Ultra Violet Curing System F600S - I606/P600M

CONTENTS

CONTENTS (CONT'D)

Introduction

The Ultra-Violet (UV) curing system is used to cure the resin applied to the fibre after it has passed through the coating applicator and comprises a lamp generating radiation concentrated in the 200-400 nanometer range.

The fibre passes through a quartz tube within the lamp and the exposure to UV light causes almost instantaneous curing of the resin coatings. The system is cooled by air drawn across the lamps with the flow rate being controlled by damper valves.

(Drawing numbers 380185A, 380113A, 189081A, 284023A, 288569A, 288604A, 288611A, 288612A, 380836A and EL83090 3rd party documentation refer).

Description

Located below the concentricity monitor the lamp is installed on a UV lamp mounting plate. The lamp assembly, installed on a sub plate, is mounted on the tower face plate. The system comprises the following components :

1. A I606 irradiator
2. A DRF10T2 optical fibre light shield

Note *Items 1 & 2 comprise the lamp module*

3. A P600 power supply

4. An EIT online monitoring system

5. Lamp module cooling supply and extraction ports

6. Nitrogen supply and curing by product extraction ports

Lamp Module

The lamp module contains an electrodeless quartz lamp bulb, mounted at the focus of an elliptical reflector and a magnetron which energises the bulb. Rectangular slots at the top and bottom of the reflector admit microwave energy generated by two magnetrons. A fine mesh Radio Frequency (RF) screen covers the reflector, contains the microwaves and allows the UV light to pass through the resin coating curing region.

Lamp Bulb

The quartz lamp bulb has a tapered shape which optimizes it's UV, thermal and microwave properties. The short stub ends provide mechanical support for mounting into spring loaded mounts within the elliptical reflector.

Ignitor Bulb

The Ignitor bulb is designed to provide positive ignition of the main bulb. When magnetrons are energized a probe projecting into the waveguide intercepts enough energy to ionize the ignitor bulb which creates the small amount of UV radiation required to ignite the main bulb.

Quartz Liner Tube

The quartz tube isolates the fibre from buffeting by the cooling air, surrounding it with a blanket of nitrogen to prevent oxygen inhibition of coating surface cure and preventing curing byproducts from contaminating the lamp. The tube spans the lamp and protrudes from the top into a fume extract assembly terminating in a bell mouth. This facilitates the threading operation and avoids buffeting of the fibre by the extract flow. The tume protrudes from the bottom of the lamp into the nitrogen input housing. Seats around the tube in the fume extractor and nitrogen input prevent the nitrogen from being sucked into the cooling air.

Electrical Power Supply

Each lamp has its own power supply unit (PSU) on the front of which is a display and a control panel. The PSU houses the high voltage power supply required to energise the magnetron units, all control and interlock electronics. In the event of a system malfunction the control system provides high voltage power cut off to the lamps, flashes a fault indication on the power supply control panel and generates an error message on the status display. Cooling is provided by two internal cooling fans. All electrical connections to the PSU are made through connectors at the rear of the unit.

The high voltage circuit consists of two identical triple half-wave voltage doubler circuits which supply a regulated source of high voltage power to the two lamp magnetrons. The capacitors and diodes provide regulation and rectification to the high voltage transformer outputs and a control transformer provides 240V power for the control card and magnetron filament units.

The PSU's are mounted within a separate UV PSU cabinet located adjacent to the fibre draw tower.

System Controls

System Status Display

The liquid crystal display (LCD) has two rows of sixteen characters each providing status information and error messages.

Power Switch

This switch turns on 240V power to the control circuits

Lamp Controls

The two lamp control switches work together to control which components are energised. Selecting the **lower** switch to the RESET position enables the system, on application of power, to initialize the control card and all other components, including safety devices, in the correct sequence. The RESET position of the **lower** switch is used to reset the system after a fault.

When RESET is shown on the LCD display the **lower** switch may be turned to START supplying 240V to the magnetron filaments.

The **upper** lamp switch determines when high voltage is directed to the magnetrons to energize the UV bulb. Selecting the **upper** switch to the STANDBY position enables the system, on application of power, to carry out a start-up sequence without producing UV light. Turning the **upper** switch to ON (with power setting at Hi) energizes the lamp to its full power.

To turn off the UV output without shutting down the system completely turn the **upper** switch to STANDBY. All interlocks, controls and magnetron filaments continue to operate.

Power Level

Selecting the POWER LEVEL switch to LO position utilizes four ofthe six transformers to energize the magnetrons resulting in approximately 60% of the UV light output at full power.

LED Indicators

LED Colour	Signal	Meaning
RED	Steady	FAULT
AMBER	Steady	RESET
YELLOW	Flashing	Startup sequence in progress
YELLOW	Steady	Interlocks OK
GREEN	Flashing	HV circuits being energized
GREEN	Steady	Lamp in normal operation

RF Detector

Each lamp has a RF microwave detector mounted at the rear of the lamp and pointing towards the irradiator screen. The tip of the sensing cone should be a minimum of 50mm (2”) from the opening of the lightshield / reflector assembly. the RF detector closes the entire system down if microwave energy leakage in excess of 5mW/cm2 is detected. The detector is functionally tested on power up and the interlocks continually monitored while the lamps are in STANDBY or LAMP ON, by the I/O module.

Cooling

Cooling is provided by a continuous flow of air drawn through the lamp. Temperature controlled, filtered air, is ducted into the rear of the lamp case, over the magnetron and into the reflector cavity through the microwave slots and an array of small holes. It then passes through the mesh screen and is exhausted via an adjustable damper valve, a common manifold and a suction fan. Damper valves and an air flow control are fitted to each lamp module to enable the extract rates to be adjusted and optimized to the valves given in the manufacturers manual.

Nitrogen

Nitrogen, supplied from the tower gas supply system, is used to provide an inert environment around the fibre within the lamp to prevent oxygen induced inhibition of resin curing. Nitrogen is introduced at the bottom nitrogen input housing on the lamp and passes up the quartz tube against the fibre direction. It is then

extracted at the fume extract assembly via an adjustable damper and the UV lamp cooling system.

Insufficient extract will result in fumes escaping from the top shutters as visible ‘smoke’ and a pungent odour. Excessive extract will cause a negative pressure at the bottom shutters drawing in air and raising oxygen levels around the fibre and inhibiting surface cure. The damper valves and the air flow control are adjusted to provide the minimum extract to prevent fumes escaping from the top shutters. this adjustment is carried out at low line speed e.g. just after thread up.

Fume Extract

Fumes, generated at the UV lamp, are a by product of the UV curing process. The UV lamp fume extraction system comprises a pair of concentric, perforated tubes, the inner tube sliding within the outer until the necessary air flow required to achieve efficient UV lamp fume removal is achieved.

Alignment

The zone of maximum radiation intensity of the lamp module irradiators is very small (approximately 1mm at the focal point of the reflectors). Correct alignment of the lamp on the tower fibre line is critical.

Operation

Safety

Warning ***The correct Personal Protective Equipment (PPE) is to be worn at all times***

Warning ***Electrical hazard***

- ***Ensure electrical power is isolated before removing / installing or servicing components***

Warning ***Heat***

- ***Surface temperatures of the lamp module exceed 49 deg C (120 deg F) during operation***
- ***Operate module in STANDBY to cool bulb before servicing***
- ***Wear heatproof gloves***

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- ***Wear heatproof gloves***

Warning ***Ultra Violet (UV) radiation hazard***

- ***The UV curing system emits high levels of UV radiation which will cause damage to the eyes and skin. The danger is greatest during thread up***
- ***UV filter glasses are to be worn when in the vicinity of the lamps***
- ***Do not stare directly at the open apertures when the lamps are on***
- ***Personnel are to thread up with the lamps at minimum power setting (25%) and with only one lamp per stack switched on***
- ***Care is to be taken when monitoring and adjusting the UV lamps during the process run***

Warning Radio Frequency (RF) radiation hazard

- ***Microwave leakage detectors, interlocks and irradiator screens are to be regularly inspected for damage and replaced if found defective***

Warning Fibre fragments

- ***Rubber gloves are to be worn during thread up***
- ***Any fibre fragments penetrating the skin are to be removed before they become broken off short. Appropriate first aid is to be applied***

Operating Procedure

1. Ensure the UV cooling extract fans are turned on
2. Place all lamp module PLC'as in the ON position
3. Initialise the UV system from the PC touchscreen. This places the PSU's in the STANDBY position.
4. Immediately prior to thread up turn on the top UV lamp of each stack from the PC touchscreen or local paradigm panel.
5. Carry out the thread up procedure.

