



Axiom CNC Safety Enclosure Assembly Manual



AXIOM[®]
P R E C I S I O N



BG Precision

Date: 28 July 2019

Manufacturer:

AXIOM PRECISION
AXIOM TOOL GROUP
TAIWAN

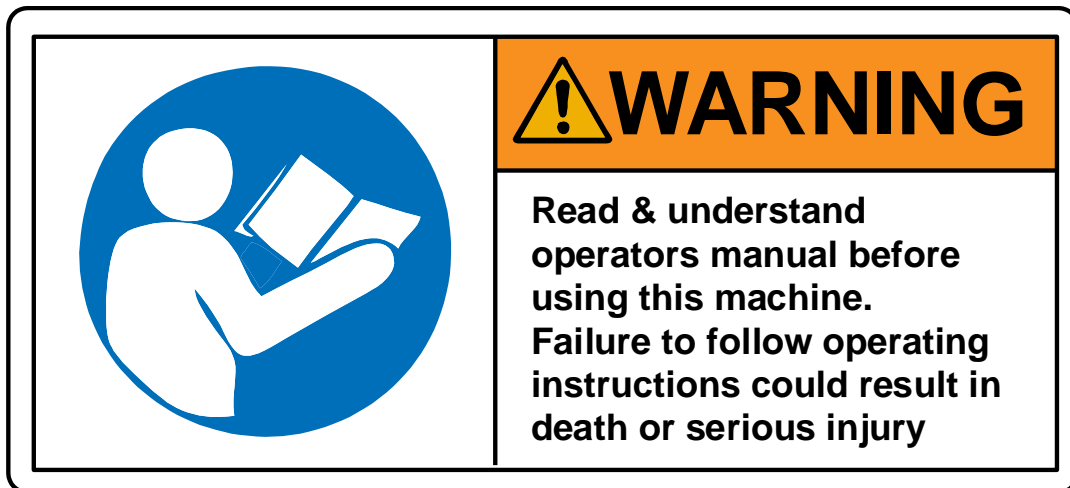
Agent and Appointed Reseller

BG Precision PTY LTD
Unit 1/82 Brunel Road
SEAFORD
3198 VIC
Australia

Mob: +61 (0)405685515

Email: info@bgprecision.com.au

Website: www.bgprecision.com.au



Before using/turning on the machine, the device should be carefully checked to make sure all connections are secure and the device is technically sound.

1 INTRODUCTION

Thank you for purchasing your AXIOM CNC Safety Enclosure system. Firstly, please inspect the machine and all components after delivery has been received. Please check and ensure all aspects of the machine and associated extra items are in good condition and there is no evidence of damage or wear to any components due to the shipping process.

Please ensure you read the operational manuals for this AXIOM CNC router machine prior to attempting to use the system.

Responsibility of use or misuse belongs to the end user. BG Precision PTY LTD and its affiliates accept no responsibility for use or misuse by the user. If you may not be able to use this product properly, we recommend that you do not begin use or cease use immediately.

If there are any further questions or if anything is not clear, please contact us at info@bgprecision.com.au

1.1 ENCLOSURE DESCRIPTION

The enclosure has been constructed to ensure the safe operation of your CNC System. The machine placed in the interior is accessible from two sides via the dual interlocked doors on the front and left-hand side of the enclosure. This allows access to all areas of your machine bed for maintenance, material clamping, tool changing and/or material loading. The interlocking doors ensure while the machine is active you cannot access the interior of the enclosure as the doors have a mechanical locking feature. To do so you must engage the reset condition for your CNC to allow the doors to open.

Placed on the left-hand side of the front and side doors is an E-Stop. Engaging this E-Stop will activate your reset condition and stop the machine from any operation. The main safety control panel is located on the front of the enclosure. This helps you monitor the current state of the safety enclosure with a green LED when lit, indicating the machine is active.

The enclosure's electronics are all integrated with your CNC Controller to monitor these conditions. If a door is open or an E-stop is triggered the UCCNC software will not allow you to activate the machine.

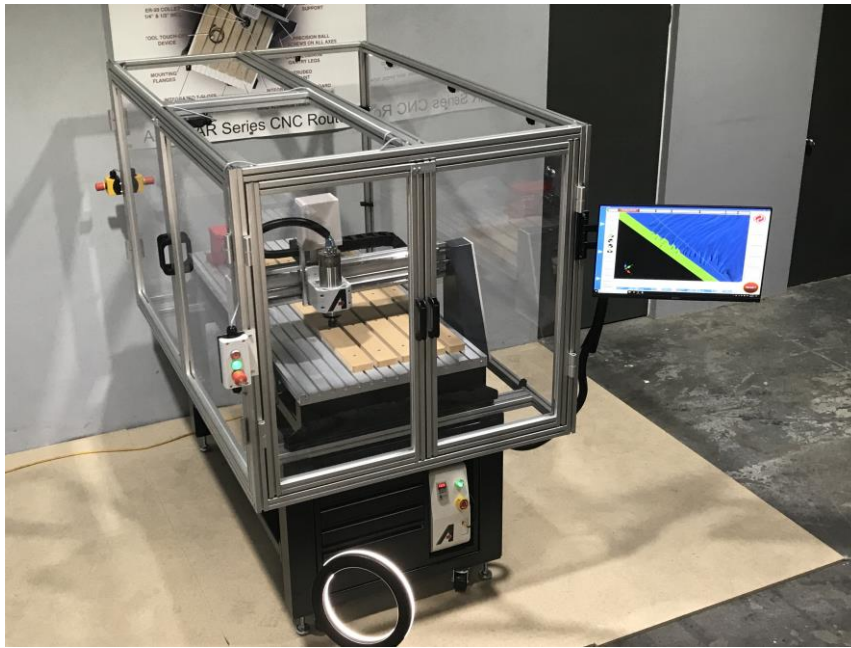


Figure 1 Axiom AR8 with full Safety Enclosure and additional touch screen display

1.2 HANDLING YOUR AXIOM CNC MACHINE

The CNC router table assembly is heavy. Please use a secure means and use caution when lifting onto the stand. At least 3-4 able bodies persons are needed to lift the machine onto the stand.



To avoid damage, be careful to never lift the router by the gantry. Always lift the Axiom CNC machine under the black steel frame. You should sight under your Axiom CNC Table (Figure 2); the y-axis profile linear rails and y-axis ballscrew.



If these precision components are damaged you must send the CNC machine back to the workshop for replacement.



