

Step Number	Step Title	Parts list		Tools list		Remarks
		Quantity	Part name	Quantity	Tool name	
01	Bottom Panel	1	Bottom Panel	1	Allen Key 5.0	Do not tighten the screws yet for further alignment.
		8	B-screw M8-10	1	Allen Key 4.0	On the right profile, insert T-nuts M6 and attach it to the Bottom Panel, with the wire duct on top.
		4	B-screw M6-12	1	Ruler	Position the wire duct starting about 70 mm from the front of the machine.
		3	Profile 30-1100			
		1	Wire Duct			
		8	T-nut M8			
		4	T-nut M6			
02	Attach Electronics	2	Motor Driver	1	Allen Key 2.5	All motor drivers should have the switches pointing outwards.
		1	Small Motor Driver	1	Allen Key 3.0	
		1	Logic Power Supply			
		1	Laser Controller			
		4	Plastic Screw M3-8			
		4	Standoff M3 M-F			
		6	C-screw M3-10			
		3	C-screw M4-10			
		1	PCB			
03.1	Inner Right Panel	1	Inner Right Panel	1	Allen Key 3.0	Attach the parts before inserting the panel in the Bottom Panel.
		1	Laser Power Supply			
		1	Motor Power Supply			
		7	C-screw M4-6			
03.2	Y-motor	1	Wire Duct	1	Allen Key 3.0	Fix the pulley on the motor shaft aligning it to the edge, with the setscrews towards the motor side.

Step Number	Step Title	Parts list		Tools list		Remarks
		Quantity	Part name	Quantity	Tool name	
		5	C-screw M4-6	1	Wrench 5.5	Tighten the set screws of the pulley to the flat part of the motor shaft.
		2	Setscrew M4-8			Insert the belt before fixing the motor on the Inner Right Panel.
		1	Y-motor Belt			Fix the wire duct after attaching the motor. They should not be touching each other.
		1	Y-motor Pulley			
		1	Y-motor			
		4	Washer M4			
		4	C-screw M4-45			
		4	Lock Nut M4			
04	Inner Left Panel and Middle Panel	1	Inner Left Panel	1	Allen Key 5.0	
		1	Middle Panel			
		3	Hinge Support			
		6	B-screw M8-25			
05	Laser Panel	1	Laser Panel	1	Allen Key 3.0	
		1	Mirror Holder	1	Allen Key 4.0	
		2	Laser Tube Holder			
		8	C-screw M5-16			
		2	C-screw M4-10			
06	Pistons	2	Piston	1	Wrench 13	

Step Number	Step Title	Parts list		Tools list		Remarks
		Quantity	Part name	Quantity	Tool name	
		2	Piston Support	1	Allen Key 5.0	
		10	Lock Nut M8			
		2	Washer M8			
		6	B-screw M8-35			
		2	B-screw M8-60			
07	Sensor Holders	1	Window Sensor	1	Allen Key 2.5	
		1	Window Sensor Holder	1	Wrench 5.5	
		4	C-screw M3-10			
		2	C-screw M3-12			
		2	Lock Nut M3			
		1	Y-endstop Sensor Holder			
		1	Y-endstop Sensor			
08	Back Panel	1	Back Panel	1	Allen Key 3.0	To fit the panel, move the machine slightly out of the table. Use a rubber hammner if necessary.
		2	Water Connector	1	Allen Key 5.0	
		1	Air Connector	1	Wrench 13	
		1	Chiller Sensor Connector	1	Rubber Hammer	
		1	Power Socket	1	Wrench 19	
		2	C-screw M4-8			
		7	B-screw M8-20			
		1	Exhaust Adaptor			

Step Number	Step Title	Parts list		Tools list		Remarks
		Quantity	Part name	Quantity	Tool name	
		4	B-screw M8-16			
		4	Lock Nut M8			
09.1	Bed Frame	2	Angle Profile	1	Allen Key 5.0	
		2	Profile 40-700			
		4	Washer M8			
		4	T-nut M8			
		4	B-screw M8-16			
		4	B-screw M8-12			
09.2	Bed Legs	4	Bed Leg	1	Wrench 13	
		4	Lock Nut M8			
		4	Bed Adjuster			
09.3	Bed Lamella	27	Angle Profile	1	Paper Cutter or Scissors	The Angle Profiles should be placed with the larger side down.
		1	Double-sided Tape			For the last Angle Profile, place it pointing backwards.
09.4	Inserting the Bed	4	Washer M8 Large			
10	Front Panel	1	Front Panel	1	Allen Key 5.0	After fixing the Front Panel, tighten all the Bottom Panel screws.
		6	T-nut M8			Insert the T-nut in the side of the profiles.
		3	B-screw M8-20			
11	Y-axis Guide	2	Y-linear Shaft	1	Allen Key 6.0	Insert the Y-guide Blocks in the guide before fixing it.
		1	Y-bearing Block Left	1	Wrench 10	Work with 2 people.
		1	Y-bearing Block Right			Insert the Hex Screw in the Y-bearing Block Right.
		4	B-screw M10-20			
		1	Hex Screw M6-12			

