



LIGO Laboratory / LIGO Scientific Collaboration

E1000393-v3

LIGO

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Stage 0-1 Horizontal Actuator Assy Procedure

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Distribution of this document:
Advanced LIGO Project

This is an internal working note
of the LIGO Laboratory.

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Note : ! Make sure there is no trash in the coil !
Remove the shoulder screws and watch carefully inside the coil.



Clean room standards

For a clean assembly all LIGO standards should be followed, as presented in the latest version of the **LIGO Contamination Control Plan (E0900047)**. Clean room garb including UHV gloves should be worn when working with parts.

All tools that come in contact with assembly should be cleaned to class B standards.

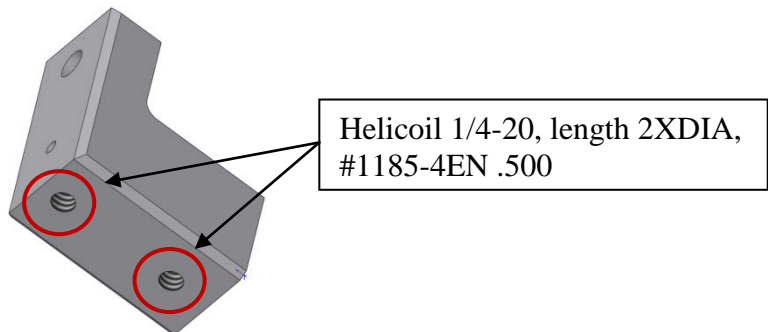
Assembly will be done under a portable clean room. Any time a part of the assembly is not covered by the portable clean room or not being actively worked on it should be covered with appropriate clean covers. (C3 polyester or equivalent).

Parts prep work: alignment pins and helicoils

To facilitate assembly, parts requiring helicoils and/or pins to be inserted before assembly will be listed to allow preliminary preparation of the parts, after cleaning and before starting general assembly. See E1000402 Current Rev.

Helicoil:

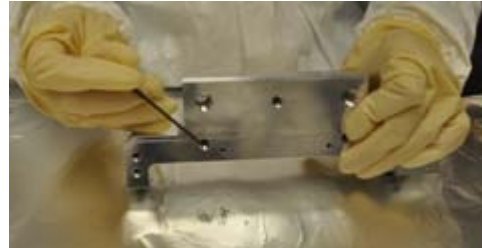
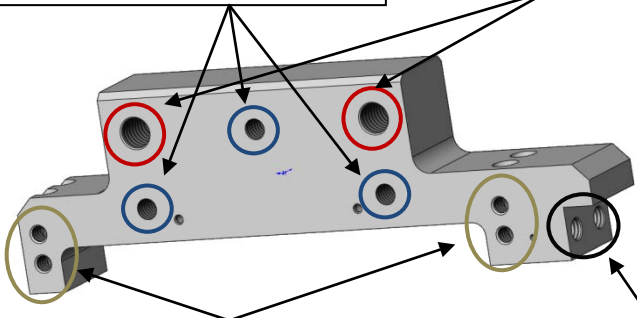
1. D0902424



2. D0902427

Helicoil 1/4-20, length 2XDIA,
#1185-4EN .500

Helicoil 3/8-16, length 2XDIA,
#1185-6EN .750

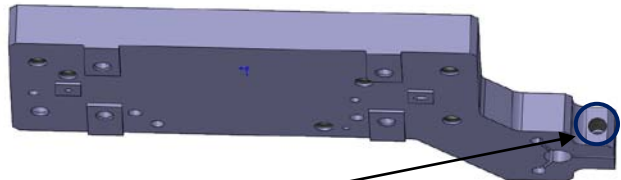
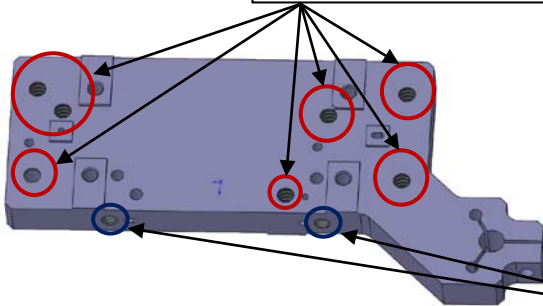