Figure 2 Underside of Axiom CNC Machine

1.3 ALUMINIUM PROFILE ASSEMBLY HINTS


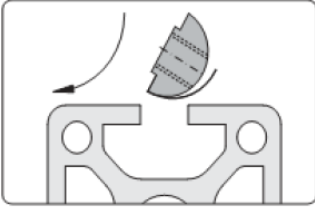



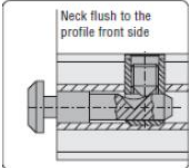
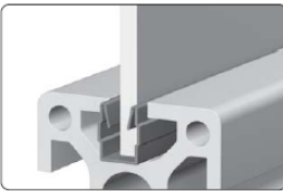
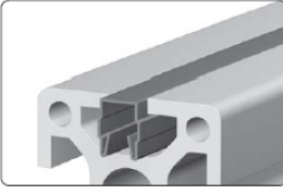
ACCESSORY	1.32.4EM6	T-Nut for subsequent insertion, w. spring E, M6
	1.32.4EM8	T-Nut for subsequent insertion, w. spring E, M8
 <p>Fixing with leaf spring</p> <p>Application Fastening element for screw-type connections</p>  <p>Insert front-sided and rotate</p> <p>Technical data Design steel: • material: steel • surface: galvanised Design stainless: • material: stainless steel 1.4305 • surface: pickled and passivated max. moment of torque: $M_{A, max}$</p>		<p>These t-nuts are easily inserted into assembled frames</p>
CONNECTOR	1.21.4E0	Connector, universal
 <p>Insert the cross bushing</p>  <p>Push in the anchor</p>  <p>Pretension the anchor</p>  <p>Neck flush to the profile front side</p> <p>Comments For the optimal assembly of the profiles the connector is to be installed in such a way that the neck is flush to the profile front side</p>		<p>Most MayTec connectors follow these assembly steps. Tightening torque is: 5-15 Nm for 20mm profiles, 30 Nm for 30mm group, 35 Nm for 40mm and larger profiles.</p>
None	1.41.E314.1	Combination profile PP, E, 1 - 4.5, grey (bar 2.5 m)
 <p>Use as reduction profile</p> <p>Application Combination profiles for use as reduction or cover profiles</p> <p>Technical data bar length: 2.5 m material: PP • oil and water resistant</p>  <p>Use as slot-cover profile</p> <p>Colours: grey black orange red blue green</p>		<p>These profiles fill the space between the panel and the walls of the T-slot.</p>



Figure 3 Corner Alignment

When connecting two aluminium extrusion components together you must ensure a square and flush fit. We achieve this by placing a straight edge across the joint while tightening the pre-tensioning anchor grub screw. This is very important to all the enclosure components aligning correctly.

2 STEP 1 – SETTING UP THE STAND

Failure to read and understand all the assembly and setup instructions before attempting assembly may result in serious injury.



Once you have verified the machine and their contents are 100% okay and damage free after transport then you can begin the setup process.

2.1 STAND CONTENTS



Figure 4 Axiom Stand Packaging



Figure 5 Axiom Stand contents

Packaging contents for the Axiom Precision Stand (ARS400/600/800):

- 2-Stand upright (front & back)
- 2-Cross braces
- 1-Lower shelf plate
- 1-Stand hardware package

Hardware package contains:

- 4-Swivel casters
- 4-Leveling Feet
- 4-hex nuts
- 16-Hex bolts (M8x25)
- 16-Lock washers (M8)
- 16-Flat washer (M8)
- 16-Hex bolts (M6x12)
- 16-Lock washer (M6)
- 16-Flat washer (M6)
- 1-Controller hook
- 2-Machine screws (M4x6)
- 4-Small rubber pads

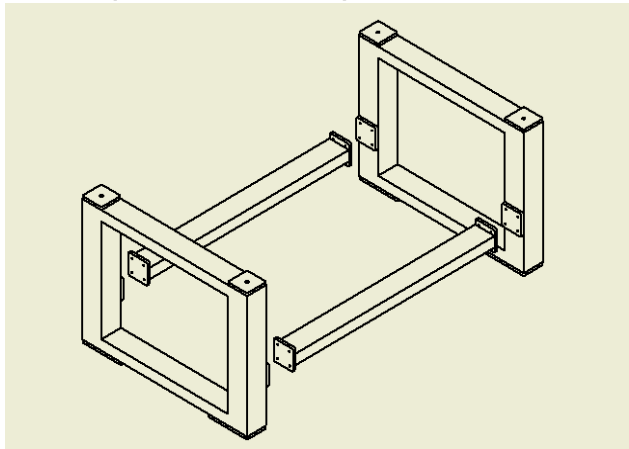


Figure 6: AXIOM steel stand assembly overview



Figure 7 Hardware package contents

Remove all contents from shipping boxes. Do not discard carton or packing material until assembly is complete. Accessories commonly ship inside machine or stand packaging and can be easily over looked.

2.2 STAND ASSEMBLY

Tools required for assembly:

- #2 Philips-Screwdriver
- 10mm, 13mm and 17mm sockets and socket wrench
- 24mm open-end wrench
- 2mm and 3mm Allen key
- Spirit Level

Assembling Stand (all models):

Assembly for stand fitting all Basic and Pro model machines is the same. The only difference is the length of the cross braces.

- 1- Thread a loose hex-nut onto each of the levelling feet.
- 2- Turn the square stand uprights upside down. Do this on top of the cardboard packaging to prevent scratching.
 - a. Install the levelling feet and swivel casters using M6 hex bolt, M6 lock washer, and M6 flat washer for each caster. Tighten all the caster hardware securely. The levelling feet can be adjusted later.
 - b. Rotate uprights so the cross-brace mounting plates are facing each other. Separate the uprights far enough that the braces can fit between them.
 - c. Align the cross-braces between the uprights and bolt the mounting flanges to the plates using (4) M8 hex bolt, (4) lock washers and (4) flat washers for each side. We recommend that you do not fully tighten these bolts until the machine is securely fixed on top of the stand as this makes the machine and stand alignment easier.



Figure 8: Castors and feet

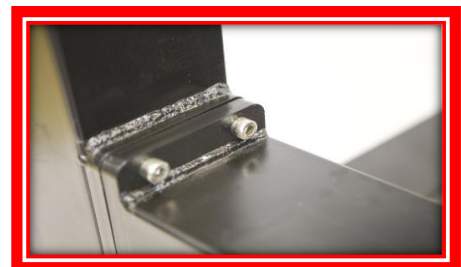


Figure 9: Bolted connections for stand

IMPORTANT NOTE: As seen in the diagram above (Figure 9), the braces should be rotated correctly for the toolbox and shelf to sit at the correct height. Braces should be mounted so that the top and bottom are the larger flat surfaces*

- 3- With assistance, the stand can now be flipped over onto the casters and levelling feet.
- 4- Flip the shelf upside down and stick of the rubber pads on each corner of the shelf flange.
 - a. Install shelf between the braces on the stand, all the way forward.

