

TargetMaster

TargetDoser

TargetZ

TargetX

TargetGrip



FCC Notice

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

Pursuant to Part 15.21 of the FCC Rules, any changes or modifications to this product not explicitly approved by Struers A/S could cause harmful radio interference and void the user's authority to operate the equipment.

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 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.

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



TargetMaster Safety Precaution Sheet

To be read carefully before use

1. The operator(s) should be fully instructed in the use of the machine, any connected equipment and accessories as well as the applied consumables according to the relevant Instruction Manuals.
2. The machine must be placed on a safe and stable work surface with a load-bearing capacity of at least 150 kg, at an adequate working height. All functions on the machine and any connected equipment must be in working order.
3. Operators should ensure that the actual voltage corresponds to the voltage on the back of the machine. The machine must be earthed. Follow the local regulations.
4. Always turn the power off and disconnect from the a.c. mains supply before any disassembly operations.
5. Connect only to cold water. Make sure that the water connections are leak-proof and that the water outlet is working.
6. Struers recommend that the mains water supply is shut off or disconnected if the machine is to be left unattended.
7. Establish efficient exhaust from the working area.
8. Make sure that the grinding or polishing discs are correctly mounted.
9. If you observe malfunctions or hear unusual noises - stop the machine and call technical service.
10. Never look directly into the laser beam at the laser measuring station.
11. Waste alcohol must not be allowed to accumulate in an open container or sink. Use a drain that flushes immediately. If environmental regulations mandate recycling of alcohol, a closed container must be used to collect waste alcohol.
12. Use only with Struers consumables and accessories.

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.).



TargetDoser Safety Precaution Sheet

To be read carefully before use

1. The operator(s) should be fully instructed in the use of the machine, any connected equipment and accessories as well as the applied consumables according to the relevant Instruction Manuals.
2. The machine must be placed on a safe and stable table with an adequate working height. All functions on the machine and any connected equipment must be in working order.
3. Alcohol-based consumables: follow the current safety rules for handling, mixing, filling, emptying and disposal of the alcohol-based liquids.
4. Use only with Struers consumables and accessories.
5. If you observe malfunctions or hear unusual noises - stop the machine and call technical service.

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.).



TargetX **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.

TargetZ **Safety Precaution Sheet**

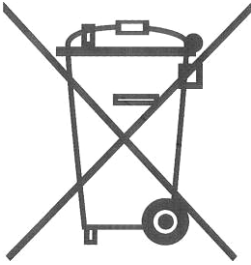
To be read carefully before use

1. The operator should be fully aware of the use of the machine according to the Instruction Manual.

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.).



Disposal

Equipment marked with a WEEE symbol  contain electrical and electronic components and must not be disposed of as general waste.

Please contact your local authorities for information on the correct method of disposal in accordance with national legislation.

Instruction Manual

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1. Getting Started with TargetMaster

Unpacking TargetMaster

- Detach TargetMaster from the bottom of the packing case by removing the four bolts from below.

Placing TargetMaster

- Place TargetMaster on a steady table with an adequate working height. The machine must be close to the power supply, water mains, water outlet facilities and a compressed air supply. Please refer to the Pre-Installation Check List for TargetSystem (available from Struers).

Note

Ensure that there is enough space to position TargetDoser to the left of TargetMaster. Additionally, if TargetZ is used, allow 0.75m to the right of TargetMaster.

Important!

System accuracy is dependent on a temperature-stable environment. Ambient temperature must be 20° C / 68° F ± 2° C / 4° F. Do not place TargetMaster beside a window, or close to other sources of heat or cooling, such as radiators or ventilation ducts.

Checking the Contents of the Packing Boxes

Important!

TargetMaster and its components are precision instruments.
Please take care when handling and storing
as any damage may affect the precision.

In the packing boxes you should find the following parts:

- 1 TargetMaster
- 1 MD-Disc (magnetic turntable, Ø200 mm)
- 2 Mains cables
- 1 Inlet hose 3/4" (2 m)
- 1 Filter gasket (3/4")
- 1 Gasket Ø11/Ø24 (1.5 mm)
- 1 Reduction ring with gasket (Ø1/2" inside / Ø3/4" outside)
- 1 Drain hose Ø32 (2 m)
- 1 87° bend outlet pipe Ø32
- 2 Hose clamps
- 1 TargetGrip
- 1 Compressed air hose (Ø4/Ø6 mm)
- 1 Compressed air connector
- 50 Metal labels for sample chair
- 50 Sample chairs
- 1 Screwdriver – 3 mm Allen key head
- 1 Air exhaust hose Ø50 (2 m)
- 1 Bottle of cyanoacrylate (super glue)
- 1 Stand for TargetGrip/Sample chair
- 1 Set of Instruction Manuals

Getting Acquainted with TargetMaster

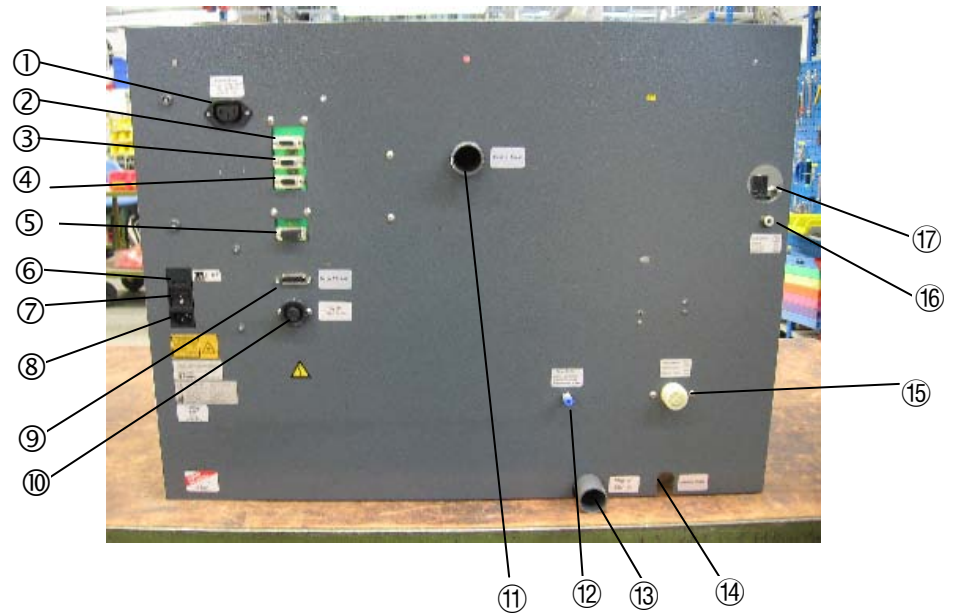
Take a moment to familiarise yourself with the location and names of all the TargetMaster components:

Front of TargetMaster



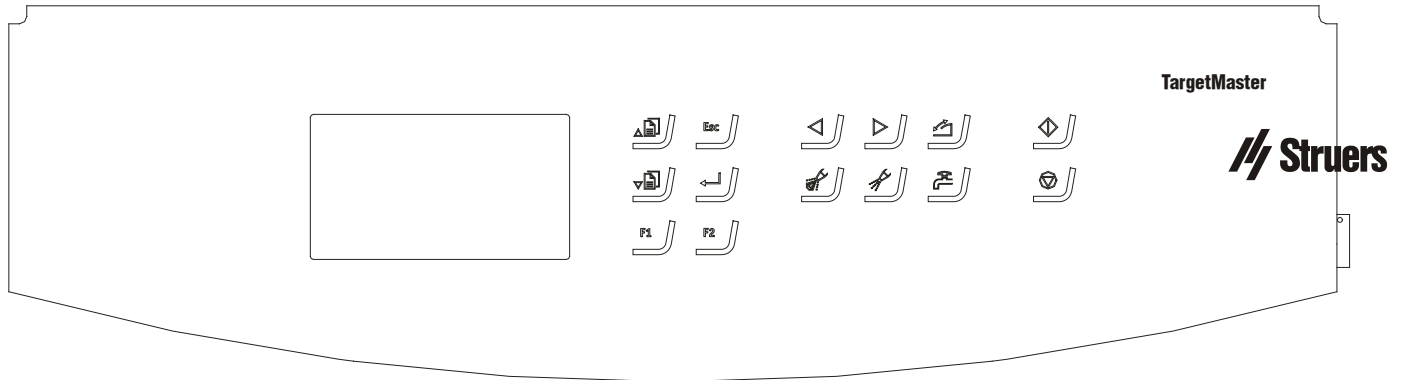
- ① Alcohol rinsing station (+ drying using compressed air)
- ② Sample mover
- ③ Soap and water rinsing station (+ drying using compressed air)
- ④ Multi-nozzle dosing head
- ⑤ Tap for controlling water flow
- ⑥ Turntable with MD-Disc
- ⑦ Laser measuring station

Rear of the TargetMaster

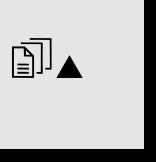
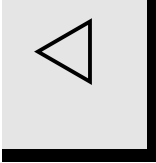
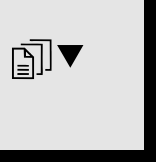
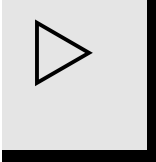
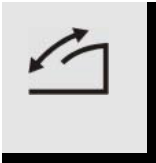
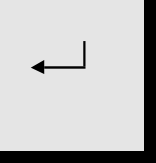
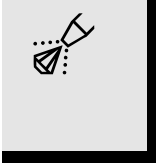
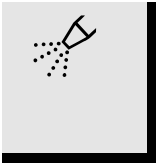


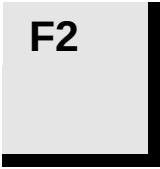
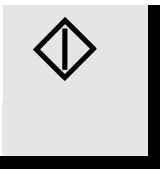
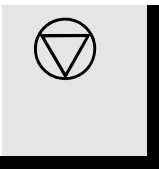
- ① Power socket for TargetZ monitor
- ② Aux socket
- ③ TargetDoser socket
- ④ Aux socket
- ⑤ Service socket
- ⑥ Fuse
- ⑦ On/Off button
- ⑧ Mains connection
- ⑨ TargetZ socket
- ⑩ Power for TargetZ
- ⑪ Exhaust outlet
- ⑫ Water supply for TargetDoser
- ⑬ Water drain outlet
- ⑭ Alcohol drain hose
- ⑮ Water inlet
- ⑯ Compressed air inlet
- ⑰ Compressed air filter and regulator access

Front Panel



Front Panel Controls

Key	Function	Key	Function
	Moves cursor in display upwards or increases the value when editing parameter values.		Moves sample holder to the left.
	Moves cursor in display downwards or decreases the value when editing parameter values.		Moves sample holder to the right.
Esc	Leaves the present menu or aborts functions/changes.		Opens and closes safety guard door while machine is not operating.
	Enables selected parameter values to be activated for editing. Saves the edited parameter values. Toggles when only two parameters available.		Only active when TargetDoser is fitted. Manual override – push button to apply suspension from the doser bottle.
F1	Controls for various purposes. See the bottom line of the individual screens.		Only active when TargetDoser is fitted. Manual override – push button to apply lubricant from the doser bottle.

Key	Function	Key	Function
	Controls for various purposes. See the bottom line of the individual screens.		Manual override - push button (toggle) for manual rinsing. This applies water to cool and rinse samples during preparation and when no process is running.
	Push button for starting the preparation process.		Push button for stopping the preparation process.

Reading the Display

Because the user interfaces for both the TargetMaster and TargetDoser have a common look and feel, the displays for both instruments are described in [TargetSystem User Interface](#), page 61.

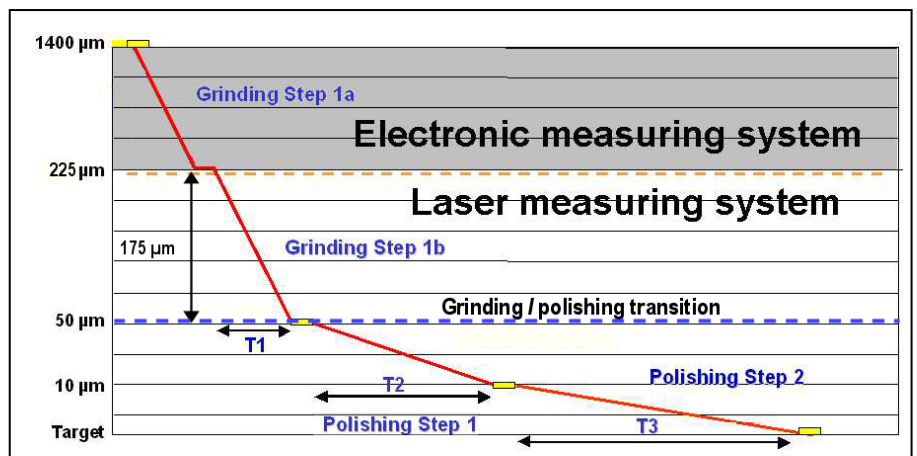
About TargetMaster

In TargetMaster, removal is controlled by two separate measuring systems. Removal in grinding steps until 175 μm from the grinding/polishing transition is controlled by an electronic measuring system, which continuously measures distance to target. In this fashion, the major part of the target distance is covered as quickly as possible. Further removal down to the grinding/polishing transition, and from there to target, is handled by a laser measuring system. The system uses a relative measuring technique, which gives $\pm 5 \mu\text{m}$ system accuracy. The laser measurements necessitate automatic movement of the sample holder from the turntable to the laser measuring station.

Note

If a grinding step starts between 250 μm and 175 μm from the grinding/polishing transition, electronic measurement is not used in this interval, and the laser measuring system is used all the way to the target.

Example of Preparation Process



Supplying Water

Water for wet grinding may be supplied from the water mains, or from an internal distilled water (DI) supply.

Connection to Water Mains

IMPORTANT

The cold water supply must have a head pressure in the range 1 – 10 bar (14.5 – 145 psi)

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

Connection to Water Drain Outlet

- Locate the end of the drain hose where a short length of the steel reinforcement has been stripped away.
- Mount the stripped end of the hose onto the water outlet tube and secure with a hose clamp.
If there is only limited space behind the TargetMaster, use the 87° pipe bend and attach it directly to the outlet tube on the back of the TargetMaster.
Then attach the drain hose to the other end of this bend.
- Lead the other end of the drain hose to the water outlet.
- Arrange the tube so that it slopes downward towards the drain throughout its length. Shorten the hose, if necessary.

Important!

Make sure that the drain hoses (water drain and alcohol drain) slope downward towards the drain throughout its length and avoid sharp bends in the drain hose.

Routing the Alcohol Drain Hose

Waste alcohol from cleaning steps is disposed of via the alcohol drain hose, which must be routed to an alcohol storage container or to a disposal drain. Local environmental regulations may require that waste alcohol is recycled. In this case the alcohol drain hose can be routed to a sealed container. Otherwise the drain hose can be routed to a waste drain.

Note:

Even after thorough filtration, we do not recommend re-using this alcohol for sample preparation in TargetMaster.

Supplying Compressed Air

The quality of the air in the compressed air system used with this machine must meet the standards stated in ISO 8573-1.

To connect the TargetMaster:

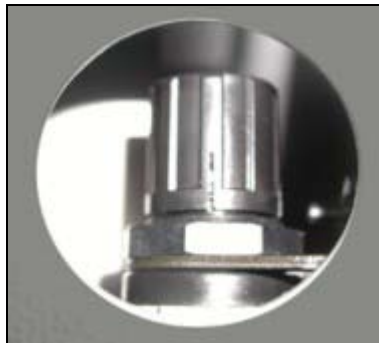
- Mount an air hose on the quick coupling supplied and secure it with the hose clamp supplied.
- Connect the quick coupling to the factory-mounted compressed air hose of TargetMaster.

IMPORTANT

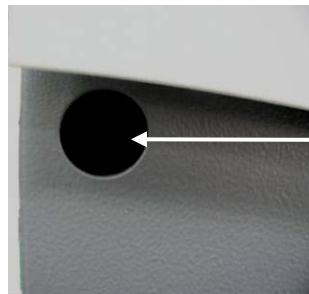
The air pressure must be between 5 bar (72 psi) and 10 bar (145 psi) and have a quality as specified in ISO 8573-1.

Air Pressure Regulator Knob

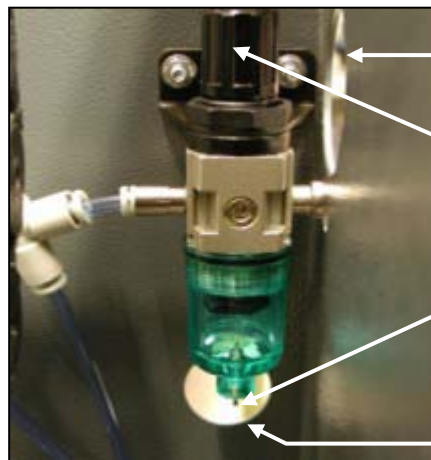
The air pressure regulator knob is visible through the access hole above the compressed air inlet at the rear of the TargetMaster. This is pre-set at the factory and should not be adjusted by the user.



Access to Air Filter



Access hole for air filter
drain valve
(in side panel)



Hole for access to air
pressure regulator knob
(in rear panel)

Air pressure regulator

Tip of air filter drain
valve

Access hole for air
filter drain valve
(in side panel)

TargetMaster is fitted with an air filter that removes trace amounts of water and oil from the compressed air supply. A view of the filter from inside the TargetMaster is shown for reference, but normally the only part of the filter accessible to the user is the tip of the drain valve, which can be seen through the access hole at the left side of the TargetMaster, as shown in the top photograph.

Emptying the Air Filter

The filter needs to be drained periodically. A spluttering sound during drying or ineffective drying are indications that this needs to be done.

- Looking through the filter access hole, locate the filter drain valve on the bottom of the filter glass.
- Press the tip of the drain valve, and hold until no more liquid emerges.

Connection to an External Exhaust System

An exhaust system must be connected:

- Securely connect a hose from your local exhaust system to the outlet at the rear of the TargetMaster using a hose clamp.
-

Supplying Power

Always remember to switch the power off when installing electrical equipment.



DANGER!

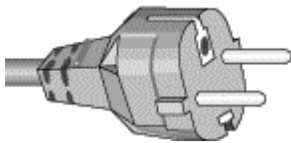
The machine must be earthed

IMPORTANT

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

The TargetMaster is shipped with 2 types of Mains cables:

Single-Phase Supply

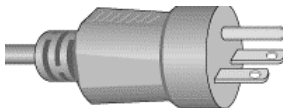


The 2-pin (European Schuko) plug is for use on single-phase connections.

If the plug supplied on this cable is not approved in your country, then the plug must be replaced with an approved plug. The leads must be connected as follows:

Yellow/green: earth
Brown: line (live)
Blue: neutral

2-Phase Supply



The 3-pin (North American NEMA) plug is for use on 2-phase power connections.

If the plug supplied on this cable is not approved in your country, then the plug must be replaced with an approved plug. The leads must be connected as follows:

Green: earth
Black: line (live)
White: line (live)

Connection to the Machine



Both cable types are fitted with an IEC 320 connector, which fits in the socket on the rear of the TargetMaster.

WARNING!

The output voltage from this cable is 200 – 240V and not 110V. DO NOT use this cable to connect equipment that use a 110V power supply. Failure to adhere to this may result in material damage.

Important!

TargetMaster should normally be switched on for at least 45 minutes before use. Struers recommend that TargetMaster is left on at all times (24/24). This helps to maintain the constant internal temperature that is vital for system accuracy.

Fitting MD-Disc

The TargetMaster's turntable is fitted as standard with an MD-Disc, which has a magnetic surface. This enables the abrasive discs (MD consumables), which have a metallic back plate, to remain attached to the turntable without the use of any additional mechanical fixtures or adhesives.

Turntable



MD-Disc



To fit the MD-Disc:

- Place the MD-Disc on the turntable, and rotate the disc until the pins on the underside of the MD mate with the corresponding holes in the turntable
- Ensure that the MD-Disc is fully seated by pressing down at several places around the disc.

Fitting Abrasive Discs

To fit an abrasive disc (MD consumable):

- If there is a disc already fitted on the magnetic surface, remove it by lifting it at the edge.
- Check that the magnetic surface is dry and free of any loose material.

Important

If the magnetic surface is not clean and dry,
the abrasive disc may not lay flat on the turntable.

- Place the new abrasive disc over the turntable, making sure that the turntable and the disc are centred on each other.
- Lower the disc into position until it is held securely by the magnet.

Dressing Diamond Pad Discs

Diamond Pad discs must be used with the diamond surface exposed properly through frequent dressing. Otherwise, the disc will glaze over, and will begin to tear rather than grind. However, use of dressing sticks on Diamond Pad is not recommended. Instead, use a stiff brush, soap and water.

Cleaning Diamond Pad Discs

Material from the plastic sample chair can accumulate on the surface of the Diamond Pad discs and reduce the removal rate. The discs should be cleaned after each use using a stiff brush, soap and water.

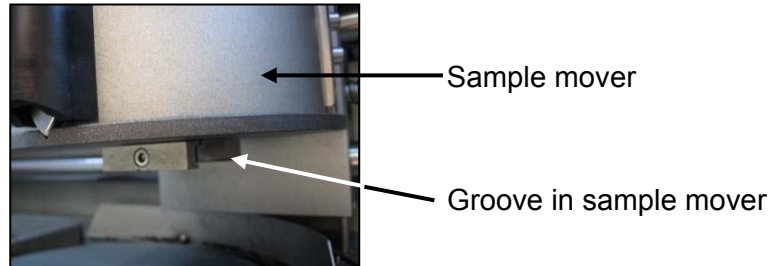
Checking the Water Supply

- Once the abrasive disc has been placed on the turntable, the water supply should be checked:
- Ensure that a grinding or polishing disc is correctly placed on the turntable.
- Open the water flow tap in the TargetMaster rinsing station to verify that an appropriate flow rate can be obtained. Regulate the flow rate by increasing the flow until splashing just occurs, then slightly reducing the flow.

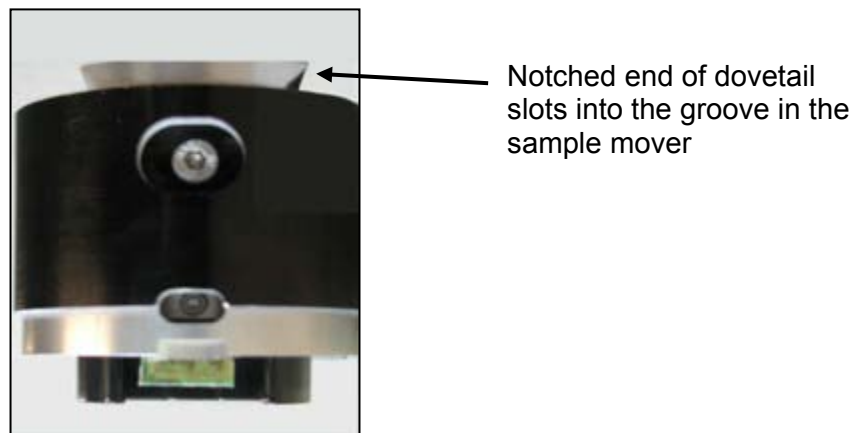
Mounting TargetGrip

The samples are secured in a TargetGrip, which has a dovetail end. This enables samples to be shuttled between TargetMaster, TargetZ, TargetX, and a microscope, without any loss of accuracy.

TargetMaster Measuring Station



TargetGrip



- With the sample fitted in the TargetGrip, insert the dovetail end of the TargetGrip into the groove on the sample mover in the direction indicated.

- Slide the dovetail in and secure the TargetGrip using the 3 mm screwdriver supplied.



The sample is now ready for grinding/polishing.

2. Getting Started with TargetDoser

Unpacking TargetDoser

- Remove TargetDoser from the foam packing.

Placing TargetDoser

- Place TargetDoser to the left of TargetMaster, and as close as possible without it interfering with the operational condition of the TargetMaster.

Note

The tubes linking the TargetDoser and the TargetMaster are pre-fitted on the TargetDoser. These tubes limit the distance between the two units.

Checking the Contents of the Packing Box

In the packing box you should find the following parts:

- 1 TargetDoser
- 1 Dosing bottle box with built-in pumps, 3 large and 4 small bottles
- 1 Bottle of soap solution (1L)

Getting Acquainted with TargetDoser

Take a moment to familiarise yourself with the location and names of all the components:

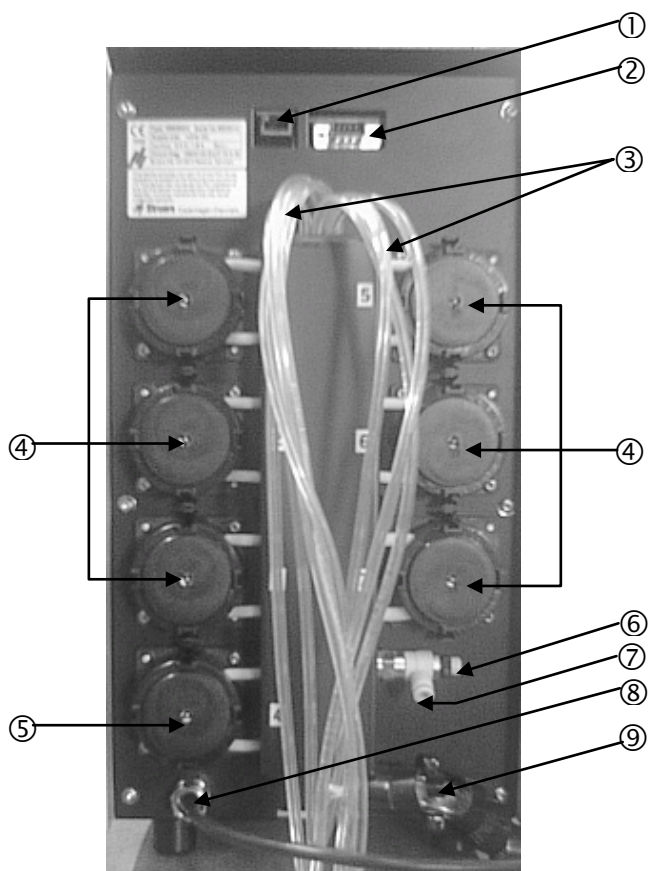


Back of TargetDoser

TargetDoser comes fitted with 7 pumps:
Pumps 1 – 4 Diamond suspensions or lubricants
Pump 5 Alcohol
Pump 6 Soap
Pump 7 OP suspensions

Note

This pump allocation is very specific and must not be altered.
The dimensions of Pumps 5 – 7 are not the same as the dimensions of the other pumps, as they are fitted to do a specific job.



- ① Network socket (RJ45 connector)
- ② Service socket (serial port connector)
- ③ Supply tubes from lubricant / suspension bottles
- ④ Pumps (1 to 6)
- ⑤ OP-Suspension pump
- ⑥ Regulation valve for water pressure
- ⑦ Water connection from TargetMaster for OP-pump
- ⑧ Power and interface connection from TargetMaster
- ⑨ Tubes going to the TargetMaster multi-dosing head via the connectors on the left side of TargetMaster

Front Panel



Front Panel Controls

Key	Function
F1	Controls for various purposes. See the bottom line of the individual screens.
F2	Controls for various purposes. See the bottom line of the individual screens.
F3	Controls for various purposes. See the bottom line of the individual screens.
F4	Controls for various purposes. See the bottom line of the individual screens.

Key	Function
	Moves cursor in display upwards or increases the value when editing parameter values.
	Moves cursor in display downwards or decreases the value when editing parameter values.
Esc	Leaves the present menu or aborts functions/changes.
	Enables selected parameter values to be activated for editing. Saves the edited parameter values. Toggles when only two parameters available.

Reading the Display

Because the user interfaces for both the TargetMaster and TargetDoser have a common look and feel, the displays for both instruments are described in in [TargetSystem User Interface](#), page 61.

Connecting TargetDoser

TargetDoser supplies the grinding/polishing suspensions and lubricants as well as pre-defined grinding/polishing procedures. The TargetDoser unit is supplied with power and water from the TargetMaster:

Electrical Connections

The electrical connection from the TargetMaster supplies the TargetDoser with a 24V power supply to TargetDoser and a data bus, which enables the two machines to communicate together.

- Switch off the TargetMaster.
- Connect the cable from the rear of TargetDoser to the TargetDoser socket on the rear of the TargetMaster.

Supplying Water for OP Flushing

- Push the water tube supplied onto the quick fit connector on the rear of the TargetMaster.
- Take the other end of the water tube and push it onto the quick fit connector on the rear of TargetDoser.

Important!

Do not push the water tube all the way into the connector as that might squeeze the tube and reduce the water flow.

TargetDoser Pump Connections

The TargetMaster is fitted with a 5-nozzle dosing head for the application of lubricants and suspensions, which are supplied through the TargetDoser. TargetDoser comes complete with tubing to allow it to be connected to the side of the TargetMaster.

Note

The length of the tubes between TargetDoser and TargetMaster determines the distance between the two units. The factory-mounted tubes are of optimal length and it is not recommended that this length be increased.

Connecting TargetDoser Tubes to the TargetMaster

Each tube is numbered according to the pump to which it is connected:

- Connect the tube from pump number 1 to the connector on the side of TargetMaster labelled number 1.
- Repeat until all the tubes are connected to the TargetMaster.

Dosing Tube Connectors on TargetMaster



LAN Option

If a LAN card is fitted in TargetDoser, the optional MethodPro software can be used. MethodPro is a database program that can be run on a PC to store or edit an unlimited number of preparation methods for TargetMaster or several other Struers equipment. The stored methods can be quickly downloaded to TargetMaster via the LAN connection. Another use of the software is to make backup copies of user methods. MethodPro is also useful for changing the internal reference table of consumable materials when product changes are made by Struers.

3. Getting Started with TargetGrip

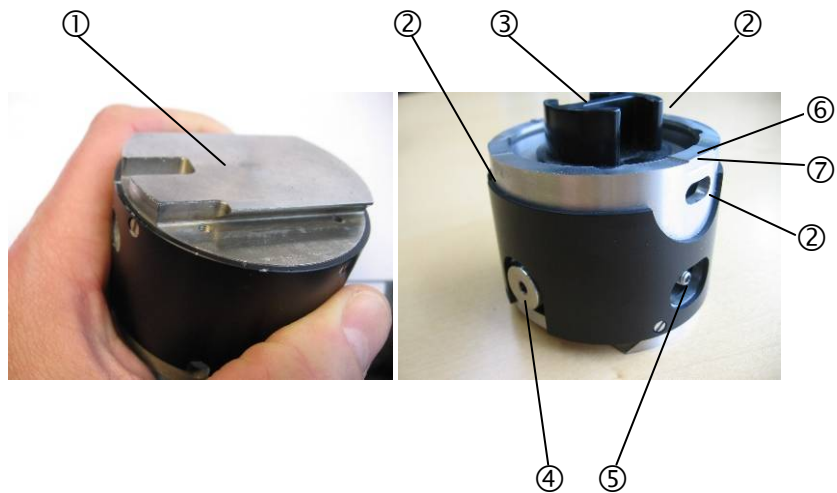
Checking the Contents of the Packing Box

In the packing box you should find the following parts:

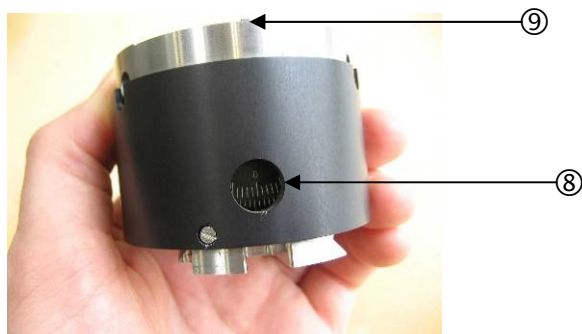
- 1 TargetGrip
- 1 2 mm Allen screwdriver

Getting Acquainted with TargetGrip

Take a moment to familiarise yourself with TargetGrip's components:



- ① Dovetail connector with orientation notch
- ② Locking screws for mounts/adapters
- ③ Sample chair (cross-sectioning adapter used with TargetGrip)
- ④ Tilt adjustment screw
- ⑤ Tilt locking screw
- ⑥ Reference plane
- ⑦ Reference edge
- ⑧ Tilt scale (each division = 2°)
- ⑨ Alignment plane



About TargetGrip

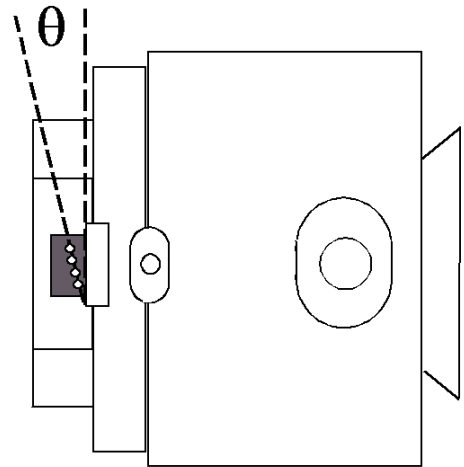
TargetGrip, together with the sample chair/holder, contains two design features that make it a unique sample holder:

- Tilt mechanism
- Dovetail connector

Tilt Mechanism

The tilt mechanism enables you to adjust the sample chair/holder so that the samples are ground with the grinding surface parallel to the target area to be inspected.

Max. tilt θ to
target plane: $\pm 5^\circ$



The tilt mechanism is normally used when the TargetGrip is mounted in TargetZ or TargetX. This allows you to align the target area with the cross-hairs displayed on the video monitor.

To adjust the tilt:

- Loosen the tilt locking screw.
- Use the tilt adjustment screw to change the angle of tilt for the sample, so that the target area is parallel to the lines illustrated on screen. On TargetX the tilt is done by a motor controlled by the keys on the TargetX console.
- Tighten the tilt locking screw to secure the alignment.

IMPORTANT

Failure to tighten the tilt locking screw may cause loss of alignment and thus failure to reach the intended target plane.

Dovetail Connector

The dovetail connector enables TargetGrip to be removed from TargetMaster at any time during the grinding or polishing process for viewing or inspection. It is recommended to use an inverted microscope with the Target system, for the sample chair to remain clamped in TargetGrip, so that it can be returned to the process without any loss of precision or need for re-alignment.

TargetGrip on inverted microscope



The dovetail connector is compatible with the dovetail fixture on the Struers precision cut-off machines Accutom and Secotom. Thus specimens can be cut whilst retaining alignment - saving time where a large amount of material needs to be removed.

*Mounting Holders/Adapters in
TargetGrip*

- Place the holder/adapter in TargetGrip.
- Rotate the holder/adapter so that the sample is facing the reference area. See [Getting Acquainted with TargetGrip](#).
- Rotate/rock the sample holder/adapter so that pins on the back of the holder/adapter click into the corresponding guide holes in the TargetGrip.

Guide Pins in Sample
Holder/Adapter



- Use the 2 mm Allen screwdriver to secure the holder/adapter in the TargetGrip.
- Using the dovetail connector, mount the TargetGrip in the set-up station. Use the TargetZ/ TargetX instructions to align the sample if necessary and obtain the target value.
- Remove the TargetGrip from the set-up station.
- Clean the Reference surface with alcohol to ensure that it is clean and free from grease or mounting residue. Alternatively, use the Initial cleaning programme on TargetMaster.

The TargetGrip is now ready to be mounted in the TargetMaster's sample mover.

HOLDERS and Adapters

TargetSystem features a range of specimen holders and adapters suitable for both cross-sectioning and parallel polishing.

The holders and adapters should be used whenever possible as they are specifically designed with a neutral black surface, providing the perfect background for the laser measuring system.

The laser measuring system keeps track of material removal by measuring on the holder/ adapter and not the sample.

For some applications it may be desirable to clamp a full 30 or 40 mm mount into TargetGrip. In this case, laser measuring is done directly on the sample surface. Please see the section "[Clamping Mounts Directly into TargetGrip](#)" later in the manual

The following holders/adapters are available for use with TargetGrip:

- Sample chair for 40 mm dia. TargetGrip
- Sample chair for 30 mm dia. TargetGrip
- Parallel holder for 40 mm dia. TargetGrip
- Parallel holder for 30 mm dia. TargetGrip
- Mould insert for 40 mm dia. TargetGrip
- Ø40 to Ø25 Ø30 mm/SEM adapter

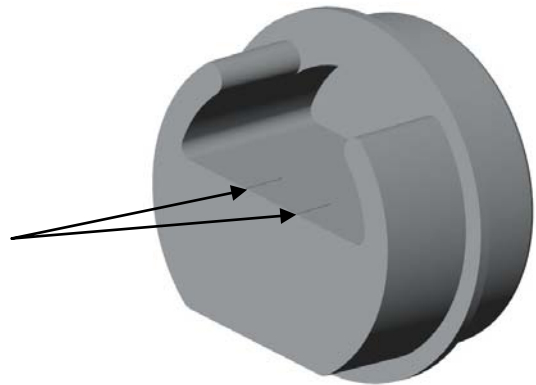
Sample Chair

Sample chair is a single-use consumable developed specifically for 90° positioning of a specimen for cross-sectioning. The sample chair is clamped into TargetGrip, and the target aligned and measured in either TargetX or TargetZ.

Precision

The sample chair has markings to indicate the area within which the maximum accuracy of $\pm 5 \mu\text{m}$ can be achieved. The area corresponds to ca 10 x 6 mm (w x d), the width of which is equal to the width of the reference edge on TargetGrip. At the same time, the markings indicate the maximum depth to which a specimen can be polished (6 mm from the edge).

*For maximum
precision, place
target between
these lines*



Specimen Dimensions

The maximum specimen size that will fit into the sample chair:

40 mm sample chair: (w x d) 29 x 20.5 mm

30 mm sample chair: (w x d) 23 x 20.5 mm

The target area of a specimen must be within 6.0 mm from the front edge of the sample chair.

The target may be positioned right along the front edge of the sample chair. However, as a polished surface is required for the inspection, we recommend that the target area is at least 0.5 mm from the front edge of the sample chair.

For specimens too large to fit on the shelf of the sample chair, a Mould Insert can be used. See [Mould Insert](#) on page 35.

Overall, the capacity of TargetGrip and its adapters is based on the measuring range of the laser measuring system, which is 0-10 mm.

Specimen Height

IMPORTANT!

Maximum total height of a sample chair/mould insert/parallel holder with sample must not exceed 24 mm. Exceeding the allowed maximum height may result in incorrect laser measurements and/or collision in TargetMaster.

Failure to observe the 24 mm height limitation may cause the specimen to collide with the cover of the laser measuring system.

This problem is even more likely to occur if the specimen is fully tilted. Should the mount exceed 24 mm, excessive material must be removed before the mount is fixed into TargetGrip.

Minimum total height of the mounted specimen is less critical, since TargetMaster is preset with a minimum acceptable height of 17 mm, to prevent damage to TargetGrip.

IMPORTANT

Specimens affixed to the sample chair should be positioned so that the target plane is within 0.5-6 mm from the top of the sample chair before any material is removed. The specimen must not exceed the edge of the sample chair

Mounting Specimens in Sample Chair

- Using “superglue” or wax, secure the sample in the sample chair. Make sure that the target to be inspected is parallel (or nearly parallel) to the edge of the sample chair, within the guide markers, and positioned in the area from 1 to 6 mm below the top edge.

IMPORTANT!

To ensure correct laser measurements, the measuring point on the sample chair must be clean and planar. If glue is accidentally spilled onto the surface of the sample chair, remove it immediately, or use 800 grit SiC paper for cured glue.

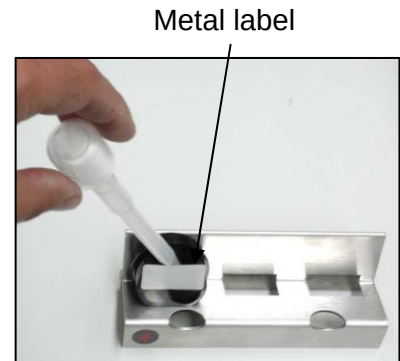
Resin Mounting (Optional)

When the Sample Chair is filled with resin, it needs to be supported while the resin is poured and while it is curing. The stand (supplied with TargetMaster) is used for this purpose. It can support 3 sample chairs or 2 TargetGrips (with sample chairs). A Sample Chair holder is also available for mounting samples under vacuum.

Resin Mounting with TargetX

If a sample needs to be set in resin and subsequently examined with TargetX:

- Mount the sample in the sample chair.
- Place a metal label (supplied with TargetMaster) on the sample chair.



- Place the sample chair on the stand.
- Mix the resin and use a pipette to pour the resin into the sample chair until the sample is completely covered.
- Allow the resin to cure and then remove the metal label.

Resin Mounting with TargetZ

IMPORTANT

If TargetX is used, the sample chair may be filled with resin (to support the specimen) prior to measurement. However, if TargetZ is used, resin may be filled into the sample chair only after the target value measurement has been made, since resin will affect the precision of the measurement.

- Mount the sample on a sample chair
- Secure the sample chair in TargetGrip.
- Measure the distance to target in TargetZ.
- Remove TargetGrip from TargetZ
- Place a metal label (supplied with TargetMaster) on the sample chair.
- Place TargetGrip on the stand.
- Mix the resin and use a pipette to pour the resin into the sample chair until the sample is completely covered.
- Allow the resin to cure and then remove the metal label.

TargetGrip on Stand



Sample Chair Holder for CitoVac

For larger numbers of samples or for samples requiring a vacuum to be mounted (e.g porous samples), a special Mount holder is available for use in CitoVac – the vacuum impregnation unit from Struers.

(For Instructions of use, please refer to the CitoVac manual.)



The holder can support up to 6 x 30 mm and 5 x 40 mm Sample Chairs.

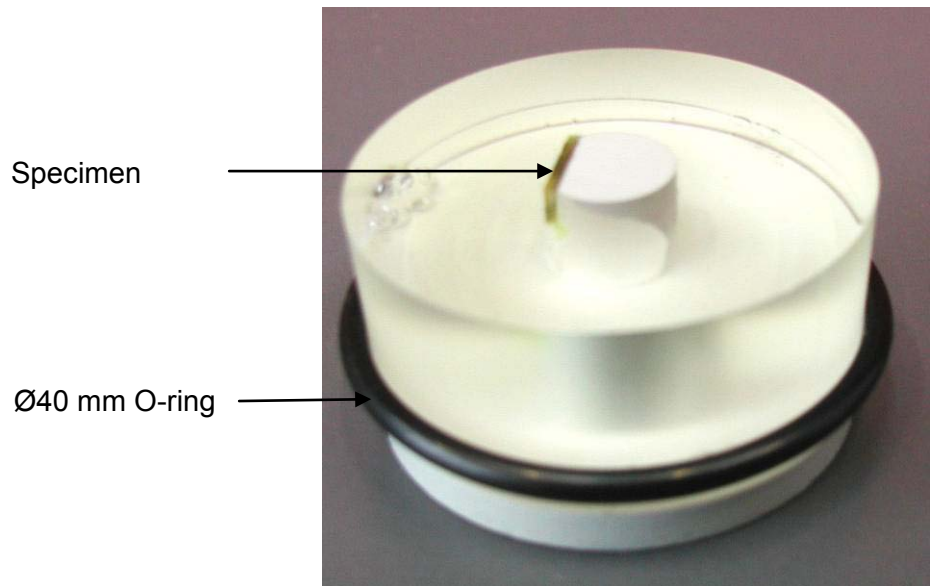
Parallel Holder

TargetMaster is primarily designed for cross-sectioning. However, less demanding parallel polishing may be accomplished using the parallel holder.

Please see the section on [Parallel Polishing](#) later in the manual.

Mould Insert

The mould insert is used to mount cross-sections of specimens, which do not fit into the sample chair. The capacity of the mould insert is (w x d) 35 x 20 mm. The mould insert is clamped into TargetGrip in the same fashion as the sample chair.



IMPORTANT!

The Ø40 mm O-ring supplied with TargetGrip must be used with the mould insert and when mounts are clamped in TargetGrip. Failure to do so can result in water getting in under the mould insert during preparation, seeping out during cleaning, and causing incorrect measuring.

Preparing the Mould Insert

- Glue the specimen onto the stem of the insert.
- Place the mould insert in an ordinary 40 mm dia. mount cup.
- Pour mounting resin into the mould.