Operation and sequencing of the UV lamp modules, once thread up has taken place, is dependent upon line speed and automatically controlled from the tower control console PLC control system.

Fault Diagnosis

Details of faults, fault numbers and appropriate corrective action may be found in the manufacturers OEM.

Maintenance

Warning ***Personnel are to comply with the warnings given in this section at all times***

Warning ***Methanol***

- ***Methanol is toxic if ingested and can be absorbed through the skin on prolonged exposure***
- ***Imperbeable gloves are to be worn***

Warning ***Resin Spillage***

- ***Do not operate the lamp module if it is heavily contaminated with resin spillage***
- ***Isolate the module, strip down and inspect for internal resin contamination***

General

The UV system requires on condition serviceing dependant upon the results of routine maintenance inspections.

Routine

The following inspection and servicing procedure is to be carried out. The frequency of the inspection and servicing may vary dependant on tower usage, cleanliness of the cooling air and the working environment.

Before every start up attempt

1. Ensure shutter doors are clean and free from resin deposits. Clean with a lint free tissue soaked in methanol if required

2. Clean the quartz liner tube by passing a long handled bottle brush, soaked in methanol, through its length several times, top to bottom

Note *After cleaning ensure the tube is fully seated on the protruding pin in the lamp shutter holder*

After completing a full preform draw

Inspect he quartz tube for discolouration. If any discolouration is present replace the tube

Every 500 hours

1. Clean the surface of the lamp modules with lint free tissues soaked in methanol

2. Inspect and clean as required, using a lint free tissue soaked in methanol, the reflector, UV lamp bulb and RF screen

Every 3 Months

1. Remove dust from the PSU units

2. Replace air filters if required

Quartz tube removal / installation

Warning Electrical hazard

- ***Ensure electrical power is isolated before removing / installing or servicing components***

Perform the following steps

1. Switch off the UV cooling fan or if not possible mark the position of the relevant cooling system damper valves and close them

2. Release over centre latches and swing the lamp stack away from the tower face

3. Remove the UV fume extract assembly from the top lamp

4. Inspect the top and bottom seals for damage or deterioration and replace if necessary

Caution Wear cotton gloves. Touching the tube produces contamination and the need for re cleaning

5. Apply a very thin film of silicone grease to the new tube at the top and bottom where the seals make contact and insert the tube vertically into the stack until the tube is seated on the protruding pin in the UV shutter holder

6. Swing the lamp stack back into place on the tower face and fasten over centre latches

7. Turn the cooling fan on or return the damper valves to their marked positions

RF Screen and Bulb Removal / Cleaning / Installation

Warning ***Electrical hazard***

- ***Ensure electrical power is isolated before removing / installing or servicing components***

Warning ***Heat***

- ***Operate module in STANDBY to cool bulb before servicing***

Caution ***Wear cotton gloves. Touching the tube produces contamination and the need for re cleaning***

Caution ***Wear cotton gloves. Touching the tube produces contamination and the need for re cleaning***

Perform the following steps

1. Disconnect the silicone tubing from the lightshield to the pressure switch tap on the irradiator
2. Release the two over centre latches and remove the lightshield
3. Remove the eight RF screen retaining screws
4. Remove the screen. Inspect for damage and replace if necessary
5. Grasp the lamp bulb at one end and apply axial pressure towards the other end. Once the bulb is clear of its retaining hole remove from the reflector
6. Clean the bulb using a lint free tissue soaked in methanol
7. Place the bulb into the retaining hole at one end of the reflector
8. Apply axial pressure towards the located end until the bulb can be located in the remaining retaining hole
9. Place the screen assembly in position and locate using eight screws tightened to 0.88Nm (8.0 in lbs)
10. Install the lightshield and fasten over centre latches
11. Connect irradiator pressure switch silicone tube to the lightshield

Reflector Removal / Installation

Perform the following steps

1. Remove the lightshield, RF screen and lamp bulb in accordance with the RF screen and bulb removal / cleaning / installation procedure

2. Remove the four flat head screws and remove the reflector

3. Remove and discard the four gasket strips. Clean gasket grooves if required

4. Remove and discard the two end reflectors and gaskets

5. Remove the self adhesive protective material from the reflective side of the two replacement end reflectors. Ensure all adhesive is removed using a lint free tissue soaked in methanol if required

6. Insert both end reflectors ensuring they are fully sealed

Caution ***Wear cotton gloves. Touching the tube produces contamination and the need for re cleaning***

7. Install the four pre cut RF gaskets into their grooves ensuring the end s are flush with top of the mounting surfaces

8. Remove the self adhesive protective material from the replacement reflector. Ensure all adhesive is removed using a lint free tissue soaked in methanol if required

9. Install reflector ensuring it does not bind on the end reflectors during installation

10. Tighten the four screws sequentially clockwise ensuring the reflector face is flush with the two end reflectors

11. Clean the reflector and end reflectors using a lint free tissue soaked in methanol

12. Install the lamp bulb, RF screen and lightshield in accordance with RF screen and bulb removal / cleaning / installation procedure#

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	D00613	FAN 23 m3/min 5500 Pa 3.3kW 400V 3PH 50Hz
2	1	D00614	FAN 28 m3/min 1000 Pa 0.5kW 400V 3PH 50Hz

REVISION HISTORY				
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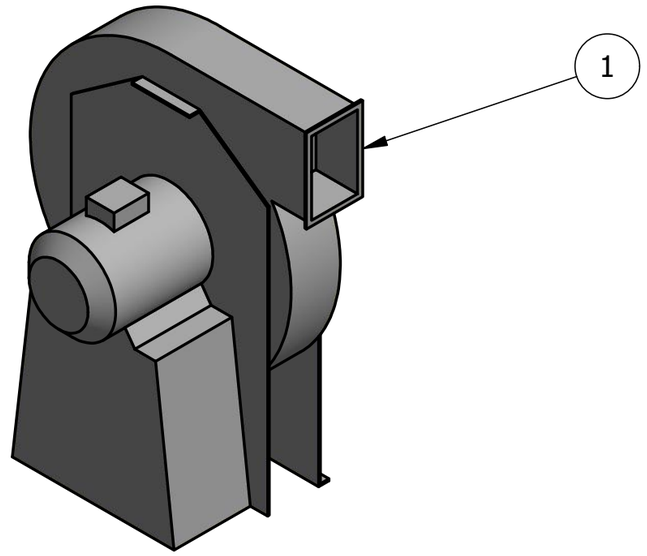

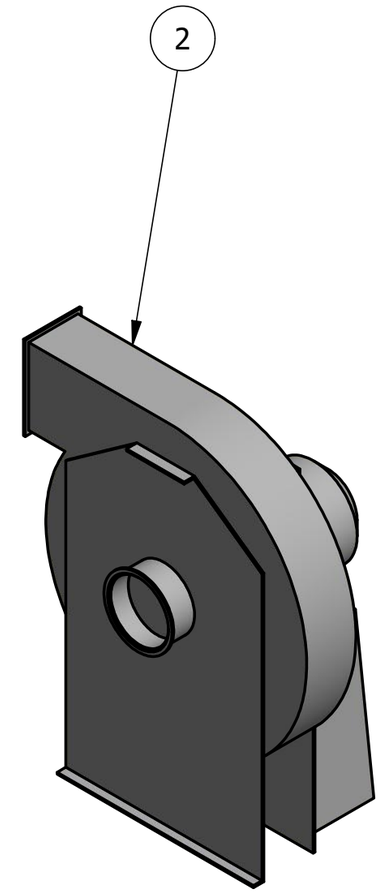

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DRAWN aweise | DATE 22/06/2020