- b. The small rubber pads should now be between the flange and the top surface of the brace. This will help prevent unwanted movement and scratching.

2.3 AXIOM TOOLBOX

- 1- Turn the tool-box upside down. Install (1) of each hanger on either side of the toolbox using the installed rivnuts and (2) 3mm cap-screw each.
- 2- Insert the toolbox into the stand, from the top. The hangers will with snugly between the braces on either side of the toolbox.
- 3- The front can be slid forward to rest within the opening on the stand upright.



Figure 10: Toolbox



Figure 11: Hangers for toolbox

2.4 ENCLOSURE BASE ASSEMBLY

The final step of the setting up the stand assembly is fixing the machine enclosure base to the stand. To assist with locating the assemblies correctly we have provided 4 x M4x10mm screws that should be used to help align the enclosure base assembly to the stand assembly (See Figure 12). If the hole alignments are not correct, we suggest you loosen the bolts on the stand cross member as per Figure 9 above. Please take note of Figure 14 for orientation.



Figure 12 M4 Locator Screw

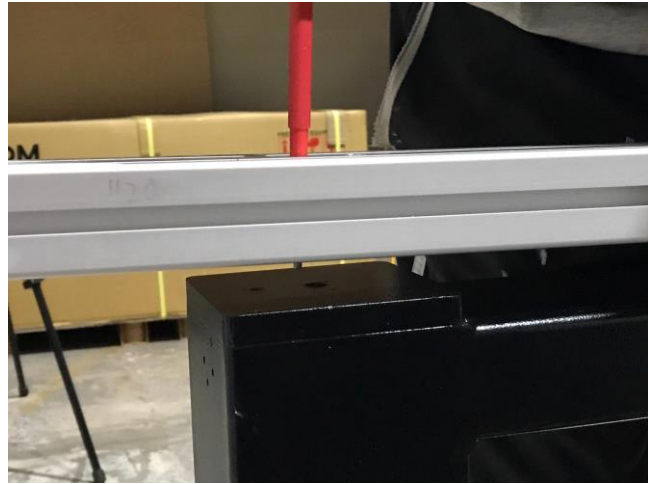


Figure 13 Base Assembly and stand Alignment

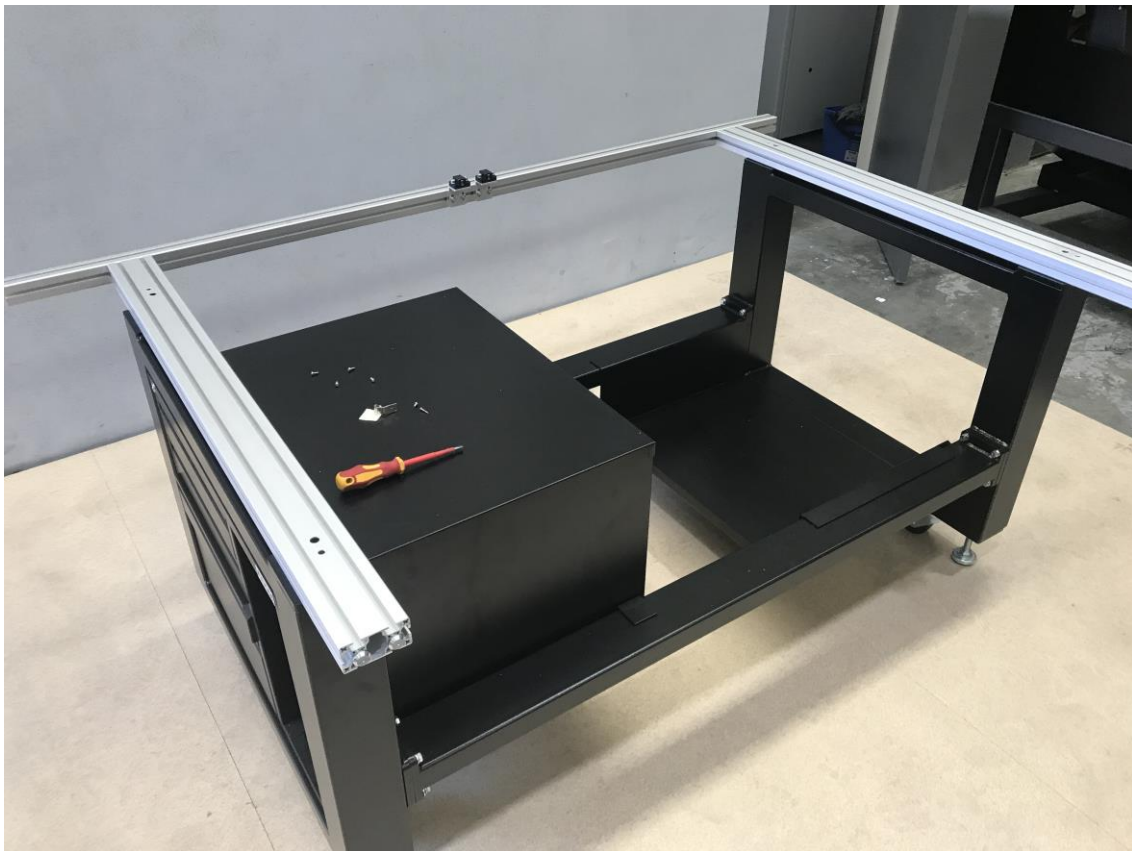


Figure 14: Final Stand and enclosure base

Step 1 is complete when your assembly looks like Figure 14

3 STEP 2 - INSTALLING THE ROUTER TABLE ON THE STAND

The CNC router table assembly is heavy. Please use a secure means and use caution when lifting onto the stand. At least 3-4 able bodies persons are needed to lift the machine onto the stand.

To avoid damage, be careful to never lift the router by the gantry. Always lift the Axiom CNC machine under the **BLACK STEEL FRAME**. You should sight under your Axiom CNC Table; the y-axis profile linear rails and y-axis ballscrew. If these precision components are damage you must send the CNC machine back to the workshop for replacement. If required to lift via the Aluminium T-Slot Table, you must only lift closest the black steel frame and never any further from it than a hands width away. See Figure 15 Lifting the Axiom CNC.



Figure 15 Lifting the Axiom CNC

If using a forklift, keep forks under the black steel frame to avoid damaging the wiring and mechanics of the machine. Place a scrap piece of lumber beneath the router assembly and carefully slide forks beneath the steel base.



