

Sheridan College

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5 Stage Reverse Osmosis Pedal Powered Water Pump Purification System Faculty of Applied Science & Technology (FAST)

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2017

### Pedal Powered Water Pump / Purification System (PowerPoint)

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*Humber College of Applied Arts and Technology*

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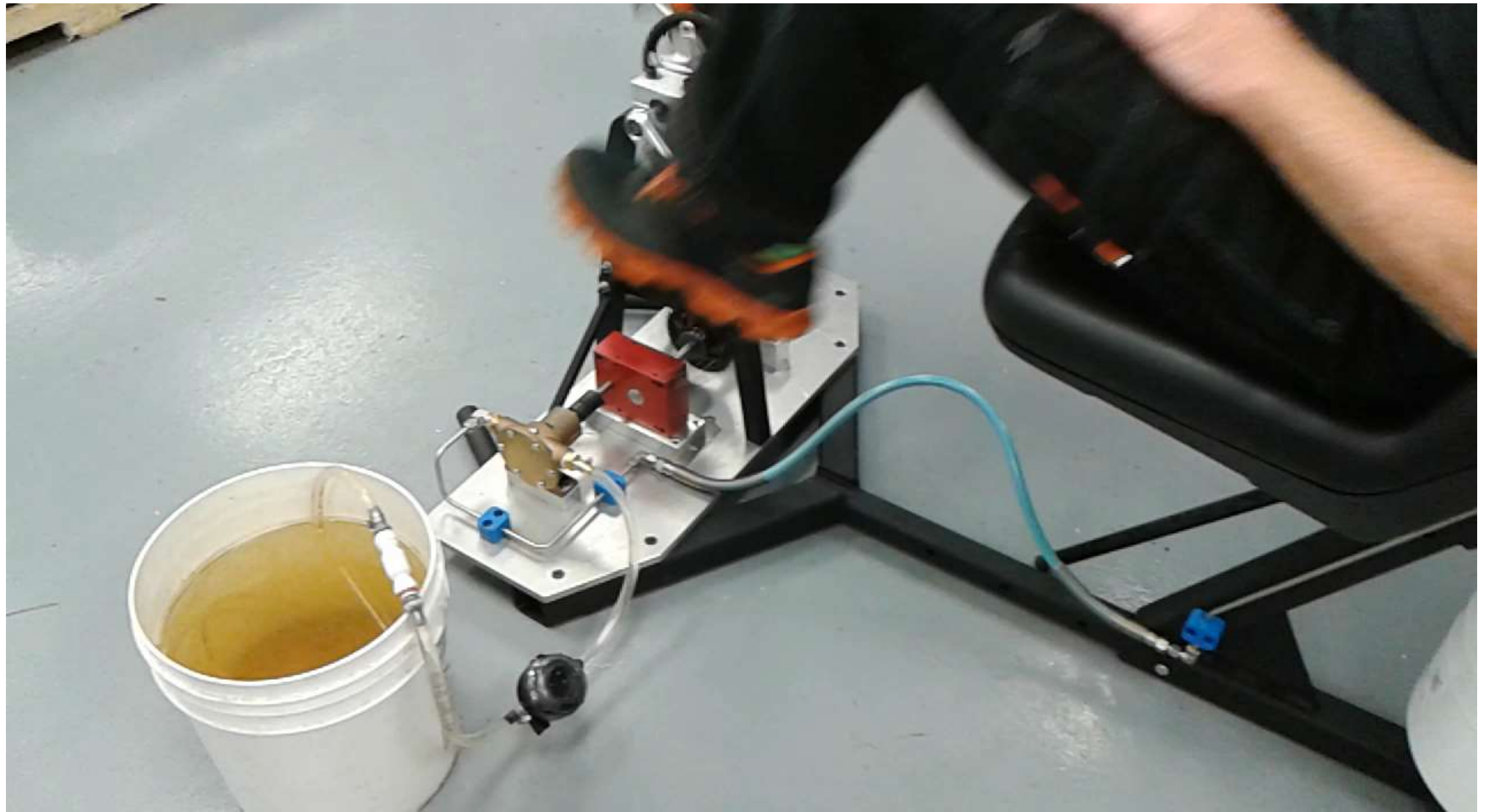
# Sheridan

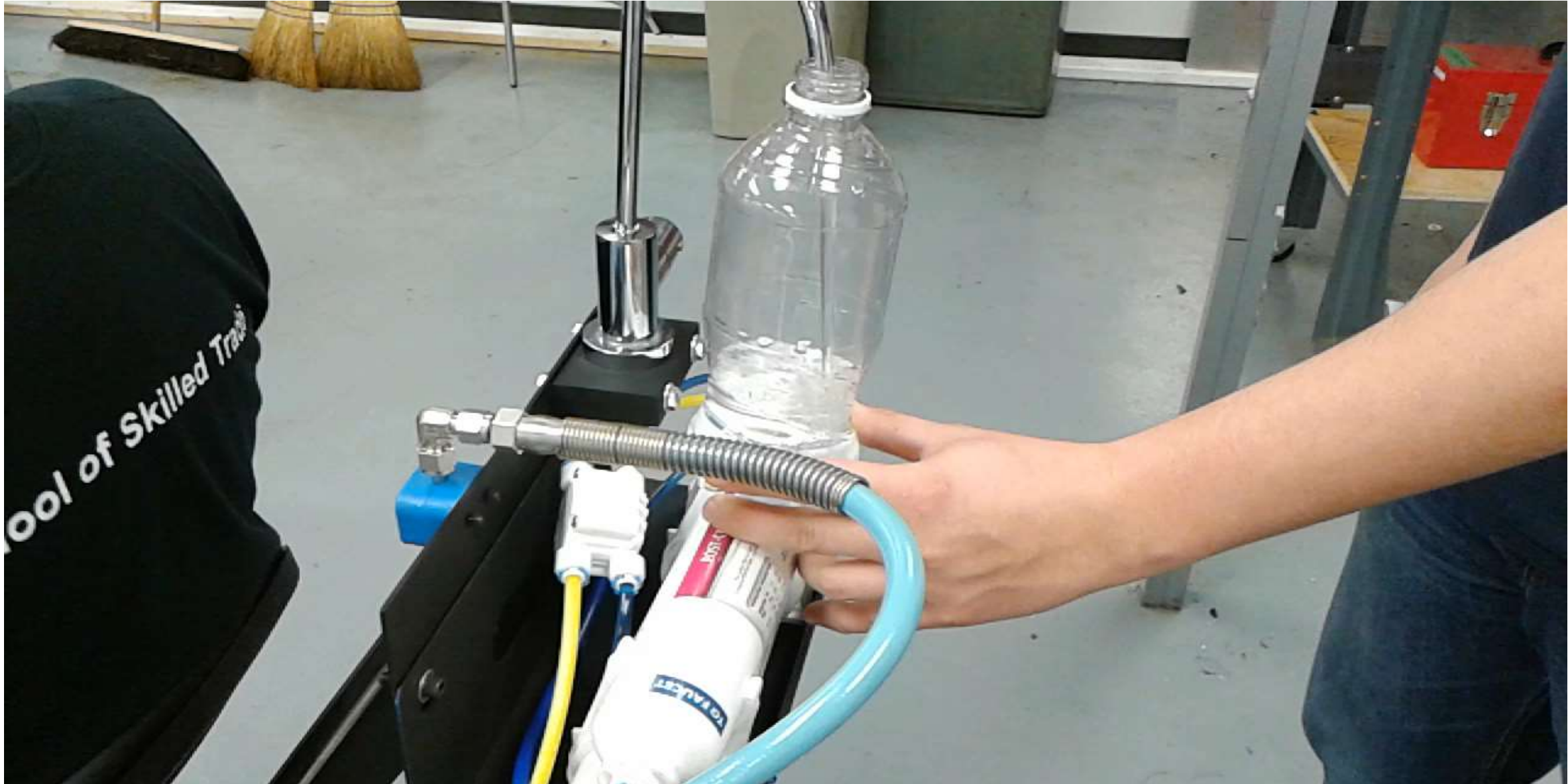
Get  
Creative

## **Worldskills Industrial Mechanic Millwright Skill # 48**

### **Pedal Powered Water Pump / Purification System.**

**At 30 to 40 rpm this unit will deliver 1/2 a litre of clean drinking water every 30 seconds through the overdrive gearbox, rubber vane positive displacement pump and 5 stage Reverse Osmosis Filtration System**













# **Worldskills IMM Skill # 48**

## **Welding.**

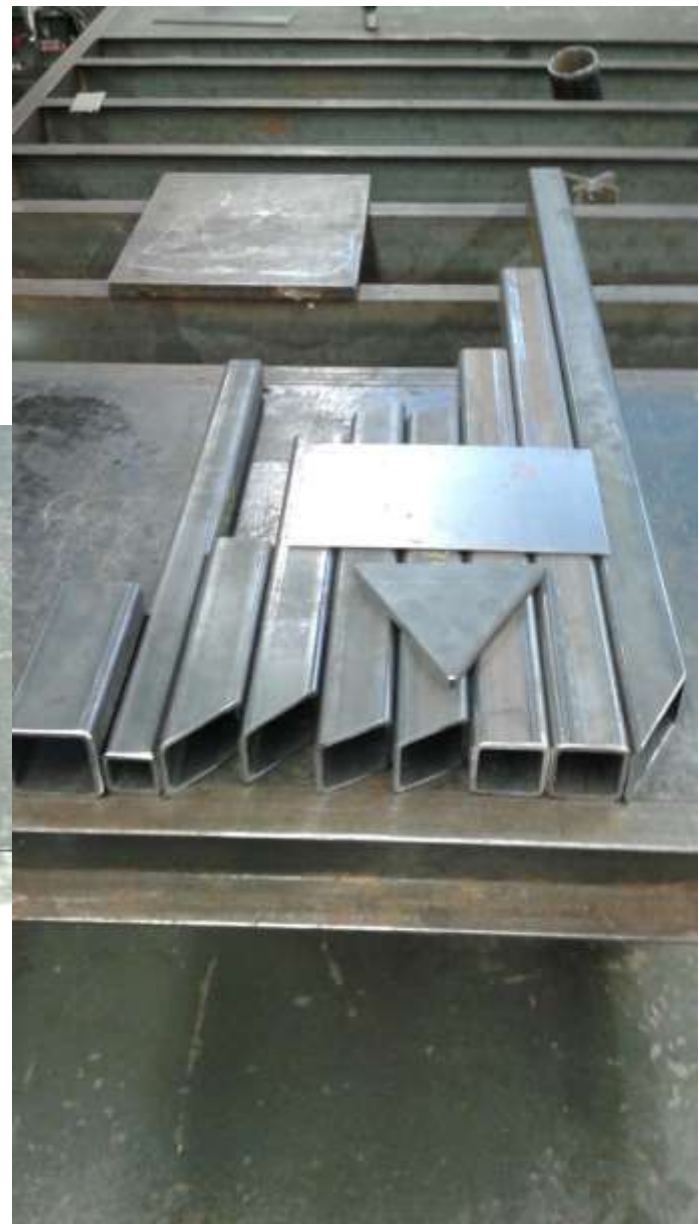
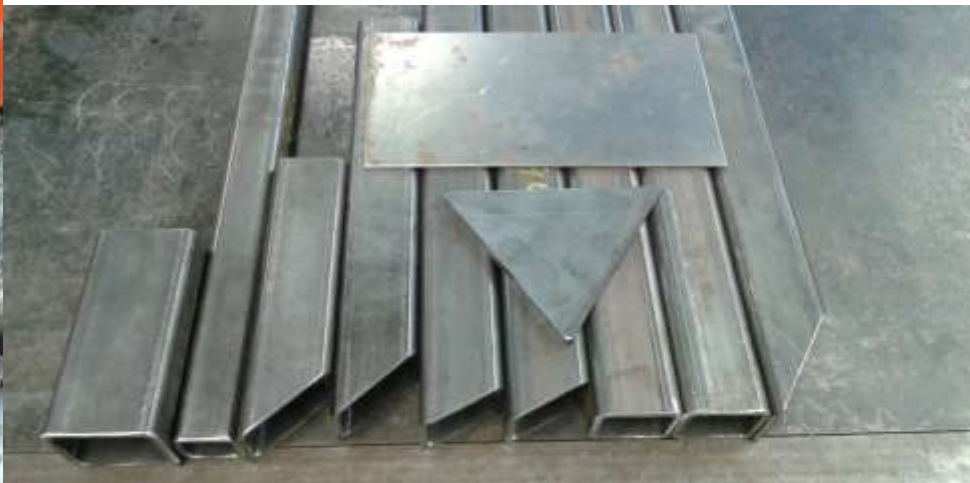




