AbraPlan-20

Struers

Instruction Manual

Manual No.: 15897001

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AbraPlan-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 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

AbraPlan-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. Be sure 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. Be aware that when the machine is connected to a compressed air supply the specimen holder arm moves upwards.

10. Make sure that the specimens in the specimen holder are securely fixed, and ensure that the securing screws are not sticking out.

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

12. The machine must be disconnected from the mains supply prior to any service.

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

14. Use of working gloves is recommended when changing the grinding stone/ diamond grinding disc.

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. Basic Operations

3. Maintenance

1. Getting Started

Checking the Contents of the Packing Box

In the packing box you should find the following parts:

AbraPlan-20

1 AbraPlan-20
(Automatic, high-capacity machine for fast and efficient plane grinding)
1 Outlet hose 0.8 m for connection to internal cooling unit (factory mounted)
1 Outlet hose 2.5 m for connection to external cooling unit
1 Inlet hose (factory mounted)
2 Hose clamps, 17 mm
1 Drain angle, 90^0
1 Hose clamp, 35-60 mm
1 Hose for compressed air
2 Hose clamps, 12 mm
1 Hose connection for compressed air
1 Rubber disc 350 mm
1 Flange
1 Bolt M12
1 Allen key 8 mm
1 Set of Instruction Manuals

Unpacking and Placing AbraPlan-20

AbraPlan-20 should be placed directly on a plane and horizontal floor, capable of bearing the weight of this machine, please refer to the Technical Data section.

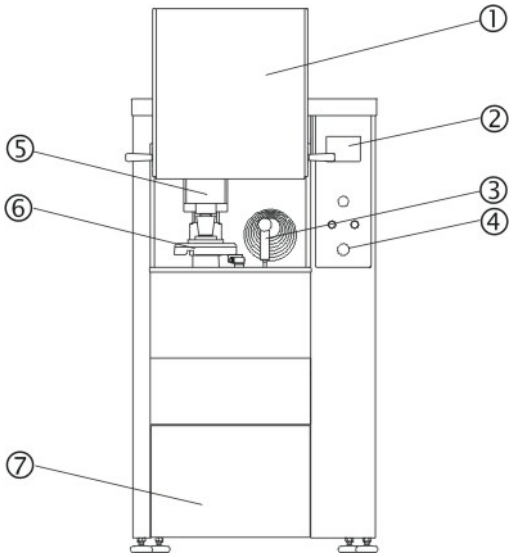
- Unscrew the nuts from the transport brackets fixing the machine to the pallet.
- Lift the machine from the pallet by means of a forklift truck from the front, and place in a suitable location.
- Remove the safety-springs from the front crossbar, and remove the bar.

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

Getting Acquainted with AbraPlan-20

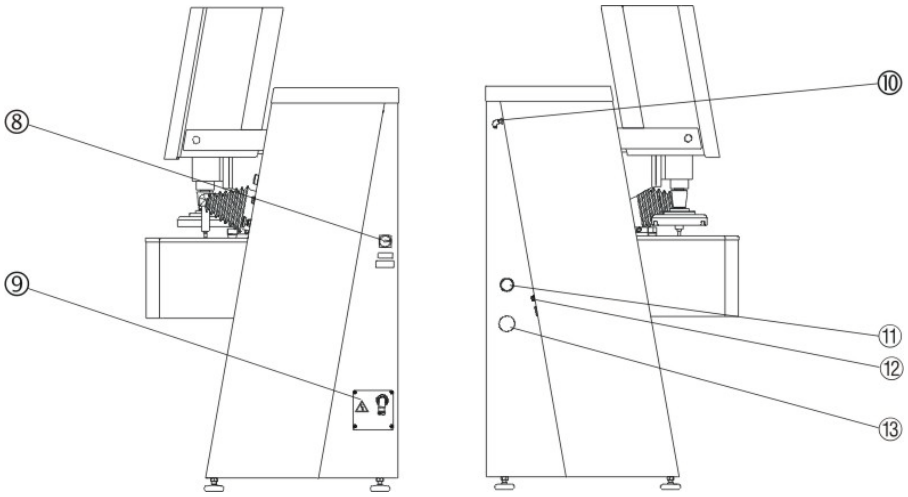
Take a moment to familiarise yourself with the location and names of the AbraPlan-20 components.

Front view



① Safety guard
② Control panel, (see 2. Basic Operations)
③ Dresser arm
④ Emergency Stop
⑤ Specimen holder motor
⑥ Specimen quick coupling
⑦ Cover plate for Recirculation Cooling Unit

Side views



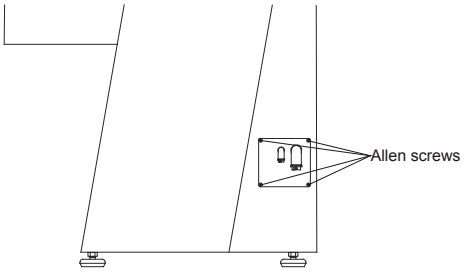
⑧ Mains power switch
⑨ Electrical connections
⑩ Compressed air inlet
⑪ Connection to exhaust
⑫ Connector for Recirculation Cooling Unit
⑬ Opening for water outlet hose

Noise Level

Approx. 68 dB (A) measured during idle running, at the operator's position in front of the machine.

Supplying Power

IMPORTANT
Check that the mains supply voltage corresponds to the voltage stated on the Type Plate (located under the mains switch on the side of the machine). If the machine is already connected to a mains supply, disconnect this supply before removing the Allen screws securing the electrical panel.



- 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 earth according to local regulations.

Direction of Rotation

Check that when the power is turned on the grinding stone/ diamond grinding disc rotates counter-clockwise.
If this is not the case, switch off AbraPlan-20 and unplug the machine.

- Change two of the phases.
- Repeat the rotation check.

Supplying Compressed Air

- Connect the compressed air supply to the inlet, located at the rear of the left-hand side of the machine, using 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 can be supplied either from a central compressor, a portable compressor with a compressed air reservoir, or a compressed-air bottle. A capacity of 20 l/min at atmospheric pressure is sufficient.

Connection to an External Exhaust System

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

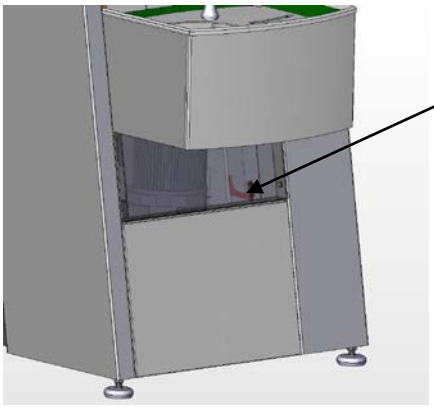
Recommended capacity for exhaust system: 180m^3/h at 0mm water gauge.

Connecting the Recirculation Cooling Unit (accessory)

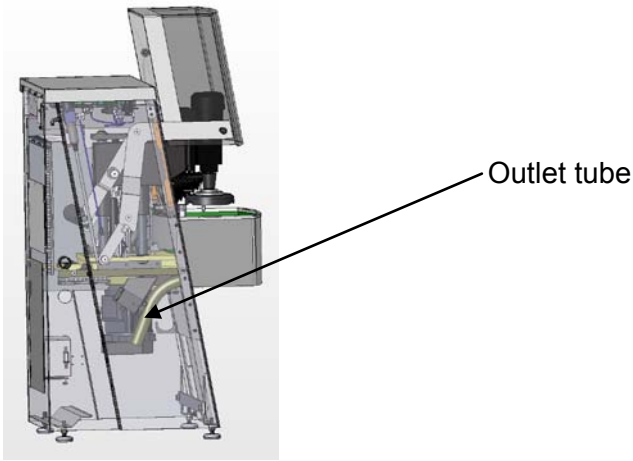
Please refer to the manual for the Recirculation Cooling Unit for details.

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.

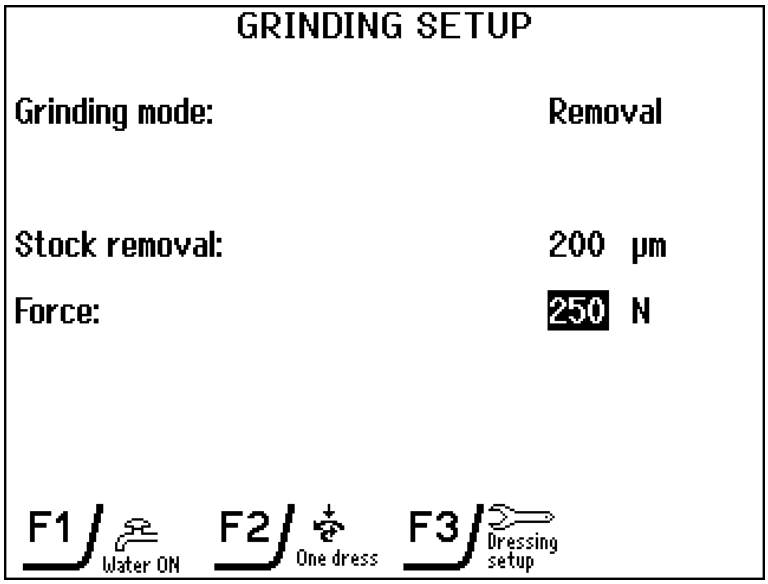
- Lead the water outlet tube down into the Recirculation Cooling Unit.
  Whenever the recirculation tank is removed from the compartment underneath the AbraPlan-20, place the tube in the tube holder to avoid dripping.
  Remember to put the tube back into the tank before starting the machine.



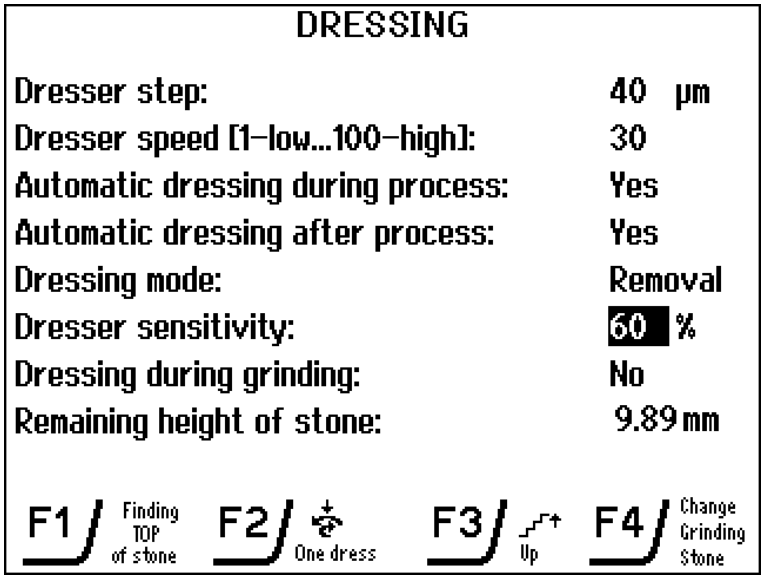
IMPORTANT
When AbraPlan-20 is connected to an external cooling unit the short outlet tube has to be replaced with the long tube. The long tube is then guided through the outlet hole on the left-hand side of the machine (see picture) and connected to the cooling unit. Shorten the hose to the required length. The inlet hose is led underneath the machine from the pump to the water inlet.



Mounting the Grinding Stone/ Diamond Grinding Disc

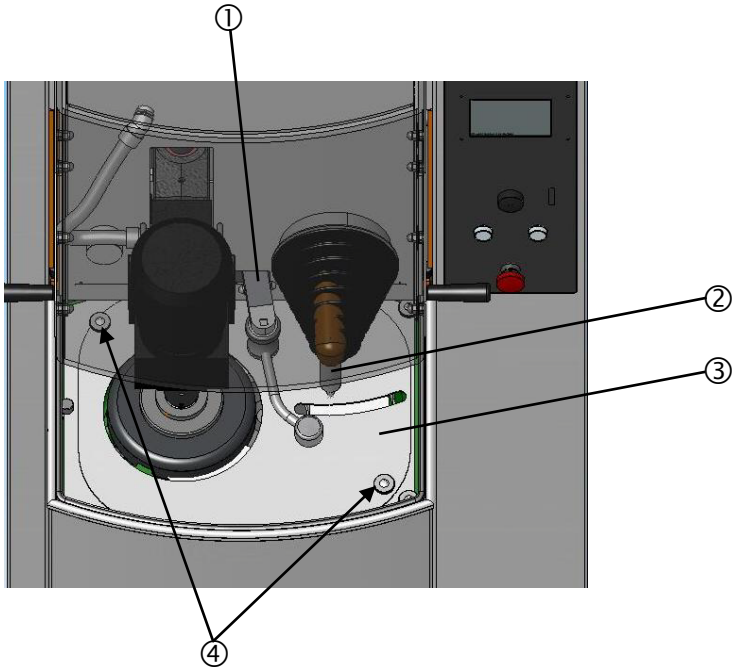


- From the grinding set-up screen, press **F3** to go to the Dressing Set-up.



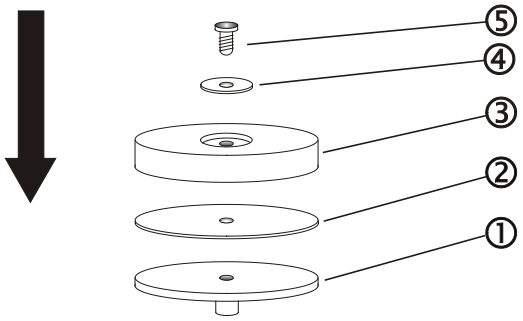
- Press **F4** Change Grinding Stone to move the dresser to the top position.

① Flushing unit (head)
② Dressing arm
③ Stone Guard
④ Securing finger screws



- Ensure that the sample motor is fully raised, and lift the safety guard to gain access to the grinding area.
- Lift the flushing unit head and, using its built-in magnet, attach it to the back of the grinding chamber.
- Unscrew the 2 finger screws.
- Carefully lift the stone guard up and away to the front of the machine.

- Assemble the grinding stone/ diamond grinding disc on the motor flange as illustrated:



① Motor Flange
② Rubber disk
③ Grinding stone/ diamond grinding disc
④ Securing flange and cardboard washer
⑤ Securing bolt

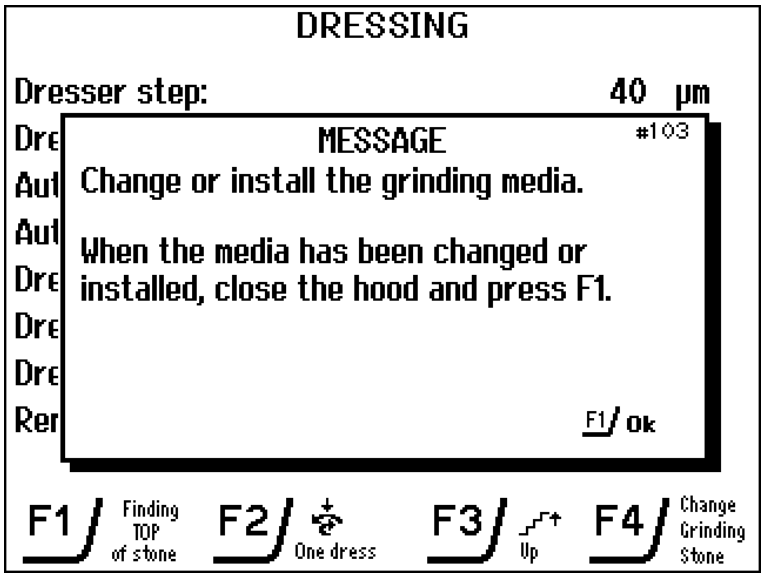
IMPORTANT
Make sure that the grinding stone/diamond grinding disc is intact. The stone/disc must be dry when mounted and the flange should be clean and smooth.

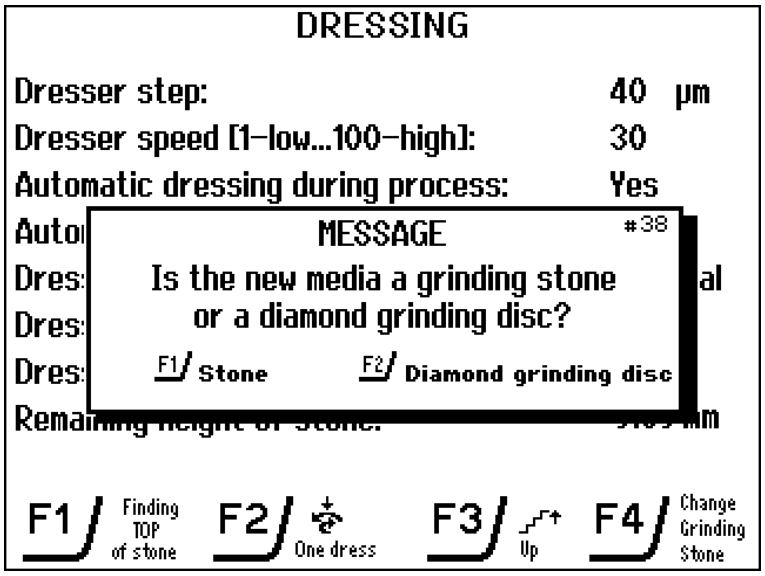
- Mount the bolt and fasten firmly using an 8 mm Allen key.

IMPORTANT
Do not over-tighten the securing bolt as this may damage the grinding stone/diamond grinding disc.
The bolt should be tightened with a force of minimum 8 Nm (5.9 lbf-ft), maximum 10 Nm (7.4 lbf-ft).

Warning
Take care of sharp or rough edges whilst securing/ removing the grinding stone/diamond grinding disc.

- Replace the stone cover and secure it with the 2 nuts.
- Re-attach the flushing unit head.
- Lower the safety guard and press F1 to configure the automatic dresser.

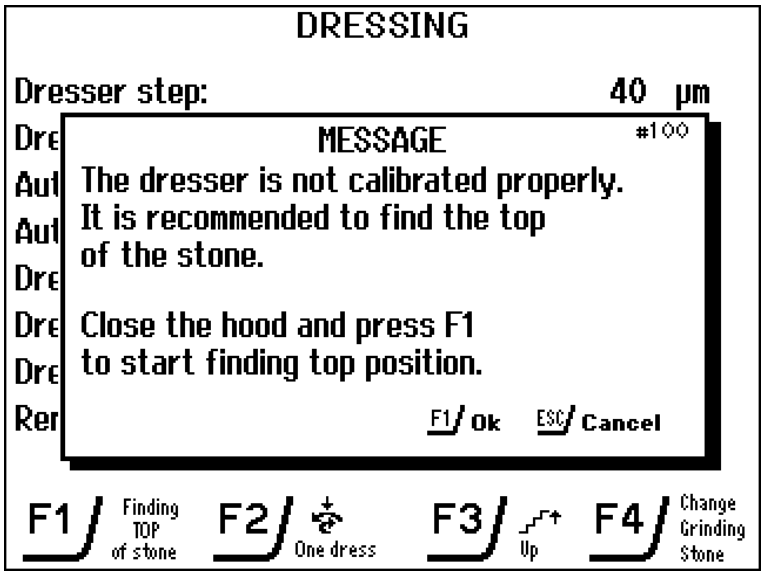




- Press F1 if you have installed a grinding stone or press F2 for a diamond grinding disc.

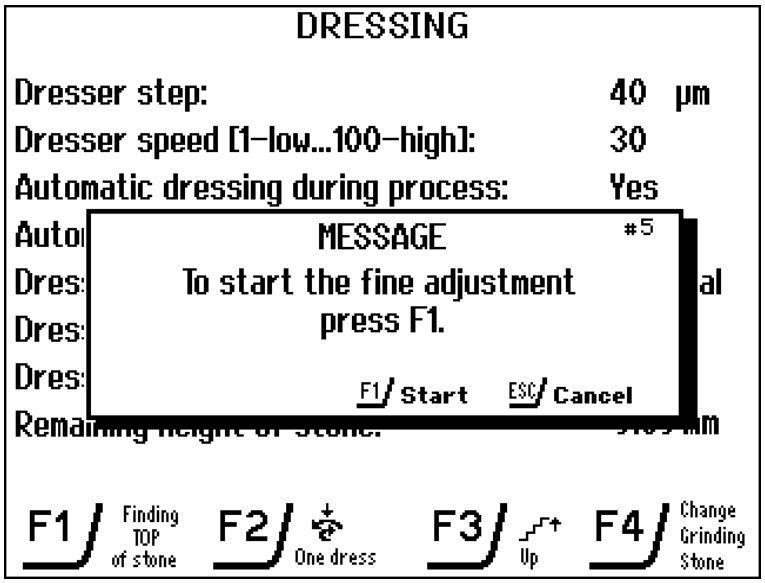
IMPORTANT
Pressing F1 when a diamond grinding disc has been inserted can result in severe damage to both the dressing tool and the diamond grinding disc.

When a grinding stone has been inserted the following screen will appear:

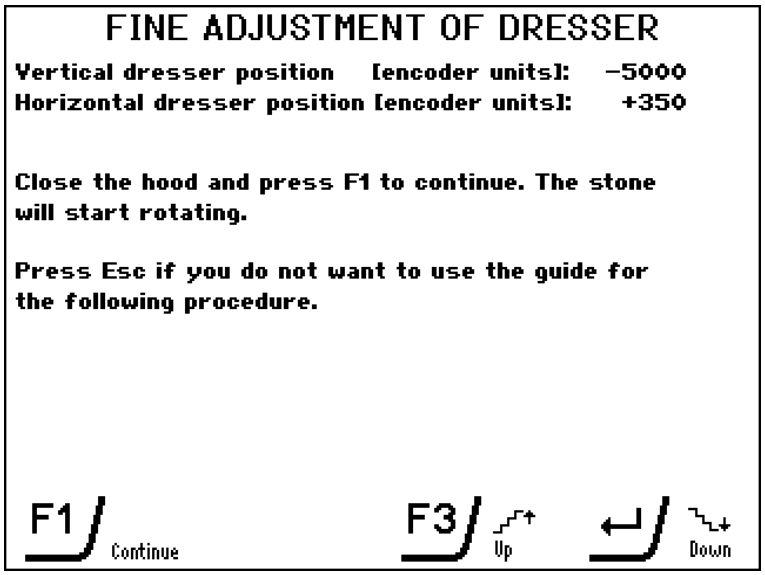


- Press F1 to continue and start the calibration process

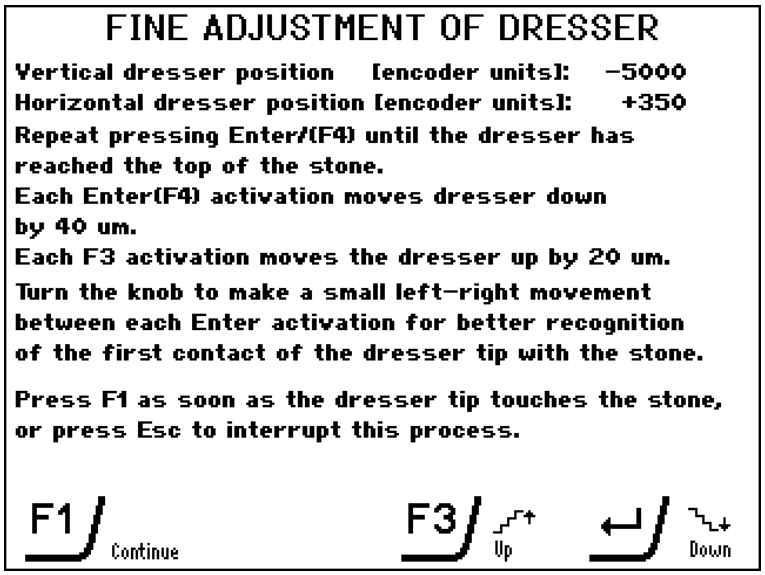
The dresser checks the height of the grinding stone in two positions, one close to the centre, and the other at the periphery.
Wherever the stone is highest, the following fine adjustment will start.



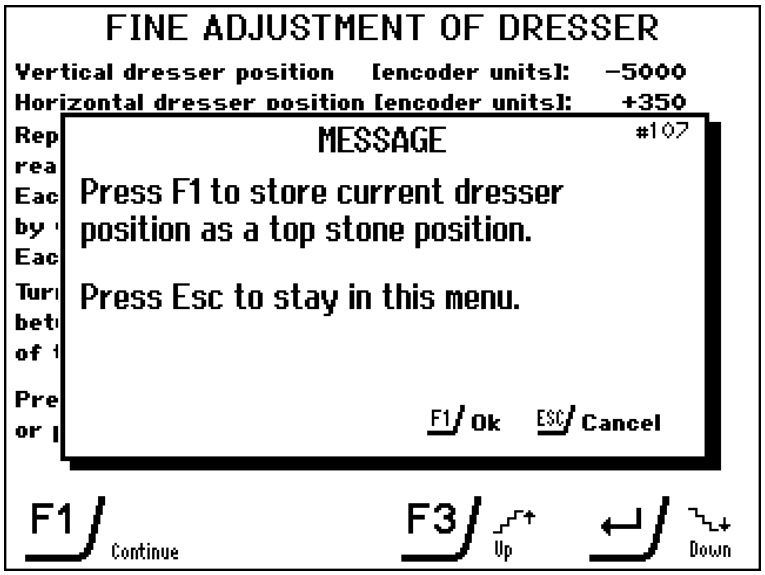
- Press F1 to continue with the fine adjustment.



- Press F1 to continue with the fine adjustment.

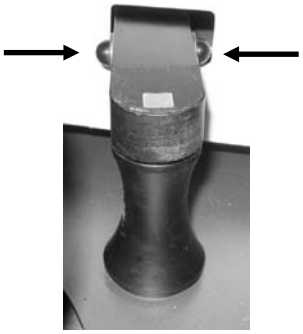


- Press Enter or F4 to move the dresser downwards in steps of 40 µm.
- Turn the knob to move the dresser sideways to ensure that the dresser has touched the grinding stone.
- Press F1 to finish the fine adjustment.



- Press F1 again to store the current dresser position as the top of the grinding stone.

Flushing Unit



When attached to its mounting (as illustrated), the flushing unit supplies water/coolant to the grinding stone/ diamond grinding disc during the grinding and dressing processes. However, the flushing unit can be removed from the mounting and used to hose down the grinding area and samples etc. To do this:

- Squeeze in and hold the clamp buttons (illustrated by arrows) to cut-off the water/coolant flow.
- Press **F1** to start the pump.
- Lift the flushing unit free of its mounting and pull out the tube.
- Direct the flushing unit in the desired direction and release the clamp buttons.
- Press **F1** to stop the pump.
- Push the tube back into the opening at the back of the grinding chamber and reinsert the flushing unit in its mounting.

If the grinding/dressing process is not active, a water/coolant flow can be achieved by pressing **F1** when the GRINDING or DRESSING Menus are displayed.

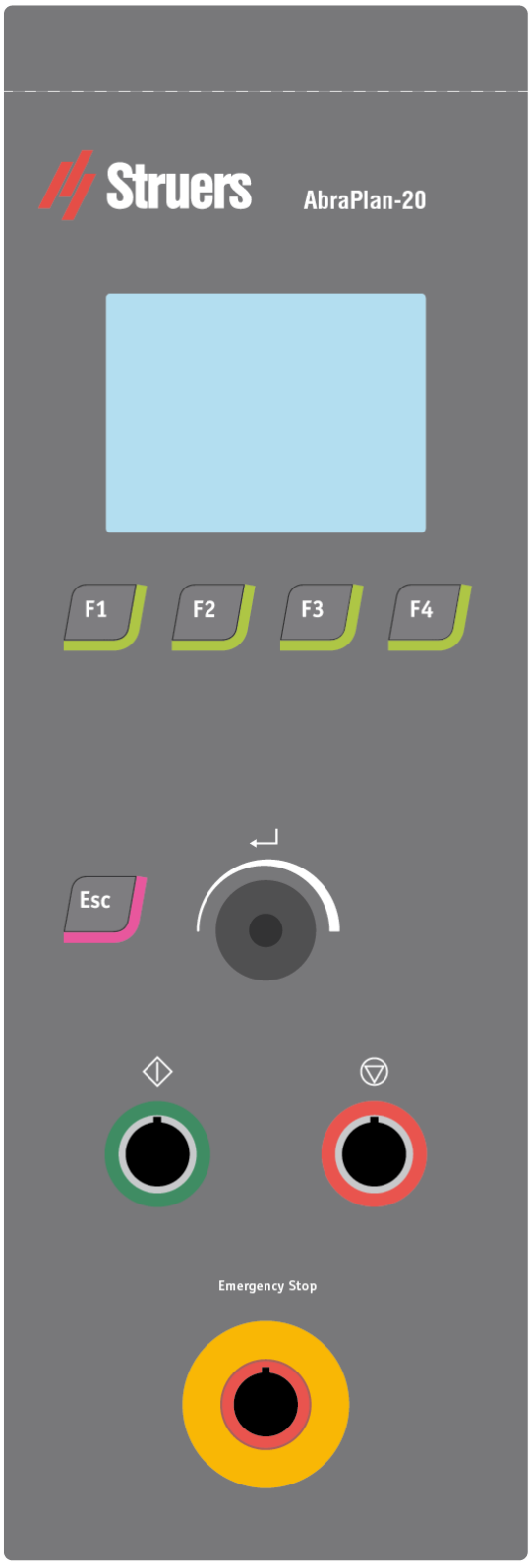
Cleaning the Inside of the Safety Guard

To clean the inside of the safety guard use the built-in magnet of the flushing unit head to attach it to the back of the grinding chamber.

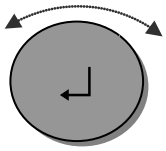
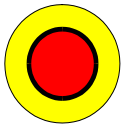
- Lift the flushing unit free of its mounting and pull out the tube.
- Use the magnet to attach the flushing unit to the back of the grinding chamber.
- Close the safety guard.
- Press **F1** to start the pump.
- When the safety guard has been flushed sufficiently press **F1** to stop the pump.
- Open the safety guard.
- Push the tube back into the opening at the back of the grinding chamber and reinsert the flushing unit in its mounting.

2. Basic Operations

Front Panel

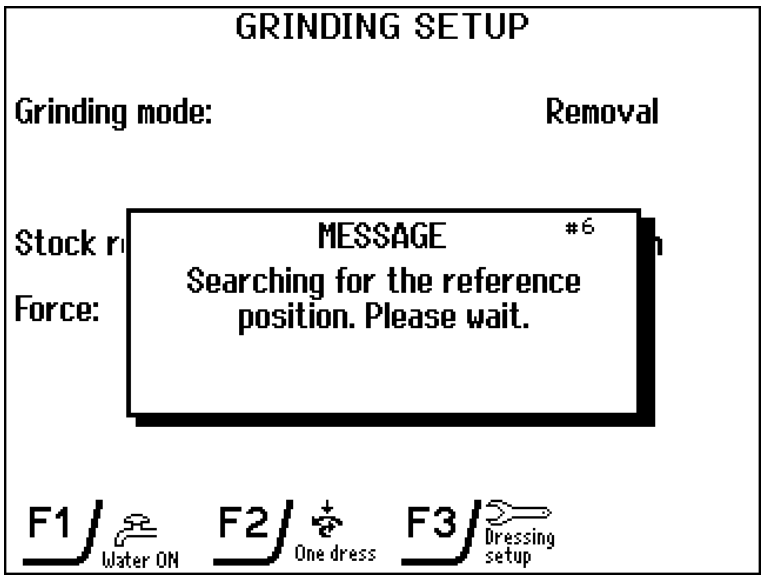


Front Panel Controls

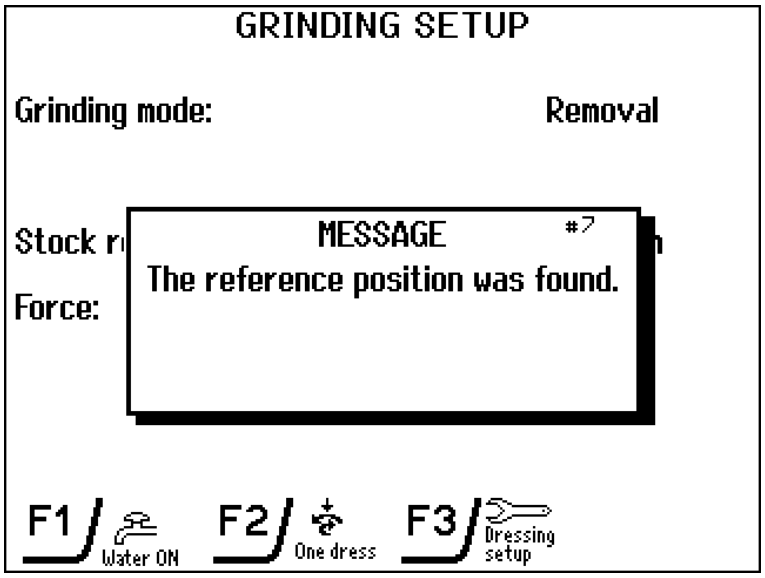
Name	Key	Function	Name	Key	Function
FUNCTION KEY	F1	Controls for various purposes. See the bottom line of the individual screens.	Push/Turn Knob		Used for entering and changing parameters. Combined cursor and enter key.
FUNCTION KEY	F2	Controls for various purposes. See the bottom line of the individual screens.	START		Starts the preparation process
FUNCTION KEY	F3	Controls for various purposes. See the bottom line of the individual screens.	STOP		Stops the preparation process.
FUNCTION KEY	F4	Controls for various purposes. See the bottom line of the individual screens.	EMERGENCY STOP		The EMERGENCY STOP is located on the front of the machine. - Push the red button to stop. - Pull the red button to release.
Esc	Esc	Leaves the present menu or aborts functions/changes.	MAIN SWITCH		The main switch is located on the right side of the machine.

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

AbraPlan-20 will then search for the reference position of the dresser, showing the following screen:



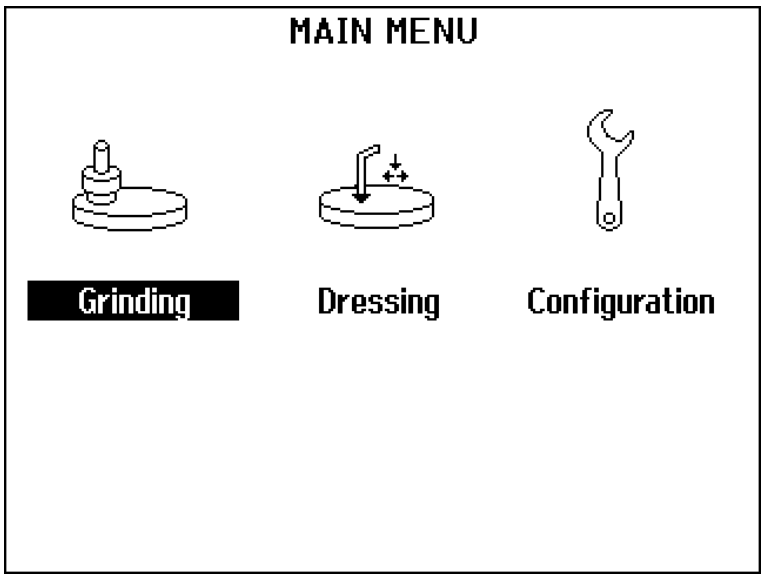
When the reference position has been found, the next screen will appear for a short while:


GRINDING SETUP
Grinding mode:
Removal
Stock r
Force:
MESSAGE
#7
The reference position was found.
F1
Water ON
F2
One dress
F3
Dressing setup

Software Settings

The display will then change to the last screen shown before AbraPlan-20 was switched off.
When switching on AbraPlan-20 for the first time, a message will appear to request selection of the language of your choice.
The MAIN MENU display 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. From this menu, you can enter the configuration menu and grinding process menu.