IMPORTANT!

Do not fill the mould beyond the top of the mould insert.
Exceeding the allowed maximum height of the mount of 24 mm
may result in incorrect laser measurements.

Clamping Mounts Directly into TargetGrip

For some applications it may be desirable to clamp a full 30 or 40 mm mount into TargetGrip. In this case, laser measuring is done directly on the sample surface.

To avoid incorrect initial measurements, the mount should first be plane ground (planarized).

Some highly reflective surfaces may cause the laser measuring system to fail to recognise the sample, e.g. when a die is cleaned manually prior to the preparation. The solution is to run a manual cleaning process on TargetMaster after which an ultrathin alcohol-coat will cover the surface.

At the final polishing steps, high reflectivity may cause errors. To overcome this, the steps are converted from *Removal Mode* to *Time Mode*.

Tips when clamping full mounts:

- Place an O-ring at the base of the mount, to prevent water seeping underneath the sample. Trapped water may seep out during cleaning and contaminate the surface.
- More conservative IRR values should be used when preparing highly reflective materials such as silicon.
- If the mount is not tall enough place a washer underneath the mount (TargetMaster will alert the user if this is the case).

4. Getting Started with TargetZ

Unpacking TargetZ

Placing TargetZ

- Remove TargetZ from the foam packing.
- Place TargetZ on a flat level surface, as close to the TargetMaster as possible without impeding access to the TargetMaster.
- Place the 15-inch TFT monitor so that you can view the screen while operating the controls on TargetZ.

Note

The power supply and the communication bus between the TargetZ and the TargetMaster have a pre-defined length. These cables determine the maximum distance between the two units.

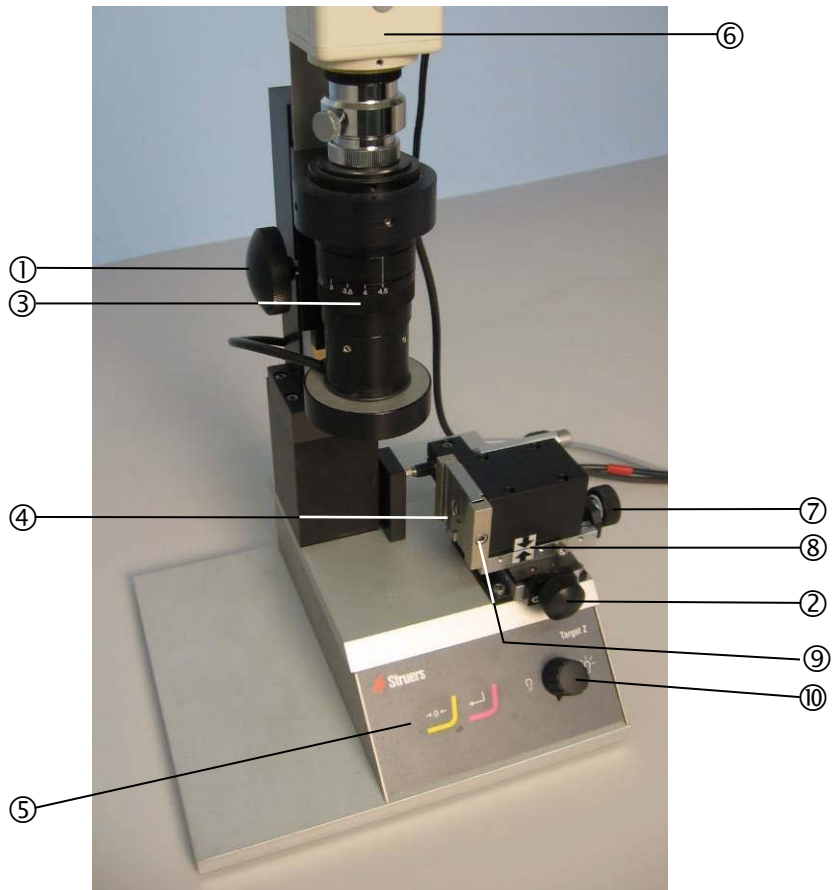
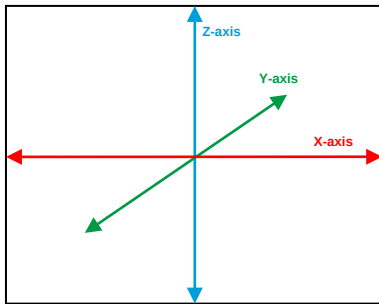
Checking the Contents of the Packing Box

In the packing box you should find the following parts:

- 1 TargetZ
- 1 Camera
- 1 TFT monitor (15-inch) with 5µm division crosshairs
- 1 Set of cables for the camera (power supply and monitor cable)
- 1 User's Guide for TargetZ video camera

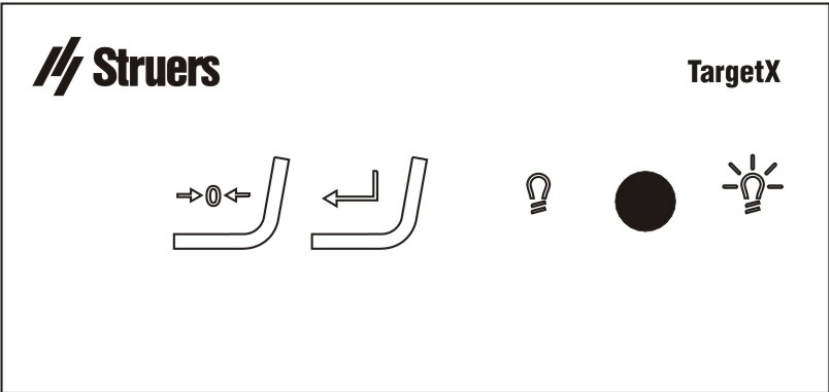
Getting Acquainted with TargetZ

Take a moment to familiarise yourself with the location and names of all the components:



- ① **z-axis adjustment**
Knob to adjust vertical position of camera in z-axis.
Movement up (ccw) and down (cw) for focusing image
- ② **y-axis adjustment**
Knob to adjust horizontal position of camera in y-axis. Movement backward (ccw) and forward (cw)
- ③ Magnification (zoom) adjustment barrel on camera lens
- ④ Dovetail connector to secure TargetGrip
- ⑤ Front Panel
- ⑥ Video camera
- ⑦ **x-axis adjustment**
Knob to adjust horizontal position of TargetGrip in x-axis.
Movement left (ccw) and right (cw)
- ⑧ x -axis alignment arrows
- ⑨ Screw for securing TargetGrip
- ⑩ Light intensity adjustment

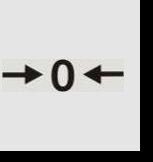
Front Panel



Front Panel Controls

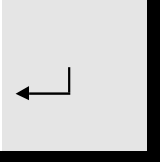
Key

Function



"Zero" setting button

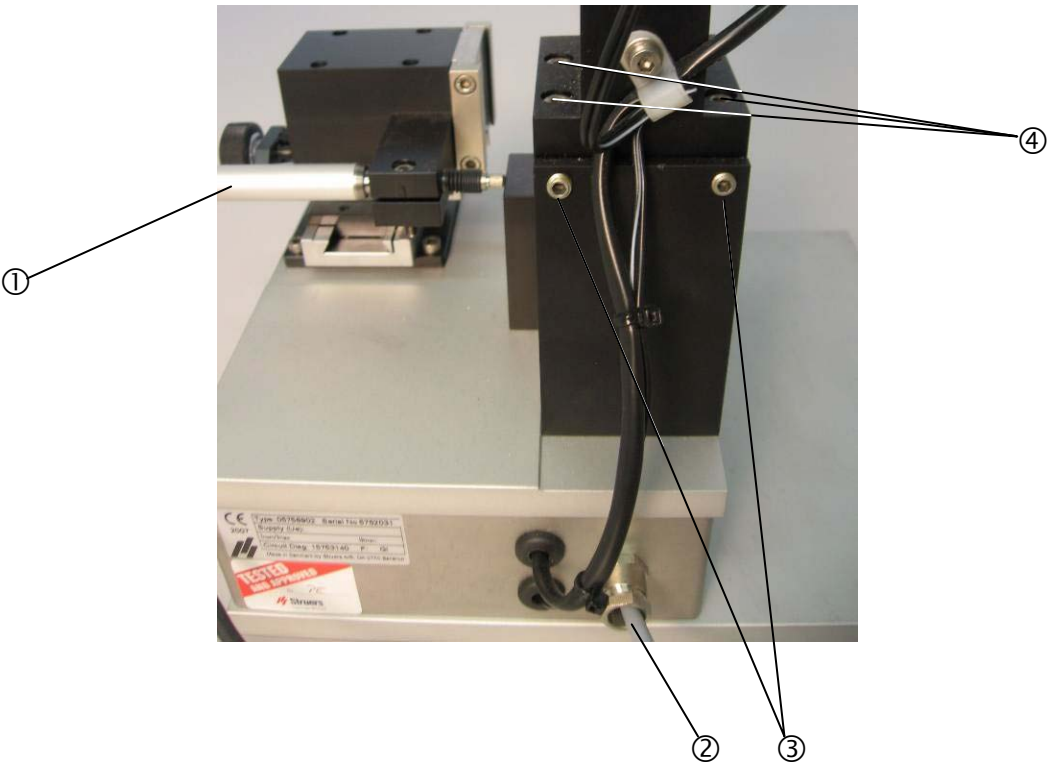
Function



Transfer button (send measurement to TargetMaster)

Rear of TargetZ

- ① Data communication between TargetZ and TargetMaster
- ② Power supply from TargetMaster
- ③ Camera alignment screws
- ④ Locking screws for camera stand



Electrical Connections

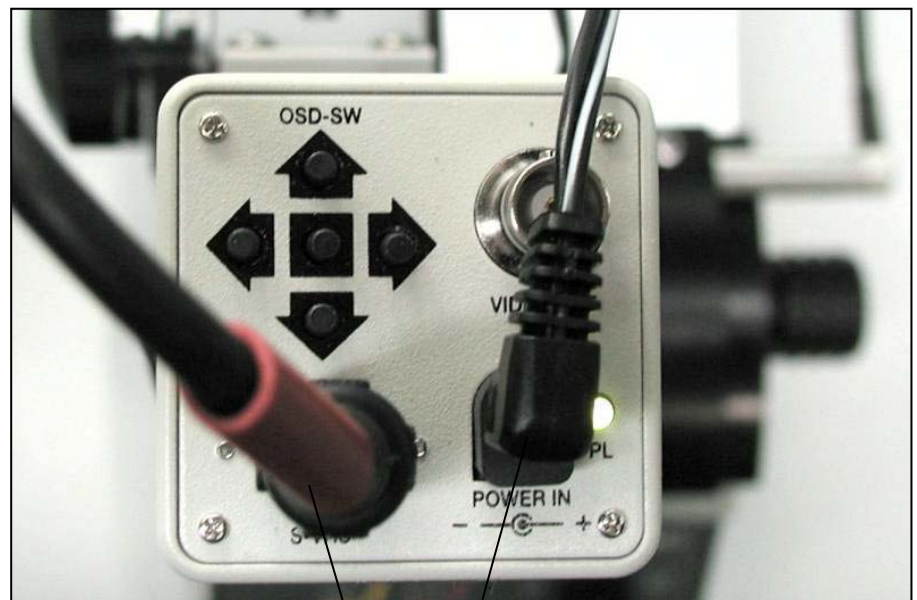
There are two electrical connections between the TargetMaster and TargetZ. The 24V power supply for TargetZ and a data bus enable the two machines to communicate together. In addition, the camera and monitor must be connected.

Note

To locate and identify the connectors on the TargetMaster, refer to the Getting Acquainted with TargetMaster.

- Switch off both TargetMaster and TargetZ.
 - Use the power cable attached to the rear of TargetZ and connect it to the power out connector on the rear of TargetMaster.
 - Use the data communication cable attached to the rear of TargetZ and connect it to the 15-pin connector on the rear of the TargetMaster.
-
- Connect the S-VHS cable from the monitor to the connector at the top of the video camera.
 - Connect the camera power cable attached to the rear of the TargetZ to the power connector at the top of the video camera.
 - Connect the DC cable from the mains adapter for the monitor to the monitor.
 - Connect the mains adapter power cable to the female IEC socket on the rear of TargetMaster.

Connecting the Camera and Monitor



- ① S-VHS cable to monitor
- ② Camera power cable from TargetZ

About TargetZ

TargetZ can be used in two ways, *Removal Mode* and *Target Mode*:

Target Mode

To determine the distance from the reference edge of TargetGrip to the target area to be inspected.

Removal Mode

To determine the distance from the edge of the sample chair (the reference edge) to the target area to be inspected.

The different types of preparation modes are described in [Preparation Methods](#) on page 91.

Calibration

The calibration of TargetZ should be done prior to first use, and should be checked on a regular basis. This is done using a polished sample chair. See [Calibration of TargetZ](#) on page 80.

Geometry

Even with it aligned correctly, the y-axis is not perfectly perpendicular to the x-axis along the entire length of the y-axis. A small parallel displacement of the camera relative to the sample occurs with adjustment in the y-plane. However, since the measurement of the distance between the target plane and reference edge is relative, and no movement is made in the y-plane between the two measurement points, accuracy is unaffected by any parallel displacement.

Video Camera

The camera can be adjusted. See the User's Guide supplied with the camera.

Using TargetZ

The following procedure describes *Target Mode*.

The procedure to obtain the distance for a *Removal Mode* operation is similar. For *Removal Mode* the edge of the sample chair is used for reference instead of the reference edge.

Note

Before starting this procedure, the preparation method must be selected on the TargetDoser and transferred to the TargetMaster. The sample must be affixed to the sample chair/holder, but resin must not have been used on the sample at this point.

Important!

Before measuring samples on TargetZ, make sure that they are at room temperature. If this is not the case, you may introduce an inaccuracy in the measurements for Removal and Target modes

Important!

When measuring on TargetZ, it is recommended that both the reference plane and target plane are approached from the same side, ideally from the left side. Thus, when looking at the monitor, the target plane/reference edge should be aligned with the vertical crosshair by slowly moving the target plane/reference edge in from the RIGHT side until it is aligned with the crosshair.

If the target is moved past the crosshair, move the target to the far right side of the crosshair, and re-approach the crosshair from the right side.

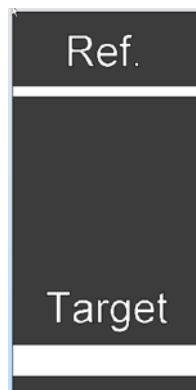
If, during the following procedure, you are not sure which [axis adjustment knob](#) is being referred to, please refer to page 39.

Using Target Mode the distance between a specific target and the reference edge on TargetGrip is determined. The TargetZ camera is firstly used to align and focus on the target and then on the reference edge.

It is possible to carry out the measuring process in reverse order, ie the reference edge is measured first, and the target second. However, it is very important that TargetGrip is not moved on the Y-axis between the two measurements as this will result in a loss of precision.

Locating the Target Plane

- Using the z-axis adjustment knob, move the camera to the top position (Marked “Ref.” on the label).



- Insert TargetGrip in the dovetail connector and secure it using the screwdriver supplied. See [Getting Started with TargetGrip](#) on page 26.
- Using the z-axis adjustment knob, move the camera down until the target plane is in focus (Marked “Target” on the label).
- Turn the camera lens barrel counter-clockwise to set to its lowest magnification (zoom out).
- Use the x-axis knob to bring the target into view.
- Adjust the focus with the z-axis knob.
- If the target is not centred on the y-axis, use the y-axis knob to centre the target.
- Unlock the TargetGrip tilt mechanism and tilt using the 3 mm screwdriver until the target is aligned parallel to the vertical crosshair on the monitor (see [Tilt Mechanism](#) on page 27).



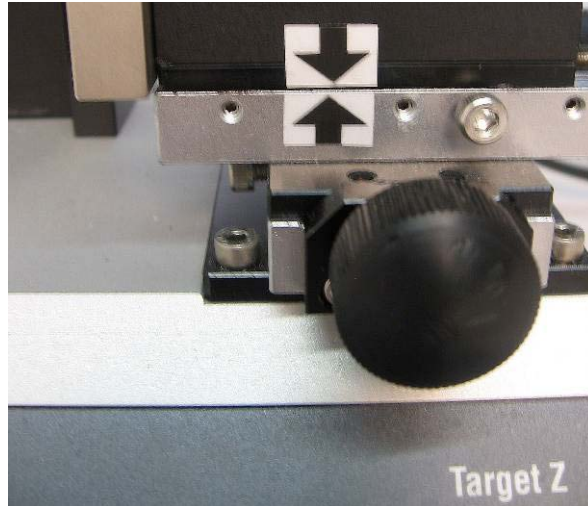
- Lock the tilt mechanism on TargetGrip.
- Increase the camera magnification to maximum by turning the lens barrel fully clockwise (adjust the light intensity as necessary).
- Adjust the focus with the z-axis knob for a sharp image of the target.
- Slowly turn the z-axis knob, moving the camera upward until the image becomes less sharp
- Turn the z-axis knob very slowly in the opposite direction (camera moves downward) until the target is in focus
- Turn the x-axis knob clockwise to bring the target to the right of the centre line on the monitor
- Slowly turn the x-axis knob counter-clockwise to align the target with the centre line on the monitor.
- Press the “zero” setting button → 0 ← on the control panel. This transfers the zero setting to the TargetMaster.

Important!

Do not adjust the y-axis or the camera barrel (magnification) between this step and the step where the reference edge is entered in the TargetZ control panel.

Locating the Reference Edge

- Turn the x-axis knob counter-clockwise, moving TargetGrip to the far left until the two arrows are aligned.



- Turn the z-axis knob, moving the camera upwards until the reference plane is in focus (Marked "Ref." on the label).
- Slowly turn the z-axis knob, moving the camera upward until the image becomes less sharp.
- Turn the z-axis knob very slowly in the opposite direction (camera moves downward) until the reference plane is in focus again.
- Slowly turn the x-axis knob counter-clockwise to move the reference edge towards the crosshair (from the right hand side) and align the reference edge in the centre of the screen.
- Press $\leftarrow$ to transfer the target distance to TargetMaster (this distance is now displayed as the Target Value on the TargetMaster).

Important!

The camera must be at maximum magnification when the $\rightarrow 0 \leftarrow$ (target) and $\leftarrow$ (reference edge) buttons are pressed.

- Raise the camera to its top position.
- Unlock and remove the TargetGrip.

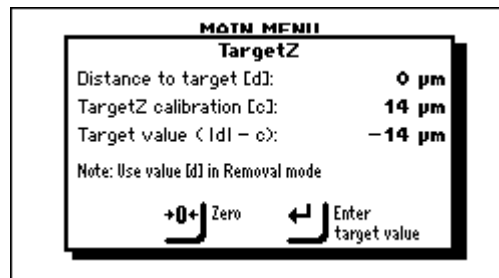
Optional

If the sample is to be set in resin in a sample chair using resin barrier tape, it is now ready for this process. See [Mounting Holders/Adapters in TargetGrip](#) on page 29.

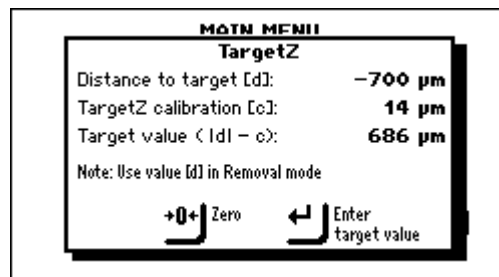
Using TargetZ as a Measuring Station

TargetZ can also be used as a measuring station at any time. In Removal Mode for example, it is possible to measure distances, which can then be entered in TargetMaster. The sample must be mounted in a sample chair.

- Use the x-axis adjustment knob to position one measuring point at the vertical cross hair on the TargetZ monitor.
- Press →0← on TargetZ. "0" is shown in the TargetMaster display. (Ignore the middle and lower values.)



- Use the x-axis adjustment knob to position the other measuring point at the vertical cross hair on the TargetZ monitor. The distance between the points can now be read on the TargetMaster display (the value at the top).



If TargetMaster is used in *Target Mode*, it will automatically pick the lower *Target value*.

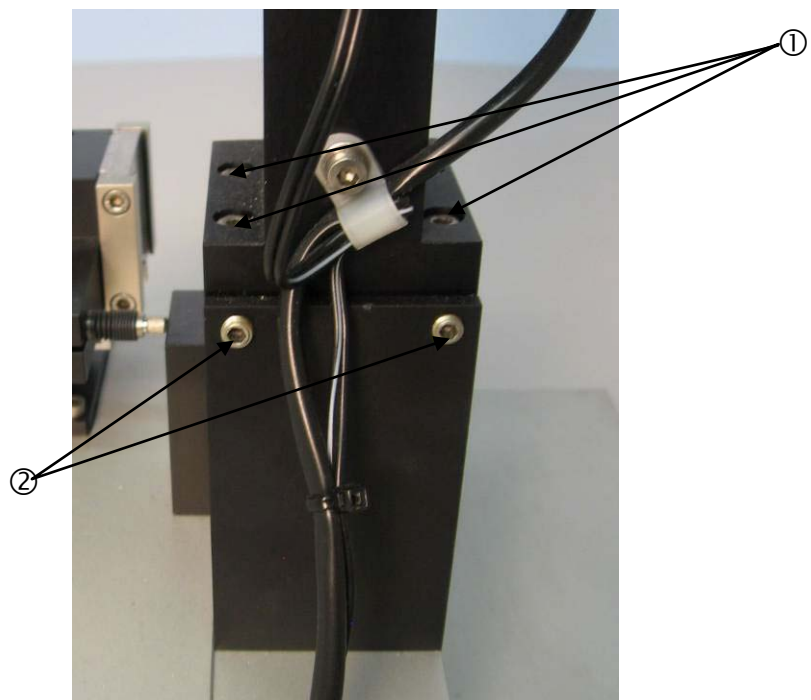
If the measurement is used for *Removal Mode*, use the the upper value, *Distance to target*, and manually enter the value in TargetMaster.

Camera Alignment

The camera alignment is factory adjusted. However, should the camera or TargetZ be knocked or roughly handled, it may be observed that the reference edge cannot be aligned with the vertical crosshair on the monitor over the entire width of the reference edge. In this case, a camera alignment is necessary.

With TargetGrip mounted in TargetZ:

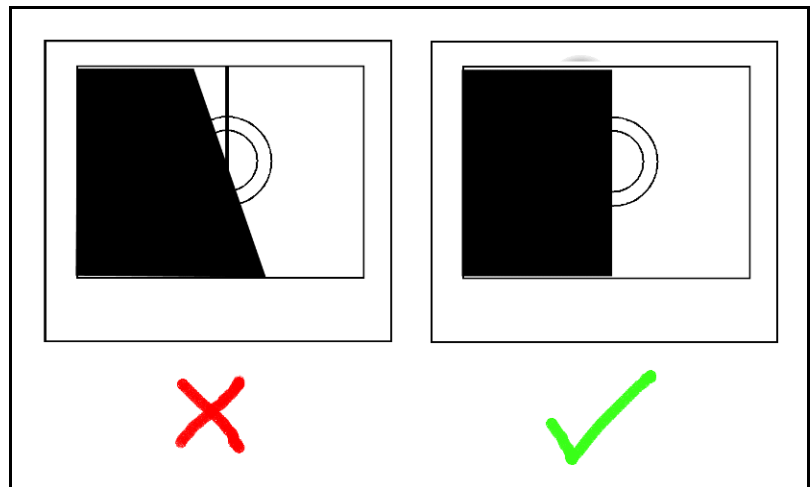
- Use the x-axis knob to bring the reference edge into view and bring it into focus using the z-axis knob.



① Locking screws for camera stand (4 in total)

② Camera alignment screws

- Turn the camera lens barrel clockwise to set to its highest magnification (zoom in) and focus on the reference edge.
- Check that the reference edge is in perfect alignment with the vertical crosshair as you move the camera on the Y-axis.
If not:
 - Slightly loosen the 4 camera stand locking screws ① with a suitable Allen key.
- Adjust the camera alignment screws ② with a suitable Allen key until the reference edge is parallel with the vertical crosshair on the monitor.



- Turn the x-axis knob to align the reference edge with the vertical crosshair
- Fine adjust the camera alignment screws for perfect alignment. It may be necessary to readjust the position of the reference edge with the x-axis knob, since the camera alignment may cause some movement of the camera in the x-axis.
- Tighten the locking screws.
- Do a TargetZ calibration.

Important!

Always calibrate TargetZ
after doing a y-axis alignment.

5. Getting Started with TargetX

Unpacking TargetX

- Remove TargetX from the foam packing.

Checking the Contents of the Packing Box

In the packing box you should find the following parts:

- 1 TargetX console
- 1 TargetGrip set-up station
(mounted on base plate, complete with motors to move sledge and tilt TargetGrip)
- 2 mains cables
- 1 Allen key 2mm
- 1 Allen screwdriver

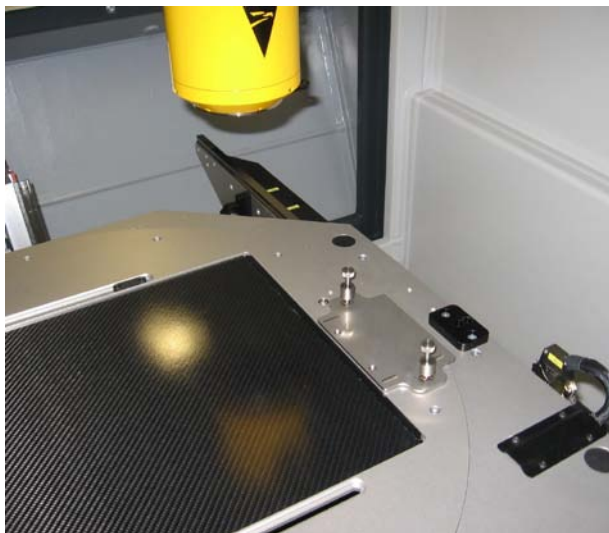
Getting Acquainted with TargetX

Take a moment to familiarise yourself with the location and names of all the components of TargetX:

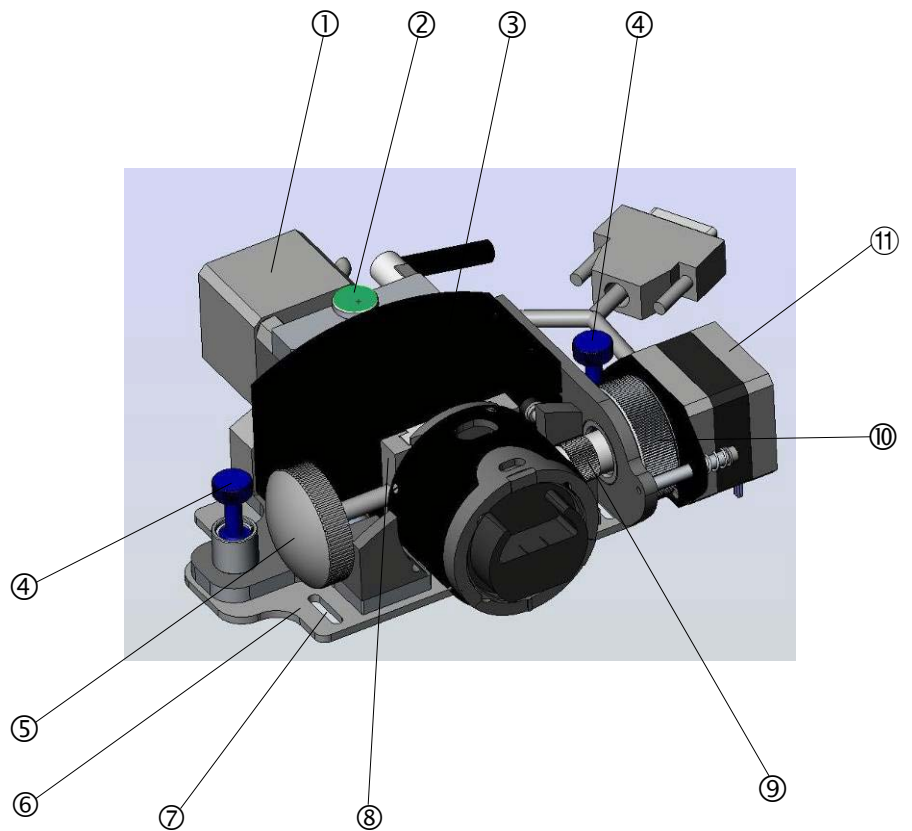
Console



Base Plate, Mounted in x-ray Chamber

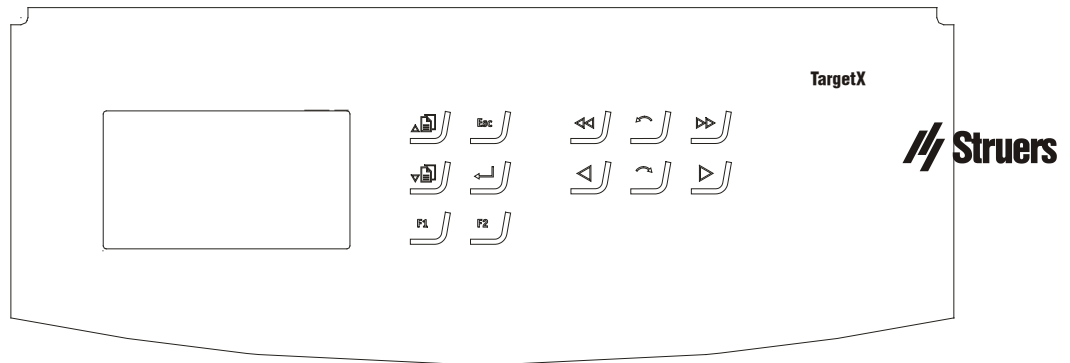


Components of Set-up Station



- ⑤ Locking knob for dovetail
- ③ Set-up station sledge
- ⑥ Base plate (for permanent installation in x-ray chamber)
- ② Horizontal adjustment screw
- ① Motor to adjust horizontal position of TargetGrip in x-plane (movement left and right on X-ray monitor)
- ⑧ Dovetail connector to secure TargetGrip
- ⑨ Drive shaft for tilt mechanism
- ⑪ Motor to tilt the sample to align the target plane with the reference edge (this adjusts the tilt mechanism in the TargetGrip)
- ⑩ Motor lock-in wheel
- ④ Spring-loaded screws (2)
- ⑦ Elongated holes for mounting base plate

TargetX
Console



Key	Function	Key	Function
	Moves cursor in display upwards or increases the value when editing parameter values.		Coarse movement, moves sample left on the monitor.
	Moves cursor in display downwards or decreases the value when editing parameter values.		Tilts sample in direction of arrow (max. tilt $\pm 5^\circ$).
Esc	Leaves the present menu or aborts functions/changes.		Coarse adjustment, moves sample right on the monitor.
	Enables selected parameter values to be activated for editing. Saves the edited parameter values. Toggles when only two parameters available.		Fine adjustment, moves sample left on the monitor.
F1	Controls for various purposes. See the bottom line of the individual screens.		Tilts sample in direction of arrow (max. tilt $\pm 5^\circ$).
F2	Controls for various purposes. See the bottom line of the individual screens.		Fine adjustment, moves sample right on the monitor.

About TargetX

TargetX is a set-up station. It provides a known distance between the reference edge of TargetGrip and the target area to be inspected on the sample. This is illustrated in the [Preparation Methods](#) section of this manual.

Installation is a 6-part process:

- Placing the TargetX Console
- Cable installation
- Cable connection
- Base Plate for set-up station
- Set-up station
- Alignment

Placing TargetX Console

The TargetX console must be placed in such a way that the operator can observe movements on the X-ray monitor while adjusting the controls on the console.



The distance between the console and the set-up station is limited by the 5 m (16ft) cable connecting the two units

Note,
An additional connection cable may be added if desired.

Cable Installation

- Route the connection cable into the x-ray chamber through the x-ray trap, following the procedure given in the documentation for the x-ray machine.
- The ends of the connection cable are identical, so either end can be placed in the x-ray chamber.

Cable Connection

When the set-up station and console are ready to be linked.

- Connect the set-up station with the connection cable.
- Connect the other end with the TargetX console.

Before using TargetX, the set-up station must be aligned on two axes.

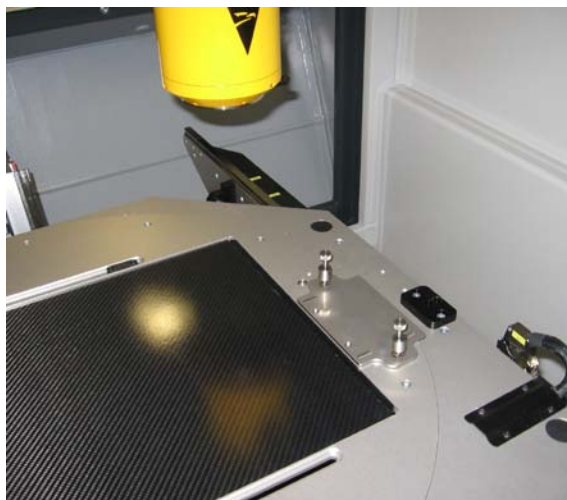
Mounting the Base Plate

The base plate ensures that the set-up station always is positioned correctly inside your x-ray device. If the x-ray chamber is to be used for other purposes, it may be necessary to remove the set-up station from the chamber. The base plate enables you to do this and then re-install the set-up station without loss of alignment.

Important:

- Before fixing the base plate permanently, check that
1. the set-up station is located such that the reference edge and target can be viewed, and
 2. the reference edge is aligned with the vertical crosshair.

- Position the base plate on the side of the x-ray manipulation table, which is closest to the point of entry of the connection cable.
- Align the base plate with the edge of the table.
- Slide the set-up station on the base plate until the conical feet slot into place on the base plate.
- Use the two spring-loaded screws to lock the set-up station to the base plate.
- Switch on the x-ray and check that the reference edge is visible on the monitor. If not, reposition the base plate with set-up station.
- Use the x-ray manipulation table controls to roughly move the reference edge into the desired position.
- Use the TargetX console to move the reference edge until it is as close as possible to being parallel to the vertical cross hair of the x-ray.
- Align the base plate, so that the reference edge is centered around the vertical crosshair of the x-ray monitor, and the reference edge is perfectly plane-parallel with the vertical crosshair.
- Remove the set-up station and mark the base plate position of the centre of the elongated holes with a water-resistant pen.
- Remove the base plate and drill holes in the marked positions.





- Secure the base plate with four suitable screws.
- Re-install the set-up station.
- Secure the two TargetX connection cables with cable ties to prevent the set-up station being pulled out of position.

Mounting the Base Plate with Tape

Instead of drilling holes, a thin, double-adhesive tape (available from Struers, Cat. No. 49900028) may be used to secure the base plate.

Additional Alignment

Should additional alignment be required, most x-ray are equipped with a turntable manipulation table.

Using the turntable controls,

- Turn the table until the reference is plane-parallel with the vertical crosshair.
- Note the position (x degrees) for future use.
- Ensure that the table is in this specific position whenever using TargetX.

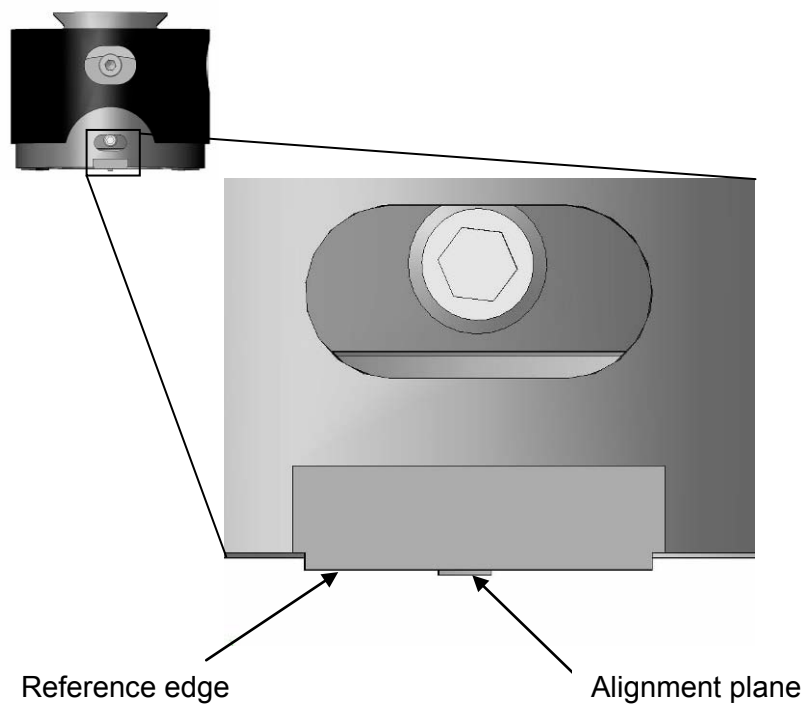
Important!

Before initiating a TargetX measuring process, the reference edge must always be plane-parallel with the vertical crosshair of the x-ray monitor.

Vertical Alignment of the TargetGrip in the Sledge

It is very important that the reference edge and the alignment plane on the TargetGrip are in perfect alignment to the x-ray source. Check that they meet exactly at the vertical cross hair. It may be necessary to open the x-ray door, adjust, close the door, start the x-ray, use the console, and repeat this several times while carrying out the alignment procedure:

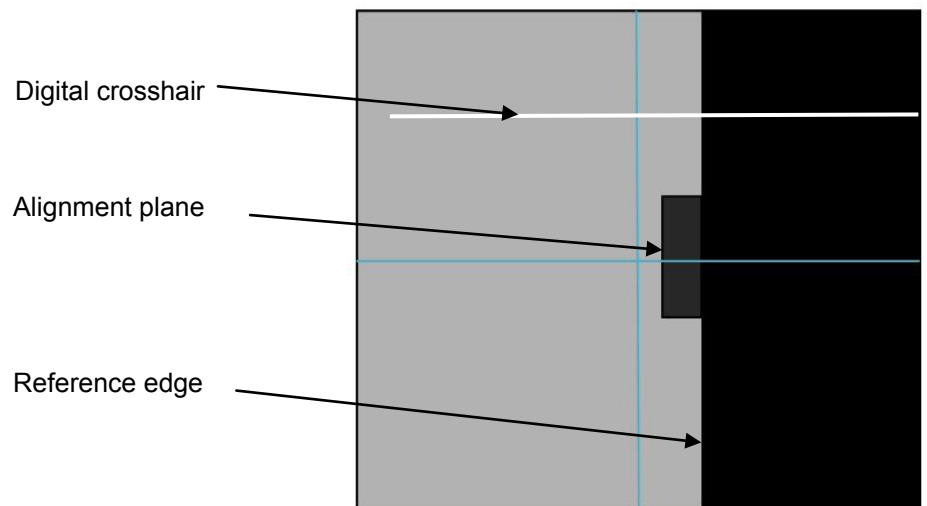
- Locate the reference edge and alignment plane on the TargetGrip.



- Use the monitor of the x-ray machine to look at the TargetGrip. Use the TargetX console controls ◀ and ▶ to position the reference edge on the vertical cross hair in the monitor. Fine-position with ◁ and ▷.
- Locate the horizontal adjustment screw on the top of the sledge (see [Components of Set-up Station](#) on page 51).
- If the alignment plane is not visible, turn the adjustment screw until the pin comes into view.
- Turn the adjustment screw in the other direction to tilt the TargetGrip until the alignment plane just disappears from view.

IMPORTANT!

Do not continue to adjust the vertical alignment screw after the alignment plane is no longer visible.



TargetGrip as seen on x-ray monitor

- If, after daily use, the reference edge is no longer aligned with the vertical cross hair, use the ◁ and ▷ keys on the TargetX console to reposition the reference edge at the vertical cross hair.
- Turn the adjustment screw to adjust the tilt until the alignment plane just disappears from view.
- Repeat these two steps until both the reference edge and the alignment plane are aligned with the horizontal cross hair. The TargetGrip is now aligned vertically with the x-ray source.

IMPORTANT!

To obtain accurate measurements in your X-ray, always check that the reference edge meets the alignment plane exactly at the horizontal cross hair before starting a measurement.

Using TargetX

IMPORTANT

Before measuring, ensure that the sledge of the set-up station is moved as far back as possible to allow unrestricted movement from the reference plane to the target plane.

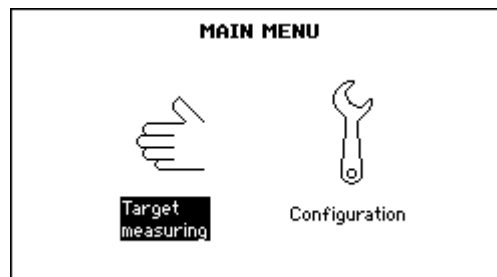
The following procedure describes *Target Mode*. The procedure to obtain the distance for a *Removal Mode* operation is similar. For *Removal Mode* the edge of the sample chair is used instead of the reference edge.

To determine the distance between the reference edge and the target plane:

IMPORTANT

Before measuring samples on this set-up station, make sure that they are at room temperature. If this is not the case, you may introduce an inaccuracy in the measurements for Removal and Target modes

- Unlock the tilt locking screw in the TargetGrip, using the screwdriver supplied.
- Insert the TargetGrip in the TargetX dovetail connector and secure it using the locking knob.
- Turn the motor lock-in wheel to move the tilt motor near TargetGrip.
- Rotate the tilt motor shaft back and forth until it clicks into position in the TargetGrip.
- Ensure that TargetX is in target measuring mode. In this mode, Target measuring is highlighted on the display of the TargetX console.



- Press ◀ and locate the target plane of the specimen. Roughly align the target plane with the vertical cross hair.
- If necessary, use ↶ and ↷ to perfectly align the target plane with the vertical cross hair.
- Press ▶ to locate the reference edge.
- Use ◀ and ▶ to fine-position the reference edge at the point where the two cross hairs meet.
- Press F1 to set the zero reference point. The position shown on the TargetX console is set to 0.

TARGET MEASURING		
No.	Absolute	Relative
Current position :		0 μ m
F1	Reset Ref. point	F2 Move to ref. point

- Press ◀ until the target plane is close to the vertical cross hair.
- Use ◀ and ▶ to fine-position the target plane at the vertical cross hair.
- Write down the target value displayed on the TargetX Control Box. This value must be transferred manually to the TargetMaster.
- For multiple targets, use the controls on the console to move the specimen to the other targets and write down the positions of the other targets.
- Turn the motor lock-in wheel to move the tilt motor away from TargetGrip.
- Lock the tilt screw in TargetGrip.
- Unlock the dovetail connector with the locking knob
- Remove TargetGrip from the X-ray chamber.

It is possible to return automatically to the reference edge at any time during the measurements by pressing **F2 on the TargetX console**.

6. TargetSystem User Interface

TargetMaster and TargetDoser User Interfaces

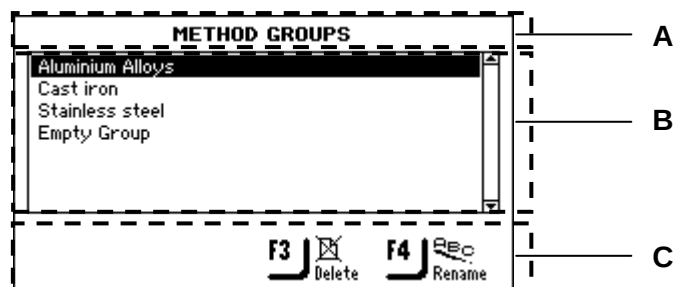
Reading the Display

The software in both TargetMaster and TargetDoser have a common look and feel, and therefore are described together in this section.

The display on the front panel provides different levels of status information. For example, when the machine is switched on using the mains switch located at the rear of the instrument, the display informs you which software version is installed:

When operating with the TargetSystem, the displays on the TargetMaster and TargetDoser are the user-interfaces to the system's software.

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



- A** Heading:
this is a navigational aid, telling you where you are in the software's hierarchy.
- B** Information fields:
these are either 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 keys change depending on the individual situations.

Acoustic Signals

When pressing a key, a short beep indicates that the command has been accepted, whereas a long beep indicates that the key cannot be activated at the moment.

