AbraPol-20

Struers

Instruction Manual

Manual No.: 15887001

Date of Release 23.07.2013

AbraPol-20
Instruction Manual

Table of Contents **Page**

Always state *Serial No* and *Voltage/frequency* if you have technical questions or when ordering spare parts. You will find the Serial No. and Voltage on the type plate of the machine itself. We may also need the *Date* and *Article No* of the manual. This information is found on the front cover.

The following restrictions should be observed, as violation of the restrictions may cause cancellation of Struers legal obligations:
Instruction Manuals: Struers Instruction Manual may only be used in connection with Struers equipment covered by the Instruction Manual.
Service Manuals: Struers Service Manual may only be used by a trained technician authorised by Struers. The Service Manual may only be used in connection with Struers equipment covered by the Service Manual.

Struers assumes no responsibility for errors in the manual text/illustrations. The information in this manual is subject to changes without notice. The manual may mention accessories or parts not included in the present version of the equipment.

Original instructions. The contents of this manual is the property of Struers. Reproduction of any part of this manual without the written permission of Struers is not allowed.

Struers A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark
Telephone +45 44 600 800
Fax +45 44 600 801

AbraPol-20
Safety Precaution Sheet

To be read carefully before use

1. The operator should be fully aware of the use of the machine according to the instruction manual.

2. The machine must be installed in compliance with local safety regulations.

3. Be aware that the machine's centre of gravity is located in the upper half of the machine.

4. Before lifting the machine, ensure that the supplied lifting boom is securely bolted to the machine.

5. When lifting the machine using a forklift, lift from front - never lift the machine from the side or the rear.

6. When lifting the machine using lifting straps, ensure that the straps are crossed and do not press on the sides of the machine.

7. The machine must be placed on a safe and stable support, which is capable of bearing the weight of this machine. Before using the machine, it must be levelled using the adjustable legs.

8. Check that the actual voltage corresponds to the voltage stated on the side of the machine and that the connections comply with local regulations.
The machine must be earthed.

9. Make sure that the water connections are without leaks. The main water supply should be turned off or disconnected if you leave the machine unattended.

10. Alcohol based consumables: follow the current safety rules for handling, mixing, filling, emptying and disposal of the alcohol-based liquids.
Struers recommend the use of an external exhaust system.

11. Make sure that the specimens in the specimen holder are securely fixed when operating.

12. If you observe malfunctions or hear unusual noises - stop the machine and call technical service.

13. The machine must be disconnected from the mains prior to any service. Wait until residual potential on the capacitors is discharged.

14. Do not cycle mains power more than once every three minutes. Damage to the drive will result.

15. To achieve maximum safety and lifetime of the machine, use only original Struers consumables.

The equipment should only be used for its intended purpose and as detailed in the Instruction Manual.

The equipment is designed for use with consumables supplied by Struers. If subjected to misuse, improper installation, alteration, neglect, accident or improper repair, Struers will accept no responsibility for damage(s) to the user or the equipment.

Dismantling of any part of the equipment, during service or repair, should always be performed by a qualified technician (electromechanical, electronic, mechanical, pneumatic, etc.).

User's Guide

Table of Contents **Page**

1. Getting Started

2. Operation

3. Maintenance

1. Getting Started

Checking the Contents of the Packing Box

In the packing box you should find the following parts:

1 AbraPol-20 (Grinding polishing machine)
1 Outlet hose 2.5 m with straight PVC pipe, for connection to external cooling unit
1 Hose clamp, 32-50 mm
1 Inlet hose for tap water 3/4" (2m)
1 Filter gasket
1 Gasket ø11/ø24 (1.5 mm)
1 Reduction ring with gasket
1 Hose for compressed air
1 Hose connection for compressed air
2 Hose clamps, 12 mm
2 Silicone tubes for use with alcohol based lubricants
2 Bottles, ½ l, with lids (4 Bottles if delivered with Additional Dosing Unit)
1 Bottle, 1 l, with lid (2 Bottles if delivered with Additional Dosing Unit)
1 Fork spanner (24 mm)
1 Set of Instruction Manuals

Additional Dosing Unit (accessory)

Three additional pumps for dosing of OP-Suspension, lubricants and suspensions.

Outlet Kit (accessory)

Shift valve for recirculation cooling unit or drain.

Accurate Material Removal Unit (accessory)

For accurate removal of material. Stops process after required amount of material has been removed.

Unpacking and Placing AbraPol-20

AbraPol-20 should be placed on a plane and horizontal floor, capable of bearing the weight of this machine, please refer to the Technical Data section.
The machine must be placed close to the power supply, compressed air, water mains and water outlet facilities.

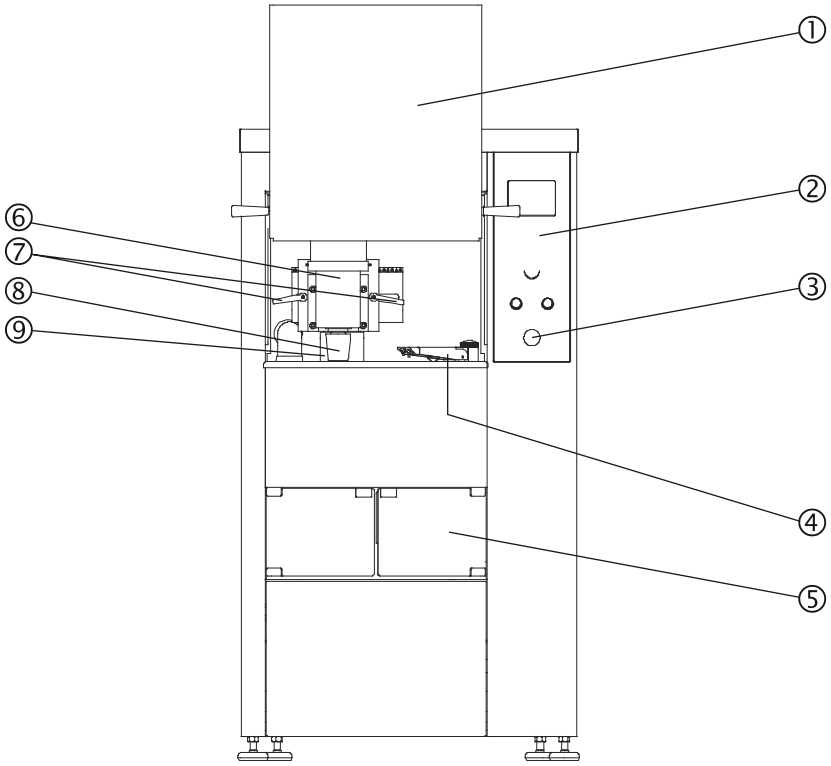
- Unscrew the nuts from the transport brackets fixing the machine to the pallet.
- Lift the machine from the pallet by means of a forklift truck from the front, and place in a suitable location.
- Remove the safety-springs from the front crossbar, and remove the bar.

Important
If necessary, turn the adjustable feet so that the machine stands firmly and is level.

Getting Acquainted with AbraPol-20

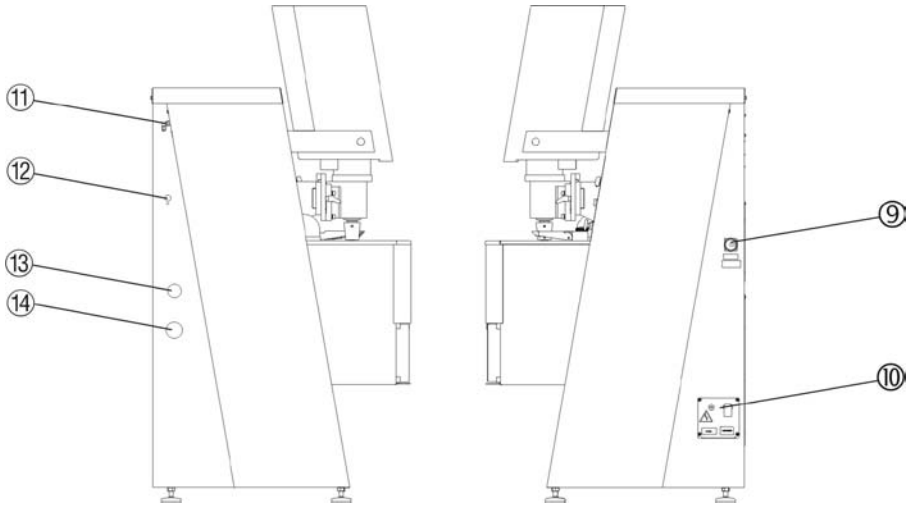
Take a moment to familiarise yourself with the location and names of the AbraPol-20 components.

Front view



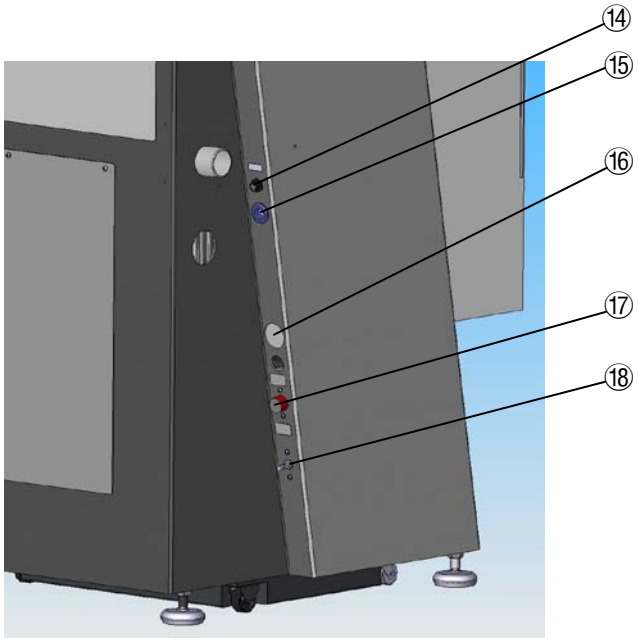
① Safety guard
② Control panel,
(see 2. Basic Operations)
③ Emergency Stop
④ Nozzle block
⑤ Bottle unit
⑥ Specimen holder motor
⑦ Handle for adjusting specimen holder position
⑧ Specimen quick coupling
⑨ LED-light to illuminate preparation disc

Side views



⑨ Mains power switch
⑩ Electrical connections
⑪ Compressed air inlet
⑫ Adjustment screw for speed of Sample Mover head
⑬ Connection to exhaust
⑭ Opening for water outlet

Rear view



⑭ Connector for Recirculation Cooling Unit
⑮ Hole for lead from Recirculation Cooling Unit
⑯ Water outlet (when shift valve is fitted)
⑰ Connection for water inlet
⑱ Regulation valve for disc cooling

Power Supply

IMPORTANT
Check that the mains voltage corresponds to the voltage stated on the type plate on the side of the machine.

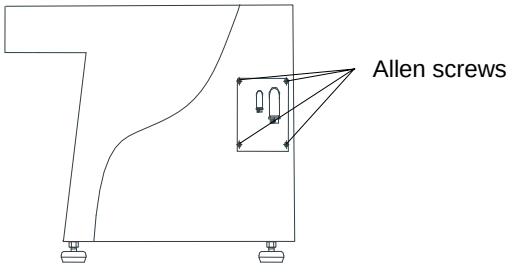
IMPORTANT
AbraPol-20 must be connected with an electric cable and an additional wire for earth connection which MUST be hard-wired into the mains (ref. EN 50178 / 5.2.11.1)

Important:
For Electrical Installations with Residual Current Circuit Breakers
For AbraPol-20 connected to electrical installations with residual current circuit breakers, a residual current circuit breaker, type B, 30 mA is REQUIRED (ref. EN 50178 / 5.2.11.1).

For Electrical Installations without Residual Current Circuit Breakers
The equipment must be protected by an insulation transformer (double-wound transformer)

Please contact a qualified electrician to verify which option is suitable for the local installation setup.

Both requirements refer to the European standard EN 50178 / 5.2.11.1. Similar standards apply in North America.



- Remove the 4 Allen screws, on the right hand side of the machine, securing the electrical panel, and let the electrical panel rest on the tabs.
- Lead the cable through the conduit in the panel and connect the 3 phases and 2 earth connections according to local regulations.
- The second Protective Earth must be earthed by connection to a terminal marked ⏚ or PE
  alternatively, use a system whereby there is an automatic disconnection of the supply in case of loss continuity of the protective conductor.

Supplying Compressed Air

- Connect the compressed air supply with the inlet on the rear, left side of the machine by means of the air hose and the hose connection delivered with the machine.
- Fasten the air hose with a hose clamp.

The pressure supply should be 6-10 bar and should be supplied either from a central compressor, portable compressor with compressed air reservoir or compressed-air bottle. A capacity of 20 l/min at atmospheric pressure is sufficient.
Please refer to the section on Technical Data for recommended air quality.

Connection to an External Exhaust System

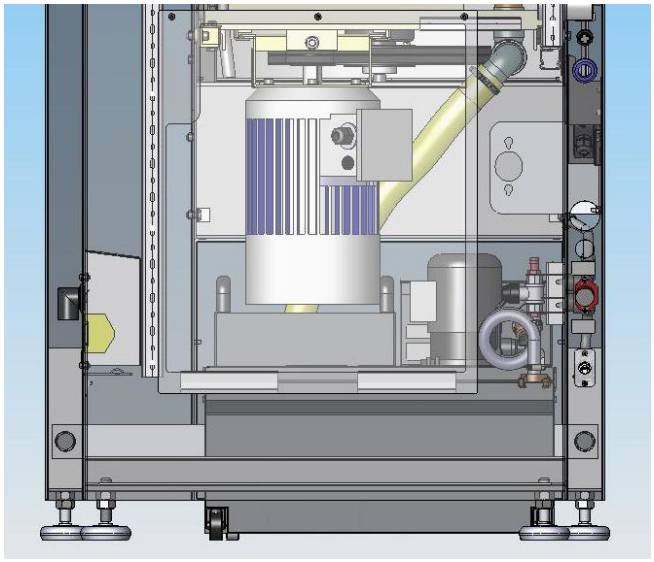
An exhaust system should be connected when using alcohol based suspensions or lubricants.

- Connect a 50 mm pipe to the outlet at the rear of the machine, on the left and connect to the exhaust system.

Recommended capacity for exhaust system: 180m^3/h at 0mm water gauge.

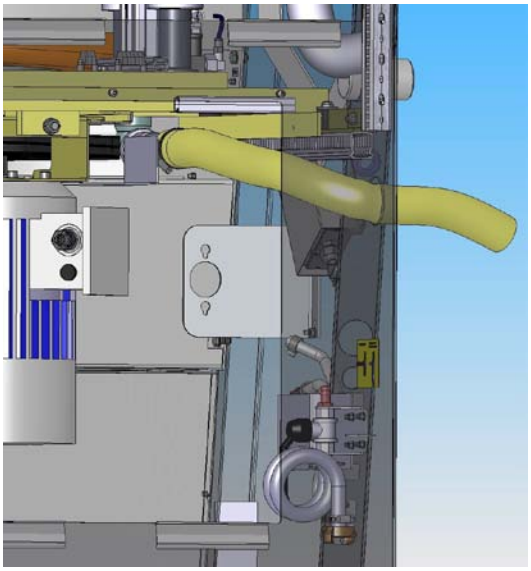
Water Outlet

AbraPol-20 is delivered with a short piece of hose (0.8 m) attached to the water outlet. This is sufficient to connect the machine to a recirculation cooling unit placed underneath the machine.



To connect the machine to an external drain, lengthen the outlet hose with the longer piece delivered with the machine (2.5 m).

- Insert the straight piece of pipe halfway into the second piece of hose (2.5 m) and secure with a hose clamp. Lubricate with grease or soap to facilitate insertion.
- Insert the other end of the straight pipe into the outlet hose mounted on AbraPol-20 and secure with a hose clamp.
- Check that the outlet hose slopes downwards towards the drain along the whole of its length. Shorten the hose to the required length.

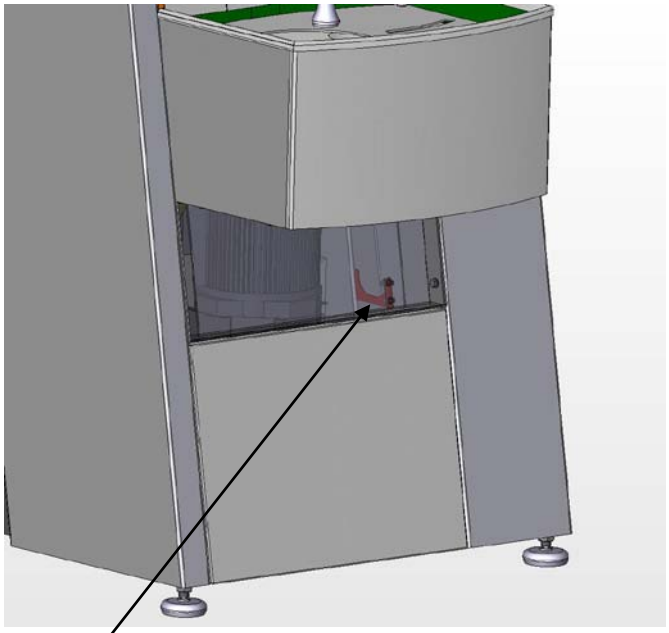


Mounting a Recirculation Cooling Unit (accessory)

Please refer to the manual for the Recirculation Cooling Unit for details.

IMPORTANT
Always maintain the correct concentration of Struers Additive in the cooling water (percentage stated on the Additive container).
Remember to top up with Struers Additive each time you refill with water.

Whenever the recirculation tank is removed from the compartment underneath the AbraPol-20, place the drain tube in the tube holder to avoid dripping.
Remember to put the tube back into the tank before starting the machine.



Tube holder

Mains Water Connection

When the AbraPol-20 is used without a Recirculation Cooling Unit, with the second dosing unit for dosing of OP-Suspensions or when disc cooling is required, AbraPol-20 must be connected to water directly from the mains.

- Mount the pressure hose onto the water inlet tube on the back of the AbraPol-20.
  - Insert the filter gasket in the coupling nut with the flat side against the pressure hose.
  - Tighten the coupling nut completely.
- Mount the other end of the pressure hose on the water mains tap for cold water:
  - Mount the reduction ring with gasket on the water mains tap, if necessary.
  - Introduce the gasket and tighten the coupling nut completely.

Placing Bottles in the Dosing Unit

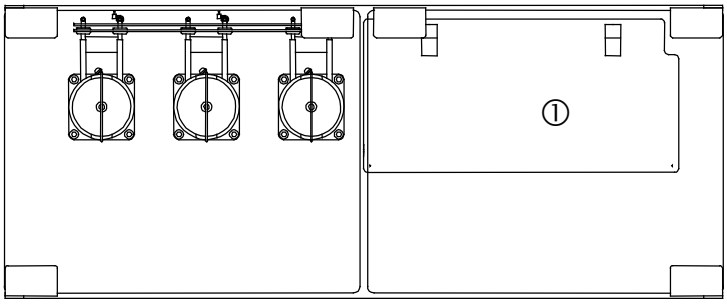
- Place the filled bottles in the dosing unit and connect the tubing.
- Enter the bottle details in the Bottle Configuration menu to make them available for preparation methods. See “Setup Bottle Configuration”.

The tubes can easily go through the bottle unit to reach larger containers placed on the floor e.g. Lubricants.

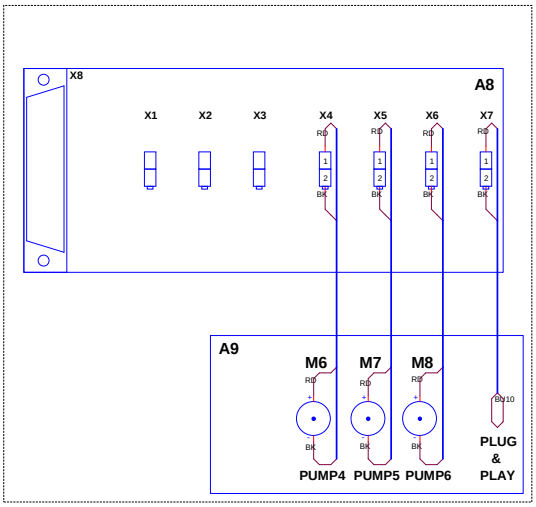
Nb!
OP-Suspensions can not be placed on the floor.

Mounting an Additional Dosing Unit (accessory)

- Switch off the machine.
- Open the doors to the bottle unit.



- Remove the rectangular cover plate ① with a 3 mm Allen key.
- Loosen the hose clamp on the water hose and remove the plug from the hose.
- Connect the hose to the tube at the back of the Additional Dosing Unit and secure it with the hose clamp.
- Connect the electrical plugs from the Additional Dosing Unit to the PCB inside the machine. (see fig.)
  Start from the left with pump 4 to the left connection, pump 5 to the second connection, pump 6 to the third connection and finally the plug with the all black wires to the last connection on the right.



NB
Remember the earth connections.

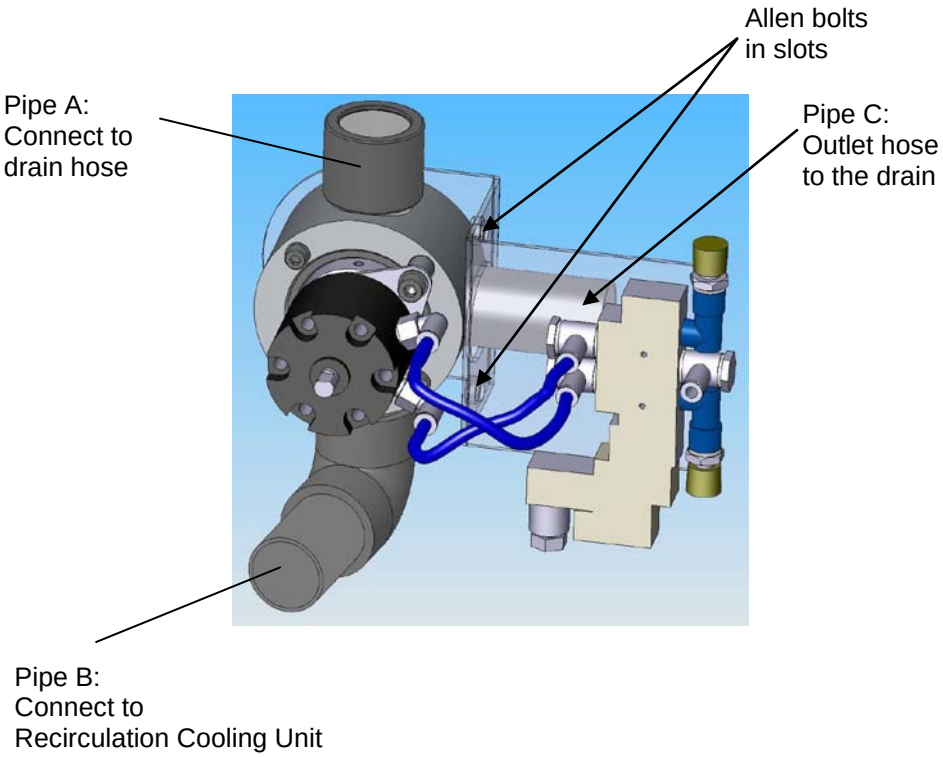
- Mount the Additional Dosing Unit using the four screws.
- Connect the tubes to the inlets/outlets of the dosing pumps.
- Switch the machine back on again and configure the new pumps.

NB
OP-suspensions can only be used in bottle 4.

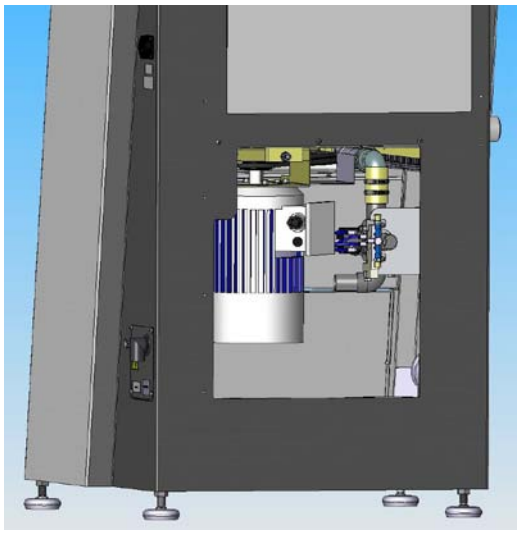
Mounting the Outlet Kit (accessory)

The shifting valve can be mounted from the rear of the AbraPol-20 (recommended) or from the front.

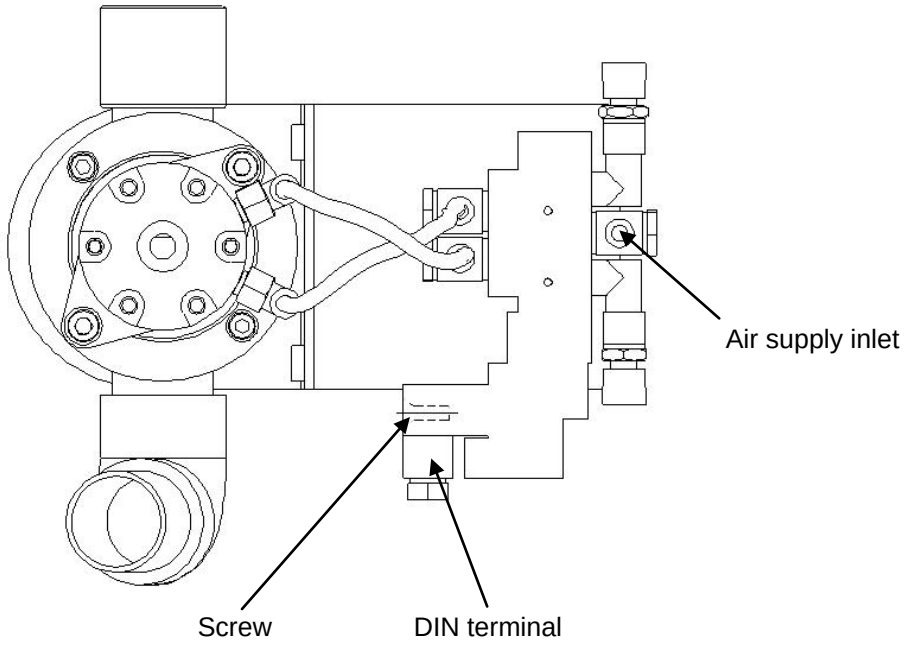
- Switch off the machine
- To install from the rear:
  Remove the lower back cover plate
- To install from the front:
  Remove lower cover plate and the Recirculation Cooling Unit, if there is one.
- Take the entire unit, and place it in position by letting the two Allen bolts slide into the slots located in the left rear side.



- Tighten the Allen bolts.



- Cut the water outlet hose to the required length and mount onto pipe **A** of the Shifting Valve**,** clamp using a hose clamp.
- Take another piece of drain hose and check that it is long enough to reach the Recirculation Cooling Unit (Ø40 mm and 0.5m long). Mount onto pipe **B** and clamp using a hose clamp**.**
- Connect to the Recirculation Cooling Unit.
- Connect a piece of drain hose from the outlet at the rear (pipe **C**) and lead to the drain. Check that the outlet hose slopes downwards towards the drain along the whole of its length.
- Reposition the Recirculation Cooling Unit.
- Make sure that the hoses do not interfere with the belts.



- Locate the electrical cable for the air solenoid valve (located on the inner left side of the machine) and remove the cap covering the stripped wires.
- Open the cover of the DIN terminal by removing the screw and connect the wires to the terminals.
- Replace the cover for the DIN terminal.

> ***Note:***
> It is not important to which terminal the wires are co
> each wire can be connected to either termina.

- Find the air supply hose and cut off the plug (stopper). Fix the cut end into the air supply inlet.
- Replace the front cover and reconnect main power.

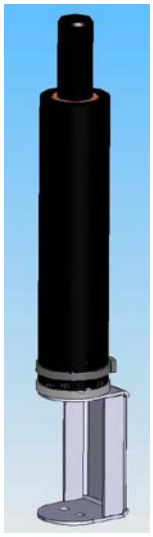
Adjusting Disc Cooling

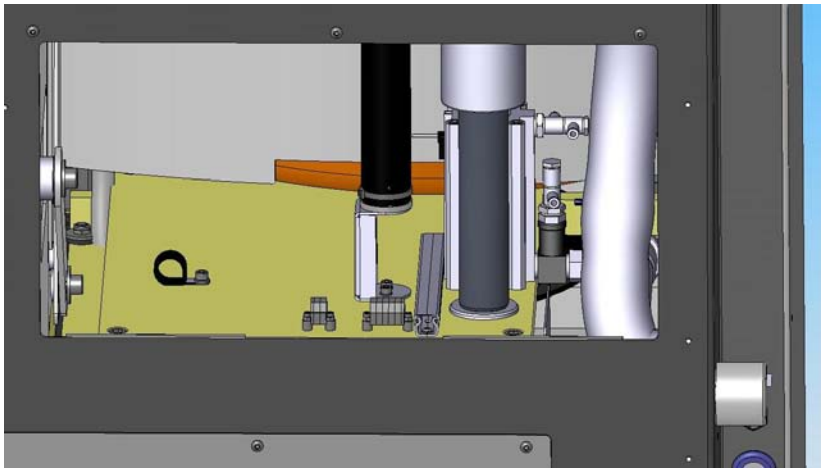
Should the rate of disc cooling require adjustment:

- Loosen the contra nut and turn the regulator screw to the required rate.
- Re-tighten the contra nut.

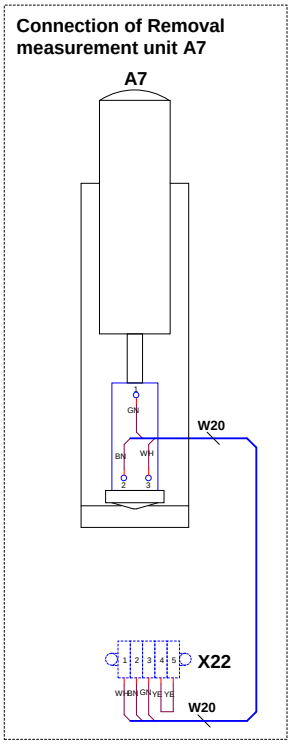
Mounting the Stock Removal Sensor (accessory)

- Disconnect main power.
- Remove the upper back cover plate.
- Take the Stock removal unit with the stand and position over the predrilled holes on the machine.
- Secure the Stock Removal Sensor in place using two M5 screws and washers (use a 4 mm Allen key).





- Connect the wire to the connector X22 (remember to lead the wire in the trunking).



- Replace the cover plate
- Reconnect main power and follow the instructions on the screen, using the tools supplied and the calibrating sticks.

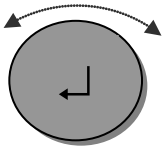
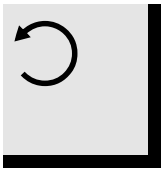
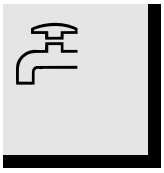
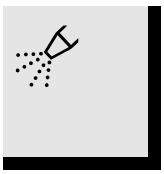
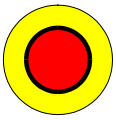
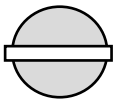
2. Operation

Front Panel

For more information also see page on Front Panel Controls.

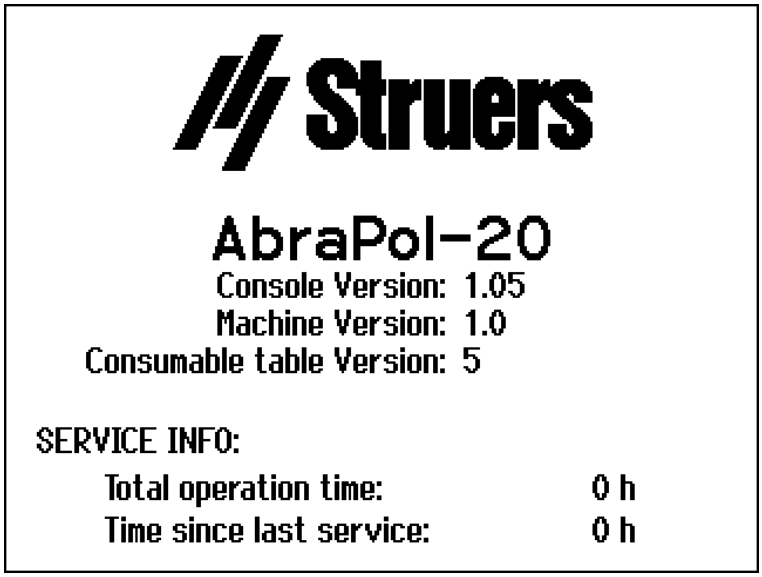
Front Panel Controls

Name	Key	Function
FUNCTION KEY	**F1**	Controls for various purposes. See the bottom line of the individual screens.
FUNCTION KEY	**F2**	Controls for various purposes. See the bottom line of the individual screens.
FUNCTION KEY	**F3**	Controls for various purposes. See the bottom line of the individual screens.
FUNCTION KEY	**F4**	Controls for various purposes. See the bottom line of the individual screens.
Esc	**ESC**	Leaves the present menu or aborts functions/changes.
START		Starts the preparation process.
STOP		Stops the preparation process.

Name	Key	Function
Push/Turn Knob		Used for entering and changing steps and parameters. Combined cursor and enter key.
DISC		Starts the rotation of the disc.
Water		Activates the water flow. Remember to adjust the flow on the water tap.
LUBRICANT		Manual dosing of lubricant
ABRASIVE		Manual dosing of abrasive
EMERGENCY STOP		- Push the red button to stop. - Turn the red button clockwise to release.
MAIN SWITCH		The main switch is located on the right side of the machine.

Software Settings

Switch on the power at the main switch located at the right hand side of the machine.
The following display will appear briefly:

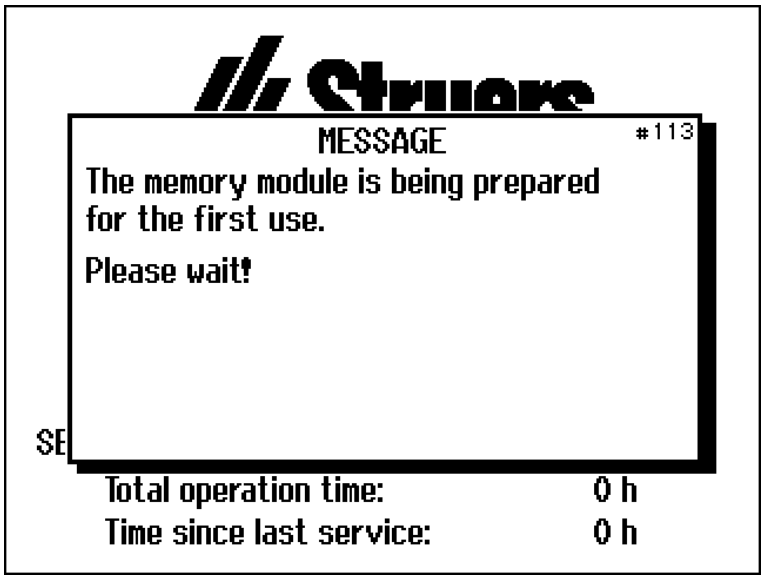


This screen shows the software versions of both the operating console and the machine, as well as the version number of the consumables table.

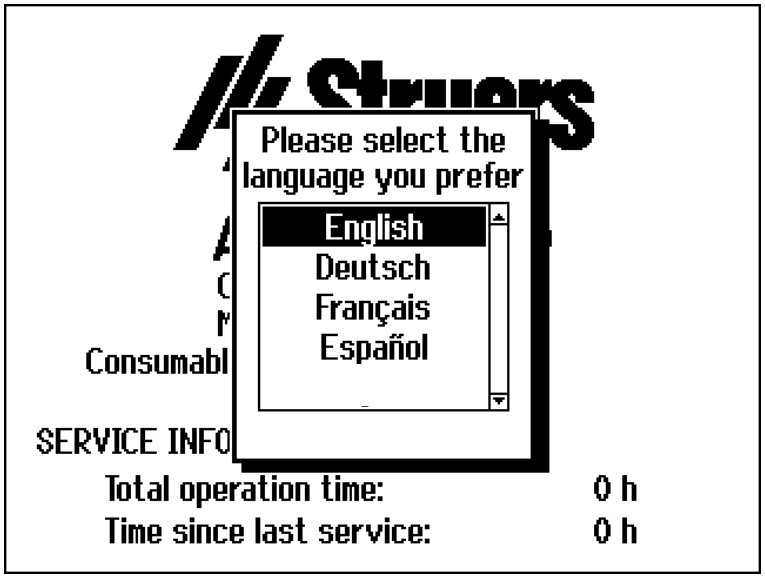
Additionally some service information is supplied; the total operation time and the time since the last service of the machine.

The display will then change to the last screen shown before AbraPol-20 was switched off, usually a preparation method.

When switching on AbraPol-20 for the first time, the following screen will appear for a short while:



A pop-up menu will appear to request selection of the language of your choice.



↓

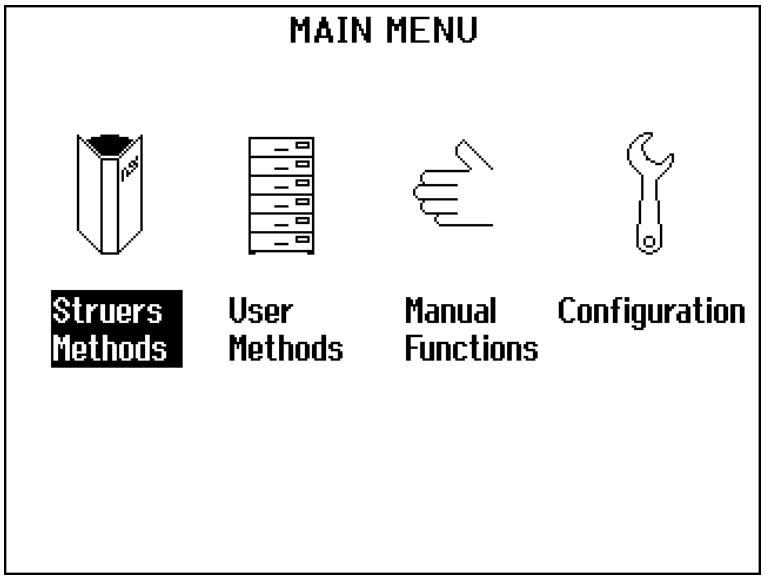
Turn knob to select the language you prefer.

↓

Push knob to accept the language.

Then the MAIN MENU will then appear.
If the heading in the display is different, press Esc, until the MAIN MENU appears.

The MAIN MENU is the highest level in the menu structure. Pre-defined Struers methods, your own methods, manual functions or the configuration menu can then be selected.



↓

Turn knob to select *Configuration*.

↓

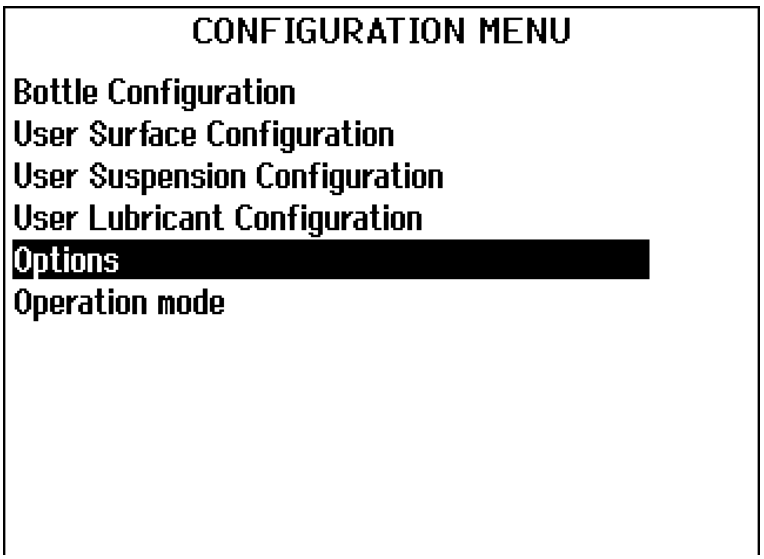
Push knob to activate the *CONFIGURATION MENU*.

↓

Setting the Language

Turn knob to select *Options*.

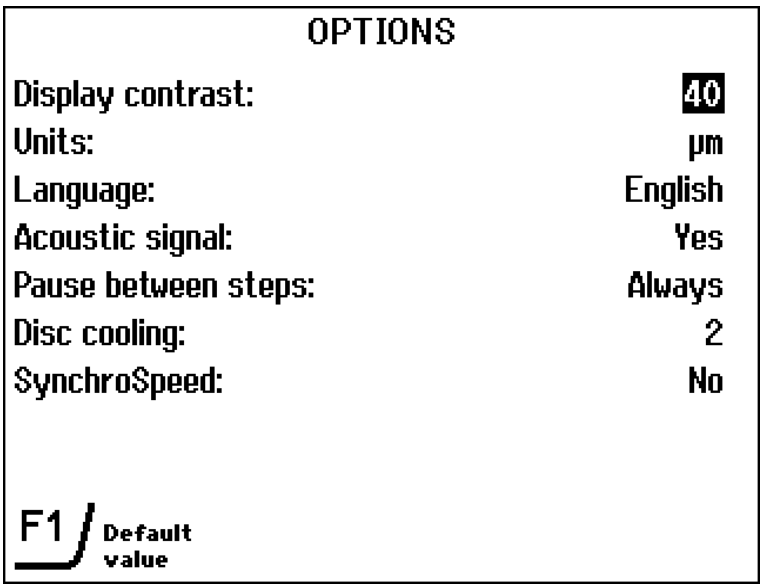
↓



↓

Push knob to activate the *OPTIONS* menu.

↓



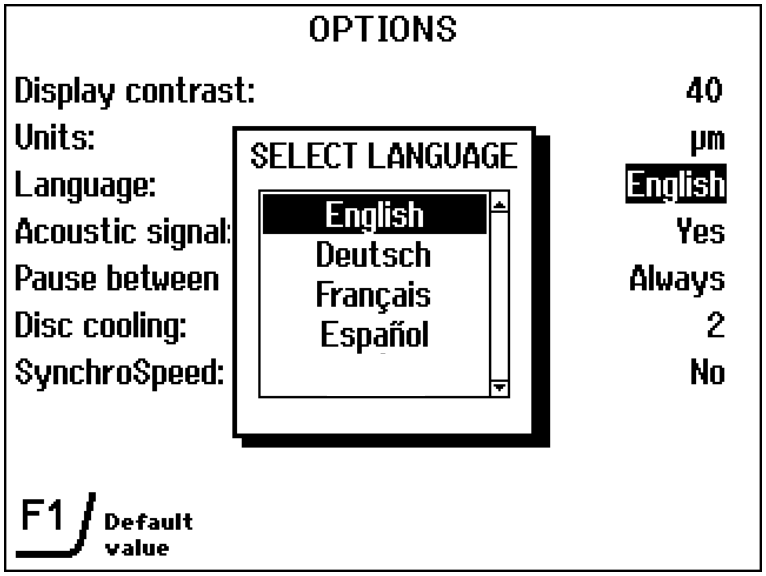
↓

Turn knob to select *Language*.

↓

Push knob to activate the *SELECT LANGUAGE* pop-up menu.

↓



↓

Turn knob to select the language you prefer.

↓

Push knob to accept the language.

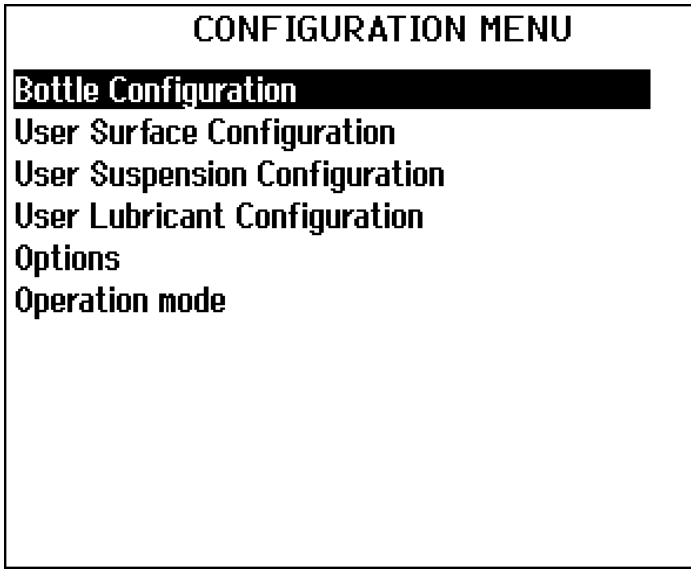
The *CONFIGURATION MENU* now appears in the language you have chosen.

Press Esc to return to the *MAIN MENU*.

Setup Bottle Configuration

Turn knob to select *Bottle Configuration*.

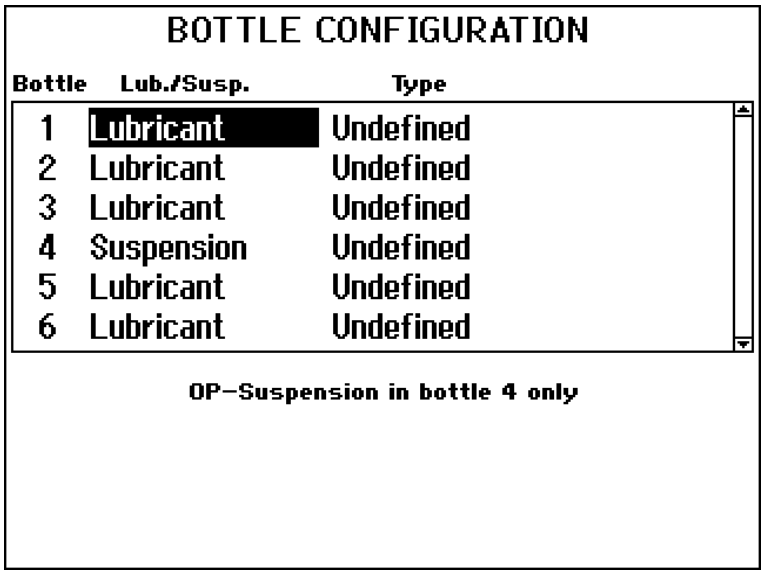
↓



↓

Push knob to activate the *BOTTLE CONFIGURATION* menu.

↓



↓

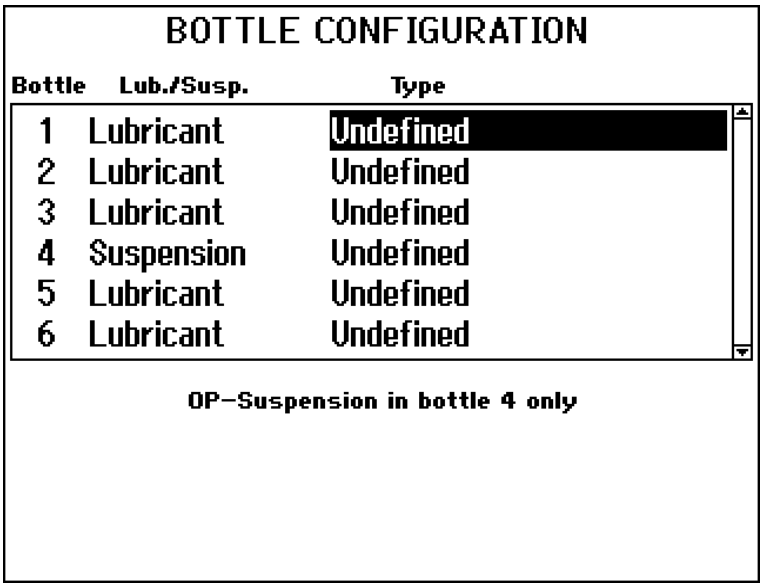
Turn knob to select which bottle to configure.

↓

Push knob to toggle between Lubricant and Suspension.

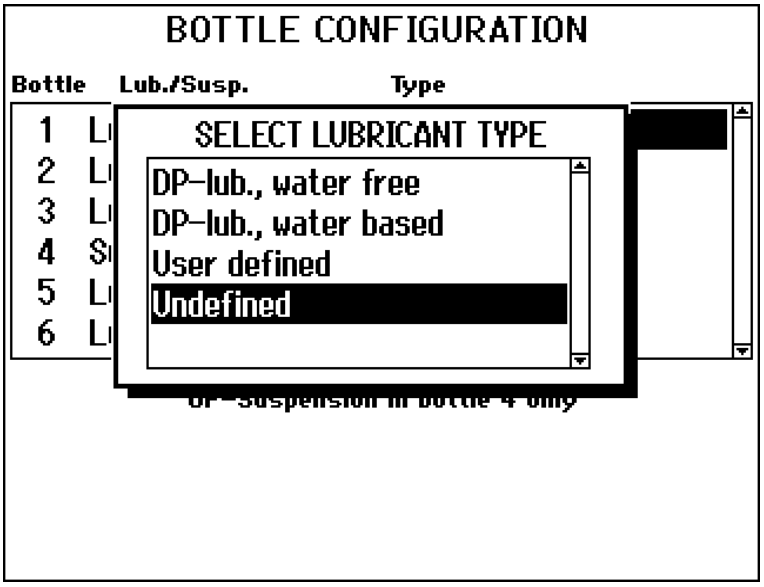
↓

Turn knob to move to *Type*.