Helicoil 10-32, length 1.5XDIA,
#1191-3EN .285

Helicoil 1/4-20, length 1.5XDIA,
#1185-4EN .375

3. D0902310

Helicoil 5/16-18, length 2XDIA,
#1185-5EN .625

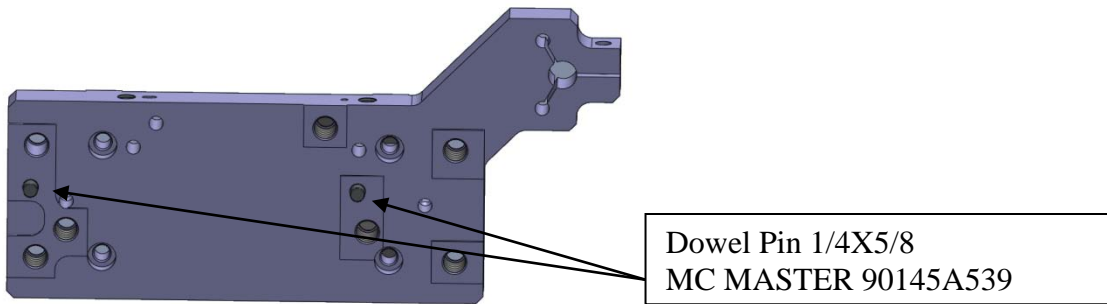


Helicoil 1/4-20, length 1.5XDIA,
#1185-4EN .375

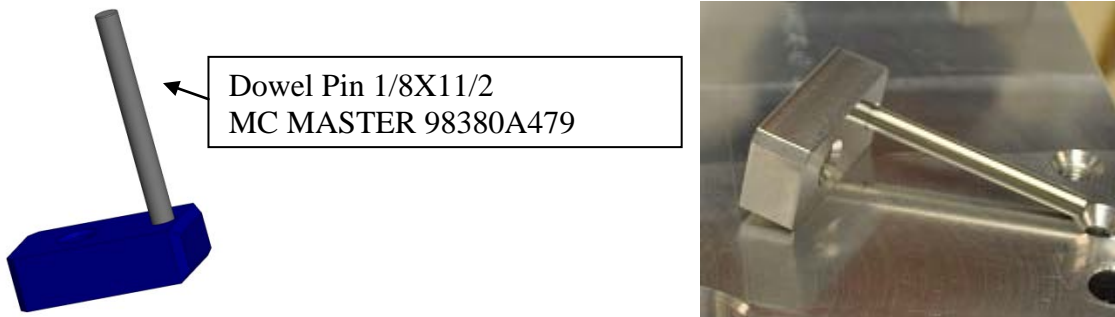


Dowel:

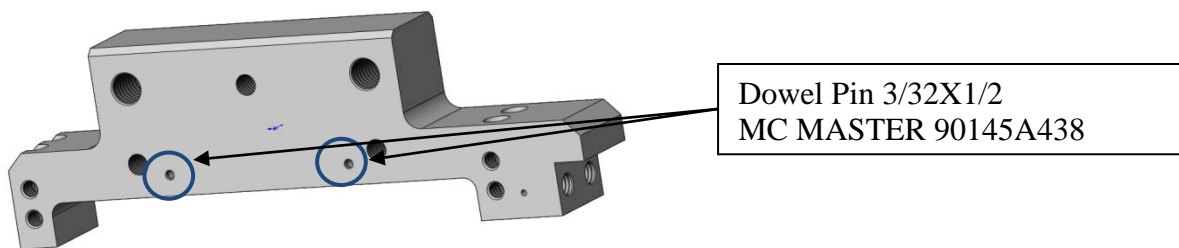
1. D0902310



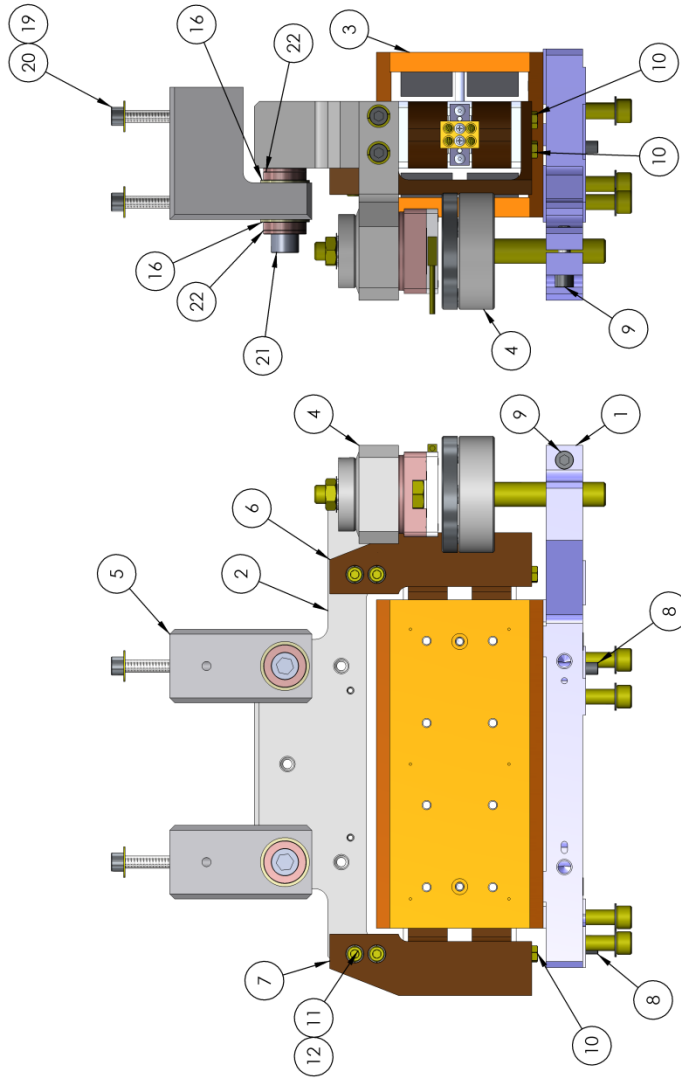
2. D0902436



3. D0902427



ITEM NO.	PART NUMBER	DESCRIPTION	QTY
23	D1002282	STEP PIN, LARGE ACTUATOR, alIGO BSC ISI	2
22	McMaster_91944A450	Spherical Washer .406 ID x .88 od x .25 THK	4
21	McMASTER_92196A633	SHCS	2
20	HOLOKROME_78066	Screw 1/4-20 x 1.5 lg SHCS	4
19	McMASTER_98019A355	WASHER .28 ID X .63 OD X .065 THK	4
18	HOLOKROME_78060	SHCS, 1/4"-20x.875"	4
17	UCC Wfv-25	Flat Washer, Vented .255 ID, .46 OD, .032 THK	4
16	McMASTER_92141A051	Flat Washer, 3/8"	4
15	McMaster_92196A584	Screw, SHCS, 5/16-18 x 1 1/8 lg.	4
14	UC_COMPONENTS_WFV-31	Washer Vented, .328 ID X .562 OD X .032 THK #5/16	4
13	McMaster_92196A291	Screw SHCS, 10-32 x 1.375 lg.	4
12	UC_COMPONENTS_WFV-10	Washer Vented, 0.195 ID, 0.354 OD, 0.032 THK #10	8
11	McMaster_92196A271	Screw 10-32 x .62 lg.	4
10	UC_COMPONENTS_H-1006	Hex Head Machine Screw, 10-32 x 3/8 lg vented	4
9	HOLOKROME_78062	SHCS, 1/4"-20x1.0"	1
8	McMaster_90145A539	Dowel Pin 1/4" (.2501) x 5/8" L 18.8 SST	2
7	D1000175	THERMAL BAR, LEFT, LARGE ACTUATOR, alIGO BSC ISI	1
6	D1000176	THERMAL BAR, RIGHT, LARGE ACTUATOR, alIGO BSC ISI	1
5	D0902424	HORIZONTAL ACTUATOR L CONNECTOR, STAGE 0-1, alIGO BSC ISI	2
4	D1000478	SENSOR ASSEMBLY HORIZONTAL, alIGO BSC ISI	1
3	D0902749	Large Actuator, alIGO SEI HAM-ISI & BSC-ISI	1
2	D0902427	ACTUATOR COIL BRACKET HORIZONTAL, STAGE 0-1, alIGO BSC ISI	1
1	D0902310	ACTUATOR MAGNET BRACKET, STAGE 0-1, alIGO BSC ISI	1