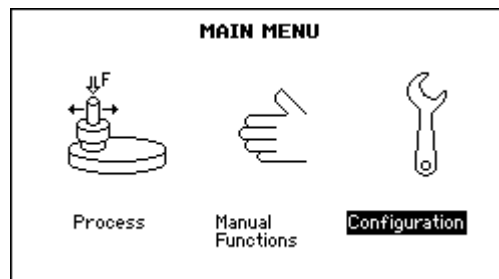
Software Settings

When TargetMaster is started for the first time, English is the language used in the display. If you want to change the display language, refer to [Configuring TargetMaster](#) on page 70.

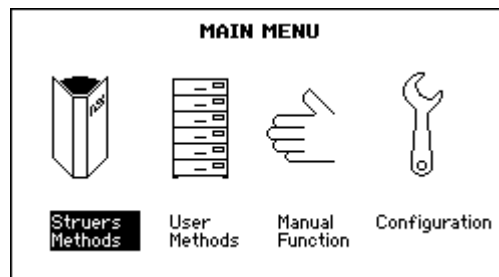
When TargetDoser is started, it automatically uses the language selected in the TargetMaster Configuration Options settings.

During normal operation, immediately after start up, where the splash screen is displayed, the software goes to the last screen displayed. When using the software for the first time, the MAIN MENU is displayed. This is the highest level in the menu structure.

TargetMaster MAIN MENU



TargetDoser MAIN MENU



Editing Numeric Values

Use the arrow buttons   to select the value to be changed, e.g. Removal:

↓

EDIT METHOD STEP – Step No 1	
Surface:	Diamond Pad 20 µm
Lubricant:	Water
Removal:	Level: ON
Force:	3000 µm
Rotation speed (disc / sample):	40 N
Sample holder direction:	300 / 150 rpm
Process mode:	Removal
F1  Prev. F2  Next F4  Transmit	

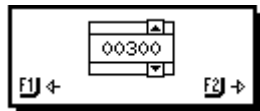
↓

 Press ENTER  to edit the value.

↓ A pop-up box showing the current value and up/down arrows is displayed.

EDIT METHOD STEP – Step No 1	
Surface:	Diamond Pad 20 µm
Lubricant:	Water
Removal:	Level: ON
Force:	3000 µm
Rotation speed (disc / sample):	40 N
Sample holder direction:	300 / 150 rpm
Process mode:	Removal
F1  Prev. F2  Next F4  Transmit	

↓ If the numeric value has a wide range, then the pop-up box is modified. Use **F1** and **F2** to move the cursor along the number displayed, for example to move from the 10's column to the 100's column.



Note:

If there are only two options, the pop-up box is not displayed. Use ENTER  to toggle between the two options and ignore the following steps.

  Use the arrow buttons   to increase or decrease the numeric value.

↓ For large numbers, use the **F1** and **F2** buttons to move along the digits and change them as described above.

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

7. Manual Functions

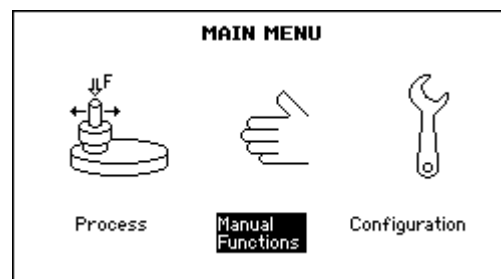
TargetMaster and TargetDoser have several manual functions. Manual functions are accessed via the main menu of each machine.

Manual Functions in TargetMaster

The manual functions in TargetMaster consist of the following:

Manual Cleaning

Manual Measuring



↓ If the MAIN MENU is not currently displayed, press Esc until the MAIN MENU appears.



Use the arrow buttons  to select Manual Functions

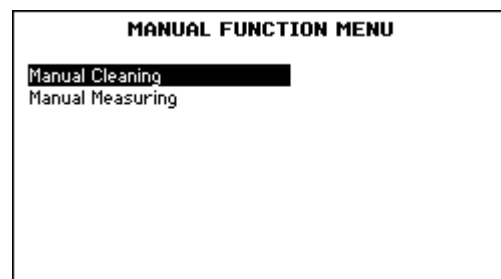
↓



Press ENTER  to enter the Manual functions menu.

Manual Cleaning

In manual cleaning mode, additional cleaning can be done, using any of the cleaning programs.



Use the arrow buttons  to select Manual Cleaning

↓



Press ENTER 

MANUAL CLEANING		
Program type:		Final cleaning
Step No.	Cleaning media	Time
1	Soap	5s
Total cleaning time:		1 m 40 s
F1 Start cleaning		



Press ← to sequentially select (scroll function) the type of cleaning program. The cleaning media and time for the first step are shown.



Press **F1** to start the cleaning cycle. All the steps of the cleaning program selected are carried out. If you wish to stop the cleaning cycle before the cycle has completed, press **F1** again.

MANUAL CLEANING		
Program type:		Final cleaning
Step No.	Cleaning media	Time
5	Soap	3s
Total cleaning time:		1 m 02 s
F1 Stop cleaning		

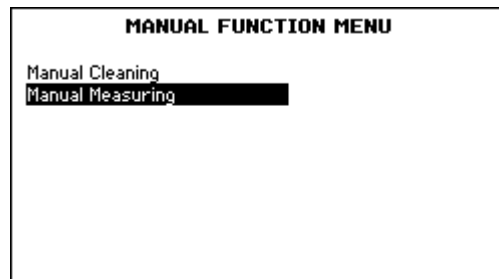
Manual Measuring

The manual measuring function uses the laser measuring station to determine the distance between the reference plane and the top of the sample.

The display shows each step of the measuring process: distance from laser to reference plane, distance from laser to sample, and then the difference between these two measurements, which is the sample height.

Note

To verify a target result, after preparation has ended, select Manual Measuring and let TargetMaster verify the height that has been removed.



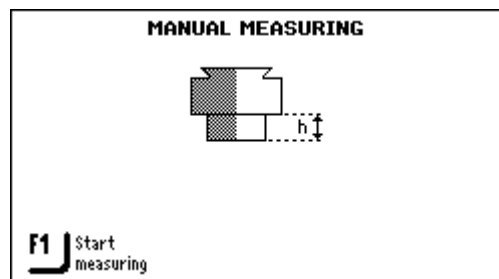
Use the arrow buttons ▲▼ to select Manual Measuring

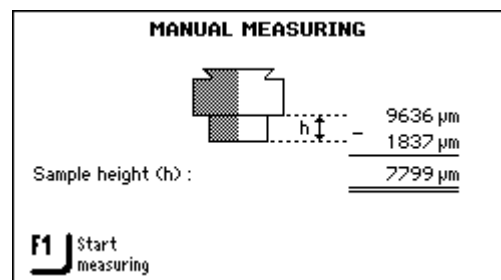
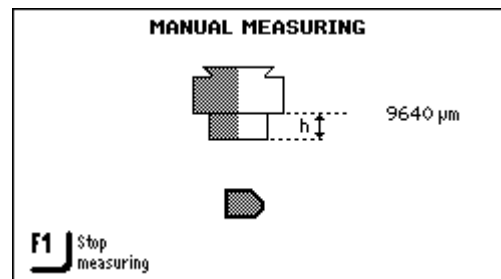


Press ENTER ↵



Press **F1** to start the measurement process.





Important!

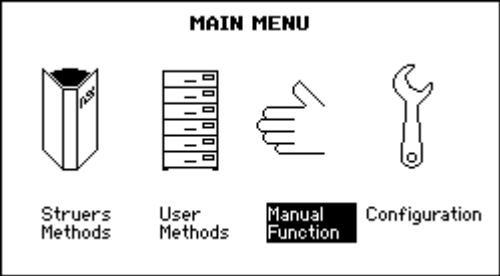
No temperature compensation is applied to manual measurements. If manual measurement is done shortly after rinsing with alcohol / water, the result may be inaccurate, since the sample may have undergone thermal contraction.

Using TargetZ for Manual
Measuring

See [Using TargetZ as a Measuring Station](#) on page 47 for details.

Manual Functions in
TargetDoser

Tube cleaning is at present the only manual function in TargetDoser.



Tube Cleaning

Manual Tube Cleaning is normally done when changing TargetDoser bottles. However, it must also be done immediately after OP-S usage.

Important!
Manual tube cleaning must be carried out within 1 hour after using OP-S.

↓ If the MAIN MENU is not currently displayed, press **Esc** until the MAIN MENU appears.

↓ Use the arrow buttons to select Manual Functions

↓ Press ENTER

↓ The Status column indicates which tubes and pumps have been used.

CLEANING OF TUBES			
No.	Lub./Susp name	Status	Select
1	DiaP. All/Lar.	Used	No
2	DiaP. Mol	Used	No
3	DiaP. Nap-R	Used	No
4	DiaP. Plan	Used	No
5	Alcohol	Used	No
6	Soap	Used	No
7	OP-S	Clean	No
F1 Start cleaning of selected tubes		F2 Select all tubes with Status = Used	

↓ Use the arrow buttons to select the tube to be cleaned.

↓ Toggle the Select status with F2 can be used to quickly select all used tubes.

↓

CLEANING OF TUBES			
No.	Lub./Susp name	Status	Select
1	DiaP. All/Lar.	Used	Yes
2	DiaP. Mol	Used	Yes
3	DiaP. Nap-R	Used	Yes
4	DiaP. Plan	Used	Yes
5	Alcohol	Used	Yes
6	Soap	Used	Yes
7	OP-S	Clean	No

F1 Start cleaning of selected tubes **F2** Select all tubes with Status = Used



F1 Press F1 to clean the selected tubes.

CLEANING OF TUBES			
No.	MESSAGE		
1	Cleaning of tubes started, fluids		
2	are pumped back into the bottles.		
3			
4			
5			
6			
7			

F1



Then simply follow the messages on the screen to clean the tubes and pumps.

When the cleaning is completed, the selected tubes have their status changed back to Clean.

Now you can also change to a different type of suspension if necessary.

Note

If the OP-S has not been used for more than 2 days, the tube has to be flushed with water. Place the top of the OP-S bottle on a bottle of water and press the manual dosing button until clean water comes out of the dosing arm.

8. Configuring TargetMaster

Before the TargetMaster is ready for use, the following must be configured:

Cleaning Programs
Options, including language
Calibration of the measuring system

Cleaning Programs

The TargetMaster has four cleaning programs:

- Initial cleaning
- Cleaning after grinding
- Cleaning after polishing
- Final cleaning

The Cleaning Program Configuration menu enables you to define which agents are used and the duration of the individual cleaning steps.

Initial cleaning is an optional step, selected in the Options menu. The program is for specimens which require cleaning prior to initial measuring.

Final cleaning is an optional step for additional final cleaning without alcohol (which may leave stains). Final cleaning is selected in the Options menu.

Configuring Cleaning Programs

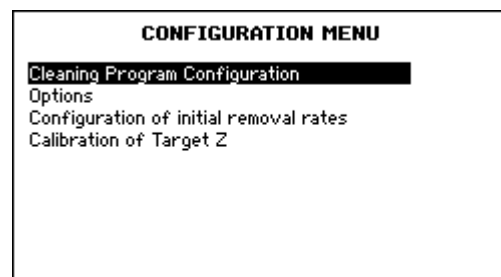
To configure the cleaning programs:



Use the arrow buttons ▲▼ to select Configuration.



Press ENTER  to activate the CONFIGURATION MENU.



 Use the arrow buttons ▲▼ to select Cleaning Program Configuration.

↓
 Press ENTER  to activate the CLEANING PRG. CONFIGURATION menu.

CLEANING PRG. CONFIGURATION
Program type: Cleaning after polishing

Step No.	Cleaning media	Time
1	Soap	5s
2	Water	5s
3	Air	15s
4	Alcohol	10s

Total cleaning time: 1 m 10 s

F1 Choose Program type **F2** Default value

↓
F1  Use the **F1** button to toggle between cleaning programs: Cleaning after grinding, Cleaning after polishing and Final cleaning.

↓
 Use the arrow buttons ▲▼ to position the cursor in the Cleaning Media column of the desired step.

↓
Note:
Steps 4 and 5 are for cleaning the 2nd chamber.
It is recommended that both chambers are cleaned at each stage

↓
 Press ENTER  to activate the SELECT CLEANING MEDIA drop-down list.

↓
 Use the arrow buttons ▲▼ to select the correct cleaning media.

CLEANING PRG. CONFIGURATION
Program type: Cleaning after polishing

Step No.	SELECT CLEANING MEDIA	Time
1	None	5s
2	Water	5s
3	Soap	15s
4	Alcohol	10s

Total cleaning time: 1 m 10 s

F1 Choose Program type **F2** Default value

- ↓
-  Press ENTER ↵ to select the cleaning media and return to the CLEANING PRG. CONFIGURATION menu.
- ↓
-  Use the arrow buttons ▲▼ to position the cursor in the Time column.
- ↓
-  Press ENTER ↵ to activate the time value pop-up box.
- ↓
-  Use the arrow buttons ▲▼ to set the time value.
- The time range is from 0 to 120 seconds, and changes in increments of 1.
- ↓
-  Press ENTER ↵ to select the time and return to the CLEANING PRG. CONFIGURATION menu.
- ↓ Repeat the above until all the Program steps are set.
-  Press **Esc** twice to return to the MAIN MENU.

If necessary, you can return to the factory default settings for the selected cleaning program (cleaning after grinding, cleaning after polishing or final cleaning) by pressing **F2**. This will reset all the cleaning steps in the program (not just the step currently highlighted).

Optimising the Cleaning After Grinding Program

In many cases the cleaning program after grinding can be shortened. Using SiC paper, soap can be avoided, and the remaining steps in the cleaning program may also be reduced by half.

Note

Cleaning after polishing is much more critical, and soap is required to remove slurry. It is recommended to use the default polishing cleaning program.

Testing the new cleaning program

- In the Configuration menu, change the Cleaning after grinding program values to the following:

1.	Soap	0s
2.	Water	5s
3.	Air	5s
4.	Alcohol	5s
5.	Air	15s
	Total	30s

- Create a Removal mode method with a single step with SiC #800, removal 500 $\text{\AA}$ m (or more, depending on the specimen).
- Transfer method from TargetDoser to TargetMaster.
- Select Manual measuring and measure the specimen height. Record the value.
- Go to the Process menu and press Start (after the removal of 500 $\text{\AA}$ m, the sample is automatically cleaned).
- Compare the results. If there is more than a ± 5 $\text{\AA}$ m deviation, remove another 500 $\text{\AA}$ m and stop the process immediately after cleaning. Remove the TargetGrip and check that the reference plane and sample surface are totally dry. If there is still some moisture, gradually increase the air time (step 5), until reference plane and sample surface are totally dry.
- If this fails, select the default values.

Options

The Options menu enables you to set the following physical parameters that are common throughout the software menus in the TargetMaster:

- Display contrast
- Displayed units
- OP flushing time
- Language
- Sample contraction during cleaning
- Initial cleaning
- Final cleaning

Configuring Options

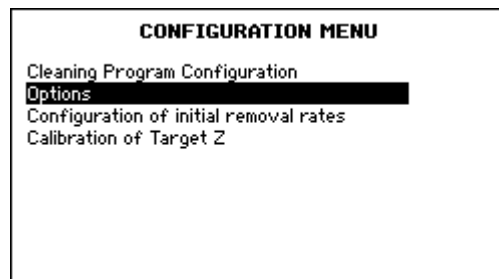
To configure these options:



Use the arrow buttons ▲▼ to select Configuration.



Press ENTER  to activate the CONFIGURATION MENU.



Use the arrow buttons ▲▼ to select Options.



Press ENTER  to activate the OPTIONS menu.



OPTIONS	
Display contrast:	26
Unit:	µm
OP flushing time:	15s
Language:	English
Sample contraction during cleaning:	4 µm
Final cleaning:	No
Time/accuracy Factor:	1
F1 Default value	

↓

 Use the arrow buttons  to position the cursor opposite the parameter to be changed.

↓

 Press ENTER  to open the editor to change the settings displayed.

The following settings are possible:

Option	Settings	Change increment
Display contrast	0 – 50 (default 25)	1
Unit	mils, µm	
OP Flushing Time	0 – 120 seconds	1
Language	English (default) German French Japanese	
Sample contraction during cleaning	0 – 99 µm (default 12)	1
Initial cleaning	yes/no	
Final cleaning	yes/no	

↓

 Use the arrow buttons  to change the value of the parameter.

↓

 Press ENTER  to select the changed setting and return to the OPTIONS menu.

↓

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

Sample Contraction During Cleaning

When samples are cleaned and rinsed with water, air and alcohol, they are rapidly cooled. This cooling causes a contraction in the materials. The contraction lasts long enough to affect following steps in the preparation. To compensate for this, a temperature change offset value is defined as a variable in the TargetMaster software. After extensive trials, this offset value has been set to a default value of 1 μm per cleaning cycle, which adds up to a total offset of 4 μm in the standard methods provided with TargetSystem, where 4 cleaning cycles are used. If fewer cleaning cycles are used, TargetMaster automatically reduces the total contraction value.

If consistent measurement errors are observed, the total offset value can be redefined.

To change the offset value, refer to [Configuring Options](#) on page 74.

OPTIONS	
Display contrast:	26
Unit:	μm
OP flushing time:	15s
Language:	English
Sample contraction during cleaning:	12
Final cleaning:	No
Time/accuracy Factor:	1

F1 Default value

Configuration of Initial Removal Rates

The Initial Removal Rate (IRR) values are used by TargetMaster for the first part of any polishing step, for the first part of any grinding *step that starts at closer than 250 µm to the grinding / polishing transition*, and otherwise when grinding reaches 175 µm from the grinding / polishing transition.

The IRR database can accommodate up to 20 IRR values which can be allocated to any consumable in TargetDoser.

The laser measurement system requires the use of Initial Removal Rates, because the laser cannot continuously measure the removal. Removal is measured by the laser system at discrete time intervals. After having completed the first part of the step, a measurement is made of the amount of material removed, and the actual removal rate is calculated. Initial Removal Rates can be used to optimise preparation, but must *never be lower than the actual removal rate*, which is displayed on the Process Summary at the end of a full preparation.

Important

The Initial Removal Rate should always be higher than the actual removal rate.

If # 800 SiC paper, which is the default surface for plane grinding, is replaced by for example, Diamond Pad, remember to adjust Initial Removal Rate downwards, e.g. from 2300 µm to 900 µm/minute.

It is recommended not to change the surface in the middle of a step. If a SiC paper tears, replace with a new, finer grit paper, and continue step.

Adding/Editing an IRR-value

When transferring a method from TargetDoser to TargetMaster, it is automatically detected whether IRR-values are available for all steps in the preparation method. If not, a message is displayed on TargetMaster.



Use the arrow buttons ▲▼ to select Configuration.



Press ENTER to activate the CONFIGURATION MENU.



CONFIGURATION MENU	
Cleaning Program Configuration	
Options	
Configuration of initial removal rates	
Calibration of TargetZ	



Use the arrow buttons ▲▼ to select Configuration of initial removal rates.



Press ENTER to activate the CONFIG. OF INITIAL REMOVAL RATES menu.



CONFIG. OF INITIAL REMOVAL RATES	
Surface	Removal rate
6 Dia. Pad 20 µm	300.0 µm/min
7 Sat	22.0 µm/min
8 SiC-Pap. #220	2500.0 µm/min
9 Largo	8.0 µm/min
10 SiC-Pap. #320	2200.0 µm/min

F1 Add new surface
F2 Delete surface



Press F1 to retrieve the surfaces which need to be defined.



Use the arrow buttons ▲▼ to highlight the rate to be changed.

- ↓
-  Press ENTER ↵ to open the editor to change the settings displayed.
- ↓
-  Press ENTER ↵ to select the changed setting and return to the CONFIG. OF INITIAL REMOVAL RATES menu
- ↓
-  Press **Esc** twice to return to the MAIN MENU.

Note:

A surface must be deleted to make room for new surfaces if the IRR database is full.

Calibration of TargetZ

Ideally, the z-axis (camera axis) of TargetZ should be at a 90 degree angle to the x-axis. To compensate for any deviation, the TargetZ calibration is undertaken. This should be done if TargetZ has been relocated or accidentally pushed.

Calibration should also be done if there is a consistent target error in preparations done on TargetMaster.

Measuring a black plastic part on TargetZ is very difficult, which is why it is necessary to mount a part in the sample chair before planarizing it. Any bright sample can be used. This sample should then be kept for future calibration.

Preparing the Sample Chair

The sample chair must first be prepared to ensure that the surface is completely plane.

- Set the tilt angle to zero while observing the tilt scale.
- Lock the tilt screw.
- Mount a sample into the sample chair (a bright sample is recommended for greatest possible contrast).
- Mount the sample chair into Target Grip.
- Transfer suitable Time method from TargetDoser.
- Plane grind for 2 min. on #800 SiC paper.
- Polish for 2 min. on MD-Sat with DiaPro/ Allegro / Largo suspension.

In the calibration process, the distance between the target plane and the reference plane is first measured in TargetMaster, then manually in TargetZ. Any small difference between the two measurements is used as a reference by TargetMaster to compensate for any deviation in the z-axis of TargetZ.

The TargetZ calibration should be repeated to verify the value.

Note:

The polished sample chair can be re-used for calibration at a later date.
Handle the sample chair carefully to protect from damage to the surface.

Calibration Procedure

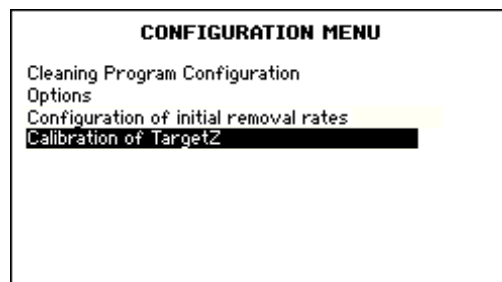
On TargetMaster:



Use the arrow buttons   to select Configuration.



Press ENTER  to activate the CONFIGURATION MENU.



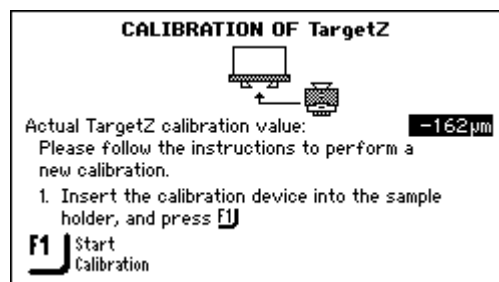
Use the arrow buttons   to select Calibration of TargetZ.



Press ENTER  to activate the Calibration menu.



Follow the instructions on the TargetMaster display.



The following procedure is carried out:

- With the sample chair fitted in the TargetMaster Sample Mover, automatic measurements are made on the reference plane and on the sample surface.
- The sample chair is transferred to the TargetZ and a manual measurement is made.
- Measurement data is transmitted from the TargetZ to the TargetMaster.
- The difference between the measurement results obtained on the TargetMaster and those obtained on the TargetZ is now

stored in the TargetMaster memory and is used as a correction value.

Important!

When carrying out the calibration measuring on TargetZ, it is recommended that both the target plane and the reference plane are approached from the same side, ideally from the right side. Thus, when looking at the monitor, the target should be aligned with the vertical crosshair by slowly moving the reference plane in from the RIGHT side until it is aligned with the crosshair.

If the reference plane is moved past the crosshair, move the reference plane to the right side of the monitor, and re-approach the crosshair from the right side.

Remember that maximum precision of TargetZ is achieved in the central 10 mm of the sample chair.

Before doing TargetZ calibration, ensure that the monitor has the central part of the TargetGrip reference edge in view:

- Position the camera on the y-axis until either of the corners of the reference edge is seen.
- Reposition the camera until the other corner is visible on the monitor.
- Adjust the y-axis until the camera view is on the center part of reference edge.

Important!

Do not adjust the y-axis on TargetZ from this point until the calibration procedure has been completed.

9. Configuring TargetDoser

Introduction

Before TargetDoser is ready for use, the following must be configured:

Bottle Configuration

Options (Display contrast)

The other menu options in the CONFIGURATION MENU enable you to specify user-defined surfaces, suspensions and lubricants. These, like the Operation mode and LAN Module options, are for advanced configuration and are covered in [TargetDoser Advanced Configuration](#) on page 142.

Configuring the Suspension and Lubricant Bottles

Before TargetDoser can be used in a preparation process, it is necessary to define which suspensions or lubricants are present in the bottles connected to the pumps.

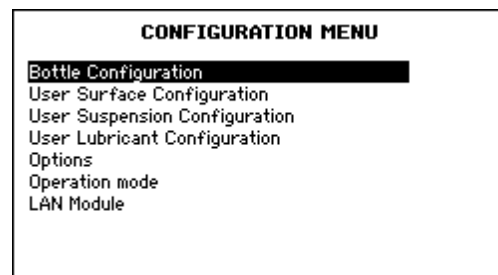
Due to the limited number of bottles available, it is recommended to use Struers DiaPro consumables, which combine suspension and lubricant in one product.



Use the arrow buttons ▲▼ to select Configuration.



Press ENTER  to activate the CONFIGURATION MENU.



Use the arrow buttons ▲▼ to select Bottle Configuration.



Press ENTER  to activate the BOTTLE CONFIGURATION menu.



BOTTLE CONFIGURATION		
Bottle	Lub./Susp.	Type
1	Suspension	DiaP. All/Lar.
2	Suspension	DiaP. Dac
3	Suspension	DiaP. Dur
4	Suspension	DiaP. Nap-R
5	Cleaning media	Alcohol
6	Cleaning media	Soap

OP-Suspension in bottle 7 only

F1 Alcohol and soap refilled



Use the arrow buttons   to select the Lub./Susp. column for the individual bottles.



Note!

Bottle 7 can only be configured as OP or AP suspension.



Press ENTER  to toggle between lubricant and suspension.



Use the arrow buttons   to select the Type column.



Press ENTER  to display the Lubricant Type or Suspension Type list.



BOTTLE CONFIGURATION		
Bottle	Lub./Susp.	Type
1	L	
2	L	
3	L	
4	L	
5	L	
6	L	
7	S	

SELECT LUBRICANT TYPE

OP-lub., water free

OP-lub., water based

User defined

OP-Suspension in bottle 7 only



Use the arrow buttons   to select the correct Lubricant or Suspension Type.





Press ENTER ↵ to display the lubricants or suspensions list.



Use the arrow buttons ▲▼ to select the correct lubricant or suspension.



Press ENTER ↵ to activate selection.



Repeat the steps above until the contents for all the bottles are defined.

BOTTLE CONFIGURATION		
Bottle	Lub./Susp.	Type
1	Suspension	DiaP. All/Lar.
2	Suspension	DiaP. Dac
3	Suspension	DiaP. Dur
4	Suspension	DiaP. Nap-R
5	Cleaning media	Alcohol
6	Cleaning media	Soap

OP-Suspension in bottle 7 only

F1 Alcohol and soap refilled



When alcohol and soap bottles have been filled, press **F1**.



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

Always remember to press **F1** when the alcohol and soap bottles have been filled. If this is not done, a warning message may appear at the start of a preparation, because the usage tracking database in TargetMaster indicates that one of the bottles is likely to run dry during the preparation. The warning message can be overridden.

Warning

Do not press **F1** in the BOTTLE CONFIGURATION menu unless both the soap and the alcohol bottles have been filled.

Changing the Display Contrast

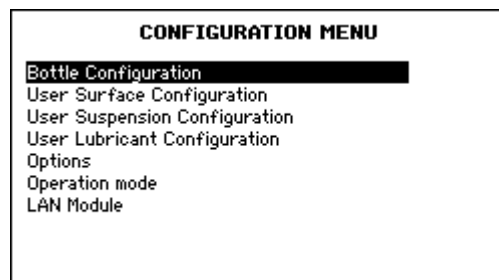
To change the display contrast setting:



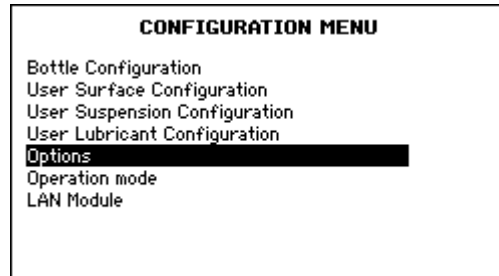
Use the arrow buttons ▲▼ to select Configuration.



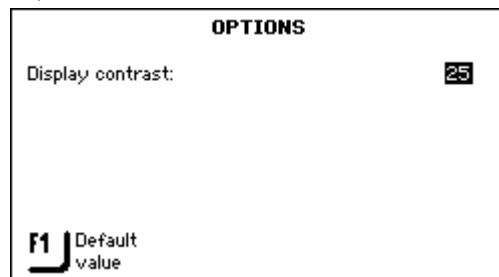
Press ENTER  to activate the CONFIGURATION MENU.



Use the arrow buttons ▲▼ to select Options.



Press ENTER  to activate the OPTIONS menu.





Press ENTER ↵ to activate the Display contrast pop-up menu.



Use the arrow buttons ▲▼ to select the setting you prefer.



Contrast settings are: Default: 25
Contrast range: 0 – 50
Change increment: 1



Press ENTER ↵ to accept the setting.



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

10. Configuring TargetX

Introduction

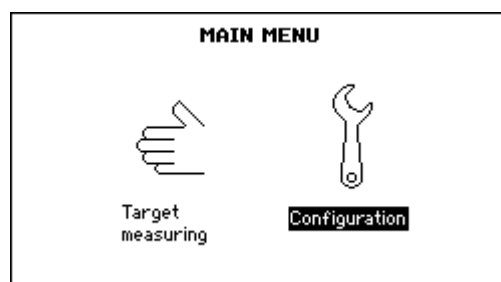
TargetX has several configuration options:

Display contrast

Measurement unit

Language

Configuration options are entered from the Main Menu of the TargetX Console.



Using the Configuration Menu

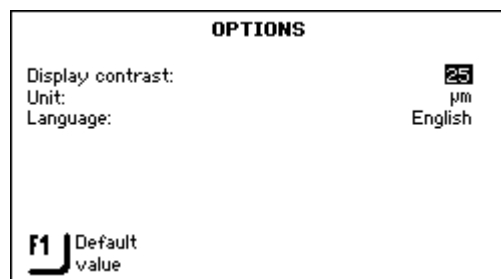
To enter the configuration menu:



Use the arrow buttons ▲▼ to select Configuration.



Press ENTER  to activate the CONFIGURATION MENU.



Optimising the Display Contrast

↓
 Use the arrow buttons ▲▼ to move the cursor to the display contrast.

↓
 Press ENTER ↵ to activate the display contrast adjustment.

↓

OPTIONS

Display contrast: 
Unit: pm
Language: English

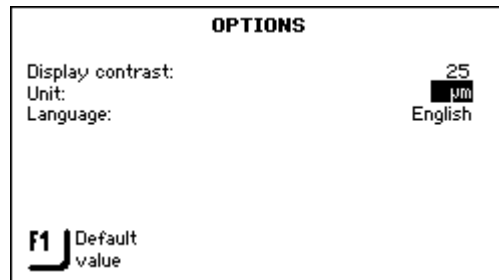
F1 Default value

↓
 Use the arrow buttons ▲▼ to optimise the display contrast.

↓
 Press ENTER ↵ to enter the adjustment done.

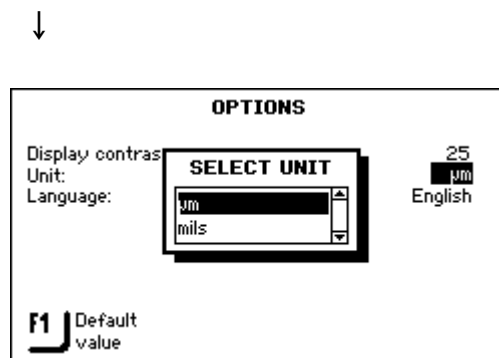
F1 Optionally, the **F1** key can be used to set the contrast at the default setting.

Changing the Measurement Unit



↓
 Use the arrow buttons   to move the cursor to the measurement unit

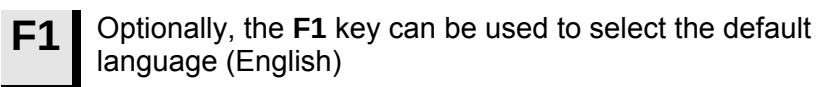
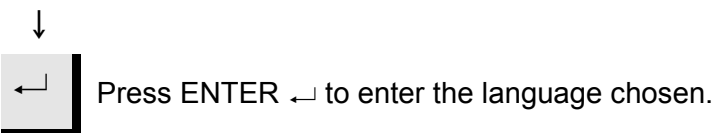
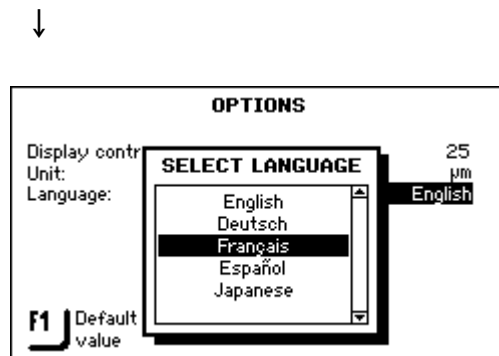
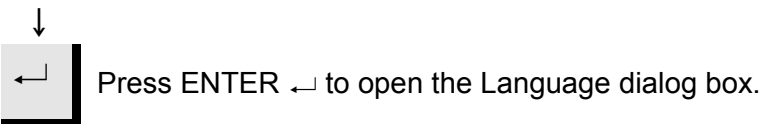
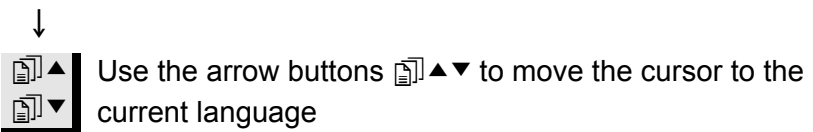
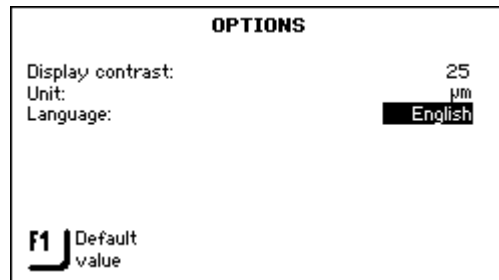
↓
 Press ENTER  to select the highlighted item.



↓
 Use the arrow buttons   to toggle between μm and mil.

↓
 Press ENTER  to select the desired measurement unit.

Changing the Interface Language



11. Preparation Methods

Introduction

TargetSystem offers three separate preparation methods or modes:
Time Mode
Removal Mode
Target Mode

An explanation about each of these modes is included in the following sections. For instructions about how to move samples and use the set-up stations, see the *Getting Started with* chapters for the individual set-up stations.

The method parameters are stored in and loaded from TargetDoser. See [Transmitting Method to TargetMaster](#) on page 124.

Time Mode

As the name suggests, this mode removes sample material for a specified period of time. Although no pre-grinding measurements are necessary, it may be a good idea to make some basic measurements. This lets you know how much material is actually removed. You can then use the calculated removal rates for similar materials.

Time mode is used on preparation steps with very low removal, e.g. oxide polishing or parallel polishing.

Time Mode User Interface

When a Struers Method or User Method based on Time mode has been selected as the method for removing material, before the start button is pressed the user interface indicates the total process time and time per step. The step time can be edited at this stage, refer to [Editing Removal Step](#) on page 135.

Method A , Time Mode			
Surface	Susp.	Lub.	µm or Time
1 SiC-Pap. #320		Water	1 m 00s
2 Largo	DiaP. All/Lar.		3 m 00s
3 Mol	DiaP. Mol		5 m 00s
4 Chem	OP-U		1 m 00s
Total process time:			10 m 00s

F2  Process summary

After the start button has been pressed, the user interface indicates the amount of time remaining.

Removal Mode

If for example, consecutive layers of a specimen are inspected on a regular basis, Removal mode will take you to each of the layers within an accuracy of $\pm 5 \text{ } \mu\text{m}$ and automatically stop when it is reached.

Using TargetZ/X with Removal Mode

If the layer thickness is not known, Target Z (or TargetX) can be used to predetermine the thickness of the layer to be removed.

- Make sure that the sample is mounted correctly in TargetGrip. The target area should be as parallel as possible to the reference plane.
- Align the outermost edge of the sample chair with the vertical crosshair on the monitor of the set-up station. Now zero the setting. This becomes the start reference point.
- Using the set-up station controls, move the sample until the crosshair is aligned with the target area.
- The difference between the first measurement value (0) and this value is the removal value. This is the amount of material that is to be removed during the preparation process on the TargetMaster.

The manually measured removal value must be entered as the total removal value in the Process Menu (TargetMaster), refer to [Manually Entering Target / Removal Value](#) on page 129.

Plane Grinding Before Start

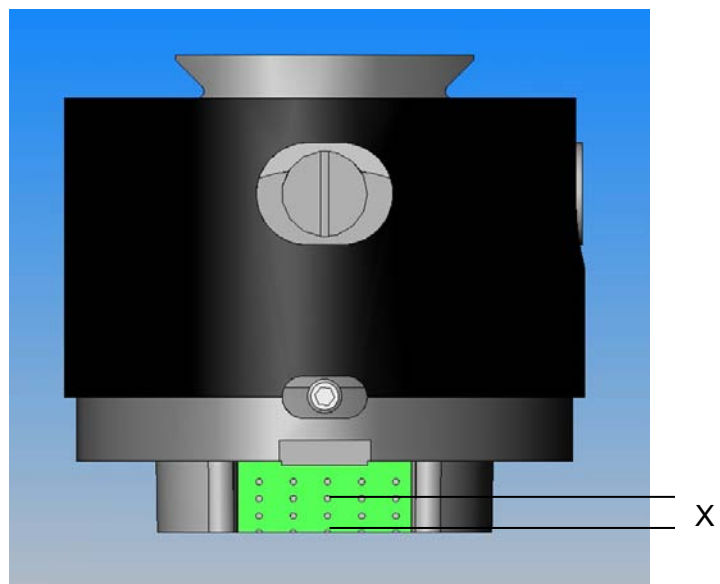
When working with critical specimens (small or few samples or with fine geometries), the mount should first be plane ground (planarized) prior to the actual preparation. If the sample surface is not plane, incorrect initial measurements may be the result, which can affect the entire preparation.

To plane grind.

- Select a *Time Mode* method with a #800 SiC paper step and transfer to TargetMaster.
- Edit the time on #800 step to 1 minute.
- Plane grind specimen.

IMPORTANT!

For critical specimens, ascertain how the laser measuring system responds to the material, by running a trial preparation of a similar specimen, using higher Initial Removal Rate (IRR) and a reduced RPM.



Using Removal Mode

When a Struers Method or User Method based on Removal Mode has been selected, before the start button is pressed, the user interface indicates the total removal value and the removal per step:

SR removal, Removal Mode				
Surface	Susp.	Lub.	μm or Time	
1 Dia. Pad 20 μm		Water	300 μm	
2 Dac	DiaP. Dac		5 μm	
Total removal:			305 μm	

F1 Edit
Total Removal

F2  Process summary

The removal values can still be edited at this stage by selecting the value.

After the start button has been pressed, the display indicates the amount of material that still needs to be removed.

Removal Mode and Thin Layers

A high degree of control is required when working with thin layers of samples. This is obtained by reducing the speed and the force. In addition, the rotational speed should be reduced when mounts are clamped directly into TargetGrip.

For example, when delayering chips, RPM's should be reduced to a minimum and Force reduced by 25-50%.

In addition, IRR values should be increased by 25-50%. With experience, these values can be lowered.

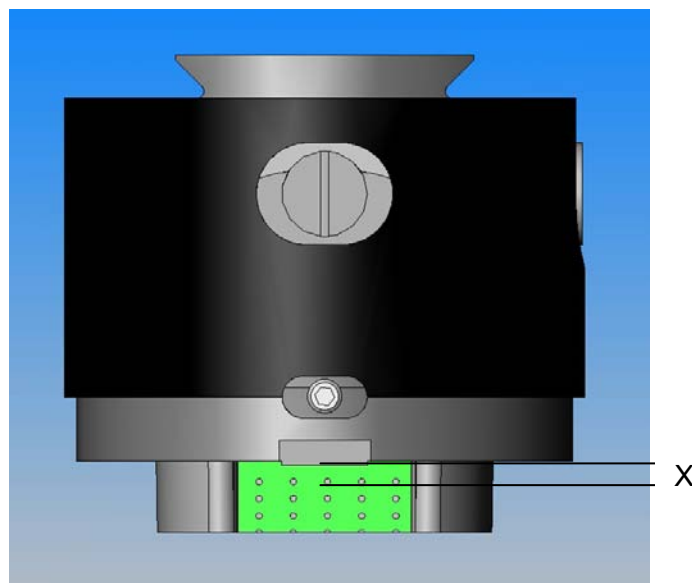
Target Mode

This mode requires accurate measurements of the distance from the reference edge on TargetGrip to the target area (distance X on the illustration below). The measurements are done using either a TargetZ or TargetX set-up station.

IMPORTANT!

When using TargetGrip in either of the set-up stations, all the alignment rules explained in the section on the particular set-up station must be followed.

- Make sure that the sample is mounted correctly in the TargetGrip. The target area must be parallel to the reference edge.
- Align the target area with the vertical crosshair on the monitor of the set-up station. Now zero the setting. This becomes the start reference point. Do not move TargetGrip on the y-axis after this.
- Using the set-up station controls, move the sample until the lines on the monitor are aligned with the reference edge of TargetGrip.
- The difference between the first measurement value and this value is the target value (distance x on the illustration below).



For detailed instructions on how to obtain the target value, refer to the chapters for [Getting Started with TargetZ](#) or [Getting Started with TargetX](#).

Target Mode User Interface

When a Struers Method or User Method based on Target Mode has been selected as the method for removing material, before the start button is pressed the user interface indicates the distance to target and the distance per step. The Target distance and the removal per step can still be edited at this stage, refer to [Operating TargetSystem](#).

Via prep , Target Mode			
Surface	Susp.	Lub.	µm or Time
1 Dia. Pad 20 µm		Water	? µm
2 Largo	DiaP. All/Lar.		20 µm
3 Dac	DiaP. Dac		15 µm
Target value:			5680 µm
F1 Edit Target Value F2 Process summary			

After the start button has been pressed, the remaining distance to target is shown:

PROCESS STATUS – IN PROCESS			
Surface	Susp.	Lub.	µm or Time
1 SiC-Pap. #800		Water	500 µm
2 Sat	DiaP. All/Lar.		40 µm
3 Dac	DiaP. Dac		5m 00s
Target value:			5680 µm
Remaining removal:			320 µm
Remaining estimated sub-process time:			-m -s
TAF 1			

Time Remaining to Target

When a Target mode preparation is being carried out, it is possible to monitor the remaining distance on the display. At distances greater than 175 µm from the grinding / polishing transition, the electronic measuring system is used, and the display shows the distance counting down towards zero. However, if a grinding step starts at 250 µm or less from target, the electronic measuring system is not used at all during the grinding step, and in this case the remaining distance is not updated continuously.

At distances less than or equal to 175 µm from the grinding /polishing transition, (or less than 250 µm if it is the start of a grinding step), the laser measuring system is used, and the display shows the estimated remaining time for the sub-process.

Two Grinding Steps

When two consecutive grinding steps are selected, up to 50 µm may automatically be transferred from the first to second grinding step.

**Methods, General
Recommendations**

A general preparation method, starting with a #800 SiC paper (re below), will be suitable for a wide range of materials. For fragile materials such as silicon, it is recommended to start soft with a #1200 SiC paper.

General Method:	Plane Grinding:	#800 SiC paper
	Fine Grinding (9µm):	MD-Sat, DiaPro Allegro/Largo
	Diamond Polishing 1 (3µm):	MD-Dac, DiaPro Dac
	Diamond Polishing 2 (1µm):	MD-Nap, DiaPro Nap
Ceramics and PCB:	As general method, but PG with 20 µmDiamond Pad.	
Brittle Materials eg. Silicon:	As general method, but PG with #1200 SiC paper.	