↓

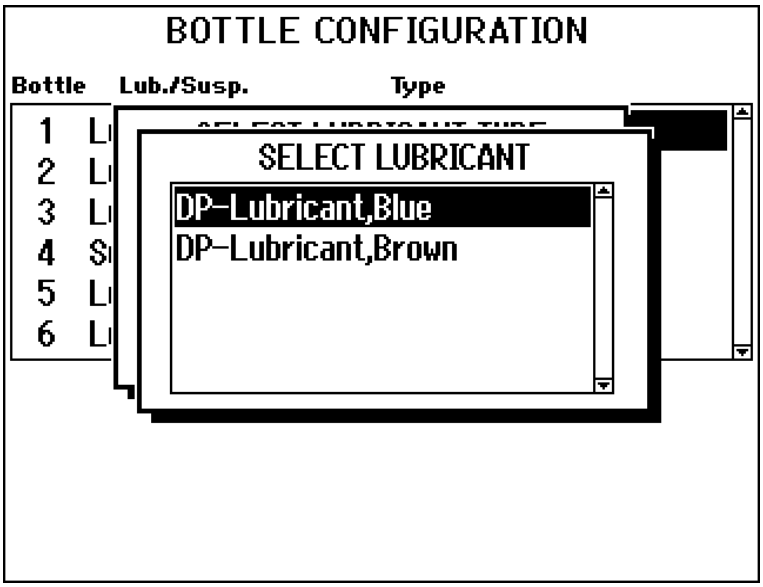
Push knob to activate the select type menu.



↓

Turn and push knob to select type of Lubricant/Suspension.

↓



↓

Turn and push knob to select an option.

Repeat this procedure for all the bottles in use.

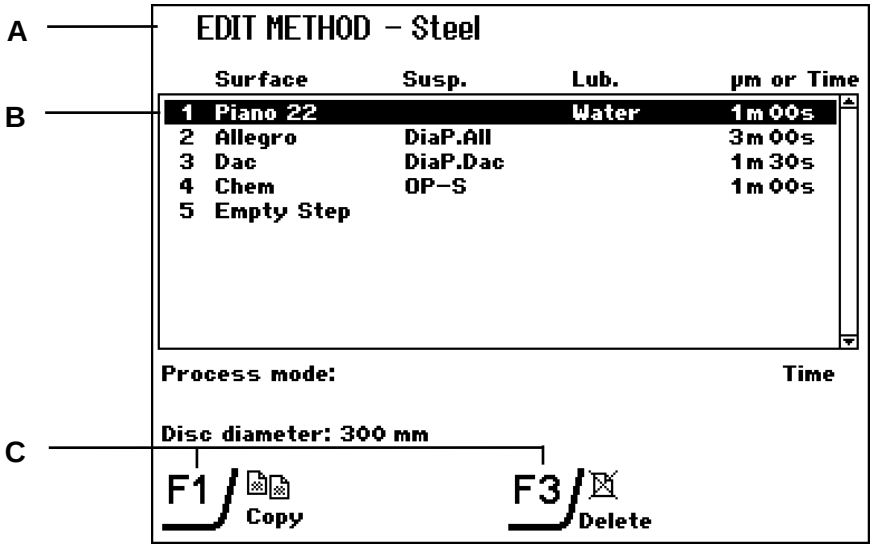
↓

Esc Press Esc twice to return to the *Main Menu*.

NB
The different suspensions and lubricants used must always be defined here so that AbraPol-20 can locate the correct suspension or lubricant.

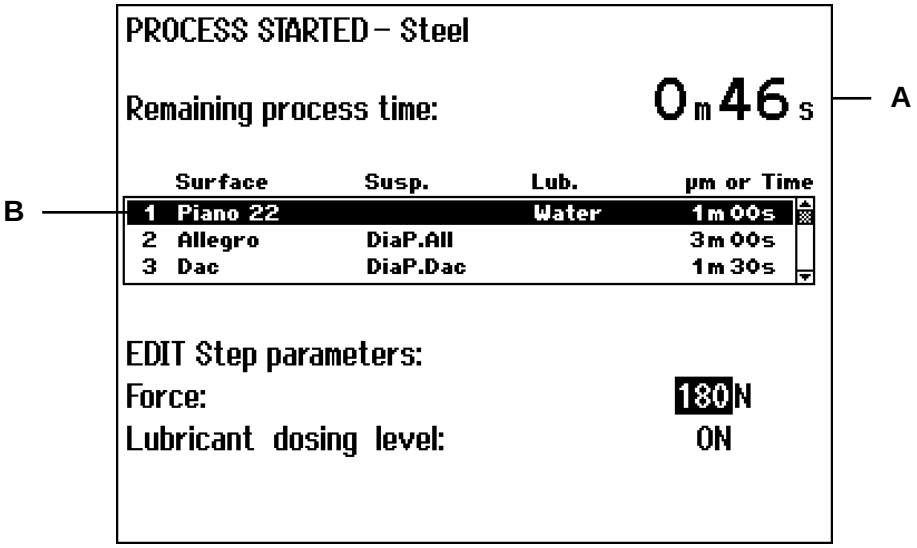
Reading the Display

The display can show various kinds of information, for example parameters of a preparation method, or the ongoing process.
An example of the screen for a preparation method is shown below:



A Heading.
B Inverted text: cursor position.
C Function key options

During the process the screen could look as follows:



A Time remaining in currently running step.
B Preparation step currently running.

Sleep Mode

To increase the lifetime of the display, the backlight is dimmed automatically if AbraPol-20 has not been used for 15 min. Press any key to re-activate the backlight.

> ***Please Note***
> The sample screens in this Instruction Manual show a number of possible texts. The actual display screen may differ from the samples in the Manual.

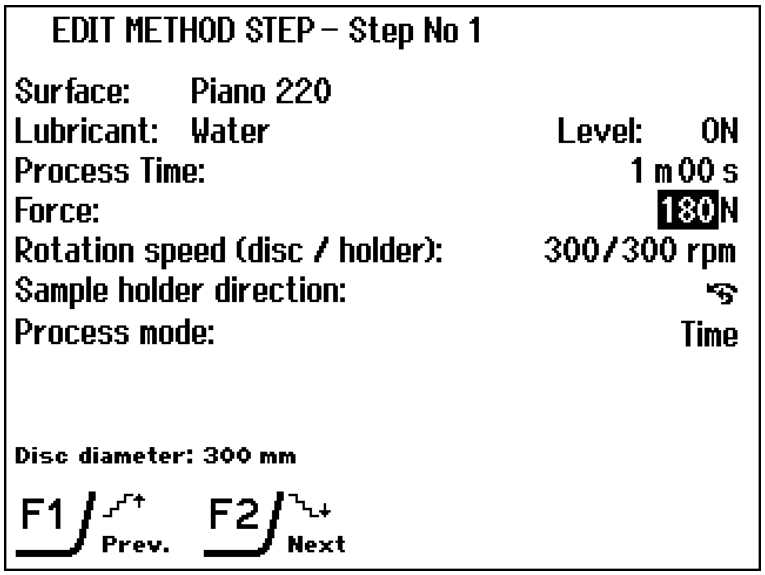
Changing/Editing Values

Depending on the type of value, there are two different ways of editing.
STRUERS METHODS can not be edited or changed in any way, this is only valid for USER METHODS and CONFIGURATION.

Numeric Values

Turn knob to select the value to be changed, e.g. *Force*:

↓

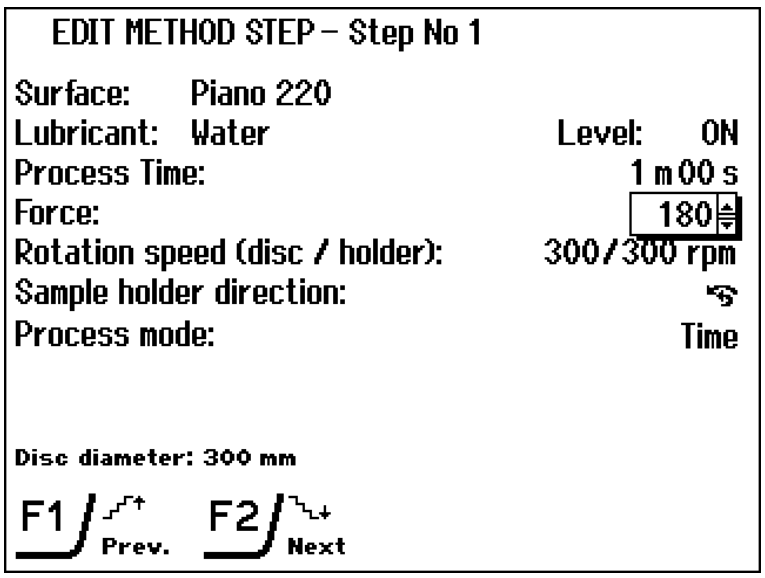


↓

Push knob to edit the value.

↓

A scroll box appears around the value.



↓

Turn knob to increase or decrease the numeric value.

↓

Push knob to accept the new value. (Pressing Esc aborts the changes, preserving the original value.)

Alphanumeric Values

Turn knob to select the alphanumeric value to be changed, e.g. *Surface*

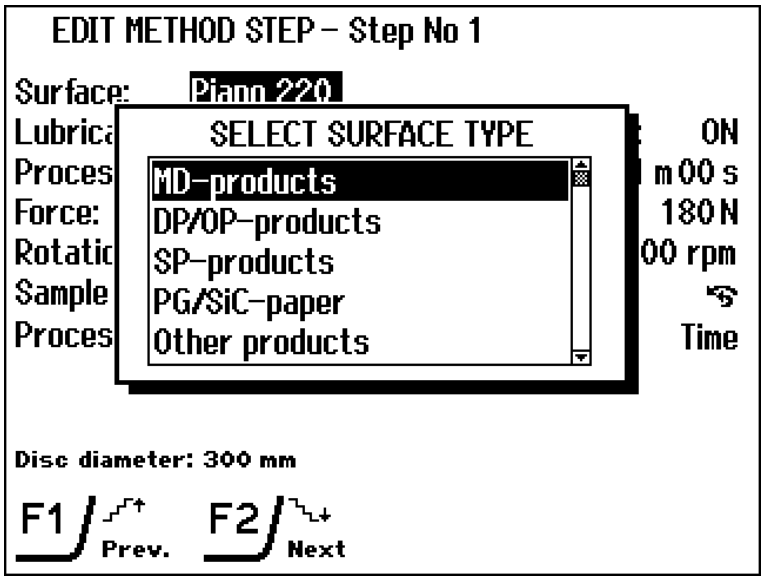
↓

↓

Push knob to edit the value.

↓

A pop-up menu appears.



↓

Turn knob to select the correct choice.

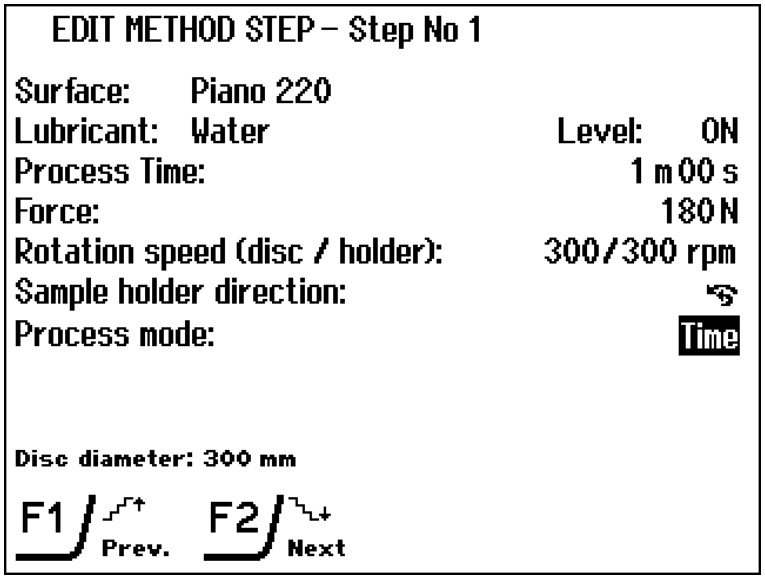
↓

Push knob to accept the new selection and to continue or to return to the previous screen. (Pressing Esc aborts the changes, preserving the original setting.)

Text Values

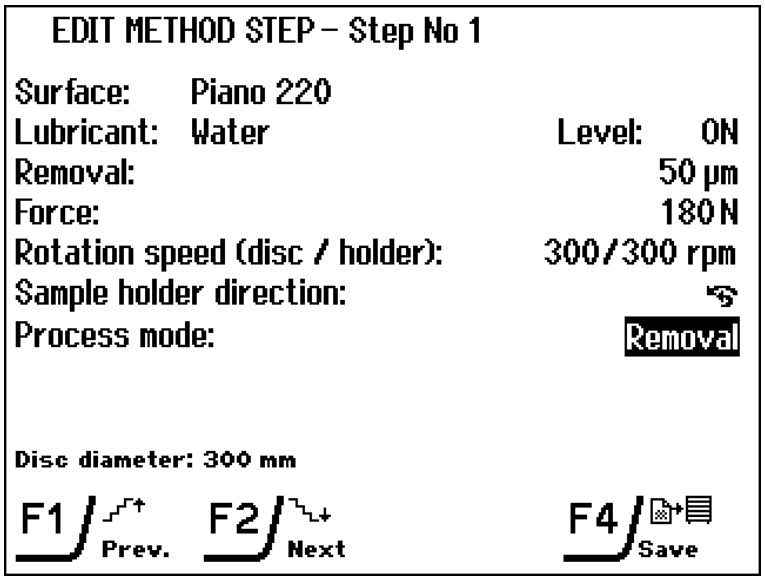
Turn knob to select the parameter to be changed, e.g. *Process mode*.

↓



↓

Push knob to change the value.



Programming a Preparation Step

Different preparation steps can be programmed individually in regard of time, speed of disc, water, type and dosing of lubricant and suspension. These steps can be combined in a number of different ways so that different materials can be prepared without having to repeat the programming.

Mounting a Preparation Disc (300 or 350 mm)

- Move the nozzle block to the side.
- Place the disc on the turntable and move it until the three pins engage with the holes in the turntable.

Inserting the Specimen Holder

- Place the specimen holder under the quick coupling.
- Press and hold the black flange of the column down with your thumbs while guiding the pressure tap of the specimen holder into the coupling.
- Release the black flange.
- Turn the specimen holder until the three pins engage with the corresponding holes.

Adjusting the Specimen Holder Position

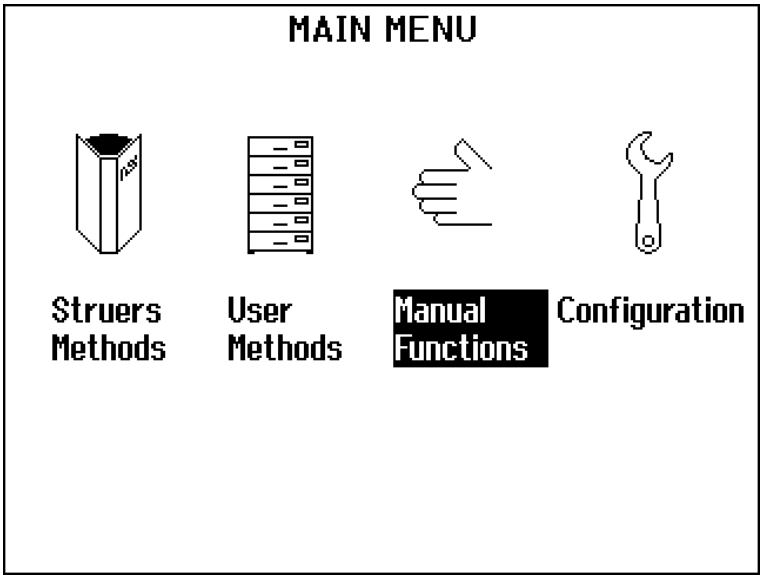
The position of the specimen holder has to be adjusted correctly in relation to the preparation disc to get the best possible preparation results.

- Loosen the two handles located on each side of the specimen holder motor.
- The specimen holder motor can now be moved manually to the sides. The eccentricity can be read on the scale on the specimen holder motor.
- When the correct position is found, fasten the handles again.

For very precise adjustments a special function is available in the *Manual Functions* menu

Turn knob to select *Manual Functions*.

↓

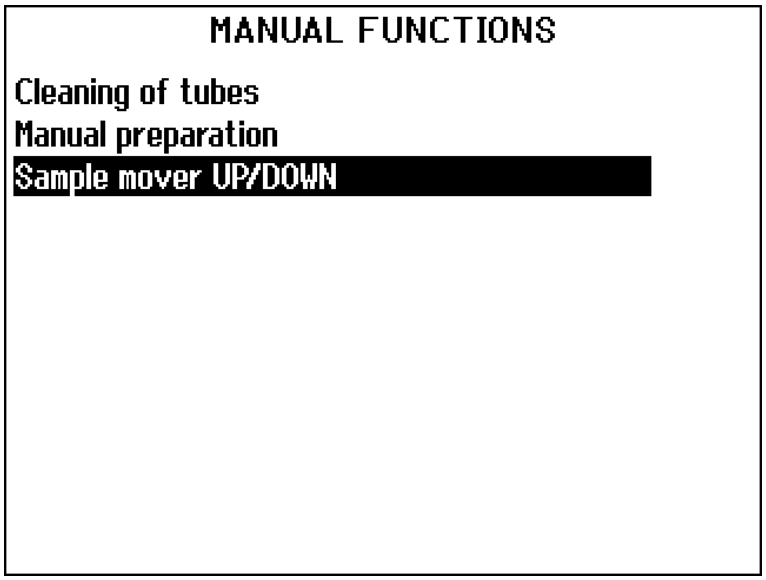


↓

Push knob to activate the *Manual Functions* Menu.

↓

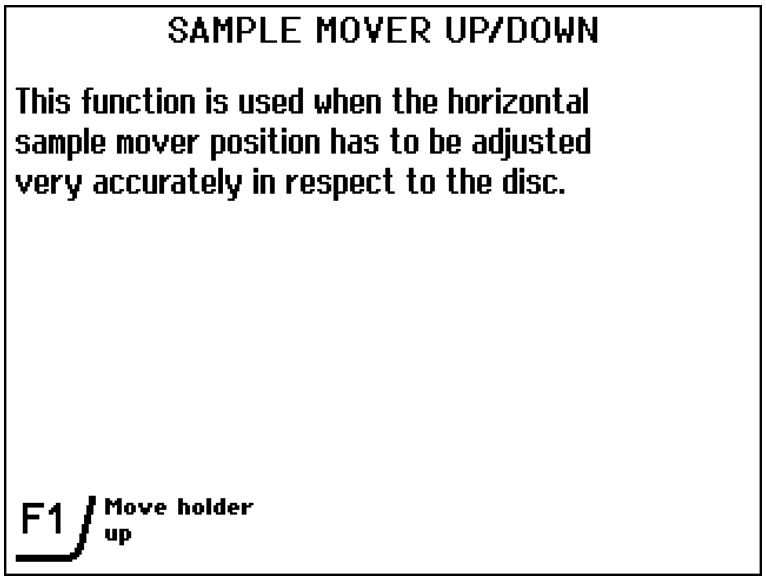
Turn knob to select *Sample mover UP/DOWN*.



↓

Push knob to enter the *SAMPLE MOVER UP/Down* menu.

↓



↓

Press **F1** to move the specimen holder down.
The specimen holder moves down at the lowest possible force (and without rotation) and the holder can now be positioned precisely as required.
Press **F1** again to move the holder up.

Starting the Preparation Process (Struers Method)

- Check that the splash ring is in place.
- Press **ESC** to get to the *Main Menu*.
- Select *Struers Methods* in the *Main Menu* by turning the knob.
- Push the knob to enter the *Struers Methods* menu.
- Turn the knob to select a Struers Method.
- View Method by pushing the knob.
- Place the required preparation surface on the MD-Disc.
- Insert the specimen holder into the coupling.
- Close the safety guard.
- Start the preparation by pressing the Start button ◊.

Stopping the Preparation Process

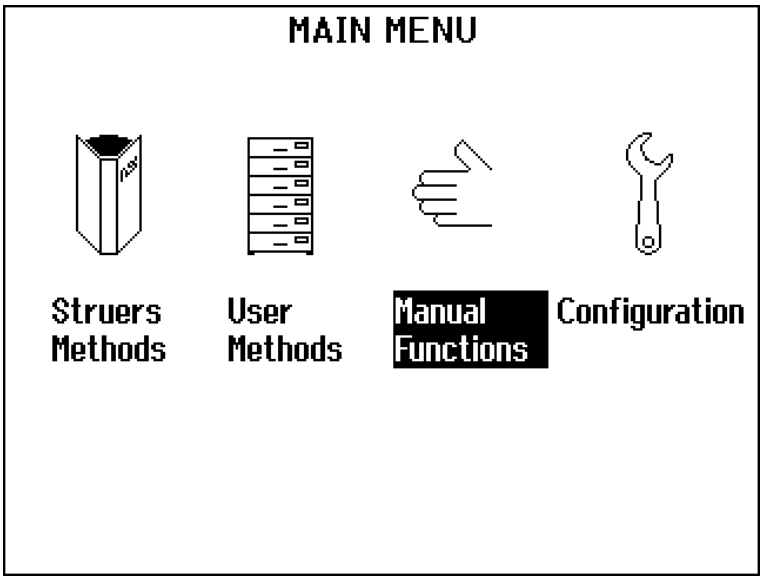
When the time has elapsed the preparation disc will automatically stop and the specimen holder will return to its initial position. The machine is now ready for the next step.

- A preparation step can be stopped at any time during the process by pressing the key STOP ▽.
- A process can also be stopped using the emergency stop button. The emergency stop button must be pulled outwards again to release it before the machine can be restarted. The sample mover will return to its initial position before the process can be started again.

Manual Functions

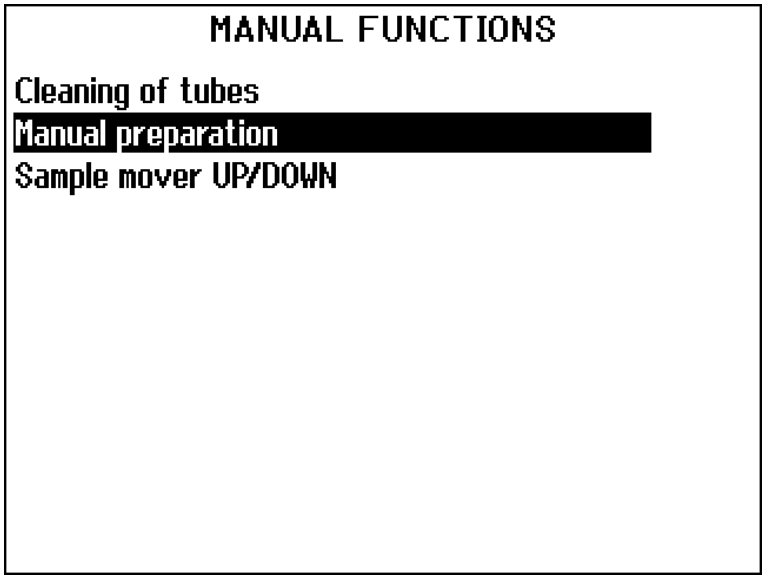
Manual preparation can also be carried out from the *Manual Functions* menu.

Turn knob to select *Manual Functions*.

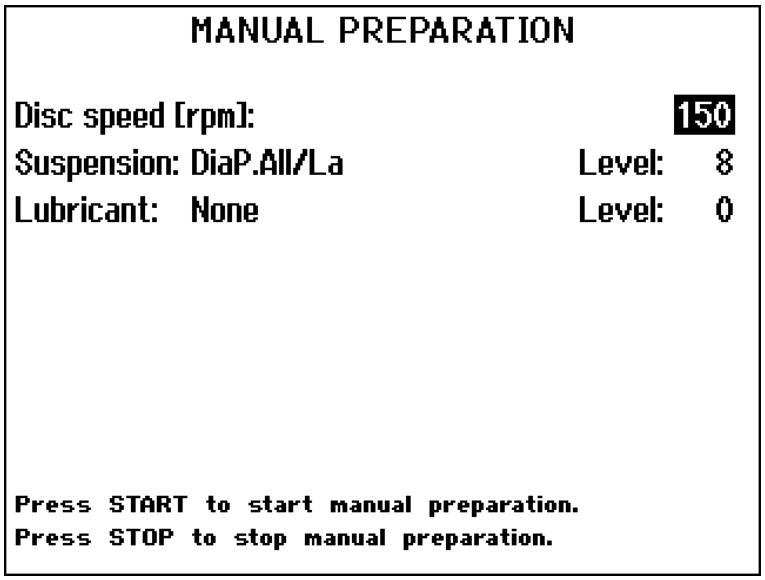


Push knob to activate the *MANUAL FUNCTIONS* menu.

Turn knob to select *Manual preparation*.



Push knob to activate the *MANUAL PREPARATION* menu.



Press Start.

The preparation disc will start rotating at the pre-set speed and the selected suspension/lubricant will automatically be added in the pre-set level.

Press Stop.

The preparation disc will stop rotating and dosing will stop.

3. Maintenance

General Cleaning

The machine and the Recirculation Cooling System should be kept as clean as possible in order to avoid contamination of the specimens.

Cooling Tank

Each time the water is changed, the cooling tank should be cleaned carefully to remove all grinding waste.

> ***IMPORTANT***
> Always maintain the correct concentration of Struers Additive in the cooling water (percentage stated on the container of the Additive). Remember to add Struers Additive each time you refill with water.

> ***IMPORTANT***
> Do not use benzene or petroleum for cleaning when the additive is used.

Painted Surfaces

Painted surfaces and keyboard should be cleaned with a moist cloth and common household detergents.

> ***IMPORTANT***
> Never use alcohol, acetone or similar solvents.

Weekly Service

Checking the Recirculation Cooling Unit

The cooling unit should be checked for cooling water after 8 hours use or at least every week. The unit must be refilled if the flushing pump cannot reach the cooling water or if the cooling water is too contaminated.
Please refer to the manual for the Recirculation Cooling Unit for details.

Monthly service

Replacing the Cooling Water

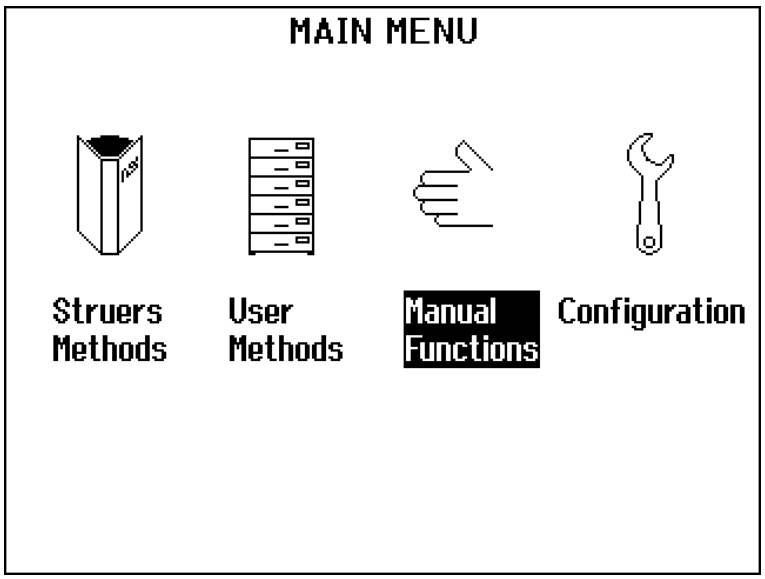
- Replace the cooling water in the Recirculation Cooling Unit at least once a month.
  Please refer to the manual for the Recirculation Cooling Unit for details.

Cleaning of Tubes

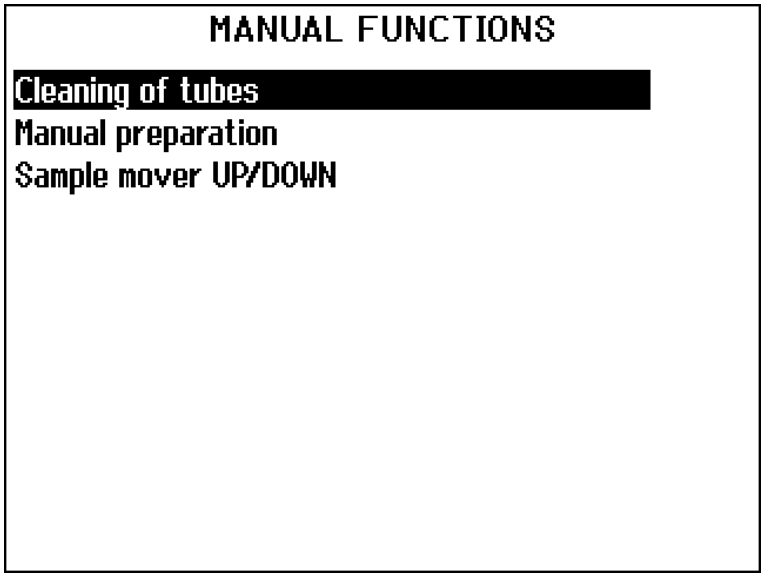
The cleaning procedure for CLEANING OF TUBES can be used weekly or when necessary.
Clean the tubes every time bottles are changed or replaced, thus avoiding lubricant/suspension left in tubes interfering with the preparation procedures.

Push knob to select *Manual Functions*.

↓



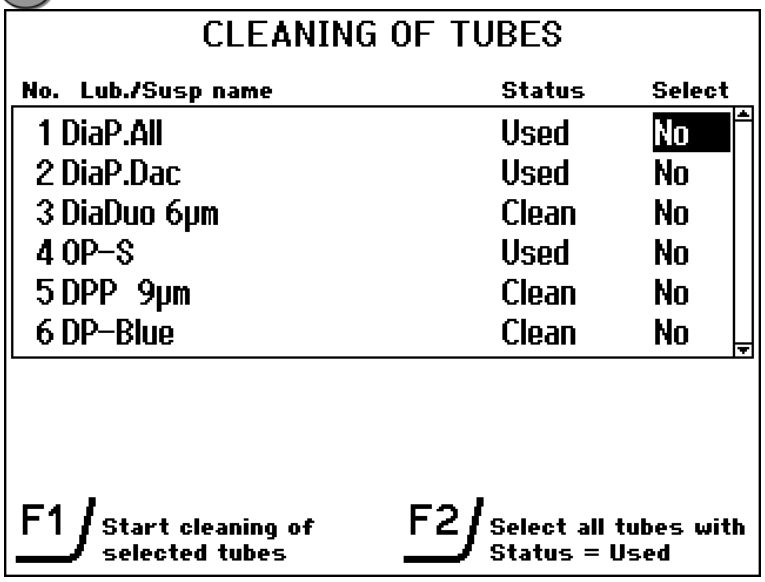
↓



Push knob to activate *Cleaning of tubes*.

Cleaning of Selected Tubes

Turn knob to select a bottle.

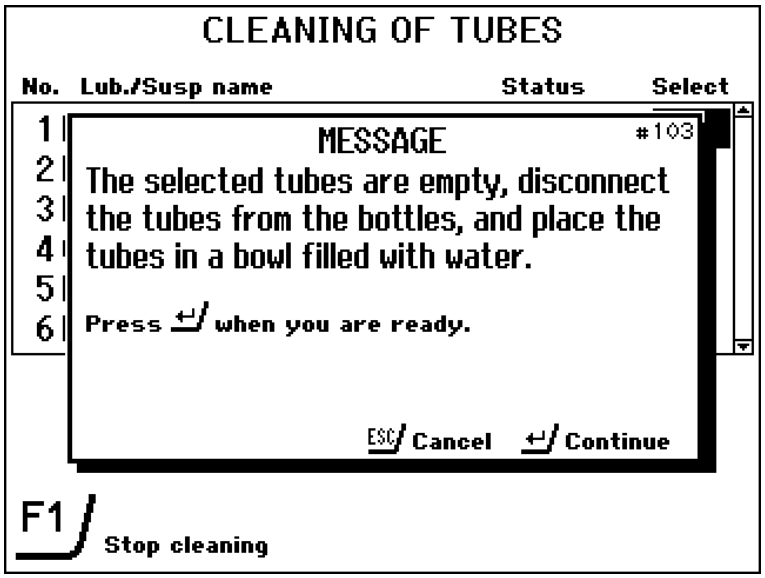


↓

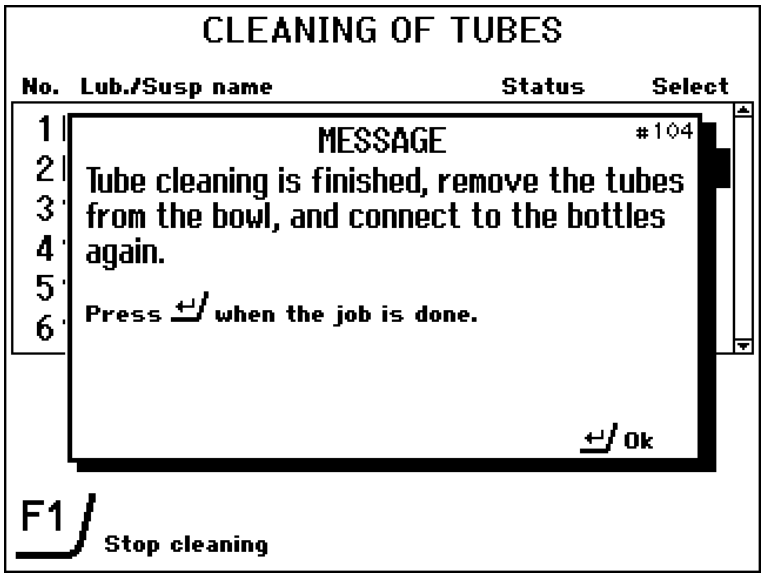
Push knob to toggle between *YES* and *NO* in the Select column. One or more bottles can be selected.

↓ Select *YES* and press **F1**, the cleaning process starts. After a while a pop-up message will appear.

Follow the instructions in the pop-up message.



↓ When tube cleaning is finished the following pop-up message appears.

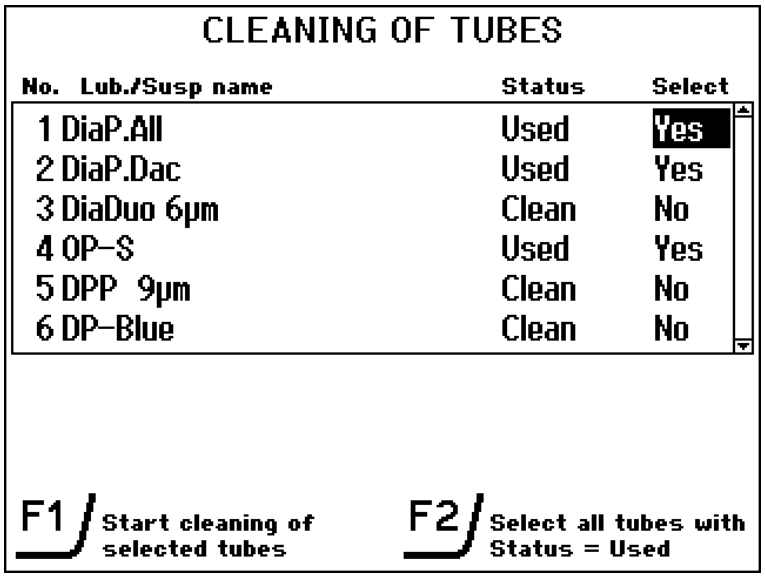

CLEANING OF TUBES
No.
Lub./Susp name
Status
Select
1
2
3
4
5
6
MESSAGE
#104
Tube cleaning is finished, remove the tubes from the bowl, and connect to the bottles again.
Press when the job is done.
Ok
F1
Stop cleaning

Cleaning of All Used Tubes

The tubes in use should be cleaned from time to time.

F2 When in the *CLEANING OF TUBES* menu press **F2** to select all used tubes.

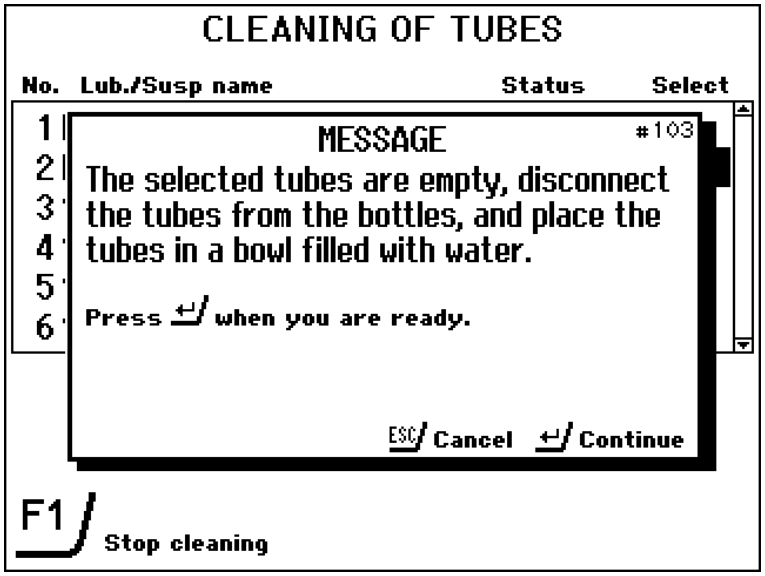
↓



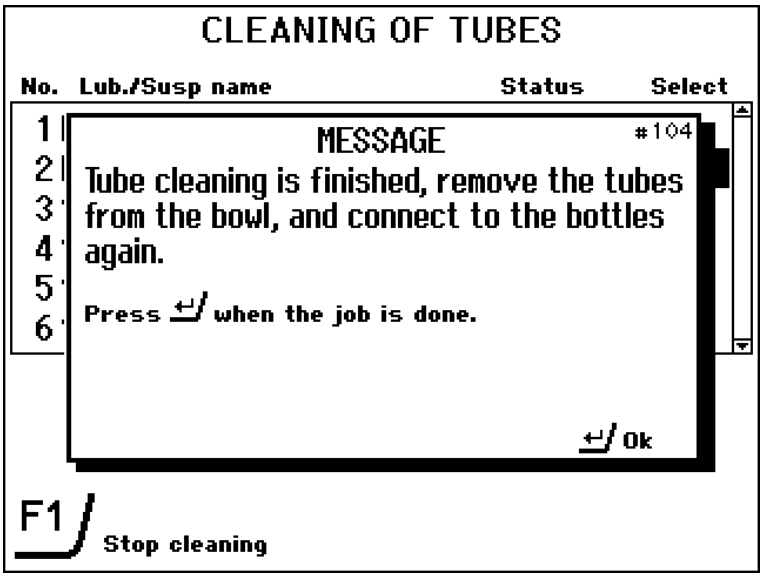
↓

F1 Press **F1** to start the cleaning process and follow the pop-up instructions.

↓



↓ When tube cleaning is finished the following pop-up message will appear.



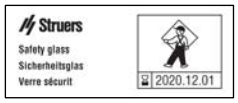
Yearly Service

Inspection of Cover

- Visually inspect the cover and the glass for signs of wear or damage.

Important
Carry out inspection at more regular intervals if AbraPol-20 is used for more than one 7 hour shift a day.

Struers recommends that the PETG glass in the cover is replaced after 5 years of routine operation.
The cover should be replaced immediately if it has been weakened by collision with projectile objects or if there are visible signs of deterioration.
A label on the cover indicates when the cover glass is due to be replaced.



Reference Guide

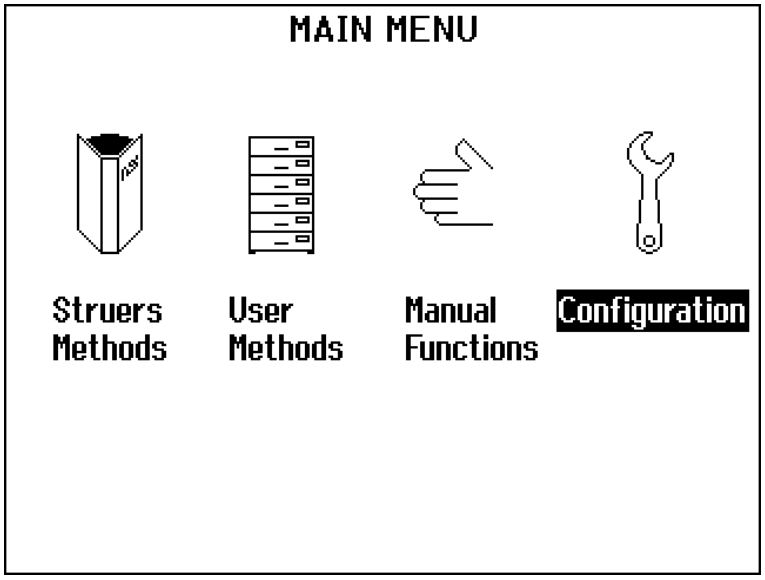
Table of Contents **Page**

1. Advanced Operations

1. Advanced Operations

Configuration Menu

Press **Esc** until the *MAIN MENU* appears.



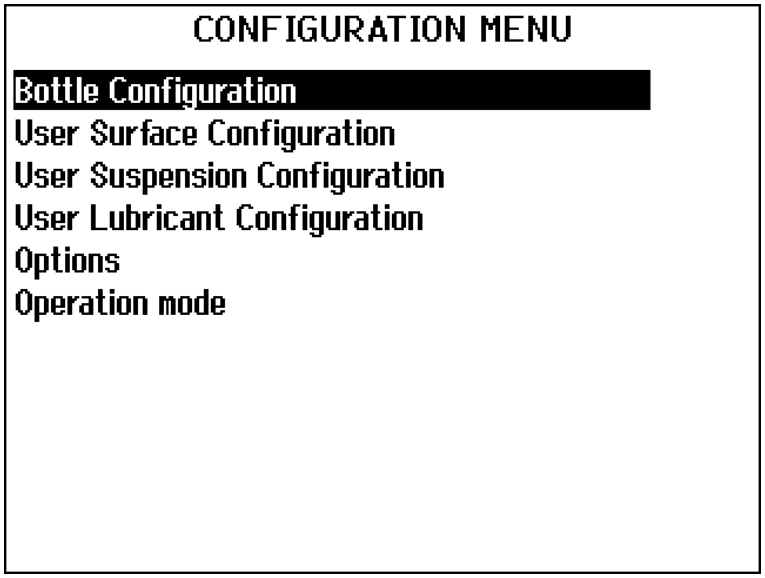
↓

Turn knob to select *Configuration*.

↓

Push knob to activate the *CONFIGURATION MENU*.

↓



Bottle Configuration	Please see the User's Guide section for detailed information on *Bottle Configuration*.
Setup User Consumables	The menus *User Surface Configuration*, *User Suspension Configuration* and *User Lubricant Configuration* allow the user to add ten grinding/polishing surfaces, ten suspensions and ten lubricants.

Defining a User Surface Configuration

Using this option, it is possible to define up to 10 new user-defined surfaces. The name, the abrasive rule and lubricant rule for each surface can also be defined.

To define these parameters:

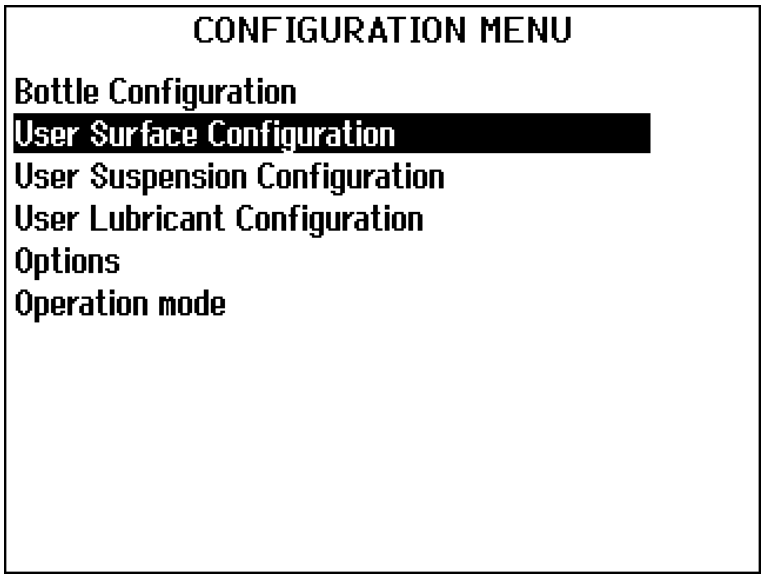
With the MAIN MENU displayed.

Turn knob to select *CONFIGURATION*.

↓

Push knob to activate the *CONFIGURATION MENU*.

↓



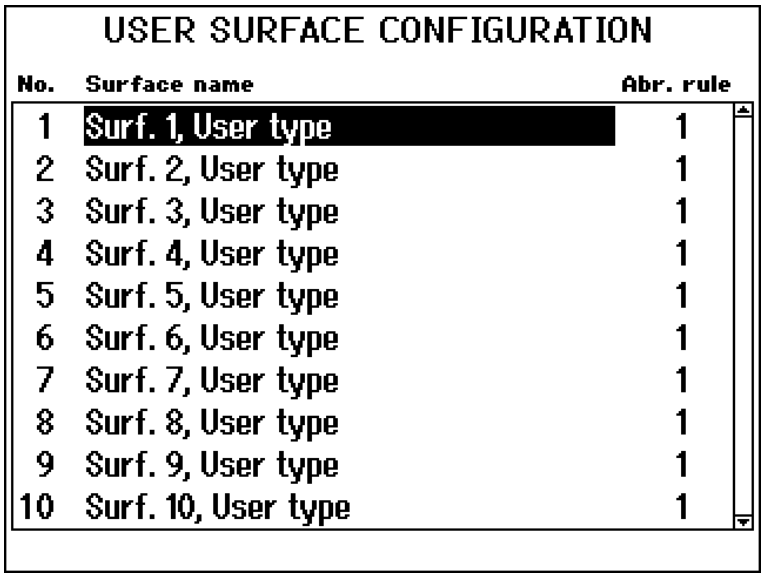
↓

Turn knob to select *User Surface Configuration*.

↓

Push knob to activate the *USER SURFACE CONFIGURATION* menu.

↓



↓

Turn knob to select the *Surface name* column opposite the desired *No.* position.

↓

Push knob to activate the Text editor and define the Surface name.

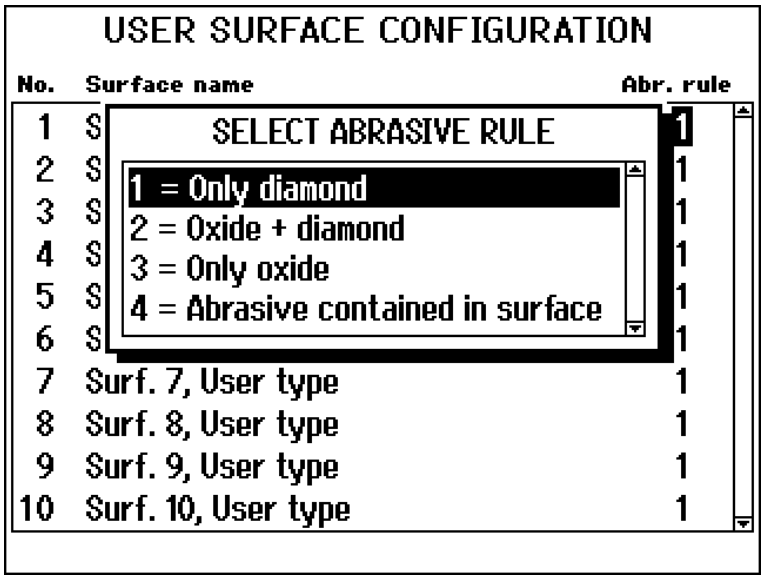
↓

Turn knob to select the *Abr. rule* column.

↓

Push knob to display the *SELECT ABRASIVE RULE* menu.

↓



Turn knob to select the correct rule.

Note

It is important to select the correct rules for each surface as the selection will influence the possible choices of suspensions and lubricants available when creating a new preparation method.
If the defined surface already contains an abrasive, for example SiC paper, select 4 – no abrasives, as this means no abrasives need to be added.
If the surface is only suitable for use with diamond products, select 1.
If both oxide and diamond can be used on the surface, select 2.
If only oxide can be used, select 3.

Push knob to activate the selected rule and return to the *USER SURFACE CONFIGURATION* menu.

↓ Repeat these steps if additional surfaces are to be configured. Otherwise follow the next step.

Esc Press **Esc** to accept the definitions and return to the *CONFIGURATION MENU.*

Defining a User Suspension Configuration

Using this option, it is possible define up to 10 new user-defined suspensions. The name, the abrasion type and lubricant rule for each suspension can then be defined.

To define these parameters:

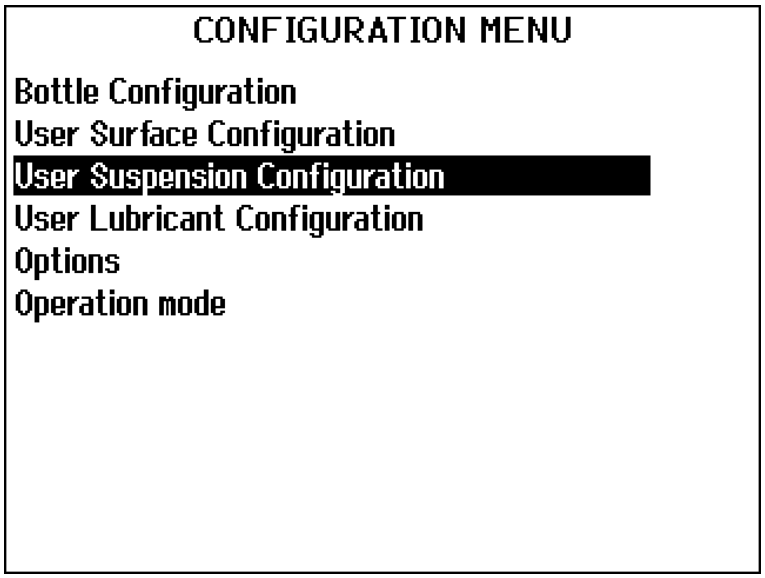
With the *MAIN MENU* displayed.

Turn knob to select *Configuration*.

↓

Push knob to activate the *CONFIGURATION MENU*.