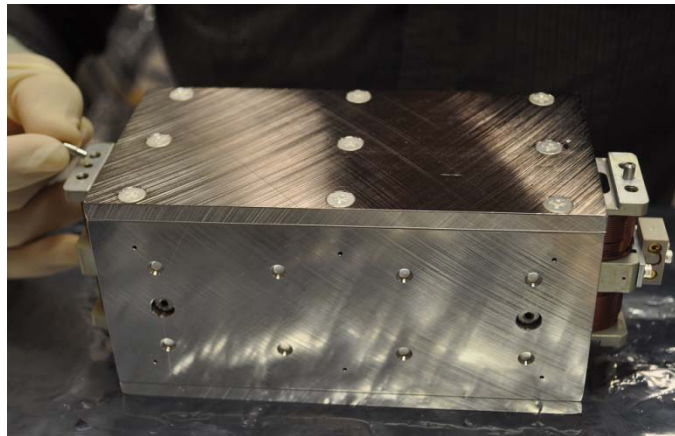
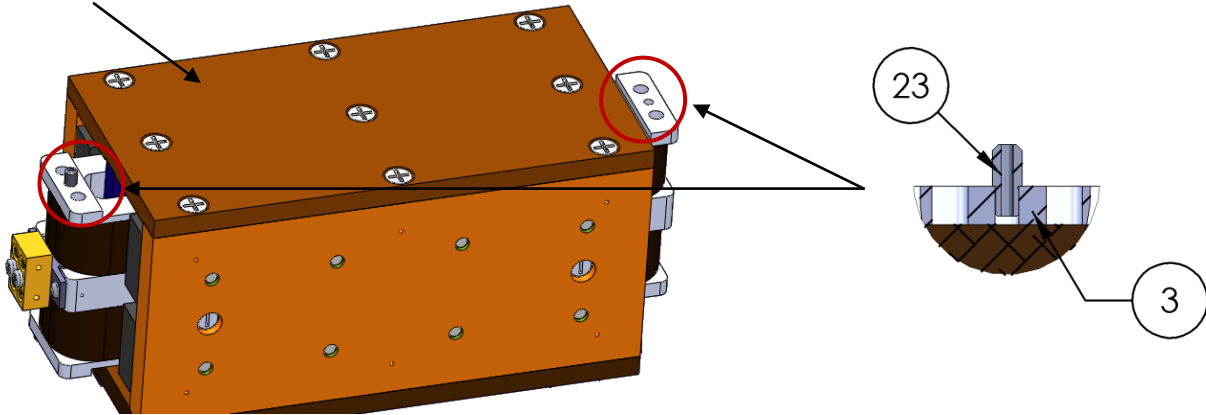