Figure 16: Ensure forks extend the entire way across the machine

IMPORTANT NOTE Make sure the forks extend through to the other side of the machine for safe lifting. See Figure 16 for more detailed info. It's **IMPERATIVE** you lift only from the steel frame.



- 1- Position router over the stand and align holes on router mounting flanges and the enclosure base assembly holes being careful to make sure the stand is properly oriented with the machine front. Stand front is the side you placed the toolbox in as per Figure 17.



Figure 17 Installing the Router Table on the Stand

- 2- Place rubber bushing over the holes in the stand. Lower the machine to sit on the bushings.
 - a. Attach the machine to the stand using M10 Hex bolt provided with washer at each corner.
 - b. Insert the bolt/washer through the machine mounting flange and the rubber bushing.
 - c. Thread the bolt loosely into the stand mounting holes. **Do not tighten until all bolts have been threaded. This ensures correct alignment.**
 - d. Remove fork lift and tighten bolts evenly.



Figure 18 Correct fixing of router table to stand assembly

- 3- When the Router Table is securely fixed to the enclosure base and stand assembly you can then proceed to tighten the 4 bolts at each end of the stand cross members.



Figure 19 Stand cross member bolts

- 4- Now is a good time to place your control box into its correct location in the toolbox and feed all the connection cables through the hole at the back



Figure 20 Axiom Controller in toolbox



Figure 21 Connection Cables

- 5- Connect the two barrel connections to the back of the Router Table as per Figure 22. Leave the mains plug disconnected until the full enclosure assembly is complete.

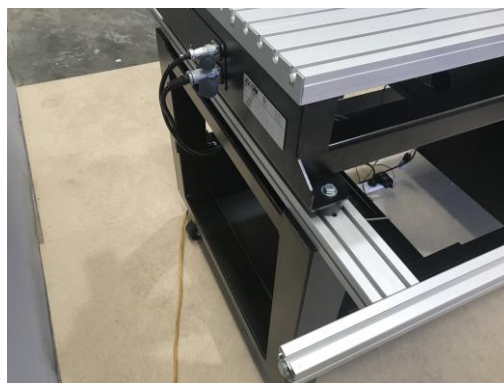


Figure 22 Machine Connections

Step 2 is now complete.

4 STEP 3 - ENCLOSURE ASSEMBLY

- 1- The first step of the enclosure assembly is the front left corner upright. Ensure it is flush with cross-member and tighten accordingly. Please note orientation of hinge brackets.



Figure 23 Front Left Upright

- 2- The second step is the right-hand side assembly. Ensuring the front hinges as facing in towards the centre of the machine slide the right-hand side assembly along the enclosure base cross members as per the picture shown.



Figure 24 LHS assembly



Figure 25 LHS assembly complete

- 3- Now proceed to the back of the machine. The rear assembly should be positioned as shown making sure the hinges are positioned in towards the machine for the side doors. Take care of the barrel connections at the back of the machine. There are two black brackets to hold the polycarbonate in place that can be secured to the side installed previously. Take care not to overtighten the screw on the clear polycarbonate.



Figure 26 Rear Enclosure Assembly



Figure 27 Barrel Connections



Figure 28 Rear Assembly Complete

- 4- Now we can fit the single front bottom cross member as per the pictures shown. Take note that the magnetic door stops should be facing up. Again, it is very important to ensure all connections are flush on both sides



Figure 29 Bottom front cross member



30 Bottom front cross member complete

- 5- Now we can proceed to hang the doors. Make sure you have the correct door in the correct location before hanging. This can be done by placing them as per the picture below before lifting them in place.



Figure 31 Door Locations



Figure 32 Doors Fitted

- 6- Place the top assembly as shown in the picture below. This step may require a few hands and a safe working platform to reach the top of the enclosure.



Figure 33 Preparation for top assembly

With the doors shut the step will be easier to allow the top assembly to rest in place.



Figure 34 Top assembly Location

7- Remove the bubble wrap and position the control electronics in place as per the pictures below. You can pop out the slot covers to place the electronic cable in neatly inside.



Figure 35 E-Stop Location at rear



Figure 36 Safety Enclosure Main Controller

- 8- Now you can secure each corner of the top assembly the four uprights. You must ensure a flush connection for perfect enclosure alignment.



Figure 37 Top Assembly Complete

- 9- Now you can open each door and remove the interlock key from the door interlocks and install on the doors as shown. Please note these have been adjusted on first assembly and should be installed on the door associated with the interlock you have removed it from. Also take note of the “top” notation on each key.



Figure 38 Door Interlock Keys



Figure 39 Safety controller connection to Axiom Control box

The final step in this section is to connect the safety controller to the Axiom control box. This connection is identified in Figure 39.

Step 3 is now complete.

5 STEP 4 – SAFETY ENCLOSURE OPERATION

5.1 SAFETY ENCLOSURE OPERATION CONDITIONS

When using the Safety Enclosure, the following conditions must be met for operation of the Axiom CNC machine:

1. All doors must be closed
2. All E-stops keyed or none keyed must be reset (Pulled out)
3. Axiom Controller powered on
4. STEP 1 SET UP THE NETWORK complete as per Axiom Machine user manual
5. STEP 2 INSTALL THE UCCNC SOFTWARE as per Axiom Machine user manual
6. STEP 3 UCCNC LICENSE AND PROFILE INSTALLER complete as per the Axiom Machine user manual with correct machine profile (Profile: Axiom_AR8++)
7. Click on the UCCNC Machine Profile shortcut on your desktop (Profile: Axiom_AR8++)
8. Hit the reset button (it should be flashing yellow and red). Once clicked it should remain solid red in colour. You should now be able to control the machine with your UCCNC software.

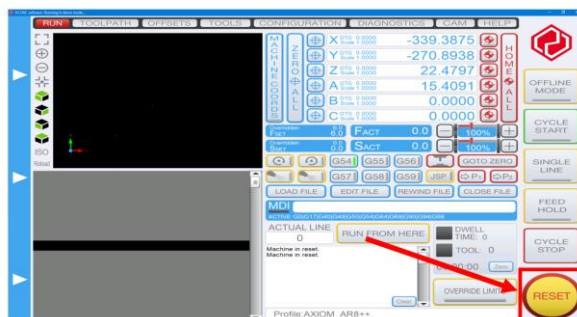


Figure 40: Reset button on UCCNC front panel

9. If all conditions are met it will be indicated by the green LED on from of the main enclosure controller as per Figure 41



Figure 41 Machine Active Green LED

5.2 “THE RESET LOGIC IS ACTIVE”

If the following message comes up “The Reset Logic Is Active” (Figure 42) the best way to diagnose is the Diagnostic Tab as per Figure 43. If the E-stop function is highlighted green, it means one of the conditions of section 5.1 SAFETY ENCLOSURE OPERATION CONDITIONS are not met.