↓



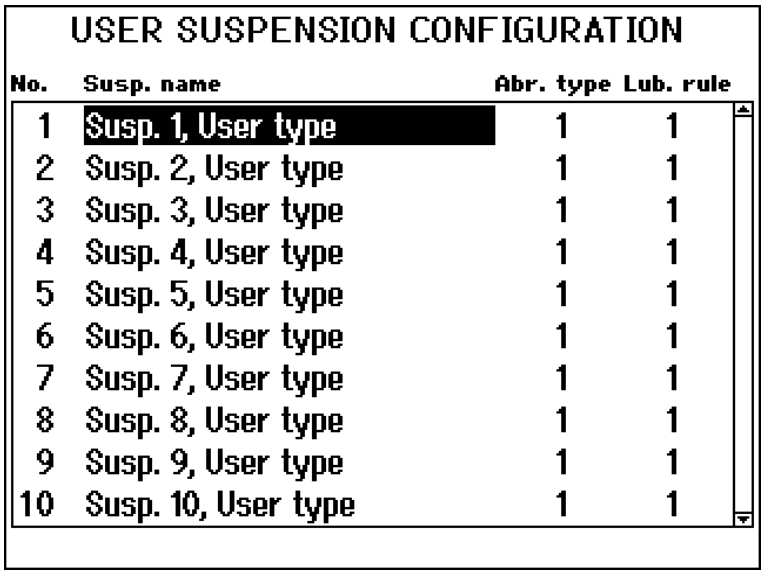
↓

Turn knob to select *User Suspension Configuration*.

↓

Push knob to activate the *USER SUSPENSION CONFIGURATION* menu.

↓



↓

Turn knob to select the *Susp. name*" column opposite the desired *No.* position.

↓

Push knob to activate the Text editor and define the suspension name.

↓

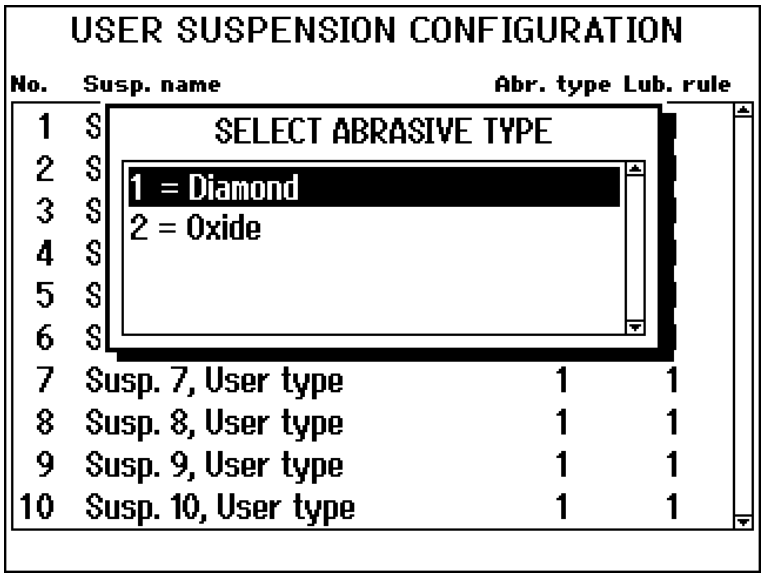
Turn knob to select the *Abr. type* column.

↓

Push knob to display the *SELECT ABRASIVE TYPE* menu.

↓

Note
There are only 2 types of abrasives available.
Be sure to select the correct one.



Turn knob to select the correct type.

↓

Push knob to activate the selected type and return to the *USER SUSPENSION CONFIGURATION* menu.

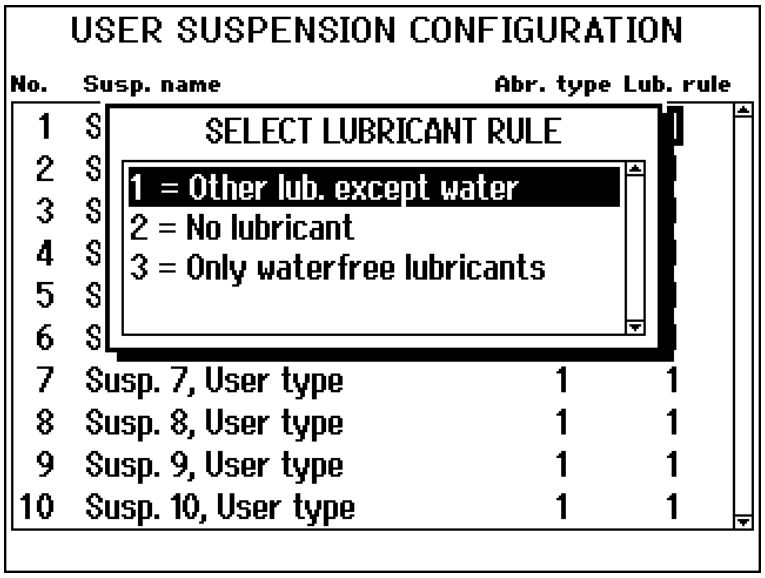
↓

Turn knob to select the *Lub. rule* column.

↓

Push knob to display the *SELECT LUBRICANT RULE* menu.

↓



Note
If the suspension used requires the use of a lubricant, select 1.
If the suspension doesn't require a lubricant, e.g oxide polishing suspensions or DiaPro, select 2.
If the abrasive is only to be used with water-free lubricants, select 3.

↓

Turn knob to select the correct rule.

↓

Push knob to activate the selected rule and return to the *USER SUSPENSION CONFIGURATION* menu.

↓ Repeat these steps if additional suspensions are to be added. Otherwise follow the next step.

Esc Press **Esc** to accept the definitions and return to the *CONFIGURATION MENU*.

Defining a User Lubricant Configuration

Using this option, it is possible to define up to 10 new user-defined lubricants. The name and lubricant type can be defined for each lubricant.

To define these parameters:

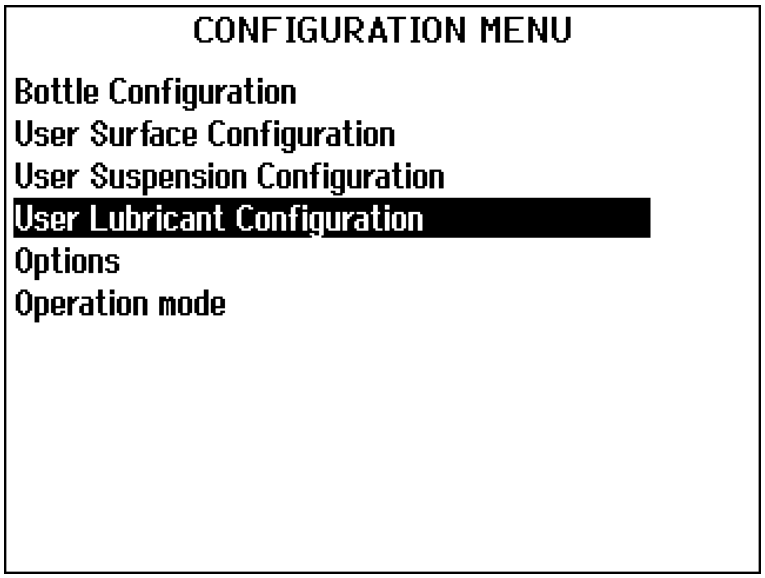
With the *MAIN MENU* displayed.

Turn knob to select *Configuration*.

↓

Push knob to activate the *CONFIGURATION MENU*.

↓



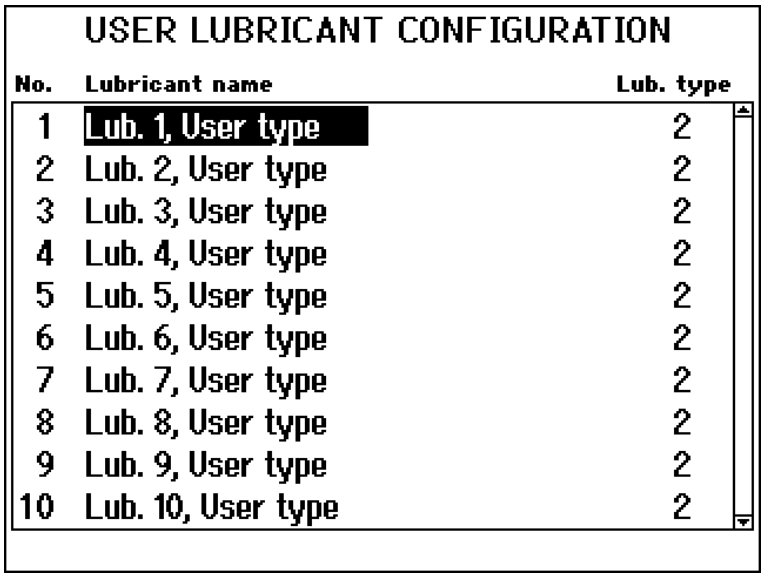
↓

Turn knob to select *User Lubricant Configuration*.

↓

Push knob to activate the *USER LUBRICANT CONFIGURATION* menu.

↓



↓

Turn knob to select the *Lubricant name* column opposite the desired *No.* position.

↓

Push knob to activate the Text editor and define the lubricant name.

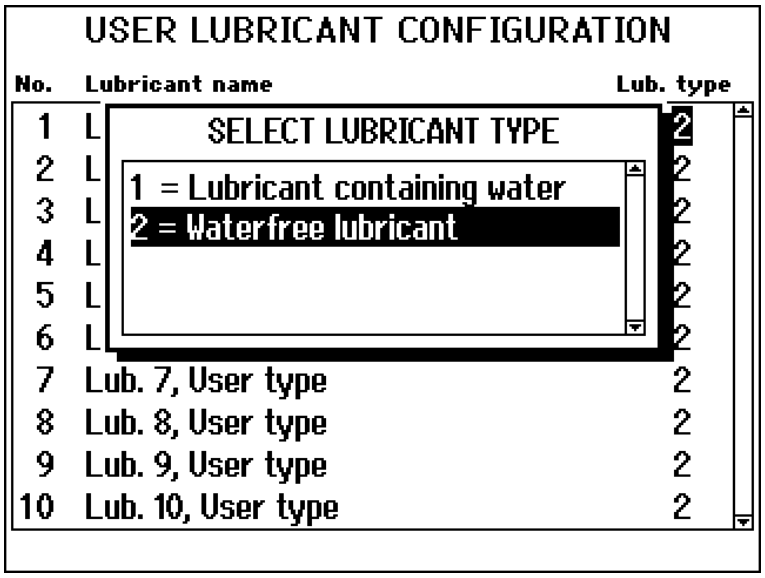
↓

Turn knob to select the *Lub. type* column.

↓

Push knob to display the *SELECT LUBRICANT TYPE* menu.

↓



Note
If the lubricant contains water, select 1.
If the lubricant is water-free and is to be used when preparing water-sensitive materials, select 2.

Turn knob to select the correct type.

↓

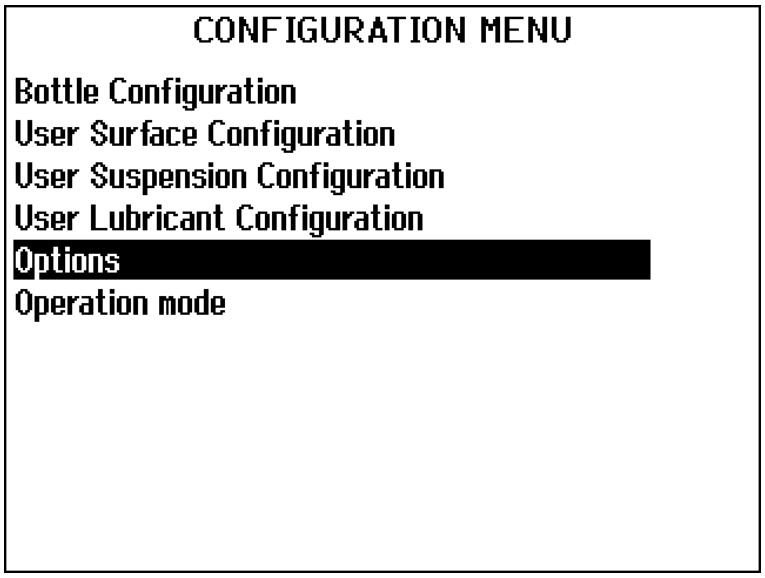
Push knob to activate the selected type and return to the *USER LUBRICANT CONFIGURATION* menu.

↓ Repeat these steps if additional lubricants are to be added.
Otherwise follow the next step.

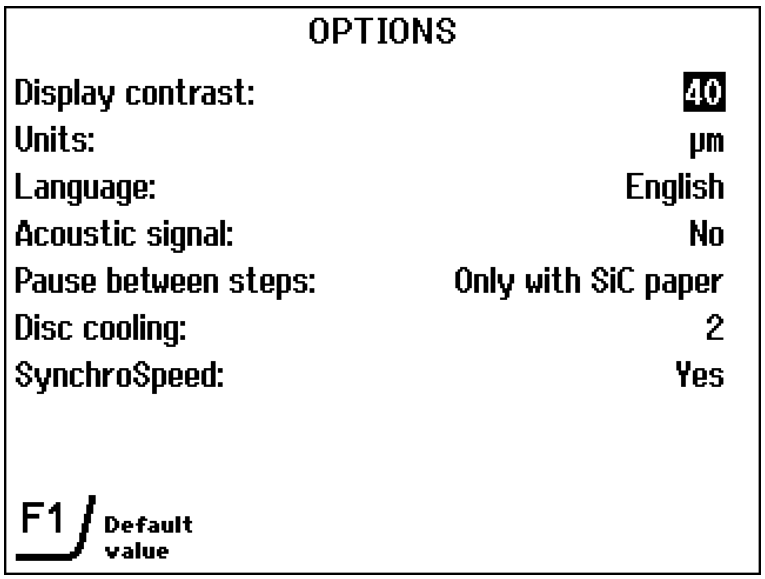
Esc Press **Esc** to accept the definitions and return to the *CONFIGURATION MENU*.

Options

Select *Options* and push the knob to activate the *OPTIONS* menu



The following settings can be adjusted:



Display Contrast

The contrast settings of the display can be adjusted for maximum readability.

Units

Select between µm or mils (mils??) for the removal rate settings.

Language

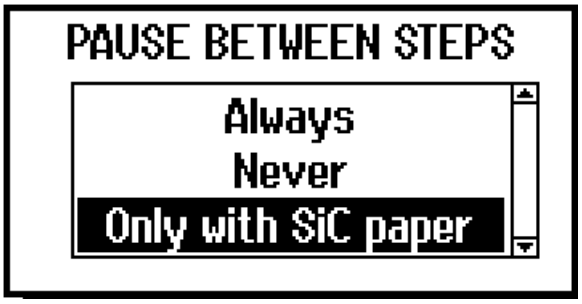
The language can be set to English, German, French, Spanish Japanese or Chinese.

Acoustic signal

Select to have each activation of a key on the touchpad confirmed by an acoustic signal.

Pause between steps

Several preparation steps can be combined to a single step with several phases.
Normally steps with the same surface, suspension and lubricant will be run without interruption. Pause between steps can be used to program things differently.



Always: Even if surface, suspension and lubricant are the same AbraPol-20 will stop after every step.
The surface can be exchanged and the specimen holder can be re-positioned.

Never: All steps based on the same surface, suspension and lubricant will be run without stopping

Only with SiC paper: When SiC paper is selected the preparation is stopped in-between identical steps. With other surfaces the steps will be run in succession.

Disc cooling

Disc cooling can be set to levels between 0 – 5.
0 is off, 5 is running continuously. Levels 1 -4 are intermediate settings.

SynchroSpeed

When SynchroSpeed is selected changes of either the disc speed or the holder speed will automatically result in changes of the other speed as well. SynchroSpeed works only in the range of 50 – 300 rpm. For higher speed settings of the disc SynchroSpeed has to be set to: No

F1, Default Value

The factory setting of some parameters can be restored by pressing the function key **F1** when the appropriate value is highlighted.

Operation Mode

In *Operation mode* 3 different user levels can be set.

Operation Modes:	
Process:	Methods can be selected and viewed but no editing is possible.
Development:	Methods can be selected, viewed and edited
Configuration:	Methods can be selected, viewed and edited and bottles can be configured.

To define these parameters:

With the *MAIN MENU* displayed.

Turn knob to select *Configuration*.

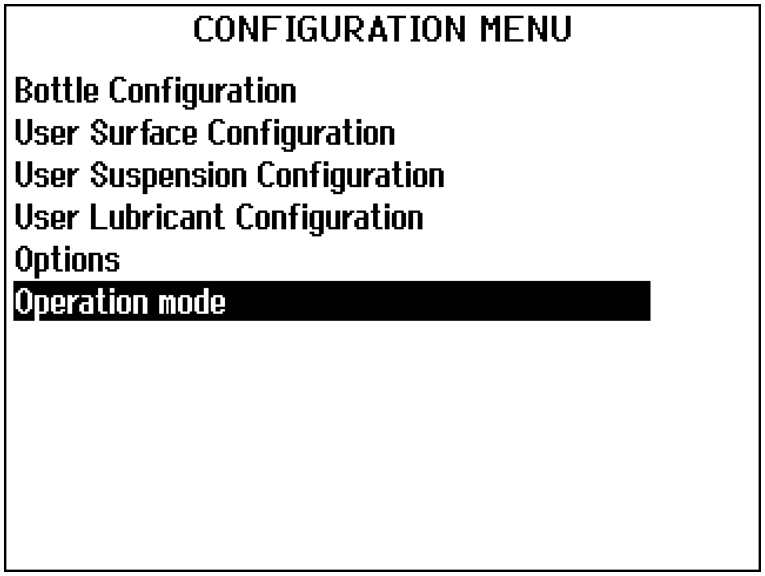
↓

Push knob to activate the *CONFIGURATION MENU*.

↓

Turn knob to select *Operation mode*.

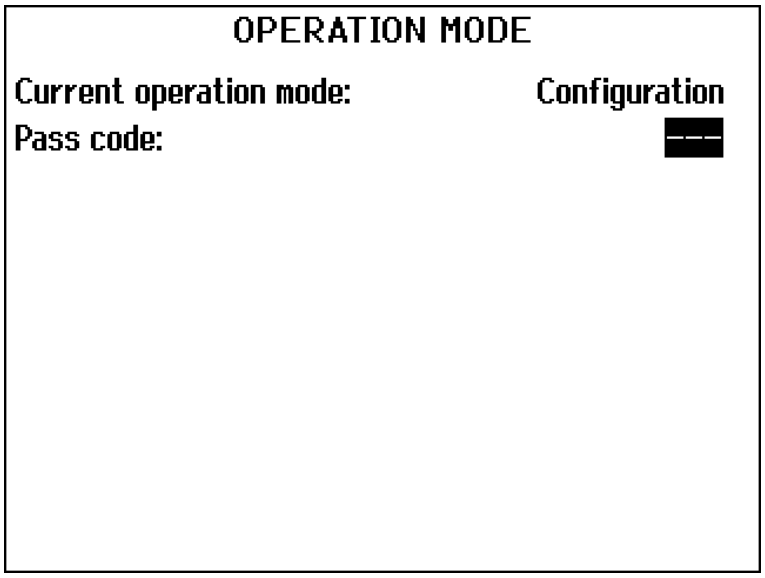
↓



↓

Push knob to activate the *OPERATION MODE* menu.

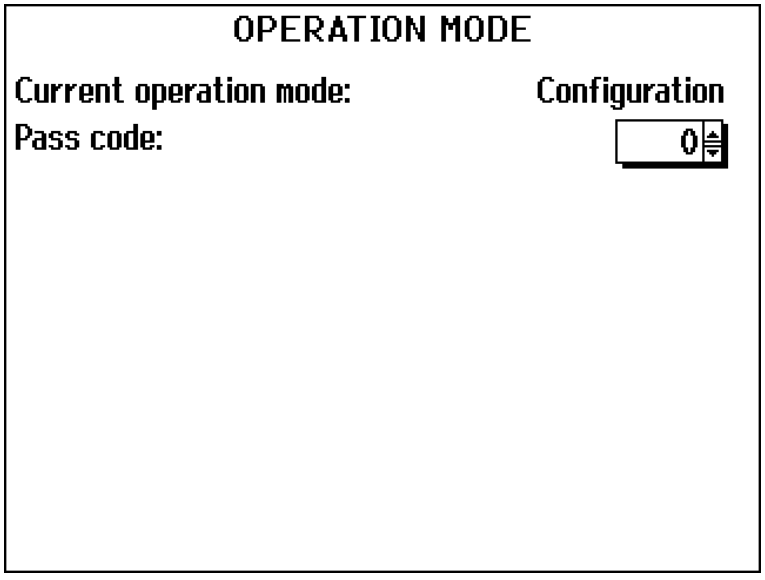
↓



↓

Push knob to activate the *Pass code* selector.

↓



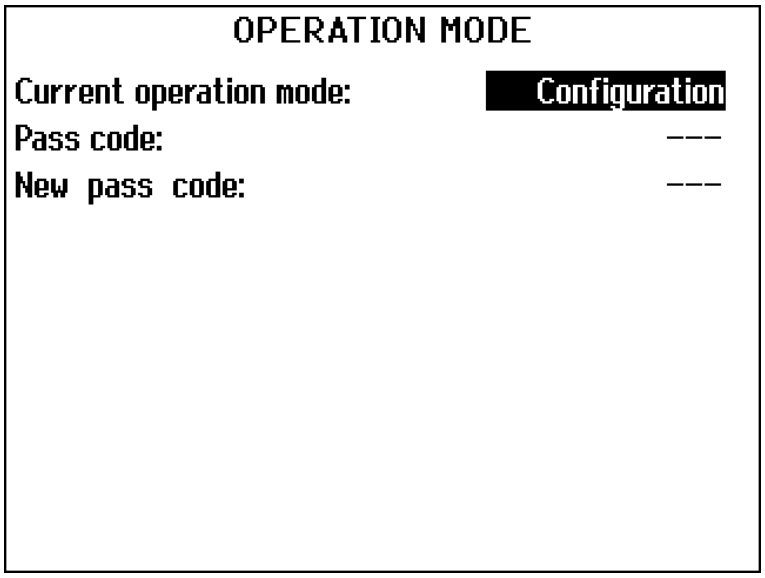
↓

Turn knob to set the value to 176.

↓

Push knob to enter the pass code.

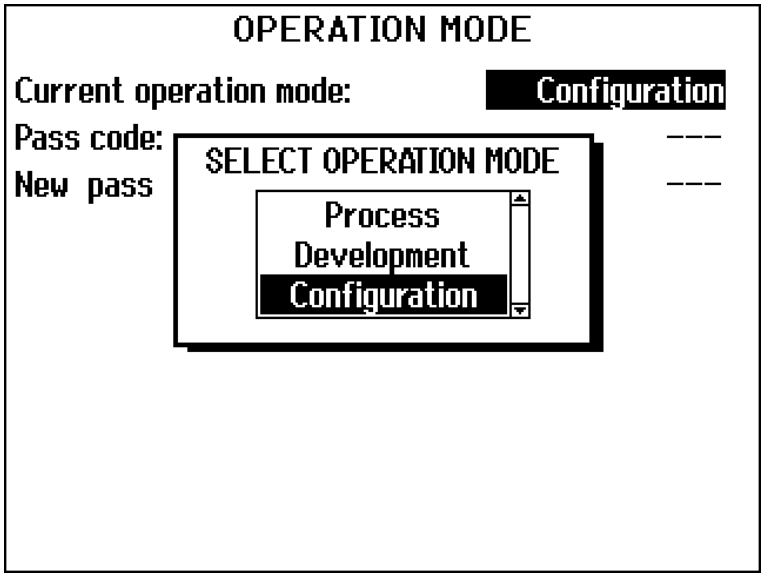
↓



↓

Push knob to activate the *SELECT OPERATION MODE* menu.

↓



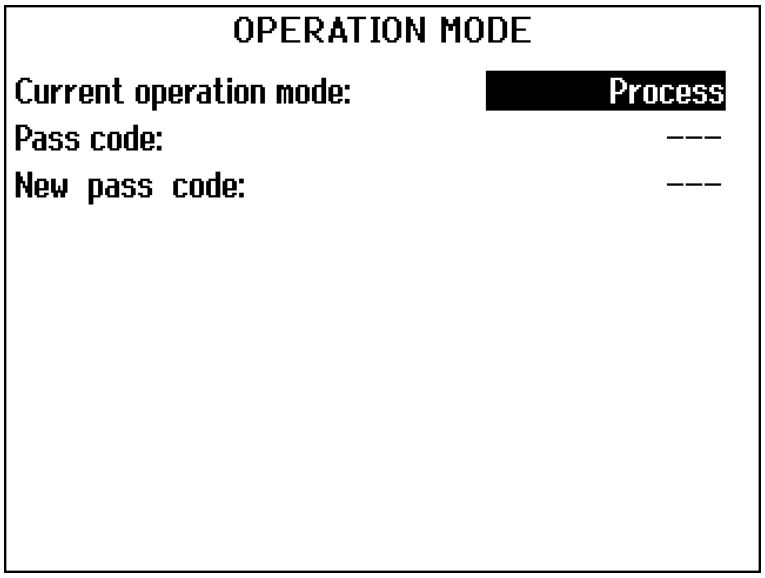
↓

Turn knob to select the appropriate operation mode.

↓

Push knob to enter the selection.

↓



Important!
Remember to make a note of the new Pass code
as settings can no longer be changed without the Pass code.

Method Options

Methods can be adjusted to suit the particular requirements of the user.

Struers Methods

The AbraPol-20 software includes 10 Metalog Guide Methods. The AbraPol-20 will automatically calculate the correct preparation time and dosing level depending on if a 300 mm disc and 350 mm disc is used.
As the Struers methods can not be changed or deleted, the first step will often be to copy a Struers method into the User Methods database and then adjust it to suit individual requirements.

Storing Capacity

The new/adapted methods can be stored in 10 groups; each group can contain 20 methods resulting in an overall storage capacity of 200 methods.

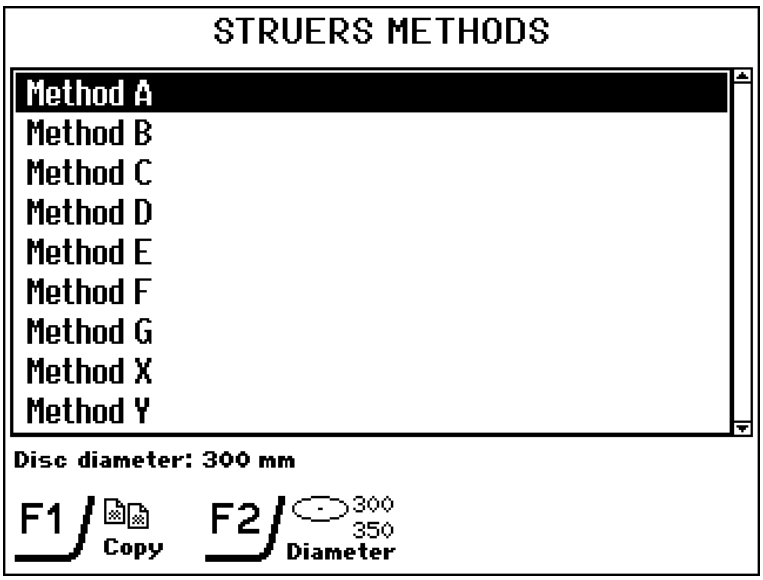
Copying a Method

In the Main Menu select STRUERS METHODS.

↓

Push knob to activate the STRUERS METHODS menu

↓



↓

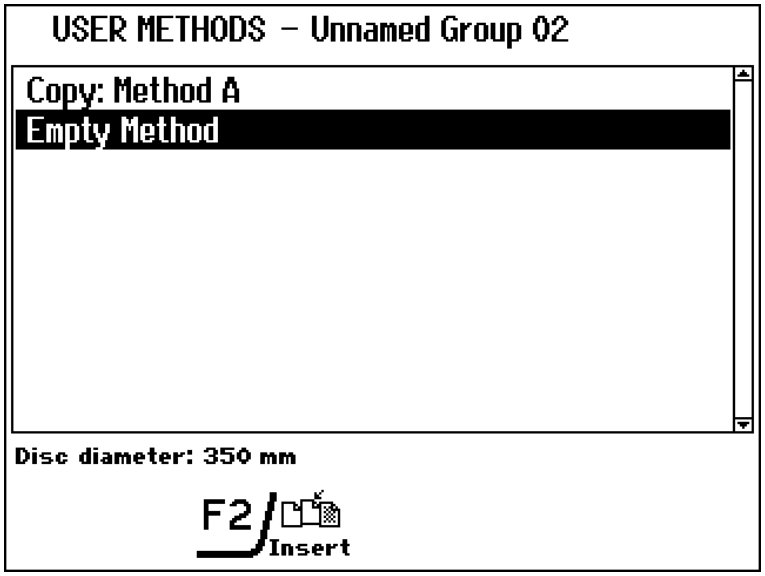
F1 Select the correct method and press **F1**:COPY.

Inserting a Method

Esc Press Esc to return to the Main Menu.

↓ In the Main Menu select USER METHODS.

F2 Press **F2** to insert the copied method.



Renaming a Method

The names of the methods in the USER METHODS database can be edited and changed. After copying a method from the Struers Methods the name can be changed to a name of your choice.

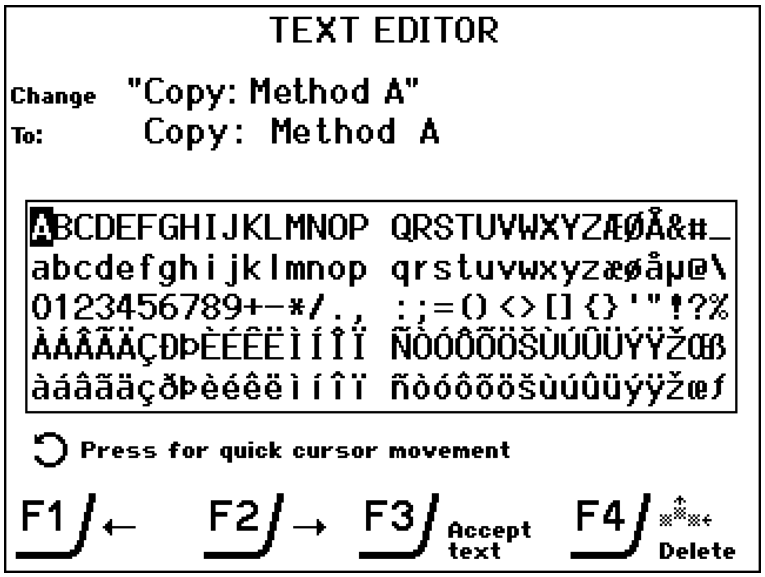
Select the method you want to rename.

↓

F4 Press **F4**: RENAME.

The following screen will appear:

↓



Use **F1** or **F2** to select the character to be changed.

↓ Use **F4** to delete the selected character.

Turn knob to move the cursor in the character set.

↓

Push knob to insert new character.

For detailed information please see

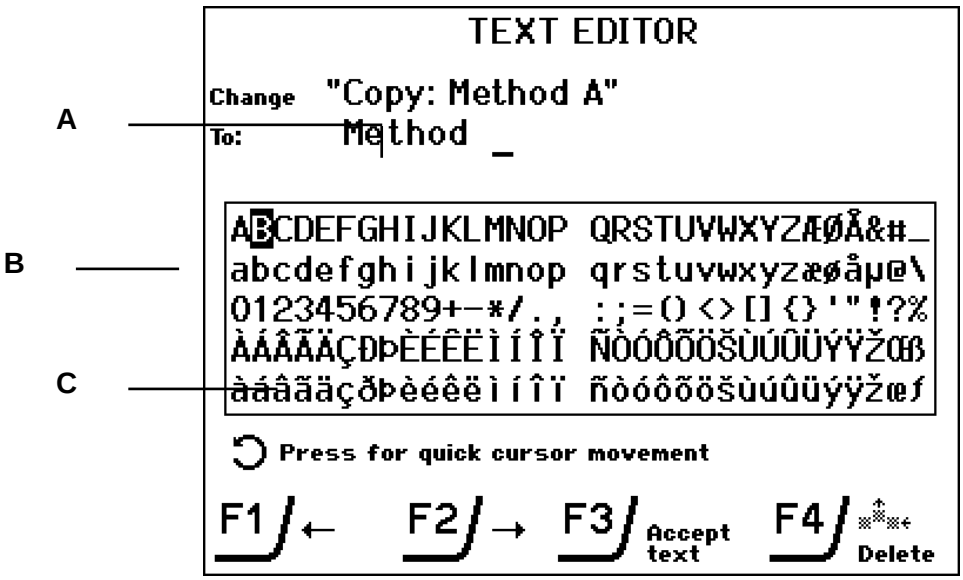
↓ "*Name Editing Principles*".

NB!
If a method name starts with "Copy of ……" the text "Copy of" can be deleted by pressing F4 once.

Name Editing Principles

Place the auxiliary cursor on the character you want to select, using **F1**: LEFT or **F2**: RIGHT. Turn the knob to move to the character cursor to select a character.

- Write the new name using the following keys:
  - **F1** Moves the cursor to the left
  - **F2** Moves the cursor to the right
  - **F3** Accepts the new name
  - **F4** Deletes one character in the text
  - Moves character cursor when turned.
  - Enters characters (from character set) when pressed.
  - Pressing the disc button moves the cursor to the next line



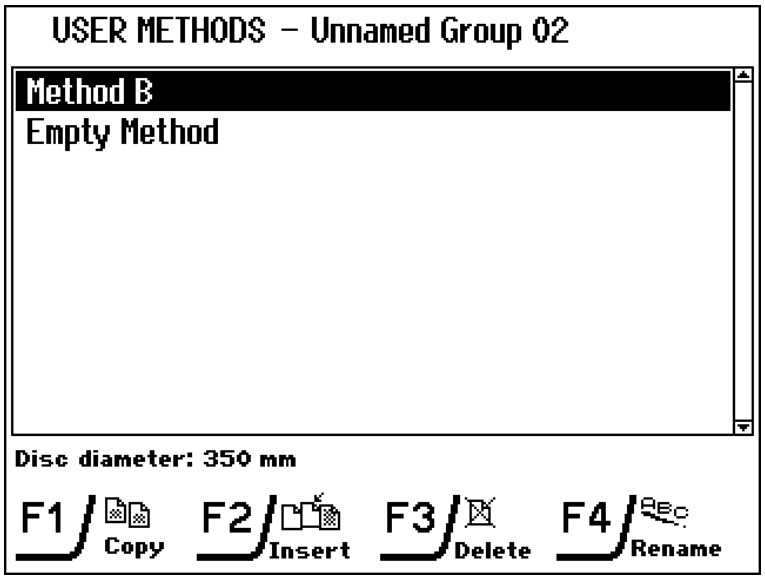
A Auxiliary cursor
B Character cursor
C Character set

Write the new name using the name editing procedures.

↓

F3 Press **F3** to accept the name and leave the editor.

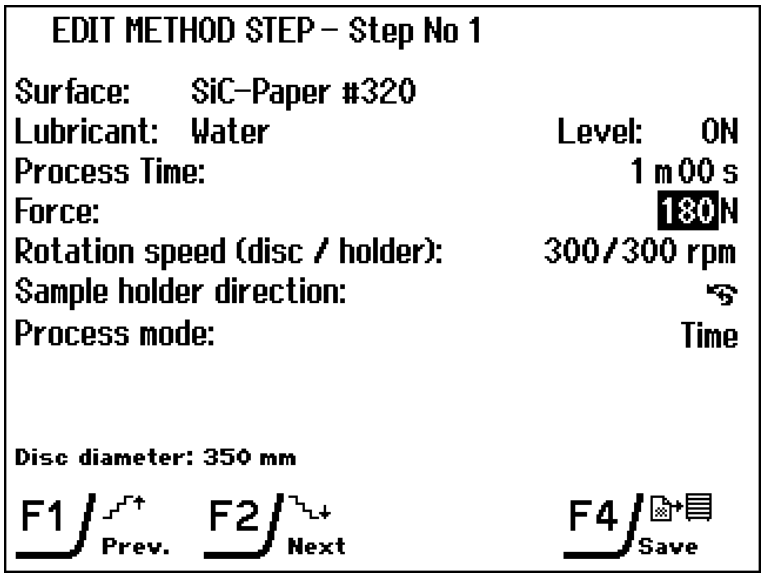
↓

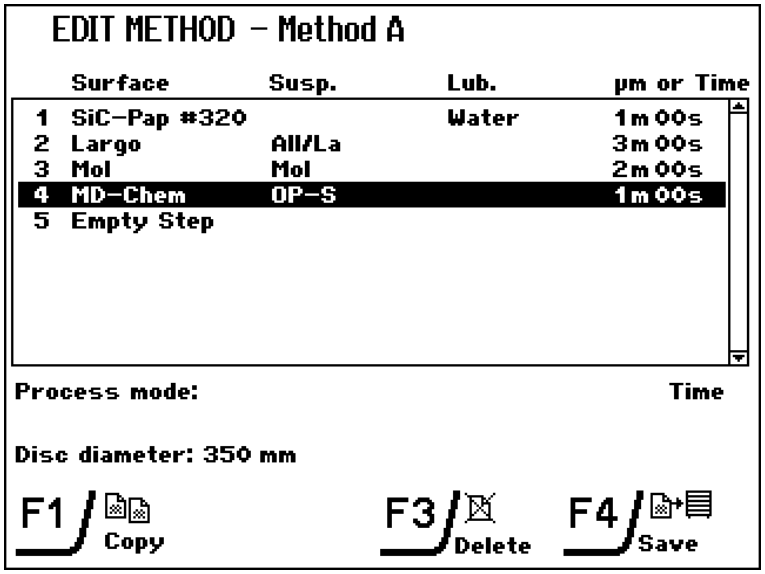

USER METHODS - Unnamed Group 02
Method B
Empty Method
Disc diameter: 350 mm
F1
Copy
F2
Insert
F3
Delete
F4
Rename

Saving a Method

While working with a user method, changes made in the database can be saved.

- As soon as a parameter is changed, **F4**: SAVE will be shown on the display and changes can be saved.
  Changes can be saved at both step and method level.





↓

F4 Press **F4**: SAVE to save the changes after all necessary parameters have been altered.

Important
When saving changes, the original method will be overwritten.
To preserve the original method, a copy should be made and renamed. The new method can then be changed as required.
For details, see *Copying a Method*.

If a new method is created from EMPTY METOD the name will automatically change name from Empty Method to Unnamed Method 01 when saved.
The method can then be renamed and altered as required.

A new empty method is always created automatically.

Deleting a Method

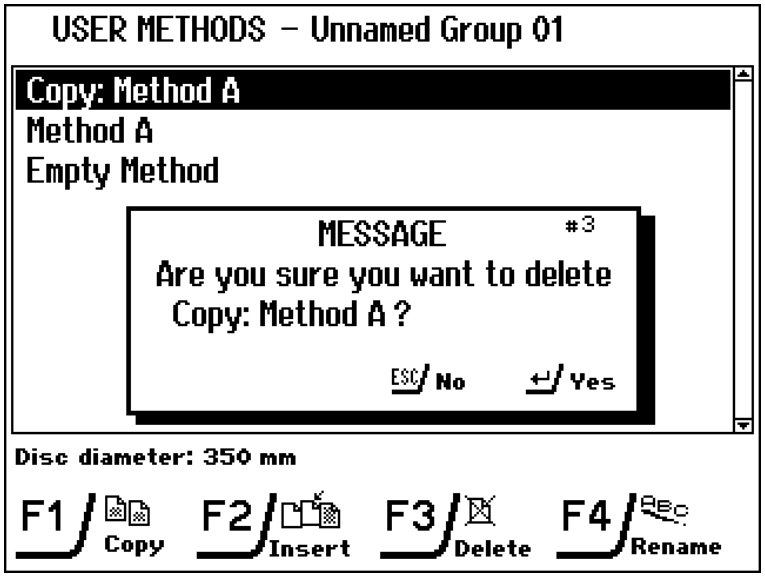
If a method is no longer used it can be deleted.

Select the method you want to delete.

↓

F3 Press **F3**:DELETE.

↓



↓ When asked for confirmation,

Push knob to confirm

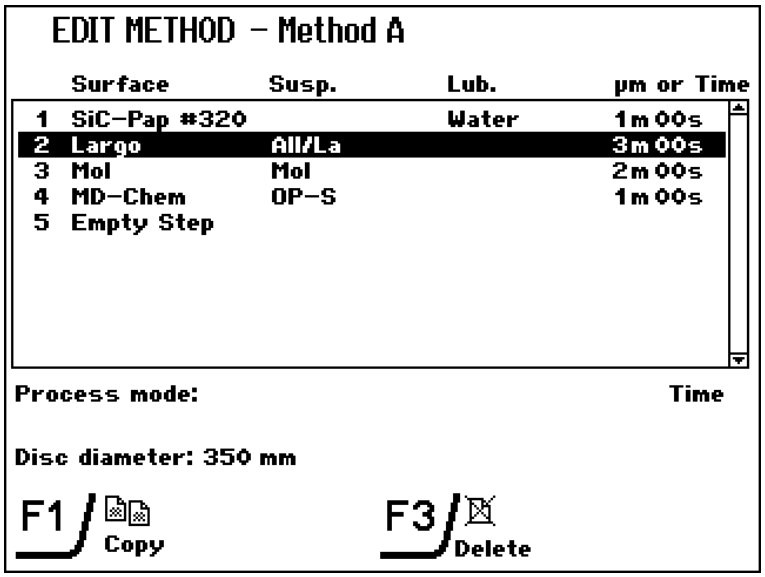
NB!
Struers Methods can not be deleted.

Step Options

Single steps can also be copied to customise preparation methods.

Copying a Step

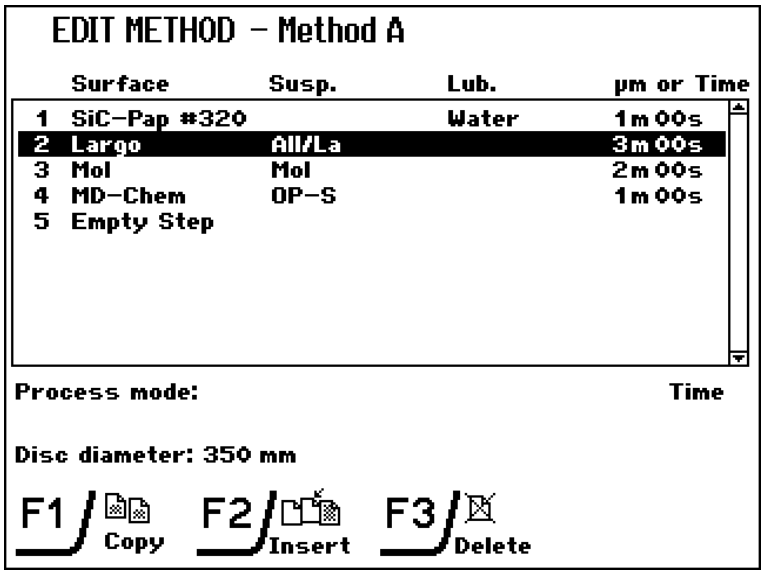
Select the method and the preparation step to be copied.



F1 Press **F1**: Copy.
The method step is automatically copied into the buffer

↓

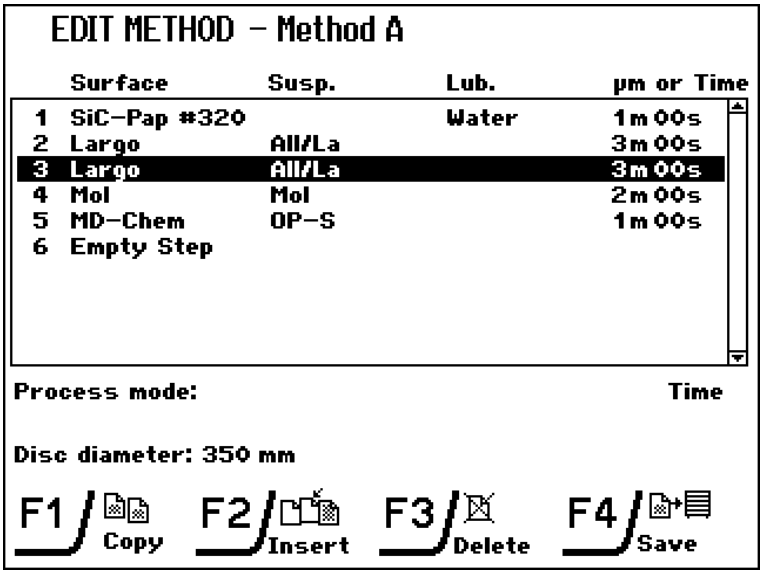
Inserting a Step



↓ Select the method and step where the copied step is to be inserted.

F2 Press **F2**: Insert.
The step is automatically inserted after the step shown inverted

↓



↓

F4 Press **F4**: Save.
The changed method is saved.

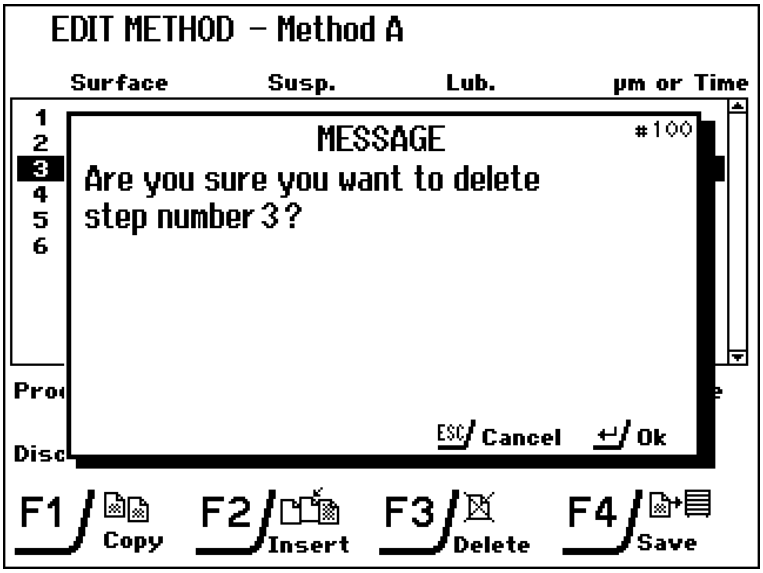
Deleting a Step

Turn knob to move to step you want to delete.

↓

F3

Press **F3** Delete.
A pop-up will appear.



When asked for confirmation,

↓

Push knob to confirm

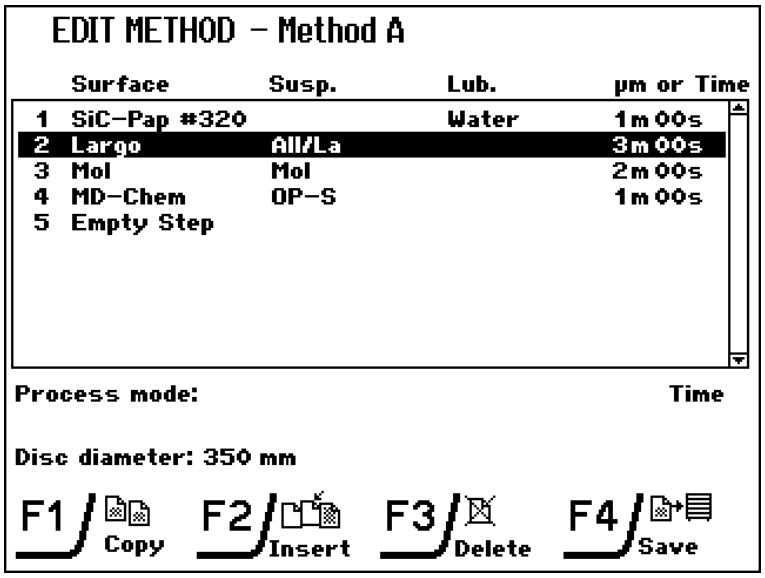
↓

F4

Press **F4** Save
To save the changed method.