Reference D0901102 : Final assembly between Stage 0 and Stage 1

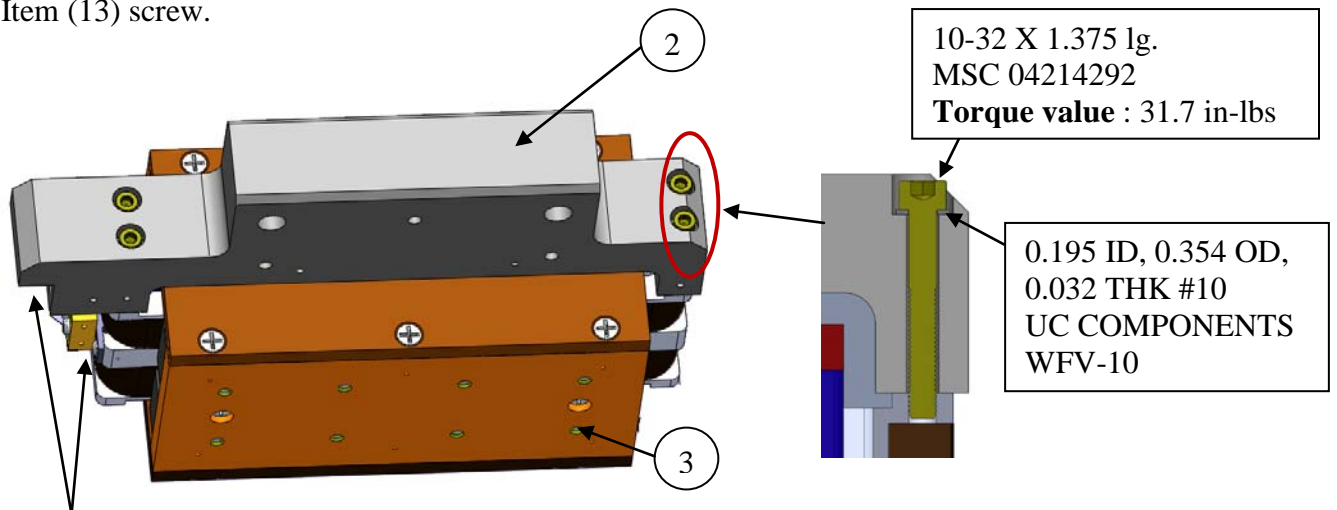
Assembly Instructions

1. Insert Item (23) (D10002282) Step Pin into Item (3) (D0902749) Large Actuator.

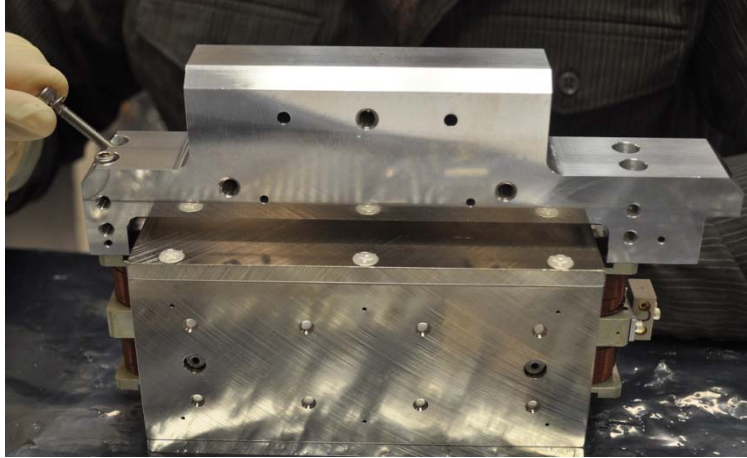
Note : Non pined face



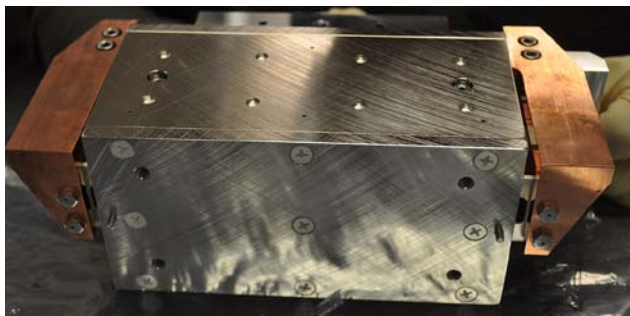
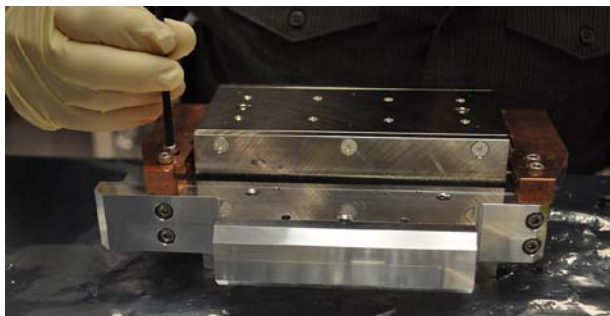
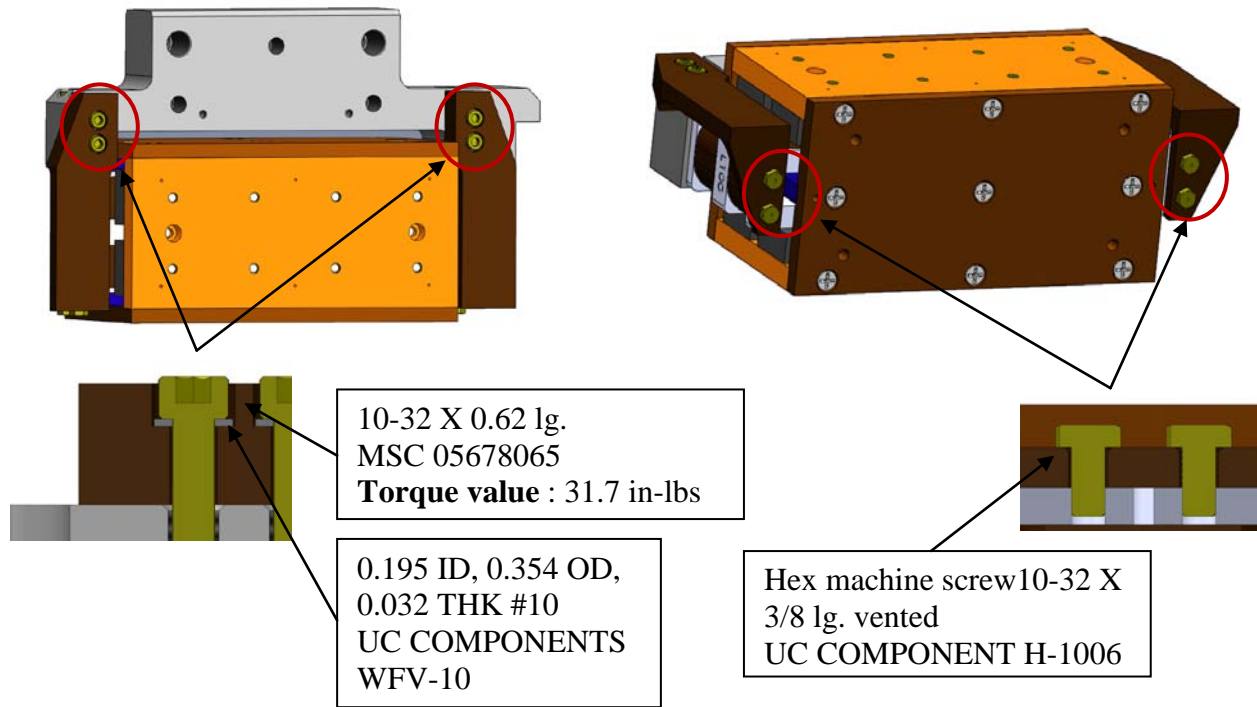
