lichtmesstechnik GmbH Berlin, Germany	Lighting intensity test
Vibration meter, e.g. PCE-VM 3D or similar	PCE Deutschland GmbH, Germany	Vibration intensity test
Formaldehyde vaporizer, e.g. VAP/2 or VAP/4 depending on solution volume and process	Foramaflow Ltd Windlesham, England	Disinfection with gas, vaporization of formaldehyde solution and aqua ammonia
Formaldehyde vaporizer IVE 2020	BAIN Marie Hotpot, 4 x pot	Disinfection with gas, vaporization of formaldehyde solution and aqua ammonia, Fa. Bartscher

Electrical safety test

Purpose of the test:

This test is conducted to check the electrical safety after the cabinet has been installed and during the annual safety inspection or after any electrical intervention. The following is tested:

Application in USA/Canada (NSF 49)

- PE conductor resistance test
- Leakage current test
- Polarity test

Application in EU (EN 12469)

- PE conductor resistance test
- Insulation resistance test
- Equivalent leakage current test

Test conditions

The test is conducted in accordance with the following guidelines:

Application in USA/Canada

- UL 61010-1
- CAN/CSA-C22.2 No.61010-1

Application in EU: IEC 61010-1 or EN 61010-1

All other applications in accordance with applicable national regulations.

Testing equipment

Application in USA/Canada (NSF 49)

- Electrical safety analyzer (ESA) with 1 kW input impedance and two leads,
- 1 k Ohm one lead with a sharp point,
- One lead with a probe,
- Circuit tester.

Application in EU (EN 12469 / DIN 12980)

- Testing equipment in accordance with IEC 61010-1 or EN 61010-1 or in accordance with applicable national regulations.
- Safety inspection device (e.g. Gossen Metrawatt Tester 5) with inspection socket

Accessories

Adapter with 3-hole electrical receptacle on one end and 2-prong plug on the other end.

Calibration of the testing equipment

Calibration performed by manufacturer.

Electrical safety test (NSF 49)

A. Testing for electrical leakage

1. Switch the device to OFF mode, de-energize the illumination and the internal power supply.
2. Plug the ESA power plug into the outlet of the power supply.
3. Connect the safety cabinet power plug to the ESA ground circuit resistance adapter.
4. Turn the ESA function selector to microamp (mA) scale. Read and record the displayed value.
5. Switch the safety cabinet on, then read and record the displayed measured value.

B. Testing for ground circuit resistance

1. Switch all electrical switches of the safety cabinet to position **OFF**.
2. Plug the ESA power plug into the outlet of the power supply.
3. Connect the safety cabinet power plug to the ESA ground circuit resistance adapter.
4. Read and record the displayed value.

C. Testing for polarity and ground faults

1. Disconnect all accessories from the device-internal power supply.
2. Set the GFI tester to **polarity** and test each cabinet power outlet. If the polarity is correct, the two yellow lights will light equally. Any other combination of lights indicates a fault as identified on the tester.
3. On devices with ground fault interrupters, disconnect all accessories from the device-internal power supply. Plug the tester into the last connected receptacle in the GFI protected branch.
4. Turn the tester selector switch to the 1, 2, and 3 mA positions. If leakage is detected, the lights will go off indicating leakage in the safety cabinet.

Acceptable values for all applications (in accordance with IEC 61010 / UL 61010)

The measured electrical leakage must not exceed 3.5 mA, and the cabinet ground circuit resistance must not exceed 0.1 mOhm.

Electrical safety test (EN 12469 / DIN 12980)

According to IEC 61010-1, EN 61010-1 and DIN VDE 0701-1 repaired or modified electrical devices must provide users with the same protection against electrical energy as is offered by new devices. The following tests must be performed to this end, in the following order:

- A. Visual inspection
- B. Protective conductor resistance
- C. Insulation resistance followed by

D. Protective conductor current or equivalent leakage current.

A. Visual inspection

The visual inspection of a cabinet tested is the first step in the correct evaluation of its technical condition.

The scope of a visual inspection includes:

1. Check the device identification plate
2. Check the power supply cord and plug
3. Operation of mechanical parts, switches, motors, interlocks
4. Check gas pressure spring, bolts and front window seals
5. Check grid filters for dust / blocking and remove if necessary
6. Check all additional accessories, like the exhaust system, solenoid valve and the surface of the work table tops
7. Testing internal sockets, LED lights and UV lights inside the device and plug.

Connecting the device being tested to the inspection device (e.g. Gossen Metrawatt tester).

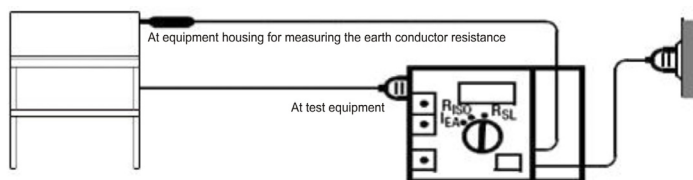


Figure 1. Inspection device connection

To measure grounding conductor resistance, insulation resistance and replacement leakage current, the device being tested must be connected to the inspection socket or to the sockets or clamps lying parallel to the inspection socket. The connection is connected with the short-circuited outer conductor sockets and the connection with the safety contact of the inspection socket.

B. Testing Grounding Conductor Resistance

1. Switch all electrical switches of the safety cabinet to position OFF.
2. Insert the power cable of the inspection device into the electrical plug of the power supply.
3. Connect the power cable of the safety workbench with the inspection socket of the inspection device.
4. Set the measurement range of the inspection device to the lowest unit, RSL 20 Ohm.
5. Read and note the measurement reading in Ohm.
6. Measure the grounding conductor resistance at the following points using the cone point on all accessible, conductive parts or test at the following points:
 - Housing
 - Light covering

- Safety contact of the electrical plug in the workroom
- Safety contact of the power supply failure alarm (Alarm 1)
- Safety contact of the Monitor connection (Alarm 2)

Reliable Values for the Grounding Conductor Resistance (in accordance with EN 61010)

The value of the grounding conductor resistance may not exceed $<0.3 \text{ Ohm}$.

Troubleshooting

- **Leakage detected:** Check the cables and terminal clamps of the device-internal power supply and of the safety cabinet.
- **Ground resistance not correct:** Check the power supply lines at the location of the device.
- **Ground faults detected:** Check the device grounding and the power supply lines at the location of the safety cabinet.

C. Testing Insulation Resistance

1. Insert the power cable of the inspection device into the electrical plug of the power supply.
2. Connect the power cable of the safety workbench with the inspection socket of the inspection device.
3. Set the measurement range of the inspection device to the highest unit, RISO 20 MOhm.
4. Read and note the measurement reading in MOhm.

Reliable Values for the Insulation Resistance (in accordance with EN 61010)

The value of the grounding conductor resistance may not be below $> 2 \text{ MOhm}$.

D. Equivalent leakage current test

The equivalent leakage current test must be performed after insulation testing has been passed.

1. Insert the power cable of the inspection device into the electrical plug of the power supply.
2. Connect the power cable of the safety workbench with the inspection socket of the inspection device.
3. Set the measurement range of the inspection device to the lowest unit IEA 20 mA.
4. The measured electrical leakage must not exceed $< 3.5 \text{ mA}$ (EN 61010).

**Note: Electrical measurement tools**

The safety cabinets of the series Herasafe 2030i / Maxisafe 2030i have a two-pole electrical cut-off and symmetrical Y-capacitive circuit on the main board. Therefore a 50 % reduction of the actual measuring equivalent leakage current is allowed.

Summary of the equivalent leakage current:

- Only together with insulation resistance
- Not applicable for multiphase devices
- Limit value 3.5 mA
- For devices with any all-pole, electrically actuated switches and symmetrical capacitive circuit a 50 % reduction of the actual measuring current

**Note:**

Correct calculation inside the service test protocols.

**Note:**

Electrical safety devices, which are used as working tools, should be tested and periodical according to the standards.

**CAUTION:**

Do not touch the instrument's terminal contacts during equivalent leakage current measurements!

Troubleshooting

- Leakage detected: Check the cables and terminal clamps of the device internal power supply and of the safety cabinet.
- Ground resistance not correct: Check the power supply lines at the location of the device.
- Ground faults detected: Check the device grounding and the power supply lines at the location of the safety cabinet.

HEPA filter leakage test

Purpose of the test

This test is conducted to check the HEPA down-flow and exhaust filters, the filter housings, and the mounting frames for possible leakage.

Testing equipment

Particle counter with a dilution range (1:100) or Aerosol photometer with linear or extended logarithmic scale and internal measurement capacity of 1cf.

Calibration of the testing equipment

Calibration in accordance with the manufacturer's instructions or in accordance with the requirements of IES-RP-CC-013-86T (Institute of Environmental Sciences, Mt. Prospect, Illinois).

Measuring accuracy of the testing equipment**Application in USA/Canada (NSF 49):**

- Aerosol photometer with an upper measuring threshold of 10 µg/l-100 µg/l at a measurement range of no fewer than 5 logarithmic concentration levels.
- The measuring accuracy must ensure that an aerosol concentration of 10 mg/L DEHS or PAO detects exactly 100% of the inflowing particles. The resulting light-scattering intensity is used for a comparison measurement. The adjustment of the device must ensure that the value 100 can be read on the 100% scale.
- The photometer must have a minimum air sample capacity of 1 cfm (28 l/min). The sample image must not exceed 2.5 cm (1 in.).

Application in EU (EN 12469)

- Particle counter for individual particles with a dilution range capable of detecting a penetration of 0.01% or less of particles exceeding 0.3 µm or
- Aerosol photometer with an upper measuring threshold of 10 µg/l-100 µg/l at a measurement range of no fewer than 5 logarithmic concentration levels.

Accessories

Aerosol generator / Dilution range.

**Note:**

Every year replace the measurement probe tubes.

For measurement of the raw air and clean air concentration use separate probe tubes with different colors or marked with labels.

Prior to measurement check the zero point calibration of the particle counter with a connected HEPA test filter (0,2 µm).

Test conditions

- The windows and doors of the operating room must be closed (no draft).
- The sample chamber of the safety cabinet must be completely empty.
- The front window has been moved to the maximal opening height.
- The airflow system operates with the specified values for airflow velocity (see Technical Data).

Method with Aerosol photometer (NSF 49)

1. Filters that can be accessed and scanned
Allow the cabinet to operate for approximately 20 minutes.
2. Remove the work tray and protective covers, as appropriate.
3. Introduce the aerosol from the generator in the center rear of the work area, using a tee fitting to evenly distribute the aerosol.
4. If desired, and if the cabinet has not been used with hazardous materials since an effective decontamination, the upstream concentration can be measured.

If desired, connect the photometer sample hose to the appropriate (supply or exhaust) test hose connection (exhaust test hose - right side / supply test hose - left side) from under the work tray.
5. Using either the appropriate upstream challenge measurement or calculated challenge value, set the photometer accordingly.
6. Scan the downstream side and perimeter of the filter as prescribed in NSF/ANSI 49, Annex F.

Acceptance:

- Filters scanned – 0.01% of upstream concentration at any point

Filters that cannot be accessed or scanned

Method:

1. Set up as in steps 1 through 5 above
2. In the duct, downstream of the filter, sample in accordance with NSF/ANSI Standard 49, 2004.

Acceptance:

- Filters not scanned – 0.005% of upstream concentration

HEPA Filter leakage test (NSF49)

Testing the Down Flow Filter using a aerosol photometer

Testing the Down Flow Filter Herasafe 2030i



Figure 2. Test ports Herasafe 2030i

HEPA filter leakage test ports for the Downflow (left side) and exhaust plenum (right side) are on the under the table tops behind the inner rear wall.

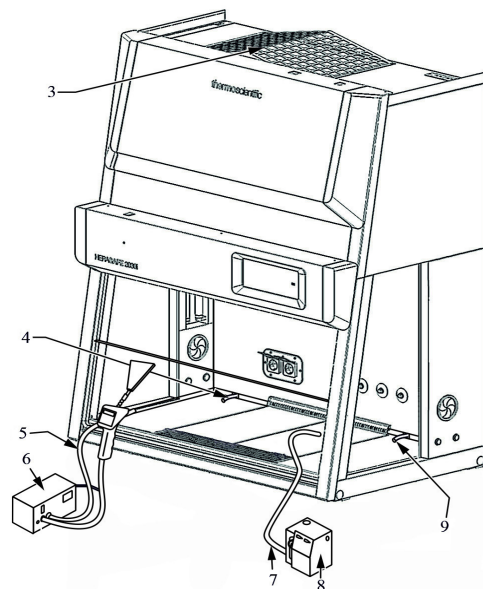
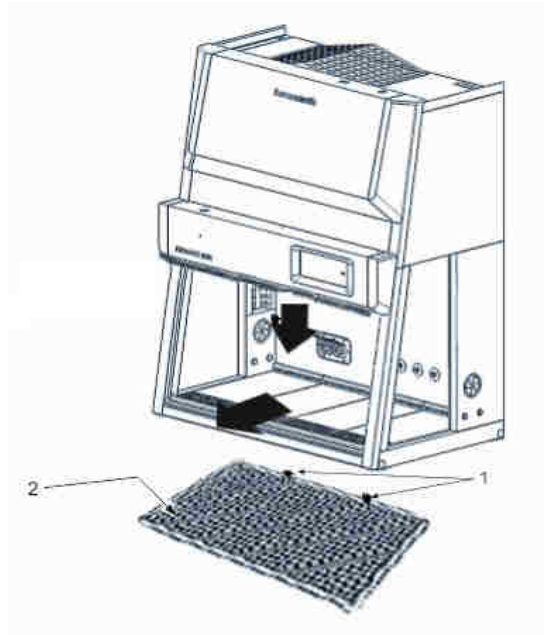


Figure 3. HEPA filter leakage test Down Flow Filter Herasafe 2030i

1. **Figure 3:** Remove the perforated plate [2]; Remove the 2 lock screws. then tilt the plate forward and remove it from the work chamber.
2. Route the hose [5] of the aerosol generator [6] so that the aerosols are supplied to the down-flow upward airflow.

First connect the supply testing hose [2] on the left side of the device of the circulation unit with the upstream and the downstream hose on the photometer.

3. Switch the aerosol generator on.

4. First, establish the 100% baseline using the aerosol sample as a reference.
5. Turn the selector valve knob to the upstream position. Observe that the % Leakage display immediately begins to show the concentration of the upstream challenge aerosol in % of the 100% baseline.
6. The photometer is comparing the concentration of the upstream challenge now to the concentration of this same source when it was previously used to establish the 100% baseline benchmark in its memory!
7. Measure the apparent air concentration (P_{max}).

Using the testing equipment [4], measure the aerosol concentration and check to see if the light-scattering intensity corresponds with the comparison measurement:

- 10 mg /L DEHS or PAO / NSF 49, Annex F

8. Scan the flow-off side of the circulation filter at a distance of 1 inch (2.5 cm) from the filter surface in slightly overlapping measuring tracks (trace). The sampling speed for this should not exceed 5 cm/sec.



Note:

If a filter's challenge concentration is known, follow the operating instructions of the photometer to establish a correct sensitivity setting. If the challenge concentration has been calculated, set the internal reference for the calculated amount. The photometer will automatically adjust its sensitivity to this quantity as the 100% baseline.

Acceptable values

Application in USA/Canada (NSF 49)

The escaping quantity of aerosols of the aerosol-generated air concentration may not exceed 0.01% of the maximum permissible discharge P_{max} (average integrated measurement of the aerosol-generated air concentration).

Troubleshooting

- Replace down-flow filter



Note:

The down-flow filter should only change if the limit value of the local penetration will be exceeded.

Testing the Down Flow Filter Maxisafe 2030i



Figure 4. Test ports Maxisafe 2030i

HEPA filter leakage test ports for the Downflow and exhaust plenum are on the under the table tops behind the inner rear wall.

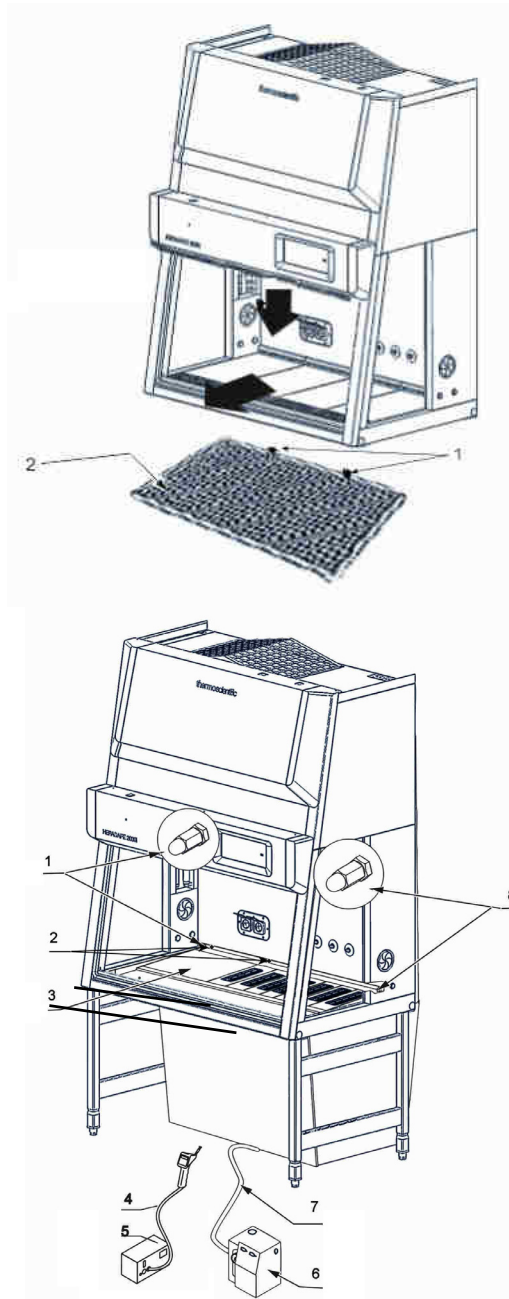


Figure 5. HEPA filter leakage test Down Flow Filter Maxisafe 2030i

1. **Figure 5:** Remove the perforated plate [2]: Remove the 2 lock screws at position [1], then tilt the plate forward and remove it from the work chamber.

To determine the apparent air concentration:

2. Remove the diaphragm socket.
Maxisafe 2030i 0.9 and 1.2 versions:
Opening [2] at the left side of the sample chamber rear panel

Maxisafe 2030i 1.5 and 1.8 versions

Opening [2] at the left side of the sample chamber rear panel Seal two pre-filter elements in the area [3] of the opening

3. Route the hose [7] of the aerosol generator [6] into the opening [2] so that the aerosols are supplied to the downflow upward airflow.
4. First connect the supply testing hose [1] on the left side of the device of the circulation unit with the upstream and the downstream hose on the photometer.
5. Switch the aerosol generator on.
6. First, establish the 100% baseline using the aerosol sample as a reference.
7. Turn the selector valve knob to the upstream position. Observe that the % Leakage display immediately begins to show the concentration of the upstream challenge aerosol in % of the 100% baseline.
8. The photometer is comparing the concentration of the upstream challenge now to the concentration of this same source when it was previously used to establish the 100% baseline benchmark in its memory!
9. Measure the apparent air concentration (P_{max}).

Using the testing equipment [5], measure the aerosol concentration and check to see if the light-scattering intensity corresponds with the comparison measurement:

- 10 mg /L DEHS or PAO

10. Scan the flow-off side of the circulation filter at a distance of 1 inch (2.5 cm) from the filter surface in slightly overlapping measuring tracks (trace). The sampling speed for this should not exceed 5 cm/sec.



Note:

If a filter's challenge concentration is known, follow the operating instructions of the photometer to establish a correct sensitivity setting. If the challenge concentration has been calculated, set the internal reference for the calculated amount. The photometer will automatically adjust its sensitivity to this quantity as the 100 % baseline.

Acceptable values

The escaping quantity of aerosols of the aerosol-generated air concentration may not exceed 0.01% of the maximum permissible discharge P_{max} (average integrated measurement of the aerosol-generated air concentration).

Troubleshooting

- Replace down-flow filter



Note:

The down-flow filter should only change if the limit value of the local penetration will be exceeded.

HEPA Filter leakage test (EN 12469)

Acceptance Herasafe 2030i and Maxisafe 2030i for downflow and exhaust filter:

If a discrete particle counter is used, the local penetration of a HEPA H14 filter with 0.005% integral penetration should be not more than 0.05%.

For additional security Thermo has defined a filter leakage limit lower than that required by the EN 12469 standard. The permissible integral penetration has been reduced about of factor 3.

None of the penetration rates shall exceed three times as the specific nominal value of the penetration rate of the filter according to EN12469.

Acceptance values	Penetration	H14 Filter
Limit value according standard	Integral penetration	0.005%
Specific Thermo nominal value	Integral penetration	0.00165 %
Limit value according standard	Local penetration	0.05%

Test requirements Herasafe 2030i and Maxisafe 2030i:

It is to be guaranteed that the load of the aerosol concentration on the upstream side of the HEPA filter is uniform.

The installation of the aerosol sources and sampling locations should ensure that the mean value of the aerosol concentration upstream of the filter will not vary by more than +25 % over time.

In the case of several filters, the determination of the particle concentration must be performed at least twice (before and after measurements) if proof was established that the aerosol distribution was uniform. Therefore an average aerosol concentration has to be measured and calculated.

- Determine traverse scan rate, sample acquisition time and the actual particle counts which characterize a leak.
- Assuming a constant scanning speed of 0.05 m/s a sampling air volume flow of 28.3 l/min will result. Increasing or reducing the scanning speed requires a commensurate change of the test aerosol concentration. For the leakage test, the airflow velocity should be adjusted to the specified value +30%.

- The recommended aerosol raw concentration for the Service should be at least 10 million particles, but not more than 30 million particles!
- Distributive differential measurements: In the future the particles have to be determinate and measured only distributive (not more cumulative).
- Reference particle size is always 0.3 µm.

Testing the Down Flow Filter using a particle counter

Testing the Downflow Filter Herasafe 2030i



Figure 6. Test ports Herasafe 2030i

HEPA filter leakage test ports for the Downflow (left side) and exhaust plenum (right side) are on the under the table tops behind the inner rear wall.

Herasafe 2030i

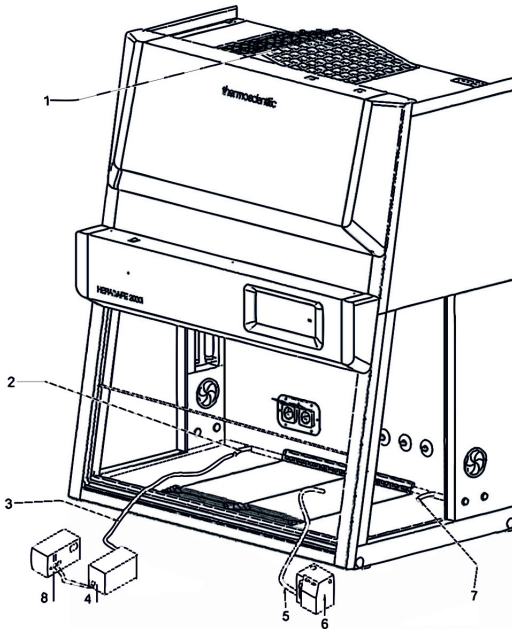


Figure 7. Testing down-flow filter Herasafe 2030i

Method with particle counter (EN 12469)



Note:

EN 12469 requires only a HEPA filter leakage test of the installed HEPA filter. A classification of the adsorption rate according to EN1822 is not possible. The filter class and the adsorption rate are already tested by the filter producer with each filter documented by means of a filter certificate according to EN1822.

This test serves to demonstrate proper installation of the filter system or to confirm that no leakage has occurred during operation. This test consists of a measurement of the installed filter system, aimed at detecting small leakages and other damage to the filter medium and the frame seal.

1. Allow the cabinet to operate for approximately 20 minutes.
2. Remove the work tray and protective covers, as appropriate.
3. Introduce the aerosol from the generator in the center rear of the work area, using a tee fitting to evenly distribute the aerosol.

Testing the Down Flow Filter Maxisafe 2030i



Figure 8. Test ports Maxisafe 2030i

HEPA filter leakage test ports for the Downflow (left side) and exhaust plenum (right side) are on the under the table tops behind the inner rear wall.

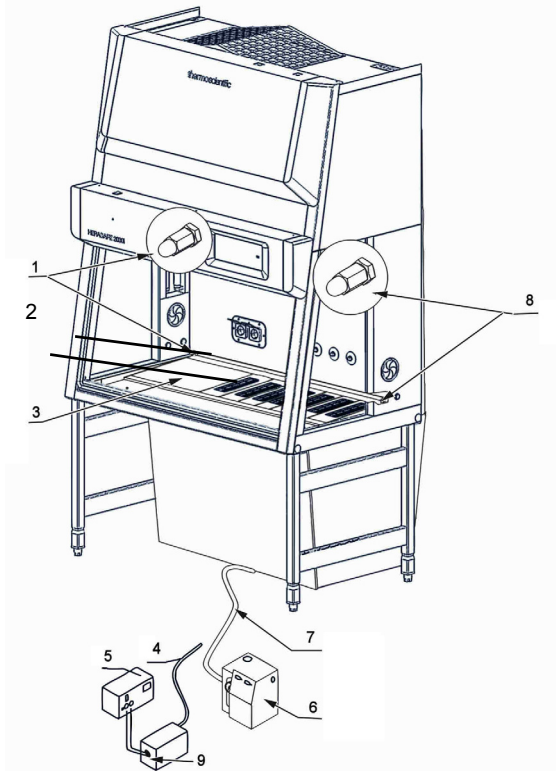


Figure 9. HEPA filter leakage test Down Flow Filter Maxisafe 2030i

To determine the raw air concentration:

1. Remove the diaphragm socket.
Maxisafe 2030i 0.9 and 1.2 versions:
 Opening [2] at the left side of the sample chamber rear panel

Maxisafe 2030i 1.5 and 1.8 versions
 Opening [2] in the center of the sample chamber rear panel
 Seal two pre-filter elements in the area [3] of the opening
2. Route the hose [7] of the aerosol generator [6] into the opening [2] so that the aerosols are supplied to the downflow

Test procedure Herasafe 2030i and Maxisafe 2030i:

1. The perforated plate stays inside the work chamber. Fig. 7: Route the hose [5] of the aerosol generator [6] so that the aerosols are supplied to the downflow upward airflow.
2. First connect the supply testing hose [2] on the left side of the device of the circulation unit with the hose [3] of the dilution line [4] and then with the connection hose of the inspection device.
3. Switch the aerosol generator on.
4. With a dilution line [4] of 1:100 measure the aerosol-concentration (aerosol-generated air-concentration R1) in the circulation chamber for 1 min. with the particle counter [8].
5. Fig. 7: Then connect the connection hose [3] of the particle counter (without the dilution line) with the measuring probe.

6. Determination of the scanning time: A distinction should be made between the different isokinetic probe shapes when calculating the scanning time. The scanning time depends on the size of the probe shapes and filter sizes. In a probe diameter of app. 36 mm following scanning times will be necessary.

Filter size	0.9 m	1.2 m	1.5 m	1.8 m
Scanning rate	5 min	6 min	8 min	9 min

7. Scan the filter, moving the probe over it in overlapping strokes. When doing so, the probe shall be held at a distance of no more than 3 cm from the downstream filter surface or the frame. For each filter, the scan should cover the entire clean-air side of the filter medium, the filter frame and the joints. The complete area of the laminator sheet (perforated plate) should be scanned. According to the EN12469 the laminator sheet stays inside during measurement.
8. While scanning, each indication of at least the same magnitude as the limit for a nominal leak should cause the probe to be halted at the location of the leak. As the location of the leak, record that location where the particle counter indication is maximal. If a escalate jump of particle climbing is observed during the scan, then the leakage has to be found and individually tested for 1 min Determine the raw air concentration again.
9. Fig. 7: Reconnect the testing hose supply [2] of the downflow plenum with the dilution line hose [3] and then with the connection hose of the particle counter [8] and measure the aerosol-concentration (aerosol-generated air-concentration R2) in the downflow plenum for 1 min. once again.
10. Calculation of the averaged aerosol-generated air concentration R:

$$R=(R1+R2)/2$$
11. Calculation of the max. permissible particle quantity (Pmax).

$$Pmax = R \times \text{Nominal limit value for integral penetration}$$
12. Nominal limit value for integral penetration of a H-14 filter: 0,0000165 (Thermo value) or standard value 0.00005.
13. Expression of results in the test protocol according to EN 12469 the results should be express as the upstream aerosol concentration, downstream aerosol concentration and the ratio of concentrations in percentage.

Troubleshooting

- Replace down-flow filter



Note:

The down-flow filter should only change if the limit value of the local penetration will be exceeded.

Testing the Exhaust Filter (NSF49)

Testing the Exhaust Filter using a aerosol photometer

Testing the Exhaust Filter Herasafe 2030i



Figure 10. Test ports Herasafe 2030i

HEPA filter leakage test port for the Downflow (left side) and exhaust plenum (right side) are on the under the table tops behind the inner rear wall.

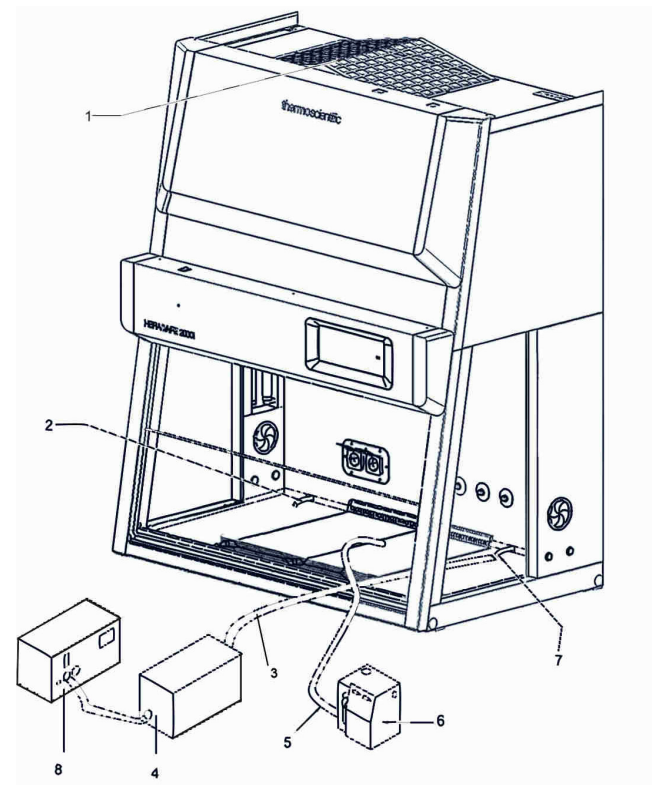


Figure 11. Testing the Exhaust HEPA filter (NSF49)

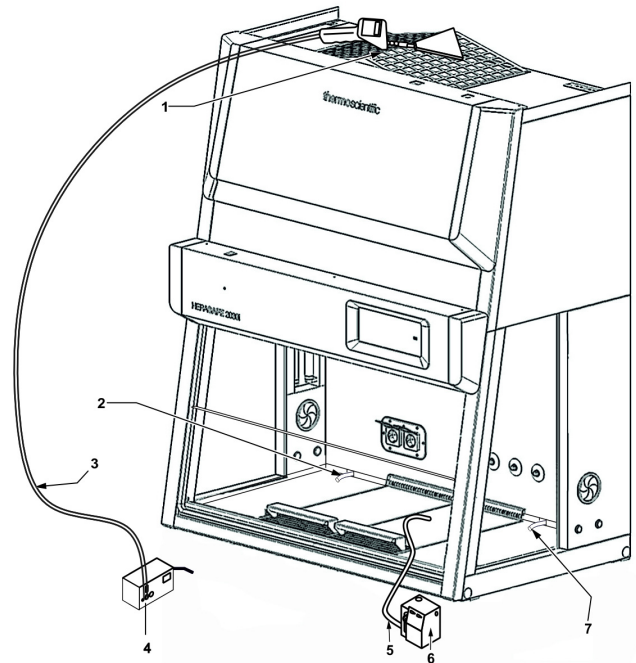


Figure 12. Testing the Exhaust HEPA filter (NSF49)



Note:

Remove the protective grid on the exhaust filter for scanning.

1. **Figure 12:** Route the hose [5] of the aerosol generator [6] so that the aerosols are supplied to the exhaust upward airflow.
2. Connect the **Exhaust** test hose [7] to the exhaust air chamber on the right side of the device with the hose [3] of the dilution line (only for measurement with particle counter) and then with the connection hose of the inspection device [8].



Note:

Measurement procedure and acceptance values like see testing circulation filter (downflow filter).

3. Switch the aerosol generator on.
4. First, establish the 100% baseline using the aerosol sample as a reference.
5. Turn the selector valve knob to the upstream position. Observe that the % Leakage display immediately begins to show the concentration of the upstream challenge aerosol in % of the 100% baseline.
6. The photometer is comparing the concentration of the upstream challenge now to the concentration of this same source when it was previously used to establish the 100% baseline benchmark in its memory!
7. Measure the apparent air concentration (P_{max}).

8. Using the testing equipment [4] with a dilution range of 1:100 or 1:1000, measure the aerosol concentration and check to see if the light-scattering intensity corresponds with the comparison measurement:
 - 10 mg/L DEHS or PAO / NSF 49, Annex F
9. Scan the flow-off side of the exhaust air filter at a distance of 1 inch (2.5 cm) from the filter surface in slightly overlapping measuring tracks (trace). The sampling speed for this should not exceed 5 cm/sec. The diffuser surface should be vacuumed from the rear wall to the front edge of the diffuser plate.



Note:

If a filter's challenge concentration is known, follow the operating instructions of the photometer to establish a correct sensitivity setting. If the challenge concentration has been calculated, set the internal reference for the calculated amount. The photometer will automatically adjust its sensitivity to this quantity as the 100% baseline.

Acceptable values

Application in USA/Canada (NSF49)

- The escaping quantity of aerosols of the aerosol-generated air concentration may not exceed 0.01% of the maximal permissible discharge P_{max} (average integrated measurement of the aerosol-generated air concentration).

Troubleshooting

- Replace exhaust filter



Note:

The exhaust filter should only change if the limit value of the local penetration will be exceeded.

Testing the Exhaust Filter Maxisafe 2030i



Figure 13. Test ports Maxisafe 2030i

HEPA filter leakage test ports for the Downflow (left side) and exhaust plenum (right side) are on the under the table tops behind the inner rear wall.

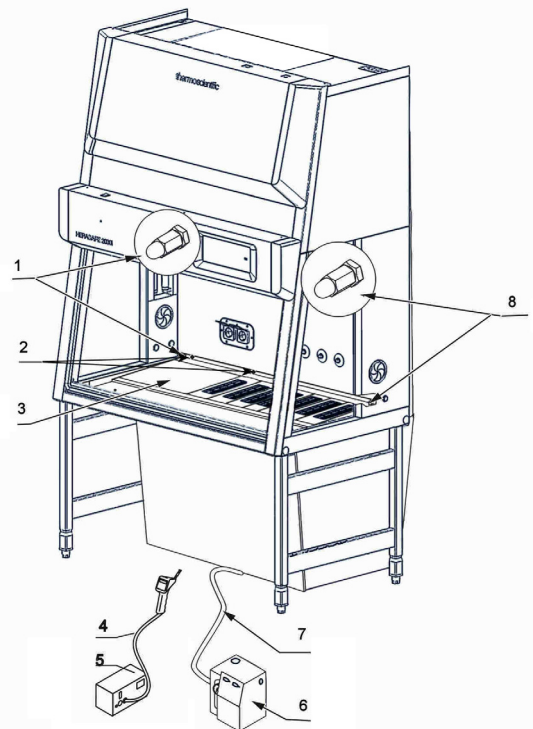


Figure 14. HEPA filter leakage test Exhaust Filter Maxisafe 2030i

To determine the raw air concentration:

1. Remove the diaphragm socket.
 - Maxisafe 2030i 0.9 and 1.2 versions:**
Opening [2] at the right side of the sample chamber rear panel
 - Maxisafe 2030i 1.5 and 1.8 versions**
Opening [2] in the center of the sample chamber rear panel.
- Seal two pre-filter elements in the area [3] of the opening
2. Route the hose [7] of the aerosol generator [6] into the opening [2] so that the aerosols are supplied to the downflow upward airflow.
3. First connect the supply testing hose [1] on the right side of the device of the circulation unit with the upstream and the downstream hose on the photometer.
4. Switch the aerosol generator on.
5. First, establish the 100% baseline using the aerosol sample as a reference.
6. Turn the selector valve knob to the upstream position. Observe that the % Leakage display immediately begins to show the concentration of the upstream challenge aerosol in % of the 100% baseline.

7. The photometer is comparing the concentration of the upstream challenge now to the concentration of this same source when it was previously used to establish the 100% baseline benchmark in its memory!
8. Measure the apparent air concentration (P_{max}).
Using the testing equipment [5], measure the aerosol concentration and check to see if the light-scattering intensity corresponds with the comparison measurement:
 - 10 mg /L DEHS or PAO
9. Scan the flow-off side of the circulation filter at a distance of 1 inch (2.5 cm) from the filter surface in slightly overlapping measuring tracks (trace). The sampling speed for this should not exceed 5 cm/sec.



Note:

If a filter's challenge concentration is known, follow the operating instructions of the photometer to establish a correct sensitivity setting. If the challenge concentration has been calculated, set the internal reference for the calculated amount. The photometer will automatically adjust its sensitivity to this quantity as the 100% baseline.

Acceptable values

The escaping quantity of aerosols of the aerosol-generated raw air concentration may not exceed 0.01% of the maximum permissible discharge P_{max} (average integrated measurement of the aerosol-generated air concentration).

Troubleshooting

- Replace exhaust filter



Note:

The exhaust filter should only change if the limit value of the local penetration will be exceeded.

Testing the Exhaust filter (EN12469)

Testing the Exhaust Filter using a particle counter

Testing the Exhaust Filter Herasafe 2030i



Figure 15. Test ports Herasafe 2030i

HEPA filter leakage test ports for the Downflow (left side) and exhaust plenum (right side) are on the under table tops behind the inner rear wall.

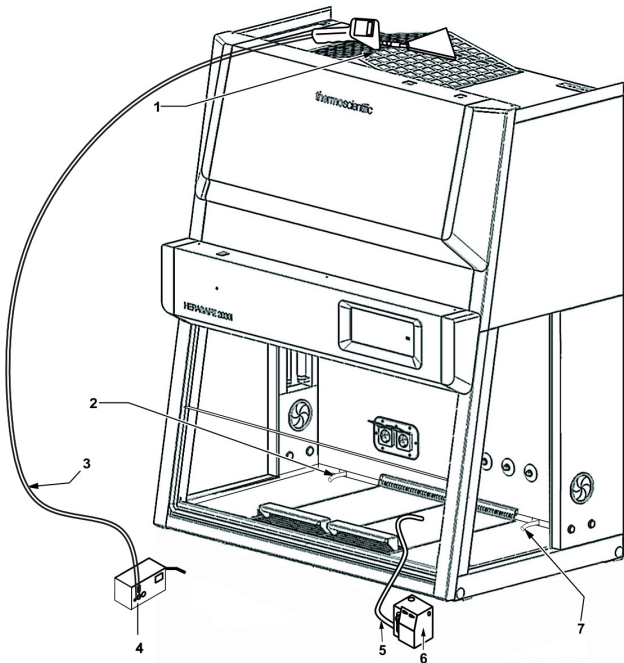
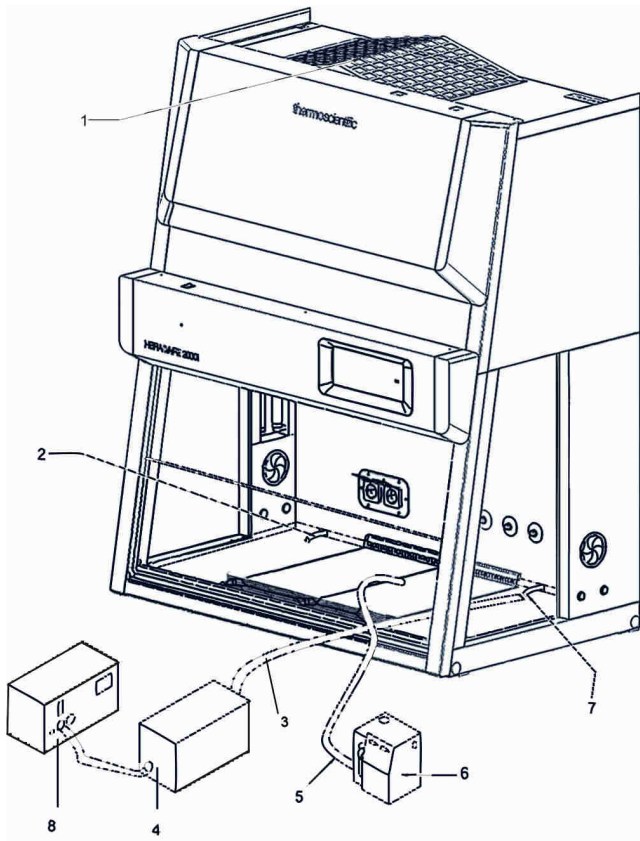


Figure 16. Testing Exhaust Filter

1. **Figure 16** Route the hose [5] of the aerosol generator [6] so that the aerosols are supplied to the exhaust upward airflow.
2. First, connect the supply testing hose [7] on the right side of the device of the exhaust plenum unit with the hose [3] of the dilution line [4] and then with the connection hose of the inspection device.

3. Switch the aerosol generator on.
4. With a dilution line [4] of 1:100 measure the aerosol-concentration (aerosol-generated air-concentration R1) in the exhaust plenum for 1 min. with the particle counter [8].
5. **Figure 16:** Then connect the connection hose [3] of the particle counter (without the dilution line) with the measuring probe.
6. Scan the flow-off side of the exhaust filter at a distance of 2.5 cm from the filter surface in slightly overlapping measuring tracks (trace). The sampling speed for this should not exceed 5 cm/sec.

Scanning time exhaust filter

Determination of the scanning time: A distinction should be made between the different isokinetic probe shapes when calculating the scanning time. The scanning time depends on the size of the probe shapes and filter sizes. In a probe diameter of app. 36 mm following scanning times will be necessary:

Exhaust filter – Model type	0.9	1.2	1.5	1.8
Scanning rate	2 min	3 min	3 min	5 min

7. While scanning, each indication of at least the same magnitude as the limit for the nominal leak should cause the probe to be halted at the location of the leak. as the location of the leak, record that location where the particle counter location is maximal. If a escalate jump of the particle climbing is observed during the scan, then the leakage has to be found and individually tested for 1 min. Determine the raw air concentration again.

Figure 16: Reconnect the testing hose supply [7] of the exhaust plenum with the dilution line hose [3] and then with the connection hose of the particle counter [8] and measure the aerosol- concentration (aerosol-generated air-concentration R2) in the circulation chamber for 1 min once again.

8. Calculation of the averaged aerosol-generated air concentration R:

$$R = (R1 + R2) / 2$$

9. Calculation of the max. permissible particle quantity (Pmax):

$$P_{max} = R \times \text{Nominal limit value for integral penetration}$$

Nominal limit value for integral penetration of a H-14 filter: 0.0000165 (Thermo value) or standard value 0.00005.

Testing the Exhaust Filter Maxisafe 2030i



Figure 17. Testing Exhaust Filter

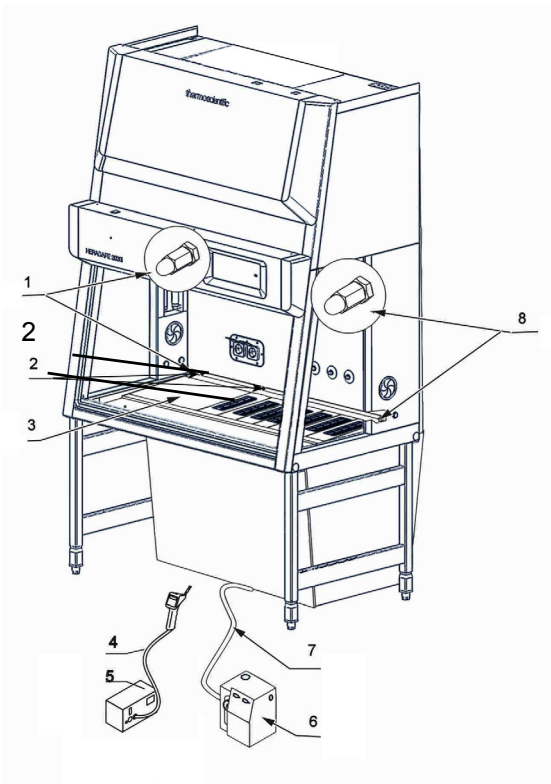


Figure 18. HEPA filter leakage test Exhaust Filter Maxisafe 2030i

To determine the raw air concentration:

1. Remove the diaphragm socket.
Maxisafe 2030i 0.9 and 1.2 versions:
 Opening [2] at the left side of the sample chamber rear panel
Maxisafe 2030i 1.5 and 1.8 versions
 Opening [2] at the left side of the sample chamber rear panel

Seal two pre-filter elements in the area [3] of the opening

2. Route the hose [7] of the aerosol generator [6] into the opening [2] so that the aerosols are supplied to the downflow upward airflow.

