



LECS 4x4 CNC Table

Assembly guide

March 1, 2016

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Lincoln Electric Cutting Systems



Cutting
Systems

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Statement of warranty

30 Day guarantee

If Buyer is not satisfied with the performance of the Goods within 30 days from the date the Goods were shipped from the Seller, Buyer may return the Goods in the original carton(s) for a full refund less Shipping, Handling, Damages and Freight Charges. All sales become final after this 30 day period. Buyer should determine the satisfactory performance of the Goods by using the software, and inspecting and bench running the motors and/or accessory items. Any items to be returned for full refund must be in new, unused (except for bench testing), and saleable condition at the sole determination of the Seller. Items that, in the Seller's judgment, have been used or modified in any way, or kits that have been partially or fully completed will be subject to a restocking fee to be determined by the Seller. A return merchandise authorization number (RMA) must be obtained by the customer prior to any return. Shipments of returned items not marked with a valid RMA will be refused.

Warranty

Electronics and motors are warranted by their manufacturer to the original purchaser for 12 months from the date of Torchmate, Inc.'s sale invoice. Mechanical components are standard industrial parts and are not warranted except by their respective manufacturers. If any of the warranted items are found by Seller to be defective, such Goods will, at Seller's option, be replaced or repaired at Seller's cost. No defective goods are to be returned without written authorization of seller. The sole purpose of the stipulated exclusive remedy shall be to provide the Buyer with free repair and replacement of defective Goods in the manner provided herein. This exclusive remedy shall not be deemed to have failed of its essential purpose so long as the Seller is willing and able to repair or replace defective Goods in the prescribed manner. The foregoing warranty is in lieu of all other warranties, express or implied, including those of merchantability or fitness for any purpose not expressly set forth herein. No affirmation of Seller, by words or action, other than as set forth in this Section shall constitute a warranty. Seller's warranty does not apply to any Goods which have been subjected to misuse, mishandling, misapplication, neglect (including but not limited to improper maintenance), accident, improper installation, modification (including but not limited to use of unauthorized parts or attachments), or adjustment or repair performed by anyone other than Seller or one of Seller's authorized agents. When returning products to Seller packaging must be adequate or all warranty is null and void. Buyer will pay for the cost of Shipping to and from the Seller for all warranty repairs.

Any claim by Buyer with reference to the Goods sold hereunder shall be deemed waived by the Buyer unless submitted in writing to seller within the earlier of (i) thirty (30) days following the date Buyer discovered or by reasonable inspection should have discovered, any claimed breach of foregoing warranty, or (ii) 12 months following the date of shipment. Any cause of action for breach of the foregoing warranty shall be brought within one year from the date the alleged breach was discovered or should have been discovered, whichever occurs first.

Seller's liability (whether under the theories of breach of contract or warranty, negligence, or strict liability) for its Goods shall be limited to repairing or replacing Goods found by Seller to be defective, or at Seller's option, to refunding the purchase price of such Goods or parts thereof.

Limitation of liability

In no event shall seller be liable for consequential damages arising out of or in connection with this agreement, including without limitation, breach of any obligation imposed on seller hereunder. Consequential damages shall include without limitation, loss of use, income or profit, or loss sustained as the result of injury (including death) to any person, or loss of or damage to property (including without limitation property handled or processed by the use of the goods). Buyer shall indemnify seller against all liability, cost or expense which may be sustained by seller on account of any such loss, damage, or injury.

Disclaimer of consequential damages

Upon buyer's receipt of shipment, Buyer shall immediately inspect the Goods. Unless Buyer provides Seller with written notice of any claim for shortage, overcharge, or damage of Goods within ten (10) days from invoice date, such Goods shall be deemed finally inspected, checked and accepted by Buyer and no allowances shall be made thereafter. In absence of shipping and packaging instructions, Seller shall use its own discretion in the choice of carrier and method of packing. Seller shall not be responsible for insuring shipments unless specifically requested by Buyer and any insurance or special packaging so requested shall be at Buyer's expense and valuation.

Acceptance and transportation

Title to any Goods sold and risk of loss of such Goods passes to Buyer upon delivery by Seller to carrier and any claims for losses or damages shall be made by Buyer directly with carrier.

Title and risk of loss

- A. In addition to the rights and remedies conferred upon Seller by law, Seller shall not be required to proceed with the performance of any order or contract if the Buyer is in default in the performance of any order or contract with Seller, and in case of doubt as to Buyer's financial responsibility, shipments under this order may be suspended.
- B. No delay or omission by Seller in exercising any right or remedy provided for herein shall constitute a waiver of such right or remedy and shall not be constituted as a bar to or a waiver of any such right or remedy on any future occasion.
- C. The sale of Goods shall be governed by the laws of the State of Maryland. Seller agrees to comply with all applicable laws of the United States.

General conditions

The invalidity or unenforceability of any one or more phrases, sentences, or sections shall not affect the validity or enforceability of the remaining portions of this Agreement.

Severability

Safety First

Torchmate and Lincoln Electric Cutting Systems equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation ... and thoughtful operation on your part.

WARNING

DO NOT INSTALL, OPERATE, OR REPAIR THIS EQUIPMENT WITHOUT READING THE SAFETY WARNINGS CONTAINED THROUGHOUT THIS MANUAL.

Think before you act— and be careful.

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH.

KEEP CHILDREN AWAY.

IF YOU WEAR A PACEMAKER, YOU SHOULD CONSULT WITH YOUR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting - ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE, AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS

ELECTRIC SHOCK can kill.

- The electrode and work (or ground) circuits are electrically "hot" when the power source is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
- Disconnect the power source before performing any service or repairs. When the power source is operating, voltages in excess of 250 volts are produced. This creates the potential for serious electrical shock - possibly even fatal.
- Insulate yourself from work and ground using dry insulation. Wear dry gloves and clothing. Take extra care when the work place is moist or damp.
- Always be sure the work cable makes a good electrical connection with the metal being cut or gouged. The connection should be as close as possible to the area being cut or gouged.
- Ground the work or metal to be cut or gouged to a good electrical (earth) ground.
- Maintain the plasma torch, cable and work clamp in good, safe operating condition. Repair or replace all worn or damaged parts. Replace damaged insulation.
- Never dip the torch in water for cooling or plasma cut or gouge in or under water.
- When working above floor level, protect yourself from a fall should you get a shock.
- Operate the pilot arc with caution. The pilot arc is capable of burning the operator, others or even piercing safety clothing.

ARC RAYS can burn.

- Plasma Arc Rays can injure your eyes and burn your skin. The plasma arc process produces very bright ultraviolet and infrared rays. These will damage your eyes and burn your skin if you are not properly protected.
- Use safety glasses and a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when performing or observing plasma arc cutting or gouging. Glasses, head-shield, and filter lens should conform to ANSI Z87.1 standards.
- Use suitable clothing including gloves made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- Protect other nearby personnel with suitable non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.

Arc Current	Minimum Shade No.	Suggested Shade No.
Less than 20A	4	4
20A-40A	5	5
40A-60A	6	6
60A-300A	8	9
300A-400A	9	12
400A-800A	10	14

FUMES AND GASES can be dangerous.

- Plasma cutting or gouging may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When cutting or gouging, keep your head out of the fumes. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone.
- Use an air-supplied respirator if ventilation is not adequate to remove all fumes and gases.
- When plasma cutting or gouging on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required.
- Additional precautions are also required when cutting (zinc) galvanized steel or materials containing or coated with any of the following:

Antimony	Beryllium	Cobalt	Manganese	Selenium
Arsenic	Cadmium	Copper	Mercury	Silver
Barium	Chromium	Lead	Nickel	Vanadium

- The operation of plasma cutting or gouging fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment, and the specific procedure and application involved. Worker exposure levels should be checked upon installation and periodically thereafter to be certain levels are within applicable OSHA PEL and ACGIH TLV limits. For information on how to test for fumes and gases in your work place, refer to publications section of this manual.
- Do not use plasma cutting or gouging equipment in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products. Remove all sources of these vapors.
- Gases used for plasma cutting and gouging can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- Read and understand the manufacturer’s instructions for this equipment and follow your employer’s safety practices.
- This product, when used for cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects
- Some dust created by routing, sawing, grinding, drilling, and other construction activities contains chemicals known to cause cancer, birth defects or other reproductive harm. Avoid prolonged contact with this dust. Wear protective clothing and wash exposed areas with soap and water. Allowing dust to get into your mouth, eyes, or lay on the skin may promote absorption of harmful chemicals.

Some examples of these chemicals are:

Lead from lead-based paint.

Crystalline silica from bricks and cement and other masonry products.

Arsenic and chromium from chemically-treated lumber (CCA).

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles.

Cutting flame and sparks can cause FIRE OR EXPLOSION.