12. Using User Methods

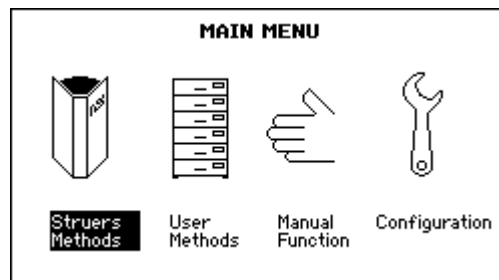
Introduction

TargetDoser software enables you to build a catalogue of user-defined methods. These can be created either from scratch by defining all the preparation parameters manually or by copying existing methods which can then be edited via the USER METHODS menu.

Struers Methods

Struers methods are a set of pre-defined methods, each identified by a letter corresponding to a material type described by the same letter in the Metalogram in Struers *Metalog Guide*. Struers methods cannot be overwritten by the user. The Struers Methods menu is provided for the purpose of copying Struers methods to user methods.

Copying a Struers Method



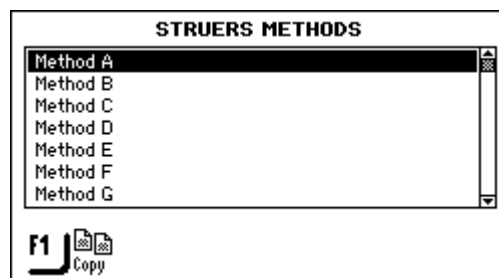
If the MAIN MENU is not currently displayed, press **Esc** until the MAIN MENU appears.



Use the arrow buttons    to select Struers Methods.



Press ENTER  to enter the Struers Methods menu.



Use the arrow buttons    to select the Struers Method to be copied.

↓
 (Optional)
Press ENTER ↵ to examine the method to ensure that it is the correct one.

↓
Esc If the method has been entered for examination, press **Esc** to return to the menu

↓
 Press **F1** to copy the selected method to the clipboard.

↓
 Press **Esc** to return to the Main Menu

↓
The copied Struers method can now be pasted in a User Method Group

Method Groups

To ease the task of managing the preparation methods, they can be grouped together as method groups. Method Groups are methods with common attributes, for example the same class or type of materials. All the preparation process data available through the User Methods menu can be copied, moved, edited, renamed and/or deleted.

Accessing Method Groups

Method groups are accessed as follows:

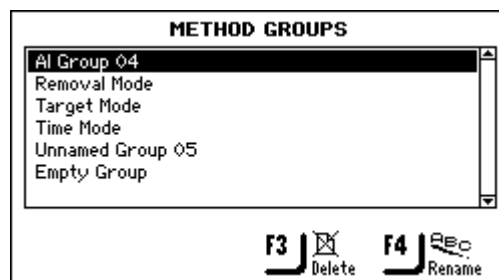
↓ If the MAIN MENU is not currently displayed, press **Esc** until the MAIN MENU appears.



Use the arrow buttons ▲▼ to select User Methods.



Press ENTER ↵ to activate the METHOD GROUPS menu.



The METHOD GROUPS menu can list up to 10 groups. These are listed alphabetically and from within this menu, you can create new groups, as well as rename and/or delete existing groups.

Creating a New Method Group

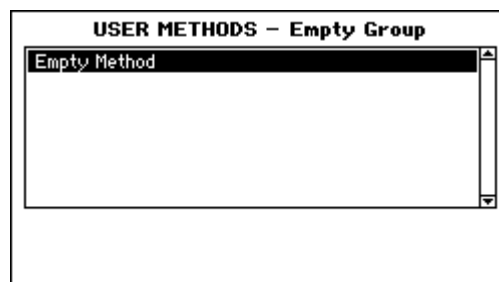
With the METHOD GROUPS menu displayed.



Use the arrow buttons ▲▼ to select Empty Group.



Press ENTER  to activate the USER METHODS – Empty Group menu.

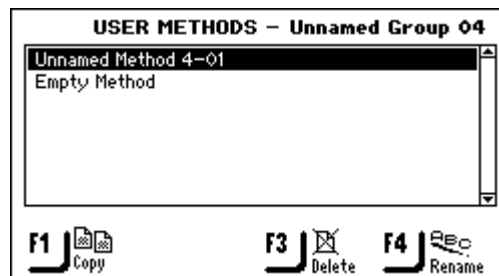


In the Empty Group menu, there is only one Empty Method. If you have used the copy function, press **F2** to insert the method currently stored on the clipboard. Otherwise, select the Empty Method for editing (as described in [Creating a New User Method](#) on page 108).

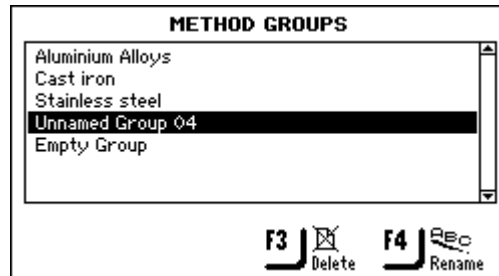
As soon as an Empty Method or Group is changed then the name is automatically changed to “Unnamed” Method or Group. The renaming function can then be used to edit the name of the method or group.

Note

At the same time as the Unnamed Method or Group is created, a new Empty Method or Empty Group is created automatically.

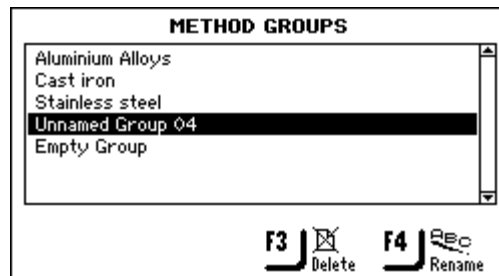


The unnamed group is also included in the METHOD GROUPS menu.



Renaming Method Groups

With the METHOD GROUPS menu displayed.



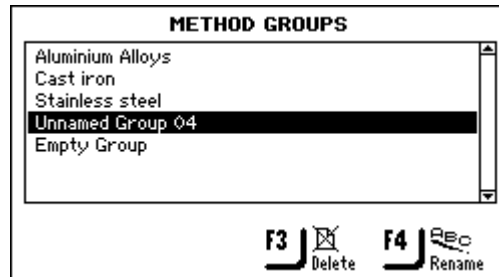
- ↓
- New Method Groups have a default new name e.g. USER GROUPS – Unnamed Group – 04.
- ↓
-  Use the arrow buttons   to select the correct Method Group.
- ↓
-  Press **F4** to display the text editor and rename the group.

Deleting Method Groups

Important!

Before a method group can be deleted, all the user methods in this group must be deleted first.

With the METHOD GROUPS menu displayed.



Use the arrow buttons  to select the correct Method Group.



Press **F3** to delete the selected group.



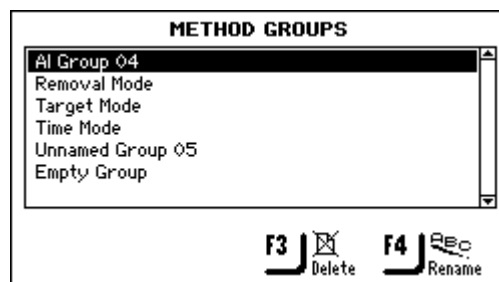
Before the group can be deleted, confirmation is required
Press ENTER  to confirm the deletion and return to the METHODS GROUP menu.

User Methods

Each method group can contain up to 20 user methods. Unlike the method groups, the user methods are not listed alphabetically. Each user method provides a series of method steps that are required for the preparation process. Using the USER METHODS menu, you can copy existing user methods, insert these copied Methods, create new user methods manually, as well as rename and delete existing user methods.

Displaying USER METHODS Menu

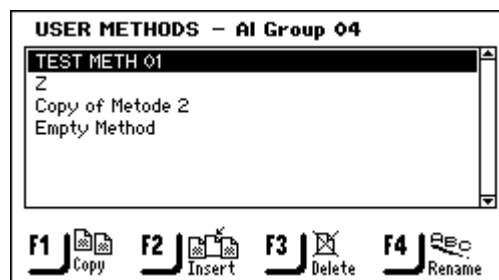
With the METHOD GROUPS menu displayed.



Use the arrow buttons to select the correct Method Group.



Press ENTER to activate the USER METHODS - <Method group name> menu, e.g. AI Group 04.

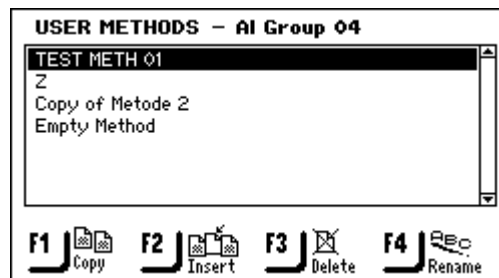


Copying User Methods

Complete User Methods, including all the process method steps they contain, can be copied and then inserted to create a new User Method.

To copy these user methods:

With the correct USER METHODS group displayed.



WARNING!

Using the copy function overwrites whatever is stored on the clipboard.



F1

Use the **F1** button to copy the highlighted method.



The copied data is now stored on the clipboard in the random access memory.

Important!

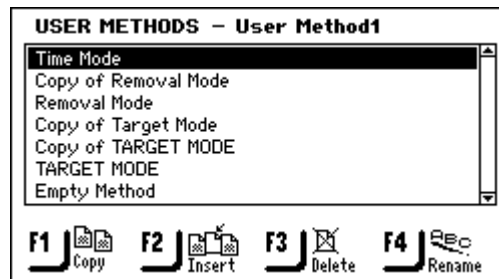
The data on the clipboard will remain there until the copy or delete function is activated again. Using the copy or delete function overwrites whatever exists on the clipboard.

As a method or a method step is stored on the clipboard when deleted this enables you to move a method or a method step from one group to another. Simply delete a method or a single method step and insert it in a different group or preparation method.

Inserting/ Pasting User Methods

This feature enables you to insert user methods after they have been copied on to the clipboard. To insert a method:

With the correct USER METHODS group displayed.



Use the arrow buttons  to select the position in the list, where the new method is to be inserted.



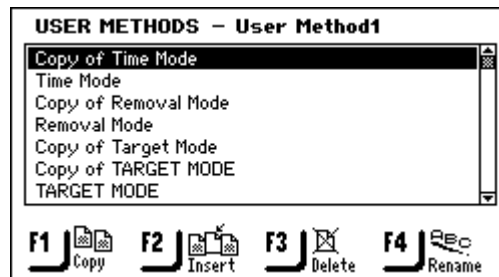
The inserted method will appear above the method highlighted in the list.



Use the **F2** button to insert the contents of the clipboard.



All the method steps associated with this method are also inserted. You are now able to edit the necessary steps – see [Editing Method Steps](#) on page 118.



Note

It is recommended that you rename the newly inserted method now - use an easy to identify name.

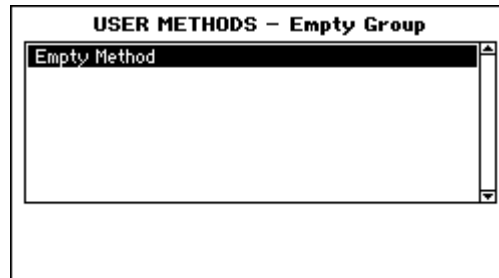
When using the Copy/Insert function the name of the copied method changes automatically to Copy of <method name> when inserted.

If the Delete/Insert function is used the name does not change as the method has been moved, not copied.

Creating a New User Method

To create a new user method without inserting an existing user method:

With the correct USER METHODS group displayed.



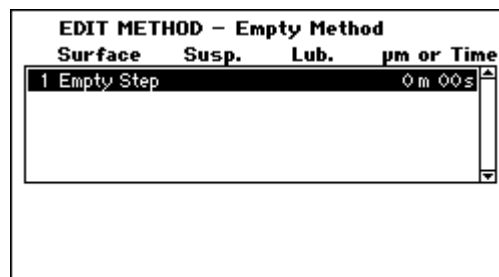
When creating a method in a new group, only Empty Method is available.



Use the arrow buttons ▲▼ to select Empty Method.



Press ENTER ↵ to activate the EDIT METHOD menu.



As soon as this step is changed and saved, the Method name changes to – Unnamed Method <Group no>-01, and a new Empty Step is created.

If you have used the copy function, press **F2** to insert the Method step currently stored on the clipboard.

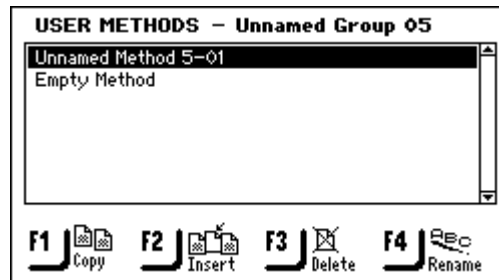
Only a method that contains a step, where the preparation parameters have been set and saved, can be renamed.

Renaming User Methods

Note

A new user method can only be renamed when it contains at least one method step where the preparation parameters have been set and saved.

With the USER METHODS - < Method group name> menu displayed.



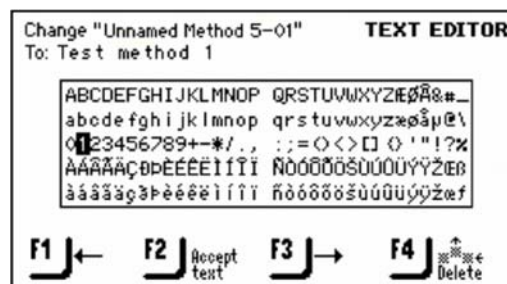
New User Methods have a default new name: e.g. Unnamed Method <Group no> – 05.



Use the arrow buttons ▲▼ to select the correct User Method.



Press **F4** to display the text editor and rename the method.

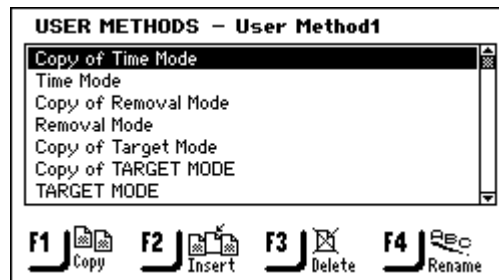


Deleting/ Moving User Methods

Important

Once a User Method is deleted it is stored on the clipboard until the next method or method step is deleted or copied. Until then using the Insert function can retrieve it.

With the correct USER METHODS menu displayed.



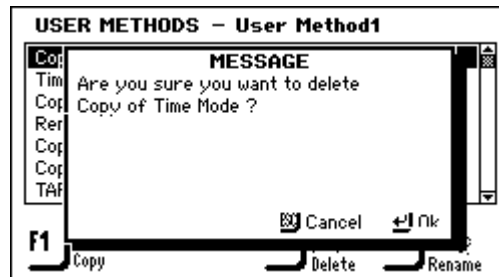
Use the arrow buttons to select the User Method to be deleted.



Use the **F3** button to delete the selected User Method.



All the method steps associated with this method are also deleted.



Press ENTER to confirm deletion of selected user method.



Press Esc to go back to the User Method Groups.

This completes deletion of the user method.



Use the arrow buttons to select the User Method Group where you want to move the method to.

↓
 Press ENTER ↵ to activate this User Method Group.

↓
 Use the **F2** button to re-insert the deleted User Method.

Note

If the method to be deleted is the current method in TargetMaster, a different method must first be sent to TargetMaster before it is possible to delete the method in TargetDoser.

User Method Steps

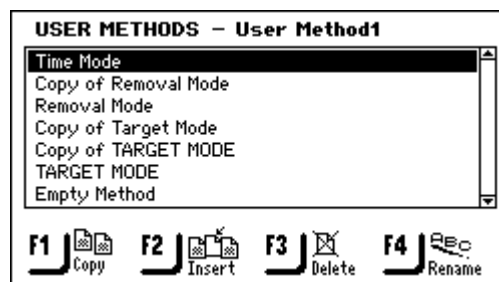
Each user method can contain up to 20 steps. Each method step contains a list of process parameters that must be defined and saved before the method step can be part of a user method.

Similar to the user groups and user methods, the copy and insert functions can be used to allow you to reuse existing user method steps. This means that these are the most fundamental building blocks when creating new user methods using the insert function.

User method steps are displayed in the EDIT METHOD menu. Transmission of the complete edited method to TargetMaster is also done from the EDIT METHOD menu.

Displaying the EDIT METHOD Menu

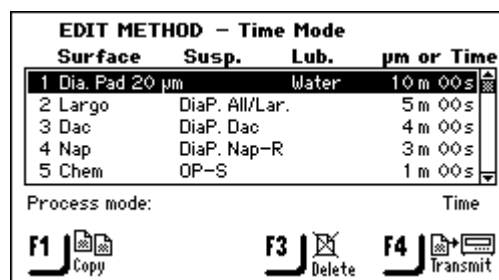
With the correct USER METHODS group displayed.



Use the arrow buttons to select the correct User Method.



Press ENTER to activate the EDIT METHOD - <User Method name> menu.



Copying Method Steps

With the correct EDIT METHOD menu displayed.

EDIT METHOD – Time Mode			
Surface	Susp.	Lub.	µm or Time
1 Dia. Pad 20 µm		Water	10 m 00s
2 Largo	DiaP. All/Lar.		5 m 00s
3 Dac	DiaP. Dac		4 m 00s
4 Nap	DiaP. Nap-R		3 m 00s
5 Chem	OP-S		1 m 00s

Process mode: _____ Time _____

 **F1** Copy
  **F3** Delete
  **F4** Transmit



Use the arrow buttons   to select the correct Method Step.



Use the **F1** button to copy the selected User Method Step.



All the parameter settings for this individual step are copied to the clipboard.

Inserting Method Steps

This feature enables you to insert user method steps after they have been copied on to the clipboard.

To insert a method step:

With the correct EDIT METHOD menu displayed.

	Surface	Susp.	Lub.	µm or Time
1	Largo	DiaP. All/Lar.		5 m 00s
2	Dac	DiaP. Dac		4 m 00s
3	Nap	DiaP. Nap-R		3 m 00s
4	Chem	OP-S		1 m 00s

Process mode: Time

F1 Copy F2 Insert F3 Delete F4 Transmit



Use the arrow buttons to select the position in the list, where the new method step is to be inserted.



The new step is inserted above the highlighted step.



Use the **F2** button to insert the contents of the clipboard.



All the parameter settings associated with this method step are also inserted. You are now able to edit the step – see [Editing Method Steps](#) on page 118.

	Surface	Susp.	Lub.	µm or Time
1	Dia. Pad 20 µm		Water	10 m 00s
2	Largo	DiaP. All/Lar.		5 m 00s
3	Dac	DiaP. Dac		4 m 00s
4	Nap	DiaP. Nap-R		3 m 00s
5	Chem	OP-S		1 m 00s

Process mode: Time

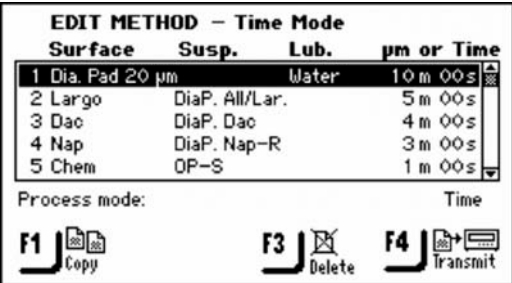
F1 Copy F3 Delete F4 Save



To save the method with the added step, press **F4**. This will also transmit the method to TargetMaster if the method is the current method in TargetMaster.

Deleting Method Steps

With the correct EDIT METHOD menu displayed.



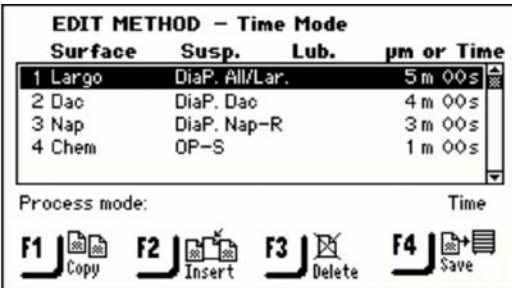
Use the arrow buttons to select the step to be deleted.



Press **F3** to delete the step.



A pop-up dialog box appears, press ENTER to confirm the deletion, or Esc to cancel the deletion.



To save the method with the step deleted, press **F4**. This will also transmit the method to TargetMaster if the method is the current method in TargetMaster.

Setting IRR values

IRR values for individual surfaces must be entered manually after a method is transferred to TargetMaster.

Enter the Options menu under Configuration and enter the value for the surface in the IRR list. See Configuration of Initial Removal Rates on page 77.

When a new method is transmitted, TargetMaster will add any new surfaces to the IRR list. A pop-up will inform the user if the IRR values have not been defined for all the surfaces of a preparation method.

The IRR value for any given surface can be edited at a later date to further optimise preparation times.

Creating a New Method Step

With the correct EDIT METHOD menu displayed.

EDIT METHOD – Time Mode			
Surface	Susp.	Lub.	µm or Time
1 Dia. Pad 20 µm		Water	10 m 00s
2 Largo	DiaP. All/Lar.		5 m 00s
3 Dac	DiaP. Dac		4 m 00s
4 Nap	DiaP. Nap-R		3 m 00s
5 Chem	OP-S		1 m 00s

Process mode: Time

F1 Copy F3 Delete F4 Transmit



Use the arrow buttons to select Empty Step.



Press ENTER to activate the EDIT METHOD STEP – Step No # (Empty) menu.



EDIT METHOD STEP – Step No 6 (Empty)	
Surface:	MD-Plan
Suspension: DP-Suspension, P 9 µm	Level: 0 / 0
Lubricant: DP-Lubricant, Blue	Level: 0 / 0
Process Time:	0m 05s
Force:	10 N
Rotation speed (disc / sample):	150 / 150 rpm
Sample holder direction:	
Process mode:	Time

F1 Prev. F2 Next F4 Transmit

To edit the process parameters before pressing **F4** and saving the settings, see the next section.

Editing Method Steps

Before starting to edit the process parameters for the individual user method steps, please note that the parameters displayed vary depending on the type of “Surface:” and “Suspension:” defined. In the screen illustration below, the surface selected requires both an abrasive suspension and a lubricant, but this is not always the situation.

EDIT METHOD STEP – Step No 2

Surface: MD-Largo

Suspension: DiaPro All/Lar. Level: 2 / 6

Process Time: 5m 00s

Force: 25 N

Rotation speed (disc / sample): 150 / 150 rpm

Sample holder direction: ↺

Process mode: Time

F1 Prev.
F2 Next
F4 Transmit

There are two types of polishing surfaces: abrasive surfaces and non-abrasive surfaces. Depending on which one is selected, it determines what is displayed in the EDIT METHOD menu.

The table below provides a basic overview of the polishing surfaces and the parameters, which are displayed, when they are selected. When “Not required” is indicated in the table, then the line including this parameter, for example “Suspension” is not included in the screen display.

Type of Surface	Requires	
	Suspension	Lubricant
Abrasive surface	Not required	Water only
Non-abrasive surface	Diamond susp. DiaPro or DiaDuo (All-in-one products)	Not required
	Diamond susp. (water based)	Water-based
	Diamond susp. (water-free)	Water-free
	Oxide susp.	Not required

Editing Procedure

With the correct EDIT METHOD menu displayed.

EDIT METHOD – Time Mode			
Surface	Susp.	Lub.	µm or Time
1 Dia. Pad 20 µm		Water	10 m 00s
2 Largo	DiaP. All/Lar.		5 m 00s
3 Dac	DiaP. Dac		4 m 00s
4 Nap	DiaP. Nap-R		3 m 00s
5 Chem	OP-S		1 m 00s

Process mode: Time

F1 Copy F3 Delete F4 Transmit



Use the arrow buttons ▲▼ to select the step to be edited.



Press ENTER to edit the step.



EDIT METHOD STEP – Step No 2	
Surface:	MD-Largo
Suspension:	DiaPro All/Lar. Level: 2/6
Process Time:	5m 00s
Force:	25 N
Rotation speed (disc / sample):	150 / 150 rpm
Sample holder direction:	
Process mode:	Time

F1 Prev. F2 Next F4 Transmit



Use the arrow buttons ▲▼ to move between the individual parameters.



Press ENTER to edit the parameter.



A pop-up box showing the current setting and the possible options is displayed



Use the arrow buttons ▲▼ to select the correct value setting for Type of surface, lubricant and suspension.





Press ENTER ↵



For Surfaces, Lubricants and Suspension see the following sections for details.

EDIT METHOD STEP – Step No 2	
Surface:	MD-Large
Suspension: DiaPro All/Lar.	Level: 2/6
Process Time:	5m 00s
Force:	25N
Rotation speed (disc / sample):	150 / 150 rpm
Sample holder direction:	
Process mode:	Time
F1 Prev. F2 Next F4 Save	



Use the **F1** and **F2** buttons to move between the method steps to edit as necessary.



Press the **F4** button to save the edits. The modified method is also automatically sent to TargetMaster if it is the current method in TargetMaster.

Process Mode

The process mode used by a method can be changed by editing the first step of the method. The process mode of the remaining steps is changed automatically.

With the correct EDIT METHOD menu displayed:



Use the arrow buttons to select the first step



Press ENTER ↵ to edit the step.



Use the arrow buttons to highlight the current value of the process mode.



Press ENTER ↵ to toggle to the desired mode (time, removal or target).



F4 Press the **F4** button to save the edit. The modified method is also automatically sent to TargetMaster if it is the current method in TargetMaster.

Defining Surfaces, Lubricants and Suspensions

The types of lubricants and suspensions that can be selected (i.e. actually shown as options) depend of the type of surface defined. So although the actual choices may change, the same method is used to select the different surfaces, lubricants and suspensions. To simplify this procedure, the term <CONSUMABLE> is used instead of surface, lubricant or suspension:

Note

As many different consumables are available, they are sub-divided:
1. Product groups, e.g. MD-Products
2. Product names, e.g. MD-Largo

With the EDIT METHOD STEP menu displayed.



Use the arrow buttons  to move between the parameters.



When the correct parameter is highlighted.



Press ENTER  to activate the SELECT <CONSUMABLE> TYPE menu, e.g. SELECT SURFACE TYPE.



EDIT METHOD STEP – Step No 2	
Surface:	SP-PoliPlan1
Suspension: DiaPro All/Lar.	Level: 2 / 6
Process Time:	5m 00s
Force:	25 N
Rotation speed (disc / sample):	150 / 150 rpm
Sample holder direction:	
Process mode:	Time
F1  Prev. F2  Next F4  Save	



Use the arrow buttons  to select the correct <consumable> Type.



Press ENTER  to activate the SELECT <consumable> menu, e.g. SELECT SURFACE.





↓



Use the arrow buttons   to select the correct consumable.

↓



Press ENTER  to select the highlighted consumable.

Note

Depending on which consumable was selected the EDIT METHOD STEP menu may change its displayed parameters.

Setting Dosing Levels

When suspensions and/or lubricants are used in a preparation step, first the type of suspension or lubricant is selected and afterwards the dosing level.

Suspension: DP-Suspension, P 9 µm	Level: 1 / 5
Lubricant: DP-Lubricant, Green	Level: 2 / 5

Following "Level:", two values can be set, e.g. 1 / 5

The first value [1] is the pre-dosing level, the amount of suspension or lubricant applied onto the surface before the actual step is started. This is used to provide a lubricated surface to avoid any damage that could occur if the specimens would be running on a dry surface.

Depending on the frequency of use and the type of surface different values should be set. For frequently used surfaces a lower value can be used than for surfaces used only once in a while.

The second value [5] is the dosing level maintained throughout the preparation. This is set according to the type of surface: soft, napped polishing cloths require more lubricant than hard, flat cloths or fine grinding discs. Fine grinding discs require a higher dosing level of abrasive than polishing cloths.

Option	Settings for		Change increment
	Pre-dosing	Dosing	
Dosing Level	0 - 10	0 - 20	1

Changes During a Process

Dosing levels for suspensions and lubricants can be changed during a process without any interruption to the process. Changes done have immediate effect as soon as **F4** is pressed.

Transmitting Method to TargetMaster

In the EDIT METHOD menu, the **F4** button has two functions:
To send a method to TargetMaster, select the method from the EDIT METHOD menu and press the **F4** Transmit button.

After editing a method in TargetDoser, press the **F4** Save button to save the change. The saved method is also sent automatically to TargetMaster if it is the current method in TargetMaster.

Note

Transmission of methods to TargetMaster is done from the EDIT METHOD menu and not from the USER METHOD menu.

When a method is in use on TargetMaster, it cannot be edited (except for the dosing values).

Optimising a User Method

The following section includes some of the preparation know-how developed at Struers to optimise the performance of TargetSystem.

Preparation of Silicon

SiC is the recommended surface for coarse grinding of Silicon. Use #800 SiC paper, which may be followed by a #1200 SiC paper. Typically, as much as 1500 µm can be removed on the same paper within less than 5 minutes. If the total material to be removed exceeds 1500 µm, insert a second #800 SiC paper step. On this second step, preset the removal to e.g. 1000 µm.

When replacing Diamond Pad with SiC paper in a method step, removal rates increase dramatically, and it is thus very important to change the Initial Removal Rate (IRR) setting. The default value for grinding is 720 µm/min, but must be increased to minimum 1300 µm/min with SiC.

For shortest possible preparation times, the rotational speed of the disc is set to 300 rpm. The SiC paper is used only once.

Fine Grinding

MD-Largo has excellent properties and is very well suited for electronics with both very soft and very hard materials in the same matrix. However, over time plastic from the sample chair reduces the performance significantly, unless the MD-Largo is cleaned after each single use.

As an alternative, MD-Sat (plain woven acetate) is also very well suited for fine grinding using the same DiaPro Allegro/Largo suspension as used on MD-Largo.

MD-Sat requires about 10 minutes of running in before a stable removal rate is achieved, after which it will deliver high removal rates over a long period of time, without any cleaning. Be careful not to over-saturate the cloth with DiaPro, as this may cause aquaplaning of the sample.

Run in the MD-Sat using Time Mode and an empty sample chair for 10 minutes.

When replacing MD-Largo with MD-Sat, removal rates increase dramatically; it is thus important to ensure that the Initial Removal Rate (IRR) setting is at 22 $\mu\text{m}/\text{min}$. Recommended IRR-value for MD-Largo remains at 9 $\mu\text{m}/\text{min}$.

In Target Mode, it is advisable to set the removal on the fine grinding step to 40 μm , due to the higher removal rate.

Adjustment of Rotational Speed of Grinding/polishing Disc

A significantly higher removal rate can be achieved by increasing the rotational speed from 150 rpm to 300 rpm. To reduce preparation times, 300 rpm can be selected on both grinding and polishing steps. However for some sensitive specimen types, the lower rpms are recommended.

Note:

On the grinding steps, test the removal rate before running an actual sample. Alternatively, introduce a buffer step, i.e. an additional short grinding step between the grinding step and the fine grinding step.

Using the Mould Insert

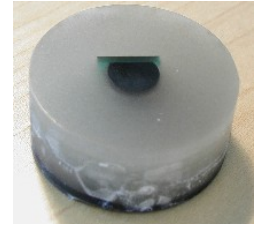
Using specimen carriers other than the sample chair, has a significant effect on polishing dynamics. The Ø40 mm mould insert produces very high removal rates, which may be difficult for the electronic measuring system to keep track of. Thus it becomes necessary to reduce the rotational speed, and the force.



40 mm mould insert



partially mounted



fully mounted

Generally, Struers recommends that specimens are fully set in resin. However a smaller amount of resin can be used to facilitate recovery of the specimen after preparation or to save on mounting resin. Thus, if a specimen is set only e.g. 50%, the preparation surface of the specimen is reduced to a minimum. This is reflected in extremely high removal rates, unless both rotational speed and force are reduced.

Please see the rear of the Instruction Manual for Preparation Methods for a sample mounted in a:

[Ø40 mm sample chair](#)

[Ø40 mm fully mounted insert](#)

[Ø40 mm partially mounted insert](#)

Important

When using mould inserts always seal the opening between mould insert and TargetGrip with an O-ring (supplied with TargetMaster). To be able to mount the O-ring and to clamp the mould insert in TargetGrip, a minimum mounting level of ca. 13 mm is necessary.

13. Operating TargetSystem

Running-in Period, Target Mode

A running-in period is recommended for new users to become familiar with TargetSystem.

Interrupt the preparation after the grinding step and manually measure the distance to target in TargetZ or TargetX. The manually measured distance should be checked against the one shown in the display on TargetMaster.

This procedure is also useful when determining actual removal rates for new types of specimens or when changing surfaces.

The standard Preparation Methods and IRR values relate to samples mounted in a 40 mm sample chair prepared with the specified parameters and consumables.

Hint:

As a precaution, insert a buffer value of 1000 μm onto the step immediately after coarse grinding and of 20-30 μm on the final step. Thus if the actual removal rate is too high, the risk of missing the target will be greatly reduced.

The Preparation Process

To operate the TargetSystem, the list of steps provided here must be carried out in the order shown. If more detailed information is required for an individual step, then this can be obtained in the other sections of the Instruction Manual.

Before Starting

- Make sure that all the instruments in the system are switched on.

Important!

System accuracy is dependent on a temperature-stable environment. Ensure that the ambient temperature is $20^{\circ}\text{C} / 68^{\circ}\text{F} \pm 2^{\circ}\text{C} / 4^{\circ}\text{F}$, and that the temperature has been within these limits for at least one hour before operating TargetMaster. The sample holder must also be at this temperature.

To minimise the effect of temperature fluctuations, it is recommended that the Preparation Process is carried out without taking long breaks between the individual steps.

Prepare the Sample

- Affix the sample to the sample chair/holder.
- Mount the sample chair/holder in the TargetGrip and secure with the Allen screwdriver supplied.

Select Preparation Method

- Select the correct preparation method on the TargetDoser and transmit this to the TargetMaster.

Obtain and Enter the Target Value

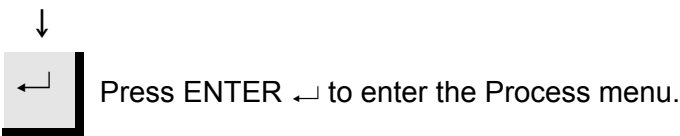
Where the Target Value is the distance from the reference plane on the TargetGrip to the target area on the sample; removal value is the distance between the top of the sample chair and the target area. The removal value is automatically calculated by TargetMaster, based on the Target Value.

See [Removal Mode](#) on page 93, and [Target Mode](#) on page 96.

- Mount the TargetGrip in TargetZ or TargetX and obtain the target value.
- When using TargetZ in connection with a preparation in Target Mode, send this value to the TargetMaster. When using TargetZ in connection with a preparation in Removal Mode, note the removal value and enter it manually.
When using TargetX, note the value and enter it manually.
- Remove the TargetGrip from TargetZ/TargetX and, when required, apply resin to support the sample.

Manually Entering Target /
Removal Value

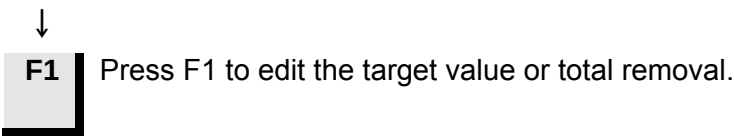
In Target Mode and Removal Mode, the target / removal distance can be changed before the Start  button is pressed. To edit the removal value for any step in the preparation, refer to [Editing Removal Step](#) on page 135.
From the MAIN MENU on TargetMaster:



↓

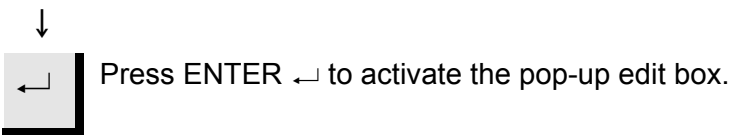
Via prep , Target Mode			
Surface	Susp.	Lub.	µm or Time
1 Dia. Pad 20 µm		Water	? µm
2 Largo	DiaP. All/Lar.		20 µm
3 Dac	DiaP. Dac		15 µm
4 Nap	DiaP. Nap-R		2m 00s
Target value:			4200 µm

F1 Edit Target Value F2  Process summary



Via prep , Target Mode			
Surface	Susp.	Lub.	µm or Time
1 Dia. Pad 20 µm		Water	? µm
2 Largo	DiaP. All/Lar.		20 µm
3 Dac	DiaP. Dac		15 µm
4 Nap	DiaP. Nap-R		2m 00s
Target value:			4200 µm

F1 Edit Step F2  Process summary



Via prep, Target Mode

Surface	Susp.	Lub.	µm or Time
1 Dia. Pad 20 µm		Water	? µm
2 Largo			20 µm
3 Dac			15 µm
4 Nap			2m 00s

Target value: µm

F1 Edit Step F2 Process summary

↓

 Use the arrow buttons   to change the target or total removal value.

↓

 Press ENTER  to accept the value displayed.

↓

F2 Press **F2** to save the change.

Start TargetMaster

In the TargetMaster display:

- Check that the preparation method times or distances are correct. Fine-tune them if necessary by editing via the TargetMaster front panel controls.
- Fit the correct preparation surface to the turntable.
- Insert the TargetGrip in the TargetMaster sample mover and secure it using the Allen screwdriver supplied.
- Press Start  on the TargetMaster front panel to begin the preparation procedure. The current step in the procedure is highlighted in the display:

PROCESS STATUS - IN PROCESS

Surface	Susp.	Lub.	µm or Time
1 SiC-Pap. #800		Water	500 µm
2 Sat	DiaP. All/Lar.		40 µm
3 Dac	DiaP. Dac		5m 00s

Target value: 5680 µm

Remaining removal: 320 µm

Remaining estimated sub-process time: -m -s

TAF
1

If an error has been made when entering the target value, so that the target distance is greater than the sample height, an error message will be displayed and the machine will stop. Re-measure the removal distance or distance to target and enter the correct value.

During the Process

When TargetMaster is using the Target mode:
 $\text{Removal Value} = \text{sample height} - \text{target value}.$

The sample mover slides over to the laser measuring system where the Sample Height is measured. The Sample Height is the distance from the TargetGrip reference plane to the end of the sample. Removal is measured electronically at the beginning of the process.

The sample mover then positions itself over the rotating turntable ready to start step one in the preparation procedure.

When the electronic measuring system has determined that remaining distance to the grinding / polishing transition is 175 μm or less, the laser measuring system is used for the rest of the process. The change-over takes place during grinding.

When the first step is complete, which is normally coarse grinding, the sample mover lifts the sample and transports the sample to the rinsing station.

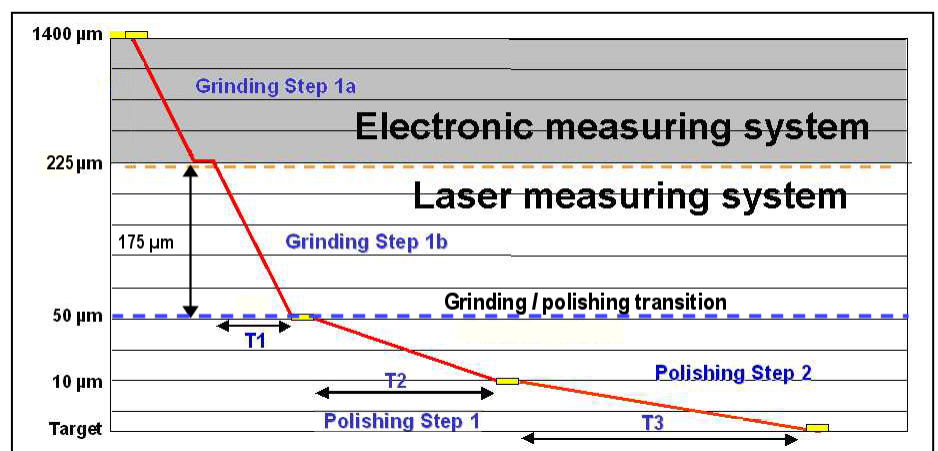
The sample is washed with soap, rinsed with water and then dried using alcohol and compressed air.

The process now loops, making laser measurements, grinding and finally washing and rinsing the samples until the desired amount of material has been removed.

The sample mover then stops. The TargetMaster display prompts you to change the preparation surface.

- Follow the instructions on screen.
- Now press Start $\diamond$ to continue the process.

A typical process can be illustrated using the following diagram:



Using SiC Paper

When using SiC paper, never change papers in the middle of a step, since TargetMaster cannot keep track of the removal rate when the surface is changed during a step.

As a general rule, if a paper needs to be changed, there should be 800-1000 Åm of material left to remove. If the paper tears below this threshold, it is recommended to put a finer grit paper to avoid grinding past the target.

Normally, a single paper can remove as much 1500-2000 Åm. For the most efficient preparation, we recommend that you add a second plane grinding step, where a fresh SiC paper is used.

Spill over and Overshoot

If a laser measurement during removal shows that less than 9 µm remains before completion of a grinding step, the step is terminated and the difference is transferred to the next step. In a polishing step, this happens if the shortfall is less than 3 µm. The transfer to the next step is called *spill over*.

If too much material has been removed by grinding (overshoot), the polishing steps are corrected automatically. If correction is not possible, the machine stops and an error message is shown. In this case, it may be possible to successfully complete the preparation by entering a new method with just one polishing step to compensate.

Note

Overshoot occurs very rarely. Possible causes are faulty measurement due to a wet sample, or incorrect setting for Initial Removal Rate.

Changing Step Sequence

In Time and Removal modes, it is possible to manually change the sequence of steps, or repeat steps while a preparation is in progress. It is also possible to start a preparation on any of the steps.

- Press Stop ⏏ to pause the process.

PROCESS STATUS - PAUSE			
Surface	Susp.	Lub.	µm or Time
1 SiC-Pap. #800		Water	500 µm
2 Sat	DiaP. All/Lar.		40 µm
3 Dac	DiaP. Dac		5m 00s
Remaining removal:			540 µm
Remaining estimated sub-process time:			-m -s
F1 Remove sample F2 Manual Functions TAF 1			

- Use the buttons to select the step required.
- Press Start ⏏ to continue the process.

Manual Functions

To access manual functions during a preparation process:

- Press Stop ⏻ to pause the process.
- Press **F2** Manual functions.
- Use the  ▲▼ buttons to highlight Manual Cleaning or Manual Measurement
- Press ENTER ↵ to start the manual function. Refer to [Manual Functions in TargetMaster](#) on page 64.
- Press **Esc** to leave the Manual functions menu.
- Press Start ⏻ to continue the process.

Interrupting the Process

It may be necessary in the course of a preparation to inspect the sample optically or in an X-ray chamber. To interrupt the process:

- Press Stop ⏻ to pause the process.
- Press **F1** to activate the Remove Sample function.
- Loosen the TargetGrip using the Allen screwdriver supplied and remove it from the TargetMaster.
- Take the TargetGrip and inspect it.
- Return the TargetGrip to the sample mover and secure it in position using the Allen key.
- Press Start ⏻ to continue the process.

IMPORTANT

It is recommended NOT to interrupt the preparation process between the cleaning process and the laser measuring process. Instead, press Stop after the laser measuring process has been completed.

Completing the Process

When all the steps in the preparation process are complete, the Process Summary is displayed. This shows the actual removal rates for each step and the total process time:

PROCESS SUMMARY		
Copy of Target Mode, Target Mode		
Surface	Removal	Rate or Time
1 Dia. Pad 20 µm	1607 µm	117.8 µm/min
2 Largo	16 µm	3.5 µm/min
Distance to target: 0 µm		
Total process time: 28m 29s		

The actual removal values are displayed and can be used to optimise the IRR database values. The closer the IRR values are to the actual removal rates, the faster the preparation.

Note

Always allow a margin of safety by adding 20% to the actual values.

The sample mover moves from the measuring station to a position convenient for TargetGrip removal, and the safety guard door opens.

- Now remove the TargetGrip from the sample mover and inspect the target area.

Deformation in Polishing Steps

If unacceptable deformation of the sample occurs in polishing steps, either reduce the force used in the step (see [Editing Method Steps](#) on page 118), or use a less aggressive preparation surface.

Editing Removal Step

In all modes, individual steps in the preparation can be changed from TargetMaster before the Start  button on TargetMaster is pressed. From the Process menu:

Via prep , Target Mode				
Surface	Susp.	Lub.	µm or Time	
1 Dia. Pad 20 µm		Water	?	µm
2 Largo	DiaP. All/Lar.		20	µm
3 Dac	DiaP. Dac		15	µm
4 Nap	DiaP. Nap-R		2m 00s	
Target value:			4200 µm	

F1 Edit Target Value **F2**  Process summary



Press **F1** to enter the first edit screen.