2. Attach Item (2) (D0902427) Actuator Coil Bracket as shown Figure 2, to Item (23) (D10002282) Step Pin and Item (3) (D0902749) Large Actuator using Item (12) vent washer and Item (13) screw.



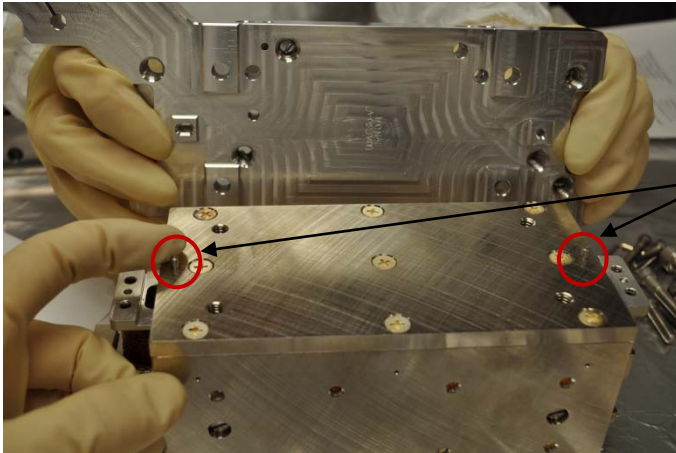
Note : edge of Item 7 and the yellow block are on the same side



3. Attach Items (7) (D1000175) Left Thermal Bar and Item (6) (D1000176) Right Thermal Bar, to Item (3) (D0902749) Large Actuator and Item (2) (D0902427) Actuator Coil Bracket using Item (12) washer and Items (10)/(11) screws.