**Raw Material Stock for  
Welding Details 1-1 to 1-5,  
2-1 to 2-3 & 3-1 to 3-3**

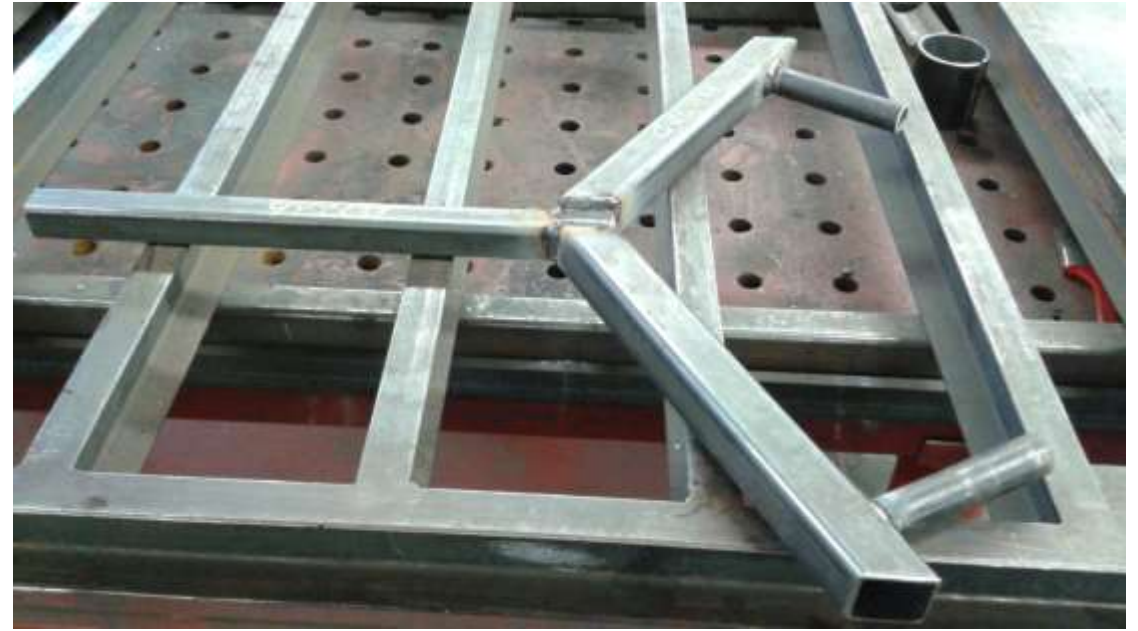


# Welding Details Angles Cut 1-3, 2-2 x 2 & 3-1















**Completed  
Welding  
Assembly**



# **Worldskills IMM # 48**

## **Layout, Drilling & Tapping**



Layout, drill, tap and  
countersink as per  
supplied blueprint.  
Detail #4A







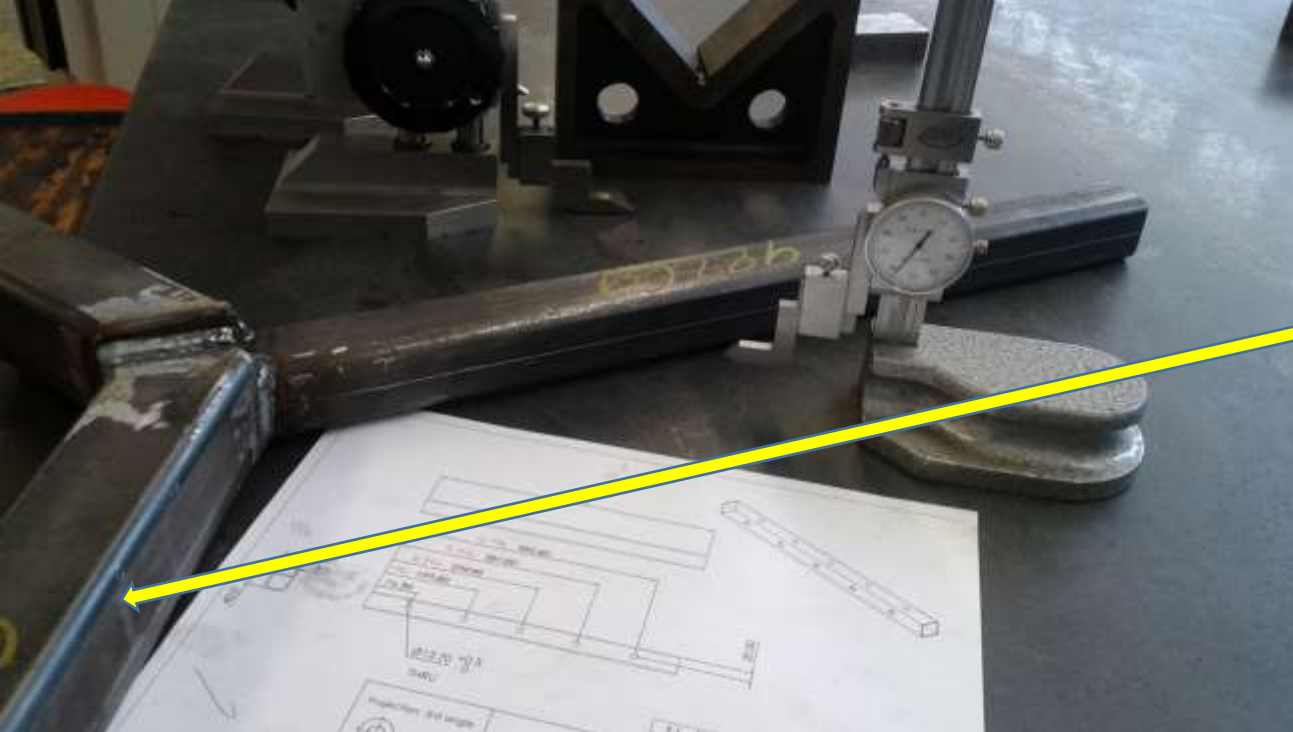
Layout, drill, tap and  
countersink as per  
supplied blueprint.  
Detail #4A



**Install Detail #4A level with the outside edge +/- 1.00mm of Detail #2-2 on both sides**



**Drill 9mm dia. & countersink to suit M8 x 25 FHCS, 4 reqd.**



Layout, drill and tap as per supplied  
blueprint on Detail #'s 2-1 & 2-2





As per supplied blueprint layout & drill detail #2-1.



As per supplied blueprint layout, drill & tap. Detail #2-2.







Layout and drill detail #'s 3-1 & 17 as per tolerances on blueprint and install to detail #3-1 (2 M10 x 80 SHCS, 4 washers & 2 lock washers) & 47 (4 5/16" x 1 1/4 SHCS with 4 washers & lock washers)



Install detail #23 with cotter pin to detail #1-3 & 3-3.

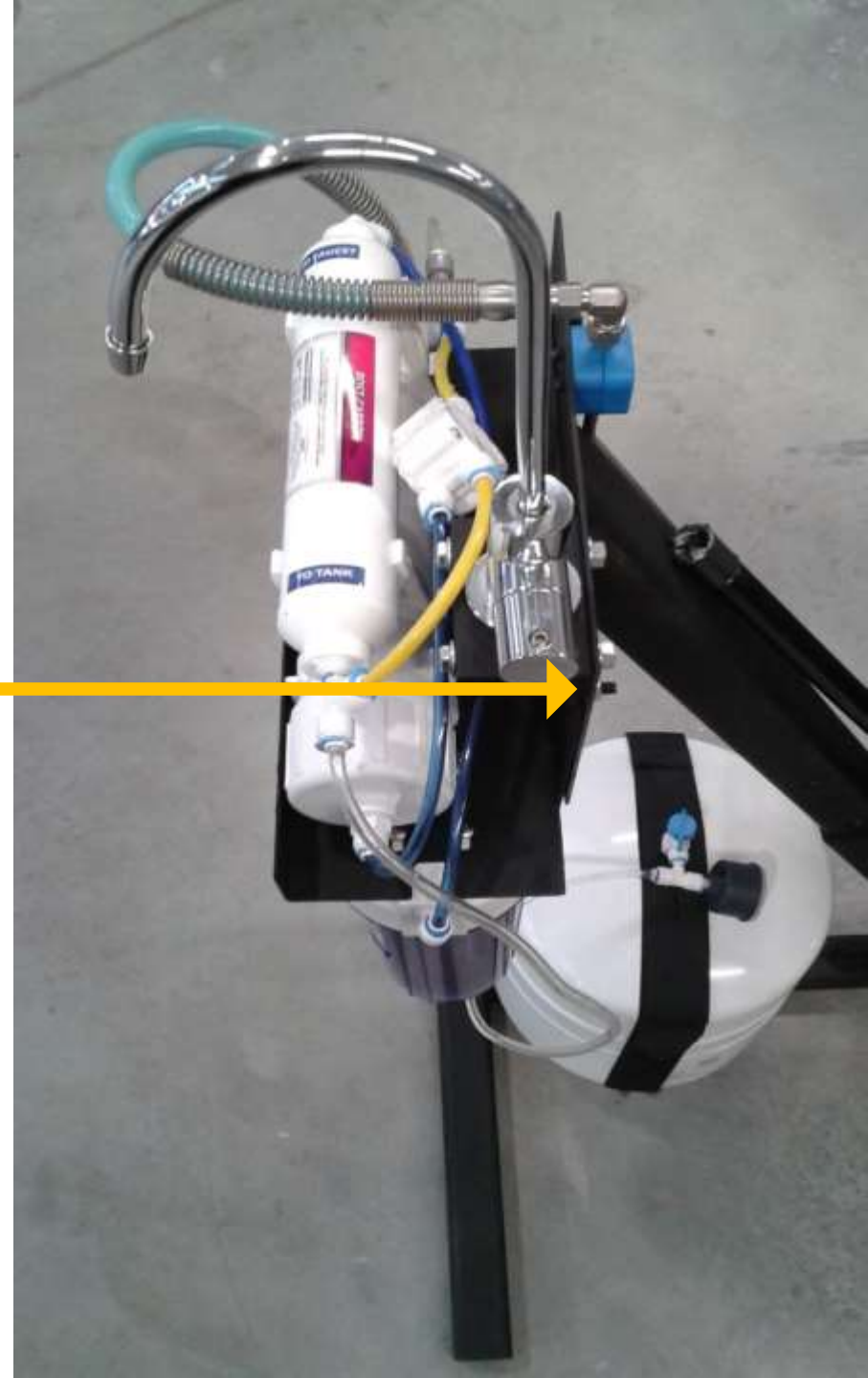


# **Worldskills IMM Skill # 48**

## **Reverse Osmosis Filter Unit**



**Layout & drill as per supplied blueprint  
& install Reverse Osmosis Filter  
Unit to Detail #1-5.  
(2 M6 x 15 SHCS, bolts,  
nuts and washers.)**





Layout, drill & tap as per blueprint install detail #40. (2 M6 x 25)