Press **F1** to enter the edit step screen.



Use the arrow buttons ▲▼ to highlight the step to be changed.



Press ENTER  to edit the highlighted step.



Use the arrow buttons ▲▼ to change the distance for the step.



Press ENTER  to accept the new value.



Press **F2** to save the change.

Note

In Time Mode, the **F1** Edit Step button is not used. To edit a step, select the step with the ▲▼ buttons, enter with ENTER , and change the value with ▲▼ followed by ENTER .

Setting the Time/ Accuracy Factor

The Time/ Accuracy Factor (TAF) setting enables the user to select whether or not highest accuracy or speed of preparation has the highest priority.

TAF	
1	Faster preparation, less accuracy
2	Medium speed and accuracy
3	Slower preparation, highest accuracy

Note:
For new Preparation Methods a TAF value of 3 is recommended initially.

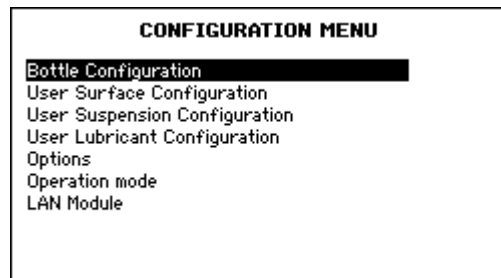
With the MAIN MENU displayed.



Use the arrow buttons ▲▼ to select Configuration.



Press ENTER  to activate the CONFIGURATION MENU.



Use the arrow buttons ▲▼ to select Options.



Press ENTER  to activate the Options menu.



OPTIONS	
Display contrast:	26
Unit:	µm
OP flushing time:	15s
Language:	English
Sample contraction during cleaning:	4 µm
Final cleaning:	No
Time/accuracy Factor:	1

F1 Default value



Use the arrow buttons ▲▼ to select *Time/accuracy Factor*.



Press ENTER ↵ to edit the value.



A pop-up box showing the current value and up/down arrows is displayed.



Use the arrow buttons ▲▼ to select the correct TAF value.



Press ENTER ↵ to accept the new value and return to the Options menu.
(Pressing **Esc** aborts the changes, preserving the original value.)

The TAF value selected will be visible in the bottom right hand side of the screen during a preparation process.

Parallel Polishing

Generally, both RPM and Force should be reduced. If no silicon is present in the specimen, it may not be necessary to reduce the force. The following example is for a BGA (ball grid array). Preparation times are approximate.

Remember: it is better to be safe than sorry, so proceed slowly until you are sure about the actual removal you get from a particular surface.

Before using the parallel holder,

- Place the supplied O-ring under the flange of the parallel holder to prevent water from entering the cavity underneath the holder.

Before Mounting

- Modify a suitable method based on Time Mode - reduce the RPM to 150 and transfer the method to TargetMaster.
- Add 50% to the IRR values in the IRR database (there is much less friction on a measuring pin compared to a sample chair).
- On the scale, check that the TargetGrip is as level as possible. Secure the tilt locking screw. Ensure the O-ring is in place in the parallel holder and clamp the parallel holder in TargetGrip.
- Position the parallel holder in TargetGrip so that the clamping screw is facing the cut-out to the right of the reference edge.
- Secure the TargetGrip locking screws.



- Run on #800 SiC paper for 30 seconds to align the parallel holder with the dovetail of the TargetGrip.
- Clean the parallel holder thoroughly with acetone.

Mounting the Sample



- Mount the specimen on the parallel holder using thin, double-adhesive tape, placing the specimen on the adhesive tape, observing that it is:
 - as close to the measuring pin as possible.
 - centred around the reference plane of TargetGrip.
- Press the specimen gently onto the adhesive tape, and secure with superglue along the edges of the specimen.



- Insert the measuring pin with the O-ring first. Let the top of the measuring pin be a few mm above the top of the specimen.
- Lock the measuring pin.

IMPORTANT!

When the measuring pin is inserted in the Parallel holder, the end of the measuring pin must not protrude more than 3.5 mm from the surface of the parallel holder. If it is any higher than this maximum height, it will collide with the laser well cover. Use a vernier gauge to double check the height.



Grinding

- Plane grind for a few seconds on #800 SiC paper, so that the Measuring Pin is level with the specimen.
- On MD-Dac, grind the specimen for 15-20 seconds and check the specimen. Repeat until the specimen is plane.



- Transfer to TargetMaster and select a suitable removal method. We recommend: Sat/9 μ m, Dac/3 μ m, Nap/1 μ m, and Op-S.
- Stop at regular intervals and check the planarity visually in an optical microscope.
Use a micrometer dial gauge to measure the planeness / tilt of the sample.
- Measure the height at the centre of the sample, and then the sides.
- Tilt the sample until you have compensated for any side-to-side difference.
- Continue the procedure until you have reached the target .

14. TargetDoser Advanced Configuration

Introduction

Although the Configuration Menu enables you to change the display contrast setting and define the contents of the suspension and lubrication bottles connected to the TargetDoser (both of which are described already) it also allows you to define new user-defined polishing surfaces, lubricants and suspensions.

Defining a User Surface Configuration

Using this option, it is possible to define up to 10 new user-defined surfaces. You are able to define the name, the abrasive rule and lubricant rule for each surface.

To define these parameters:

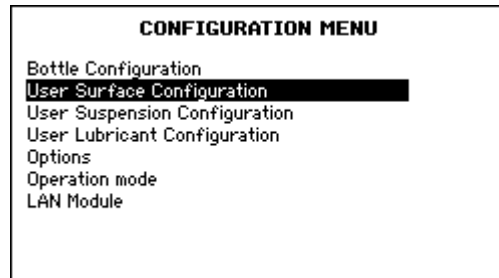
With the MAIN MENU displayed.



Use the arrow buttons ▲▼ to select Configuration.



Press ENTER  to activate the CONFIGURATION MENU.



Use the arrow buttons ▲▼ to select User Surface Configuration.



Press ENTER  to activate the USER SURFACE CONFIGURATION menu.



USER SURFACE CONFIGURATION		
No.	Surface name	Abr. rule
1	Surf. 1, User type	1
2	Surf. 2, User type	1
3	Surf. 3, User type	1
4	Surf. 4, User type	1
5	Surf. 5, User type	1
6	Surf. 6, User type	1
7	Surf. 7, User type	1

↓
 Use the arrow buttons   to select the Surface name column opposite the desired No. position.

↓
 Press ENTER ↵ to activate the Text editor and define the Surface name.
 Return to the USER SURFACE CONFIGURATION menu.

↓
 Use the arrow buttons   to select the Abr. rule column.

↓
 Press ENTER ↵ to display the SELECT ABRASIVE RULE menu.

USER SURFACE CONFIGURATION		
No.	Surface name	Abr. rule
1	SELECT ABRASIVE RULE 1 = Only diamond 2 = Oxide + diamond 3 = Only oxide 4 = Abrasive contained in surface	
2		
3		
4		
5		
6		
7		

↓
 Use the arrow buttons   to select the correct rule.

Note

It is important to select the correct rules for each surface as the selection will influence the possible choices of suspensions and lubricants available when creating a new preparation method.

If the surface you defined already contains an abrasive, for example SiC paper, select 4 – Abrasive contained in surface.

If the surface only is suitable for use with diamond products, select 1.

If both oxide and diamond can be used on the surface, select 2.

If only oxide can be used, select 3.



Press ENTER ↵ to activate the selected rule and return to the USER SURFACE CONFIGURATION menu.

Defining a User Suspension Configuration

Using this option, it is possible to define up to 10 new user-defined suspensions. You are able to define the name, the abrasion type and lubricant rule for each suspension.

To define these parameters:

With the MAIN MENU displayed.



Use the arrow buttons ⏮⏭ to select Configuration.



Press ENTER ↵ to activate the CONFIGURATION MENU.



CONFIGURATION MENU	
Bottle Configuration	
User Surface Configuration	
User Suspension Configuration	
User Lubricant Configuration	
Options	
Operation mode	
LAN Module	



Use the arrow buttons ⏮⏭ to select User Suspension Configuration.



Press ENTER ↵ to activate the USER SUSPENSION CONFIGURATION menu.



USER SUSPENSION CONFIGURATION			
No.	Susp. name	Abr. type	Lub. rule
1	Susp. 1, User type	1	1
2	Susp. 2, User type	1	1
3	Susp. 3, User type	1	1
4	Susp. 4, User type	1	1
5	Susp. 5, User type	1	1
6	Susp. 6, User type	1	1
7	Susp. 7, User type	1	1

↓
 Use the arrow buttons ▲▼ to select the “Susp. name” column opposite the desired No. position.

↓
 Press ENTER ↵ to activate the Text editor and define the Suspension name.

↓
 Use the arrow buttons ▲▼ to select the Abr. type column.

↓
 Press ENTER ↵ to display the SELECT ABRASIVE TYPE menu.

↓

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

USER SUSPENSION CONFIGURATION			
No.	Susp. name	Abr. type	Lub. rule
1			
2			
3			
4			
5			
6			
7	Susp. 7, User type	1	1

SELECT ABRASIVE TYPE
 1 = Diamond
 2 = Oxide

 Use the arrow buttons ▲▼ to select the correct type.

↓
 Press ENTER ↵ to activate the selected type and return to the USER SUSPENSION CONFIGURATION menu.

↓
 Use the arrow buttons ▲▼ to select the Lub. rule column.

 Press ENTER ↵ to display the
SELECT LUBRICANT RULE menu.



USER SUSPENSION CONFIGURATION			
No.	Susp. name	Abr. type	Lub. rule
1			
2			
3			
4			
5			
6			
7			

SELECT LUBRICANT RULE

1 = Other lub. except water
2 = No lubricant
3 = Only waterfree lubricants

Note

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



 Use the arrow buttons ▲▼ to select the correct rule.



 Press ENTER ↵ to activate the selected rule and return to
the USER SUSPENSION CONFIGURATION menu.



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

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

Defining a User Lubricant Configuration

Up to 10 new user-defined lubricants can be defined by name and lubricant type.

To define these parameters:

With the MAIN MENU displayed.



Use the arrow buttons ▲▼ to select Configuration.



Press ENTER  to activate the CONFIGURATION MENU.



CONFIGURATION MENU	
Bottle Configuration	
User Surface Configuration	
User Suspension Configuration	
User Lubricant Configuration	
Options	
Operation mode	
LAN Module	



Use the arrow buttons ▲▼ to select User Lubricant Configuration.



Press ENTER  to activate the USER LUBRICANT CONFIGURATION menu.



USER LUBRICANT CONFIGURATION		
No.	Lubricant name	Lub. type
1	Lub. 1, User type	2
2	Lub. 2, User type	2
3	Lub. 3, User type	2
4	Lub. 4, User type	2
5	Lub. 5, User type	2
6	Lub. 6, User type	2
7	Lub. 7, User type	2



Use the arrow buttons ▲▼ to select the Lubricant name column opposite the desired No. position.





Press ENTER ↵ to activate the Text editor and define the Lubricant name.



Use the arrow buttons ↵▲▼ to select the Lub. type column.



Press ENTER ↵ to display the SELECT LUBRICANT TYPE menu.



USER LUBRICANT CONFIGURATION		
No.	Lubricant name	Lub. type
1		
2		
3		
4		
5		
6		
7	Lub. 7, User type	2

SELECT LUBRICANT TYPE

1 = Lubricant containing water

2 = Waterfree lubricant

Note

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



Use the arrow buttons ↵▲▼ to select the correct type.



Press ENTER ↵ to activate the selected type and return to the USER LUBRICANT CONFIGURATION menu.



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



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

Setting the Operation Mode

Access to the software can be restricted using the Operation mode menu.

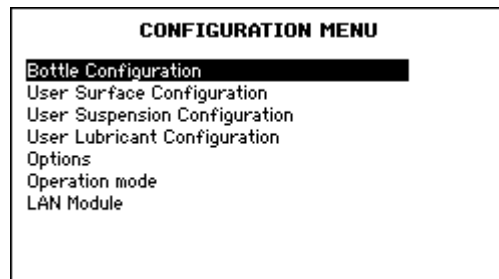
With the MAIN MENU displayed.



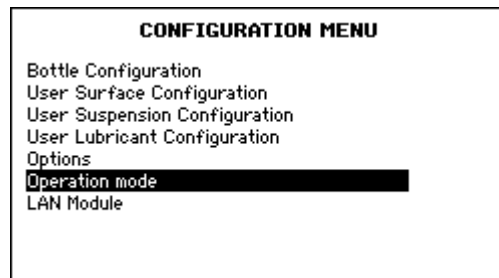
Use the arrow buttons ▲▼ to select Configuration.



Press ENTER  to activate the CONFIGURATION MENU.



Use the arrow buttons ▲▼ to select Operation mode.



Press ENTER  to activate the Operation mode menu.



OPERATION MODE

Current operation mode:	Configuration
Pass code:	---



To change the Current operation mode Press ENTER ↵.



Use the arrow buttons ▲▼ to scroll up to the pass code.
The default Pass code is 176.



OPERATION MODE

Current operation mode:	Configuration
Pass code:	176



Press ENTER ↵ to accept the Pass code.



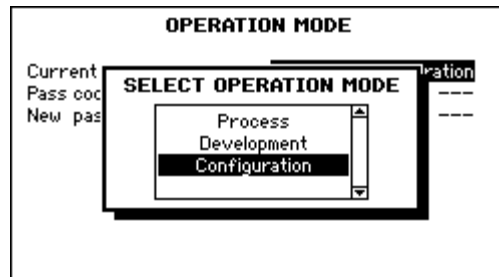
OPERATION MODE

Current operation mode:	Configuration
Pass code:	---
New pass code:	---



Press ENTER ↵ to edit the Current operation mode.





Use the arrow buttons   to select the Operation Mode.

Operation Modes:

- Process:** Methods can be selected and viewed, but no editing is possible.
- Development:** Methods can be selected, viewed and edited
- Configuration:** Methods can be selected, viewed and edited, bottles can be configured and the IP address can be reset.



Press ENTER  to activate the selected Operation Mode.

Changing the Pass Code

With the MAIN MENU displayed.



Use the arrow buttons  ▲▼ to select Configuration.



Press ENTER  to activate the CONFIGURATION MENU.



CONFIGURATION MENU	
Bottle Configuration	
User Surface Configuration	
User Suspension Configuration	
User Lubricant Configuration	
Options	
Operation mode	
LAN Module	



Use the arrow buttons  ▲▼ to select Operation mode.



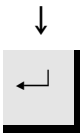
CONFIGURATION MENU	
Bottle Configuration	
User Surface Configuration	
User Suspension Configuration	
User Lubricant Configuration	
Options	
Operation mode	
LAN Module	



Press ENTER  to activate the Operation mode menu.



OPERATION MODE	
Current operation mode:	Configuration
Pass code:	---



To change the current pass code:
Press ENTER ↵ to enter the pass code. The default pass code is 176.



OPERATION MODE	
Current operation mode:	Configuration
Pass code:	176



Press ENTER ↵ to accept the pass code.



Use the arrow buttons ↵▲▼ to select: New pass code.



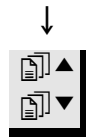
OPERATION MODE	
Current operation mode:	Configuration
Pass code:	---
New pass code:	---



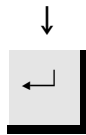
Press ENTER ↵ to access the pass code.



OPERATION MODE	
Current operation mode:	Configuration
Pass code:	---
New pass code:	0



Use the arrow buttons ▲▼ to set your new personal pass code.



Press ENTER  to accept your new personal pass code.

Resetting the LAN Option

The LAN module is not shown in the Configuration menu if the LAN module is not installed. If the LAN module is installed, the IP address of the LAN module can be reset to the default address:

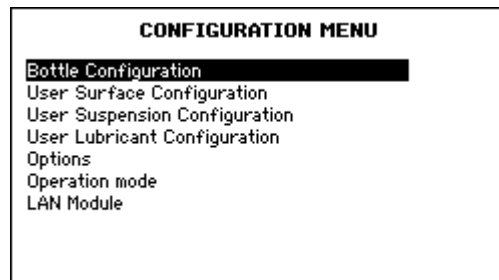
With the MAIN MENU displayed.



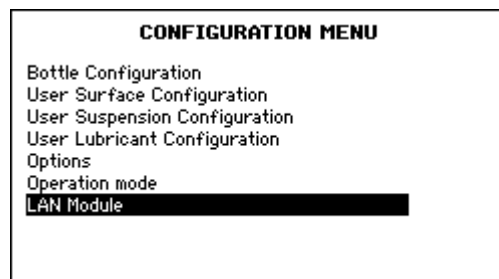
Use the arrow buttons  to select Configuration.



Press ENTER  to activate the CONFIGURATION MENU.

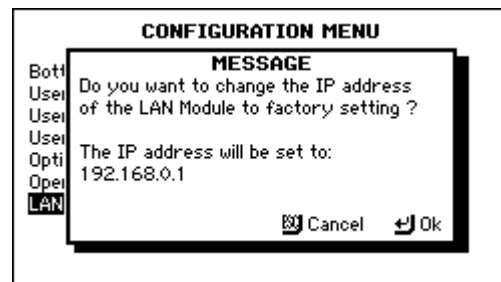


Use the arrow buttons  to select LAN Module.



Press ENTER  to activate the LAN Module menu.





Press ENTER ↵ to reset the IP address to 192.168.0.1

15. Trouble-shooting for TargetSystem

Problem	Explanation	Action
Missing the Target		
Poor drying Wet reference plane on TargetGrip or wet sample surface resulting in incorrect measurements	Insufficient air supply, clogged valves in the cleaning chamber, oil/water in compressed air, flooded cleaning chamber(s) i.e. drain is blocked/clogged. Insufficient supply of alcohol and/or soap. These levels are monitored by TargetDoser, but must be reset manually after refill.	Check that there are no blocked valves or drains in the cleaning chambers. The most critical error is oil in compressed air; drain the air filter (see Emptying the Air Filter page 15). If the problem persists, contact an authorized compressed air engineer. <i>NOTE:</i> When removing TargetGrip from TargetMaster, always routinely check that the reference plane is <u>dry</u> .
Poor cleaning	Insufficient supply of soap and/or clogged valves in the cleaning chamber.	Check soap level and supply hose and valve in cleaning chamber 2 (left-most).
Incorrect TargetZ calibration		Re-calibrate TargetZ.
Sample Contraction Value set too high	A setting of 4 microns is normally recommended.	Go to Configuration Menu, Options to check/change setting.
Laser measuring system is unstable		Repeat 5 manual measurements on any polished specimen. The readings should all be within +/- 5 μm tolerance. If not, please contact a Struers Service Technician.

Error Messages

Error message	Explanation	Action required
Air pressure too low!	This message is shown in connection with vertical movement of the sample mover.	The compressed air supply has been shut off, or the air pressure is less than the minimum specified.
Are you sure you want to load the default cleaning program?	F2: Default Value has been pressed in the Cleaning program configuration menu.	Confirm by pressing ↵ if you want to overwrite the selected cleaning program with the default values. NB. Only the selected cleaning program is changed
Are you sure you want to terminate the process?	This message is shown when the Stop key is pressed in the Process Status screen and the process has been paused. The message is shown to prevent unintentional termination of the process.	Press ↵ if you want to terminate the process, otherwise press Esc .
ATTENTION - The safety guard is closing, and TargetMaster is searching for reference position, please wait.	This message is shown at power-up, if the safety guard is open when the power connection is made to TargetMaster.	No action required. Wait.
Cleaning program not configured	You have tried to start a manual cleaning process, but the chosen cleaning program does not contain any active steps.	In the Cleaning Program Configuration menu, ensure that the step time is greater than 0 second.
Deviation too large when measuring the reference surface! Reference surface or laser surface is wet or dirty.	This measurement is shown in connection with a laser measurement. The measurement of the reference surface shows too large a deviation compared to the preceding measurements.	Check if the sample holder's reference edge is clean and dry: the smallest drop of water will give a measurement error. If the surface is wet, there is a fault condition in the cleaning function. If the surface is dry, check the less likely reason for the error message: Under some circumstances water can have run down into the laser itself. Move the laser protection plate aside and clean carefully with a cotton bud.
Disc motor or frequency inverter overloaded!	This message is shown in the course of a grinding or polishing operation if the disc motor or the frequency inverter is overloaded.	Check if the method used causes a particularly heavy load on the motor, and if so, correct the method parameters. Let TargetMaster cool down, and restart the process. If the error message reoccurs after a cold start, call a service technician.
Do you want to save changed method?	A process time or removal value has been changed.	If yes is pressed, the TargetDoser method will be overwritten with the new data.

TargetSystem
Instruction Manual

Error message	Explanation	Action required
Encoder error!	This message is shown at power-up if the sample holder's horizontal position cannot be measured.	Remove power, wait 5 seconds, and reconnect power. If the error reoccurs, a service technician must be called.
Horizontal movement of sample mover blocked	This message is shown in connection with horizontal movement of the sample mover.	Check if a physical obstacle is blocking the sample mover's horizontal movement. If this is not the case and the error message is shown again, a service technician must be called.
Laser Displacement sensor not calibrated! Please call service technician.	START has been pressed on TargetMaster, but the laser displacement sensor is not calibrated.	This can arise in connection with a software update, where the entire database is re-established. The user cannot solve this problem; a service technician must be called.
Lubricant is not configured!	An attempt has been made to start a process, but the lubricant required for the step has not been configured in TargetDoser.	Select Bottle configuration on TargetDoser, and configure a bottle for the lubricant required.
Manual lubricant or suspension denied, process menu not selected	You have pressed manual lub or manual susp in a menu from which it is not possible to start a manual dosing.	Select the Process menu and place the cursor on the desired process step. Then start the dosing required.
Manual process in progress, certain functions are not allowed!	A manual process is in progress, e.g. "Manual Cleaning", and a key such as "→" has been pressed.	A process or function cannot be started while a process is being carried out.
New method data received	This message is shown when new method data is sent from TargetDoser to TargetMaster.	No action required.
No communication to TargetForce!	This message is shown at power-on if there is a communications error between the two internal circuit boards in the TargetMaster. TargetForce is not an external unit: it is the factory name for an integral part of TargetMaster.	Remove power from TargetMaster for 5 seconds, and then switch on again. If the message is shown again, call a service technician.
No communication to TargetDoser!	This message is shown at power-on if there is no data communication between TargetMaster and TargetDoser.	Check if TargetDoser is connected correctly to TargetMaster. If this is the case, remove power for 5 seconds, and then switch on again. If the message is shown again, call a service technician.

Error message	Explanation	Action required
Process in progress, certain functions are not allowed!	A process is underway, and a function button has been pressed, e.g. ▷	Manual functions cannot be started while a preparation is in progress.
Removal rate base value is critically low, you might grind past the target! Please see Instruction Manual.	This message is shown in connection with a removal process, if the actual removal rate exceeds the base value that is specified in the Configuration of initial removal values menu.	There is a risk that TargetMaster will grind past the target, so stop the machine immediately and check if the initial removal value is too low. For safety's sake, the value should be approx. 20% greater than the actually achieved removal rate. Refer to Configuration of Initial Removal Rates on page 77.
Removal rate too low! Either the sample doesn't touch the surface, or the grinding disc is worn down. Correct the error.	This message is shown in a grinding process when the removal rate falls to under 30 µm/minute	Check if the sample has been ground so far down that it no longer touches the grinding surface. If this is not the case, change the grinding disc. The max grinding depth of 6mm may have been reached.
	Air pressure too low.	Air pressure supply must be minimum 6 bars.
Removal rate too low! Either the sample doesn't touch the surface, or the disc/cloth is unable to remove material. Correct the error.	This message is shown when grinding or polishing has been in progress for more than 30 minutes without the removal value for the step being reached.	Check if the sample has been ground so far down that it no longer touches the grinding surface. If this is not the case, change the grinding disc.
Safety guard not closed!	◁ or ▷ has been pressed, but the safety guard is open.	Press  to close the safety guard before attempting to move the sample mover.
Sample motor error!	This message is shown in connection with the start of a horizontal sample movement, if the required rotational speed cannot be achieved.	Call a service technician.
Sample motor zero position not found!	This message is shown when the sample mover motor stops and the sensor that registers the parking position is not activated.	Call a service technician.

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Instruction Manual

Error message	Explanation	Action required
Start denied, process menu not selected.	You have pressed START in a menu from which it is not possible to start a process	Go to the Process menu, and ensure that a method has been sent from TargetDoser. Then press START.
Start denied, the amount of material to be removed is zero or negative! Please read the Instruction Manual for further information.	START has been pressed on TargetMaster, but the step cannot be started, because the present removal value is zero or negative. Either a laser error has occurred, or too much material was removed in the previous step.	Remove the sample holder from TargetMaster. If the target has not been destroyed, measure the specimen again, and make a new method that matches the remaining distance to target. Refer to Spill over and Overshoot on page 132.
Step number 1 is finished, prepare next step by changing the surface to: Largo	This message is shown when the first step is completed. TargetMaster cannot proceed to the next step without the user intervention specified.	Confirm by pressing ↵ and change the surface to the specified type.
Suspension is not configured!	An attempt has been made to start a process, but the suspension required for the step has not been configured in TargetDoser.	Select Bottle configuration on TargetDoser, and configure a bottle for the suspension required.
TargetMaster is searching for reference position, please wait	This message is shown at power-up, at the point where the reference position is being found.	No action required. Wait.
Target value error! Either the target is outside the sample, or the amount of polishing is too large. Please see Instruction Manual.	A process has stopped because the specified target value is not valid in relation to the mounted sample and the method used. Either the target value is greater than the sample height, which is meaningless, or the sum of the polishing steps removal is greater than the amount of material to be removed before the target is reached.	The probable cause is that you have made a mistake in the measurement of the distance to target. Make a new measurement. If this is not the case, the removal values in one or more of the subsequent polishing steps must be reduced. Refer to Operating TargetSystem on page 127.
The deviation is too great, you have to perform the calibration again. If you get this message again, please contact a service technician. Deviation: xxx µm	This message is shown when a TargetZ calibration has been completed. The calibration has not been accepted; either because a fault has been made or because the adjustment made to TargetZ falls outside the tolerance limits.	Try to do a TargetZ calibration again. If the error message reoccurs, a service technician must be called.

TargetSystem
Instruction Manual

Error message	Explanation	Action required
The horizontal reference position is not found, try to restart TargetMaster.	The reference check process has been interrupted (STOP has been pressed)	Remove power, wait 5 seconds, and reconnect power.
The inductive sensor used for finding the horizontal reference position was not activated! TargetMaster cannot continue.	This message is shown at power-up, if a sensor has not been activated.	Remove power, wait 5 seconds, and reconnect power. If the error reoccurs, a service technician must be called.
The level in the alcohol or soap bottle is low. Please refill both bottles to 1.0 litre mark. Press↵ to continue process.	START has been pressed, but the level check done byTargetDoser has revealed that the level in either the alcohol or the soap bottle is low.	Fill both bottles completely and press ↵ to continue. If you do not ensure that both bottles are completely full at this stage, the level metering function will not give an accurate indication, and there is a risk of running dry of alcohol or soap.
The reference position is found, TargetMaster is ready.	This message is shown at power-up, and indicates that the machine is ready for use.	No action required.
The safety guard inductive sensor is not activated!	This message is shown when an attempt is made to open the safety guard, but the sensor that registers that the safety guard is fully open does not activate.	Check if there is a physical blockage that prevents the safety guard from opening completely. If this is not the case, a service technician must be called.
The safety guard switch is not activated!	This message is shown when an attempt is made to close the safety guard, but the sensor that registers that the safety guard is fully closed does not activate.	Check if there is a physical blockage that prevents the safety guard from closing completely. If this is not the case, a service technician must be called.
The sample holder is not moving down!	A process has been started, but the sample mover is not moving downwards in its current position.	Check if there is a physical blockage of the sample mover travel, and clear the blockage. If this is not the case, a service technician must be called.
The sample holder is not moving up!	This message is shown when the sample holder is meant to be lifted up after running on a disc or after being in a cleaning station. The sensor that measures the sample mover's vertical position has not registered that the sample holder is in the up position.	Check if a physical obstacle is preventing the sample holder rising. If this is not the case, and the fault message reoccurs, a service technician must be called.

Error message	Explanation	Action required
The sample is tilting, or protruding from the sample chair	This message is shown in connection with a grinding process, when a laser measurement indicates that no material has been removed since the preceding measurement.	No action required. The message is just to inform you that the sample has not yet been ground parallel to the reference edge, or that the sample is protruding slightly beyond the edge of the sample chair.
Too much material has been removed in this step! Your target is not necessarily destroyed, but you cannot continue with the actual method. Please read the instruction manual for further information.	Too much material has been removed in the step that has just been completed. It is not possible to compensate for this by reducing the removal values for the following steps. Either a laser error has occurred, or the initial removal rate for the step was set too low.	Check the sample and the sample holder. The measurement surfaces should be clean and dry, unless there is a fault in the cleaning function. Check if the removal rate in the configuration menu matches that of the present step, the value must be greater than the realisable removal rate. Refer to Configuration of Initial Removal Rates on page 77. If the target has not been destroyed, measure the specimen again, and make a new method that matches the remaining distance to target.
Tube cleaning in progress!	START has been pressed on TargetMaster, but TargetDoser is still carrying out a tube cleaning process and is therefore not yet ready.	Wait until the tube cleaning process is ready, then press START .

16. Maintenance

Daily Service

- Clean all accessible surfaces with a moist cloth.
- Check and refill the suspensions and lubricants in the bottles.

Weekly Service

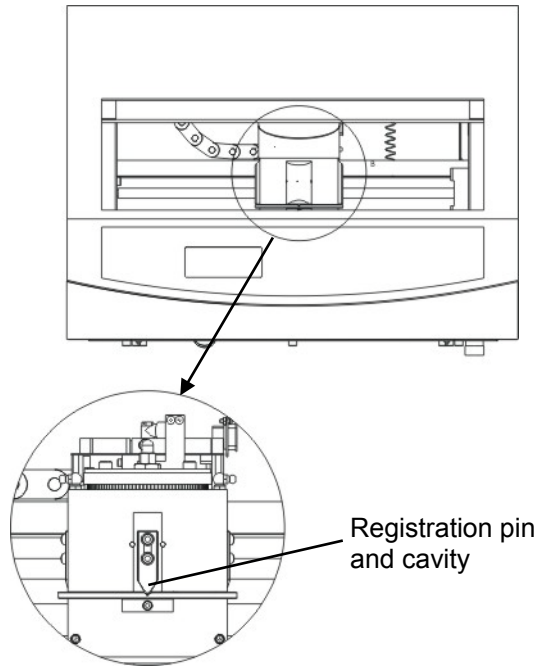
- Re-calibrate TargetZ weekly, or after every 10-20 samples.

Tube Cleaning

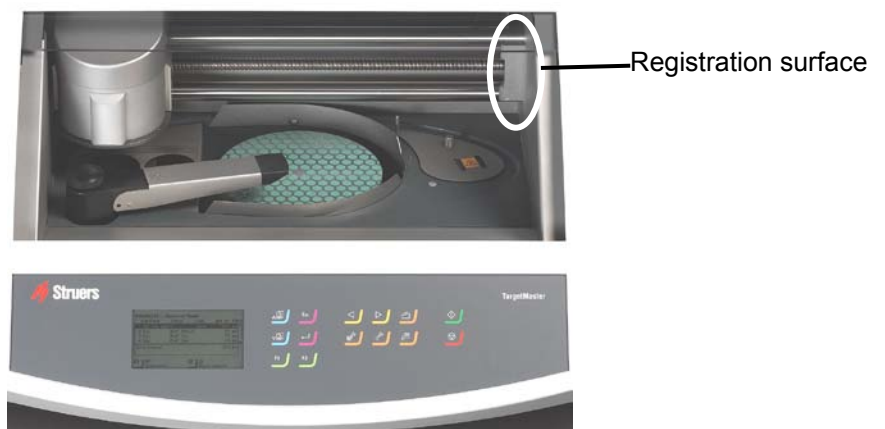
Cleaning of TargetDoser tubes must be done when bottles are changed. Tube cleaning must also be done immediately after OP-S has been used in a preparation. See [Tube Cleaning](#) in the Manual Functions section on page 68.

Monthly Service

- Clean the Multi-nozzle dosing head with a mild acidic solution (or other anti-limescale product) to remove any calcium carbonate deposits.
- Rinse the dosing head thoroughly with clean water.
- Clean the registration pins and the corresponding cavities on the sample mover.



- Clean the registration surfaces at each side of the spindle with a cotton wool bud and some alcohol.
(Note: only one registration surface is visible in the picture below)



Cleaning the Laser Window

- Ensure that the TargetMaster is switched off at the mains.
- Moisten a cotton wool bud with alcohol, swing laser well cover aside and carefully wipe the surface of the laser window.

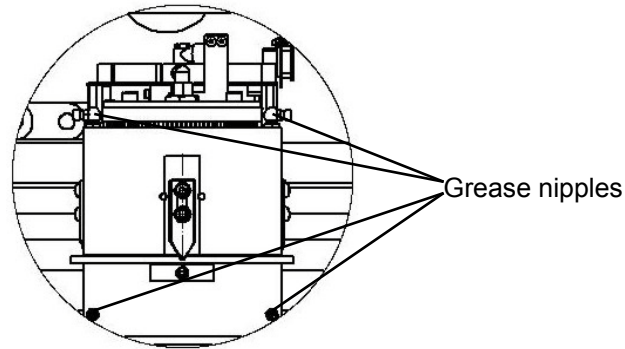
Cleaning TargetGrip

- Remove the three small screws.
- Remove the outer cover and clean any residue from inside the TargetGrip.
- Lubricate all moveable parts and re-assemble.

Yearly Service

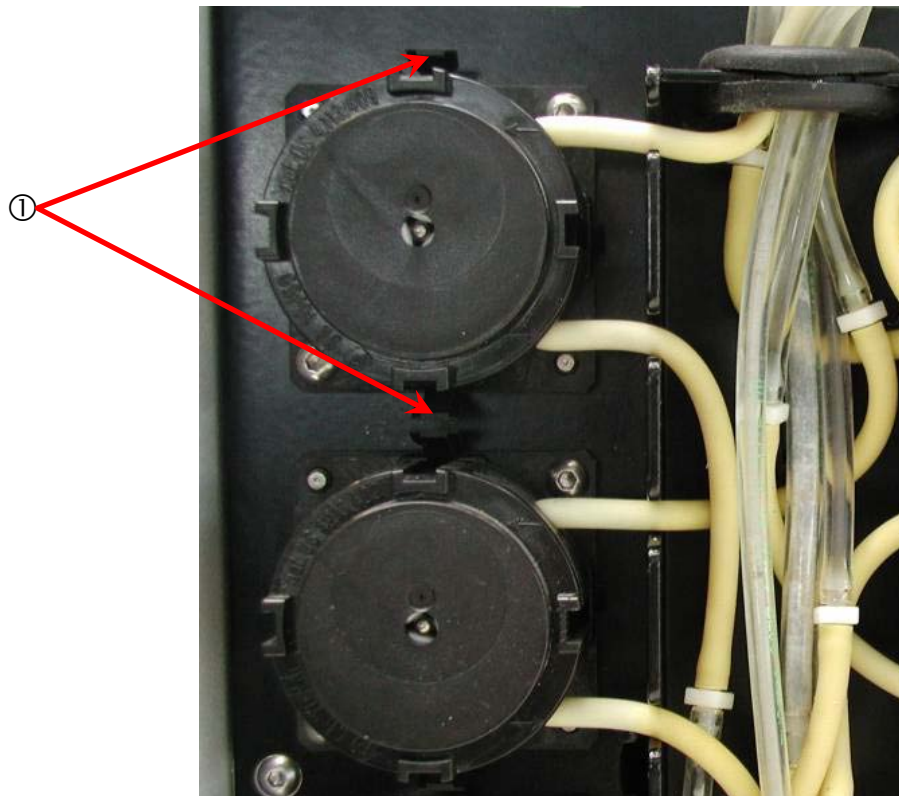
Greasing the Sample Mover Head

- Lightly grease the surface of the upper ring on the sample mover head and grease the 4 nipples with Shell Albida EP2.



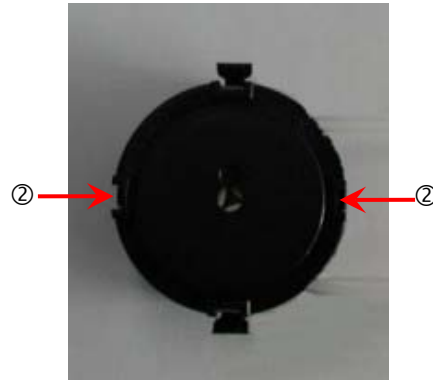
Changing Tubes

The tubing on TargetDoser's pump 5 is made of Silicone, which has a better resistance against alcohol than the Novoprene tubes mounted in the other pumps. However, the silicone tubing is not as hard wearing as Novoprene and we recommend replacing the silicone tubes on a yearly basis. To exchange the Silicone tubing:



- Separate the doser tubes at the white couplings (the couplings should stay on the tubes connected to TargetDoser).
- Press the two tabs ① and remove the pump from the axle.

- Press the two tabs on the pump ② and remove the bottom cover.



- Remove the 3 loose rollers and replace the silicone tube.



- Replace the 3 rollers in the pump housing.



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

17. Accessories and Consumables

Please refer to the [TargetSystem Brochure](#) for details of the range available.

18. Technical Data

Subject		Specifications
TargetMaster		
System accuracy		$\pm 5 \mu\text{m}$ at 20° C / 68° F $\pm 2^\circ \text{C}$ / 4° F
Disc	Diameter	200 mm / 8"
	Speed turntable specimen holder	40-300 rpm in steps of 10 rpm 20-150 rpm in steps of 10 rpm
	Force	10-75 N in steps of 5N
	Rotational direction	CW / CCW
	Motor	250 W / 0.33 HP
	Torque at disc:	
Cont. at <300 rpm		5.7 Nm / 4.2 ft-lbf
Max.		> 10 Nm / 7.4 ft-lbf
Connected equipment	TargetZ or TargetX	1
	TargetDoser	1
Software and electronics	Controls	Touch pads
	Memory	FLASH-ROM / RAM / NV-RAM
	LC display	240 x 128 dots with back light
Safety Standards		Please refer to the Declaration of Conformity
Noise level	At idle running, at a distance of 1.0 m / 39.4" from the machine	During preparation 54dB (A)
		During cleaning 72dB (A)
Working environment	Ambient temperature	20° C / 68° F $\pm 2^\circ \text{C}$ / 4° F
	Non condensing humidity	35-50% RH

TargetSystem
Instruction Manual

Subject		Specifications	
TargetMaster			
Supply	Voltage / frequency	200-240 V / 50-60 Hz	
	Power inlet	1-phase (N+L1+PE) or 2-phase (L1+L2+PE) The electrical installation must comply with “Installation Category II”.	
	Power, nominal load	700 W	
	Power, idle	16 W	
	Current, nom.	3.5 A	
	Current, max.	6.9 A	
	Pressure for tap water	1-10 bar / 14.5-145 psi	
	Water inlet	1/2" or 3/4"	
	Water outlet	Ø32 mm / 1¼"	
	Compressed air supply	Ø6 mm / ¼"	
	Compressed air pressure	6-10 bar/ 87-145 psi	
	Compressed air quality	In compliance with ISO 8573-1, 5.6.4	
	Air extraction	Ø32 mm / 1¼"	
	Air extraction, min airflow	30 m³ / 1059 ft³ per hour	
Dimensions and weight	Width	820 mm / 32.3"	
	Depth	860 mm / 33.9"	
	Height	595 mm / 23.4"	
	Weight	115 kg / 253.5 lbs	

TargetSystem
Instruction Manual

Subject		Specifications
TargetDoser		
Capacity	Pumps	4 for suspension / lubricant 1 for OP-Suspension 1 for soap 1 for alcohol
Dosing levels	Suspensions	0.2-4.0 ml in 20 steps
	All-in-one suspensions	0.2-12.0 ml in 20 steps
	Lubricants	0.2-12.0 ml in 20 steps
	OP-Suspensions	20.0-90.0 ml in 20 steps
Software and electronics	Controls	Touch pads
	Memory	FLASH-ROM / RAM / NV-RAM
	LC display	240 x 128 dots with back light
Network connection	Struers LAN module	Option
Safety Standards		Please refer to the Declaration of Conformity
Working environment	Ambient temperature	5-40°C / 41-104°F
	Non condensing humidity	35-50% RH
Supply	Voltage / frequency	24 v DC, 1A supplied from TargetMaster
Dimensions and weight	Width	200 mm / 8"
	Depth excl. bottle tray incl. bottle tray	210 mm / 8.3" 550 mm / 21.7"
	Height	380 mm / 15"
	Weight excl. bottle tray incl. bottle tray	8.5 kg / 18.7 lbs 10.0 kg / 22.1 lbs

TargetSystem
Instruction Manual

Subject		Specifications
TargetX		
Software and electronics	Controls	Touch pads
	Memory	FLASH-ROM / RAM / NV-RAM
Safety Standards		Please refer to the Declaration of Conformity
Working Environment	Ambient temperature	20° C / 68° F ± 2° C / 4° F
	Non condensing humidity	35-50% RH
Supply	Voltage / frequency	200-240 V / 50-60 Hz
	Power inlet	1-phase (N+L1+PE) or 2-phase (L1+L2+PE) The electrical installation must comply with "Installation Category II".
	Power, nominal load	50 W
	Power, idle	10 W
	Current, nom.	0.25 A
	Current, max.	1.0 A
Dimensions and weight	Width	705 mm / 27.7"
	Depth	385 mm / 15.1"
	Height	285 mm / 11.2"
	Weight	13 kg / 28.6 lbs

TargetSystem
Instruction Manual

Subject		Specifications
TargetZ		
Software and electronics	Controls	Touch pads
	Video display	15" TFT monitor
Safety Standards		Please refer to the Declaration of Conformity
Surrounding temperature		20° C / 68° F ± 2° C / 4° F
Humidity	Non condensing	35-50% RH
Supply	Voltage / frequency	24 v DC, 1A supplied from TargetMaster
	Video monitor	200-240 V / 50-60 Hz
Dimensions and weight	Width	235 mm / 9.3"
	Depth	315 mm / 12.4"
	Height	205 mm / 8.1"
	Weight	15 kg / 33 lbs

TargetSystem
Instruction Manual

Subject		Specifications
TargetGrip		
Specimen sizes	Diameter	Ø 40mm or Ø 30 mm with adapter
Cross-sectioning		Sample Chair, adapter for cross-sectioning
Max sample size	Width	23 mm
	Height	23 mm
Tilt range		± 5 degrees
Weight		0.58 kg / 1.27 lbs

Preparation Method Target



Material: 40 mm dia. sample chair

Grinding

Step		PG	FG 1	FG 2	FG 3
	Surface	SiC #800	DP-Sat		
	Type		DiaPro Allegro/Largo		
	Level		3/6		
	Type	Water			
	Level				
	RPM	300 / 150	300 / 150		
	Force (N)	35	30		
	Initial removal rate	1500	18		

Polishing

Step		DP 1	DP 2	DP 3	OP
	Surface	MD-Dac	MD-Nap		
	Type	DiaPro Dac	DiaPro Nap-R		
	Level	3 / 8	3 / 8		
	Type				
	Level				
	RPM	300 / 150	150 / 150		
	Force (N)	25	20		
	Initial removal rate	18	Time mode 1 – 2 min.		
Comments					

Preparation Method Target



Material: 40 mm dia. fully mounted insert

Grinding

Step		PG	FG 1	FG 2	FG 3
	Surface	SiC #800	DP-Sat		
	Type		DiaPro Allegro/Largo		
	Level		3/6		
	Type	Water			
	Level				
	RPM	300 / 150	300 / 150		
	Force (N)	40	35		
	Initial removal rate	1500	18		

Polishing

Step		DP 1	DP 2	DP 3	OP
	Surface	MD-Dac	MD-Nap		
	Type	DiaPro Dac	DiaPro Nap-R		
	Level	3 / 8	3 / 8		
	Type				
	Level				
	RPM	300 / 150	150 / 150		
	Force (N)	25	20		
	Initial removal rate	18	Time mode 1 – 2 min.		
Comments					

Preparation Method Target



Material: 40 mm dia. partially mounted insert

Grinding

Step		PG	FG 1	FG 2	FG 3
	Surface	SiC #800	DP-Sat		
	Type		DiaPro Allegro/Largo		
	Level		3/6		
	Type	Water			
	Level				
	RPM	50 / 50	150 / 150		
	Force (N)	25	25		
	Initial removal rate	2500	38		

Polishing

Step		DP 1	DP 2	DP 3	OP
	Surface	MD-Dac	MD-Nap		
	Type	DiaPro Dac	DiaPro Nap-R		
	Level	3 / 8	3 / 8		
	Type				
	Level				
	RPM	150 / 150	150 / 150		
	Force (N)	25	25		
	Initial removal rate	38	Time mode 1 – 2 min.		
Comments					

English

Declaration of Conformity

Manufacturer

Struers ApS
 Pederstrupvej 84
 DK-2750 Ballerup, Denmark
 Telephone +45 44 600 800

Herewith declares that

Name:	TargetMaster
Cat. No.:	05756128
Function:	Grinding and polishing machine
Type No.:	575

fulfils all the relevant provisions of the:
**Machinery Directive
 2006/42/EC**

according to the following standard(s):
 EN ISO 12100:2010, EN 60204-1:2006/AC:2010, EN 61010-1:2010,
 EN 60825-1:2014.

and is in conformity with the:
**EMC Directive
 2014/30/EU**

according to the following standard(s):
 EN 61000-6-1:2007, EN 61000-6-2:2005, EN 61000-6-3:2007/A1:2011, EN 61000-6-4:2007/A1:2011, EN 61326-1:2013.