Setting the Language

To change the language, carry out the following steps:

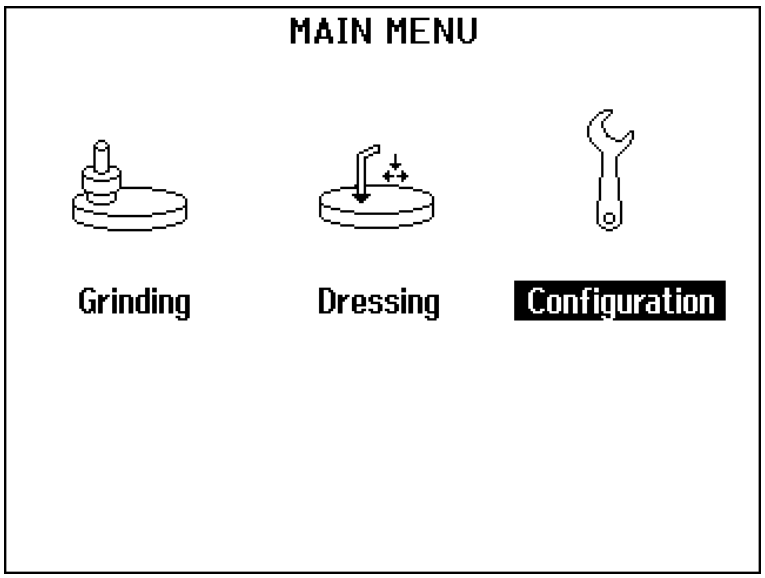
↓

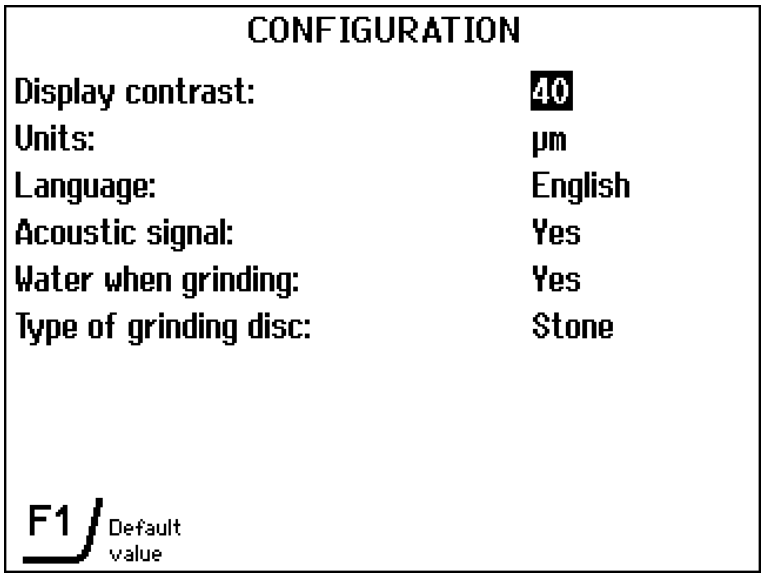
Turn knob to select CONFIGURATION.

↓

Push knob to activate the CONFIGURATION Menu.

↓





↓

Turn knob to select Language.

↓

Push knob to activate the LANGUAGE pop-up menu.

↓

↓

Turn knob to select the language you prefer.

↓

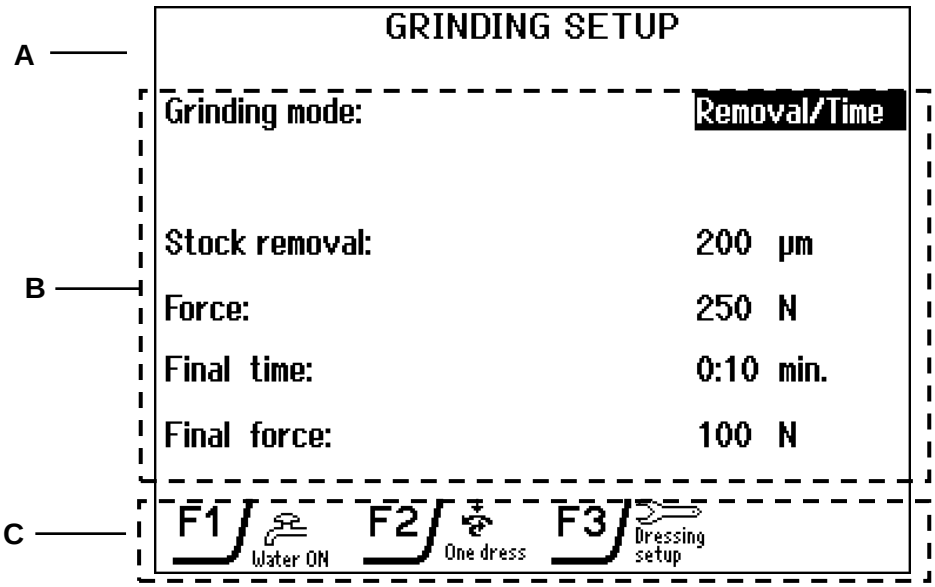
Push knob to accept the language.

The CONFIGURATION Menu now appears in the language you have chosen.

Esc Press **Esc** to return to the MAIN MENU.

Reading the Display

The display is primarily divided into 3 areas. The position of these areas and the information they contain are explained in the illustration below, which uses the CONFIGURATION Menu as an example:

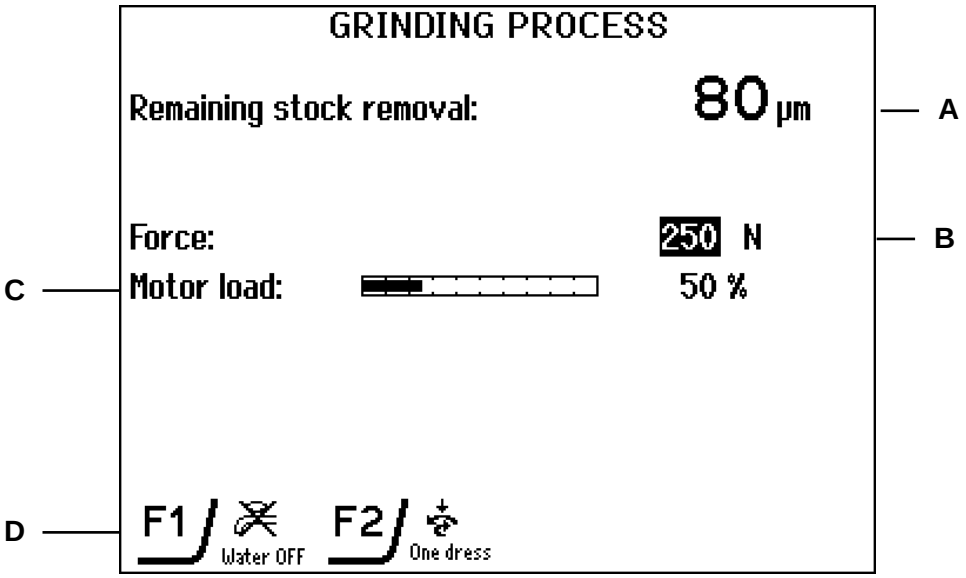


A Heading: this tells you where you are in the software.

B Information fields: these will either be numerical values or text fields providing information associated with the process shown in the heading. The inverted text shows the cursor position.

C Function key options: the functions of these change with the window displayed.

During the grinding process the screen could look as follows:



A Remaining stock removal
B Force applied on specimen holder
C Load on main motor
D Function(s) selectable during process

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

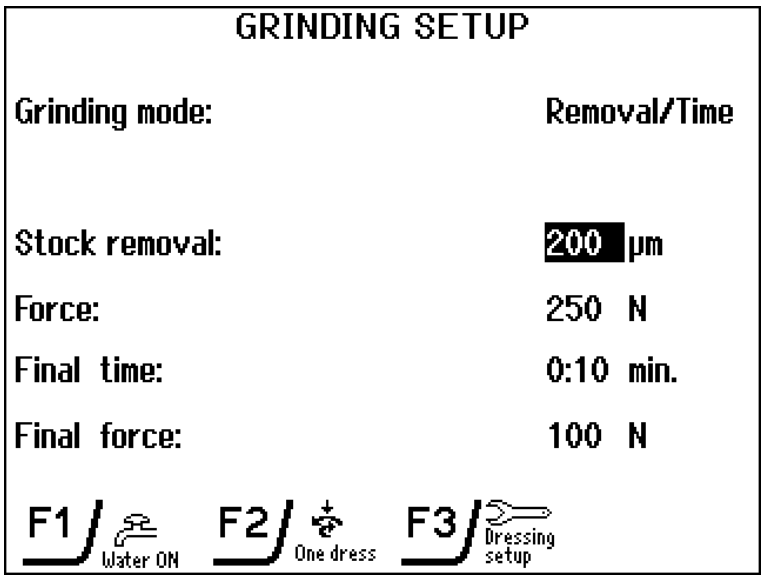
Changing/Editing Values

Numeric Values

Depending on the type of value, there are two different ways of editing.

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

↓

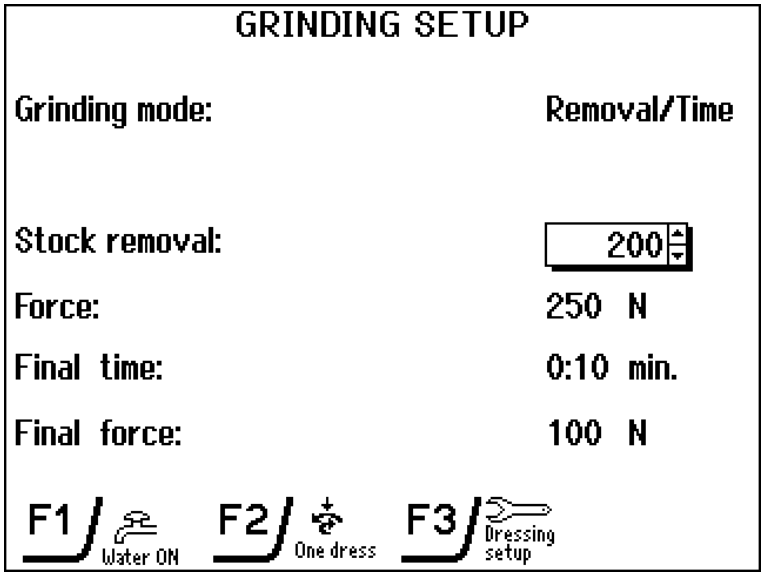


↓

Push knob to edit value.

A scroll box appears around the value.

↓



↓

Turn knob clockwise to increase, or counter-clockwise to decrease the numeric value.

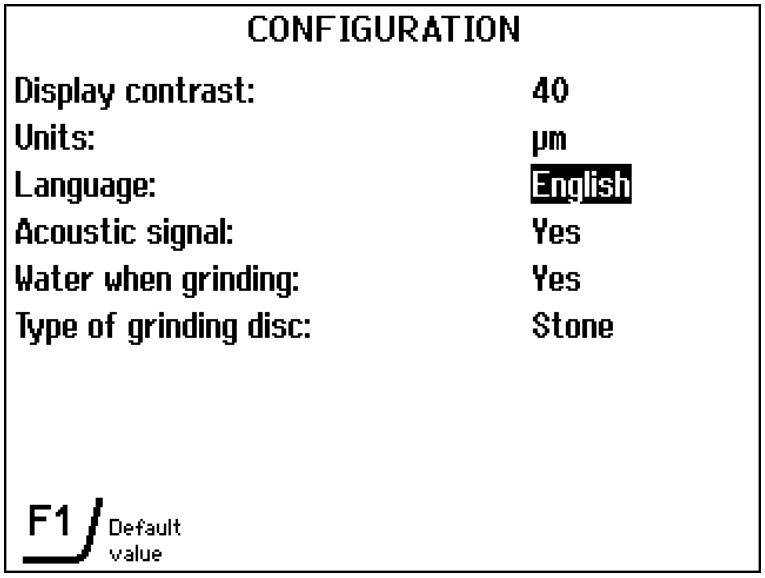
↓

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

Text Values

Turn knob to select the text value to be changed, e.g. *Language*

↓



↓

Push knob to edit the value.

↓

If there are only two options, then a toggle function is active, e.g. Yes / No.
If there are more than two options, a pop-up menu appears:

↓

Turn knob to select/toggle the correct option.

↓

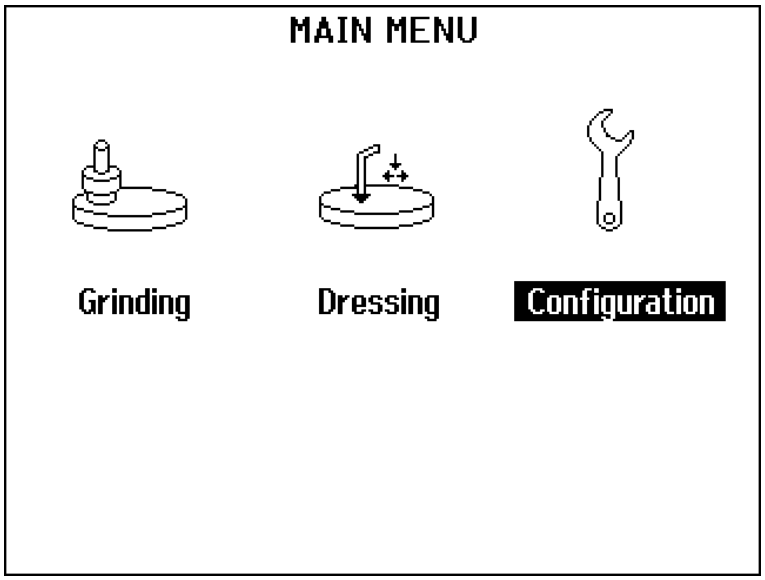
Push knob to accept the new value. (Pressing **Esc**, aborts the changes, preserving the original setting.)

Setting up the Software

Before operating the AbraPlan-20, check/edit the software configuration values:

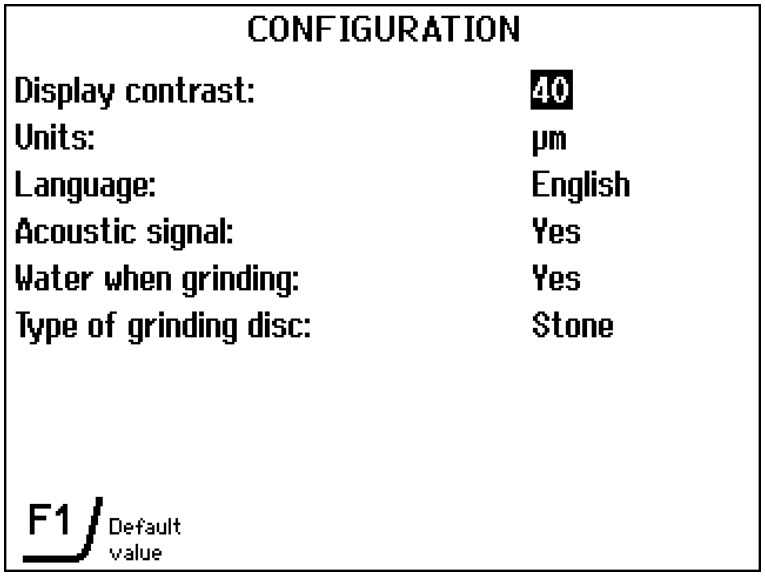
↓

Turn knob to select CONFIGURATION.



Push knob to activate the CONFIGURATION Menu.

↓



↓

Turn knob to select desired parameter.

↓

Push knob to edit the parameter setting.

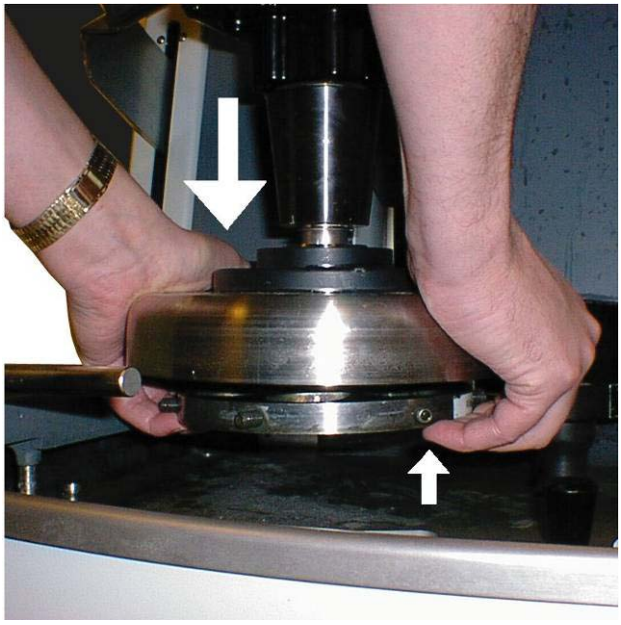
↓ The settings possible and the default settings are shown below:

	Possibilities	**Increment**	**Default**
Display contrast	10 - 100	1	40
Units	µm / mils		µm
Language	English German French Spanish Japanese Chinese		English
Water when grinding	Yes / No		Yes
Keyboard sound	Yes / No		No
Type of grinding disc	Stone / diamond grinding disc		Stone

↓ Repeat the process until all values are correct.

Esc Press **Esc** to return to the MAIN MENU.

Inserting/Removing the Specimen Holder



Inserting the Specimen Holder

- Position the specimen holder under the quick coupling, and support it with your fingertips.
- Press and hold the flange of the column down with the heel of your hand while guiding the pressure tap of the specimen holder into the coupling.
- Turn the specimen holder until the three pins engage with the corresponding holes. Check that the specimen holder is in position by trying to turn it to the side.
- Release the flange.

Removing the Specimen Holder

- Place your hands as shown in the illustration above.
- Press upwards with your fingers to lift the specimen holder slightly. At the same time, press and hold down the flange with the heel of your hand.
- Using your fingers to support the specimen holder; lower it free of the coupling.
- Release the flange and completely remove the specimen holder.

Grinding Setup

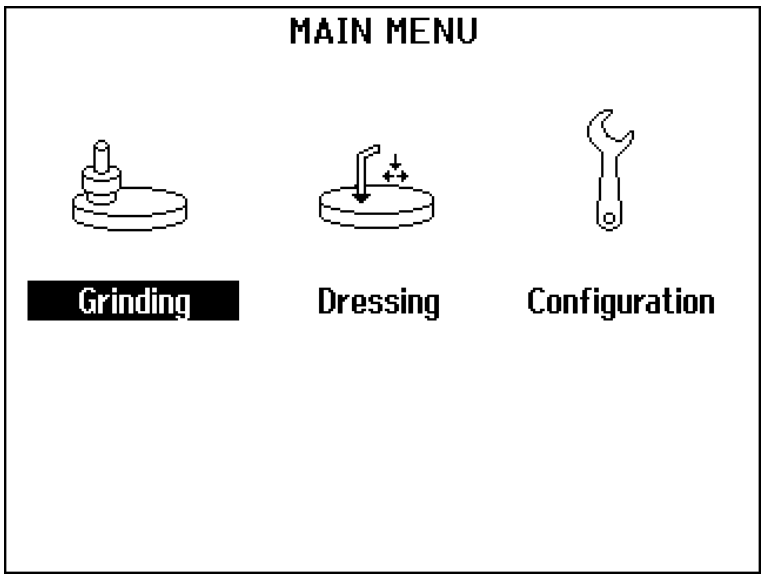
Before starting the grinding process, the grinding time and force setting should be checked/ changed. This is done using the control panel software:

↓

If the MAIN MENU is not currently displayed, press **Esc** twice

Turn knob to select *Grinding*:

↓



↓

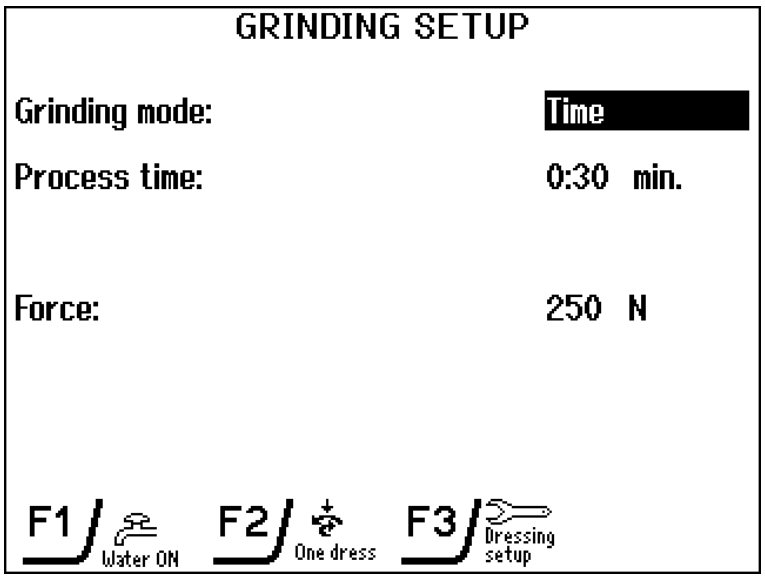
Push knob to enter the GRINDING MENU.

↓

Setting the Process Time

Turn knob to select *Grinding mode*.

↓



↓

Push knob to display square brackets [ ] and turn knob to change to *Time* setting.

↓ Note that stock removal is not available when time is selected.

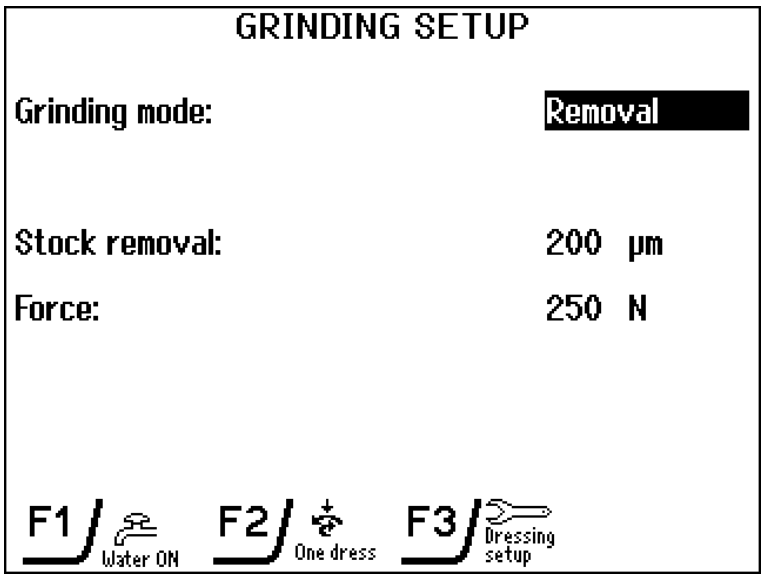
Push knob to accept the new setting.

↓ Then adjust the process time and the force value to the correct settings.

Setting Removal

Turn knob to select *Grinding mode*.

↓



↓

Push knob to display square brackets [ ] and turn knob to change to *Removal* setting.

↓

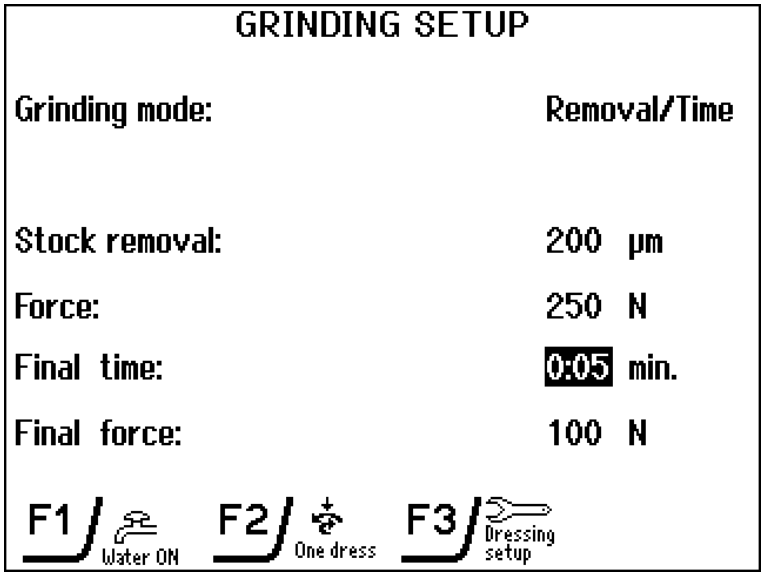
Push knob to accept the new setting.

↓ The Removal process has a 15 minutes time-out. If the prescribed amount of material has not been removed within this time, the process stops automatically.
Then adjust the stock removal and the force value to the correct settings.

Setting Removal/Time

Turn knob to select *Grinding mode*.

↓



↓

Push knob to display square brackets [ ] and turn knob to change to *Removal/Time*.

↓

Push knob to accept the new setting.

↓ Then adjust the process time, the stock removal and the force values to the correct settings.

> ***Note***
> Removal/Time is used when absolute planeness is required.
> First the required amount of material is removed, then the stone is dressed and the samples are ground again for a very short time.
> This ensures a maximum planeness after the required amount of material has been removed.

Cooling Water

The cooling water pump will automatically start when the preparation process is started. To stop the pump, press **F1**.

> ***Please Note***
> All the value and function settings defined in the GRINDING SETUP menu are saved in the AbraPlan-20's memory. Therefore, if the power to the machine is interrupted, these values are remembered.

Starting the Preparation Process

- Insert the specimen holder.
- Lower the safety guard.
- Using the software display, enter the GRINDING menu and select *Removal*, *Time* or *Removal/Time* mode.

  AbraPlan-20 has 3 different grinding modes:

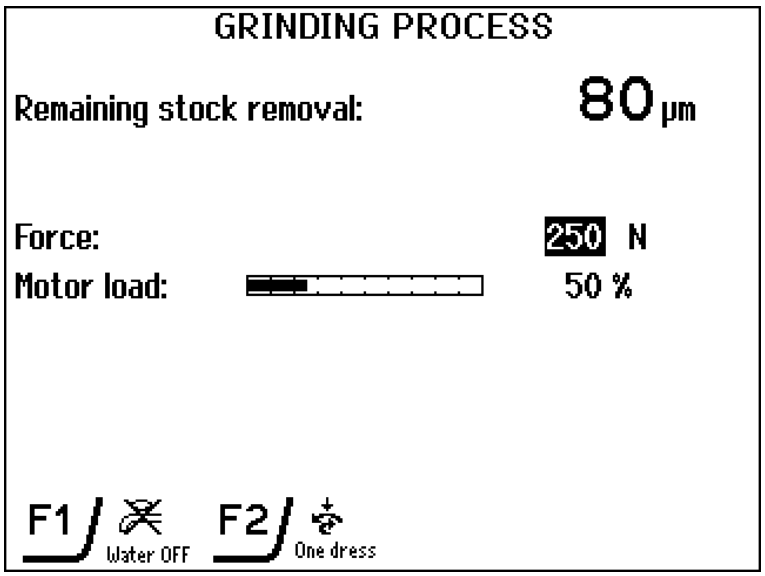
  Removal: Select *Removal* to remove a specific amount of material from the specimens.

  Time: Select *Time* to always use the same grinding time.

  Removal/Time: For maximum planeness a combination of removal and time can be used. Firstly a specified amount of material is removed. The stone is then dressed. A very short grinding step on the newly dressed, plane stone is then carried out.

- Check the correct settings for *Removal*, *Time* and *Force*.
- Start the grinding process by pressing the Start button.

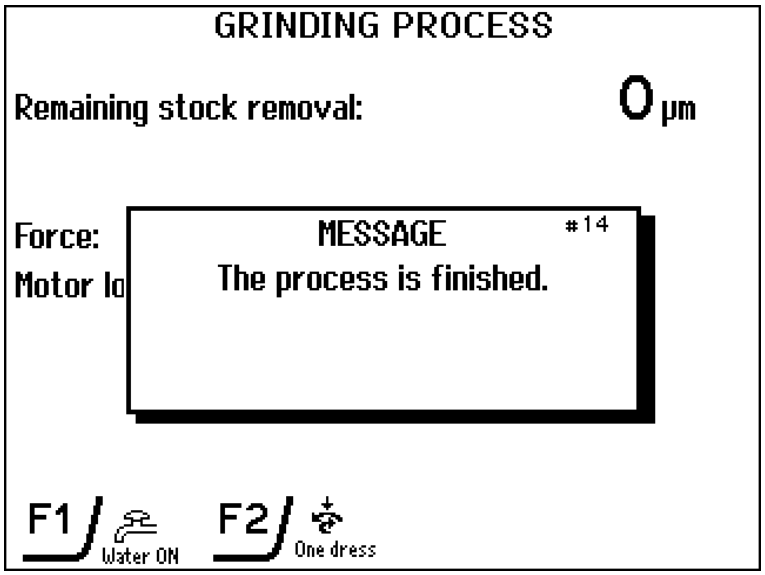
The software display will appear as:



Please Note
Although the force setting can be changed during the grinding process, this is not recommended when using Stock removal.

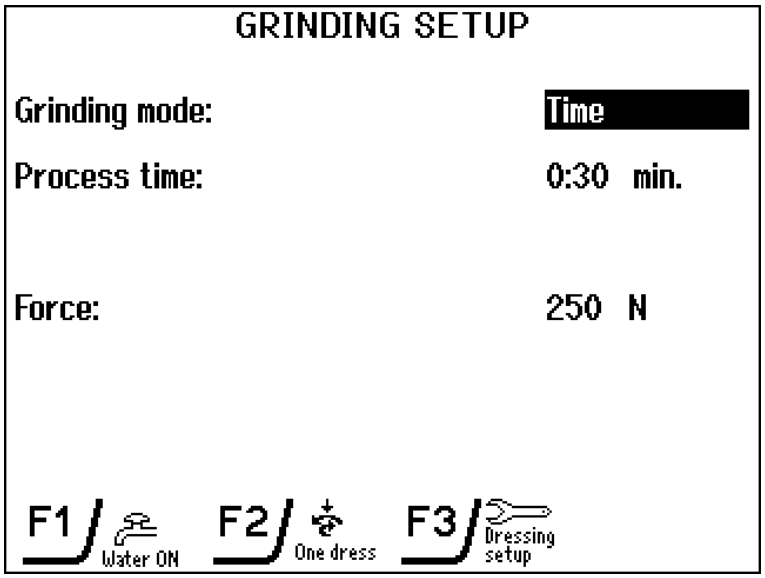
Stopping the Preparation Process

When the time has elapsed or the specified material removal has been obtained, the grinding stone will automatically stop rotating and the specimen holder will return to its initial position.



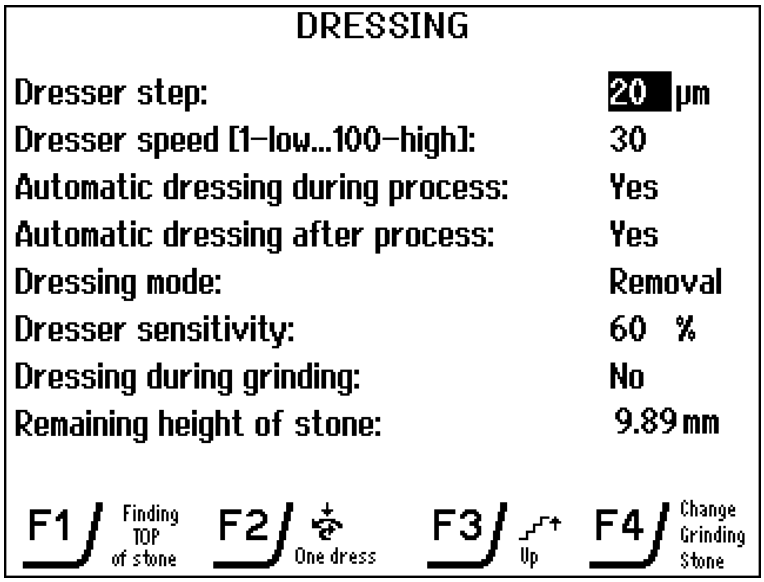
Dressing Functions and Changing the Grinding Stone

AbraPlan-20 is fitted with a diamond tool for automatic dressing of the grinding stone. It is important to dress the grinding stone at regular intervals to keep the stone plane and sharp. It is recommended that the automatic dressing function is enabled.



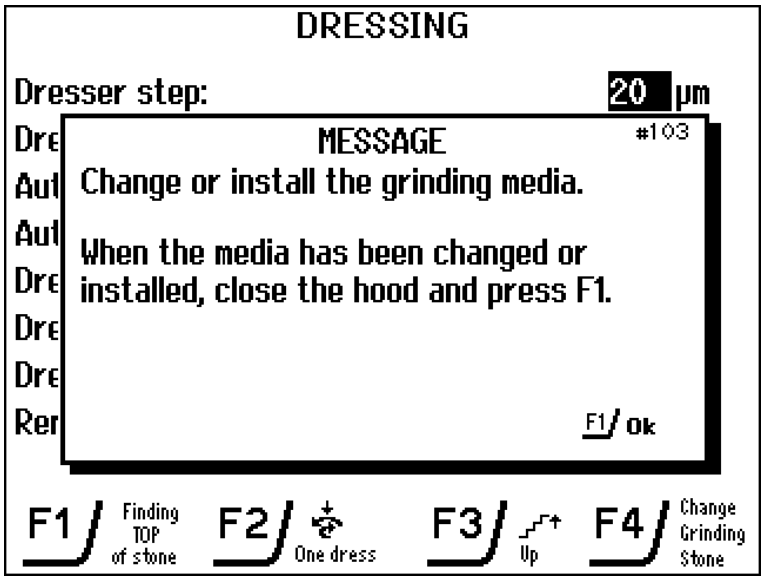
To exchange or insert a grinding stone:

- Press **F3**: *Dressing setup* from the GRINDING SETUP menu:

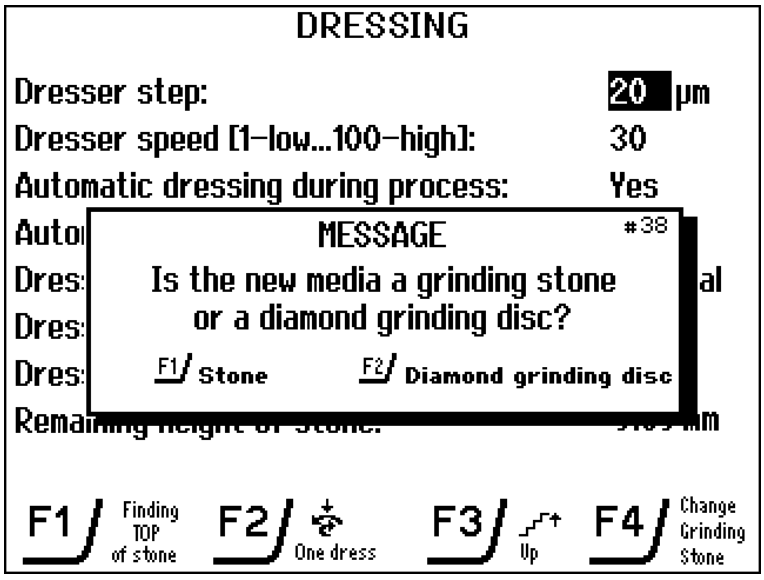


- In the DRESSING menu, press **F4**: *Change Grinding Stone* to be guided through the changing sequence.

- The dresser is moved into the topmost position and the following screen is displayed:

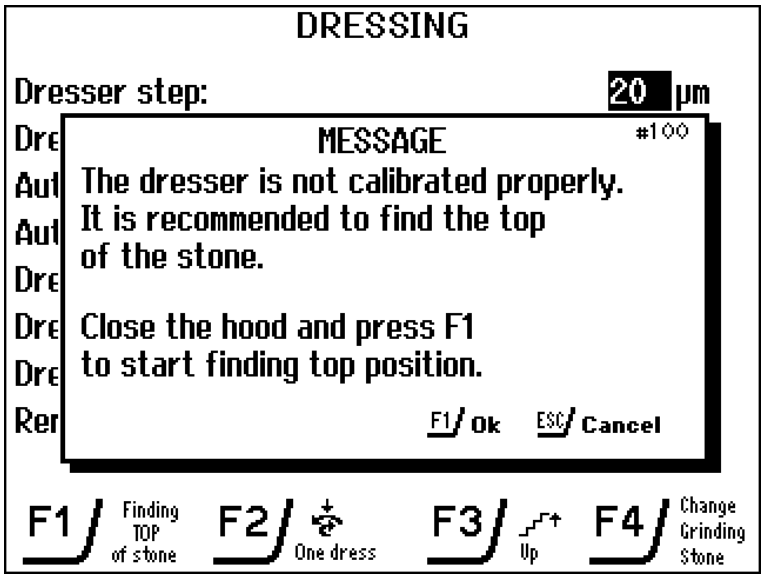


- Press **F1** and the next screen appears:

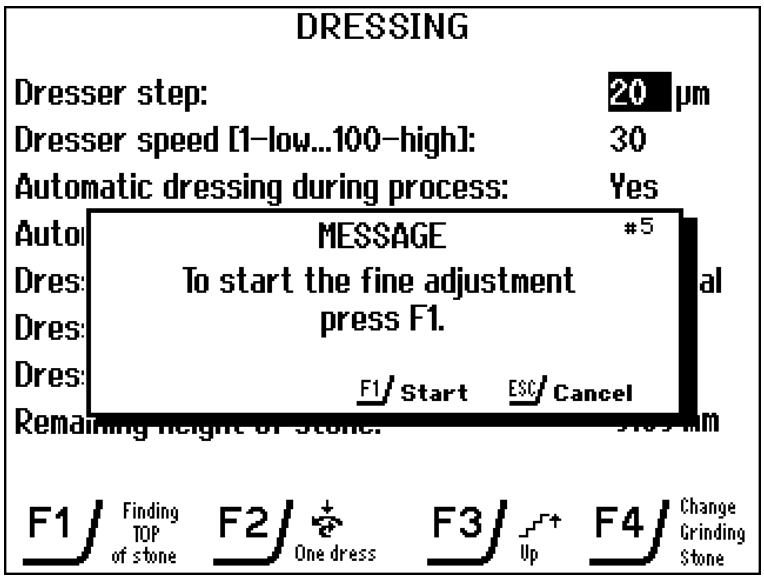


- Select the inserted grinding media by pressing **F1** or **F2**.