Install all supplied plastic tubing as per supplied tubing diagram

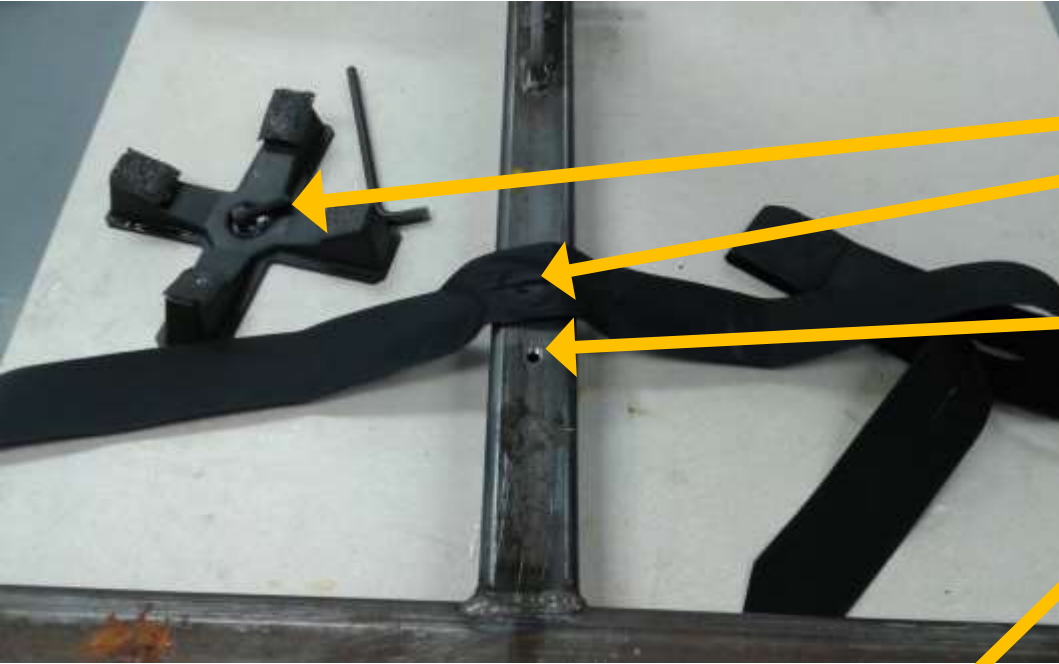


Detail #44

Detail #43



Detail #42



**Tank Cradle Detail #21**  
**Velcro Strap Detail #46**

**Detail# 1-2 Drilled & Tapped M6**  
**as per blueprint.**

**Cradle Installed**  
**(1 M6 x 30 SHCS & Washer)**

**Cradle, Tank & Velcro Strap**  
**Mounted & Installed**



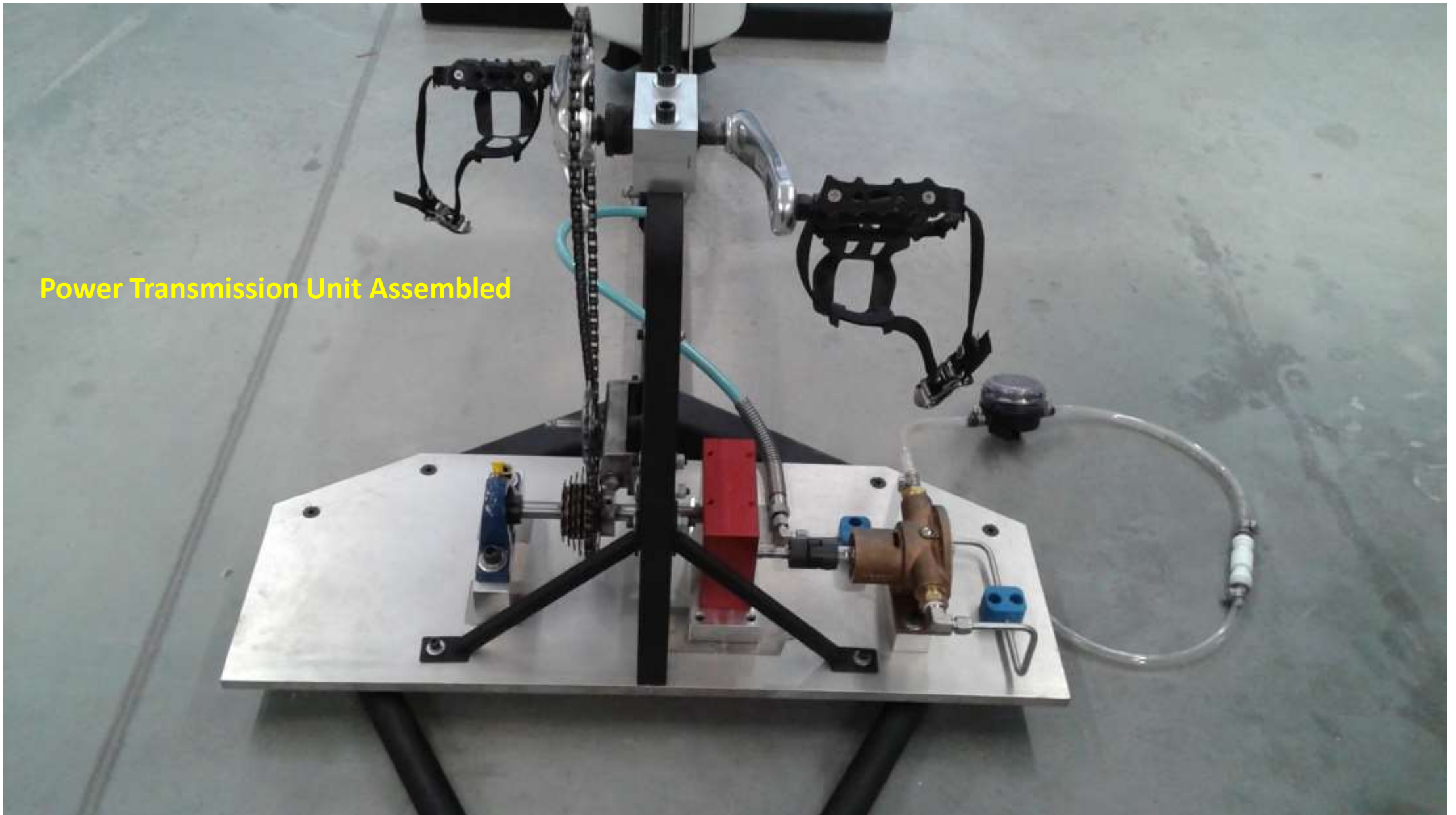
# **Worldskills IMM Skill # 48**

## **Power Transmission System.**





Power Transmission Unit Assembled





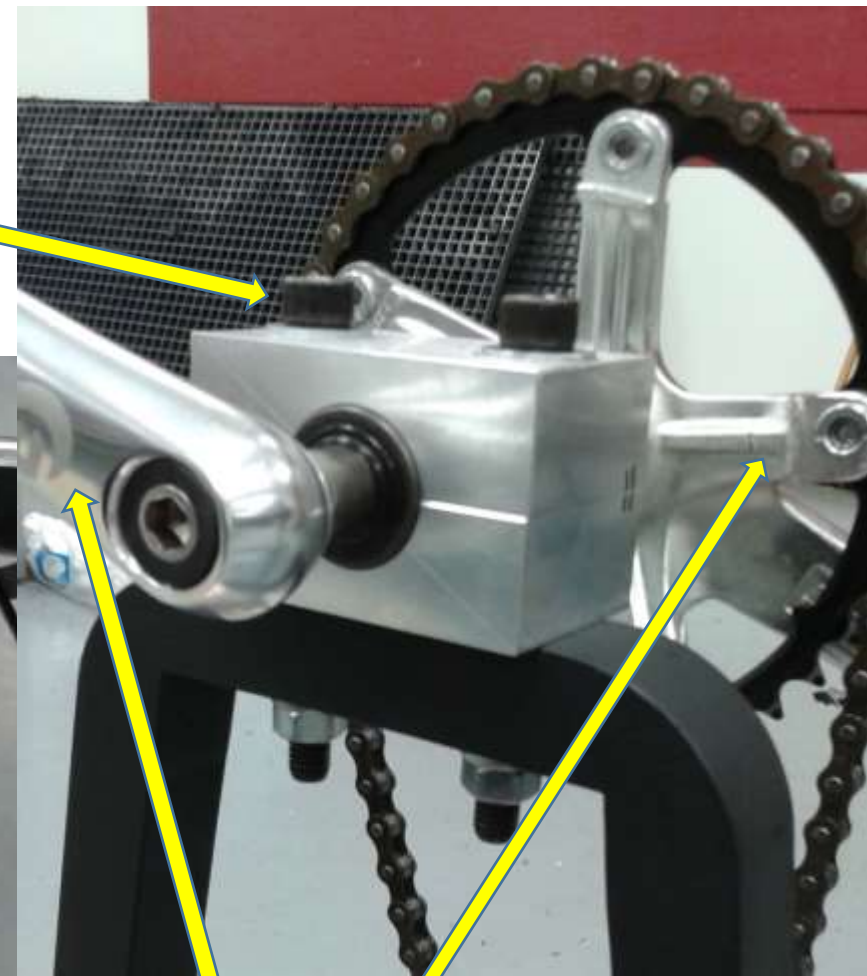


**Square off datum edges +/- 1.00mm.  
Competitor to decide datum edges to use.**

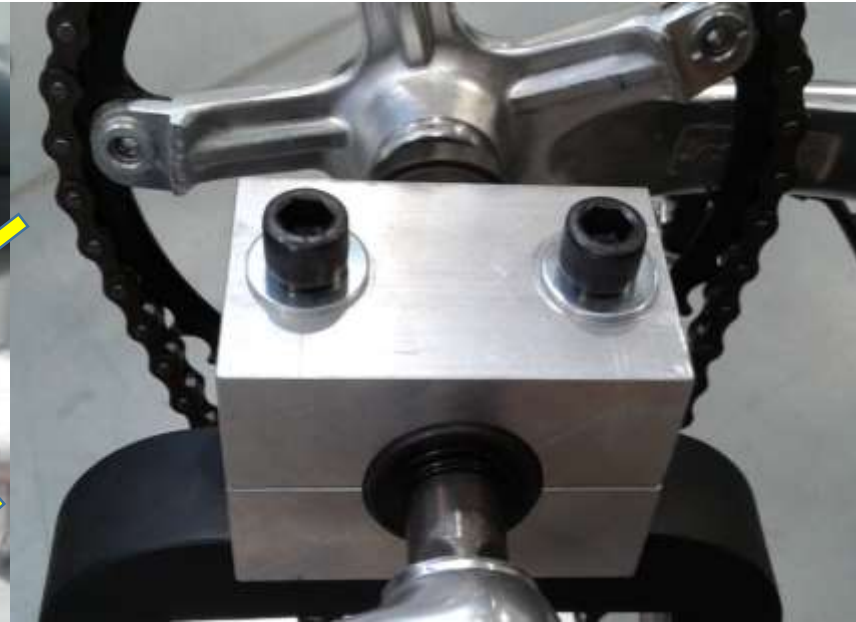




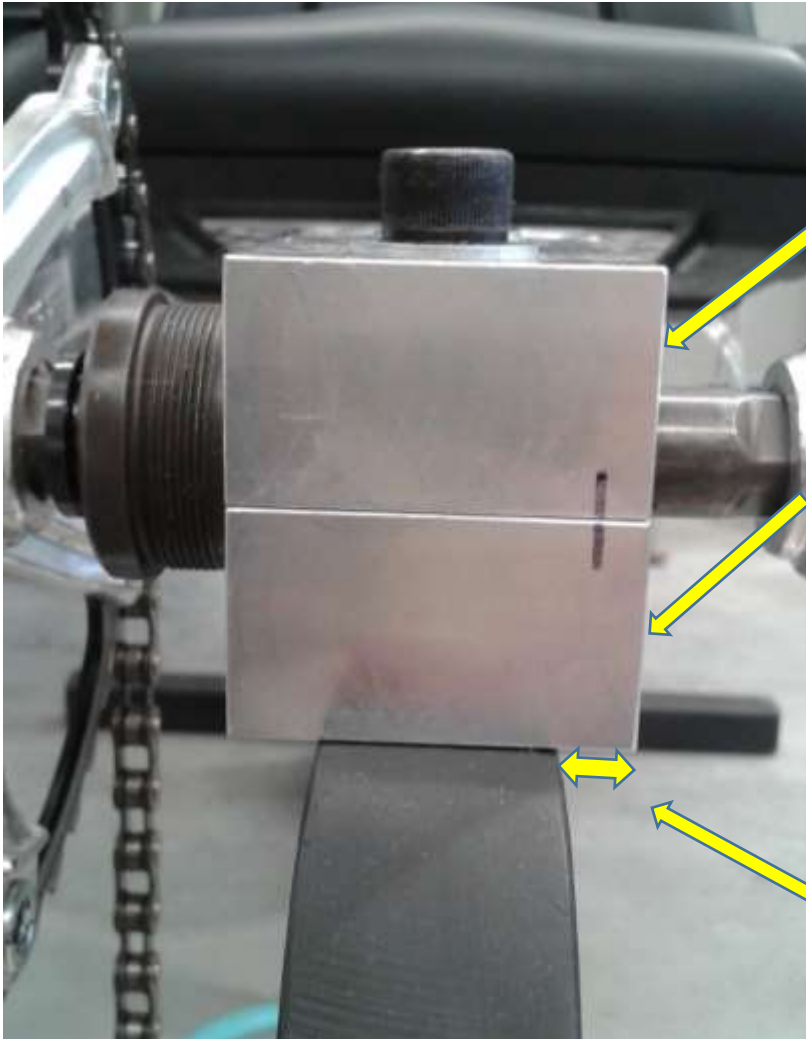
**Install detail #'s 7 & 8 as per photo on top of detail #9 with  
2 M10 x 100 SHCS (2 nuts, 4 washers, 2 lock washers)**

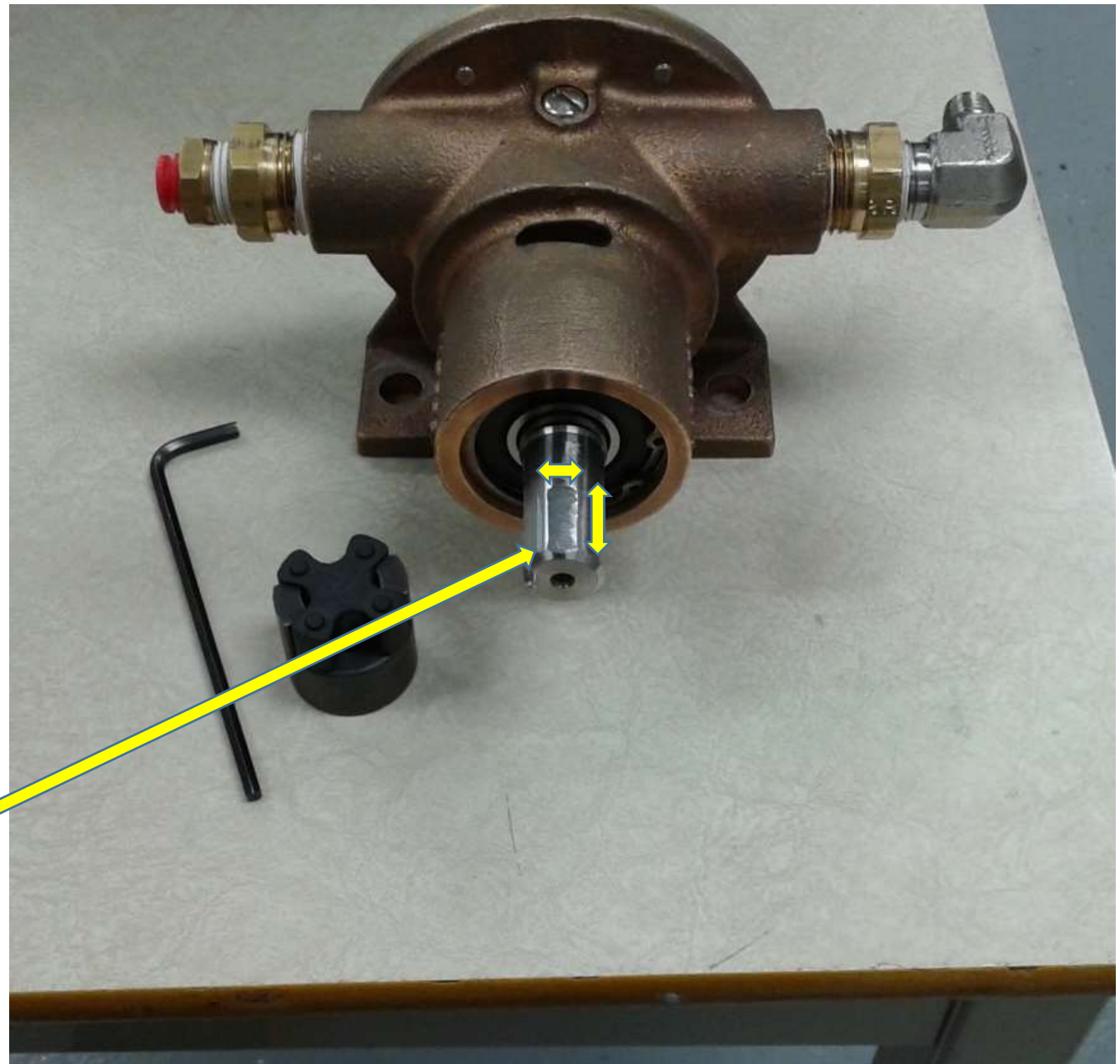
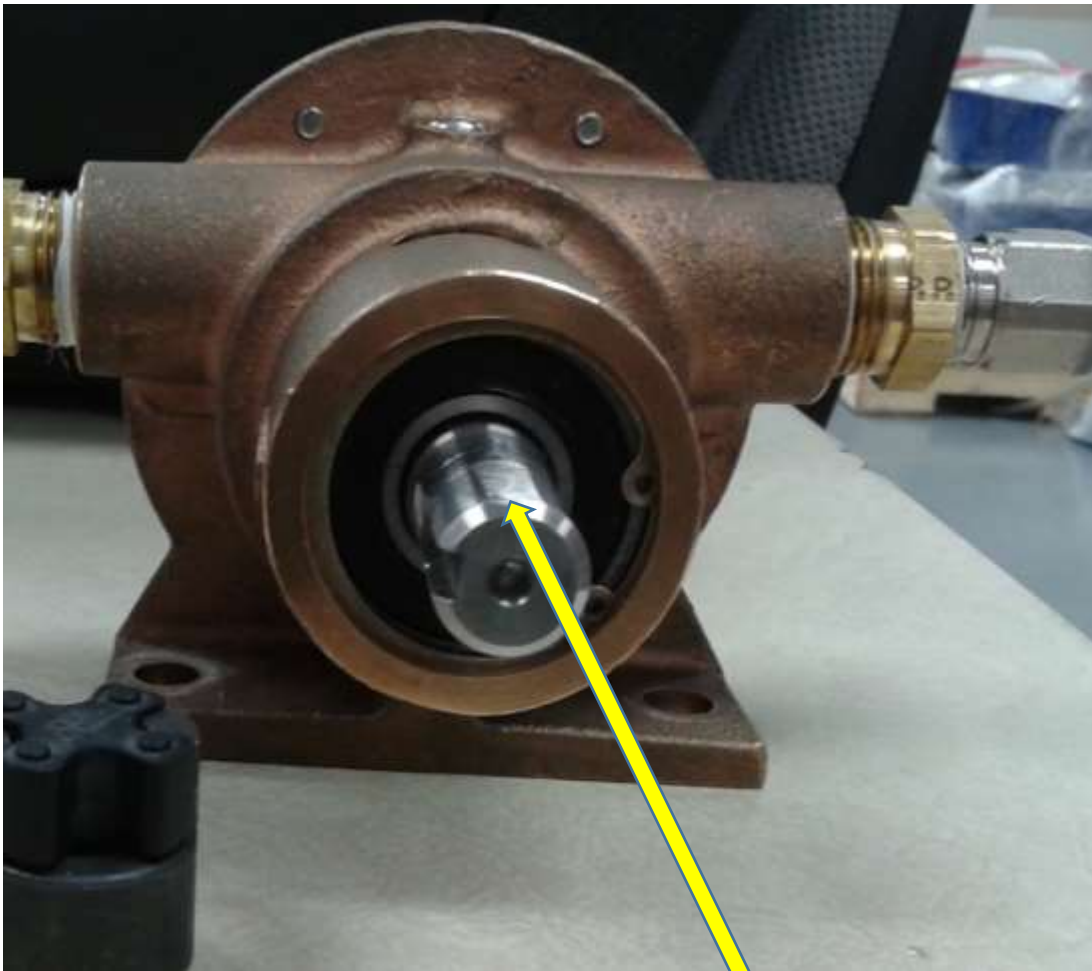