If confirmed all conditions are met, please review the next section (6 STEP 5 – DOOR INTERLOCK ALIGNMENT)

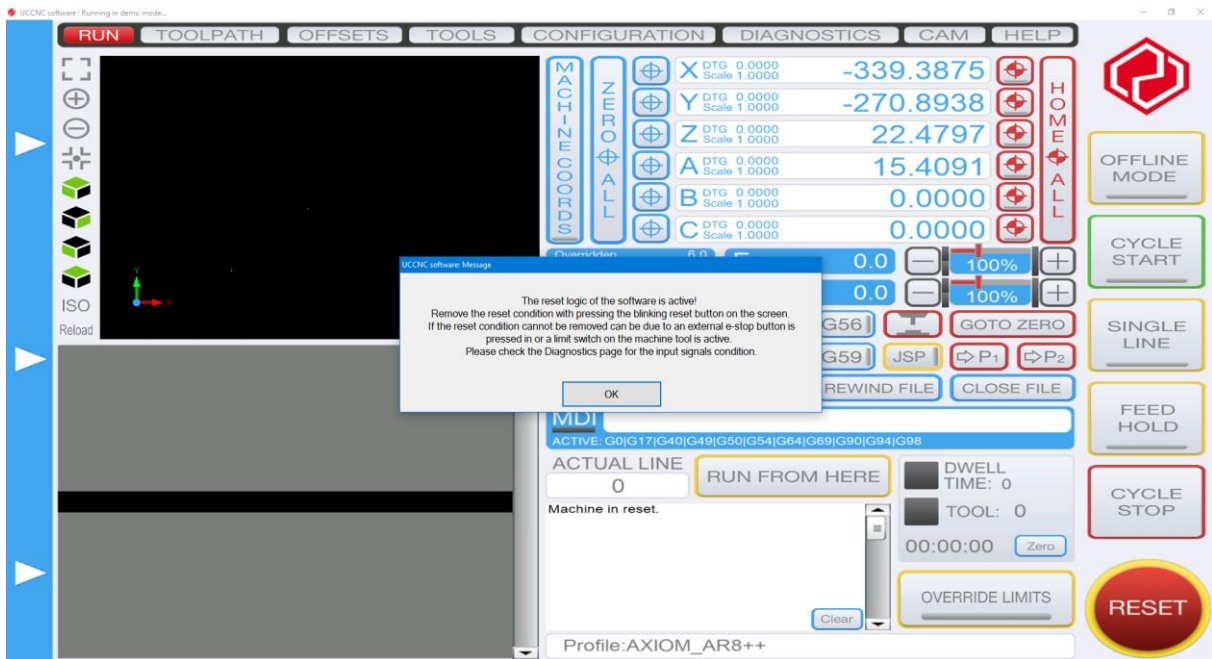


Figure 42 The Reset Logic is Active

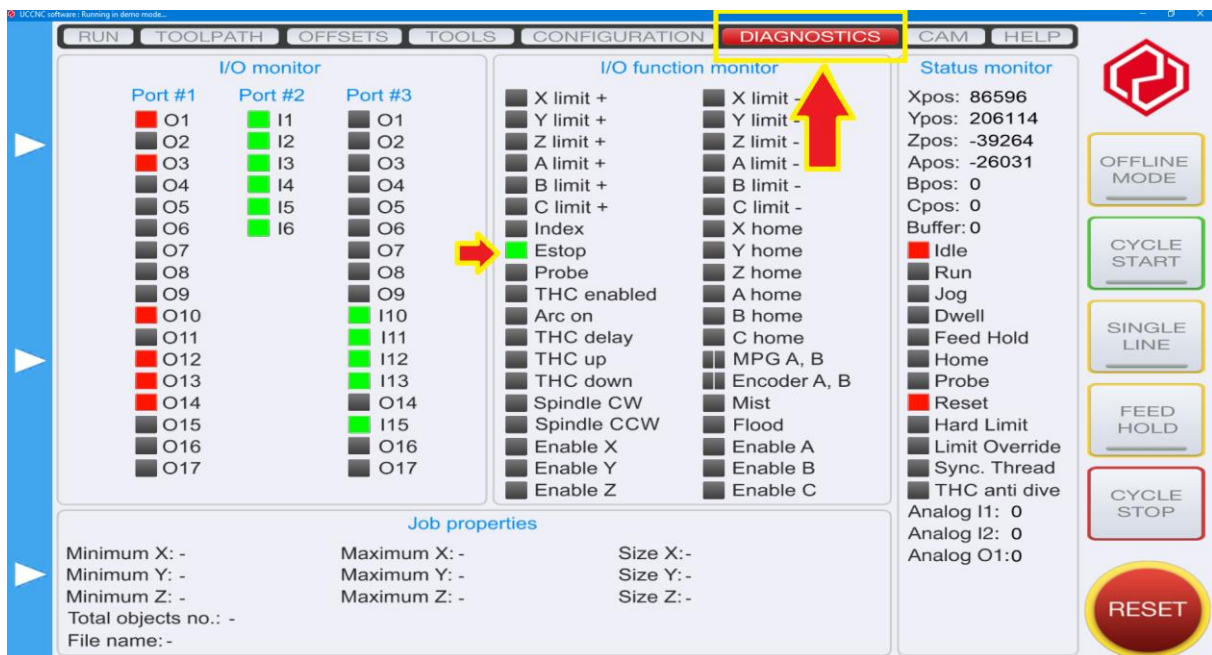


Figure 43 Diagnostics Screen UCCNC

6 STEP 5 – DOOR INTERLOCK ALIGNMENT

While we do are best to align all doors and interlocks at initial assembly, they may need adjustment from the final assembly on site or simply need adjustment overtime. There are several adjustment points which will be highlighted in this section. Please note that if the interlocks are not alignment correctly the machine cannot be activated which is the safest situation.

The main adjustment point is the “Door Interlock Plate” as identified in Figure 44 Door Interlock Plate There are two 5mm Allen key screws that can be loosened to adjust the plate and slide it forward or back.

The aim is to have the door interlock plate as far back from doors as possible. This is to ensure that when you close the doors and activate the machine the door interlock stays engaged if you were to try and open the doors. If the door interlock is too loose and you try to open the doors you may disengage the interlock and put the machine into a reset state.



Figure 44 Door Interlock Plate

It can be seen from our alignment picture in Figure 45 there is a gap present between the interlock key and the actual interlock itself. This is ok.