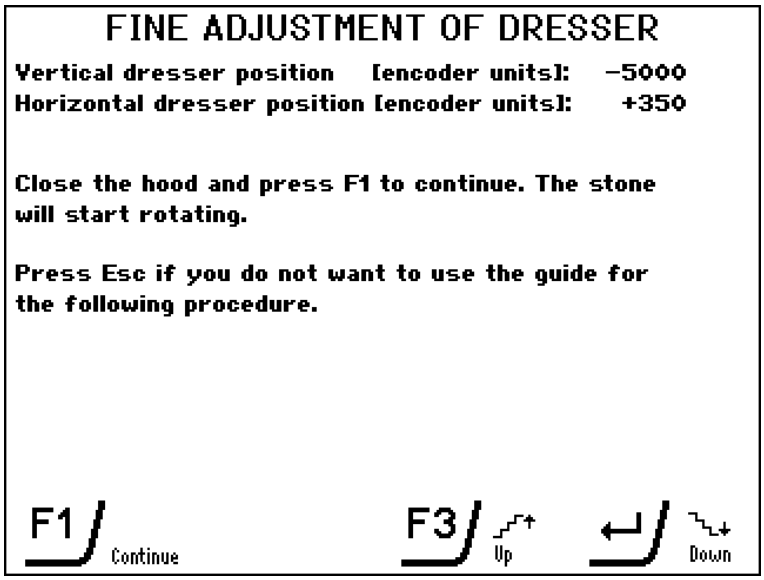
Important
The dressing arm with the diamond tool should never be used on a diamond grinding disc since this would destroy the disc or the diamond tool. Therefore always select the correct media when inserting or changing the grinding media.



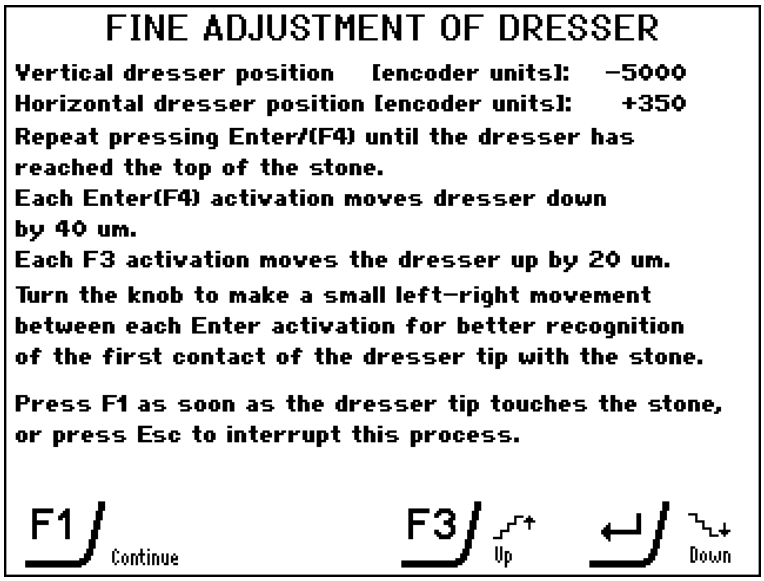
- Press F1 to continue and start the calibration process.
  The dresser checks the height of the grinding stone in two positions, one close to the centre, and the other at the periphery. Wherever the stone is highest, the following fine adjustment will start.



- Press **F1** to start fine adjustment.
  The dresser will retract slightly to avoid any possible damage to the stone. The stone will begin to rotate.

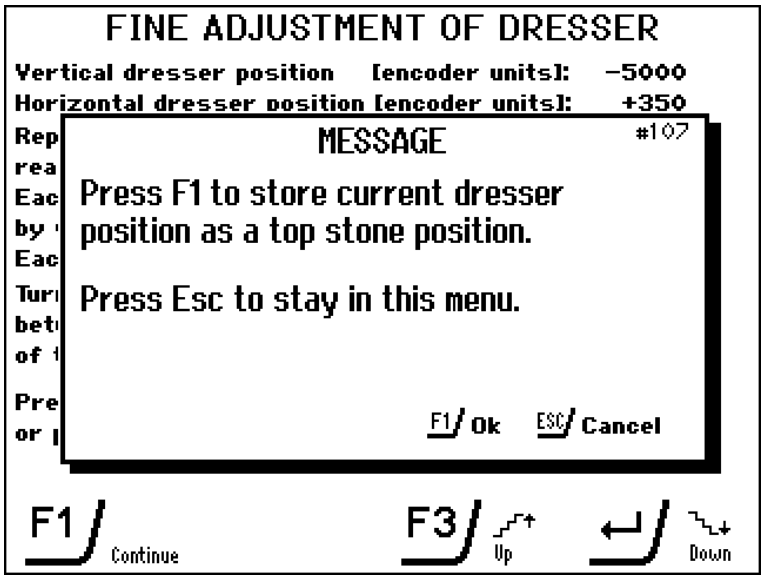


- Press F1 to continue with the fine adjustment.



- Press Enter or F4 to move the dresser downwards in steps of 40 µm. Turn the knob to move the dresser sideways to ensure that the dresser has touched the grinding stone.

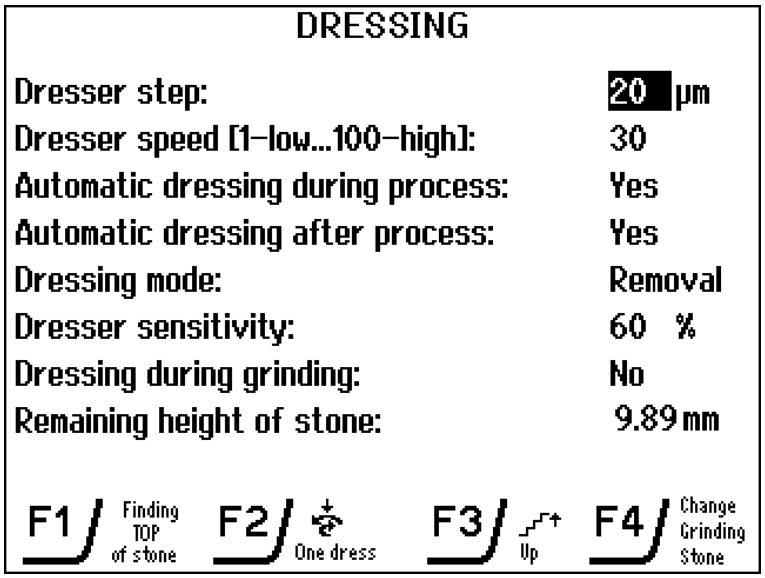
- Press F1 to finish the fine adjustment.



- Press F1 again to store the current dresser position as the top of the grinding stone.

Setting the Dressing Parameters

Several parameters can be set for the best possible utilization of the dresser.



Dresser step:

The distance the dresser is moved down for every step.
Can be set between 20 µm and 100 µm in steps of 20 µm. Always try to use the smallest possible step size, this will keep the consumables cost down. However, enough material must be removed from the stone to ensure the best possible grinding result.

Dresser speed:

The speed of the dresser when moving across the stone.
Can be set between 1 and 100.
A speed of 30 is recommended for most types of grinding stones. But depending also on the dresser step size, adjustments can be made to both higher and lower values.

Dresser speed can be adjusted depending on the dresser step size:
Reduce speed for hard grinding stones or large dresser steps
Increase speed for soft grinding stones and small dresser steps.

Automatic dressing during process:	Should be set to *Yes* to enable automatic dressing while grinding, especially when removal rate mode is used.
Automatic dressing after process:	Can be selected to automatically dress the stone after every process. Should be set to *Yes* when time mode is used to ensure a sharp grinding stone when starting the process. Can be set to *No* when removal mode is used and *Automatic dressing during process* is set to *Yes*.
Dressing mode:	Dressing mode can be set to either *Removal* or *Time*, depending on the grinding mode. When the Grinding mode is set to *Time*, the Dressing mode is also set to *Time*. When the Grinding mode is set to *Removal*, both *Time* and *Removal* can be selected. Removal:- dressing will automatically start when the removal rate decreases to a certain level. Time:- the stone will be dressed in regular intervals.
Dresser sensitivity:	When the dressing mode is set to *Removal*, *Dresser Sensitivity* can be adjusted. The sensitivity of the dresser during the grinding process can be set to values between 20 – 100 % in steps of 20 %. High sensitivity means that the stone is dressed as soon as the removal rate decreases, low sensitivity allows for a higher decrease in removal before the stone is dressed. High sensitivity provides the shortest possible grinding times whereas low sensitivity gives a longer lifetime of the grinding stone.
Dressing interval:	When the dressing mode is set to *Time*, *Dressing interval* can be adjusted. The interval can be set to between 0:10 and 5:00 minutes in steps of 10 seconds.
Dressing during grinding:	This function allows dressing while the specimen holder is still on the grinding stone. It should be used when grinding very hard materials where frequent dressing is necessary to keep the grinding time at a minimum.

Remaining height of stone:	Shows how much grinding stone is left.
Function buttons	**F1:** Function to automatically find the top of the grinding stone
	F2: Carries out a single dressing of the grinding stone
	F3: Moves the dresser upwards
	F4: Starts sequence to change the grinding stone
Dressing the Diamond Grinding Disc	In order to dress a diamond grinding disc, mount 3 aluminium oxide dressing sticks in a sample holder and grind for a few seconds.

3. Maintenance

Daily Service

- Remove the filter paper in the static filter of the Recirculation Cooling Unit.
- Refill the Recirculation Cooling Unit.

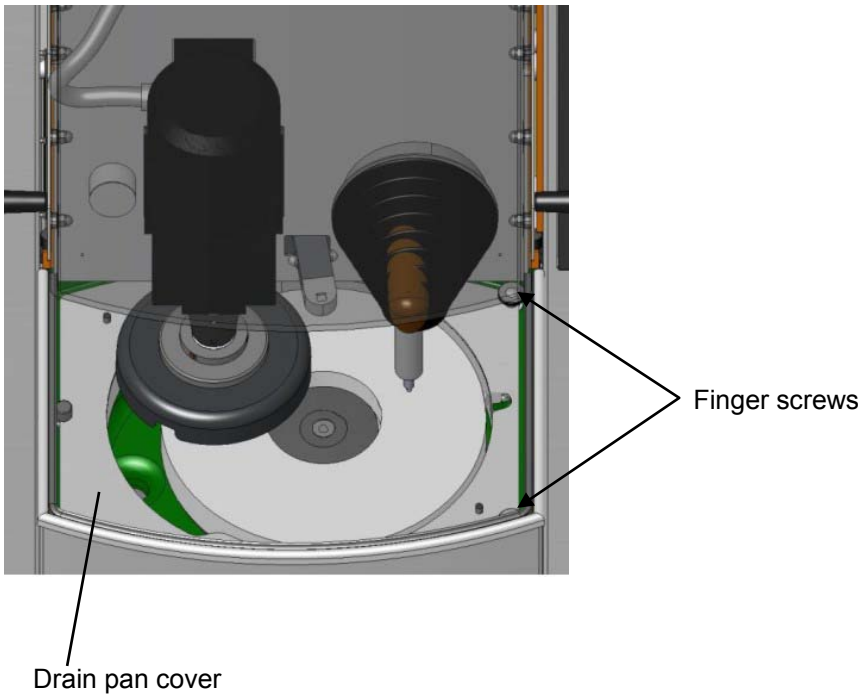
> ***IMPORTANT***
> Always use the correct concentration of Struers Additive in the cooling water (percentage stated on the container of the Additive). Remember to top up with Struers Additive each time you refill with water.

Weekly Service

AbraPlan-20 and the Recirculation Cooling Unit should be cleaned regularly, in order to avoid damaging effects to the machine and the specimens from abrasive grains or metal particles.

Cleaning the Drain Pan

- Remove Stone guard as described earlier.
- Remove the drain pan cover by unscrewing the 2 finger screws (located on the right-hand side).



- Remove any material that may have accumulated on the bottom of the drain pan.
- Replace the drain pan cover and the stone guard.

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 supplied with the Struers Cooling Units for instructions.

Monthly Service

When cleaning the Recirculation Cooling Unit empty the tank of cooling water and clean the tank and the static filter mounted under the discharge branch.

Replacing the Cooling Water

- Replace the cooling water in the Recirculation Cooling Unit at least once a month.
  Please refer to the manual supplied with the Struers Cooling Units for filling instructions.

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 AbraPlan-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 as a result of using a cooling fluid other than those produced by Struers.
A label on the cover indicates when the cover glass is due to be replaced.

Reference Guide

Table of Contents **Page**

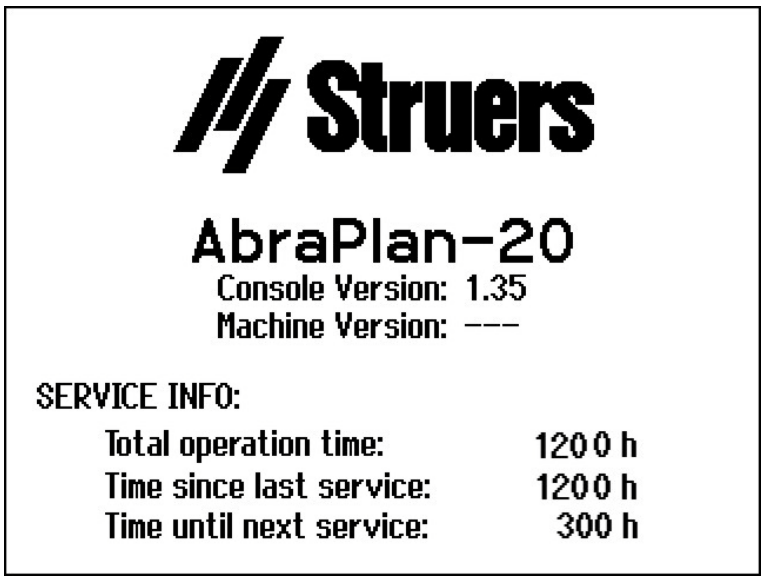
1. Accessories and Consumables

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 on a yearly basis or after every 1500 hours of use. Information on total operation time and servicing of the machine is displayed on the screen at start-up:



A pop-up message will appear after 1,000 hours operation time to remind the user that a service check should be scheduled.

After the 1,500 hours operation time has been exceeded the pop-up message will change to alert the user that the recommended service interval has been exceeded.

- Contact a Struers Service Technician to service the machine.

2. 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™ on the Struers website for the correct preparation method for the actual specimens.

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

3. Trouble-Shooting

Troubleshooting the AbraPlan-20 is achieved using popup messages displayed in the LCD display on the console unit.
These messages are divided into several categories and are listed below with decreasing severity:

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 the unit before a technician has rectified problem.

Warnings

Warnings must be rectified before process can continue.

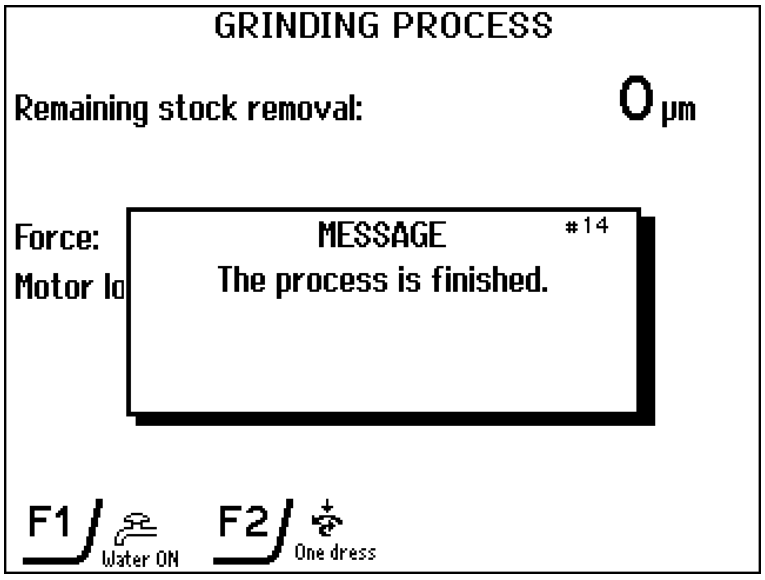
Messages

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

When a popup message is displayed, it will have the following format:

- a heading showing one of the categories listed above.
- an information field providing a message or instruction.

An example of a popup is shown below:



The information in the following table is divided by category.

Error message	Explanation	Action required
Error		
Main supply voltage is too low! Please restart the machine. (#18)	No power to circuitry in AbraPlan-20	Contact a Struers Service Technician.
15V DC in PCB missing! Please restart the machine. (#19)	No power to circuitry in AbraPlan-20	Contact a Struers Service Technician.
24V DC in PCB missing! Please restart the machine. (#24)	No power to circuitry in AbraPlan-20	Contact a Struers Service Technician.
No RS 485 communication. Please restart the machine. Call service if error persists. (#45)	Communication problem between elements inside AbraPlan-20.	Restart the machine. Contact Technical Support if error persists.
Machine and console software are not compatible, please upgrade. (#43)	Incompatible software in AbraPlan-20.	Contact a Struers Service Technician.
There is problem with contactors K7 or K8. Please call technical service. (#46)	Contactor(s) are wrong.	Contact a Struers Service Technician.
LIN bus: X SMU is off line. Please restart the machine. (#1)	Dresser X motor is not responding.	Restart the machine. Contact a Struers Service Technician if error persists.
LIN bus: Y SMU is off line. Please restart the machine. (#2)	Dresser Y motor is not responding.	Restart the machine. Contact a Struers Service Technician if error persists.
LIN bus: X and Y SMU are off line. Please restart the machine. (#3)	Both X and Y motors are not responding.	Restart the machine. Contact a Struers Service Technician if error persists.

Error message	Explanation	Action required
Warning		
The air pressure is too low (#27)	There may be a leak in the hose or the compressor maybe defective.	Check the compressed air system for possible cause.
Disc motor is overloaded (#16)	Load pressure is too high.	Reduce force value.
Emergency Stop is active	The Emergency Stop is pushed in. This is displayed until action is taken.	Release the Emergency Stop.
The removal rate is too low. The time limit was exceeded! (#22)	The stone is not dressed regularly.	Allow for automatic dressing during the process.
	The stone is not suited for the material to be ground.	Replace the stone with one suited for that application.
The sample mover motor is unable to move upwards after the process! (#23)	There may be a problem with the compressed air system.	Check the compressed air system.
	There may be an internal electrical problem.	Contact a Struers Service Technician.
Sample motor is overloaded!(#17)	Loading on the motor is too high.	Reduce the force value.

Message	Explanation	Action required
Messages		
The grinding stone must be replaced ! (#26)	Message received during the dressing process.	Stone is worn and must be replaced.
The process is already stopping. (#15)	Message if the Stop button is pushed when the process is already finished.	
Process in progress (#12)	Message if a button is pressed while the grinding process is running.	
The process is finished. (#14)	Message at the end of the process.	
The process was stopped through the emergency stop. Press **F1** to raise the sample mover motor.	The emergency stop has been pressed and the sample motor must be raised manually.	Press **F1** to raise the sample mover motor.
Safety guard not closed! (#11)	The grinding process can not start because the safety guard is not closed.	Lower the safety guard and start the process.

	Explanation	Action
Physical Observations/Problems		
No material removed	The grinding stone/diamond grinding disc is covered with material.	Dress the stone/disc. Replenish the cooling water volume.
	Insufficient grinding force.	Regulate the grinding force.
The specimen heats up	No cooling water.	Replenish the volume of cooling water in the recirculation unit.
		Cooling water pump is blocked.
Un-plane specimens	Stone not dressed.	Dress the stone. Select Removal/Time as the correct grinding mode
	Too few specimens in the specimen holder. Badly centred large specimen or specimen with too small a distribution in one direction.	Put blank specimen/s in the specimen holder.
Squeaking noise	V-belt slides.	Please contact a Struers Service Technician.
Hissing noise when the machine is in operation and/or is switched off	Leak in the air system.	Tighten the fittings and/or replace the defective air tubing.
Violent vibrations when the machine is running idle	The grinding stone is defective and out-of-balance.	Exchange the stone. Before doing so, try to turn the stone in relation to the turntable.
Machine very noisy when running idle	Axial bearing defective.	Please contact a Struers Service Technician.
	Spindle or motor bearings defective.	Please contact a Struers Service Technician.
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.

4. Technical Data

Subject		**Specifications**	
		Metric/International	**US**
Grinding Stone/ Disc	Rotational speed	1450 rpm	1450 rpm
	Size	356 mm	14.0”
	Power consumption	4 kW	5.4 Hp
Specimens	Speed	150 rpm	150 rpm
	Direction	CCW	
	Force	50-700 N	10-150 lbf
	Motor power consumption	0.37 kW	0.5 Hp
Software and Electronics	LC Display	320x240 pixels	
	Controls	Touch pads/Push-turn knob	
	Memory	EPROM/RAM/NV-RAM	
Compressed Air	Compressed air supply	6-10 bar	
Dimensions and Weight	Width	840 mm	33.1”
	Depth	980 mm	38.6”
	Height	1560 mm	61.4”
	Weight	400 kg	880 lbs

Subject		**Specifications**			
Electrical Data					
Supply Voltage	*Power consumption*	4.4 kW			
	No. of phases	3 (3L+PE)			
	Output, main motor	4.0 kW			
	Voltage/frequency:	*Max. Load:*			
	3 x 200 V / 50Hz	16.9 A			
	3 x 200 - 210 V / 60Hz CSA	15.7 A			
	3 x 220 - 230 V / 50 Hz	16.9 A			
	3 x 220 - 240 V / 60 Hz	15.7 A			
	3 x 380 - 415 V / 50 Hz	8.9 A			
	3 x 380 - 415 V / 60 Hz	10.3 A			
	3 x 460 - 480 V / 60 Hz CSA	8.5 A			
Mains Cable Recommendation	*Voltage/ frequency*	**Min. Fuse**	**Minimum cable size @ Min. fuse**	**Max. Fuse**	**Minimum cable size @ Max. fuse**
	3 x 200 V / 50Hz	25	3x2,5mm² + PE	40	3x2,5mm² + PE
	3 x 200 - 210 V / 60Hz CSA	25	3xAWG12 + PE	40	3xAWG12 + PE
	3 x 220 - 230 V / 50 Hz	25	3x2,5mm² + PE	40	3x2,5mm² + PE
	3 x 220 - 240 V / 60 Hz	25	3xAWG12 + PE	40	3xAWG12 + PE
	3 x 380 - 415 V / 50 Hz	20	3x2,5mm² + PE	40	3x2,5mm² + PE
	3 x 380 - 415 V / 60 Hz	20	3xAWG12 + PE	40	3xAWG12 + PE
	3 x 460 - 480 V / 60 Hz CSA	20	3xAWG12 + PE	40	3xAWG12 + PE
	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 A, 30 mA (or better) is recommended.				
Environment	Safety standards	Please refer to the Declaration of Conformity			
	Noise level(idle)	77dbA			
	Surrounding temperature	5-40°C			
	Humidity	Max. 95%RH			

Quick Reference Guide

Inserting the Specimen Holder

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

Removing the Specimen Holder

- Press upwards with your fingers to lift the specimen holder slightly. At the same time, press and hold down the flange with the heel of your hand.
- Using your fingers to support the specimen holder; lower it free of the coupling.
- Release the flange and completely remove the specimen holder.

Starting the Preparation Process

- Insert the specimen holder.
- Lower the safety guard.
- Enter the GRINDING menu and set/check the correct removal and/or time and force.
- Start the grinding process.

Stopping the Preparation Process

- When the time has elapsed, the grinding stone will automatically stop rotating and the specimen holder will return to its initial position.

Dressing the Grinding Stone

- Press **F2** for a single dressing of the grinding stone.

Dressing the Diamond Grinding Disc

- Mount 3 aluminium oxide dressing sticks in a sample holder and grind it for a few seconds.

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:	AbraPlan-20
Type No:	589
Machine Type:	Grinding 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, EN 349:1993+A2:2008, EN 1037:1995+A1:2008.
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:	AbraPlan-20
Type nr.:	589
Maskintype:	Slibe maskine

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 349:1993+A2:2008, EN 1037:1995+A1:2008.
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 47 CFR 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

Struers

Pederstrupvej 84
DK-2750 Ballerup
Denmark

AbraPlan-20

Struers

Spare Parts and Diagrams

Manual No.: 15897001

Date of Release 23.07.2013

AbraPlan-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.

The following is a list of the spare parts that may need replacement during the lifetime of the equipment.

To check the availability of other replacement parts, please contact your local Struers Service Technician. It may help identify the part by referral to its position number on the assembly drawings included in this manual.

Spare Part list for AbraPlan-20

Drawing	Pos.		Cat no.
15890045		**Sample motor, assembly**	
	20	Coupling	15490410
	10	GEAR MOTOR 3X200V 50HZ. painted	15499016
	10	GEAR MOTOR 3X220-230V 50HZ. painted	15499017
	10	GEARMOTOR. 3X380-415V 50HZ. painted	15499018
	10	GEAR MOTOR. 3X200-208V 60HZ.CSA.painted	15499019
	10	GEAR MOTOR 3X220-240V 60HZ.CSA.painted	15499020
	10	GEAR MOTOR. 3X380-415V 60HZ. painted	15499021
	10	GEAR MOTOR 3X460-480V 60HZ.CSA.painted	15499022
	60	Hose Adaptor 45° SVAD-P167GT	2NM10437
	40	Hose Adaptor. SVNV-M257.50	2NM10472
	40	Hose Adaptor. SVNV-M257.50	2NM10472
	40	Hose Adaptor. SVNV-M257.50	2NM10472
	40	Hose Adaptor. BVND-N027GT.100	2NM11027
	40	Hose Adaptor. BVND-N027GT.100	2NM11027
	40	Hose Adaptor. BVND-N027GT.100	2NM11027
	40	Hose Adaptor. BVND-N027GT.100	2NM11027
	50	Flexible Hose PMA PIST-17S.30, 0.4 m	2NU31200
15890021		**Motor for grindstone**	
	60	V-Belt SPZ/3 ø106	2JE10106
	10	Motor 3x220-240VD / 50Hz 4kW	2ME06205
	10	Motor 3x220-240VD / 50Hz 4kW	2ME06205
	10	Motor 3x220-240VD / 50Hz 4kW	2ME06205
	10	Motor 3x380VD/60Hz 4,0kW	2ME06386
	10	Motor 3x400VD/50Hz-480V/60 4kW	2ME06405
	10	Motor 3x208VD/60Hz 4,0kW CSA	2ME56206
	10	Motor 3x480VD/60Hz 4,0kW CSA	2ME56486
	30	Hose Adaptor. SVNV-M257.50	2NM10472
	30	Hose Adaptor. SVNV-M257.50	2NM10472

Spare Part list for AbraPlan-20

Drawing	Pos.		Cat no.
15890001		**AbraPlan-20, complete**	
	140	Down arm, 2pcs	15890930
	150	Top right arm, welded	15890900
	160	Top left arm, welded	15890905
	170	Flange bearing GFM-2528-21, 2pcs	2BG00089
	180	Flange bearing GFM-2023-07, 2pcs	2BG00088
	210	Safety guard AbraPlan-20, assy	15890081
	300	Arm, assembly	15890073
	340	Flushing gun, complete	15490009
	360	Rubber	15890508
	470	AbraPlan-10 Quick-release coupling, complete	15490007
15890006		**Casing with electrical, assembly**	
	110	35A 800V KBPC3508 BRIGDE RECT.	2VB30750
	140	Terminal block with spring	2XL00301
	145	Terminal block double with spring, grey	2XL00331
15890007		**Casing with motor, assembly**	
	100	Rubber disc Ø12/Ø26.4, 4pcs	11440069
	110	Rubber bushing	15090690
15890032		**Plate with PCB & pneumatic distribution**	
	30	PCB AbraPlan-20 A2, testet	15893002
	60	Pressure Regulator, 5-8.5 bar 1/4in	2YR00001
	70	Gasket, PVC O-1/8	2IF00011
	80	Throttle-sound absorber. RSS-111-M35-1/8	2YL00035
	100	Gasket, PVC 1/4"	2IF00012
	110	Banjo til quick-coupling ø5-1/8	2NF10034
	120	Banjo screw 1631-03-1/8"	2NF20080
	130	Quick release angle swivel connector ø5-1/8"	2NF10082
	150	Magnet vent. 3/2 24V DC 1/8	2YM10030
	210	3/2 solenoid valve 24VDC	2YM10124
	220	Sound absorber, SINTER 2931-M5	2YL00015
	240	Gasket, PVC M5	2IF00010
	270	Pressure nipple RTU PK3/3	2NF40242
	290	Neopren nipple ø36/ø47/ø54-2.5	2GK90457
	370	Air tube ø5/ø3.2 Superflex	2NU12445

Spare Part list for AbraPlan-20

Drawing	Pos.		Cat no.
15890083		**Stock removal unit, complete**	
	20	Self-lubricating bearing ø20/28x32	2BG32032
	40	Charnier for potentiometer	15490830
	120	Pin for rate measur. unit	15890800
15890082		**Control box, assembly**	
	10	Display, 320X240 w. white LED	2HD32024
	40	Main PCB f.AbraPlan-20, tested	15893000
	130	Pushbutton Head RVAT DG stainl.	2SA00400
	150	2 channel opt. encoder w. pressure 24p	2HR12411
15890081		**Safety guard assembly**	
	10	Hood for AbraPlan-20	15890441
	100	Brace of safety guard	15890410
	140	Straight Actuator AZ 17/170-B1	2SS10017
15890073		**Arm, assembly**	
	40	Diamond dresser/CDP8181-18/22	12660212
15490009		**Flushing gun, assembled**	
	10	Flushing head	15490535
	20	Tube, flushing guns	15490537
	25	Tube, internal, flushing guns	15490538
	30	Silicone hose ø8/ø12	2NU19208
	70	Push button	15490545
	80	Slide bearing.M.KR. 12x15x8/18x1.5	2BG00120
	120	Magnet 10x10x3 VACODYM 351 WZ	2LM00034
15490007		**Quick-release coupling, complete**	
	10	Quick-release coupling	15090009

Spare Part list for AbraPlan-20

Drawing	Pos.		Cat no.
15890011		**Box for tub, assembly**	
	20	Tub, assembly	15890057
	30	Sealing disc	15490512
	60 + 65	Cover for grindstone, assembly	15890008
	65	Cover for grindstone, welded	15890511
	60	Top of Grindstone cover	15890514
	70	Distance Bushing	15490511
	110	Disc for stone. Replaced by R5490006	15490006
	170	Elbow 87 for hose ø51(2") pipe socket ø50	2NG20587
	175	Drain tube, straight ø50x250	2NG25026
15090032		**Air connection, assembled**	
	40	Air filter, air regulation EAW3000-F02D-6	2YF00005
	90	Gasket, PVC 1/4"	2IF00012
	100	Nipple 2531-1/4-1/8	2NF40041
	110	Gasket, PVC O-1/8	2IF00011
	120	Banjo screw 1631-03-1/8"	2NF20080
	130	Banjo to quick-coupling ø5-1/8	2NF10034
	140	PVC-Hose, clear 13/32"-Ø10	2NU19313
	145	PVC-hose 10 mm	2NP00010
	150	Air tube ø5/ø3.2 Superflex	2NU12445
	160	Quick coupling	2NF10024
	170	End piece	2NF40071
	190	Angle Quick coupling, Ø8-1/4"	2NF10087
	200	Distance nipple.2525-1/4-1/4-27	2NF40181
15090040		**Bearing housing, assembled**	
	3	Ball bearing 6208-2RS1 ø40/80	2BK00120
	4	Angle contact bearing ø50/ø90x20	2BK30050
	5	Nilos-ring 7210AVH	2BK97210
	6	Disc spring for ball bearing 79.5x55.5x0.8.	2GF51026
	7	Locking ring J80 DIN 472	2ZL20800

Spare Part list for AbraPlan-20

Drawing	Pos.		Cat no.
15480018		**Stepmotor, assembled**	
	10	Stepper Motor assembl. with plug	15483532
	20	Bushing for magnet, 2LS00050	15480624
	30	Magnet ø6x2.5 NdFeB	2LS00050
	60	Distance piece F-F, M3x25mm	2GZ10325
	70	PCB for magnet SMU, tested	15483005
15890008		**Cover for grindstone, assembly**	
	20	INA-Sealing ring G 10X17X3	2II01017
	30	O-RING 12.42-1.78 72 NBR 872	2IO17817
	60	Screw with ball and spring. GN615-M10-KN	2TX91019
	90	Nozzle for dresser	15890522
15890010		**Casing, assembly**	
	200	Key Lock Switch AZM 170-02ZRKA 24V	2SS00007
	305	Neopren bushing ø53/ø64/ø75-2.5	2GK90459
	310	Hose nipple 2601-12-1/4	2NF40087
	320	Gasket, PVC 1/4"	2IF00012
	330	Ball valve MINIBALL ¼ in-¼ in internal	2YH03622
	340	Armed PVC HOSE 1/2" -ø12.5 for water.	2NU29316
	360	GEKA hose connection 1-2	2NF60000
15890013		**Contactor box, assembled**	
	30	Contactor CA4-5-0, 24V-50/60HZ	2KM04501
	35	Contactor CI4-5-01, 24VDC	2KM04502
	80	Contactor Danf. CI-25A/24VAC	2KM10641
	100	Auxiliary switch block for K1 CB-NO 037H0111	2KH00111
	110	Contactor CI 12 37H0032/13	2KM10232
	120	TRAFO 200-460V/24V+24V/200VA	2MT72034
	125	4.00A T FUSE GLASS 6,3x32 250V	2FU14200