Step Number	Step Title	Parts list		Tools list		Remarks
		Quantity	Part name	Quantity	Tool name	
12.1	Y-axis Motion Back 1	5	Bearing Unit	1	Allen Key 6.0	The Bearing units need to be fixed with the setscrews pointing left (right side of the machine looking from the front).
		10	B-screw M10-12			
12.2	Y-axis Motion Back 2	1	Y-shaft 1500	1	Lubricant	For inserting the shaft, the bearings of the Bearing Units can tilt. Use some force and lubricant.
		2	Pulley 26-5M-15	1	Rubber Hammer	Pulleys need to be inserted while inserting the shaft, with setscrews pointing left (right side of the machine looking from the front).
		4	Setscrew			Insert the Pulley 26-5M-09 inside the Y-motor belt (step 3.2) before inserting the shaft.
		1	Pulley 26-5M-09			Start inserting the shaft from the left side of the machine.
12.3	Y-axis Motion Front	4	Bearing Unit	1	Allen Key 6.0	
		2	Pulley 26-5M-15			
		2	Setscrew			
		1	Y-shaft Left 100			
		1	Y-shaft Right 150			
		8	B-screw M10-12			
13.1	Wiring DC	1	Controller Power Cable	1	Screwdriver slotted small	
		1	Motor Driver Power Cable	1	Screwdriver Phillips	
		1	Expansion Driver Power Cable			
		2	Driver Logic Cable			
13.2	Wiring AC	3	Connector 3 slots	1	Screwdriver Phillips	
		1	Connector 2 slots			
		1	Mains Cable			
		1	Emergency Button Cable			

Step Number	Step Title	Parts list		Tools list		Remarks
		Quantity	Part name	Quantity	Tool name	
14.1	Preparing the X-axis 1	1	X-plate	1	Allen Key 4.0	Push the Linear Guide to the outside to align and tighten the screws all at the same time.
		1	Linear Guide			
		20	C-screw M5-14			
14.2	Preparing the X-axis 2	2	C-screw M3-10	1	Allen Key 2.5	Hammer the shaft inside the X-axis Support.
		1	X-shaft	1	Allen Key 5.0	Fix the X-endstop Sensor Holder in the correct position.
		1	X-shaft Pulley	1	Hammer	Do not tighten the Belt Fixers yet.
		2	Setscrew	1	Lubricant	
		4	Belt Fixer			
		8	C-screw M6-16			
		8	Washer M6			
		1	X-endstop Sensor Holder			
14.3	Preparing the X-axis 3	1	Second Mirror Holder	1	Allen Key 4.0	
		1	Mirror Spacer			
		2	C-screw M5-25			
15	Attaching the X-axis	1	Linear Guide Carriage	1	Allen Key 5.0	Insert the Linear Guide carefully, removing the plastic linear guide.
		8	B-screw M8-20			
		1	X-endstop Sensor			
16	Attaching the X-motor	1	X-motor	1	Allen Key 3.0	[1]
		4	B-screw M5-20	1	Wrench 8	[2]
		4	Lock Nut M5			
		1	X-motor Pulley			
		2	Setscrew			

Step Number	Step Title	Parts list		Tools list		Remarks
		Quantity	Part name	Quantity	Tool name	
17	Install LEDs	2	LED strip	1	Allen Key 3.0	The cables of the LED strip should point to the holes in the Inner side panels.
		2	C-wire Fixer			
		4	C-screw M4-10			
		2	U-wire Fixer			
18	Top Profiles	2	Profile 3060-1100	1	Allen Key 6.0	
		6	B-screw M10-20			
		6	T-nut M8			Insert the T-nuts in the profiles
19	Y-belts	2	Y-belt 230 cm	1	Large Pliers	To tighten the Y-belts, loosen the front Bearing Units. Then fix one end of the belt with the Belt Fixer gripping the belt teeth. Pass the belt around the pulley and fix the other end of the belt. Then tighten the Bearing units again to tension the belts.
20	Install Air Pipes	1	Merging Air Pipe			
		1	Pipe Splitter			
		1	Laser Pointer Air Connector			
		1	Laser Pointer Air Tube			
		1	Head Air tube			
21	Install Laser Head	1	Laser Head Support	1	Allen Key 2.5	Pass the Head Air Tube through the X-chain before fixing it.
		1	Laser Head			Fix the chain in the right position. If needed, invert the ending piece.
		8	C-screw M4-12			Fix the chain to the X-axis with cable ties, together with the X-endstop Sensor. Position it under the X-axis.
		1	X-chain			
		3	Countersunk Screw M4-40			
		1	Chain Spacer			