DO NOT SCALE

IF IN DOUBT ASK

UNLESS OTHERWISE STATED
DIMENSIONS ARE IN mm
DIM TOL' 0 ± 0.3
0.0 ± 0.1
ANGULAR TOL ± 0.5
SURFACE FINISH: 1.6 µm

REMOVE ALL SHARP EDGES

TITLE

U.V. LAMP COOLING FAN ASSY

USED ON	DRG No.	SHEET	REV
380185A	380836A	1 OF 1	1
	MATERIAL:	ORIG SCALE	1 :12.5
	FINISH:	ORIG SHEET	A3

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	380113A	UV LAMP MTG & FUME EXTRACT
2	1	380836A	U.V. LAMP COOLING FAN ASSY

REVISION HISTORY				
REV	DESCRIPTION	DCR No.	DATE	APPROVED
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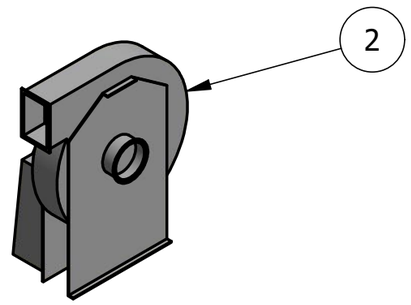

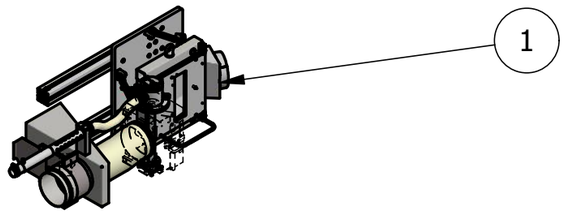

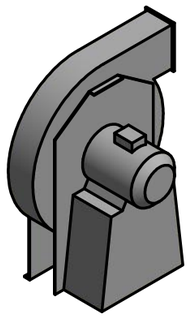

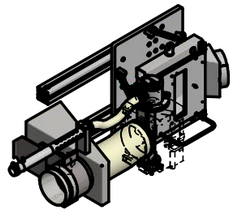

SG Controls Limited

DRAWN aweise | DATE 22/06/2020

DO NOT SCALE

IF IN DOUBT ASK

UNLESS OTHERWISE STATED DIMENSIONS ARE IN mm

DIM TOL' 0 ± 0.3
0.0 ± 0.1
ANGULAR TOL ± 0.5
SURFACE FINISH: 1.6 µm

REMOVE ALL SHARP EDGES

TITLE

UV LAMPS SYSTEM

USED ON	DRG No.	SHEET	REV
380000A	380185A	1 OF 1	1
	MATERIAL:	ORIG SCALE	1 :25
	FINISH:	ORIG SHEET	A3

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	189081A	UV FUME EXTRACT ASSEMBLY
2	1	282003	QUARTZ LINER TUBE
3	1	284023A	LOWER SHUTTER ASSY
4	2	285462	EXTRUSION 50x50 x5470mm
5	1	287443	RF DETECTOR BRACKET
6	1	288569A	SINGLE UV LAMP MOUNT ASSY RH
7	1	288604A	SINGLE UV LAMP SUB PLATE ASSY
8	1	288611A	UV HEAT & FUME EXTRACT ASSY
9	1	288612A	AIR BLEED ASSEMBLY
10	1	H04404	VAM INTAKE
11	4	H04620	QUICK CONN 10-10 GROOVE

REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED
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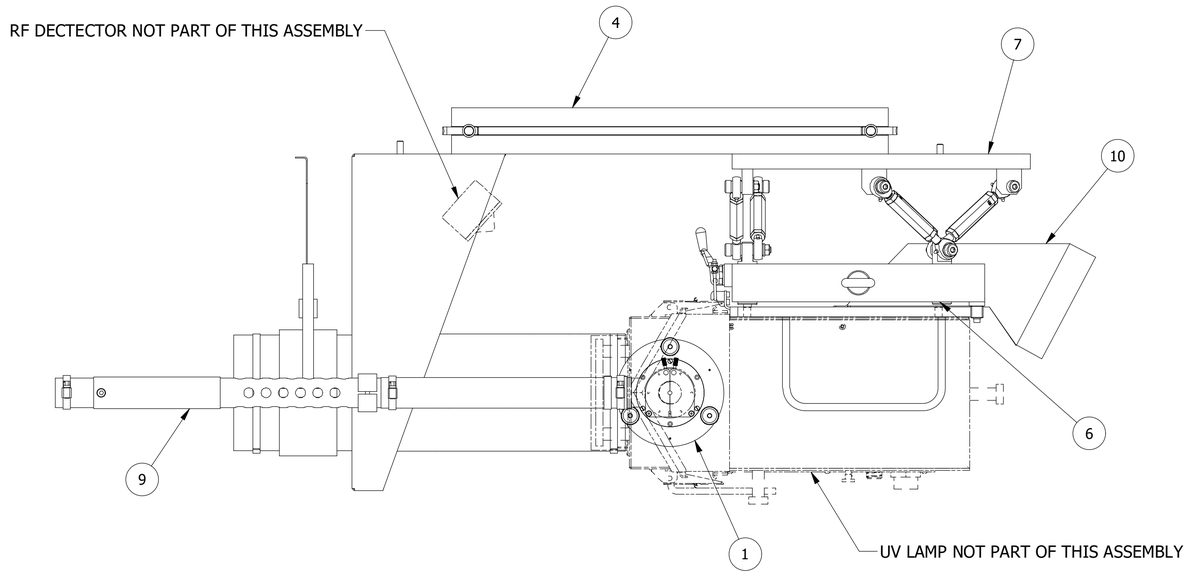
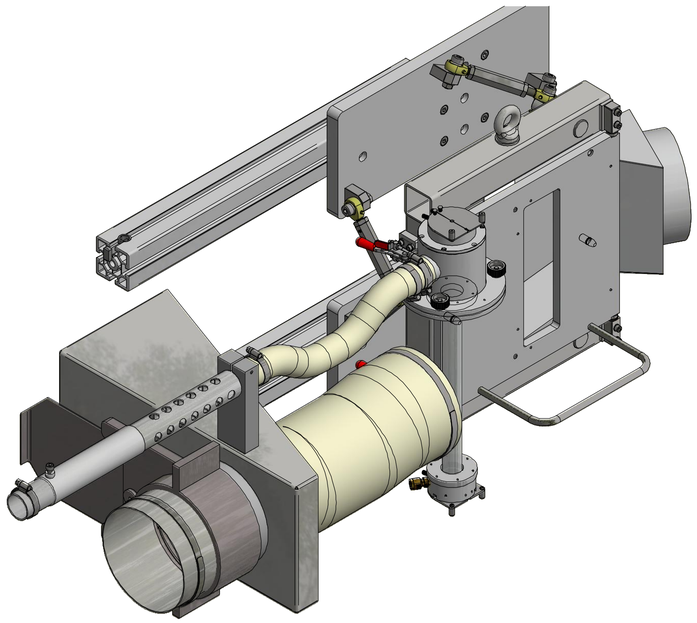
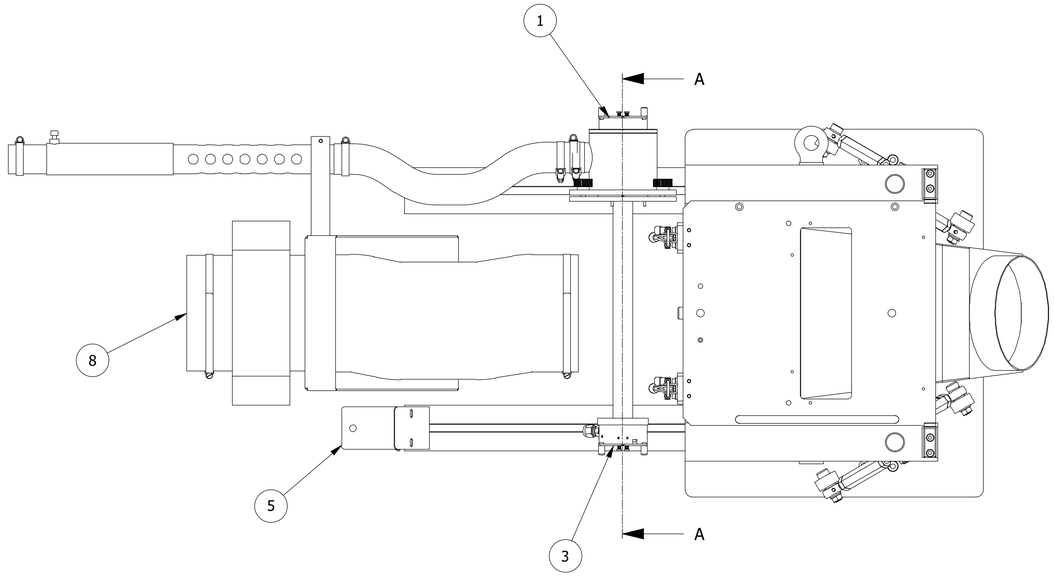
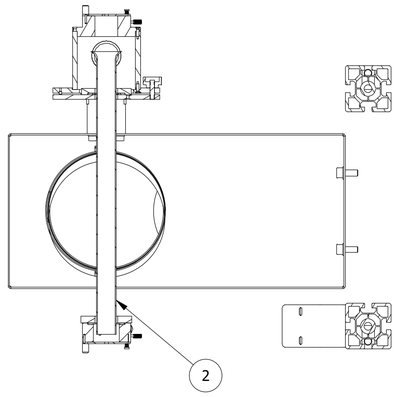