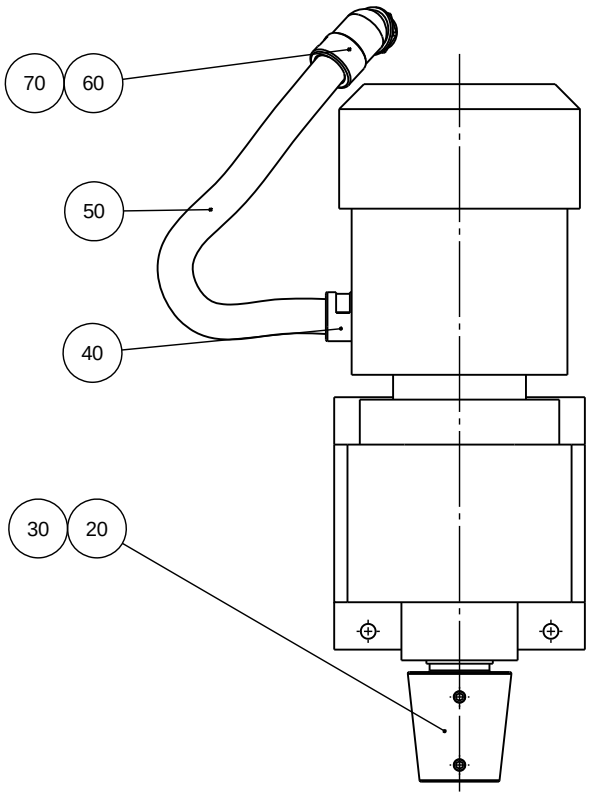
Spare Part list for AbraPlan-20

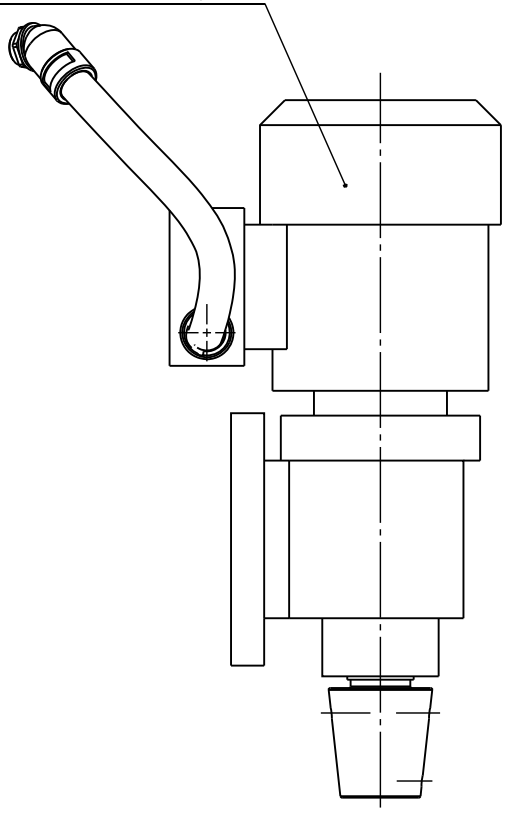
Drawing	Pos.		Cat no.
15890020		**Main mechanism, assembly**	
	90	REED-KONTAKT D-A73L	2KR30177
	140	Ball bushing KH4060	2BF20040
	150	INA-Sealing ring G 40x52x5	2II04052
	230	Distance ring-ball bearing	14590017
	240	Sensor read disc	15490568
	250	V-belt pulley SPZ/3 ø125	2JE10125
	270	Adapter 2012/ø35	2JE92035
	280	Pressure disc-V-belt	14590018
	330	Proximity sensor A01G142	2HQ00023
	340	Blocking valve R 1/4"	2YH60004
	350	Nipple 2531-1/4-1/8	2NF40041
	360	Banjo til quick-coupling ø5-1/8	2NF10034
	380	Gasket, PVC O-1/8	2IF00011
	390	Gasket, PVC 1/4"	2IF00012
	400	Quick-coupling, straight ø5-M5	2NF10011
	420	Terminal block with spring	2XL00301
	440	V-belt A XPZ/3V 1060mm	2JD01060
	450	Air tube ø5/ø3.2 Superflex	2NU12445
15890070		**Dresser, assembly**	
	20	Stepmotor, assembled	15480018
	30	Coupling ROTEX GS12-22ø6,35ø12	2JH00003
	60	Spherical ball Bearing 2201	2BK20012
	70	Locking ring J32 DIN 472	2ZL20320
	110	Locking ring A12 DIN 471	2ZL10120
	120	Pressure spring ø25.0 x ø2.0 Lo=195 22830	2GF10250
15890071		**Moving part of dresser, assembly**	
	30	Radial bearing SMS 777 20-26-15	2BG30088
	60	Locking ring A35 DIN 471	2ZL10350
	70	Locking ring A26 DIN 471	2ZL10260
	80	Cylinder pin, stainless 8m6x30 DIN 7	2ZS01530
	100	Cylinder pin, steel 6m6x25 DIN 7	2ZS02455
	110	Ball bearing,.61908-2RS1 ø40/62	2BK00118
	120	Locking ring J62 DIN 472	2ZL20620
	130	Wave spring Ø51X61X0.5 (5 pcs.)	2GF60038
	140	Tooth wheel Ulmer T43519	15890188

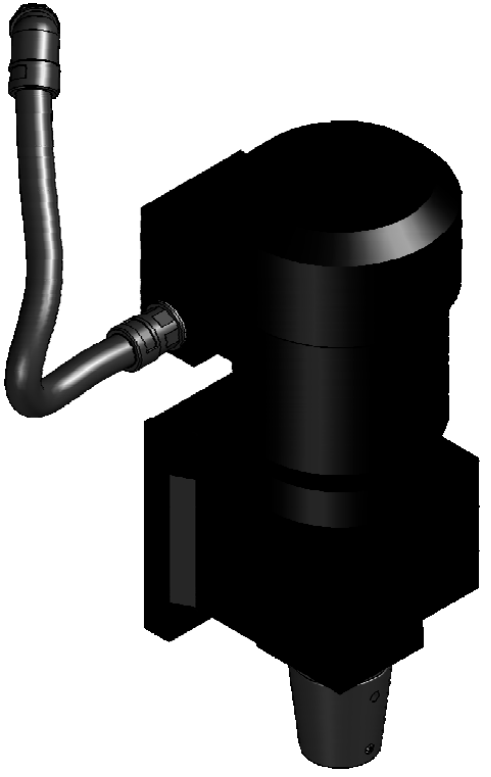
Spare Part list for AbraPlan-20

Drawing	Pos.		Cat no.
15890072		**Motor with gear**	
	10	Stepmotor, assembled	15480018
	30	Tooth wheel Ulmer T 16868	15890189
		Wireset+Cont.box f.AbraPlan-20	15893590
		Main switch KG32 K300E	2SE20317
		Terminal block with spring	2XL00301
		Terminal block double with spring, grey	2XL00331
		Contact block 1 NC 1/2 typeMTO	2SB10071
		Contact block 1 NO 3/4 typeMTI	2SB10072

Variant
M1: See AbraPlan-20, complete







20 30 Antisize grease
(Parting Lubricant 785FG)

20 Varmes op til 150°C og krympes på

30 Locked by Loctite 2701 (Låses med Loctite 2701)

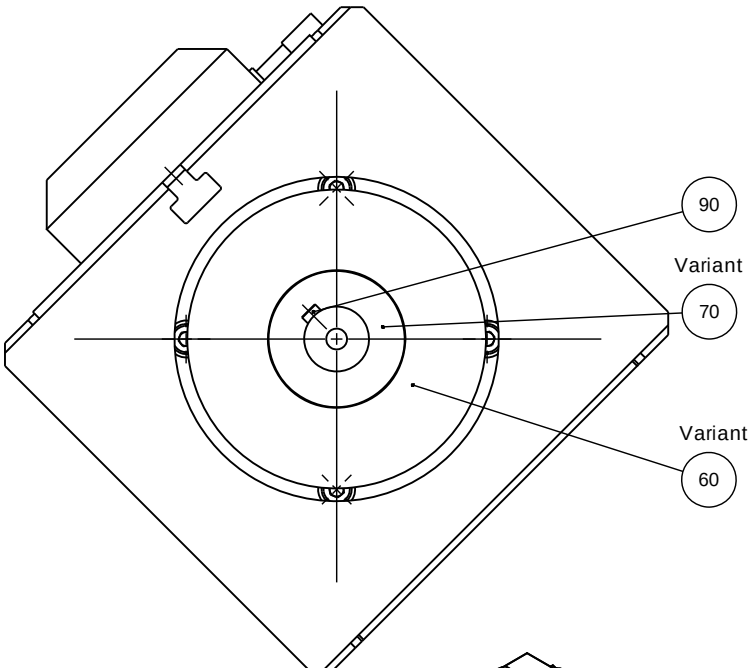
C	2013.07.31	PMA fittings changed, Pos40,50,60,70		SPE	2013.07.31	
A	28.11.2006			YKJ		
Revision	Crea. date dd-mm-yy	Revision description		Draw. Init	Appr. date dd-mm-yy	Appr. Init
		Material:	Scale: 1:3	Format: A3	Tolerance: DS/ISO 2768- mK	
					Surface treat.: None	

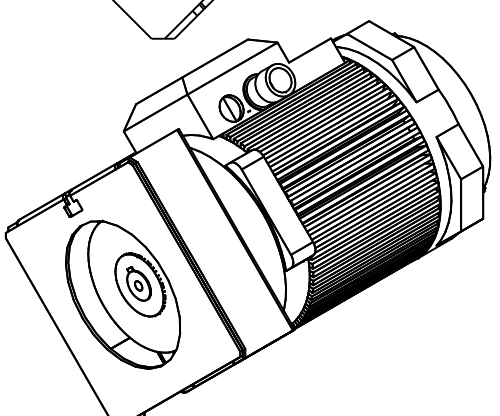
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone:+45 44 600 800
Fax. +45 44 600 804

ID: Description:

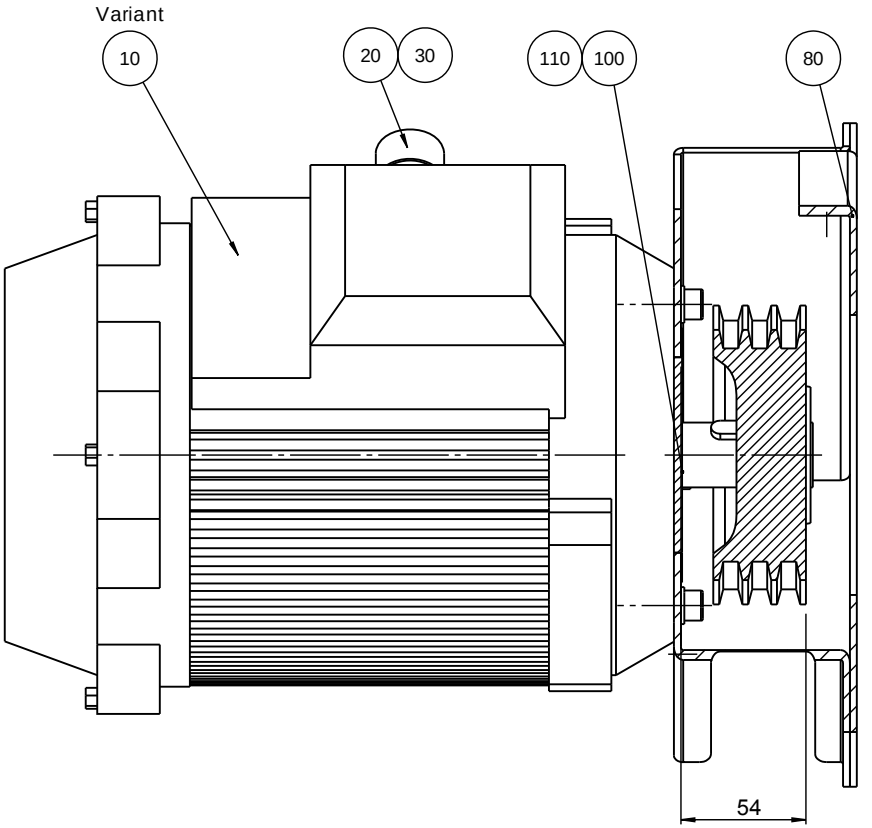
15890045 Sample motor, assembly

Rev: **C**





ISOMETRIC VIEW
SCALE 1:4



C	17.12.2008	Pos.80 15090500->15890540	SPE	17.12.2008	
A	22.12.2006		JFR		
Revision	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init

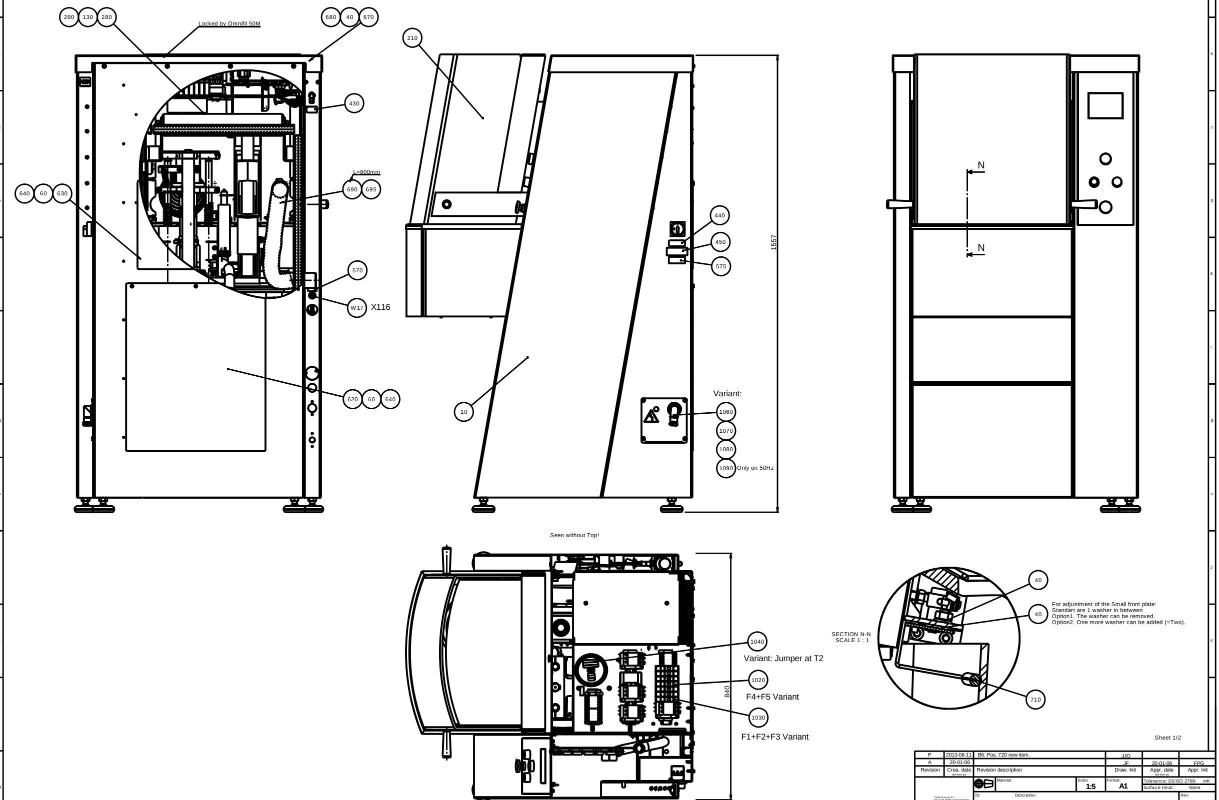
Struers
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone: +45 44 600 800
Fax: +45 44 600 804

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

ID: Description:

15890021 Motor for grindstone , assembly

Rev: **C**

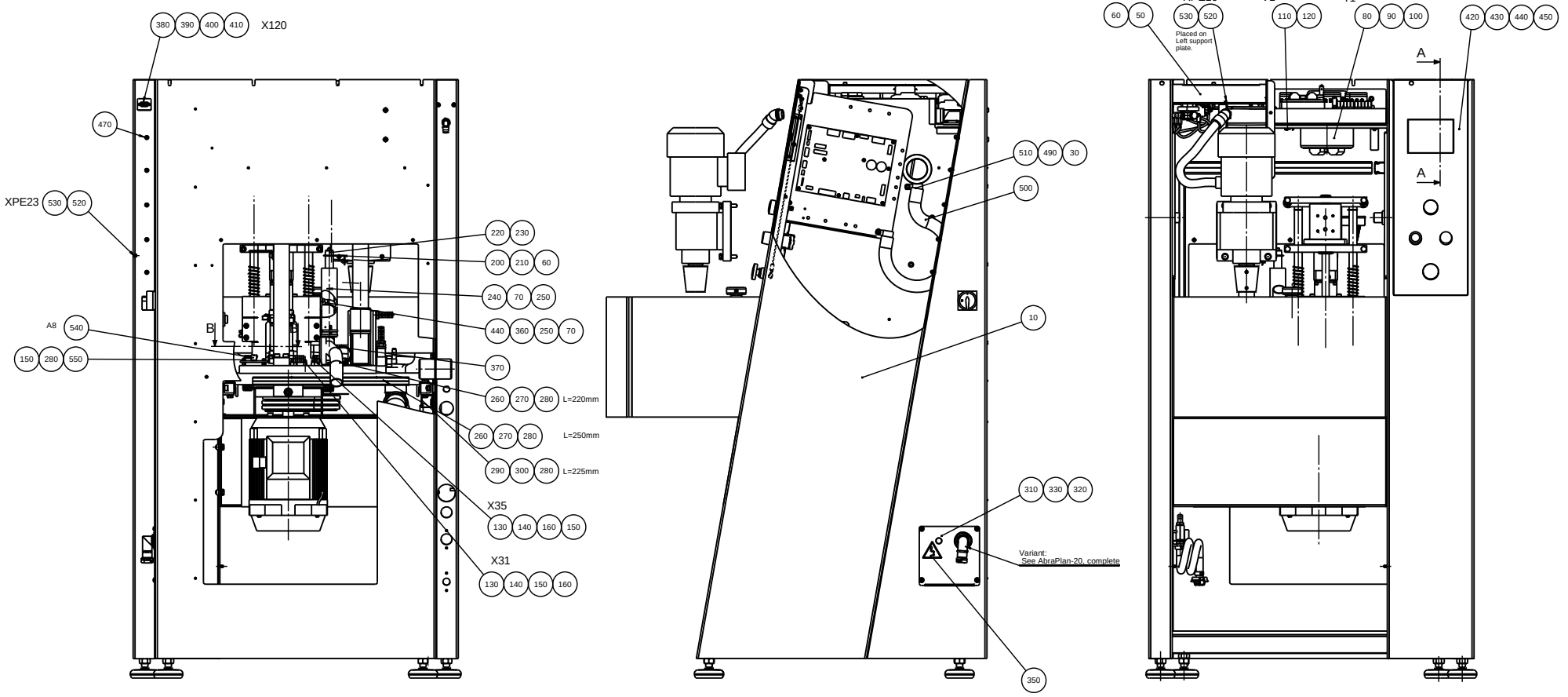


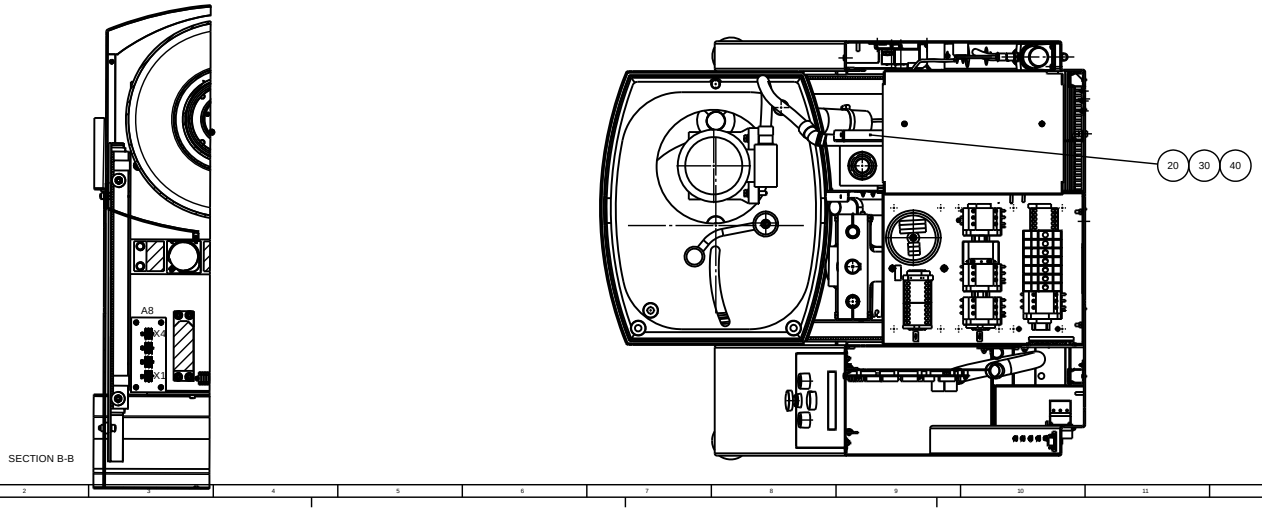
Sheet 1/2

Revision	Crea. date (dd-mm-yy)	Revision description	Draw. Init	Appr. date (dd-mm-yy)	Appr. Init
P	2013-06-11	B6: Pos. 720 new item.	JJO		
A	20-01-06		JF	20-01-06	FPG

Material: | Scale: 1:5 | Format: A1 | Tolerance: DS/ISO 2768- mK | Surface treat.: None

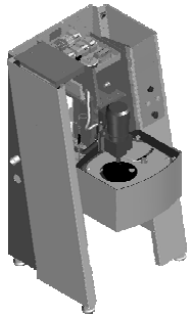
ID: Description: **15890001 AbraPlan-20, complete** | Rev: P





SECTION B-B

SECTION A-A



POS. NO.
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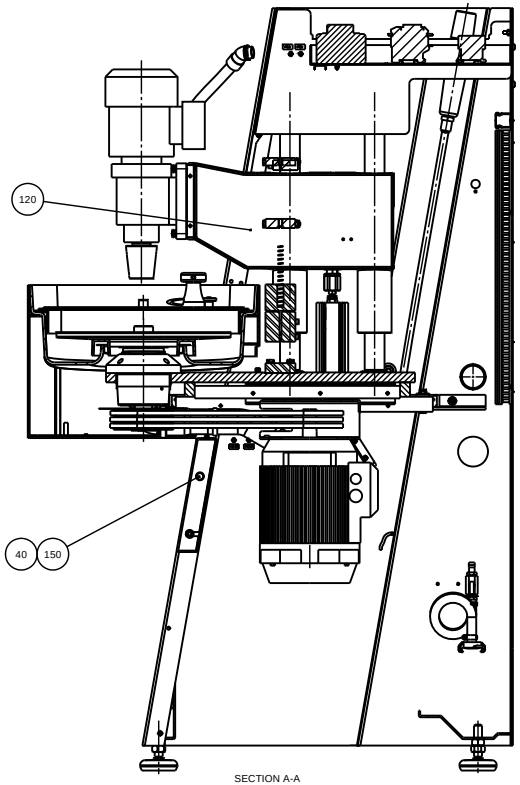
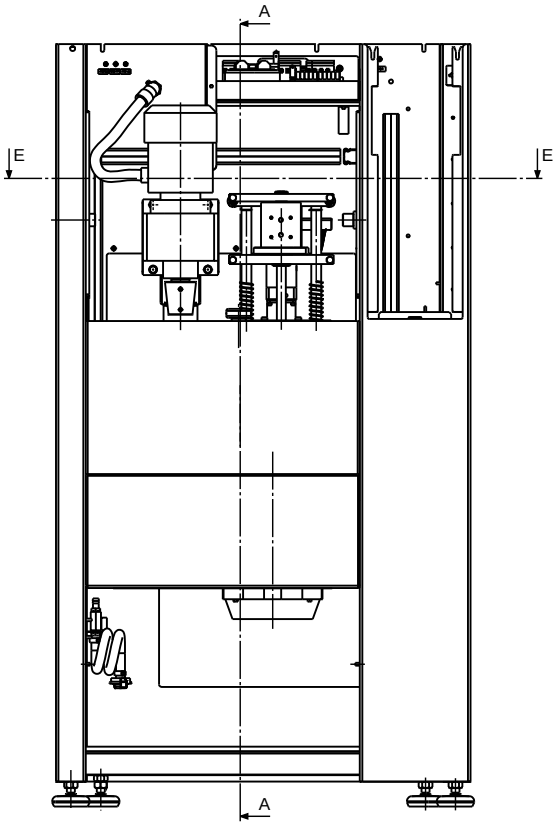
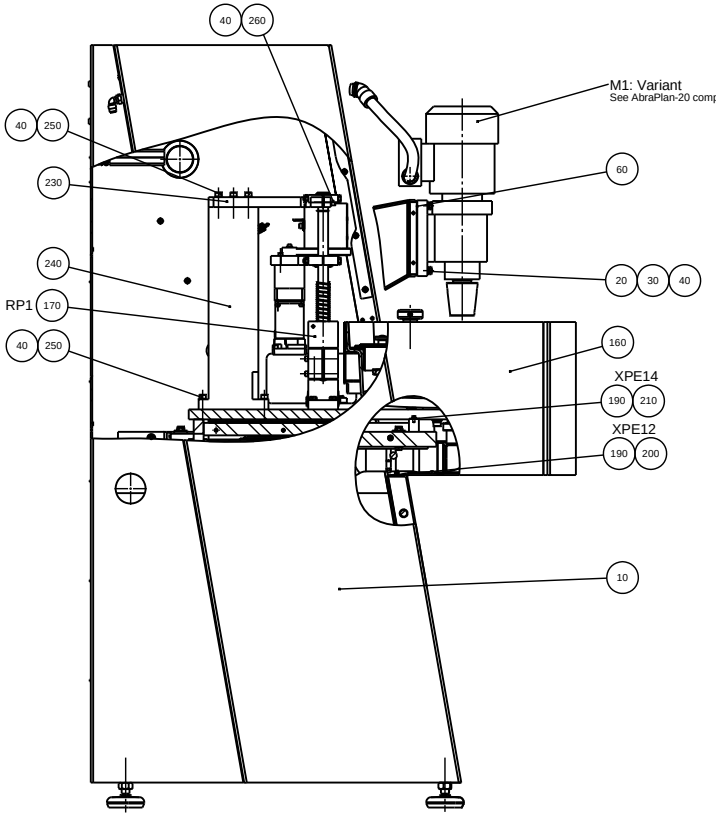
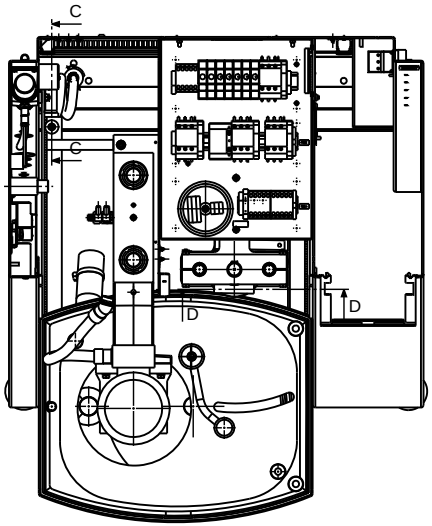
E	2013-06-12	D6: Pos. 190 -> pos. 250.		JJO	
A	12-01-06			JFR	12-01-06 FPG
Revision	Crea. date dd-mm-yy	Revision description		Draw. Init	Appr. date dd-mm-yy Appr. Init
		Material:	Scale: 1:5	Format: A1	Tolerance: DS/ISO 2768- mK
					Surface treat.: None
		ID:	Description: 15890006 Casing with electrical, assembly		Rev: E

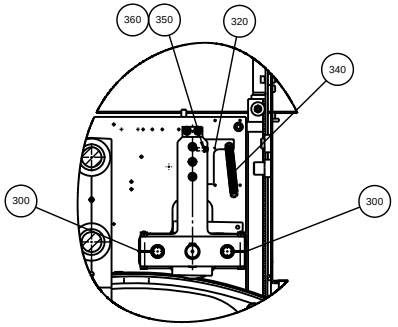


SECTION A-A

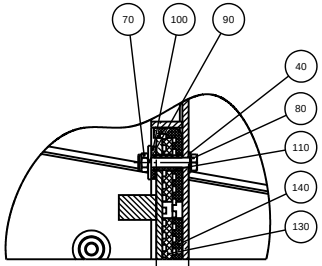






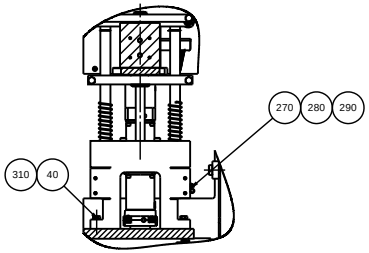


SECTION E-E



Must be tightened do this dimension
(the same must be tight on the opsite side)

SECTION C-C
SCALE 1 : 2



SECTION D-D

250 All screws pos. 250 must be tightened by torque wrench to 24Nm

POS. NO.	AM
10	
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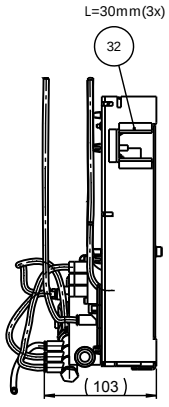
300	
310	
320	
340	
350	
360	

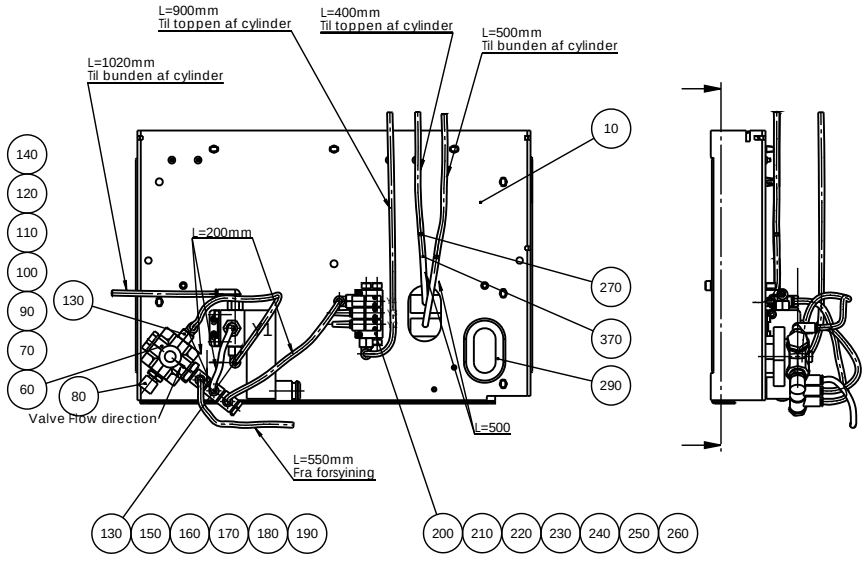
Revision	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init
G	2012.05.16	2TJ10825 removed	SPE	2012.05.16	JTV
A	11.01.2006		JFR	11.01.2006	FPG

Material: | Scale: 1:5 | Format: A1 | Tolerance: DS/ISO 2768- mK | Surface treat.: None

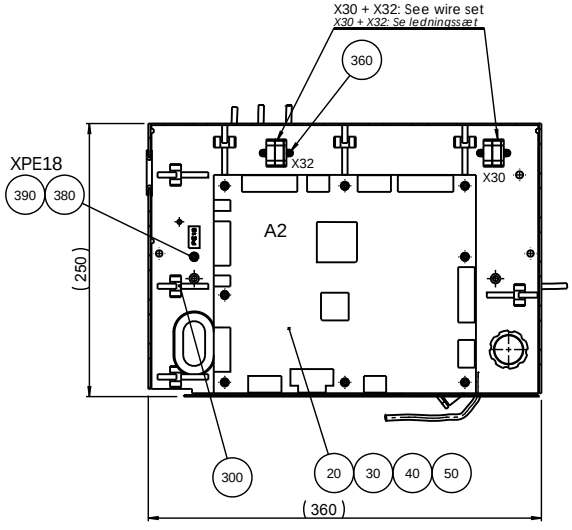
ID: 15890007 Casing with motor, assembly | Rev: G

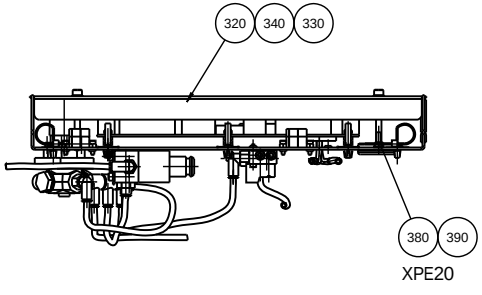
PNEUMATIC SIDE

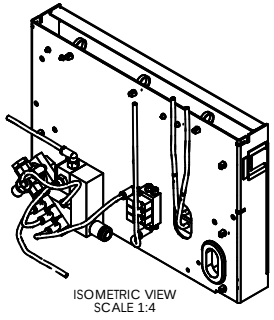




PCB SIDE







60 Indstilles paa 3 bar

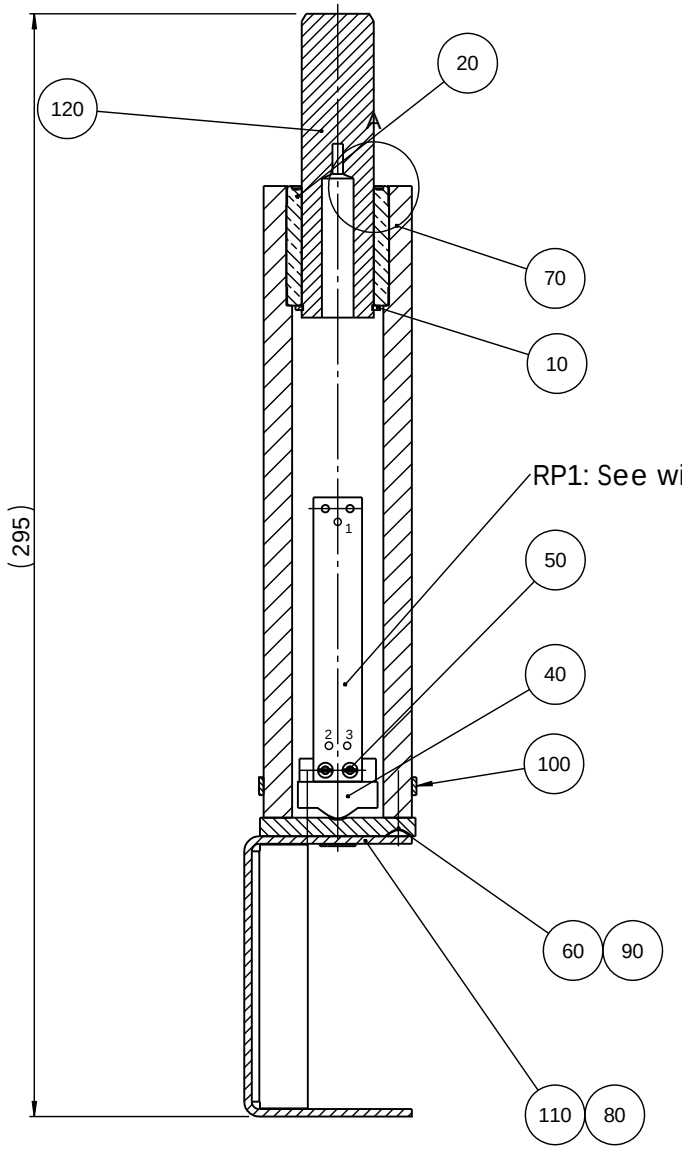
80 AAbnes 1/4 omgang

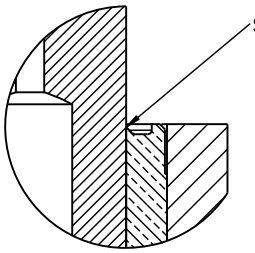
D	2009.04.16	L=500 til toppen af cyl. -> L=500 til bunden af cyl.	SPE	2009.04.16	
A	22.8.2006		JF	12-02-2007	FPG
Revision	Crea. date yyyy-mm-dd	Revision description	Draw. Init	Appr. date yyyy-mm-dd	Appr. Init

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

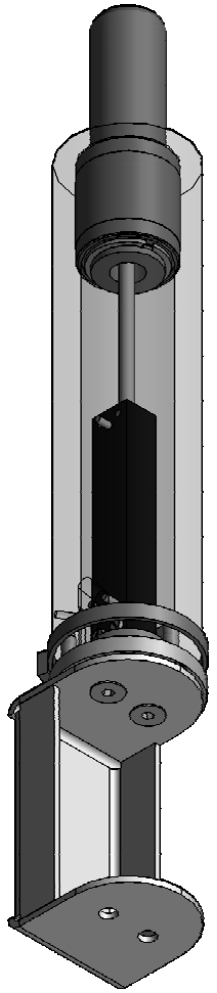
Material: | Scale: 1:5 | Format: A2 | Tolerance: DS/ISO 2768- mK | Surface treat.: None

ID: | Description: **15890032 Plate with PCB and pneumatic distribution, assembly** | Rev: **D**





DETAIL A
SCALE 2 : 1



Stock removal unit controlled by making three resistance measurements:

Benchmarks	Terms	Measurement
Between pin 1 and pin 3	-	1 kohm
Between pin 2 and pin 3	pin completely out	1 kohm ± 100 ohm
Between pin 2 and pin 3	pin pushed totally in	170 ohm ± 50 ohm

Aftagningsmåleren kontrolleres ved at lave tre modstandsmalinger:

Målepunkter	Betingelser	Måling
Mellem ben 1 og ben 3	-	1 kohm
Mellem ben 2 og ben 3	Stift helt ude	1 kohm ±100 ohm
Mellem ben 2 og ben 3	Stift helt inde	170 ohm ± 50 ohm

NB! Piston DO NOT lubricate
NB! Stempel må IKKE smøres

G	2012.10.08	Translated to english	SPE	2012.10.08	JTV
A	03-03-08		BMJ		
Revision	Crea. date yyyy-mm-dd	Revision description	Draw. Init	Appr. date yyyy-mm-dd	Appr. Init