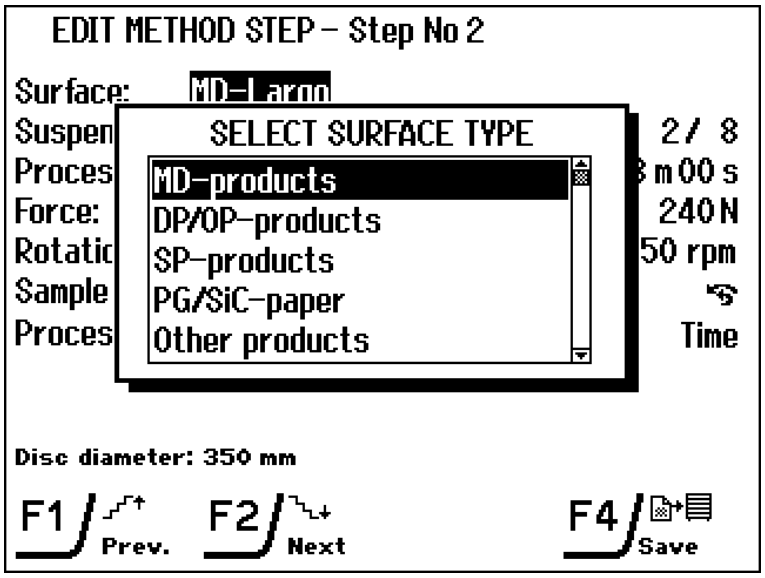
Method Parameters

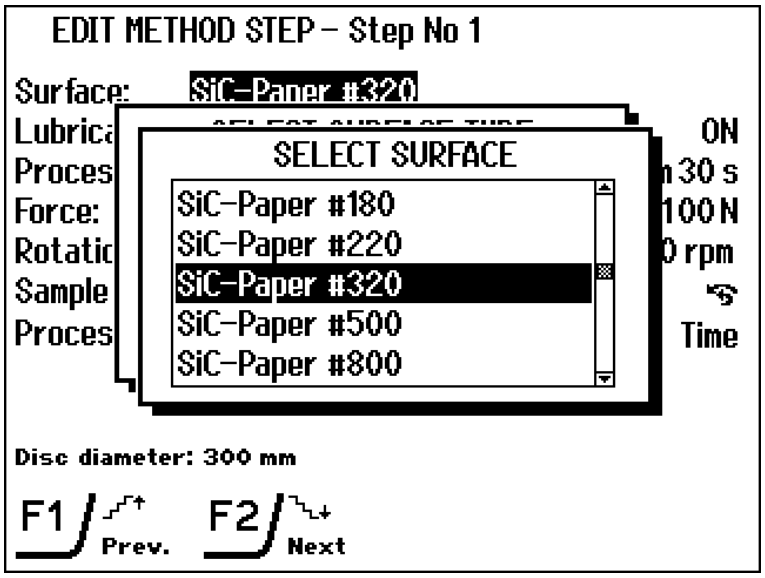
For every method step a series of parameters can be changed:



Surface

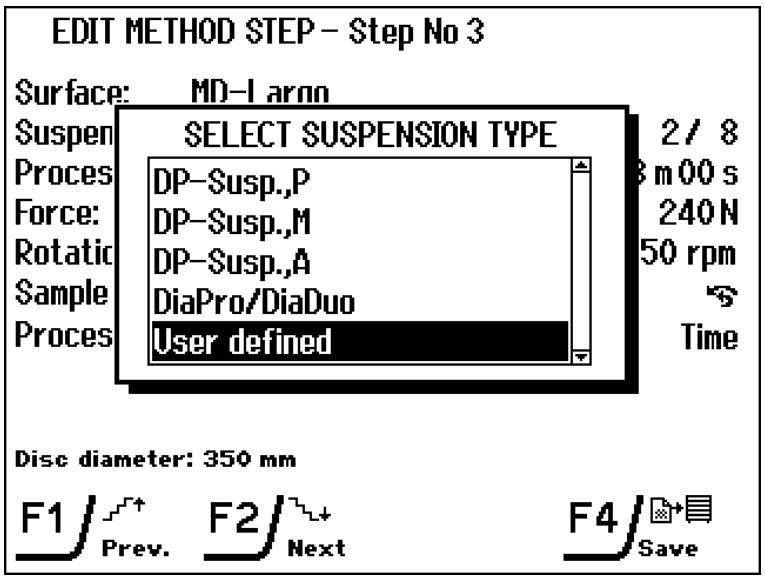
Pushing the knob allows you to select between all the surfaces in the AbraPol-20 database:





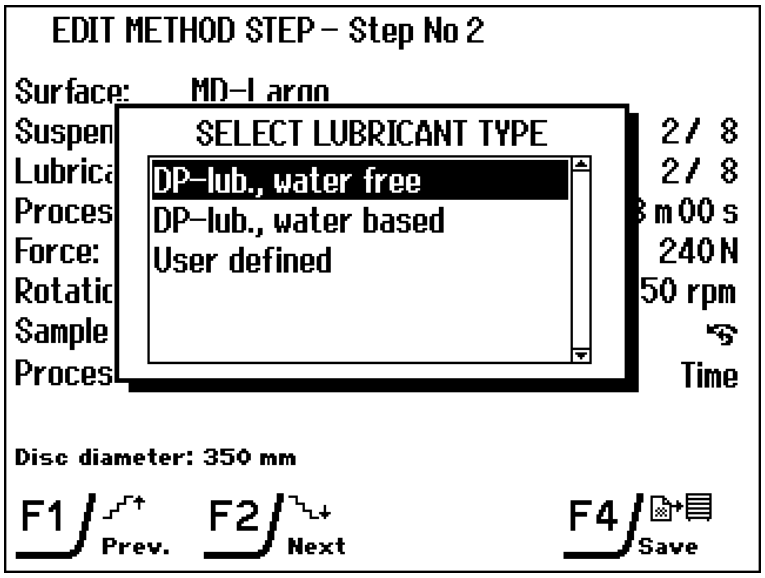
Suspension

Depending on the surface selected a variety of different suspensions can be chosen.



Lubricant

Depending on the selected suspension it may be possible to select a lubricant.
If DiaPro or DiaDuo, an all-in-one suspension has been selected the line Lubricant disappears completely.



Level

The dosing level can be set. The first number is the pre-dosing time in seconds. It can be set between 0-10
The second number is the dosing level that can be adjusted between 0-20

Process Time

When Time is selected in Process mode the preparation time can be adjusted between 5 seconds and 60 minutes.

Removal

When Removal is selected in Process Mode, the amount of material to be removed can be adjusted between 50 – 2000 µm.
(The removal rate sensor is an accessory)

Force

The force can be adjusted between 50 and 700 Newton.

Rotation speed

The speed of the disc can be set between 50 – 500 rpm. When SynchroSpeed is set to Yes the max. setting is 300 rpm.
The speed of the holder can be set between 50 – 300 rpm.

Sample holder direction

The direction can be set to either co- or counter-rotation.
Co-rotation will give the best preparation result and the most uniform polishing. Counter-rotation can be used when polishing using oxide polishing suspensions to keep the suspension on the polishing cloth.

300 rpm on Sample Mover and Disc

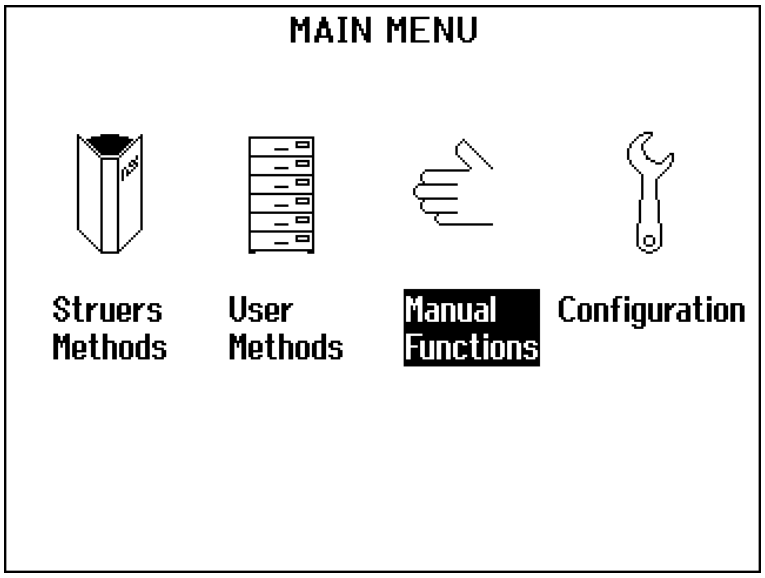
When using 300 rpm on the sample mover and 300 rpm on the disc please note the following recommendations:

- Use disc cooling.
- Pre-dose sufficiently when working with new preparation surfaces.
- Use a 200 mm sample holder on a 350 mm surface to distribute the lubricant and abrasive adequately.
- Use DP-Lubricant, Green or DP-Lubricant, Red. DP-Lubricant, Blue is alcohol-based and will evaporate too quickly.

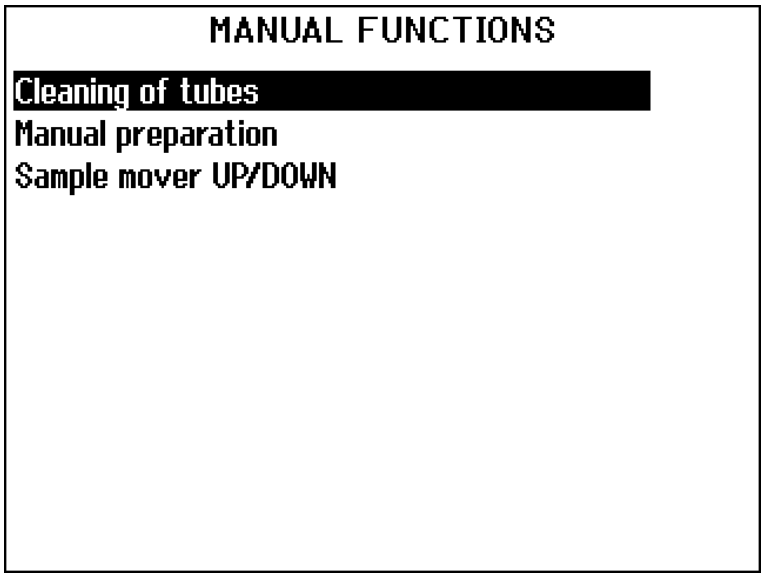
Manual Functions

Several manual functions are included in the software of AbraPol-20. Press Esc until you reach the Main Menu.

Push knob to select MANUAL FUNCTIONS.



↓

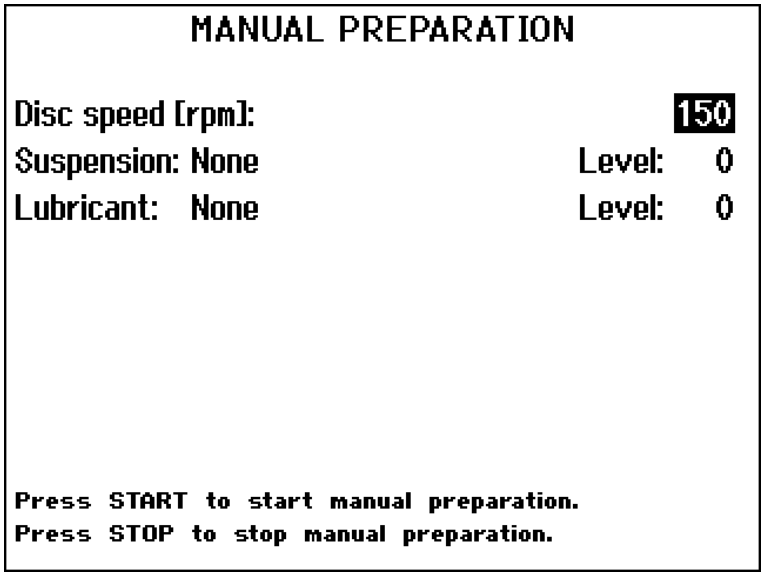


Cleaning of Tubes

Cleaning of tubes is described in depth earlier in the manual in section 3 Maintenance.

Manual Preparation

Manual functions are possible as the disc can run independently of the specimen holder.

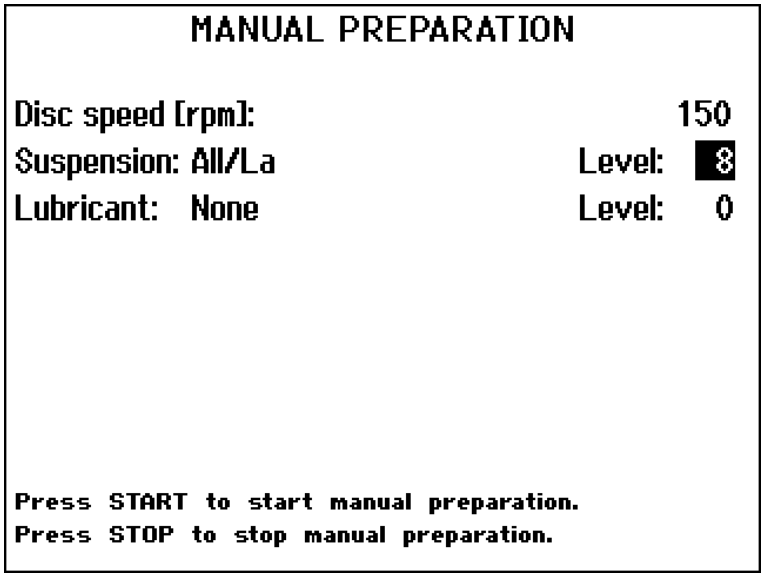


Disc Speed

The speed can be set between 50 and 300 rpm. in steps of 10 rpm.

Suspension

The different suspensions that are configured in the bottle set-up can be selected here.

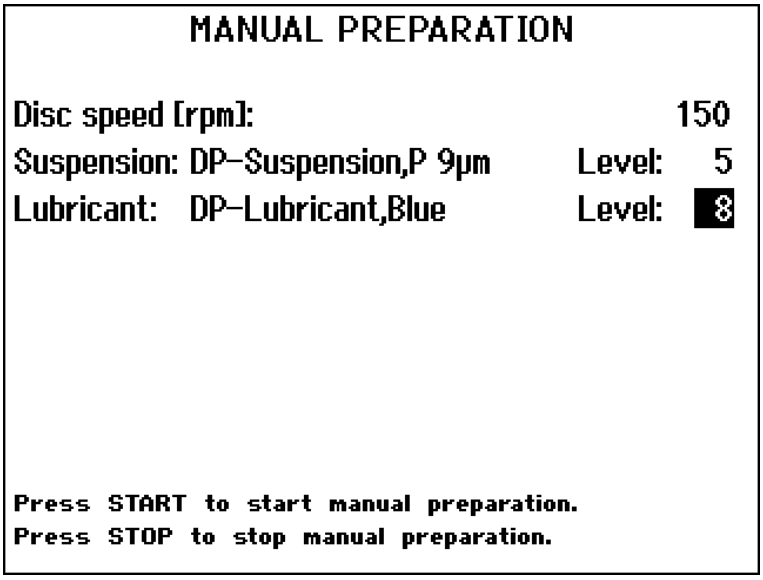


Dosing Level

The dosing level can be set to a value between 0 and 20.

Lubricant

A lubricant can be selected together with a diamond suspension for manual preparation. Only lubricants that are configured in the bottle set-up can be selected.



Dosing Level

The dosing level can be set to a value between 0 and 20.

Starting Manual Preparation

After defining all parameters the manual preparation can be started by pressing **Start**.

> ***NB!***
> If no suspension or lubricant is selected or the dosing levels are set to 0 the manual preparation can not be started.

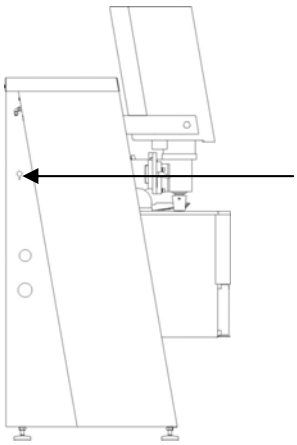
Sample mover UP/DOWN

This function is described earlier in the manual in the section *Adjusting the Specimen Holder Position*.

Adjusting the Speed of the Sample Mover Head

The speed at which the Sample Mover head moves up and down can be adjusted by turning the adjustment screw using a screwdriver:

- Increase speed: turn the screw head Counter-clockwise
- Reduce speed: turn the screw head Clockwise



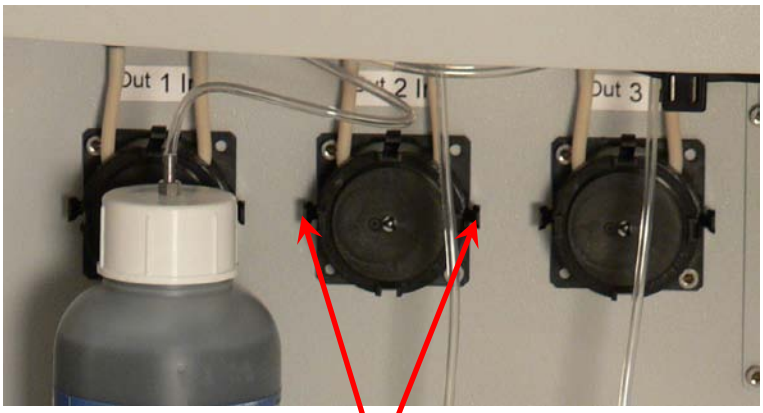
> ***Tip!***
> Take care not to set the speed too high,
> this could result in damage to the samples or the grinding/polishing consumable.

Changing Tubes

When working with alcohol based lubricants, the Novoprene tubes mounted in the pumps supplied with AbraPol-20 will harden over time. Therefore a piece of silicone tubing is supplied with the AbraPol-20 as Silicone has a better resistance against alcohol.

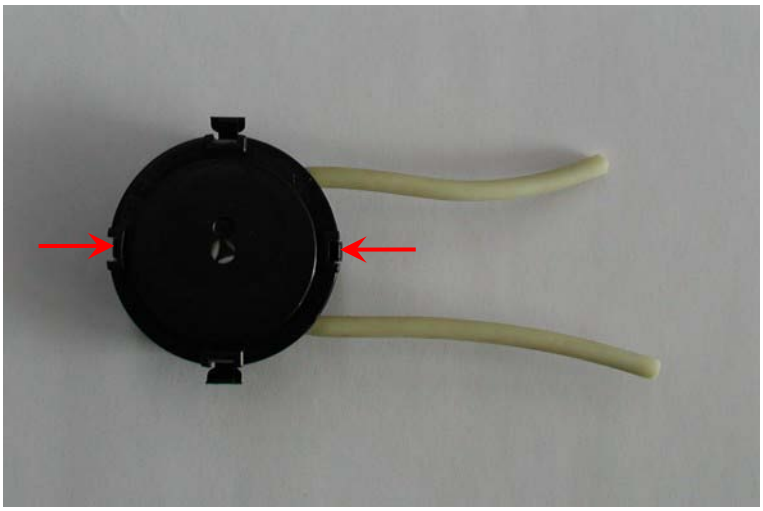
To exchange the Novoprene tube with a Silicone tube:

- Separate the doser tubes at the couplings.
- Press the two tabs and remove the pump from the axle.



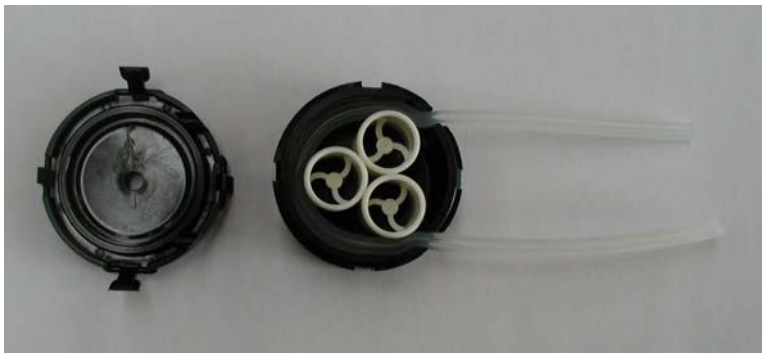
Tabs

- Press the two tabs on the pump and remove the bottom cover.



- Remove the 3 loose rollers and replace the Novoprene tube with the silicon tube.

- Replace the 3 rollers in the pump housing.



- Re-mount the bottom cover.
- Re-connect the tubes to the tubes on the AbraPol-20 and press the pump back onto the axle.
- Check that the tubes are connected correctly so that liquid is pumped to the head.

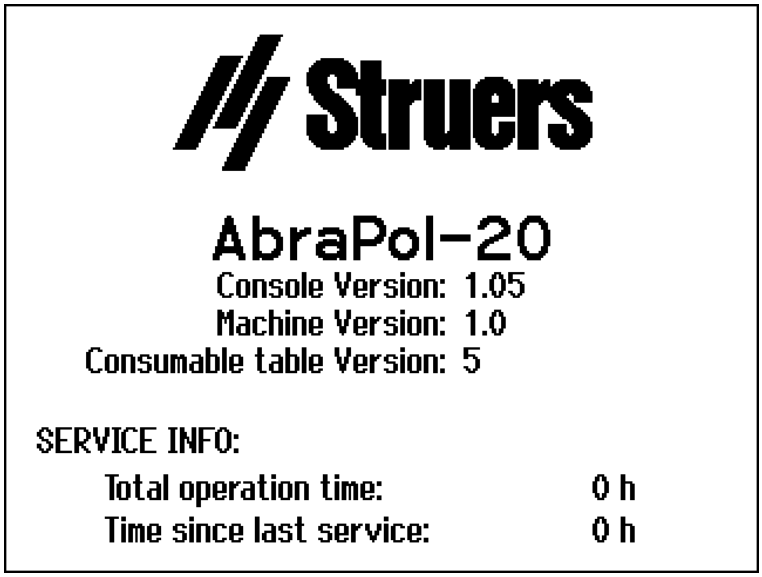
2. Accessories and Consumables

Please refer to the *AbraPol-20 Brochure* and the *Consumables Catalogue* for details of the range available.

Remember...
Struers offers a comprehensive range of consumables for grinding and polishing.

Service Information

Struers recommends that a regular service check be carried out after every 1500 hours of use. Information on total operation time and servicing of the machine is displayed on the screen at start-up:



- Contact a Struers Service Technician to service the machine.

3. Struers Metalog Guide™

In Struers Metalog Guide™ you will find a detailed description of grinding/polishing methods for automated mechanical specimen preparation.

Struers Metalog Guide™ offers preparation methods for the most common materials, based on a simple analysis of two key properties: hardness and ductility. Finding the right method is easy, including choice of consumables. Always consult Struers Metalog Guide™ for the correct preparation method for the actual specimens.

Metalog Guide™
A complete guide to materialographic specimen preparation.
www.struers.com/KNOWLEDGE/Metalog Guide.

4. Trouble shooting

Error	Explanation	Action
Machine Problems		
AbraPol-20 is switched on but the display is difficult to read	The backlight of the display has been dimmed. AbraPol-20 is in Sleep Mode.	Press any key to re-activate the backlight.
Display text not clear	The display is sensitive to temperature changes.	Change the display contrast in the CONFIGURATION Menu.
Display defective	Defect in the circuit of the display or defect in the CPU circuit.	Please contact a Struers Service Technician.
Water not draining away.	Drain hose squeezed.	Straighten the hose.
	Drain hose clogged.	Clean the hose.
	Drain hose does not slope downward.	Adjust the hose to an even slope.
Continuous, irregular wear on a grinding/polishing surface.	Coupling on either the specimen holder/mover plate or the specimen mover head of the polishing machine is worn.	Please contact a Struers Service Technician to replace the coupling.

Error Messages

Error messages are divided into three classes:
Messages
Errors
Fatal Errors

Messages

Messages are intended to inform the operator of the machine's progress and advise about minor operational errors.

Errors

Errors must be rectified before process can continue.

Fatal Errors

In case of Fatal Errors, process cannot continue before an authorised technician has rectified the error. Turn off the unit at the main switch immediately. Do not attempt to operate unit before technician has rectified problem.

Message	Explanation	Action
Process in Progress	Start is not possible as other process in progress.	
Process already stopping	Appears if Stop is pressed repeatedly.	
Process is stopping	Stop has been pressed.	
Process is stopping, await flushing please	The process is stopping but flushing removes residues of OP-Suspensions.	Wait until the flushing is completed.
Emergency Stop is active	The emergency button was pressed and the preparation was interrupted.	Pull the button outwards to release it and follow the instructions in the pop-up text.
Database is full !	The database storing capacity has been reached.	Delete one or more of the methods – this will free space to store new methods. Nb! it is not possible to delete Struers Methods.
10 steps is maximum !	The maximum of 10 steps has been reached.	Two or more methods can be used alternately.
Process is finished	The process is finished.	You can now start another process.

Message	Explanation	Action
START denied method not selected	A method has not been select.	Select a method and press start.
Manual dosing denied method step not selected	Manual dosing has been denied because step has not been selected.	Choose a preparation step that contains the suspension or lubricant in question.
The following lubricant is not configured: " xx "	The lubricant chosen for a certain preparation has not been configured and the preparation can not proceed.	In the CONFIGURATION MENU it is possible change the set-op for the different lubricants. (See Setup Bottle Configuration)
You can not dose with water	The manual lubricant key has been pressed in a step where water was selected.	Use the key for manual dosing of water.
Process time or stock removal not specified (zero)	The step can not start because neither time nor removal have been specified.	In EDIT METOD STEP specify time or stock removal.
START denied, selected method or step is Empty	It is not possible to start a preparation process from an empty method or step.	Chose a method or a step which is not empty before pressing start.
Tube(s) not selected for cleaning push knob to select tube(s)”	The tube has not been selected and can therefore not be cleaned.	Push knob to toggle between yes and no in the select column – yes must be selected if you want to clean the tube.
The following abrasive is not configured: " xx "	The abrasive chosen for a certain preparation has not been configured and the preparation can not proceed.	In the CONFIGURATION MENU it is possible change the set-op for the different abrasives. (See Setup Bottle Configuration)
Method name already in use, please rename the method	A method name can only be used once.	Use a different name.

Message	Explanation	Action
Disc motor overloaded	The disc motor was overloaded and therefore overheated.	Wait till the motor has cooled off and reduce the force before restarting the process.
Sample motor overloaded	The sample motor was overloaded and therefore overheated.	Wait till the motor has cooled off and reduce the force before restarting the process.
Pump motor overloaded	Water hose blocked or too much swarf in coolant.	Replace coolant. Inspect pump.
Main supply voltage too low	Supply voltage insufficient.	Await normalisation of power grid.
Removal rate too low, phase time exceeded	It has not been possible to grind/polish the samples to the expected level within 15 minutes.	Select a different surface or/and increase the force.
Sample holder unable to move, upwards after process	It was not possible to move the sample holder upwards after finishing a process.	The pressure in the compressed air system is too low.
		Force regulation error – please contact a Struers Service Technician.
Force regulation error	It is not possible to reach the selected force.	The pressure in the compressed air system is too low.
		Force regulation error – please contact a Struers Service Technician.
Air pressure too low	Missing or incomplete air supply.	Check that the air hoses are tight and properly clamped.
Stock removal sensor not installed	Stock removal sensor has not been installed or has not been calibrated.	If stock removal sensor (accessory) is not installed this must be done before the stock removal mode can be used.
		If the stock removal sensor is installed it is not calibrated correctly, please look in the manual for the stock removal sensor.

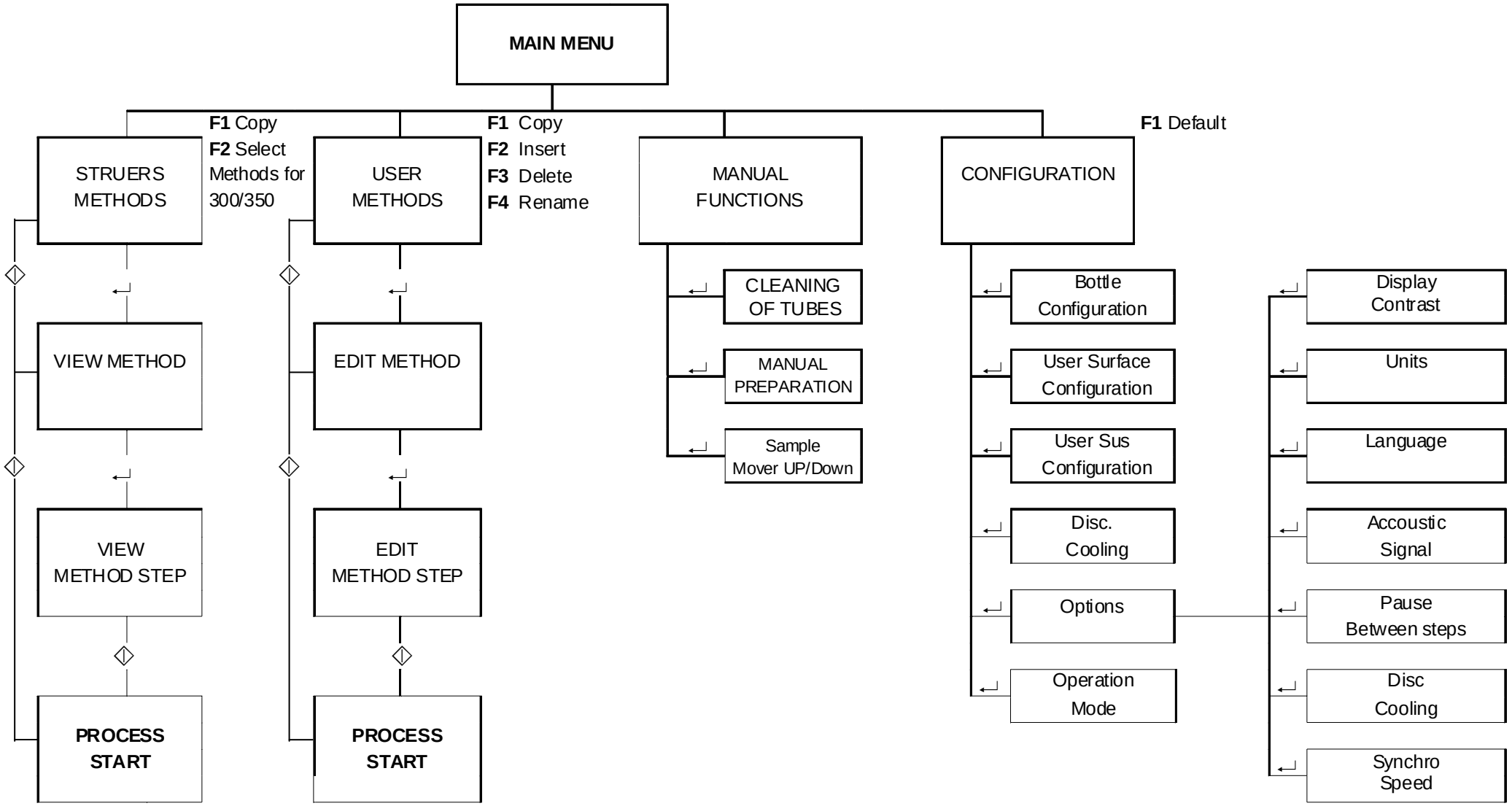
Fatal Errors	Explanation	Action
15 V DC supply in pcb missing	Fault in the internal power supply.	Turn off unit at Main Switch. Please contact a Struers Service..
24 V DC supply in pcb missing	Fault in the internal power supply.	
No serial communication	No contact between machine system and Control panel.	
Program version mismatch	Conflict between software in machine control system and Control panel.	

5. Technical Data

Subject		**Specifications**	
		Metric/ International	**US**
Disc	Rotational speed	50-500 rpm in steps of 10	50-500 rpm in steps of 10
	Size	300/350 mm	11.8”/13.7”
	Power Consumption	2.2 kW	3 Hp
Specimens	Speed	50-300rpm in steps of 10	50-300rpm in steps of 10
	Direction	CW/CCW	
	Force	0-700 N	0-150 lbf
	Motor power consumption	0.55 kW	0.75 Hp
Dosing Unit	Level	0-20	
	No. of pumps	3 (6 with Additional Dosing Unit)	
Software and electronics	LC Display	320x240 pixels	
	Controls	Touch pads/Push-turn knob	
	Memory	EPROM/RAM/NV-RAM	
Dimensions and weight	Width	840 mm	33.1”
	Depth	980 mm	38.6”
	Height	1560 mm	61.4”
	Weight	400 kg	880 lbs
Environment	Safety standards	Please refer to the Declaration of Conformity	
	Noise level (idle 300/300)	77 dbA	
	Surrounding temperature	5-40°C	
	Humidity	Max. 95%RH	
Water mains	Water supply max. 10 bar	max. 10 bar	
Compressed air	Compressed air supply Recommended quality, ISO 8573-1, class 5.6.4 for normal use	6-10 bar	

Subject		**Specifications**			
Electrical Data					
	Power consumption	3 kW			
	No. of phases	3 (3L+PE)			
	Output, main motor	2.2 kW			
	Voltage/frequency:	Max. load			
	3 x 200 - 210 V / 50/60Hz	16.5 A			
	3 x 220 - 240 V / 50/60 Hz	15.6 A			
	3 x 380 - 415 V / 50/60 Hz	9.0 A			
	3 x 460 - 480 V / 50/60 Hz	7.2 A			
Mains Cable Recommend-ation	*Voltage/frequency:*	*Min. Fuse size*	*Minimum cable size @ Min. fuse*	*Max. Fuse size*	*Minimum cable size @ Max. fuse*
	3 x 200 - 210 V / 50/60Hz	25 A	3xAWG12 / 4 mm² + PE	50 A	3x AWG10 / 4 mm² + PE
	3 x 220 - 240 V / 50/60 Hz	25 A	3x AWG12 / 4 mm² + PE	50 A	3x AWG10 / 4 mm² + PE
	3 x 380 - 415 V / 50/60 Hz	20 A	3x AWG12 / 4 mm² + PE	50 A	3x AWG10 / 4 mm² + PE
	3 x 460 - 480 V / 50/60 Hz	20 A	3x AWG12 + PE	50 A	3xAWG10 + PE
Protective Earth Cable Recommend-ation	*Voltage/frequency:*	*Cable size*			
	3 x 200 - 210 V / 50/60Hz	AWG 10			
	3 x 220 - 240 V / 50/60 Hz	AWG 10			
	3 x 380 - 415 V / 50/60 Hz	4 mm²			
	3 x 460 - 480 V / 50/60 Hz	AWG 10			
	Important: Local standards may overrule the recommendations for the main supply cable. If necessary, please contact a qualified electrician to verify which option is suitable for the local installation setup.				
Residual Current Circuit Breaker	type B, 30 mA (or better) is REQUIRED.				

6. Menu Overview



Quick Reference Guide

Description

AbraPol-20 is an automated machine ideal for laboratories or workplaces carrying out quality control testing on a large number of specimens. AbraPol-20 has the unique possibility of preparation on a 350 mm disc. Furthermore, the Speed of specimen holder and speed of disc can be set to 300 rpm, resulting in reduced grinding and polishing time.

Main Controls

Main Switch

The main switch is located at the right side of the machine.

Emergency Stop

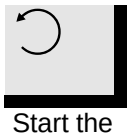
Red push button on the front of the machine. Stops all ongoing operations. Release the emergency stop by pulling the button.

Double Start Buttons

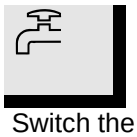
Start the actual preparation by pressing the two buttons simultaneously.

Front Panel Controls

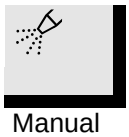
Manual Functions



Start the Rotation of the disc



Switch the Water on



Manual dosing of Lubricant

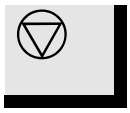
Manual dosing of Abrasive

Function Keys

F1 F2 F3 F4

Controls for various purposes.
See the bottom line of the individual screens.

Stop and ESC

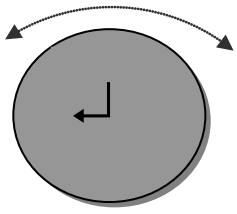


Stops the grinding or polishing process

ESC

Leaves the present menu or aborts Edit functions/changes

Turn / Push Knob



The Knob is used for entering and changing steps and parameters.

Combined cursor and enter key.

Running a Struers Method

- Press ESC to get up to Main Menu.
- Select Struers Methods in Main Menu, by turning the knob.
- Push the knob for entering Struers Methods.
- Turn the knob to select the chosen Struers Method.
- View Method by pushing the knob.
- Start the preparation by pressing the two double start buttons simultaneously.

Editing process

- For editing the process, push knob during the process.

Copying a Preparation Method

- Turn the knob to select the preparation method you want to copy.
- Press **F1** for copying a Preparation Method
- Press **F1** to accept copying
- Enter the screen USER METODS press **F2** to insert the method

Editing Names

- Select the method name you want to edit.
- Edit name by pressing **F4**.
- Use knob to select/insert character.
- Move the cursor left or right by pressing **F1** or **F4**.
- Press **F2** to accept the new name.

Modifying a Preparation Method

- Select User Methods in Main Menu, by turning the knob.
- Push the knob for entering User Methods.
- Select the Preparation Method and the step you want to change.
- Turn the knob to the parameter you want to change.
- Push the knob and select the new parameter.
- Save changes by pressing **F4**.

English

Declaration of Conformity

Struers

Manufacturer, responsible for Technical File	Struers ApS Pederstrupvej 84 DK-2750 Ballerup, Denmark Telephone +45 44 600 800

Herewith declares that

Product Name:	AbraPol-20
Type No:	588
Machine Type:	Grinding and polishing machine

is in conformity with the provisions of the following directives:

Safety of Machinery	2006/42/ EC according to the following standard(s): EN ISO 12100:2010, EN ISO 13849-1:2008/AC:2009, EN ISO 13849-2:2012, EN ISO 13850:2008, EN 60204-1:2006/AC:2010, EN 574:1996+A1:2008, EN 953:1997+A1:2009.
EMC-Directive	2014/30/EU according to the following standard(s): EN 61000-6-1:2007, EN61000-6-3:2007/A1:2011.
RoHS	2011/65/EU according to the following standard(s): EN 50581:2012.
Supplementary Information	The equipment complies with the American standards: UL508, NFPA70:2014; NFPA79:2012. FCC 47 CFR part 15.

The above has been declared according to the global method, module A

Date: 23.02.2016

Christian Skjold Heyde,
Vice President, R & D and Production, Struers ApS

Dansk

Overensstemmelseserklæring

Struers

Fabrikant, ansvarlig for Teknisk Dossier	Struers ApS Pederstrupvej 84 DK-2750 Ballerup, Danmark Telefon 44 600 800

erklærer herved, at

Produktnavn:	AbraPol-20
Type nr.:	588
Maskintype:	Slibe og poliermaskine

er i overensstemmelse med følgende EU-direktiver:

Maskindirektivet	2006/42/EF efter følgende norm(er): EN ISO 12100:2010, EN ISO 13849-1:2008/AC:2009, EN ISO 13849-2:2012, EN ISO 13850:2008, EN 60204-1:2006/AC:2010, EN 574:1996+A1:2008, EN 953:1997+A1:2009, EN 60204-1:2006/AC:2010.
EMC-direktivet	2014/30/EU efter følgende norm(er): EN 61000-6-1:2007, EN61000-6-3:2007/A1:2011.
RoHS	2011/65/EU efter følgende norm(er): EN 50581:2012.
Supplerende oplysninger	Endvidere overholdes de amerikanske normer: UL508, NFPA70:2014; NFPA79:2012. FCC Part 15.

Ovenstående overensstemmelse(r) er erklæret iflg. den globale metode, modul A

Dato: 23.02.2016

Christian Skjold Heyde,
Vice President, Udvikling og Produktion, Struers ApS

Letter of conformity

Date 2013-03-14

Struers A/S
Pederstrupvej 84
DK-2750 Ballerup, Denmark

Phone +45 44 600 800
Fax +45 44 600 801
struers@struers.dk
www.struers.com

Bankers:
Nordea Bank Denmark A/S
Account no.: 2191-0126305060
VAT no.: 15683309

Letter of conformity: Safety hood/window for the following equipment

AbraPlan-20	PETG thickness: 8 mm
AbraPol-20	PETG thickness: 8 mm
Discotom-5/-6/-10/-60/-65/-100	PETG thickness: 4 mm
Labotom-3	PETG thickness: 4 mm
Labotom-5	PETG thickness: 3 mm
Labotom-15	PETG thickness: 5 mm
Axitom/-5	PETG thickness: 4 mm
Exotom-100/-150	PETG thickness: 4 mm
Magnutom-400/-500	PETG thickness: Front: 10mm, Side: 8mm

The safety hoods/window primary function is to protect against samples not clamped properly.

The safety hood is made from PETG, which is generally used in all Struers machines as “safety glass”.

PETG is resistant to scratches and chemicals and provides the highest degree of safety for the operator.

Commodity Supplier: **RIAS A/S**, Industrivej 11, 7000 Roskilde, Denmark

Producer: **NEOPLAST ApS**, Tingbjergvej 4, 4632 Bjæverskov, Denmark

Supplier: **Struers A/S**, Pederstrupvej 84, 2750 Ballerup, Denmark

This is to certify that the product is produced according to regulations from the Commodity Supplier.

Yours faithfully

Flemming Perret-Gentil
R&D Manager
R&D Department, Equipment

+45 44 600 913 (direct)
+45 27 130 890 (mobile)
flemming.perret.gentil@struers.dk
www.struers.com

Pederstrupvej 84
DK-2750 Ballerup
Denmark

AbraPol-20

Struers

Spare Parts and Diagrams

Manual No.: 15887001

Date of Release 23.07.2013

AbraPol-20
Spare Parts and Diagrams

Always state *Serial No* and *Voltage/frequency*
if you have technical questions or when ordering spare parts.

The following restrictions should be observed, as violation of the restrictions may cause cancellation of Struers legal obligations:
Instruction Manuals: Struers Instruction Manuals may only be used in connection with Struers equipment covered by the Instruction Manual.
Service Manuals: Struers Service Manuals may only be used by a trained technician authorised by Struers. The Service Manual may only be used in connection with Struers equipment covered by the Service Manual.

Struers assumes no responsibility for errors in the manual text/illustrations. The information in this manual is subject to change without notice. The manual may mention accessories or parts not included in the present version of the equipment.

Struers A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark
Telephone +45 44 600 800
Fax +45 44 600 801

Spare Parts and Diagrams

Table of contents **Drawing**

Some of the drawings may contain position numbers
not used in connection with this manual.

Spare Part list for AbraPol-20

Drawing	Pos.		Cat no.
15880001		**AbraPol-20, complete**	
	0120	Splash ring.	15090900
	0140	Tube connection	15090920
	0170	Flange bearing GFM-2528-21	2BG00089
	0210	Bevel washer 16 DIN 125B FZB	2ZC11630
	0230	Safety guard, assembly	15890080
	0240	Down arm	15890930
	0270	Flange bearing GFM-2023-07	2BG00088
	0290	Top water valve	15880095
	0320	CLIMADUCT GF 2in 2750	2NU30300
	0400	Windows, assembled	15090004
	0410	Quick-release coupling, complete	15090009
	0450	Spring ring SB 16	2ZM30160
	0480	Turntable w. quad rings (ø350 mm)	15090005
	0640	Rubber	15890508
	1040	1.0AT aM-fuse 10x38	2FC10010
	1030	16.0AT aM-fuse 10x38	2FC10160
	1040	1.0 AT Cl.-CC fuse 10x38 CSA	2FC11010
	1040	2.0 AT Cl.-CC fuse 10x38 CSA	2FC11020
	1040	2.0 AT Cl.-CC fuse 10x38 CSA	2FC11020
	1030	15.0 AT Cl.-CC fuse 10x38 CSA	2FC11150
	1030	20.0 AT Cl.-CC fuse 10x38 CSA	2FC11200
	1030	20.0 AT Cl.-CC fuse 10x38 CSA	2FC11200
	1050	CAN-module f. Lenze freq.conv.	2PU82000
	1000	Lenze freq.conv. 3x230V 3.0kW	2PU82302
	1000	Lenze freq.conv. 3x400V 3.0kW	2PU84302
15880005		**Casing with electrical, assem.**	
	0140	Connector 9-pol.male 715270211	2XM11527
	0180	Dust cap 9-pol.D-sub male	2XM90009
	0220	Universal angle type F-90 PG21	2GK20045
	0230	Check-nut PG21 Brass DIN46320	2TD20109
	0310	Neoprene bushing ø20/ø28/ø36-4	2GK90147
	0380	Tube for wires PA ø31.3/ø23.7	2NU32004

Spare Part list for AbraPol-20

Drawing	Pos.		Cat no.
15880007		**Casing with motors, assembly**	
	0060	Rubber bushing	15090690
	0070	Rubber disc Ø12/Ø26.4	11440069
	0100	Conduit BA6 15015	2GO80015
	0270	Pressure spring Ø12X1.5	14220365
	0300	Locking rail	15090410
15880010		**Casing, assembly**	
	0030	Machine leg M75-16-070	2GB40075
	0210	Key Lock Switch AZM 170-02ZRKA 24V	2SS00007
	0280	Conduit BA6 30025	2GO80025
	0330	Neoprene bushing ø53/ø64/ø75-2.5	2GK90459
	0340	Sealing strip Grey 1.5x19	2IP10152
	0390	Armed PVC HOSE 1/2" -ø12.5 for water.	2NU29316
	0400	Hose clamp 12-20 / 9.0-C6 W2.	2NS21220
	0410	GEKA hose connection 1-2	2NF60000

Spare Part list for AbraPol-20

Drawing	Pos.		Cat no.
15880020		**Main mechanism, assembly**	
	0080	Cylinder EDCQ 2B 50-OD	2YC50101
	0090	REED-Contact D-A73L	2KR30177
	0100	Gasket, PVC 1/4"	2IF00012
	0110	Nipple 2531-1/4-1/8	2NF40041
	0120	Gasket, PVC O-1/8	2IF00011
	0130	Banjo to quick-coupling ø5-1/8	2NF10034
	0140	Banjo screw 1631-02-1/8	2NF20032
	0170	Coupling FLEXO FK-M10	2JH50010
	0200	Ball bushing KH4060	2BF20040
	0210	INA-Sealing ring G 40x52x5	2II04052
	0220	Upper guide	15090350
	0275	Sealing strip Black 6x12	2IP00601
	0280	Distance ring-ball bearing	14590017
	0290	V-Belt SPZ-2 ø315	2JE00315
	0300	Adapter 2012/ø35	2JE92035
	0320	Pressure disc-V-belt	14590018
	0350	V-belt XP2/3V 132mm	2JD01320
	0370	Slat for tensing	15890710
	0420	Sliding rail, Chromit+painted	15099007
	0440	Dial rail	15090330
	0460	Blocking valve R 1/4"	2YH60004
	0470	Quick-coupling, straight ø5-M5	2NF10011
	0480	Air tube ø5/ø3.2 Superflex	2NU12445
15880050		**Box for tub, assembly**	
	0050	Bearing housing for dosing arm, SurTec	15090160
	0070	Magnet catch black, double	2GL30035
	0110	Doser Conn. Board PCB, Tested	15883000
	0160	Holder for waste tube	15890509

Spare Part list for AbraPol-20

Drawing	Pos.		Cat no.
15880058		**Tub, assembled**	
	0010	Tub	15880240
	0020	Nozzle for disc cooling	15090885
	0040	Quick-coupling conical S6510-04-1/8	2NF10006
	0050	Tube for tub	15880241
	0060	Elbow 87° for hose, ø38/pipe socket, ø40	2NG20440
	0070	Tube with coupling Ø40x250 18 6011 025	2NG40025
15880045		**Sample motor, assembly**	
	0040	Motor 3x230VD/50 0,55kW 2p CSA	2MD10000
	0080	Coupling	15490410
	0100	Flex hose PMA PIST-17S.30	2NU31200
	0110	Hose union	2NM10471
	0120	Hose union 45° SVAO-P167T	2NM10437
15880034		**Plate with PCB and pneumatic d**	
	0060	Air tube ø5/ø3.2 Superflex	2NU12445
	0070	Pressure nipple RTU PK3/3	2NF40242
	0080	Neoprene nipple ø36/ø47/ø54-2.5	2GK90457
	0130	Pressure Regulator, 5-8.5 bar 1/4in	2YR00001
	0140	Quick release angle swivel connector ø5-1/8"	2NF10082
	0150	Gasket, PVC 1/4"	2IF00012
	0160	Cork 2611 1/4"	2NF40072
	0170	Gasket, PVC O-1/8	2IF00011
	0180	Throttle-sound absorber. RSS-111-M35-1/8	2YL00035
	0190	Nipple 2531-1/4-1/8	2NF40041
	0200	Banjo screw 1631-03-1/8"	2NF20080
	0210	Banjo til quick-coupling ø5-1/8	2NF10034
	0250	Magnetic valve. 3/2 24V DC 1/8	2YM10030
	0260	quick-coupling 6511-5- 1/8	2NF10012
	0280	Gasket, PVC M5	2IF00010
	0300	Quick-coupling ø5-M5	2NF10081
	0310	Sound absorber, SINTER 2931-M5	2YL00015
	0330	3/2 solenoid valve 24VDC	2YM10124
	0340	Strip int. adhesive 2-2.25mm	2GX20008
	0380	PCB AbraPol-20 A2, tested	15883002

Spare Part list for AbraPol-20

Drawing	Pos.		Cat no.
15880082		**Control box AbraPol-20, assemb**	
	0025	Window for display	15480465
	0030	Display, 320X240 w. white LED	2HD32024
	0080	2 channel opt. encoder w. pressure 24p	2HR12411
	0100	O-ring 21.2 x 3.00 72 NBR 872	2IO30008
	0110	Turn - Push Button	15090600
	0130	Pushbutton Head RVAT DG stainl.	2SA00400
	0140	Module holder f.3 elem. MHR-3	2SA41603
	0160	Emergency stop ø22 type RV	2SA10400
	0210	Main PCB, AbraPol-20, tested	15883001
	0295	PCB for SMM, Tested	15483004
15090055		**Dosing Arm, assembled**	
	0020	Vibration damper ø8x8-M3x6	2GS00108
	0030	INA sealing ring SD 14x20x3	2II21420
	0035	Cock spindle	15090125
	0050	Gasket, PVC O-1/8	2IF00011
	0055	reducer-muffe 2520-1/8-1/4 in	2NF40021
	0060	Gasket, PVC 1/4"	2IF00012
	0065	hose nipple 2601-12-1/4	2NF40087
	0080	O-ring snor ø4	2IM10004
	0090	Tube connection ø8x1 l=30	15090181
	0100	Silicone hose 7/ø10	2NU19207
	0110	Water pipe OB. GB	15090180
	0120	Spray nozzle	13000032
	0130	Doser arm OB:GL	15090150
	0140	Cylinder pin	2ZS01410
	0150	Nozzle block	15090140
	0170	Nozzle pipe	14600034
	0180	Tygon tube, enft. 21 Ø2.06	2NU91221
	0210	OP-nozzle pipe	14600209
	0220	Silicone tube Ø4/Ø6	2NU11454
	0270	Reinforced tube 3/8 X 300	2NU29312
	0290	Spring for dosing arm	15090151