- Fire and explosion can be caused by hot slag, sparks, oxygen fueled cutting flame, or the plasma arc.
- Have a fire extinguisher readily available. Provide a fire watch when working in an area where fire hazards may exist.
- When not cutting or gouging, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.
- Be sure there are no combustible or flammable materials in the workplace. Any material that cannot be removed must be protected.
- Sparks and hot materials from cutting or gouging can easily go through small cracks and openings to adjacent areas.
- Avoid cutting or gouging near hydraulic lines.
- Do not cut or gouge tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned." For information purchase "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances", AWS F4.1 from the American Welding Society (see address above).
- Vent hollow castings or containers before heating, cutting or gouging. They may explode.
- Do not add fuel to engine driven equipment near an area where plasma cutting or gouging is being done.
- Connect the work cable to the work as close to the cutting or gouging area as practical. Work cables connected to the building framework or other locations away from the cutting or gouging area increase the possibility of the current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.
- Hydrogen gas may be formed and trapped under aluminum work pieces when they are cut underwater or while using a water table. DO NOT cut aluminum alloys underwater or on a water table unless the hydrogen gas can be eliminated or dissipated. Trapped hydrogen gas that is ignited will cause an explosion.
- Read and follow NFPA 51B "Standard for Prevention During Welding, Cutting and Other Hot Work", available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, Ma 022690-9101.

CYLINDER may EXPLODE if damaged.

- Use only compressed gas cylinders containing the correct gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.
- Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- Cylinders should be located: · Away from areas where they may be struck or subjected to physical damage. · A safe distance from plasma cutting or gouging, arc welding operations and any other source of heat, sparks, or flame.
- Never allow any part of the electrode, torch or any other electrically "hot" parts to touch a cylinder.
- Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.
- Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association 1235 Jefferson Davis Highway, Arlington, VA 22202.

FOR ELECTRICALLY powered equipment.

- Turn off input power using the disconnect switch at the fuse box before working on the equipment.
- Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer's recommendations.
- Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer's recommendations.

PLASMA ARC can injure.

- Keep your body away from nozzle and plasma arc.
- Operate the pilot arc with caution. The pilot arc is capable of burning the operator, others or even piercing safety clothing.

ELECTRIC AND MAGNETIC FIELDS may be dangerous

- Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Cutting or gouging current creates EMF fields around torch cables and cutting machines.
- EMF fields may interfere with some pacemakers, so operators having a pacemaker should consult their physician before cutting or gouging.
- Exposure to EMF fields during cutting or gouging may have other health effects which are now not known.
- All operators should use the following procedures in order to minimize exposure to EMF fields from the cutting or gouging circuit:
 - Route the torch and work cables together - Secure them with tape when possible.
 - Never coil the torch cable around your body.
 - Do not place your body between the torch and work cables. If the torch cable is on your right side, the work cable should also be on your right side.
 - Connect the work cable to the workpiece as close as possible to the area being cut or gouged.
 - Do not work next to cutting power source.

**For Lincoln Electric Cutting Systems Technical Support
Please call 775-673-2200 Monday-Friday 7:00-4:00 PST.**

Parts checklist

The parts included in your LECS 4x4 CNC Cutting System shipment are listed here in the order you will assemble them. To make it easier to complete the assembly of your cutting system, lay out the received parts in this order as you check them against this list.

Cutting Table Parts

☑	Qty.	Part	Description	Part Number	Step
	1		GS 4' Side Set, Assembled (1 set = left and right),	TMS-180-1000-05	1
	2		Aluminum cross-member - 4' wide GS	TMS-180-0002-09	2
	1		GS 4' Gantry, Assembled	TMS-180-1000-03	3
	2		Set of cable carrier end brackets	TMS-105-0002-20	8 & 10
	1		Set of cable carrier brackets	TMS-180-0002-07	9
	10		Screw, FSCS, 10-32 x 7/8"	TMS-410-0111-14	10
	73		Mini Cable Carrier Links	TMS-105-0002-19	11
	1		Compact CNC Controller Accumove 2	BK1250-200000	12
	1		Crossover Ethernet cable	TMS-103-5000-07	
	1		24V 6.67A DC power supply, Accumove2	TMS-400-0003-02	
	1		AC power cable	TMS-402-0069-01	
	4		Cable, motor, XLR / Molex, 25 ft	TMS-402-0010-01	13
	1		USB flash drive: Driver software and owners manuals.	TMS-100-1000-01	14
	4		99R6 Ball bearings	TMS-432-0010-01	17

☑	Qty.	Part	Description	Part Number	Step
	2		GS water table side 31"	TMS-180-0001-05	1-wt
	2		GS water table side 33.75"	TMS-180-0001-07	1-wt
	2		GS water table side 25"	TMS-180-0001-09	1-wt
	2		GS water table side 22"	TMS-180-0001-08	
	4		GS water table leg—corner leg	TMS-180-0001-28	2-wt
	4		GS water table leg—side leg	TMS-180-0001-29	2-wt
	1		GS water table leg—center leg	TMS-180-0001-30	2-wt
	9		$\frac{3}{8}$ "-16 stud, leveling foot	TMS-448-0001-01	2-wt
	1		GS water table cross member—30 (medium)	TMS-180-0005-01	7-wt
	1		GS water table cross member—24.75 (short)	TMS-180-0005-02	7-wt
	1		GS water table cross member—57.625 (long)	TMS-180-0005-03	7-wt
	1		GS WATER PAN A - 4 X 4 WITH DRAIN FITTING	TMS-180-0001-64	8-wt
	1		GS water pan B - 4 x 4	TMS-180-0001-73	8-wt
	1		Growth Series Silicone Sealant, tube	TMS-180-1001-01	8-wt & 9-wt
	1		TFP-AR small table $\frac{3}{4}$ plumbing (water release valve)	TMS-459-0010-01	10-wt
N.A.	28		Slats—27 $\frac{1}{2}$ " X (3" to 4") X $\frac{3}{16}$ "	Customer supplied (you will cut these)	11-wt

Parts checklist (continued)











Hardware Pack Table Kit TMS-180-0151-01

5	TMS-414-0201-18	Jam Nut, nylock, 3/8-16
5	TMS410-0218-16	Screw BSCS 3/8-16 x 1.0 hex drive
5	TMS-410-0017-20	Screw SCS 5/25 x 3/4 hex drive
5	TMS-410-0318-08	Screw BSCS 3/8-16x 1/2 hex drive
18	TMS-413-0406-18	Flat Washer 3/8
14	TMS-414-3101-16	T-nut 5/16-18
18	TMS-410-5016-10	Screw Flanged 5/16-18 x 5/8
5	TMS-432-0010-01	99R6 Ball Bearing
9	TMS410-0511-08	Screw BSCS #10-32 x 1/2 hex drive
16	TMS-414-0201-11	Nut Nylock #10-32 x 1/2
16	TMS-413-0001-10	Flat Washer #10
9	TMS-410-0111-14	Screw FSCS #10-32 x 7/8 hex drive
5	TMS-410-0016-12	Screw SCS 5/16-18 x 3/4 hex drive
12	TMS-410-0216-16	Screw BSCS 5/16-18 x 1 hex drive
7	TMS-413-0001-16	Flat Washer 5/16
7	TMS-414-0701-16	Nut Nylock 5/16-18
5	TMS-429-0011-01	Screw SCS M6 x 1.0 x 25MM
10	TMS-410-0208-16	#8-32 x 3/8 button socket cap
8	TMS-414-0201-10	#8-32 nut nylock

Hardware Pack Water Table Kit TMS-180-0152-01

5	TMS-410-0218-16	Screw BSCS 3/8-16 x 1.0 hex drive
38	TMS-412-1116-08	Screw Serrated hex cap
26	TMS-410-0511-08	Screw BSCS #10-32 X1/2 hex drive
5	TMS-413-0001-18	Flat Washer 3/8
26	TMS-414-0201-11	Nut Nylock #10-32
38	TMS-414-0701-16	Nut Nylock Flange 5/16-18
51	TMS-410-5016-10	Screw BSCS Flanged 5/16-18 x 5/8

Additional required equipment and tools

☑	Qty.	Part	Description	Part Number	Step
	1		$\frac{3}{8}$ " wrench	[separate purchase]	9, 10, 1-wt, 2-wt
	1		$\frac{1}{2}$ " wrench	[separate purchase]	3-wt, 4-wt, 5-wt, 6-wt, 8-wt, 9-wt
	1		$\frac{9}{16}$ " wrench	[separate purchase]	17
	1		$\frac{5}{32}$ " hex key	[separate purchase]	12-wt
	1		$\frac{3}{16}$ " hex key	[separate purchase]	1, 3-wt, 4-wt, 5-wt, 6-wt, 8-wt, 9-wt
	1		$\frac{7}{32}$ " hex key	[separate purchase]	7, 17
	1		$\frac{1}{8}$ " hex key	[separate purchase]	9, 10, 1-wt
	1		Laptop or PC with Microsoft Windows 8, Windows 7, Vista, or XP	[separate purchase]	12, 14, & 15
	1		Battery power for computer (Uninterruptible power supply or UPS) –with surge protection [recommended]	[separate recommended purchase]	12, 14, & 15
	1		PTFE thread-sealing tape	[separate purchase]	10-wt

Toll Free: 1-866-571-1066
 International: 775-673-2200
 Fax: 775-673-2206
 Email: support@torchmate.com
 Live Chat Torchmate.com
 Web Community
Fabricationforum.com

Assemble the cutting table

In the following steps, you will assemble the LECS 4x4 CNC Cutting System table. It precisely controls the motion of the torch or other tools. Fourteen steps are required. If you purchased the water table, you will find the instructions for assembling the water table and mounting the cutting table on it following this section.