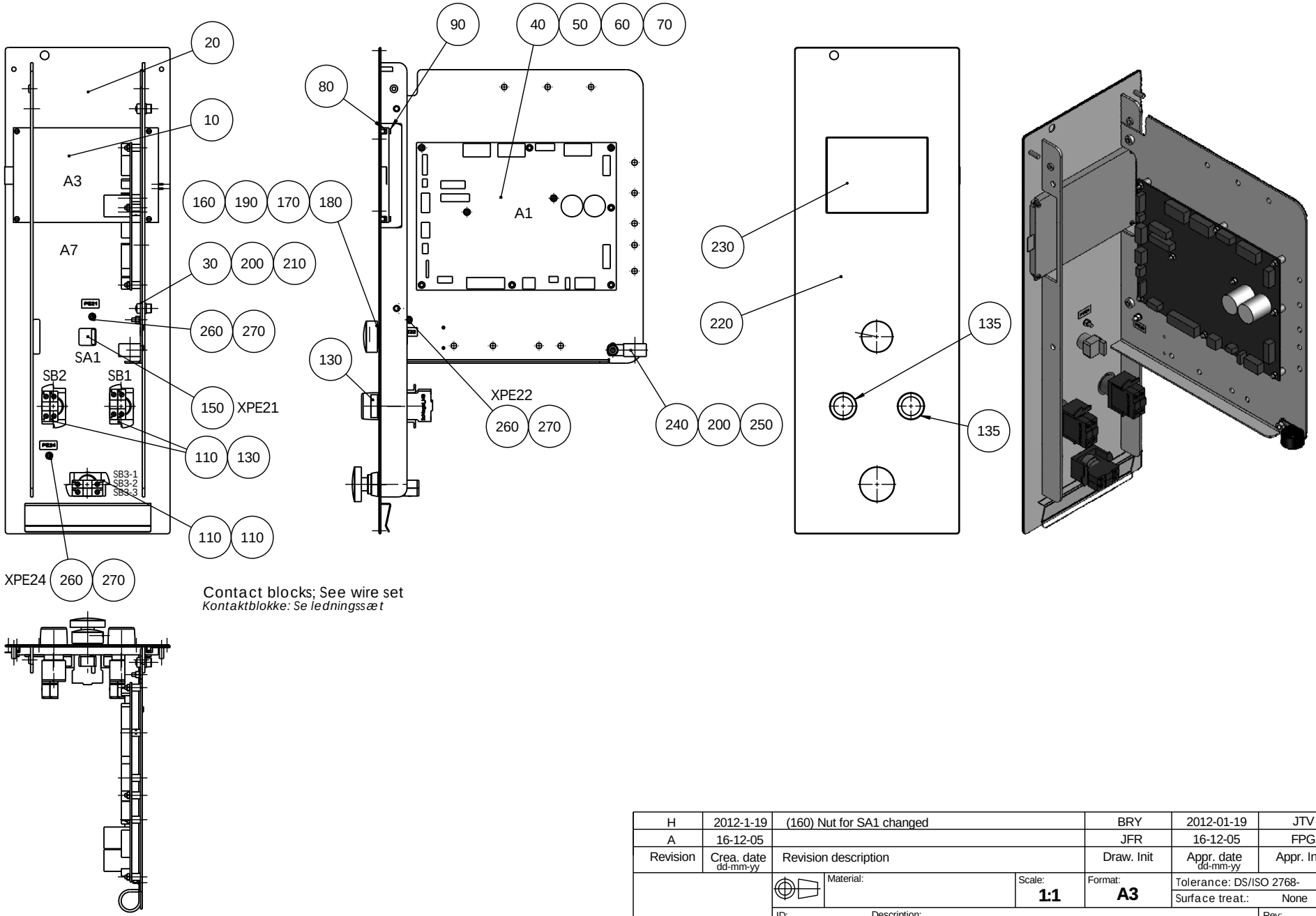
Material:
Scale: 1:1
Format: A3
Tolerance: DS/ISO 2768- mK
Weight : g

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

ID: Description:

15890083 Stock Removal unit, assembled

Rev: **G**



Contact blocks; See wire set
Kontaktblokke: Se ledningssæt

POS. I

H	2012-1-19	(160) Nut for SA1 changed	BRY	2012-01-19	JTV
A	16-12-05		JFR	16-12-05	FPG
Revision	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init

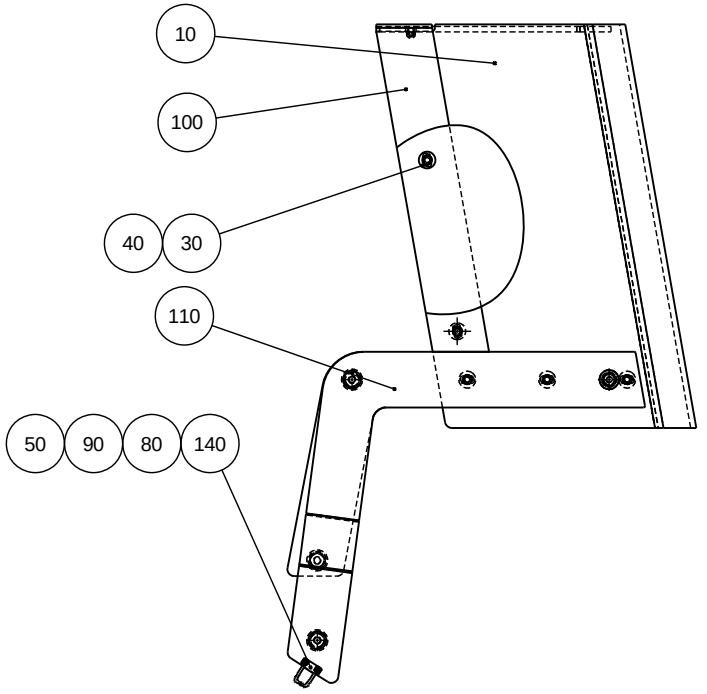
Material:
Scale: **1:1**
Format: **A3**
Tolerance: DS/ISO 2768- -
Surface treat.: None

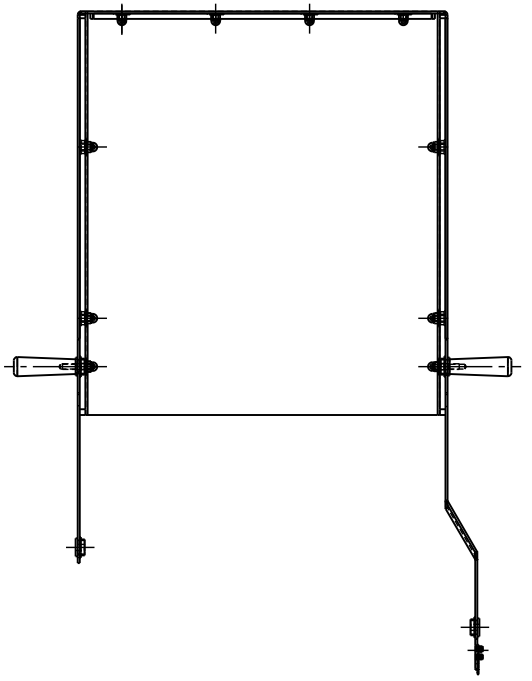
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone:+45 44 600 800
Fax: +45 44 600 804

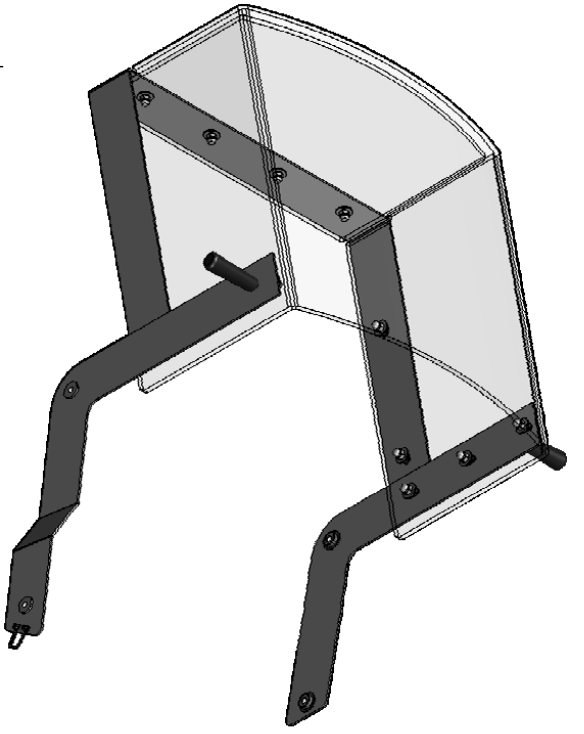
ID: Description:

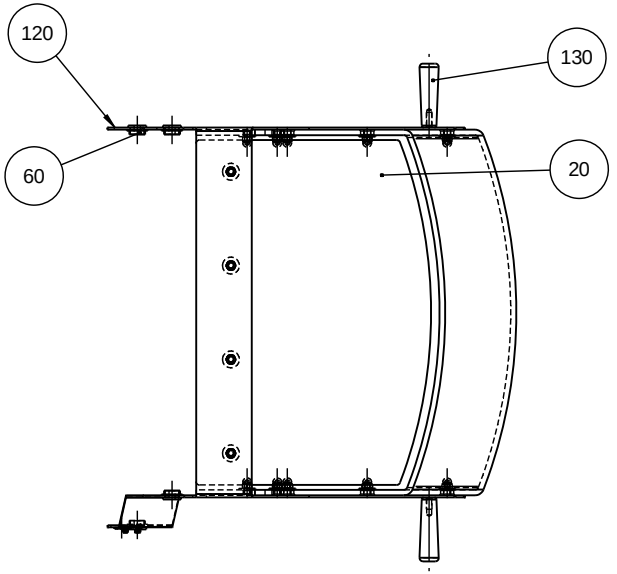
15890082 Control box, assembly

Rev: **H**









40 Clamping torque: 2Nm.
Use Loctite 243

30 Round edges against plastic.

C	2010-12-20	Pos 30 exchanged and drawing updated	JTV	2010-12-20	JTV
A	2007-07-22		JFR		
Revision	Crea. date yyyy-mm-dd	Revision description	Draw. Init	Appr. date yyyy-mm-dd	Appr. Init

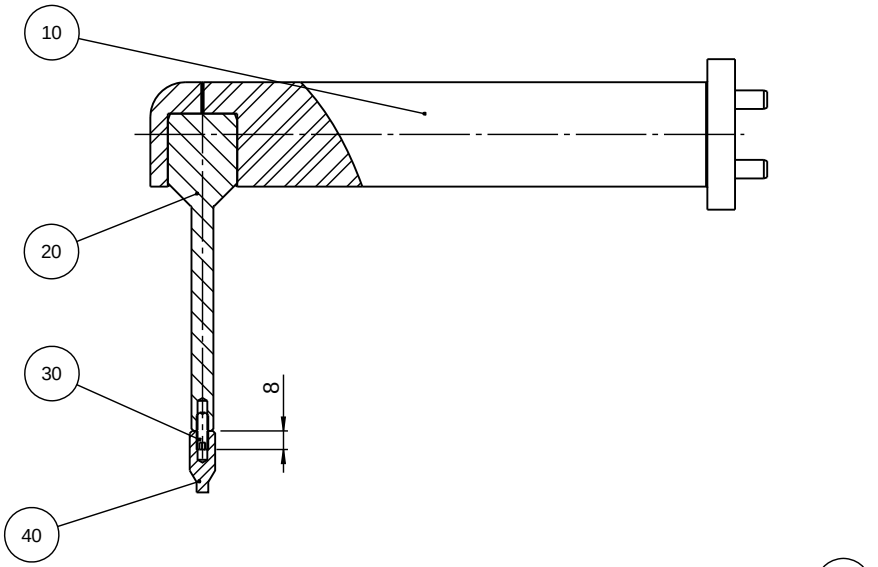
Struers
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone: +45 44 600 800
Fax: +45 44 600 804

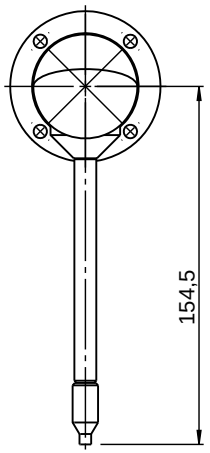
Material:
Scale: 1:7
Format: A3
Tolerance: DS/ISO 2768- mK
Surface treat.: None

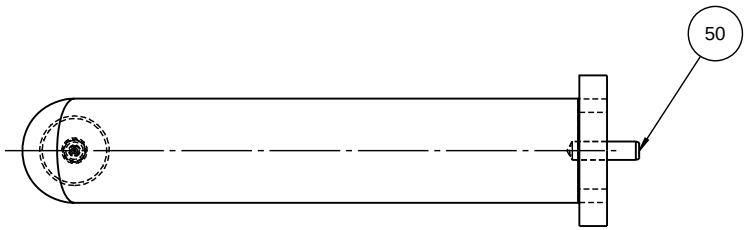
ID: Description:

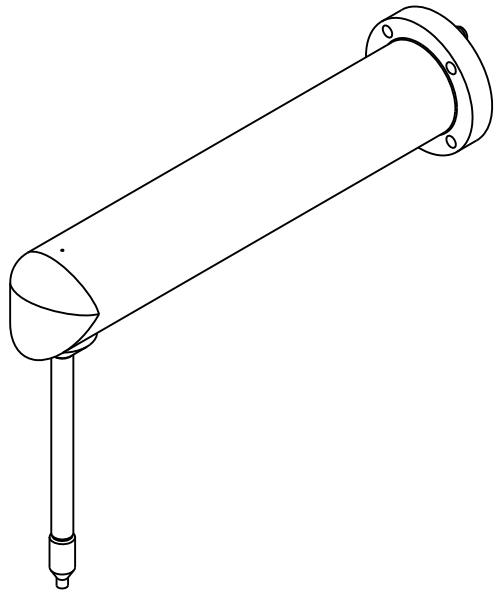
15890081 Safety guard AbraPlan-20, assembly

Rev: **C**









ISOMETRIC VIEW

30 20 Locked by Omnifit 200M (Låses med Omnifit 200M)

F	2009.10.13	P20 15890112->15890783, P40 15890161->12660212	SPE	2009.10.13	
A	2006.08.08		FPG	2006.08.08	FPG
Revision	Crea. date yyyy-mm-dd	Revision description	Draw. Init	Appr. date yyyy-mm-dd	Appr. Init

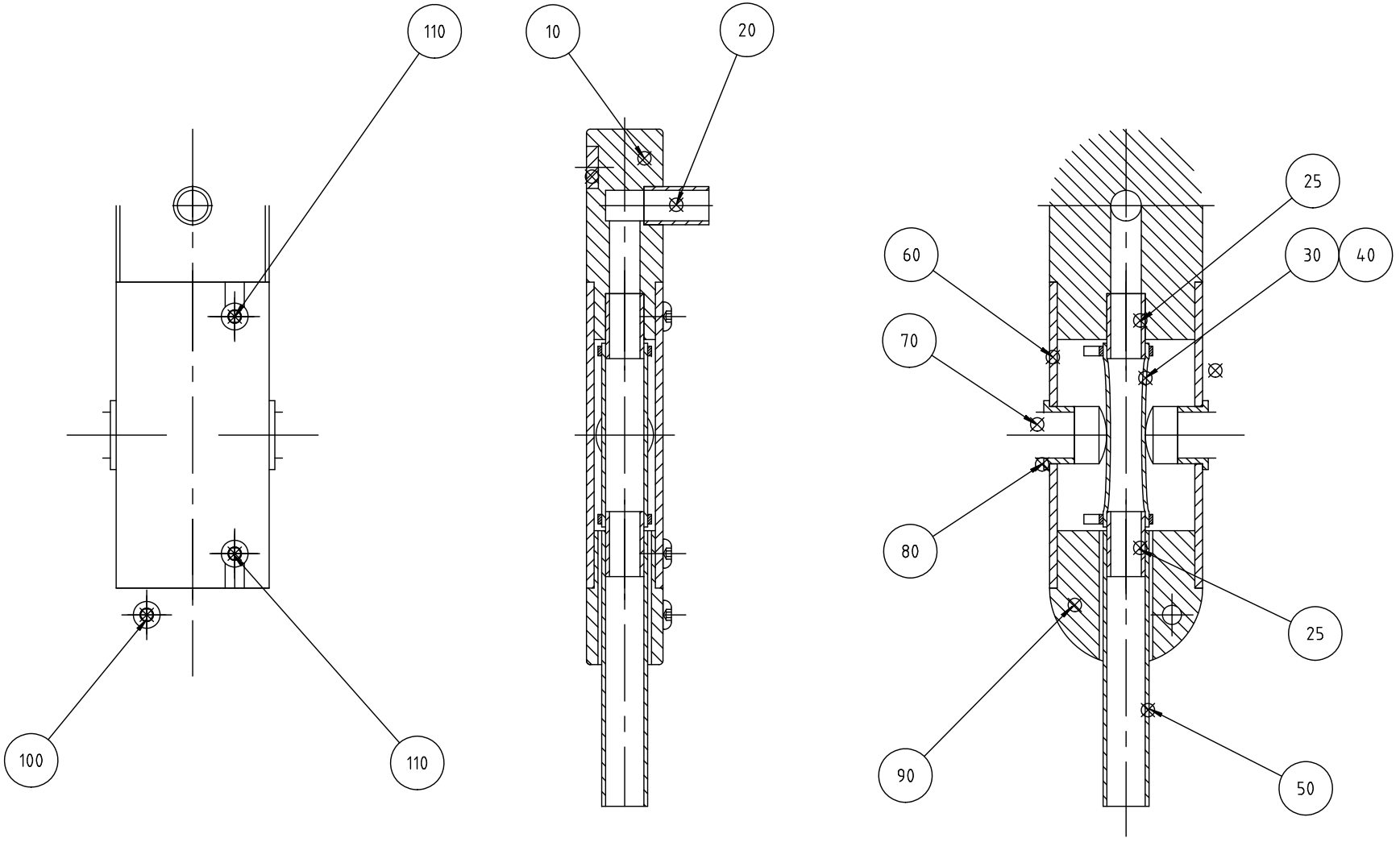
Struers
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone:+45 44 600 800
Fax: +45 44 600 804

Material:	Scale: 1:2	Format: A3	Tolerance: DS/ISO 2768- mK
			Surface treat.: None

ID: Description:

15890073 Arm, assembly

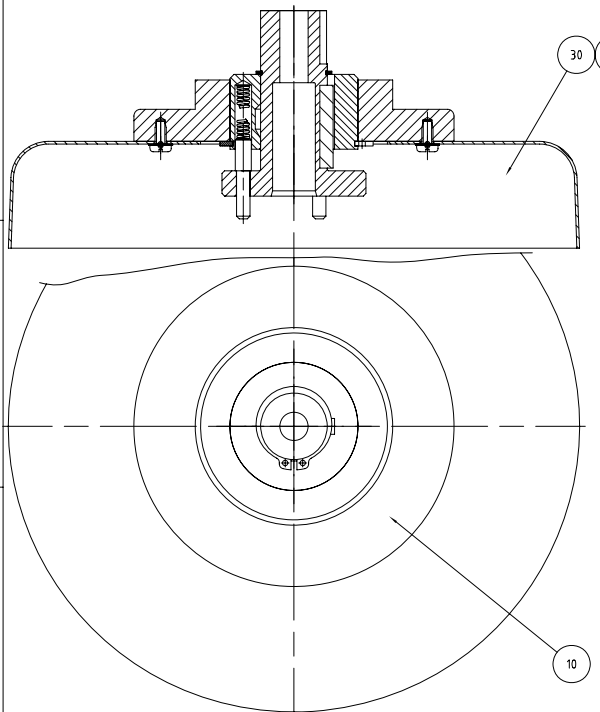
Rev: **F**

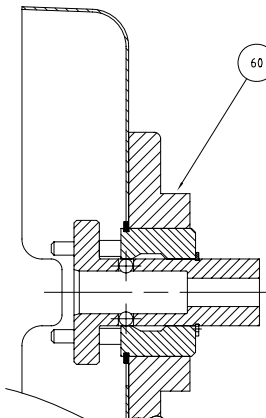


Matr.:	Overfl.beh.: Nej	Målforhold: 1:1	Ikke ang. tol. efter DS/ISO 2768– mK	
Struers	Projektionsmetode			Dato / Sign.
			Tegn:	141200 BRY
			Kontr.	141200 KLB
Spulepistol, monteret		Erst.: 549–0009 C		

C: Pos. 10+120 changed to 15490065.
2009.03.20 SPE

B. 2 stk pos. 20 –> pos. 25
010601 BRY/KLB

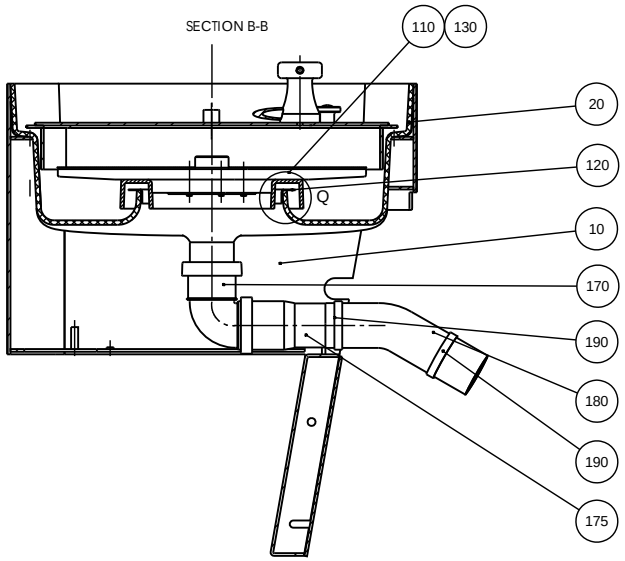




B. Pos. 20 (dæmperskive) fjernet. 020101 BRY/KLB
C: Pos.10: 15090007 –> 15090009. 051101 BMJ/JTV

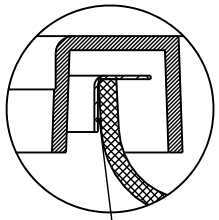
Matr.:	Overfl.beh.:	Målforhold: 1:1	Ikke ang. tol. efter DS/ISO 2768- Date / Sign.
Struers	Projektionsmetode		Tegn: 160800 BRY Kontr.: 160800 KLB
Opspændingsenhed, mont. AbraPlan-10			Erst.: 549-0007C

SECTION B-B



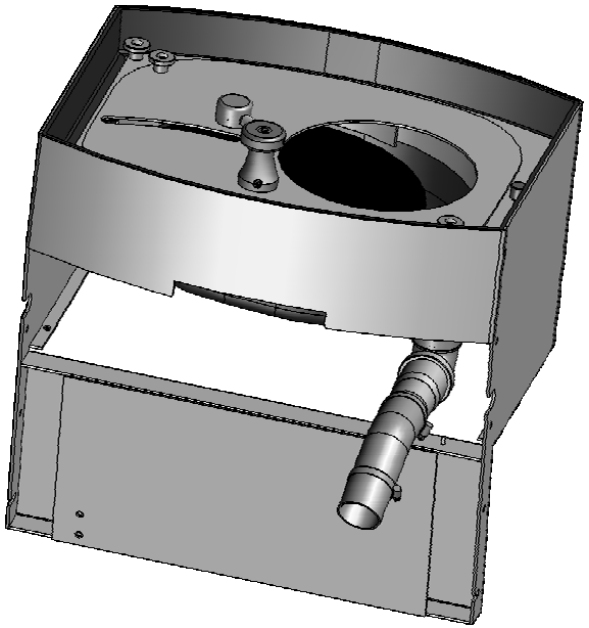
Afkortes til 160mm

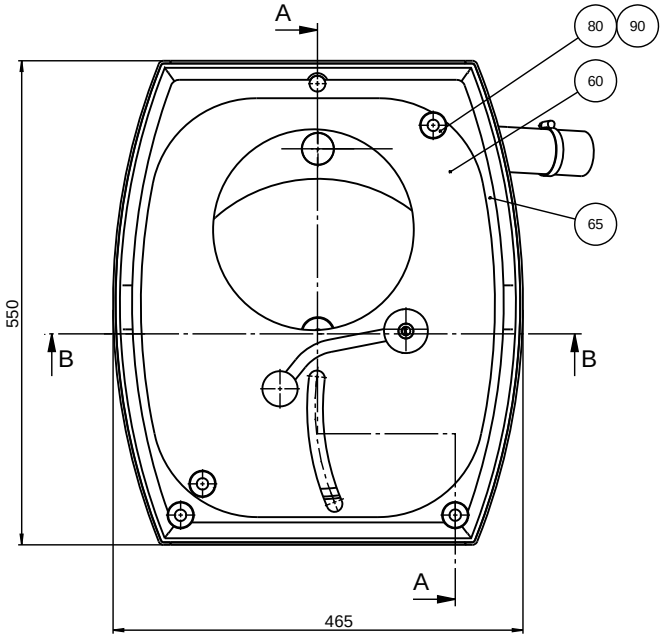
DETAIL Q
SCALE 1 : 1



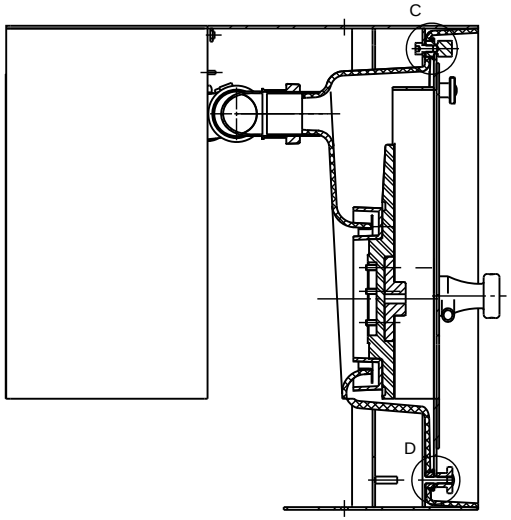
Degreased with alcohol.
Glued with silicone 515 all the way around.

Affedtes med sprit.
Limes med silicone 515 hele vejen rundt.

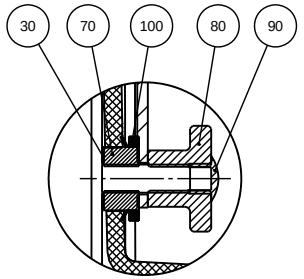




SECTION A-A
SCALE 1 : 4

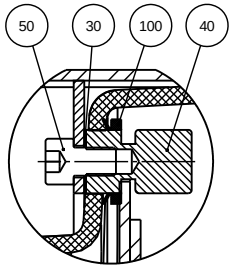


DETAIL D
SCALE 1 : 1



DETAIL C
SCALE 1 : 1

Locked by
Omnifit 50



POS. NO.
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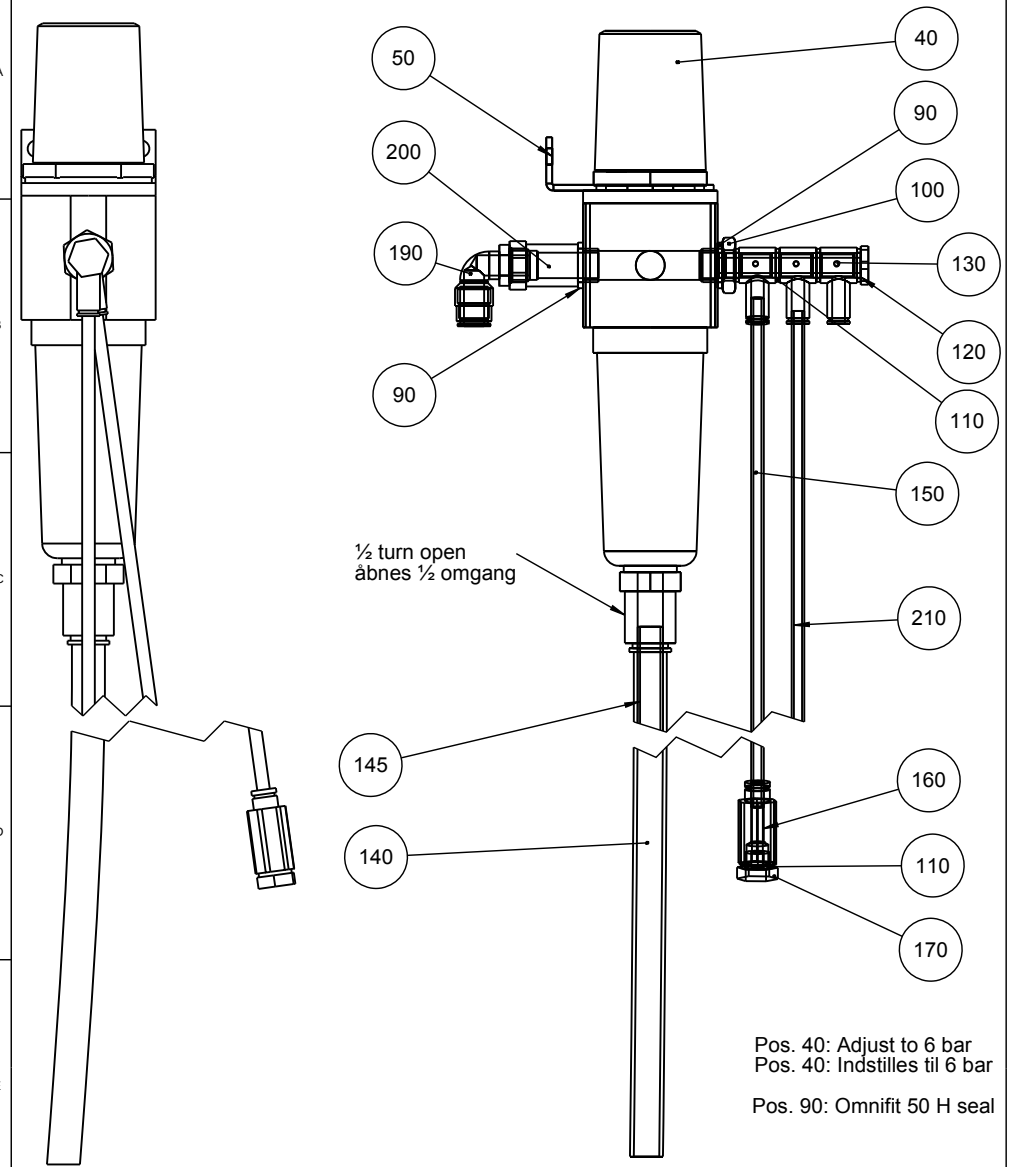
G	2012-01-24	B,7: Glue regulatory	JJO		
A	20.12.2005		JFR	20.12.2005	FPG
Revision	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init

Material:
Scale: 1:4
Format: A2
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: 15890011 Box for tub, assembly
Description:
Rev: G



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

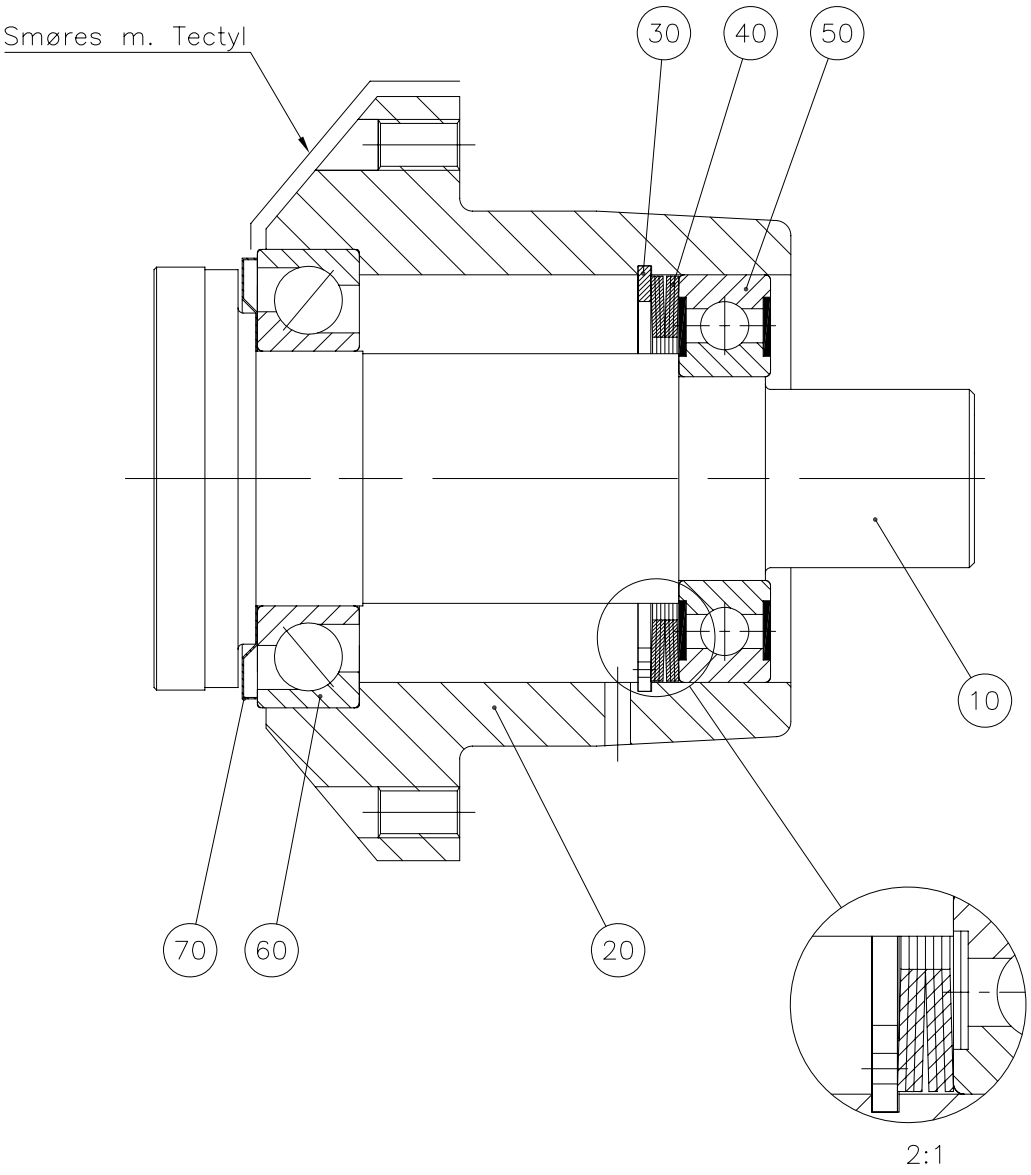
Tolerance: DS/ISO 2768 - mK

Surface treat.: None

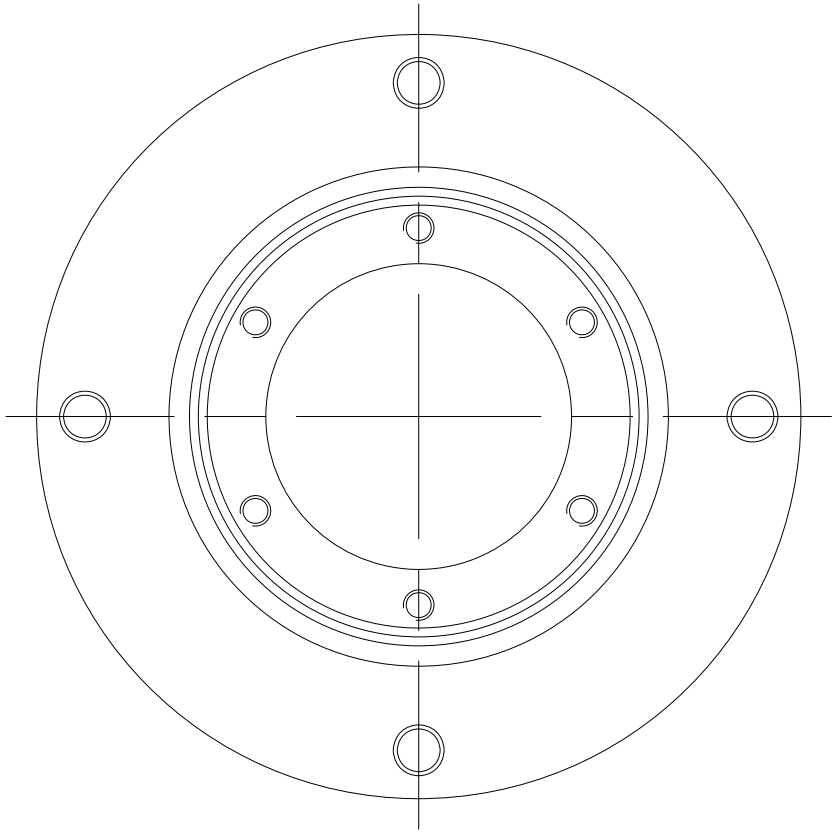
ID: Description:

15090032 Air connection, assembled

Rev: E



2:1



60 Alvanina Grease EP2

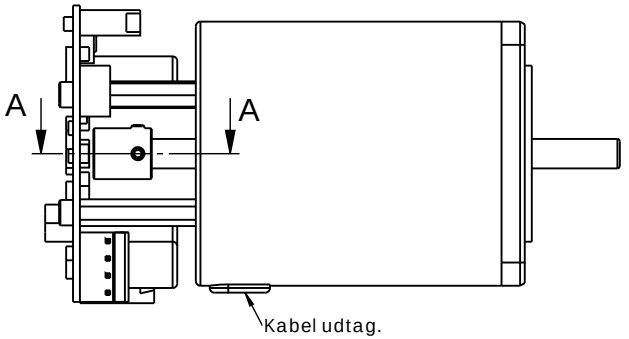
A: Vinkelkontaktleje vendt korrekt; 250400/KLB