R/H PIVOTING UV LAMP CONFIGURATION (1 : 4)



SECTION A-A



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DRAWN CK DATE 30/10/2017

DO NOT SCALE

IF IN DOUBT ASK

UNLESS OTHERWISE STATED DIMENSIONS ARE IN mm

DIM TOL' 0 ± 0.3, 0.0 ± 0.1

ANGULAR TOL ± 0.5

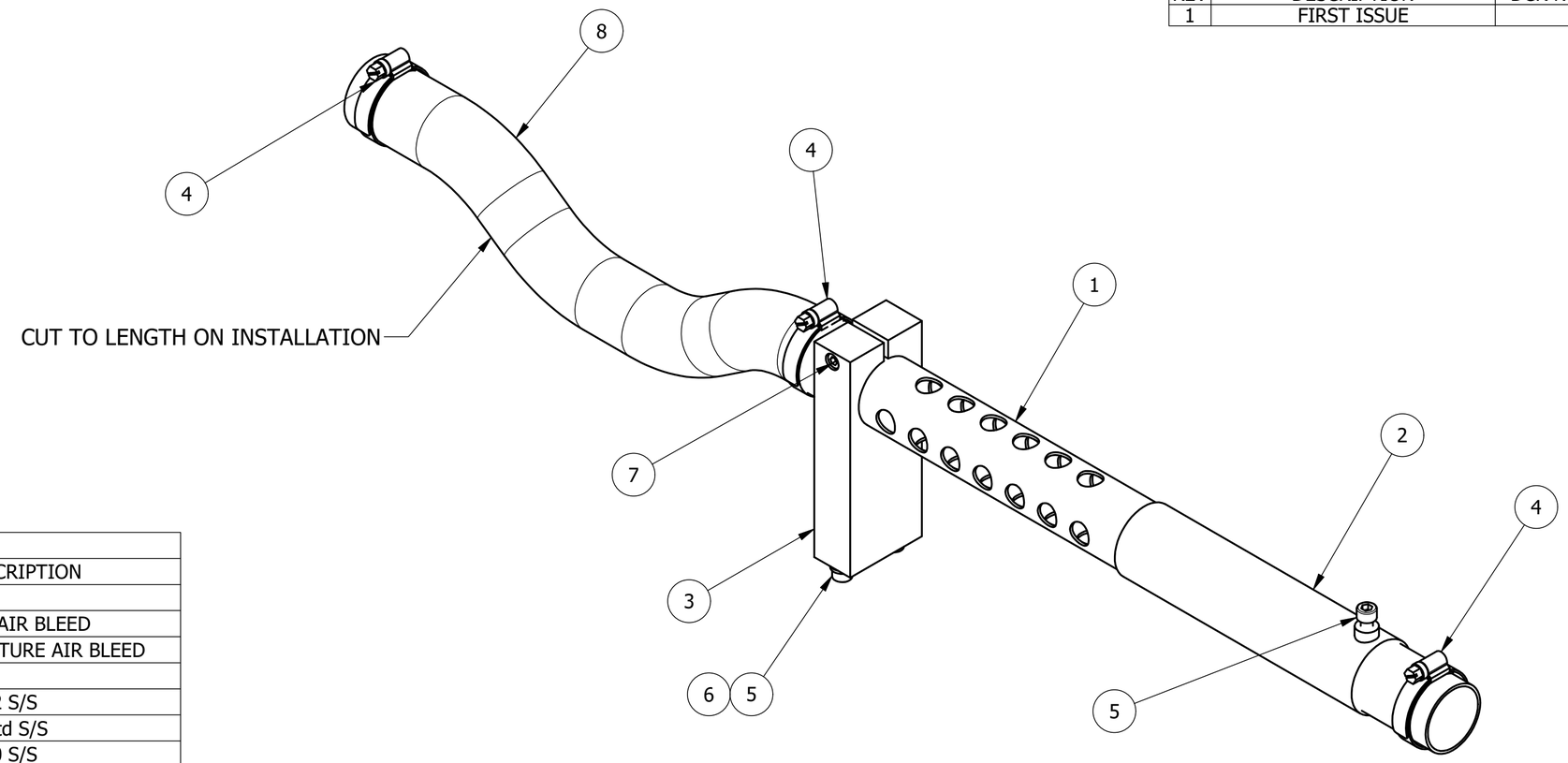
SURFACE FINISH 1.6 µm

REMOVE ALL SHARP EDGES

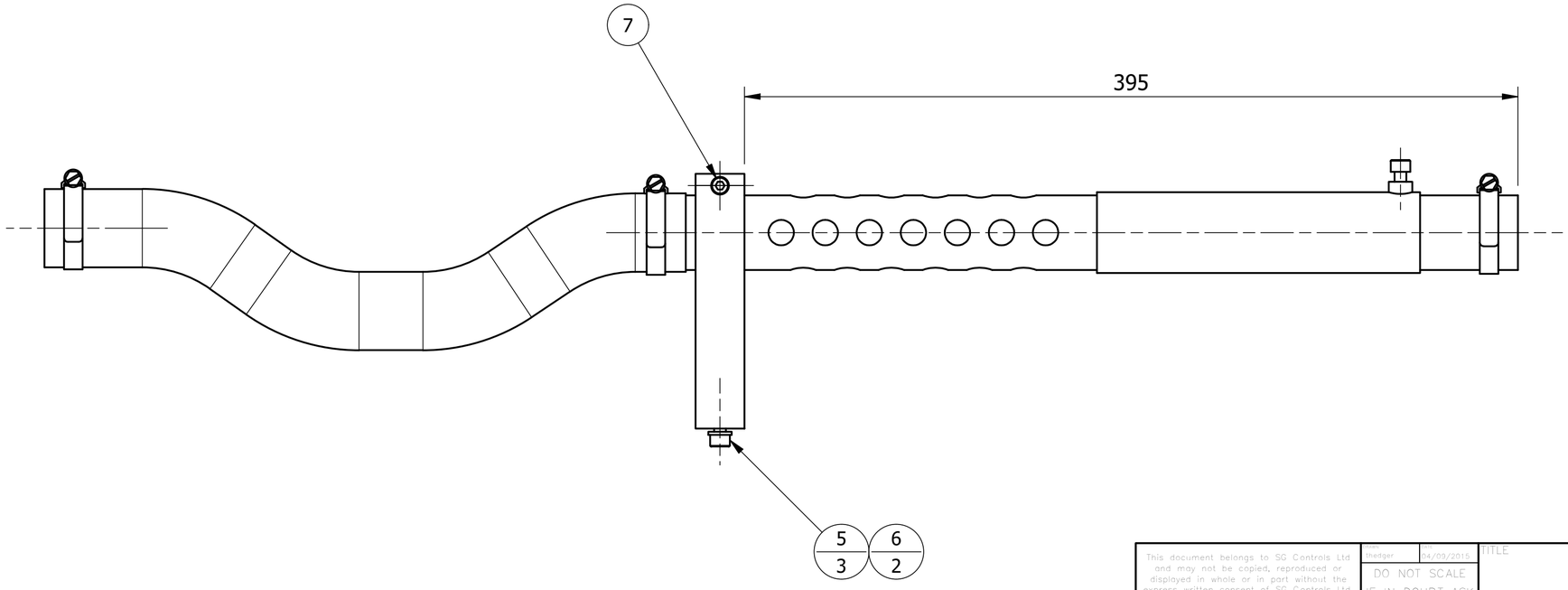
TITLE: UV LAMP MTG & FUME EXTRACT

USED ON	DRG No.	SHEET	REV
380185A	380113A	1 OF 1	1
	MATERIAL: -	ORIG SCALE	1:4
	FINISH:	ORIG SHEET	A1

REVISION HISTORY				
REV	DESCRIPTION	DCR No.	DATE	APPROVED
1	FIRST ISSUE		04.09.15	T.H.



PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	283718	INNER TUBE
2	1	283719	OUTER TUBE - AIR BLEED
3	1	283720	MOUNTING FIXTURE AIR BLEED
4	3	H01706	JUBILEE CLIP
5	3	K00067	HxCpHd M6x12 S/S
6	2	K00313	Washer 6mm Std S/S
7	1	K00438	HxCpHd M5x40 S/S
8	1	P02378	DUCTING 38mm ID



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DO NOT SCALE
IF IN DOUBT ASK
UNLESS OTHERWISE STATED
DIMENSIONS ARE IN mm
DIM TOL 0 ± 0.3
0.0 ± 0.1
ANGULAR TOL ± 0.5
SURFACE FINISH 1.6 µm
REMOVE ALL SHARP EDGES

CHK: Metger 04/09/2015

TITLE: AIR BLEED ASSEMBLY

USED ON

DRG No. 288612A

SHEET 1 OF 1

REV 1

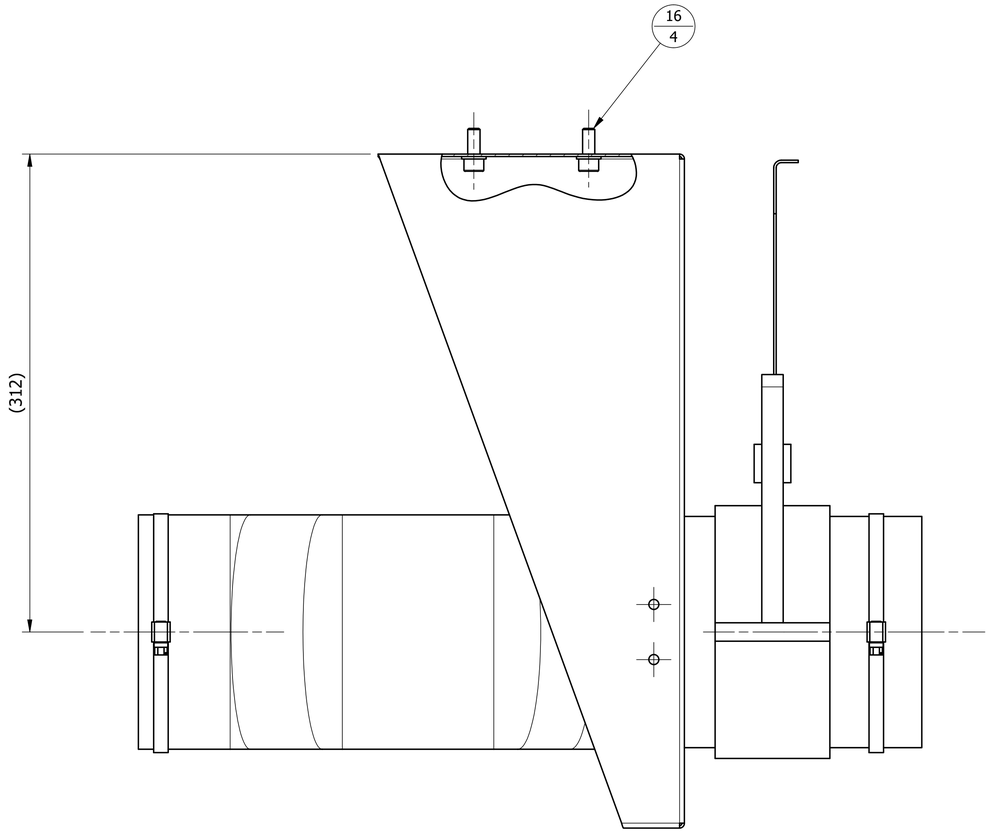
MATERIAL:

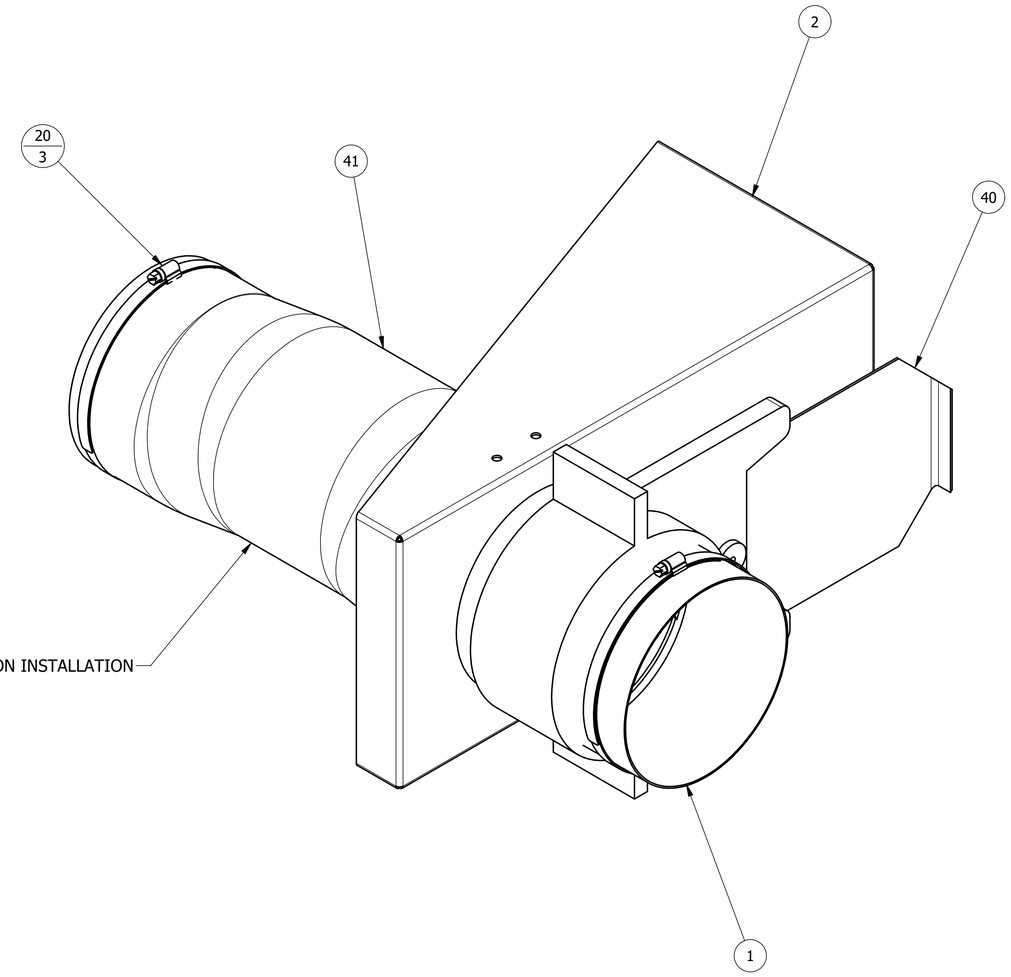
FINISH:

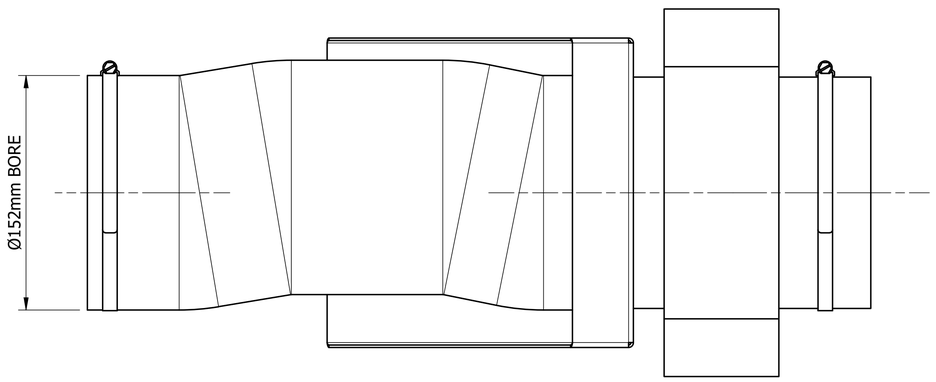
ORIG SCALE 1:2

ORIG SHEET A2

REVISION HISTORY				
REV	DESCRIPTION	DCR No.	DATE	APPROVED
1	FIRST ISSUE		04.09.15	T.H.