**Install detail #'s 49, 27 & 28  
as per photo on top of detail #9.**

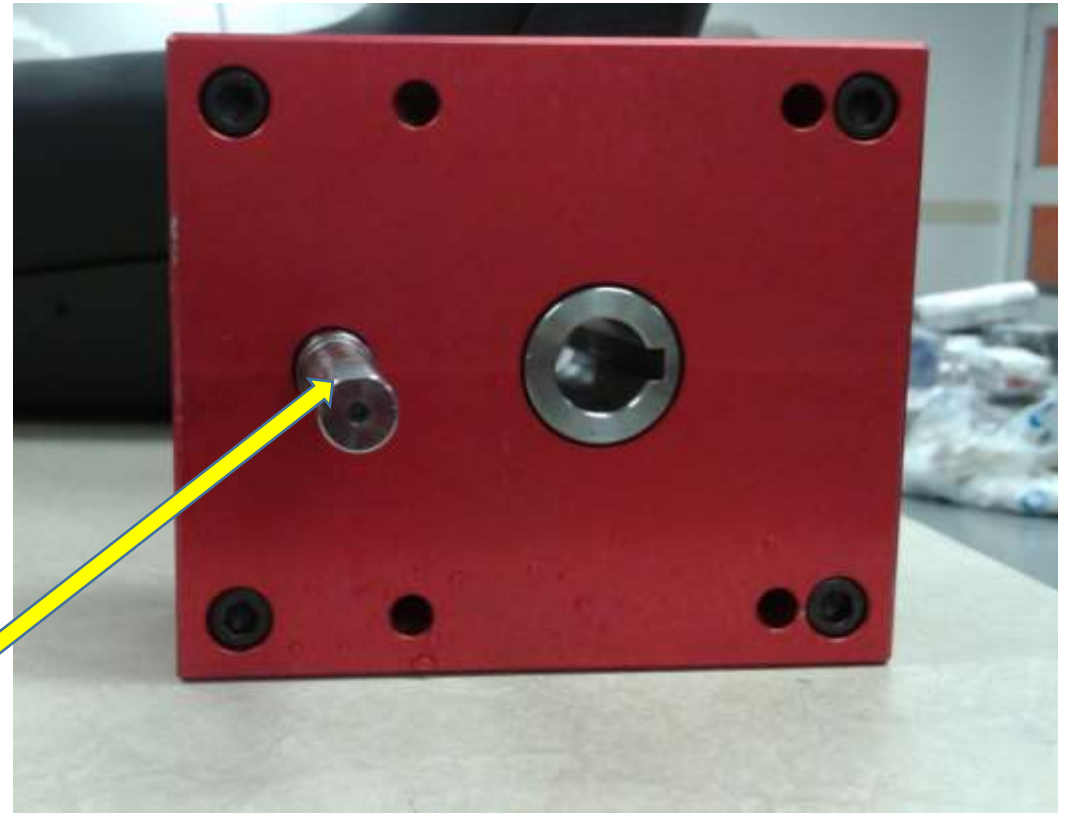
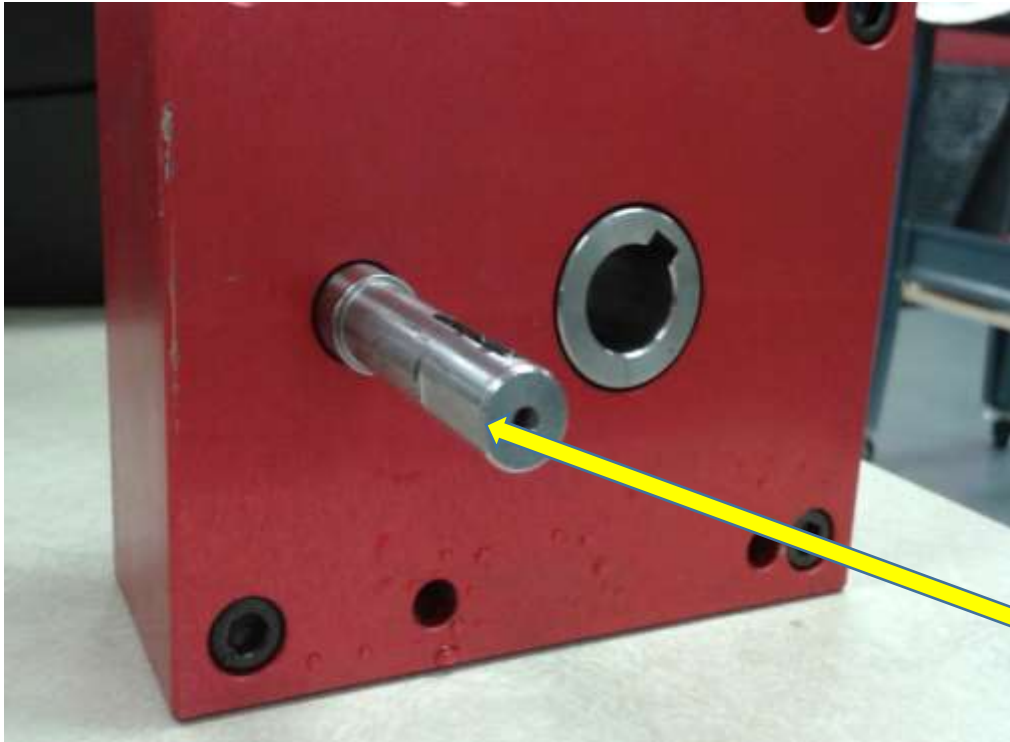


**Detail #7 to be installed within +/- 0.5mm along edge of detail #9 as per photo.**





**File a flat 2mm deep x 12mm long on the positive displacement pump shaft of detail #30 @ 90° to the keyway**

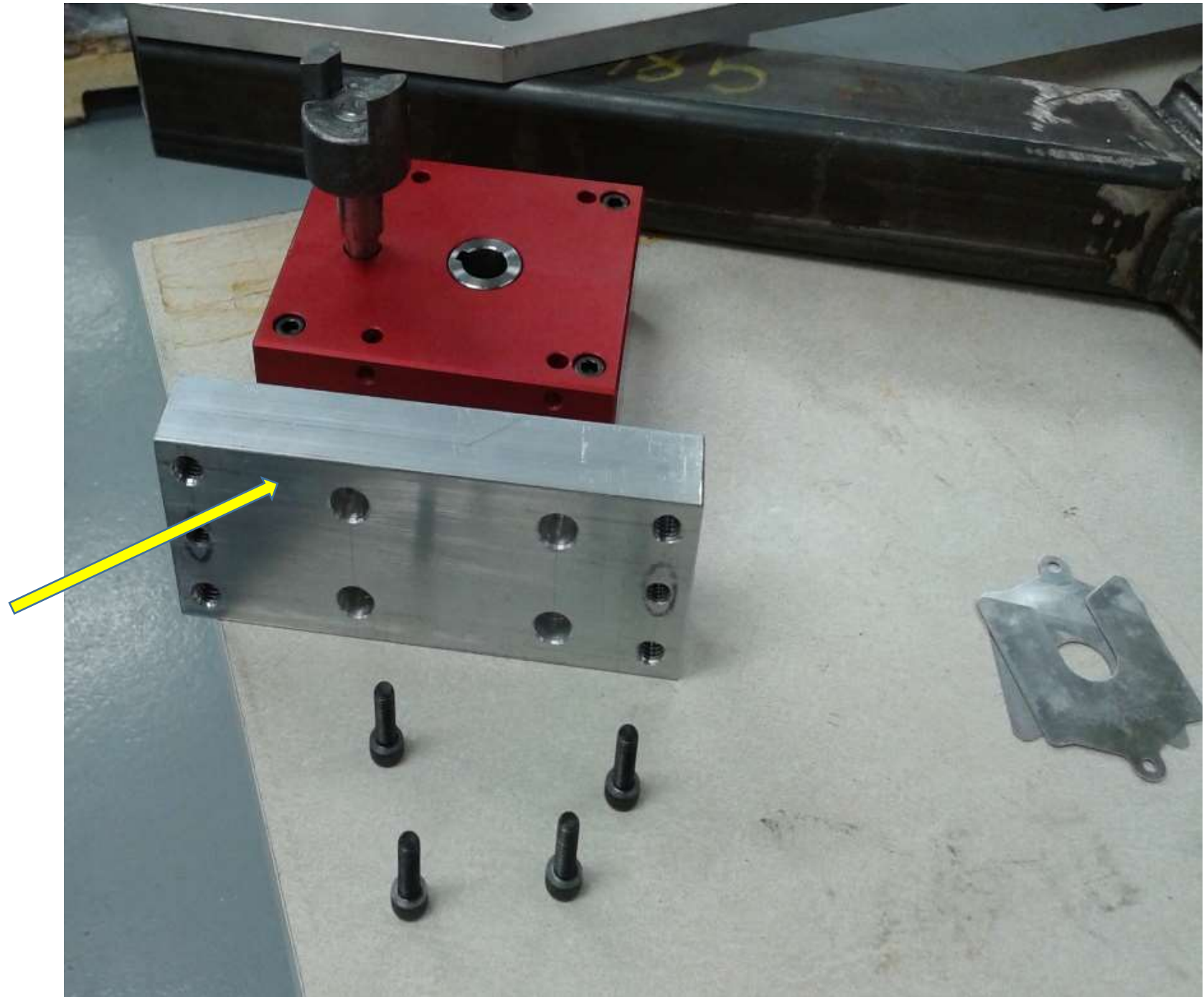


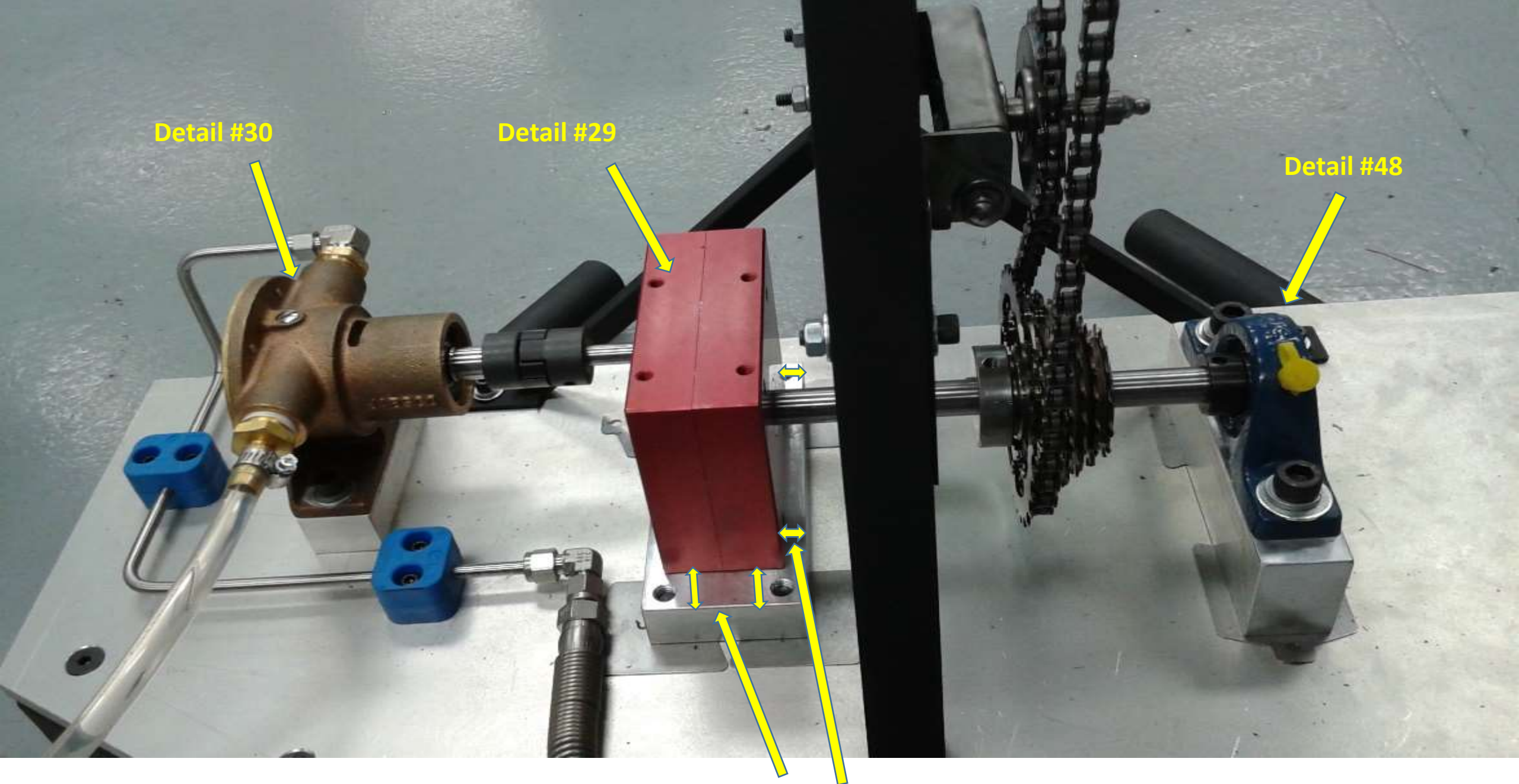
File a flat  
2mm deep x  
12mm long  
on the pump  
shaft of  
detail #29 @  
90° to the  
keyway