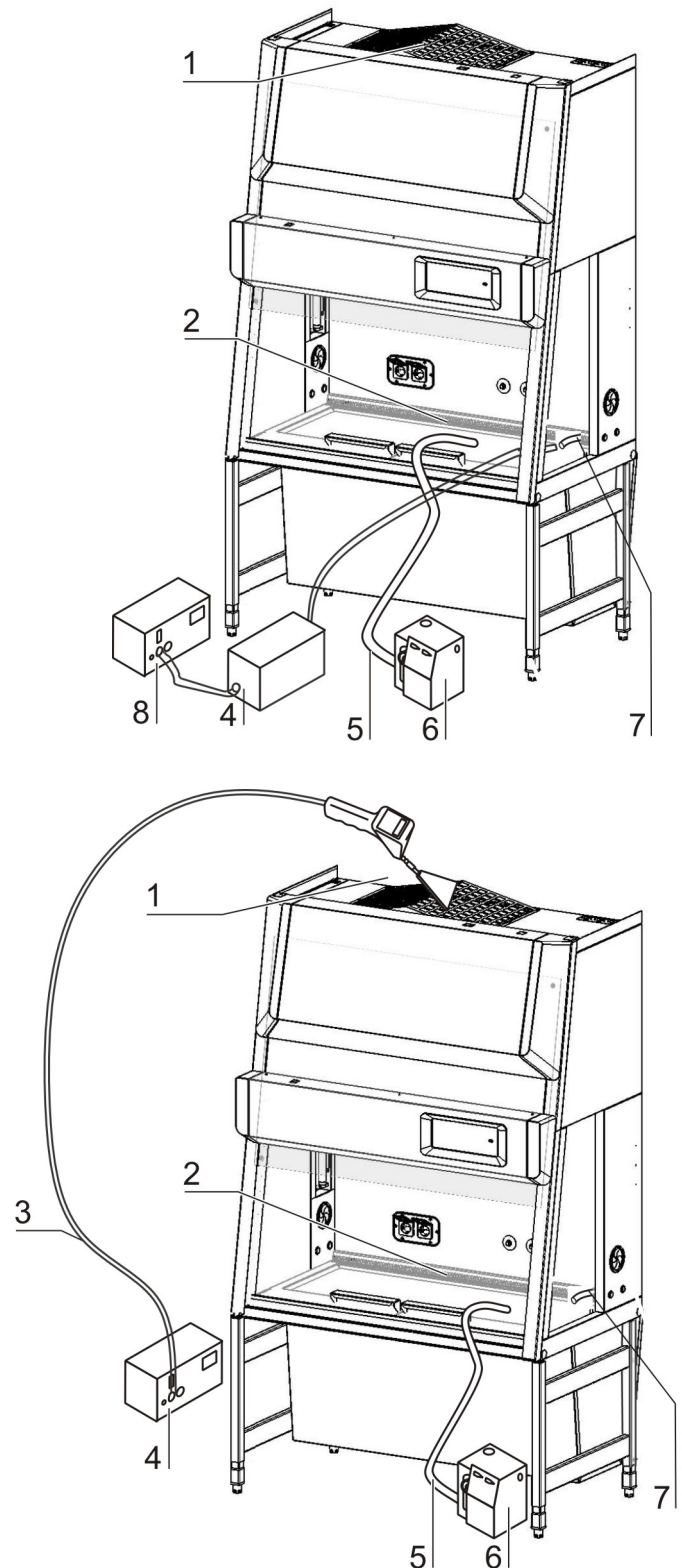


Figure 19. Testing Exhaust Filter Maxisafe 2030i

1. First, connect the supply testing hose [7] on the right side of the device of the exhaust plenum unit with the hose [3] of the dilution line [4] and then with the connection hose of the inspection device.
2. Switch the aerosol generator on.
3. With a dilution line [4] of 1:100 measure the aerosol-concentration (aerosol-generated air-concentration R1) in

the exhaust plenum for 1 min. with the particle counter [8].

4. **Figure 19:** Then connect the connection hose [3] of the particle counter (without the dilution line) with the measuring probe.
5. Scan the flow-off side of the exhaust filter at a distance of 2.5 cm from the filter surface in slightly overlapping measuring tracks (trace). The sampling speed for this should not exceed 5 cm/sec.

Scanning time exhaust filter

Determination of the scanning time: A distinction should be made between the different isokinetic probe shapes when calculating the scanning time. The scanning time depends on the size of the probe shapes and filter sizes. In a probe diameter of app. 36 mm following scanning times will be necessary:

Exhaust filter – Model type	0.9	1.2	1.5	1.8
Scanning rate	2 min	3 min	3 min	5 min

While scanning, each indication of at least the same magnitude as the limit for the nominal leak should cause the probe to be halted at the location of the leak. as the location of the leak, record that location where the particle counter location is maximal. If a escalate jump of the particle climbing is observed during the scan, then the leakage has to be found and individually tested for 1 min. Determine the raw air concentration again

Figure 19: Reconnect the testing hose supply [7] of the exhaust plenum with the dilution line hose [3] and then with the connection hose of the particle counter [8] and measure the aerosol- concentration (aerosol-generated air-concentration R2) in the circulation chamber for 1 min once again.

6. Calculation of the averaged aerosol-generated air concentration R:

$$R = (R1 + R2) / 2$$
7. Calculation of the max. permissible particle quantity (P_{max}):

$$P_{max} = R \times \text{Nominal limit value for integral penetration}$$
8. Nominal limit value for integral penetration of a H-14 filter: 0.0000165 (Thermo value) or standard value 0.00005.
9. Expression of results.
 In the test protocol according to EN 12469 the results should be express as the upstream aerosol concentration, downstream aerosol concentration and the ratio of concentrations in percentage.

Acceptable values

Application in EU (EN 12469):

The escaping quantity of aerosols of the aerosol-generated air concentration may not exceed 0.005% of the maximum

permissible discharge P_{max} (average integrated measurement of the aerosol-generated air concentration).

If this value is exceeded, the local discharge P_{loc} (Penetration) of the HEPA-filters may not exceed 0.05%.

Troubleshooting

- Replace exhaust air filter.



Note:

The exhaust filter should only change if the limit value of the local penetration will be exceeded.

Pre-filter element leakage test

Maxisafe 2030i version

Purpose of the test

This test determines the integrity of the HEPA pre-filters.

The construction of cartridge pre-filters is such that a downstream scan-test is simply not possible.

Depending on the feasibility of a suitable aerosol concentration, an overall integral penetration test can be carried out in accordance with EN 14644-3 – B.6.4.

Procedure of overall test of filters installed in air-handling ducts or air-handling units:

- measurement per single pre-filter element
- Comparison testing inside the down flow plenum



Note:

This test cannot detect individual local leaks. A local penetration scan test is not possible.

Testing equipment

Aerosol photometer with linear or extended logarithmic scale or particle monitor with dilution range (1:100).

Calibration of the testing equipment

Calibration in accordance with the manufacturer's instructions or in accordance with the requirements of IES-RP-CC-013-86T (Institute of Environmental Sciences, Mt. Prospect, Illinois).

Measuring accuracy of the testing equipment

The measuring accuracy must ensure that an aerosol concentration of 10 µg/L DEHS or PAO detects exactly 100% of the inflowing particles. The resulting light-scattering intensity is used for a comparison measurement.

The adjustment of the device must ensure that the value 100 can be read on the 100% scale.

- The photometer must have a minimum air sample capacity of 1 cfm (28 l/min).

Application in EU (EN 12469)

- Particle counter for individual particles with a dilution range capable of detecting a penetration of 0.01% or less of particles exceeding 0.3 µm or
- Aerosol photometer with an upper measuring threshold of 10 µg/l-100 µg/l at a measurement range of no fewer than 5 logarithmic concentration levels.

Accessories

Aerosol generator / Dilution range.

Test conditions

- The windows and doors of the operating room must be closed (no draft).
- The sample chamber of the safety cabinet must be completely empty, all work-plates must have been removed from the sample chamber.
- The front window has been moved to the maximal opening height.
- The airflow system operates with the specified values for airflow velocity (see Technical Data).
- For the measurement of the pre-filter leakage always the same quantity of pre-filter elements should be covered during the measurement of the upstream / downstream aerosol concentration. Our recommendation is always to cover 2 pre-filter elements!

To assess the ambient conditions:

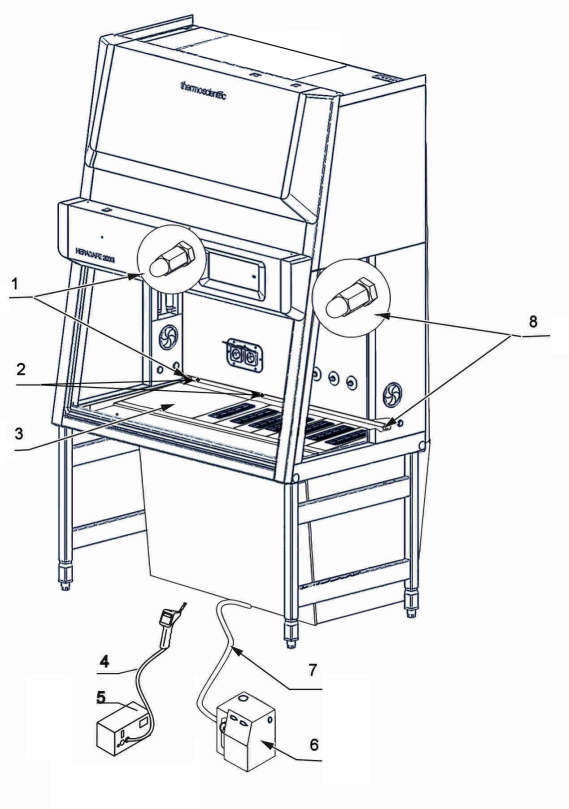


Figure 20. Pre-filter element leakage test

Method with Particle counter

1. Allow the cabinet to operate for approximately 20 minutes.
2. Connect the connection hose [4] of the particle counter with both connection threadings [1] of the circulation chamber.
For Maxisafe 2030i 0.9 and 1.2 units connect supply and exhaust using a T-fitting [8].
3. To assess the ambient conditions, measure the background / basic load (P0) for approx 1 minute. Measurement without test aerosol.

To determine the raw air concentration:

Remove the diaphragm socket from the openings [2].

Maxisafe 2030i 0.9 and Maxisafe 2030i 1.2 versions:

- Opening [2] at the left side of the sample chamber rear panel

Maxisafe 2030i 1.5 and Maxisafe 2030i 1.8 versions:

- Opening [2] in the center of the sample chamber rear panel.
4. Seal two pre-filter elements in the area [3] of the opening using foil and tape or an appropriate cover. Aerosol is inserted behind the pre-filter element.
 5. Route the hose [7] of the aerosol generator [6] into the opening [2] so that the aerosoles are supplied to the down-flow upward airflow.
 6. Connect the particle monitor [5] via dilution range (1:100) [9] to the supply connection [1].
 7. Measure the aerosol-generated air concentration (R1) in the circulation chamber for 1 min. The display value of the particle counter is multiplied with the dilution factor of the dilution line.

Testing the individual filters:

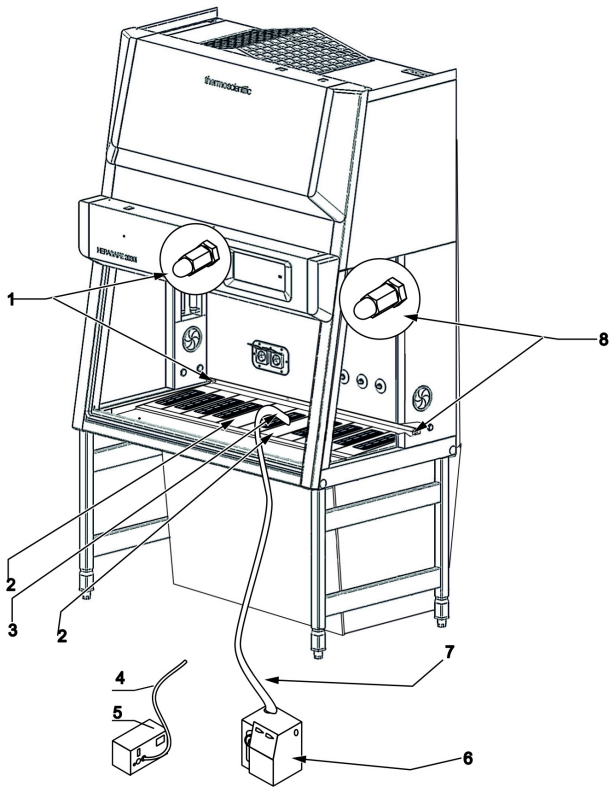


Figure 21. Testing the individual filters

8. **Figure 21:** Connect the connecting hose [4] of the particle counter [5] without dilution range to the supply connection [1]
9. Cover the pre-filter side by side to the filter which is to be tested.
10. Insert the hose [7] of the aerosol generators [6] like a probe into the pre-filter element so that all of the aerosols are directed into the pre-filter element.
11. Coat the pre-filter element undergoing testing with an even layer of test aerosol. Ensure that the aerosol supply coats as many areas of the pre-filter as possible.
12. Measure step by step the aerosol concentration (P_n) of each pre-filter element in the chamber for 1 min. (n = number of pre-filter elements).
13. Conduct the measurement with all of the pre-filter elements and determine the maximum discharge P_n (max).
14. Determine once again the aerosol-generated raw air concentration (R_2) (Steps 3-7).
15. Calculation of the averaged aerosol-generated air concentration R : $R = (R_1 + R_2) / 2$.
16. Calculation of the max. permissible particle quantity (P_{max}):

$P_{max} = R \times \text{Max. limit value for integral penetration}$
 See below: Max. limit value for H14 filter: 0.025%.

17. Calculation of the greatest permeability P_x (max) of all pre-filter elements:

Acceptable values:

Application in EU (EN 12469):

None of the penetration rates of the single pre-filter elements shall exceed five times as the specific nominal value of the MPPS penetration rate of the filter specified according EN 12469 (refer to EN ISO 14644).

Limit values Service	Penetration	H14 Filter
Nominal value acc. EN1822	MPPS Integral penetration	0.005
Max. limit value acc. EN14644	Max. Integral penetration	0.025

Method with Photometer

Testing equipment

Aerosol photometer with a linear or extended logarithmic scale, e.g. ATI TDA-2G.

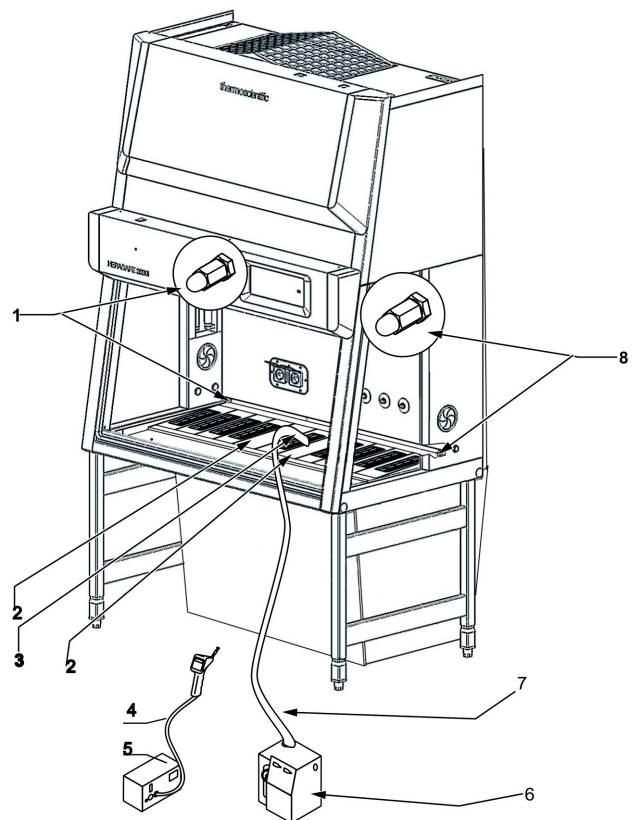


Figure 22. Testing the individual filters

1. Allow the cabinet to operate for approximately 20 minutes.
2. Connect the upstream sample fitting of the photometer to the connection threading [1] and [8] of the cabinet.

To determine the apparent raw air concentration:

3. Remove the diaphragm socket from the openings [2].

Maxisafe 20230i 0.9 and Maxisafe 2030i 1.2 versions:

- Opening [2] at the left side of the sample chamber rear panel.

Maxisafe 2030i 1.5 and Maxisafe 2030i 1.8 versions:

- Opening [2] in the center of the sample chamber rear panel.
4. Seal 2 pre-filters elements in the area [3] of the opening using foil and tape or an appropriate cover. Aerosol is inserted behind the pre-filter element.
 5. Route the hose [7] of the aerosol generator [6] into the opening [2] so that the aerosols are supplied to the down-flow upward airflow.
 6. Connect the photometer exhaust outlet with a disposable one way HEPA filter.
 7. Connect the 5-pin connector and connect the scanning probe hose to the downstream sample fitting of the photometer.
 8. Turn the selector valve knob to the “Clear” position.
 9. Turn the photometer on.



Note:

Don't turn it off during measurement is running. If the instrument will be turn off, then a complete internal reference adjustment of the 0% and 100% baseline has to be done again.

10. The pump of the photometer will start, the bar-graph will run app. 10 sec. Afterward “88888” will be displayed and will be indicated by an audible alarm beep.
11. Press the following function keys: “Enter” + “REF” + “Enter”. The % Leakage display will flash the internal reference setting for “P1” (DOP) and “100”. The system will begin its internal adjustment, indicated by the bar-graph sweeping from left to right until the task is completed. This will take app.15 sec. and will be indicated by an audible alarm beep.
12. When completed, the red LED in the 0 function key will begin to flash. Now press “Enter” again in order to automatically zero setting the instrument. This will take app. 5 sec. and will be indicated by more audible alarm beeps and “000” will be displayed. This establishes the 0% baseline reference.

It is important not to turn the valve from “Clear” until the final beep is heard.
13. Turn the selector valve knob to the “Upstream” position.

14. Turn on the aerosol generator. The apparent air concentration should be app. 100 µg/L DEHS or PAO.
15. Press the following function keys: “Enter” + “100” + “Enter”. This establishes the 100% adjustment using the aerosol sample as a 100% baseline reference. This can take app. 20 sec. to complete and will be indicated by more audible alarm beeps.
16. Turn the selector valve knob to the “Clear” position, “0” function key is flashing, press “Enter” to re-zero setting the instrument. “000” will be shown on the display and indicated by more audible alarm beeps and a long beep at the end.
17. Turn off the aerosol generator.

Testing the individual filters:

1. Cover the pre-filters side by side of the filter which is to be tested.
2. Insert the hose [7] of the aerosol generator [6] like a probe into the pre-filter element so that all of the aerosols are directed into the pre-filter element.
3. Coat the pre-filter element undergoing testing with an even layer of test aerosol. Ensure that the aerosol supply coats as many areas of the pre-filter as possible.
4. Remove the nozzle of the scanning probe.
5. Connect the downstream sample fitting of the photometer over the end of the scanning probe to the connection port [1] and [8] of the cabinet.
6. Turn the selector valve knob to the “Downstream” position and start sampling.



Note:

This only can be carried out if the internal references (0% and 100% baseline) have been established and the upstream sample line is connected to the upstream port on the unit.

7. The photometer is comparing the concentration of the downstream concentration now to the concentration of this same source when it was previously used to establish the 100% baseline benchmark in its memory.
8. Conduct this measurement step by step with all of the pre-filter elements.
9. Turn the selector valve knob to the “Clear” position and let it run for 1 min. before the photometer will be turned off.

Acceptable values

- The measurements are conducted using an aerosol photometer.

Prior to the measurements, the testing equipment must be calibrated in accordance with the manufacturer's instructions and the values for 0% and for 100 % must be determined.

- The escaping volume of aerosols of the aerosol generated raw air concentration may not exceed 0.01% of the maximum permissible discharge P_{max} .

Troubleshooting

- Replace the pre-filter elements.

Velocity tests

The inflow and downflow tests for adjustment of the workbench must be performed in following order:

1. Downflow velocity test - Nominal setpoint downflow velocity
2. Inflow velocity test - Nominal setpoint Inflow velocity
3. (Low) Inflow alarm adjustment
4. (Low) Downflow alarm adjustment
5. Alarm limit tests

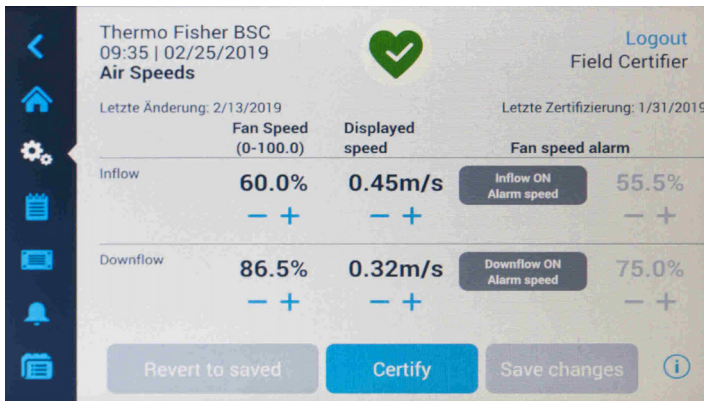


Figure 23. Field certifier screen

Needed pressure stabilization time for each value is always 1 min.(countdown 60 sec).

- To store the value press the button Save Changes
- At the end of the blower and alarm adjustment press the button Certify, to store the actual date of the Field certification. The cabinet has been certified. The Next certification date will be due in 12 month and the date of the next alert will be refreshed.



Note: No-load current blower calibration

Needed after each main board or blower replacement!

Prior of air velocity test.

Inflow velocity tests

Inflow velocity test (EN 12469)

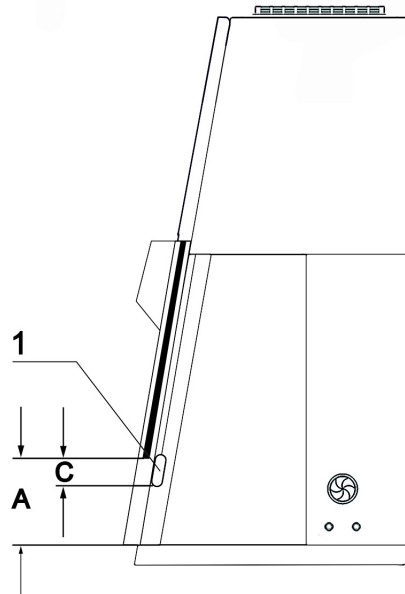
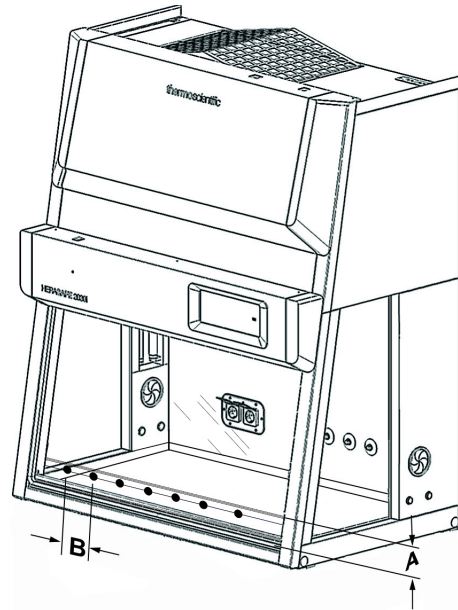


Figure 24. Measuring grid Inflow velocity test

Purpose of the test

This test is conducted to determine the nominal value of the inflow velocity. The average airspeeds of air entry and the measuring points with the lowest or highest inflow velocity must be ascertained with an anemometer.

Value to be determined

Inflow velocity, V_1 .

Direct measurement of the inflow velocity in the work aperture (EN12469)

Figure 24: The inflow velocity is measured at several measuring points in the work aperture. For this purpose:

The anemometer is installed directly to the inside of the work aperture front window.

The measuring points are located at distance C immediately at the inside of the front window lower edge and at distance B of 10 cm to each other.

The lateral distance to the work aperture edges is also 5 cm.

For Herasafe 2030i / Maxisafe 2030i 200 mm work opening:

A: 65 mm - C: 32,5 mm

Herasafe 2030i 250 mm work opening:

A: 80 mm - C: 40 mm

Testing equipment

Anemometer, freestanding fixture or equivalent, or laboratory stand with clamp free adjustable angle or tape.

Calibration of the testing equipment

The anemometer must be calibrated in accordance with the manufacturers instructions or in wind tunnel tests.

Test measurement

1. Lower the front window to a height as specified above (A).
2. Move the front window to the measurement position and operate the air system blower for approx 20 minutes.
3. Insert the thermal anemometer probe into the probe holder. Place the probe holder at the window opening work surface, ensuring it is seated properly. Adjust the probe so the air passing through probe is centered in the window opening (C).
4. Beginning 5 cm from the left inside wall, record successive readings every 10 cm.
5. Average those readings and calculate the inflow velocity (V1) as described below.
6. Evaluate the individual measurements.
7. Average those readings and calculate the inflow velocity (V1) as described below.

Calculating the average value for inflow velocity V1.

Average = Sum of measurement readings/number of measuring points x M

M: Multiplication factor:

M = Front window in reduced position / Front window in working position:

200 mm: 65 mm/200 mm = 0.325

250 mm: 80 mm/250 mm = 0,320

Acceptable values

Application in EU (EN 12469):

- The nominal value is 0.45 m/s.
- The average value of the inflow velocity (V1) must be within ± 0.01 m/s of the nominal value.

Troubleshooting

- Adjust the exhaust blower speed by changing the % of the inflow speed (see Field certification screen).
- Check the exhaust blower control voltage at main board. The control voltage in the value range of 0-10 V changes with the settings in field certifier screen. The control voltage of the exhaust blower must be coordinated with the settings in the field certifier screen.
- No load current blower calibration.
- Replace the exhaust filter.
- Check the installed exhaust system for correct function. If installed, change the size of the draft interrupter or check the exhaust plenum (air door) for correct function.

Indirect Measurement of the Exhaust

Airspeed

Indirect Measuring Method for the Measurement of the Exhaust Airspeed and Mathematical Ascertainment of the Air Entry Speed (EN 12469 / DIN 12980)

The average value of the directly measured exhaust airspeed (V2) and the ratio of the exhaust surface to the entry surface provides the mathematical calculation of the average air entry speed (V1).

Default values

Default values are the discharge surface of the exhaust filter A1 and the actual device-specific air inflow surface A2, (work aperture surface):

Herasafe 2030i / Maxisafe 2030i 0.9	Exhaust filter discharge surface	A1 = 0.181 m ²
	Actual air inflow surface	A2 = 0.178 m ²
Herasafe 2030i / Maxisafe 2030i 1.2	Exhaust filter discharge surface	A1 = 0.249 m ²
	Actual air inflow surface	A2 = 0.238 m ²
Herasafe 2030i / Maxisafe 2030i 1.5	Exhaust filter discharge surface	A1 = 0.249 m ²
	Actual air inflow surface	A2 = 0.298 m ²
Herasafe 2030i / Maxisafe 2030i 1.8	Exhaust filter discharge surface	A1 = 0.376 m ²
	Actual air inflow surface	A2 = 0.358 m ²

Values to be measured

Direct exhaust velocity measured at nine measuring points.

Values to be calculated

Average value for exhaust velocity V2

Exhaust airflow volume R1

Average value for inflow velocity V1

Test grid above the exhaust aperture

Figure 25: The direct exhaust velocity (V3) is measured using an anemometer at distance H of 10 cm above the exhaust aperture.

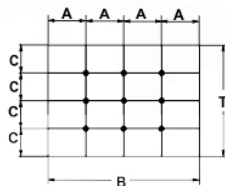
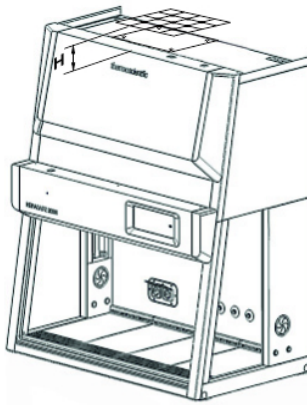


Figure 25. Test grid above the exhaust aperture

The dimensions of the exhaust aperture are:

Herasafe 2030i / Maxisafe 2030i	0.9	42.5 x 42,5 cm
Herasafe 2030i / Maxisafe 2030i	1.2/1.5	42.5 x 58.5 cm
Herasafe 2030i / Maxisafe 2030i	1.8	42.5 x 88.5 cm

Along the width, the measuring points are located at an even distance of A to each other and to the lateral edges of the exhaust aperture.

Herasafe 2030i / Maxisafe 2030i	0.9	10.6 cm
Herasafe 2030i / Maxisafe 2030i	1.2/1.5	14.6 cm
Herasafe 2030i / Maxisafe 2030i	1.8	22.1 cm

The measuring points along the depth are located at an even distance of C = 10.7 cm to each other and to the lateral edges of the exhaust aperture.

Test measurement

1. Install the testing equipment to the test grid.
2. Move the front window to the measuring position and operate the air system blowers for approx 20 minutes.
3. Perform measurement at all nine measuring points above the exhaust aperture for a minimum of one minute for each measuring point.
4. Evaluate the individual measurements.

Calculating the average value for the exhaust velocity V2

Average value (V2) = Sum measured readings/number measured points)

Calculating the average value for the inflow velocity V1 (m/s)

$$V1 \times A1 = V2 \times A2$$

Acceptable values

Application in EU (EN 12469 / DIN 12980):

- The nominal value is 0.45 m/s.
- The average value for the inflow velocity (V1) must be within +/- 0.01 m/s of the nominal value.

Troubleshooting

- Adjust the exhaust blower speed by changing the % value of the inflow velocity (see Field certification screen).
- Check the exhaust blower control voltage at main board. The control voltage in the value range of 0-10 V changes with the settings in field certifier screen. The control voltage of the exhaust blower must be coordinated with the settings in field certifier screen.
- Replace the exhaust filter.
- Check the installed exhaust system for correct function. If installed, change the size of the draft interrupter or check the exhaust plenum (air door) for correct function.

Exhaust airflow volume test

To calculate the exhaust airflow volume, multiply the average value for the exhaust velocity (V2) with the actual discharge area of the exhaust filter (A2).

Calculating the exhaust airflow volume R1 (m3/h)

$$R1 = V2 \times A2$$

Acceptable values

Application in EU (EN 12469 / DIN 12980):

Herasafe 2030i / Maxisafe 2030i	0.9	370 m ³ /h
Herasafe 2030i / Maxisafe 2030i	1.2	500 m ³ /h
Herasafe 2030i / Maxisafe 2030i	1.5	620 m ³ /h
Herasafe 2030i / Maxisafe 2030i	1.8	740 m ³ /h

Troubleshooting

Adjust the exhaust blower speed by changing the % value of the inflow velocity (see Field certification screen).



Note: Alarm limit setting

If the air speeds are changed, the alarm limits must be set as well.

Inflow Velocity – DIM method (NSF-primary) Herasafe 2030i

Figure 26: The inflow air volume is measured in the work aperture.

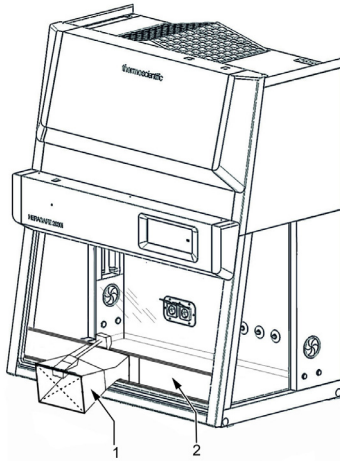


Figure 26. Inflow velocity - DIM method (primary)

The flow hood [1] is installed in the work aperture [2], and the testing equipment is installed immediately at the flow hood discharge opening.

Testing equipment

Short-ridge ADM-870, or equivalent

Flow hood Series 8400, or equivalent

Calibration of the testing equipment

The equipment must be calibrated in accordance with the manufacturer's instructions or in wind tunnel tests.

Default value

The default value is the actual device-specific inflow area A₂.

Herasafe 2030i - 10 in access opening:

0.9	Actual inflow area A ₂ =	0.229 m ² (2.465 sq ft)
1.2	Actual inflow area A ₂ =	0.305 m ² (3.285 sq ft)
1.5	Actual inflow area A ₂ =	0.381 m ² (4.101 sq ft)
1.8	Actual inflow area A ₂ =	0.457 m ² (4.919 sq ft)

Herasafe 2030i - 8 in access opening

0.9	Actual inflow area A ₂ =	0.183 m ² (1.970 sq ft)
1.2	Actual inflow area A ₂ =	0.244 m ² (2.626 sq ft)
1.5	Actual inflow area A ₂ =	0.305 m ² (3.283 sq ft)
1.8	Actual inflow area A ₂ =	0.457 m ² (4.919 sq ft)

Test measurement

1. Move the front window to the working position .
2. Attach the flow hood [1] in the work aperture [2] and seal the remaining opening surfaces.
3. Operate the system blowers for approx 20 min.
4. Record at least 5 measurements for a minimum of 1 min.
5. Average those readings and calculate the inflow velocity (V₁) as described below.

Calculating the inflow velocity V₁

$$\text{Average} = \frac{\text{Sum of measured values}}{\text{Number of measuring points}}$$

Acceptable values

Application in USA/Canada (NSF 49, Annex F):

- The nominal value is: Herasafe 2030i: 0.53 m/s (105 fpm).
- The inflow velocity must be within ± 0.025 m/s (5 ft/min) of the nominal value.

Troubleshooting

- Adjust the exhaust blower speed by changing inflow speed (see Field certification screen).
- Check the exhaust blower control voltage at main board.
- The control voltage in the value range of 0-10 V changes with the settings in field certifier screen. The control voltage of the exhaust blower must be coordinated with the settings in field certifier screen.
- Replace the down-flow filter and/or exhaust filter.
- Check the installed exhaust system for correct function. If installed, change the size of the draft interrupter or check the exhaust plenum (air door) for correct function.

Inflow Velocity – Constricted Window Method (NSF-Secondary) Herasafe 2030i

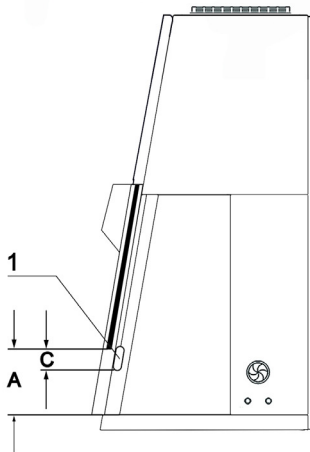
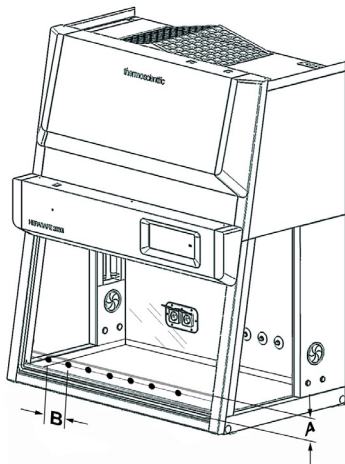


Figure 27. Inflow velocity test arrangement

The inflow velocity is measured at several measuring points in the work aperture. For this purpose, the front window is moved up to height **A**. The anemometer is installed directly to the inside of the work aperture front window.

The measuring points are located at distance **C** immediately at the inside of the front window lower edge and at distance **B** to each other..

10 in. (254 mm) working position:

A: 3.0 in. (76 mm)

B: 5.2 in (132 mm) for size 1.2 and 5.4 in (137 mm) for size 1.8

C: 1.5 in. (38 mm)

Testing equipment

Thermal Anemometer, or equivalent (hotwire)

- Anemometer Probe Holder, part number 1911325

Calibration of the testing equipment

The anemometer must be calibrated in accordance with the manufacturer's instructions or in wind tunnel tests.

Accuracy of the testing equipment

Accuracy of ± 0.01 m/s (± 2 ft/min) or a maximal deviation of 3% from the indicated airflow velocity.

Method:

1. Lower the front window to a height of H.
2. Operate the system blowers for approximately 20 minutes.
3. Insert the thermal anemometer probe into the probe holder. Place the probe holder at the window opening work surface, ensuring it is seated properly. Adjust the probe so the air passing through probe is centered in the window opening C.
4. Beginning 5.9 inches in from the left inside wall, record successive readings every 5.9 inches (5 readings for 3 foot models, 7 readings for 4 foot models, 9 readings for 5 foot models and 11 readings for 6 foot models).
5. Average those readings and calculate the inflow velocity (V1) as described below.

Calculating the average value for inflow velocity V1

Average	(Sum of the measurement readings/number of measuring points) x M x C
M	Multiplication factor
8 in working position	$M = 2.6 / 8.0 = 0.325$
10 in working position	$M = 3.0 / 10.0 = 0.300$
C	Correction factor: listed on the device nameplate.

Acceptable values

Application in USA/Canada (NSF 49):

- The nominal value is: Herasafe 2030i: 0.53 m/s (105 fpm).
- The average value must be within ± 0.025 m/s (5 ft/min) of the nominal value.

**Note:**

The thermo anemometer probe must be positioned at a 10° angle from front vertical and located on the same plane as the inside of the window glass.

Multiply the K factor by the average velocity reading (V1).

3 foot units:

3" access opening of 0.736 sq ft

Herasafe 2030i: 10" access opening 2.465 sq ft

Herasafe 2030i: 8" access opening 1.970 sq ft

4 foot units:

3" access opening of 0.982 sq ft

Herasafe 2030i: 10" access opening 3.285 sq ft

Herasafe 2030i: 8" access opening 2.626 sq ft

5 foot units:

3" access opening of 1.227 sq ft

Herasafe 2030i: 10" access opening 4.101 sq ft

Herasafe 2030i: 8" access opening 3.283 sq ft

6 foot units:

3" access opening of 1.475 sq ft

Herasafe 2030i: 10" access opening 4.919 sq ft

Herasafe 2030i: 8" access opening 3.929sq ft

Refer to the data plate on the lower right corner of the unit face.

Troubleshooting

- Adjust the exhaust blower speed by changing inflow speed (see Field certification screen).
- Check the exhaust blower control voltage at master board.

The control voltage in the value range of 0-10 V changes with the settings in field certifier screen. The control voltage of the exhaust blower must be coordinated with the settings in field certifier screen.

- Replace the exhaust filter.

Check the installed exhaust system for correct function. If installed, change the size of the draft interrupter or check the exhaust plenum (air door) for correct function.

Calculating the inflow velocity over exhaust flow (NSF49)

The average inflow velocity (V1) is calculated using the average value (V2) of the directly measured exhaust velocity and the proportion of discharge surface and inflow surface.

Default values

Default values are the discharge surface of the down-flow filter A1 and the actual device-specific air inflow surface A2 (work aperture surface).

Herasafe 2030i - 10 in access opening:

0.9	Exhaust filter discharge area A1	0.18 m ² (1.938 sq ft)
	Actual inflow area A2	0.229 m ² (2.465 sq ft)
1.2	Exhaust filter discharge area A1	0.246 m ² (2.648 sq ft)
	Actual inflow area A2	0.305 m ² (3.285 sq ft)
1.5	Exhaust filter discharge area A1	0.246 m ² (2.648 sq ft)
	Actual inflow area A2	0.381 m ² (4.101 sq ft)
1.8	Exhaust filter discharge area A1	0.375 m ² (4.036 sq ft)
	Actual inflow area A2	0.457 m ² (4.919 sq ft)

Herasafe 2030i - 8 in access opening

0.9	Exhaust filter discharge area A1	0.18 m ² (1.938 sq ft)
	Actual inflow area A2	0.183 m ² (1.970 sq ft)
1.2	Exhaust filter discharge area A1	0.246 m ² (2.648 sq ft)
	Actual inflow area A2	0.243 m ² (2.626 sq ft)
1.5	Exhaust filter discharge area A1	0.246 m ² (2.648 sq ft)
	Actual inflow area A2	0.305 m ² (3.283 sq ft)
1.8	Exhaust filter discharge area A1	0.375 m ² (4.036 sq ft)
	Actual inflow area A2	0.365 m ² (3.929 sq ft)

Values to be measured

Direct exhaust velocity measured at nine measuring points.

Values to be calculated

Average value for exhaust velocity V2

Exhaust airflow volume R1

Average value for inflow velocity V1

Test grid above the exhaust aperture

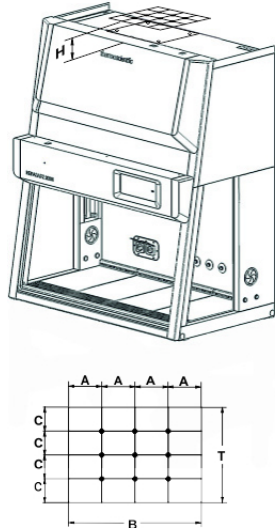


Figure 28. Test grid above the exhaust aperture

Figure 28: The direct exhaust velocity (V_3) is measured using an anemometer at distance H of 10 cm (4 in) above the exhaust aperture. The $B \times T$ of the exhaust aperture are:

Herasafe 2030i	0.9	42.5 x 42.5 cm (16.7 x 16.7 in = 1.95 sq ft)
Herasafe 2030i	1.2/ 1.5	58.5 x 42.5 cm (23 x 16.7 in = 2.67 sq ft)
Herasafe 2030i	1.8	88.5 x 42.5 cm (34.8 x 16.7 in = 4.04 sq ft)

Along the width, the measuring points are located at an even distance of A to each other and to the lateral edges of the exhaust aperture.

Herasafe 2030i	0.9	10.5 cm (4.1 in)
Herasafe 2030i	1.2/1.5	14.5 cm (5.7 in)
Herasafe 2030i	1.8	22.5 cm (8.9 in)

The measuring points along the depth are located at an even distance of $C = 10$ cm (4 in) to each other and to the lateral edges of the exhaust aperture.

Test measurement

1. Install the testing equipment to the test grid.
2. Move the front window to the measuring position and operate the air system blowers for approx 20 minutes.
3. Perform measurement at all nine measuring points above the exhaust aperture for a minimum of one minute for each measuring point.
4. Evaluate the individual measurements.

Calculating the average value for the exhaust velocity V_2

$$\text{Average} = \frac{\text{Sum of measured values}}{\text{Number of measuring points}}$$

Calculating the average value for the inflow velocity V_1 (m/s)

$$V_1 \times A_1 = V_2 \times A_2$$

Acceptable values

Application in USA/Canada (NSF 49)

- The nominal value for Herasafe 2030i is 0.53 m/s (105 ft/min), for Maxisafe 2030i: 0.45 m/s (89 fpm).
- The average value must be within ± 0.025 m/s (5 ft/min) of the nominal value.

Troubleshooting

- Raise the exhaust blower speed by changing inflow speed (see Field certification screen).
- Check the exhaust blower control voltage at master board. The control voltage in the value range of 0-10 V changes with the settings in field certifier screen. The control voltage of the exhaust blower must be coordinated with the settings in field certifier screen.
- Replace the exhaust filter.
- Check the installed exhaust system for correct function. If installed, change the size of the draft interrupter or check the exhaust plenum (air door) for correct function.

Exhaust airflow volume test

To calculate the exhaust airflow volume (R_1), multiply the average value for the exhaust velocity (V_2) with the actual discharge area of the exhaust filter (A_2).

Calculating the exhaust airflow volume R_1 (m³/h)

$$R_1 = V_2 \times A_2$$

Acceptable values

- Application in the USA/Canada for Herasafe 2030i models (NSF49):

		m ³ /h / cfm
Herasafe 2030i	1.2	580 / 342
Herasafe 2030i	1.8	873 / 514

- Acceptable values for Herasafe 2030i models (EN 12469/DIN 12980):

		m ³ /h / cfm
Maxisafe 2030i	0.9	288 / 170
Maxisafe 2030i	1.2	386 / 227
Maxisafe 2030i	1.5	483 / 284
Maxisafe 2030i	1.8	580 / 341

Troubleshooting

- Adjust the exhaust blower speed by changing inflow speed (see Field certification screen).
- Check the exhaust blower control voltage at master board. The control voltage in the value range of 0-10 V changes with the settings in field certifier screen. The control voltage of the exhaust blower must be coordinated with the settings in field certifier screen.

Down-flow velocity tests

Purpose of the test

This test is conducted to check the nominal value of the down-flow velocity (displacement airflow) in the work area of the safety cabinet.