You should test your door alignment with the UCCNC diagnostic screen as per Figure 43. Testing should consist of opening and closing doors and checking the “E-Stop” LED is highlighted green when doors are open. Close the doors and undo the reset condition which should lock the doors and try to manually open them. If you can open the doors, the interlock plate is too loose and needs to be moved back further away from the doors.

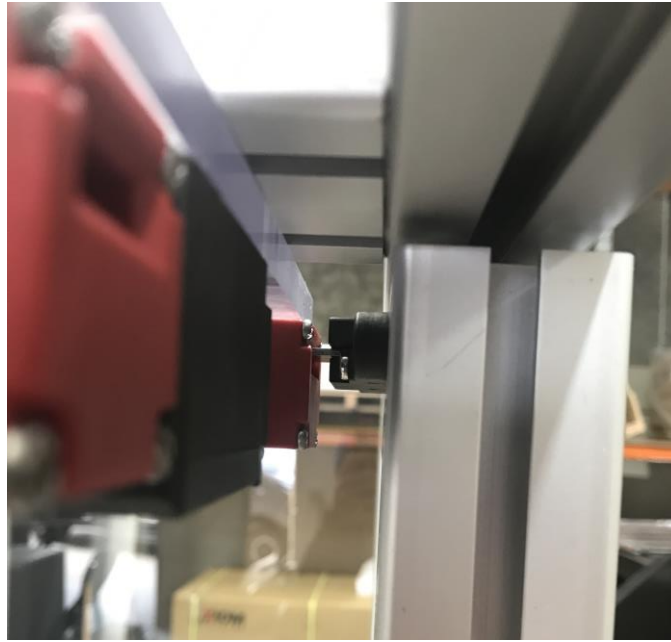


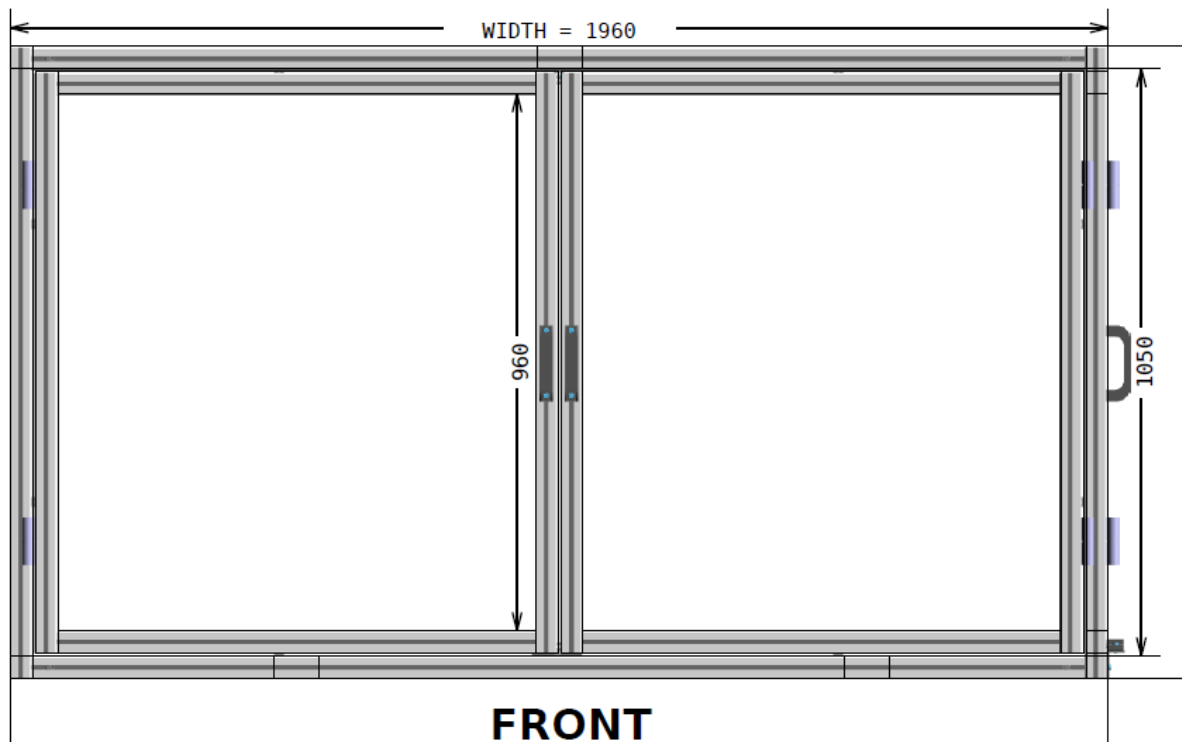
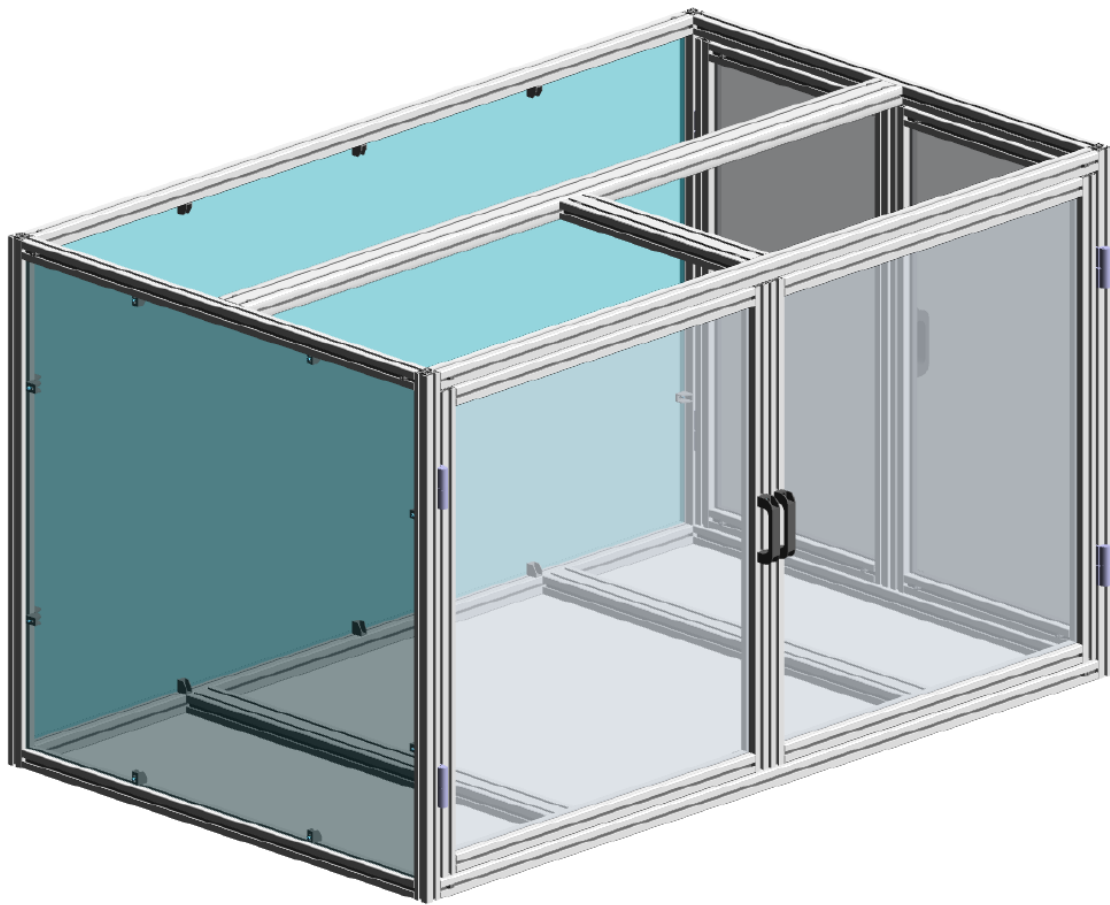
Figure 45 Door Interlock Key Alignment