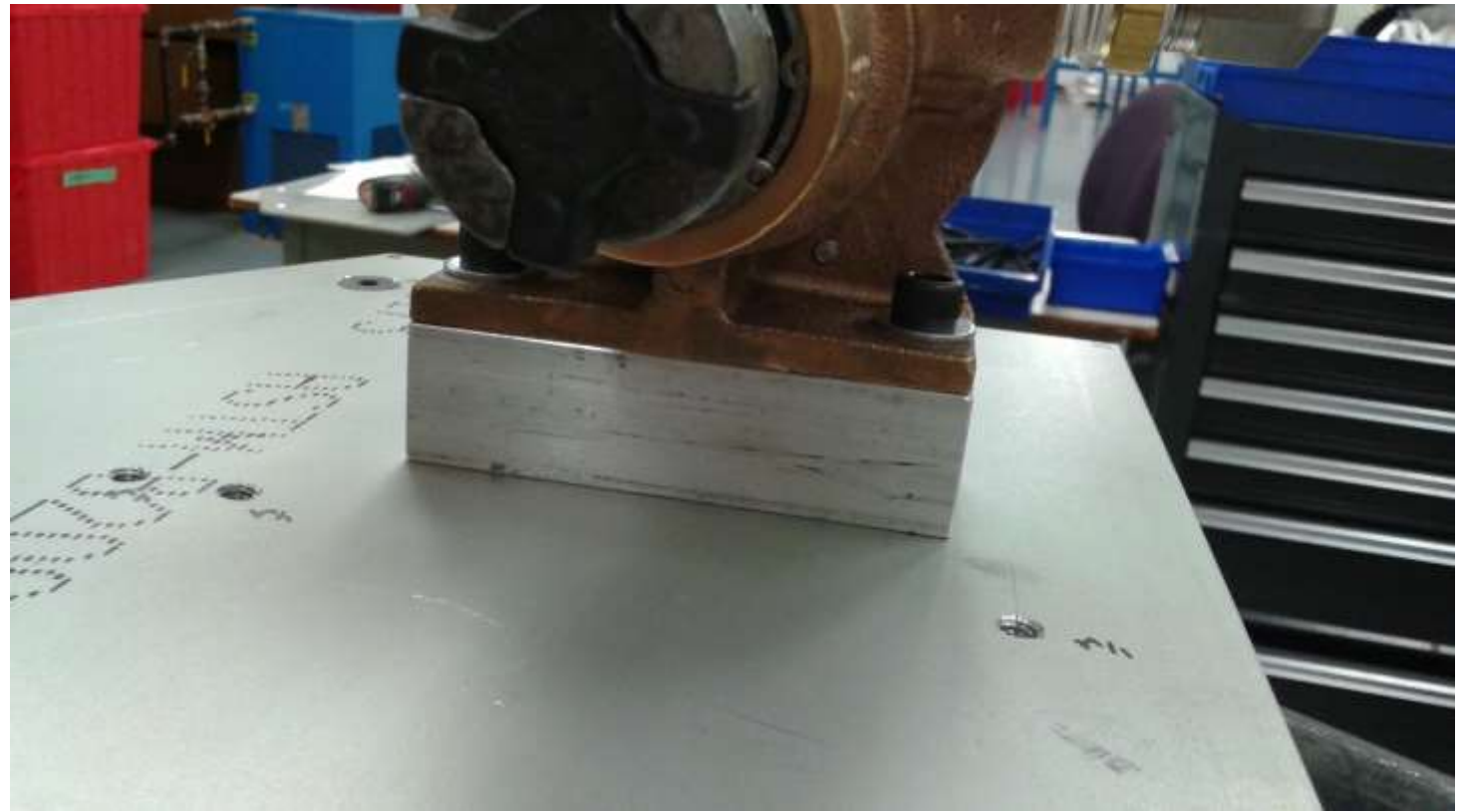
**Install detail #6 to detail #30  
(4 M6 x 20 SHCS & 4 M8 x 40 SHCS  
4 washers, 4 lock washers)**





**Install detail #6 to detail #29 equally on one side and one end**



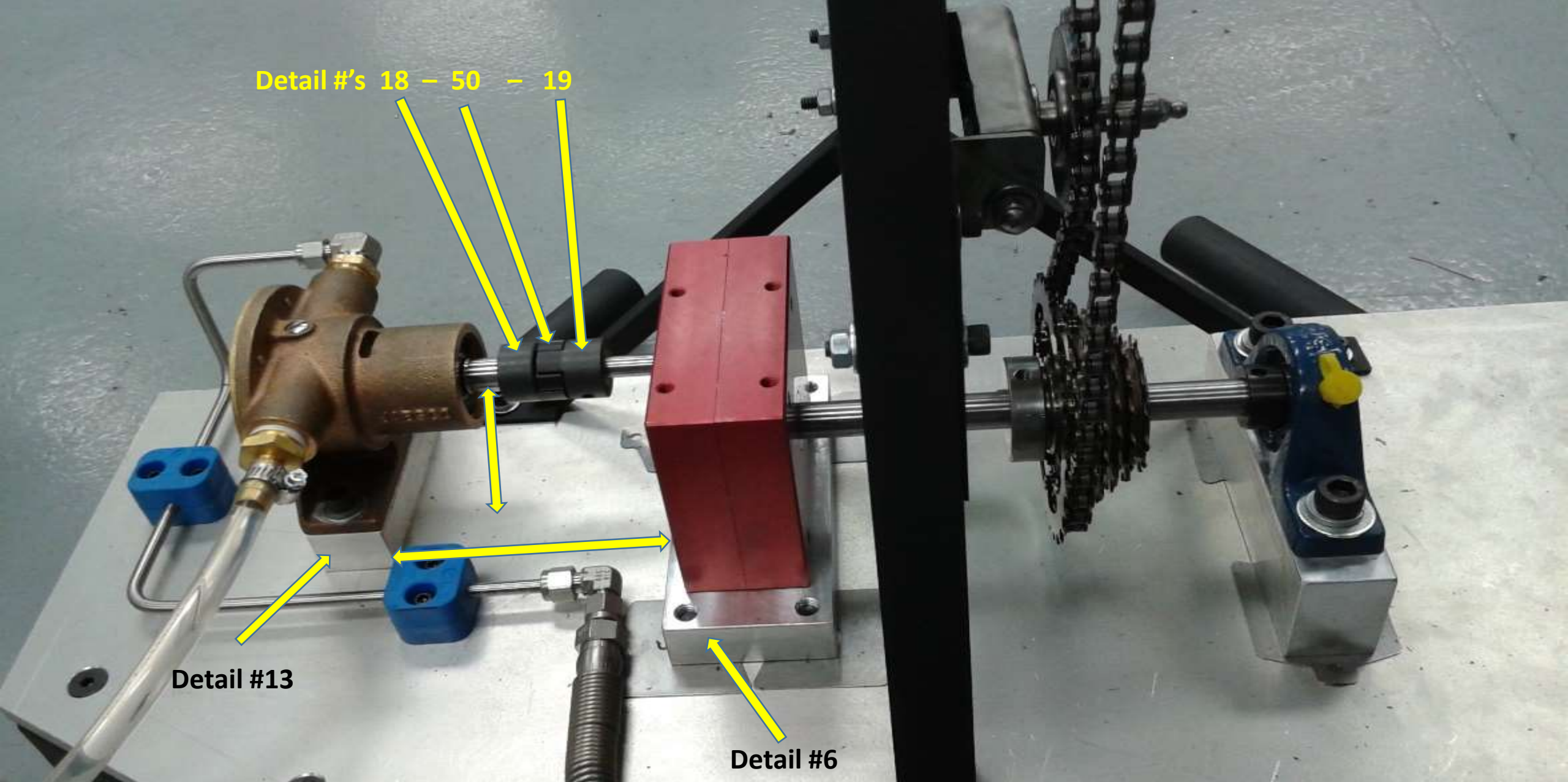


**Install detail #'s 30 & 13 set square off datum edges to +/- 0.12mm. This is the fixed machine. (2 M8 x 50 SHCS, 2 washers, 2 lock washers)**