Basic assembly steps

Please Note: your LECS 4x4 water table is no longer supplied with Torchmate branded side panels. Some images in this manual may not represent your product. Lincoln Electric Cutting Systems reserves the right to make changes to the production of products.

- The cutting table is assembled in a series of easy steps.
 - Step 1: Prepare the table sides
 - Step 2: Assemble the table frame
 - Step 3: Install the gantry
 - Step 4: Check / adjust vertical bearings
 - Step 5: Adjust the first cross-member
 - Step 6: Adjust the second cross-member
 - Step 7: Link the gantry to the drive screws
 - Step 8: Install first male cable carrier bracket
 - Step 9: Install cable carrier support brackets
 - Step 10: Install remaining cable carrier end brackets
 - Step 11: Install cable carrier links
 - Step 12: Run the USB cable
 - Step 13: Run motor cables
 - Step 14: Install Driver software
 - Step 15: Load Driver configuration
 - Step 16: Jog gantry to set side bearings
 - Step 17: Add underside roller bearings
 - Step 18-: Test-jog gantry at high speed
- Depending on the tools purchased, there will be additional tool-mounting and configuration steps.



175 lbs
80 kg



- The completed CNC cutting table is sturdy and heavy-duty, so that it can precisely and accurately move the torch, support your material, and support the weight of the water in the water table reservoir.
- After being removed from the crate, the combined weight is 450 lbs (204 kg), before adding water.
- Whether full or empty of water, don't drag the cutting table when moving it to a new location.
 - Avoid damage to the CNC cutting table / water table and avoid getting it out of square by not dragging it.
- Don't try to move the cutting table without help. When you must re-position the CNC cutting table / water table or move it to a new location, drain all the water and use the proper equipment to carefully lift it.

Weight of completed
CNC cutting table

450 lbs
204 kg


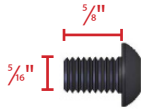



Weight of the
completed CNC
cutting table with
optional water table

Step 1: Prepare table sides

The sides of your LECS 4x4 CNC Cutting System are pre-assembled with a drive-screw, motor, and steel rails. The cross-members are extruded aluminum channels which are held to the sides with T-nuts. Here you will prepare sides by adding the T-nuts. In the next step you will add the cross-members.

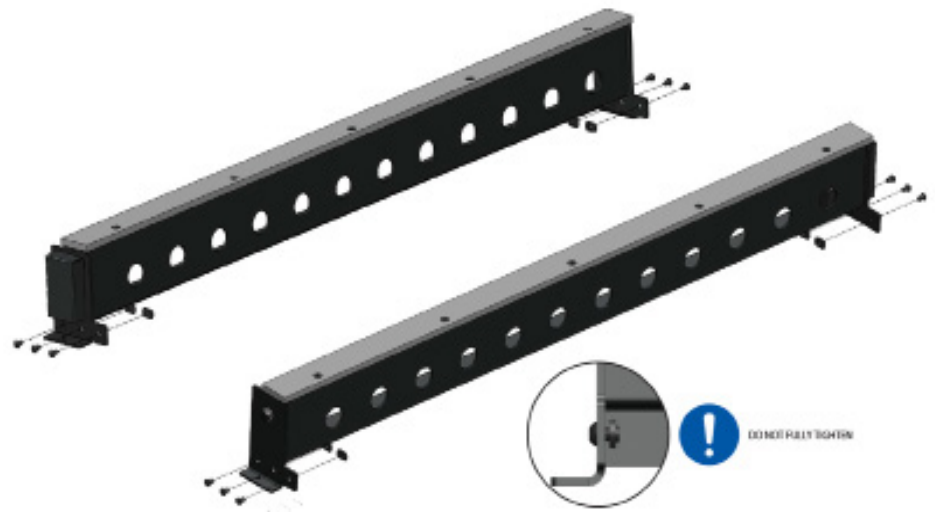
Required parts / components

Qty	Part	Description	Part #
1		GS 4' side set, assembled, (L / R set)	TMS-180-1000-05
12		Screw, BSCS $\frac{5}{16}$ "-18 X $\frac{5}{8}$ " (T-bolt)	TMS-410-0216-14
12		T-nut, $\frac{5}{16}$ "-18, steel, black-plated	TMS-414-3101-16

Instructions



- On each end of each pre-assembled side, insert three $\frac{5}{16}$ "-18 X $\frac{5}{8}$ " button head screws through the holes from the outside.
- Fasten a $\frac{5}{16}$ "-18 T-nut to each screw.
- Leave the nuts loose on the screws.
- The T-nuts should be positioned so that the flanges (raised portions) face away from the screws.
- Do not fully tighten the screws.

Illustration



Step 2: Assemble table frame

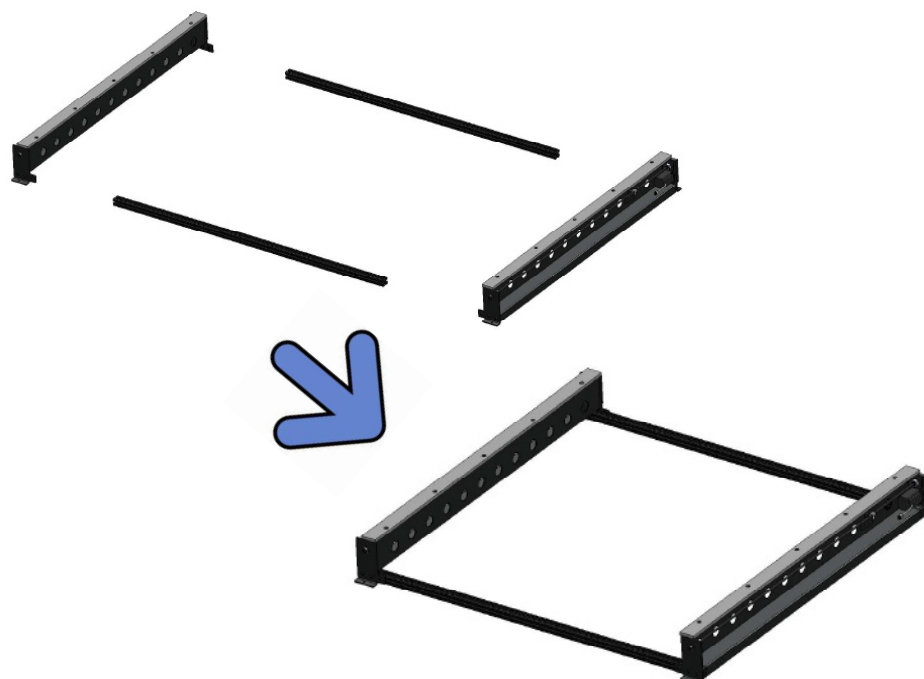
The LECS 4x4 CNC Cutting System table uses extruded aluminum cross-members attached to the sides with T-nuts. Here you will create the initial linking of the sides with the cross-members. The final adjustment for squareness is completed at a later step.

Qty	Part	Description	Part #
2		1515 lite aluminum extrusion cross-member 59.25	TMS-511-1515-02
2		Assembled table side components	From Step 1

Required parts / components

- Perform this assembly on a flat, level surface.
- Slide the cross-members onto the T-nuts on the pre-assembled sides. There are channels in the extruded aluminum cross members for the T-nuts to slide into.
 - When the T-nuts are tightened, they will hold table securely.
 - The T-nuts will be adjusted and fully tightened later, so for now, tighten them only lightly.
- Attach both cross members to one side, then slide the other side on and lightly tighten.

Instructions





Illustration

Step 3: Install the gantry

Like the sides of the LECS 4x4 CNC Cutting System table, the full gantry is pre-assembled with a drive-screw, motor, and steel rail. It also has a multi-bearing cassette and a tool-mounting plate. In this step, you will set the gantry on the side rails.

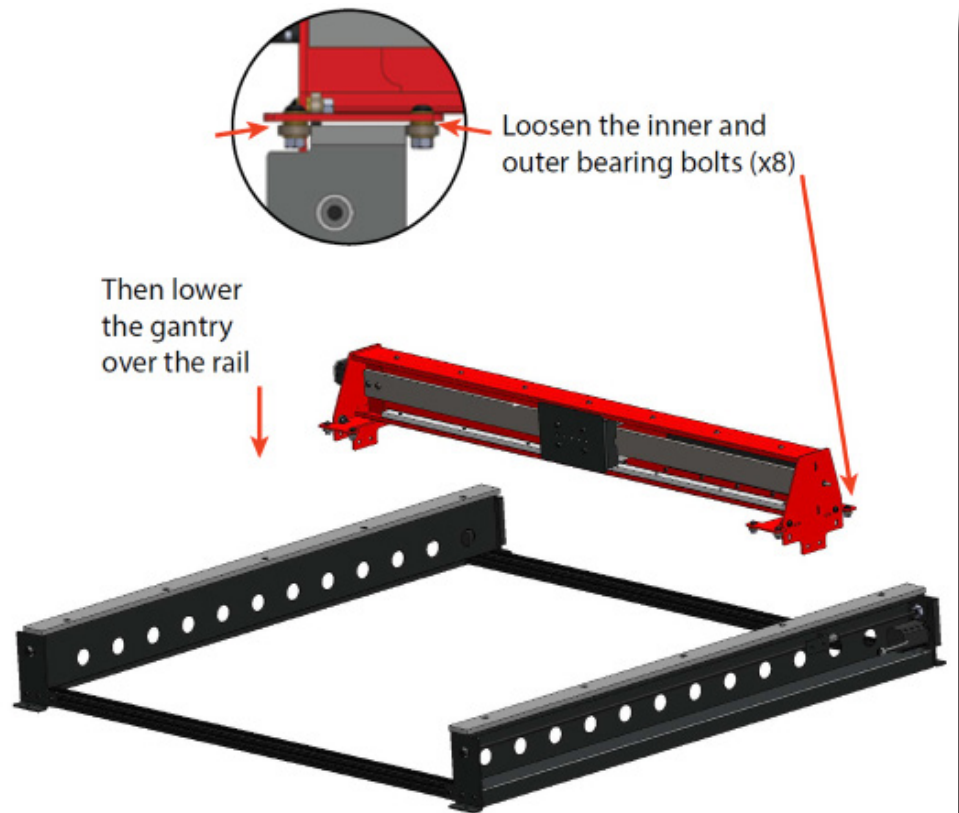
Required parts / components

Qty	Part	Description	Part #
1		Assembled gantry	TMS-180-1000-03
1		Assembled side components	From Step 2