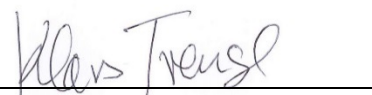
**RoHS Directive
 2011/65/EU**

according to the following standard(s):
 EN 50581:2012.

Supplementary Information

The equipment complies with the following standards:
 UL61010-1:2012, NFPA70:2014, CAN-CSA 22.2 No. 1010-010-30,
 FCC 47 CFR Part 15, AS/NZS 2064.1/2.

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

Authorized to compile the Technical File:


Klavs Tvenge
 Director of Business Development
 Struers ApS
 Pederstrupvej 84
 DK-2750 Ballerup, Denmark

Date of Issue: 2017.10.05

English

Declaration of Conformity

Manufacturer

Struers ApS
 Pederstrupvej 84
 DK-2750 Ballerup, Denmark
 Telephone +45 44 600 800

Herewith declares that

Name:	TargetDoser, TargetX and TargetZ
Cat. No.:	05756904 / 05756923 / 05756922
Function:	Dosing unit and Set-up Stations
Type No.:	575

fulfils all the relevant provisions of the:
**Machinery Directive
 2006/42/EC**

according to the following standard(s):
 EN ISO 12100:2010, EN 60204-1:2006/AC:2010, EN 61010-1:2010.

and is in conformity with the:
**EMC Directive
 2014/30/EU**

according to the following standard(s):
 EN 61000-6-1:2007, EN 61000-6-2:2005, EN 61000-6-3:2007/A1:2011, EN 61000-6-4:2007/A1:2011, EN 61326-1:2013.

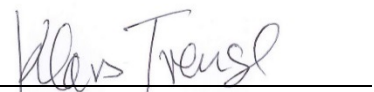
**RoHS Directive
 2011/65/EU**

according to the following standard(s):
 EN 50581:2012.

Supplementary Information

The equipment complies with the following standards:
 UL61010-1:2012, NFPA70:2014, NFPA79:2012, CAN-CSA 22.2 No. 1010-010-30,
 FCC 47 CFR Part 15 Class A, AS/NZS 2064.1/2.

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

Authorized to compile the Technical File:


Klavs Tvenge
 Director of Business Development
 Struers ApS
 Pederstrupvej 84
 DK-2750 Ballerup, Denmark

Date of Issue: 2017.10.05



Pederstrupvej 84
DK-2750 Ballerup
Denmark

TargetSystem



Spare Parts and Diagrams

Manual No.: 15757001

Date of Release 25.07.2011



**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:

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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.

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

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

Spare Part List for TargetMaster

Drawing	Pos.	Spare Part	Cat. no:
15751005		Hose assembly: Air/water diagram	
	10	Reinforced Tube 3/8 X 300	2NU29312
	30	Reinforced Tube 3/8 X 300	2NU29312
	50	Reinforced Tube 3/8 X 300	2NU29312
	60	Tygon tube ID 1/8" OD 1/4".	2NU91307
	70	Tygon tube ID 1/8" OD 1/4".	2NU91307
	80	PU hose ø2.5/ø4 TU 0425 BU (blue)	2NU14425
	90	PU hose ø2.5/ø4 TU 0425 BU (blue)	2NU14425
	100	PU hose ø2.5/ø4 TU 0425 BU (blue)	2NU14425
	110	PU hose ø2.5/ø4 TU 0425 BU (blue)	2NU14425
	120	PU hose ø2.5/ø4 TU 0425 BU (blue)	2NU14425
	130	PU hose ø2.5/ø4 TU 0425 BU (blue)	2NU14425
	140	PU hose ø2.5/ø4 TU 0425 BU (blue)	2NU14425
	150	PU hose ø2.5/ø4 TU 0425 BU (blue)	2NU14425
	160	PU hose ø2.5/ø4 TU 0425 BU (blue)	2NU14425
	170	PU hose ø2.5/ø4 TU 0425 BU (blue)	2NU14425
	180	PU hose ø2.5/ø4 TU 0425 BU (blue)	2NU14425
	190	T-piece KQ2T04-00, ø4-ø4, 3 pcs.	2NF40146
	200	Quick air escape valve AQ240-04-00	2YH20004
	205	Throttle check valve AS2001FM-04	2YI02002
	210	Reduction piece Ø6/Ø4	2NF10138
15750089		Travers, assembled	
	30	Dowel Pin Stainless St. 6m6x16 DIN 7, 4 pcs.	2ZS01422
	50	Travers shaft, stainless, 2 pcs.	15750205
	60	O-Ring 20.24-2.62 72 NBR 872, 4 pcs.	2IO26210
	75	Locking ring J32 DIN 472	2ZL20330
	80	Locking ring J32 DIN 472	2ZL20320
	110	Timing belt GT 3MR-540-9	2JT20431
	130	Bearing for travers	15750155
	140	PVC Tube ø3/ø5,	2NU11303
	150	Digital encoder 2RE 50 4 10 50	2HR10051
	185	Step. motor, assembled	15750065
	190	Timing belt GT 3MR-267-09	2JT20425
	230	Check-nut M10 A2 DIN439B	2TA20100
	340	Inductive sensor M5 x 16.	2HQ00517
15750069		Exhaust, assembled	
	10	Exhaust hose ø32, 2 pcs.	15750182
	20	T-Piece 90° ø32 06 1130 032	2NG20401
	30	Sealing cap ø32 CIV VVS 06 1301, 2 pcs.	2NG20155

Spare Part List for TargetMaster

Drawing	Pos.	Spare Part	Cat. no:
15750075		Hoseblock	
	10	Hose Cylinder	15750231
	20	Gasket, PVC M5	2IF00010
	30	Hose nipple 2601-4.5-M5, 6 pcs.	2NF40080
	40	Nipple M5-ø5/ø3 Drawing 1008-19, 8 pcs.	2NF40205
15750072		Cabinet, Complete	
	80	Step. motor 600 R034	2MI06634
	90	Tooth wheel HTD 15 3M	15750207
	100	Cylinder Pin ø2m6x14.	2ZS01214
	120	Timing belt 3MR-243-09	2JT20426
	200	Inductive sensor M5 x 16.	2HQ00517
	250	LED module 24V Osram OS-LM10A-W1	2HL10000
15750071		Cabinet shaft, complete	
	30	Tooth wheel HTD 60 3M	15750206
	40	Tooth wheel M1 dd 54, 2 pcs.	15750175
	70	Locking ring A12 DIN 471, 2 pcs.	2ZL10120
	80	Bearing housing RPB-12 INA, 2 pcs.	2BS00012
15750070		Front window, complete	
	10	Front window	15750176
	50	Dowel pin 4m6x16 DIN 7., 2 pcs.	2ZS01354
	60	Feeler steel 0.5	2GR04050
15750066		Doser arm, assembled	
	20	Vibration damper ø8x8-M3x6	2GS00108
	30	INA sealing ring SD 14x20x3	2II21420
	50	Gasket, PVC O-1/8	2IF00011
	55	Reducer 2520-1/8-1/4 in	2NF40021
	60	Gasket, PVC 1/4"	2IF00012
	65	Hose Nipple 2601-12-1/4	2NF40087
	80	O-RING String Ø4	2IM10004
	150	Nozzle block, complete	15750227
	170	Nozzle pipe, 4 pcs.	14600034
	180	Tygon tube, ENFT 21 Ø2.06	2NU91221
	210	OP-Nozzle pipe, 2 pcs.	14600209
	220	Silicone tube Ø4/Ø6	2NU11454
	270	Reinforced tube 3/8 X 300	2NU29312
	280	Hose clamp NORMA S17/9Zy	2NS11709

Spare Part List for TargetMaster

Drawing	Pos.	Spare Part	Cat. no:
15750064		Rear plate, complete	
	20	Filter regulator, Complete	15750029
	50	Solenoid valve, Triple 24Vdc green 311	2YM12311
	90	Reduction coupling	2NF40061
	100	Gasket, PVC 1/4"	2IF00012
	110	Hose Nipple 2601-12-1/4	2NF40087
	120	Quick-coupling KCH04-01S ø4-1/8	2NF10014
	130	Magnetic valve, Complete	15750036
	150	CAN-module for Lenze frequency converter	2PU82000
	160	Lenze frequency converter 1x230V 370W	2PU82371
	190	Connector print assembled for TegraPol	15513020
	210	Noise filter 6ESK1	2MO90030
	230	Power supply 85-264Vin, 24V/8A	2PA90200
	290	Fuse holder for mains connection	2XN32901
	300	Mains socket with fuse and switch	2XN32107
	310	Insulating cap for mains connection	2XN30001
	320	Fuse, 8AT, 2 pcs..	2FU14350
	500	Sealing band /31018 black	2IP30001
	510	Neoprene nipple ø11/ø15/ø19-1.5	2GK90131
15750060		Nozzle block, complete	
	10	Nozzle block	15750142
	20	CYLINDER PIN 3M 6x12, STAINLESS, 4 pcs.	2ZS01312
	50	Nozzle HB-VV 1/8 6504, 3 pcs.	2YD10022
	60	Nozzle HB-VV 1/8 6504, 3 pcs.	2YD10002
	70	O-RING STRING Ø1.78	2IM10178
	80	Gasket, PVC 1/4"	2IF00012
	90	Double nipple 2501-1/4	2NF40012
	100	Angle 2013-1/4	2NF40101
	110	Hose Nipple 2601-12-1/4	2NF40087
	120	Union, straight KQ2S04-M5, 2 pcs.	2NF90405
	130	Nipple M5-ø5/ø3 Drawing 1008-19, 2 pcs.	2NF40205
	140	Gasket, PVC M5	2IF00010
	150	Gasket, PVC O-1/8	2IF00011
	170	Nozzle B1-8HH-KY1.3 KYNAR	2YD10025
15750058		Bearing construction, complete	
	30	V-Ring VA 0050	2IV10023
	40	Angle contact bearing 3204 A-2RS1	2BK30020
	50	Wave spring 28x34.5x0.5	2GF60020
	60	Ball Bearing Ø17/Ø35 6003-2RS1	2BK00040
	80	Poly-V-belt pulley ø230, complete	15510102
	110	Disc mounted with quad-ring	15190044

Spare Part List for TargetMaster

Drawing	Pos.	Spare Part	Cat. no:
15750056		Bottom, Complete	
	20	Rubber Pad 30x15xM8, 4 pcs.	2GS00315
	30	Gasket, PVC 1/4"	2IF00012
	40	Hose Nipple 2601-12-1/4	2NF40087
	50	Angle 2020-1/4-1/4	2NF40112
	85	Dowel Pin Stainless St. 6m6x16 DIN 7, 2 pcs.	2ZS01422
	100	Laser, complete set	2HQ92950
	130	Drain hose ø32	15750145
	140	Angle 90 C. GIV-32	2NG20215
	150	Pipe strap RSGU 1.ø32/12-W1	2NS43212
	170	Nozzle block, complete	15750060
	190	Motor complete with sledge	15510020
	230	Poly-V-belt 41,5 PJ4 (L=1059)	2JD31059
	260	Neoprene nipple ø18½/ø25/ø32½-1.5	2GK90143
	340	Cylinder Pin 3M 6x12, STAINLESS, 2 pcs.	2ZS01312
	360	Pressure spring R.S ø5xø0.63 L=26	2GF10049
	370	Set Screw	14380330
	380	Sealing band /31018 black	2IP30001
	420	Cable chain, complete	15750062
	445	Spiral Hose	2WK90018
	480	Hose block	15750075
15750029		Filter regulator, Complete	
	10	Union, straight KQ2S06-M5	2NF90605
	20	Fitting ARP10P-270AS for AW10	2YF00009
	30	Filter regulator AW10-M5H-2	2YF00008
	40	Union, straight KQ2S04-M5	2NF90405
15750010		TargetMaster Dual, Complete	
	260	Spike cover, front	15750187
	270	Cylinder pin, hardened steel 4m6x16 DIN 7., 2 pcs.	2ZS01354
15710020		Optics, complete	
	20	Intermediate ring, 6 mm, 2 pcs.	15710126
	30	Camera TVCCD-700 B/W 1/3", 2 pcs.	2GI10480
	40	Intermediate tube	15710127
	45	Lining for intermediate tube	15710246
	50	Objective Cosmimar H1214-M	2GI21214
	60	Objective Cosmimar C5028-M	2GI25028
	110	Dowel pin 4m6x10 DIN 7, STAINLESS, 2 pcs.	2ZS01351
	150	Light Board, tested	15713002
	220	Camera sledge, assembly	15710090

Spare Part List for TargetDoser

Drawing	Pos.	Spare Part	Cat no:
15750097		Cabinet, complete	
	10	Cover	15609001
	70	Rubber foot	2GB05012
15750096		Front plate, complete	
	10	Front plate foil	15750213
	20	Front plate	15600171
	30	Display window	15600172
	60	Display	2HD50106
	100	PCB	15753052
15750098		Back plate, complete	
	130	PU hose $\varnothing 2,5/\varnothing 4$ (1m)	2NU14426
	170	Tygon hose 1/16x3/16 (0.7m)	2NU91303
	180	Tygon hose 1/16x3/16 (0.7m)	2NU91303
	190	Tygon hose 1/16x3/16 (0.7m)	2NU91303
	200	Tygon hose 1/16x3/16 (0.7m)	2NU91303
	210	Tygon hose 1/8x1/4 (0.7m)	2NU91307
	220	Tygon hose 1/8x1/4 (0.7m)	2NU91307
	230	Tygon hose 1/8x1/4 (0.7m)	2NU91307
	240	Flex hose $\varnothing 25$ (0.3m)	2NU31230
15600021		OP pump, complete	
	10	OP pump complete with cables	15600025
	20	Connection branch 1/8-3/16 nylon	2NF44478
	30	Tygon hose AED00007 1/8x1/4	2NU91307
15600022		DP pump, complete	
	10	DP pump complete with cables	15600026
	20	Connection branch	2NF44500
	30	Tygon hose AED00003 1/16x3/16	2NU91303

Spare Part List for TargetDoser

Drawing	Pos.	Spare Part	Cat no:
15600080		Bottle tray, complete	
	10	Bottle tray, painted	15609002
	20	Leg	15600165
	30	Rubber foot, black, adhesive ø12.7x3	2GB05012
		Bottle 0.5 l, complete	14600045
		Lid	14600014
		Union	2NF40050
		Nipple	2NF40205
		PU hose	2NU14032
		O-ring	2IO35353
		Bottle 0.5 l	71000119
		Bottle 1 l	14600046
		Lid	14600014
		Union	2NF40050
		Nipple	2NF40205
		Nipple union	2NF40206
		PU hose	2NU14032
		O-ring	2IO35353
		Bottle 1 l	71000120
		Soap	49900000

Spare Part List for TargetGrip

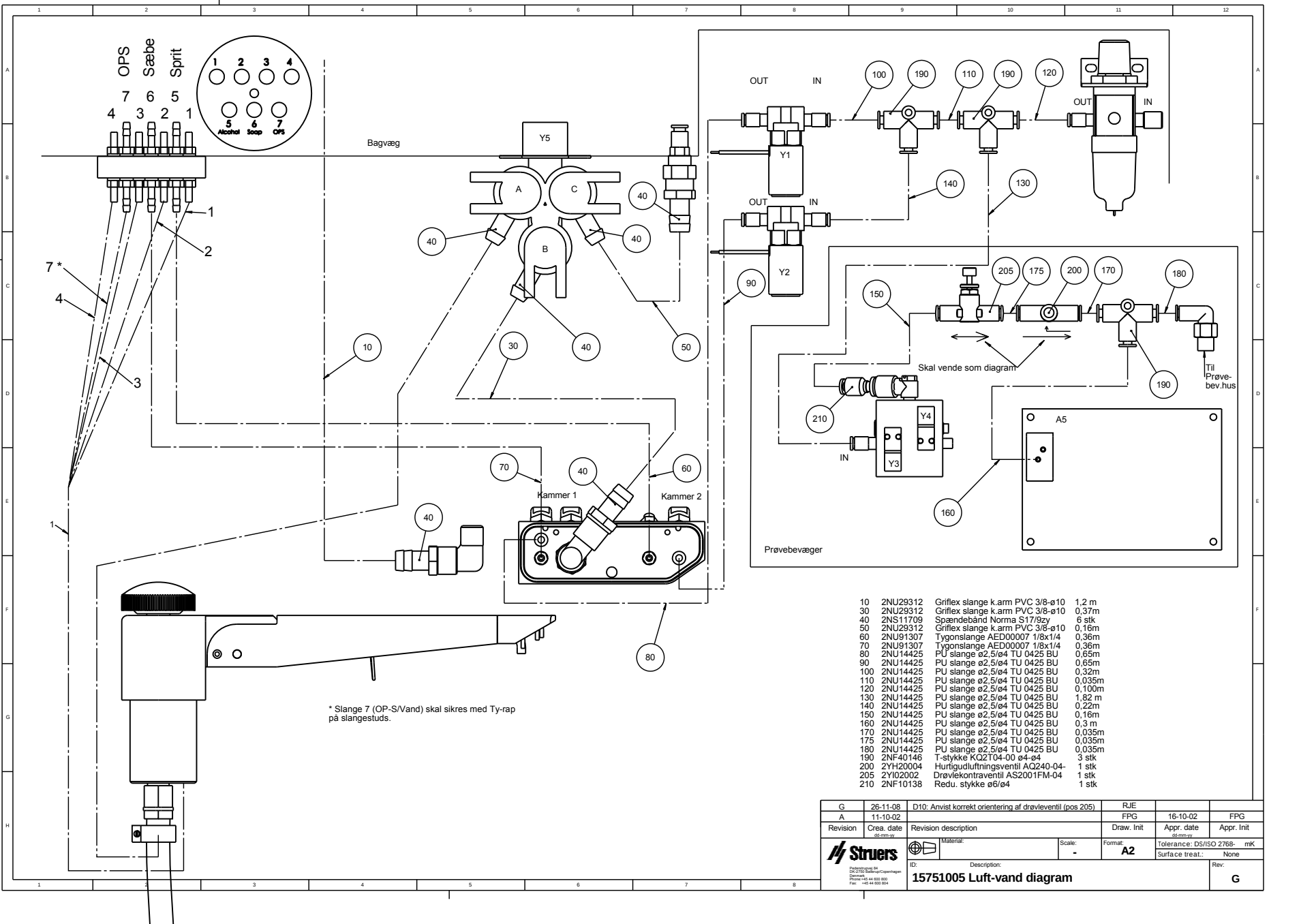
Drawing	Pos.	Spare Part	Cat no:
15750009		TargetGrip, complete	
	10	Top roundel	15750020
	20	Goniometer 123-2715	15750239
	30	Holder for sample holder	15750222
	40	Screw M2x5	2TR10205
	45	CRINKLE WASHER M3	2ZI20302
	50	Screw M3x6	2TR50306
	60	MSP screw M4x4	2TI10404
	70	Ring for sample holder	15750230
	90	Positioning screw for goniometer	15750233
	100	MSP screw M3x4	2TI10304

Spare Part List for TargetX

Drawing	Pos.	Spare Part	Cat no:
		Stepper motor, linear movement	2MI02433
		Stepper motor, rotation	2MI00243
		Accessories	
		0.75x3 MAINS CABLE, EURO 50Hz (SCUKO)	2WC04668
		Connection cable for TargetX	15753501
		0.9 ² x 3 Mains Cable w. Nema 6-15P	2WC09003
		Allen key ball type 3,0	2GR03523
		Fixture	15750086
		Allen key 2,0	2GR00020
		Packing crate	1575EM03

Spare Part List for TargetZ

Drawing	Pos.	Spare Part	Cat no:
15750002		TargetZ, complete	
	120	ADAPTOR CABLE Ø2.1mm	2WS21010
15750011		Bottom section	
	20	Rubber foot, black, adhesive ø12.7x3	2GB05012
	100	24V to 12V 3A - converter	2VG09061
	140	PCB	14933004
	170	Foil	15750400
15750059		Upper section	
	50	LINEAR distance measurer ST1278	2HQ01278
15750021		Camera holder	
	90	Diode lamp	15750015
	100	Lens MS50 incl. x2	2GI20050
	110	Camera TVCCD-700COL 1/3"	2GI10700
		Accessories	
	20	Allen key 2mm, hardened DIN 911	2GR00020
	30	Allen key 3mm w. handle	2GR03523
	50	Screen for TargetZ	15750085
	60	Allen key 4, hardened DIN 911	2GR00040
	70	Cable, S-VIDEO, 2m	2WS15000
	80	Allen key 3mm	2GR00030
	90	Button	2GT20042
	110	IEC320 male+female extension, 1m.	2WC10320
		Packing for Target Z, complete	1575EM02



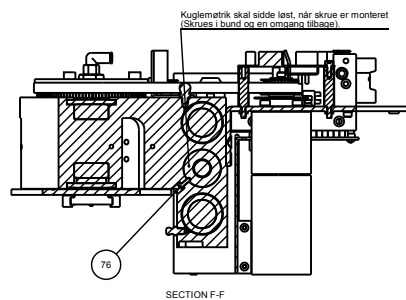
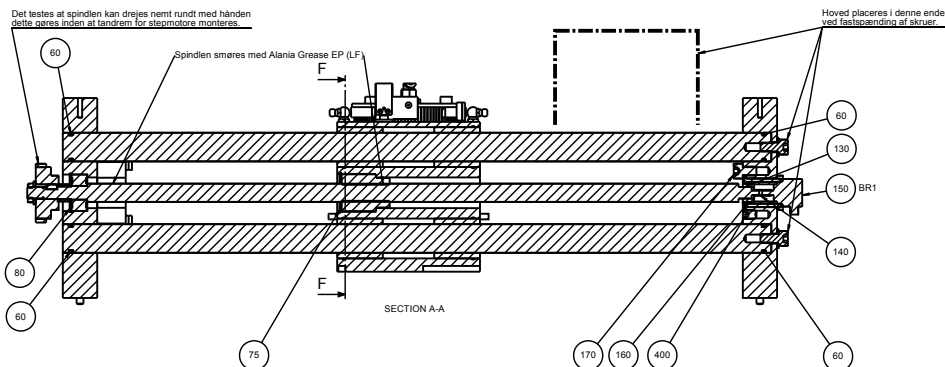
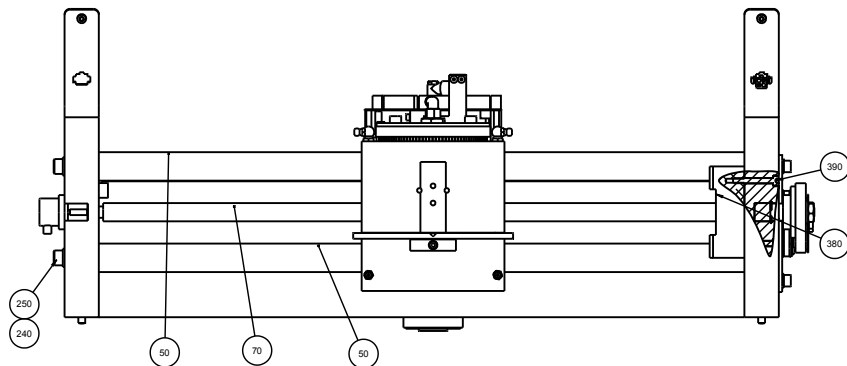
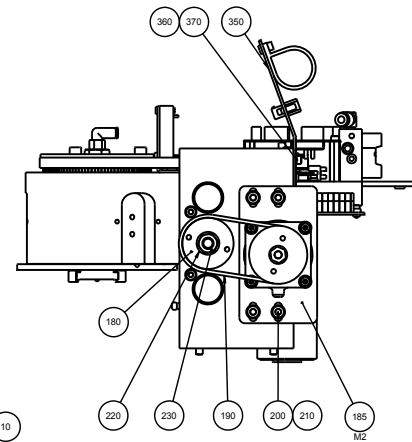
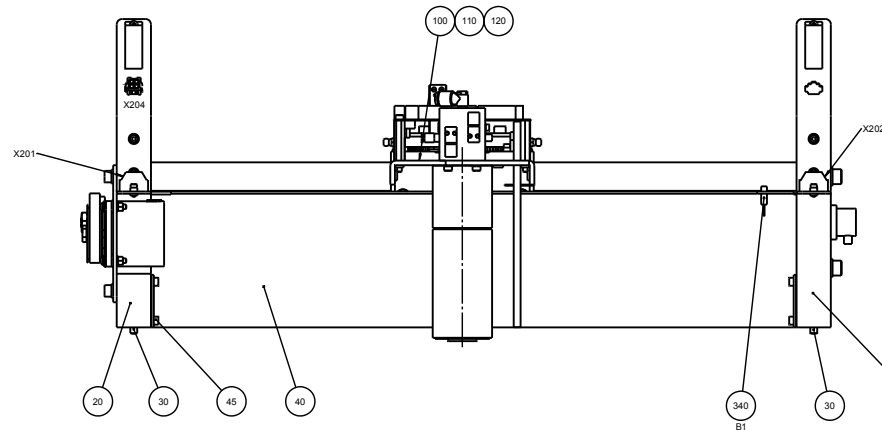
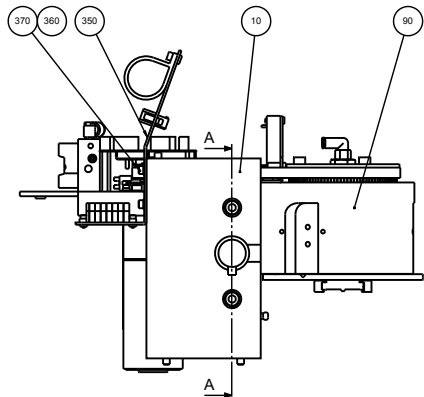
* Slange 7 (OP-S/Vand) skal sikres med Ty-rap på slangestuds.

- 10 2NU29312 Grifflex slangse k. arm PVC 3/8-ø10 1,2 m
- 30 2NU29312 Grifflex slangse k. arm PVC 3/8-ø10 0,37m
- 40 2NS11709 Spændebånd Norma S17/9zy 6 stk
- 50 2NU29312 Grifflex slangse k. arm PVC 3/8-ø10 0,16m
- 60 2NU91307 Tygongslange AED00007 1/8x1/4 0,36m
- 70 2NU91307 Tygongslange AED00007 1/8x1/4 0,36m
- 80 2NU14425 PU slangse ø2,5/ø4 TU 0425 BU 0,65m
- 90 2NU14425 PU slangse ø2,5/ø4 TU 0425 BU 0,65m
- 100 2NU14425 PU slangse ø2,5/ø4 TU 0425 BU 0,32m
- 110 2NU14425 PU slangse ø2,5/ø4 TU 0425 BU 0,035m
- 120 2NU14425 PU slangse ø2,5/ø4 TU 0425 BU 0,100m
- 130 2NU14425 PU slangse ø2,5/ø4 TU 0425 BU 1,82 m
- 140 2NU14425 PU slangse ø2,5/ø4 TU 0425 BU 0,22m
- 150 2NU14425 PU slangse ø2,5/ø4 TU 0425 BU 0,16m
- 160 2NU14425 PU slangse ø2,5/ø4 TU 0425 BU 0,3 m
- 170 2NU14425 PU slangse ø2,5/ø4 TU 0425 BU 0,035m
- 175 2NU14425 PU slangse ø2,5/ø4 TU 0425 BU 0,035m
- 180 2NU14425 PU slangse ø2,5/ø4 TU 0425 BU 0,035m
- 190 2NF40146 T-stykke K02T04-00 ø4-ø4 3 stk
- 200 2YH20004 Hurtigudluftningsventil AQ240-04- 1 stk
- 205 2YI02002 Drevlektraventil AS2001FM-04 1 stk
- 210 2NF10138 Redu. stykke ø6/ø4 1 stk

G	26-11-08	D10: Anvlist korrekt orientering af drevleventil (pos 205)	RJE		
A	11-10-02		FPG	16-10-02	FPG
Revision	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init
	05-09-02				
		Material:	Scale:	Format:	Tolerance: DS/ISO 2768- mK
			-	A2	Surface treat.: None
		ID:	Description:		Rev:
			15751005 Luft-vand diagram		G

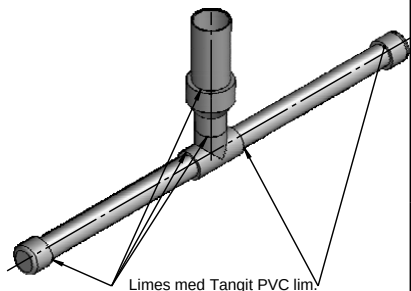
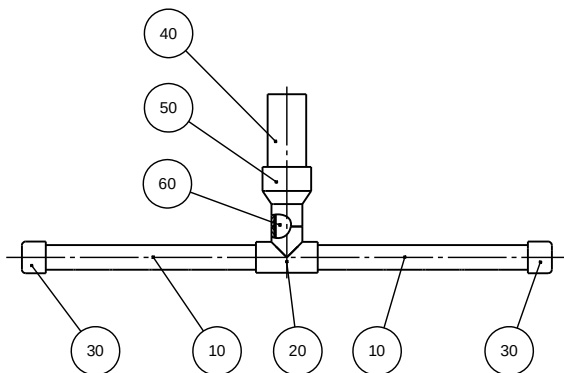
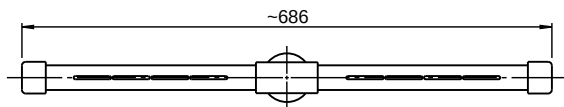


Registret
DK-2750 Søborg
Tlf: +45 44 68 68 68
Fax: +45 44 68 68 64

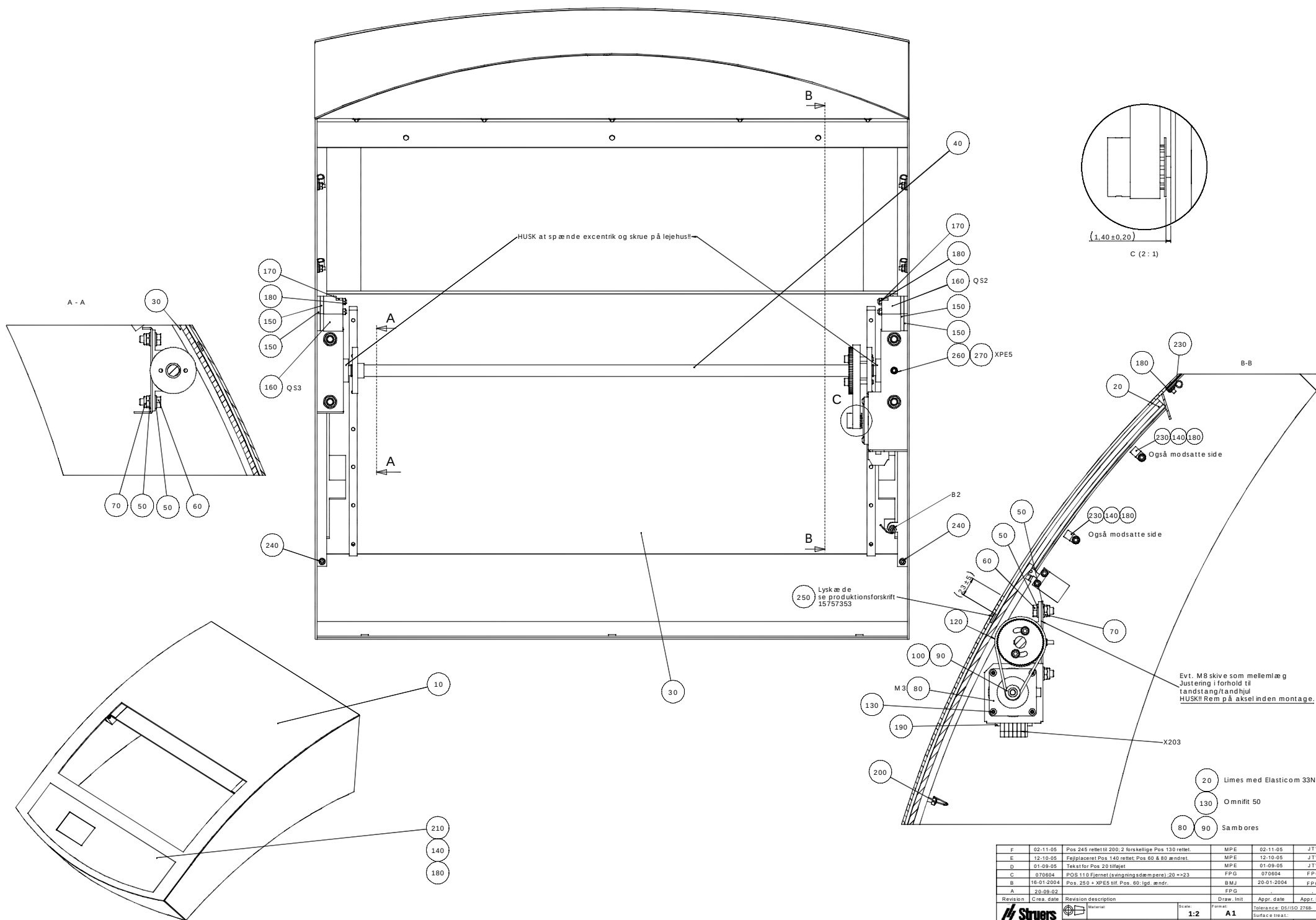


- 170 Hovedhøjde skal være $8 \pm 0,2$
- 76 230 Omriffet 50M
- 75 Smøres med TP15 klar beskyttelsesmiddel.
- 380 Spændes løst, fastgøres efter montage på bund 15750056, 1575

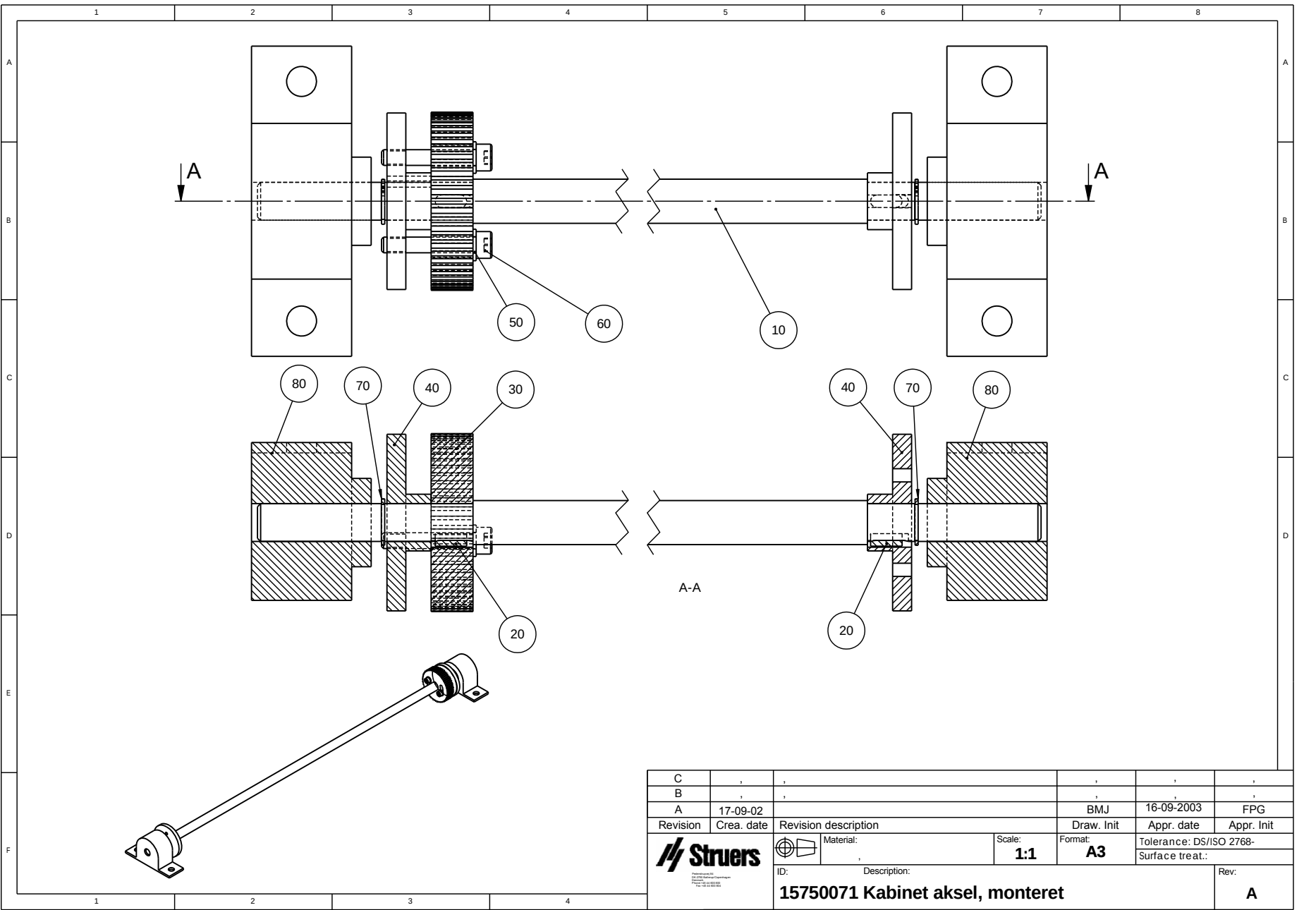
C					
B					
Revision	Crea. date	Revision description	Draw. int	Appr. date	Appr. int
A	25-03-08				
		Material	Scale	Formal	Tolerance
			1:2	A1	ISO 2768- mK
		Description	None		
		15750089 Travers, samlet			Rev
					A



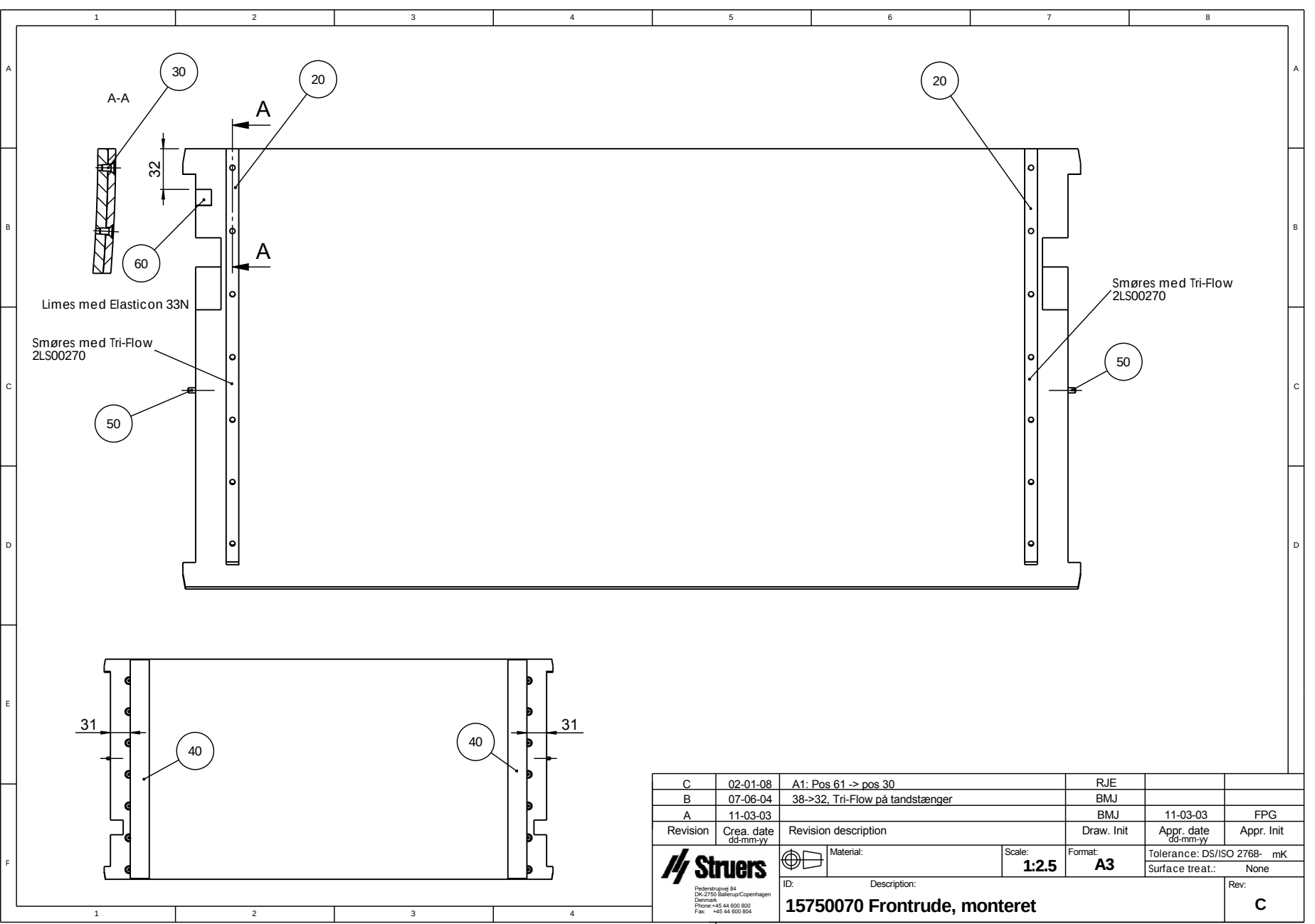
C	09-04-08	Ingen ændringer, men rev. ændret til C, så det stemmer overens med PDM/ERP			RJE		
A	18-12-07				SPE		
Rev	Crea. date dd-mm-yy	Revision description			Draw. Init	Appr. date dd-mm-yy	Appr. Init
F	 Pederstrupvej 84 DK-2750 Ballerup Copenhagen Denmark Phone: +45 44600 800 Fax: +45 44600 804	 Material:	Scale: 1:5	Format: A4	Tolerance: DS/ISO 2768 - mK		
					Surface treat.: None		
					ID: Description: 15750069 Udsugning 32-50-32, samlet		
						Rev: C	