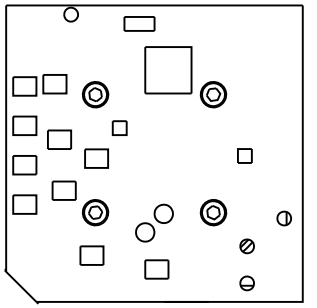
Matr.:	Overfl.beh.:	Målforhold:	Ikke ang. tol. efter DS/ISO 2768–
Struers	Projektionsmetode	1:1	

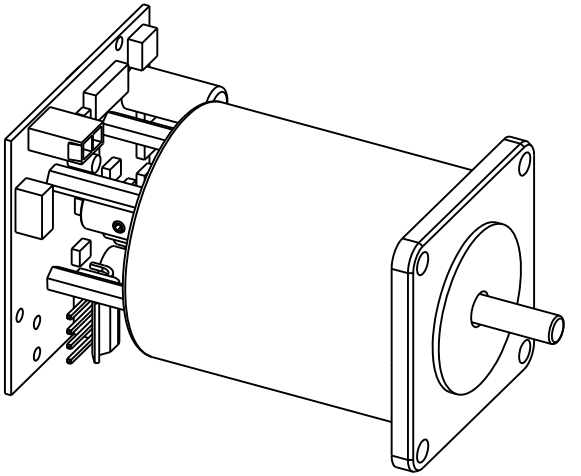
	Dato	Sign.
Tegn:	011199	BRY
Kontr.	011199	KLB

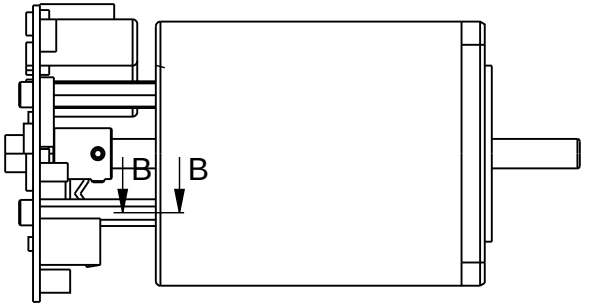
Lejeopbygning, monteret

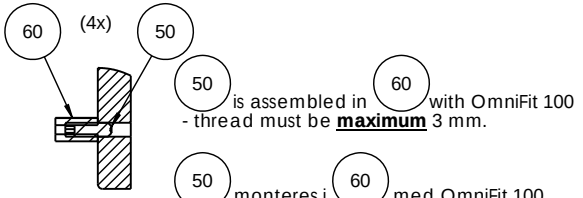
Erst.: 15090040A



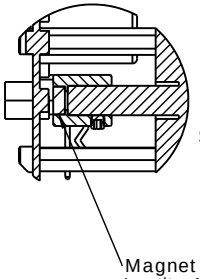




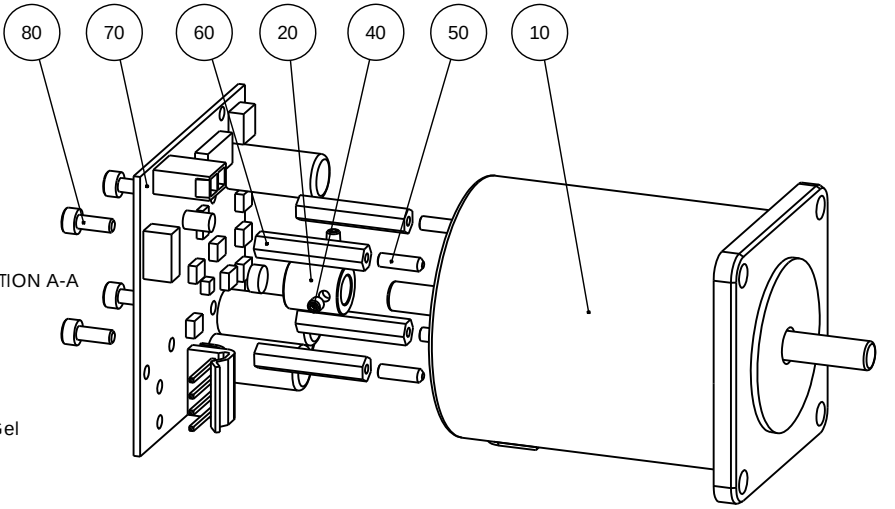




SECTION B-B



SECTION A-A



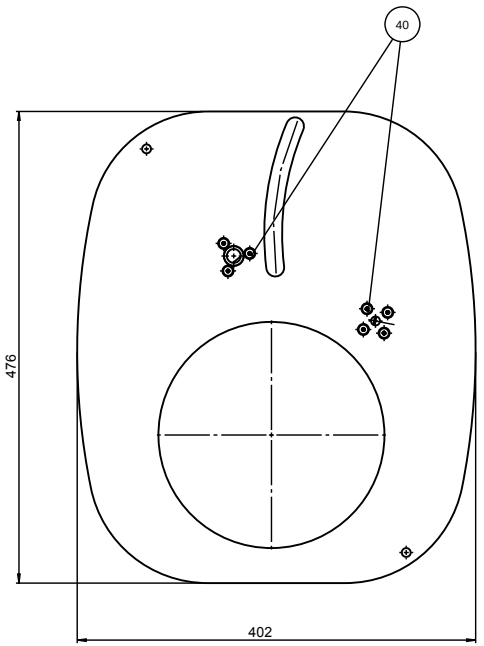
POS. NO.	AMOUNT	DRAW. NO.	NOTE
10	1	15483532 Stepmotor, assembled with plug	
20	1	15480624 Bushing for magnet	
40	2	2TI10303 MSP skrue M3x3 A2	
50	4	2TI10310 Msp skrue M3x10 DIN916 70A2	
60	4	2GZ10325 Afstandsstag 6-KT M3x25	
70	1	15483005 SMU PCB+magnet, testet	
80	4	2TR50308 MC skrue M3x8 A2	

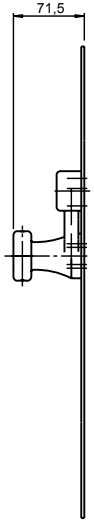
J	15.08.2008	Text for assembling of pos. 50 and 60 added.	SPE	15.08.2008	
A	13-03-08		CJE	27-11-07	AKR
Revision	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init

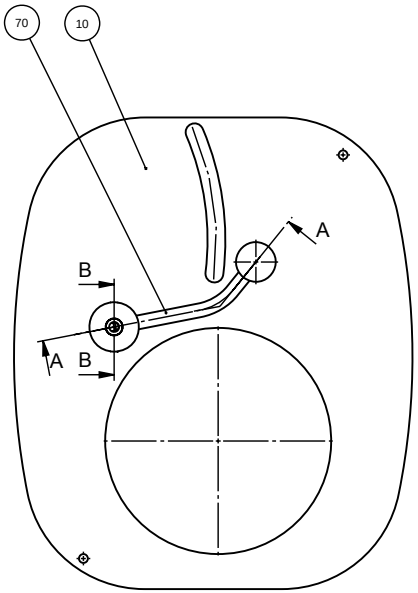
Struers
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone:+45 44 600 800
Fax: +45 44 600 804

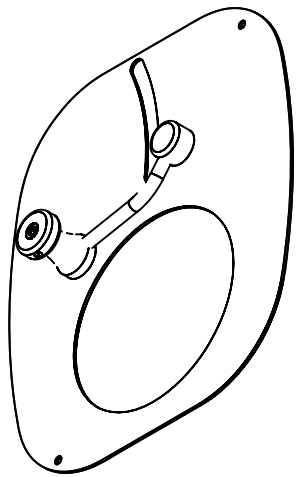
Material:
Scale: 1:1
Format: A3
Tolerance: DS/ISO 2768- mK
Surface treat.: None

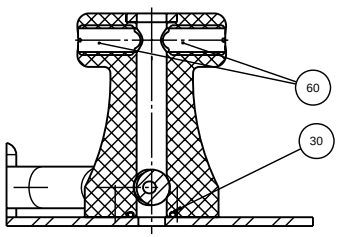
ID:
Description: **15480018 Print og stepmotor, monteret**
Rev: **J**



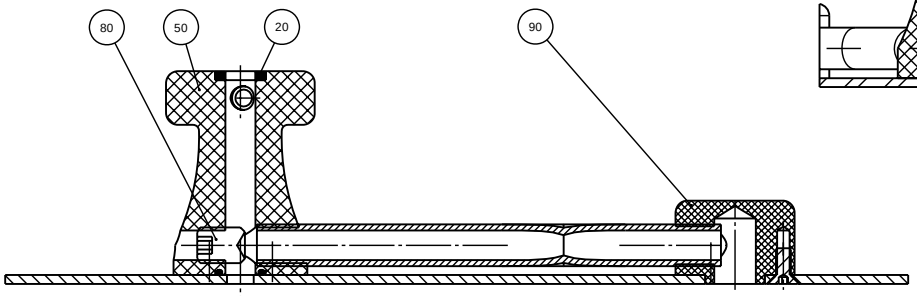








SECTION B-B
SCALE 1 : 1



SECTION A-A
SCALE 1 : 1

70 Must be sealed to pos. 50 and pos. 90 by Omnifit Seal 50 H

60 80 Adjusted according doc. 15897507 and sealed with Omnifit 50H

C	13.11.2007	Changed pos.10 (15890510→15890514)	JFR	13.11.2007	PPL
B	5.7.2007	Completely changed	JF	5.7.2007	MD
A	20.12.2005		JF	20.12.2005	FRG
Revision	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init

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

Material:
Scale: 1:3
Format: A2
Tolerance: DS/ISO 2768-
Surface treat.:

ID:
Description: 15890008 Cover for grindstone, assembly
Rev: C

Right back side

X116
See wire set
Se ledningssæt

SECTION A-A

SECTION B-B

XPE17
XPE19
XPE15
XPE7
XPE9
XPE11
XPE13
XPE4
XPE5

YS1
See wire set

QS1: See wire set

l=507mm
l=530mm
l=120mm
l=1140mm
l=65mm
l=125mm

height 50

(1530)

DETAIL C

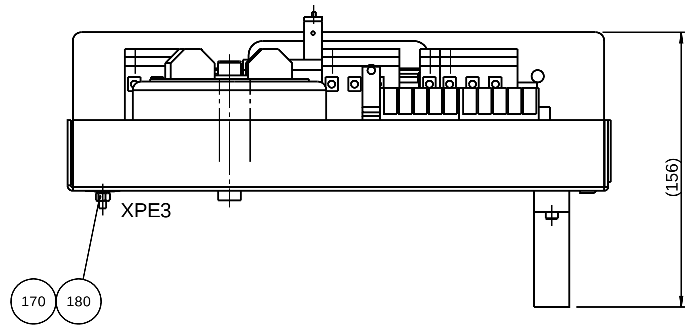
ISOMETRIC VIEW
SCALE 1:10

30 Pos 30 to be adjusted 50 0/+5mm from the floor to the edge of the cabinet (see section A-A).

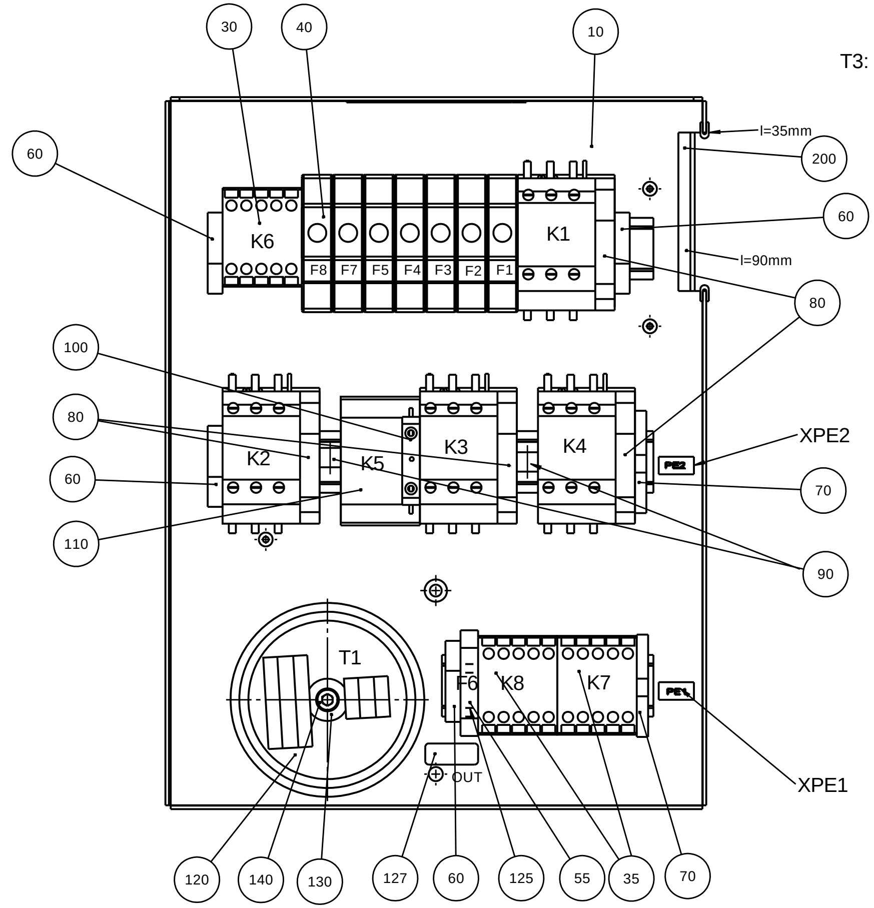
K	2013-06-14	F6: Pos. 200 removed . Text added.	JJO		
A	29-02-08		SPE	15.01.2006	FPG
Revision	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init

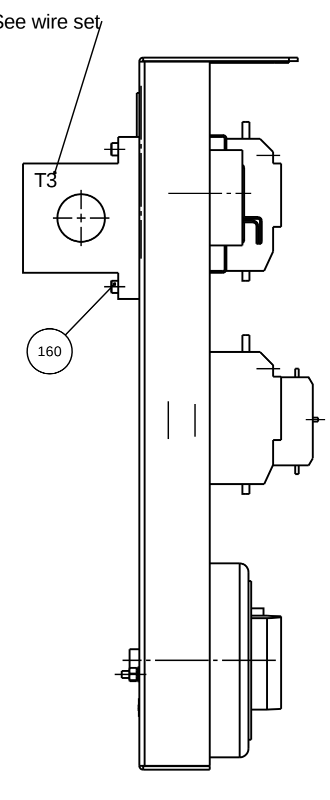
Material: | Scale: 1:5 | Format: A1 | Tolerance: DS/ISO 2768- mK | Surface treat.: None

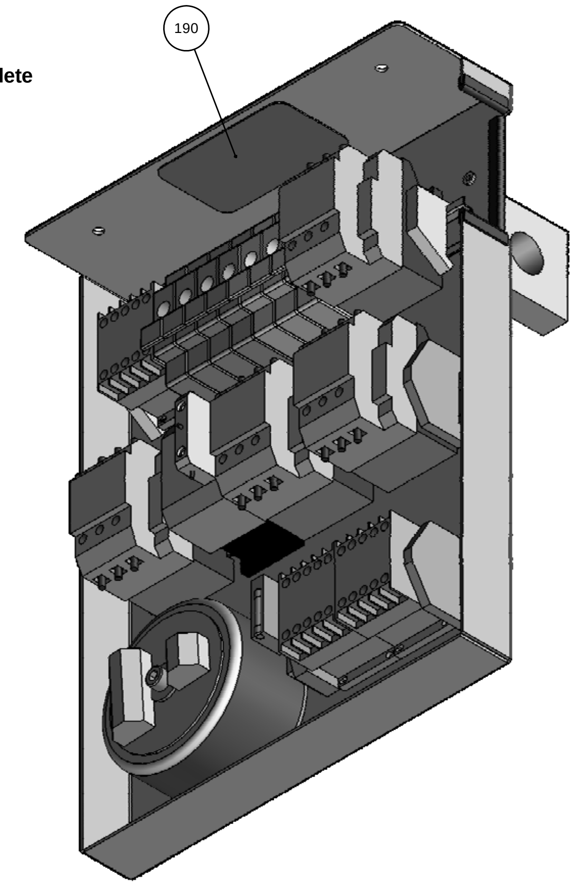
ID: 15890010 | Description: Casing, assembly | Rev.: K



Variants:
Jumper on T1: See AbraPlan-20, complete
F1-F8: See AbraPlan-20, complete

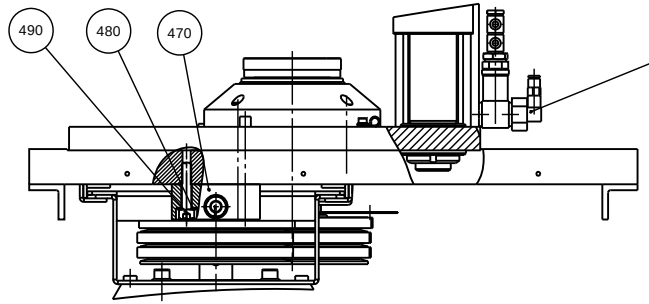


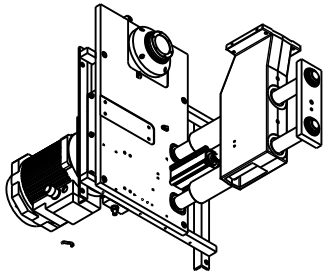


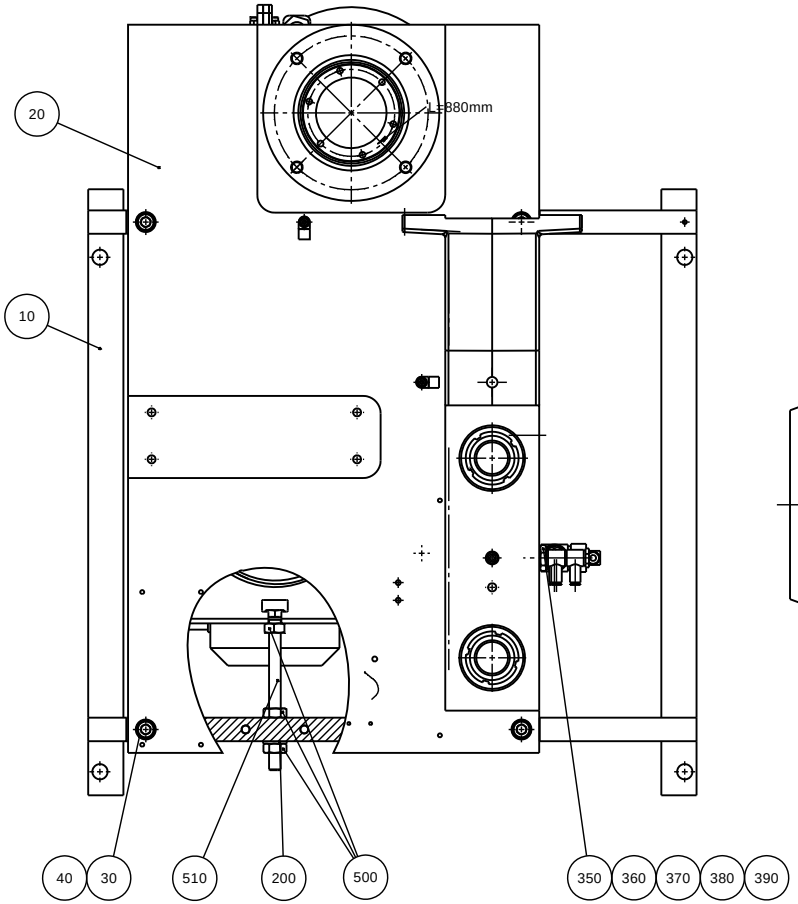


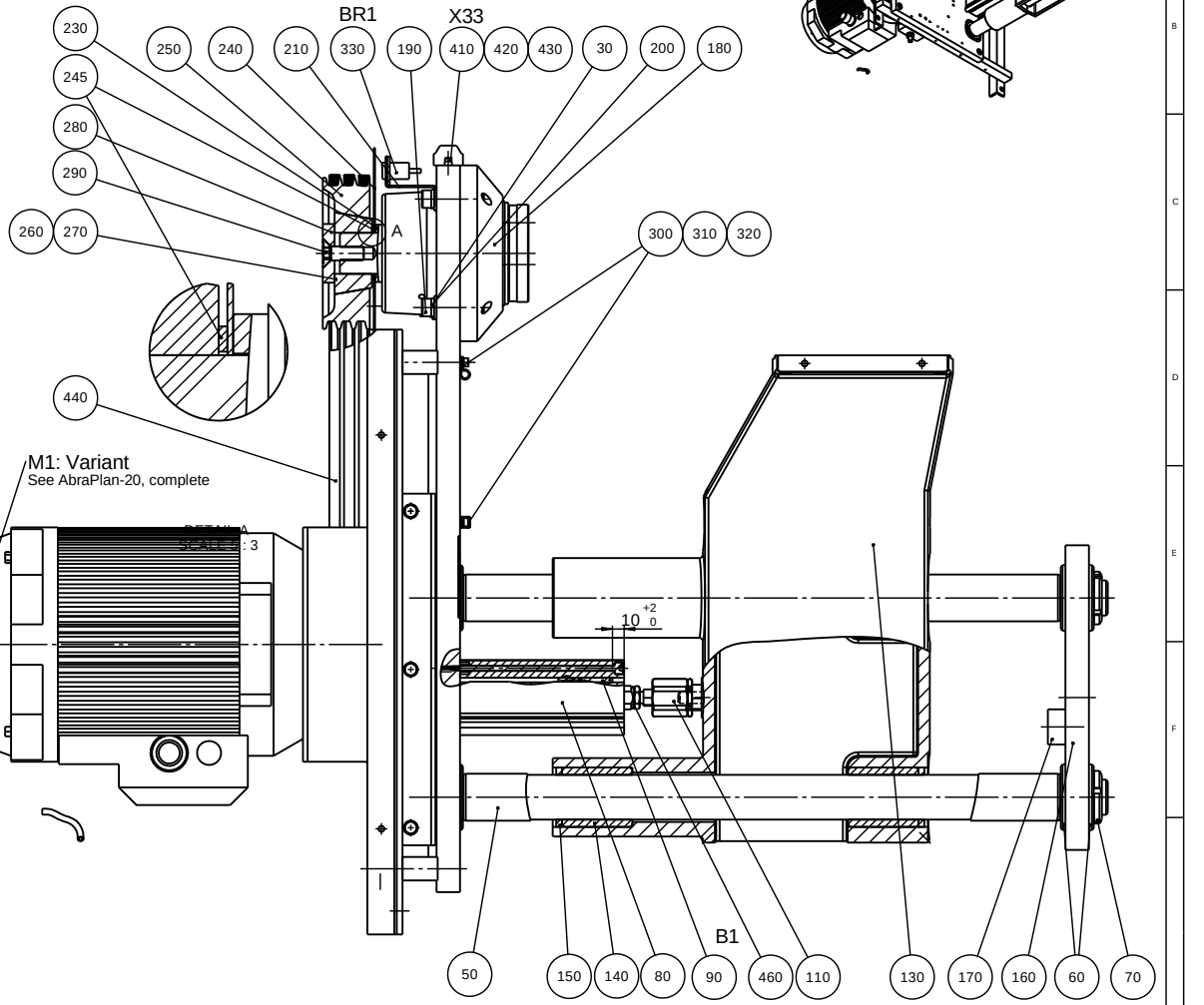
J	2013-03-22	1 x 3-pole fuse holder -> 3 x 1-poles.	BRY		AKR
A	2006.03.23		JFR	2006.03.23	FPG
Revision	Crea. date yyyy-mm-dd	Revision description	Draw. Init	Appr. date yyyy-mm-dd	Appr. Init

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: **15890013 Contactorbox, assembled**			Rev: **J**









140 Smøres med Albida EP2

290 330 Låses med Loctite 222

G	2012-05-08	P245 added. P290 changed	JTV	2012-05-15	JTV
A	2005-12-22		JF	2005-12-22	FPG
Revision	Crea. date yyyy-mm-dd	Revision description	Draw. Init	Appr. date yyyy-mm-dd	Appr. Init

Material:

Scale: **1:10**

Format: **A2**

Tolerance: DS/ISO 2768- mK

Surface treat.: None

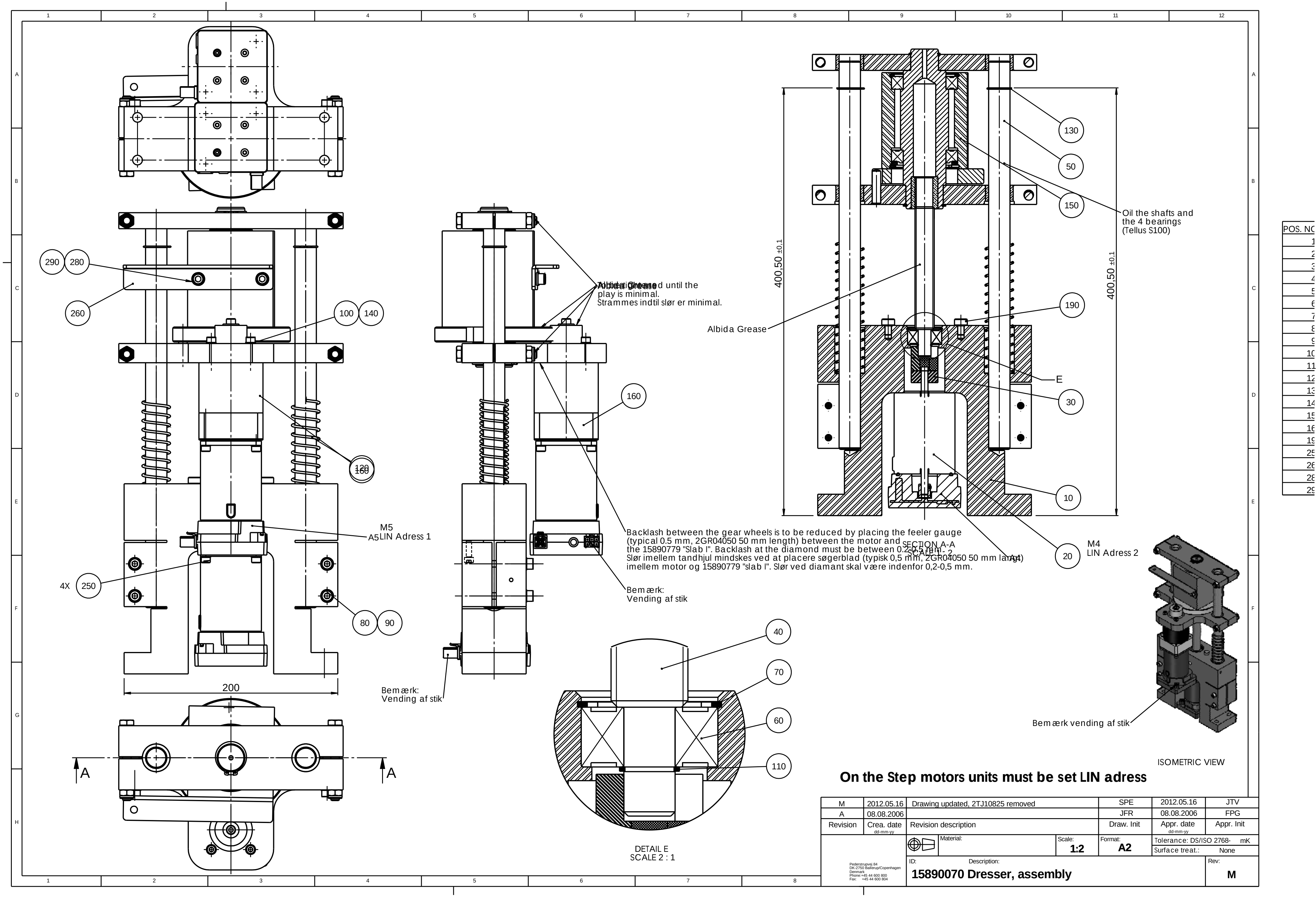
Pederstrupvej 84
DK-2750 Ballerup/Copenhagen
Denmark
Phone:+45 44 600 800
Fax: +45 44 600 804

ID: Description:

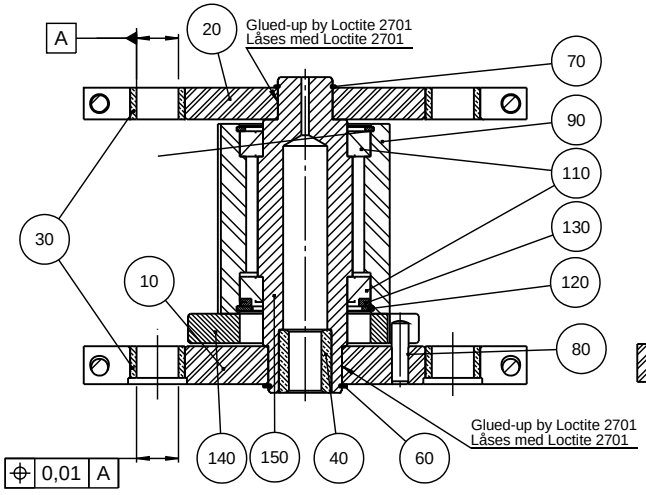
15890020 Main mechanism, assembly

Rev: **G**

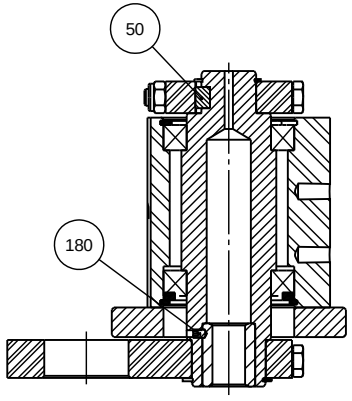
POS



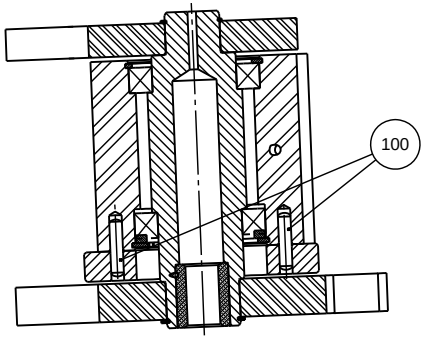
290
280
260
100
140
120
160
M5
A5 LIN Adress 1
4X
250
80
90
200
A
A
Albida Grease
Tightened until the play is minimal.
Strammes indtil slør er minimal.
160
Backlash between the gear wheels is to be reduced by placing the feeler gauge (typical 0.5 mm, 2GR04050 50 mm length) between the motor and the 15890779 "Slab I". Backlash at the diamond must be between 0.2-0.5 mm.
Slør imellem tandhjul mindskes ved at placere søgerblad (typisk 0,5 mm, 2GR04050 50 mm lang) imellem motor og 15890779 "slab I". Slør ved diamant skal være indenfor 0,2-0,5 mm.
Bemærk:
Vending af stik
Bemærk:
Vending af stik
130
50
150
Oil the shafts and the 4 bearings (Tellus S100)
400,50 ±0,1
400,50 ±0,1
Albida Grease
190
E
30
10
20
M4
LIN Adress 2
SECTION A-A
SCALE 1 : 2
40
70
60
110
DETAIL E
SCALE 2 : 1
Bemærk vending af stik
ISOMETRIC VIEW
On the Step motors units must be set LIN adress
POS. NO
M
2012.05.16
Drawing updated, 2TJ10825 removed
SPE
2012.05.16
JTV
A
08.08.2006
JFR
08.08.2006
FPG
Revision
Crea. date
Revision description
Draw. Init
Appr. date
Appr. Init
Material:
Scale:
1:2
Format:
A2
Tolerance: DS/ISO 2768- mK
Surface treat.:
None
ID:
Description:
15890070 Dresser, assembly
Rev:
M



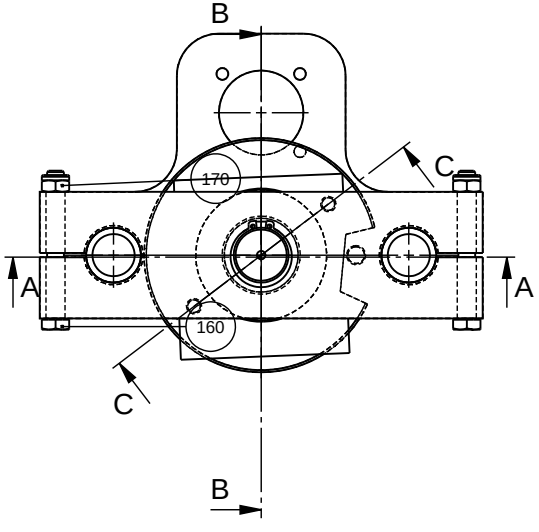
SECTION A-A

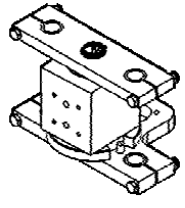


SECTION B-B



SECTION C-C





ISOMETRIC VIEW

180 Locked by Loctite 222 (Låses med Loctite 222)

80 100 Locked by Loctite 2701 (Låses med Loctite 2701)

C	2010-04-06	Pos.180 added.	JTV	2010-04-06	
A	2006.08.08		JFR		
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

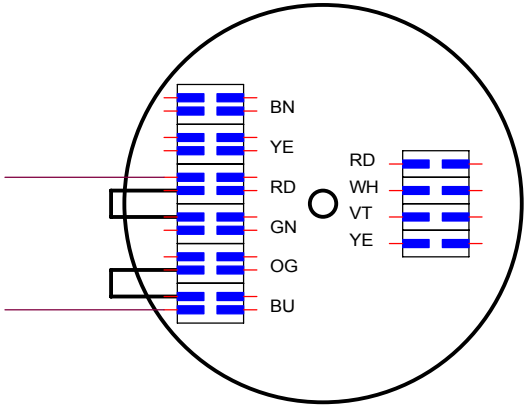
Material:
Scale: 1:2
Format: A3
Tolerance: DS/ISO 2768- mK
Surface treat.: None

ID: Description:

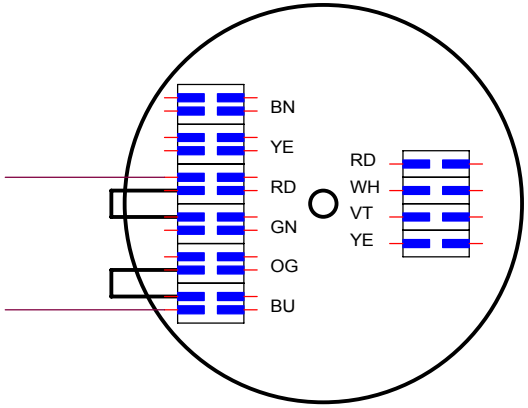
15890071 Moving part of dresser

Rev: C

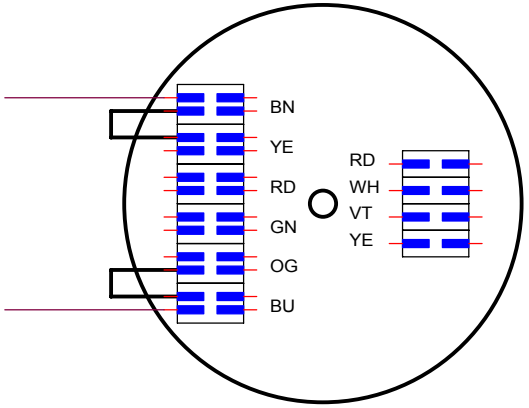
CONNECTION FOR 200V / 50Hz



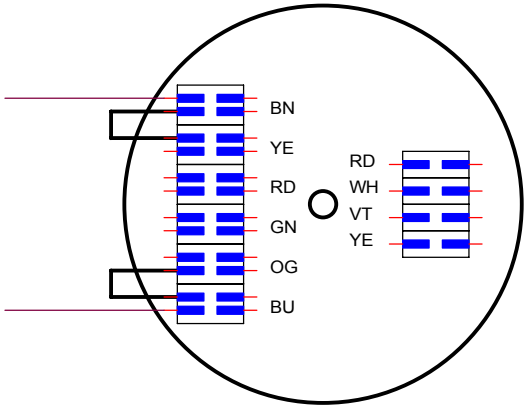
CONNECTION FOR 200-210V / 60Hz



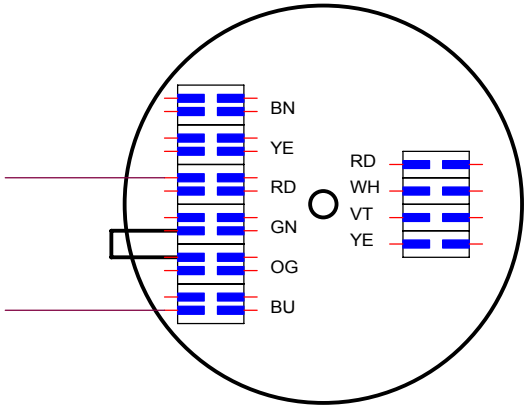
CONNECTION FOR 220-230V / 50Hz



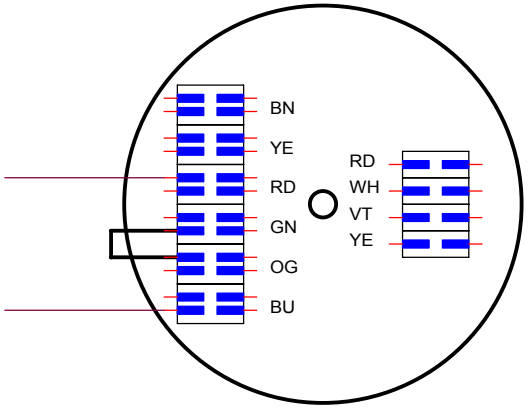
CONNECTION FOR 220-240V / 60Hz



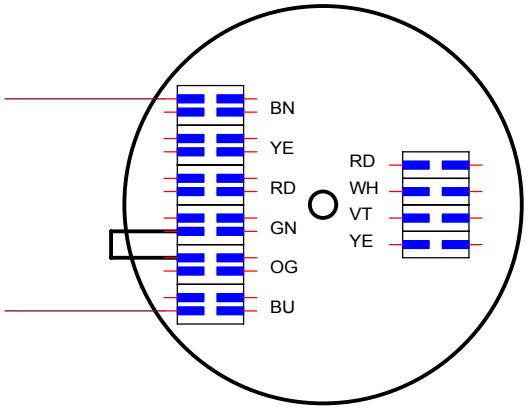
CONNECTION FOR 380-415V / 50Hz



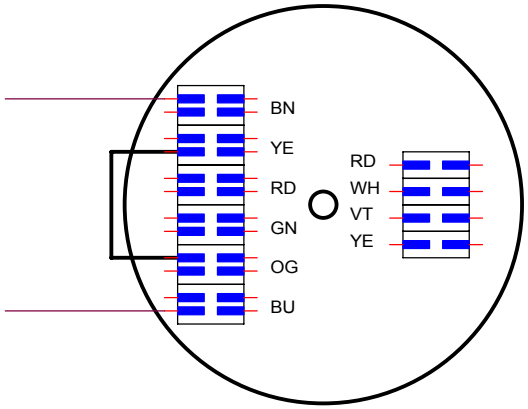
CONNECTION FOR 380-415V / 60Hz



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

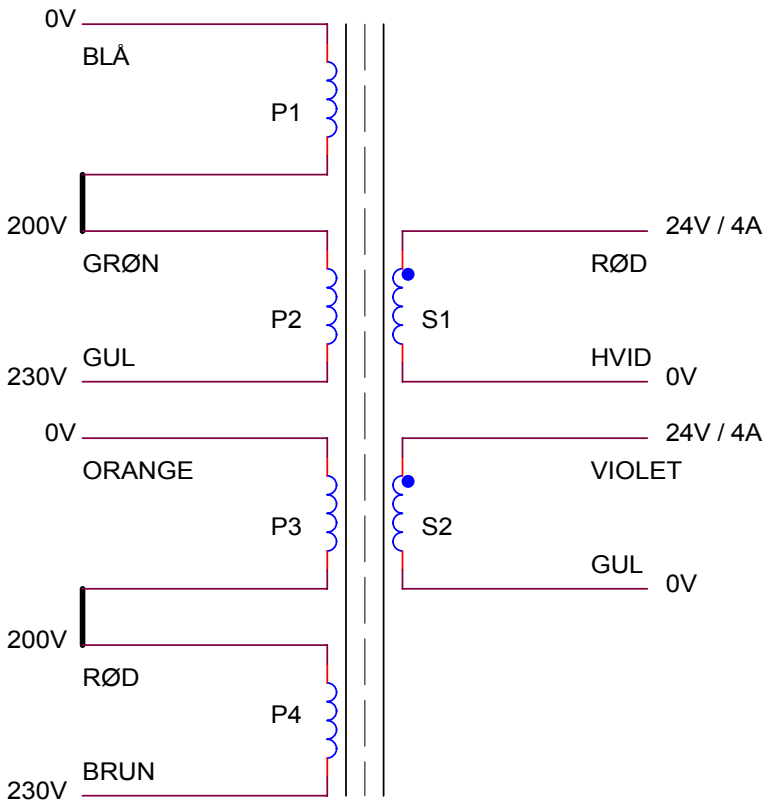
Thursday, September 21, 2000

Scale: SLN / SLN

Sheet: 1 of 3

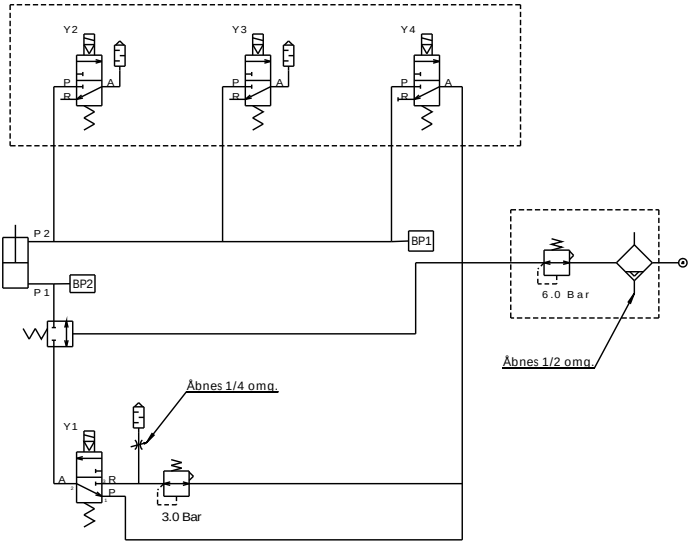
Primær:

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	



Rev	Crea. date dd-mm-yy	Revision description	Draw. Init	Appr. date dd-mm-yy	Appr. Init
C	2010-05-17	BP1 and BP2 added	JTV	2010-05-17	JTV
B	15.5.2008	Counter pressure corrected from 2,8 to 3,0 bar	JTV	15.5.2008	JTV
A	23.8.2006		JF	23.8.2006	FPG

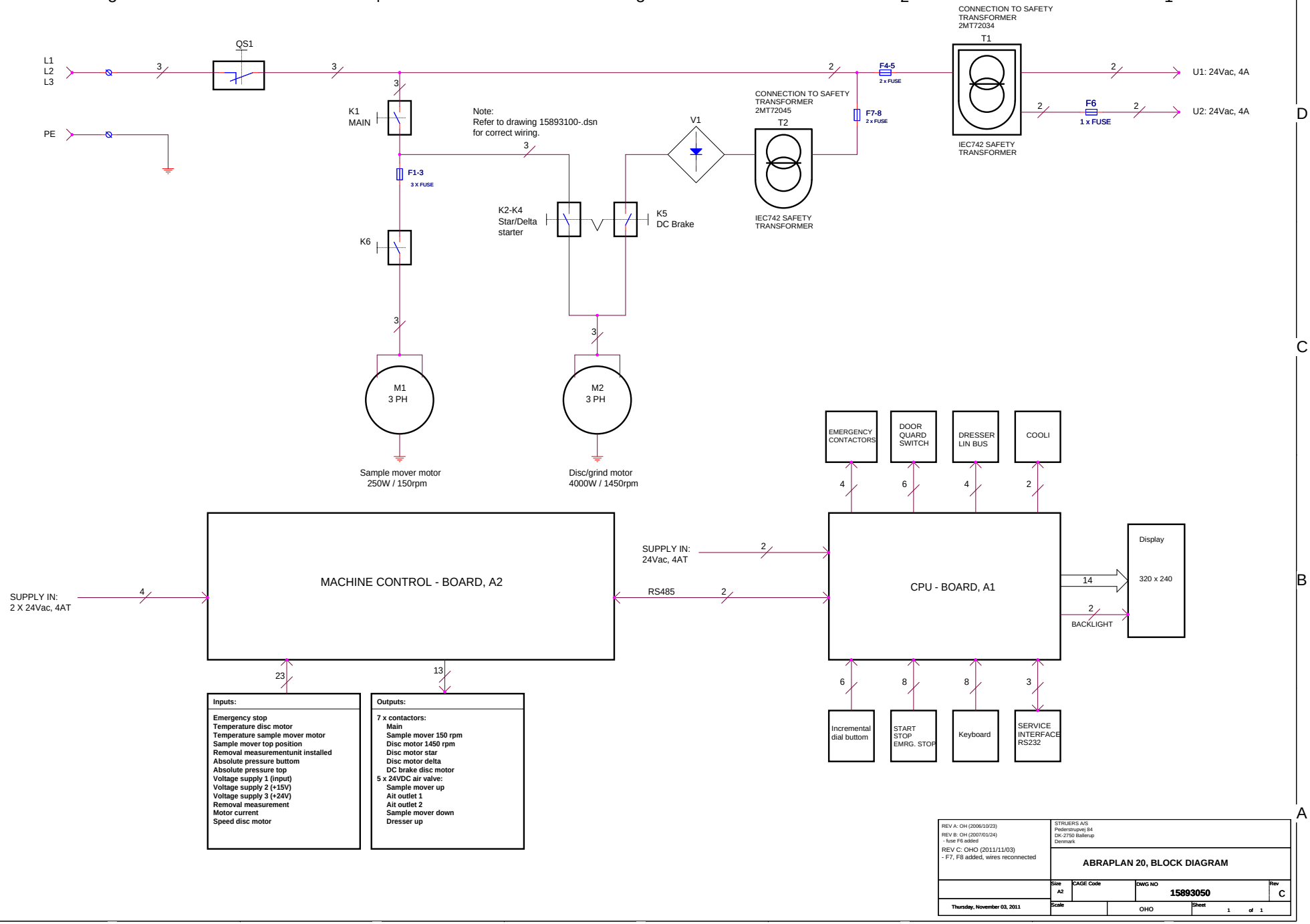
Struers
Pederstrupvej 84
DK-2750 Ballerup
Copenhagen
Denmark
Phone :+45 44600 800
Fax : +45 44600 804

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

ID: Description:

15892000 Air diagram AbraPlan-20

Rev: C



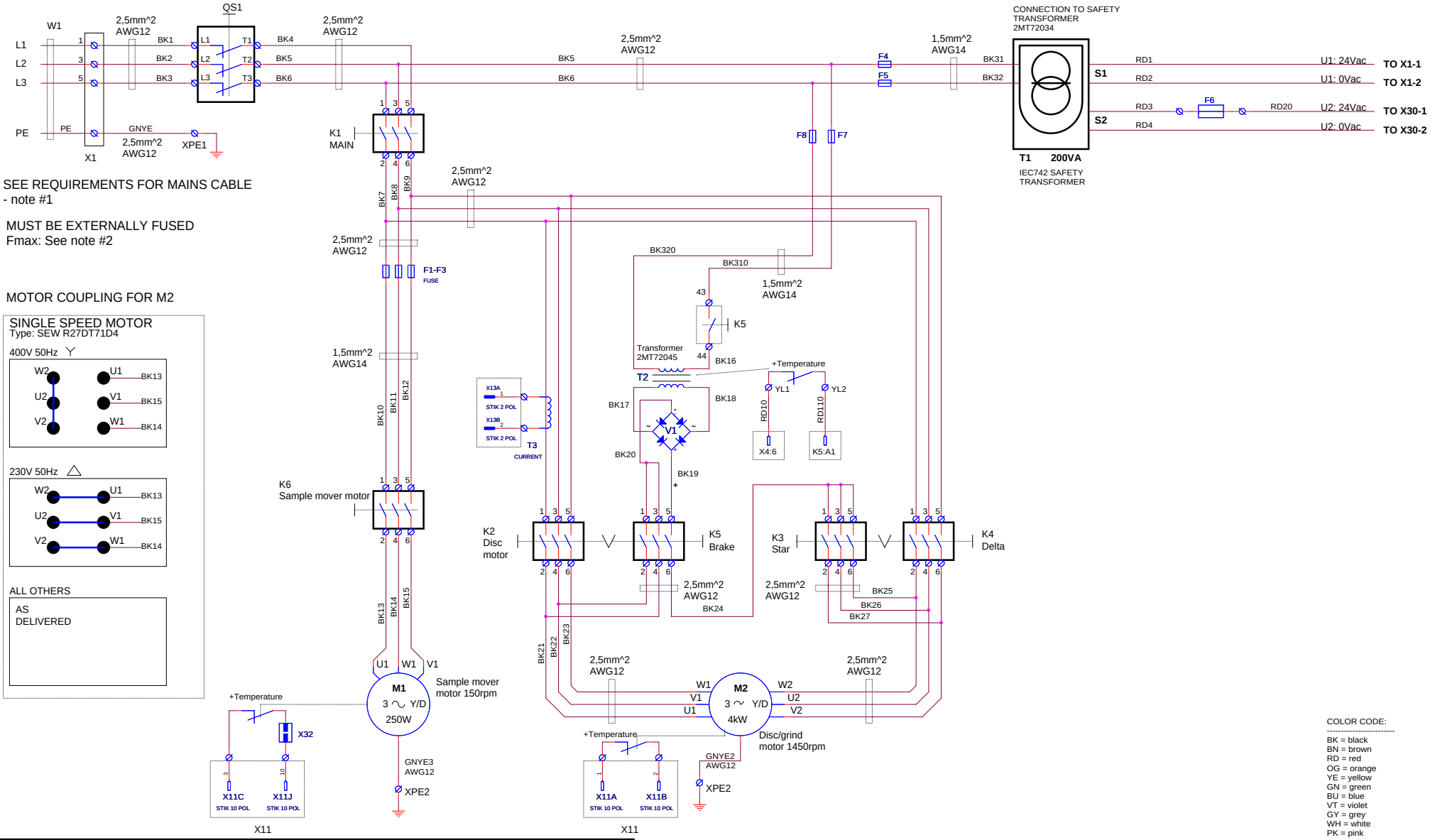
REV A: OH (2006/10/23)
REV B: OH (2007/01/24)
- fuse F6 added
REV C: OHO (2011/11/03)
- F7, F8 added, wires reconnected

STRUER'S A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

ABRAPLAN 20, BLOCK DIAGRAM

Size	CAGE Code	DWG NO	Rev
A2		15893050	C

Thursday, November 03, 2011 | Scale | OHO | Sheet 1 of 1



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)	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)	F7+F8 (fuse size) See note #3	M1 Connection
3 x 200V / 50Hz	2,5mm^2	3 x 40AT	3 x 4AT (aM)	2 x 2AT (aM)	4AT	2 x 6AT (aM)	DELTA
3 x 200-210V / 60Hz	AWG = 12	3 x 40AT	3 x 4AT (CC)	2 x 2AT (CC)	4AT	2 x 6AT (CC)	DELTA
3 x 220-230V / 50Hz	2,5mm^2	3 x 40AT	3 x 4AT (aM)	2 x 2AT (aM)	4AT	2 x 6AT (aM)	DELTA
3 x 220-240V / 60Hz	AWG = 12	3 x 40AT	3 x 4AT (CC)	2 x 2AT (CC)	4AT	2 x 6AT (CC)	DELTA
3 x 380-415V / 50Hz	2,5mm^2	3 x 40AT	3 x 4AT (aM)	2 x 1AT (aM)	4AT	2 x 4AT (aM)	STAR
3 x 380-415V / 60Hz	AWG = 12	3 x 40AT	3 x 4AT (CC)	2 x 1AT (CC)	4AT	2 x 4AT (CC)	STAR
3 x 460-480V / 60Hz	AWG = 12	3 x 40AT	3 x 4AT (CC)	2 x 1AT (CC)	4AT	2 x 4AT (CC)	STAR

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

REV D: OHO (2011/11/03)
- F7, F8 added, wires reconnected
- F4, F5 value updated
- T2 Temp. monitoring added, new RD110

Rev E: FTH (2011-11-25)
- M1 connection tabel corrected

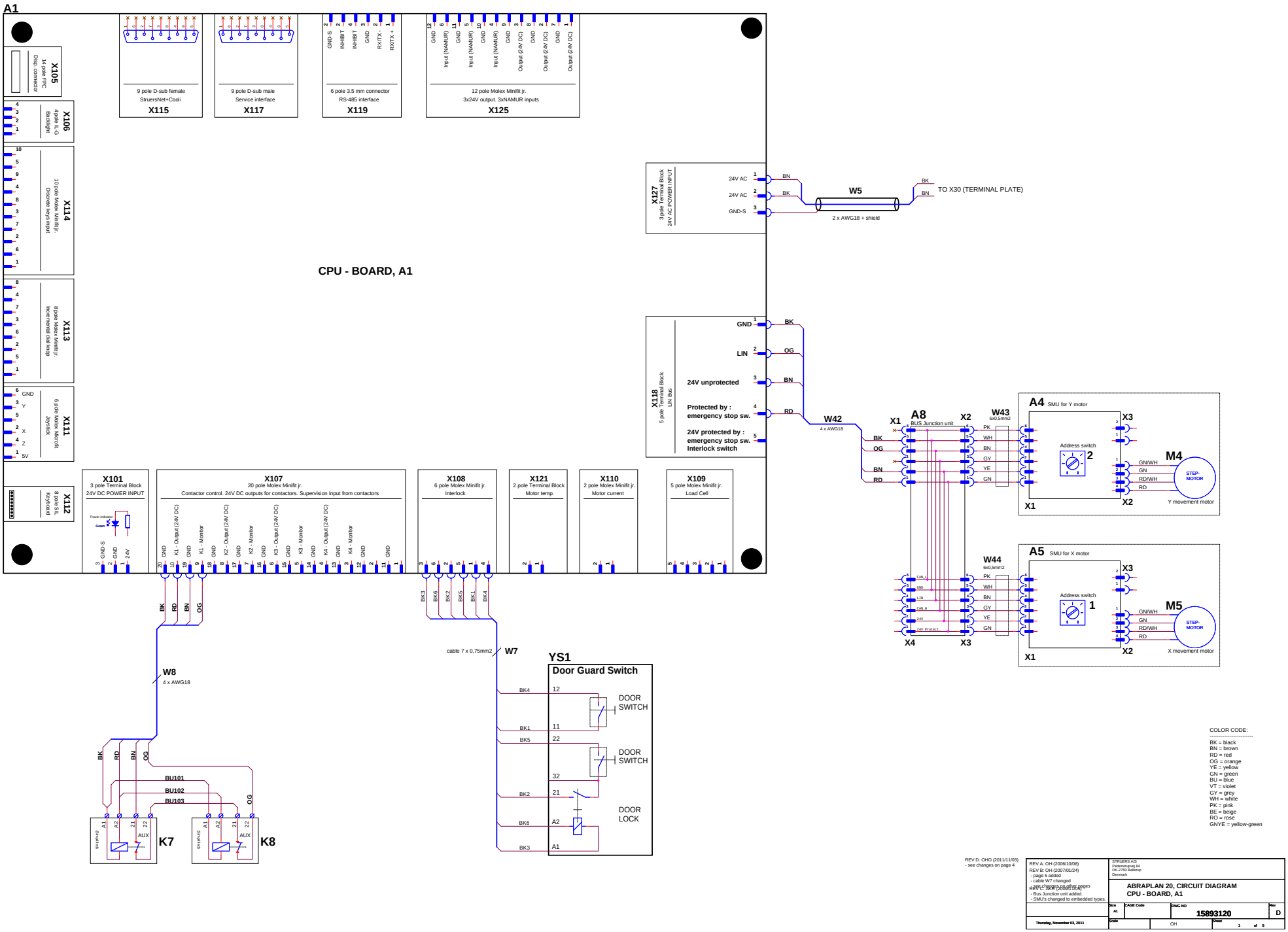
REV A: OH (2006/10/23)
REV B: OH (2007/01/24)
- Fuse F6 Added
- max. value for ext. fuse changed
- variant overview table updated
- fuses F1-F5 changed
REV C: AKR (2010/02/22)
- Conn. changed to Star for 3x 200-210V /60Hz

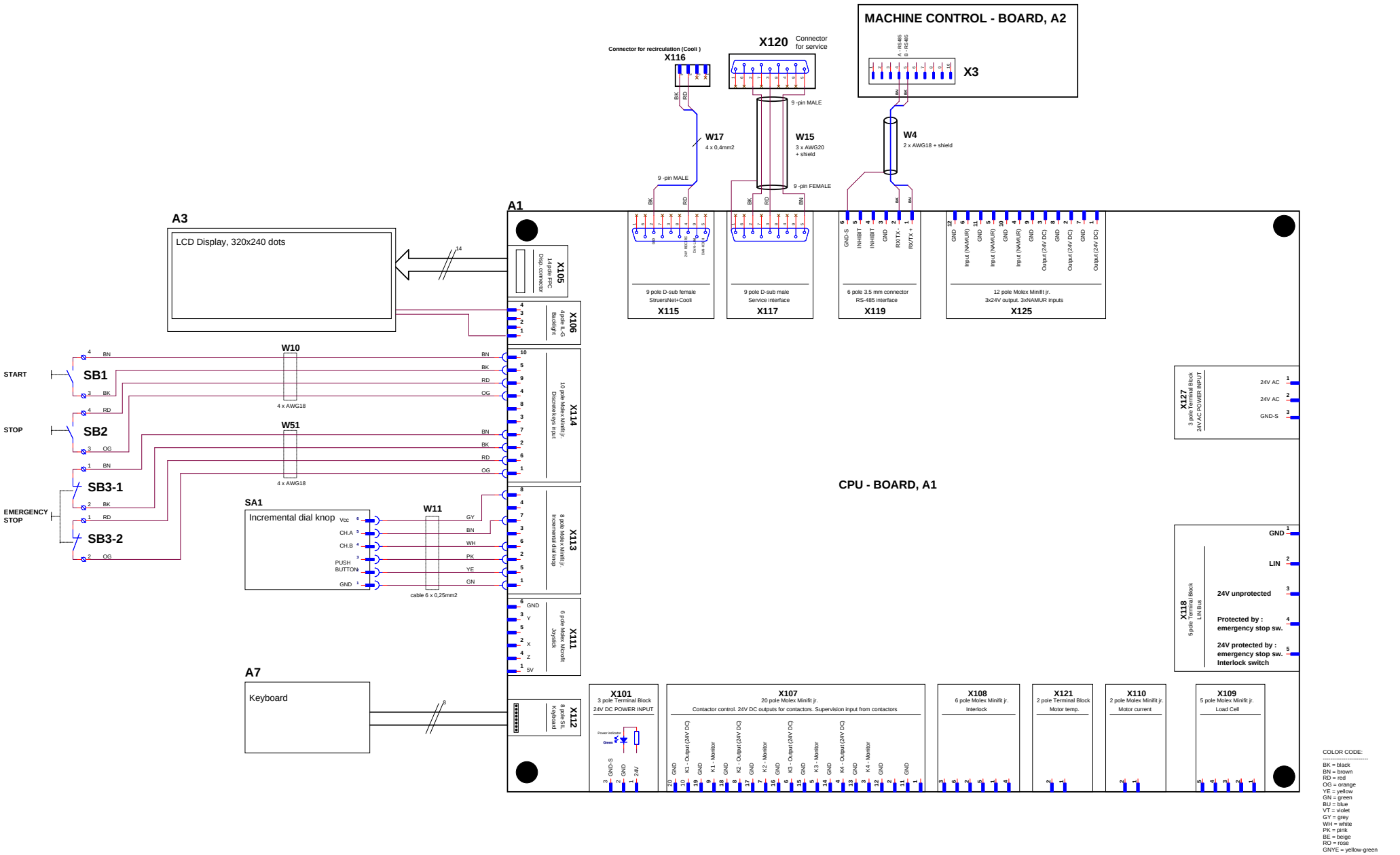
STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

ABRAPLAN 20, CIRCUIT DIAGRAM - MAIN VOLTAGE

Size	CAGE Code	DWG NO	Rev
A2		15893100	E

Friday, November 25, 2011 | Scale | OHO | Sheet 1 of 1


A1
CPU - BOARD, A1
X105
14 pole FFC
Disp. connector
X106
4 pole B.L.
Backlight
X114
10 pole Molex Minifit jr.
Character keys input
X113
8 pole Molex Minifit jr.
Incremental dial knop
X111
6 pole Molex Microfit
Joystick
X112
8 pole SIL
Keyboard
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 AC POWER INPUT
24V AC
24V AC
GND-S
W5
2 x AWG18 + shield
TO X30 (TERMINAL PLATE)
X118
5 pole Terminal Block
LIN Bus
GND
LIN
24V unprotected
Protected by : emergency stop sw.
24V protected by : emergency stop sw. Interlock switch
W42
4 x AWG18
A8
BUS Junction unit
W43
6x0,5mm2
A4
SMU for Y motor
Address switch
M4
STEP-MOTOR
Y movement motor
W44
6x0,5mm2
A5
SMU for X motor
Address switch
M5
STEP-MOTOR
X movement motor
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
W8
4 x AWG18
cable 7 x 0,75mm2
W7
YS1
Door Guard Switch
DOOR SWITCH
DOOR SWITCH
DOOR LOCK
K7
K8
BU101
BU102
BU103
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 (2011/11/03)
- see changes on page 4
REV A: OH (2006/10/08)
REV B: OH (2007/01/24)
- page 5 added
- cable W7 changed
- see changes on other pages
REV C: ROR (2007/10/08)
- Bus Junction unit added.
- SMU's changed to embedded types.
STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark
ABRAPLAN 20, CIRCUIT DIAGRAM
CPU - BOARD, A1
Size A1
CAGE Code
DWG NO 15893120
Rev D
Thursday, November 03, 2011
Scale
OH
Sheet 1 of 5



COLOR CODE:

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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 (2011/11/03)
- see changes on page 4

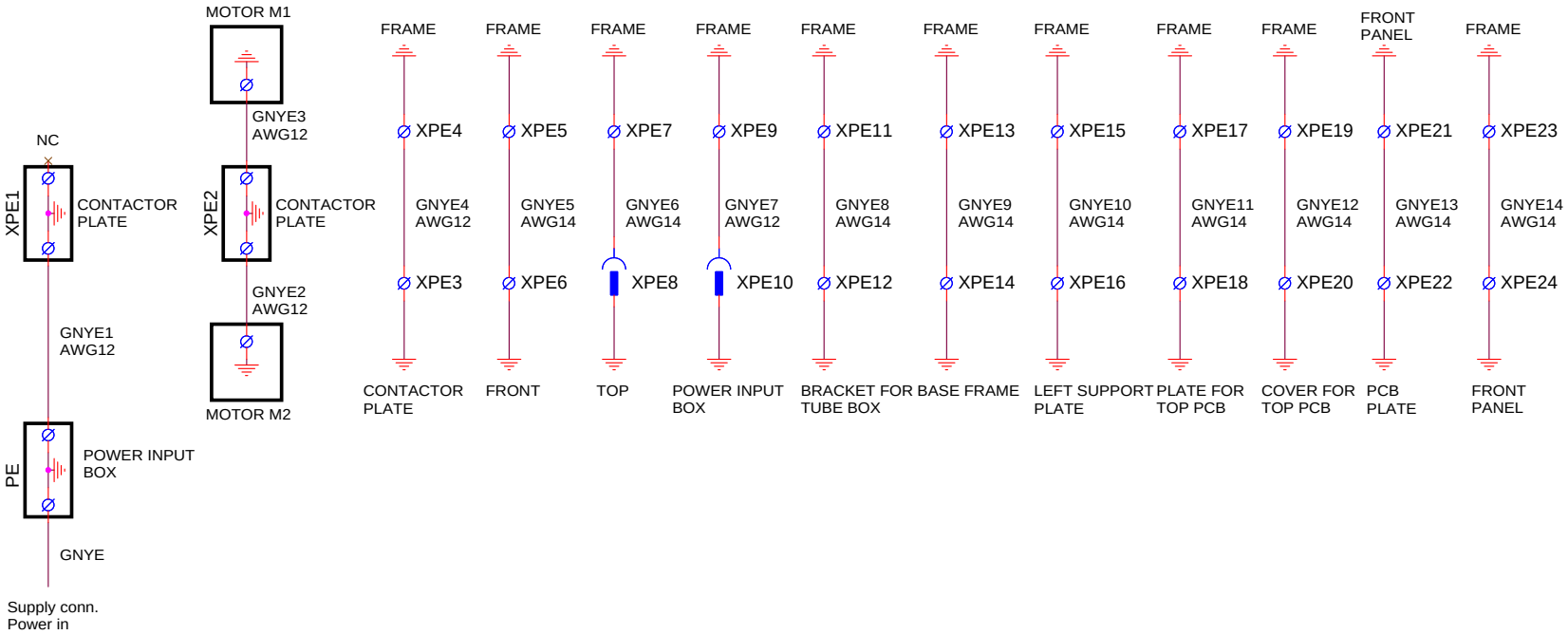
REV A: OH (2006/10/08)
REV B: OH (2007/01/24)
- SB3 renamed to SB3-1
- SB4 renamed to SB3-2
- keyboard labeled with A7
- see changes on other pages
- BR1 renamed to SA1

STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

ABRAPLAN 20, CIRCUIT DIAGRAM
CPU - BOARD, A1

Size	CAGE Code	DWG NO	Rev
A1		15893120	D

Thursday, November 03, 2011 | Scale | OH | Sheet 2 of 5



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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 (2011/11/03)
- see changes on page 4

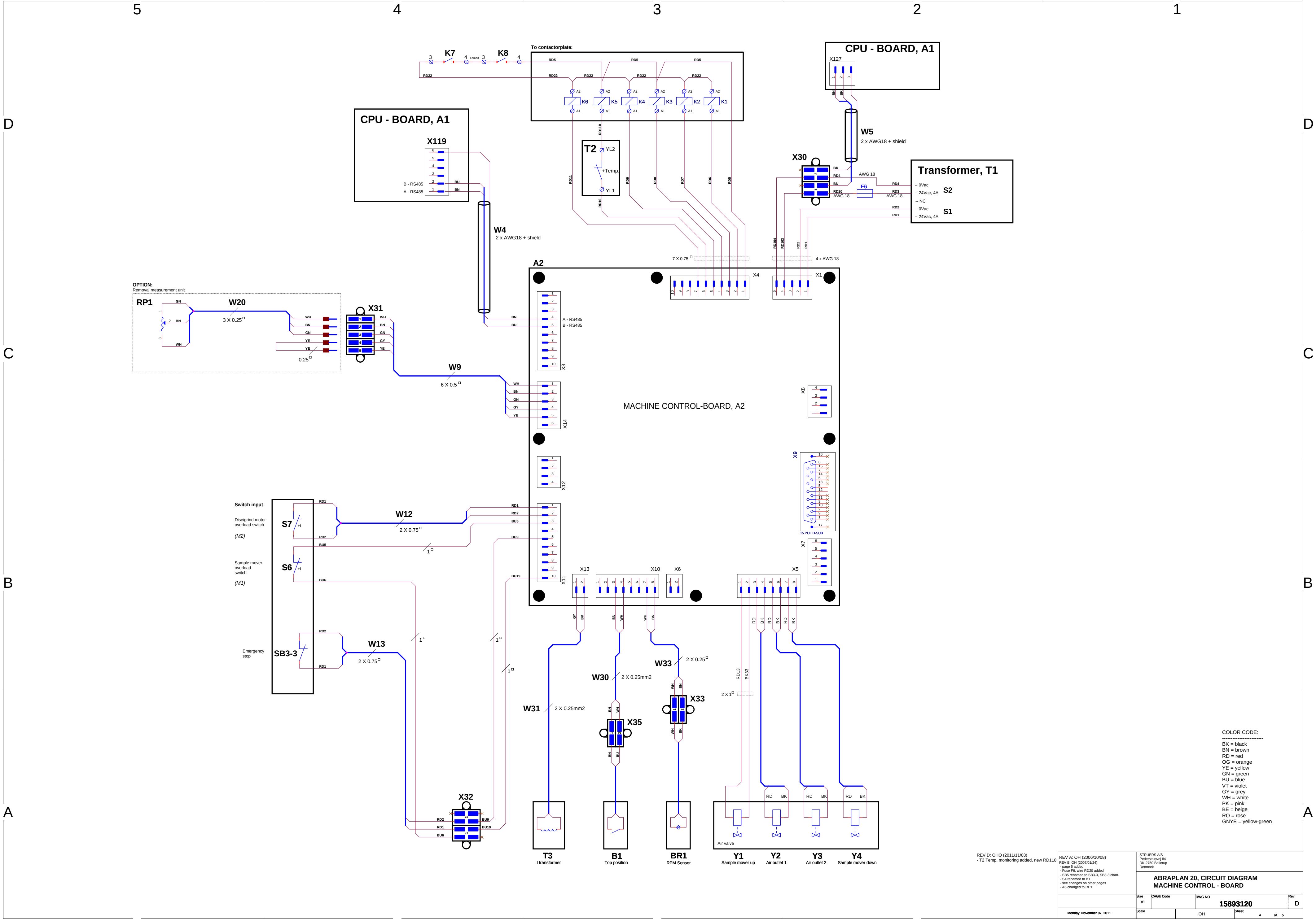
REV A: OH (2006/10/08)
REV B: OH (2007/01/24)
- page 5 added
- see changes on other pages
- GNYE4, GNYE7 changed
- name of XPE6 changed

STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

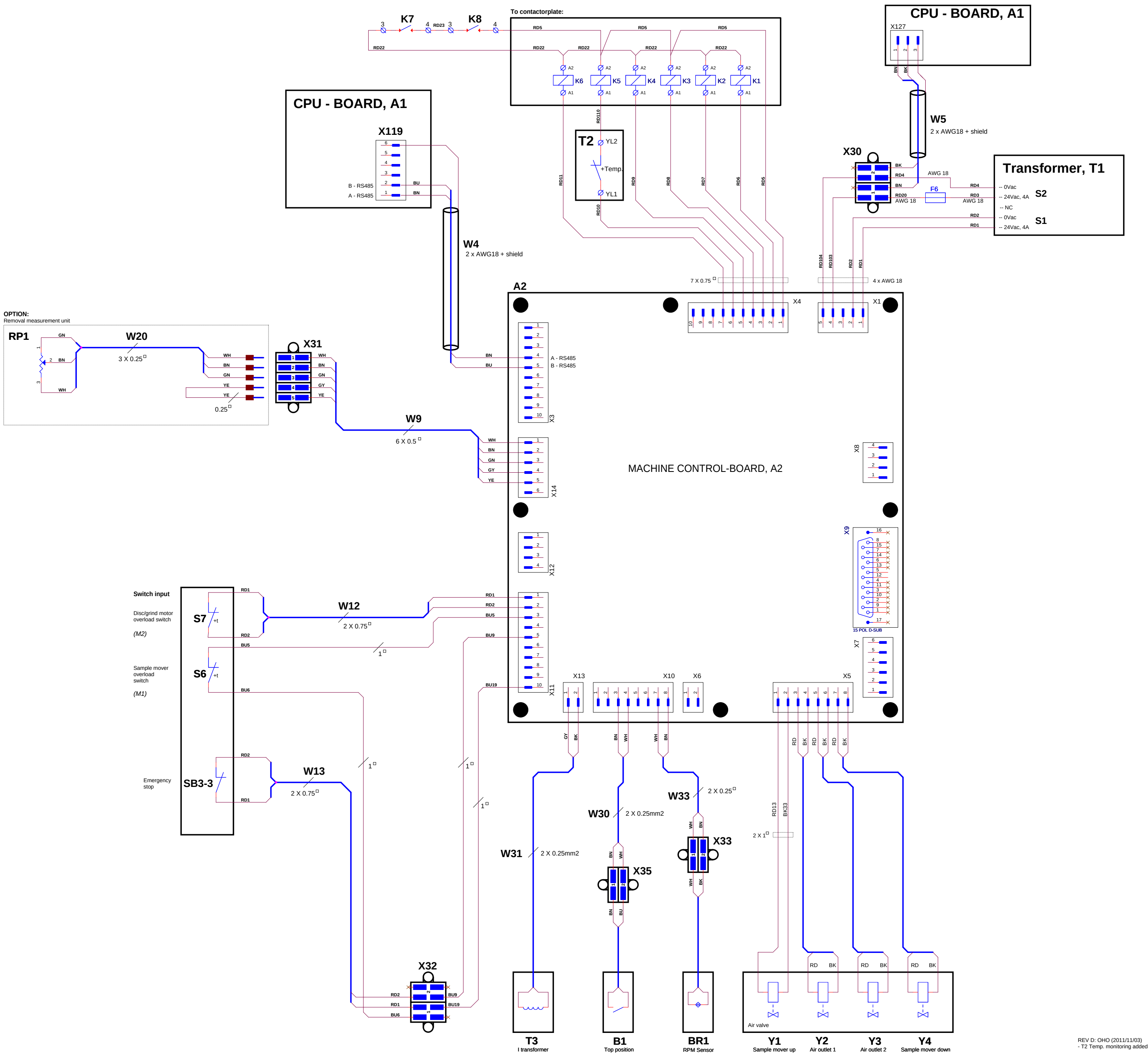
ABRAPLAN 20, CIRCUIT DIAGRAM
EARTH CONNECTIONS