Spare Part list for AbraPol-20

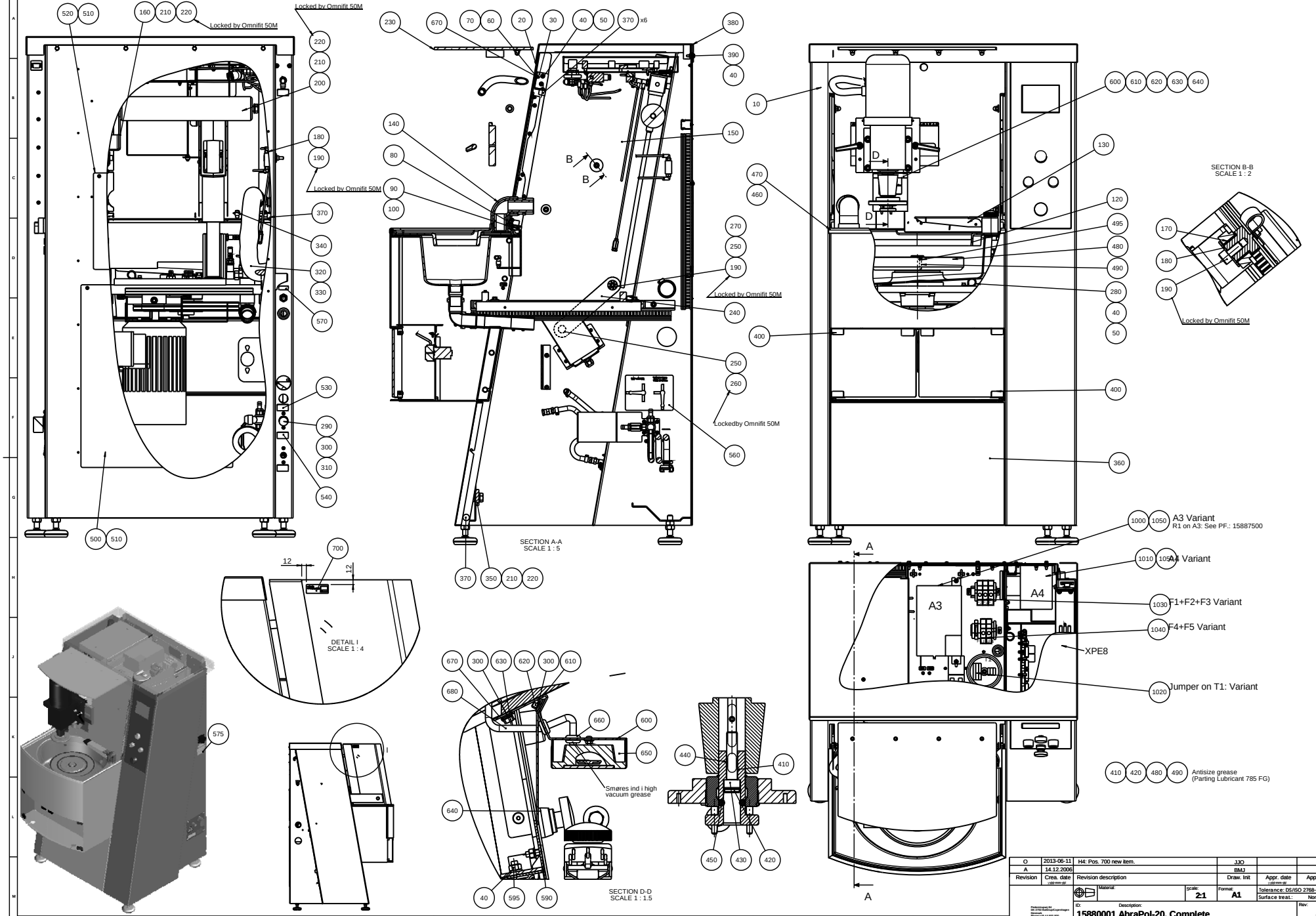
Drawing	Pos.		Cat no.
15890080		**Safety guard, assembly**	
	0010	Hood for safety guard	15890440
	0060	Flange bearing GFM-2023-07	2BG00088
	0140	Straight Actuator AZ 17/170-B1	2SS10017
15880095		**Top water valve**	
	0010	Solenoid valve, Triple 24Vdc green 311	2YM12311
	0020	Reinforced tube 3/8 X 300	2NU29312
	0050	Gasket, PVC O-1/8	2IF00011
	0060	Single banjo 1/8	2NF10029
	0070	Throttle valve	2YH00008
	0080	Reduction coupling	2NF40061
	0090	Hose nipple 2601-12-1/4	2NF40087
	0095	Gasket, PVC 1/4"	2IF00012
	0100	Reinforced tube 3/8 X 300	2NU29312
	0110	Cork 2611 1/4"	2NF40072
	0120	Socket 2543-1/4	2NF40052
15090004		**Window, assembled**	
	0001	Window for doser module	15090225
	0002	Glass door hinge set, 3-6MM, black	2GG20010
	0003	Glass door handle 3-6MM, black	2GH50010
15090009		**Quick-release coupling, complete**	
	0010	Pressure foot	12600711
	0020	Guide	15490430
	0030	Pressure spring Ø4.3X0.7	12600718
	0040	Driving pin	12600717
	0050	Shaft	15490400
	0065	Ball KU 5.556 (ø7/32 in) RS.	2BA00055
	0070	Locking ring A25, stainless DIN 471	2ZL30250
	0080	Locking ring A48, stainless I DIN 471	2ZL30480

Spare Part list for AbraPol-20

Drawing	Pos.		Cat no.
15090005		**Disc, assembled**	
	0004	Quad-ring 4326-366Y	2IQ04326
	0005	Quad-ring 4441-366Y	2IQ04441
	0006	Quad-ring 4450-366Y	2IQ04450
	0010	Disc OB:E1	15090470
15090032		**Air connection, assembled**	
	0040	Air filter, air regulation EAW3000-F02D-6	2YF00005
	0050	Stop angle filter/regu.	2YR40320
	0090	Gasket, PVC 1/4"	2IF00012
	0100	Nipple 2531-1/4-1/8	2NF40041
	0110	Gasket, PVC O-1/8	2IF00011
	0120	Banjo screw 1631-03-1/8"	2NF20080
	0130	Banjo for quick-coupling ø5-1/8	2NF10034
	0140	PVC-Hose, clear 13/32"-Ø10	2NU19313
	0145	PVC-pipe 10 mm	2NP00010
	0150	Air tube ø5/ø3.2 Superflex	2NU12445
	0160	Quick coupling	2NF10024
	0170	End piece	2NF40071
	0190	Angle Quick coupling, Ø8-1/4"	2NF10087
	0200	Distance nipple.2525-1/4-1/4-27	2NF40181
15880051		**Pumps module, assembly**	
	0020	DP pump complete with cables	15600026
	0070	Neoprene bushing ø2/ø6.5/ø11-1.5	2GK90102
	0080	Elbow pipe III	14600038
	0090	Tygon tube, ENFT 21 Ø2.06	2NU91221
15880090		**Valves for Cooli water**	
	0010	Ball valve 3-ways 3/8" internal	2YH03629
	0020	Cock 3/8"-3/8", ballofix	2YH10602
	0030	Gasket PVC 6-3/8	2IF00013
	0040	Hose nipple 2601-12-3/8	2NF40088

Spare Part list for AbraPol-20

Drawing	Pos.		Cat no.
		Accessories	
	0010	Instruction Manual for AbraPol-20	15887000
	0020	Bottle 1l. Complete	15090091
	0030	Lid for Bottle 0.5L, Complete	14600603
	0040	Plastic bottle Nat.Dia.76mm 0,5l	71000119
	0070	Band 32-50 / 9.0-C6 W3	2NS23250
	0080	PUR L suction hose Ø40	2NU30404
	0085	PVC-pipe 40	2NP00040
	0090	PUR L Suction hose Ø40	2NU30404
	0100	Water hose, grey 3/4angle-3/4straight	2NU93020
	0110	Transition tube½" inside 3/4" outside	2NG30013
	0120	Gasket Ø11/Ø24 x 1.5	13590359
	0130	Gasket w filter 3/4 in	2IX20410
	0150	Hose nipple OB. NI	13688045
	0160	Pressure hose PVC ¼in ARM.	2NU12403
	0170	Tensioner NORMA S12/9Zy	2NS11209

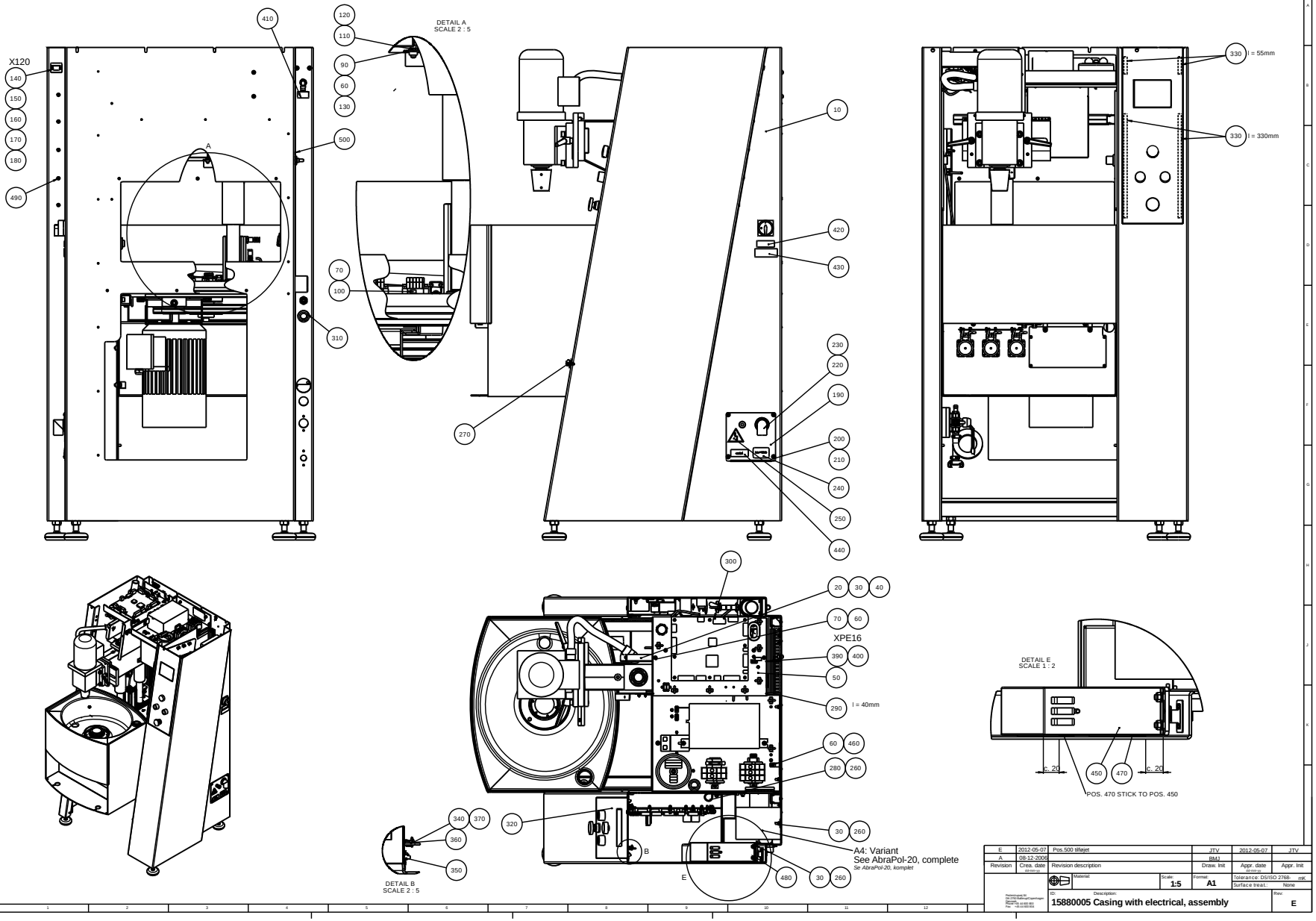


Revision	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init
O	2013-06-11	H4: Pos. 700 new item.	JJO		
A	14.12.2006		BMJ		

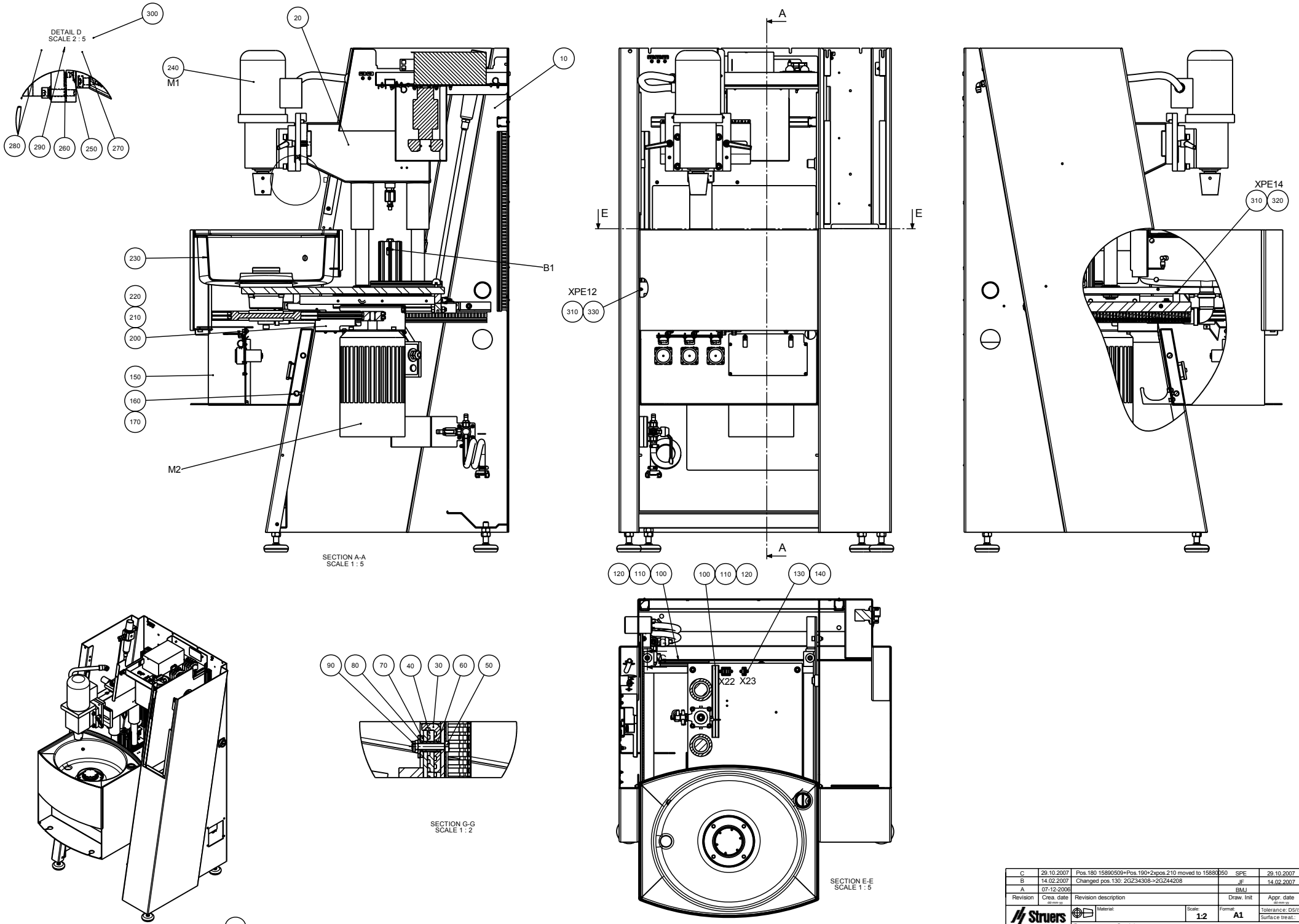
Material: | Scale: 2:1 | Format: A1 | Tolerance: DS/ISO 2768- mK | Surface treat.: None

ID: 15880001 AbraPol-20, Complete

Rev: O



E	2012-05-07	Pos.500 tilføjet		JTV	2012-05-07	JTV
A	08-12-2006			BMJ		
Revision	Crea. date dd-mm-yy	Revision description		Draw. Init	Appr. date dd-mm-yy	Appr. Init
		Material:	Scale: 1:5	Format: A1	Tolerance: DS/ISO 2768- Surface treat.:	mK None
		ID:	Description: 15880005 Casing with electrical, assembly			Rev. E



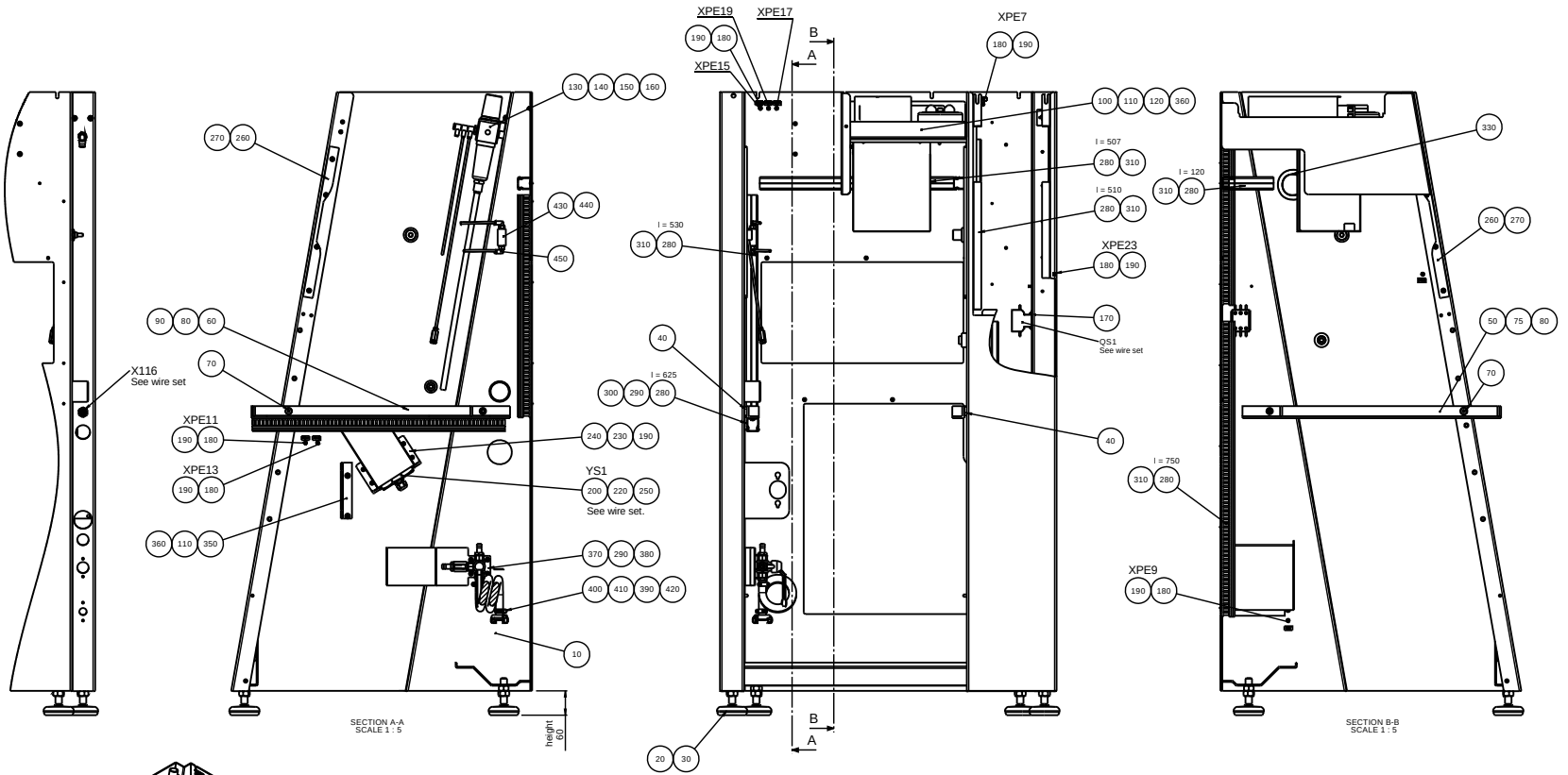
260 Omnifit 50

C	29.10.2007	Pos.180 15890509+Pos.190+2xpos.210 moved to 15880050	SPE	29.10.2007	
B	14.02.2007	Changed pos.130: 2GZ34308->2GZ44208	JF	14.02.2007	MD
A	07-12-2006		BMJ		
Revision	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init

Struers
Pederstrupvej 84
DK-2750 Ballerup
Denmark
Phone +45 44 600 800
Fax +45 44 600 801

Material:
Scale: 1:2
Format: A1
Tolerance: DS/ISO 2768- mK
Surface treat.: None

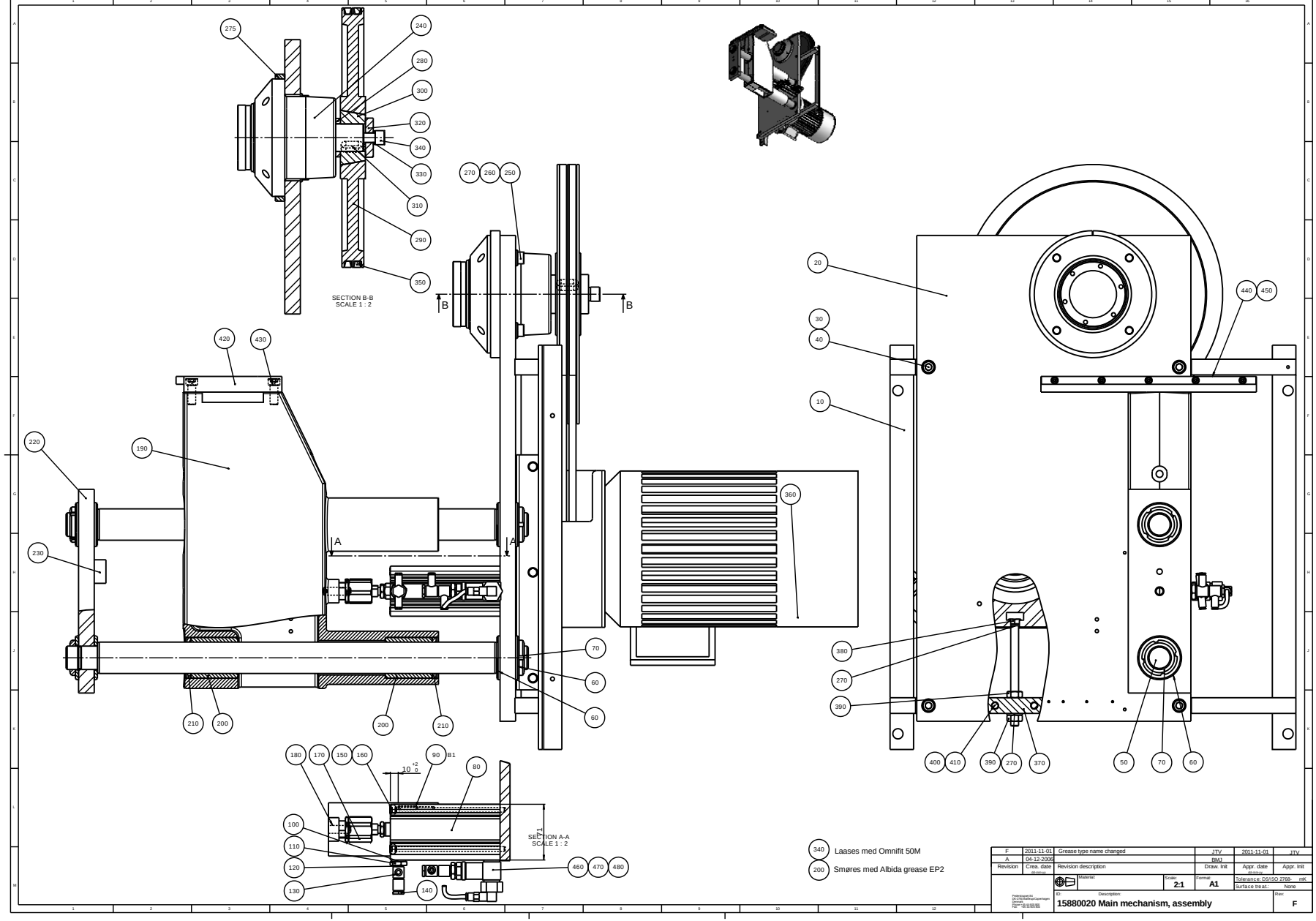
ID:
Description: **15880007 Casing with motors, assembly**
Rev: C



Revision	Date	Description	Drawn	Approved
I	2013-06-14	F7: Pos. 210 removed. Text added.	JJO	
A	06-12-2006		BMJ	
Revision	Crea. date (yyyy-mm-dd)	Revision description	Draw. Init	Appr. date (yyyy-mm-dd) / Appr. Init

Material:
Scale: 2:1
Format: A1
Tolerance: DS/ISO 2768- mK
Surface treat.: None

ID:
Description: **15880010 Casing, assembly**
Rev: I



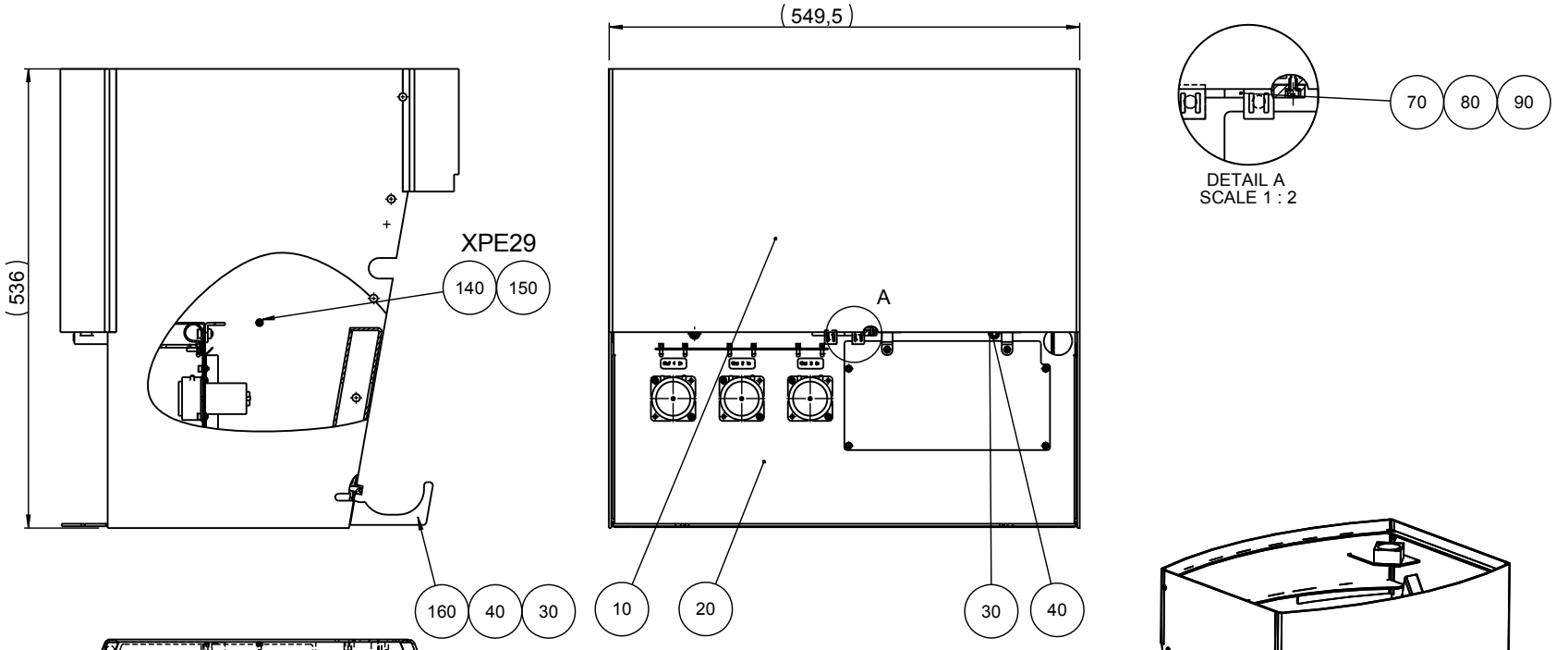
340 Laases med Omnifit 50M

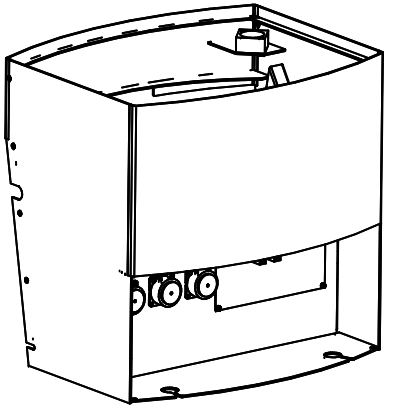
200 Smøres med Albida grease EP2

F	2011-11-01	Grease type name changed	JTV	2011-11-01	JTV
A	04-12-2006		BMJ		
Revision	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init

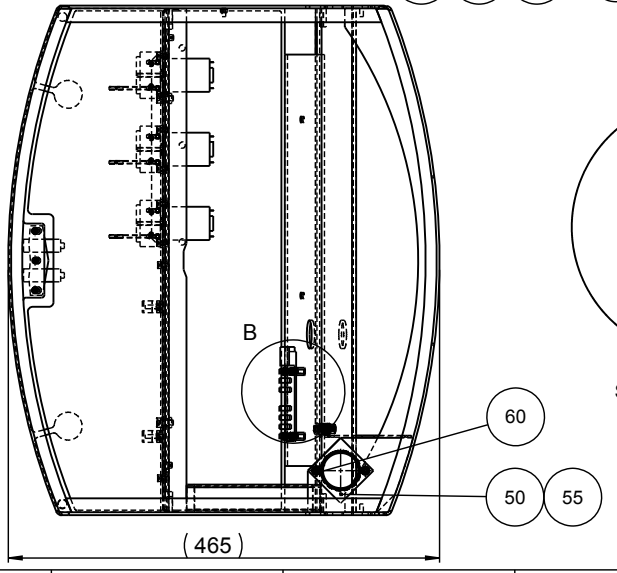
Material: | Scale: 2:1 | Format: A1 | Tolerance: DS/ISO 2768- mK | Surface treat.: None

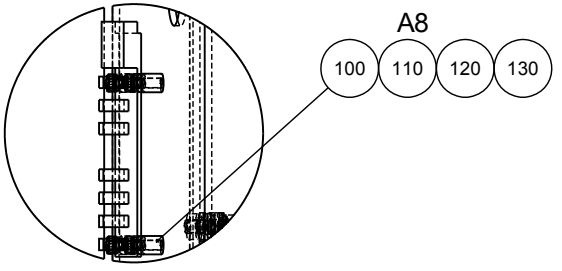
ID: 15880020 Main mechanism, assembly | Rev: F





ISOMETRIC VIEW





C	2009.03.03	Pos.55 added	SPE	2009.03.03	
A	26.01.2006		JF	26.01.2006	FPG
Revision	Crea. date yyyy-mm-dd	Revision description	Draw. Init	Appr. date yyyy-mm-dd	Appr. Init

Struers
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone:+45 44 600 800
Fax: +45 44 600 804

Material:	Scale:	Format:	Tolerance: DS/ISO 2768- mK
	1:5	A3	Surface treat.: None

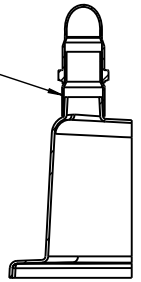
ID: Description:

15880050 Box for tub, assembly

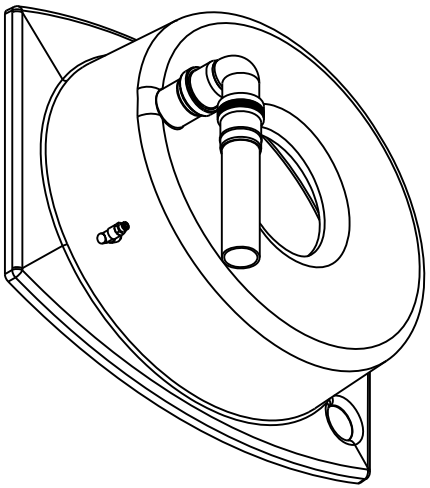
Rev: **C**

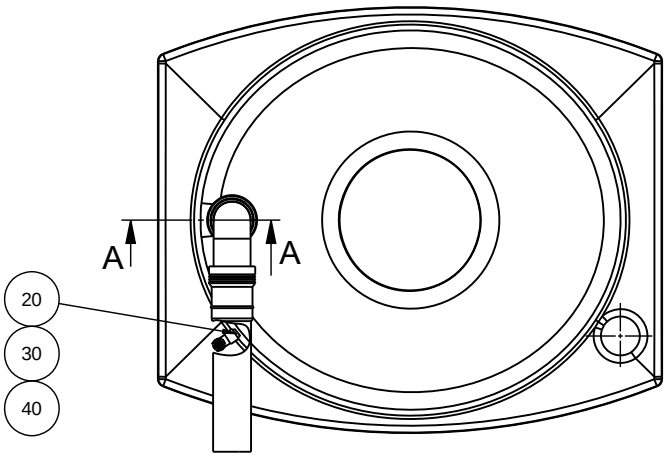
Limes med PVC lim (50)

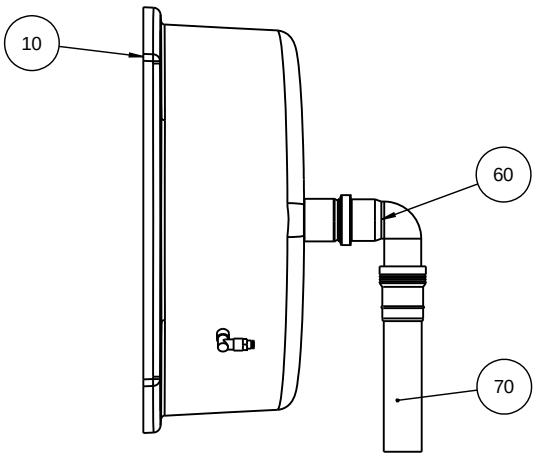
Pos. 50
PVC rør udvides med værktøj 15881501 i produktionen.



SECTION A-A







20 Seal Omnifit 100M

D	29.10.2008	Pos.70 15880242 added; See 1588LD01 list removed	SPE	29.10.2008	BRY
A	04.12.2006		SPE		
Revision	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init

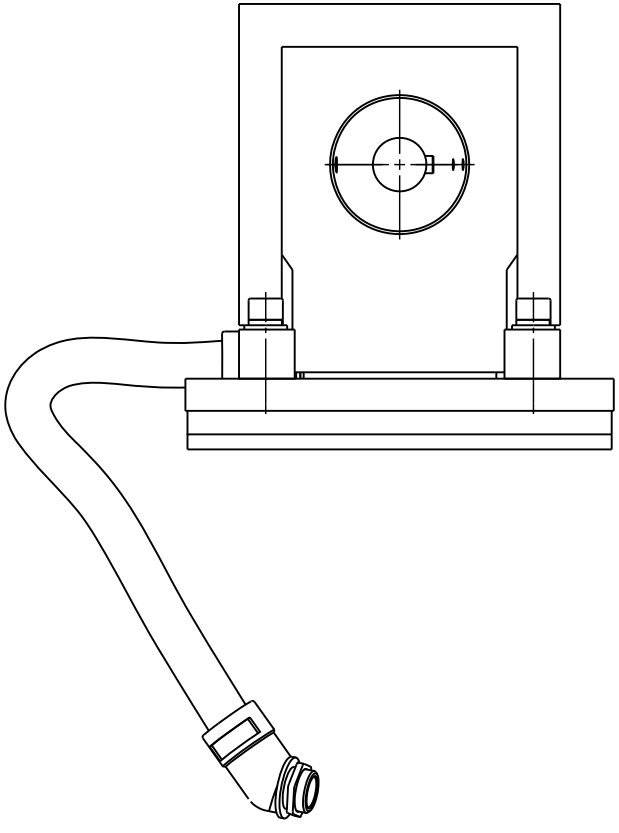
Struers
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone: +45 44 600 800
Fax: +45 44 600 804

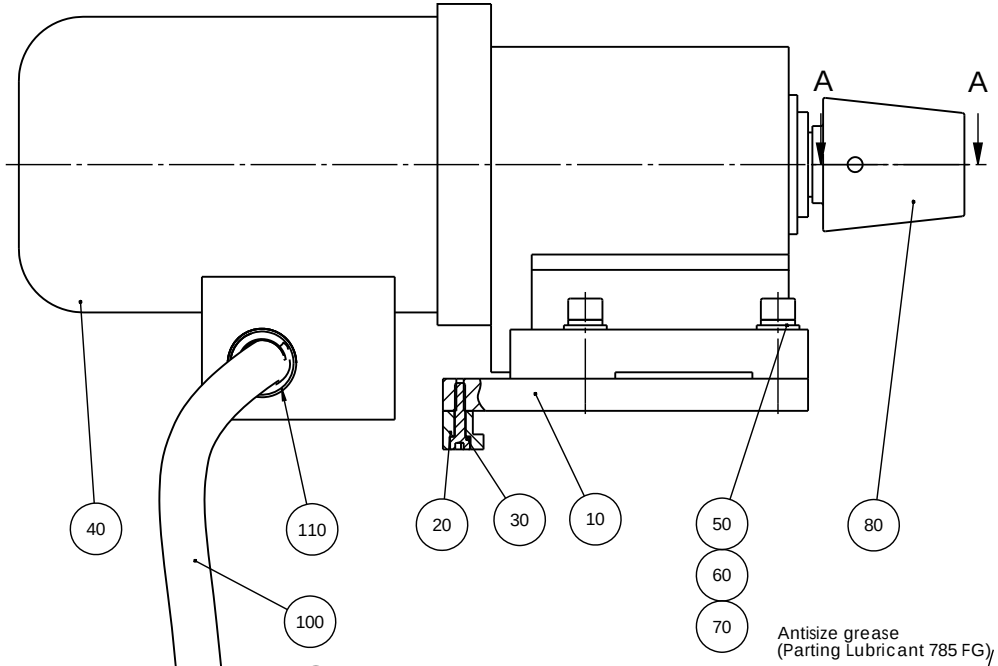
Material:	Scale: 1:5	Format: A3	Tolerance: DS/ISO 2768- mK
			Surface treat.: None

ID: Description:

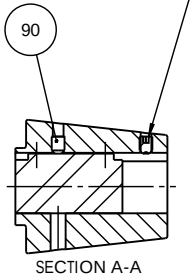
15880058 Tub, assembled

Rev: **D**

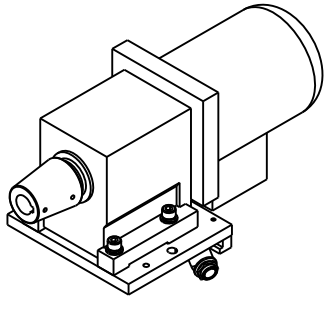




Antisize grease
(Parting Lubricant 785 FG)



SECTION A-A
SCALE 1 : 2



80 Varmes op til 150°C og krympes paa

90 Omnifit 50

Revision	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init
E	2013.07.31	PMA fittings changed Pos.100, 110,120,130	SPE	2013.07.31	
A	28-11-2006		YKJ		

Material:

Scale: **1:2**

Format: **A3**

Tolerance: DS/ISO 2768- mK

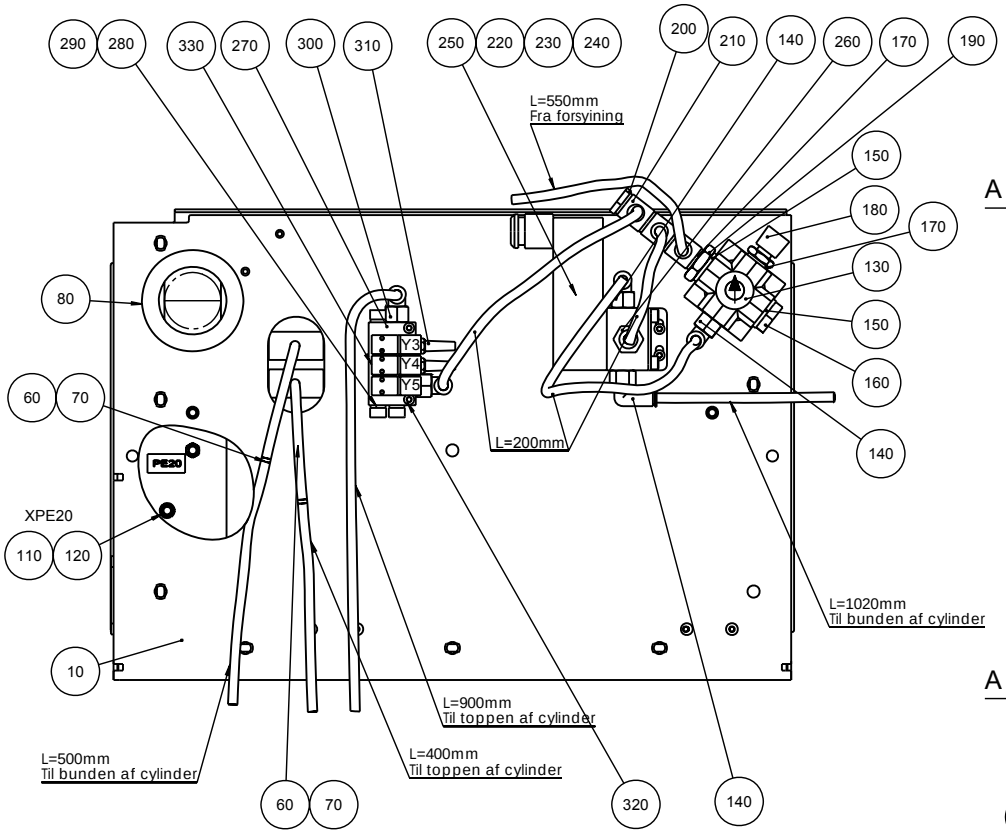
Surface treat.: None

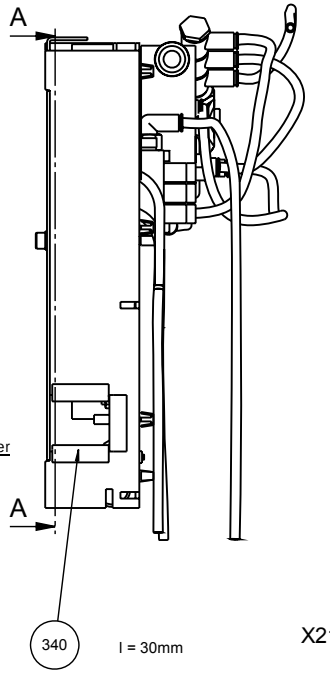
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone:+45 44 600 800
Fax: +45 44 600 804

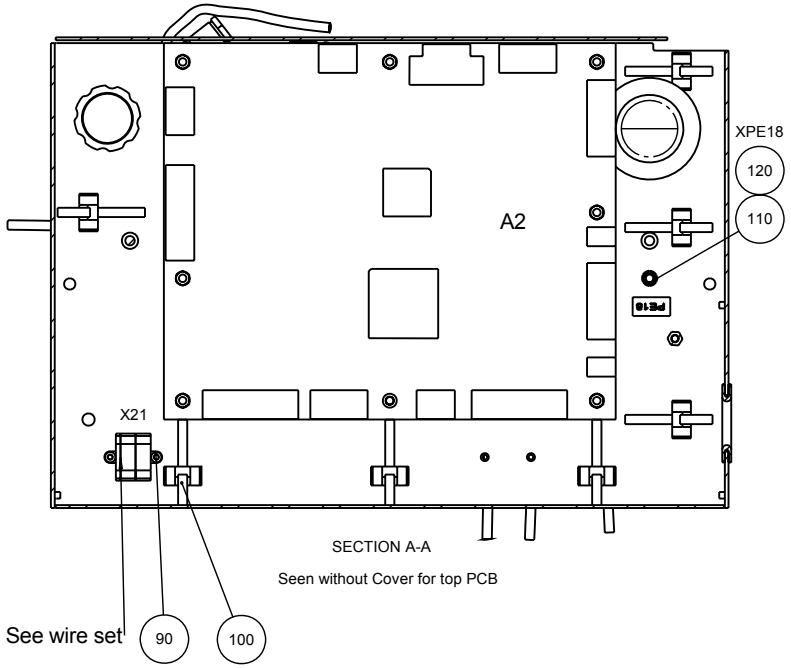
ID: Description:

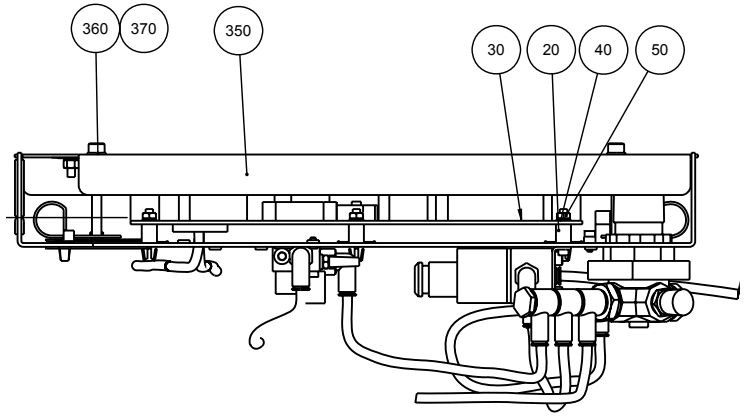
15880045 Sample motor, assembly

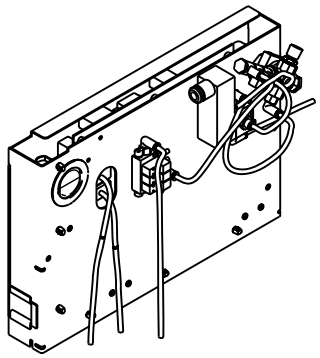
Rev: **E**









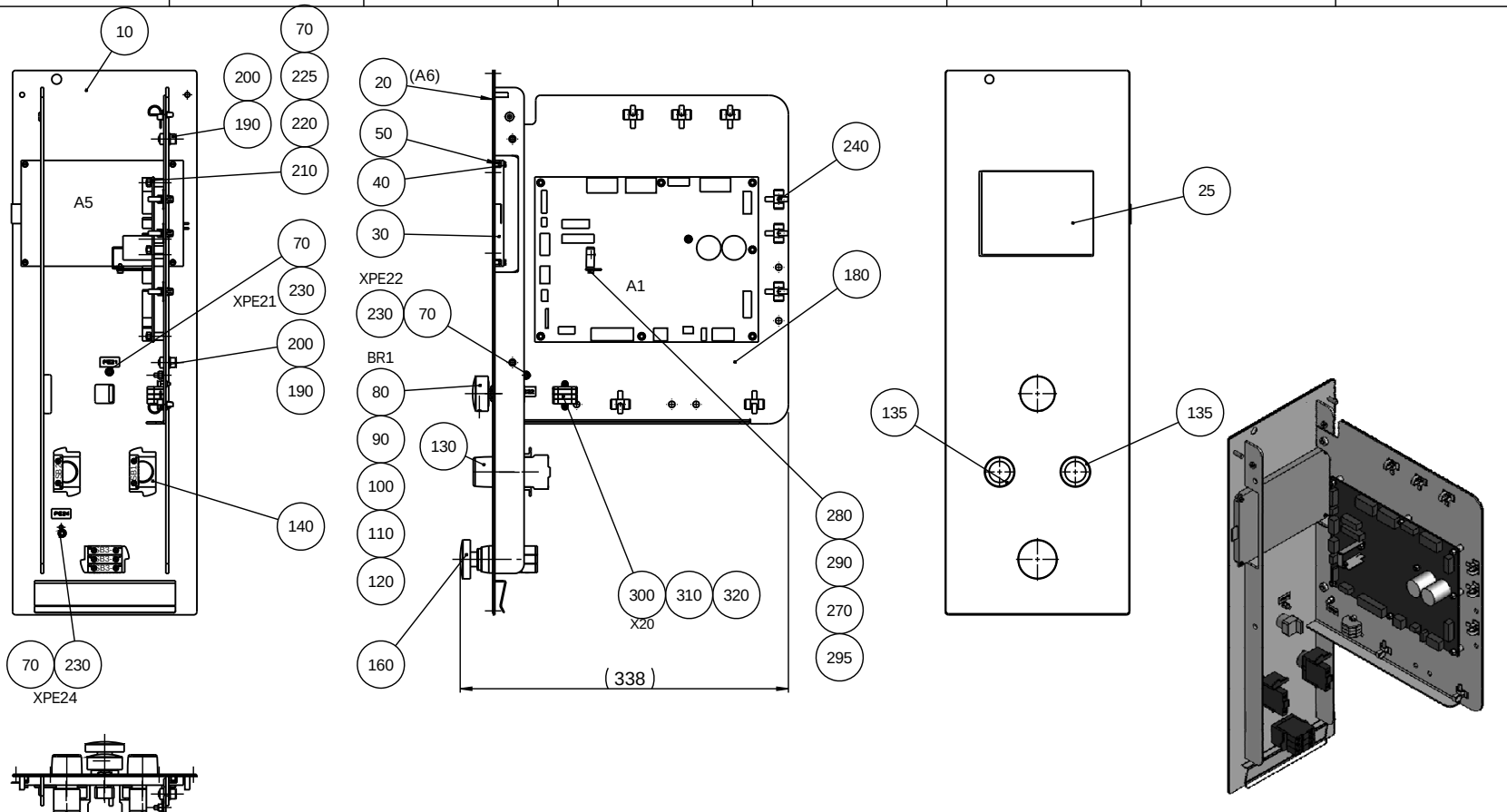


C					
B	12.09.2007	Pos, 140 have changed place with 180.	SPE	12.09.2007	
A	30-11-2006		YKJ		
Revision	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init

Struers
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone: +45 44 600 800
Fax: +45 44 600 804

Material:
Scale: 1:2
Format: A2
Tolerance: DS/ISO 2768- mK
Surface treat.: None

ID:
Description: **15880034 W. PCB and pneu. distr., assembly**
Rev: **B**



Contact blocks: See wire set

Kontaktblokke: Se ledningssæt

I	2012-01-18	(90) Nut for BR1 changed.	BRY	2012-01-18	JTV
A	26-01-06		JFR	26-01-06	FPG
Revision	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init