Testing equipment

- Thermal Anemometer, or equivalent (hotwire)
- Freestanding Fixture, or equivalent

Calibration of the testing equipment

Thermistor anemometer calibrated in accordance with the manufacturer specifications or in wind tunnel tests.

Accuracy of the testing equipment

Accuracy of ± 0.01 m/s (± 1.98 ft/min) or a maximal deviation of 3% from the indicated airflow velocity.

Test conditions

The sample chamber of the safety cabinet must be completely empty, windows and doors of the operating room must be closed (no draft).

The thermo-anemometer measuring head must be secured tightly at the measuring point to allow accurate measurements. The distances between the measuring points must be correct, the grid must not be distorted.

Downflow velocity test according EN12469

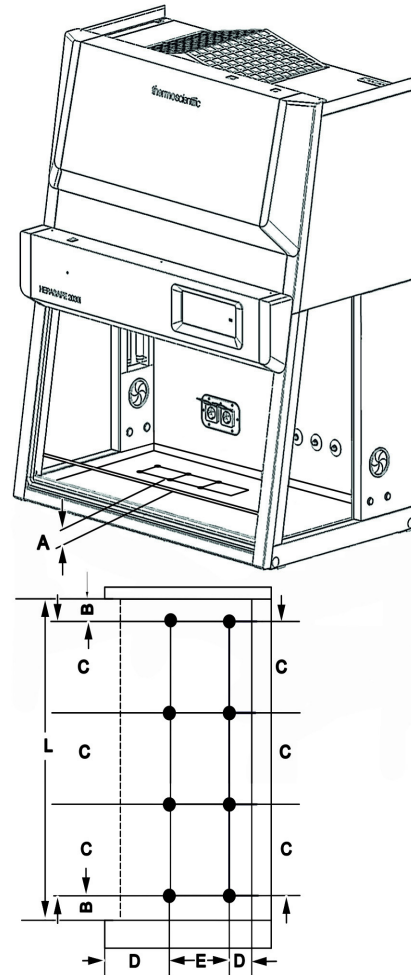


Figure 29. Down-flow velocity test arrangement according EN 12469 yearly check

Figure 29: The device is operated with a uniform displacement airflow. Therefore, the measured values at the individual measuring points must be within 20% of the average value. The test area above the work surface consists of a rectangular grid that encloses a minimum of 2 measuring rows with 4 measuring points per row:

A = Test area position. The front window is moved to the safe working position. The test area is positioned horizontally at distance A above the front window lower edge.

EN 12469: A = 10 cm (Herasafe 2030i)

DIN 12980: A= 5 cm (Maxisafe 2030i)

L: Sample chamber width, depending on version:

Herasafe 2030i / Maxisafe 2030i	0.9 = 90 cm
Herasafe 2030i / Maxisafe 2030i	1.2 = 120 cm
Herasafe 2030i / Maxisafe 2030i	1.5 = 150 cm
Herasafe 2030i / Maxisafe 2030i	1.8 = 180 cm

The values of distances B and C are calculated from the individual sample chamber width.

For yearly test 8 measuring points are required with following distances:

B = 1/8 x L: Distance between grid columns.

C = 2/8 x L: Distance between test area and front window.

D = 15.75 cm: Distance between test area and work aperture / device rear panel.

E = 31.50 cm: Distance between grid rows.

For initial installation test of the Maxisafe 2030i (DIN 12980) and filter change, different measuring points are required depending on version:

L

Maxisafe 2030i	0.9 = 90 cm	36
Maxisafe 2030i	1.2 = 120 cm	48
Maxisafe 2030i	1.5 = 150 cm	60
Maxisafe 2030i	1.8 = 180 cm	72

with following distances:

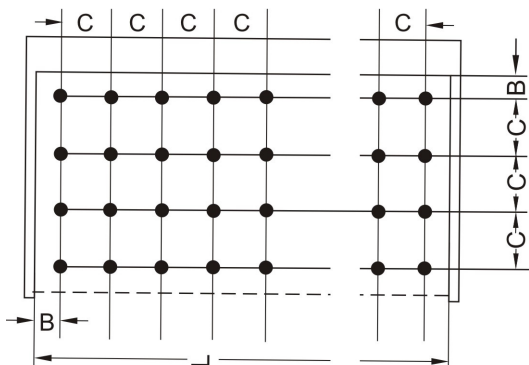


Figure 30. Measuring points initial installation test

B = 50 mm (1.97 in)

C = 100 mm (3.94 in)

Test measurement:

1. Switch the device on.
2. Move the front window to the working position. The lead time for the first measurement is 20 min.
3. Install the measuring head to the first measuring point.
4. Perform the measurement at each measuring point for a minimum time of one minute and record the values.
5. Calculate the average value for the down-flow velocity.

Calculating the average value:

$$\text{Average} = \frac{\text{Sum of measured values}}{\text{Number of measuring points}}$$

Acceptable values

Application in EU (EN 12469/DIN 12980):

- The average value must be within 0.01 m/s of the nominal value (see Technical Data).
- The nominal value for Herasafe 2030i: 0.32 m/s and for Maxisafe 2030i: 0.32 m/s.
- The measured values of the individual measuring points must be within 20% of the average down-flow velocity.

Troubleshooting:

- Set the down-flow blower speed by changing the % value of the downflow speed (see Field certification screen). The control voltage in the value range of 0-10 V changes with the settings in field certifier screen. The control voltage of the down-flow blower must be coordinated with the settings in field certifier screen.



Note: Alarm limit setting

If the air speeds are changed, the alarm limits must be set as well.

- Do No-load current blower calibration.
- Check the down-flow blower voltage at the main PCB.
- Replace the down-flow filter.

Downflow velocity test according NSF 49 Herasafe 2030i

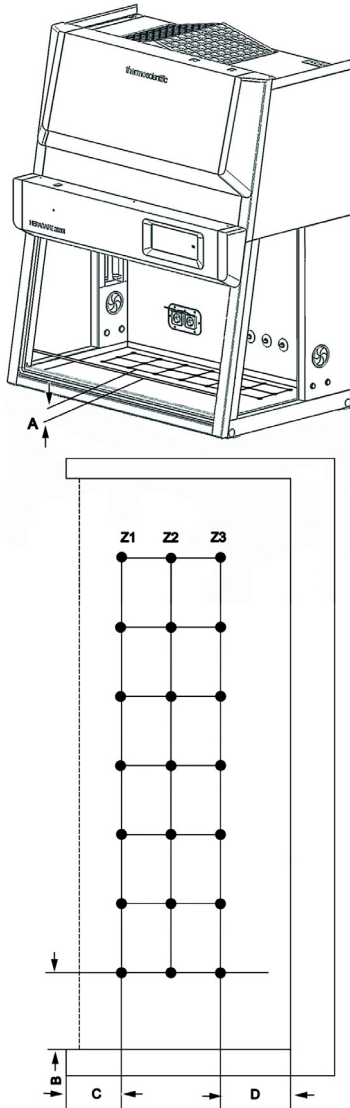


Figure 31. Downflow velocity test arrangement according NSF49, Annex A

Figure 31: The test area above the work surface consists of a rectangular grid that encloses a minimum of 3 measuring rows (zones Z1 - Z3) with 7 measuring points per row. The grid shall be rectangular with spacings

size 1.2 - 5.9 x 5.5 in (15 x 14 cm)

size 1.8 - 7.1 x 5.5 in (18 x 14 cm):

A = 10 cm (4 in): The front window is moved to the safe working position. The test area is positioned horizontally at distance A above the front window lower edge.

B = 15 cm (6 in.): Lateral distance between test area and sample chamber sidewalls.

C = 15 cm (6 in.): Distance between test area and front window.

D = 15 cm (6 in.): Distance between test area and device rear panel.

Test measurement

1. Switch the device on.
2. Operate the unit in the work position for approximately 20 minutes.
3. Insert the anemometer probe into the probe stand, adjusting for a height of 4 inches (10 cm) above the bottom edge of the window opening while in the work position.
4. Record the readings in a grid pattern as specified above.
5. Calculate the average value for the down-flow velocity.

Calculating the average value for the down-flow velocity:

$$\text{Average} = \frac{\text{Sum of measured values}}{\text{Number of measuring points}}$$

- Average down-flow Velocity = Sum of all measurements / Number of readings

Correction measures:

- Enter the Field Certifier Screen (see Field certification screen), change downflow until the desired velocity is reached and save the new value.
- If the velocity can't be adjusted due to clogging of the filters, change the supply filter.
- If the filter is in order, change the supply blower.

Acceptable values

Application in USA/Canada (NSF 49)



Note: Nominal values

The nominal values for the individual device types are listed on the nameplate.

The unit is examined as a uniform safety cabinet:

The average value must be within ± 0.025 m/s (5 ft/min) of the nominal value. The measured values of **each individual measuring point** must not deviate more than 25% or 16 ft/min (0.081 m/s) from the average down-flow velocity.

The unit is examined as a non-uniform (zoned) safety cabinet:

The average value must be within ± 0.025 m/s (5 ft/min) of the nominal value. The measured values of the **individual measuring rows (zones)** must not deviate more than 25% or 16 ft/min (0.081 m/s) from the average down-flow velocity of each zone.

Troubleshooting:

- Set the down-flow blower speed by changing downflow. The control voltage in the value range of 0-10 V changes with the settings in Field Certifier Screen. The control voltage of the down-flow blower must be coordinated with the settings in Field Certifier Screen.



Note: Alarm limit setting

If the air speeds are changed, the alarm limits must be set as well.

- Check the down-flow blower voltage at the main PCB.
- Replace the down-flow filter.

Downflow velocity test according NF 095 Herasafe 2030i

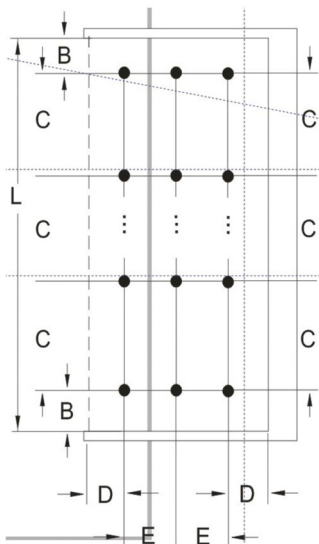
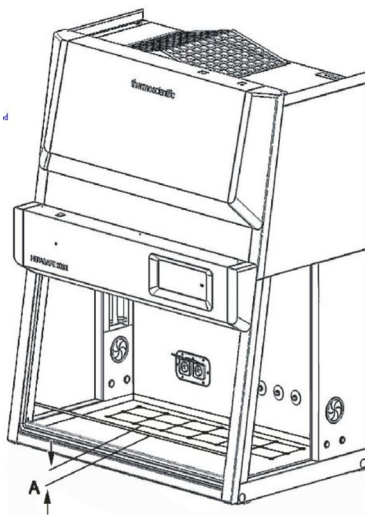


Figure 32. Downflow velocity test arrangement according NF 095

The device is operated with a uniform displacement airflow. Therefore, the measured values at the individual measuring points must be within 20% of the average value. The test area above the work surface consists of a rectangular grid that encloses a minimum of 3 measuring rows with 3 to 6 measuring points per row:

A = Test area position. The front window is moved to the safe working position. The test area is positioned horizontally at distance A above the front window lower edge.

NF 095: A = 10 cm

L: Sample chamber width, depending on version:

Herasafe 2030i 0.9 = 90 cm	9 measuring points
Herasafe 2030i 1.2 = 120 cm	12 measuring points
Herasafe 2030i 1.5 = 150 cm	15 measuring points
Herasafe 2030i 1.8 = 180 cm	18 measuring points

B = 150 mm: Distance between test area and sample chamber sidewalls.

C = 300 mm: Distance between measuring points.

D = 100 mm: Distance between test area and work aperture / device rear panel.

E = 200 mm: Distance between grid rows.

Test measurement

1. Switch the device on.
2. Operate the unit in the work position for approximately 20 minutes.
3. Insert the anemometer probe into the probe stand, adjusting for a height of 10 cm above the bottom edge of the window opening while in the work position.
4. Record the readings in a grid pattern as specified above.
5. Calculate the average value for the down-flow velocity.

Calculating the average value for the down-flow velocity:

$$\text{Average} = \frac{\text{Sum of measured values}}{\text{Number of measuring points}}$$

- Average down-flow Velocity = Sum of all measurements / Number of readings

Correction measures:

- Enter the Field Certifier Screen (see Field certification screen), change downflow until the desired velocity is reached and save the new value.
- If the velocity can't be adjusted due to clogging of the filters, change the supply filter.
- If the filter is in order, change the supply blower.

Acceptable values

Application according to NF95

The average value must be within 0,01 m/s of the nominal value (see Technical Data).

The nominal value for Herasafe 2030i: 0.32 m/s.

The measured values of the individual measuring points must be within 20% of the average downflow velocity.

Troubleshooting:

- Set the down-flow blower speed by changing downflow (see Field certification screen). The control voltage in the value range of 0-10 V changes with the settings in Field Certifier Screen. The control voltage of the down-flow blower must be coordinated with the settings in Field Certifier Screen.



Note: Alarm limit setting

If the air speeds are changed, the alarm limits must be set as well.

- Check the down-flow blower voltage at the main PCB.
- Replace the down-flow filter.

Airflow pattern test

Purpose of the test

This test is conducted to check the behavior of the airflows in the sample chamber. Check to see if the displacement airflow passes along the entire work area, if the vertical passage is correct, and if air escapes through joints or seals of the housing and of the front window.

Testing equipment

Smoke tubes.



Note: Airflow set points

The individual test sections for airflow patterns can only be performed when the inflow and the downflow velocities are at set point.

Down-flow direction test

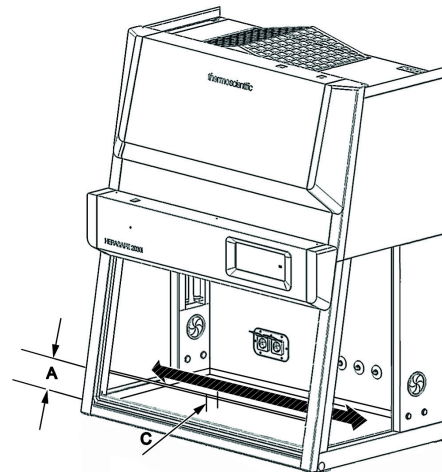
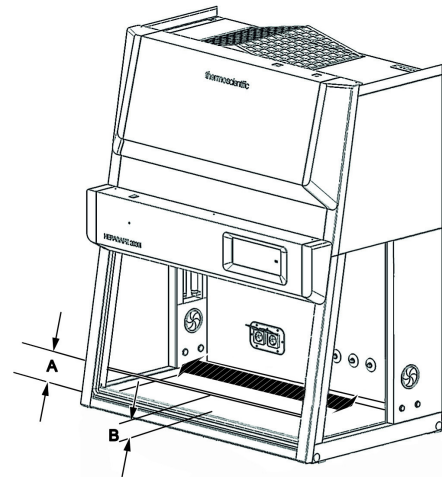


Figure 33. Airflow pattern I

1. **Figure 33:** Move the front window to the safe working position **A**
2. Using a smoke tube, scan the work area along its centerline from one end to the other. Pass smoke across the centerline of the work surface, 4 inches (10 cm) above the work opening.

Acceptable airflow behavior

Application in EU (EN12469) and in USA/Canada (NSF 49)

- The smoke does not move upwards but is removed downward.
- No smoke escapes through the working aperture.

Impermeability test for the front window

1. **Figure 33:** Move the front window to the safe working position **A**.
2. Using a smoke tube, scan the work area at distance **C** of approx 2.5 cm (1 in.) to the front window from one end to the other. Hold the smoke tube so that its tip is approx 15 cm (6 in.) above the working aperture.

Acceptable airflow behavior

Application in EU (EN12469) and in USA/Canada (NSF 49)

- The smoke shows smooth downward flow with no dead spots or reflux.
- No smoke escapes through the working aperture.

Work Opening Edge Retention

1. **Figure 34:** Move the front window to the safe working position **A**.
2. Pass smoke around the entire outside work opening, approximately 1.5 inches (3.8 cm) away from the cabinet.

Acceptable airflow behavior

Application in EU (EN 12469) and in USA/Canada (NSF 49)

- There is no smoke formation above the work surface, nor is smoke drawn to the work surface.

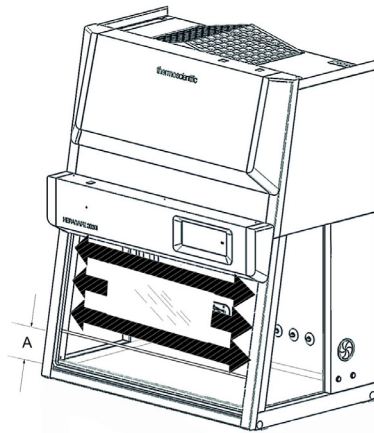
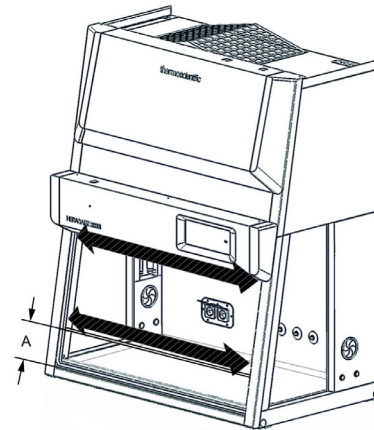


Figure 34. Airflow pattern II

Window Seal Test

1. **Figure 34:** Move the front window to the safe working position **A**.
2. Pass smoke up both sides and across the top of the window opening from inside the work area, approximately 2 inches (5 cm) from the edges.

Acceptable airflow behavior

Application in USA/Canada (NSF 49)

- Smoke does not escape from the safety cabinet.
- There is no upward vortexing.

Troubleshooting

- If vortexing or dead points occur, check the inflow and down-flow set points.

UV intensity test

Purpose of the test

The power of the UV lamps will be considerably reduced after 8000 operating hours so that an effective UV disinfection is no longer ensured. Conduct this test only at the customer's request.

Test procedure

1. Read the UV operating time value from field certifier screen (see Field certification screen).
2. If the value is just below or over 8000 h, replace all UV lamps.
3. After the UV lamps have been replaced, reset the UV operating time value at field certifier screen to zero.

Noise level test

Purpose of the test (only for application in USA/Canada in accordance with NSF 49)

This test determines the noise level produced by an operating safety cabinet as an aid in minimizing cabinet operator's fatigue. Conduct this test only at the customer's request.

Only informative for application in EU (EN 12469):

Required for type testing only at manufacturer's side in special noise reduced test room.

Testing equipment

Noise level meter with a range of 50-100 db and an "A" weighing scale.

Calibrator for the noise level meter.

Calibration of the testing equipment

The testing equipment must be calibrated in accordance with the manufacturer's instructions.

Test Point

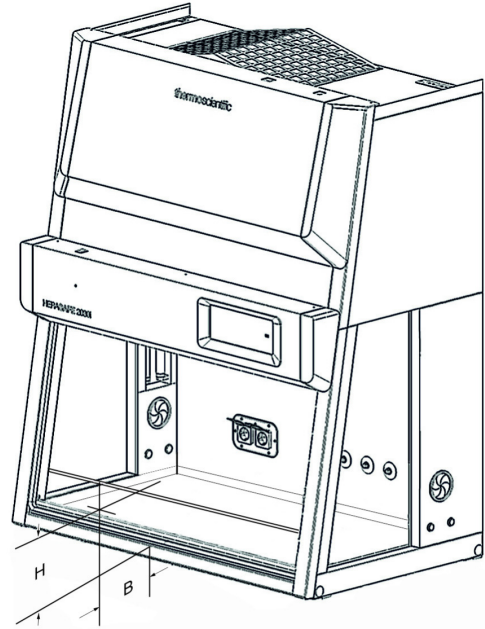


Figure 35. Noise level test

Application in EU (EN 12469)

Figure 35: Place the microphone outside the safety cabinet at distance **B** of 100 cm (39 in.) to the working aperture above the work surface at the center of the work aperture.

Application in USA/Canada (NSF 49)

Figure 35: Place the microphone outside the safety cabinet at distance **B** of 30 cm (12 in.) to the work aperture and at a height **H** of 38 cm (15 in.) above the work surface at the center of the work aperture.

Test conditions

Normal conditions at the location of the safety cabinet.

Test measurement

1. With the cabinet switched off, perform the measurement and record the value.
2. Switch on the cabinet and the cabinet lighting, determine the noise level, and record the value.

Acceptable values

Application in EU (EN 12469):

- The ambient noise level must not exceed 55 dB (A). With the cabinet operating, the noise level must not exceed 65 dB (A).

Application in USA/Canada (NSF 49):

- The ambient noise level must not exceed 57 dB (A). With the cabinet operating, the noise level must not exceed 67 dB (A).

Lighting intensity test

Purpose of the test (only for application in USA/Canada in accordance with NSF 49)

Checking the illumination in the sample chamber under ergonomic aspects. Conduct this test only at the customer's request.

Only informative for application in EU (EN 12469):

Required for type testing only at manufacturer's side.

Testing equipment

Illumination meter in accordance with the requirements of the IES (Illuminating Engineering Society).

Calibration of the testing equipment

The illumination meter must be calibrated in accordance with the manufacturers' instructions.

Test area at the work surface

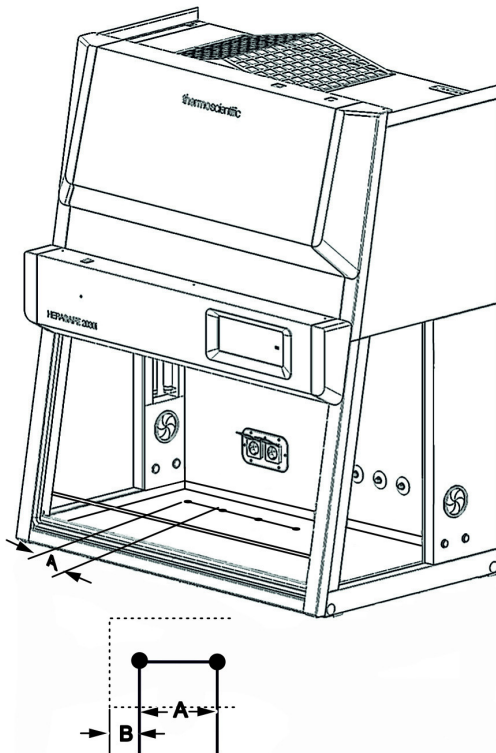


Figure 36. Lighting intensity test

Figure 36: Test line in the center of the work surface parallel to the front window. Beginning with distance **B** of 15 cm (6 in.) to the sidewalls, measure the lighting intensity at distance **A** of 30 cm (12 in.).

Test conditions

Normal lighting at the location of the safety cabinet.

Test measurement

1. Install the testing equipment.

2. Turn on the lighting of the safety cabinet. The lead time for the measurement is at least 30 minutes.
3. Switch the blower on.
4. Perform the measurements at the test points and record the values.
5. Repeat the measurements with the cabinet lights off.

Calculating the average value

$$\text{Average} = \frac{\text{Sum of measured values}}{\text{Number of measuring points}}$$

Acceptable values

Application in EU(EN 12469):

The average light intensity must be equal or exceed 750 lx.

Application in USA/Canada (NSF 49):

With a background lighting (lighting at the place of location) of 110 lx (± 50 lx), the average lighting intensity at the work surface must exceed 650 lx.

- Individual values must not fall below 430 lx.

Troubleshooting

- Check LED tubes and replace tubes, if required.

Vibration test

Purpose of the test (only for application in USA/Canada in accordance with NSF 49).

This test determines the amount of vibration with the blowers on.

Conduct this test only at the customer's request.

Only informative for application in EU (EN 12469):

Required for type testing only at manufacturer's side.

Testing equipment

Vibration analyzer with a minimum sensitivity of 2.5 $\mu\text{m rms}$ (0.0001 in rms). Calibrator for the vibration analyzer.

Calibration of the testing equipment

The testing equipment must be calibrated in accordance with the manufacturer's instructions.

Test conditions

Normal conditions at the place of location. The rack must be aligned horizontally. Inflow and down-flow velocities must be at set point.

Test measurement



Note: Multi-modules work-plate:

If more than 3 work-plate modules are installed, two measurements should be performed at the centerline between the two inner modules.

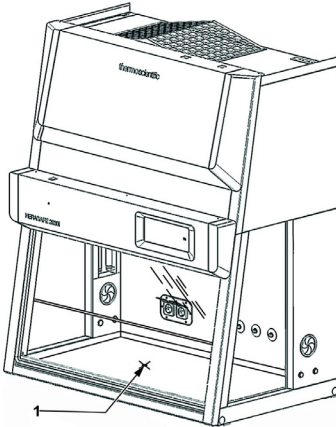


Figure 37. Vibration test

1. **Figure 37:** Secure the sensor of the vibration analyzer firmly to the center [1] of the workplate using double-faced adhesive tape.
2. Determine the background vibration amplitude with the cabinet switched off and record the value.
3. Switch on the cabinet and the cabinet lighting, determine the vibration value, and record the value.

Determining the vibration value

Vibration value = operating value - background value

Acceptable values

Application in EU (EN12469):

- The deviation must not exceed more than 5×10^{-6} m or 2×10^{-4} inch at 20 Hz - 20 kHz

Application in USA/Canada (NSF 49):

- The deviation must not exceed more than 5×10^{-6} m or 2×10^{-4} inch at 10 Hz - 10 kHz

Troubleshooting

- Check the work-plate seating.
- Check the rack for secure stand.
- In case of excessive values, check the radial blower for imbalance.

Setting the airflow alarms

The settings are made on the field certifier screen.

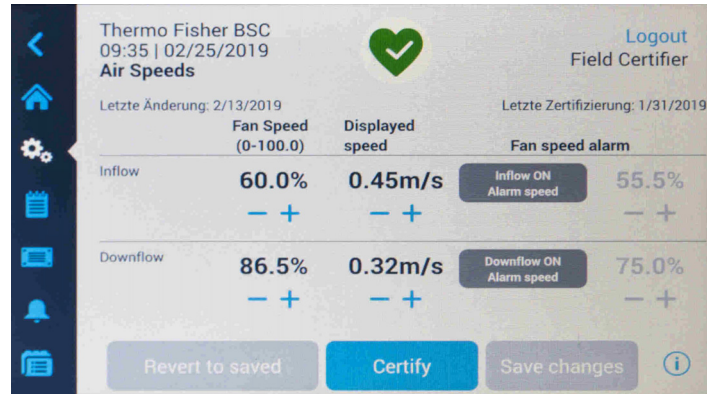


Figure 38. Field certifier screen

Attention! Alarm limits

Following order of entries must be observed:

1. If necessary, change displayed velocity
2. Adjust first setpoints
3. only then adjust alarm limits inflow and downflow.

If the order is not followed the alarm limits will not set correctly!

Description:

- Verify the airflow alarms will activate within 15 seconds when there is a 20% loss.

Purpose of the setting

Setting of the sensor response characteristics for down-flow velocity and inflow velocity. The alarm values are set so that the visual and audible warnings are issued when the corresponding airflow velocity falls below the lower limit or exceeds the upper limit.

Testing equipment

- Thermal Anemometer or equivalent (hotwire)
- Anemometer probe holder, part 1911325
- Shortridge ADM-870 or equivalent
- Flowhood series 8400 or equivalent

Test conditions

The sample chamber of the safety cabinet must be completely empty, windows and doors of the operating room must be closed (no draft).

Reference values

The nominal values of the control voltage for the down-flow and exhaust blowers (see Field certification screen) of the device control are used as reference values for setting the alarm values.

**Note: Alarm limit setting**

If the air speeds are changed, the alarm limits must be changed as well.

Inflow velocity alarm values

Permissible values according to the manufacturer's specifications:

Application in EU (EN12469/DIN 12980):

- The nominal value for Herasafe 2030i / Maxisafe 2030i: 0.45 m/s.
- The average value must be within 0.01 m/s of the nominal value.
- The minimum inflow air velocity must be > 0.40 m/s.
- Low Alarm : 0.40 m/s
- High Alarm: 0.49 m/s)

The measurement readings of the individual measuring points may not deviate more than ±10% from the average value.

Application in USA/Canada (NSF 49):

- The nominal value for Herasafe 2030i: 0.53 m/s (105 fpm).
- The minimum inflow air velocity must be > 0.40 m/s.
- The average value must be within +/- 5 ft/min (0.025 m/s) of the nominal value.

The average airflow velocity must have been determined using an anemometer or a flow hood.

Setting of the Inflow velocity alarm points:

1. Switch the safety cabinet on. The lead time for the setting is approx 20 min.
2. Determine the average inflow velocity (see chapter inflow velocities test).

The alarm must be triggered as soon as the average inflow velocity exceeds or falls below the limit.

3. Go to field certifier screen. In field certifier screen adjust the inflow alarm speed.
4. Store the value input:

**Note: Max. Alarm limit**

The min. alarm limit (Inflow Low Alarm) set in field certifier screen is automatically reflected by the program/software and this value is then stored as the max. alarm limit (Inflow High Alarm).

Testing the Alarm limits inflow velocity

Test the min. alarm limit (Inflow Low Alarm) by choosing the alarm test screen in the field certifier section.

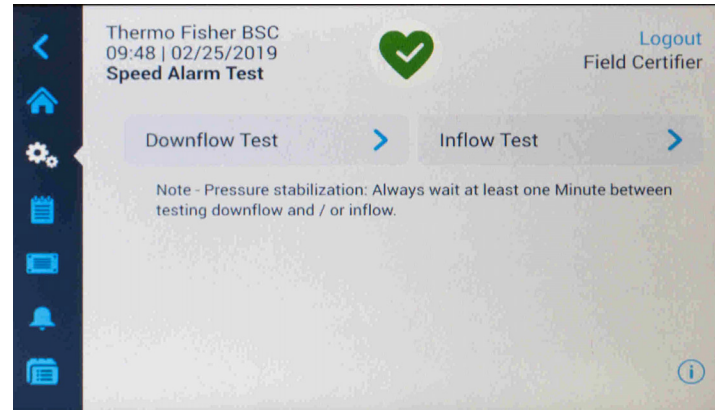


Figure 39. Speed Alarm Test

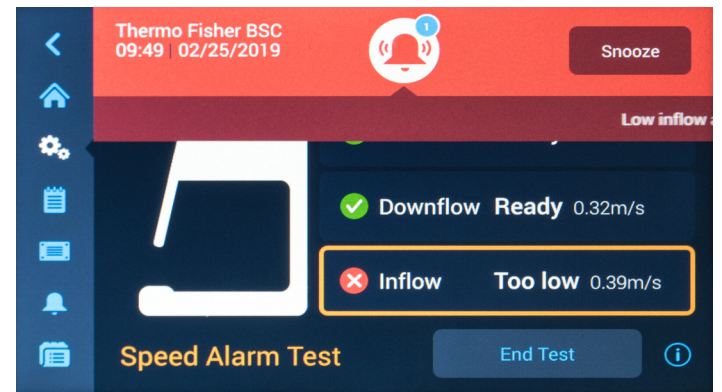


Figure 40. Inflow Alarm Test

Downflow velocity alarm values

Acceptable values**Application in EU (EN 12469):**

- The nominal value for Herasafe 2030i: 0.32 m/s and for Maxisafe 2030i 0.32 m/s.
- The average value must be within 0.01 m/s of the nominal value.

Application in USA/Canada (NSF 49):**Note: Nominal values**

The nominal values for the individual device types are listed on the nameplate.

Setting of the down-flow velocity alarm points

1. Switch the safety cabinet on. The lead time for the setting is approx 20 min.
2. Determine the average downflow velocity (see **Down-flow velocity tests**).

The alarm must be triggered as soon as an individual value exceeds or falls below the limit.

3. Go to field certifier screen. In field certifier screen, adjust the down-flow alarm speed.
4. Store the value input:

Application in EU (EN 12469):

The alarm must be triggered as soon as an individual value exceeds or falls below the limit.

Ascertain the measuring points with the lowest or highest circulation speed.

At the measuring point with the previously measured lowest airspeed, the calculated min. limit (average value 20%) may not be fallen below.

At the measuring point with the previously measured highest airspeed, the calculated max. limit (average value 20%) may not be exceeded.

No individual measured value must differ more than $\pm 20\%$ from the average value

Table2	Nominal average down-flow	Low Alarm	High Alarm
Herasafe 2030i	0.32m/s	0.26 m/s	0.38 m/s
Maxisafe 2030i	0.32m/s	0.26 m/s	0.38 m/s

Application in USA/Canada (NSF 49):

The unit is examined as a uniform safety cabinet:

The average value must be within ± 0.025 m/s (5 ft/min) of the nominal value. The measured values of each individual measuring point must not deviate more than 25% or 16 ft/min (0.081 m/s) from the average down-flow velocity.

The unit is examined as a non-uniform (zoned) safety cabinet:

The average value must be within ± 0.025 m/s (5 ft/min) of the nominal value. The measured values of the **individual measuring rows (zones)** must not deviate more than 25% or 16 ft/min (0.081 m/s) from the average down-flow velocity of each zone.

Setting the Alarm Point:

1. Switch on the blowers. The lead time for the setting takes approximately 20 min.
2. Determine the average value of the down-flow velocity (see **Down-flow velocity tests**).

The alarm must be triggered as soon as an individual value exceeds or falls below the limit.

3. Ascertain the measuring points with the lowest or highest down-flow velocity.

At the measuring point with the previously measured lowest air velocity, the calculated min. limit may not be fallen below.

At the measuring point with the previously measured highest air velocity, the calculated max. limit may not be exceeded.

4. Ascertain the smallest difference between the maximum permissible deviation and the lowest or highest measured down-flow velocity.

5. Set the anemometer at the measuring point with the lowest measured down-flow velocity.

Note in field certifier screen.

6. Store the value input:



Note: Max. Alarm Limit

The min. alarm limit (down-flow Low) set in field certifier screen is automatically reflected by the program/software and this value is then stored as the max. alarm limit (down-flow High).

Testing the down-flow velocity Alarm Limits

Test the min. alarm limit (down-flow Low alarm) in the velocity alarm test screen. See chapter speed alarm test.

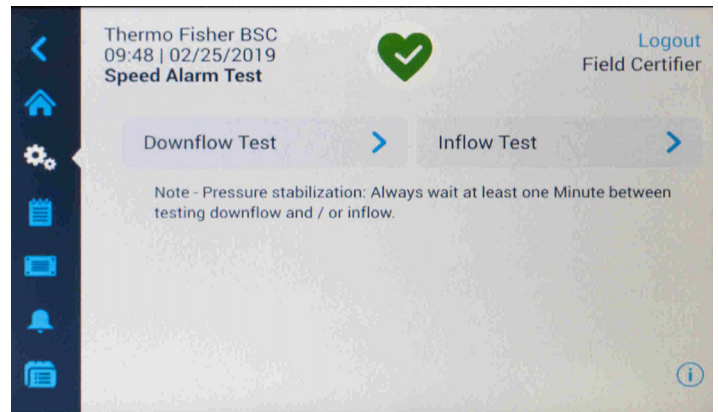


Figure 41. Speed Alarm Test

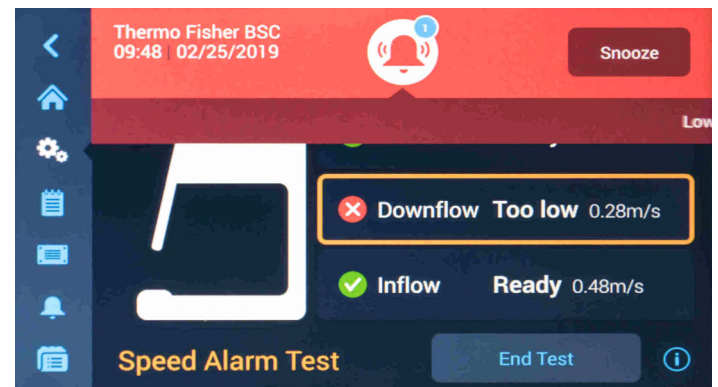


Figure 42. Downflow Alarm Test

Exhaust system performance

Description:

- Verify the exhaust system is functioning properly

Canopy /Thimble duct connections Equipment:

- Cold smoke (titanium tetrachloride)

Method:

- Pass smoke around the air gap, to ensure negative pressure exists

Acceptance:

- No smoke refluxes back into the room once drawn into the canopy

Direct connections Equipment:

- Manometer, or equivalent

Method:

- Measure static pressure in the duct between the unit and balancing dampers.

Acceptance:

- Negative pressure exists



Note: Standard

For additional and detailed information regarding these tests, refer to NSF/ANSI Standard 49



Note:

See chapter recommendations for exhaust system.

Decontamination with Gas

Disinfection with Formaldehyde

Prior to any repairs in the contaminated area (blower / filter assembly), the device and the filters must be completely decontaminated. A suitable disinfection procedure must be selected according to the scope of application of the safety cabinet. Generally, a gas decontamination using formaldehyde is performed. One possible method based on EN 12469/2000 is described in the operating manual. To cover the spectrum of action A, B, C and D, it is necessary to use another method. Based on recommendations of the RKI (Robert Koch Institute), another disinfection procedure for the service is described as below.



CAUTION: Dangerous gases!



A disinfection using formaldehyde must be performed in accordance with the specifications of NSF 49 or EN 12469.

This procedure presents considerable risks and must therefore be performed only by specially trained and authorized service person in accordance with applicable national safety regulations (e.g. Germany: TRGS 522, RKI list of the Robert-Koch-Institute)!

The disinfection of filters in safety workbenches must be carried out with suitable personal protective equipment. The requirements of occupational health and safety must be observed.



Note: Filters

The after-treatment of the filters is subject to the respective state regulations for waste disposal.

Procedure

For gas disinfection, formaldehyde is vaporized within the tightly sealed sample chamber. The quantity of the applied formaldehyde depends on the volume of the sample chamber in the safety cabinet that is to be disinfected (see Technical Data).

Per cubic meter of sample chamber volume, at least 5g formaldehyde must be evaporated with 20 ml water (corresponds with 25 ml of a 20% formaldehyde solution).

The formaldehyde evaporates immediately after reaching its boiling point; the minimum reaction time is 6 hours. Therefore, the formaldehyde should be neutralized after the specified reaction time by vaporizing 25 % aqua ammonia (10 ml per cubic meter of sample chamber volume).



CAUTION: Fire hazard!

Formalin is flammable. The auto-ignition temperature of formalin is 430 °C (820 °F).

With a volume percentage of 7.75 % in dry air, formaldehyde vapor may explode.

For vaporization, do not use heating devices reaching temperatures above 250 °C (477 °F).



CAUTION: Hazardous chemicals!



Formalin in reaction with hydrogen chloride will form BCME which is a hazardous chemical.

When using formalin, all residues of hydrogen chloride in the work chamber of the cabinet must be removed!

Gas Disinfection Based on RKI

- Application in USA/Canada (NSF 49)
- Application in EU (EN 12469)

Ambient conditions

The temperature in the work room should be approximately 21°C (40°F); the relative humidity should be between 60 and 85%.

Accessories

Appliances:

For vaporizing both solutions, an appropriate heating device (e.g. IVE 2020) with thermostat and two separate containers for formaldehyde solution and for aqua ammonia are required.



CAUTION: Warning label

A warning label should be attached to the safety cabinet during the vaporization process.

Performing Gas Disinfection Using a Hood

For formaldehyde disinfection, *Geobacillus Stearothermophilus* 106 indicator strips and an evaporator unit (e.g. IVE 2020) are required.

1. Switch the device off (OFF mode) and switch the device-integral power supply off.
2. Attach five indicator strips to the clean side of the exhaust filter according to the following scheme.

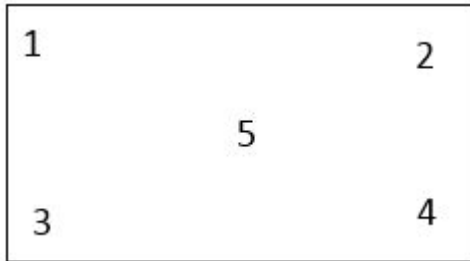


Figure 43. Top view of the exhaust filter from the workbench

3. Position a humidity sensor in the exhaust filter above position 5, which is mounted in a draft interrupter glued to the workbench. Throughout the process, the workbench runs at reduced power.
4. Place 2 sensors (humidity and temperature) on a stand in the interior of the workbench. Start recording of humidity and temperature over the whole process.
5. Insert an evaporator unit into the BSC and fill with water. Arrange sensor for regulation and data acquisition. The evaporator unit is designed so that 4 water baths are controlled and heated separately from each other. In addition, a wall heating is integrated in the device.
6. Close the front window, pull the hood [2] over the device, and seal it vapor-tight against the environment using adhesive tape [3]

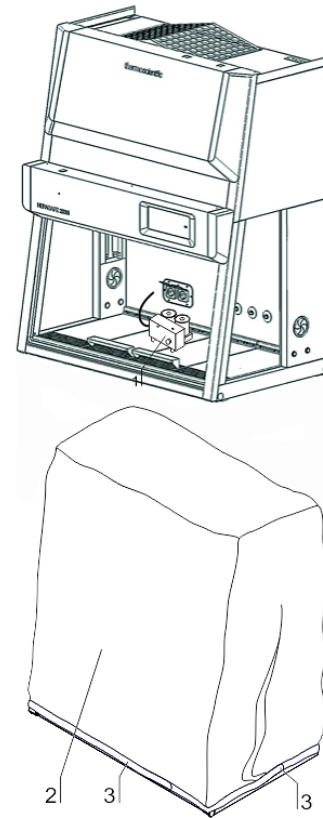


Figure 44. Gas disinfection using hood

7. Connect the vaporizer control unit to the probes and the evaporator unit.
8. Start the vaporizer control unit according to the operating instructions.
9. Wait approximately 2 hours until the required parameters have been set up in the device (70 °C & 100% r.F).

Introduce formaldehyde via the intended filling device into the evaporator, as follows:

10. Providing 500 ml of formaldehyde 37% and 300 ml of ammonia 25%.
11. Filling the formaldehyde pump bottle (if possible under an exhaust hood). Upon reaching the target temperature and setpoint humidity, introduce formaldehyde into the vaporizer Evaporator through the access hose.
12. Wait for evaporation of formaldehyde (duration minimum 9 h).
13. Take control measurements.
14. Neutralize the formaldehyde with ammonia (duration minimum 2 h).
15. Fill the ammonia pump bottle (if possible under a fume hood) and introduce it into the vaporizer evaporator via the access hose.

16. After the neutralization reaction time with ammonia, carry out check measurements and ventilate. Ventilation until the MAK value is reached: Formaldehyde concentration <0.3 ppm (Occupational Exposure Limits).
17. Remove encapsulation materials and the vaporizer unit.



CAUTION: Workroom airing

After completion of the decontamination process, ammonia vapors may escape from the sample chamber.

Therefore, air the workroom thoroughly!

Check:

- Open the bioindicators in a culture medium and incubate at 55 °C for 7 days, together with one more indicator, for positive control.
- Inspect tubes daily during incubation.

Final reading of all tubes after 7 days:

Diffusion = growth = not sterile,

No diffusion = no growth = sterile.

Validation is successfully completed when all 6 indicators show no growth.

Installation Instructions Maxisafe 2030i

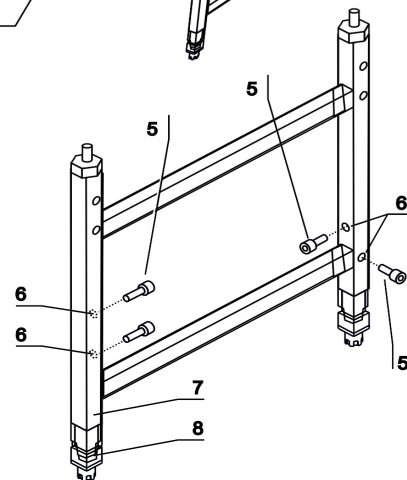
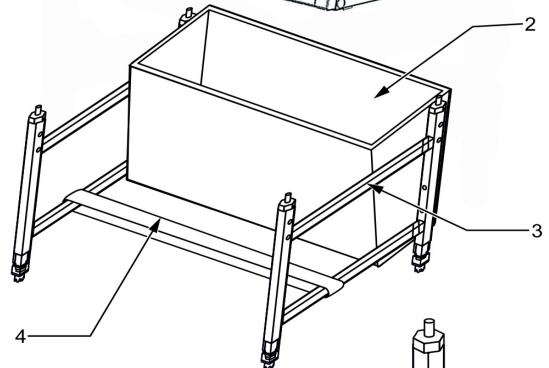
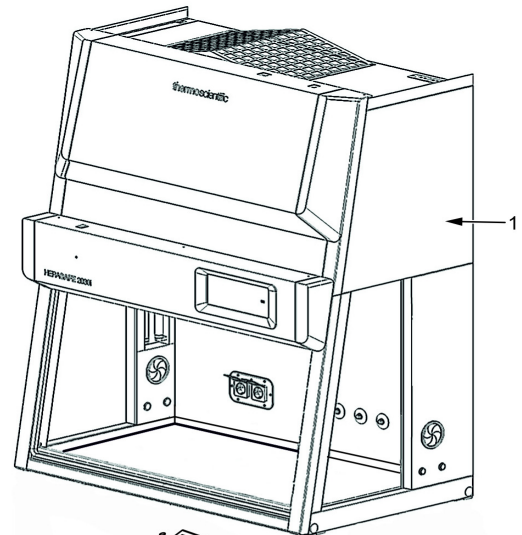
Sequence of the Installation

For the start-up of the Maxisafe 2030i, five working steps are required:

1. Install the device frame to the rack
2. Equip the pre-filter housing
3. Conduct the installation test
4. Mark the device for its intended purpose

The following shipping protections must be removed in accordance with the sequence of the working steps for installation:

- down-flow filter protective cover
- Strap on rack
- Work plate protective foil



Note: Shipping protection!