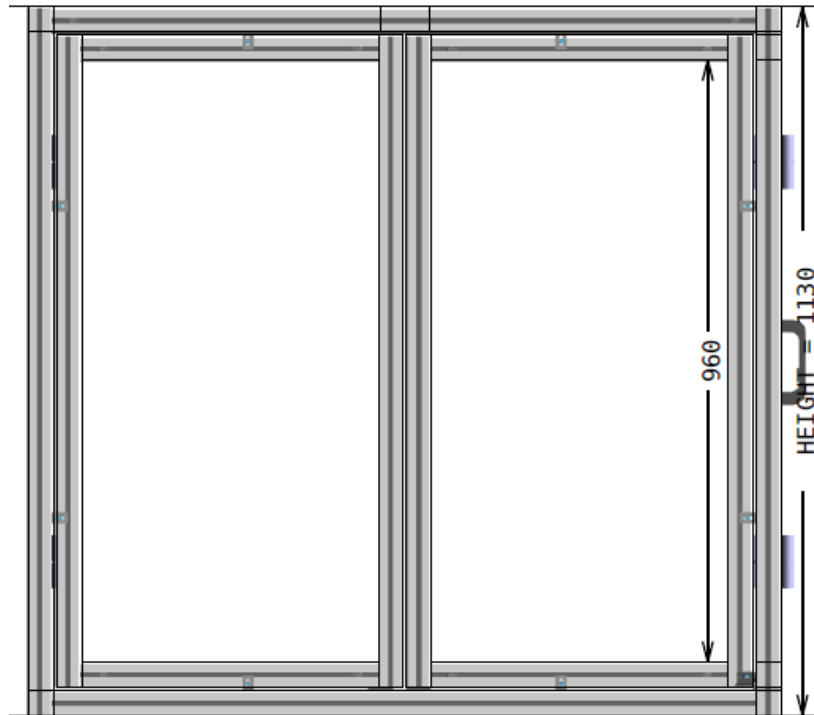
As a final note the Door Bracket in Figure 46 is vital to the operation of the enclosure and should not be removed or adjusted. It ensures you close the doors in the correct order and that both doors are locked via the mechanical lock in the interlock.