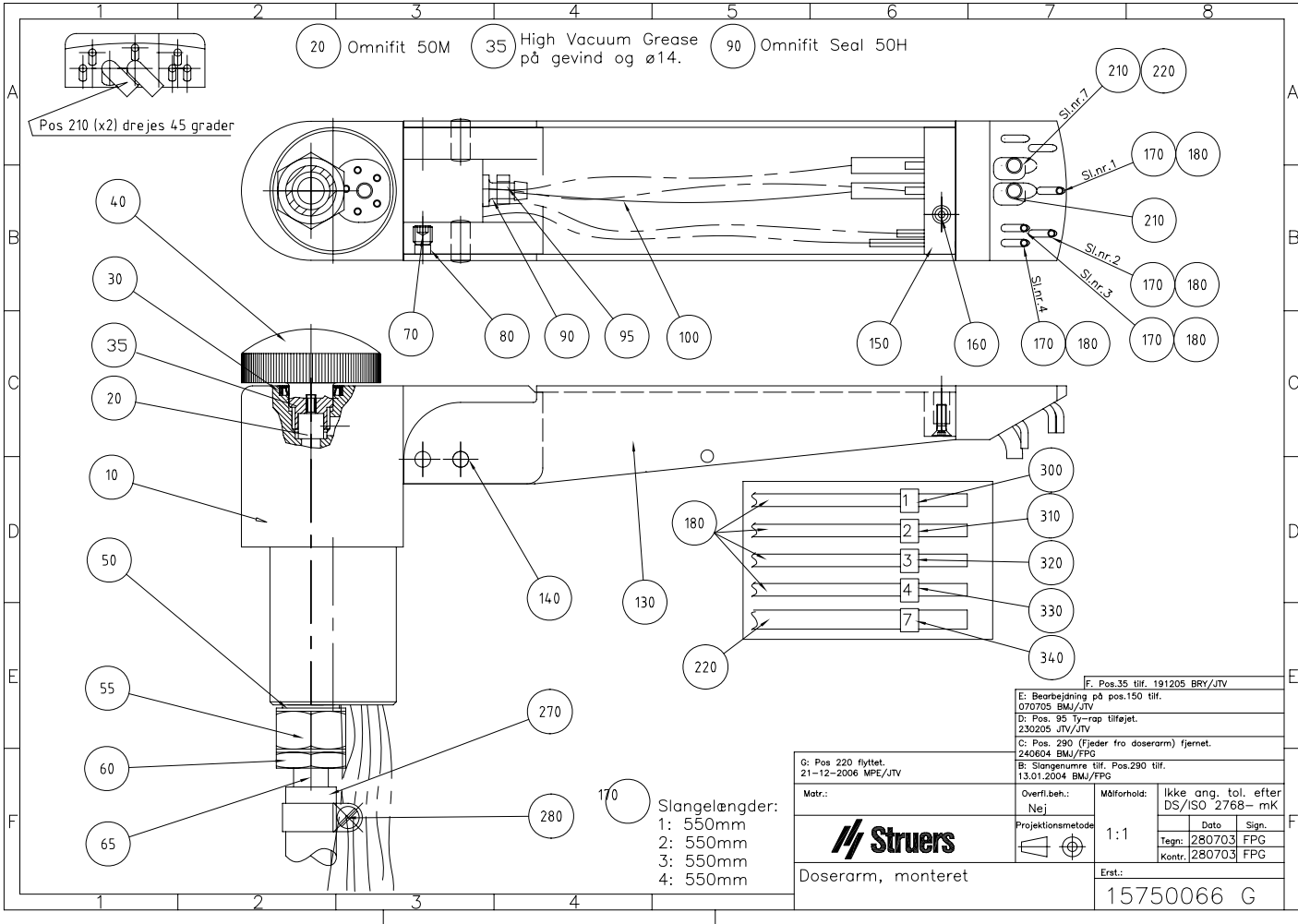
F	02-11-05	Pos 245 rettet til 200; 2 forskellige Pos 130 rettet.	MPE	02-11-05	JTV
E	12-10-05	Føjplaceret Pos 140 rettet; Pos 60 & 80 ændret.	MPE	12-10-05	JTV
D	01-09-05	Tekst for Pos 20 tilføjet	MPE	01-09-05	JTV
C	07-06-04	POS 110 fjernet (svingning ad m. pers.) 20 ↔ 23	FPG	07-06-04	FPG
B	16-01-2004	Pos. 250 + XPE5 tilf. Pos. 60; lpd. ændr.	BMJ	20-01-2004	FPG
A	20-09-02		FPG		
Revision	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init
		Material	Scale	Format	Tolerance: DS/ISO 2768-
		1:2	A1	Surface treat:	
		15750072 Kabinet, samlet			Rev: F

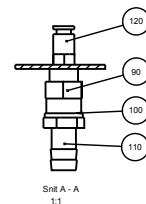


C					
B					
A	17-09-02		BMJ	16-09-2003	FPG
Revision	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init
		Material:	Scale: 1:1	Format: A3	Tolerance: DS/ISO 2768-Surface treat.:
ID:		Description:			Rev:
		15750071 Kabinet aksel, monteret			A

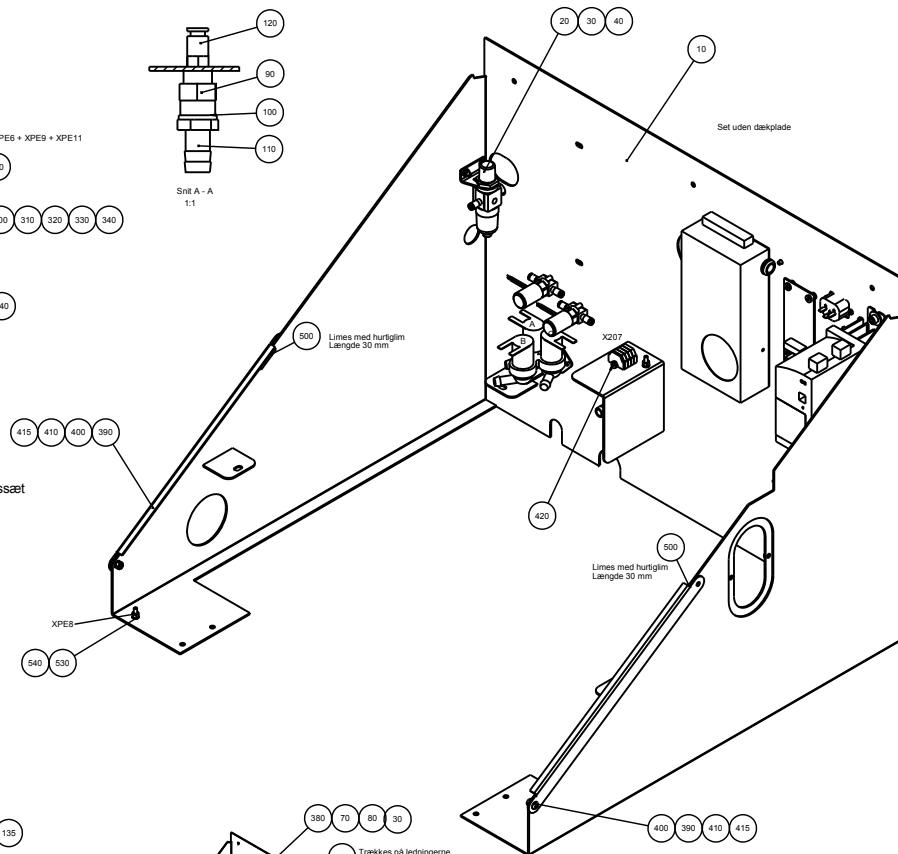


C	02-01-08	A1: Pos 61 -> pos 30		RJE		
B	07-06-04	38->32, Tri-Flow på tandstænger		BMJ		
A	11-03-03			BMJ	11-03-03	FPG
Revision	Crea. date dd-mm-yy	Revision description		Draw. Init	Appr. date dd-mm-yy	Appr. Init
 Pederstrupvej 84 DK-2750 Ballerup/Copenhagen Denmark Phone: +45 44 600 800 Fax: +45 44 600 804			Material:	Scale: 1:2.5	Format: A3	Tolerance: DS/ISO 2768- mK
						Surface treat.: None
		ID:		Description:		
		15750070 Frontrude, monteret				C





Snit A -

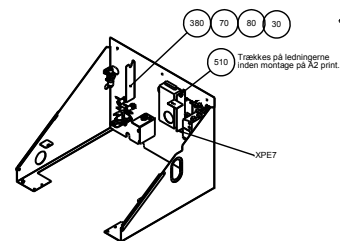


Set uden dækplade

ed hurtiglim
30 mm

30 mm³Limes
Længd

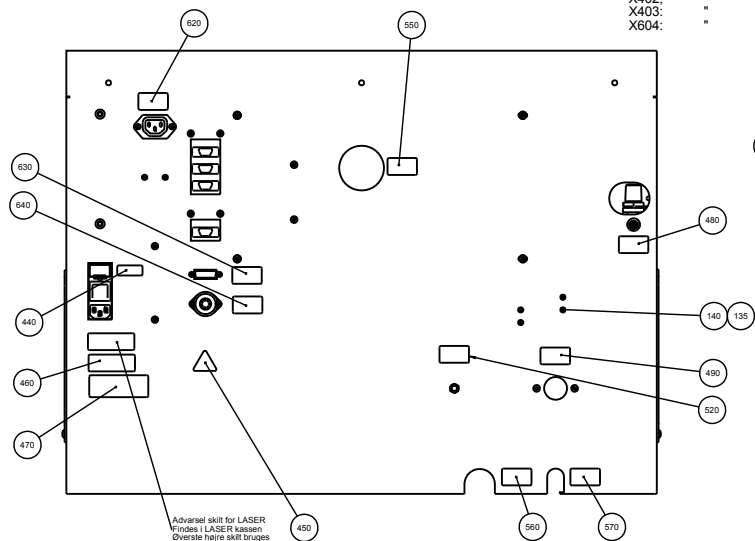
Laeng



10) Trækkes på ledningerne inden montage på A2 print

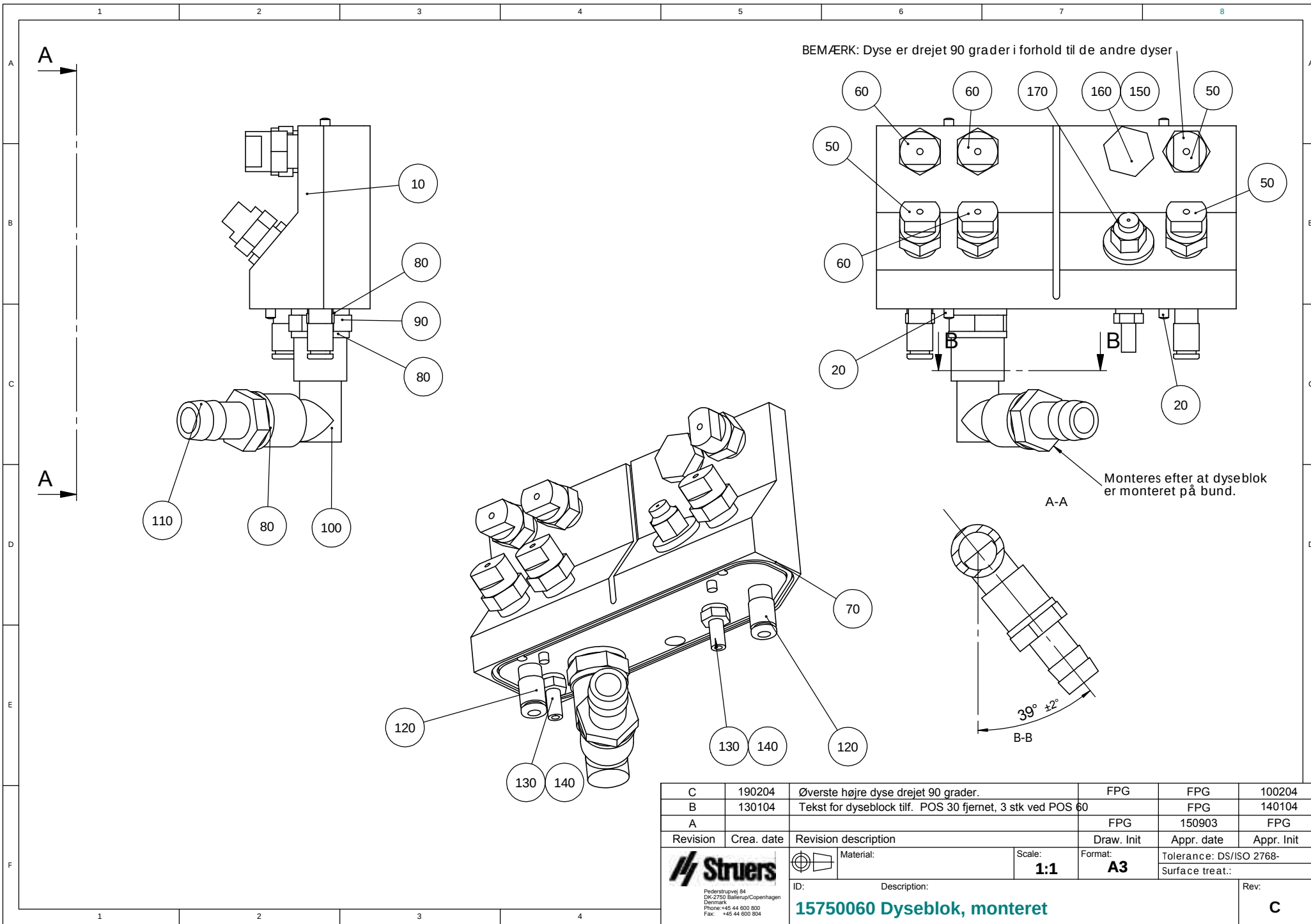
XPE7

X207: Se ledningssæt
X208: "
X402: "
X403: "
X604: "

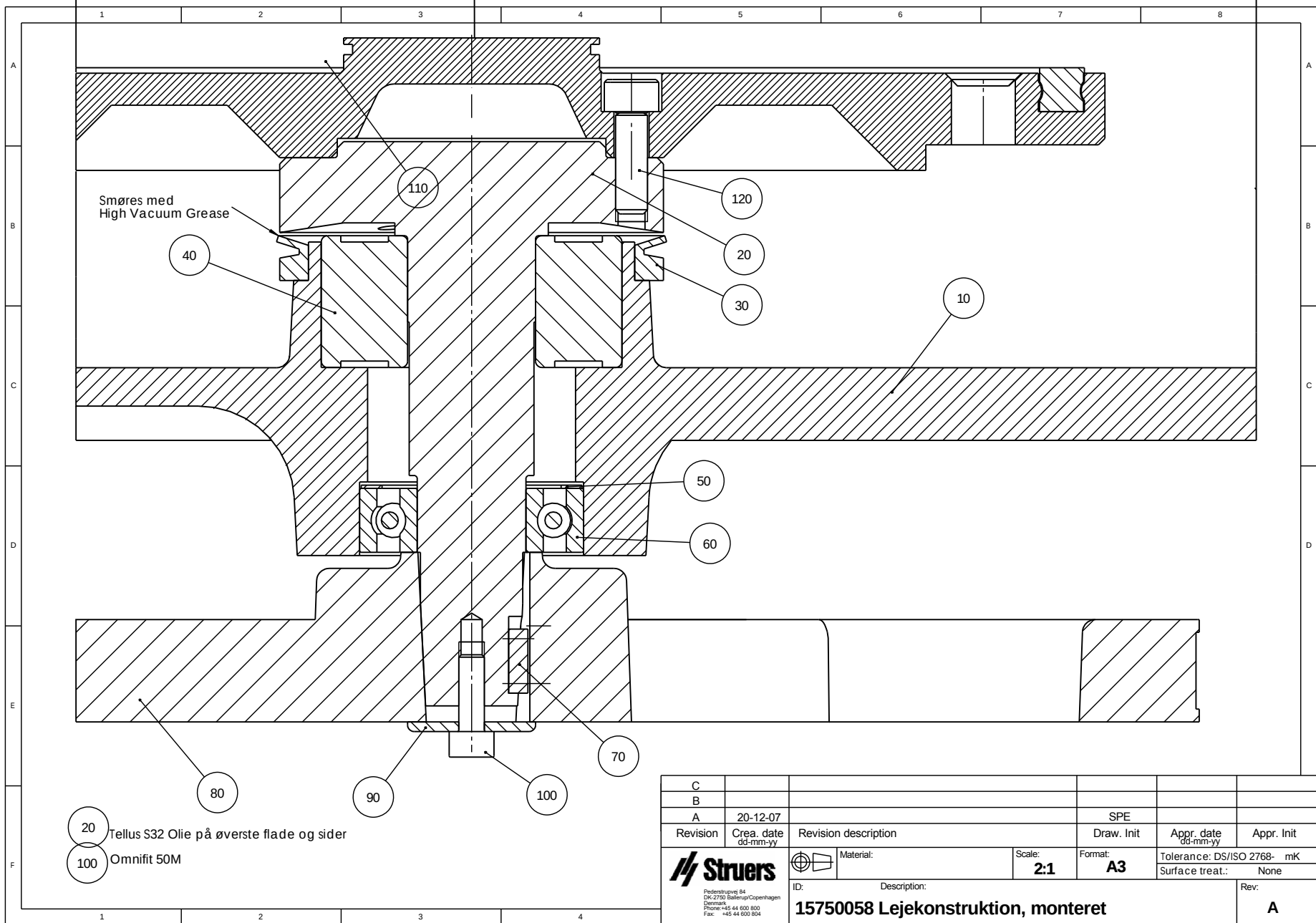


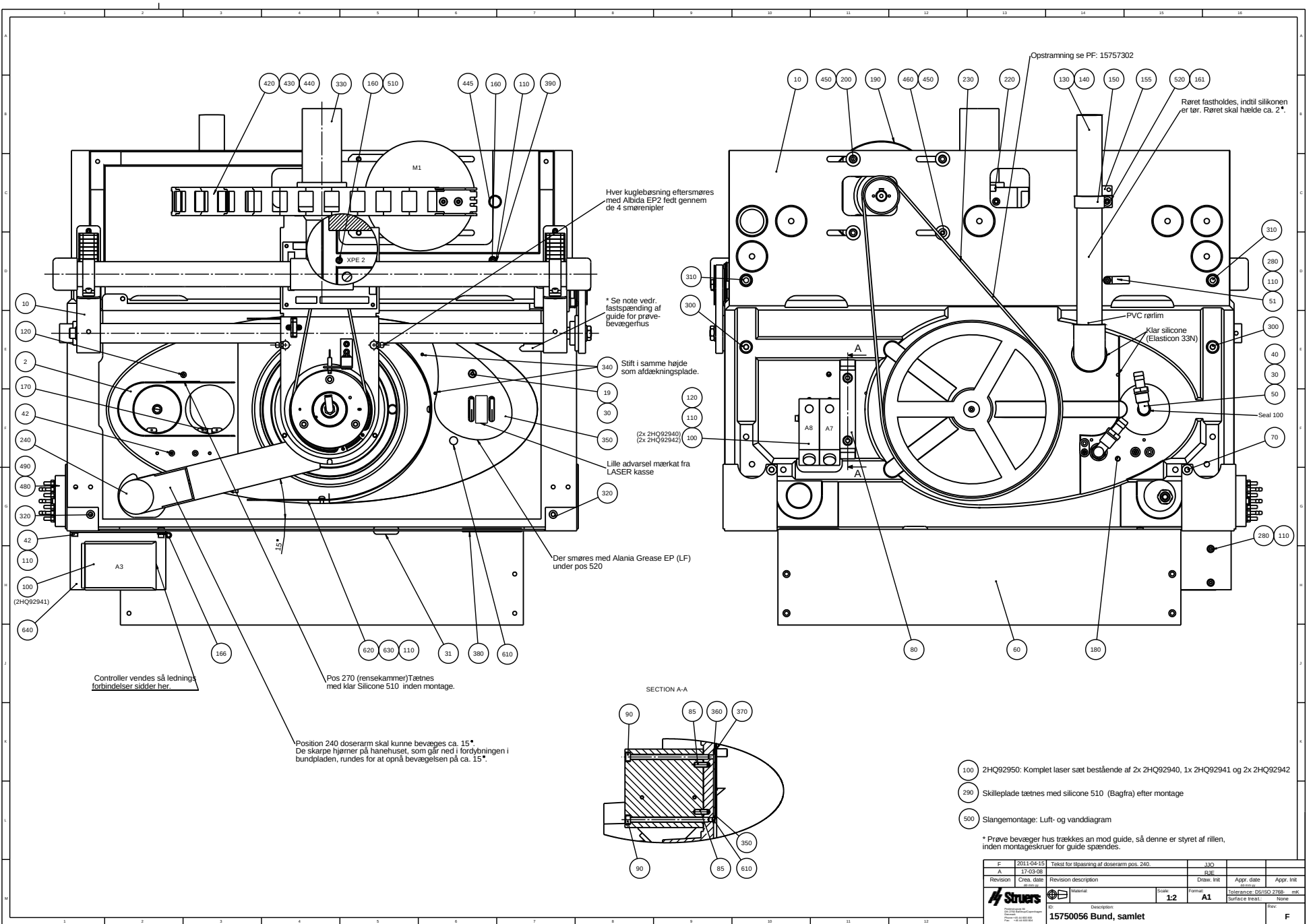
Advarsel skilt for LASER
Findes i LASER kassen
Øverste højre skilt bruges

B	17-07-08	D1: Pos 135 and 140 moved up beside pos 130		SPE			
A	28-02-08			R/E			
	Crea. date	Revision description		Draw. Inst.	Appr. date	Appr. Int.	
		Material:		Scale	Format	Tolerance: 05/ISO 2768- Surface treat: none	
				1:2.5	A1		
Part number: A5 © 1974-1999 Struers Company Struers Inc. is not an ISO 9001 certified firm		ID: Description 17550064 Bagplade, monteret				Rev: B	



C	190204	Øverste højre dyse drejet 90 grader.	FPG	FPG	100204
B	130104	Tekst for dyseblock tilf. POS 30 fjernet, 3 stk ved POS 60		FPG	140104
A			FPG	150903	FPG
Revision	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init
 Pedersbølvej 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- Surface treat.:
		ID:	Description:	Rev:	
15750060 Dyseblok, monteret					C





100	2HQ92950: Komplet laser sæt bestående af 2x 2HQ92940, 1x 2HQ92941 og 2x 2HQ92942
290	Skilleplade tættes med silicone 510 (Bagfra) efter montage
500	Slangemontage: Luft- og vanddiagram

* Prøve bevæger hus trækkes an mod guide, så denne er styret af rillen, inden montageskruer for guide spændes.

F	2011-04-15	Tekst for tilpasning af doserarm pos. 240.	330		
A	17-03-08		RJE		
Revision	Crea. date	Revision description	Draw. int.	Appr. date	Appr. int.
ID:		Description	Scale: 1:2	Frame: A1	Tolerance: DS/ISO 2768 - mK
15750056 Bund, samlet					Surface treat: None
					Rev: F

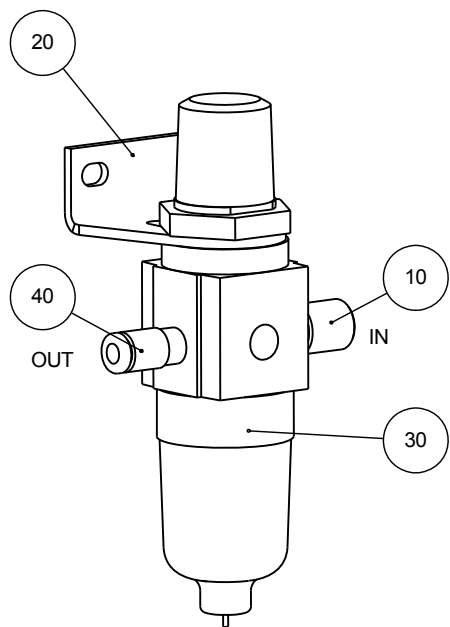
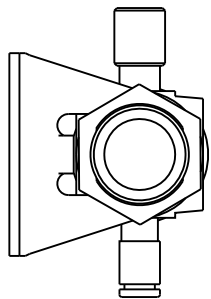
A

B

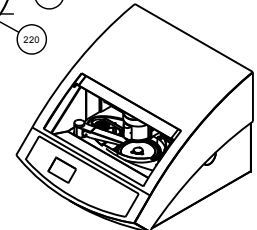
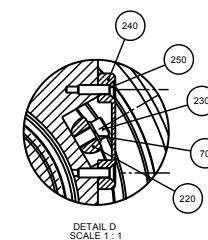
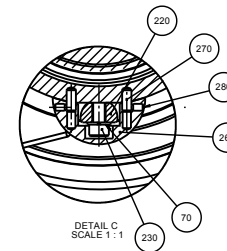
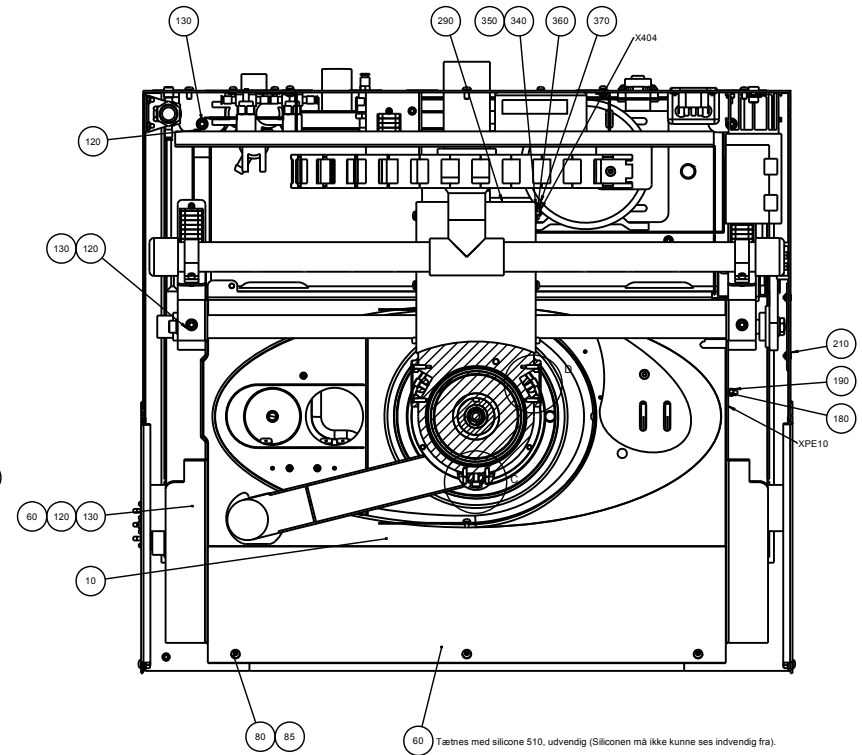
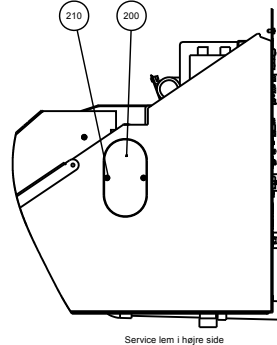
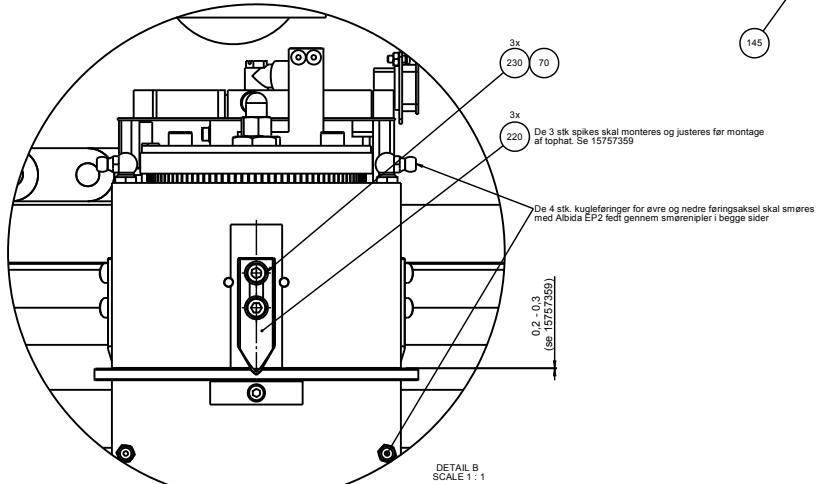
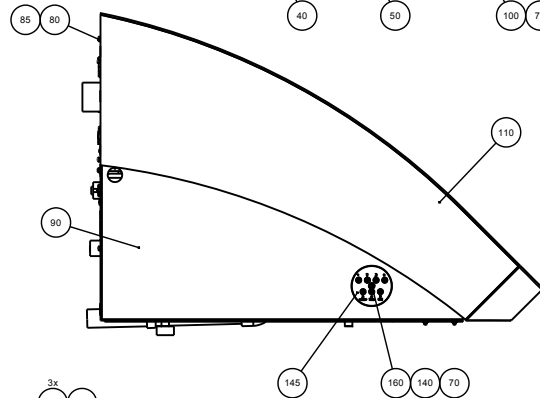
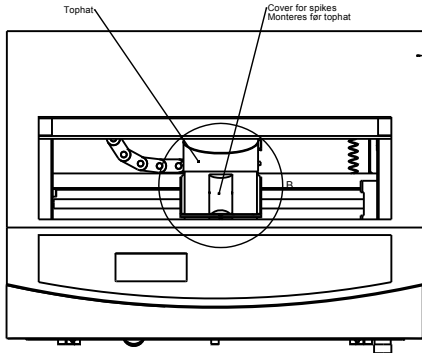
C

D

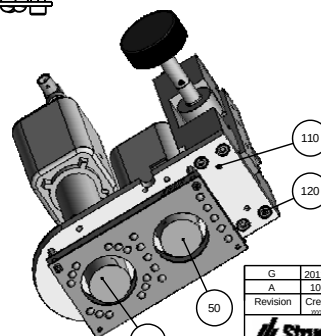
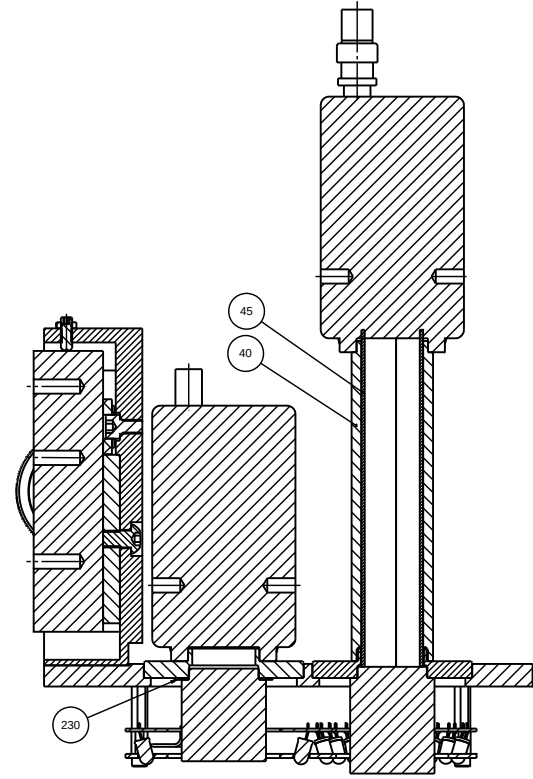
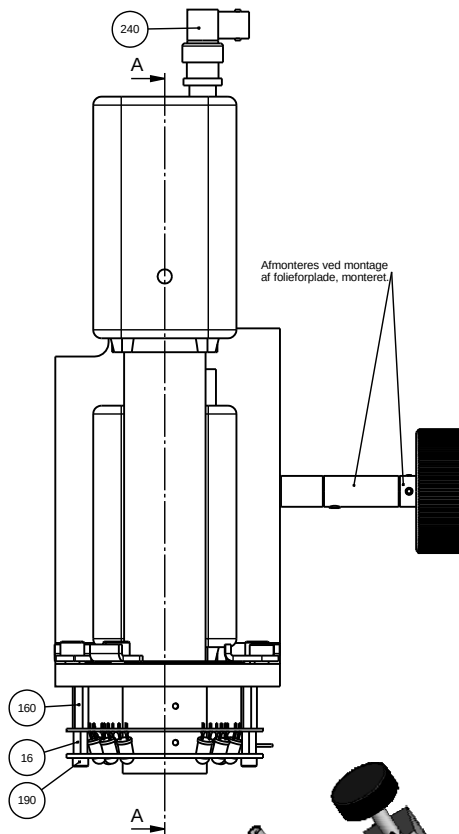
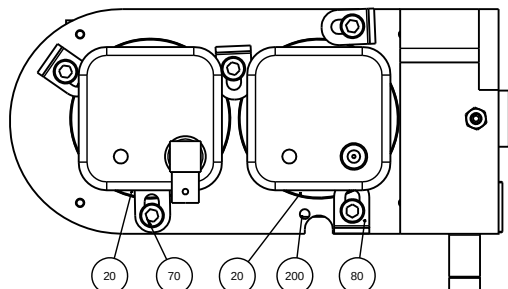
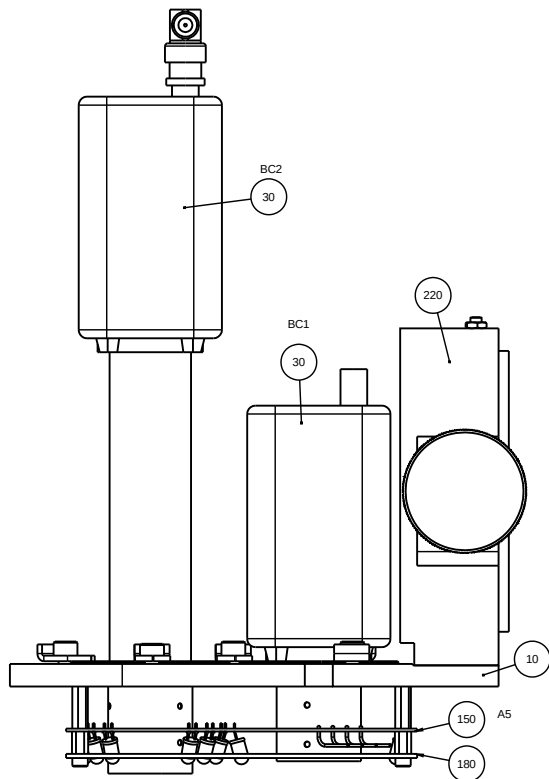
E



F	C	,	,	,	,	,
	B	13-01-2004	In og out tilf.	BMJ	,	,
	A	280802		FPG	16-09-2003	FPG
	Rev	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init
	 Pederstrupvej 84 DK-2750 Ballerup Copenhagen Denmark Phone: +45 44 600 800 Fax: +45 44 600 804			 Material:	Scale: 1:1	Format: A4
	ID: Description: 15750029 Filterregulator, samlet					Rev: B

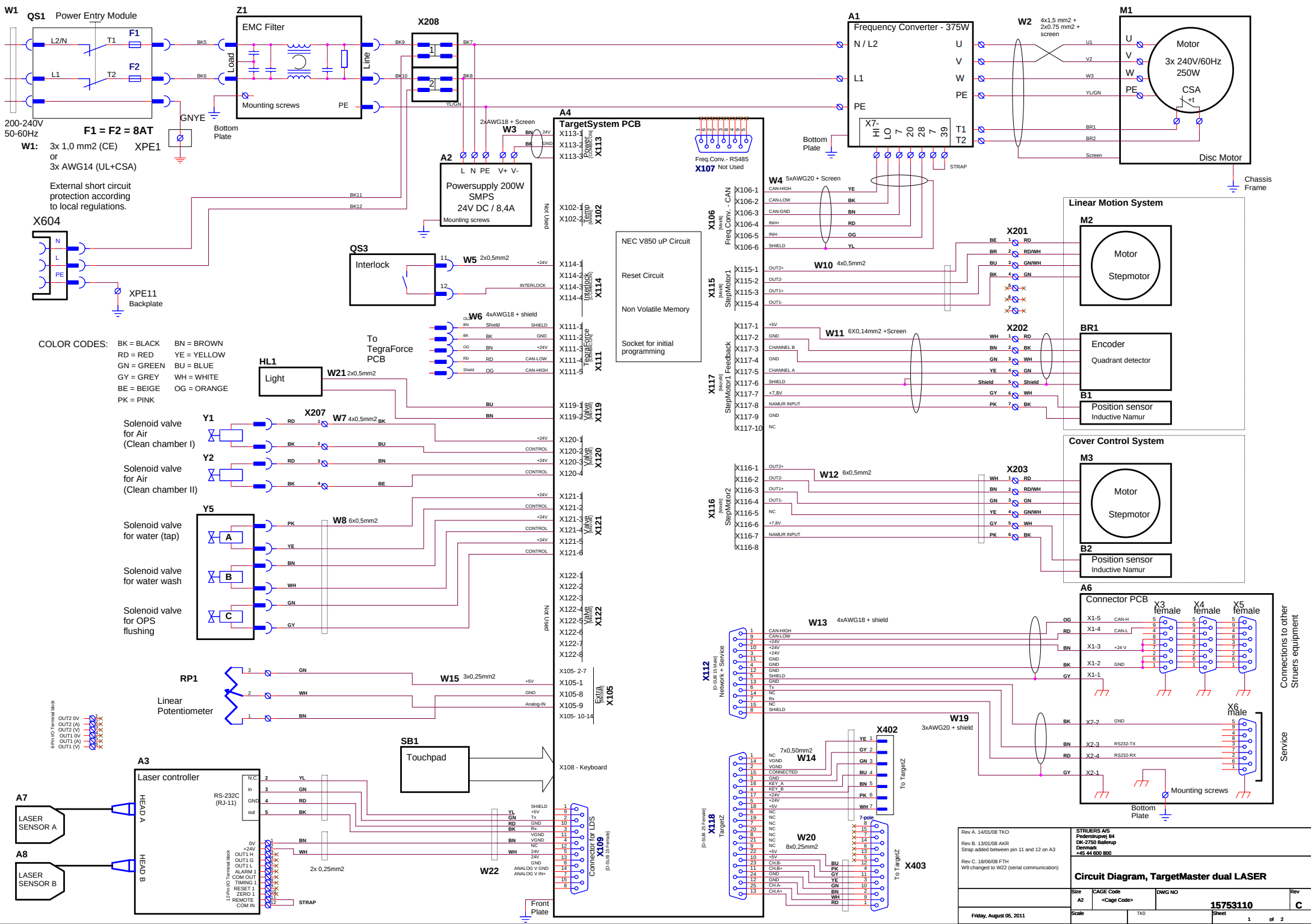


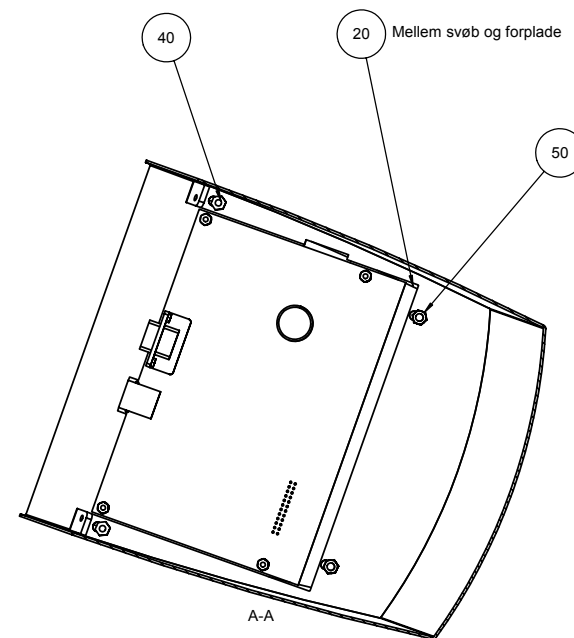
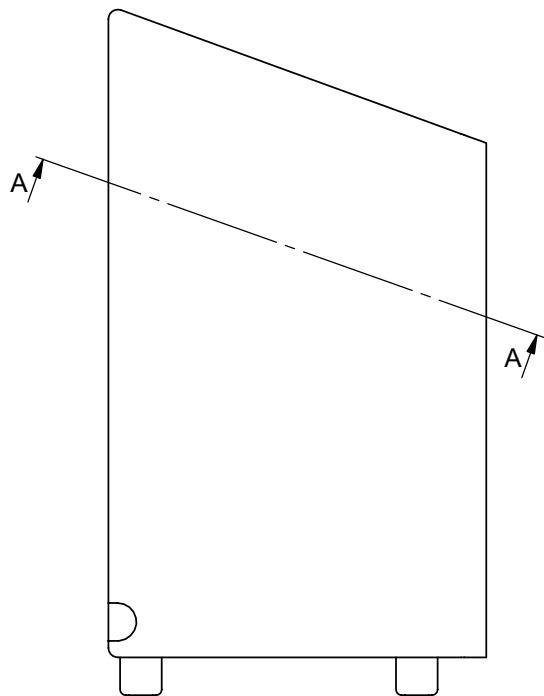
B 2009-03-30		Detail B: Tilføjet smøring af kugleføringer for travers		RJE		RJE
A 2008-03-28				RJE		RJE
Revision	Draw date	Revision description	Draw Int	Appr date	Appr Int	
	1:4		A1			
15750010 TargetMaster Dual Laser, komplet				None		B



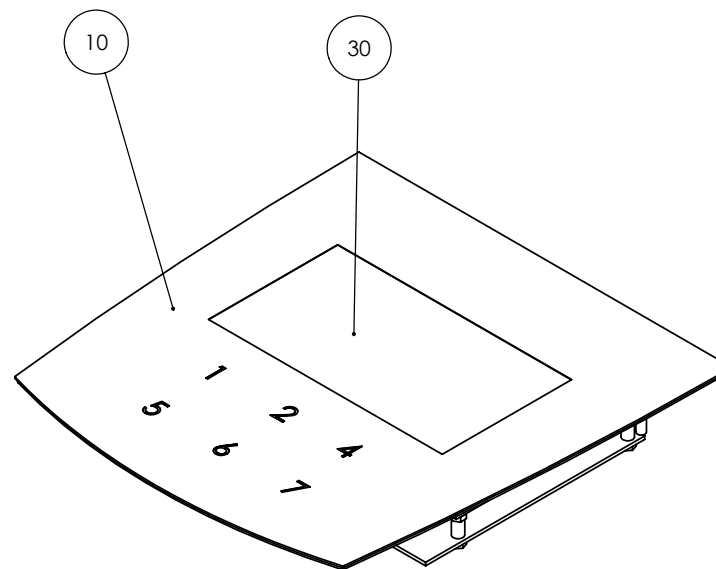
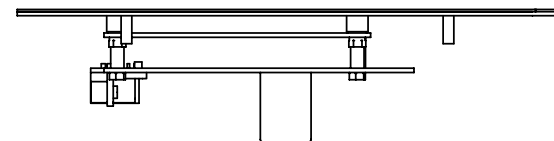
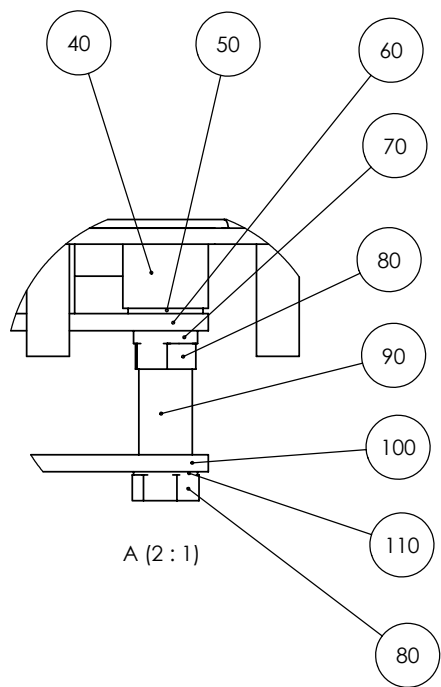
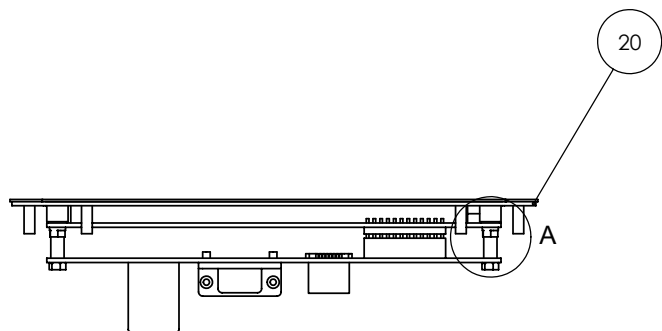
200 Til montage af ledning