The shipping protection [4] on the rack side members must be removed only after the device frame has been installed to the rack.

Installation:

Figure 45: The rack [3] and the pre-filter housing [2] form an assembly. To facilitate the installation of the device frame, the side members are equipped with a lifting mechanism.

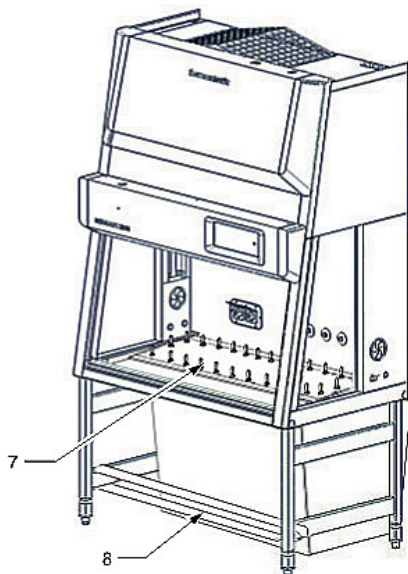
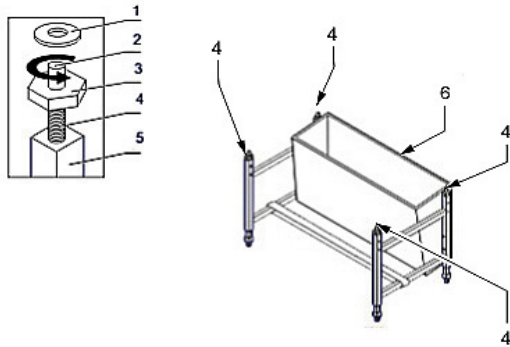
1. Set the rack height: Pull the stands [8] out of the side member guides [7] to the desired height. Lock the height setting: At each pillar, insert the screws [5] through the openings [6] and tighten them.
2. **Figure 46:** Unscrew the threaded rods [4] using the hexagon disks [3] for approx. 10 cm until the stand height is identical at all four pillars.
3. The surrounding seal [6] of the pre-filter housing is pre-installed at the factory.

Figure 45. Pre-filter housing and height adjustment



Note: Seal condition!

Do not use a damaged seal as otherwise the pre-filter housing may not be sealed airtight against the safety cabinet floor. Make sure that the cross joints are absolutely tight against each other.



- Position the device frame into the threaded rods. Check to see if the locating pins [2] are exactly flush with their retainers at the lower device frame.
- Screw the threaded rods into their columns in short, even rotations until they are located approx. 2 mm above the hexagon disk stop.
- Install the retaining screws [7] loosely to the floor-pan through the holes on the pre-filter housing contact surface.
- Lower the lifting mechanism threaded rods all the way to the stop.
- Tighten the screws to seal the pre-filter housing against the floor-pan. The number of screws depends on the device version.
- Remove the strap [8].



Note: Leveling the device!

To level the device, do not use the lifting mechanism but only the adjustable device stands.

- Level the device (see **Assembling the footrest**).

Figure 46. Lifting mechanism and retaining screws

A faulty seal must be replaced:

- Remove the sealing tape from the pre-filter housing and remove all residues from the contact surface.
- Clean the contact surface at the pre-filter housing so that it is dust- and grease-free.
- Cut the sealing tape to length in accordance with the pre-filter housing contact surface, remove the backing tape, and install the self-adhesive seal to the pre-filter housing contact surface.
- At each pillar insert a washer Ø 37 mm [1] into the locating pin [2].

Spare Parts

No.	Part Number	Description
1	50077431	FRONT WINDOW CPL. KS 18-R
2	50156482	KIT COVER INTERIOR LEFT SIDE UV HS2030i
3	50156914	DISPLAY GUI CPL 2030i Spare
4	50077780	FRONT WINDOW CPL. KS 15-R
5	50076294	FRONT WINDOW CPL. KS 12-R
6	50077779	FRONT WINDOW CPL. KS 9-R
7	50156483	KIT COVER INTERIOR RIGHT SIDE UV HS2030i
8	50117926	FILTER H14 MAIN 1.5 457X1525X094 SPARE
9	50117927	FILTER H14 MAIN 1.8 457X1830X094 SPARE
10	50117931	FILTER H14 EXHAUST 1.8 457X915X117 SPARE
11	50117925	FILTER H14 MAIN 1.2 457X1220X094 SPARE
12	50156993	FRONT COVER COMPLETE 2030i 1.8 KIT
13	50156992	FRONT COVER COMPLETE 2030i 1.5 KIT
14	50156990	FRONT COVER COMPLETE 2030i 0.9 KIT
15	50117929	FILTER H14 EXHAUST 1.2/1.5 457X610X117 SPA
16	50166565	EXHAUST BLOWER 48VDC, 140W 2030i + HOLGDER
17	50154273	DOWNFLOW BLOWER COMPLETE 2030i
18	50117930	FILTER H14 MAIN 0.9 457X0915X094 SPARE
19	50156505	FRONT WINDOW DRIVE CPL 2030i 1.5/1.8
20	50156991	FRONT COVER COMPLETE 2030i 1.2 KIT
21	50156484	FRONT WINDOW DRIVE CPL 2030i 0.9/1.2
22	50156996	LIGHT BOX COVER COMPLETE HS 2030i 1.5
23	50156997	LIGHT BOX COVER COMPLETE HS 2030i 1.8
24	50078281	BEARING BLOCK L.H. SIDE KS
25	50078282	BEARING BLOCK, R.H. SIDE KS
26	50156995	LIGHT BOX COVER COMPLETE HS 2030i 1.2
27	50156917	PCB MAIN BOARD HERASAFE 2030i SPARE
28	50117928	FILTER H14 EXHAUST 0.9 457X457X117 SPARE
29	50156518	PCB PRESSURE SENSORS + SUPPORT CPL 2030i
30	50156506	SOCKET BOX CPL TYPE F Germany 2030i
31	50156507	SOCKET BOX CPL TYPE CC CHINA 2030i
32	50156508	SOCKET BOX CPL TYPE TYP E B/F/CR/SR/PL
33	50156509	SOCKET BOX CPL TYPE G GB 2030i
34	50156510	SOCKET BOX CPL TYPE H Israel 2030i
35	50156511	SOCKET BOX CPL TYPE I AUS 2030i
36	50156512	SOCKET BOX CPL TYPE J CH 2030i
37	50156513	SOCKET BOX CPL TYPE K DK 2030i
38	50156514	SOCKET BOX CPL TYPE L Italy 2030i
39	50156515	SOCKET BOX CPL TYPE M Indien 2030i
40	50156516	SOCKET BOX CPL TYPE N Brasil 2030i
41	50154004	COVER BLOWER PLENUM CPL 2030i 1.8
42	50156994	LIGHT BOX COVER COMPLETE HS 2030i 0.9

No.	Part Number	Description
43	50154003	COVER BLOWER PLENUM CPL 2030i 1.5
44	50156916	PCB HERASAFE 2030i 1.5+1.8 ADD ON CPL
45	50054199	SEAL TESAMOLL 19 X 1,2 4952
46	50154313	WIRE HARNESS UV 2030i 1.2
47	50156915	PCB HERASAFE 2030i 0.9+1.2 ADD ON CPL
48	50106209	DC MOTOR 24 V WITH WORM GEAR
49	50152396	POWER SUPPLY 100-240VAC 48VDC, 300W
50	50075650	TUBE 16 X 1 MM 1000 MM LANG DIN 2462
51	50115620	LAMINATOR KS / KSP 18
52	50154923	WIRE HARNESS MAIN BOARD-LED 2030i 1.2
53	50156539	SOCKET BOX CPL TYPE B (NSF) W. FI HS2030i
54	50115619	LAMINATOR KS / KSP 15
55	50154423	WIRE HARNESS UV 2030i 1.8
56	50156918	PCB PRESSURE SENSORS CPL 2030i SPARE
57	50154002	COVER BLOWER PLENUM CPL 2030i 1.2
58	50154001	COVER BLOWER PLENUM CPL 2030i 0.9
59	50081821	WINDOWLEADING RIGHT CPL.KSP
60	50081822	WINDOWLEADING LEFT CPL. KSP
61	50081512	WINDOW GUIDE ASSY RIGHT KS
62	50081513	WINDOW GUIDE ASSY LEFT KS
63	50154747	IR SENSOR CPL HERASAFE 2030i
64	50081523	CROSS-SECTION FRONT WINDOW KS18
65	50115617	LAMINATOR KS / KSP 09
66	50115618	LAMINATOR KS / KSP 12
67	50081522	CROSS-SECTION FRONT WINDOW KS15
68	50154882	ELECTR.BALLAST 4X32W 120-277V 2030i
69	50081521	CROSS-SECTION FRONT WINDOW KS12
70	50081520	CROSS-SECTION FRONT WINDOW KS9
71	50155705	WIRE HARNESS HS 2030i 1.8 SOCKETS /NEMA)
72	50156841	ADAPTER CABLE USB OTG
73	50076707	MOULDING LEFT FRONT UNIT KS
74	50076715	MOULDING RIGHT FRONT UNIT KS
75	50082536	ADHESIVE TAPE, UV STABILE
76	50078618	SET OF SWITCH ACTUATORS KIT KS
77	50151194	LED TUBE 900 MM 17W 120V
78	50151196	LED TUBE 1500 MM 24W 120V
79	50151200	LED TUBE 1500 MM 24W 230V
80	50154392	WIRE HARNESS POWER SUPPLY 120V 2030i 1.8
81	50151195	LED TUBE 1200 MM 20W 120V
82	50154426	BUS CABLE 2030i 1.2
83	50075642	DOUBLE SIDE ADHESIVE TAPE
84	50076879	CABLE PULLEY TWO-LINE KS
85	50154396	WIRE HARNESS POWER SUPPLY 120V 2030i 1.2
86	50156531	WIRE HARNESS POWER SUPPLY 2030i 0.9 EU
87	50156532	WIRE HARNESS POWER SUPPLY 2030i 1.2 EU
88	50156533	WIRE HARNESS POWER SUPPLY 2030i 1.5 EU
89	50156534	WIRE HARNESS POWER SUPPLY 2030i 1.8 EU

No.	Part Number	Description
90	50073577	FRONT WINDOW SEAL, KS18
91	50156562	POWER CORD (US) NEMA 5-15P/C19 5M
92	50156564	POWER CORD (CHINA 16A) (CCC) C19 5M
93	50156575	POWER CORD (EU) SCHUKO-C19 (16A) 5M
94	50156576	POWER CORD (DK) DK3-C19 (16A) 5M
95	50156577	POWER CORD (CH) SEV1011-C19 (16A) 5M
96	50156578	POWER CORD (UK) BS13/3-C19 (13A) 5M
97	50156579	POWER CORD (AUS 15A) IEC 320-C19 5M
98	50156580	POWER CORD (IND) 16A IEC 320-C19 5M
99	50156581	POWER CORD (ISR)16A IL/3 IEC C19 5M
100	50156583	POWER CORD (ARG) 10A IEC 320-C19 5M
101	50156633	POWER CORD (IT) I/3/16-C19 (16A) 5M
102	50151198	LED TUBE 900 MM 17W 230V
103	50137689	INTERFERENCE SUPPRESSION FILTER 250VAC 16A
104	50073576	FRONT WINDOW SEAL, KS15
105	50151193	LED TUBE 600 MM 11W 120V
106	50151199	LED TUBE 1200 MM 20W 230V
107	50076199	GLASS PLATE (SIDE WINDOW) KS
108	50154922	WIRE HARNESS SOCKETS 2030i 1.8
109	50073575	FRONT WINDOW SEAL, KS12
110	50120573	EXHAUST FILTER GUARD KS KSP 18 NSF
111	50154966	POWER SUPPLY 100-240VAC 24VDC, 50W
112	50060299	BALLAST F. UV-TUBE 2X15W/120 V
113	50151197	LED TUBE 600 MM 11W 230V
114	50073574	FRONT WINDOW SEAL, KS 9
115	50081146	BATTERY 9 V 170 MAH NI-MH
116	50050943	BACKPANEL CONNECTION G 3/8 1200 MM
117	50120572	EXHAUST FILTER GUARD KS KSP 12 15 NSF
118	50155246	LABEL THERMOSCIENTIFIC 250 MM
119	50057739	FOOT LEVELER NSF COMPONENT
120	50113920	BALLAST, ELECTR. 2X18-24 /230V
121	50155032	BUS CABLE 2030i 1.8
122	50155203	HERASAFE 2030 I CD DOCUMENTATION
123	50156517	SUPPORT PRESSURE SENSORS 2030i
124	50076885	GAS STRUT, 500 N, KS 18
125	50155664	WIRE HARNESS HS 2030I 1.2 SOCKETS /NEMA)
126	50156597	DISPLAY FRAME GUI TS WITH SEAL
127	50154921	WIRE HARNESS SOCKETS 2030i 1.2
128	50074191	HOLDER RIGHT, IV-BAR/UV/HANGING BASKET
129	50048537	UVC-RADIATOR 15 W
130	50074668	FIXING ANGLE GASKET BELOW KS 18
131	50082060	GAS STRUT, 400 N, KS 15
132	50154924	WIRE HARNESS MAIN BOARD-LED 2030i 1.8
133	50155247	LABEL HERASAFE 2030I
134	50077772	FIXING ANGLE GASKET BELOW KS 9
135	50077774	FIXING ANGLE GASKET BELOW KS 15
136	50124143	PROBEHOLDER ANEMOMETER KS-KSP SERIES

No.	Part Number	Description
137	50154424	WIRE HARNESS UV LAMP 203i
138	50074667	FIXING ANGLE GASKET BELOW KS 12
139	50077112	MOTOR BRIDGE DOWNFLOW PLENUM KS
140	50157040	HOLDING ANGLE GASKET TOP HS2030i 0.9
141	50157041	HOLDING ANGLE GASKET TOP HS2030i 1.2
142	50157042	HOLDING ANGLE GASKET TOP HS2030i 1.5
143	50157043	HOLDING ANGLE GASKET TOP HS2030i 1.8
144	50075670	S-HOOKS 5,0 CM CHR. (6 pcs) Kit
145	50076884	GAS STRUT, 350 N, KS 12
146	50074192	HOLDER LEFT, IV-BAR/UV/HANGING BASKET
147	50156840	WIFI NANO USB ADAPTER
148	50082058	GAS STRUT, 275 N, KS 9
149	50044509	FOLDING BAG 1350/980x1930x0,1 LD-PE
150	50076880	WIRE CABLE, LEFT/RIGHT, KS9/12
151	50077087	WIRE CABLE, LEFT/RIGHT, KS15/18
152	50081764	SLIDER WINDOW FLAP PROTECTION KS KSP
153	50044214	SILICONE SEALING COMPOUND SISTA F109
154	50076881	CABLE GUARD TUBE, 460 MM, KS12
155	50077375	CABLE GUARD TUBE, 755 MM, KS18
156	50078012	CABLE GUARD TUBE, 310 MM, KS9
157	50078013	CABLE GUARD TUBE, 605 MM, KS15
158	50073996	DEFLECTION ROLLER, WIRE CABLE
159	50156521	SUPPORT TUBE PRESSURE EXHAUST 2030i
160	50156522	SUPPORT TUBE PRESSURE MAIN 2030i
161	50073356	BEZEL FOR MEDIA CONNECTION
162	50125589	MEMBRANE FEED PORT 3 ZOLL
163	50156491	WALL HOLDER HS2030i
164	50046334	PLUG PG 16 PVC HDL
165	50049871	PUSH BUTTON SWITCH 2-POL.
166	50035339	GROMMET 20X36DX11H
167	50076853	Z-PROFIL DOWNFLOW PLENUM KS
168	50077315	CABLE REEL CABLE GUARD
169	50154429	WIRE HARNESS LED LAMP 2030i 1.8
170	50073606	MAINSOUTLET (SOCKET) "D"
171	50076811	HINGE BOLT, FRONT WINDOW
172	50043203	POSITION SWITCH WITH LEVER 34MM, 6A
173	3009949	POLYAMID SCREW M4x6 mm
174	3000037	CABLE CLIP 11 x 9 CLOSABLE
175	3001072	TERMINAL 4 MM2 GREY
176	3002007	STRAIN RELIEVE LOOP W.SOCKET 6,0-8,5
177	3039297	HUTMU M 4 DIN 917 A4-1.4571
178	3160306	WASHER A 4,3 DIN125-ST A4E
179	3161568	SAFETY WASHER 6 DIN 6799 FD-ST A4E
180	3650435	FLEXIBLE TUBE DI= 4 X 1 SILICON (TRANS)
181	3651539	RUBBER GROMMET D=7-17, D=23,5 PVC
182	3667303	PLASTIC TUBING, 9MM D.X6 MM
183	3710384	NUT PG16 FOR PASS-THROUGH
184	3719070	CABLE TIE B=2,5 L=100 6,6 TYPE

No.	Part Number	Description
185	3719080	CABLE DRILLER DI= 10-12 MM HDL
186	3719098	Y HOSE CONNECTOR TYPE YS 4
187	50021264	CABLE HOLDER D=10-12,5 SELF ADHESIVE
188	50024703	TERMINAL STRIP (NO. 30, 40)
189	50033991	PUSH THROUGH SOCKET F. LAMP, KS
190	50042227	RETAINING RING DI=10 FORM ZA
191	50043765	LABEL "GS-ZEICHEN TÜV-NORD" (AGENCY TÜV)
192	50043822	LABEL W16 DIN 58956 (BIOGEFAEHRDUNG)
193	50044371	INSULATING PLATE FOR MICROSWITCH
194	50046053	RUBBER GROMMET 5-7 MM
195	50046294	ADHESIVE PLATE F. UV-CONNECTION
196	50051861	SEAL TESAMOLL 9 X 4 MM
197	50055371	PLUG D= 30,= PA 6.6 WHITE
198	50056671	LABEL NF - CONTROLE PAR LNE
199	50057745	NOZZEL D= 0-8 D=10 SILICON LO. D=3 HDL
200	50062779	LABEL, ADHESIVE "BIOHAZARD"
201	50062978	HOSE CONNECTOR GS 4
202	50068686	PLUG, OUTER DOOR TOP, HERACELL 240
203	50072554	NSF LABEL
204	50072680	CAP, TEST HOSE DI =8
205	50073285	BEARING BOLT, DEFLECTION ROLLER
206	50073294	TERMINAL, UV POWER SUPPLY
207	50073358	SCREW PLUG G3/8 INCH
208	50073370	LIFT STRAP F. WORKPLATES
209	50073605	SOCKET FRAME WITH COVER, GREY
210	50073690	POSITION SWITCH WITH LEVER 34MM
211	50073961	LABEL POSITIONING ARMREST KS
212	50074429	LABEL (CAUTION DECONTAMINATE...)
213	50075653	STOPPER D=20; D1=14,6 FOR IVBAR
214	50076256	ETL LABEL
215	50076297	FRONT WINDOW CABLE LOCK
216	50076845	HINGE BUSHING, FRONT WINDOW
217	50076856	COVER DRAIN VALVE BASE PLATE
218	50076886	SPRING FRONTWINDOW SECURE KS
219	50077505	WING SCREW M5 x 16 DIN 316 EXHAUST
220	50077533	KEY FOR MOTORSHAFT SPLINE
221	50077703	KNURLED HEAD SCREW M4 X 10
222	50077921	FLAT GASKET PG16 DA=27 DI=22,5 PE
223	50078324	SOCKET HEAD SCREW L
224	50078904	FERRITE RING 1-1000 MHZ
225	50080132	SEALING PU FOAM 20 x 3
226	50081150	ACCUCLIP FOR 9 VDC ACCU
227	50081829	SCREW 4,2x13 WITH SEALANT
228	50107292	LABEL WORKING AREA KS 12 (NF)
229	50107926	SPACER TUBE FOR MOTOR SHAFT
230	50108688	FIL-HEAD SCREW M5x12 TORX FLAN.+RAT.

No.	Part Number	Description
231	50113875	LABEL "GENERIC WARNING" 25MM
232	50121322	FERRITE RING, 25-100 MHZ, 151-270 OH
233	50128921	FERRITE RING, 1-1000 MHZ, 23x40x18 MM
234	50131069	IEC CONNECTOR C20
235	50150166	FUSE 16,0 A T6,3X32MM SIBA
236	50150610	FEROMAGNETIC TDK ZCAT 2035-0930A
237	50153059	FIL-HEAD SCREW M3X6 TORX FLAN.+RAT.
238	50153800	COVER HOLE FOR MEDIA TABS HS 2030i
239	50154425	WIRE HARNESS LED LAMP 2030i 1.2
240	50154911	WIRE HARNESS EMERGENCY CONTROL 2030i
241	50155830	FERRITE RING, VITROPERM 500 F
242	50156387	STICKER SET T16, T15, T5, USB, ALARM C.
243	50156402	SCREW 35X8FLANSCH TORX 15 F.
244	50156568	WIRE HARNESS HERASAFE 2030I 0.9 LED LAMP
245	50156569	WIRE HARNESS HERASAFE 2030I 1.5 LED LAMP
246	50156707	WIRE HARNESS HERASAFE 2030I 1.2 LED 120V
247	50156708	WIRE HARNESS HERASAFE 2030I 1.8 LED 120V
248	50157187	USB PORT COVER TYPE A
249	50157188	USB PORT COVER TYPE B
250	56650722	SCREW ST3,5x9,5 ISO 7049-C-H A4E
251	56650737	SCREW M4 X 10 DIN 965-4.8 A4E
252	56650741	SCREW M4 X 6 DIN 965-4.8 A4E
253	56653073	TOOTH WASHER A 4,3 DIN 6797 1.4310
254	50158001	REPLACEMENT PCB HERASAFE 2030I MAIN BOARD
255	50154204	WIRE HARNESS GUST 2 PRESSURE SENSOR BOARD
256	50156952	WIRE HARNESS HERASAFE 2030I - 1.8 RELAY
257	50075622	CLAMP D=6.4 MM, AL
258	50052955	HOSE CONNECTOR TILTED D=6 (WS 6)
259	50077339	COVER FOR UV-RADIATOR KS-R
260	50150610	FERRITE TDK ZCAT 2035-0930A
A	50159054	HEPA-FILTER MS2030i 86,5x257x575
B	50159075	ACTIVE CARBON FILTER MS2030i 86,5X257X575
C	50158960	ADHESIVE TAPE 6.5 M
D	50158959	ADHESIVE TAPE 10 M
E	50157955	CROSS BEAM FOR BASE TUB INSERTION MS2030i
F	50158163	WIRE HARNESS POWER SUPPLY MS 2030I1.2 EU
G	50158164	WIRE HARNESS POWER SUPPLY MS 2030I1.2 US
H	50159947	FLOWGRID D 245 B MAXISAFE 2030i 1.8
I	50157945	LABEL MAXISAFE 2030I
J	50159294	SMALL PARTS SET MS 2030i 0.9
K	50159305	SMALL PARTS SET MS 2030i 1.2
L	50159306	SMALL PARTS SET MS 2030i 1.5
M	50159307	SMALL PARTS SET MS 2030i 1.8
N	50081986	PREFILTER BOX KSP09 COMPL
O	50081725	PREFILTER BOX KSP12 COMPL
P	50082326	PREFILTER BOX KSP15 COMPL
Q	50081767	PREFILTER BOX KSP18 COMPL

R	50159535	MENDING PEN ANTHRACITE RAL 7016 BASE FRAME + COVER BOX
S	50159536	MENDING PEN ANTHRACITE RAL 7045 TELEGREY FRONT COVER
T	50157938	ASE AFS MS2030i 0.9 WITHOUT FILTER
U	50157939	ASE AFS MS2030i 1.2 WITHOUT FILTER
V	50157940	ASE AFS MS2030i 1.5 WITHOUT FILTER
W	50157941	ASE AFS MS2030i 1.8 WITHOUT FILTER
X1	50156478	SERVICE MANUAL EN
X2	50157925	SERVICE MANUAL DE
Z	50047013	STICKER W3 VBG125 (WARN.F.POISSON COMP.)
AA	50110025	DOWNFLOW BLOWER 48 VDC, 190 W, 2230M ³ /H KS
AB	50043617	TUBE CONNECTOR FOR TUBE 6X1,2
AC	50079474	BRAKE CLEANER STRAUSS CO.
AD	50047296	STICKER "ZYTOSTATIKA/CYTOTOXIC HAZARD"
AF	50110026	MOTOR BRIDGE DOWNFLOW PLENUM KS
AG	50082687	GASKET -PREFILTER- 10X3 5000 LG KSP
AH	50159573	DISTANCE GLIDING BLOCK
AI	50159501	RAKEL INSTALLATION PREFILTER MS2030i
BA	50156482	KIT COVER INTERIOR LEFT SIDE UV HS2030i
BB	50156483	KIT COVER INTERIOR RIGHT SIDE UV HS2030i
BC	50156484	KIT WINDOW DRIVE COMPL. HS 2030i 0.9/1.2
BD	50156505	KIT WINDOW DRIVE COMPL. HS 2030i 1.5/1.8
BE	50156506	KIT SOCKET BOX COM. TYPE F HS 2030i
BF	50156507	KIT SOCKET BOX COM. TYPE CC HS 2030i
BG	50156508	KIT SOCKET BOX COM. TYPE E HS 2030i
BH	50156509	KIT SOCKET BOX COM. TYPE G HS 2030i
BI	50156510	KIT SOCKET BOX COM. TYPE H HS 2030i
BJ	50156511	KIT SOCKET BOX COM. TYPE I HS 2030i
BK	50156512	KIT SOCKET BOX COM. TYPE J HS 2030i
BL	50156513	KIT SOCKET BOX COM. TYPE K HS 2030i
BM	50156514	KIT SOCKET BOX COM. TYPE L HS 2030i
BN	50156515	KIT SOCKET BOX COM. TYPE M HS 2030i
BO	50156516	KIT SOCKET BOX COM. TYPE N HS 2030i
BP	50156517	KIT HOLDER PCB PRESSURE SENSOR HS 2030i
BQ	50156518	KIT PCB PRESSURE SENSOR+HOLDER HS2030i
BR	50156521	KIT HOLDER PRESSURE TUBE EXHAUST HS2030i
BS	50156522	KIT HOLDER PRESSURE TUBE SUPPLY HS 2030i
BT	50156990	KIT FRONT COVER COMPLETE HS 2030i 0.9
BU	50156991	KIT FRONT COVER COMPLETE HS 2030i 1.2
BV	50156992	KIT FRONT COVER COMPLETE HS 2030i 1.5
BW	50156993	KIT FRONT COVER COMPLETE HS 2030i 1.8
BX	50156994	KIT LIGHT BOX COVER COMP. HS 2030i 0.9
BY	50156995	KIT LIGHT BOX COVER COMP. HS 2030i 1.2
BZ	50156996	KIT LIGHT BOX COVER COMP. HS 2030i 1.5
CA	50156997	KIT LIGHT BOX COVER COMP. HS 2030i 1.8
CB	50159971	FLOWGRID D 245 B WITH GAP MAXISAFE 2030i 1.8
CC	50159746	KIT WINDSCREEN FOLDING SAFETY DEVICE MAXISAFE 2030i 1.8

Parameter Lists

Service Parameter Overview

Parameter list - Herasafe 2030i						Cabinet		Type
P	Menu	Function	Access R/W/0 set/set	Unit	Default	EN 12469		Size
						BG 0.9 BG 1.2	BG 1.5 BG 1.8	
S1a	Factory Settings - Airflow	Pressure value downflow	R	Digits AD-Converter	500	500	500	
S1b	Factory Settings - Airflow	RPM downflow	R	Impulses	1240	1240	1240	
S2a	Factory Settings - Airflow	Pressure value inflow	R	Digits AD-Converter	500	500	500	
S2b	Factory Settings - Airflow	RPM inflow	R	Impulses	1538	1538	1538	
P1	Factory settings - Airflow	Airspeed reduced downflow	R/W	1/2 Percent	60	60	60	
P2	Factory settings - Airflow	Airspeed reduced inflow	R/W	1/2 Percent	60	60	60	
P10	Factory Settings - Airflow	Limit fan interlock	R/W	Percent	50	50	50	
R0	Factory Settings - Airflow	Inflow control: 0=disabled, 1=enabled	R/W	Off/On	1	1	1	
R10	Factory Settings - Airflow	Downflow control: 0=disabled, 1=enabled	R/W	Off/On	1	1	1	
P24	Factory Settings - Alarm Relay	Alarm relay (0=solenoid valve, 1=alarm)	R/W		0	0	0	
S3	Factory Settings - Alarms Settings	Pressure low alarm downflow	R/W	Digits AD-Converter	300	300	300	
S3o	Factory Settings - Alarms Settings	Pressure high alarm downflow	R/W	Digits AD-Converter	650	650	650	
S4	Factory Settings - Alarms Settings	Pressure low alarm inflow	R/W	Digits AD-Converter	300	300	300	
S4o	Factory Settings - Alarms Settings	Pressure high alarm inflow	R/W	Digits AD-Converter	650	650	650	
S9	Factory Settings - Alarms Settings	Accoustical Alarm main board 0=Mute disabled, 1=Mute enabled, 2=Off	R/W		1	0	0	

Parameter list - Herasafe 2030i						Cabinet	Type Size
P	Menu	Function	Access R/W/O set/set	Unit	Default	EN 12469	
						BG 0.9 BG 1.2	BG 1.5 BG 1.8
P5	Factory Settings - Airflow	Default alarm limit AutoParam-Function Window 1	R/W	Digits AD-Converter	200	200	200
P6	Factory Settings - Airflow	Default alarm limit AutoParam-Function Window 2	R/W	Digits AD-Converter	100	100	100
P11	Factory Settings - Airflow	Default Alarm limit	R/W	Digits AD-Converter	100	100	100
P20	Factory Settings - Airflow	Mute time audible alarm	R/W	Minutes	5	5	5
S7	Factory Settings - Auto Param Function	AutoParam-Function active? 0=Off, 1=Full Autocal function, 2=Short Autocal function	R/W		0	0	0
P19	Factory Settings - BSC Version	BSC type: 0=MSC, 1=Herasafe 2030i, 2=HERAguard Eco, 3=MSC plus	R/W		1	1	1
P14	Factory Settings - Country Version	Country version: 0=EU, 1=France 1, 2=France 2, 3=USA, 4=China	R/W		0	0	0
S13	Factory Settings - UV installed	UV installed (0=No, 1 = Yes)	R/W		1	1	1
P21	Factory Settings - Window Controls	Current limit window up	R/W	1/10 A	25	25	25
P22	Factory Settings - Window Controls	Current limit window down	R/W	1/10 A	25	25	25
S1	Field Certification - Air Speeds	Air speed downflow	R/W	1/2 percent	140	140	140
S2	Field Certification - Air Speeds	Air speed inflow	R/W	1/2 percent	90	90	90
S3a	Field Certification - Air Speeds	Alarm Fan Speed Downflow	R/W	1/2 percent	100	100	100
S4a	Field Certification - Air Speeds	Last Change (Air Velocities)	R/W	Date	0	0	0
S25	Field Certification - Air Speeds	Last Certification (Air Velocities)	R/W	Date	0	0	0

Parameter list - Herasafe 2030i						Cabinet	Type Size
P	Menu	Function	Access R/W/0 set/set	Unit	Default	EN 12469	
						BG 0.9 BG 1.2	BG 1.5 BG 1.8
P8	Field Certification - Air Speeds	Displayed airspeed downflow metric	R/W	1/100 m/s	32	32	32
P8a	Field Certification - Air Speeds	Displayed airspeed downflow imperial	R/W	feet/min	63	63	63
P9	Field Certification - Air Speeds	Displayed airspeed inflow metric	R/W	1/100 m/s	45	45	45
P9a	Field Certification - Air Speeds	Displayed airspeed inflow imperial	R/W	feet/min	105	105	105
S8	Settings - Data Plate	PlateSoftware version no. (*10)	R		xxxxx	xxxxx	xxxxx
S23	Settings - Data Plate	Serial number	R/W		20 blank	20 blank	20 blank
P7	Settings - Display Settings	Units airspeed (0=m/s, 1=feet/min)	R/W		0	0	0
S15	Settings - UV Disinfection Cycle	Auto fan off after UV cycle (0 = disabled, 1 = enabled)	R/W		0	0	0
P12	Settings - UV Disinfection Cycle	UV disinfection cycle time	R/W	Minutes	60	60	60
P27	Settings - UV Disinfection Cycle	Auto correction UV disinfection time: 0=disabled, 1=enabled	R/W	Off/On	1	1	1
S5	Status Screen	Operating hours in h*10	R/W/0	1/10 hour	0	0	0
S18	Status Screen	Last run	R	Date/Time	0	0	0
S6	Status Screen	Operating hours UV in h*10	R/W/0	1/10 hour	0	0	0
S19	Status Screen	Last UV run	R	Date/Time	0	0	0
S20	Status Screen	Date UV installed	R/W	Date	0	0	0
S17	Status Screen	Operating hours filter in h*10	R/W/0	1/10 hour	0	0	0
S21	Status Screen	Date filter changed	R/W	Date	0	0	0
S22	Status Screen	Filter life time	R/W	Hours	12500	12500	12500

Parameter list - Herasafe 2030i						Cabinet	Type
P	Menu	Function	Access	Unit	Default	NSF 49	Size
						BG 1.2	NSF 49
S1a	Factory Settings - Airflow	Pressure value downflow	R	Digits AD-Converter	500	500	500
S1b	Factory Settings - Airflow	RPM downflow	R	Impulses	1240	1240	1240
S2a	Factory Settings - Airflow	Pressure value inflow	R	Digits AD-Converter	500	500	500
S2b	Factory Settings - Airflow	RPM inflow	R	Impulses	1538	1538	1538
P1	Factory Settings - Airflow	Airspeed reduced downflow	R/W	1/2 percent	60	60	60
P2	Factory Settings - Airflow	Airspeed reduced inflow	R/W	1/2 percent	60	60	60
P10	Factory Settings - Airflow	Limit fan interlock	R/W	Percent	50	50	50
R0	Factory Settings - Airflow	Inflow control: 0=disabled, 1=enabled	R/W	Off/On	1	1	1
R10	Factory Settings - Airflow	Downflow control: 0=disabled, 1=enabled	R/W	Off/On	1	1	1
P24	Factory Settings - Alarm Relay	Alarm relay (0=solenoid valve, 1=alarm)	R/W		0	0	0
S3	Factory Settings - Alarm Settings	Pressure low alarm downflow	R/W	Digits AD-Converter	300	300	300
S3o	Factory Settings - Alarm Settings	Pressure high alarm downflow	R/W	Digits AD-Converter	650	650	650
S4	Factory Settings - Alarm Settings	Pressure low alarm inflow	R/W	Digits AD-Converter	300	300	300
S4o	Factory Settings - Alarm Settings	Pressure high alarm inflow	R/W	Digits AD-Converter	650	650	650
S9	Factory Settings - Alarm Settings	Accoustical Alarm main board 0=Mute disabled, 1=Mute enabled, 2=Off	R/W		1	1	1
P5	Factory Settings - Alarm Settings	Default alarm limit AutoParam-Function Window 1	R/W	Digits AD-Converter	200	200	200
P6	Factory Settings - Alarm Settings	Default alarm limit AutoParam-Function Window 2	R/W	Digits AD-Converter	100	100	100
P11	Factory Settings - Alarm Settings	Default Alarm limit	R/W	Digits AD-Converter	100	100	100
P20	Factory Settings - Alarm Settings	Mute time audible alarm	R/W	Minutes	5	5	5
S7	Factory Settings - Auto Param Function	AutoParam-Function active? 0=Off, 1=Full Autocal function, 2=Short Autocal function	R/W		0	0	0

Parameter list - Herasafe 2030i						Cabinet	Type
P	Menu	Function	Access R/W/O set/set	Unit	Default	NSF 49	NSF 49
						BG 1.2	BG 1.8
P19	Factory Settings - BSC Version	BSC type: 0=MSC, 1=Herasafe 2030i, 2=HERAGuard Eco, 3=MSC plus	R/W		1	1	1
P14	Factory Settings - Country Version	Country version: 0=EU, 1=France 1, 2=France 2, 3=USA, 4=China	R/W		0	3	3
S13	Factory Settings - UV installed	UV installed (0=No, 1 = Yes)	R/W		1	1	1
P21	Factory Settings - Window Controls	Current limit window up	R/W	1/10 A	25	25	25
P22	Factory Settings - Window Controls	Current limit window down	R/W	1/10 A	25	25	25
S1	Field Certification - Air Speeds	Air speed downflow	R/W	1/2 percent	140	140	140
S2	Field Certification - Air Speeds	Air speed inflow	R/W	1/2 percent	90	90	90
S3a	Field Certification - Air Speeds	Alarm Fan Speed Downflow	R/W	1/2 percent	100	100	100
S4a	Field Certification - Air Speeds	Alarm Fan Speed Inflow	R/W	1/2 percent	60	60	60
S24	Field Certification - Air Speeds	Last Change (Air Velocities)	R/W	Date	0	0	0
S25	Field Certification - Air Speeds	Last Certification (Air Velocities)	R/W	Date	0	0	0
P8	Field Certification - Air Speeds	Displayed airspeed downflow metric	R/W	1/100 m/s	32	32	32
P8a	Field Certification - Air Speeds	Displayed airspeed downflow imperial	R/W	feet/min	63	63	63
P9	Field Certification - Air Speeds	Displayed airspeed inflow metric	R/W	1/100 m/s	45	45	45
P9a	Field Certification - Air Speeds	Displayed airspeed inflow imperial	R/W	feet/min	105	105	105
S8	Settings - Data Plate	Software version no. (*10)	R		xxxxx	xxxxx	xxxxx
S23	Settings - Data Plate	Serial number	R/W		20 blank	20 blank	20 blank
P7	Settings - Display Settings	Units airspeed (0=m/s, 1=feet/min)	R/W		0	1	1
S15	Settings - UV Disinfection Cycle	Auto fan off after UV cycle (0 = disabled, 1 = enabled)	R/W		0	0	0

Parameter list - Herasafe 2030i						Cabinet	Type
P	Menu	Function	Access R/W/O set/set	Unit	Default	NSF 49	Size
						BG 1.2	NSF 49
						BG 1.2	BG 1.8
P12	Settings - UV Disinfection Cycle	UV disinfection cycle time	R/W	Minutes	60	60	60
P27	Settings - UV Disinfection Cycle	Auto correction UV disinfection time: 0=disabled, 1=enabled	R/W	Off/On	1	1	1
S5	Status Screen	Operating hours in h*10	R/W/10	1/10 hour	0	0	0
S18	Status Screen	Last run	R	Date / Time	0	0	0
S6	Status Screen	Operating hours in h*10	R/W/10	1/10 hour	0	0	0
S19	Status Screen	Last UV run	R	Date / Time	0	0	0
S20	Status Screen	Date UV installed	R/W	Date	0	0	0
S17	Status Screen	Operating hours filter in h*10	R/W/10	1/10 hour	0	0	0
S21	Status Screen	Date filter changed	R/W	Date	0	0	0
S22	Status Screen	Filter life time	R/W	Hours	12500	12500	12500

Parameter list - Herasafe 2030i					Cabinet and Type Size			
P	Menu	Function	Access R/W/O set/set	Unit	Default	EN 12980		
						BG 0.9	BG 1.2	BG 1.5 BG 1.8
S1a	Factory Settings - Airflow	Pressure value downflow	R	Digits AD-Converter	500	500	500	500
S1b	Factory Settings - Airflow	RPM downflow	R	Impulse	1240	1240	1240	1240
S2a	Factory Settings - Airflow	Pressure value inflow	R	Digits AD-Converter	500	500	500	500
S2b	Factory Settings - Airflow	RPM inflow	R	Impulses	1538	1538	1538	1538
P1	Factory Settings - Airflow	Airspeed reduced downflow	R/W	1/2 percent	60	60	60	60
P2	Factory Settings - Airflow	Airspeed reduced inflow	R/W	1/2 percent	60	60	60	60
P10	Factory Settings - Airflow	Limit fan interlock	R/W	Percent	50	50	50	50
R0	Factory Settings - Airflow	Inflow control: 0=disabled, 1=enabled	R/W	Off/On	1	1	1	1
R10	Factory Settings - Airflow	Downflow control: 0=disabled, 1=enabled	R/W	Off/On	1	1	1	1
P24	Factory Settings - Alarm Relay	Alarm relay (0=solenoid valve, 1=alarm)	R/W		0	0	0	0
S3	Factory Settings - Alarm Settings	Pressure low alarm downflow	R/W	Digits AD-Converter	300	300	300	300
S3o	Factory Settings - Alarm Settings	Pressure high alarm downflow	R/W	Digits AD-Converter	650	650	650	650
S4	Factory Settings - Alarm Settings	Pressure low alarm inflow	R/W	Digits AD-Converter	300	300	300	300
S4o	Factory Settings - Alarm Settings	Pressure high alarm inflow	R/W	Digits AD-Converter	650	650	650	650
S9	Factory Settings - Alarm Settings	Accoustical Alarm main board 0=Mute disabled, 1=Mute enabled, 2=Off	R/W		1	0	0	0
P5	Factory Settings - Alarms Settings		Default alarm limit AutoParam-Function Window 1			R/W	Ziffern ADWandler	200
P6	Factory Settings - Alarms Settings		Default alarm limit AutoParam-Function Window 2			R/W	Ziffern ADWandler	100

Parameter list - Herasafe 2030i					Cabinet and Type Size			
P	Menu	Function	Access R/W/O set/set	Unit	Default	EN 12980		
						BG 0.9	BG 1.2	BG 1.5 BG 1.8
P11	Factory Settings - Alarm Settings	Default Alarm limit	R/W	Digits AD-Converter	100	100	100	100
P20	Factory Settings - Alarm Settings	Mute time audible alarm	R/W	Minutes	5	5	5	5
S7	Factory Settings - Auto Param Function	AutoParam-Function active? 0=Off, 1=Full Autocal function, 2=Short Autocal function	R/W		0	0	0	0
P19	Factory Settings - BSC Version	BSC type: 0=MSC, 1=Herasafe 2030i, 2=HERAguard Eco, 3=MSC plus, 4=Maxisafe 2030i	R/W		1	4	4	4
P14	Factory Settings - Country Version	Country version: 0=EU, 1=France 1, 2=France 2, 3=USA, 4=China	R/W		0	0	0	0
S13	Factory Settings - UV installed	UV installed (0 = No, 1 = Yes)	R/W		1	1	1	1
P21	Factory Settings - Window Controls	Current limit window up	R/W	1/10 A	25	25	25	25
P22	Factory Settings - Window Controls	Current limit window down	R/W	1/10 A	25	25	25	25
S1	Field Certification - Air Speeds	Air speed downflow	R/W	1/2 Percent	140	140	140	140
S2	Field Certification - Air Speeds	Air speed Inflow	R/W	1/2 Percent	90	90	90	90
S3a	Factory Settings - Alarm Settings	Alarm Fan Speed Downflow	R/W	1/2 Percent	100	100	100	100
S4a	Field Certification - Air Speeds	Alarm Fan Speed Inflow	R/W	1/2 Percent	60	60	60	60
S24	Field Certification - Air Speeds	Last Change (Air Velocities)	R/W	Date	0	0	0	0
S25	Field Certification - Air Speeds	Last Certification (Air Velocities)	R/W	Date	0	0	0	0

Parameter list - Herasafe 2030i						Cabinet and Type Size		
P	Menu	Function	Access R/W/O set/set	Unit	Default	EN 12980		
						BG 0.9	BG 1.2	BG 1.5 BG 1.8
P8	Field Certification - Air Speeds	Displayed airspeed downflow metric	R/W	1/100 m/s	32	32	32	32
P8a	Field Certification - Air Speeds	Displayed airspeed downflow imperial	R/W	feet/min	63	63	63	63
P9	Field Certification - Air Speeds	Displayed airspeed inflow metric	R/W	1/100 m/s	45	45	45	45
P9a	Field Certification - Air Speeds	Displayed airspeed inflow imperial	R/W	feet/min	105	105	105	105
S8	Settings - Data Plate	Software version no. (*10)	R		xxxxx	xxxxx	xxxxx	xxxxx
S23	Settings - Data Plate	Serial number	R/W		20-blank	20-blank	20-blank	20-blank
P7	Settings - Display Settings	Units airspeed (0=m/s, 1=feet/min)	R/W		0	0	0	0
S15	Settings - UV Disinfection Cycle	Auto fan off after UV cycle (0=disabled, 1=enabled)	R/W		0	0	0	0
P12	Settings - UV Disinfection Cycle	UV disinfection cycle time	R/W	Minutes	60	60	60	60
P27	Settings - UV Disinfection Cycle	Auto correction UV disinfection time: 0=disabled, 1=enabled	R/W	Off/On	1	1	1	1
S5	Status Screen	Operating hours in h*10	R/W/O	1/10 hour	0	0	0	0
S18	Status Screen	Last run	R	Date/Time	0	0	0	0
S6	Status Screen	Operating hours UV in h*10	R/W/O	1/10 hour	0	0	0	0
S19	Status Screen	Last UV run	R	Date/Time	0	0	0	0
S20	Status Screen	Date UV installed	R/W	Date	0	0	0	0
S17	Status Screen	Operating hours filter in h*10	R/W/O	1/10 hour	0	0	0	0
S21	Status Screen	Date filter changed	R/W	Date	0	0	0	0
S22	Status Screen	Filter life time	R/W	hours	12250	12250	12250	12250

Function parameter overview

Level	Function	S/MS 0.9	S/MS 1.2	S/MS 1.5	S/MS 1.8
P01	Software version			2.1	
P02	Parameter ID	see "Configuration identifier overview"			
P03	Window type			0	
P04	UV lamp/socket No (0) or Yes (1)		0 or 1, depending on device type		
P05	External consumer available No (0) or Yes (1)			0	
P06	Monitor alarm available No (0) or Yes (1)			1	
P07	Audible alarm can be silenced No (0), Yes (1) or no audible alarm (2)			0 (1)	
P08	Air velocity unit (feet/min) 1 or (m/s) 0			1/0	
P09	Control voltage for reduced down-flow			30	
P10	Control voltage for reduced inflow			30	
	Application in USA/Canada				
P13	Blower Performance Factor Offset		12		10
P14	Blower Performance Factor Window		10		5
	Application in EU / Middle East / Africa				
P13	Blower Performance Factor Offset			0	
P14	Blower Performance Factor Window			100	
P15	Silenced alarm repeated after 0 – 60 Minutes			0	
P16	Holding time for key press code in seconds			5	
P17	Duration in minutes for automatic return from service level			15	
P19	Down-flow velocity increase display			-	
P21	Audible signal after P 16 elapses for 0 – 1000 m/s			300	
P22	Reset total operating hours (h/10) display		Carry-over upon PCB replacement		
P23	Audible alarm delay for timer start			25	
P24	Down-flow blower limit value monitoring	50	50	50	50
P25	Current limit for window motor up in A			2.5	
P26	Current limit for window motor down in A			2.5	
P27	Auto alarm limit			150	
P28	Speed pressure display			0	
P29	Value window 1 auto-calibration routine			200	
P30	Battery board Yes/No			1	
P31	Value window 2 auto-calibration routine			30	
P32	Remote control / keyboard foil			0	
P33	Monitor alarm, Manual (0), auto (1)			0	

Error list

Low downflow alarm

- Potential for reduced sample protection.
- Reduce risk and restart fans.
- Check air velocities and save values again.