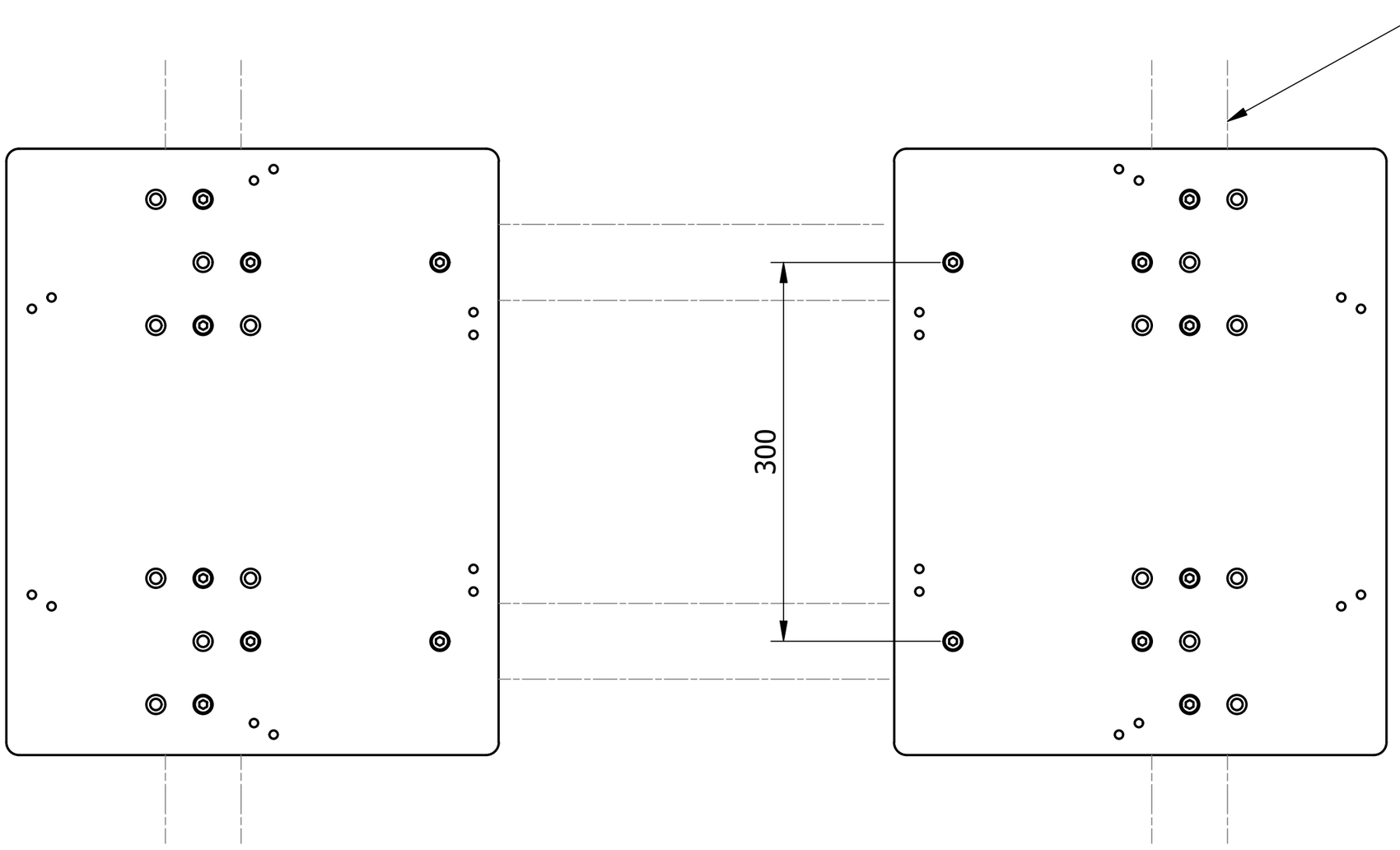
SG Controls Limited

DO NOT SCALE
IF IN DOUBT ASK
UNLESS OTHERWISE STATED DIMENSIONS ARE IN mm
DIM TOL ± 0.5
ANGULAR TOL ± 0.5°
SURFACE FINISH 1.6
REMOVE ALL SHARP EDGES

TITLE: UV HEAT & FUME EXTRACT ASSY

USED ON	DRG No.	SHEET	REV
	288611A	1 OF 1	1
	MATERIAL:	DRG SCALE 1:2	
	FINISH:	DRG SHEET A1	

REVISION HISTORY				
REV	DESCRIPTION	DCR No.	DATE	APPROVED
1	FIRST ISSUE		14.08.15	T.H.
2	NOTE FOR RAIL MTG ADDED		19/11/2018	AJW
3	381494 replaces 288577 & 288576		16/09/2019	LAR



L/H VERSION (1 : 4)

R/H VERSION (1 : 4)

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	381494	MOUNTING PLATE - SINGLE UV LAMP
2	8	H04608	M8 TEE NUT 10 GRV
3	8	K00882	M8x25 SKT CAP SCREW S/S