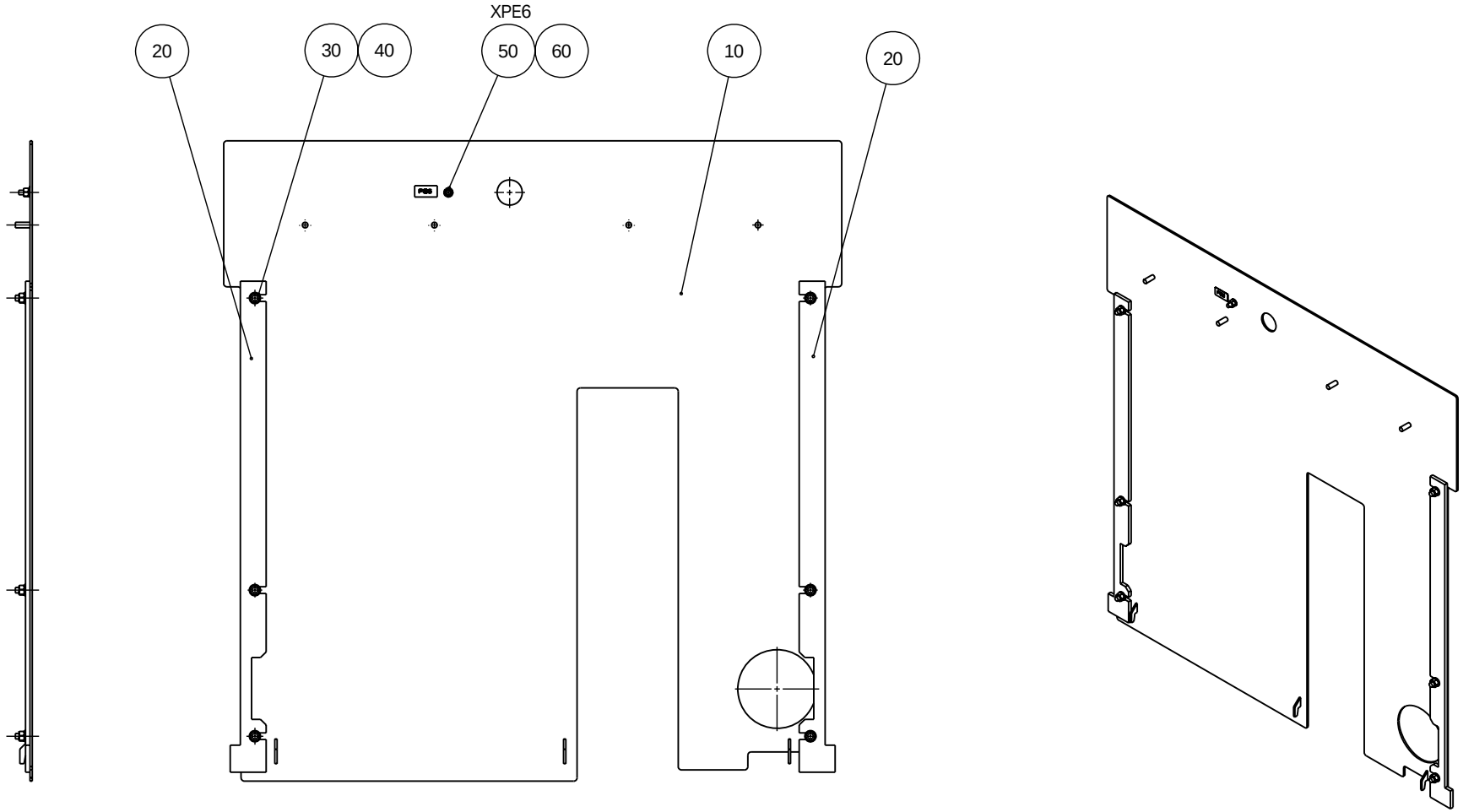
Material: | Scale: **1:4** | Format: **A3** | Tolerance: DS/ISO 2768- mK | Surface treat.: None

Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone:+45 44 600 800
Fax: +45 44 600 804

ID: Description:

15880082 Control box AbraPol-20, assembly

Rev: **I**



C	,	,	,	,	,
B	05.11.2007	Pos. 20 15881195 changed	SPE	05.11.2007	
A	27.11.2006		JF	27.11.2006	FPG
Revision	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init

Struers
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone:+45 44 600 800
Fax: +45 44 600 804

Material:

Scale: 1:4

Format: A3

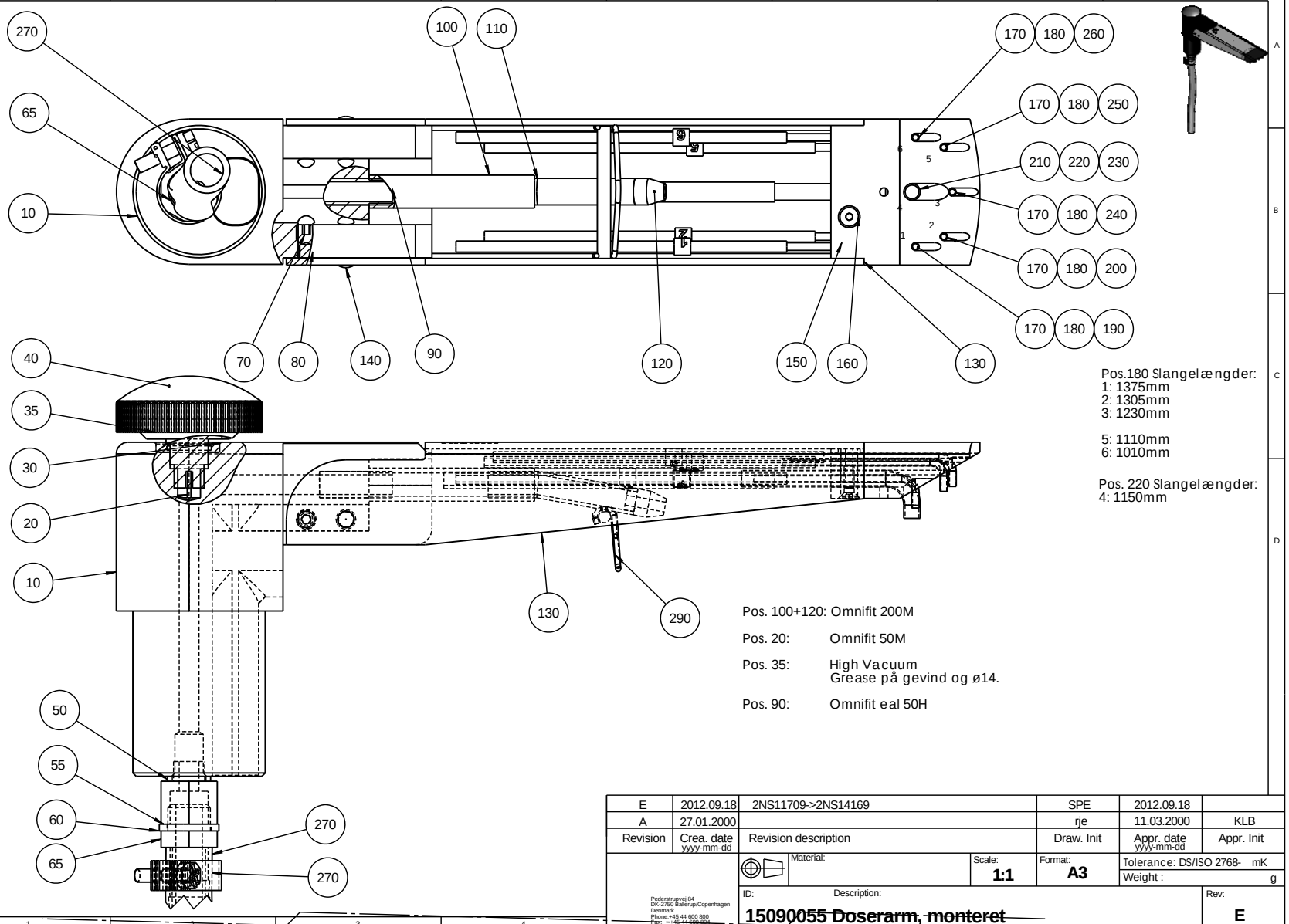
Tolerance: DS/ISO 2768-

Surface treat.:

ID: Description:

15880025 Front, assembly

Rev: B



Pos.180 Slangelængder:
1: 1375mm
2: 1305mm
3: 1230mm

5: 1110mm
6: 1010mm

Pos. 220 Slangelængder:
4: 1150mm

Pos. 100+120: Omnifit 200M

Pos. 20: Omnifit 50M

Pos. 35: High Vacuum
Grease på gevind og ø14.

Pos. 90: Omnifit eal 50H

E	2012.09.18	2NS11709->2NS14169	SPE	2012.09.18	
A	27.01.2000		rje	11.03.2000	KLB
Revision	Crea. date yyyy-mm-dd	Revision description	Draw. Init	Appr. date yyyy-mm-dd	Appr. Init

Material:

Scale: **1:1**

Format: **A3**

Tolerance: DS/ISO 2768- mK

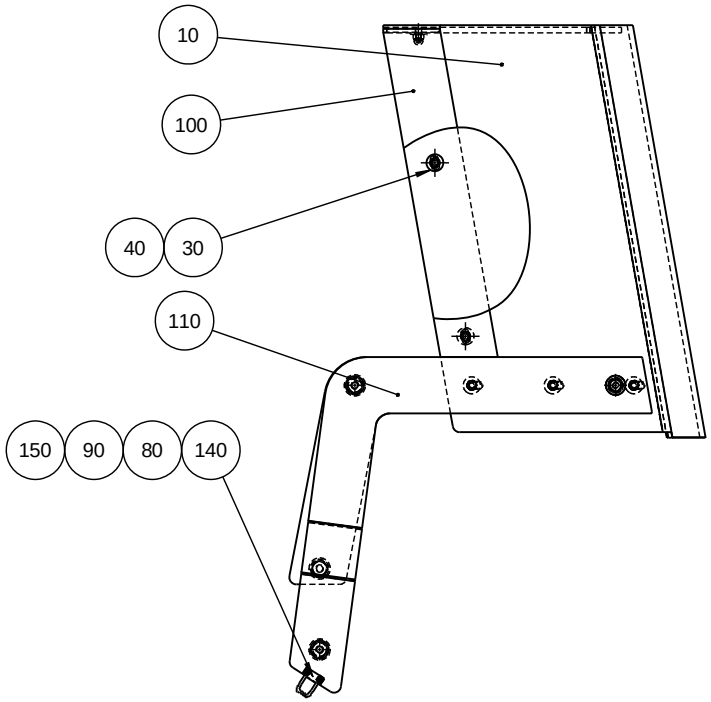
Weight : g

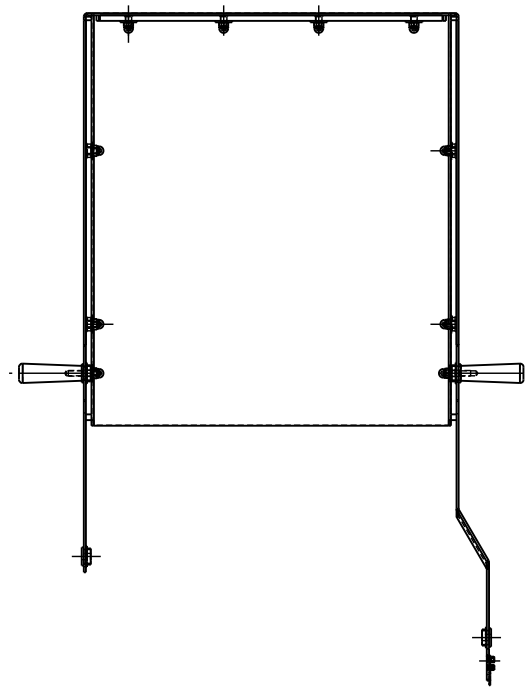
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone: +45 44 600 800
Fax: +45 44 600 801

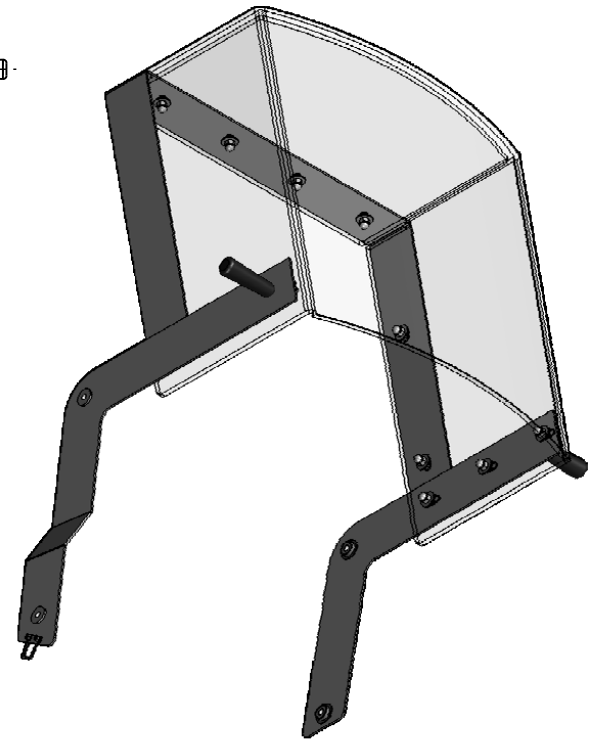
ID: Description:

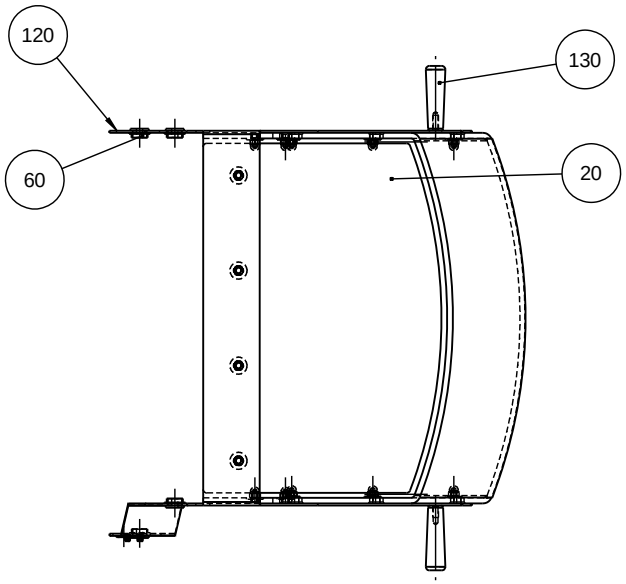
15090055 Doserarm, monteret

Rev: **E**









40 Clamping torque: 2Nm.
Use Loctite 243/Omnifit 100M.

30 Round edges against plastic.

D	2010-03-16	Text about (30)(40) added.	BRY	2010-03-16	JTV
A	02.02.2006		JF	02.02.2006	FPG
Revision	Crea. date yyyy-mm-dd	Revision description	Draw. Init	Appr. date yyyy-mm-dd	Appr. Init

Struers
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone: +45 44 600 800
Fax: +45 44 600 804

Material:

Scale: 1:7

Format: A3

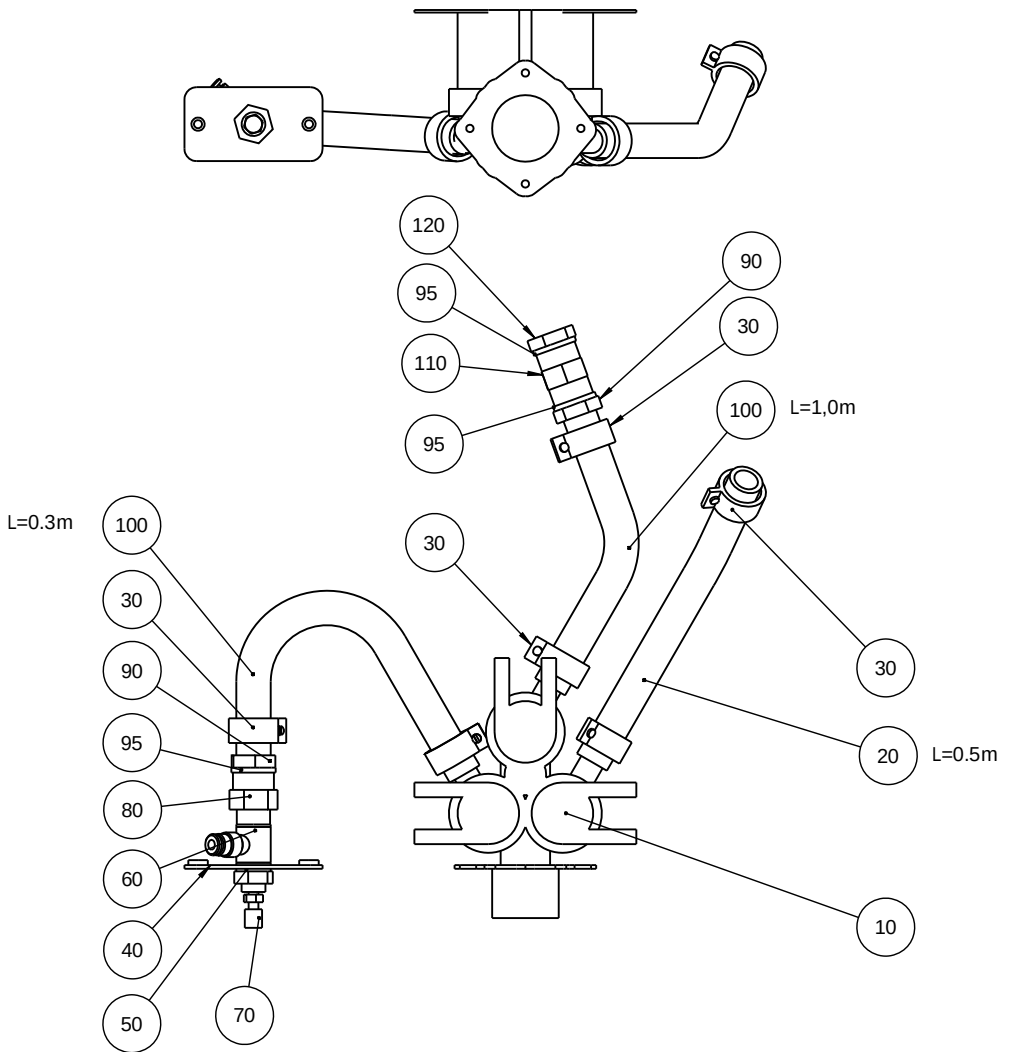
Tolerance: DS/ISO 2768- mK

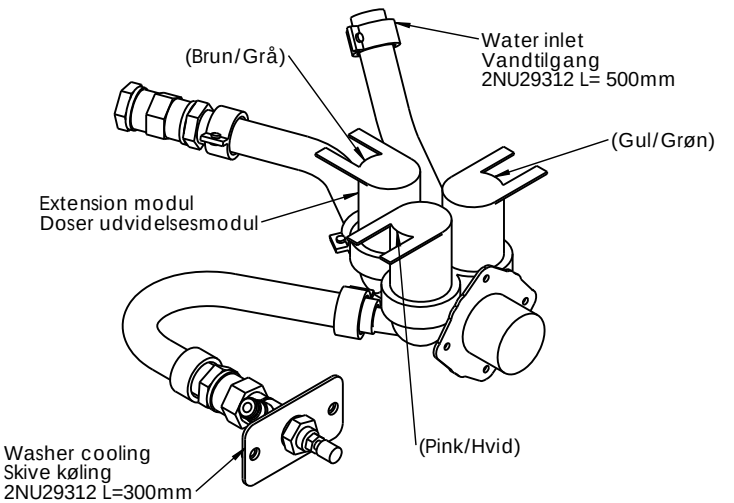
Surface treat.: None

ID: Description:

15890080 Safety guard, assembly

Rev: D





D	2011-06-28	2IF00011 -> 2IF51014	JTV	2011-06-28	JTV
A	04-12-2006		YKJ		
Revision	Crea. date yyyy-mm-dd	Revision description	Draw. Init	Appr. date yyyy-mm-dd	Appr. Init

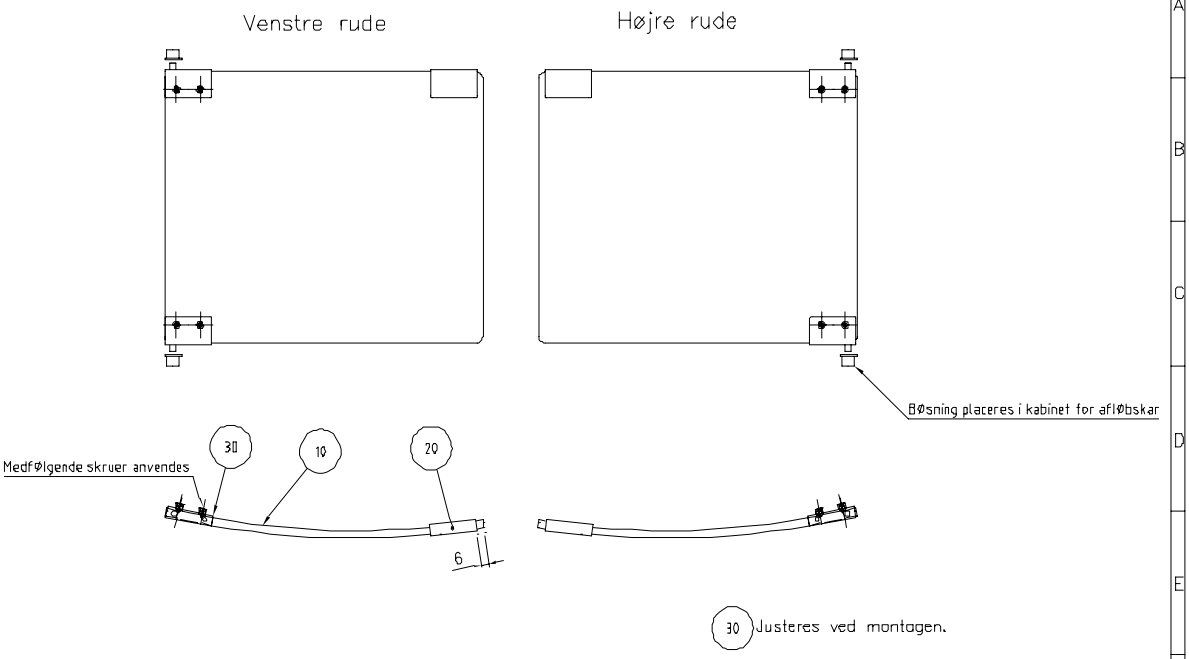
Struers
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone:+45 44 600 800
Fax: +45 44 600 804

Material:	Scale: 1:2	Format: A3	Tolerance: DS/ISO 2768- mK	
			Weight :	g

ID: Description:

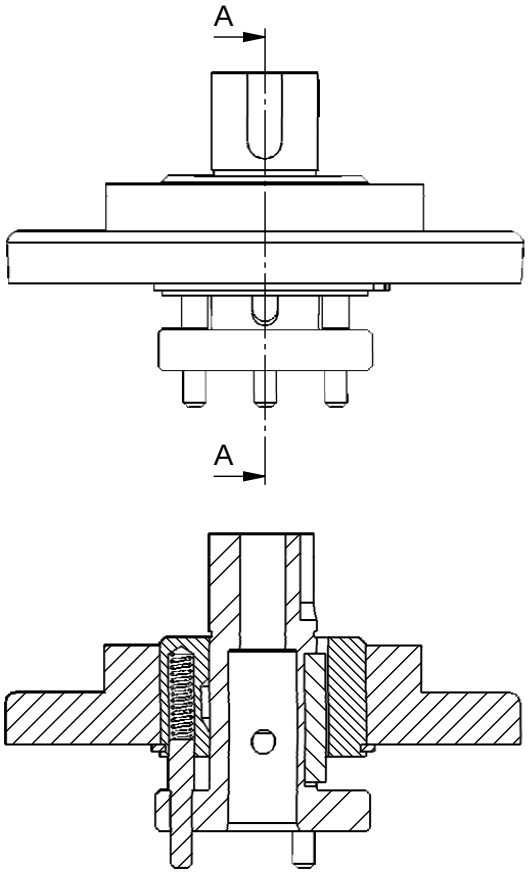
15880095 Tap water valve

Rev: **D**

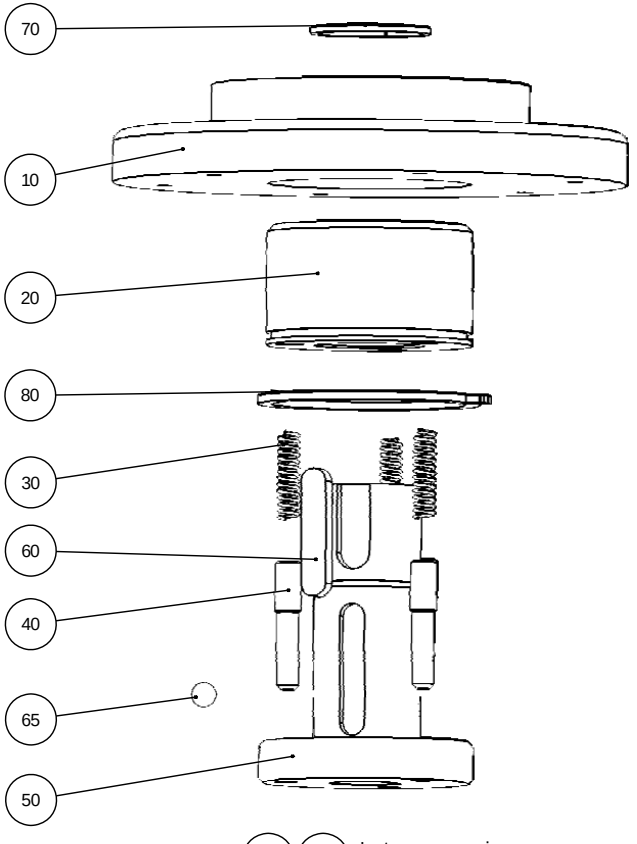


30 Justeres ved montagen.

Matr.:	Overfl.beh.:	Målforhold: 1:2.5	Ikke ang. tol. efter DS/ISO 2768--
Struers	Projektionsmetode		Data / Sign.
			Tegn: 160300 BMJ
			Kontr.: 180700 KLB
Ruder for dosermodul, mont.		Emb.: 15090004	



SECTION A-A



10 20 Let prespasning

POS. NO.	AMOUNT	DRAW. NO.	NAME	NOTE
10	1	12600711 Tryksko		
20	1	15490430 Styr		
30	3	12600718 Trykfjeder d4.3x0.7		
40	3	12600717 Medbringertap		
50	1	15490400 Aksel		
60	1	12600723 Feder		
65	2	2BA00055 Kugle KU 5,556 ø7 Rustfri		
70	1	2ZL30250 Laasering A25 Rustfri DIN471		
80	1	2ZL30480 Laasering A48 Rustfri DIN471		

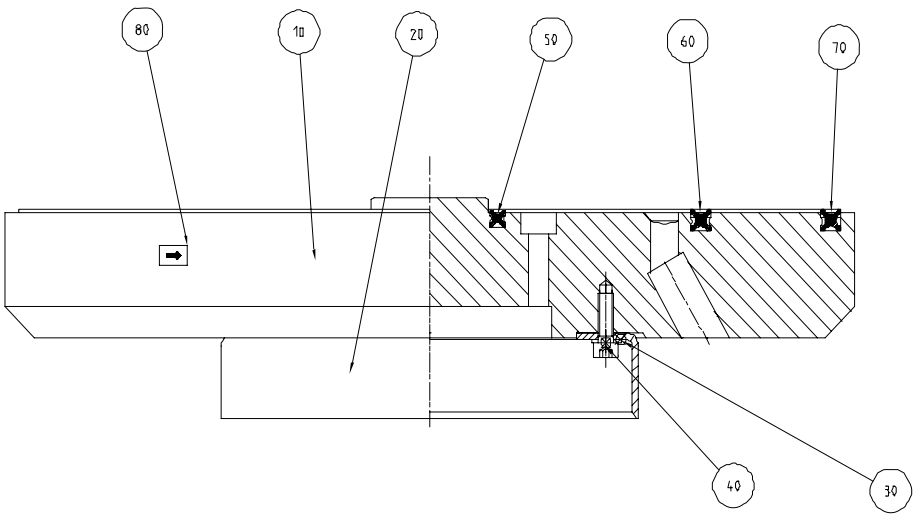
C	2012.05.15	Drawing updated		TOS	2012.05.15	
A	2001.06.11			BMJ	2001.06.11	
Revision	Crea. date yyyy-mm-dd	Revision description		Draw. Init	Appr. date yyyy-mm-dd	Appr. Init
		Material:	Scale: 1:1	Format: A3	Tolerance: DS/ISO 2768- mK	
					Weight : g	

Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone:+45 44 600 800
Fax: +45 44 600 804

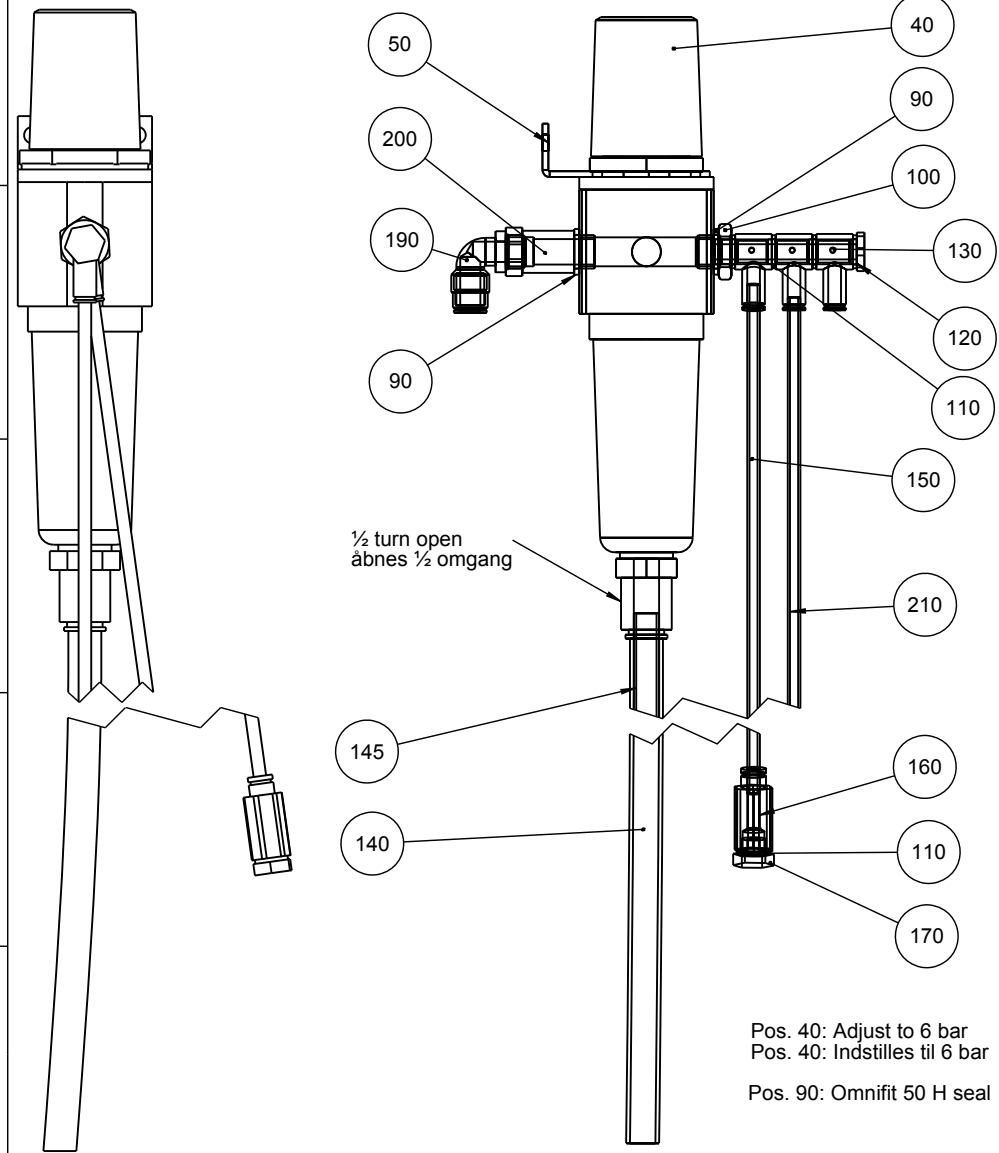
ID: Description:

15090009 Opspaendingsenhed, monteret

Rev: **C**



Matr.:	Overfl.behs.	Målforhold	Ikke ang. tol. efter DS/ISO 2768-m
Struers	Projektionsmetode	1:1	
			Dato / Sign.
		Tegn.:	200300 BMJ
		Kontr.:	180700 KLB
Tallerken, monteret		Erst.:	15090005



Pos. 40: Adjust to 6 bar
Pos. 40: Indstilles til 6 bar

Pos. 90: Omnifit 50 H seal

E	08.09.2008	Pos.210 added, pos. 110+150+160+170 moved.	SPE	08.09.2008	
A	29-02-08		SPE	02-04-07	JTV
Rev	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init

Struers

Pederstrupvej 84
DK-2750 Ballerup
Copenhagen
Denmark
Phone :+45 44600 800
Fax : +45 44600 804

Material:

Scale: 1:2

Format: A4

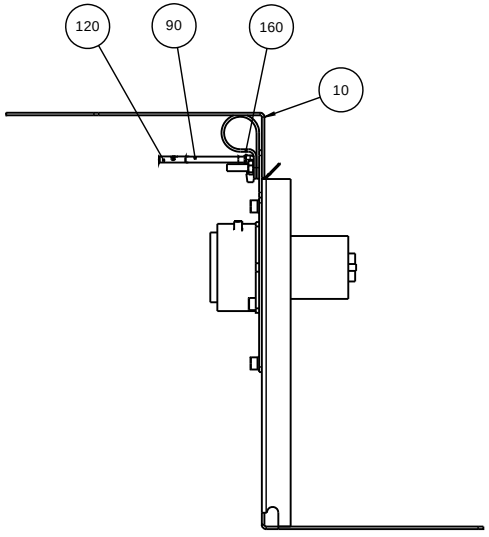
Tolerance: DS/ISO 2768 - mK

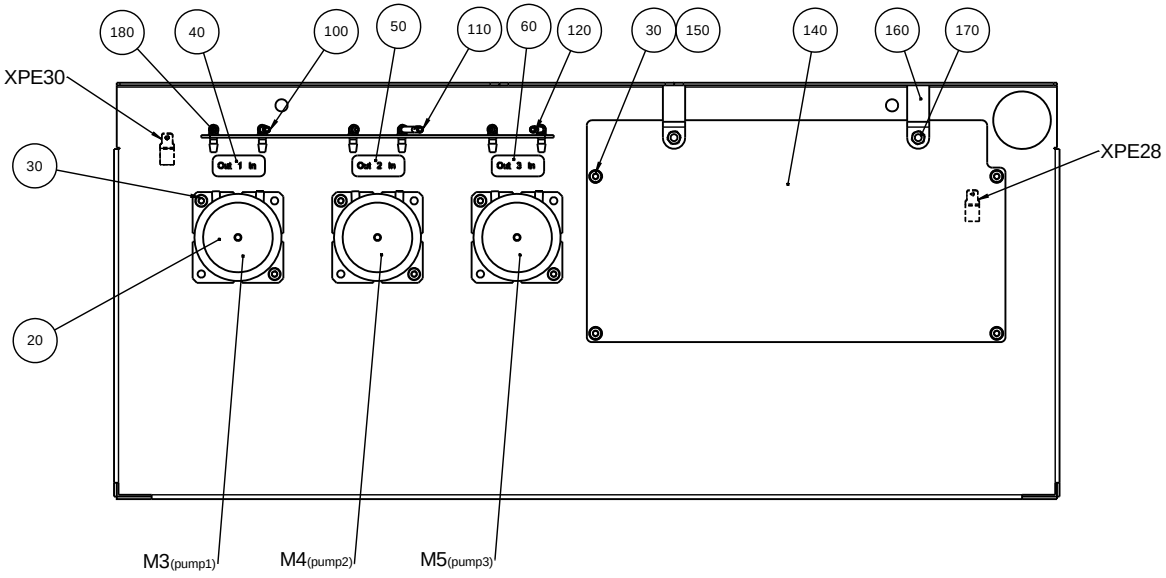
Surface treat.: None

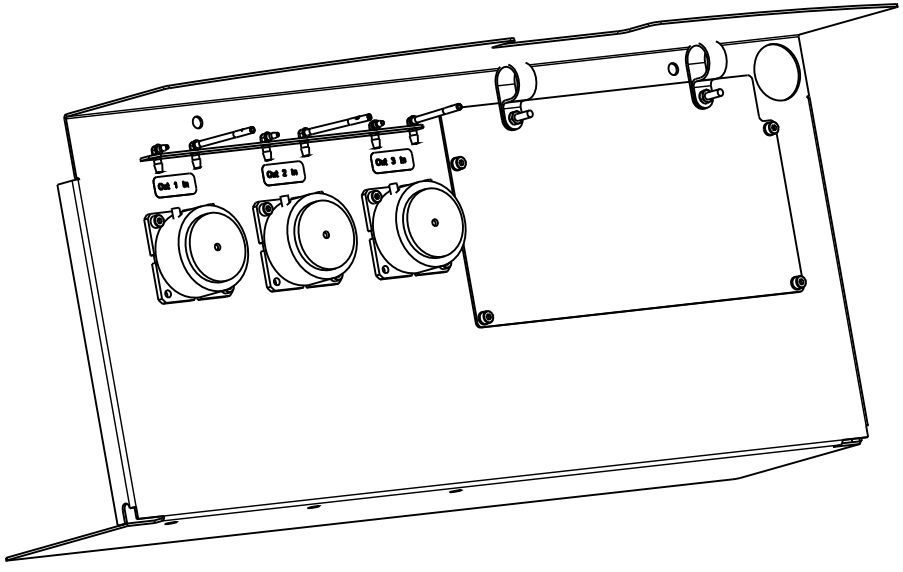
ID: Description:

15090032 Air connection, assembled

Rev: E





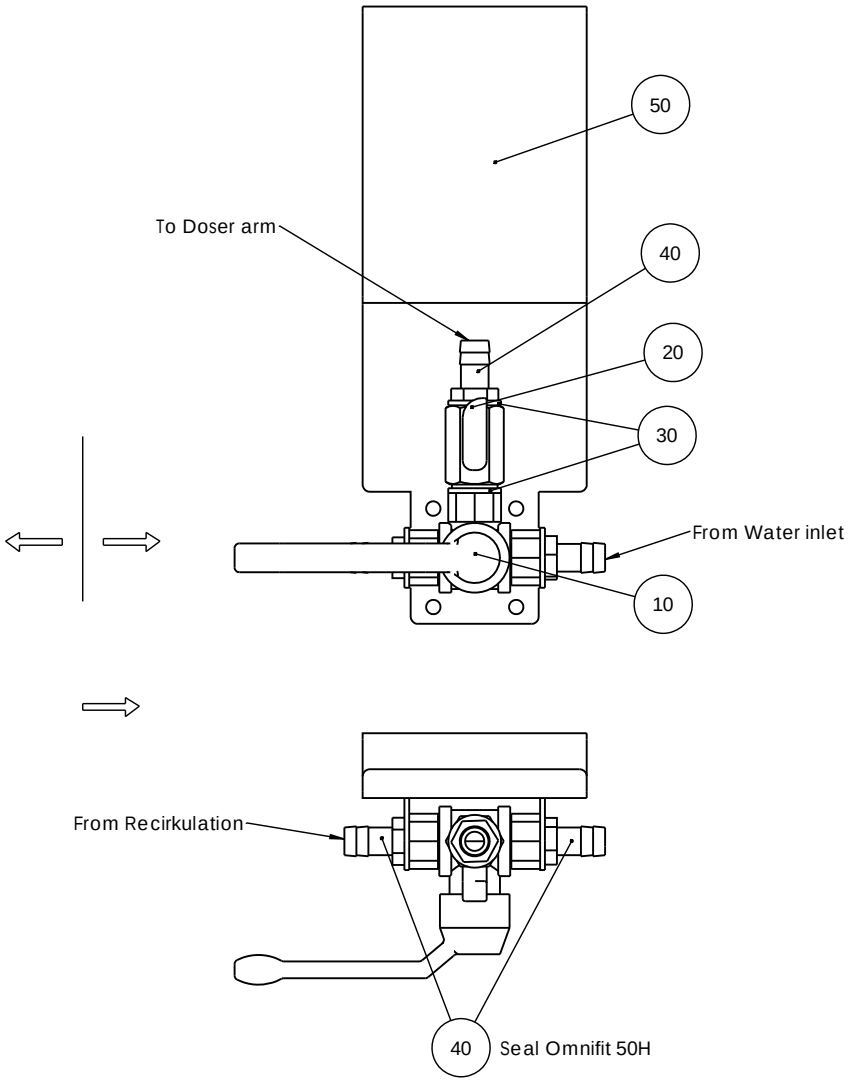


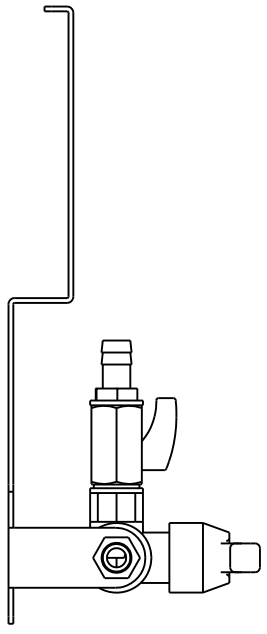
F	2009-12-06	Pos 180 changed to reduction angle.	JTV	2009-12-06	JTV
A	28-11-2006		BMJ		
Revision	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init

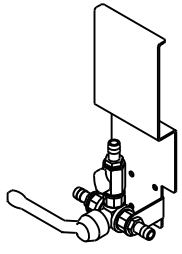
Struers
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone: +45 44 600 800
Fax: +45 44 600 804

Material:
Scale: 1:2
Format: A2
Tolerance: DS/ISO 2768- mK
Surface treat.: None

ID:
Description: **15880051 Pumps module, assembly**
Rev: **F**







Revision	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init
C					
B	12.09.2007	Water inlet, recirkulation and doser arm added	SPE	12.09.2007	
A	07-12-2006		YKJ		

Struers
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone: +45 44 600 800
Fax: +45 44 600 804

Material:

Scale: 1:2

Format: A3

Tolerance: DS/ISO 2768- mK

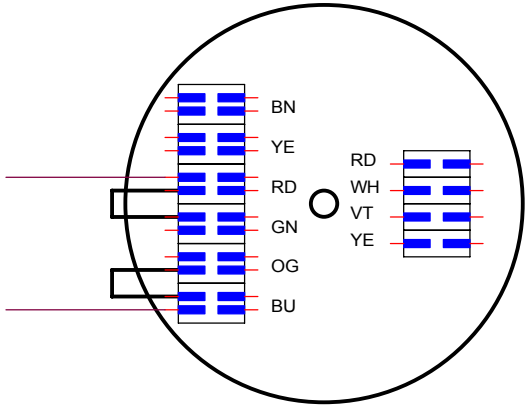
Surface treat.: None

ID: Description:

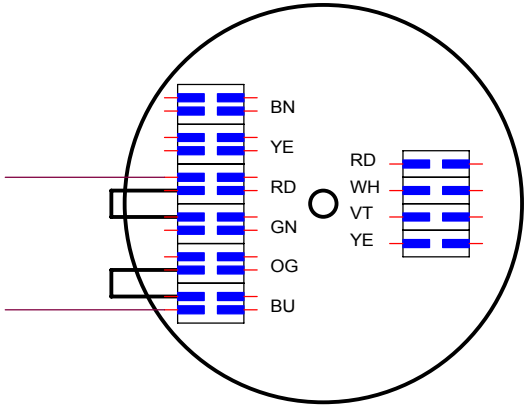
15880090 Valves for cooli water

Rev: **C**

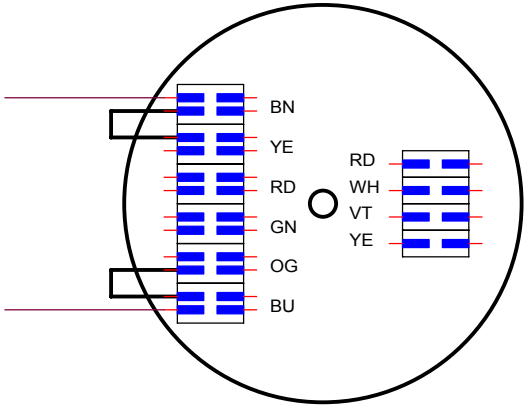
CONNECTION FOR 200V / 50Hz



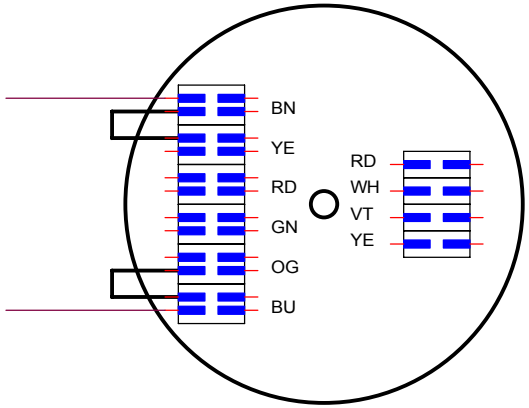
CONNECTION FOR 200-210V / 60Hz



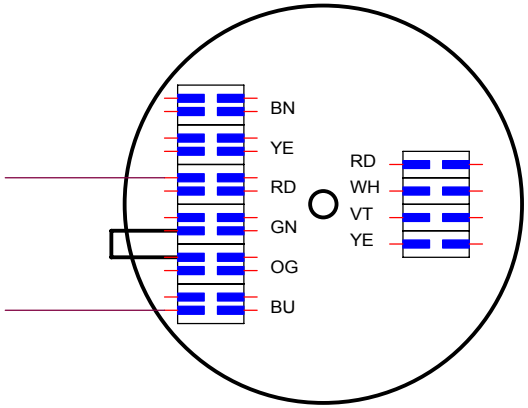
CONNECTION FOR 220-230V / 50Hz



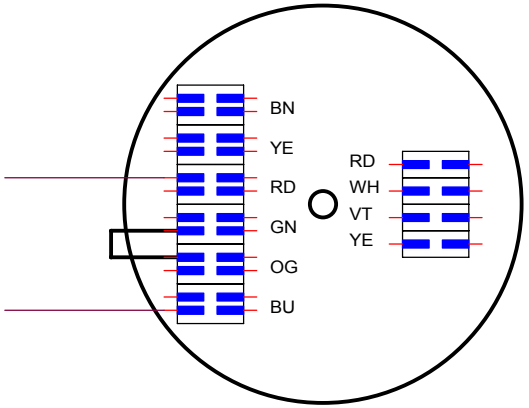
CONNECTION FOR 220-240V / 60Hz



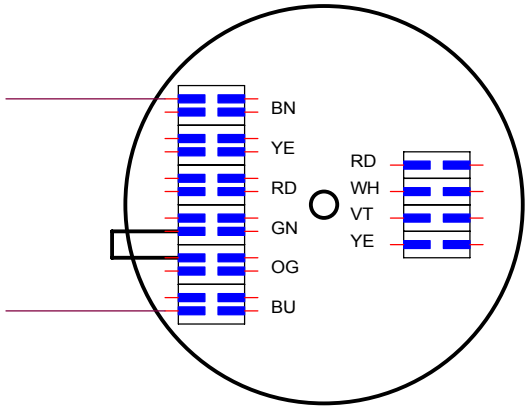
CONNECTION FOR 380-415V / 50Hz



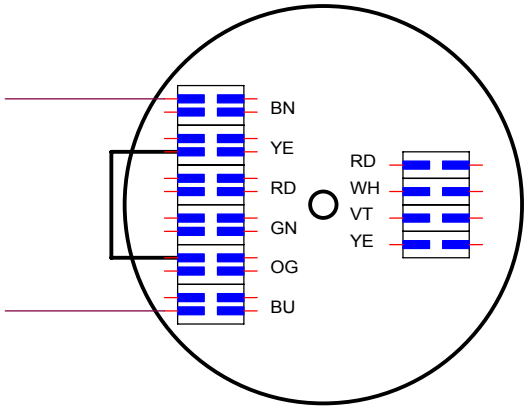
CONNECTION FOR 380-415V / 60Hz



CONNECTION FOR 430-460V / 60Hz



CONNECTION FOR 460-480V / 60Hz



COLOR CODES:

BK = BLACK
BN = BROWN
RD = RED
OG = ORANGE
YE = YELLOW
GN = GREEN
BU = BLUE
VT = VIOLET
GY = GREY
WH = WHITE

Rev. A: Baan PDM

STRUERS A/S
VALHOEJS ALLE 1176
DK-2610 ROEDOVRE
DENMARK
PHONE: + 45 3670 3500

Transformer connections.