High downflow alarm

- Potential for reduced personal protection.
- Reduce risk and restart fans.
- Check air velocities and save values again.

Low inflow alarm

- Potential for reduced personal protection.
- Reduce risk and restart fans.
- Check air velocities and save values again.

High inflow alarm

- Potential for reduced sample protection.
- Reduce risk and restart fans.
- Check air velocities and save values again.

Downflow sensor fault

- Check downflow airflow velocity and correct as required.
- Check connection between pressure sensor and plenum or main PCB.
- Replace pressure sensor.



CAUTION: Contaminated area!

The pressure sensors are located within the contaminated area. Observe safety instructions!

Inflow sensor fault

- Check inflow/exhaust airflow velocity and correct as required.
- Check connection between pressure sensor and plenum or main PCB.
- Replace pressure sensor.



CAUTION: Contaminated area!

The pressure sensors are located within the contaminated area. Observe safety instructions!

NVRAM Error

- Parameters replaced with default parameters
- Check air velocities and save values again.
- Re-certification required.

Data bus communication error

- Turn unit ON/OFF to see if system corrects.
- Check connections between display and main PCB as well as connecting cable.
- Disconnect and reconnect connecting cable on both ends, replace cable or PCB's as required

Window position switch error

- Close window if possible.
- Check function with Pilot switch.
- Turn unit ON/OFF to see if system corrects.
- See Micro switch diagnostic mode.
- Check function and connection of all micro switches according wire diagrams.

Communication error in the bus to add-on board

- Turn unit ON/OFF to see if system corrects.
- Check connections between add-on board and main PCB as well as connecting cable.
- Disconnect and reconnect connecting cable on both ends, replace cable or PCB's as required

Current exceeded as window moved up/down

- Safely remove restriction.
- Check function with Pilot switch.
- Turn unit ON/OFF to see if system corrects.
- See Micro switch diagnostic mode.
- Check function and connection of all micro switches according wire diagrams.

Downflow or inflow fan failed

- Turn unit ON/OFF if system corrects.
- Check connections between fan and main board as well connecting cable.
- Disconnect and reconnect connecting cable on both ends, replace fan or PCB's as required.



CAUTION: Contaminated area!

The pressure sensors are located within the contaminated area. Observe safety instructions!

Internal system error

- Turn unit ON/OFF to see if system corrects.

Window position undefined

- Close window if possible.
- Check function of Pilot switch.
- Turn unit ON/OFF to see if system corrects.
- See Micro switch diagnostic mode.
- Check function and connection of all micro switches according wire diagrams.

Low inflow with low downflow alarm

- Potential for reduced personal and sample protection.
- Reduce risk and restart fans.
- Check air velocities and save values again.
- Re-certification required.

High inflow with high downflow alarm

- Potential for reduced personal and sample protection.
- Reduce risk and restart fans.
- Check air velocities and save values again.
- Re-certification required.

Low inflow with high downflow alarm

- Potential for reduced personal protection.
- Reduce risk and restart fans.
- Check air velocities and save values again.
- Re-certification required.

High inflow with low downflow alarm

- Potential for reduced sample protection.
- Reduce risk and restart fans.
- Check air velocities and save values again.
- Re-certification required.

Window not at operational height

- Protection reduced.
- Move window to operational height and turn on fans for proper use.
- See Micro switch diagnostic mode.
- Check function and connection of all micro switches according wire diagrams.

Window is below operational height

- Protection reduced.
- Raise window to operational height and turn on fans for proper use.
- See Micro switch diagnostic mode.
- Check function and connection of all micro switches according wire diagrams.

Window is above operational height

- Protection reduced.
- Lower window to operational height and turn on fans for proper use.
- See Micro switch diagnostic mode.
- Check function and connection of all micro switches according wire diagrams.

Test report

Test report

Device ID No:

Device serial number:

Date of test:

Date of repeat test:

Test results:

Electrical tests

Polarity:

Ground resistance:

Leakage currents:

Airflow velocity tests

Inflow velocity:

down-flow velocity:

Airflow pattern tests

Airflow direction:

Front window impermeability:

Work aperture impermeability:

Seal impermeability:

Filter leak tests

Exhaust filter impermeability:

Down-flow filter impermeability:

Pre-filter element leakage test:

Values for ergonomic tests

Lighting intensity:

Vibrations:

Noise level:

UV intensity

Tester

Surname:

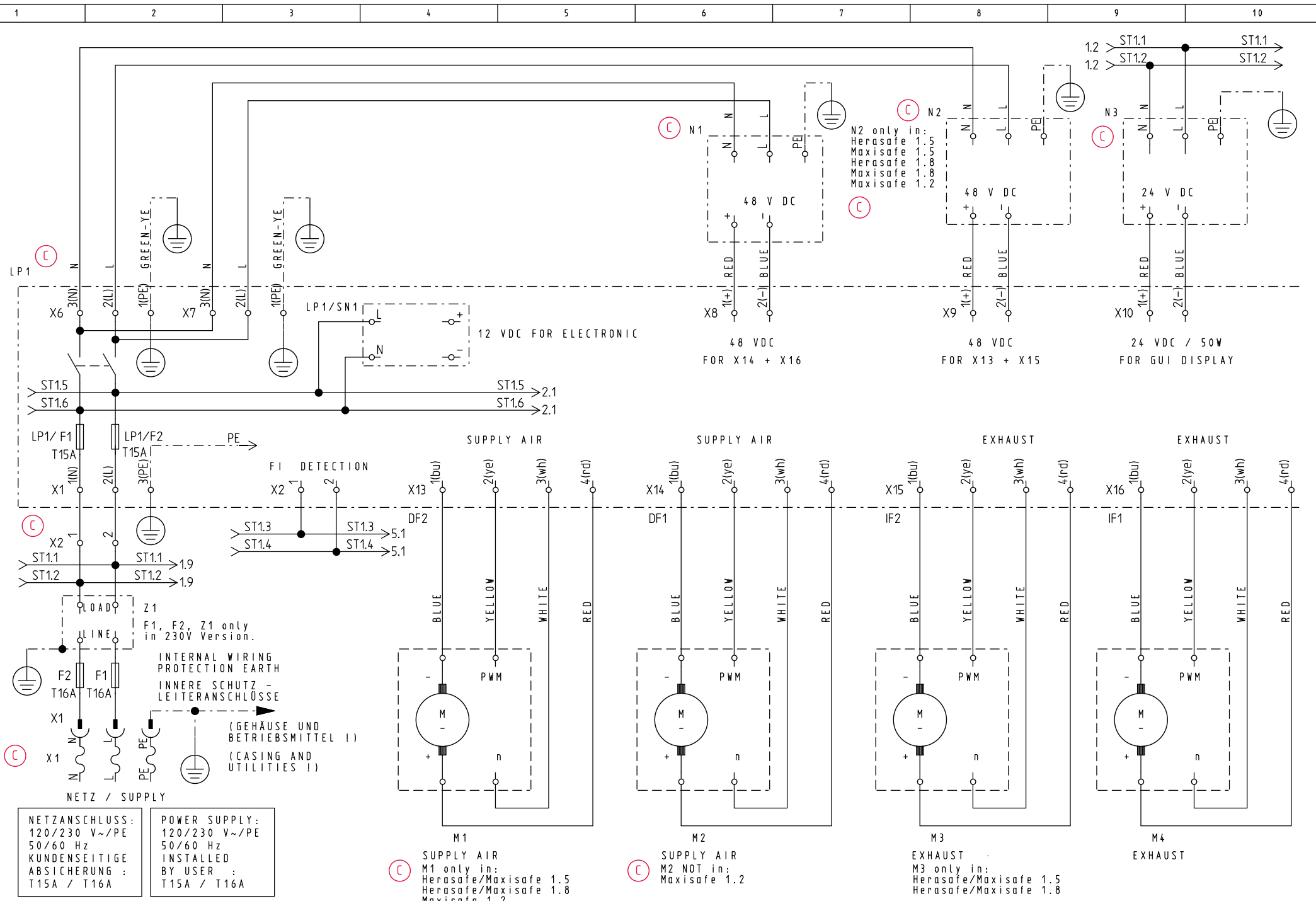
First name:

Company:

Phone:

Fax:

Date, Signature :



NETZANSCHLUSS:
120/230 V~/PE
50/60 Hz
KUNDENSEITIGE
ABSICHERUNG :
T15A / T16A

POWER SUPPLY:
120/230 V~/PE
50/60 Hz
INSTALLED
BY USER :
T15A / T16A

M1
SUPPLY AIR
M1 only in:
Herasafe/Maxisafe 1.5
Herasafe/Maxisafe 1.8
Maxisafe 1.2

M2
SUPPLY AIR
M2 NOT in:
Maxisafe 1.2

M3
EXHAUST
M3 only in:
Herasafe/Maxisafe 1.5
Herasafe/Maxisafe 1.8

M4
EXHAUST

				Bearb.	19.12.2017	Mirsu
				Gepr.	15.01.2018	Hofmann
C	217712	06.11.2018	Mirsu	Norm		
Ind.	Änderung	Datum	Name	Datum	Datum	Name

PROJEKT: 5015558_C

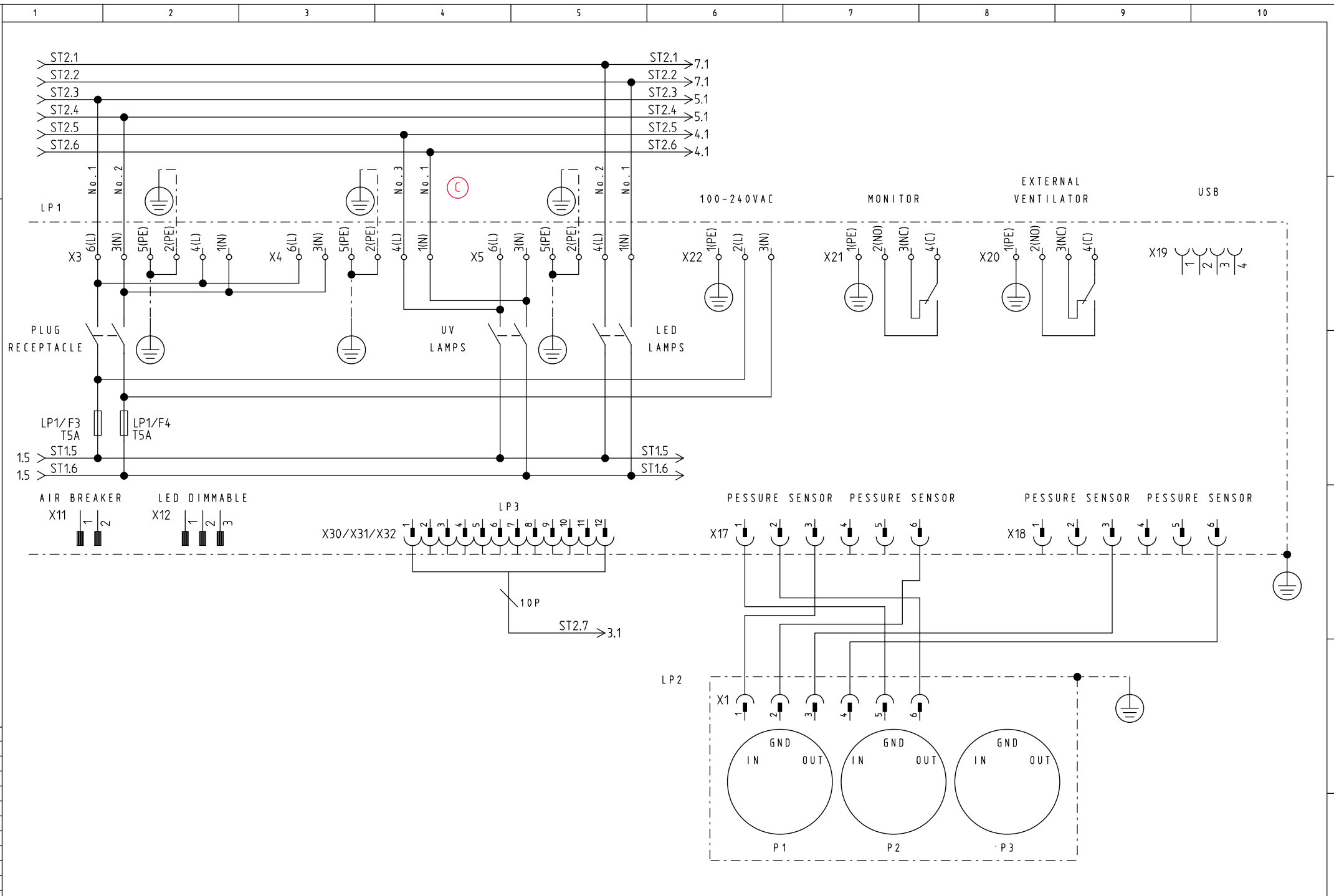
sp SP / WD Herasafe / Maxisafe 2030i 100-240V

ThermoFisher
SCIENTIFIC

id.-nr. 50 155 558

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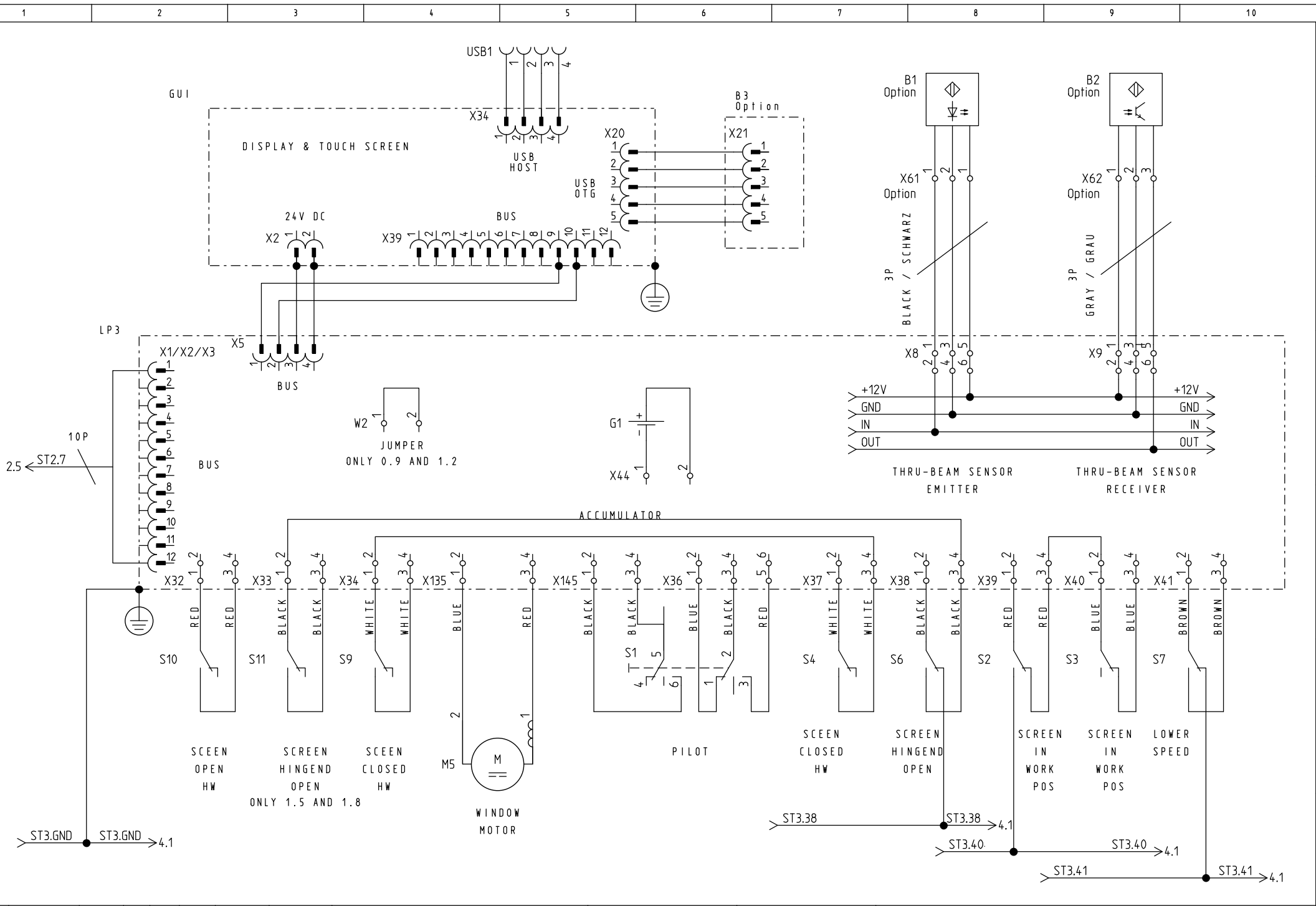
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BSC					
VS2					
SPM					

Bearb.	19.12.2017	Mirsu
Gepr.	15.01.2018	Hofmann
Norm		

C	217712	06.11.2018	Mirsu
Ind.	Anderung	Datum	Name



Ind.	Anderung	Datum	Name	Bearb.	Datum	Name
				19.12.2017		Mirsu
				15.01.2018		Hofmann
C	217712	06.11.2018	Mirsu	Norm		

PROJEKT: 5015558_C

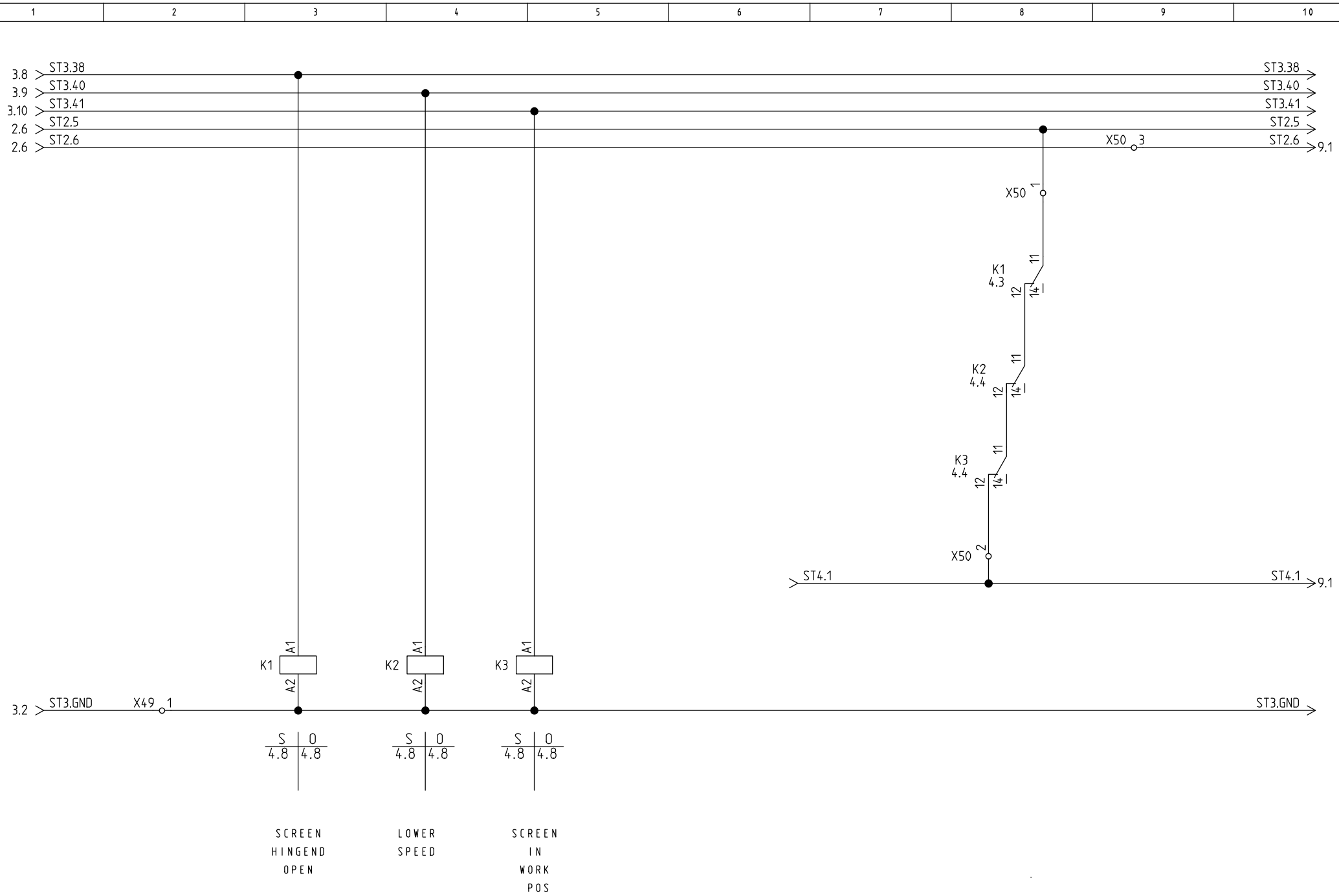
sp SP / WD Herasafe / Maxisafe 2030i 100-240V

ThermoFisher
SCIENTIFIC

50 155 558

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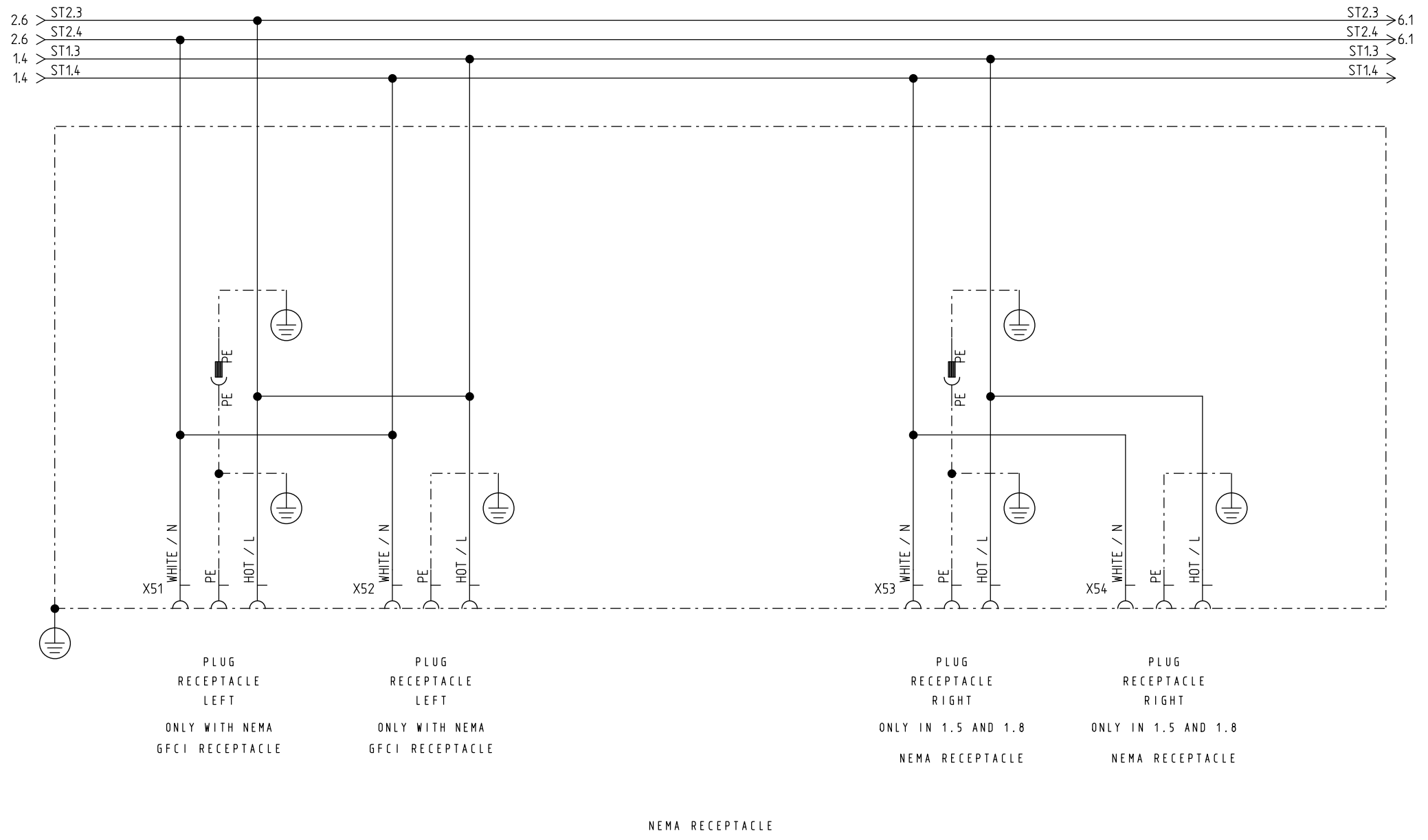
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BSC
VS2
SPM

Bearb.	19.12.2017	Mirsu
Gepr.	15.01.2018	Hofmann
Norm		
Datum		

1 2 3 4 5 6 7 8 9 10



PLUG
RECEPTACLE
LEFT

ONLY WITH NEMA
GFCI RECEPTACLE

PLUG
RECEPTACLE
LEFT

ONLY WITH NEMA
GFCI RECEPTACLE

PLUG
RECEPTACLE
RIGHT

ONLY IN 1.5 AND 1.8
NEMA RECEPTACLE

PLUG
RECEPTACLE
RIGHT

ONLY IN 1.5 AND 1.8
NEMA RECEPTACLE

NEMA RECEPTACLE

B

C

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BSC

VS2

SPM

Bearb. 19.12.2017 Mirsu
Gepr. 15.01.2018 Hofmann

Ind.	Änderung	Datum	Name	Norm	Datum	Name
C	217712	06.11.2018	Mirsu			

PROJEKT: 5015558_C

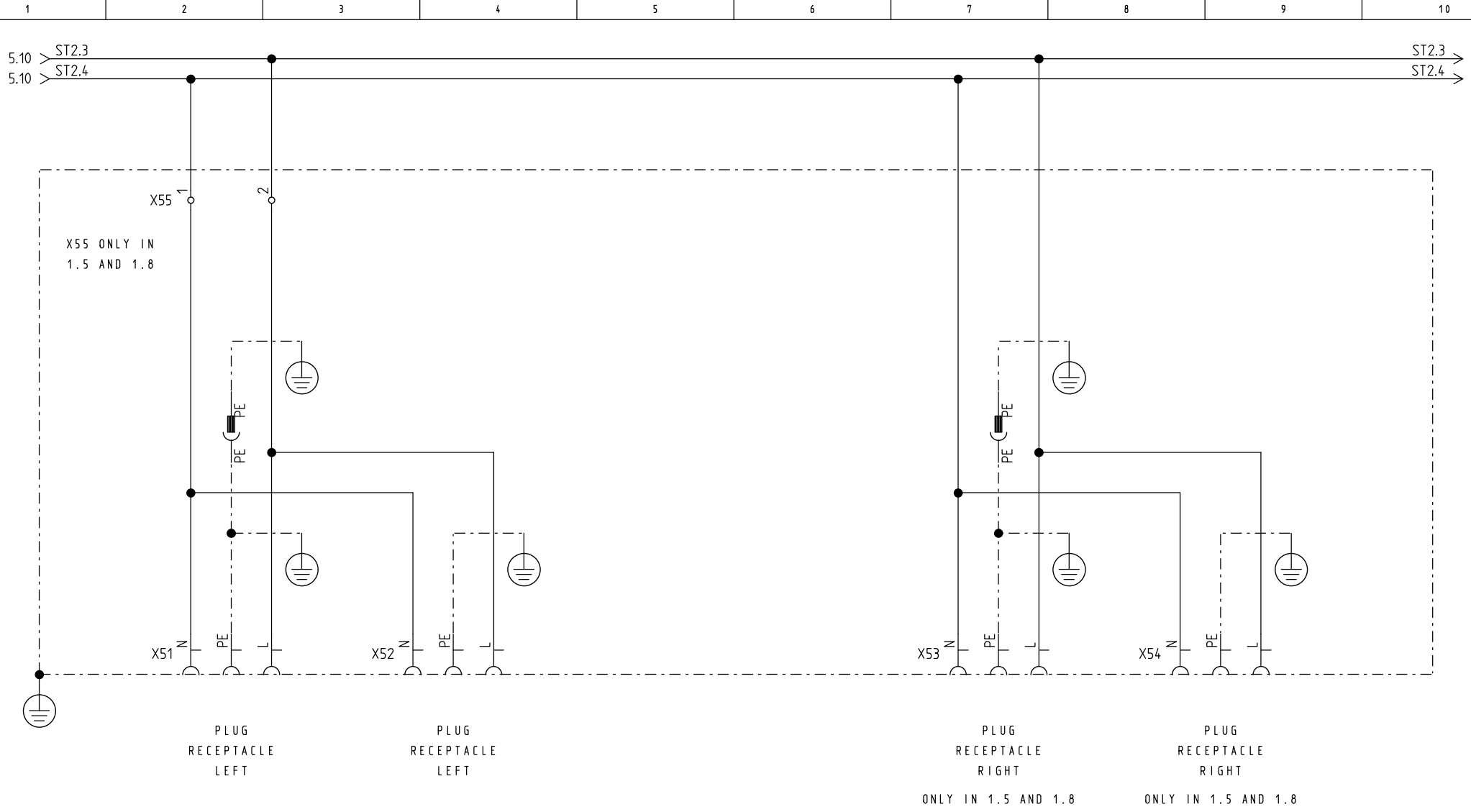
sp SP / WD Herasafe / Maxisafe 2030i 100-240V

ThermoFisher
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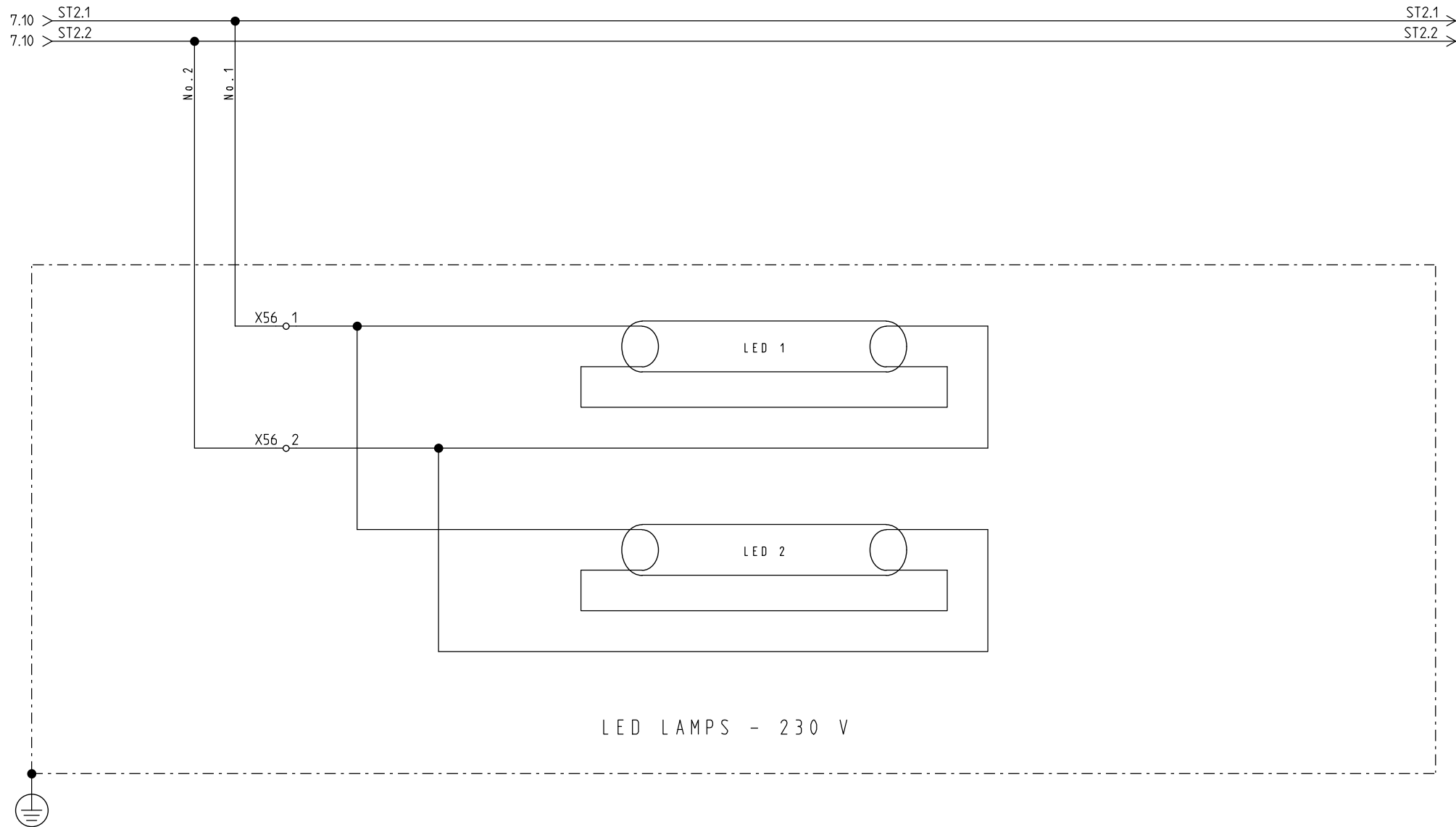
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BSC
VS2
SPM

				Bearb.	19.12.2017	Mirsu
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C	217712	06.11.2018	Mirsu	Norm		
Ind.	Aenderung	Datum	Name		Datum	Name



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Bearb.	19.12.2017	Mirsu
Gepr.	15.01.2018	Hofmann
Norm		
Datum		

C	217712	06.11.2018	Mirsu
Ind.	Aenderung	Datum	Name

PROJEKT: 5015558_C

sp SP / WD Herasafe / Maxisafe 2030i 100-240V

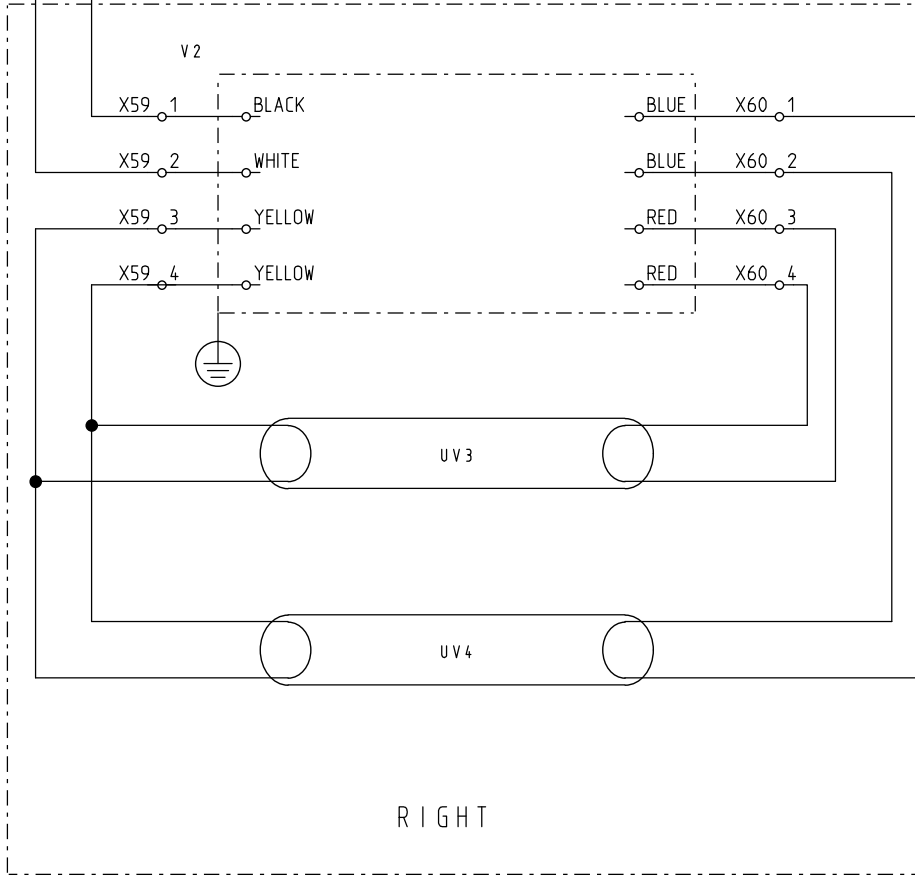
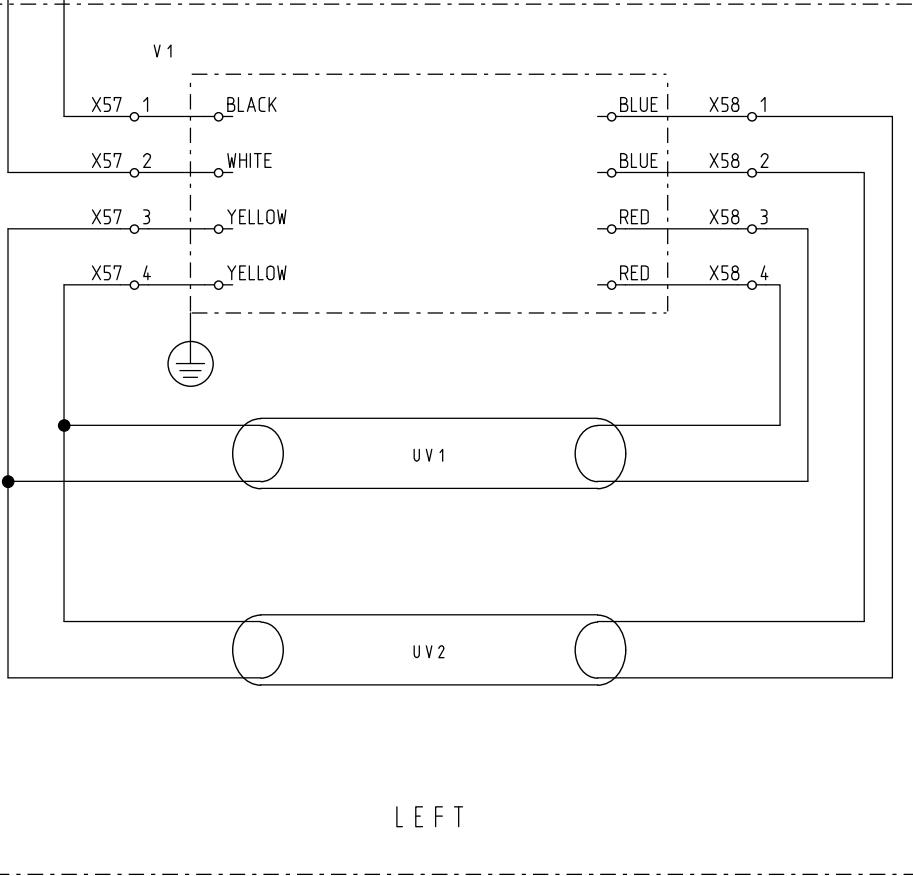
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Bl. 8
Ind. Bl. 11

4.10 > ST4.1
 4.10 > ST2.6
 ST4.1 > 10.1
 ST2.6 > 10.1



LEFT

RIGHT

UV LIGHTS - 120 VAC

B
 C
 D
 E
 BSC
 VS2
 SPM

				Bearb.	19.12.2017	Mirsu
				Gepr.	15.01.2018	Hofmann
C	217712	06.11.2018	Mirsu	Norm		
Ind.	Aenderung	Datum	Name		Datum	Name

PROJEKT: 5015558_C

sp SP / WD Herasafe / Maxisafe 2030i 100-240V

ThermoFisher
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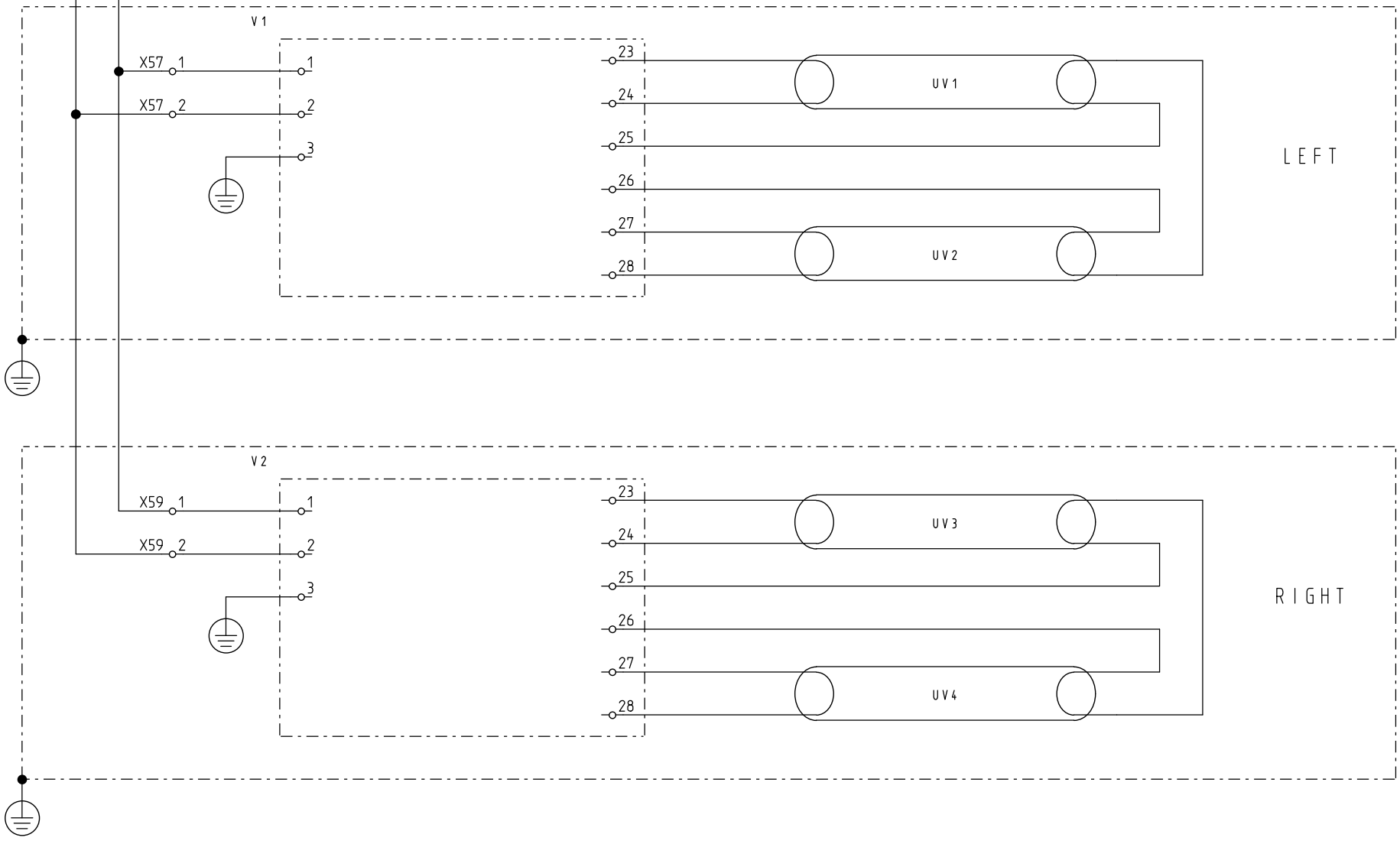
Id.-Nr. 50 155 558