Instructions


- Loosen the inner and outer bearings so that they can be moved outward to give clearance for the rail.
- Set the gantry onto the sides over the rails. Make sure the vertical bearings are taking the weight of the gantry and that it is free to move.
 - Ensure that the gantry's tool-mounting plate faces away from the motors on the end of the two sides.

Illustration



Step 4: Check / adjust vertical bearings

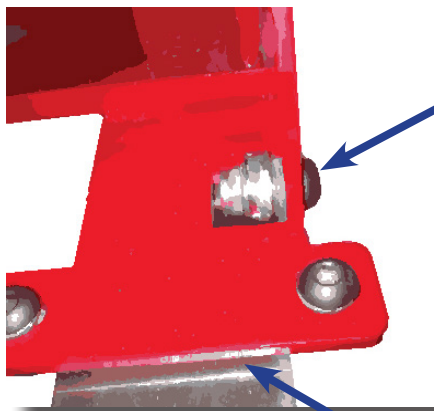
The smooth motion of the LECS 4x4 CNC Cutting System gantry is managed by the four vertical bearings that carry the gantry's weight. In this step you check the gantry's clearance above the side rails and adjust its height, if necessary, by moving the vertical bearings.

Qty	Part	Description	Part #
1		Assembled cutting table	From Step 3

Required parts /
components

- Measure the front and back clearances between each gantry end and the rails (four total measurements).
 - A clearance of approximately $\frac{1}{8}$ " is desired.
 - Hint: The thickness of a new penny and a new dime (0.114 in.) or two new pennies (0.122 in.) is a good beginning clearance.
- Loosen and adjust each vertical bearing, as necessary, to achieve an equal clearance of approximately $\frac{1}{8}$ " at each location.
- Tighten the vertical bearings fully.
 - Note: the vertical bearings may require further adjustment in a later step.

Instructions



Loosen this bolt to adjust
the bearing height


Measure here to get the
clearance

Illustration

Step 5: Adjust the first cross-member

With the gantry positioned on your LECS 4x4 CNC Cutting System table, you can now begin to adjust the table's squareness and begin to tighten the cross-members. Squaring is essential for smooth and accurate gantry operation.

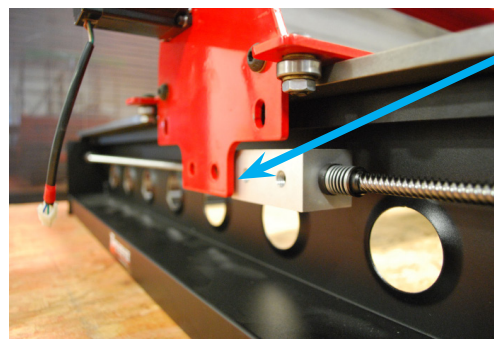
Required parts / components

Qty	Part	Description	Part #
1		Assembled cutting table	From Step 4

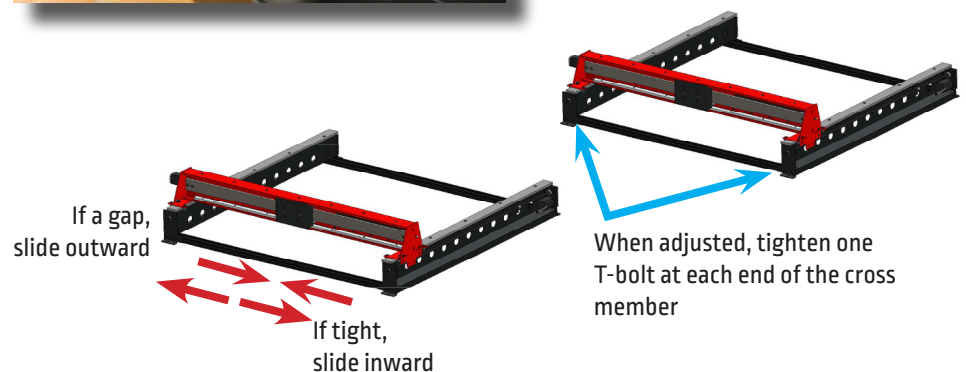
Instructions

- Slide the gantry to one end of the table, until it reaches the stops.
- On each side rail, rotate the drive screw to move the aluminum brackets. Align the bracket holes horizontally with the gantry holes.
- If there is a gap between the bracket and the gantry, slide the sides outward in the cross-member channel until the gantry and bracket just touch with no pressure.
- If there is tightness between the bracket and the gantry, slide the sides inward in the cross-member channel until the gantry and bracket just touch with no pressure.
- Tighten one of the T-bolts on each end of the adjusted cross-member.

Illustration





With the gantry at its stop and the bracket holes aligned with the gantry holes, check for a gap or for tightness. They should just touch on both sides, with no pressure.



Step 6: Adjust the second cross-member

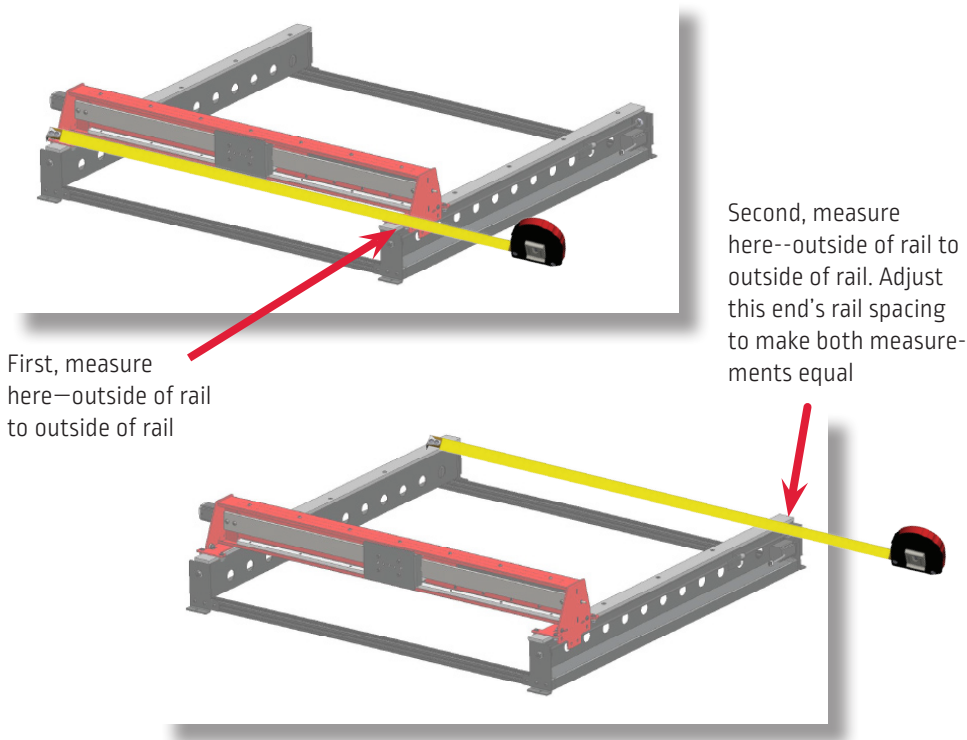
With the gantry secured to your LECS 4x4 CNC Cutting System table, you can now adjust the table's squareness and securely tighten the cross-members. When squared, the gantry will operate smoothly and accurately.

Qty	Part	Description	Part #
1		Assembled cutting table	From Step 5
1		Tape measure	(From your tool-box)

Required parts / components

Instructions

- Measure the distance between the outside edges of the rails at the gantry end.
- Measure the distance between the outside edges of the rails at the other (non-gantry) end.
- Adjust side rails in the cross-members at the other (non-gantry) end to make both measurements the same.
- Re-check the measurements, and make diagonal (corner to corner) measurements to ensure the table is square.
- Tighten all T-bolts on both cross-members.





Illustration

Step 7: Link the gantry to the drive screws

Your LECS 4x4 CNC Cutting System achieves accuracy and precision in cutting complex shapes because it uses anti-backlash nuts, which minimize backlash (play) on its drive screws. Here you will attach the gantry to the side rail drive screw brackets.