FILE NAME.: 5093452.DSN
PAGE1.SCH

Size: A3

CAGE Code: <Cage Code>

DWG NO: 15093452

Rev: A

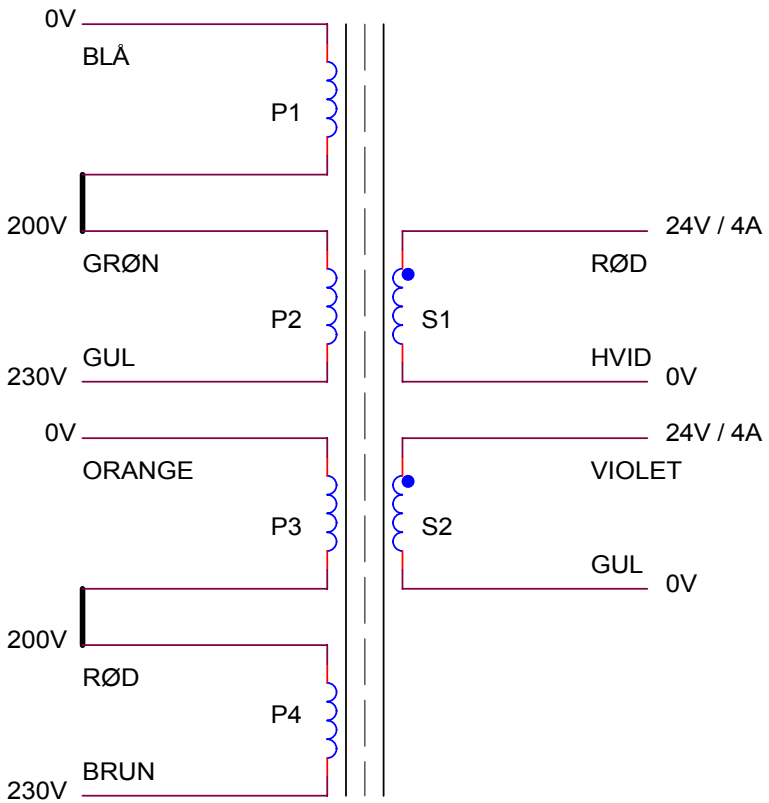
Thursday, September 21, 2000

Scale: SLN / SLN

Sheet: 1 of 3

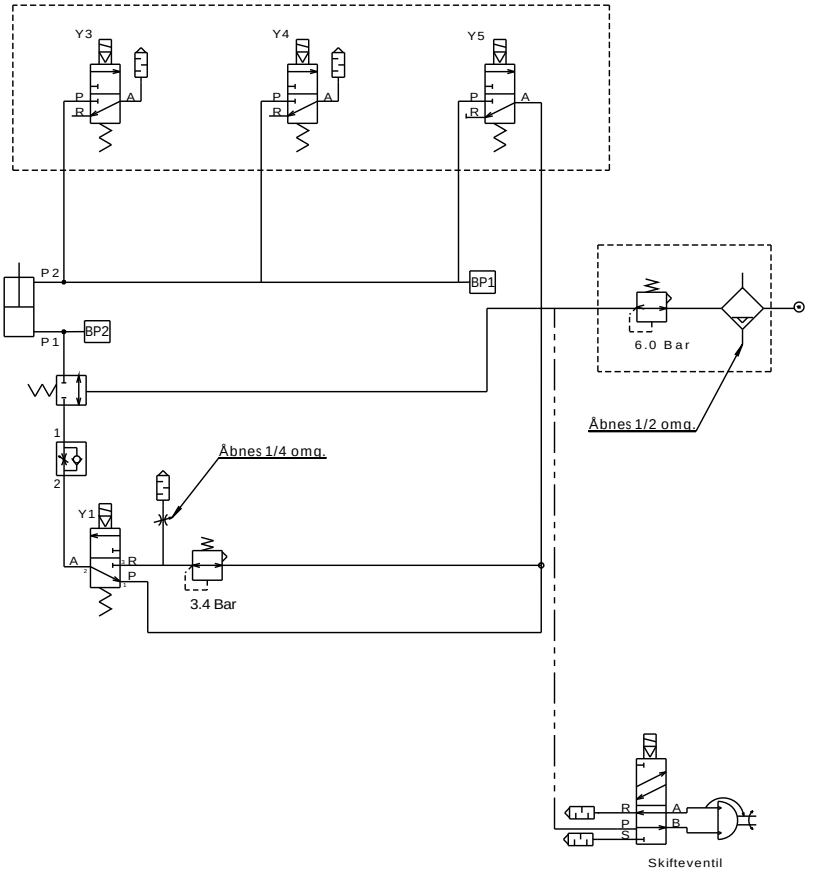
Primær:

Sekundær:



= intern forbindelse

Rev. A: Baan PDM	STRUERS A/S VALHOEJS ALLE 1176 DK-2610 ROEDOVRE DENMARK PHONE: + 45 3670 3500			
	Transformator Construction - electrical			
FILE NAME.: 5093452.DSN PAGE2.SCH	Size A4	CAGE Code <Cage Code>	DWG NO 15093452	Rev A
Thursday, September 21, 2000	Scale	SLN / SLN	Sheet 2 of 3	



C	2011-06-08	Speed adjustment valve added	JTV	2011-06-08	JTV
A	18.11.2006		JF	18.11.2006	FPG
Rev	Crea. date yyyy-mm-dd	Revision description	Draw. Init	Appr. date yyyy-mm-dd	Appr. Init

Struers
Pederstrupvej 84
DK-2750 Ballerup
Copenhagen
Denmark
Phone :+45 44600 800
Fax : +45 44600 804

Material:

Scale: **1:1**

Format: **A4**

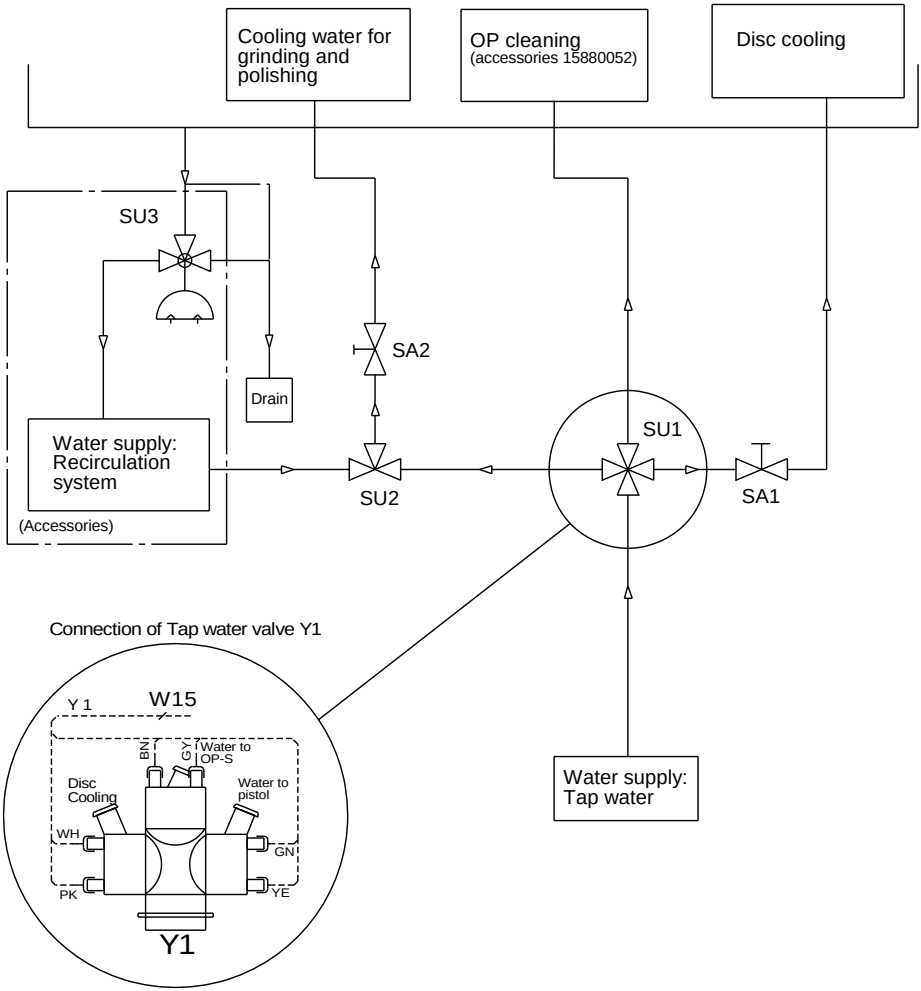
Tolerance: DS/ISO 2768 -

Surface treat.:

ID: Description:

15882000 Air diagram AbraPol-20

Rev: **C**



SA1 Throttle-valve (Assy:15880095, part: 2YH00008) for regulation of inflow water for disc cooling (Assy:15880058)
SA2 Throttle-valve (Assy:15880090, part: 2YH10602) for regulation of inflow water for water pistol (Assy15880055)
SU1 Three-way electromagnetic valve (Assy: 15880095, part: 2YH12311)
SU2 Three-way spherical valve (Assy: 15880090, part: 2YH03629)
SU3 Three-way air actuator driven valve: 15880080

B	2010-03-12	SU3 added to diagram	JTV	2010-03-12	JTV
A	15.8.2007		JF	15.8.2007	MD
Rev	Crea. date yyyy-mm-dd	Revision description	Draw. Init	Appr. date yyyy-mm-dd	Appr. Init

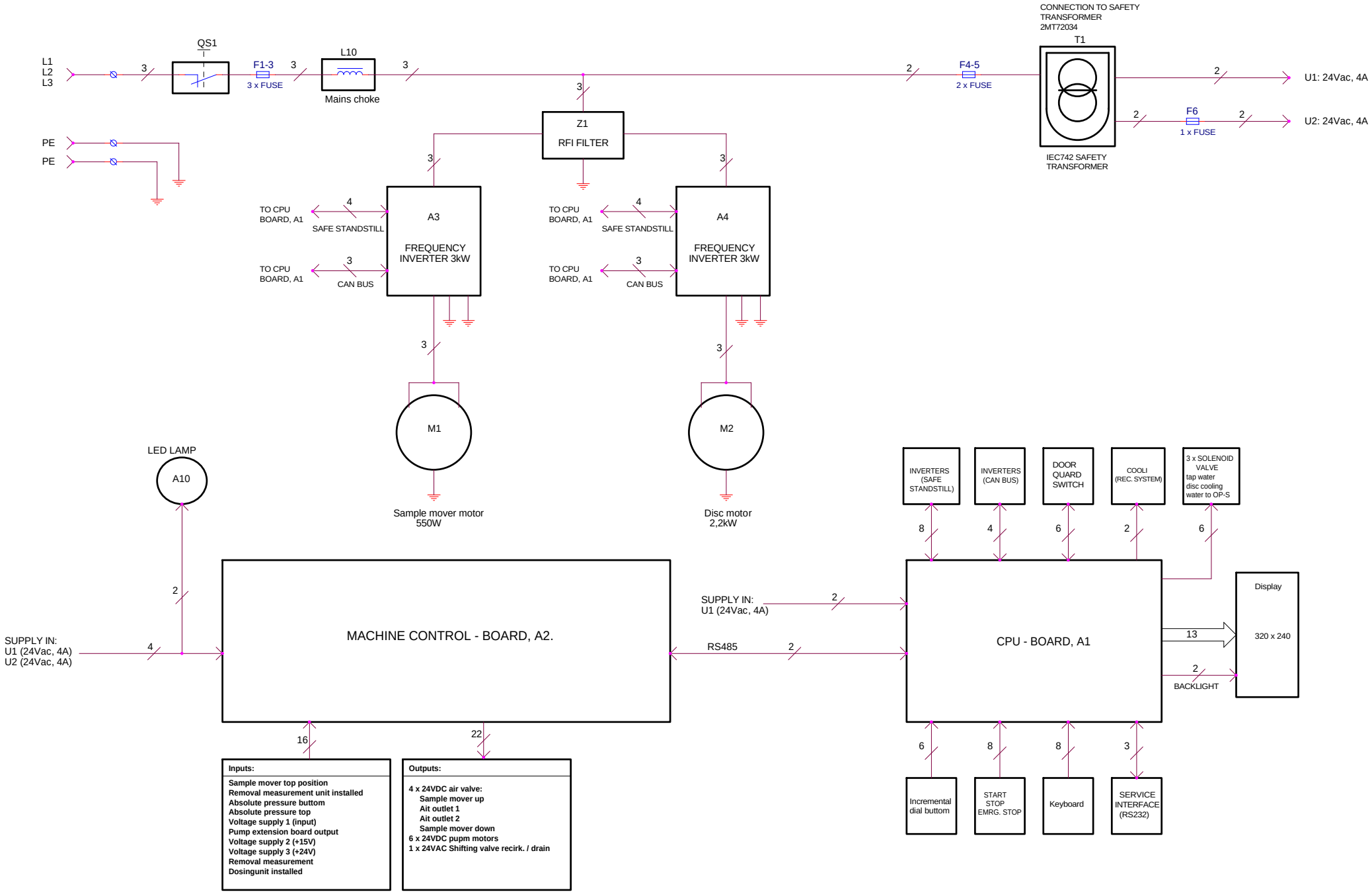
Material: | Scale: 1:1 | Format: A4 | Tolerance: DS/ISO 2768 - | Surface treat.:

Struers
Pederstrupvej 84
DK-2750 Ballerup
Copenhagen
Denmark
Phone : +45 44600 800
Fax : +45 44600 804

ID: Description:

15882005 Water connection diagram AbraPol-20

Rev: **B**



REV A: OH (2006/10/23)
REV B: OH (2007/03/29)
- L10 added
REV C: OH (2007/07/27)
- 2nd PE terminal added
REV D: OHO (2008/11/20)
- Z1 added
REV E: TKO (2009-05-11) - A10 added

STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

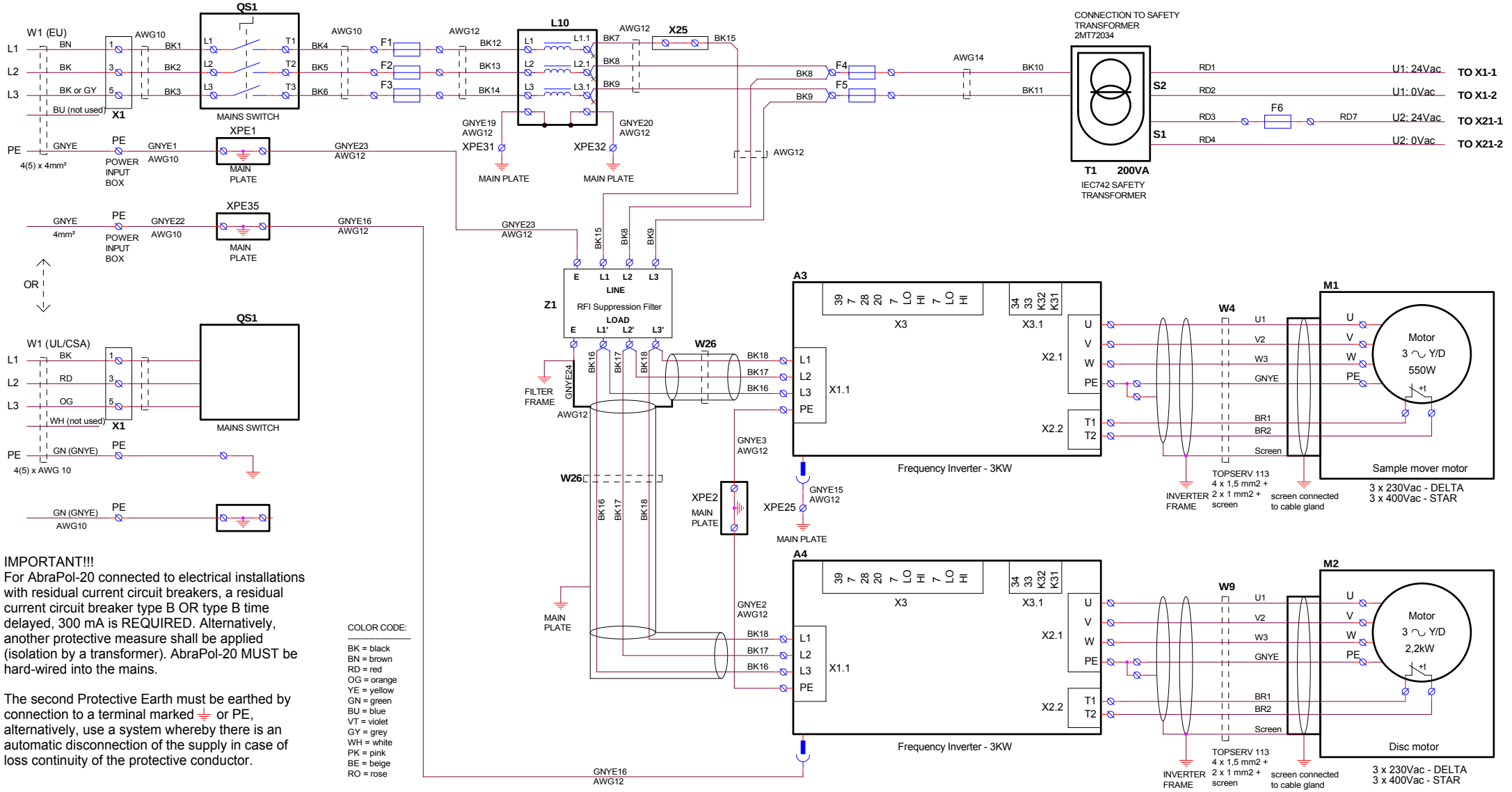
ABRAPOL-20, BLOCK DIAGRAM

Size	CAGE Code	DWG NO	Rev
A2		15883050	E

Monday, May 11, 2009 | Scale | OH | Sheet 1 of 1

SEE REQUIREMENTS FOR MAINS CABLE (EU or UL/CSA)
- note #1

MUST BE EXTERNALLY FUSED
Fmax: See note #2



IMPORTANT!!!
For AbraPol-20 connected to electrical installations with residual current circuit breakers, a residual current circuit breaker type B OR type B time delayed, 300 mA is REQUIRED. Alternatively, another protective measure shall be applied (isolation by a transformer). AbraPol-20 MUST be hard-wired into the mains.

The second Protective Earth must be earthed by connection to a terminal marked ⏚ or PE, alternatively, use a system whereby there is an automatic disconnection of the supply in case of loss continuity of the protective conductor.

COLOR CODE:

BK = black
BN = brown
RD = red
OG = orange
YE = yellow
GN = green
BU = blue
VT = violet
GY = grey
WH = white
PK = pink
BE = beige
RO = rose

VOTAGE / FREQ. (from nameplate)	VOTAGE / FREQ. (depending on country)	note #1 W1 - mains cable	note #2 max. ext. fuse	F1+F2+F3 (fuse size) See note #3	F4+F5 (fuse size) See note #3	F6 (fuse size)	M1+M2 Connection
3 x 200-210V 50/60Hz	3 x 200V / 50Hz	4mm^2	3 x 50AT	3 x 20AT (CC)	2AT (CC)	4AT	DELTA
	3 x 200-210V / 60Hz	AWG = 10	3 x 50AT	3 x 20AT (CC)	2AT (CC)	4AT	DELTA
3 x 220-240V 50/60Hz	3 x 220-230V / 50Hz	4mm^2	3 x 50AT	3 x 20AT (CC)	2AT (CC)	4AT	DELTA
	3 x 220-240V / 60Hz	AWG = 10	3 x 50AT	3 x 20AT (CC)	2AT (CC)	4AT	DELTA
3 x 380-415V 50/60Hz	3 x 380-415V / 50Hz	4mm^2	3 x 50AT	3 x 16AT (aM)	1AT (aM)	4AT	STAR
	3 x 380-415V / 60Hz	AWG = 10	3 x 50AT	3 x 16AT (aM)	1AT (aM)	4AT	STAR
3 x 460-480V 60Hz	3 x 460-480V / 60Hz	AWG = 10	3 x 50AT	3 x 15AT (CC)	1AT (CC)	4AT	STAR

Note #3:
F1, F2, F3, F4, F5 are time delay fuses
CC...Class-CC characteristic
aM...aM characteristic

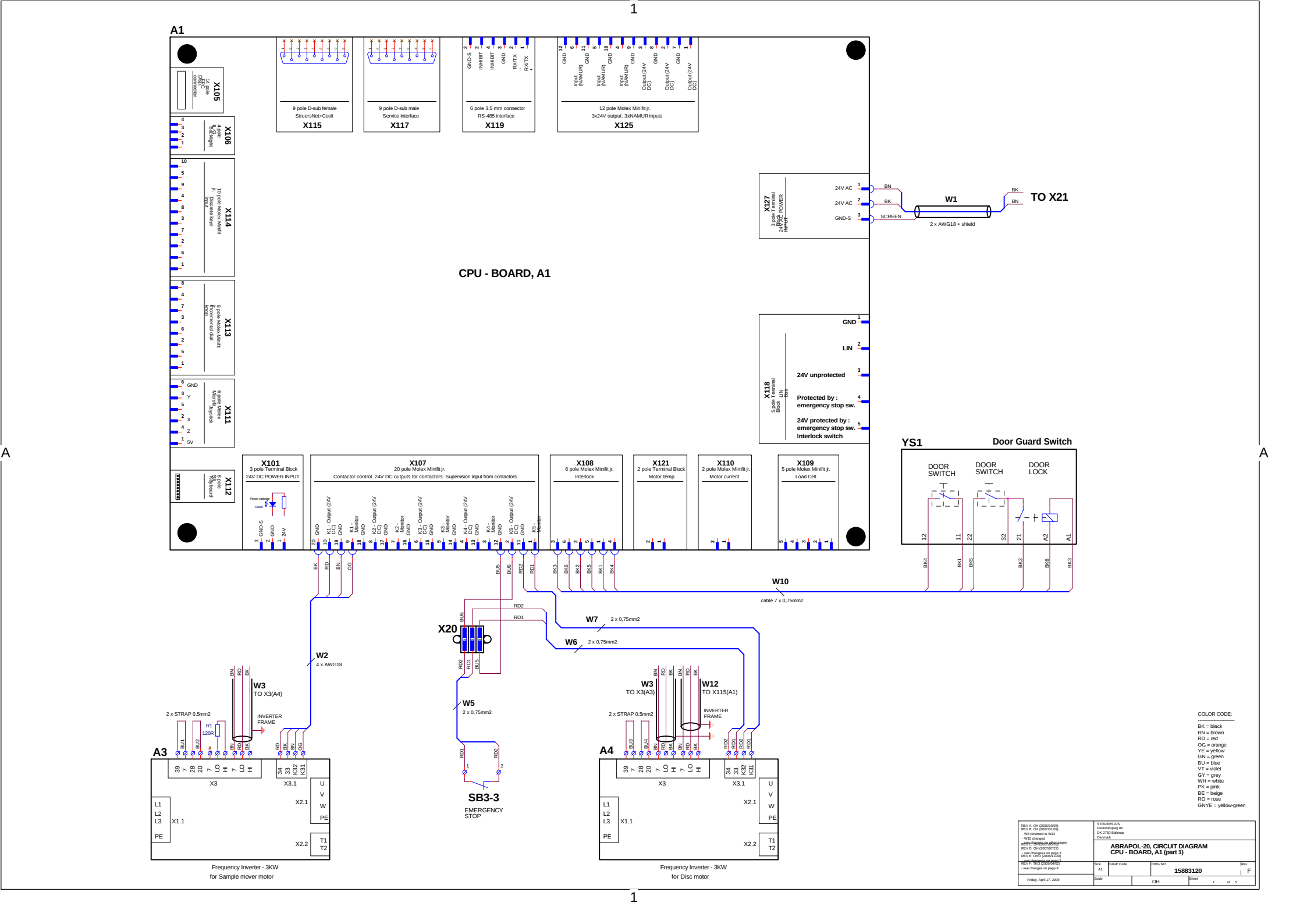
REV E: OHO (2008/11/20)
- Z1, GNYE23, GNYE24, W26 added
- BK7,BK8, BK9 for con. L10-A3 removed
- connection wiht BK16, BK17, BK18 added
- BK15, BK8, BK9 reconnected

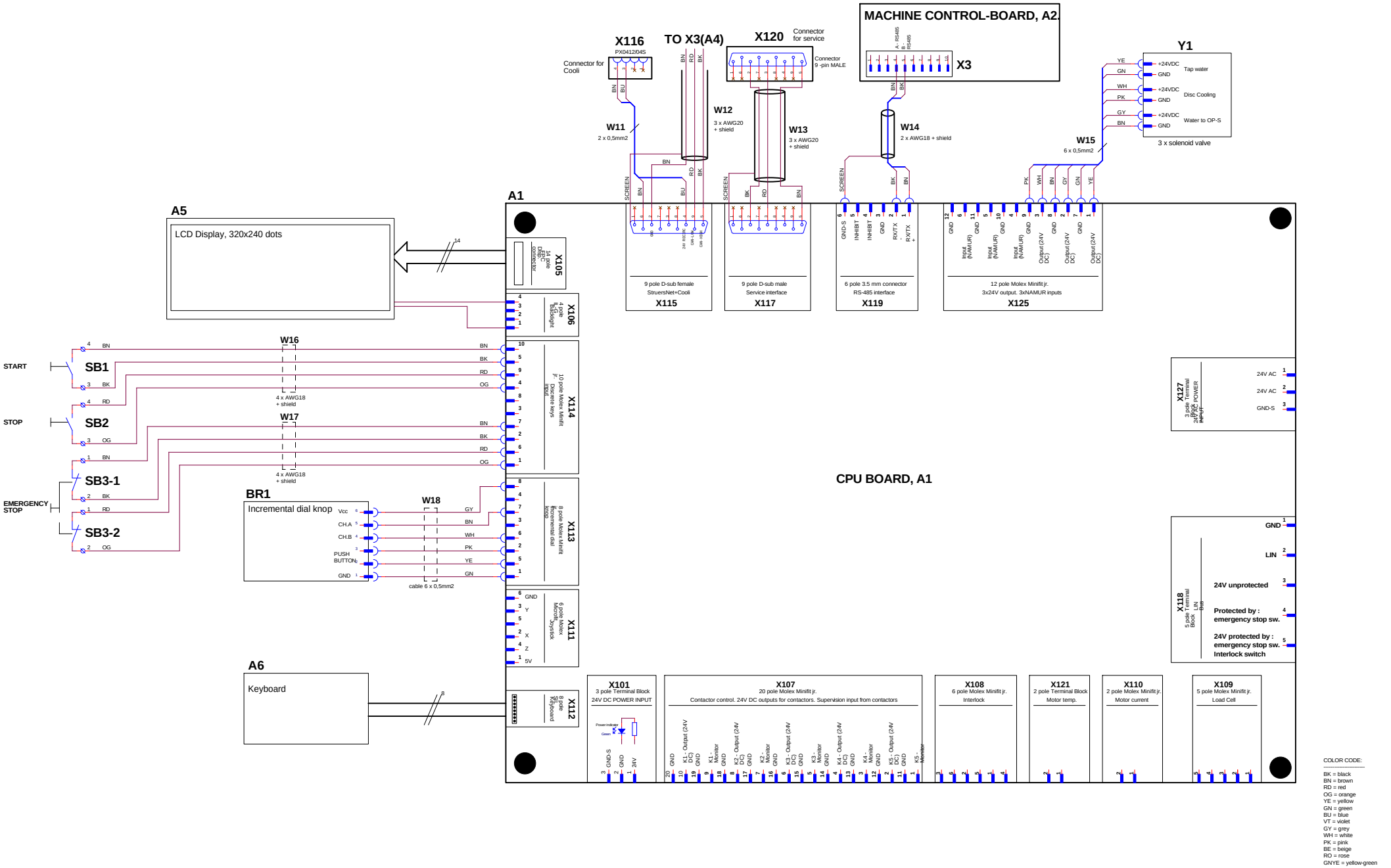
REV A: OH (2006/10/08)
REV B: OH (2007/01/24)
- max. value for ext. fuse changed
- fuses F1-F5 changed
REV C: OH (2007/03/29)
- variants of mains cable added
- L10, X25 added --> changed connections
- BK12, BK13, BK14, BK15 added
- XPE31,32 and GNYE19,20 added
REV D: OH (2007/07/27)
- PE, XPE35 and GNYE22 added
- XPE26 removed, GNYE16 reconnected
Wednesday, February 11, 2009

STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

ABRAPOL-20, CIRCUIT DIAGRAM - MAIN VOLTAGE

Size	CAGE Code	DWG NO	Rev
A2		15883100	E
Scale	OHO	Sheet	1 of 1


A1
X105
X106
X114
X113
X111
X112
X115
9 pole D-sub female
StruersNet+Cooli
X117
9 pole D-sub male
Service interface
X119
6 pole 3.5 mm connector
RS-485 interface
X125
12 pole Molex Minifit jr.
3x24V output. 3xNAMUR inputs
X127
3 pole Terminal Block
24V DC POWER INPUT
24V AC
24V AC
GND-S
BN
BK
SCREEN
W1
2 x AWG18 + shield
BK
BN
TO X21
CPU - BOARD, A1
X118
5 pole Terminal Block
LIN Bus
GND
LIN
24V unprotected
Protected by : emergency stop sw.
24V protected by : emergency stop sw. Interlock switch
YS1
Door Guard Switch
DOOR SWITCH
DOOR SWITCH
DOOR LOCK
X101
3 pole Terminal Block
24V DC POWER INPUT
X107
20 pole Molex Minifit jr.
Contactor control. 24V DC outputs for contactors. Supervision input from contactors
X108
6 pole Molex Minifit jr.
Interlock
X121
2 pole Terminal Block
Motor temp.
X110
2 pole Molex Minifit jr.
Motor current
X109
5 pole Molex Minifit jr.
Load Cell
W10
cable 7 x 0,75mm2
X20
W7
2 x 0,75mm2
W6
2 x 0,75mm2
W2
4 x AWG18
W3
TO X3(A4)
2 x STRAP 0,5mm2
INVERTER FRAME
R1
120R
W5
2 x 0,75mm2
SB3-3
EMERGENCY STOP
W3
TO X3(A3)
W12
TO X115(A1)
2 x STRAP 0,5mm2
INVERTER FRAME
A3
X3
X3.1
X2.1
X2.2
X1.1
Frequency Inverter - 3KW
for Sample mover motor
A4
X3
X3.1
X2.1
X2.2
X1.1
Frequency Inverter - 3KW
for Disc motor
COLOR CODE:
BK = black
BN = brown
RD = red
OG = orange
YE = yellow
GN = green
BU = blue
VT = violet
GY = grey
WH = white
PK = pink
BE = beige
RO = rose
GNYE = yellow-green
STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark
ABRAPOL-20, CIRCUIT DIAGRAM
CPU - BOARD, A1 (part 1)
DWG NO
15883120
Rev
F
Size
A1
Scale
OH
Sheet
1 of 5
Friday, April 17, 2009



COLOR CODE:

BK = black
BN = brown
RD = red
OG = orange
YE = yellow
GN = green
BU = blue
VT = violet
GY = grey
WH = white
PK = pink
BE = beige
RO = rose
GNYE = yellow-green

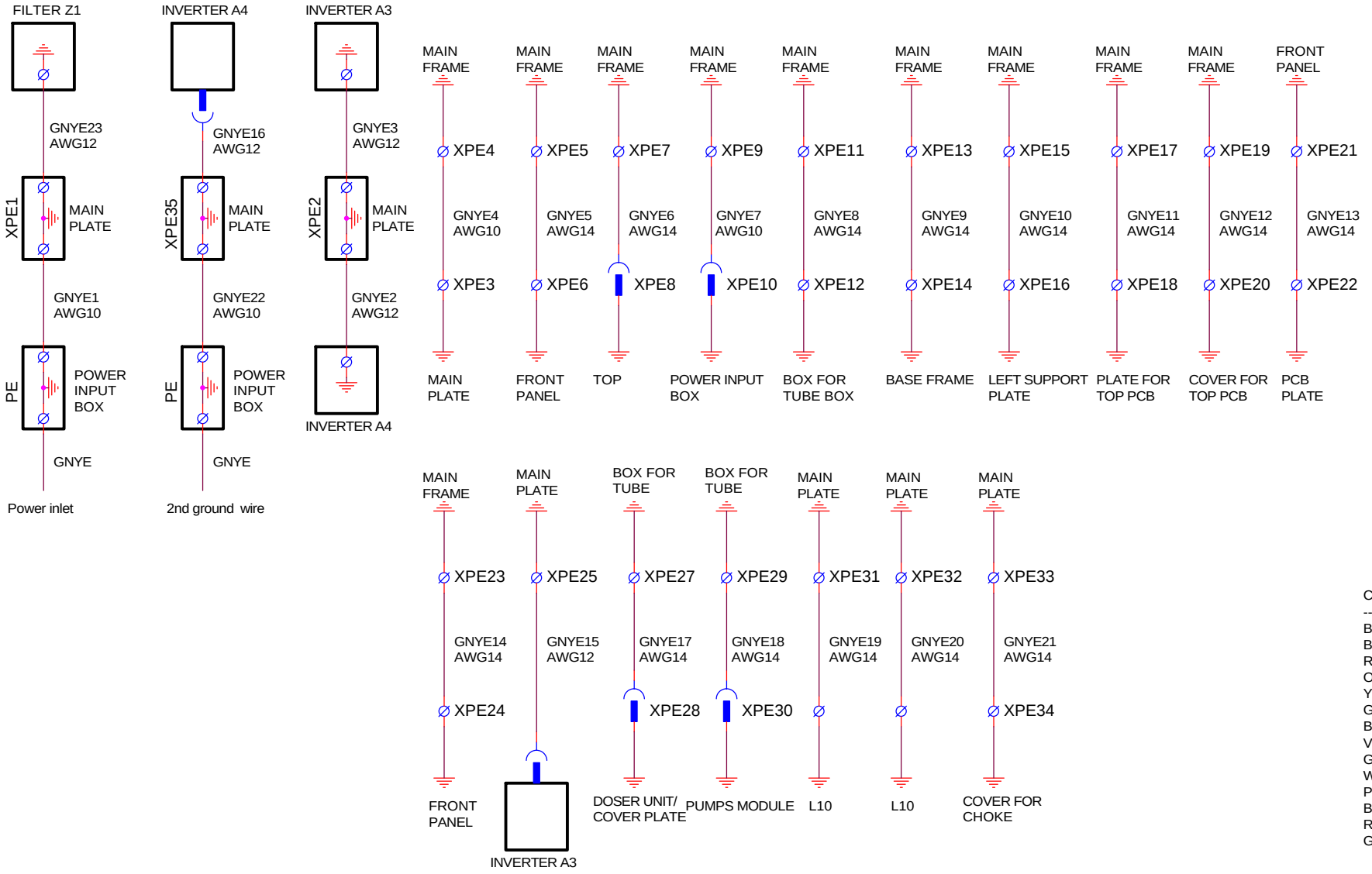
REV A: OH (2006/10/08)
REV B: OH (2007/01/09)
- see changes on other pages
REV C: OH (2007/05/03)
- X116 updated
REV D: OH (2007/07/27)
- see changes on page 3
REV E: OHO (2008/11/20)
- see changes on page 3
REV F: TKO (2009/04/02)
- see changes on page 4

Friday, April 17, 2009

STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

ABRAPOL-20, CIRCUIT DIAGRAM
CPU - BOARD, A1 (part 2)

Size	CAGE Code	DWG NO	Rev
A1		15883120	F
Scale		Sheet	
	OH	2 of 5	



COLOR CODE:

BK = black
BN = brown
RD = red
OG = orange
YE = yellow
GN = green
BU = blue
VT = violet
GY = grey
WH = white
PK = pink
BE = beige
RO = rose
GNYE = yellow-green

REV F: TKO (2009/04/02)
- see changes on page 4.

REV A: OH (2006/10/08)
REV B: OH (2007/01/09)
- see changes on other pages
REV C: OH (2007/05/03)
- XPE31,32 and GNYE19,20 added
- XPE33, 34 and GNYE 21 added
REV D: OH (2007/07/27)
- PE, XPE35 and GNYE22 added
- XPE26 removed, GNYE16 reconnected
REV E: OHO (2008/11/20)
- Z1, GNYE23 added

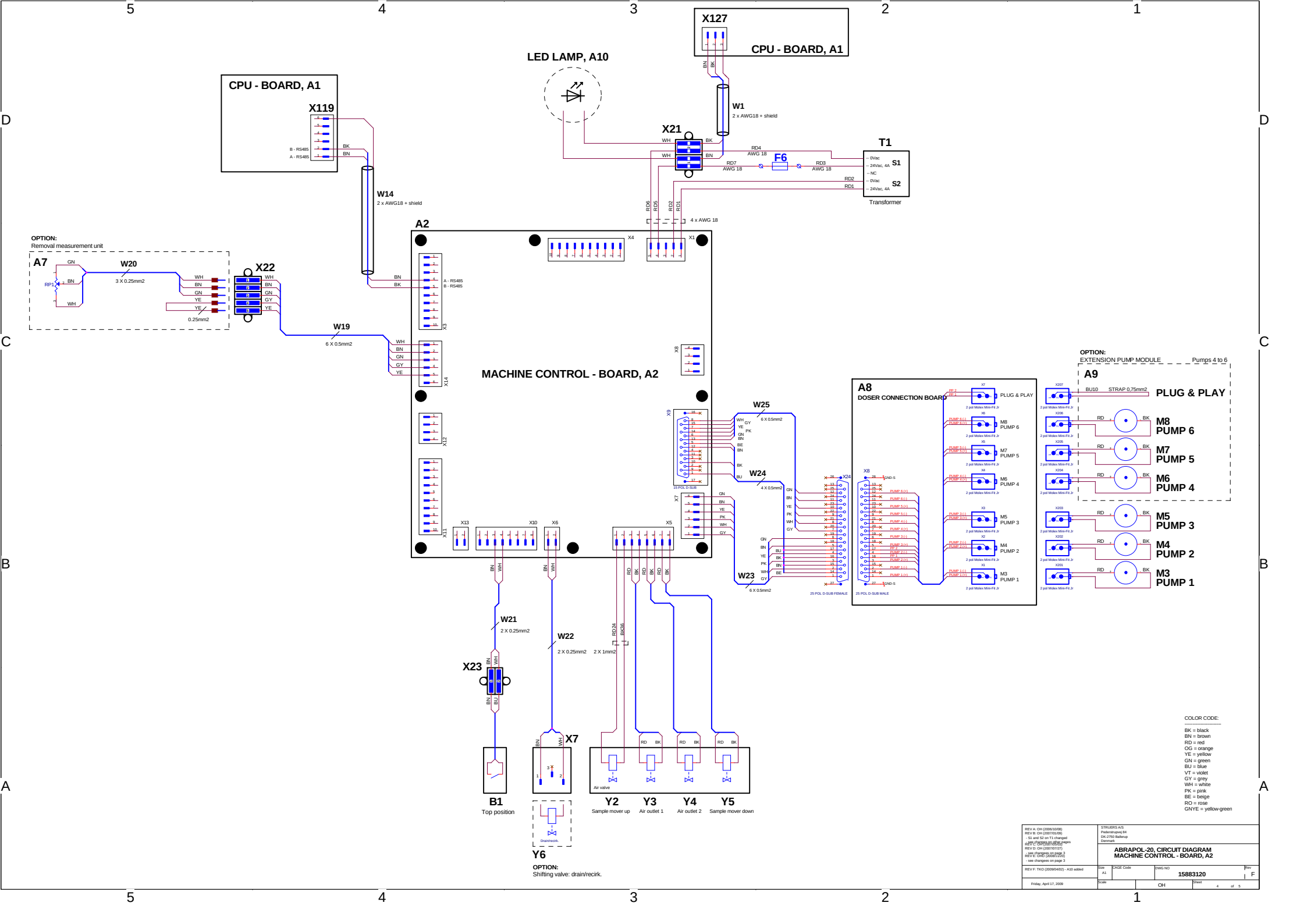
Friday, April 17, 2009

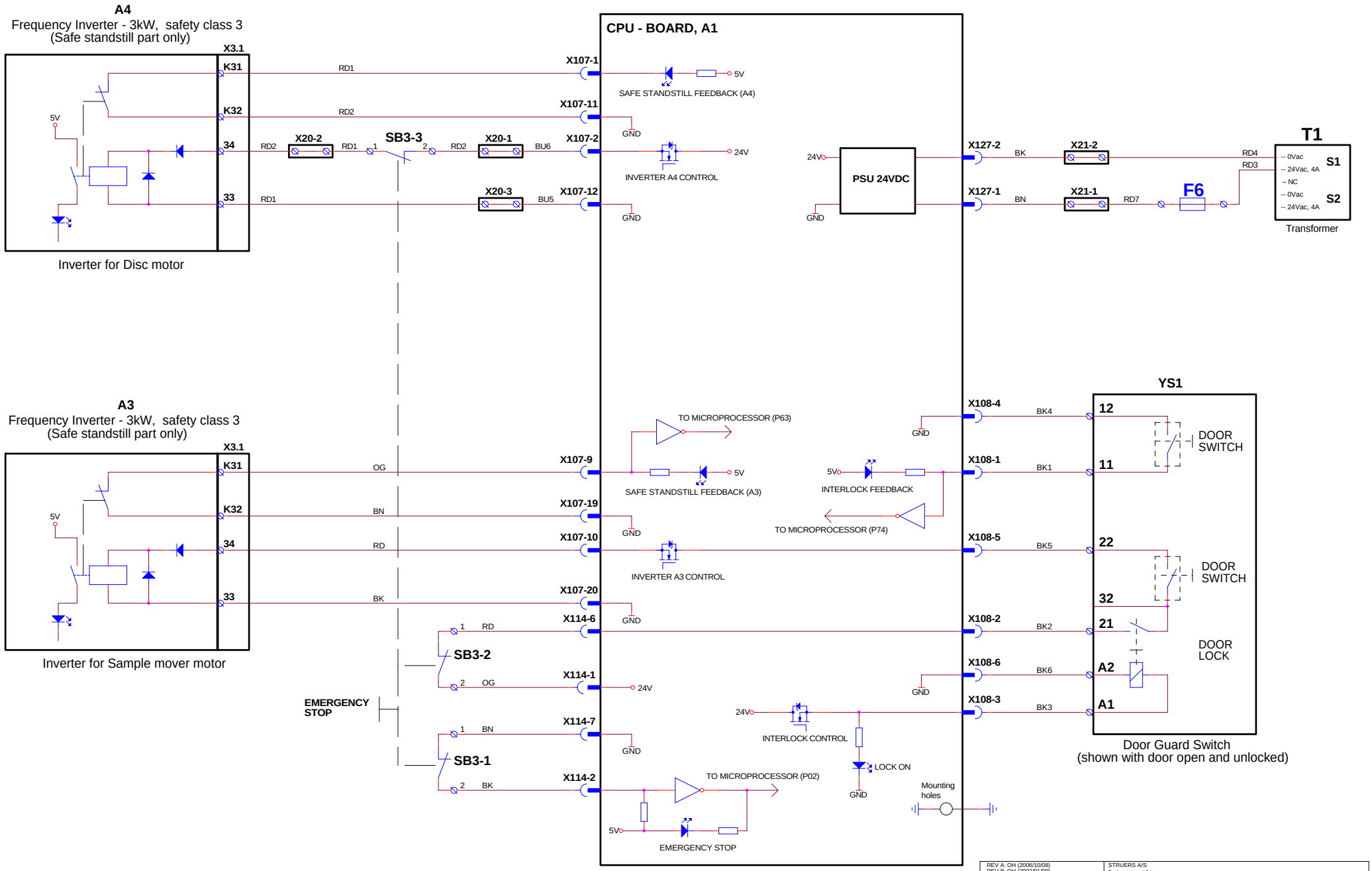
STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

ABRAPOL-20, CIRCUIT DIAGRAM EARTH CONNECTIONS

Size	CAGE Code	DWG NO	Rev
A3		15883120	F

Scale		Sheet
	OH	3 of 5


CPU - BOARD, A1
X127
LED LAMP, A10
CPU - BOARD, A1
X119
W1
2 x AWG18 + shield
X21
T1
F6
S1
S2
Transformer
W14
2 x AWG18 + shield
4 x AWG 18
A2
OPTION:
Removal measurement unit
A7
W20
3 X 0.25mm2
0.25mm2
X22
W19
6 X 0.5mm2
MACHINE CONTROL - BOARD, A2
W25
6 X 0.5mm2
W24
4 X 0.5mm2
W23
6 X 0.5mm2
A8
DOSER CONNECTION BOARD
PLUG & PLAY
M8 PUMP 6
M7 PUMP 5
M6 PUMP 4
M5 PUMP 3
M4 PUMP 2
M3 PUMP 1
OPTION:
EXTENSION PUMP MODULE
Pumps 4 to 6
A9
BU10
STRAP 0,75mm2
W21
2 X 0.25mm2
W22
2 X 0.25mm2
2 X 1mm2
X23
X7
B1
Top position
Y2
Sample mover up
Y3
Air outlet 1
Y4
Air outlet 2
Y5
Sample mover down
Y6
OPTION:
Shifting valve: drain/recirk.
COLOR CODE:
BK = black
BN = brown
RD = red
OG = orange
YE = yellow
GN = green
BU = blue
VT = violet
GY = grey
WH = white
PK = pink
BE = beige
RO = rose
GNYE = yellow-green
STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark
ABRAPOL-20, CIRCUIT DIAGRAM
MACHINE CONTROL - BOARD, A2
15883120
OH



REV A: OH (2006/10/08)
REV B: OH (2007/01/09)
- S1 and S2 on T1 changed
- cable for YS1 changed
- see changes on other pages
REV C: OH (2007/05/03)
REV D: OH (2007/07/27)
- see changees on page 3
REV E: OHO (2008/11/20)
- see changees on page 3
REV F: TKO (2009/04/02)
- see changes on page 4

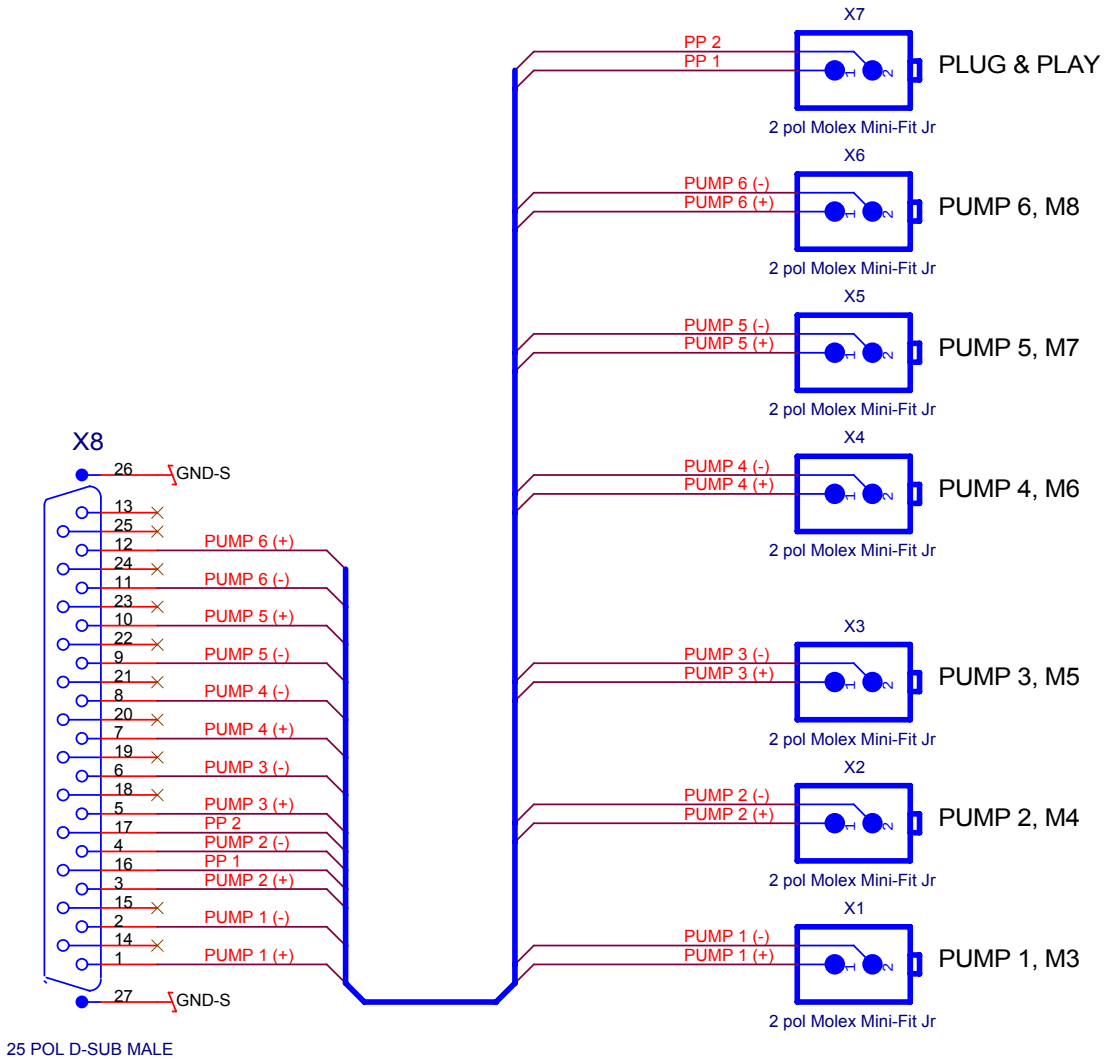
Friday, April 17, 2009

STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

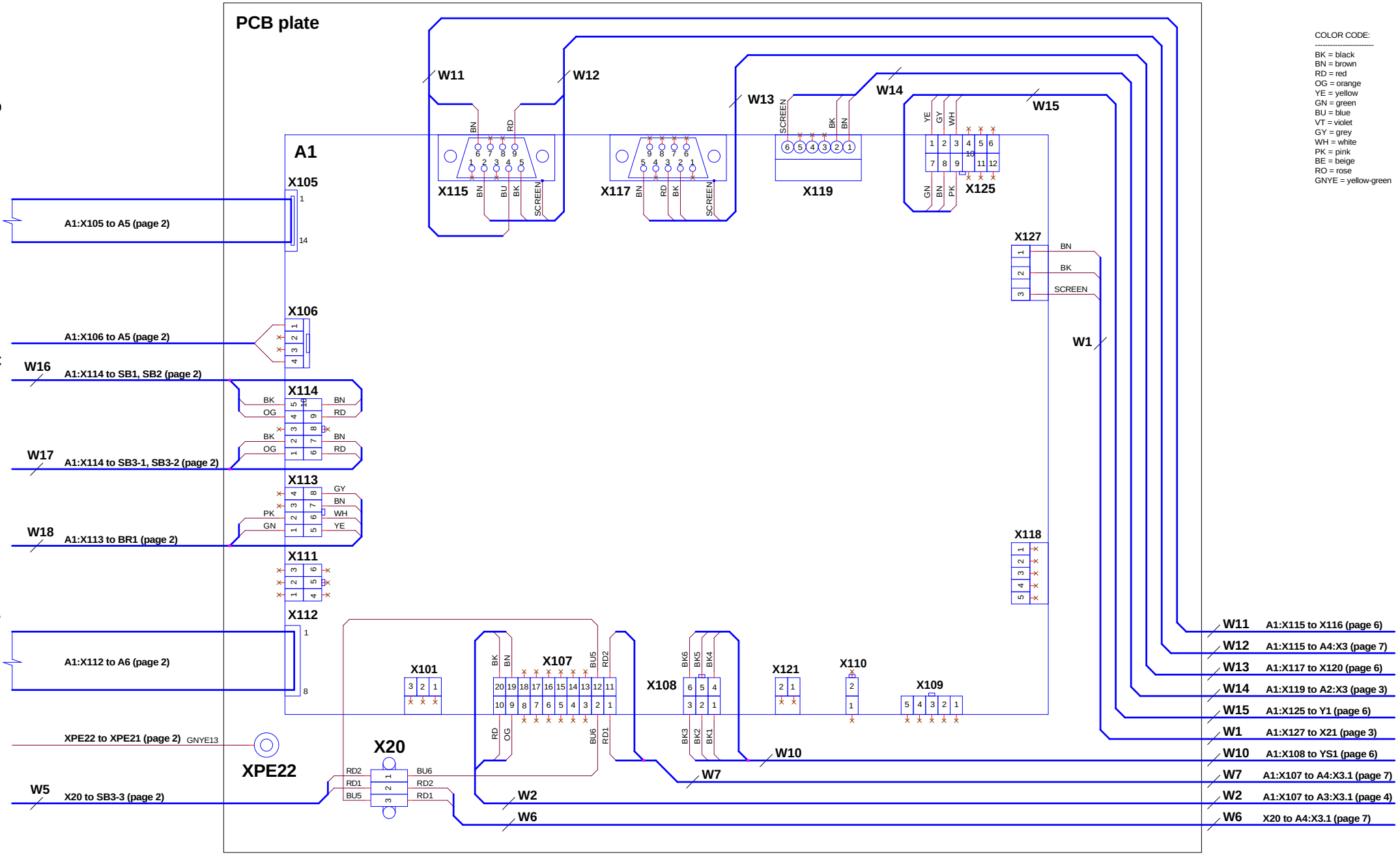
ABRAPOL-20, CIRCUIT DIAGRAM
SAFETY RELATED CIRCUIT