A4

C
 Ind. Bl. 9
 Bl. 11

9.10 > ST4.1
 9.10 > ST2.6

ST4.1 →
 ST2.6 →



UV LIGHTS - 230 VAC

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BSC
VS2
SPM

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				Bearb.	19.12.2017	Mirsu
				Gepr.	15.01.2018	Hofmann
C	217712	06.11.2018	Mirsu	Norm		
Ind.	Aenderung	Datum	Name		Datum	Name

PROJEKT: 50155558_C	
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LEGENDE ZU: SP Herasafe / Maxisafe 2030i, 100 - 240 VAC (C)

LEGEND TO: WD Herasafe / Maxisafe 2030i, 100 - 240 VAC (C)

NAME	BETRIEBSMITTEL
F1,1	SICHERUNGEN GERÄT, NETZSPANNUNG (nur 230V Geräte) (C)
B1,2	SENSOR LICHTSCHRANKE (OPTION)
B3	WLAN USB Stick (OPTION)
GUI	BILDSCHIRM UND BERÜHRUNGSEMPFINDLICHER BILDSCHIRM
LED1,2	LED LAMPEN; EXPERIMENTIERAUM
LP1	HAUPTLEITERPLATTE
LP1/F1,2	SICHERUNGEN LP1, NETZEINGANG
LP1/F3,4	SICHERUNGEN, NETZAUSGANG X22 UND STECKDOSEN X51-54
LP1/SN1	SCHALTNETZTEIL
LP2	DRUCKSENSOREN LEITERPLATTE
LP2/P1-3	DRUCK SENSOREN
LP3	SCHALTER LEITERPLATTE
LP3/G1	AKKUMULATOR (OPTION)
M1	MOTOR, UMLUFT (NUR 1.5,1.8 UND MAXISAFE 1.2) (C)
M2	MOTOR, UMLUFT (NICHT IN MAXISAFE 1.2) (C)
M3	MOTOR, ABLUFT (NUR 1.5 UND 1.8) (C)
M4	MOTOR, ABLUFT (C)
M5	MOTOR, FRONTSCHIEBE
N1	SCHALTNETZTEIL, M2 UND M4
N2	SCHALTNETZTEIL, M1 UND M3 (NUR 1.5 UND 1.8)
N3	SCHALTNETZTEIL GUI
S1	SCHALTER "PILOT SWITCH"
S2,S3	POSITIONSSCHALTER, FRONTSCHIEBE IN ARBEITSPOSITION
S4,S9	POSITIONSSCHALTER, FRONTSCHIEBE ZU (HARDWARE)
S6	POSITIONSSCHALTER, FRONTSCHIEBE GEKLAFFT
S7	POSITIONSSCHALTER, REDUZIERTER DREHZAHL
S10	POSITIONSSCHALTER, FRONTSCHIEBE OFEN (HARDWARE)
S11	POSITIONSSCHALTER, FRONTSCHIEBE GEKLAFFT (NUR 1.5 UND 1.8)
UV1-4	UV STRAHLER (OPTION)
V1,V2	ELEKTRONISCHER VORSCHALTGERÄT UV STRAHLER (OPTION)
X1	STECKVERBINDER NETZANSCHLUSS
X2	KLEMMENLEISTE NETZSPANNUNG
X2,20,34,39	GUI Anschlüsse
X50	KLEMMENLEISTE UV FREIGABE
X51-54	STECKDOSEN; EXPERIMENTIERAUM (OPTION)
X55	KLEMMENLEISTE STECKDOSE (NUR 1.5 UND 1.8 230V GERÄTE)
X56	KLEMMENLEISTE; LED LAMPEN EXPERIMENTIERAUM
X57-60	KLEMMENLEISTE UV STRAHLER (OPTION)
X61-62	STECKVERBINDER LICHTSCHRANKE (OPTION)
Z1	EMV Filter (nur 230V Geräte) (C)

NAME	ACCESSORIES
F1,2	EQUIPMENT FUSE; MAIN VOLTAGE (just 230V appliance) (C)
B1,2	SENSOR THRU-BEAM (OPTION)
B3	Wi-Fi USB Stick (OPTION)
GUI	GRAPHIC USER INTERFACE / DISPLAY UND TOUCH SCREEN
LED1,2	FLUORESCENT LIGHTS; EXPERIMENT ROOM
LP1	MAIN BOARD
LP1/F1,2	FUSE LP1; MAIN
LP1/F3,4	FUSE; MAIN VOLTAGE X22 AND PLUG RECEPTACLES X51-X54
LP1/SN1	SWITCHING POWER SUPPLY LP1
LP2	PRESSURE SENSORS BOARD
LP2/P1-3	PRESSURE SENSORS
LP3	SWITCH BOARD
LP3/G1	ACCUMULATOR (OPTION)
M1	MOTOR, SUPPLY AIR (ONLY 1.5,1.8 AND MAXISAFE 1.2) (C)
M2	MOTOR, SUPPLY AIR (NOT IN MAXISAFE 1.2) (C)
M3	MOTOR, EXHAUST (ONLY 1.5 AND 1.8) (C)
M4	MOTOR, EXHAUST (C)
M5	MOTOR, WINDOW
N1	SWITCHING POWER SUPPLY M2 AND M4
N2	SWITCHING POWER SUPPLY, M1 AND M3 (ONLY 1.5 AND 1.8)
N3	SWITCHING POWER SUPPLY GUI
S1	SWITCH "PILOT SWITCH"
S2,S3	POSITION SWITCH, SCREEN IN WORK POSITION
S4,S9	POSITION SWITCH, SCREEN CLOSED (HARDWARE)
S6	POSITION SWITCH, SCREEN HINGED OPEN
S7	POSITION SWITCH, LOWER SPEED
S10	POSITION SWITCH, SCREEN OPEN (HARDWARE)
S11	POSITION SWITCH, SCREEN HINGED OPEN (ONLY 1.5 AND 1.8)
UV1-4	UV SPOTLIGHT (OPTION)
V1,V2	ELECTRONIC BALLAST UV LAMPS (OPTION)
X1	MAINS CONNECTION
X2	TERMINAL STRIP UV RELEASE
X2,20,34,39	Connection
X50	TERMINAL STRIP MAINS VOLTAGE
X51-54	PLUG RECEPTACLES; EXPERIMENT ROOM (OPTION)
X55	TERMINAL STRIP PLUG RECEPTACLES (ONLY 1.5 AND 1.8)
X56	TERMINAL STRIP LED LAMPS EXPERIMENT ROOM
X57-60	TERMINAL STRIP UV LAMP (OPTION)
X61-62	SENSOR THRU-BEAM CONNECTOR (OPTION)
Z1	EMC Filter (just 230V appliance) (C)

B

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D

E

BSC

VS2

SPM

A

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Bearb.	19.12.2017	Mirsu
Gepr.	15.01.2018	Hofmann
Norm		
Ind.	Anderung	Datum Name Datum Name

C	217712	06.11.2018	Mirsu
Ind.	Anderung	Datum Name	Datum Name

PROJEKT: 50155558_C

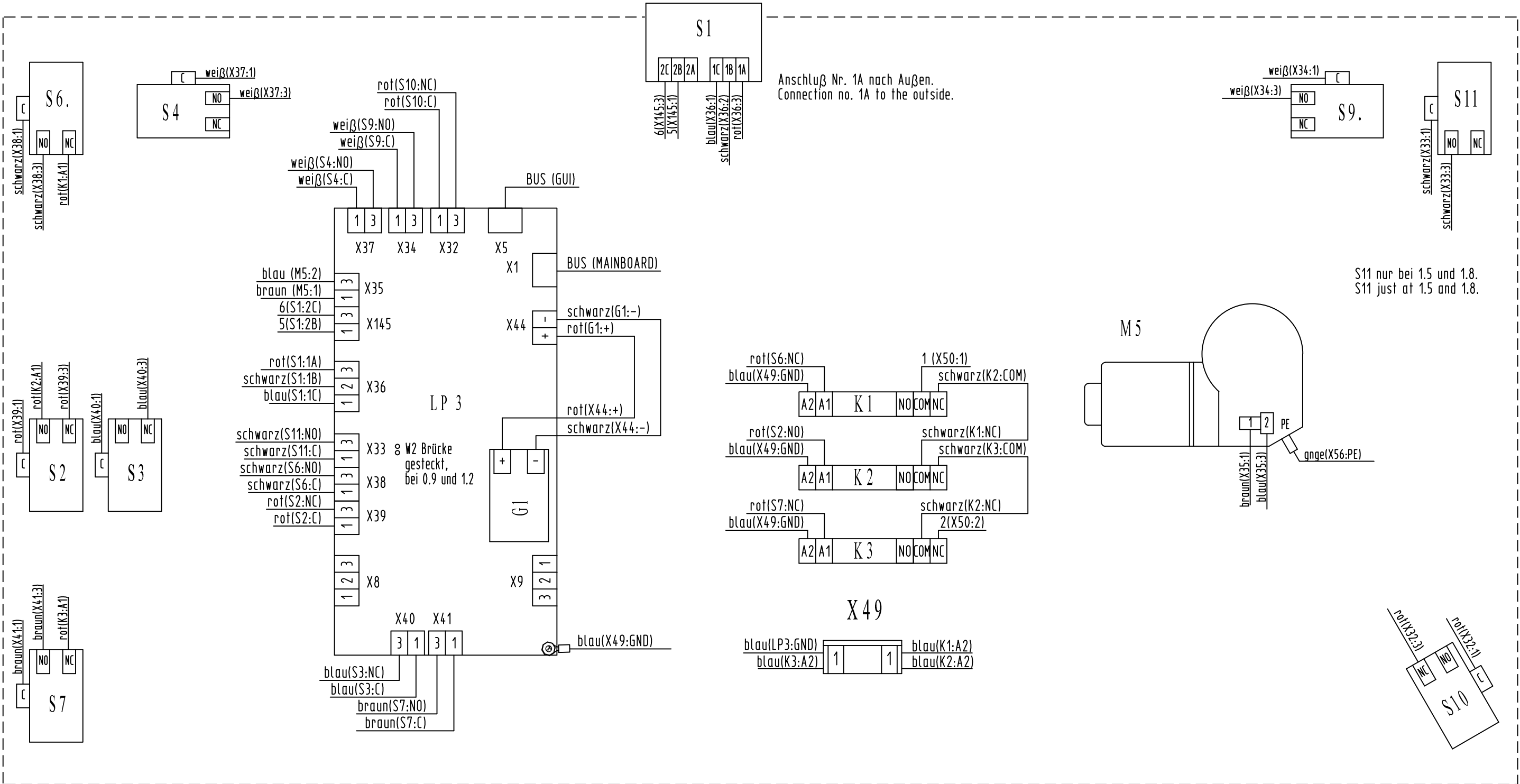
sp SP / WD Herasafe / Maxisafe 2030i 100-240V

ThermoFisher SCIENTIFIC

50 155 558

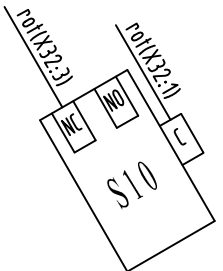
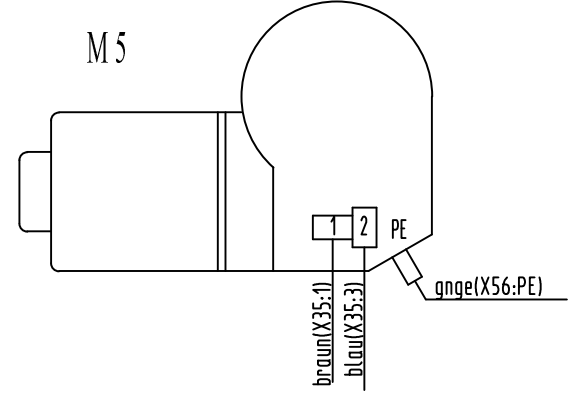
A4

C Bl. 11 Ind. Blat. 11



Anschluß Nr. 1A nach Außen.
Connection no. 1A to the outside.

S11 nur bei 1.5 und 1.8.
S11 just at 1.5 and 1.8.



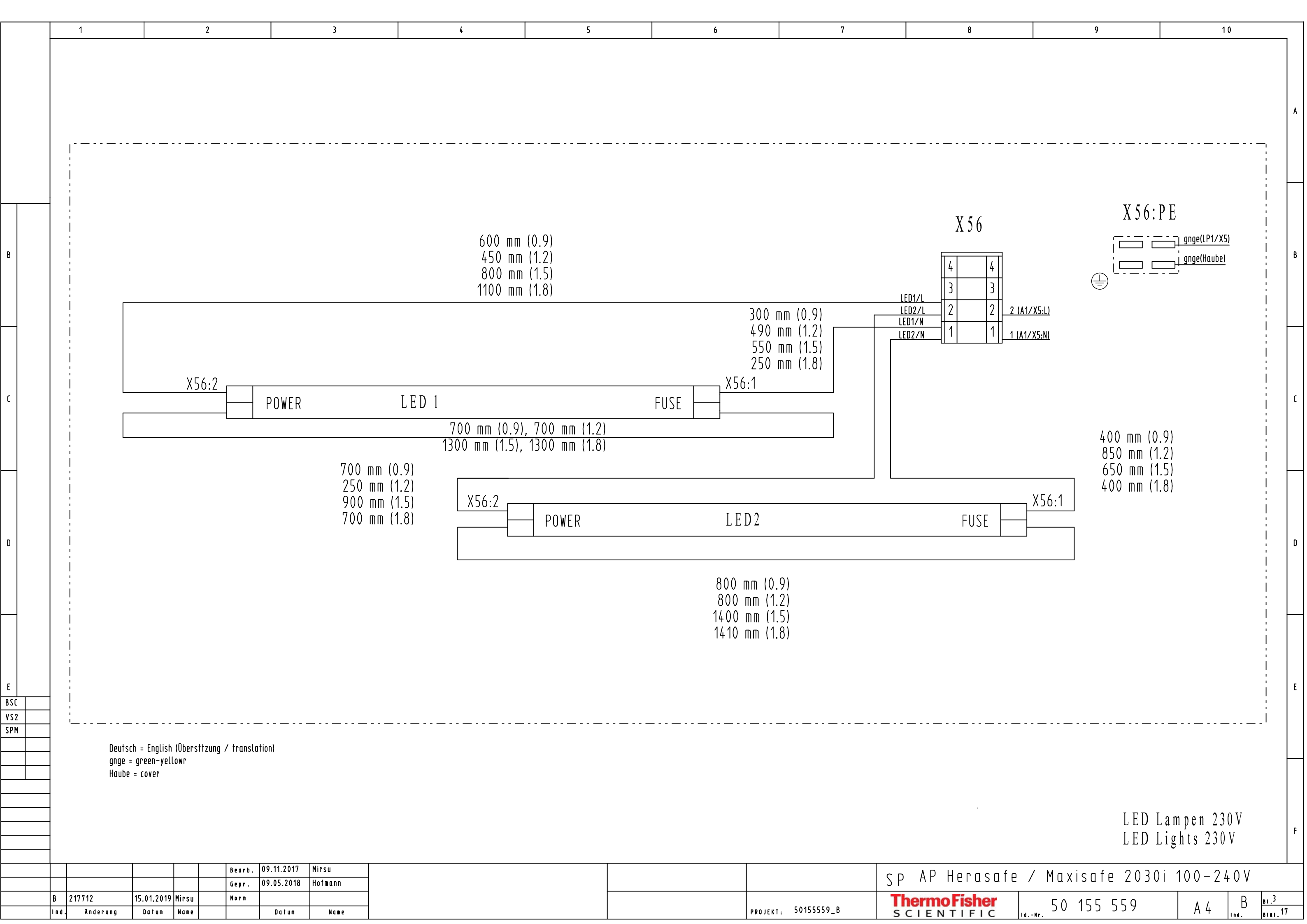
Deutsch = English (Übersetzung / translation)
 blau = blue
 Braun = brown
 rot = red
 schwarz = black
 weiß = white
 W2 Brücke ist nur bei 0.9 und 1.2 gesteckt = W2 jumper is set just at 0.9 and 1.2.

Addon Leiterplatte, Schalter, Motor Frontscheibe, Relais
 Addon Leiterplatte Board, Switches, Window Motor, Relay.

BSC	
VS2	
SPM	

				Bearb.	09.11.2017	Mirsu
				Gepr.	09.05.2018	Hofmann
B	217712	15.01.2019	Mirsu	Norm		
Ind.	Änderung	Datum	Name	Datum	Name	

PROJEKT: 50155559_B	
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Deutsch = English (Oberstzuzung / transtation)
 gnge = green-yellow
 Haube = cover

LED Lampen 230V
 LED Lights 230V

BSC
VS2
SPM

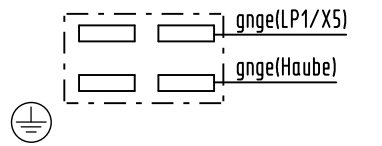
Bearb.	09.11.2017	Mirsu
Gepr.	09.05.2018	Hofmann
Norm		
Datum		
Name		

B	217712	15.01.2019	Mirsu
Ind.	Änderung	Datum	Name

PROJEKT:	50155559_B
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SP AP Herasafe / Maxisafe 2030i 100-240V			
ThermoFisher	50 155 559	A 4	B
SCIENTIFIC	Ind.-Nr.	Ind.	Bl. 3
			Blat. 17

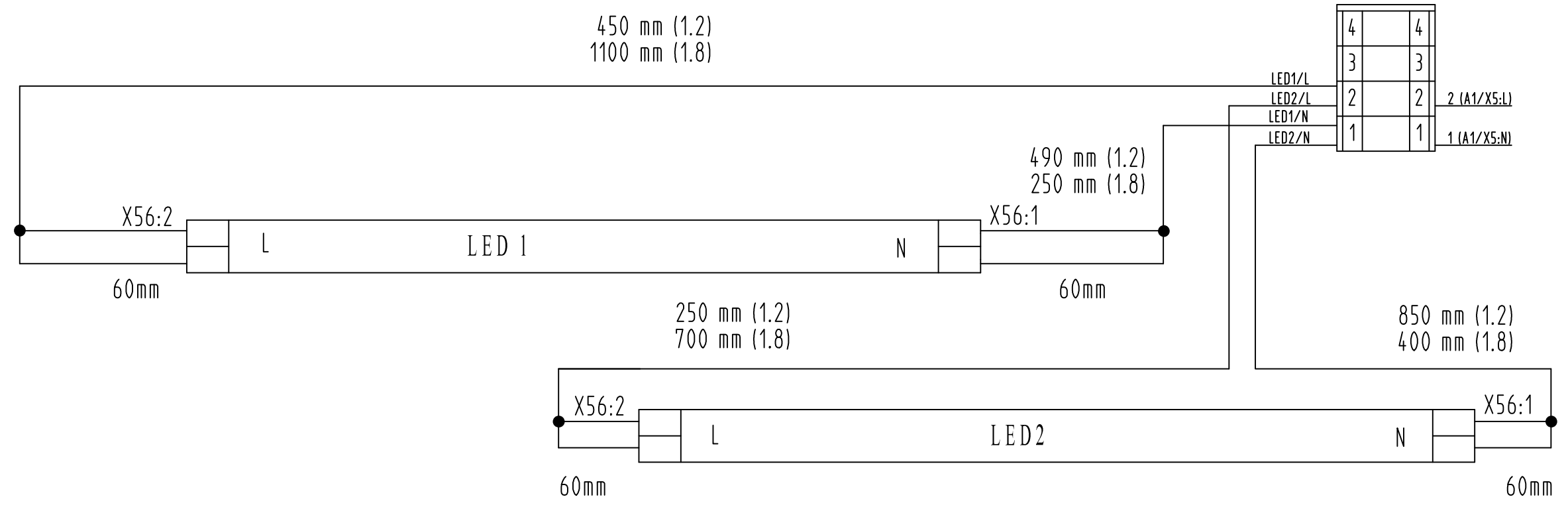
X56:PE



X56

4	4
3	3
2	2
1	1

2 (A1/X5:L)
1 (A1/X5:N)



Deutsch = English (Übersetzung / translation)
 gng = green-yellow
 Haube = cover

LED Lampen 120V
 LED Lights 120V

BSC	
VS2	
SPM	

Bearb.	09.11.2017	Mirsu
Gepr.	09.05.2018	Hofmann
Norm		
Datum		Name

B	217712	15.01.2019	Mirsu
Ind.	Änderung	Datum	Name

SP AP Herasafe / Maxisafe 2030i 100-240V

PROJEKT: 5015559_B

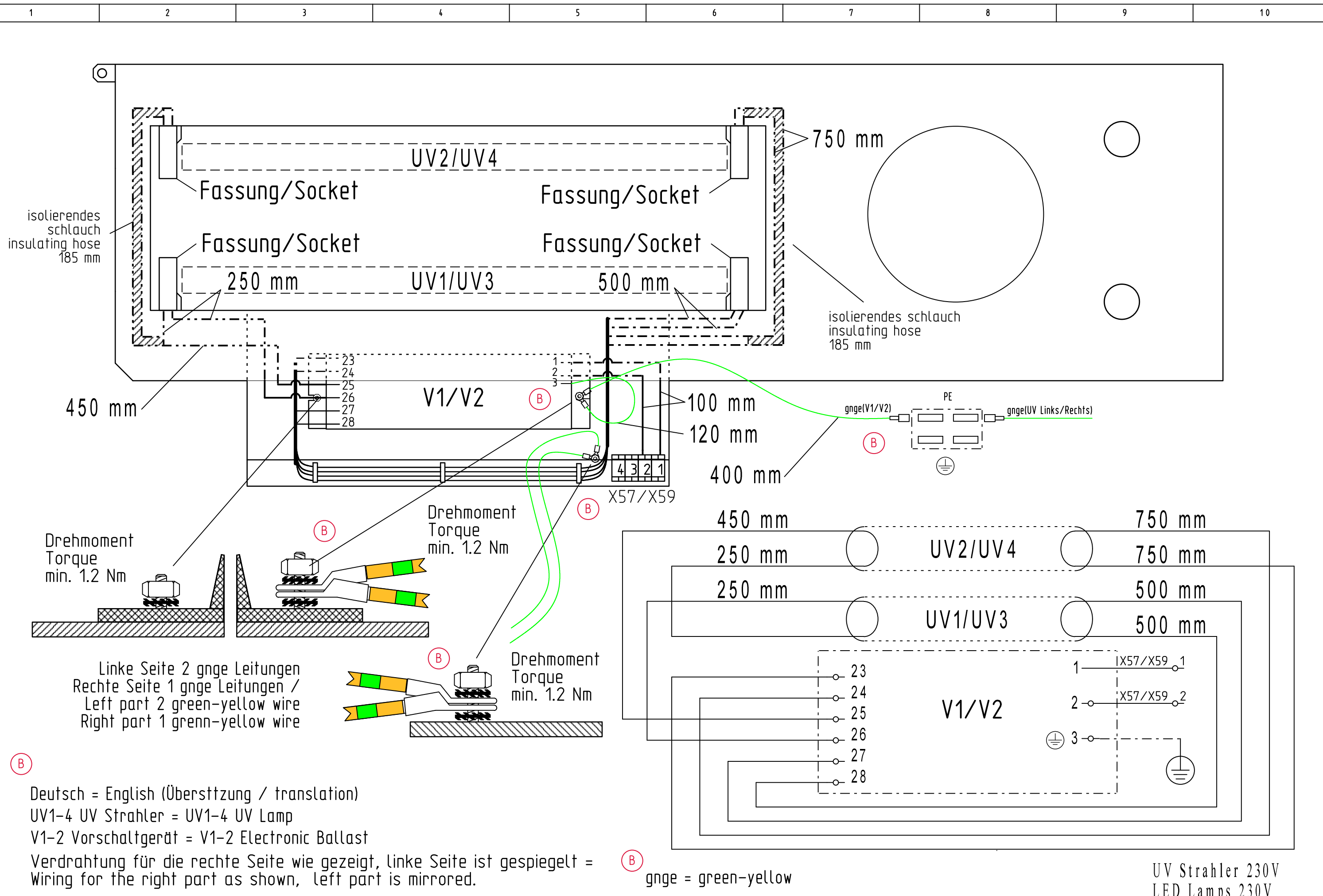
ThermoFisher
 SCIENTIFIC

Ind.-Nr. 50 155 559

A 4

B

Bl. 4
 Blat. 17



Linke Seite 2 gnge Leitungen
Rechte Seite 1 gnge Leitungen /
Left part 2 green-yellow wire
Right part 1 green-yellow wire

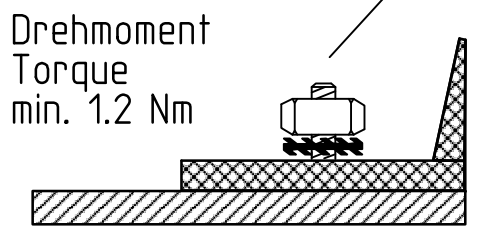
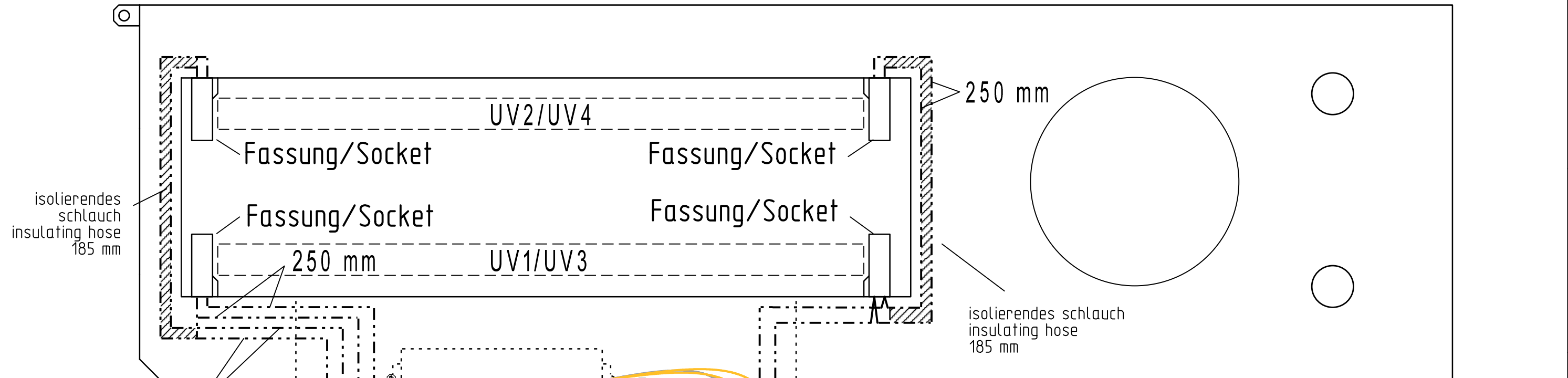
Deutsch = English (Übersetzung / translation)
UV1-4 UV Strahler = UV1-4 UV Lamp
V1-2 Vorschaltgerät = V1-2 Electronic Ballast
Verdrahtung für die rechte Seite wie gezeigt, linke Seite ist gespiegelt =
Wiring for the right part as shown, left part is mirrored.

BSC
VS2
SPM

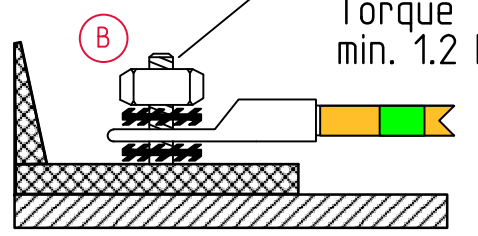
				Bearb.	09.11.2017	Mirsu
				Gepr.	09.05.2018	Hofmann
B	217712	15.01.2019	Mirsu	Norm		
Ind.	Änderung	Datum	Name	Datum	Name	

PROJEKT: 50155559_B		sp AP Herasafe / Maxisafe 2030i 100-240V		ThermoFisher SCIENTIFIC		50 155 559		A 4		B		Bl. 5 Blat. 17	
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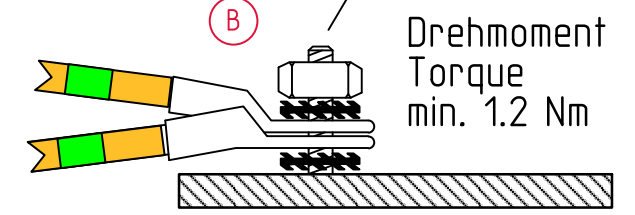
1 2 3 4 5 6 7 8 9 10



Drehmoment
Torque
min. 1.2 Nm



Drehmoment
Torque
min. 1.2 Nm

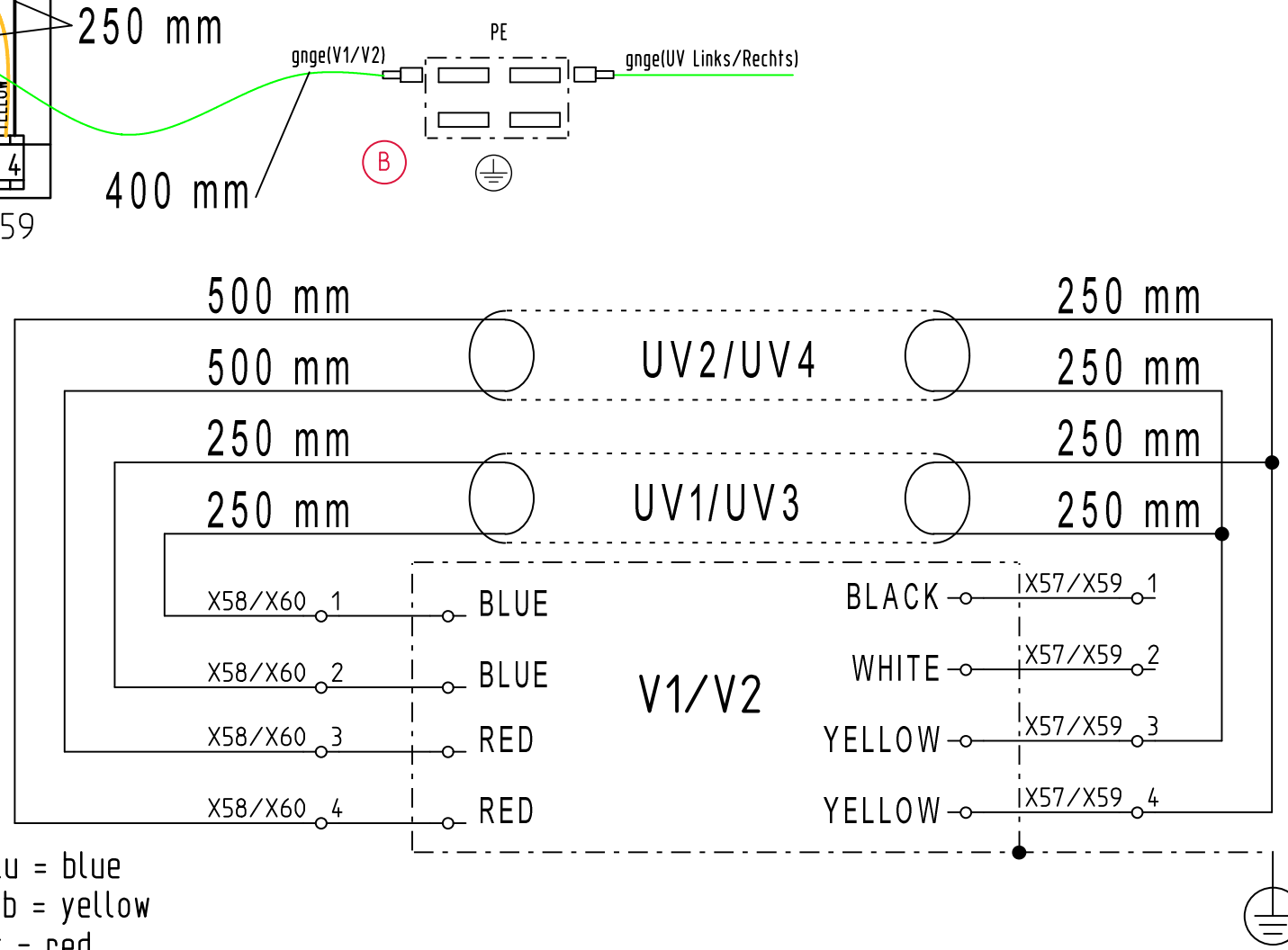


Drehmoment
Torque
min. 1.2 Nm

Linke Seite 2 gnge Leitungen
Rechte Seite 1 gnge Leitungen /
Left part 2 green-yellow wire
Right part 1 gngn-yellow wire

(B)
Deutsch = English (Übersetzung / translation)
UV1-4 UV Strahler = UV1-4 UV Lamp
V1-2 Vorschaltgerät = V1-2 Electronic Ballast
Verdrahtung für die rechte Seite wie gezeigt, linke Seite ist gespiegelt =
Wiring for the right part as shown, left part is mirrored.

(B)
Blau = blue
Gelb = yellow
Rot = red
Weiß = white
gngn = green-yellow



UV Strahler 120V
LED Lamps 120V

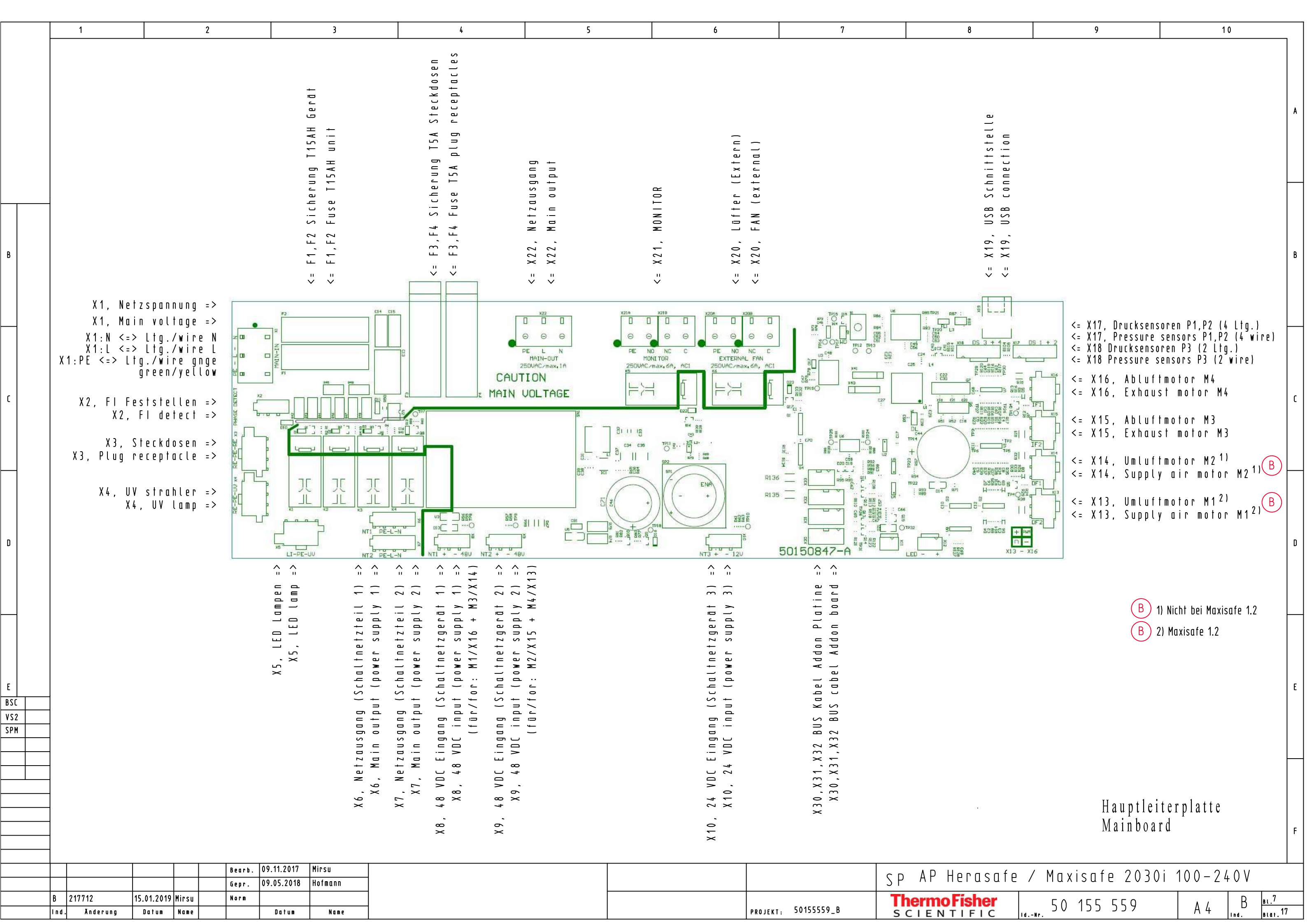
BSC
VS2
SPM

B	217712	15.01.2019	Mirsu		
Ind.	Änderung	Datum	Name	Datum	Name

Bearb.	09.11.2017	Mirsu
Gepr.	09.05.2018	Hofmann

PROJEKT: 50155559_B

SP AP Herasafe / Maxisafe 2030i 100-240V



- X1, Netzspannung =>
- X1, Main voltage =>
- X1:N <=> Ltg./wire N
- X1:L <=> Ltg./wire L
- X1:PE <=> Ltg./wire gnge green/yellow
- X2, FI Feststellen =>
- X2, FI detect =>
- X3, Steckdosen =>
- X3, Plug receptacle =>
- X4, UV strahler =>
- X4, UV lamp =>

- <= F1,F2 Sicherung T15AH Gerät
- <= F1,F2 Fuse T15AH unit
- <= F3,F4 Sicherung T5A Steckdosen
- <= F3,F4 Fuse T5A plug receptacles
- <= X22, Netzausgang
- <= X22, Main output
- <= X21, MONITOR
- <= X20, Lüfter (Extern)
- <= X20, FAN (external)
- <= X19, USB Schnittstelle
- <= X19, USB connection

- <= X17, Drucksensoren P1,P2 (4 Ltg.)
- <= X17, Pressure sensors P1,P2 (4 wire)
- <= X18 Drucksensoren P3 (2 Ltg.)
- <= X18 Pressure sensors P3 (2 wire)
- <= X16, Abluftmotor M4
- <= X16, Exhaust motor M4
- <= X15, Abluftmotor M3
- <= X15, Exhaust motor M3
- <= X14, Umluftmotor M2 1)
- <= X14, Supply air motor M2 1)
- <= X13, Umluftmotor M1 2)
- <= X13, Supply air motor M1 2)

- X5, LED Lampen =>
- X5, LED lamp =>
- X6, Netzausgang (Schaltnetzteil 1) =>
- X6, Main output (power supply 1) =>
- X7, Netzausgang (Schaltnetzteil 2) =>
- X7, Main output (power supply 2) =>
- X8, 48 VDC Eingang (Schaltnetzgerät 1) =>
- X8, 48 VDC input (power supply 1) =>
- (für/for: M1/X16 + M3/X14)
- X9, 48 VDC Eingang (Schaltnetzgerät 2) =>
- X9, 48 VDC input (power supply 2) =>
- (für/for: M2/X15 + M4/X13)
- X10, 24 VDC Eingang (Schaltnetzgerät 3) =>
- X10, 24 VDC input (power supply 3) =>
- X30,X31,X32 BUS Kabel Addon Platine =>
- X30,X31,X32 BUS cable Addon board =>

(B) 1) Nicht bei Maxisafe 1.2
 (B) 2) Maxisafe 1.2

Hauptleiterplatte
Mainboard

BSC		VS2		SPM		Bearb. 09.11.2017 Mirsu		Gepr. 09.05.2018 Hofmann		Sp AP Herasafe / Maxisafe 2030i 100-240V	
B	217712	15.01.2019	Mirsu	Norm							
Ind.	Änderung	Datum	Name	Datum	Name	PROJEKT: 50155559_B	ThermoFisher SCIENTIFIC	50 155 559	A 4	B	Bl. 7 / Blat. 17

X34:1 - S9:COM, Frontscheibe geschlossen, weiß / Front window close, white
 X34:3 - S9:NO, Frontscheibe geschlossen, weiß / Front window close, white

X32:1 - S10:COM Frontscheibe offen, rot / Front window open, red
 X32:3 - S10:NC Frontscheibe offen, rot / Front window open, red

X37:1 - S4:COM, Frontscheibe geschlossen, weiß / Front window close, white
 X37:3 - S4:NO, Frontscheibe geschlossen, weiß / Front window close, white

X5, BUS Kabel nach GUI
 X5, BUS cabel to GUI



1A/2A nach vorne
 1A/2A to front

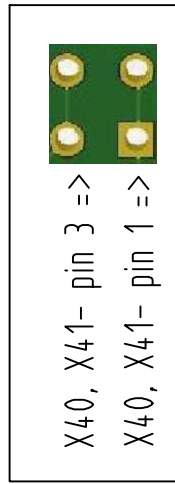
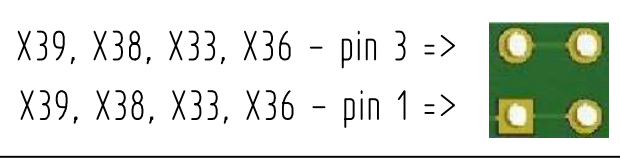
LP3

X135:3, Motor, blau / blue =>
 X135:1, Motor, braun / braun =>
 X145:3, Pilot switch Not Steuerung Ltg. 6 / emergency control wire 6 =>
 X145:1, Pilot switch Not Steuerung Ltg. 5 / emergency control wire 5 =>
 X36:3, Pilot switch rot / red =>
 X36:2, Pilot switch schwarz / black =>
 X36:1, Pilot switch blau / blue =>

X33 - S11 nur/just model 1.5 & 1.8
 X33:3 - S11:NO, Frontscheibe gekippt schwarz/hingend open, black =>
 X33:1 - S11:COM, Frontscheibe gekippt schwarz/hingend open, black =>
 X38:3 - S6:NO, Frontscheibe gekippt schwarz / hingend open, black =>
 X38:1 - S6:COM, Frontscheibe gekippt schwarz / hingend open, black =>
 X39:3 - S2:NC, Arbeit Position/Work position, rot/red =>
 X39:1 - S2:COM, Arbeit Position/Work position, rot/red =>