SG Controls Limited

DRAWN thedger | DATE 13/08/2015

DO NOT SCALE

IF IN DOUBT ASK

UNLESS OTHERWISE STATED DIMENSIONS ARE IN mm

DIM TOL' 0 ± 0.3
0.0 ± 0.1
ANGULAR TOL ± 0.5
SURFACE FINISH: 1.6 µm

REMOVE ALL SHARP EDGES

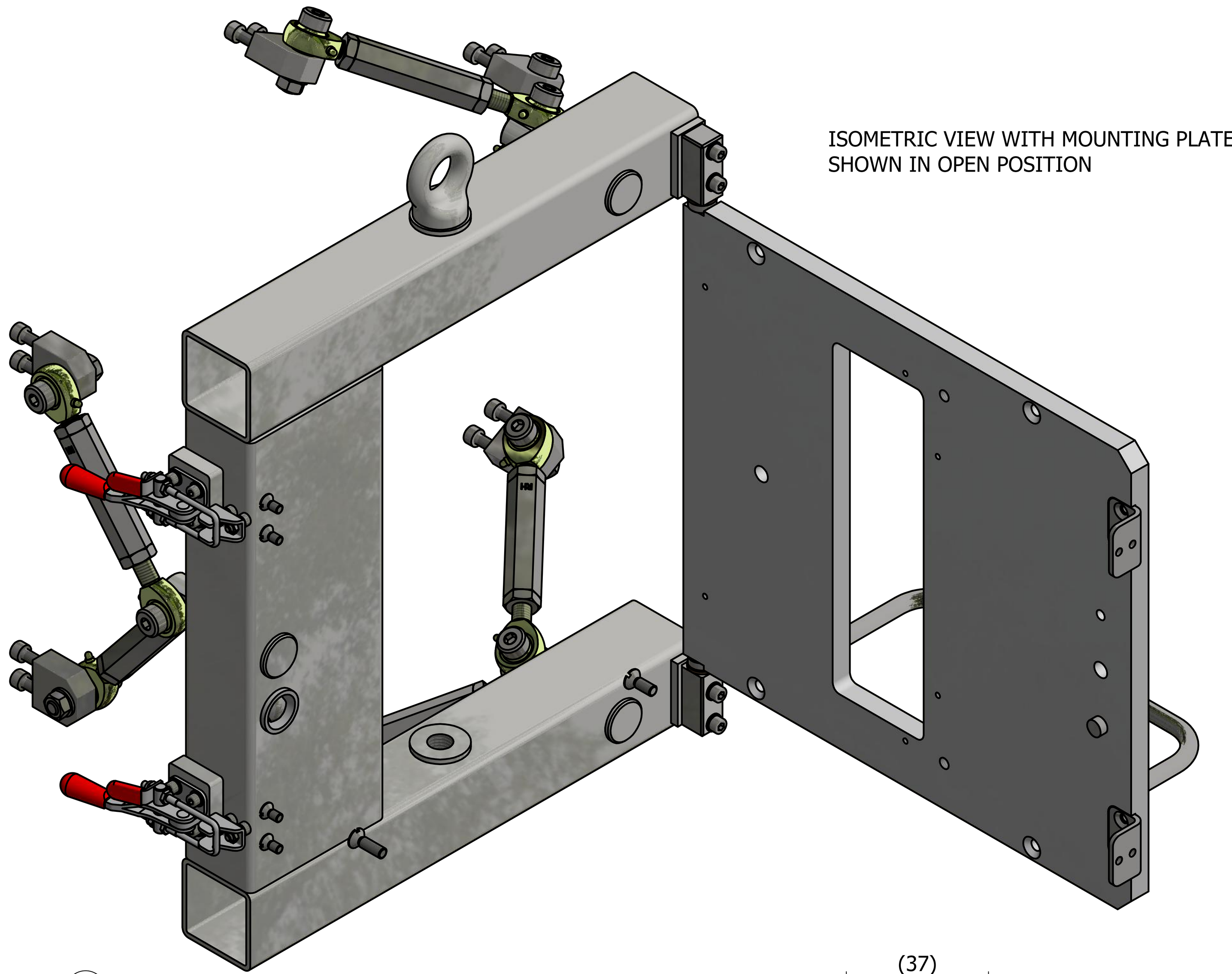
TITLE

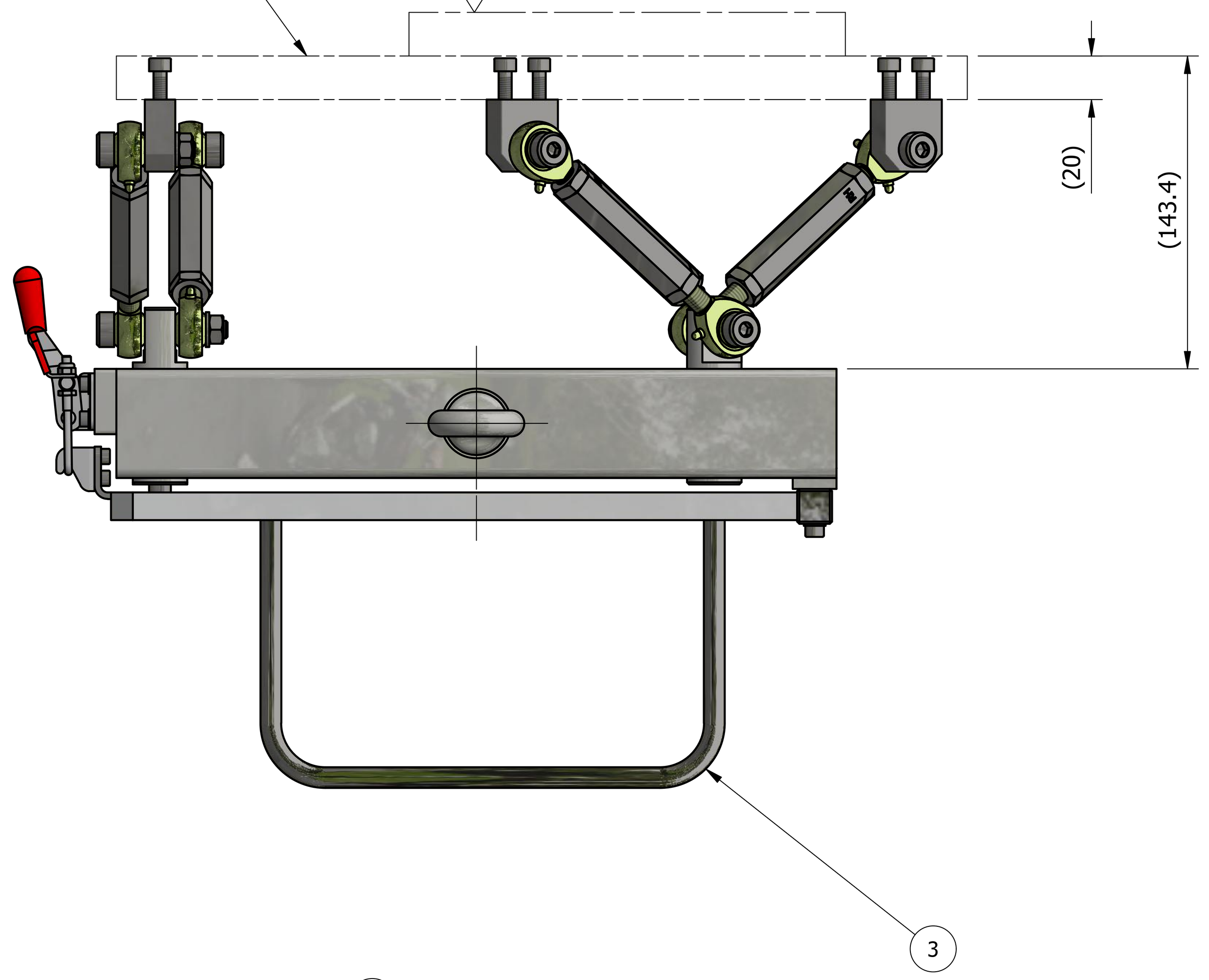
SINGLE UV LAMP SUB PLATE ASSY

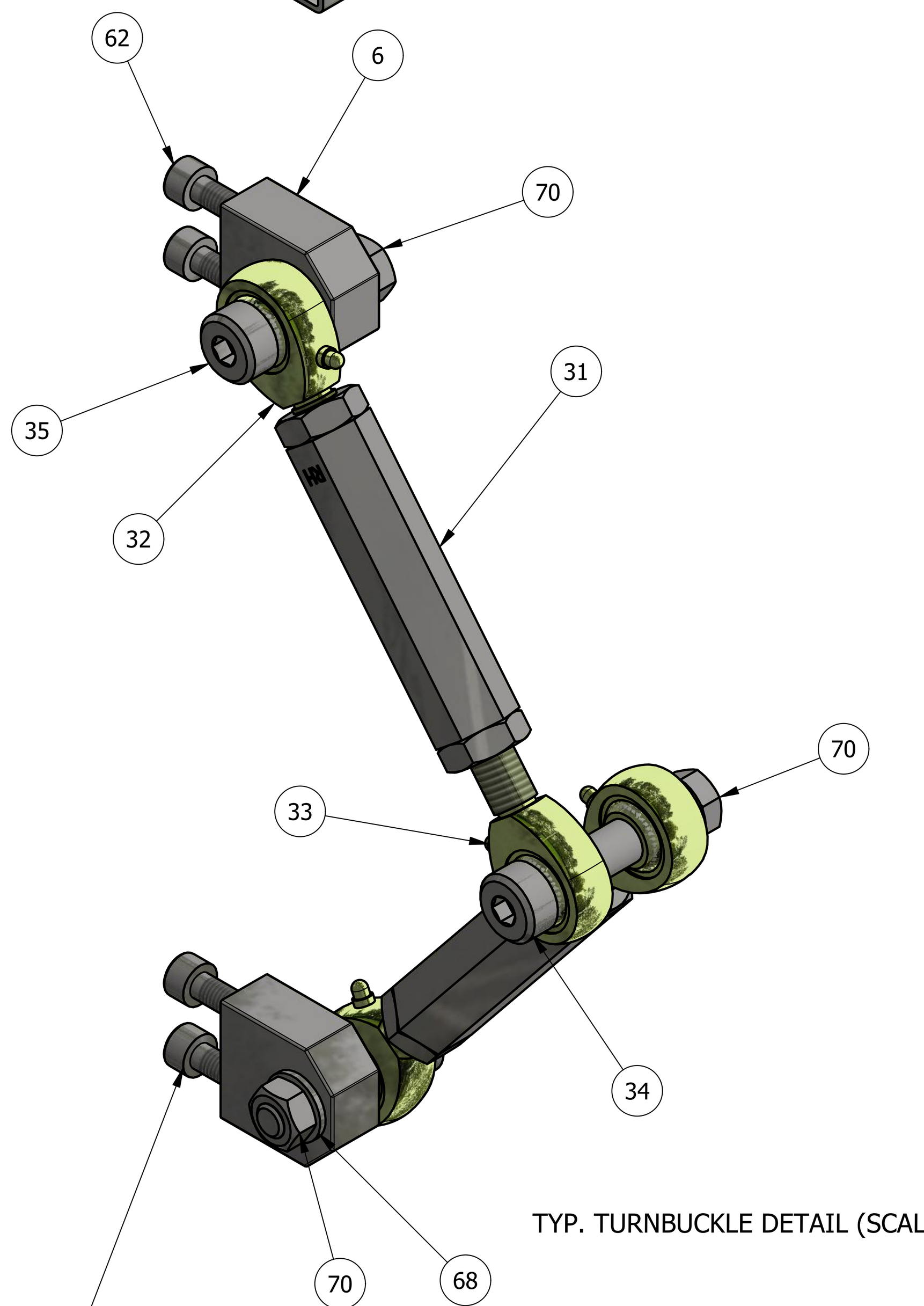
USED ON	DRG No.	SHEET	REV
	288604A	1 OF 1	3
	MATERIAL:	ORIG SCALE	1 : 4
	FINISH:	ORIG SHEET	A3