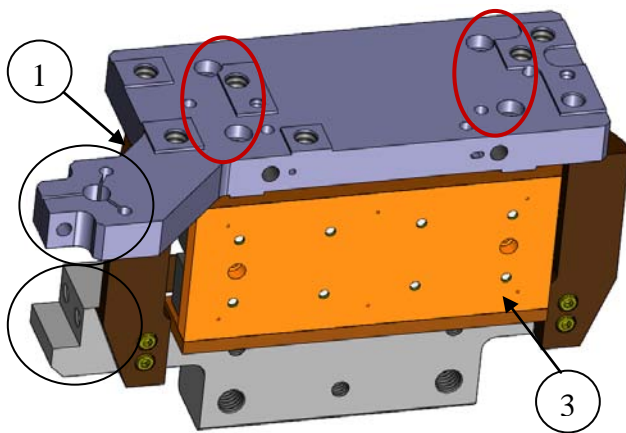


4. Insert Item Dowel Pin into Item (3) (D0902749) Large Actuator.

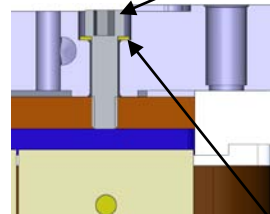


1/8 X 7/16 lg.
MC MASTER 90145A481

5. Attach Item (1) (D0902310) Actuator Magnet Bracket to the Bottom of Item (3) Actuator as shown Figure 4 using Items (17) vent washer and Item (18) screw.

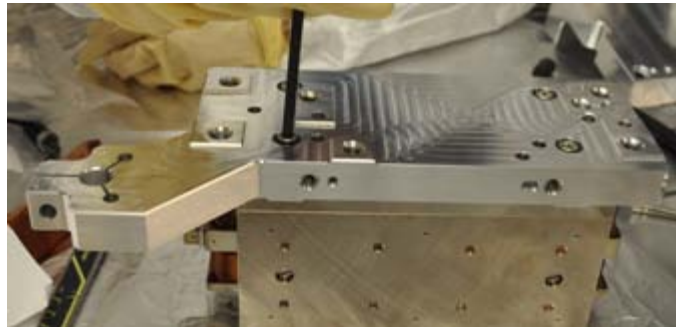


1/4-20X0.875 lg.
HOLOKROME 78060
Torque value : 100 in-lbs



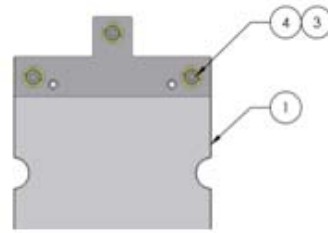
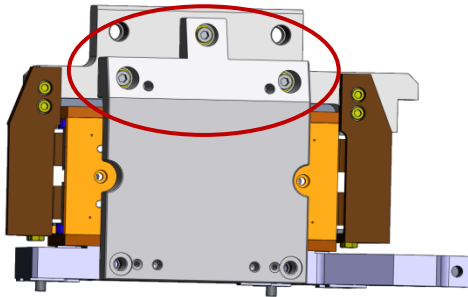
0.255 ID, 0.46 OD, 0.032 THK
UCC WFV-25

Note : the two edges are on the same side



6. Tooling Bracket Assembly

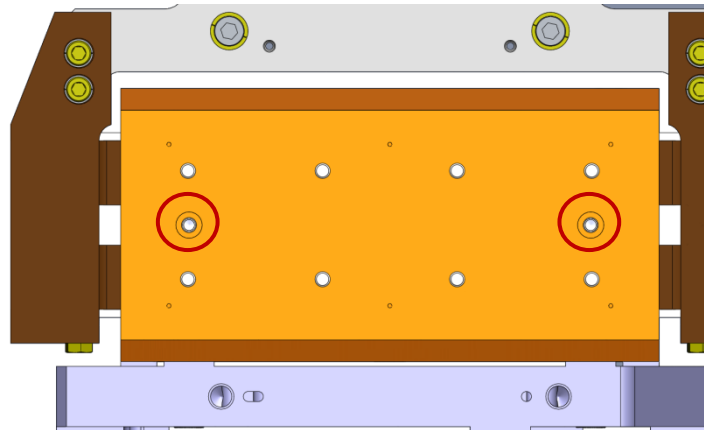
Attach **only the top** of Item (2) (D1000290) tooling Bracket Assembly with 3 screws.