Schwarzer Kabel
 Black cable

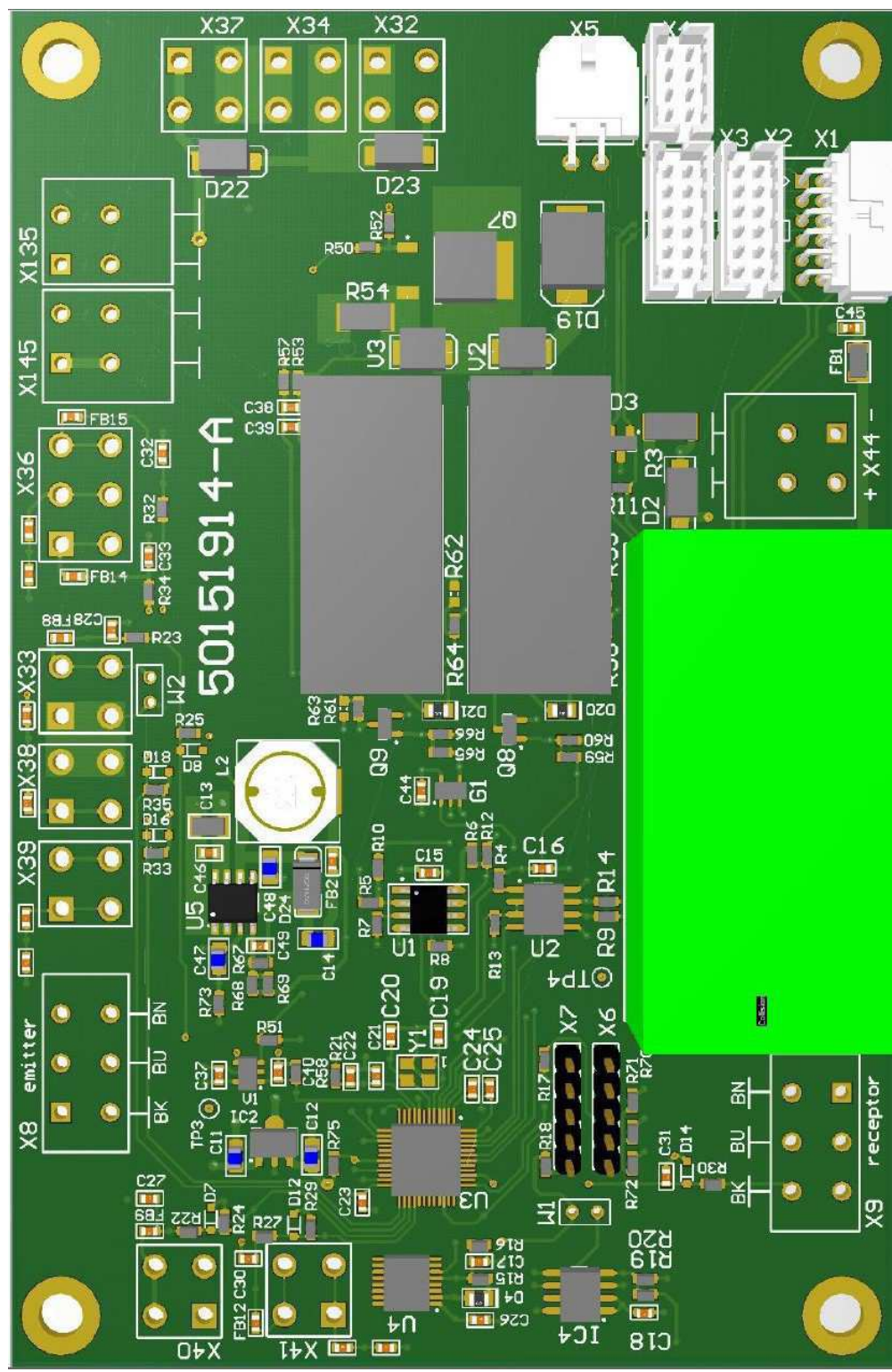
X8:3, IR Sensor, braun / braun =>
 X8:2, IR Sensor, blau / blue =>
 X8:1, IR Sensor, schwarz / black =>



X40:3 - S3:NC, Arbeit Position, blau / Work position, blue
 X40:1 - S3:COM, Arbeit Position, blau / Work position, blue

X41:3 - S7:NO, Reduzierte Drehzahl, braun / Lower speed, braun
 X41:1 - S7:COM, Reduzierte Drehzahl, braun / Lower speed, braun

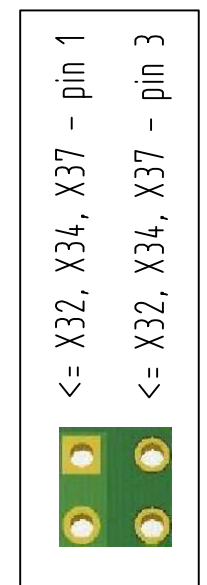
Addon Leiterplatte
 Addon Board



<= X1 BUS Kabel von Mainboard
 <= X1, BUS cabel from Mainboard

<= X44:(-), Akkumulator / accumulator, schwarz / black
 <= X44:(+), Akkumulator / accumulator, rot / red

<= X9:1, IR Sensor, braun / braun
 <= X9:2, IR Sensor, blau / blue
 <= X9:3, IR Sensor, schwarz / black

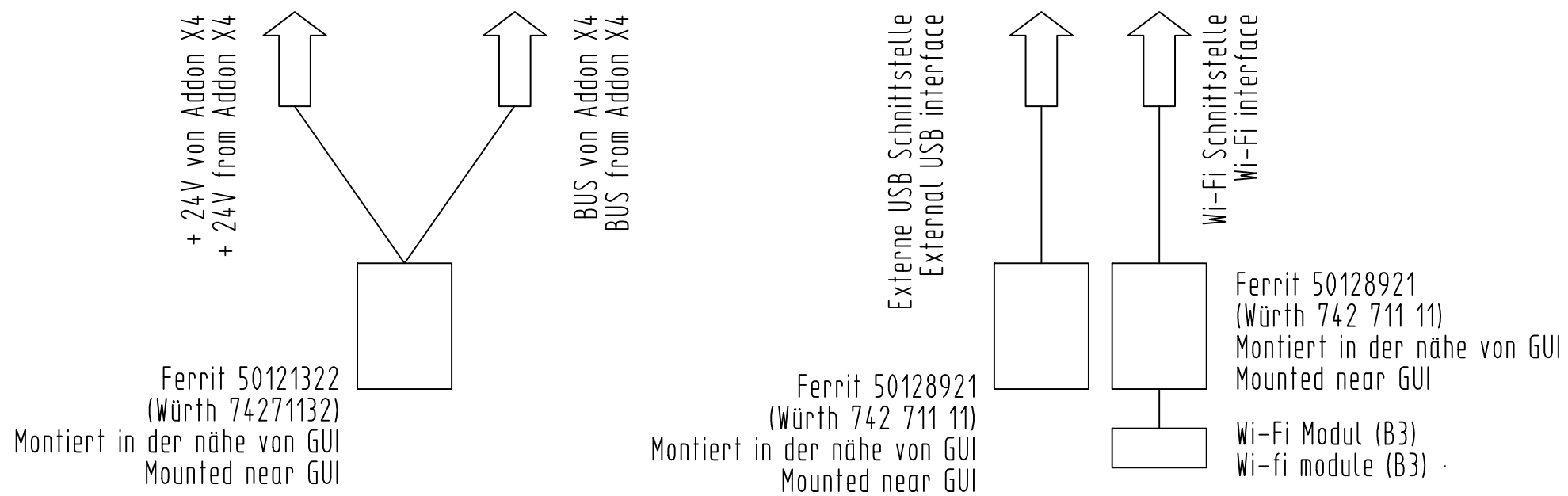
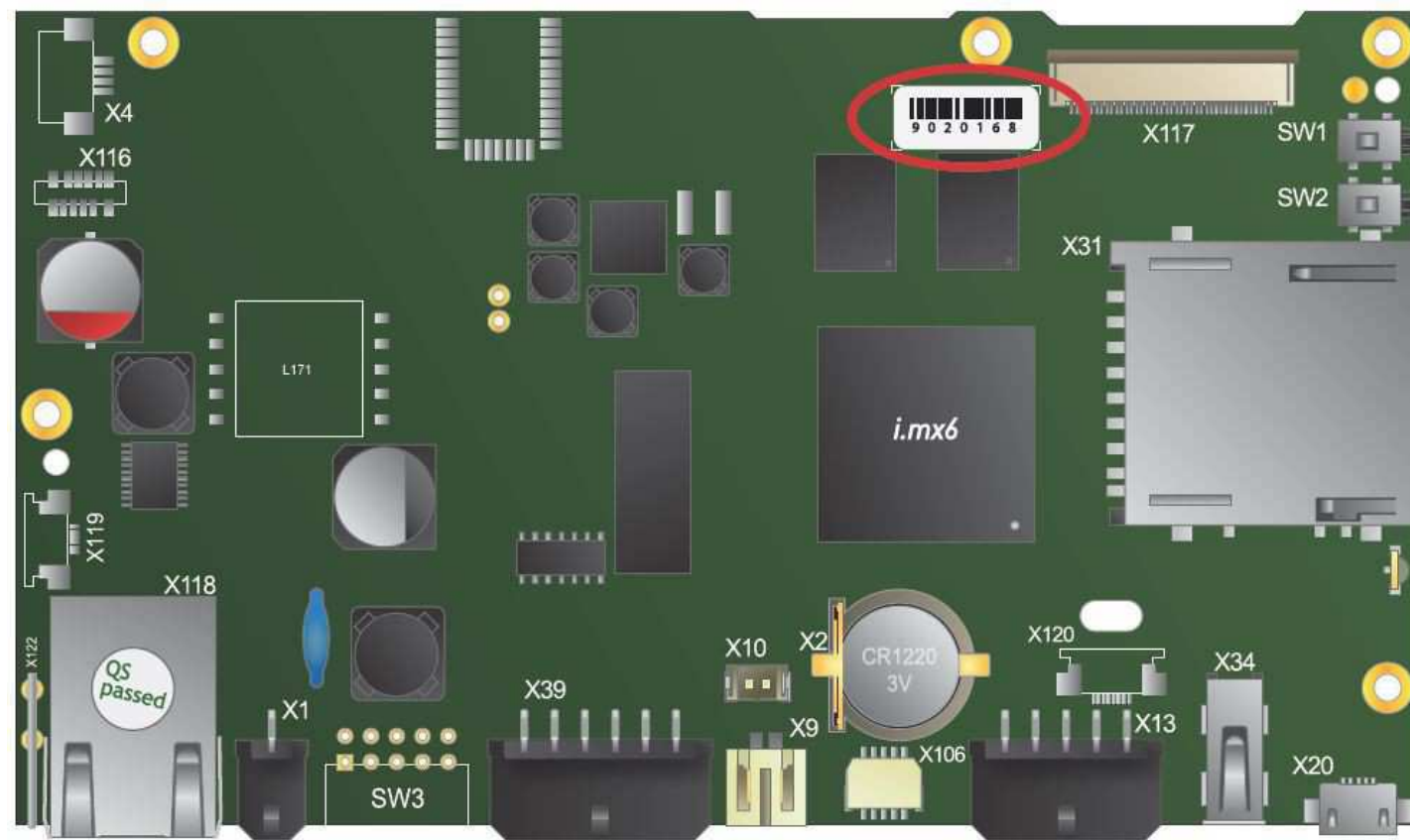


Grauer Kabel
 Grey cable

BSC	
VS2	
SPM	

Bearb.	09.11.2017	Mirsu
Gepr.	09.05.2018	Hofmann
Ind.	Anderung	Datum
	Name	Datum
	Name	

sp AP Herasafe / Maxisafe 2030i 100-240V			
PROJEKT:	50155559_B	ThermoFisher SCIENTIFIC	50 155 559
		A 4	
		Bl. 8	
		Blat. 17	



GUI (Graphic User Interface)

BSC
VS2
SPM

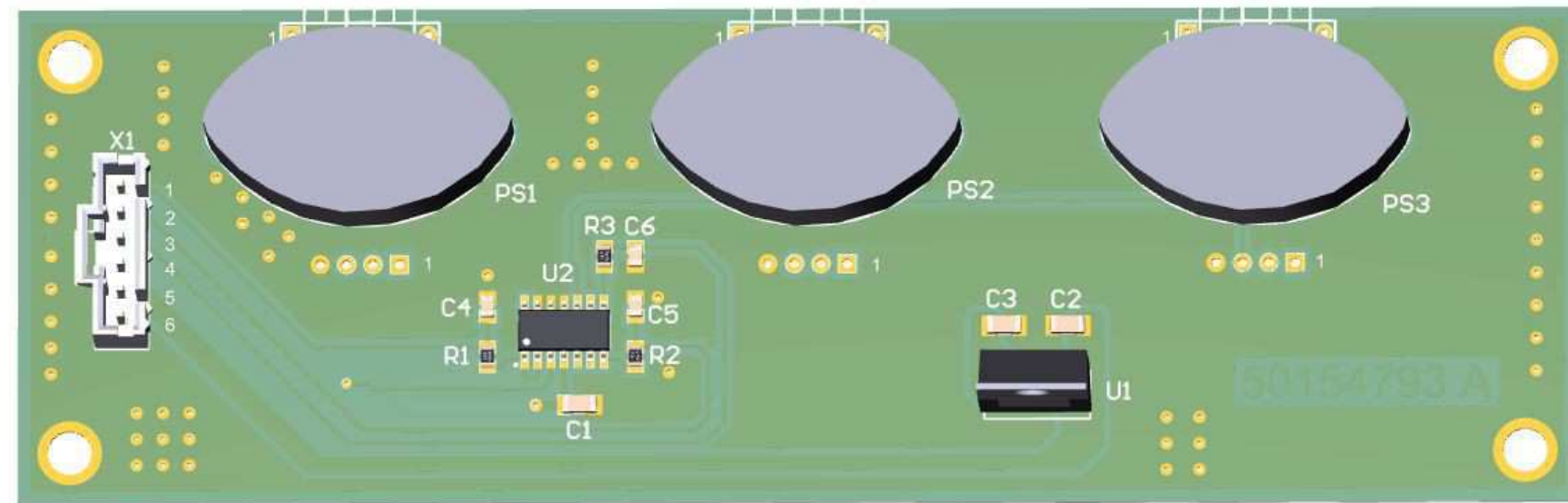
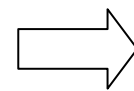
Bearb.	09.11.2017	Mirsu
Gepr.	09.05.2018	Hofmann
Norm		
Datum		Name

Sp AP Herasafe / Maxisafe 2030i 100-240V

PROJEKT:	5015559_B	ThermoFisher SCIENTIFIC	50 155 559	A 4	B	Bt. 9
						Blat. 17

LP2

An Hauptleiterplatte X17, X18
To Mainboard X17, X18



Leiterplatte Drucksensoren
Board pressure sensors

BSC
VS2
SPM

Ind.	Änderung	Datum	Name

Bearb.	09.11.2017	Mirsu
Gepr.	09.05.2018	Hofmann
Norm		

Datum	Name

SP AP Herasafe / Maxisafe 2030i 100-240V

PROJEKT: 5015559_B

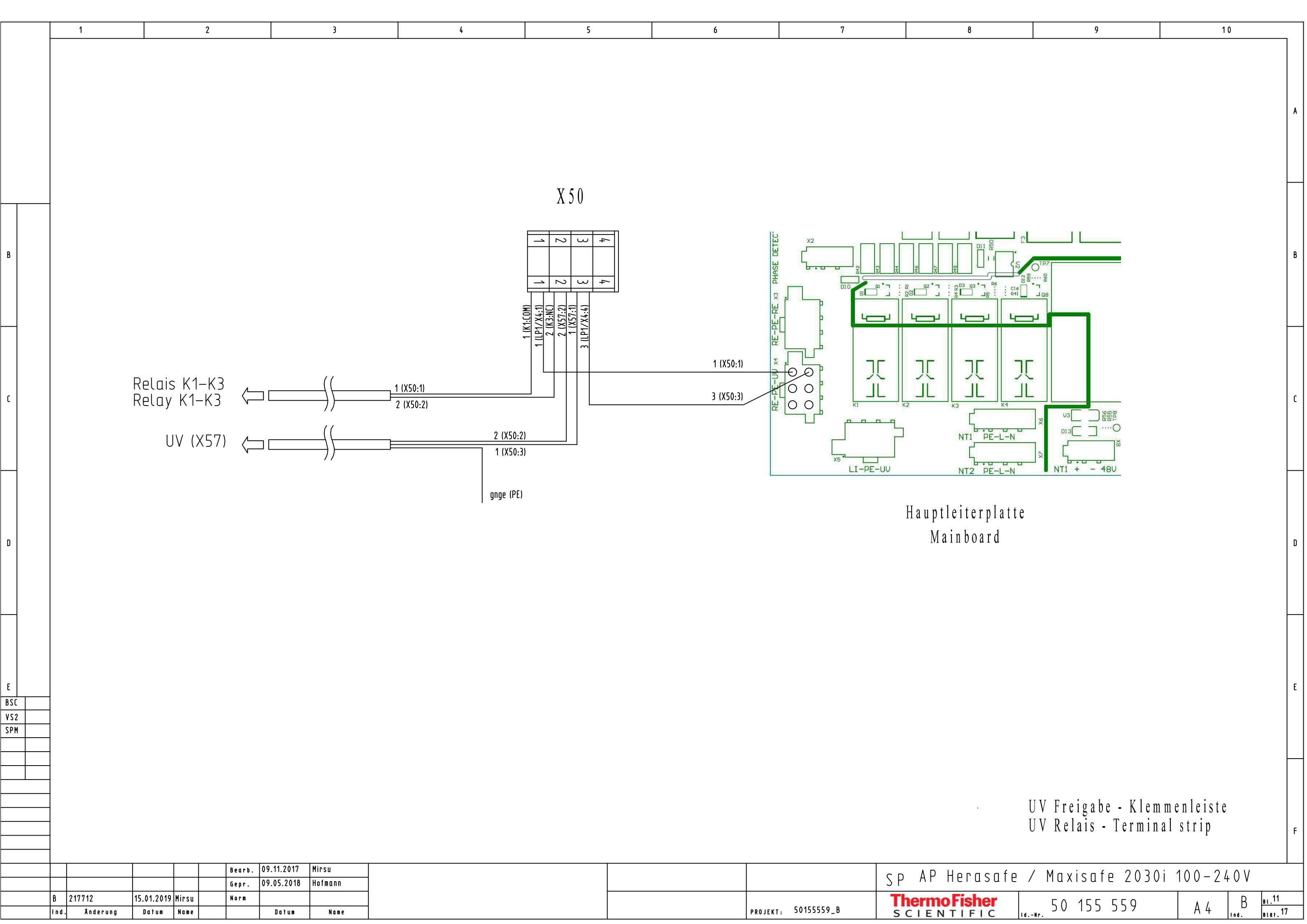
ThermoFisher
SCIENTIFIC

Id.-Nr. 50 155 559

A 4

B

Bl. 10
Blat. 17



Relais K1-K3
Relay K1-K3

UV (X57)

X50

Hauptleiterplatte
Mainboard

UV Freigabe - Klemmenleiste
UV Relais - Terminal strip

BSC
VS2
SPM

				Bearb.	09.11.2017	Mirsu
				Gepr.	09.05.2018	Hofmann
B	217712	15.01.2019	Mirsu	Norm		
Ind.	Änderung	Datum	Name	Datum	Name	

SP AP Herasafe / Maxisafe 2030i 100-240V

PROJEKT: 50155559_B

ThermoFisher
SCIENTIFIC

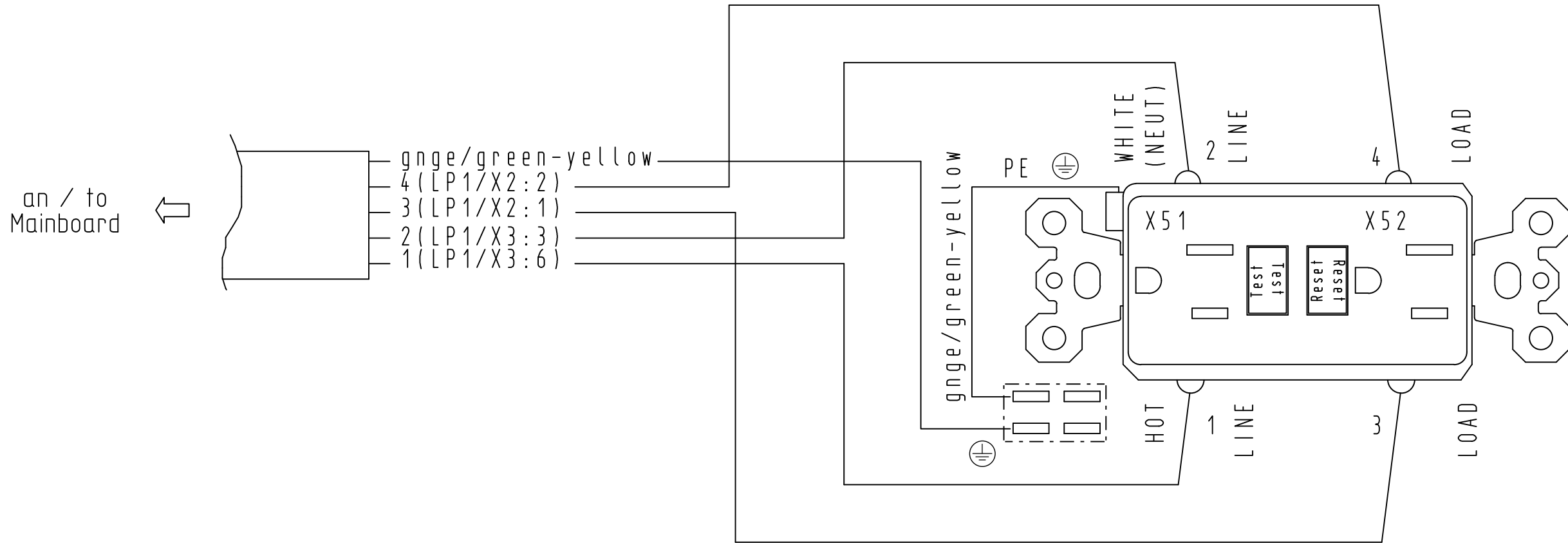
Id.-Nr. 50 155 559

A 4

B

Bl. 11
Blat. 17

STECKDOSEN FRONT SEITE
PLUG RECEPTACLE FRONT SIDE



Deutsch = English (Übersttzung / translation)
Phase = HOT
Nullleiter = NEUT
Weiß = white

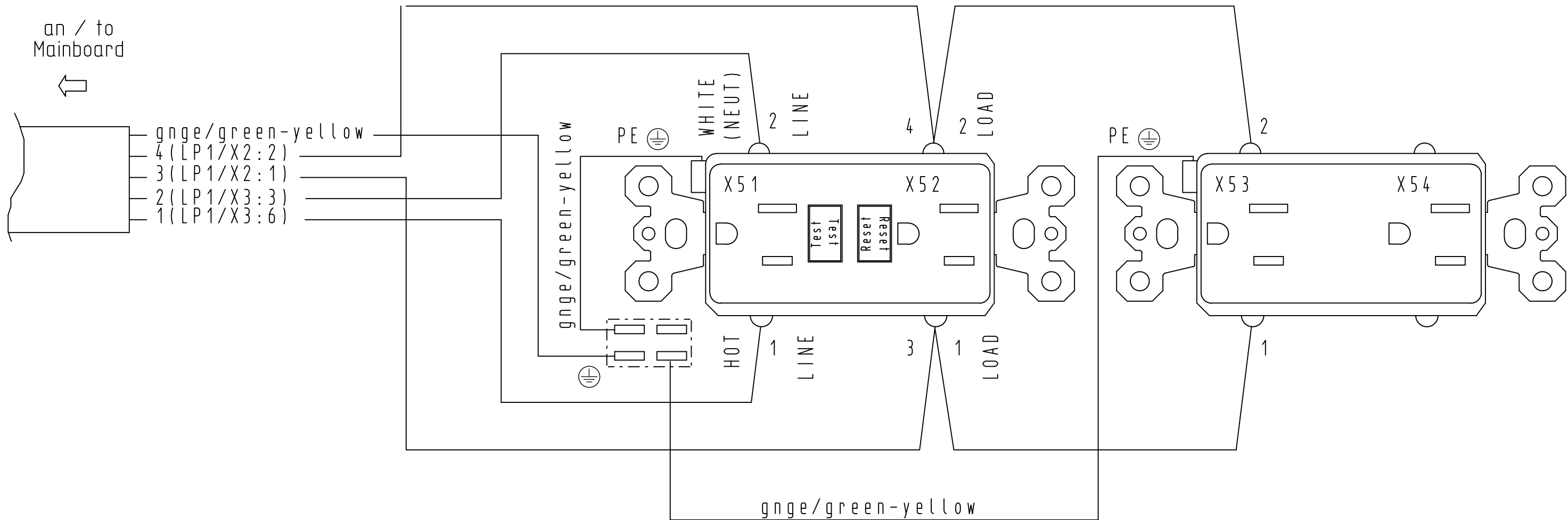
Herasafe 2030i model 1.2, 120V
Steckdosen
Plug Recptacles

BSC	
VS2	
SPM	

Bearb.	09.11.2017	Mirsu			
Gepr.	09.05.2018	Hofmann			
Ind.	Änderung	Datum	Name	Datum	Name

sp AP Herasafe / Maxisafe 2030i 100-240V	
PROJEKT:	50155559_B

STECKDOSEN FRONT SEITE
PLUG RECEPTACLE FRONT SIDE



Deutsch = English (Übersttzung / translation)
Phase = HOT
Nullleiter = NEUT
Weiß = white

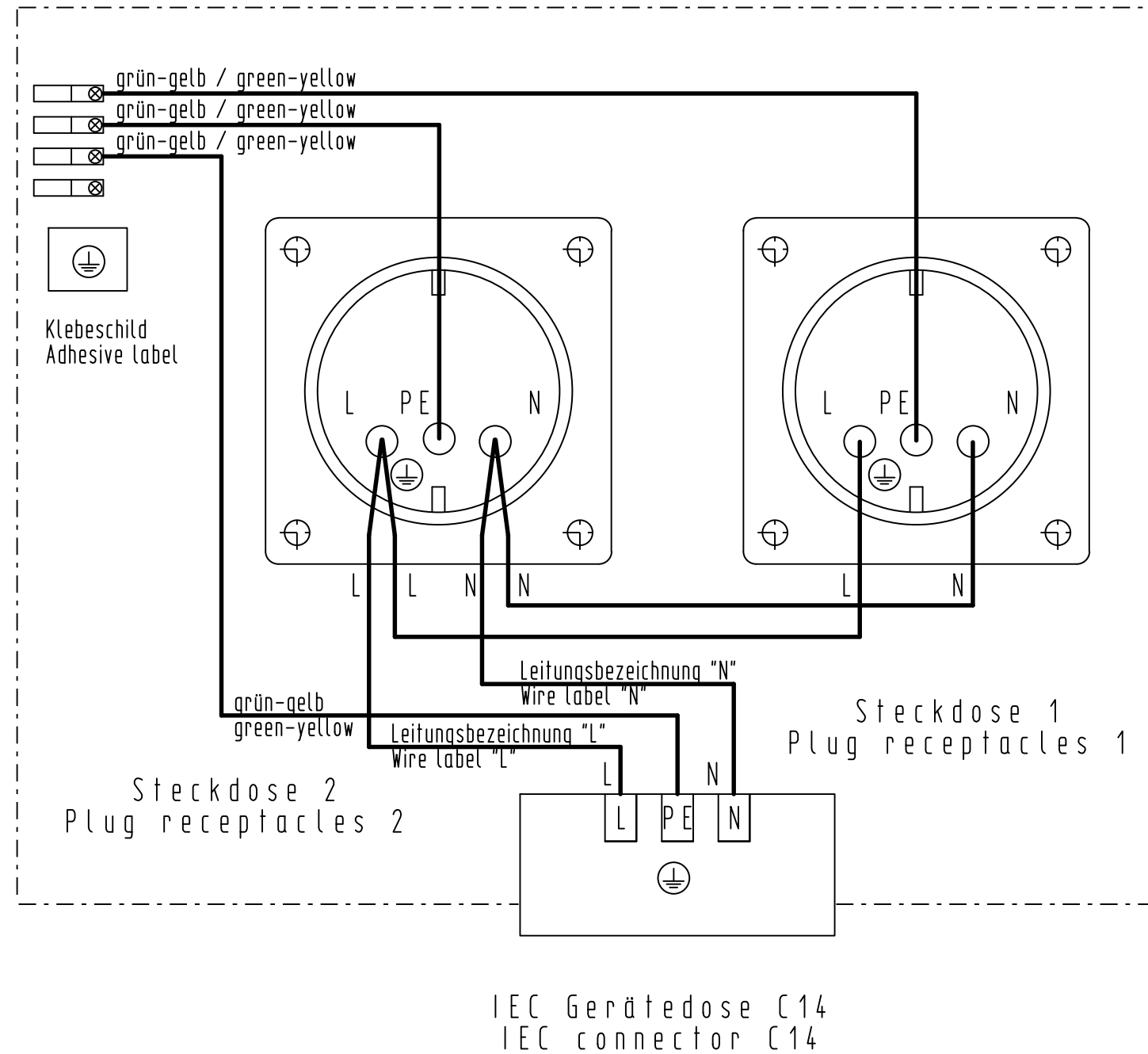
Herasafe 2030i model 1.8, 120V
Steckdosen
Plug Recptacles

BSC
VS2
SPM

Bearb.	09.11.2017	Mirsu			
Gepr.	09.05.2018	Hofmann			
Norm					
Ind.	Änderung	Datum	Name	Datum	Name

B	217712	15.01.2019	Mirsu	Norm	
Ind.	Änderung	Datum	Name	Datum	Name

Anschluss Seite Ansicht
Connection side view



ⓑ

Deutschland/Germany "F"
L PE N

Frankreich/France "E"
L PE N

Schweiz/Swiss "J"
L PE N

Dänmark/Denmark "K"
L PE N

Grossbritannien/Great Britain "G"
L PE N

Italien/Italy "L"
L PE N

China/China "I" (CCC)
L E N

Israel/Israel "H"
L PE N

Brasilien/Brasil "N"
L PE N

Steckdosen Kasten 230V
Plug receptacles box 230V

B
C
D
E

BSC
VS2
SPM

Bearb.	09.11.2017	Mirsu
Gepr.	09.05.2018	Hofmann
Ind.	217712	15.01.2019
Änderung	Mirsu	Norm
Datum	Datum	Name

SP AP Herasafe / Maxisafe 2030i 100-240V

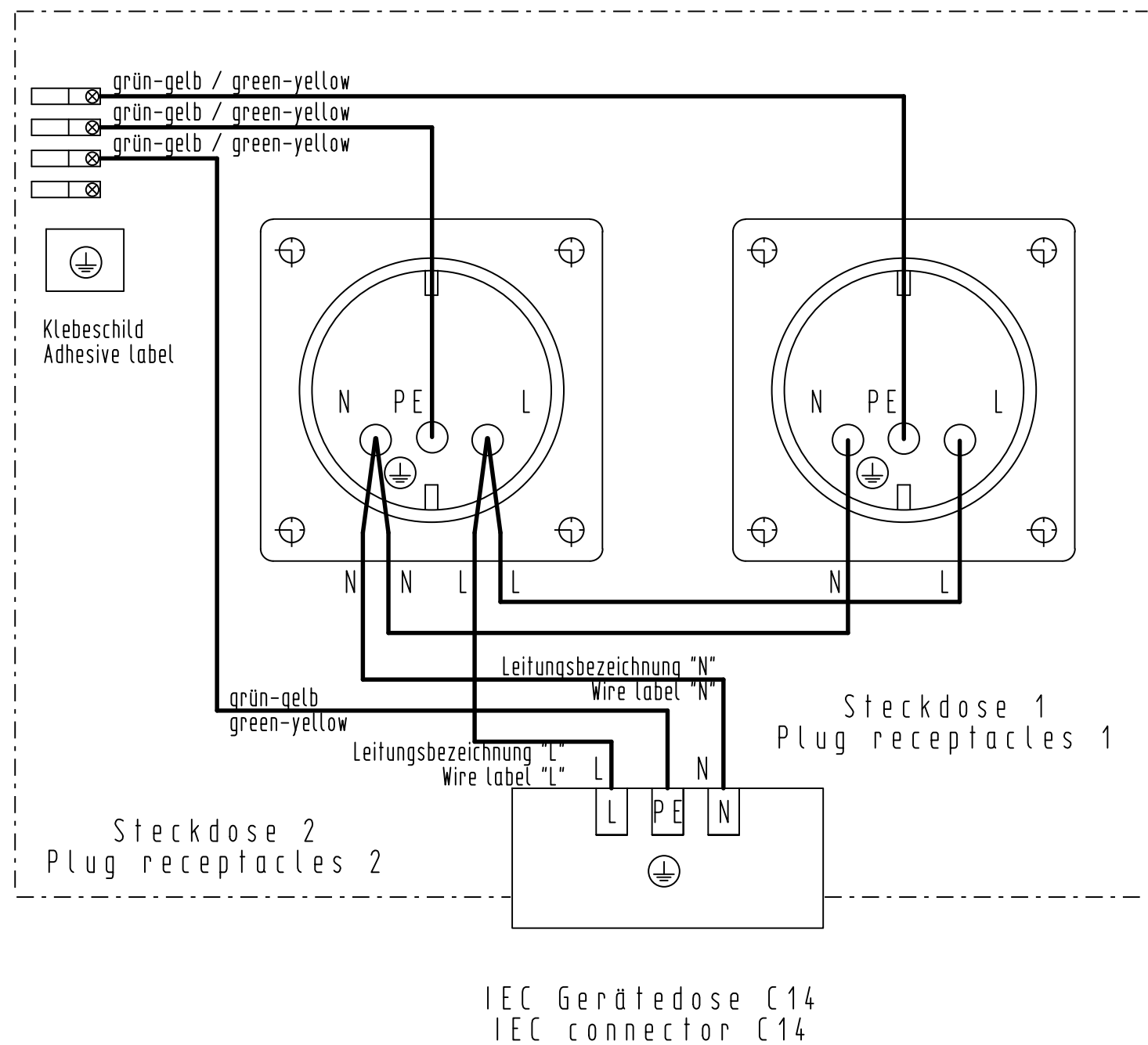
ThermoFisher
SCIENTIFIC

Ind.-Nr. 50 155 559

A 4 B Bl. 14 Blat. 17

PROJEKT: 50155559_B

Anschluss Seite Ansicht
Connection side view



B

Australien/Australia "I"
N PE L

Steckdosen Kasten 230V
Plug receptacles box 230V

BSC										
VS2										
SPM										
Bearb.	09.11.2017		Mirsu							
Gepr.	09.05.2018		Hofmann							
Ind.	217712	15.01.2019	Mirsu	Norm						
Anderung		Datum	Name	Datum	Name					

SP AP Herasafe / Maxisafe 2030i 100-240V

ThermoFisher
SCIENTIFIC

Ind.-Nr. 50 155 559

A 4

B

Bl. 15
Blat. 17

PROJEKT: 50155559_B

Anschluss Seite Ansicht
Connection side view



Deutschland/Germany "F" (B)
L PE N



Frankreich/France "E" (B)
L PE N



Schweiz/Swiss "J" (B)
L PE N



Dänmark/Denmark "K" (B)
L PE N



Grossbritannien/Great Britain "G" (B)
L PE N



Italien/Italy "L" (B)
L PE N



China/China "I" (CCC) (B)
L E N

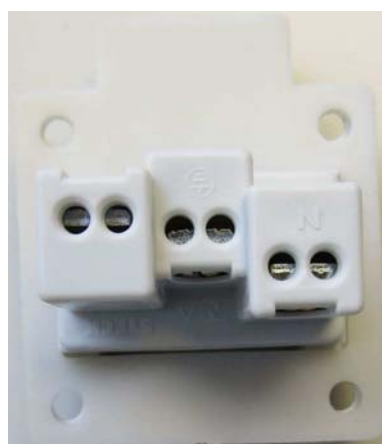


Australien/Australia "I" (B)
N PE L

(B)



Israel/Israel "H" (B)
L PE N



Brasilien/Brasil "N" (B)
L PE N

Steckdosen Kasten 230V
Plug receptacles box 230V

BSC	
VS2	
SPM	

Bearb.	09.11.2017	Mirsu			
Gepr.	09.05.2018	Hofmann			
Ind.	Änderung	Datum	Name	Datum	Name

SP AP Herasafe / Maxisafe 2030i 100-240V

PROJEKT:	50155559_B	ThermoFisher SCIENTIFIC	50 155 559	A 4	B	Bl. 16 Blat. 17
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LEGENDE ZU: SP Herasafe / Maxisafe 2030i, 100 - 240 VAC (B)

LEGEND TO: WD Herasafe / Maxisafe 2030i, 100 - 240 VAC (B)

NAME	BETRIEBSMITTEL
F1,1	SICHERUNGEN GERÄT, NETZSPANNUNG (nur 230V Geräte) (B)
B1,2	SENSOR LICHTSCHRANKE (OPTION)
B3	WLAN USB Stick (OPTION)
GUI	BILDSCHIRM UND BERÜHRUNGSEMPFINDLICHER BILDSCHIRM
LED1,2	LED LAMPEN; EXPERIMENTIERRAUM
LP1	HAUPTLEITERPLATTE
LP1/F1,2	SICHERUNGEN LP1, NETZEINGANG
LP1/F3,4	SICHERUNGEN, NETZAUSGANG X22 UND STECKDOSEN X51-54
LP1/SN1	SCHALTNETZTEIL
LP2	DRUCKSENSOREN LEITERPLATTE
LP2/P1-3	DRUCK SENSOREN
LP3	SCHALTER LEITERPLATTE
LP3/G1	AKKUMULATOR (OPTION)
M1	MOTOR, UMLUFT (NUR 1.5, 1.8 UND MAXISAFE 1.2) (B)
M2	MOTOR, UMLUFT (NICHT IN MAXISAFE 1.2) (B)
M3	MOTOR, ABLUFT (NUR 1.5 UND 1.8) (B)
M4	MOTOR, ABLUFT (B)
M5	MOTOR, FRONTSCHIEBE
N1	SCHALTNETZTEIL, M2 UND M4
N2	SCHALTNETZTEIL, M1 UND M3 (NUR 1.5 UND 1.8)
N3	SCHALTNETZTEIL GUI
S1	SCHALTER "PILOT SWITCH"
S2,S3	POSITIONSSCHALTER, FRONTSCHIEBE IN ARBEITSPOSITION
S4,S9	POSITIONSSCHALTER, FRONTSCHIEBE ZU (HARDWARE)
S6	POSITIONSSCHALTER, FRONTSCHIEBE GEKLAPPT
S7	POSITIONSSCHALTER, REDUZIERTE DREHZAHL
S10	POSITIONSSCHALTER, FRONTSCHIEBE OFEN (HARDWARE)
S11	POSITIONSSCHALTER, FRONTSCHIEBE GEKLAPPT (NUR 1.5 UND 1.8)
UV1-4	UV STRAHLER (OPTION)
V1,V2	ELEKTRONISCHER VORSCHALTGERÄT UV STRAHLER (OPTION)
X1	STECKVERBINDER NETZANSCHLUSS
X2	KLEMMENLEISTE NETZSPANNUNG
X2,20,34,39	GUI Anschlüsse
X50	KLEMMENLEISTE UV FREIGABE
X51-54	STECKDOSEN; EXPERIMENTIERRAUM (OPTION)
X55	KLEMMENLEISTE STECKDOSE (NUR 1.5 UND 1.8 230V GERÄTE)
X56	KLEMMENLEISTE; LED LAMPEN EXPERIMENTIERRAUM
X57-60	KLEMMENLEISTE UV STRAHLER (OPTION)
X61-62	STECKVERBINDER LICHTSCHRANKE (OPTION)
Z1	EMV Filter (nur 230V Geräte) (B)

NAME	ACCESSORIES
F1,2	EQUIPMENT FUSE; MAIN VOLTAGE (just 230V appliance) (B)
B1,2	SENSOR THRU-BEAM (OPTION)
B3	Wi-Fi USB Stick (OPTION)
GUI	GRAPHIC USER INTERFACE / DISPLAY UND TOUCH SCREEN
LED1,2	FLUORESCENT LIGHTS; EXPERIMENT ROOM
LP1	MAIN BOARD
LP1/F1,2	FUSE LP1; MAIN
LP1/F3,4	FUSE; MAIN VOLTAGE X22 AND PLUG RECEPTACLES X51-X54
LP1/SN1	SWITCHING POWER SUPPLY LP1
LP2	PRESSURE SENSORS BOARD
LP2/P1-3	PRESSURE SENSORS
LP3	SWITCH BOARD
LP3/G1	ACCUMULATOR (OPTION)
M1	MOTOR, SUPPLY AIR (ONLY 1.5, 1.8 AND MAXISAFE 1.2) (B)
M2	MOTOR, SUPPLY AIR (NOT IN MAXISAFE 1.2) (B)
M3	MOTOR, EXHAUST (ONLY 1.5 AND 1.8) (B)
M4	MOTOR, EXHAUST (B)
M5	MOTOR, WINDOW
N1	SWITCHING POWER SUPPLY M2 AND M4
N2	SWITCHING POWER SUPPLY, M1 AND M3 (ONLY 1.5 AND 1.8)
N3	SWITCHING POWER SUPPLY GUI
S1	SWITCH "PILOT SWITCH"
S2,S3	POSITION SWITCH, SCREEN IN WORK POSITION
S4,S9	POSITION SWITCH, SCREEN CLOSED (HARDWARE)
S6	POSITION SWITCH, SCREEN HINGED OPEN
S7	POSITION SWITCH, LOWER SPEED
S10	POSITION SWITCH, SCREEN OPEN (HARDWARE)
S11	POSITION SWITCH, SCREEN HINGED OPEN (ONLY 1.5 AND 1.8)
UV1-4	UV SPOTLIGHT (OPTION)
V1,V2	ELECTRONIC BALLAST UV LAMPS (OPTION)
X1	MAINS CONNECTION
X2	TERMINAL STRIP UV RELEASE
X2,20,34,39	Connection
X50	TERMINAL STRIP MAINS VOLTAGE
X51-54	PLUG RECEPTACLES; EXPERIMENT ROOM (OPTION)
X55	TERMINAL STRIP PLUG RECEPTACLES (ONLY 1.5 AND 1.8)
X56	TERMINAL STRIP LED LAMPS EXPERIMENT ROOM
X57-60	TERMINAL STRIP UV LAMP (OPTION)
X61-62	SENSOR THRU-BEAM CONNECTOR (OPTION)
Z1	EMC Filter (just 230V appliance) (B)

B
C
D
E

A
B
C
D
E
F

BSC
VS2
SPM

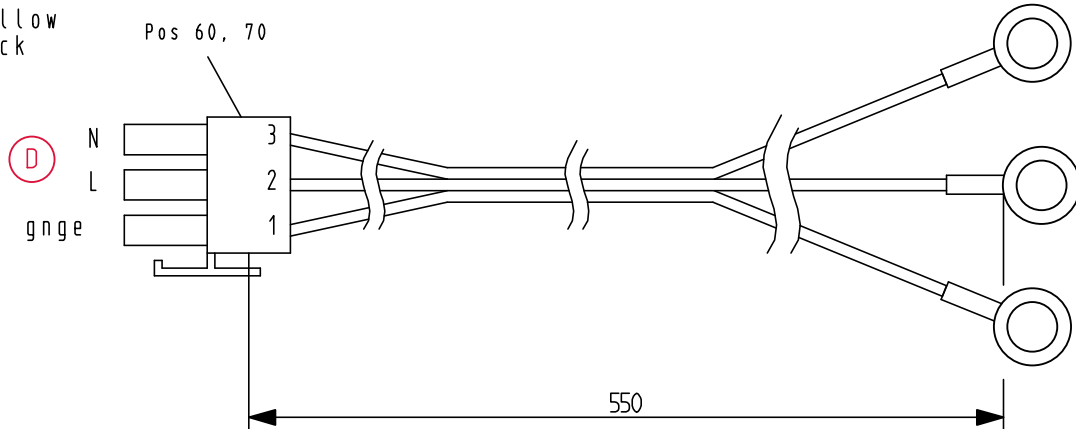
Bearb.	09.11.2017	Mirsu
Gepr.	09.05.2018	Hofmann
Norm		
Datum		Name

Ind.	217712	15.01.2019	Mirsu
Änderung			

SP AP Herasafe / Maxisafe 2030i 100-240V
ThermoFisher SCIENTIFIC
 PROJEKT: 50155559_B
 50 155 559
 A 4 B Bl. 17
 ind. Blat. 17

Ltgs.- bez. Wire Label	Leitungsführung Wire guide		Leitungsmaterial Wire material	Länge Length mm	Leitungsenden / Wire end						Bemerkung Remark
	von from	nach to			abisoliert/mm stripped/mm		bestückt equipped		zus.bestückt add equipped		
					Anf. Begin	Ende End	Anf. Begin	Ende End	Anf. Begin	Ende End	
L	X6:2	N1:L	AWG 18, Pos.10 0,82 mm ² , sw	300	3	6	BK4	K5			BK4 = Pos 60
N	X6:3	N1:N	"	300	3	6	BK4	K5			K5 = Pos 90
gngc	X6:1	N1:PE	H05V-K, Pos.20 0,75 mm ² , gngc	300	3	6	BK4	K5			