**Install detail #'s 30 & 13 flush as per drawing**



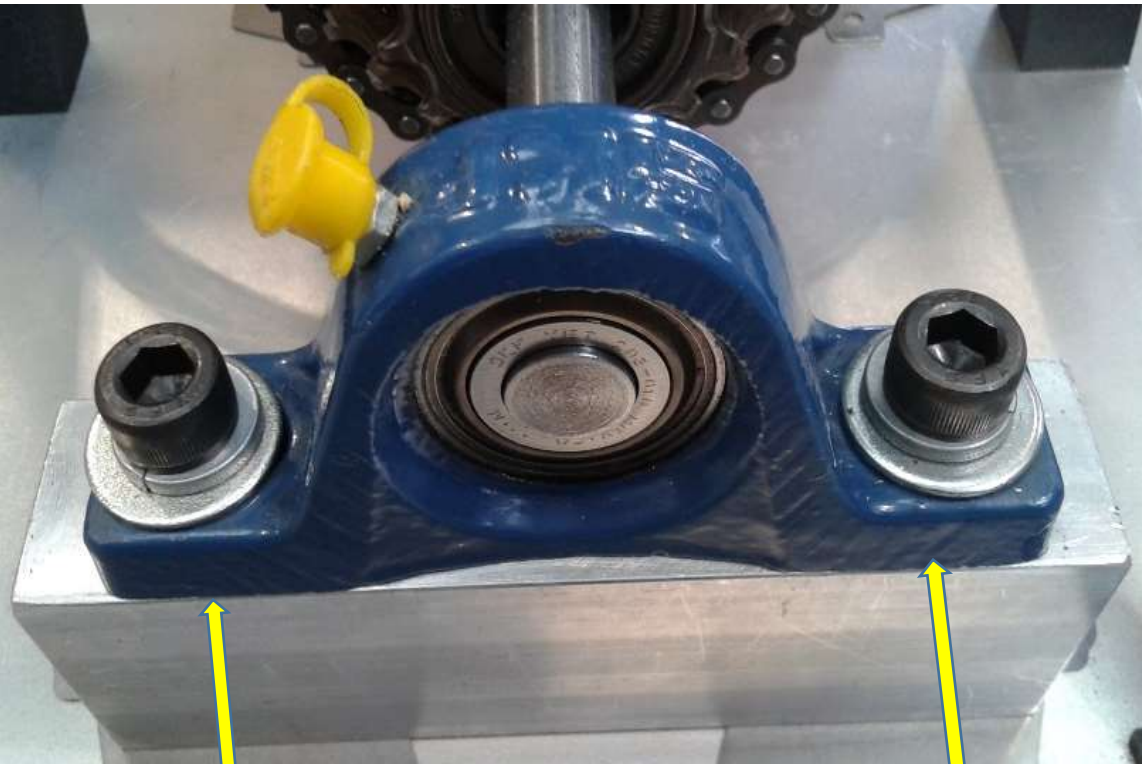


Detail #'s 18 - 50 - 19

Detail #13

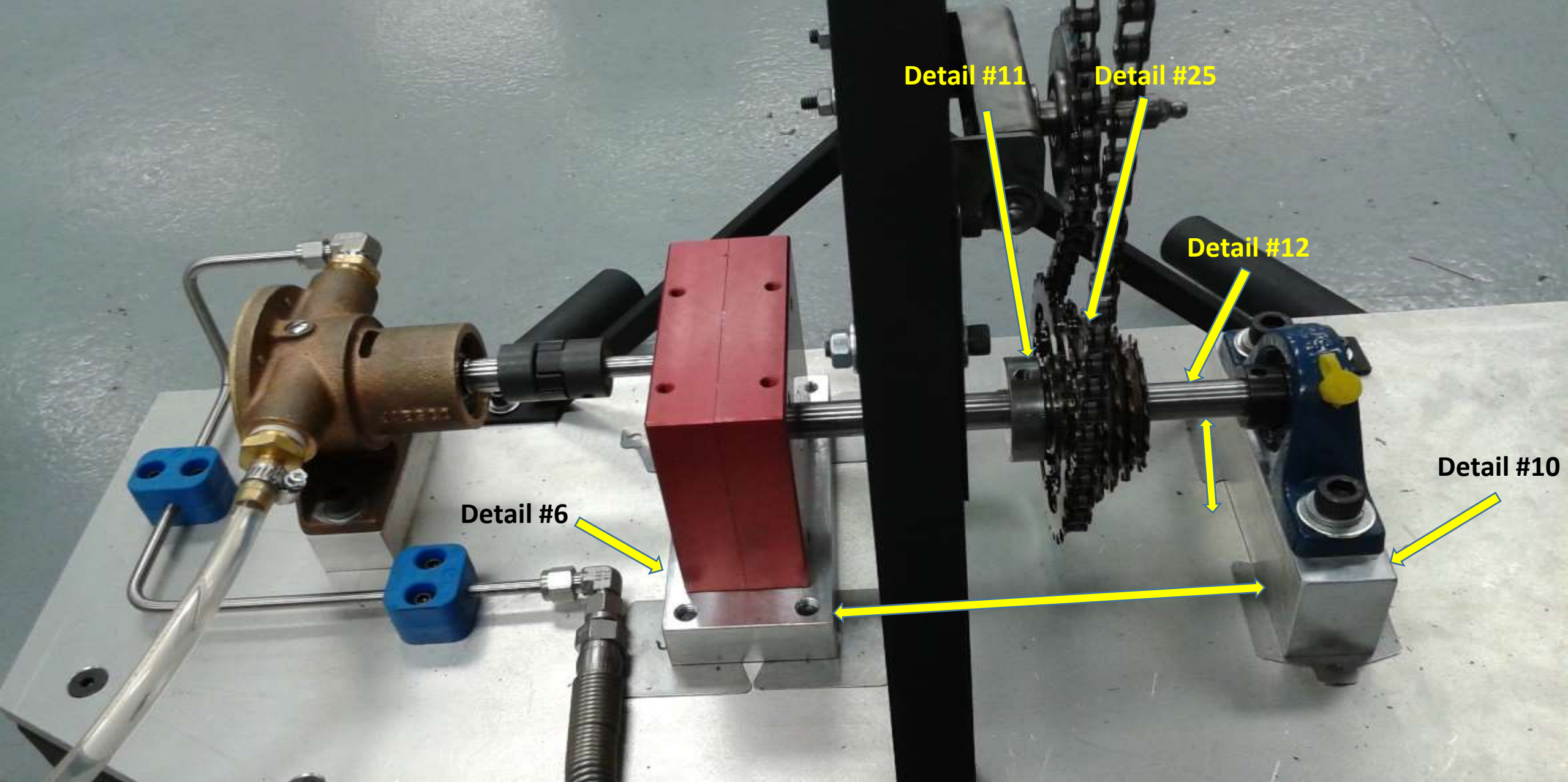
Detail #6

**Install details 18, 19. Install details 29 & 6. Align by hand detail #'s 6 & 13 in the horizontal and vertical to a tolerance of +/- 0.12mm, using supplied tooling.**



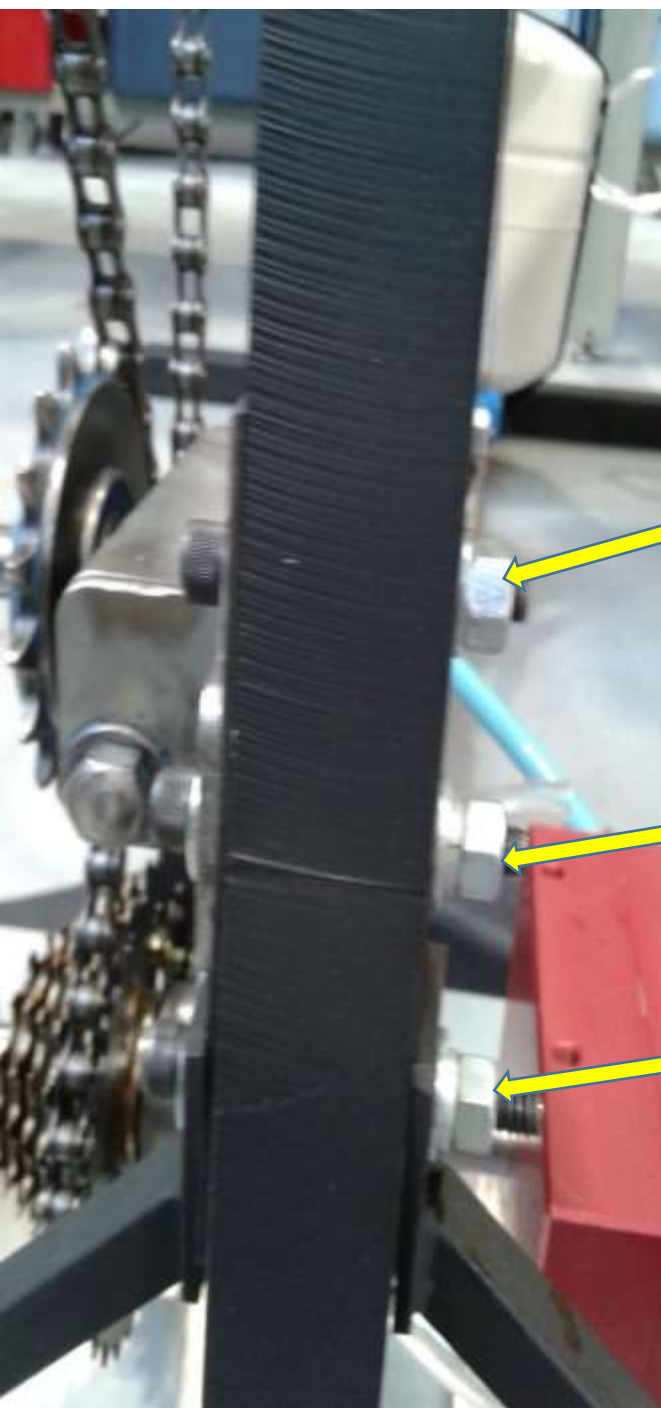
**Install detail #'s 10 & 48 flush as per drawing  
(2 M10 x 25 SHCS, 2 washers, 2 lock washers, topside.  
2 M10 X 25 SHCS, 2 washers, 2 lock washers underside)**





**Install detail #'s 11, 12, 25. Align by hand detail #'s 6 & 10 in the horizontal and vertical to a tolerance of  $\pm 0.12\text{mm}$  using supplied tooling.**





2 M6 x 40 SHCS, 2 nuts, 4 washers, 2 lock nuts

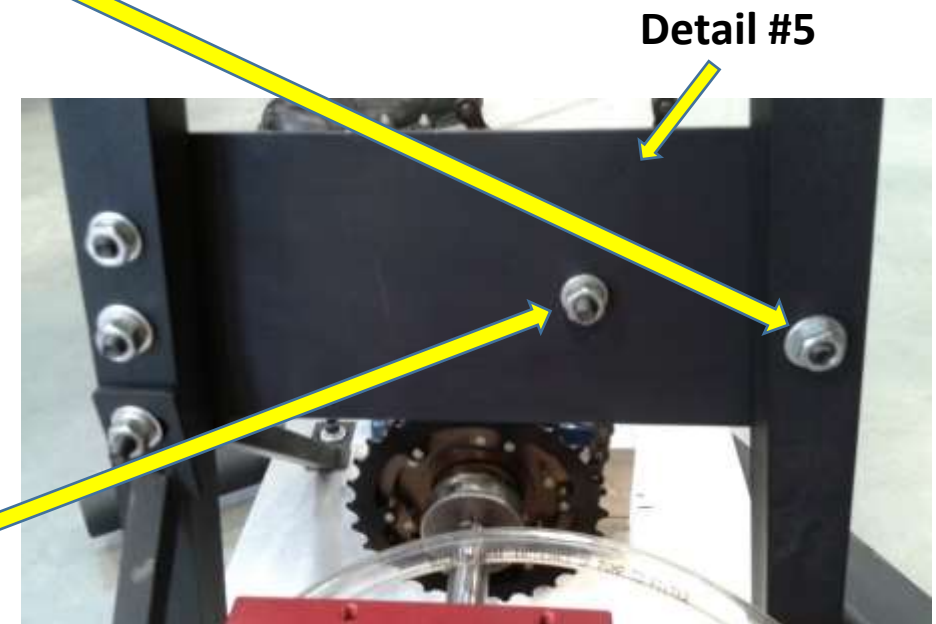
1 M6 x 45 SHCS, 1 nut, 2 washers, 1 lock nuts

1 M6 x 50 SHCS, 1 nut, 2 washers, 1 lock nut

1 M6 x 20 SHCS, 1 nut, 2 washers, 1 lock nut



Detail #26

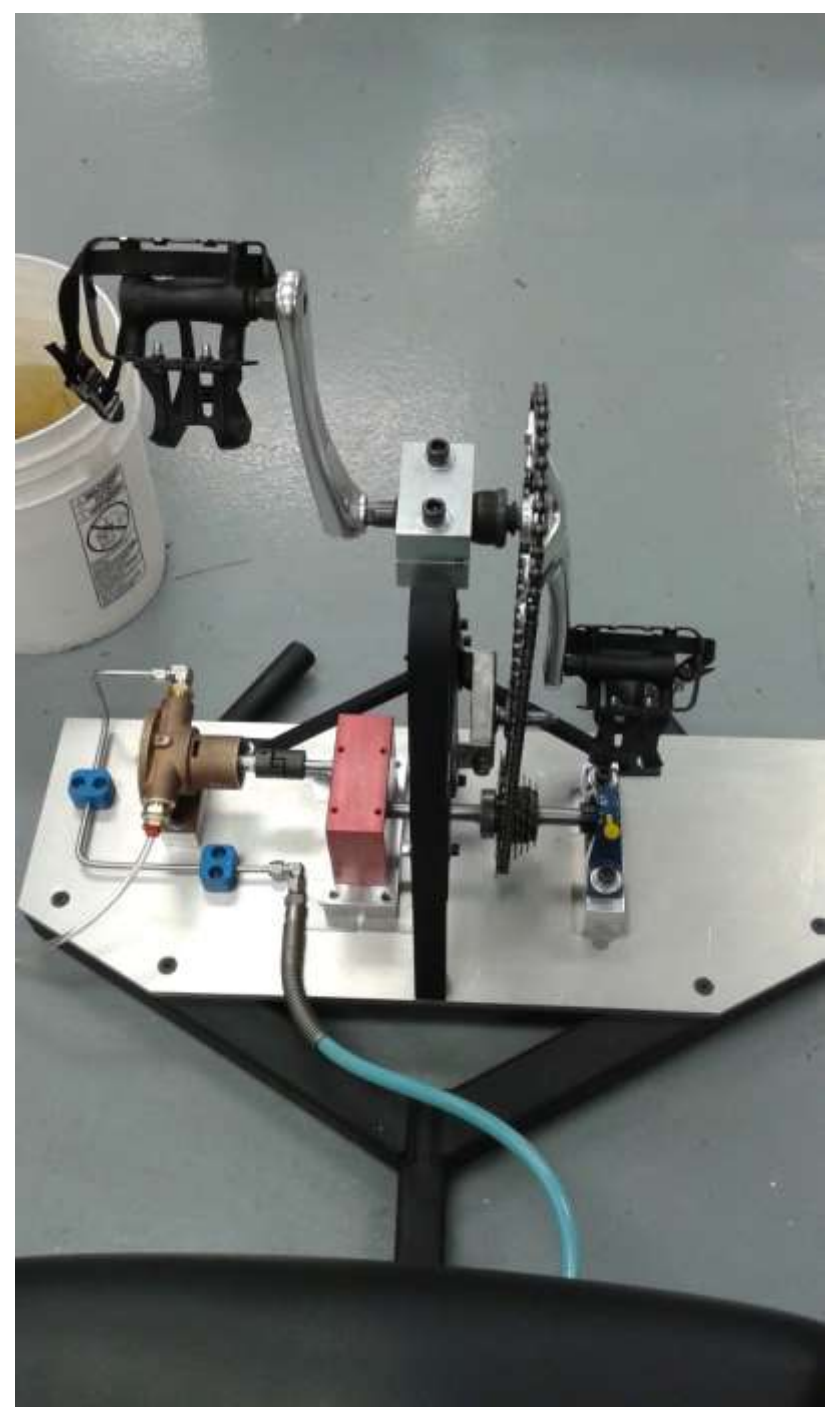
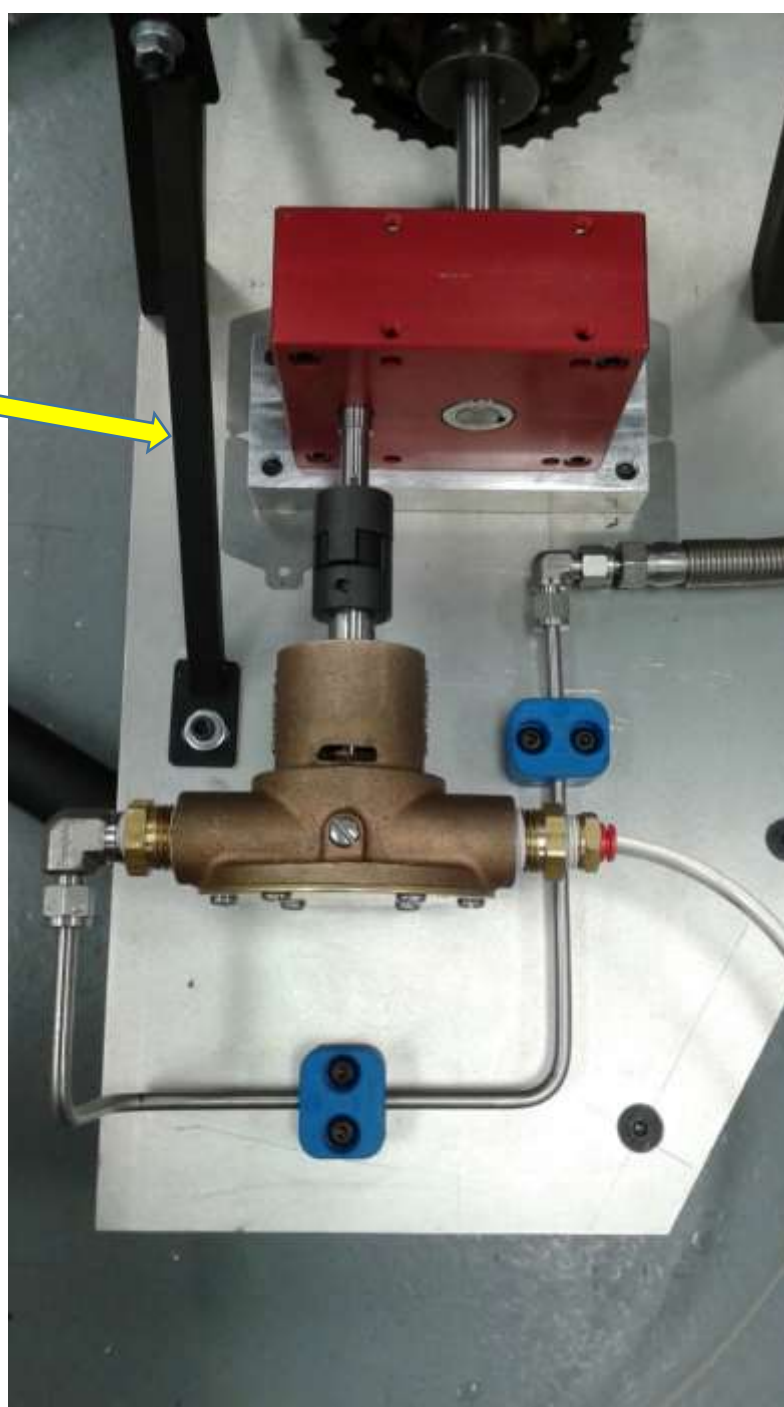