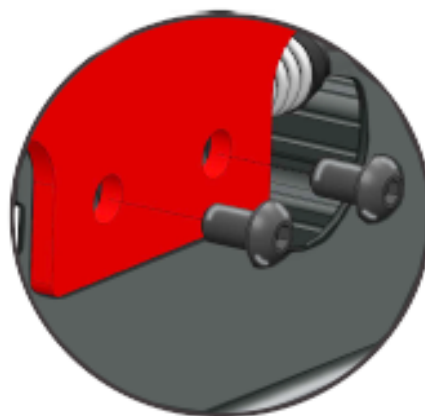
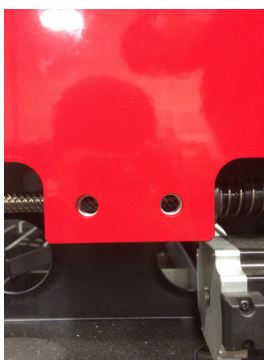
Required parts / components

Qty	Part	Description	Part #
1		Squared cutting table	From Step 6
4		Screw, BSCS, $\frac{3}{8}$ "-16 X $\frac{1}{2}$ "	TMS-410-0318-08

Instructions

- Check that you can bolt the gantry to the aluminum bracket without applying vertical force.
 - If the holes do not align vertically, adjust the gantry clearance by re-positioning the vertical bearings.
 - The bearings should support the entire weight of the gantry, leaving the drive screw free to rotate without any binding.
- Attach the gantry to the aluminum anti-backlash drive screw brackets on both sides of the table using button head screws.
- Fully tighten the screws to secure the gantry to the table.
- Note: With the gantry linked to the drive screws, only move the gantry using software jogging or programmed motor control. Don't try to move the gantry by hand.



Illustration



Use button head screws to attach the gantry to the spring-loaded, anti-backlash nut.

Step 8: Install first male cable carrier bracket

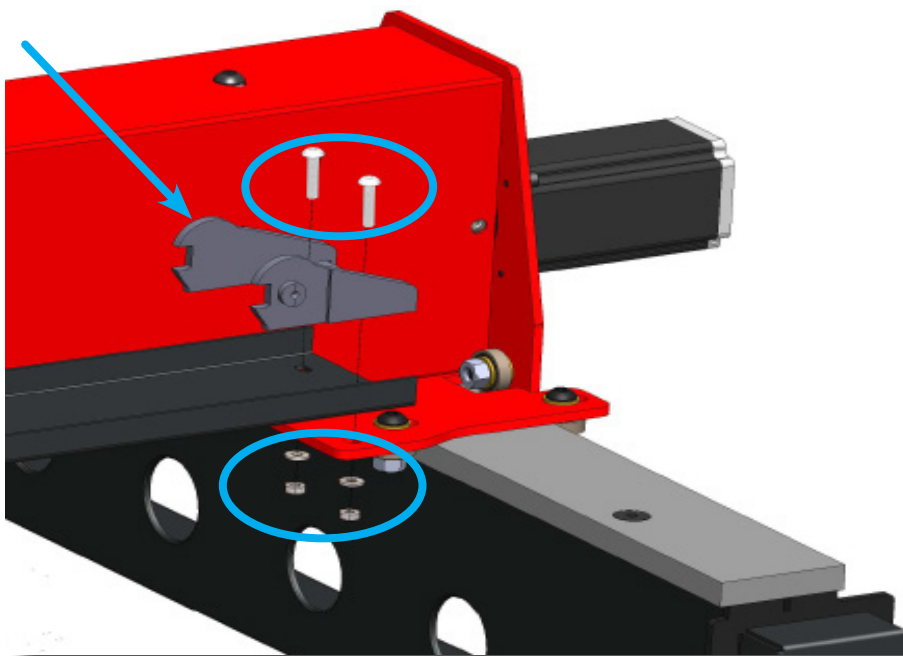
The LECS 4x4 CNC Cutting System includes a "cable carrier" cable management system, which consists of: 1) a number of links that can be opened to insert the cables and 2) a male / female pair of end bracket links at the ends that attach to the table components. Here we will attach the first of the end brackets.

Qty	Part	Description	Part #
1		Set of cable carrier end brackets (only the male bracket is used in this step)	TMS-105-0002-20
1		Cutting table with linked gantry	From Step 7

Required parts / components

- The cable carrier tray is pre-installed on the gantry
- Remove the nuts and washers from the bolts holding the tray at the motor end of the gantry
- Position the male cable carrier end bracket (the male half of the set) over the tray mounting holes and replace the bolts, washers, and nuts.
- Tighten securely.

Instructions

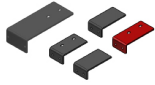







Remove the nuts and washers from the bolts, add the male bracket, and replace the nuts and washers on the bolts

Step 9: Install cable carrier support brackets

The LECS 4x4 includes a cable carrier system that uses two lengths to manage cables along the rail and along the gantry. A tray supports the carrier along the gantry and support brackets, mounted in this step, support the carrier along the rails, at the end of the gantry, and on the tool mounting plate.

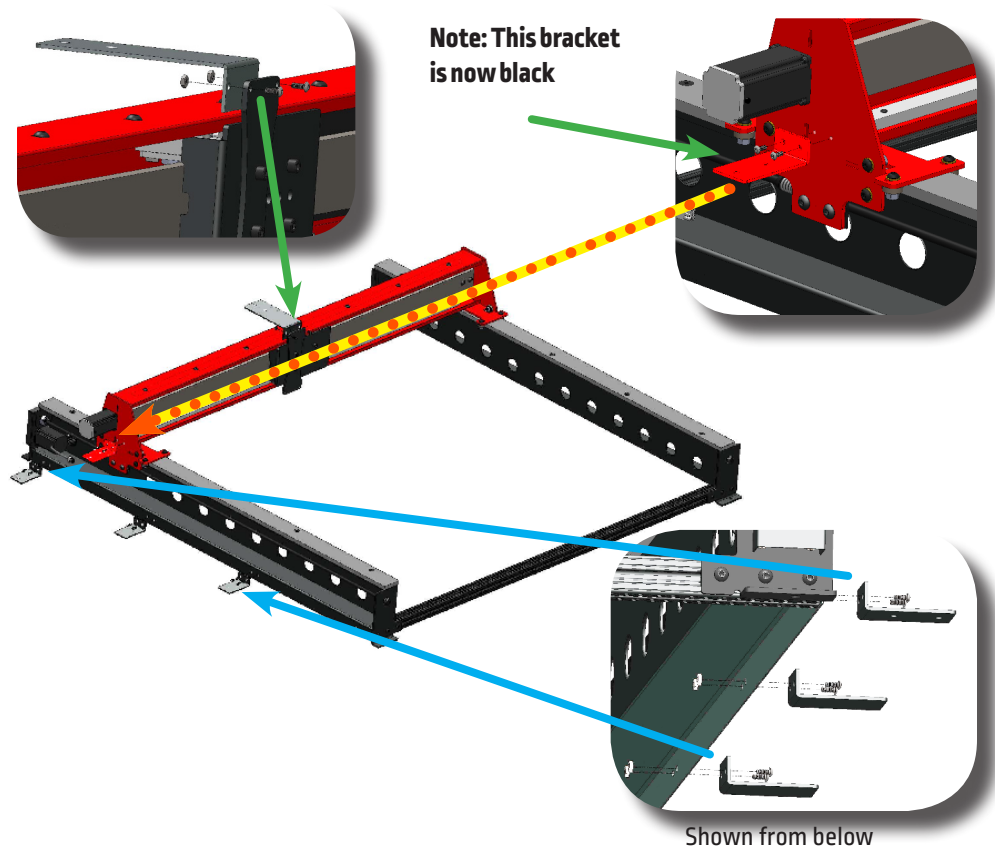
Required parts / components

Qty	Part	Description	Part #
1		Set of cable carrier brackets Note: All Brackets are Black	TMS-180-0002-07
8		Screw, BSCS, 10-32 x 1/2"	TMS-410-0511-08
2		Screw, BSCS, #8-32 X 3/8	TMS-410-0208-16
6		Washer, flat, #10, steel, zinc-plated	TMS-413-0001-10
8		Nut, Nylock, 10-32, steel, zinc-plated	TMS-414-0201-11
1		Cutting table with cable carrier end bracket on tray	From Step 8

Instructions






- Use the screws, washers, and nuts (except at the end of the gantry, where you use the threaded holes instead of nuts and washers) to attach the cable carrier support brackets to the rails (x3), the gantry end (x1), and the tool mounting plate(x1).

Mount: (1) the large cable carrier on the tool mounting plate, (2) the red bracket on the gantry end's threaded holes, and (3) the small bracket with holes nearest the motor along the rail. (4) Mount the remaining two support brackets along the rail.