Step Number	Step Title	Parts list		Tools list		Remarks
		Quantity	Part name	Quantity	Tool name	
22	Align X-axis			2	Template or two identical objects	Align the X-axis using the templates as reference to set an equal distance from the Front Panel. Then tighten all the pulley of the Y-axis.
23	Insert X-belt	1	X-belt	1	Allen Key 3.0	After inserting the belt around the pulleys, tighten it by unscrewing the Hex-screw in the Y-bearing Block Right.
		1	X-belt Fixer			
		2	C-screw M4-16			
		2	Washer M4			
24	Installing the Y-chain	1	Y-chain	1	Allen Key 3.0	Make sure the chain has the correct length.
		3	B-screw M5-10	1	Drill with 5 mm bit	Insert the Head Air Tube, the X-endstop Sensor Cable and the X-motor cables in the Y-chain. The segments can be opened with a flat screwdriver.
		2	Lock Nut M5	1	Wrench 8	Drill two holes on top of the Wire Duct cover to fix the bottom end of the Y-chain.
25	Water Pipes	1	Water Tube Inlet Inside			
		1	Water Tube Outlet Inside			
		1	Water Tube Inlet Outside			
		1	Water Tube Outlet Outside			
26	Laser Tube	1	Laser Tube	1	Cutter	Remove the top part of the laser tube holder to insert the laser tube.
		1	Cable Ties			Connect the Water Tube Inlet Inside to the Laser Tube Inlet and the Water Tube Outlet Inside to the Laser Tube Outlet. Fix the connections with Cable Ties.
27.1	Wiring			1	Screwdriver slotted small	
27.2	Cable Management		Cable Ties			
28.1	Sub and Spacer Sides Panels	1	Subpanel Right			
		1	Subpanel Left			
		1	Spacer Panel Right			

Step Number	Step Title	Parts list		Tools list		Remarks
		Quantity	Part name	Quantity	Tool name	
		1	Spacer Panel Left			
28.2	Top Panel	1	Top Panel	1	Screwdriver Phillips	Insert the T-nuts before placing the Top Panel.
		8	T-nut M8			
		1	Emergency Button			
28.3	Sub and Spacer Back Panels	1	Subpanel Back	1	Allen Key 5.0	Fit the Subpanel back and the Spacer Panel Back under the Top Panel with the holes aligned.
		1	Spacer Panel Back	1	Wrench 13	
		3	Hinges			
		6	Countersink Screw M8-35			
		6	Lock Nut M8			
28.4	Subpanel Front	1	Subpanel Front	1	Allen Key 5.0	
		8	B-screw M8-12	1	Wrench 13	
		8	B-screw M8-20			
		8	Lock Nut M8			
29	Fillet Profile	1	Fillet Profile	1	Wrench 13	Fix the Front Panel Holder and the Front Subpanel Holder to the Fillet Profile before fixing it to the Front Panel.
		1	Front Panel Holder	1	Allen Key 5.0	Do not tighten the screws yet for further alignment.
		2	Lock Nut M8	1	Allen Key 2.5	
		2	T-nut M8			
		2	B-screw M8-10			
		2	B-screw M8-20			

Step Number	Step Title	Parts list		Tools list		Remarks
		Quantity	Part name	Quantity	Tool name	
		2	Front Subpanel Holder			
		2	C-screw M3-10			
		2	Washer M3			
		2	T-nut M3			
30	Prepare Window	1	Window	1	Allen Key 4.0	
		2	Squared Profile 995	1	Wrench 10	
		2	Squared Profile 680	1	Allen Key 3.0	
		11	B-screw M6-30	1	Allen Key 2.5	
		11	Lock Nut M6			
		4	Corner Connector			
		2	C-screw M4-35			
		1	Handle			
		1	Window Magnet			
		2	C-screw M3-10			
31	Install Window	1	Prepared Window	1	Allen Key 5.0	
		6	Counter Sync Screw M8-25	1	Allen Key 6.0	
		2	Standoff M8 M-F	1	Wrench 13	
		2	B-screw M8-35			
		6	Washer M8			
		2	Lock Nut M8			
32	Prepare for Calibration	1	Mirror 25	1	Digital Level meter	Semi-tighten the screws of the laser tube holder and first mirror.

Step Number	Step Title	Parts list		Tools list		Remarks
		Quantity	Part name	Quantity	Tool name	
		1	Chiller			Test the water.
		1	Water Flow Sensor Cable			Make sure the tube is parallel to the frame and horizontally levelled.
						Pre-align visually first mirror, second mirror and laser tube.
33	Insert Mirrors	1	Mirror 25			Insert the second mirror only after calibrating the Y-axis.
		1	Mirror 20			Do not touch the surface of the mirrors.
34	Insert Lens	1	Lens			Place it with the flat surface down.
		2	Rubber Ring			Do not touch the surface of the lens.
35	Fix Top Back Panel	1	Laser Pointer Switch	1	Allen Key 2.5	
		1	Laser Pointer Cable			
		1	Top Back Panel			
		8	B-screw M4-8			
36	Insert Side Panels	1	Left Panel	1	Allen Key 5.0	Tighten the screws of the Front Panel Holder and the Front Subpanel Holder.
		1	Right Panel			To fix the Side Panels, insert them in the slot of the Front Panel first.
		6	B-screw M8-12			
		2	B-screw M8-20			