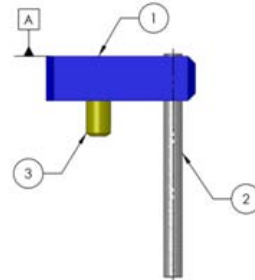
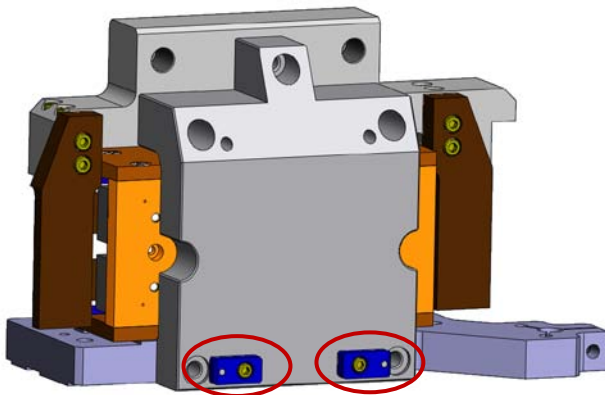
Torque value : 100 in-lbs

4	HOLOKROME_78066	Screw 1/4-20 x 1.5 lg SHCS	5
3	UC_COMPONENTS_WFV-25	Vented Washer .255 ID X .468 OD X .032 THK # 1/4	5
1	D0902342	ACTUATOR TOOLING BAR, STAGE 0-1, αLIGO BSC ISI	1
ITEM NO.	PART NUMBER	DESCRIPTION	REQ

7. **Loose** the 4 shoulder screws of Item (3) (D0902749) Large Actuator.



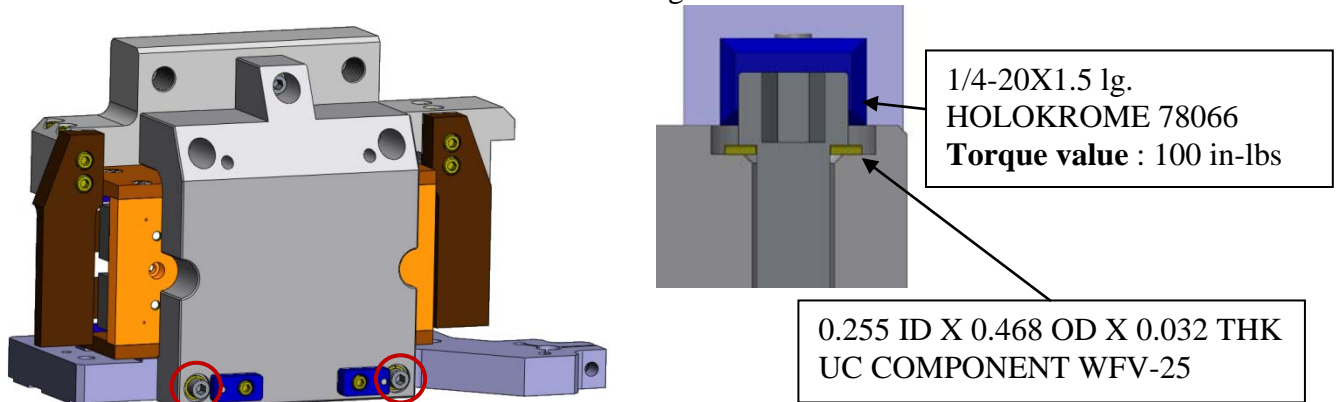
8. Slide Pin Carrier (D0902436) into the Tooling Bar and Item 1 (D0902310).



3	McMASTER_92196A192	SCREW SHCS, 8-32 X 3/8 LG	1
2	McMASTER_98380A479	DOWEL PIN, .1252 DIA X 1.5 LG (OVERSIZE)	1
1	D0902436	PIN CARRIER FOR LARGE PIN KEY, αLIGO BSC ISI	1
ITEM NO.	PART NUMBER	DESCRIPTION	REQ

9. **Remove** the 4 shoulder screws of Item (2) (D0902749) Large Actuator.

10. Add the two last screws and washers in the Tooling Bar.



11. Remove the Pin Carrier (D0902436).

Gap Test : Go / No Go

➔ Check the gap between the coil and the magnet with shims on both sides.

Go : 0.085 inches

No Go : 0.115 inches