Step 10: Install remaining cable carrier end brackets

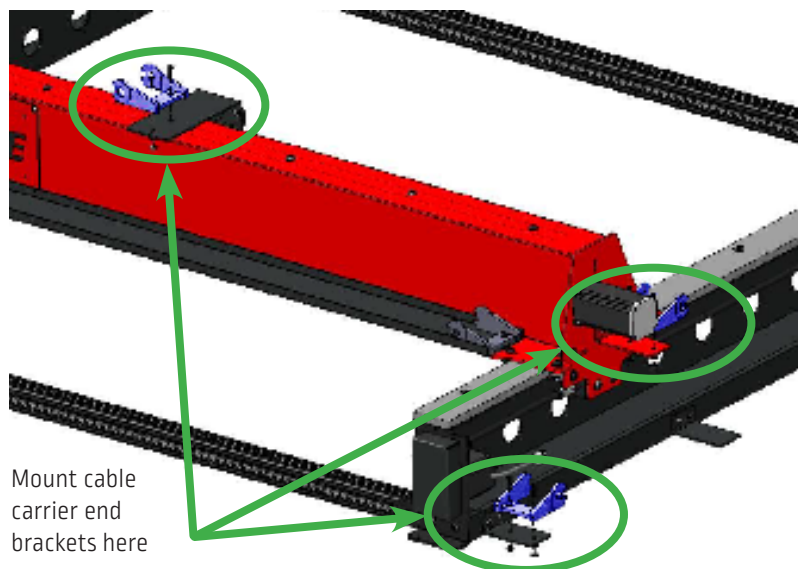
The cable carrier has two sections of links that attach to the table by means of end brackets. These end brackets are similar to regular cable carrier links in the way they snap together, but they are also bolted to the support brackets installed in Step 9.

Qty	Part	Description	Part #
2		Set of CC end brackets (one male bracket from one set was used in Step 8)	TMS-105-0002-20
6		Screw, FSCS, 10-32 x 7/8"	TMS-410-0111-14
6		Washer, flat, #10, steel, zinc-plated	TMS-413-0001-10
6		Nut, Nylock, 10-32, steel, zinc-plated	TMS-414-0201-11
1		Cutting table with support brackets	From Step 9

Required parts / components

- Install the remaining 3 cable carrier end brackets onto the cable carrier support brackets, securing them with screws, washers, and locking nuts.
- The end brackets open ends should face the same direction, as illustrated, These will be used to attach the cable carrier links in the next step.



Instructions



Mount the cable carrier end brackets so that a male and female bracket are on each of the two runs, facing the same direction

Step 11: Install cable carrier links

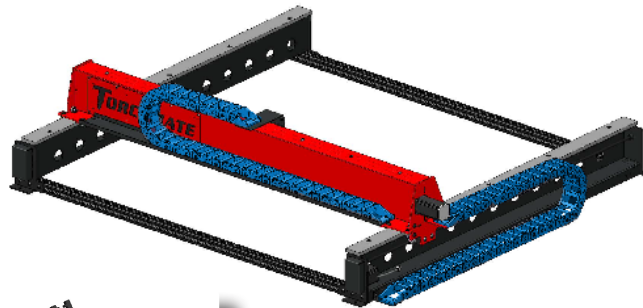
The LECS 4x4 cutting table includes two sections of snap-together links. They similarly snap to the end brackets installed in Steps 8 and 10. The lines can be popped open with a screwdriver (from either side) so that the motor-control and other cables can be put inside the carrier. We recommend the plasma torch cable be tied to the side.

Qty	Part	Description	Part #
73		Mini cable carrier links (10.84 feet)	TMS-105-0002-19
1		Cutting table with CC end brackets	From Step 10

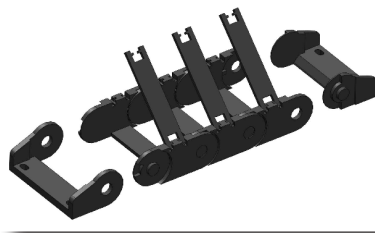
Instructions

- The cable carrier links snap together. You may find it easier to open the links, set the cables inside, and close the links before attaching the chain to the table.
- Snap a 38 link chain to the side, resting it on the support brackets
- Snap a 35 link chain to the gantry, resting it on the tray
- Keep the motor (and other signal) cables as far away from the torch cable as possible. Tying the torch cable to the outside of the carriers is advised. Tie-zips are not included.

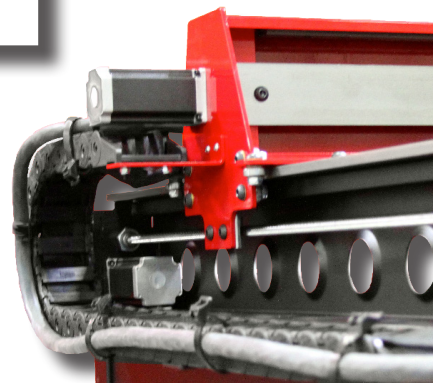
The links lie as a chain along the gantry tray and along the rail brackets.



Snap the links open to set the cables, then snap the links to the end brackets



Electromagnetic interference (EMI) is reduced by separating the power and control cables. Tying the torch lead to the outside of the carrier links helps.







Assemble the 4x4 water table

In the following steps, you will assemble the water table. The water table supports the CNC cutting table, supports the workpiece being cut, and safely eliminates nearly all of the sparks, dust, and smoke during cutting. Nine steps are required to complete the water table assembly.

- Assembly steps
- The 4x4 water table is assembled in a series of easy steps:
 - Step 1-wt: Add a leveling foot to each leg
 - Step 2-wt: Attach legs to each end panel
 - Step 3-wt: Connect the side legs and side panels
 - Step 4-wt: Insert cross-member into frame
 - Step 5-wt: Seal the water pans and the edge
 - Step 6-wt: Install the drain valve and pan
 - Step 7-wt: Add the material support slats.
 - [Note: these slats are components you will cut to fit from local material, and are not included in your shipment.]
 - Step 8-wt: Secure cutting table to water table
- Required space
- The completed water table is fairly compact and can easily be assembled for use in a small space. It's dimensions are: 62" X 61.72" X 30.31"
 - When planning for the table's location, consider access to power for the plasma cutter (208V or 230V / 1 or 3 phase / 50 or 60 Hz), power for the computer and CNC controller (120 V), access to compressed air (and/or recommended gas), and how to obtain (and drain) the water.

Step 1-wt: Add a leveling foot to each leg

The second step in water table assembly is to attach a leveling foot to each of the nine legs. The leveling feet are used to level the table when the floor is uneven. Each leg will be adjusted individually before filling the table with water.

Qty	Part	Description	Part #
4		GS water table leg - corner leg	TMS-180-0001-28
4		GS water table leg - side leg	TMS-180-0001-29
1		GS water table leg - center leg	TMS-180-0001-30
9		$\frac{3}{8}$ "-16 stud leveling foot	TMS-448-0001-01

Required parts / components

- On each corner leg, side leg, and center leg attach one $\frac{3}{8}$ " leveling foot into the threaded bottom base plate.
- The leveling feet will be adjusted once the table is fully assembled and in position.

Instructions





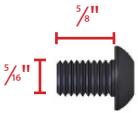



Illustration

Step 2-wt: Attach legs to panels for first corner

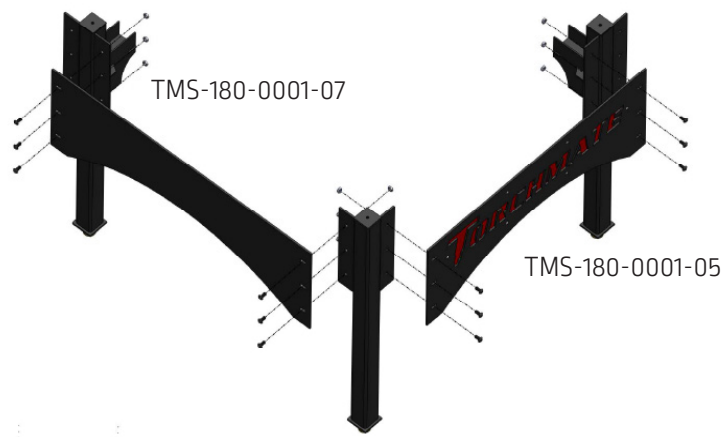
In the third step, you attach the legs to both end panels. Because adjustments may be required later, you only partly tighten the screws now.

Required parts / components

Qty	Part	Description	Part #
1		GS water table side 31"	TMS-180-0001-05
1		GS water table side 33.75	TMS-180-0001-07
1		Assembled corner leg component	From Step 1
2		Assembled side leg component	From Step 1
12		Screw, BSCS $\frac{5}{16}$ "-18 X $\frac{5}{8}$ "	TMS-410-0216-10
12		Nut, hex $\frac{5}{16}$ "-18, steel, zinc-plated	TMS-414-0001-16

- Instructions
- Attach one side to two assembled legs from Step 1 using six $\frac{5}{16}$ "-18 x $\frac{5}{8}$ " Button Head Cap Screws and six $\frac{5}{16}$ "-18 Hex Nuts
 - On the corner leg, add a long side panel, securing it the same way.
 - The side panels are slotted to be adjusted once the 4x4 table is attached.
 - Do not fully tighten the cap screws.





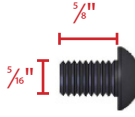

Illustration



Note: Side Panels are no longer branded with Torchmate Logo.