G	2011-07-28	Pos. 240 introduced.	JLU	31-03-04	JLU
A	10-11-03		JLU		
Revision	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init
	www.stuers.dk				
		Material	Scale	Format	Tolerance DS/ISO 2768
			1:1	A2	mm
					Surface treat.
					None
15710020 Optik, samlet					G

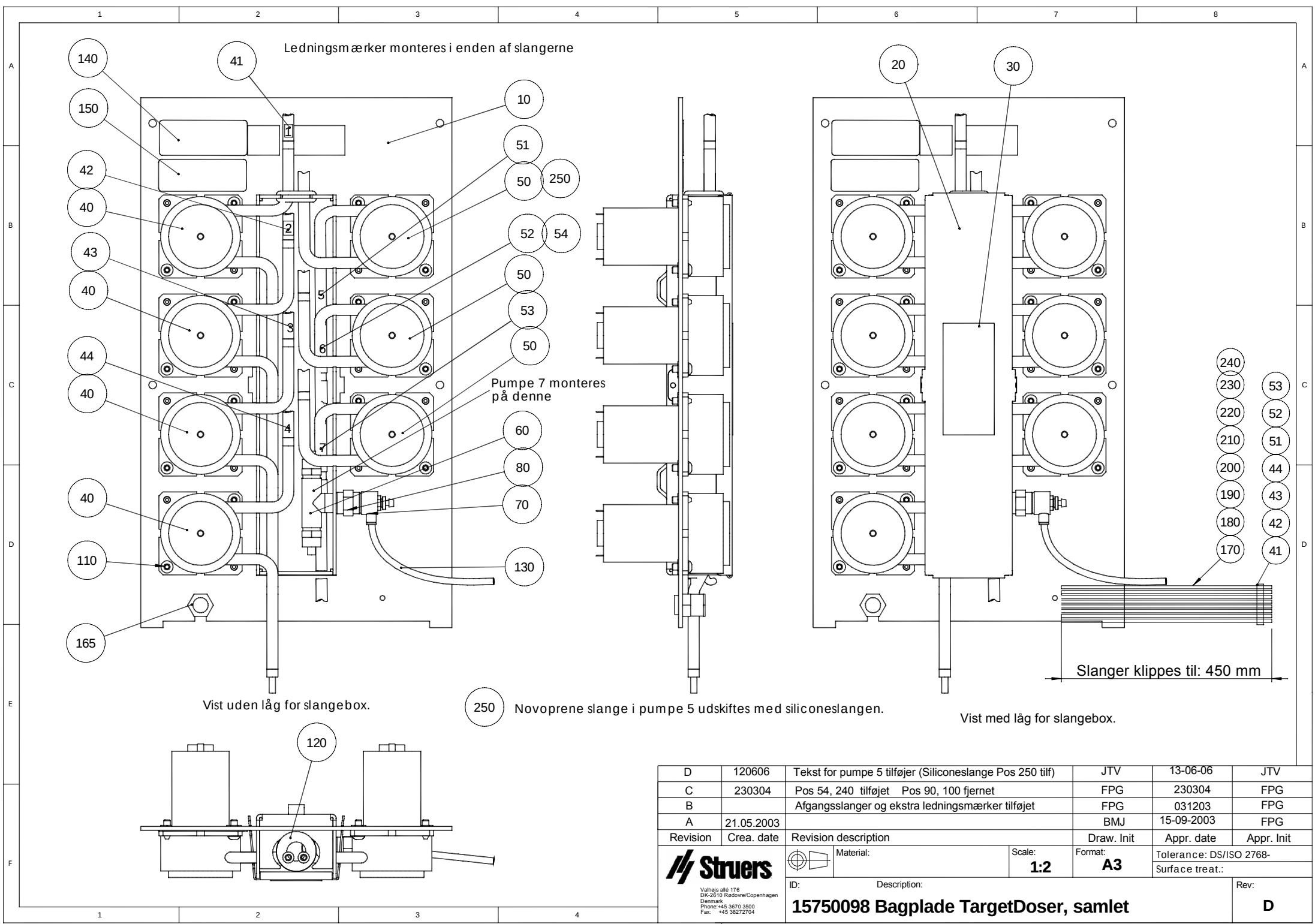




C	.	.	.	.	.	.	.	.
B								
A	22.05.2003				BMJ	15-09-2003		FPG
Revision	Crea. date	Revision description			Draw. Init	Appr. date		Appr. Init
				Material:	Scale:	Format:	Tolerance: DS/ISO 2768-	
					1:2	A2	Surface treat.:	
Vagstvej 40B 170 DK-2816 Rødovre/Copenhagen Denmark Tel: +45 3672 5002 Fax: +45 3672 5074		ID: Description:					Rev:	
		15750097 Svøb og forplade, samlet					A	



C					
B					
A	21.05.2003		BMJ	15-09-2003	FPG
Revision	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init
 Valhøjs allé 176 DK-2610 Rødovre/Copenhagen Denmark Phone: +45 3670 3500 Fax: +45 36272704	Material:		Scale: 1:2	Format: A3	Tolerance: DS/ISO 2768- Surface treat.:
	ID: Description: 15750096 Forplade TargetDoser, samlet				Rev: A



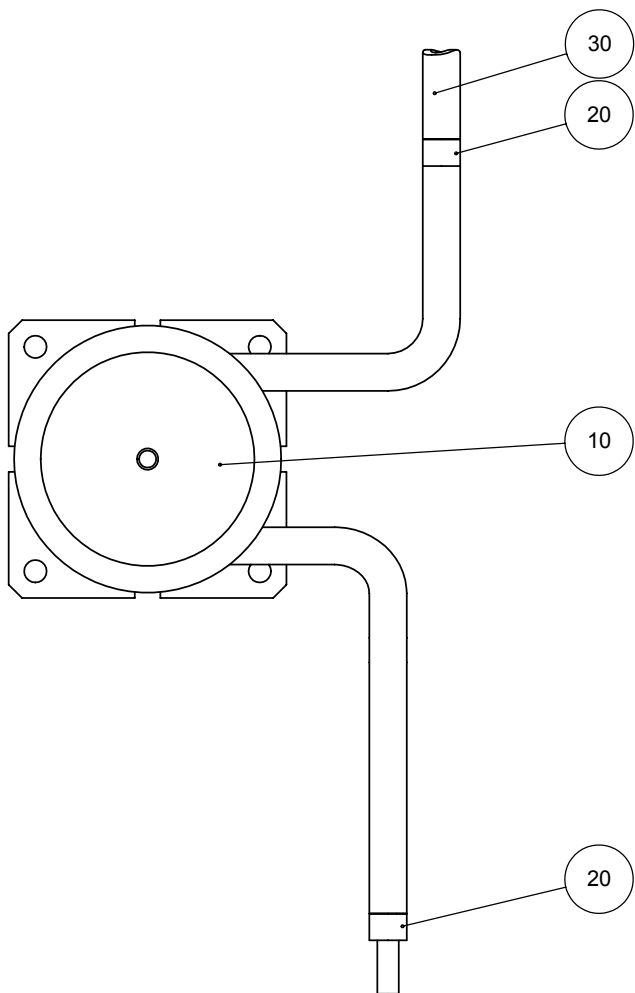
A

B

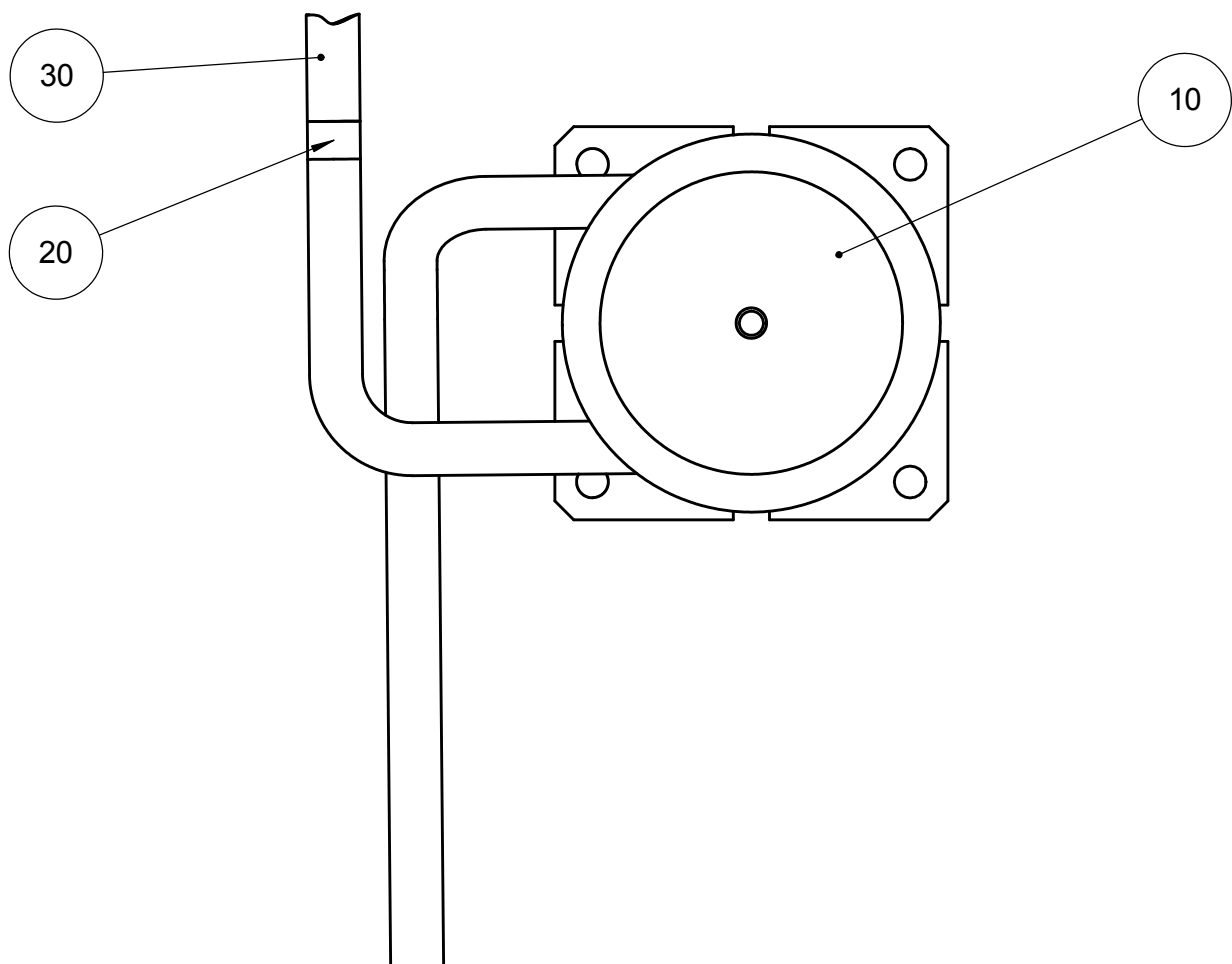
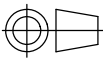
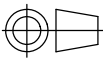
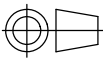
C

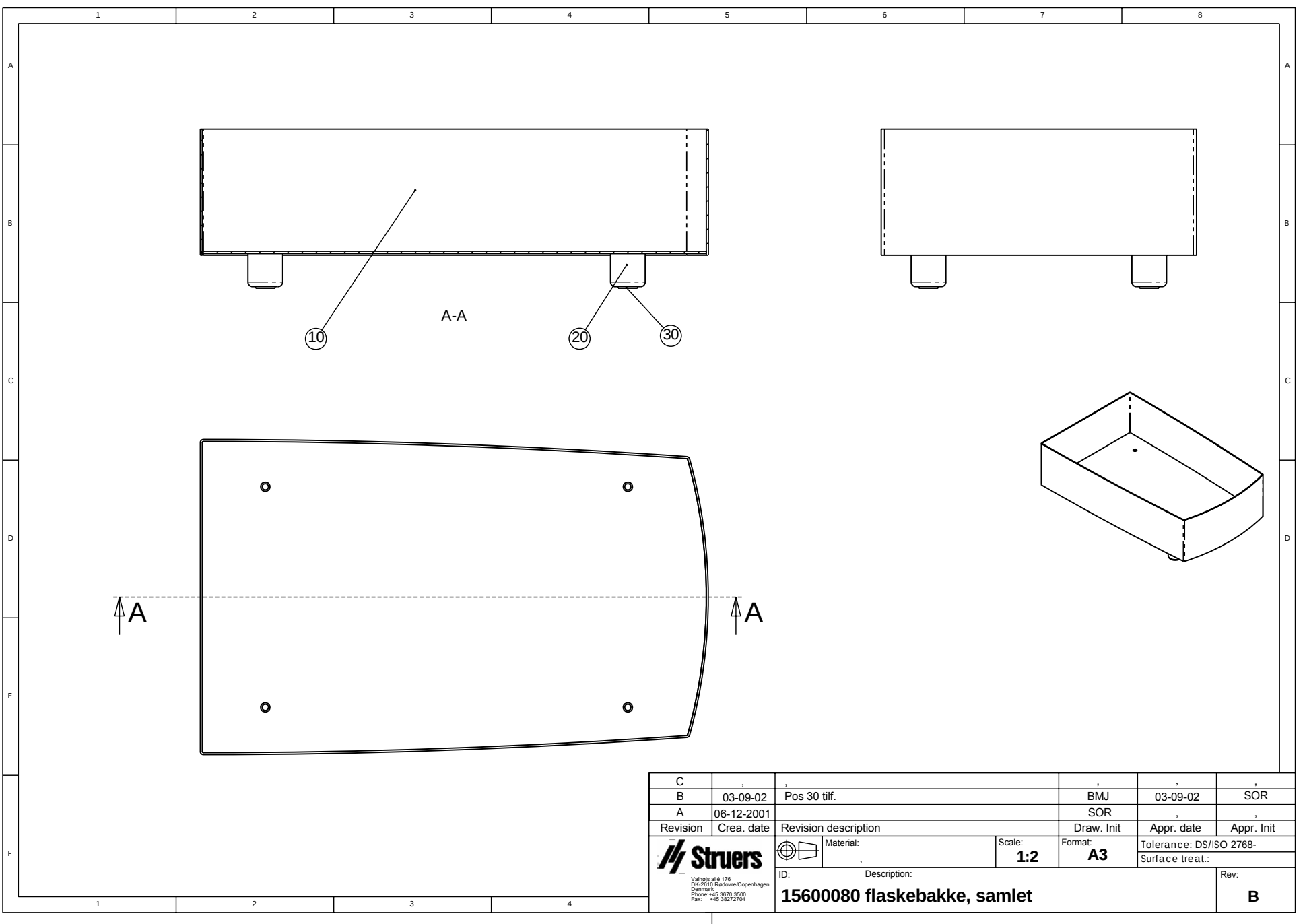
D

E

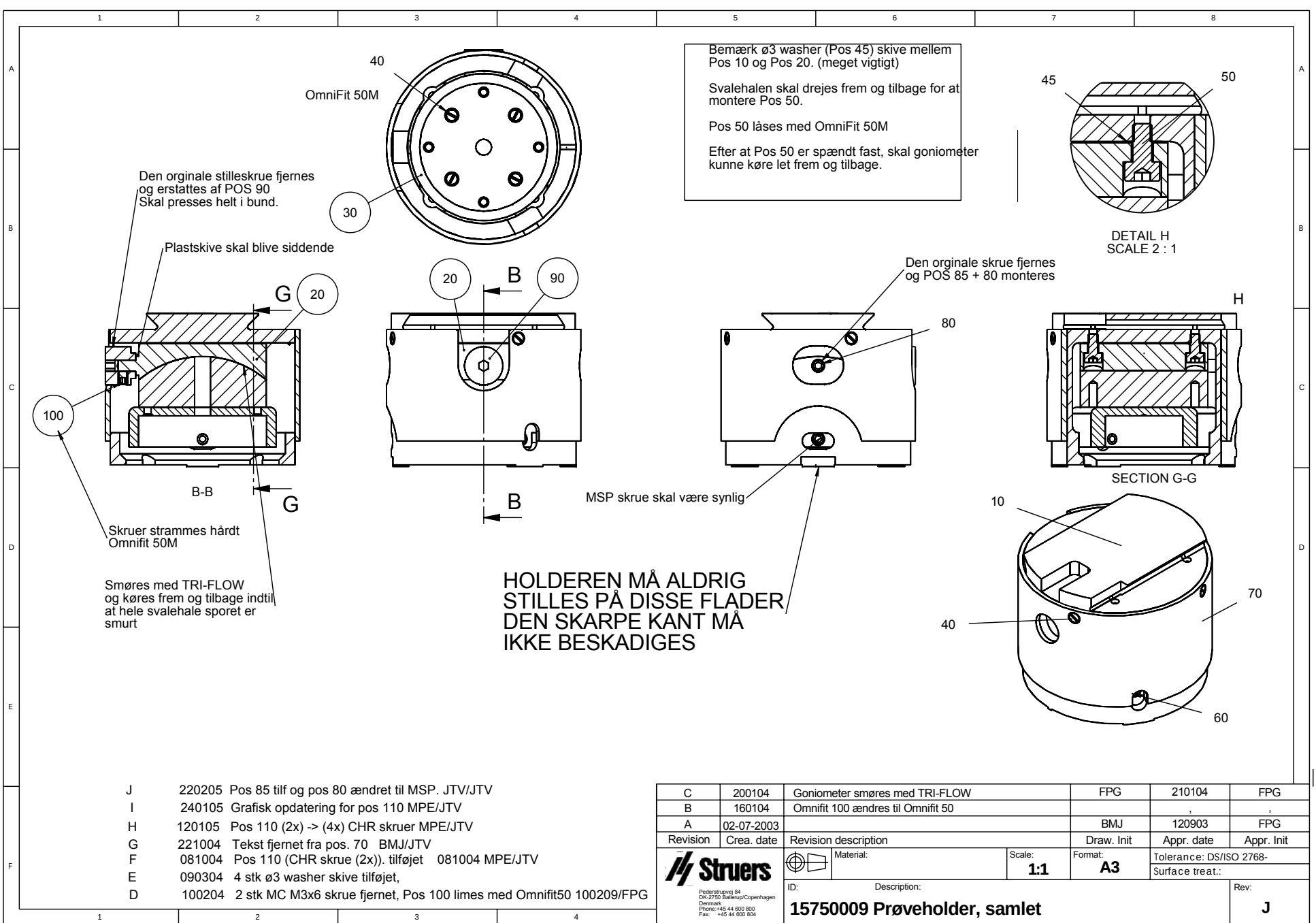


	C	,				,			,
	B	,				,			,
	A	14-12-01				JLI			,
	Rev	Crea. date	Revision description			Draw. Init	Appr. date	Appr. Init	
F	 Valhøjs allé 176 DK-2610 Rødovre Copenhagen Denmark Phone: +45 3670 3500 Fax: +45 38272704		 Material: ,	Scale: 1:1	Format: A4	Tolerance: DS/ISO 2768 - Surface treat.:			
	ID:	Description: 15600022 DP pumpe, monteret					Rev:	A	

	1	2	3	4																																															
A																																																			
B																																																			
C																																																			
D																																																			
E																																																			
F	<table><tr><td>C</td><td>,</td><td>,</td><td>,</td><td>,</td><td>,</td></tr><tr><td>B</td><td>18-12-2002</td><td>1 stk pos.20 fjernet.</td><td>BMJ</td><td>,</td><td>,</td></tr><tr><td>A</td><td>14-12-01</td><td></td><td>JLI</td><td>,</td><td>,</td></tr><tr><td>Rev</td><td>Crea. date</td><td>Revision description</td><td>Draw. Init</td><td>Appr. date</td><td>Appr. Init</td></tr><tr><td colspan="2" rowspan="2"> Valhøjs allé 176 DK-2610 Rødovre Copenhagen Denmark Phone: +45 3670 3500 Fax: +45 38272704</td><td> Material:</td><td>Scale: 1:1</td><td>Format: A4</td><td>Tolerance: DS/ISO 2768 -</td></tr><tr><td colspan="3">Surface treat.:</td><td></td></tr><tr><td colspan="2">ID:</td><td colspan="3">Description:</td><td>Rev:</td></tr><tr><td colspan="2"></td><td colspan="3">15600021 OP pumpe, monteret</td><td>B</td></tr></table>					C	,	,	,	,	,	B	18-12-2002	1 stk pos.20 fjernet.	BMJ	,	,	A	14-12-01		JLI	,	,	Rev	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init	 Valhøjs allé 176 DK-2610 Rødovre Copenhagen Denmark Phone: +45 3670 3500 Fax: +45 38272704		 Material:	Scale: 1:1	Format: A4	Tolerance: DS/ISO 2768 -	Surface treat.:				ID:		Description:			Rev:			15600021 OP pumpe, monteret			B
C	,	,	,	,	,																																														
B	18-12-2002	1 stk pos.20 fjernet.	BMJ	,	,																																														
A	14-12-01		JLI	,	,																																														
Rev	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init																																														
 Valhøjs allé 176 DK-2610 Rødovre Copenhagen Denmark Phone: +45 3670 3500 Fax: +45 38272704		 Material:	Scale: 1:1	Format: A4	Tolerance: DS/ISO 2768 -																																														
		Surface treat.:																																																	
ID:		Description:			Rev:																																														
		15600021 OP pumpe, monteret			B																																														



C							
B	03-09-02	Pos 30 tilf.		BMJ	03-09-02	SOR	
A	06-12-2001			SOR			
Revision	Crea. date	Revision description			Draw. Init	Appr. date	Appr. Init
 Valheis allé 176 DK-2610 Rødovre/Copenhagen Denmark Phone: +45 3670 3500 Fax: +45 3672 7104		Material:	Scale:	Format:	Tolerance: DS/ISO 2768-		
			1:2	A3	Surface treat.:		
		ID:	Description:				Rev:
		15600080 flaskebakke, samlet				B	

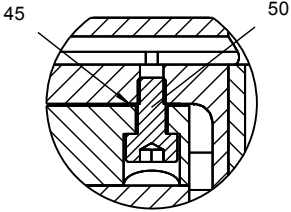


Bemærk ø3 washer (Pos 45) skive mellem Pos 10 og Pos 20. (meget vigtigt)

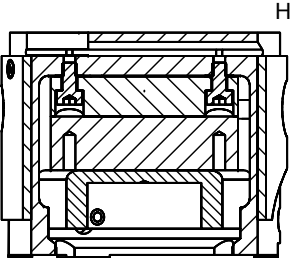
Svalehalen skal drejes frem og tilbage for at montere Pos 50.

Pos 50 låses med OmniFit 50M

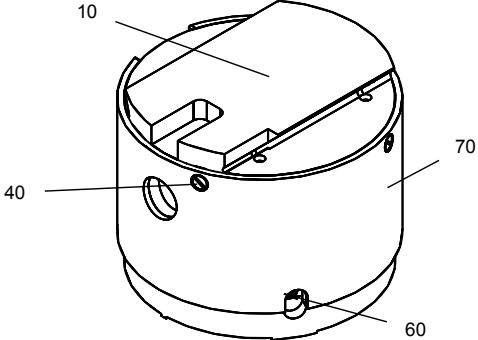
Efter at Pos 50 er spændt fast, skal goniometer kunne køre let frem og tilbage.



DETAIL H
SCALE 2 : 1



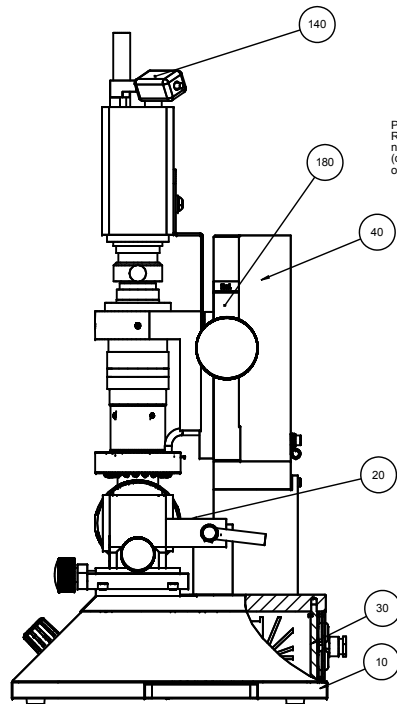
SECTION G-G



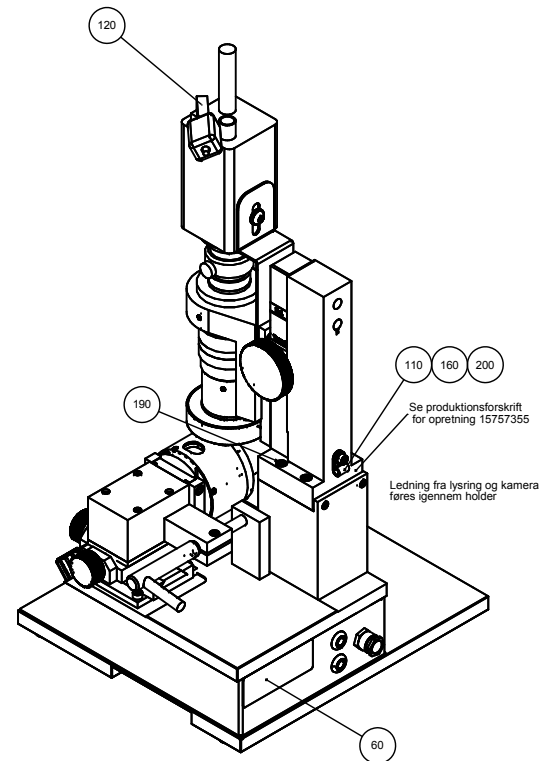
HOLDEREN MÅ ALDRIG
STILLES PÅ DISSE FLADER
DEN SKARPE KANT MÅ
IKKE BESKADIGES

- J 220205 Pos 85 tilf og pos 80 ændret til MSP. JTV/JTV
- I 240105 Grafisk opdatering for pos 110 MPE/JTV
- H 120105 Pos 110 (2x) -> (4x) CHR skruer MPE/JTV
- G 221004 Tekst fjernet fra pos. 70 BMJ/JTV
- F 081004 Pos 110 (CHR skruer (2x)). tilføjet 081004 MPE/JTV
- E 090304 4 stk ø3 washer skive tilføjet,
- D 100204 2 stk MC M3x6 skruer fjernet, Pos 100 limes med Omnifit50 100209/FPG

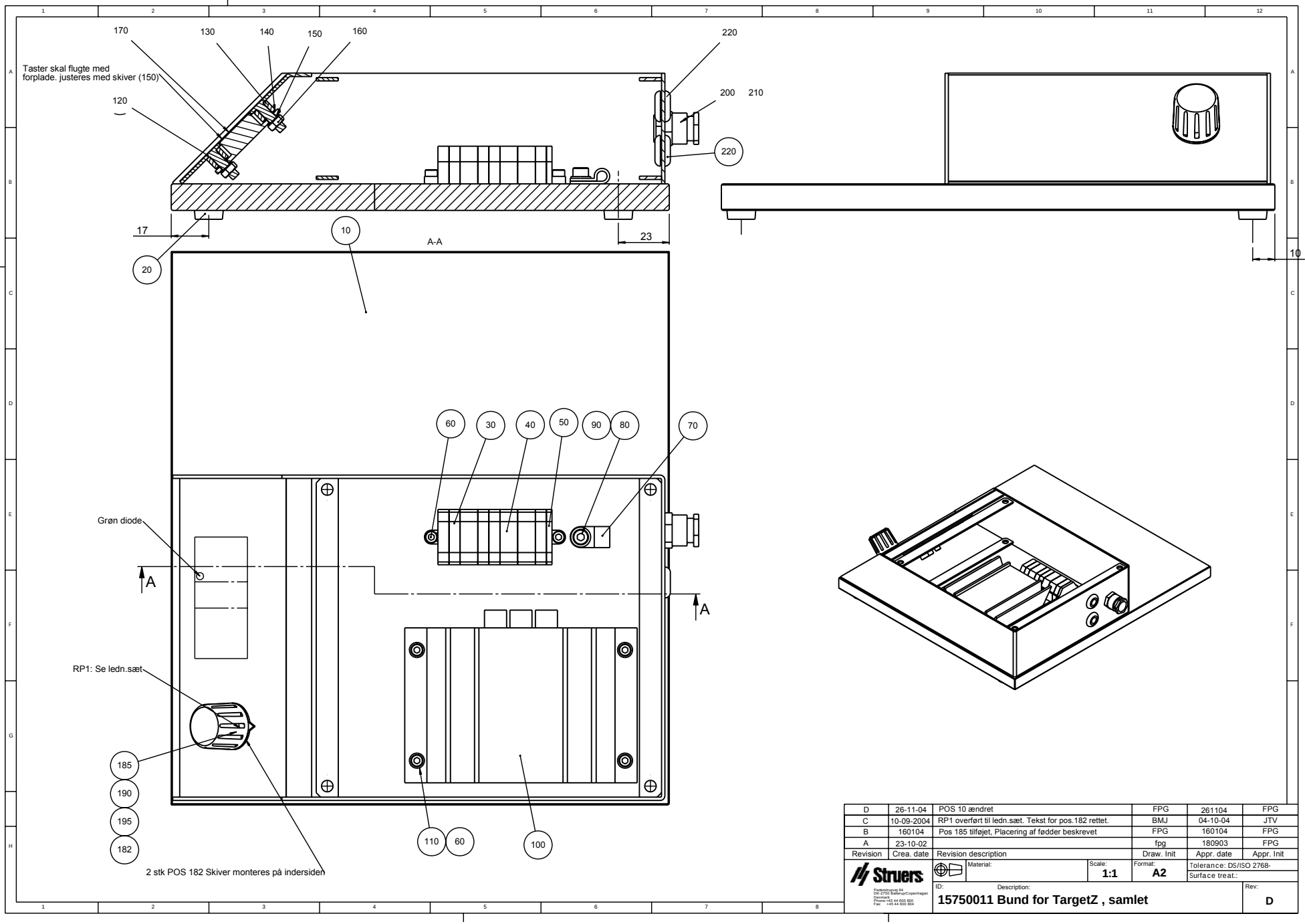
C	200104	Goniometer smøres med TRI-FLOW	FPG	210104	FPG
B	160104	Omnifit 100 ændres til Omnifit 50			
A	02-07-2003		BMJ	120903	FPG
Revision	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init
		Material:	Scale: 1:1	Format: A3	Tolerance: DS/ISO 2768-Surface treat.:
ID:		Description:			Rev:
		15750009 Prøveholder, samlet			J



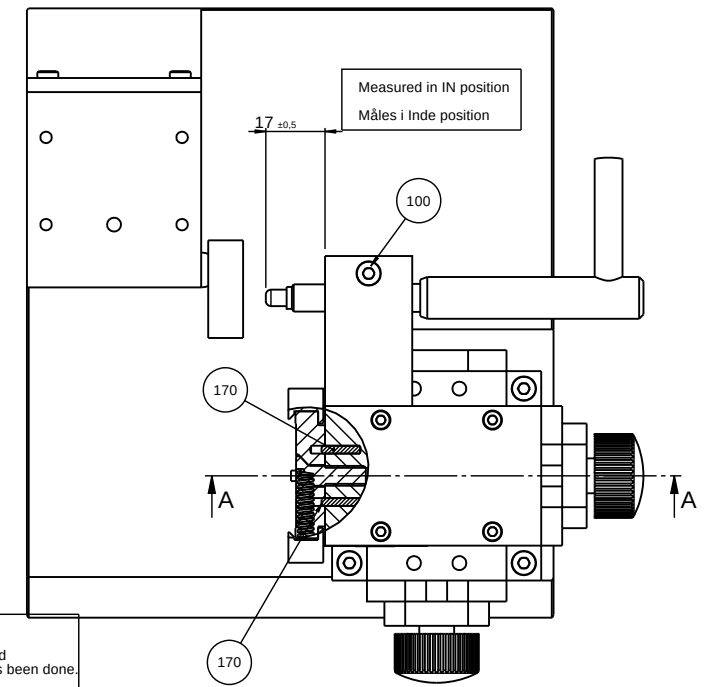
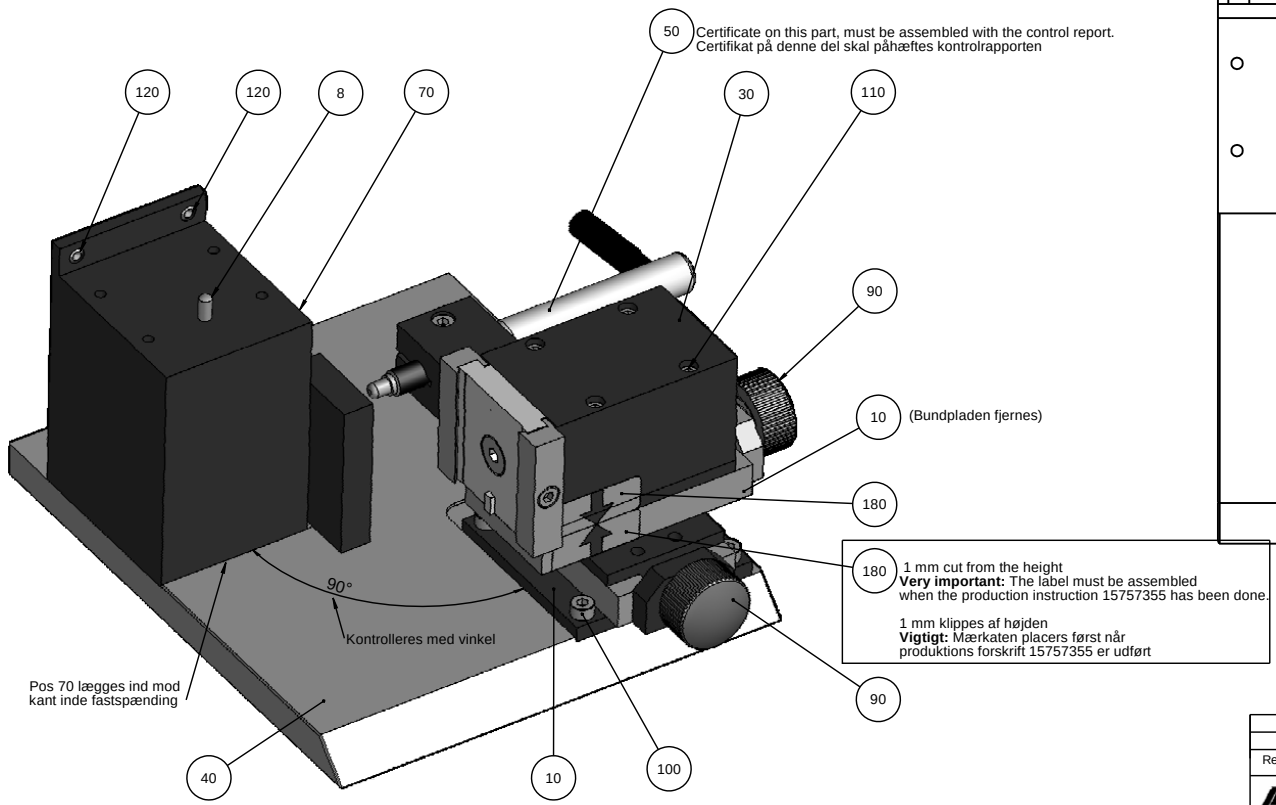
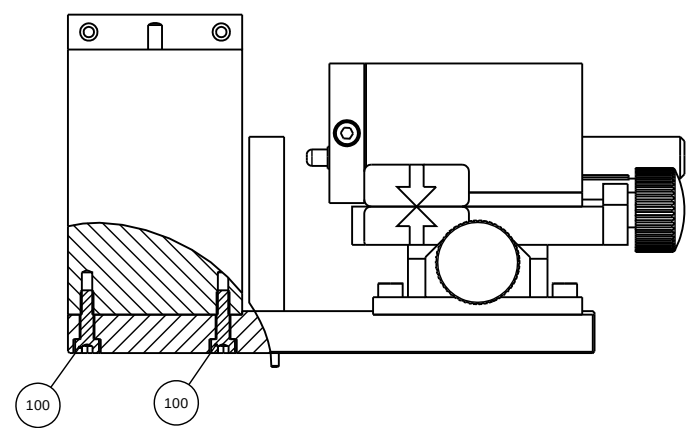
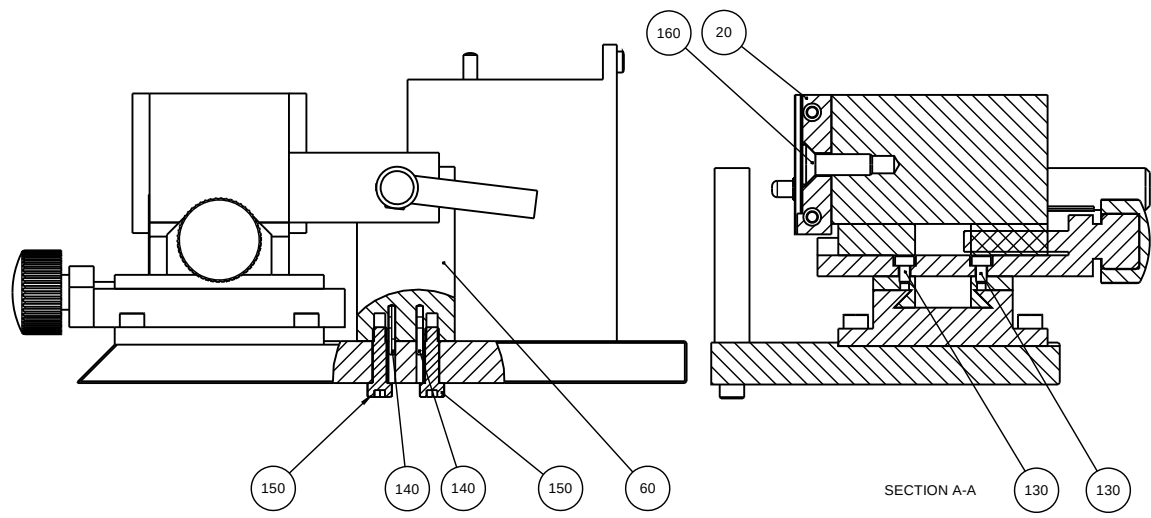
Placering af Foile:
Ref. stregen placeres ud for øverste kant på plastklods
når reference kanten på TargetGrip er i focus
(dvs. TargetGrip skal være monteret og skærm tilsluttet,
og linsen skal være sat til Max zoom)



F	29.05.2008	P20 15750013->15750059. P250-260 fjernet	SPE	29.05.2008	
A	28.10.2002		FPG	11.02.2003	FPG
Revision	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init
	28.10.2002				
ID: 		Material:	Scale: 1:2	Format: A2	Tolerance: DS/ISO 2768- mK
		Description: 15750002 TargetZ, komplet	Surface treat.: None		
					Rev: F

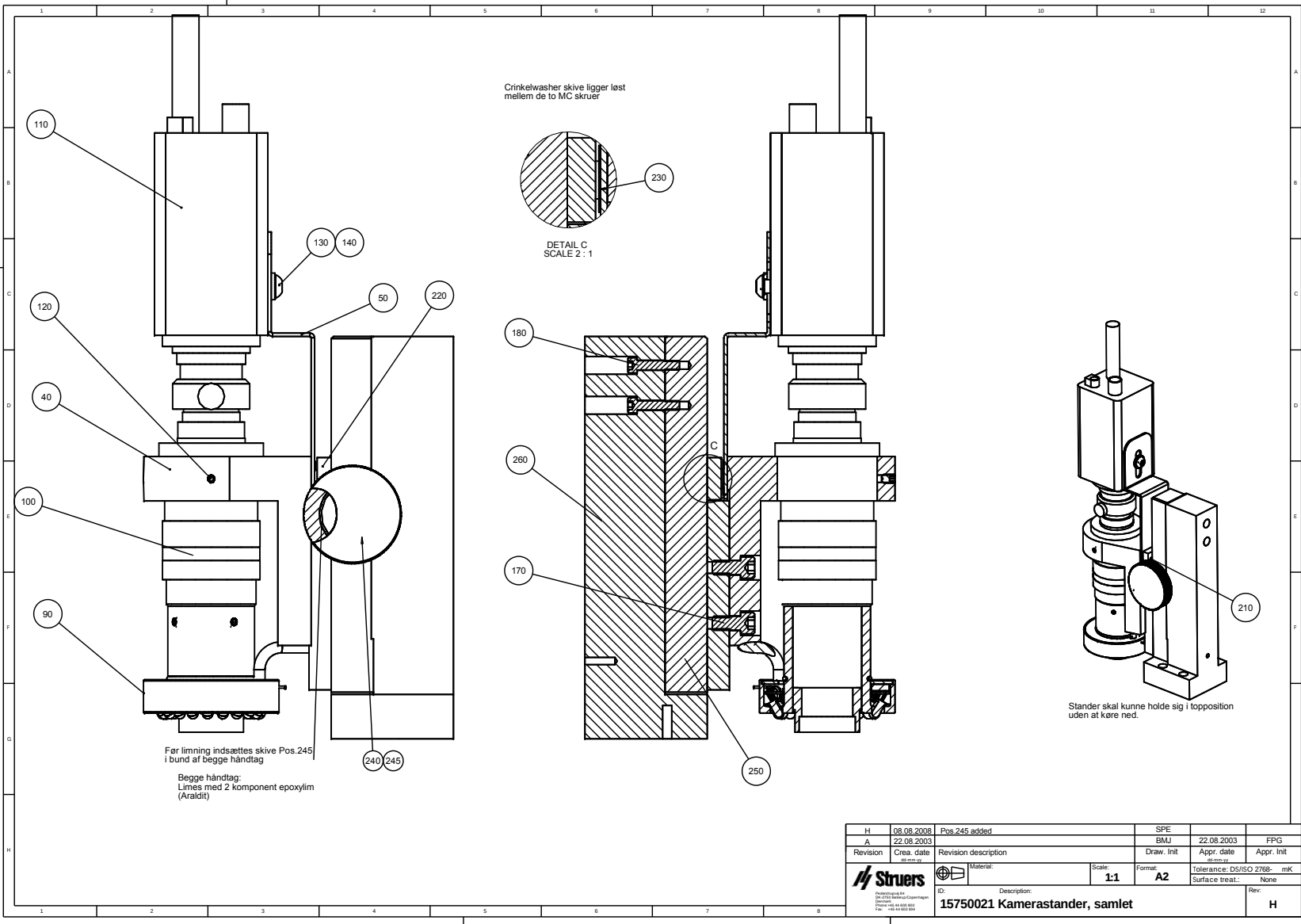


D	26-11-04	POS 10 ændret	FPG	261104	FPG
C	10-09-2004	RP1 overført til ledn.sæt. Tekst for pos.182 rettet.	BMJ	04-10-04	JTV
B	160104	Pos 185 tilføjet, Placering af fødder beskrevet	FPG	160104	FPG
A	23-10-02		fpg	180903	FPG
Revision	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init
		Material:	Scale:	Format:	Tolerance: DS/ISO 2768-
			1:1	A2	Surface treat.:
		ID:	Description:		
		15750011 Bund for TargetZ , samlet			Rev:
					D



B	06.11.08	Placering af afstandsmåler tilføjlet	FPG	23.09.09	FPG
A	22.05.08		FPG	22.05.08	FPG
Revision	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init
	08.05.09			08.05.09	
Material:		Scale: 1:1	Format: A2	Tolerance: DS/ISO 2768- mk	Surface treat.: None
ID: 15750059		Description: 15750059 Top part TargetZ , assembled			Rev: C





H	08.08.2008	Pos.245 added	SPE		
A	22.08.2003		BMJ	22.08.2003	FPG
Revision	Crea. date	Revision description	Draw. Init	Appr. date	Appr. Init
	08.08.03			08.08.03	
Material:			Scale:	Format:	Tolerance: D5/ISO 2768- mK
			1:1	A2	Surface treat.: None
ID:			Description:	Rev:	
			15750021 Kamerastander, samlet	H	



Pederstrupvej 84
DK-2750 Ballerup
Denmark