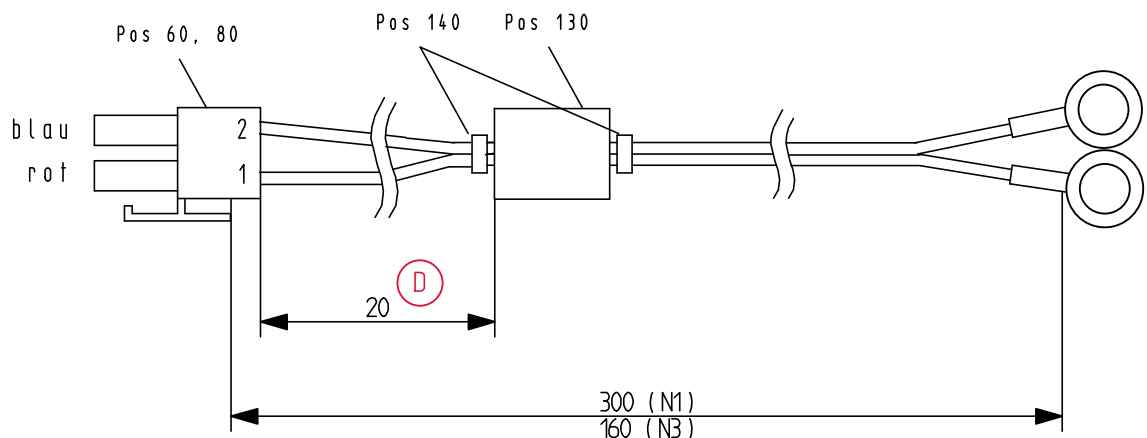
gngc =
green/yellow
sw = black



N1+	X8:1	N1:+	AWG 18, Pos.40 0,82 mm ² , rot	300	3	6	BK4	K5			BK4 = Pos 60
N1-	X8:2	N1:-	AWG 18, Pos.50 0,82 mm ² , blau	300	3	6	BK4	K5			K5 = Pos 90
N3+	X10:1	N3:+	AWG 18, Pos.40 0,82 mm ² , rot	160	3	6	BK4	K5			
N3-	X10:2	N3:-	AWG 18, Pos.50 0,82 mm ² , blau	160	3	6	BK4	K5			

blau = blue
rot = red

1 x (N1+ und/and N1-)
1 x (N3+ und/and N3-)



Be./Wor.	05.03.18	Hofmann	D	217 712	14.12.18	Mi		VS2	VS3	EE				
Gep/Exam	13.07.18	Mirsu	C	217 409	27.07.18	Mi								
Norm			B	217 375	13.07.18	Mi		Verteiler / Distribution						
Mik/Mic			A	217 169	03.05.18	Hof		Maßstab/Scale			Ers.f/Replace			
	Datum / Date	Name / Name	Ind	Ander./Change	Dat/Date	Name	M/M	Urspr./Origin			Ers.d/Replace			

DIN 34-1-D

Benennung / Designation

DS/WS 20301 - 0.9 Netzanschluss/mains supply EU

**Thermo Fisher
SCIENTIFIC**

Zeichnungsnummer / Drawing no.
50 156 531

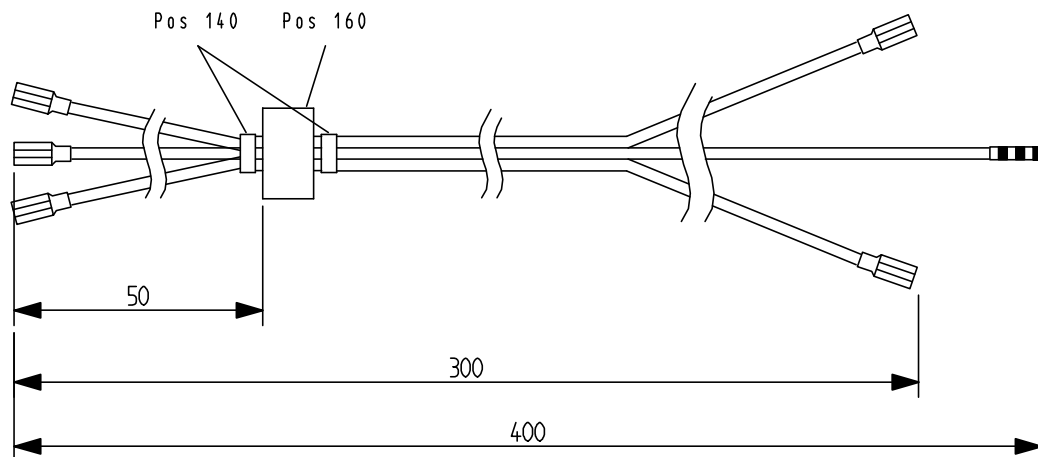
Format
A 4

Index
D

Bl/page
1/2

Ltgs.- bez. Wire Label	Leitungsführung Wire guide		Leitungsmaterial Wire material	Länge Length mm	Leitungsenden / Wire end						Bemerkung Remark
	von from	nach to			abisoliert/mm stripped/mm		bestückt equipped		zus.bestückt add equipped		
					Anf. Begin	Ende End	Anf. Begin	Ende End	Anf. Begin	Ende End	
L	X1:1	F1	AWG 16, Pos.5 1,35 mm ² , sw	300	6	6	F4	F4	H3	H3	siehe Zeichnung unten refer to drawing below
N	X1:2	F2	"	300	6	6	F4	F4	H3	H3	
L	F1	Filter Line	"	400	6	6	F4	F4	H3	H3	D K6 = Pos 95 F4 = Pos 100 H3 = Pos 110 EL5 = Pos 120 CL2 = Pos 150
N	F2	Filter Line	"	400	6	6	F4	F4	H3	H3	
L	X2:1	Filter Load	"	450	-	6	EL5	F4		H3	
N	X2:2	Filter Load	"	450	-	6	EL5	F4		H3	
L	X2:1	LP1/X1:1	"	100	-	-	EL5	EL5			
N	X2:2	LP1/X1:2	"	100	-	-	EL5	EL5			
L	X2:1	N3:L	"	650	-	6	EL5	K6	D		
N	X2:2	N3:N	"	650	-	6	EL5	K6	D		
gnge	X1:3	PE	H07V-K, Pos.30 1,5 mm ² , gnge	400	6	9	F4	CL2			siehe Zeichnung unten refer to drawing below
gnge	Abdeck.	PE	"	400	6	9	F4	CL2			
gnge	LP1/X1:3	PE	"	150	-	9	EL5	CL2			
gnge	N3:PE	PE	"	650	6	9	K6	D CL2			
gnge	Filter Line	PE	"	400	6	6	F4	CL2			

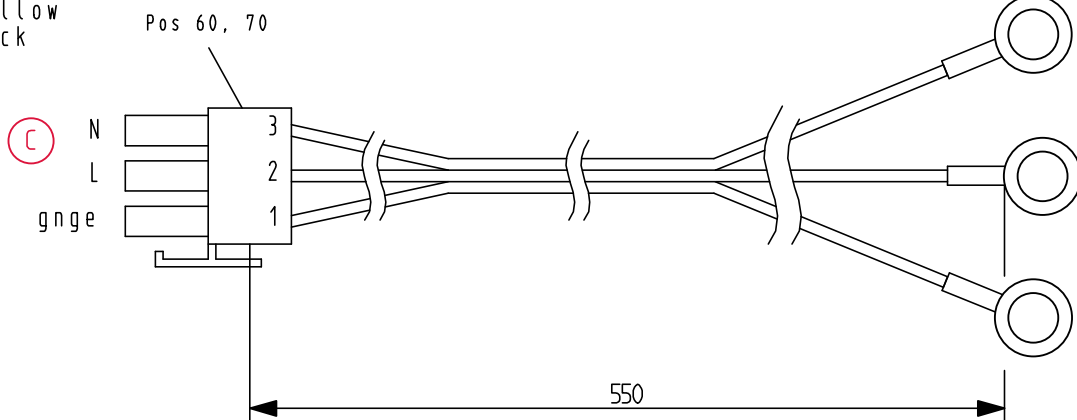
gnge = green/yellow
sw = black



Be./Wor.	05.03.18	Hofmann	D	217 712	14.12.18	Mi		VS2	VS3	EE				
Gep/Exam	13.07.18	Mirsu	C	217 409	27.07.18	Mi								
Norm			B	217 375	13.07.18	Mi		Verteiler / Distribution						
Mik/Mic			A	217 169	03.05.18	Hof		Maßstab/Scale				Ers.f/Replace		
	Datum / Date	Name / Name	Ind	Ander./Change	Dat/Date	Name	M/M	Urspr./Origin				Ers.d/Replace		
DIN 34-1-D			Benennung / Designation DS/WS 20301 - 0.9 Netzanschluss/mains supply EU											
			Thermo Fisher SCIENTIFIC				Zeichnungsnummer / Drawing no. 50 156 531			Format A 4		Index D	Bl/page 2/2	

Ltgs.- bez. Wire label	Leitungsführung Wire guide		Leitungsmaterial Wire material	Länge Length mm	Leitungsenden / Wire end						Bemerkung Remark
	von from	nach to			abisoliert/mm stripped/mm		bestückt equipped		zus.bestückt add equipped		
					Anf. Begin	Ende End	Anf. Begin	Ende End	Anf. Begin	Ende End	
L	X6:2	N1:L	AWG 18, Pos.10 0,82 mm ² , sw	550	3	6	BK4	K5			BK4 = Pos 60
N	X6:3	N1:N	"	550	3	6	BK4	K5			K5 = Pos 90
gngc	X6:1	N1:PE	H05V-K, Pos.20 0,75 mm ² , gngc	550	3	6	BK4	K5			

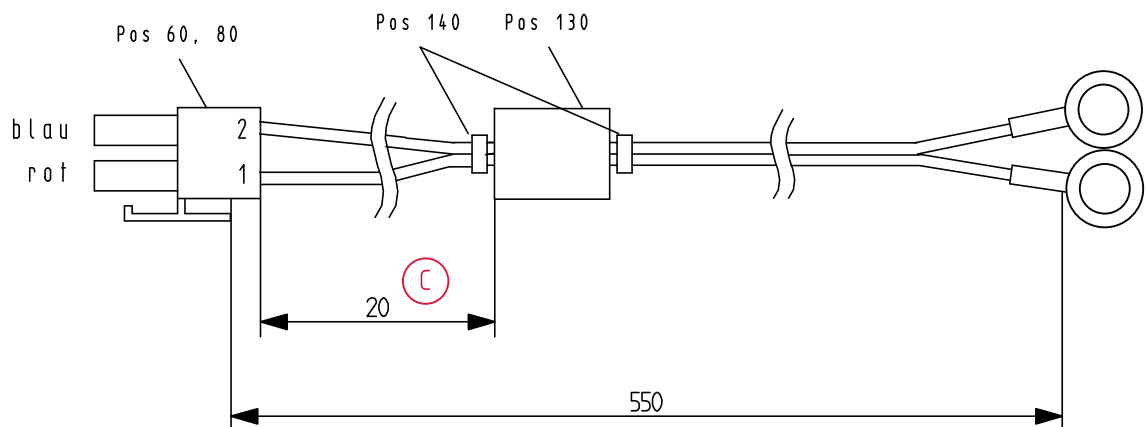
gngc =
green/yellow
sw = black



N1+	X8:1	N1:+	AWG 18, Pos.40 0,82 mm ² , rot	550	3	6	BK4	K5			BK4 = Pos 60
N1-	X8:2	N1:-	AWG 18, Pos.50 0,82 mm ² , blau	550	3	6	BK4	K5			K5 = Pos 90
N3+	X10:1	N3:+	AWG 18, Pos.40 0,82 mm ² , rot	550	3	6	BK4	K5			
N3-	X10:2	N3:-	AWG 18, Pos.50 0,82 mm ² , blau	550	3	6	BK4	K5			

blau = blue
rot = red

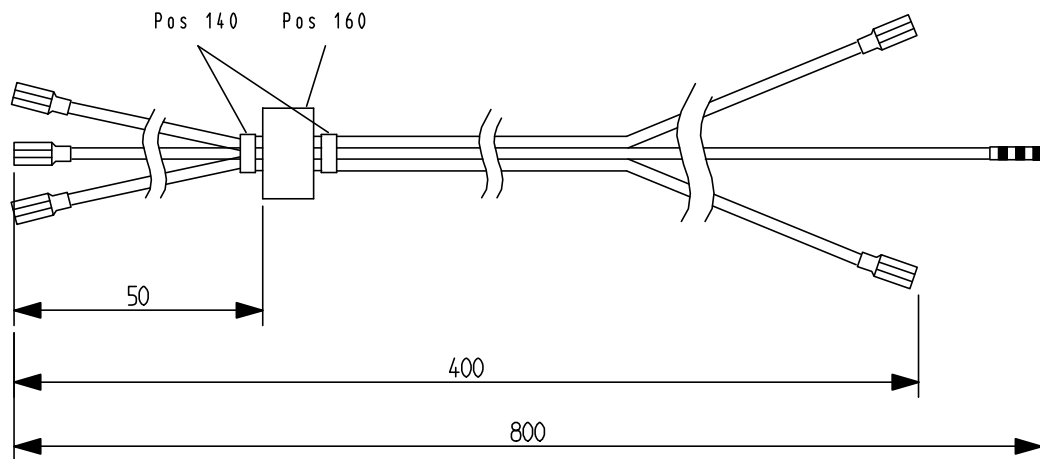
1 x (N1+ und/and N1-)
1 x (N3+ und/and N3-)



Be./Wor.	05.03.18	Hofmann						VS2	VS3	EE				
Gep/Exam	13.07.18	Mirsu	C	217 712	14.12.18	Mi								
Norm			B	217 375	13.07.18	Mi	Verteiler / Distribution							
Mik/Mic			A	217 169	03.05.18	Hof	Maßstab/Scale				Ers.f./Replace			
	Datum / Date	Name / Name	Ind	Ander./Change	Dat/Date	Name	M/M	Urspr./Origin				Ers.d/Replace		
DIN 34-1-D			Benennung / Designation DS/WS 20301 - 1.2 Netzanschluss/mains supply EU											
Thermo Fisher SCIENTIFIC							Zeichnungsnummer / Drawing no. 50 156 532			Format A 4		Index C	Bl/page 1/2	

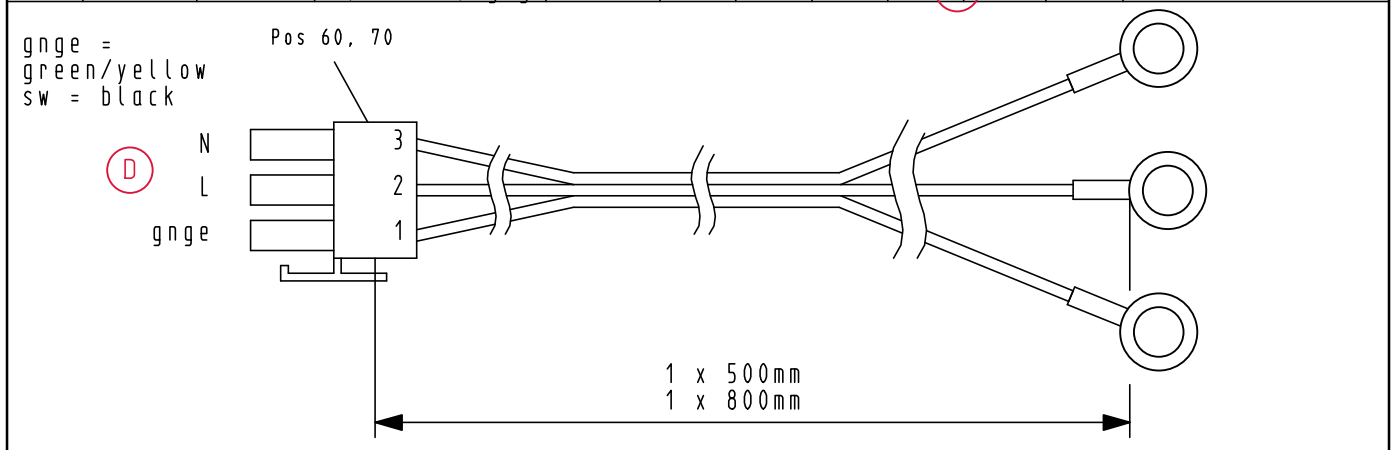
Ltgs.- bez. Wire Label	Leitungsführung Wire guide		Leitungsmaterial Wire material	Länge Length mm	Leitungsenden / Wire end						Bemerkung Remark
	von from	nach to			abisoliert/mm stripped/mm		bestückt equipped		zus.bestückt add equipped		
					Anf. Begin	Ende End	Anf. Begin	Ende End	Anf. Begin	Ende End	
L	X1:1	F1	AWG 16, Pos.5 1,35 mm ² , sw	400	6	6	F4	F4	H3	H3	siehe Zeichnung unten refer to drawing below
N	X1:2	F2	"	400	6	6	F4	F4	H3	H3	
L	F1	Filter Line	"	200	6	6	F4	F4	H3	H3	C K6 = Pos 95 F4 = Pos 100 H3 = Pos 110 EL5 = Pos 120 CL2 = Pos 150
N	F2	Filter Load	"	200	6	6	F4	F4	H3	H3	
L	X2:1	Filter Load	"	150	-	6	EL5	F4		H3	
N	X2:2	Filter Line	"	150	-	6	EL5	F4		H3	
L	X2:1	LP1/X1:1	"	150	-	-	EL5	EL5			
N	X2:2	LP1/X1:2	"	150	-	-	EL5	EL5			
L	X2:1	N3:L	"	200	-	6	EL5	K6			
N	X2:2	N3:N	"	200	-	6	EL5	K6			
gnge	X1:3	PE	H07V-K, Pos.30 1,5 mm ² , gnge	800	6	9	F4	CL2			siehe Zeichnung unten refer to drawing below
gnge	Abdeck.	PE	"	500	6	9	F4	CL2			
gnge	LP1/X1:3	PE	"	150	-	9	EL5	CL2			
gnge	N3:PE	PE	"	300	6	9	K6	CL2			
gnge	Filter Line	PE	"	250	6	6	F4	CL2			

gnge = green/yellow
sw = black

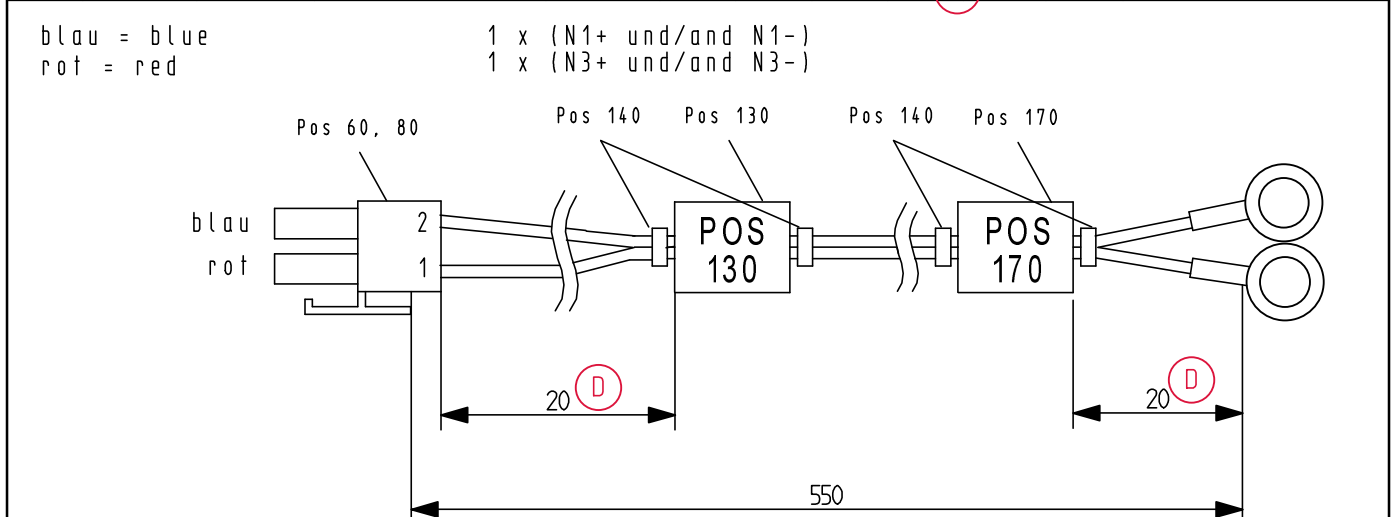


Be./Wor.	05.03.18	Hofmann						VS2	VS3	EE						
Gep/Exam	13.07.18	Mirsu	C	217 712	14.12.18	Mi										
Norm			B	217 375	13.07.18	Mi	Verteiler / Distribution									
Mik/Mic			A	217 169	03.05.18	Hof	Maßstab/Scale				Ers.f/Replace					
	Datum / Date	Name / Name	Ind	Ander./Change	Dat/Date	Name	M/M	Urspr./Origin				Ers.d/Replace				
DIN 34-1-D			Benennung / Designation DS/WS 20301 - 1.2 Netzanschluss/mains supply EU													
			Thermo Fisher SCIENTIFIC				Zeichnungsnummer / Drawing no. 50 156 532				Format A 4		Index C		Bl/page 2/2	

Ltgs.-bez. Wire label	Leitungsführung Wire guide		Leitungsmaterial Wire material	Länge Length mm	Leitungsenden / Wire end						Bemerkung Remark
	von from	nach to			abisoliert/mm stripped/mm		bestückt equipped		zus.bestückt add equipped		
					Anf. Begin	Ende End	Anf. Begin	Ende End	Anf. Begin	Ende End	
L	X6:2	N1:L	AWG 18, Pos.10 0,82 mm ² , sw	500	3	6	BK4	K5			BK4 = Pos 60 K5 = Pos 90 Ⓚ
N	X6:3	N1:N	"	500	3	6	BK4	K5			
gnge	X6:1	N1:PE	H05V-K, Pos.20 0,75 mm ² , gnge	500	3	6	BK4	K5			
L	X7:2	N2:L	AWG 18, Pos.10 0,82 mm ² , sw	800	3	6	BK4	K5			
N	X7:3	N2:N	"	800	3	6	BK4	K5			
gnge	X7:1	N2:PE	H05V-K, Pos.20 0,75 mm ² , gnge	800	3	6	BK4	K5			



N1+	X8:1	N1:+	AWG 18, Pos.40 0,82 mm ² , rot	550	3	6	BK4	K5			BK4 = Pos 60 K5 = Pos 90 Ⓚ
N1-	X8:2	N1:-	AWG 18, Pos.50 0,82 mm ² , blau	550	3	6	BK4	K5			
N3+	X10:1	N3:+	AWG 18, Pos.40 0,82 mm ² , rot	550	3	6	BK4	K5			
N3-	X10:2	N3:-	AWG 18, Pos.50 0,82 mm ² , blau	550	3	6	BK4	K5			

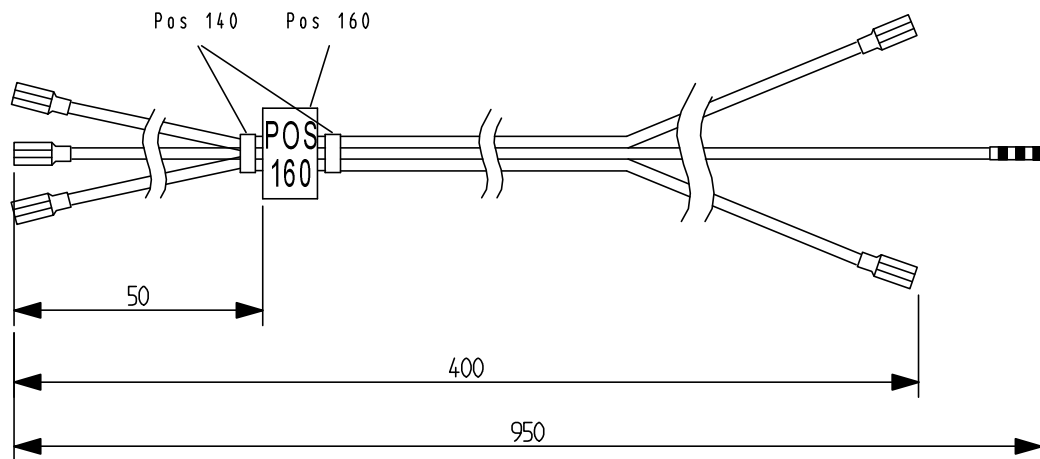


ACHTUNG ! VERSCHIEDENE FERRITRINGE ! - ATTENTION ! DIFFERENT FERRITE !

Be./Wor.	05.03.18	Hofmann					VS2	VS3	EE				
Gep/Exam	13.07.18	Mirsu											
Norm							Verteiler / Distribution						
Mik/Mic			D	217 712	17.12.18	Mi	Maßstab/Scale			Ers.f/Replace			
	Datum / Date	Name / Name	Ind	Ander./Change	Dat/Date	Name	M/M	Urspr./Origin			Ers.d/Replace		
DIN 34-1-0			Benennung / Designation DS/WS 20301 - 1.5 Netzanschluss/mains supply EU										
			ThermoFisher SCIENTIFIC				Zeichnungsnummer / Drawing no. 50 156 533			Format A 4	Index D	Bl/page 1/3	

Ltgs.- bez. Wire Label	Leitungsführung Wire guide		Leitungsmaterial Wire material	Länge Length mm	Leitungsenden / Wire end						Bemerkung Remark
	von from	nach to			abisoliert/mm stripped/mm		bestückt equipped		zus.bestückt add equipped		
					Anf. Begin	Ende End	Anf. Begin	Ende End	Anf. Begin	Ende End	
L	X1:1	F1	AWG 16, Pos.5 1,35 mm ² , sw	400	6	6	F4	F4	H3	H3	siehe Zeichnung unten refer to drawing below
N	X1:2	F2	"	400	6	6	F4	F4	H3	H3	
L	F1	Filter Line	"	500	6	6	F4	F4	H3	H3	D K6 = Pos 95 F4 = Pos 100 H3 = Pos 110 EL5 = Pos 120 CL2 = Pos 150
N	F2	Filter Load	"	500	6	6	F4	F4	H3	H3	
L	X2:1	Filter Load	"	200	-	6	EL5	F4		H3	
N	X2:2	Filter Line	"	200	-	6	EL5	F4		H3	
L	X2:1	LP1/X1:1	"	200	-	-	EL5	EL5			
N	X2:2	LP1/X1:2	"	200	-	-	EL5	EL5			
L	X2:1	N3:L	"	150	-	6	EL5	K6			
N	X2:2	N3:N	"	150	-	6	EL5	K6			
gnge	X1:3	PE	H07V-K, Pos.30 1,5 mm ² , gnge	950	6	9	F4	CL2			siehe Zeichnung unten refer to drawing below
gnge	Abdeck.	PE	"	500	6	9	F4	CL2			
gnge	LP1/X1:3	PE	"	150	-	9	EL5	CL2			
gnge	N3:PE	PE	"	250	6	9	K6	CL2			
gnge	Filter Line	PE	"	300	6	6	F4	CL2			

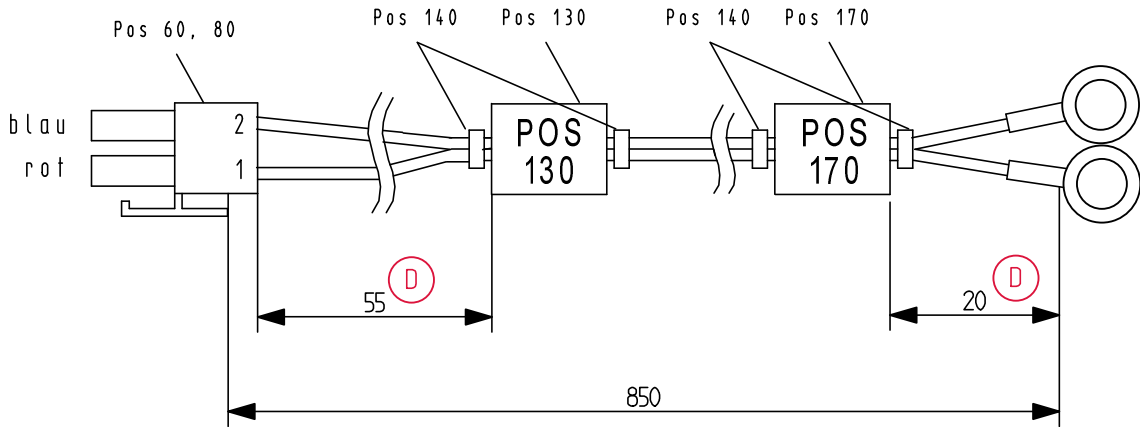
gnge = green/yellow
sw = black



Be./Wor.	05.03.18	Hofmann						VS2	VS3	EE				
Gep/Exam	13.07.18	Mirsu												
Norm								Verteiler / Distribution						
Mik/Mic			D	217 712	17.12.18	Mi		Maßstab/Scale				Ers.f/Replace		
	Datum / Date	Name / Name	Ind	Ander./Change	Dat/Date	Name	M/M	Urspr./Origin				Ers.d/Replace		
DIN 34-1-D			Benennung / Designation DS/WS 20301 - 1.5 Netzanschluss/mains supply EU											
			ThermoFisher SCIENTIFIC				Zeichnungsnummer / Drawing no. 50 156 533			Format A 4		Index D		Bl/page 2/3

Ltgs.- bez. Wire label	Leitungsführung Wire guide		Leitungsmaterial Wire material	Länge Length mm	Leitungsenden / Wire end						Bemerkung Remark
	von from	nach to			abisoliert/mm stripped/mm		bestückt equipped		zus.bestückt add equipped		
					Anf. Begin	Ende End	Anf. Begin	Ende End	Anf. Begin	Ende End	
N2+	X9:1	N2:+	AWG 18, Pos.40 0,82 mm ² , rot	850	3	6	BK4	K5			BK4 = Pos 60
N2-	X9:2	N2:-	AWG 18, Pos.50 0,82 mm ² , blau	850	3	6	BK4	K5			K5 = Pos 90

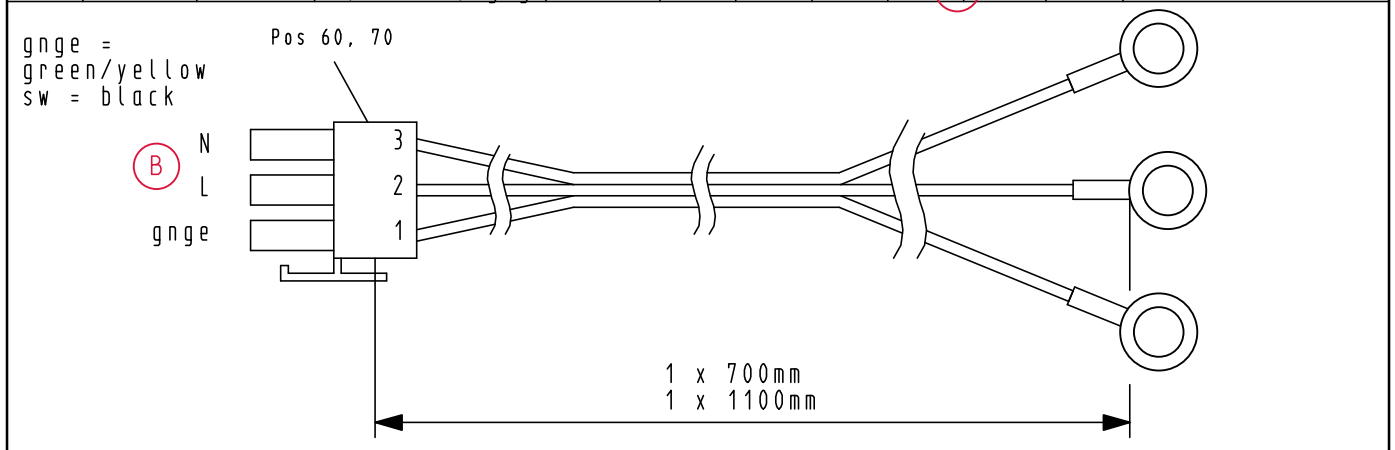
rot = red
sw = black



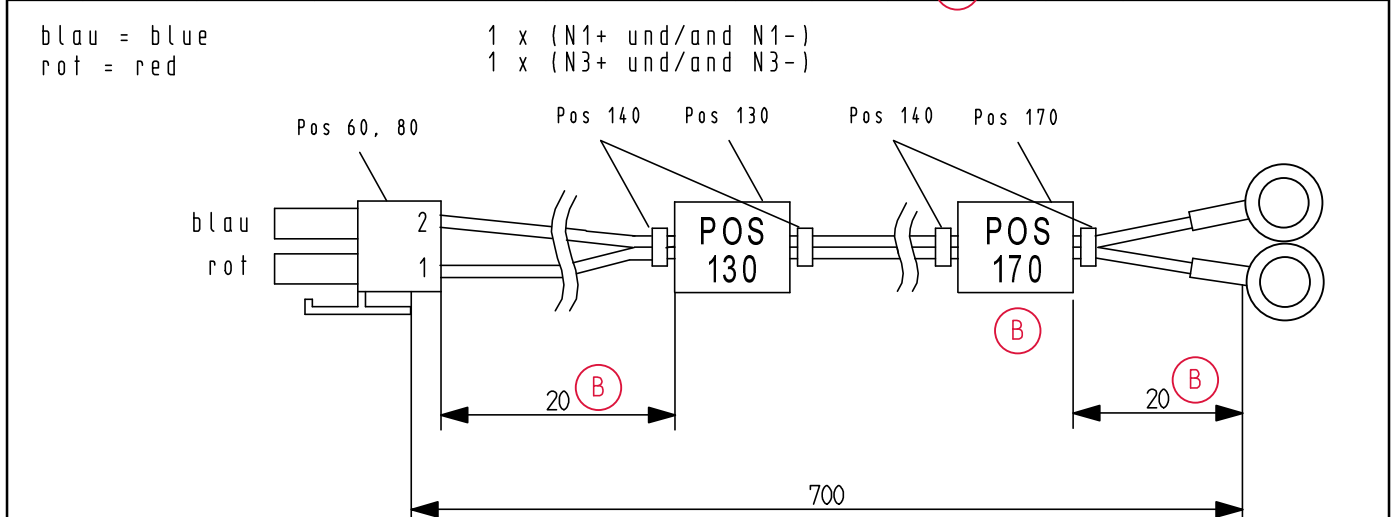
ACHTUNG ! VERSCHIEDENE FERRITRINGE ! - ATTENTION ! DIFFERENT FERRITE !

Be./Wor.	05.03.2018	Hofmann						VS2	VS3	EE					
Gep/Exam	13.07.2018	Mirsu													
Norm								Verteiler / Distribution							
Mik/Mic			D	217 712	17.12.18	Mi		Maßstab/Scale				Ers.f/Replace			
	Datum / Date	Name / Name	Ind	Ander./Change	Dat/Date	Name	M/M	Urspr./Origin				Ers.d/Replace			
DIN 34-1-D			Benennung / Designation D.S/WS 2030i-1.5 Netzanschluss/mains supplyEU												
			ThermoFisher SCIENTIFIC				Zeichnungsnummer / Drawing no. 50 156 533				Format A 4		Index D		Bl/page 3/3

Ltgs.- bez. Wire label	Leitungsführung Wire guide		Leitungsmaterial Wire material	Länge Length mm	Leitungsenden / Wire end						Bemerkung Remark
	von from	nach to			abisoliert/mm stripped/mm		bestückt equipped		zus.bestückt add equipped		
					Anf. Begin	Ende End	Anf. Begin	Ende End	Anf. Begin	Ende End	
L	X6:2	N1:L	AWG 18, Pos.10 0,82 mm ² , sw	700	3	6	BK4	K5			BK4 = Pos 60 K5 = Pos 90 (B)
N	X6:3	N1:N	"	700	3	6	BK4	K5			
gnge	X6:1	N1:PE	H05V-K, Pos.20 0,75 mm ² , gnge	700	3	6	BK4	K5			
L	X7:2	N2:L	AWG 18, Pos.10 0,82 mm ² , sw	1100	3	6	BK4	K5			
N	X7:3	N2:N	"	1100	3	6	BK4	K5			
gnge	X7:1	N2:PE	H05V-K, Pos.20 0,75 mm ² , gnge	1100	3	6	BK4	K5			



N1+	X8:1	N1:+	AWG 18, Pos.40 0,82 mm ² , rot	700	3	6	BK4	K5			BK4 = Pos 60 K5 = Pos 90 (B)
N1-	X8:2	N1:-	AWG 18, Pos.50 0,82 mm ² , blau	700	3	6	BK4	K5			
N3+	X10:1	N3:+	AWG 18, Pos.40 0,82 mm ² , rot	700	3	6	BK4	K5			
N3-	X10:2	N3:-	AWG 18, Pos.50 0,82 mm ² , blau	700	3	6	BK4	K5			

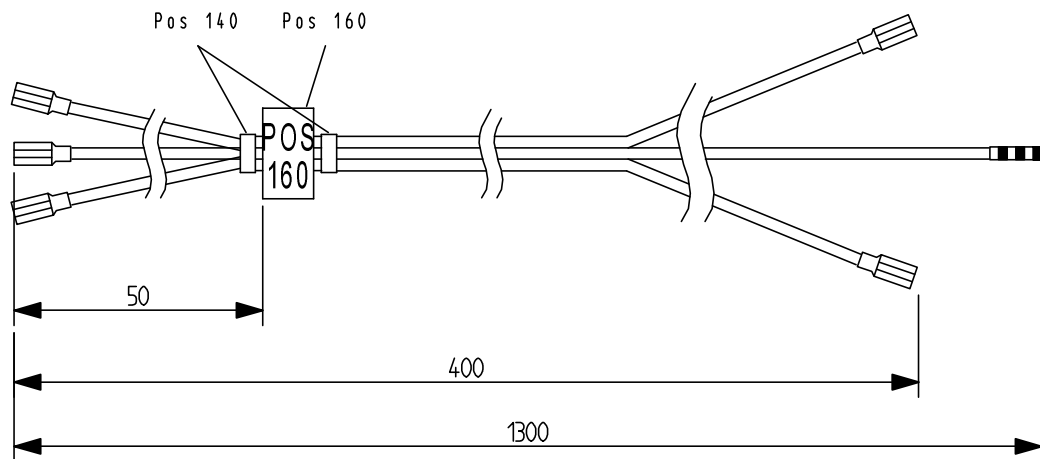


ACHTUNG ! VERSCHIEDENE FERRITRINGE ! - ATTENTION ! DIFFERENT FERRITE !

Be./Wor.	05.03.18	Hofmann					VS2	VS3	EE				
Gep/Exam	13.07.18	Mirsu											
Norm							Verteiler / Distribution						
Mik/Mic			B	217 712	17.12.18	Mi	Maßstab/Scale			Ers.f/Replace			
	Datum / Date	Name / Name	Ind	Ander./Change	Dat/Date	Name	M/M	Urspr./Origin			Ers.d/Replace		
DIN 34-1-0			Benennung / Designation DS/WS 20301 - 1.8 Netzanschluss/mains supply EU										
			ThermoFisher SCIENTIFIC				Zeichnungsnummer / Drawing no. 50 156 534			Format A 4		Index B	Bl/page 1/3

Ltgs.- bez. Wire Label	Leitungsführung Wire guide		Leitungsmaterial Wire material	Länge Length mm	Leitungsenden / Wire end						Bemerkung Remark
	von from	nach to			abisoliert/mm stripped/mm		bestückt equipped		zus.bestückt add equipped		
					Anf. Begin	Ende End	Anf. Begin	Ende End	Anf. Begin	Ende End	
L	X1:1	F1	AWG 16, Pos.5 1,35 mm ² , sw	400	6	6	F4	F4	H3	H3	siehe Zeichnung unten refer to drawing below
N	X1:2	F2	"	400	6	6	F4	F4	H3	H3	
L	F1	Filter Line	"	600	6	6	F4	F4	H3	H3	B K6 = Pos 95 F4 = Pos 100 H3 = Pos 110 EL5 = Pos 120 CL2 = Pos 150
N	F2	Filter Load	"	600	6	6	F4	F4	H3	H3	
L	X2:1	Filter Load	"	150	-	6	EL5	F4		H3	
N	X2:2	Filter Line	"	150	-	6	EL5	F4		H3	
L	X2:1	LP1/X1:1	"	150	-	-	EL5	EL5			
N	X2:2	LP1/X1:2	"	150	-	-	EL5	EL5			
L	X2:1	N3:L	"	300	B	6	EL5	K6	B		
N	X2:2	N3:N	"	300	B	6	EL5	K6	B		
gnge	X1:3	PE	H07V-K, Pos.30 1,5 mm ² , gnge	1300	6	9	F4	CL2			siehe Zeichnung unten refer to drawing below
gnge	Abdeck.	PE	"	500	6	9	F4	CL2			
gnge	LP1/X1:3	PE	"	150	-	9	EL5	CL2			
gnge	N3:PE	PE	"	350	B	6	9	K6	B	CL2	
gnge	Filter Line	PE	"	350	6	6	F4	CL2			

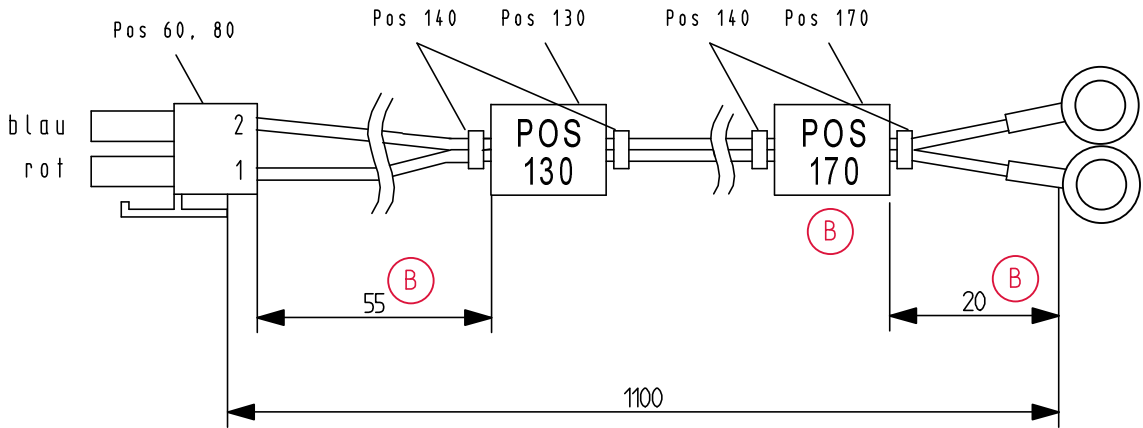
gnge = green/yellow
sw = black



Be./Wor.	05.03.18	Hofmann						VS2	VS3	EE				
Gep/Exam	13.07.18	Mirsu												
Norm								Verteiler / Distribution						
Mik/Mic			B	217 712	17.12.18	Mi		Maßstab/Scale				Ers.f/Replace		
	Datum / Date	Name / Name	Ind	Ander./Change	Dat/Date	Name	M/M	Urspr./Origin				Ers.d/Replace		
DIN 34-1-D			Benennung / Designation DS/WS 20301 - 1.8 Netzanschluss/mains supply EU											
			ThermoFisher SCIENTIFIC				Zeichnungsnummer / Drawing no. 50 156 534			Format A 4		Index B	Bl/page 2/3	

Ltgs.- bez. Wire label	Leitungsführung Wire guide		Leitungsmaterial Wire material	Länge Length mm	Leitungsenden / Wire end						Bemerkung Remark
	von from	nach to			abisoliert/mm stripped/mm		bestückt equipped		zus.bestückt add equipped		
					Anf. Begin	Ende End	Anf. Begin	Ende End	Anf. Begin	Ende End	
N2+	X9:1	N2:+	AWG 18, Pos.40 0,82 mm ² , rot	1100	3	6	BK4	K5	(B)		BK4 = Pos 60
N2-	X9:2	N2:-	AWG 18, Pos.50 0,82 mm ² , blau	1100	3	6	BK4	K5	(B)		K5 = Pos 90 (B)

rot = red
sw = black



ACHTUNG ! VERSCHIEDENE FERRITRINGE ! - ATTENTION ! DIFFERENT FERRITE !

Be./Wor.	05.03.2018	Hofmann						DE	PLM	VS					
Gep/Exam	13.07.2018	Mirsu													
Norm								Verteiler / Distribution							
Mik/Mic			B	217 712	17.12.18	Mi		Maßstab/Scale				Ers.f/Replace			
	Datum / Date	Name / Name	Ind	Ander./Change	Dat/Date	Name	M/M	Urspr./Origin				Ers.d/Replace			
DIN 34-1-D			Benennung / Designation D.S/WS 2030i-1.8 Netzanschluss/mains supplyEU												
			ThermoFisher SCIENTIFIC				Zeichnungsnummer / Drawing no. 50 156 534				Format A 4		Index B		Bl/page 3/3



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