Size	CAGE Code	DWG NO	Rev
A2		15883120	F

Scale: | OH | Sheet: 5 of 5



REV A: OH (2006/11/09)	STRUERS A/S PEDERSTRUPVEJ 84 DK-2750 BALLERUP DENMARK PHONE: +45 44 600 800			
	DOSER CONNECTION BOARD			
	Size: A4	CAGE Code: <Cage Code>	DWG NO: **15883200**	Rev: **A**
Monday, December 11, 2006	Scale:	OH	Sheet: 1 of 1	



REV A: OH (2007/05/02)
REV B: OH (2007/07/27)
- See changees on other pages
REV C: AKR (2007/09/19)
- See changes on page 8.
REV D: OHO (2008/12/03)
- See changees on other pages
REV E: TKO (2009/04/02)
- See changees on other pages

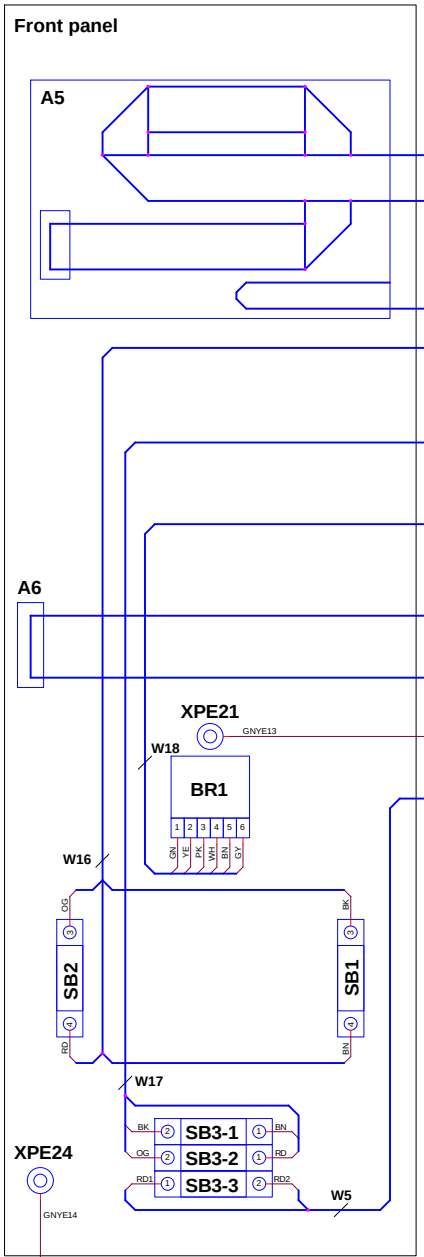
Thursday, April 02, 2009

STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

ABRAPOL-20, WIRING DIAGRAM
PCB plate

Size	CAGE Code	DWG NO	Rev
A2		15883450	E

Scale		Sheet
	OHO	1 of 10



COLOR CODE:

BK = black
BN = brown
RD = red
OG = orange
YE = yellow
GN = green
BU = blue
VT = violet
GY = grey
WH = white
PK = pink
BE = beige
RO = rose
GNYE = yellow-green

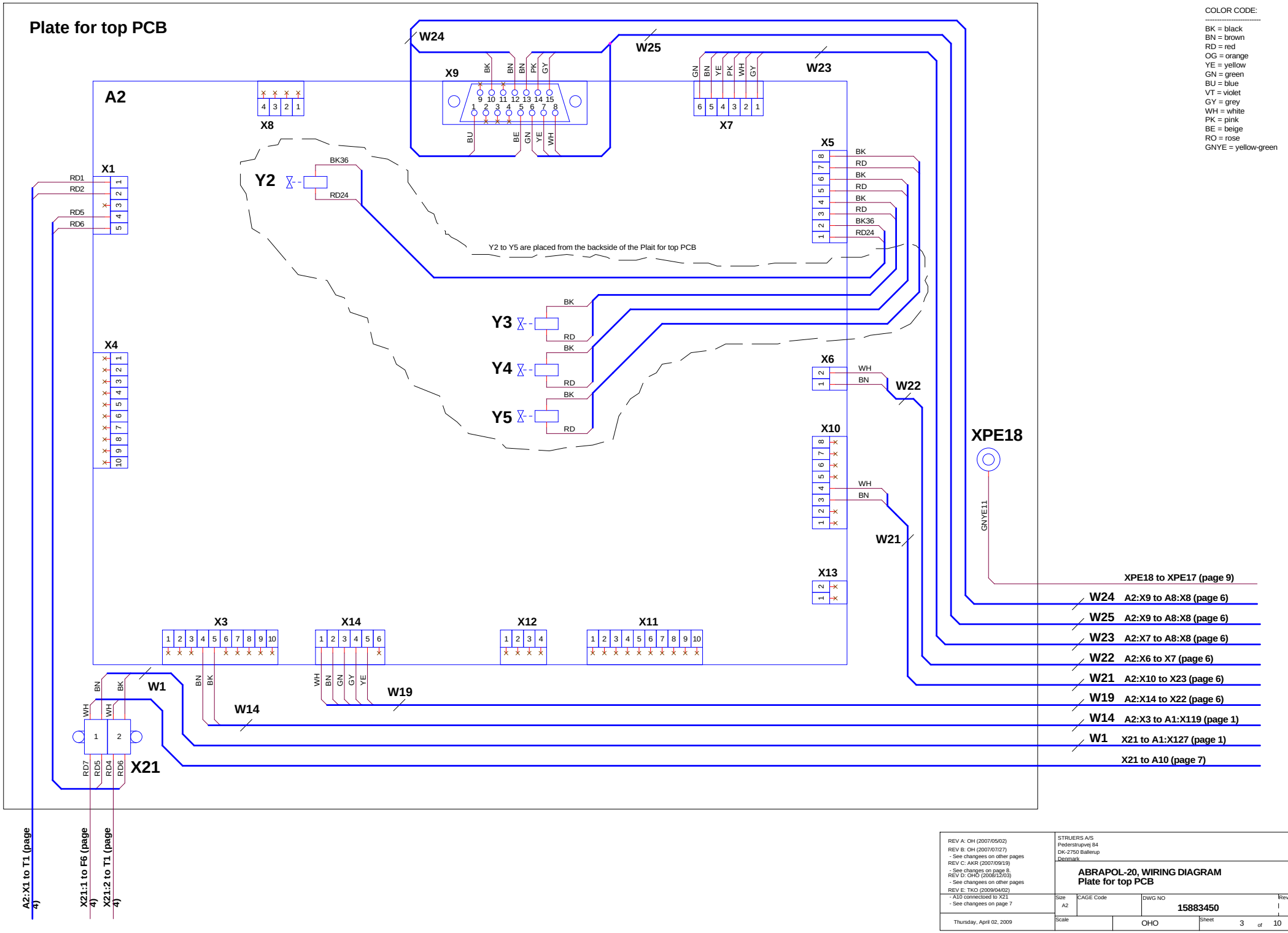
REV A: OH (2007/05/02)
REV B: OH (2007/07/27)
- See changes on other pages
REV C: AKR (2007/09/19)
- See changes on page 8.
REV D: OHO (2008/12/03)
- See changes on other pages
REV E: TKO (2009/04/02)
- See changes on other pages

STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

ABRAPOL-20, WIRING DIAGRAM
Front panel

Size	CAGE Code	DWG NO	Rev
Custom		15883450	E
Thursday, April 02, 2009	Scale	OHO	Sheet 2 of 10

Plate for top PCB



COLOR CODE:

BK = black
BN = brown
RD = red
OG = orange
YE = yellow
GN = green
BU = blue
VT = violet
GY = grey
WH = white
PK = pink
BE = beige
RO = rose
GNYE = yellow-green

REV A: OH (2007/05/02)
REV B: OH (2007/07/27)
- See changees on other pages
REV C: AKR (2007/09/19)
- See changes on page 8.
REV D: OHO (2008/12/03)
- See changees on other pages
REV E: TKO (2009/04/02)
- A10 connected to X21
- See changees on page 7

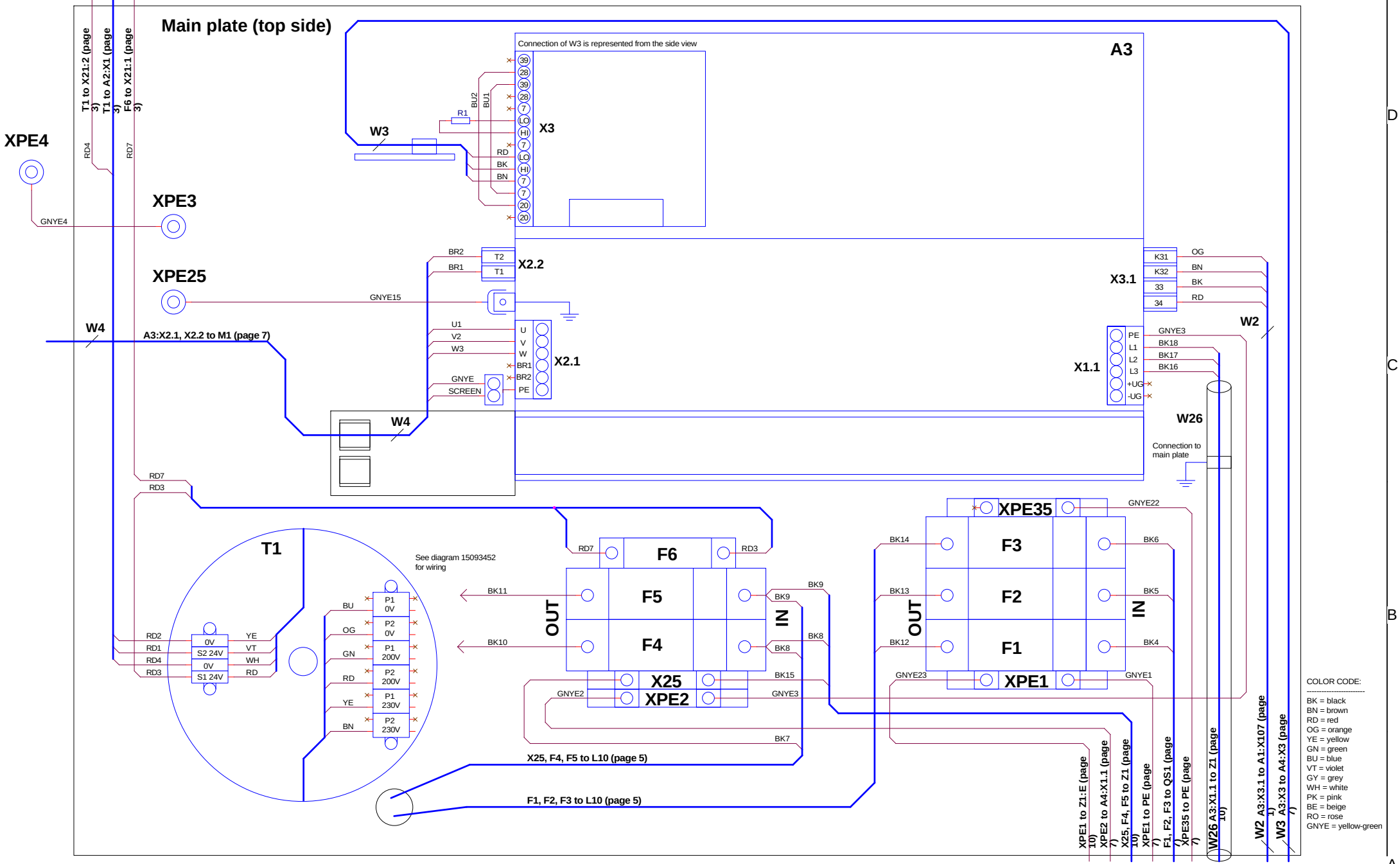
Thursday, April 02, 2009

STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

ABRAPOL-20, WIRING DIAGRAM
Plate for top PCB

Size	CAGE Code	DWG NO	Rev
A2		15883450	E
Scale	OHO	Sheet	3 of 10

Main plate (top side)



COLOR CODE:

BK = black
BN = brown
RD = red
OG = orange
YE = yellow
GN = green
BU = blue
VT = violet
GY = grey
WH = white
PK = pink
BE = beige
RO = rose
GNYE = yellow-green

REV D: OHO (2008/12/03)
- Connection A3:X1.1 to L10 removed
- X25, F4, F5 reconnected to Z1
- Connection W26 A3:X1.1 to Z1 added
- GNYE23 added
- See changees on other pages

REV E: TKO (2009/04/02)
- See changees on other pages

REV A: OH (2007/05/02)

REV B: OH (2007/07/27)
- XPE35 and GNYE22 added
- See changees on other pages

REV C: AKR (2007/09/19)
- See changes on page 8.

STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

ABRAPOL-20, WIRING DIAGRAM
Main plate - part 1

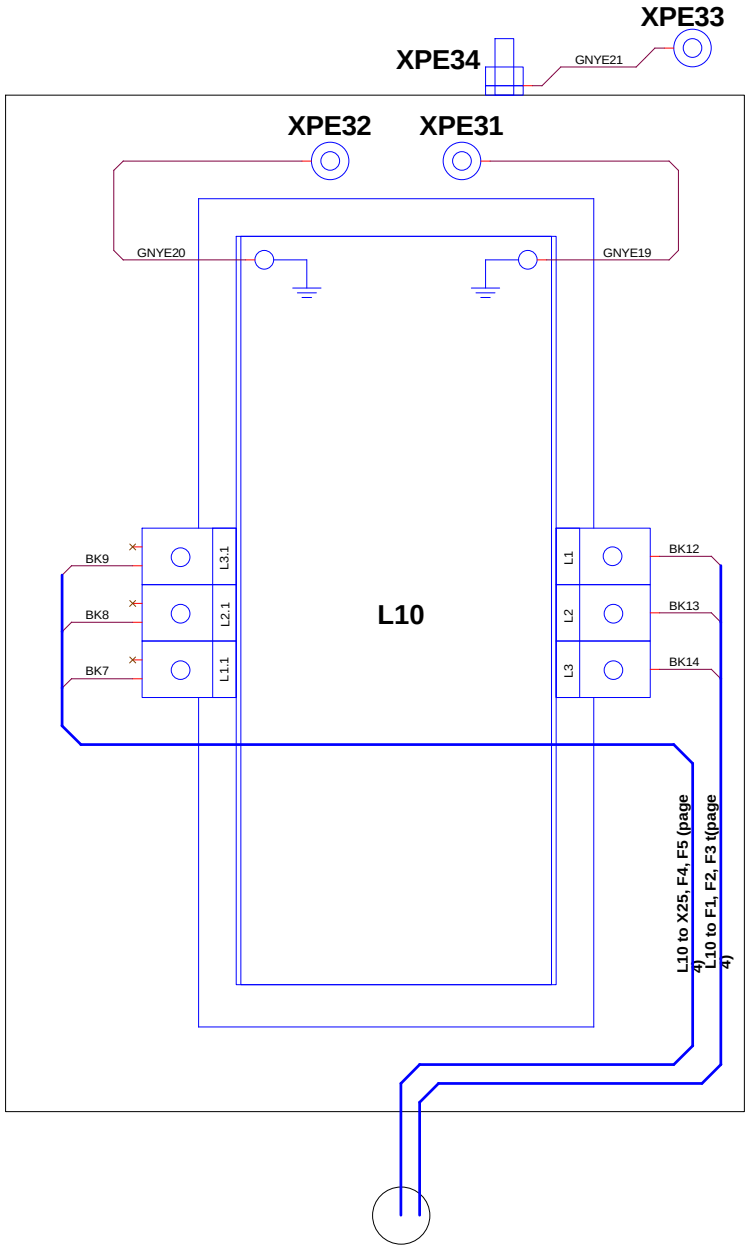
Size	CAGE Code	DWG NO	Rev
A2		15883450	E

Thursday, April 02, 2009

Scale: OHO

Sheet: 4 of 10

Main plate (bottom side)



COLOR CODE:

BK = black
BN = brown
RD = red
OG = orange
YE = yellow
GN = green
BU = blue
VT = violet
GY = grey
WH = white
PK = pink
BE = beige
RO = rose
GNYE = yellow-green

REV A: OH (2007/05/02)
REV B: OH (2007/07/27)
- See changees on other pages
REV C: AKR (2007/09/19)
- See changes on page 8.
REV D: OHO (2008/12/03)
- Connection L10 to A3:X1.1 removed
- See changees on other pages
REV E: TKO (2009/04/02)
- See changees on other pages

Thursday, April 02, 2009

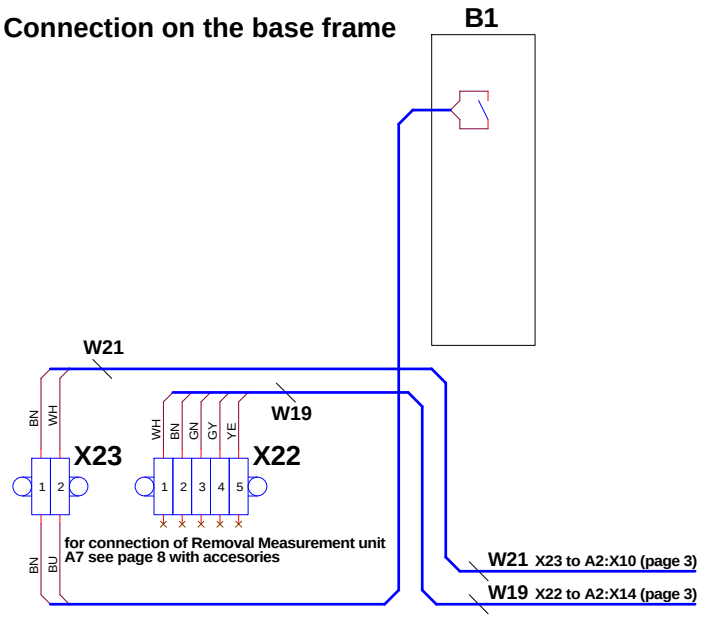
STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

ABRAPOL-20, WIRING DIAGRAM
Main plate - part 2

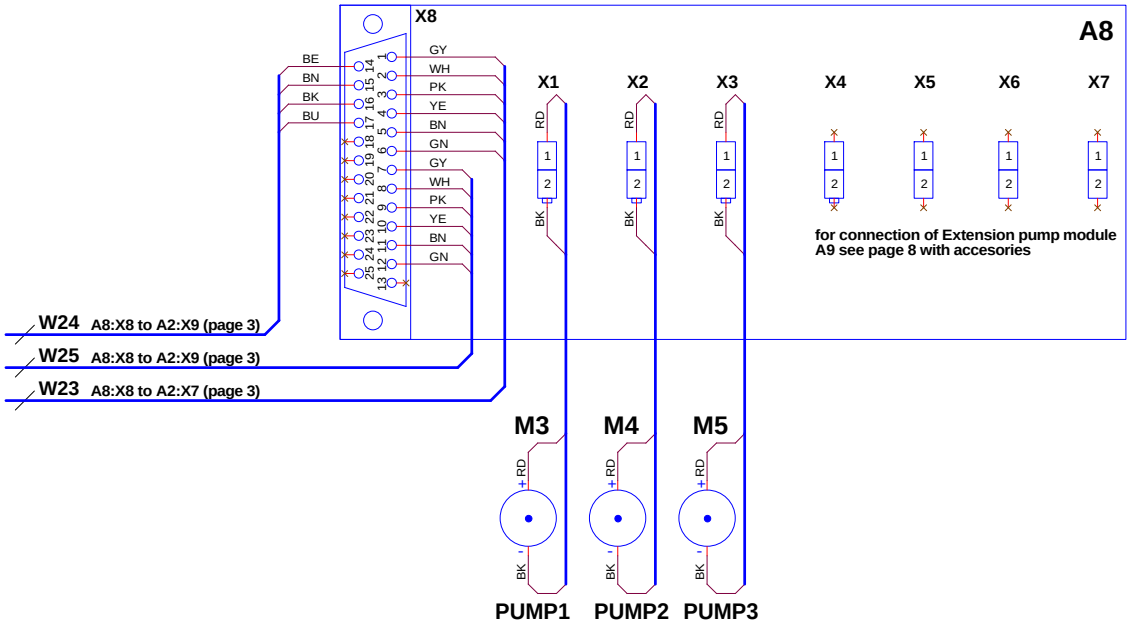
Size	CAGE Code	DWG NO	Rev
A2		15883450	E

Scale		Sheet
	OHO	5 of 10

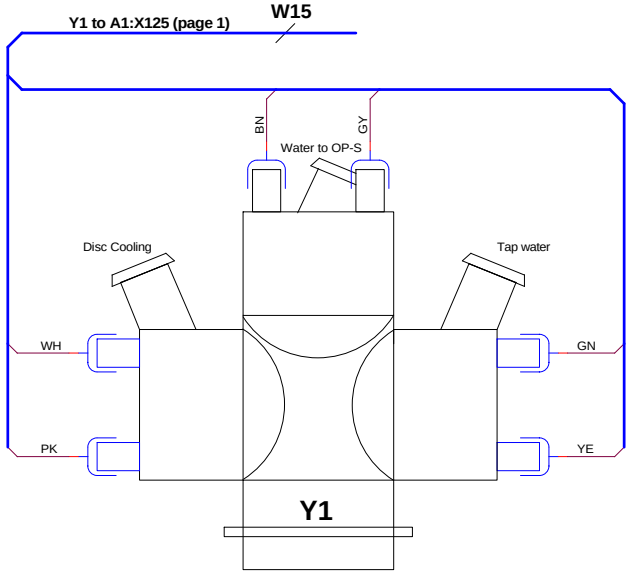
Connection on the base frame



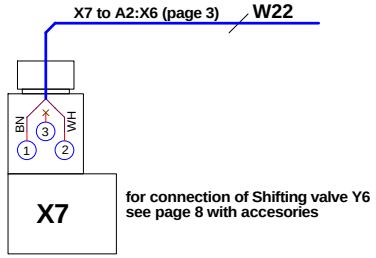
Connection of Doser connection board A8



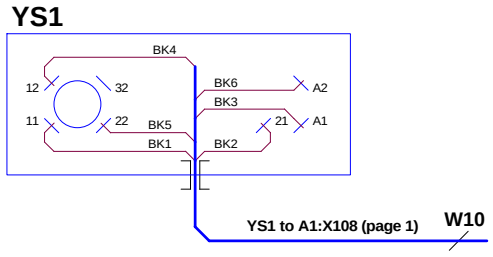
Connection of Tap water valve Y1



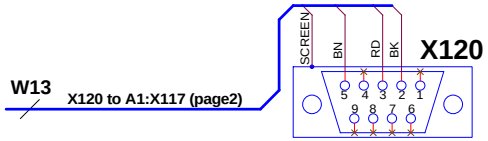
Connection of X7 (for Shifting valve Y6)



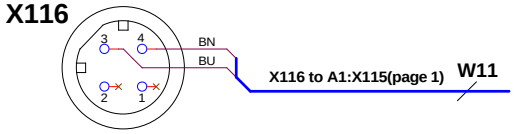
Connection of Door Guard Switch YS1



Connection of Connector for service X120



Connection of Connector for Cooli X116



COLOR CODE:

BK = black
BN = brown
RD = red
OG = orange
YE = yellow
GN = green
BU = blue
VT = violet
GY = grey
WH = white
PK = pink
BE = beige
RO = rose
GNYE = yellow-green

REV A: OH (2007/05/02)
REV B: OH (2007/07/27)
- See changees on other pages
REV C: AKR (2007/09/19)
- See changes on page 8.
REV D: OHO (2008/12/03)
- See changees on other pages
REV E: TKO (2009/04/02)
- See changees on other pages

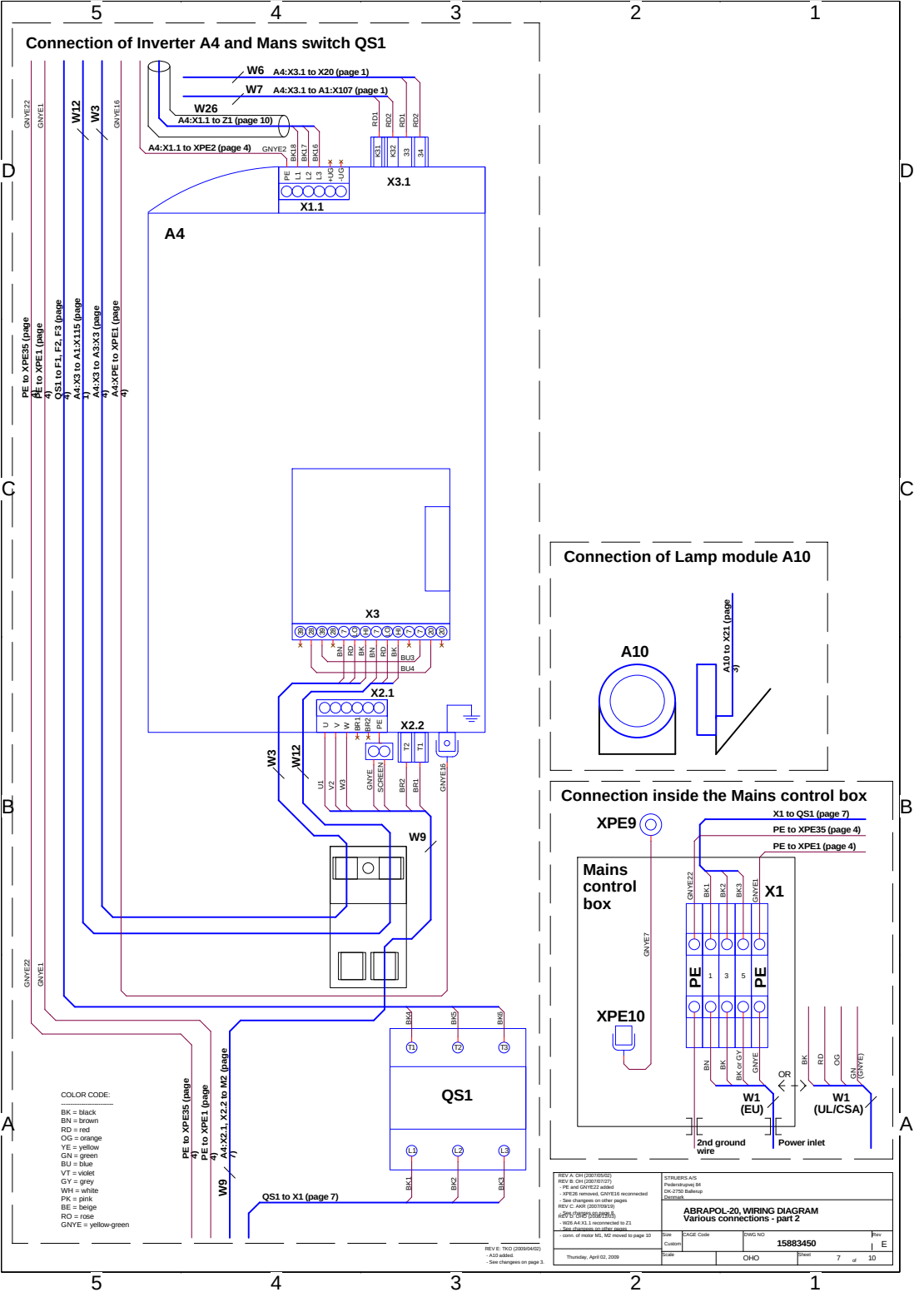
Friday, April 17, 2009

STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

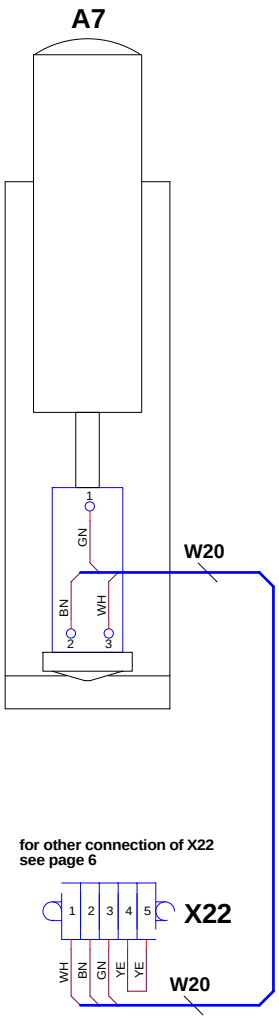
ABRAPOL-20, WIRING DIAGRAM
Various connections - part 1

Size	CAGE Code	DWG NO	Rev
A2		15883450	E

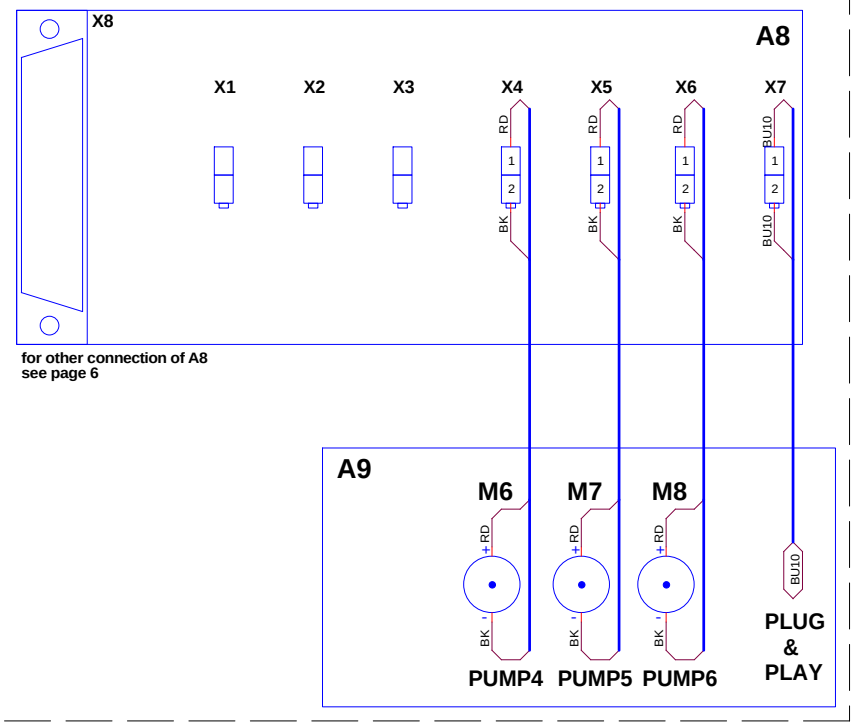
Scale: OHO
Sheet: 6 of 10


Connection of Inverter A4 and Mans switch QS1
W6 A4:X3.1 to X20 (page 1)
W7 A4:X3.1 to A1:X107 (page 1)
W26 A4:X1.1 to Z1 (page 10)
A4:X1.1 to XPE2 (page 4)
GNYE22
GNYE1
W12
W3
GNYE16
PE to XPE35 (page 4)
PE to XPE1 (page 4)
QS1 to F1, F2, F3 (page 4)
A4:X3 to A1:X11S (page 1)
A4:X3 to A3:X3 (page 1)
A4:XPE to XPE1 (page 4)
A4
X1.1
X3.1
X3
X2.1
X2.2
W9
QS1
QS1 to X1 (page 7)
PE to XPE35 (page 4)
PE to XPE1 (page 4)
W9 A4:X2.1, X2.2 to M2 (page 7)
COLOR CODE:
BK = black
BN = brown
RD = red
OG = orange
YE = yellow
GN = green
BU = blue
VT = violet
GY = grey
WH = white
PK = pink
BE = beige
RO = rose
GNYE = yellow-green
Connection of Lamp module A10
A10
A10 to X21 (page 3)
Connection inside the Mains control box
XPE9
XPE10
Mains control box
X1
X1 to QS1 (page 7)
PE to XPE35 (page 4)
PE to XPE1 (page 4)
W1 (EU)
W1 (UL/CSA)
OR
2nd ground wire
Power inlet
ABRAPOL-20, WIRING DIAGRAM
Various connections - part 2
STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark
15883450
OHO
Thursday, April 02, 2009

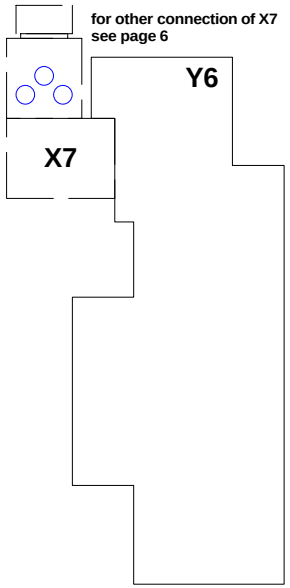
Connection of Removal measurement unit A7



Connection of Extension pump module A9



Connection of Shifting valve Y6



COLOR CODE:

BK = black
BN = brown
RD = red
OG = orange
YE = yellow
GN = green
BU = blue
VT = violet
GY = grey
WH = white
PK = pink
BE = beige
RO = rose
GNYE = yellow-green

REV A: OH (2007/05/02)
REV B: OH (2007/07/27)
- See changees on other pages
REV C: AKR (2007/09/19)
- RD and BK at X7 changed to BU10.
REV D: OHO (2008/12/03)
- See changees on other pages
REV E: TKO (2009/04/02)
- See changees on other pages

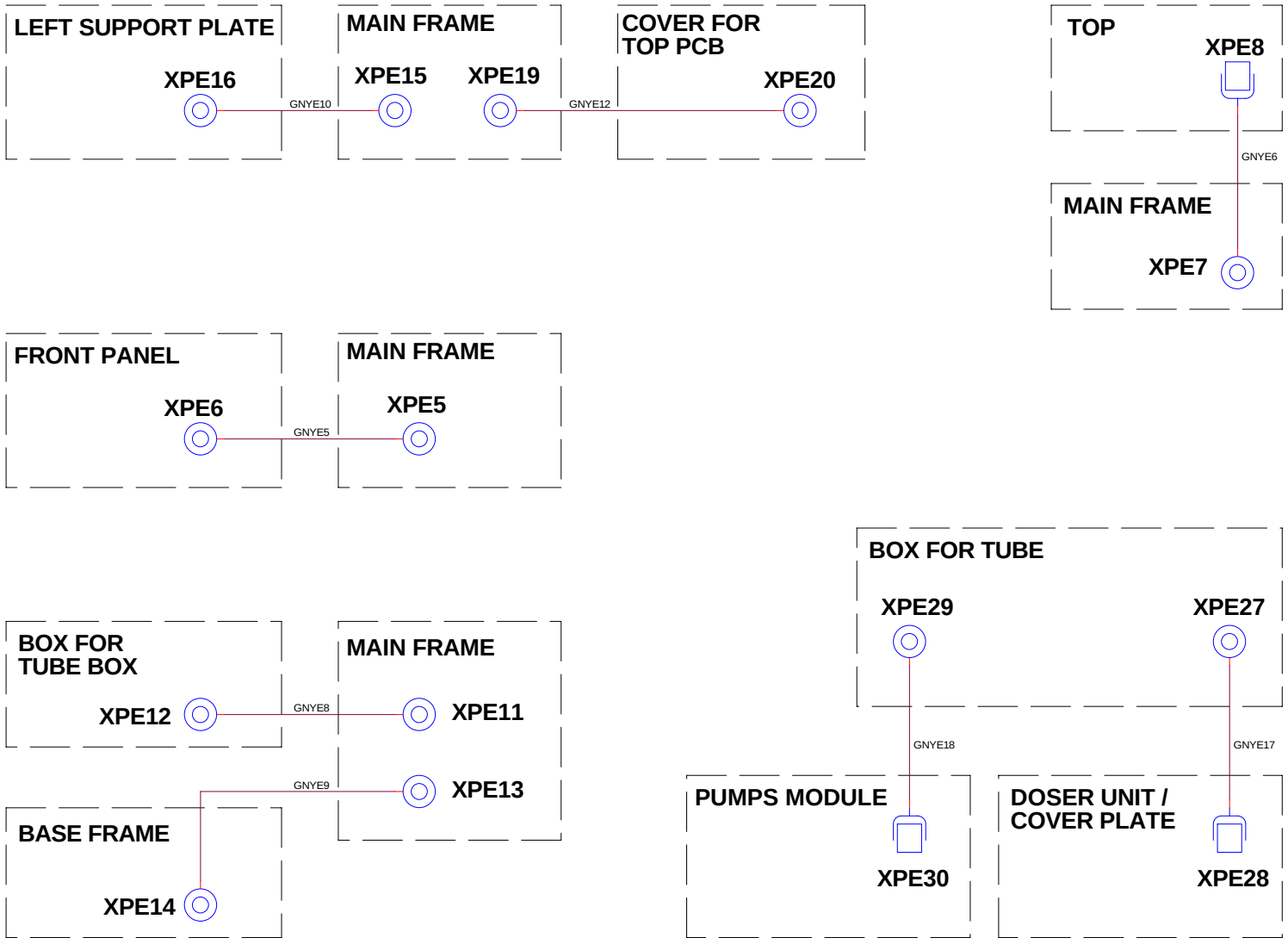
Thursday, April 02, 2009

STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

ABRAPOL-20, WIRING DIAGRAM
Accessories

Size A2 | CAGE Code | DWG NO 15883450 | Rev E

Scale | OHO | Sheet 8 of 10



COLOR CODE:

BK = black
BN = brown
RD = red
OG = orange
YE = yellow
GN = green
BU = blue
VT = violet
GY = grey
WH = white
PK = pink
BE = beige
RO = rose
GNYE = yellow-green

REV B: OH (2007/07/27)
- New page 9 created
- See changes on other pages
REV C: AKR(2007/09/19)
- See changes on page 8
REV D: OHO (2008/12/03)
- See changes on other pages
REV E: TKO (2009/04/02)
- See changes on other pages

Thursday, April 02, 2009

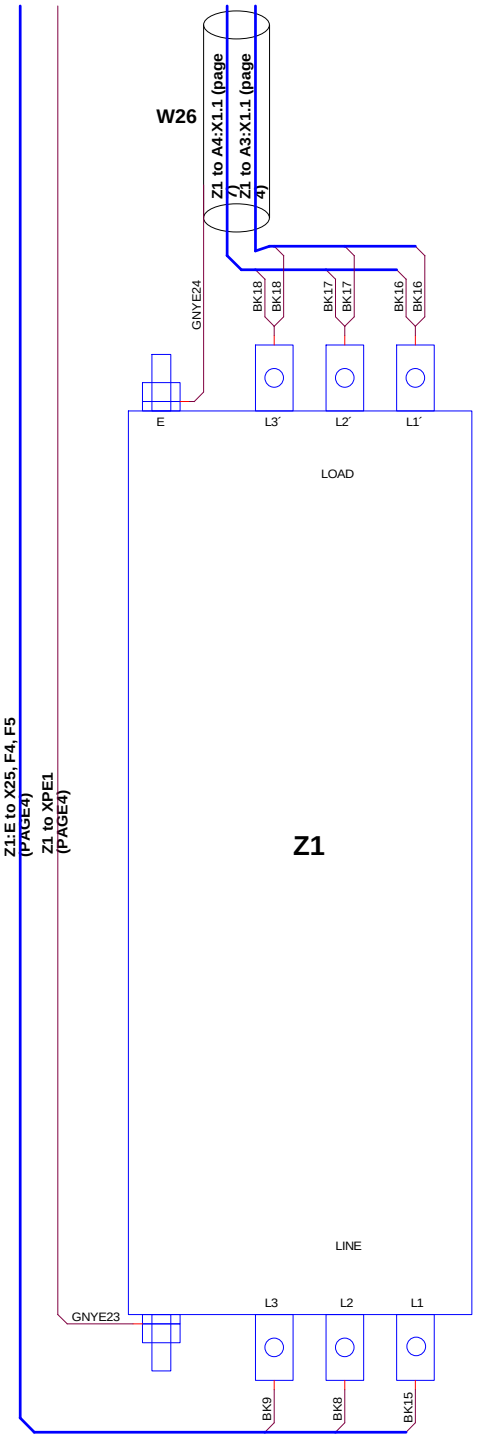
STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

ABRAPOL-20, WIRING DIAGRAM
Protective bonding circuit (the rest)

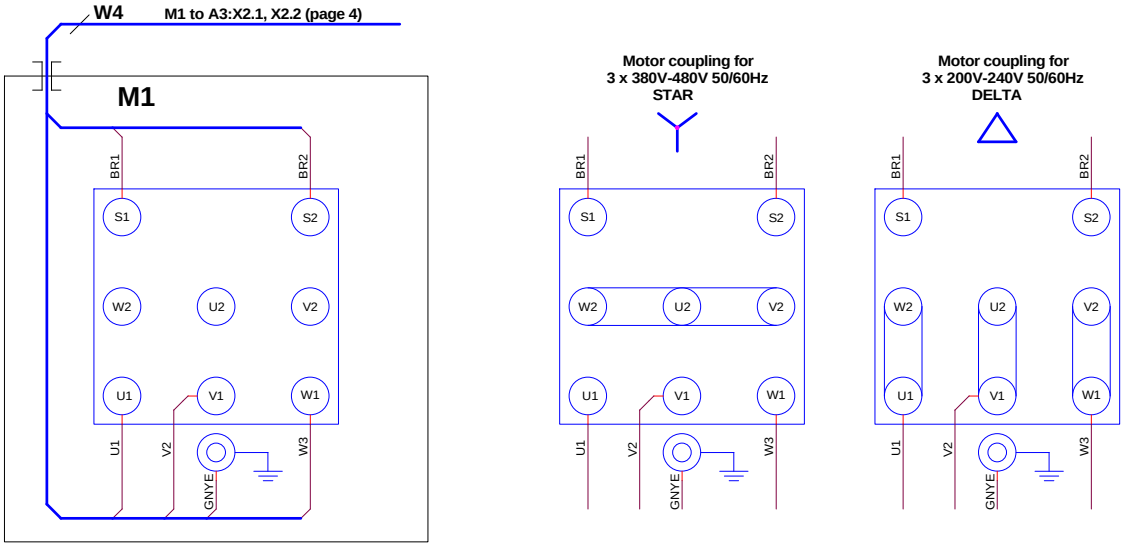
Size	CAGE Code	DWG NO	Rev
A2		15883450	E

Scale		Sheet
	OHO	9 of 10

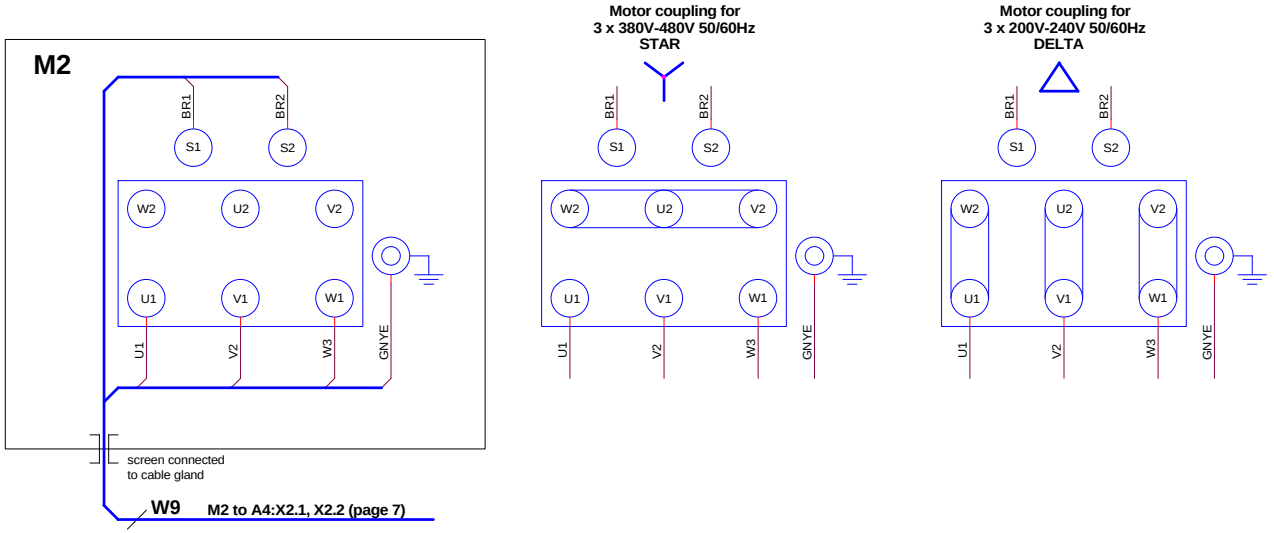
Connection of EMC filter Z1



Connection box on the sample mover motor M1



Connection box on the disc motor M2



COLOR CODE:

BK = black
BN = brown
RD = red
OG = orange
YE = yellow
GN = green
BU = blue
VT = violet
GY = grey
WH = white
PK = pink
BE = beige
RO = rose
GNYE = yellow-green

REV D: OHO (2008/12/03)
- New page created
- Connection of M1, M2 updated
- See changees on other pages

REV E: TKO (2009/04/02)
- See changees on other pages

STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

ABRAPOL-20, WIRING DIAGRAM
Connection of Z1, M1, M2

Size	CAGE Code	DWG NO	Rev
A2		15883450	E

Thursday, April 02, 2009 | Scale | OHO | Sheet 10 of 10

Overview, variant parts in Abrapol-20.

Country nom. Voltage /frequency	Gear Motor M1 nameplate	Freq. converter A3	Motor M2 nameplate	Freq. Converter A4	Transformer T1		Fuses F1,F2,F3	Fuses F4, F5	Fuse F6	Ordering number
					Type	Connections				
Japan 3x200V / 50Hz **CSA-norm.** Japan + USA + Canada 3x200-210V / 60 Hz	Item nr.: 2MD10000 Voltage: 3 x 230 V Power: 0,55 kW Connection: DELTA	Item nr.: 2PU82303 Voltage: 3 x 230 V Power: 3 kW	Item nr.: 2ME60000 Voltage: 3 x 230V Power: 2,2 kW Connection: DELTA	Item nr.: 2PU82303 Voltage: 3 x 230 V Power: 3 kW	Item No.: 2MT72034 Ulveco No.: AA-72034 See diagram: 15093452	Connection: 200 ÷ 210 V Imax = 0,65 A Item No.: 2x 2XL30402	20 AT (Class-CC) 2FC11200	2 AT (Class-CC) 2FC11020	4 AT 2FU14200	05886**129** 3x200-210V/50 or 60Hz Mains Fuses Max 50 AT
Norway, France, Belgium 3x220-230V / 50 Hz USA, Mexico, Brasil, S.Korea. 3x220-240V / 60 Hz						Connection: 220 ÷ 240 V Imax = 0,65 A Item No.: 2x 2XL30402				05886**135** 3x220-240V /50 or 60 Hz Mains Fuses Max 50 AT
Europe 3x380-415V / 50Hz South America 3x380-415V / 60Hz	Item nr.: 2MD10000 Voltage: 3 x 400 V Power: 0,55 kW Connection: STAR	Item nr.: 2PU84303 Voltage: 3 x 400 V Power: 3 kW	Item nr.: 2ME60000 Voltage: 3 x 400V Power: 2,2 kW Connection: STAR	Item nr.: 2PU84303 Voltage: 3 x 400 V Power: 3 kW		Connection: 380 ÷ 415 V Imax = 0,33 A Item No.: 1x 2XL30402	16 AT (aM) 2FC10160	1 AT (aM) 2FC10010		05886**146** 3x380-415V /50 or 60Hz Mains Fuses Max 50 AT
CSA-norm. USA + Canada 3x460-480V / 60 Hz						Connection: 460 ÷ 480 V Imax = 0,33 A Item No.: 1x 2XL30402	15 AT (Class-CC) 2FC11150	1 AT (Class-CC) 2FC11010		05886**154** 3x460-480V /60Hz Mains Fuses 50 AT

Pederstrupvej 84
DK-2750 Ballerup
Denmark