Detail #5

**Detail #14 x 2 reqd.**

**(2 M6 x 25, 2 washers)**

**Detail #14 x 2 is installed only after the  
Power Transmission Plate has been  
completely built.**



# **Worldskills IMM Skill # 48**

## **Chain Drive Alignment**

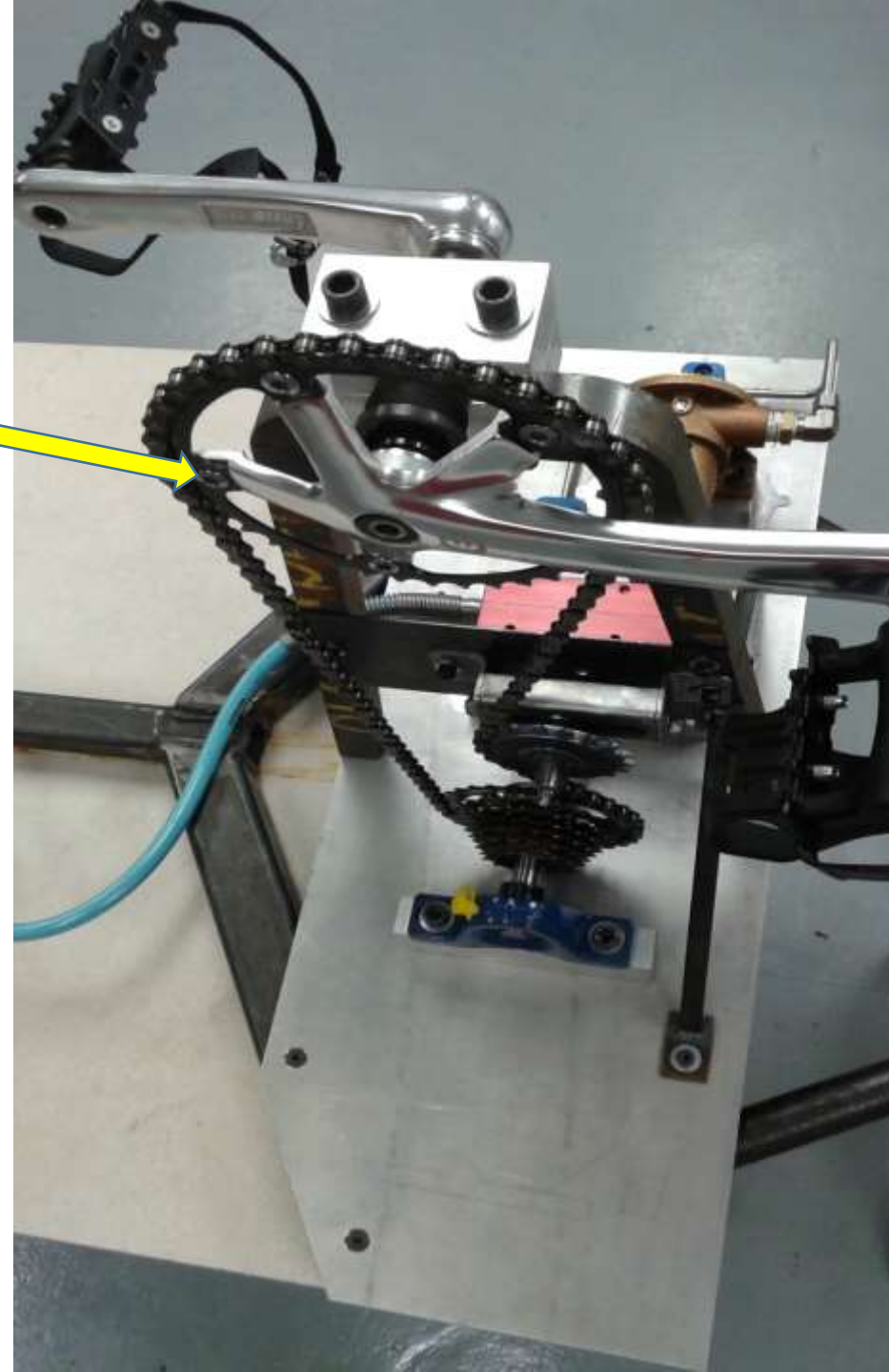


The competitor must remove the lower Chain Set bolt to allow for the PAT holding fixture to sit “flat” for alignment

The competitor must choose the correct sprocket to align on the driven gear block that will achieve a Driver/Driven 1:1.5 overdrive

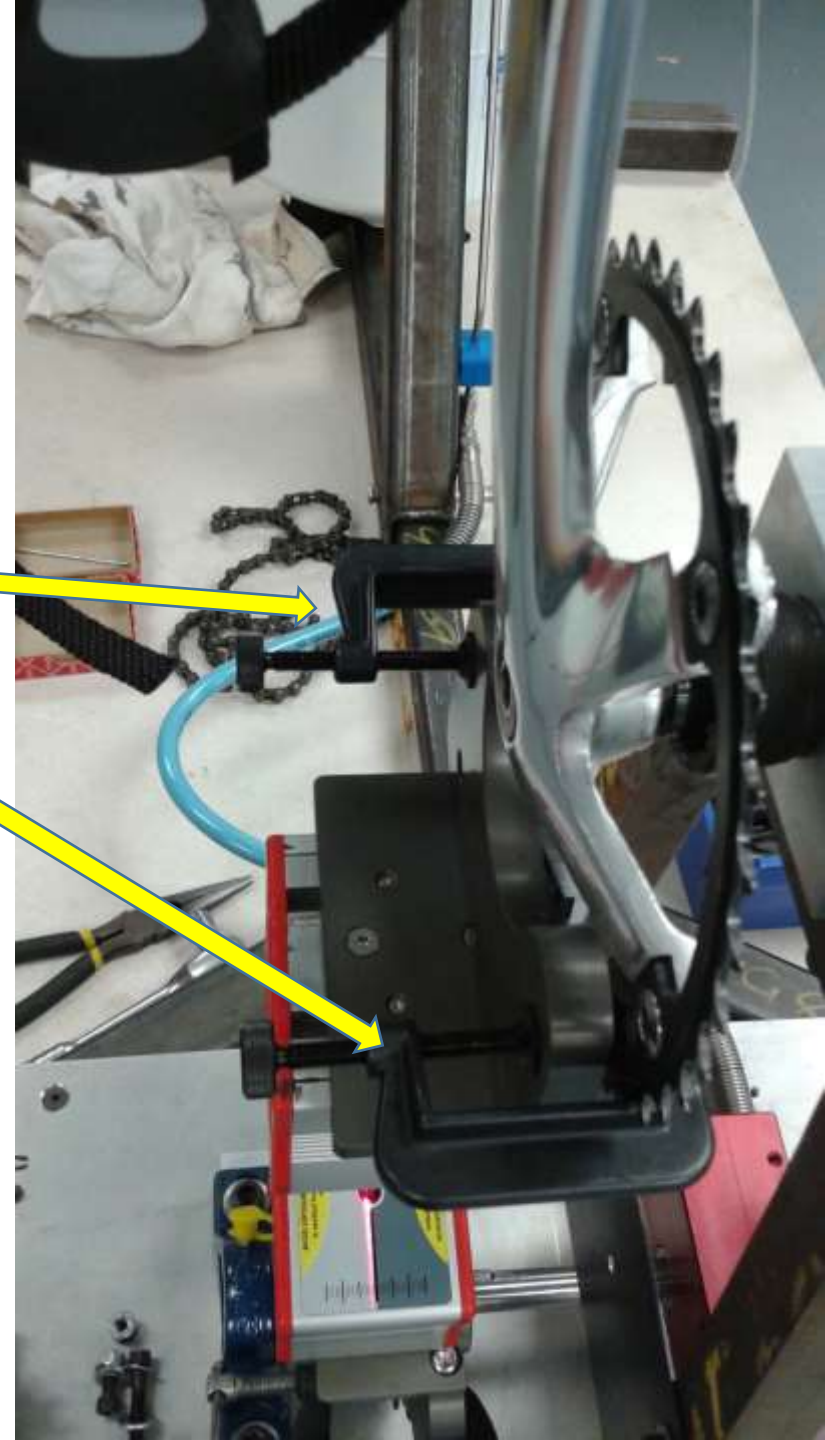
After the PAT alignment is complete and signed off by the Experts.

The competitor requests the bicycle chain from the Workshop Manager. The competitor has to cut the chain to the required length and adjust to 4% chain slack for the chain drive.



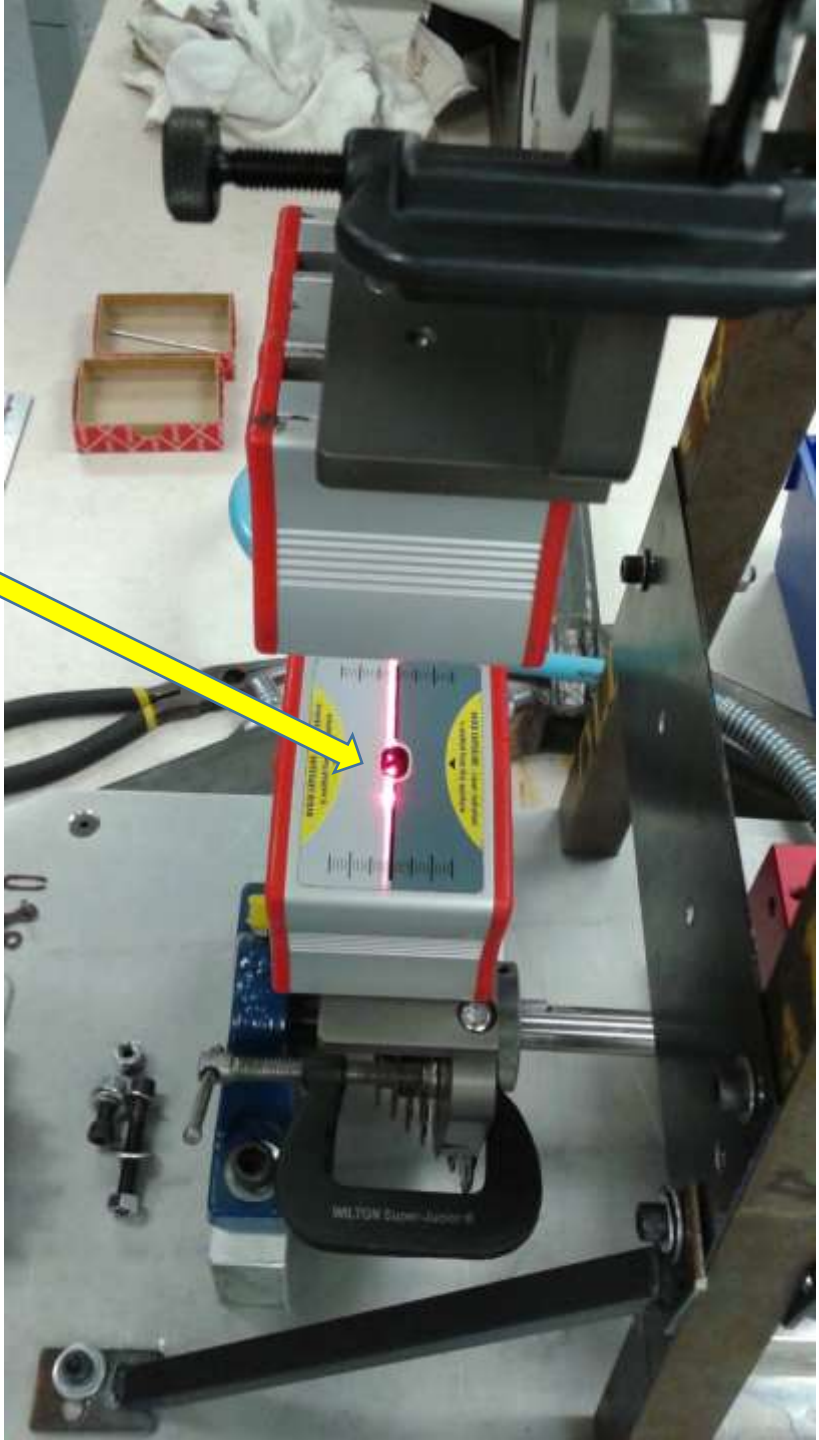
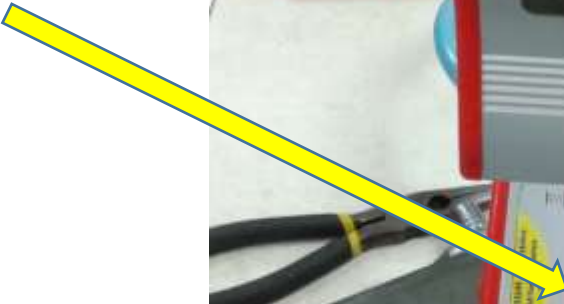