Step 3-wt: Extend the sides with legs and side panels

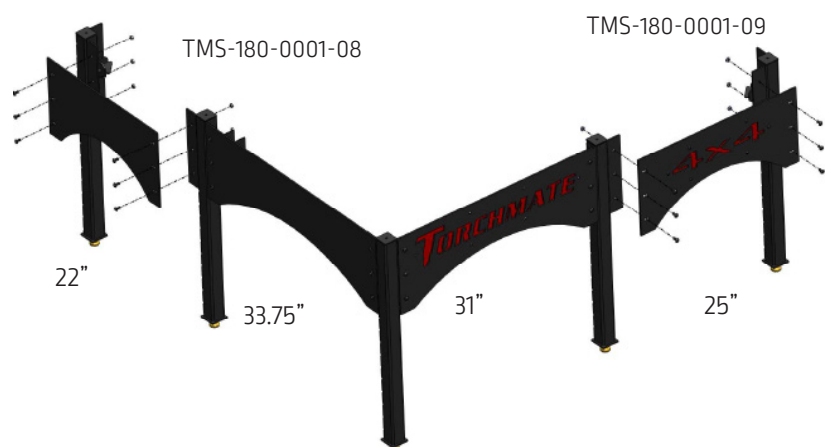
In the fourth step, you will attach additional side panels to the legs and additional legs. Because adjustments may be required, you'll only partly tighten the screws.

Qty	Part	Description	Part #
1		Frame components—assembled	From Step 2
1		GS water table side—25"	TMS-180-0001-09
1		GS water table side—22"	TMS-180-0001-08
2		Assembled corner leg	From Step 1
12		Screw, BSCS $\frac{5}{16}$ "—18 X $\frac{5}{8}$ "	TMS-410-0216-10
12		Nut, hex, $\frac{5}{16}$ "—18, steel, zinc-plated	TMS-414-0001-16

Required parts / components

- Continue with the water table frame assembly. Attach the side panels to the side leg next to the long side panel, and attach the short side panel to the side leg next to the long panel. Then add the corner legs to each corner.
- Use $\frac{5}{16}$ "—18 X $\frac{5}{8}$ " button head cap screws, and $\frac{5}{16}$ "—18 hex nuts.
- The side panels are slotted to be adjusted once the cutting table is attached.
- Do not fully tighten the cap screws.

Instructions







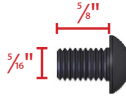

Illustration

Note: Side Panels are no longer branded with Torchmate Logo.

Step 4-wt: Complete the second and third corners

The 4x4 Growth Series water table frame, which holds the water pan, material support slats, and the cutting table, is built in multiple pieces so that during “growth” to the larger sized water tables, the existing components can continue to be used. The fifth step seals and attaches additional panels and legs to the frame.

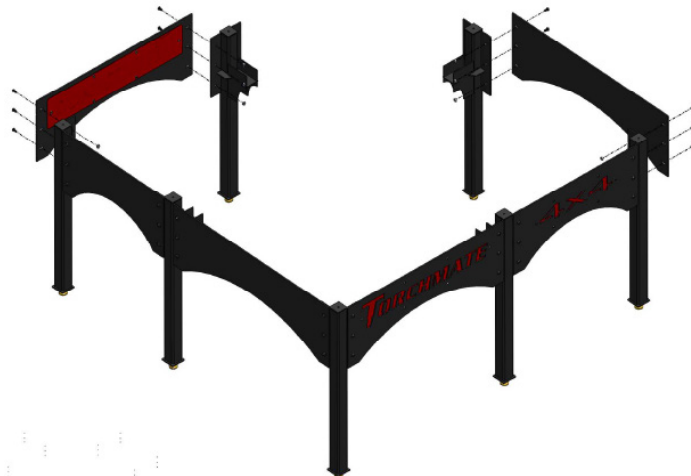
Required parts / components

Qty	Part	Description	Part #
1		Frame components—assembled	From Step 3
1		Assembled cutout panel—31"	TMS-180-0001-05
1		GS water table side - 33.75"	TMS-180-0001-07
2		Side leg assemblies	From Step 1
12		Screw, BSCS, $\frac{5}{16}$ "—18 X $\frac{5}{8}$ "	TMS-410-0216-10
12		Nut, hex, $\frac{5}{16}$ "—18, steel, zinc-plated	TMS-414-0001-16

Instructions





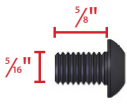
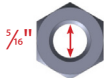
- Continue with the water table frame assembly. Attach the long side panels to the corner leg next to the short side panel, and attach the long side panel to the corner leg next to the short panels. Then add the two remaining side legs.
- Use $\frac{5}{16}$ "—18 X $\frac{5}{8}$ " button head cap screws, and $\frac{5}{16}$ "—18 hex nuts.
- The side panels are slotted to be adjusted once the cutting table is attached.
- Do not fully tighten the cap screws.

Illustration



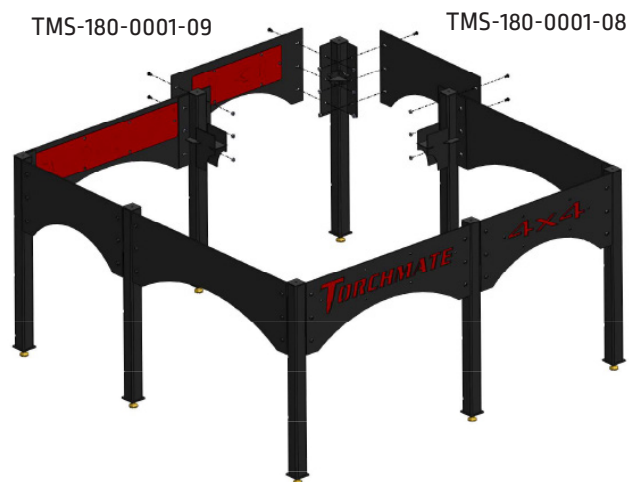
Step 5-wt: Complete the fourth corner

In step six, you complete the assembly of the table frame. At this point, the cap screws attaching the side panels to the legs should not be fully tightened, but should be tight enough to provide the table with strength to hold the water pan and material slats. The frame will be squared and tightened after the water pan and cutting table are in place.

Qty	Part	Description	Part #	Required parts / components
1		Frame components—assembled	From Step 4	Required parts / components
1		Assembled cutout panel—25"	TMS-180-0001-09	
1		GS water table side—22"	TMS-180-0001-08	
1		Assembled corner leg	From Step 1	
12		Screw, BSCS, 5/16"–18 X 5/8"	TMS-410-0216-10	
12		Nut, hex, 5/16"–18, steel, zinc-plated	TMS-414-0001-16	

- Complete the water table frame assembly. Attach the short cutout side panels to the corner leg next to the short uncut side panel, and attach the long uncut side panel to the corner leg next to the short cutout panels. Then add the two remaining side legs.
- Use 5/16"–18 X 5/8" button head cap screws, and 5/16"–18 hex nuts.
- The side panels are slotted to be adjusted once the cutting table is attached. Do not fully tighten the cap screws.

Instructions








Illustration

Step 6-wt: Insert cross members into frame

The 4x4 water table provides a heavy-duty support system for both the water in the water pan, and also the material being cut. The table's side and center legs have support channels to hold the cross members that, in turn, will hold the water pan. Step 5-wt places those cross members in the frame and locates the center leg.

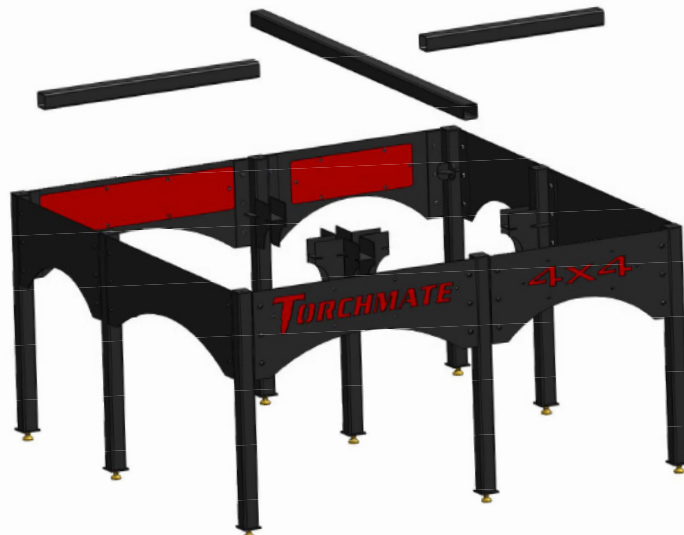
Required parts / components

Qty	Part	Description	Part #
1		Assembled water table outer frame	From Step 5-wt
1		Center leg with foot	From Step 1-wt
1		GS water table cross member 57.625	TMS-180-0005-03
1		GS water table cross member 30	TMS-180-0005-01
1		GS water table cross member 24.75	TMS-180-0005-02

Instructions

- Place the center leg so that the long cross member runs through its channel from side legs to the other.
- Locate the other two cross members between the remaining side legs and the center leg.
- No fasteners are required.



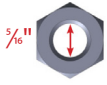
Illustration



Step 7-wt: Add and seal the 4x4 water pan

The 4x4 water pan bed, which holds the water, is built in multiple pieces to reduce shipping costs. In this step you will join the two halves of the water pan into a single unit.