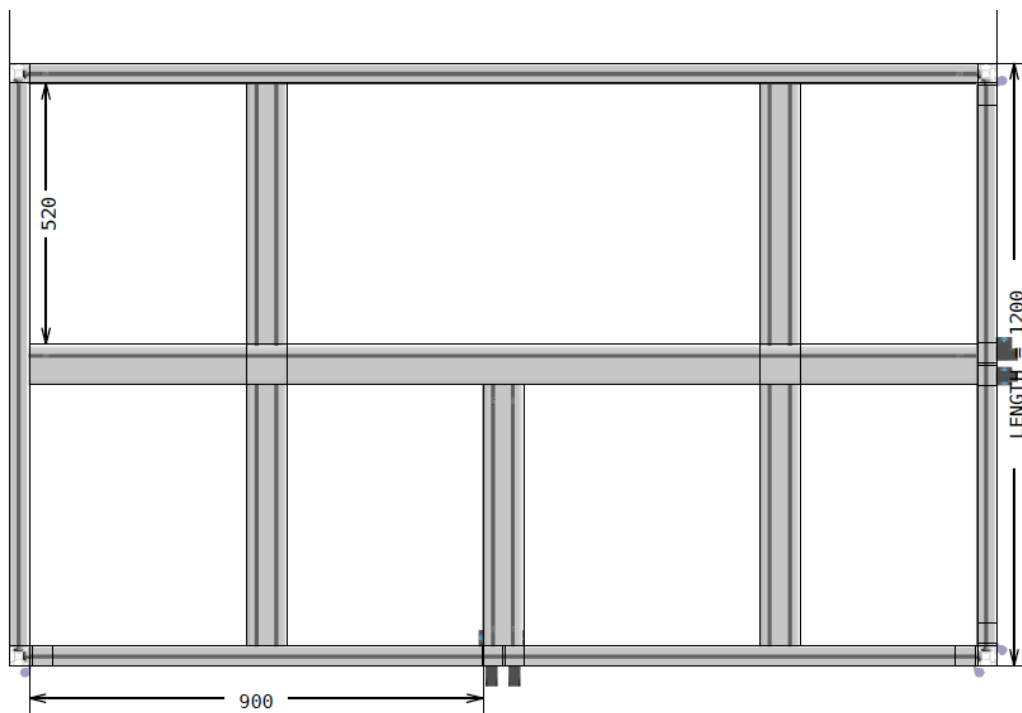
Figure 46 Door Bracket

7 APPENDIX 1 – ENCLOSURE DIMENSIONS



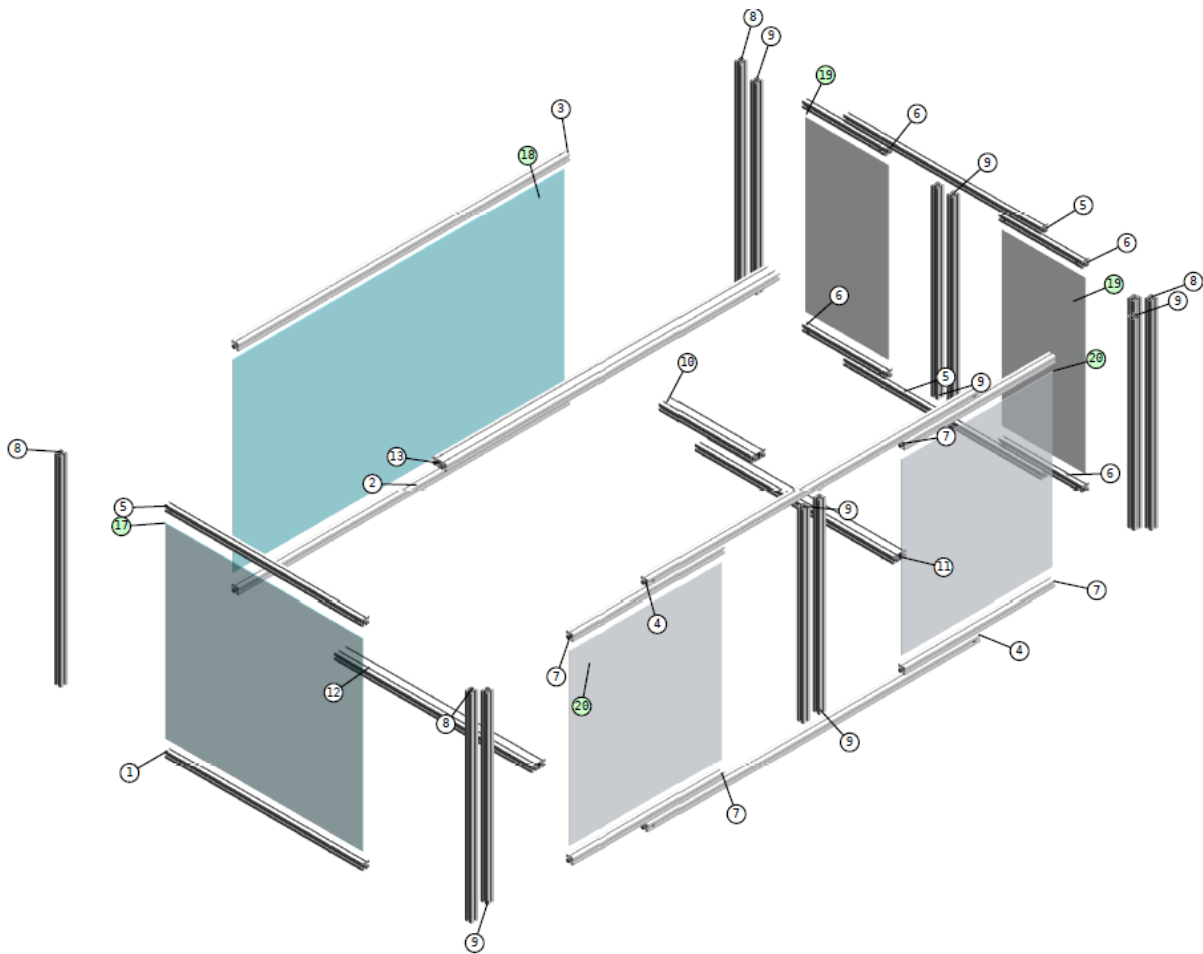


LEFT



TOP

8 APPENDIX 2 - ENCLOSURE COMPONENTS



Pos	Article-No	Description	Related parts	Qty
1	1.11.040040.43LP-AA4AA4/1120	Profile 40x40, 4E, light, plain	1.21.4E0. Connector. universal	2
2	1.11.040040.43LP-AA4AA4/1880	Profile 40x40, 4E, light, plain	1.21.4E0. Connector. universal	2
3	1.11.040040.43LP-AA2AA2/1880	Profile 40x40, 4E, light, plain	1.21.4E0. Connector. universal	2
4	1.11.040040.43LP-AA3AA3/1880	Profile 40x40, 4E, light, plain	1.21.4E0. Connector. universal	4
5	1.11.040040.43LP-AA3AA3/1120	Profile 40x40, 4E, light, plain	1.21.4E0. Connector. universal	6
6	1.11.040040.43LP-AA4AA4/472.5	Profile 40x40, 4E, light, plain	1.21.4E0. Connector. universal	8
7	1.11.040040.43LP-AA4AA4/852.5	Profile 40x40, 4E, light, plain	1.21.4E0. Connector. universal	8
10	1.11.040080.64LP-FB4FB4/520	Profile 40x80, 6E, light, plain	1.21.4E0. Connector. universal	4
11	1.11.040080.64LP-FB2FB2/1120	Profile 40x80, 6E, light, plain	1.21.4E0. Connector. universal	4
12	1.11.040080.64LP-FB4FB4/1120	Profile 40x80, 6E, light, plain	1.21.4E0. Connector. universal	4
13	1.11.040080.64LP-FB4FB4/1880	Profile 40x80, 6E, light, plain	1.21.4E0. Connector. universal	4
17	2.87.045.00	Polycarb 4.5mm	0.63.D06912.04016, Cylindric head screw, DIN 6912 - M4x16	8
18	2.87.045.00	Polycarb 4.5mm	0.63.D07991.04016, Flat head screw, DIN 7991 - M4x16	10
21	1.61.24139	Handle PA, with bore dia: 6.5 L139	1.32.4EM6, T-Nut for subsequent insertion, w. spring E, M6 0.63.D06912.06016, Cylindric head screw, DIN 6912 - M6x16	8 8
22	1.65.2101	Magnetic lock PA	0.63.D06912.06016, Cylindric head screw, DIN 6912 - M6x16	8
23	1.65.2301	Angle bracket for magnetic lock PA	1.32.4EM6, T-Nut for subsequent insertion, w. spring E, M6 0.63.D06912.06014, Cylindric head screw, DIN 6912 - M6x14	8 8
32	1.62.842032085	Aluminium hinge heavy Type 20, PG 40	0.63.D07991.08012, Flat head screw, DIN 7991 - M8x12 1.32.4EM8, T-Nut for subsequent insertion, w. spring E, M8	32 32
33	1.64.2E3M4.1	Mounting block E3, M4, grey	0.63.D06912.04016, Cylindric head screw, DIN 6912 - M4x16 0.63.D07991.08012, Flat head screw, DIN 7991 - M8x12 1.62.842032085, Aluminium hinge heavy Type 20, PG 40 1.64.2x05.1, Distancing plate for mounting block FE, B5, grey 1.32.4EM8, T-Nut for subsequent insertion, w. spring E, M8 0.63.D07991.04016, Flat head screw, DIN 7991 - M4x16	8 32 8 18 32 10