Use the supplied "C" clamps (4) to attach the (2) top and (2) bottom PAT Laser Alignment Tool on Details #'s 25 & 27



**When alignment is complete as per photo call Experts to verify**

**Tolerance +/- 1.00mm**

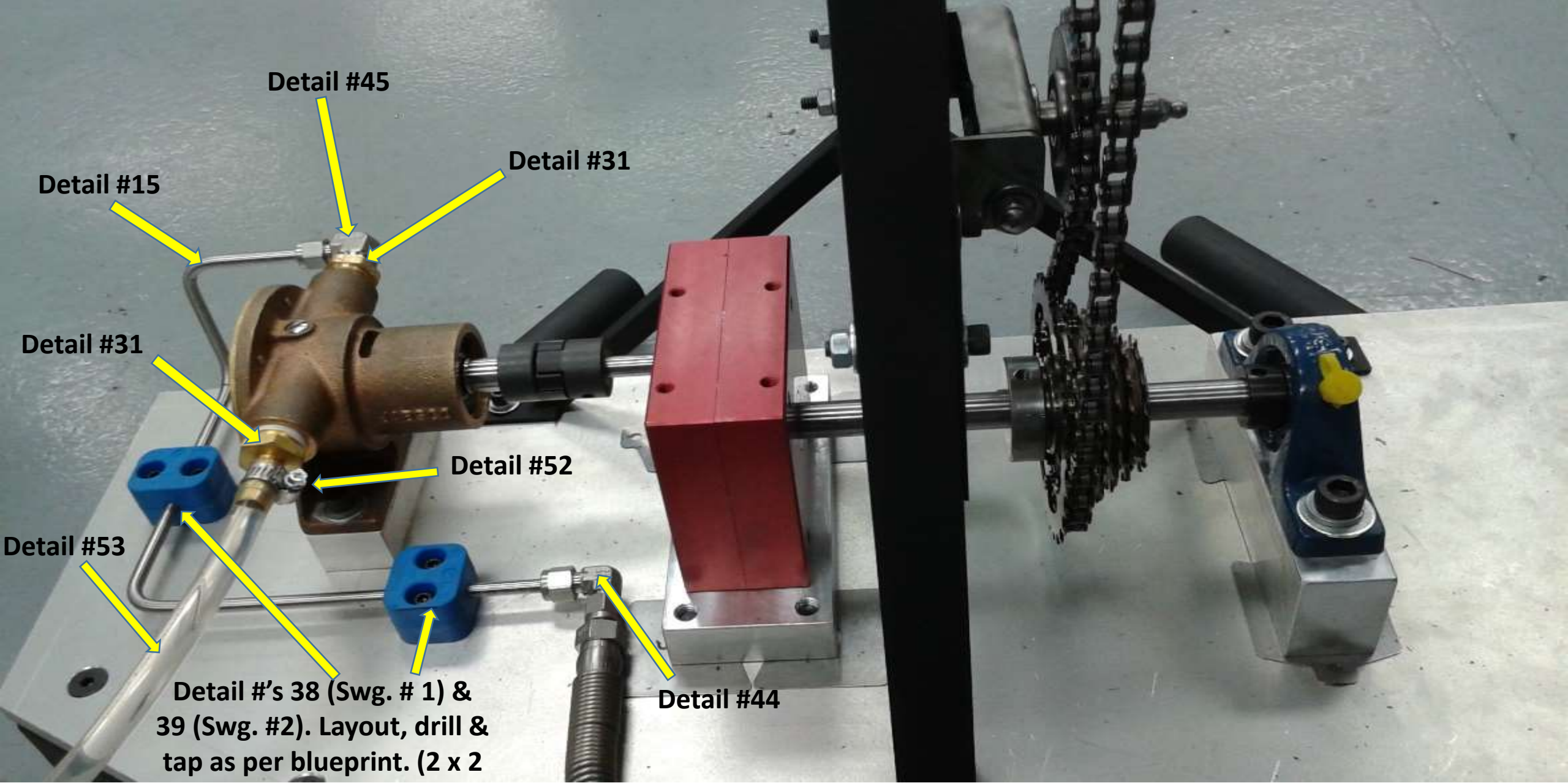






# **Worldskills IMM Skill # 48**

## **Stainless Steel Tube Bending.**



Detail #45

Detail #31

Detail #15

Detail #31

Detail #52

Detail #53

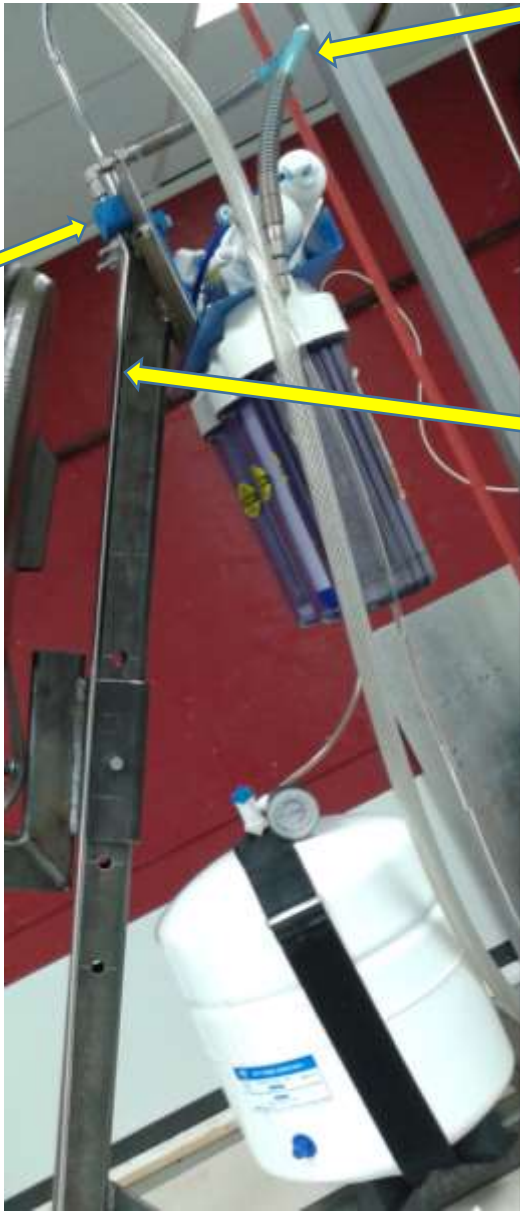
Detail #44

Detail #'s 38 (Swg. # 1) &  
39 (Swg. #2). Layout, drill &  
tap as per blueprint. (2 x 2  
M6 x25)

Tube bending tolerances for detail #'s 15 & 16 is  $\pm 2.00$



Layout,  
drill, tap &  
install  
Detail #40  
(Swg. #4)  
2 M6 X 25  
SHCS



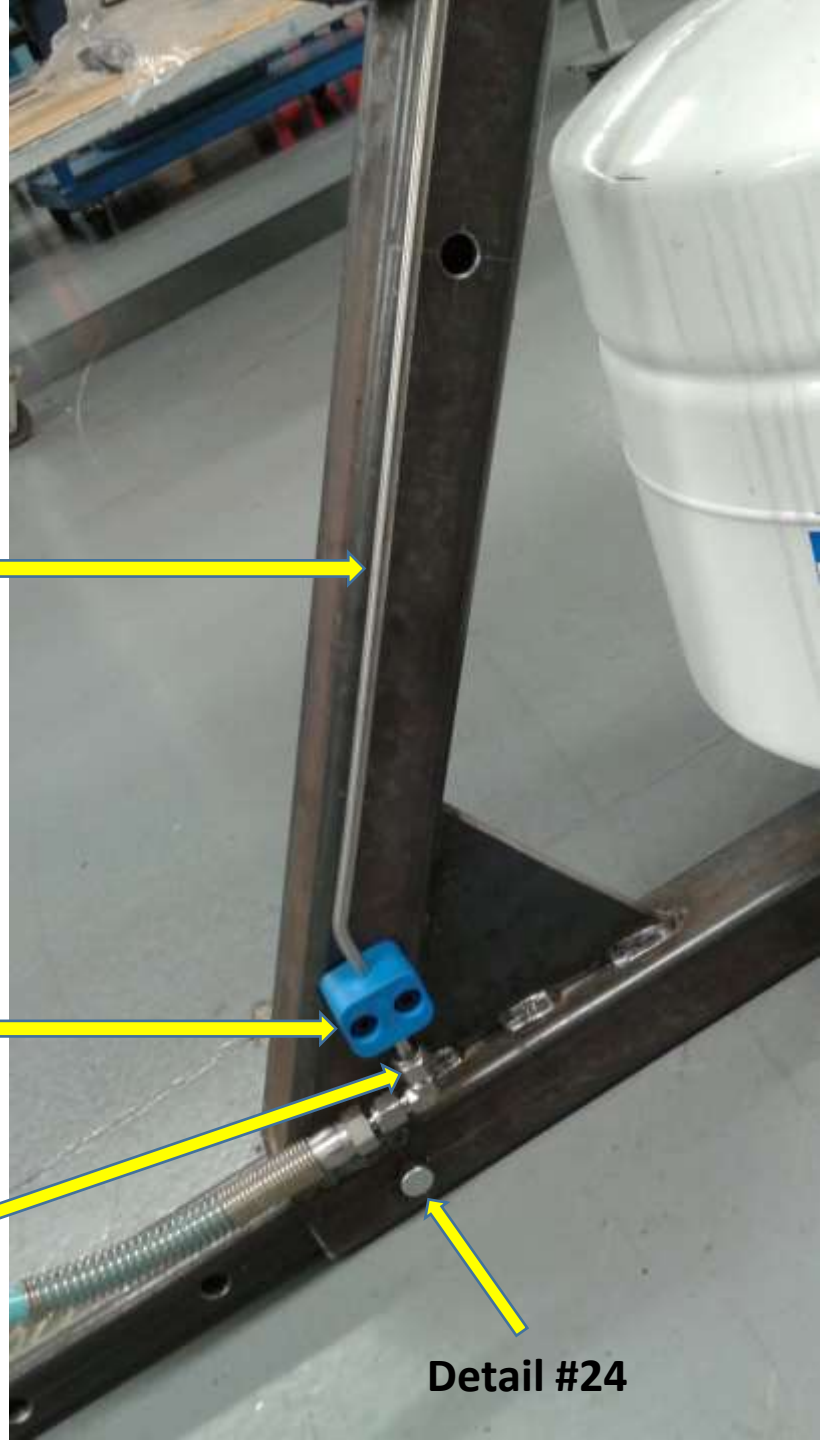
Detail #42

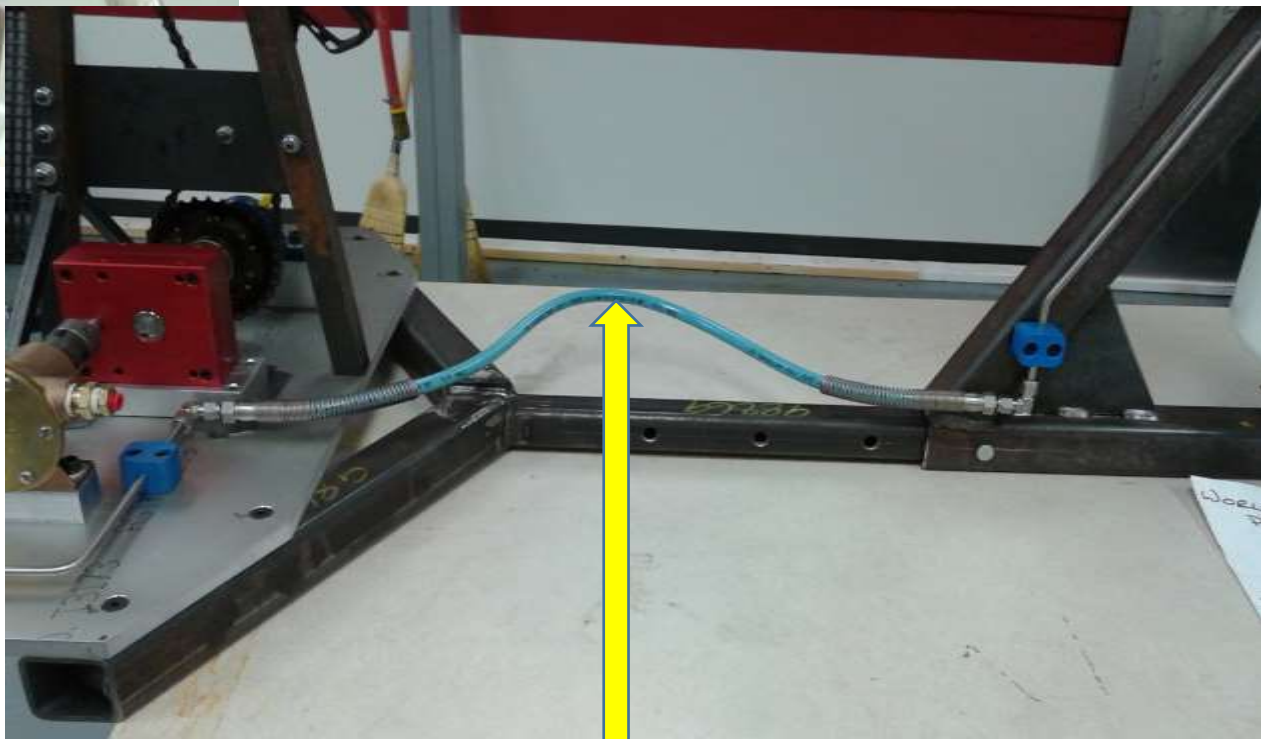
Detail #16

Layout, drill, tap &  
install Detail #39  
(Swg. #3)  
2 M6 x .75 X 25  
SHCS

Detail #44

Detail #24





**Detail #41**



# **Worldskills IMM Skill # 48**

**Filtration:**

**Tubing, Filter, Check Valve.**





**Detail #34**

**Detail #51 (6 reqd.)**

**Detail #33**

**Detail #52**

**Detail #52**

**Detail #35**

**Detail #52**

**Detail #52 (Each section. 4 reqd. 1500mm long)**

**Note: NOT TO SCALE**