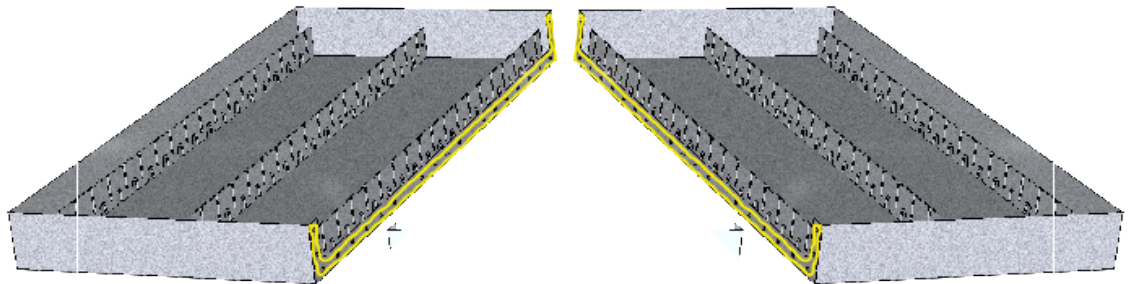
Required parts / components

Qty	Part	Description	Part #
1		GS water pan 4x4	TMS-180-0001-64
		GS water pan 4x4	TMS-180-0001-73
22		Screw, BSCS, $\frac{5}{16}$ "-18 X $\frac{5}{8}$ "	TMS-412-1116-08
22		Nut, hex, $\frac{5}{16}$ "-18, steel, zinc-plated	TMS-414-0701-16
1		GS silicone sealant, tube	TMS-180-1001-01

Instructions

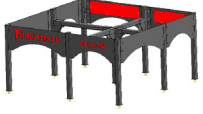

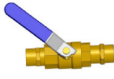

- Apply a generous, continuous, double-bead of silicone sealant to the mating surfaces of the water pans. Avoid gaps in the sealant, which may cause leakage.
- Attach the water pans together with screws and nuts. Don't tighten so much as to squeeze out all the sealant.
- Trim off the excess sealant after it has thoroughly set.

Illustration



Step 8-wt: Install the drain valve and pan

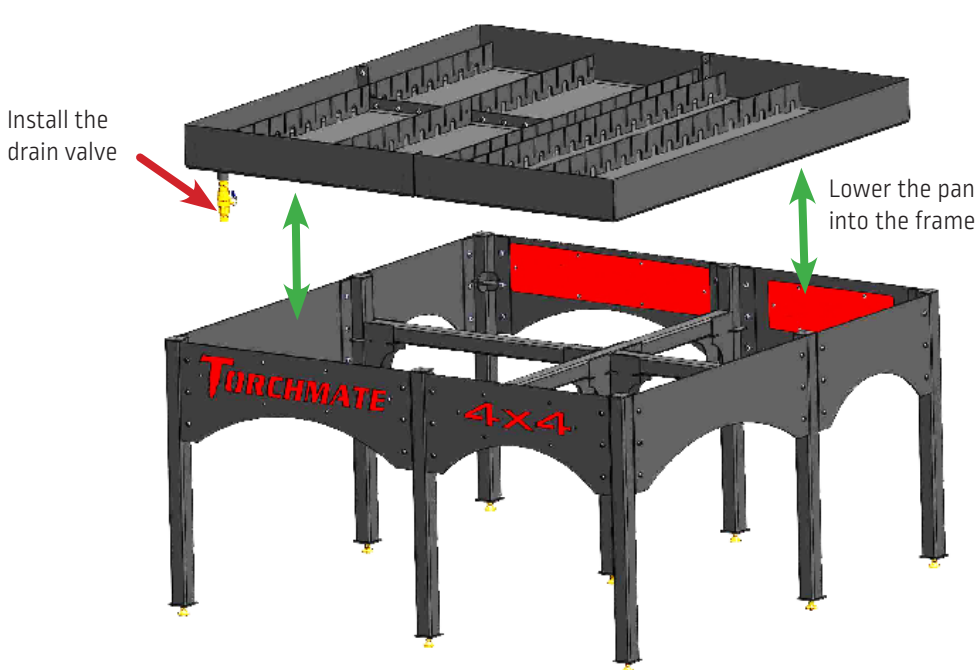
In this step you install the drain valve in the water pan, and then set the pan into the table frame. The pan will be filled with water after the cutting table is added.

Qty	Part	Description	Part #
1		Assembled water table frame	From Step 5
1		Assembled water pan	From Step 7
1		TFP-AR small table $\frac{3}{4}$ plumbing (water release valve)	TMS-452-0016-01
1		PTFE thread-sealant tape (recommended)	(separate purchase)

Required parts / components

- Wrap PTFE tape around the valve threads and tighten the water release valve into the water pan.
- Get some help, as the pan is heavy. Carefully lower the pan into the table frame assembled in Step 5. The pan simply rests in the frame.
- You may connect a hose or other plumbing to the drain valve so that you may dispose of the table's water appropriately, as necessary.

Instructions





Illustration

Step 9-wt: Add the material support slats

The 4x4 water table provides a heavy-duty support system for the material being cut using slats that you supply (and replace from time to time) from local material. Placed on edge, with a slight curvature, the slats develop the strength required to provide durable, long lasting service. Sparks, debris, and smoke from the cutting process are minimized because of the open access to the water surface between the slats.

Required parts / components

Qty	Part	Description	Part #
1		Assembled water table with pan	From Step 8
38		Material support slats 27 1/2" x (3 to 4)" x 3/16"	(obtain slats locally—not supplied)

Instructions

- Cut 38 support slats from 3/16" thickness material. (This material is not supplied with your water table.) Make them between 3" and 4" at 27 1/2" long
- Insert the slats into the slat support brackets in the pans. **The offset in the brackets creates a curve in the slats, which increases their strength and weight-bearing capacity.**
- 3" to 4" high slats may be used. A 4" high slat will place the material at the top of the water table. A lower slat height allows greater control over water contact with the cut material.
- Over time, the cutting processes will consume the slats and you will replace them. This is normal.



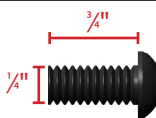

Illustration

The material to be cut will rest directly on the slats



Step 10-wt: Secure cutting table to water table

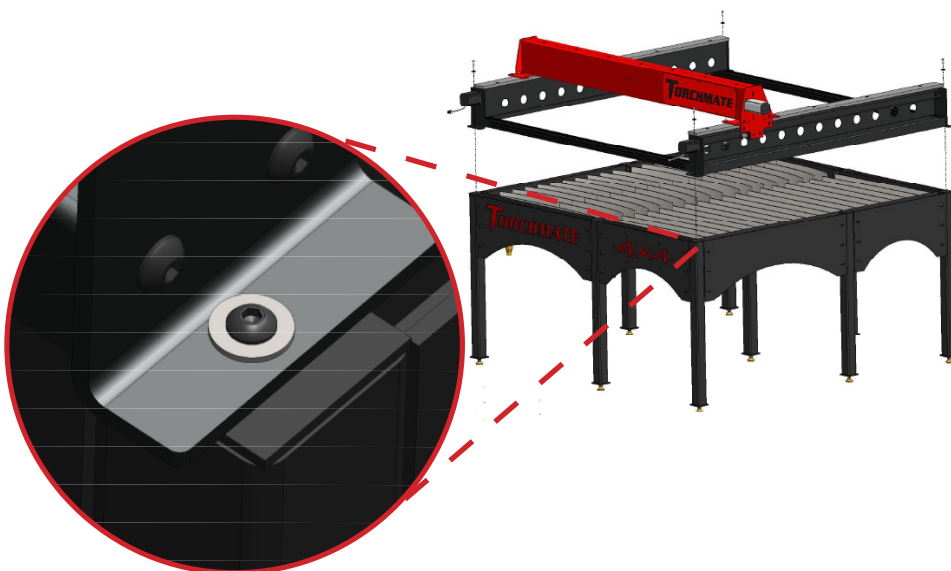
Finally, in this step, you mount the cutting table onto the water table. Because the cutting table is heavy, work with your team to set the cutting table in place. After mounting it securely, check the table's squareness by measurement and by high-speed jogging.

Qty	Part	Description	Part #
1		Cutting table	From Step 11 Page 21
1		Water Table	From Step 9-wt
4		Screw, BSCS 3/8" -16 X 1"	TMS-410-0218-16
4		5/16" Flat Washers	TMS-413-0001-16

Required parts /
components

- Attach the cutting table to the water table's legs. The legs have threaded holes. Use button-head cap-screws and flat washers.
- Check that the table is square and level. Adjust the leveling feet, as needed. Refer to Step 5 of the cutting table installation for the beginning steps of the squaring procedure.
- With the table square and level, fully tighten all screws.
- Fill the water pan with water and check for leaks.

Instructions



Illustration

Technical Support

Call, fax, or email

When making the connections and setting up the table if a question or concern arises or a part seems to be missing, please contact Torchmate technical support.

Technical support will also help you with operating the CNC system, and troubleshooting problems.

Torchmate technical support is available Monday through Friday from 6 AM to 4 PM (06:00 to 16:00), Pacific Time Zone.



Toll Free: 1-866-571-1066

International: 775-673-2200

Fax: 775-673-2206

Email: support@torchmate.com

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www.TorchmateStore.com