Size	CAGE Code	DWG NO	Rev
A3		15893120	D

Thursday, November 03, 2011 | Scale | OH | Sheet 3 of 5



To contactorplate:
K7
K8
K6
K5
K4
K3
K2
K1
T2
YL2
+Temp.
YL1
CPU - BOARD, A1
X127
W5
2 x AWG18 + shield
X30
Transformer, T1
AWG 18
F6
0Vac
24Vac, 4A
NC
S2
S1
CPU - BOARD, A1
X119
B - RS485
A - RS485
W4
2 x AWG18 + shield
A2
7 X 0.75
4 x AWG 18
X4
X1
OPTION:
Removal measurement unit
RP1
W20
3 X 0.25
X31
W9
6 X 0.5
A - RS485
B - RS485
X3
X14
MACHINE CONTROL-BOARD, A2
X8
X9
15 POL D-SUB
X7
X12
X11
X13
X10
X6
X5
Switch input
Disc/grind motor overload switch
(M2)
S7
W12
2 X 0.75
Sample mover overload switch
(M1)
S6
Emergency stop
SB3-3
W13
2 X 0.75
X32
W31
2 X 0.25mm2
W30
2 X 0.25mm2
W33
2 X 0.25
X35
X33
2 X 1
T3
I transformer
B1
Top position
BR1
RPM Sensor
Air valve
Y1
Sample mover up
Y2
Air outlet 1
Y3
Air outlet 2
Y4
Sample mover down
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 (2011/11/03)
- T2 Temp. monitoring added, new RD110
REV A: OH (2006/10/08)
REV B: OH (2007/01/24)
- page 5 added
- Fuse F6, wire RD20 added
- SB5 renamed to SB3-3, SB3-3 chan.
- S4 renamed to B1
- see changes on other pages
- A6 changed to RP1
STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark
ABRAPLAN 20, CIRCUIT DIAGRAM
MACHINE CONTROL - BOARD
Size A1
CAGE Code
DWG NO 15893120
Rev D
Monday, November 07, 2011
Scale
OH
Sheet 4 of 5



COLOR CODE:
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RD = red
OG = orange
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GN = green
BU = blue
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GY = grey
WH = white
PK = pink
BE = beige
RO = rose
GNYE = yellow-green

REV D: OHO (2011/11/03)
- T2 Temp. monitoring added, new RD110

REV A: OH (2006/10/08)
REV B: OH (2007/01/24)
- page 5 added
- Fuse F6, wire RD20 added
- SB5 renamed to SB3-3, SB3-3 chan.
- S4 renamed to B1
- see changes on other pages
- A6 changed to RP1

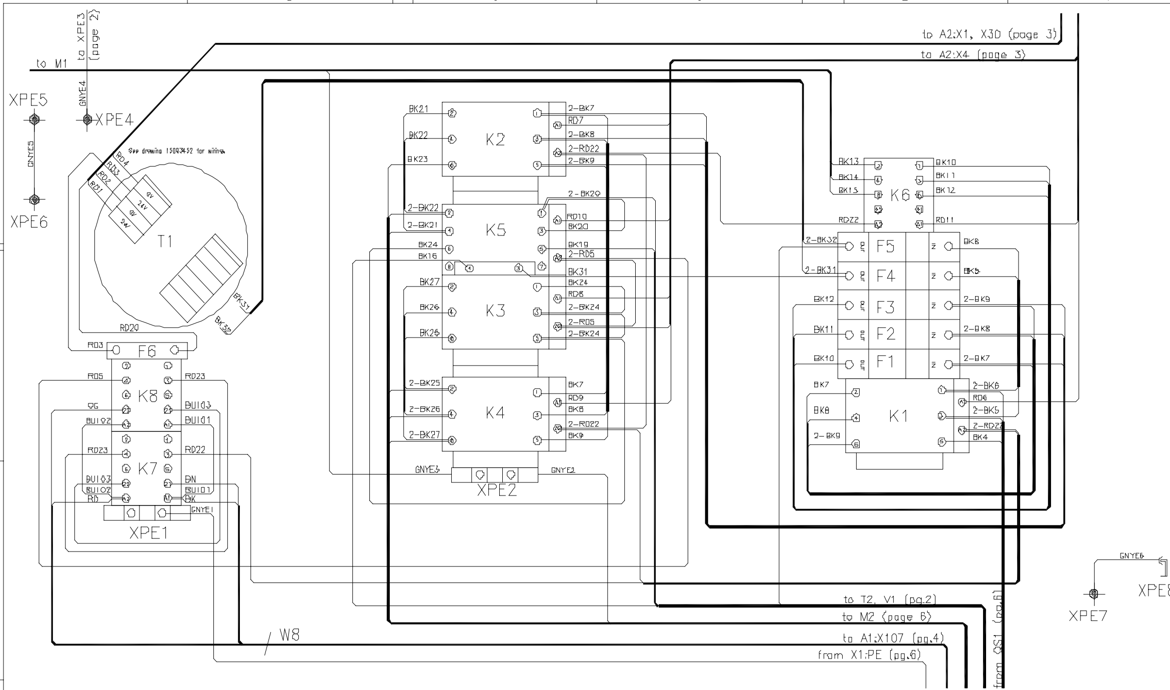
STRUERS A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark

ABRAPLAN 20, CIRCUIT DIAGRAM
MACHINE CONTROL - BOARD

Size	CAGE Code	DWG NO	Rev
A1		15893120	D

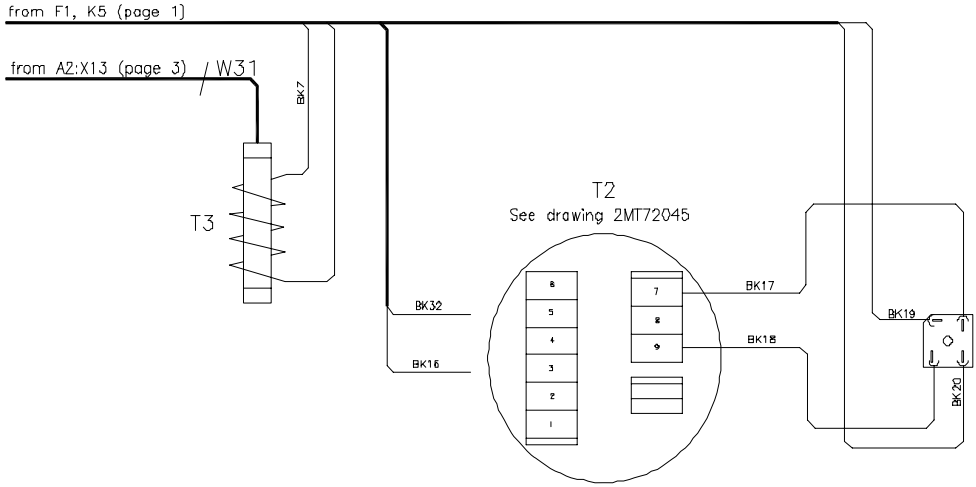
Monday, November 07, 2011

Scale | OH | Sheet 4 of 5



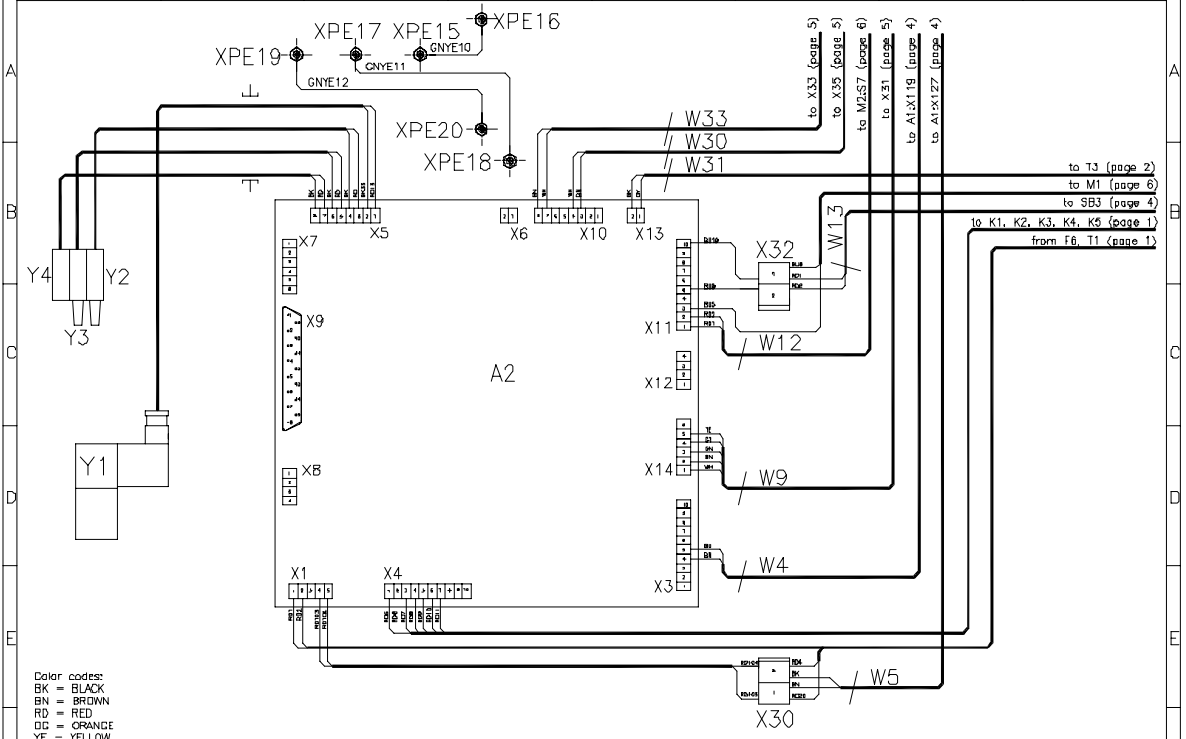
Color codes:
BK = BLACK
BN = BROWN
RD = RED
OG = ORANGE
YE = YELLOW
GN = GREEN
BU = BLUE
VT = VIOLET
GY = GREY
WH = WHITE
PI = PINK
GNYE = GREEN/YELLOW

Matr.:	Overfl.beh.:	Målforhold: (1:2)	Ikke ang. tol. efter DS/ISO 2768-
Struers	Projektionsmetode		Tegn: 080507 BRY
Wiring Diagr. Contactor box AbraPlan-20 Page 1/6			Erst.: 15893450-1A



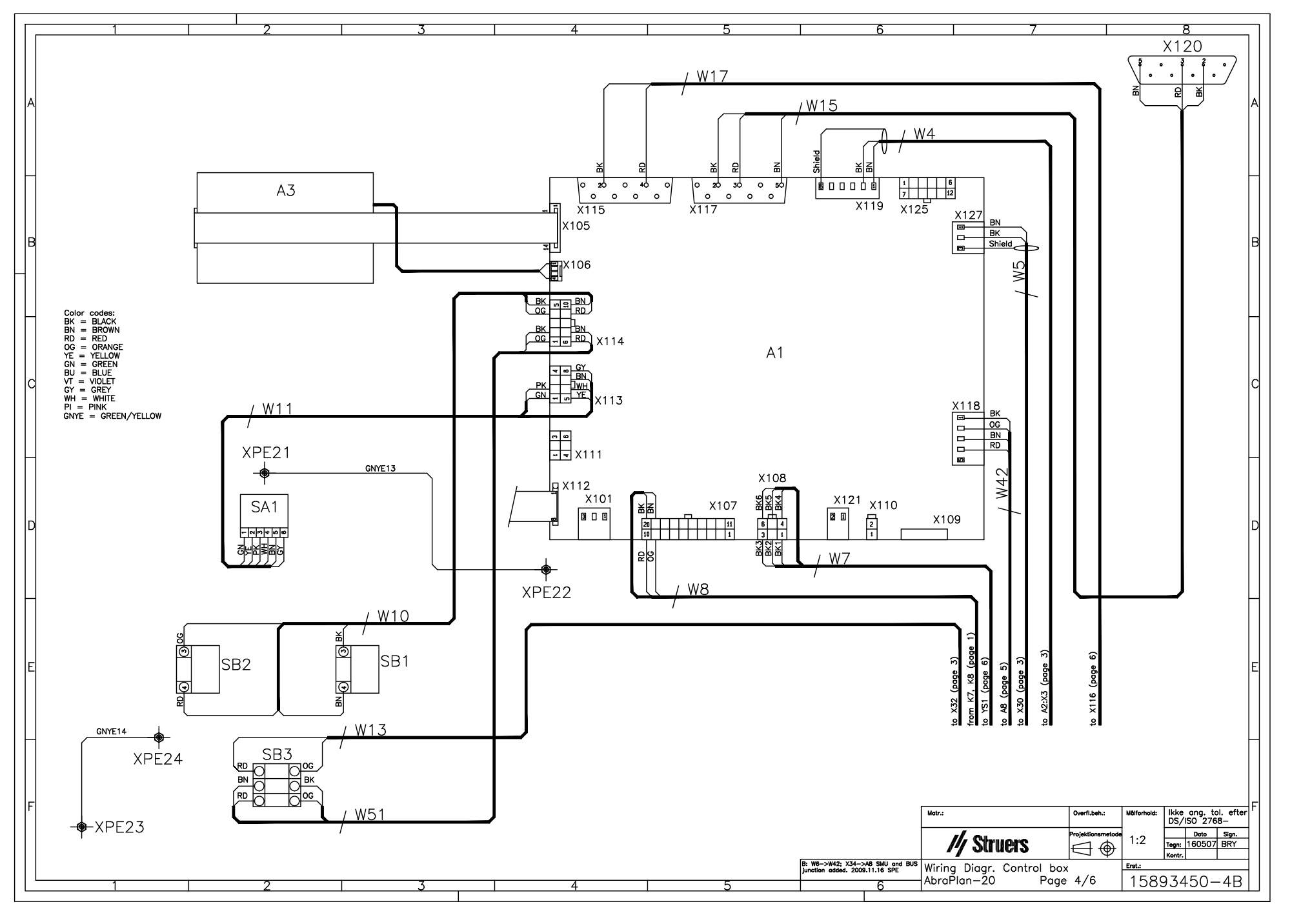
Color codes:
BK = BLACK
BN = BROWN
RD = RED
OG = ORANGE
YE = YELLOW
GN = GREEN
BU = BLUE
VT = VIOLET
GY = GREY
WH = WHITE
PI = PINK
GNYE = GREEN/YELLOW

Matr.:	Overfl.beh.:	Målforhold:	Ikke ang. tol. efter DS/ISO 2768–	
Struers	Projektionsmetode:	1:2		Dato / Sign.
			Tegn. 110507	BRY
			Kontr. 110507	
Wiring Diagr. Contactor box AbraPlan-20 Page 2/6		Erst.:	15893450-2A	

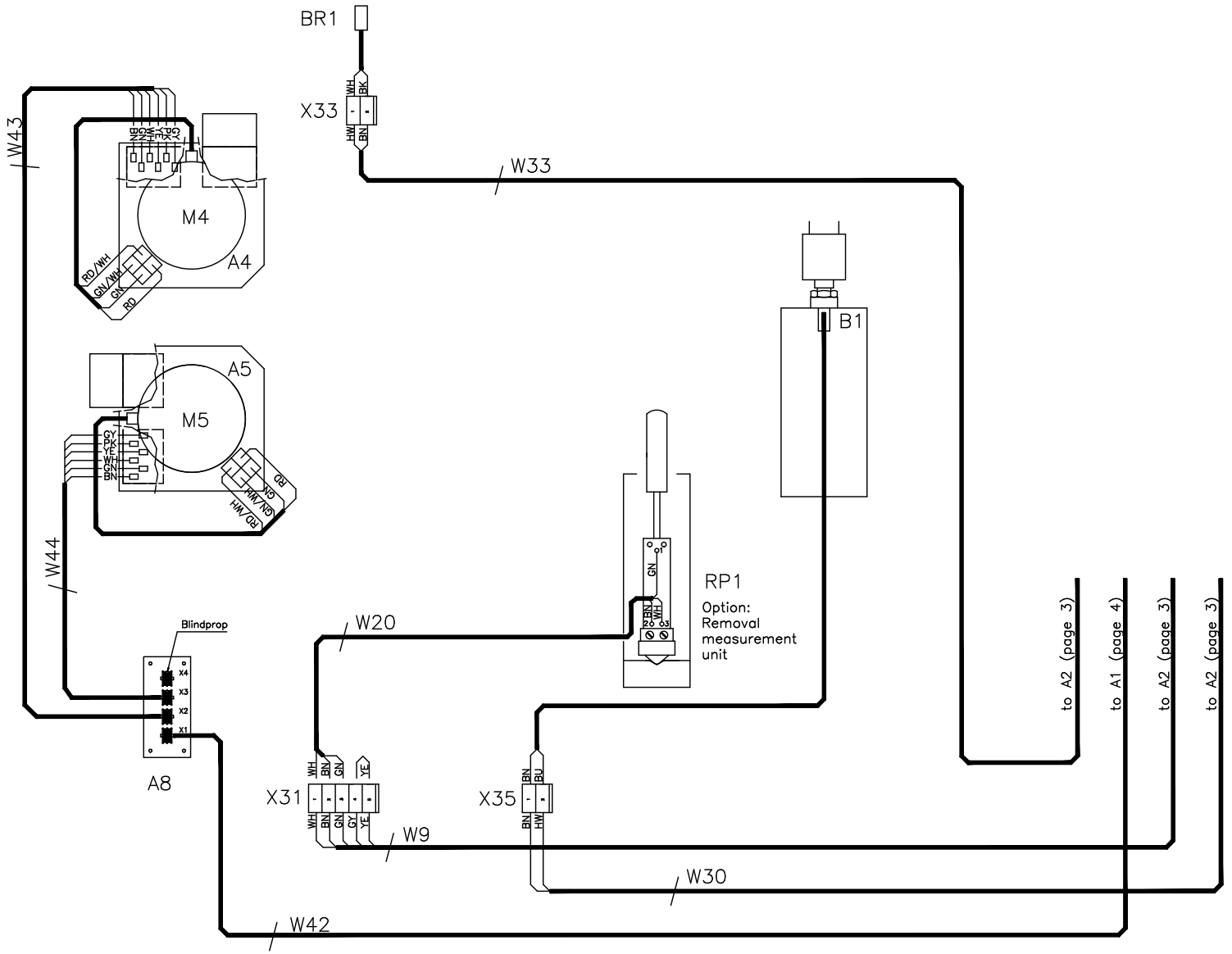


Color codes:
BK = BLACK
BN = BROWN
RD = RED
OG = ORANGE
YE = YELLOW
GN = GREEN
BU = BLUE
VT = VIOLET
GY = GREY
WH = WHITE
PI = PINK
GNYE = GREEN/YELLOW

Matr.:	Overfl.beh.:	Målforhold:	Ikke ang. tol. efter DS/ISO 2768-:
Struers	Projektionsmetode:	1:2	Dato / Sign.
			Tegn.: 11DSO7 BRY
			Kontr.:
Wiring Diagr. Control Board AbraPlan-20 Page 3/6			Erst.: 15893450-3A

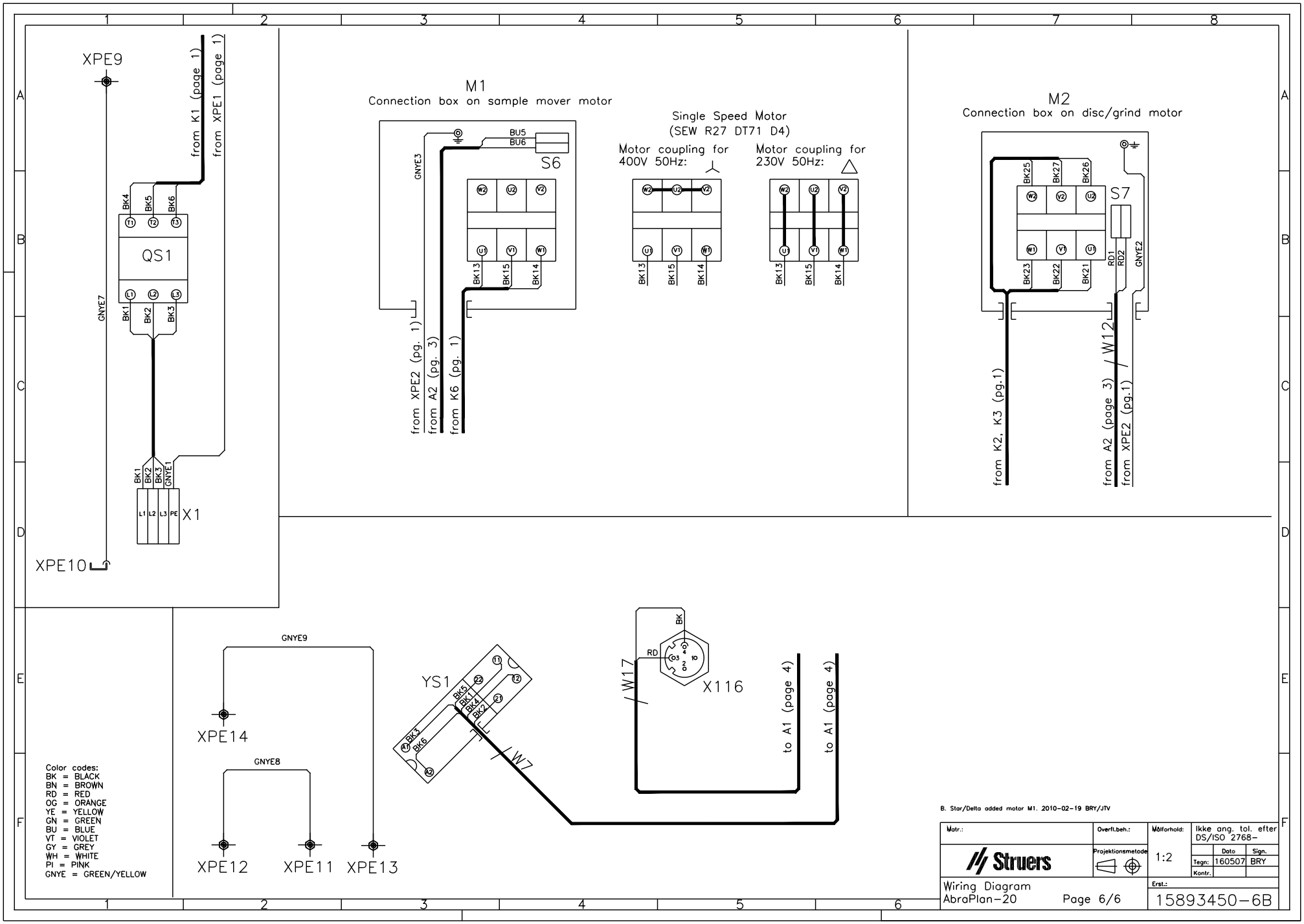

Color codes:
BK = BLACK
BN = BROWN
RD = RED
OG = ORANGE
YE = YELLOW
GN = GREEN
BU = BLUE
VT = VIOLET
GY = GREY
WH = WHITE
PI = PINK
GNYE = GREEN/YELLOW
A3
A1
X105
X106
X114
X113
X111
X112
X115
X117
X119
X125
X127
X120
X118
X101
X107
X108
X121
X110
X109
W17
W15
W4
W5
W11
W42
W7
W8
W10
W13
W51
XPE21
XPE22
XPE23
XPE24
GNYE13
GNYE14
SA1
SB1
SB2
SB3
to X32 (page 3)
from K7, K8 (page 1)
to YS1 (page 6)
to A8 (page 5)
to X30 (page 3)
to A2:X3 (page 3)
to X116 (page 6)
B: W6->W42; X34->A8 SMU and BUS junction added. 2009.11.16 SPE
Matr.:
Overfl.beh.:
Projektionsmetode
Målforhold:
1:2
Ikke ang. tol. efter DS/ISO 2768-
Dato
Sign.
Tegn:
160507
BRY
Kontr.
Struers
Wiring Diagr. Control box
AbraPlan-20
Page 4/6
Erst.:
15893450-4B

Color codes:
BK = BLACK
BN = BROWN
RD = RED
OG = ORANGE
YE = YELLOW
GN = GREEN
BU = BLUE
VT = VIOLET
GY = GREY
WH = WHITE
PI = PINK
GNYE = GREEN/YELLOW



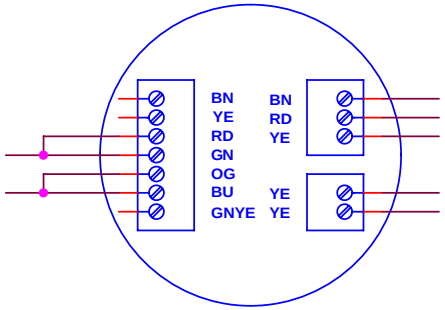
B: BUS junction and SMU added. 2009.11.16 SPE

Matr.:	Overfl.beh.:	Målforhold:	Ikke ang. tol. efter DS/ISO 2768–
Struers	Projektionsmetode	1:2	Dato / Sign.
			Tegn: 040607 BRY
			Kontr.
Wiring Diagram AbraPlan–20 Page 5/6			Erst.: 15893450–5B


XPE9
from K1 (page 1)
from XPE1 (page 1)
BK4
BK5
BK6
QS1
GNYE7
BK1
BK2
BK3
BK1
BK2
BK3
GNYE1
L1 L2 L3 PE
X1
XPE10
M1
Connection box on sample mover motor
BU5
BU6
S6
GNYE3
BK13
BK15
BK14
from XPE2 (pg. 1)
from A2 (pg. 3)
from K6 (pg. 1)
Single Speed Motor
(SEW R27 DT71 D4)
Motor coupling for
400V 50Hz:
Motor coupling for
230V 50Hz:
M2
Connection box on disc/grind motor
BK25
BK27
BK26
S7
BK23
BK22
BK21
RD1
RD2
GNYE2
from K2, K3 (pg.1)
from A2 (page 3)
/W12
from XPE2 (pg.1)
GNYE9
XPE14
GNYE8
XPE12
XPE11
XPE13
YS1
BK5
BK1
BK4
BK2
BK3
BK6
/W7
BK
RD
X116
/W17
to A1 (page 4)
to A1 (page 4)
Color codes:
BK = BLACK
BN = BROWN
RD = RED
OG = ORANGE
YE = YELLOW
GN = GREEN
BU = BLUE
VT = VIOLET
GY = GREY
WH = WHITE
PI = PINK
GNYE = GREEN/YELLOW
B. Star/Delta added motor M1. 2010-02-19 BRY/JTV
Matr.:
Overfl.beh.:
Projektionsmetode
Målforhold:
1:2
Ikke ang. tol. efter DS/ISO 2768-
Dato
Sign.
Tegn:
160507
BRY
Kontr.
Struers
Wiring Diagram
AbraPlan-20
Page 6/6
Erst.:
15893450-6B

TRAFO NO. AA-72045 (200-240V)

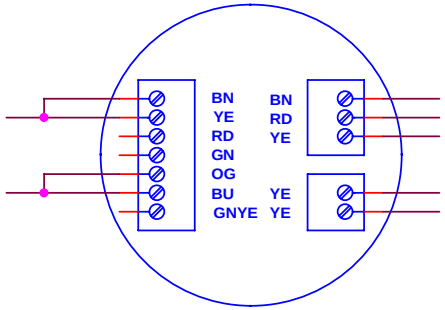
200 - 210V



0V 40AMP
60V
Th. Switch

max. 220V

220 - 240V

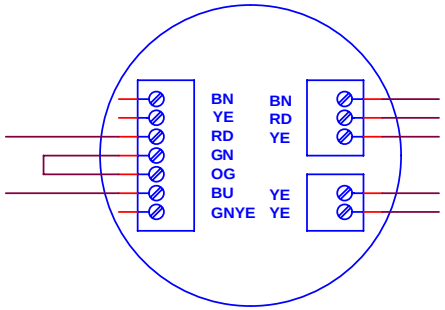


0V 40AMP
60V
Th. Switch

max. 253V

TRAFO NO. AA-72045 (400-460V)

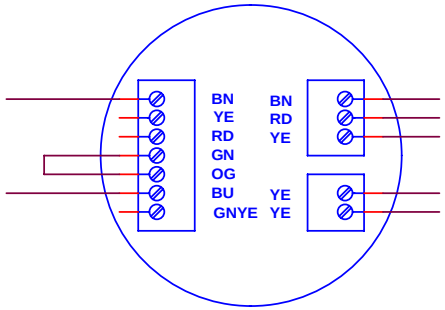
380 - 415V



0V 40AMP
60V
Th. Switch

max.440V

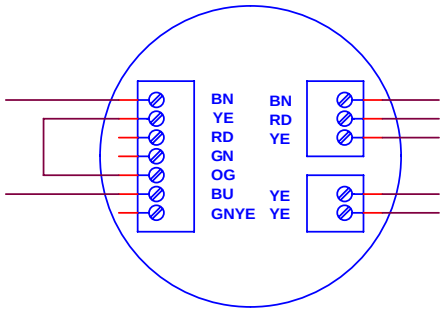
408 - 450V



0V 40AMP
60V
Th. Switch

max.473V

460 - 480V



0V 40AMP
60V
Th. Switch

max. 506V

COLOR CODES:

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

Max. 10% overspænding
pr. kobling.

REV A: OH (2006/10/23)	STRUERS A/S Pederstrupvej 84 DK-2750 Ballerup Denmark
	WIRING DIAGRAM: WIRING AT BRAKE TRANSFORMERS 2MT72045B: **POWER SUPPLY 200V - 480V 50/60Hz.**
	Size A4 · CAGE CODE · DWG NO 15893451 · Rev A
Tuesday, October 24, 2006	SCALE · 24.10.2006 / OH · Sheet 1 of 1

Overview, variant parts in Abraplan-20:

BRY/JTV 2010-02-22: Star/Delta added.
JTV 13-02-2007: Fusetype changed in 60Hz versions to Class CC.
Ver. E: F7, F8 added. F4, F5 values updated. (OHO 2011-11-03)
Ver. F: Reduced number of M1 motor variants (FTH 2011-11-25)
Ver. G: M2: 2ME06405 and 2ME56486 merged into one new ICME version of 2ME56486 (FTH 2013-05-07)

Country Nom. voltage/frequency.	Motor M1	Motor M1 data:	Motor M2	Motor M2 data:	Transformer T2		Fuses F1, F2 & F3	Fuses F4 & F5	Fuses F7 & F8	Variant parts	Ordering number
					Type	Connections					
Japan: 3x200V 50Hz.	Item no.: **15499016** (Delta connection) Gear motor 169 rpm. Cable gland **2NM10472** (M25)	200V/50Hz (S1:) kW = 0,37 Amp = 2,3	Item no. **2ME06205** 1440 rpm. Star/Delta start	240V/50Hz (Delta) (S1:) kW = 4,0 Amp = 15,4	Item no. **2MT72045** Ulveco nr. AA-72045 See diagram 15893451	200 V. Imax. 0,65A Item no. 2x 2XL30402	4 AT (Type: aM) Item no. **2FC10040**	2 AT (Type: aM) Item no **2FC10020**	6 AT (Type: aM) Item no **2FC10060**	Belt wheel Item no. **2JE10125** **2JE92028** . Cable gland	**05896129.** 3x200V/50Hz Mains Fuses 25 Amp.
Norway: 3x220-230V / 50 Hz	Item no. **15499018** (Delta connection) Gear motor 169 rpm. Cable gland **2NM10472** (M25)	230V/50Hz (S1:) kW = 0,37 Amp = 2,15				230 V Imax. 0,65A Item no. 2x 2XL30402					**05896135.** 3x220-230V/50Hz Mains Fuses 25 Amp.
Europe: 3x380-415V / 50Hz.	Item no. **15499018** (Star connection) Gear motor 169 rpm Cable gland **2NM10472** (M25)	415V/50Hz (S1:) kW = 0,37 Amp = 1,24	Item no. **2ME56486** 1430 rpm. Star/Delta start	400V/50Hz (Delta) (S1:) kW = 4,0 Amp = 9,4		400 V. Imax. 0,33A Item no. 1x 2XL30402		1 AT (Type: aM) Item no. **2FC10010**	4 AT (Type: aM) Item no. **2FC10040**	Item no. **2GK20025** **2GK20043** **2GK60022**	**05896146.** 3x380-415V/50Hz Mains Fuses 20 Amp.

Overview, variant parts in Abraplan-20:

BRY/JTV 2010-02-22: Star/Delta added.
JTV 13-02-2007: Fusetype changed in 60Hz versions to Class CC.
Ver. E: F7, F8 added. F4, F5 values updated. (OHO 2011-11-03)
Ver. F: Reduced number of M1 motor variants (FTH 2011-11-25)
Ver. G: M2: 2ME06405 and 2ME56486 merged into one new ICME version of 2ME56486 (FTH 2013-05-07)

Country nom. voltage/frequency	Motor M1	Motor M1 data:	Motor M2	Motor M2 data:	Transformer T1		Fuses F1, F2 & F3	Fuses F4 & F5	Fuses F7 & F8	Variant parts	Ordering number
					Type	Connections					
UL /CSA: USA, Canada, Japan. 3x200-210V / 60Hz.	Item no.: **15499019** (Delta connection) Gear motor 168 rpm. Cable gland **2NM11027** (NPT ½")	208V/60Hz. (Delta) Hp = 0,37 Amp = 2,05	Item no. **2ME56206** 1740 rpm. Star/Delta start	208V/60Hz. (Delta) Hp = 5,4 Amp = 15,9	Item no. **2MT72045** Ulveco nr. AA-72045 See drawing 15893451	200 V. Imax. 0,65A Item no. 2x 2XL30402	4 AT (Class: CC) Item no. **2FC11040**	2 AT (Class: CC) Item no. **2FC11020**	6 AT (Class: CC) Item no. **2FC11060**	Belt wheel Item no. **2JE10106** **2JE91628** Cable gland Item no. **2GK20026** **2GK20045**	**05896130.** 3x200-210V/60Hz Mains Fuses 25 Amp.
UL / CSA: USA, Mexico, S-Korea. 3x220-240V / 60Hz.	Item no. **15499020** (Delta connection) Gear motor 168 rpm. Cable gland **2NM11027** (NPT ½")	240V/60Hz. (Delta) Hp = 0,37 Amp = 1,76	Item no. **2ME06205** 1740 rpm. Star/Delta start	220V/50Hz. (Delta) Hp = 5,4 Amp = 15,9		230 V Imax. 0,65A Item no. 2x 2XL30402					**05896136.** 3x220-240V/60Hz Mains Fuses 25 Amp.
UL / CSA: Canada, Brazil, S-Korea. 3x380-416V / 60Hz.	Item no. **15499020** (Star connection) Gear motor 168rpm Cable gland **2NM11027** (NPT ½")	415V/60Hz. (Star) Hp = 0,37 Amp = 1,01	Item no. **2ME06386** 1740 rpm. Star/Delta start	380V/60Hz. (Delta) Hp = 5,4 Amp = 9,7		400 V. Imax. 0,33A Item no. 1x 2XL30402	4 AT (Class: CC) Artikel nr.: **2FC11040**	1 AT (Class: CC) Artikel nr.: **2FC11010**	4 AT (Class: CC) Artikel nr.: **2FC11040**		**05896147.** 3x380-415V60Hz Mains Fuses 20 Amp.
UL / CSA: USA, Canada. 3x460-480V / 60Hz.	Item no. **15499022** (Star connection) Gear motor 168 rpm Cable gland **2NM11027** (NPT ½")	480V/60Hz. (Star) Hp = 0,37 Amp = 0,88	Item no. **2ME56486** 1730 rpm. Star/Delta start	480V/60Hz. (Delta) kW = 4.8 Amp = 9,5		460 V. Imax. 0,33A Item no. 1x 2XL30402					**05896154.** 3x460-480V60Hz Mains Fuses 20 Amp.

Struers

Pederstrupvej 84
DK-2750 Ballerup
Denmark