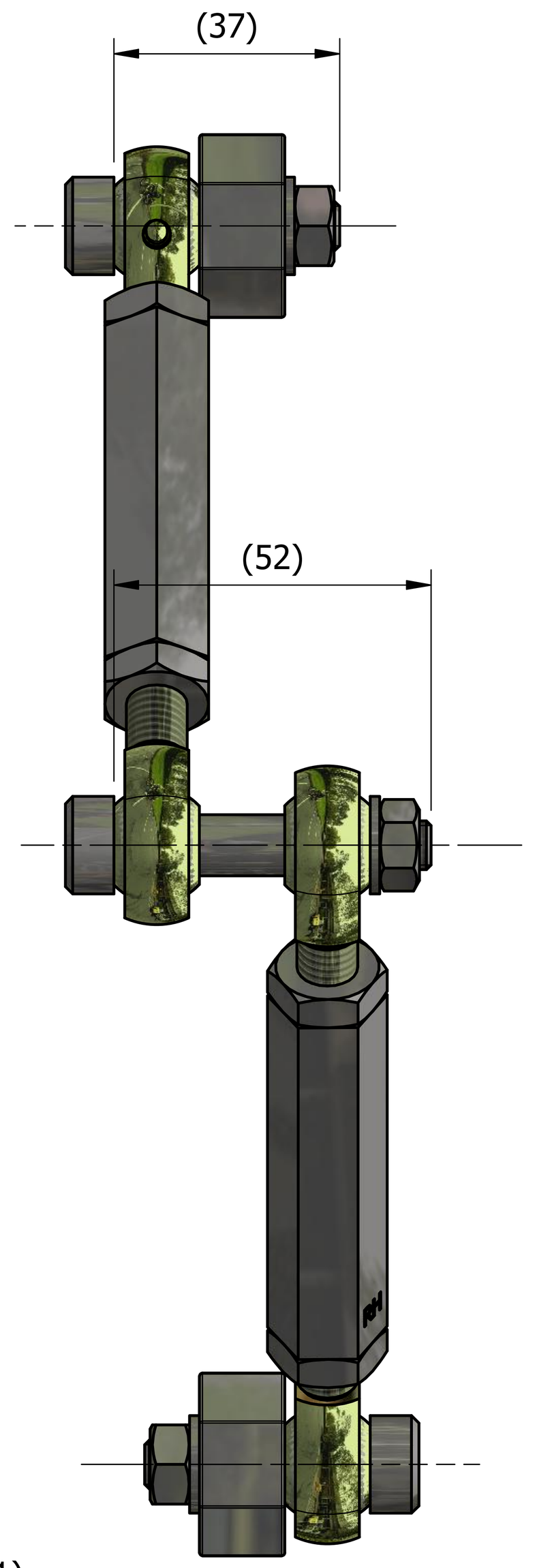
REVISION HISTORY				
REV	DESCRIPTION	DCR No.	DATE	APPROVED
1	FIRST ISSUE		12.08.15	T.H.

ISOMETRIC VIEW WITH MOUNTING PLATE SHOWN IN OPEN POSITION



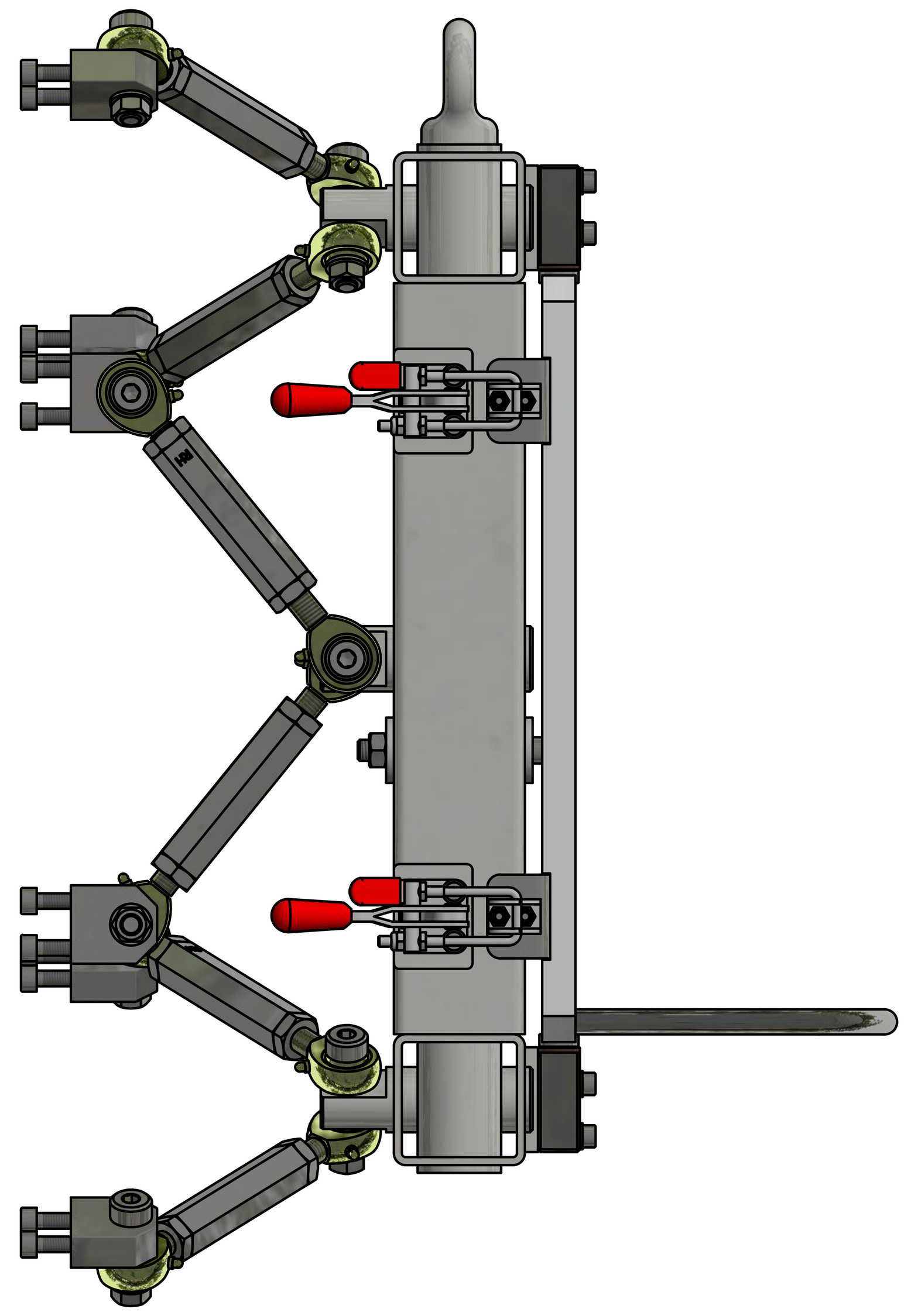


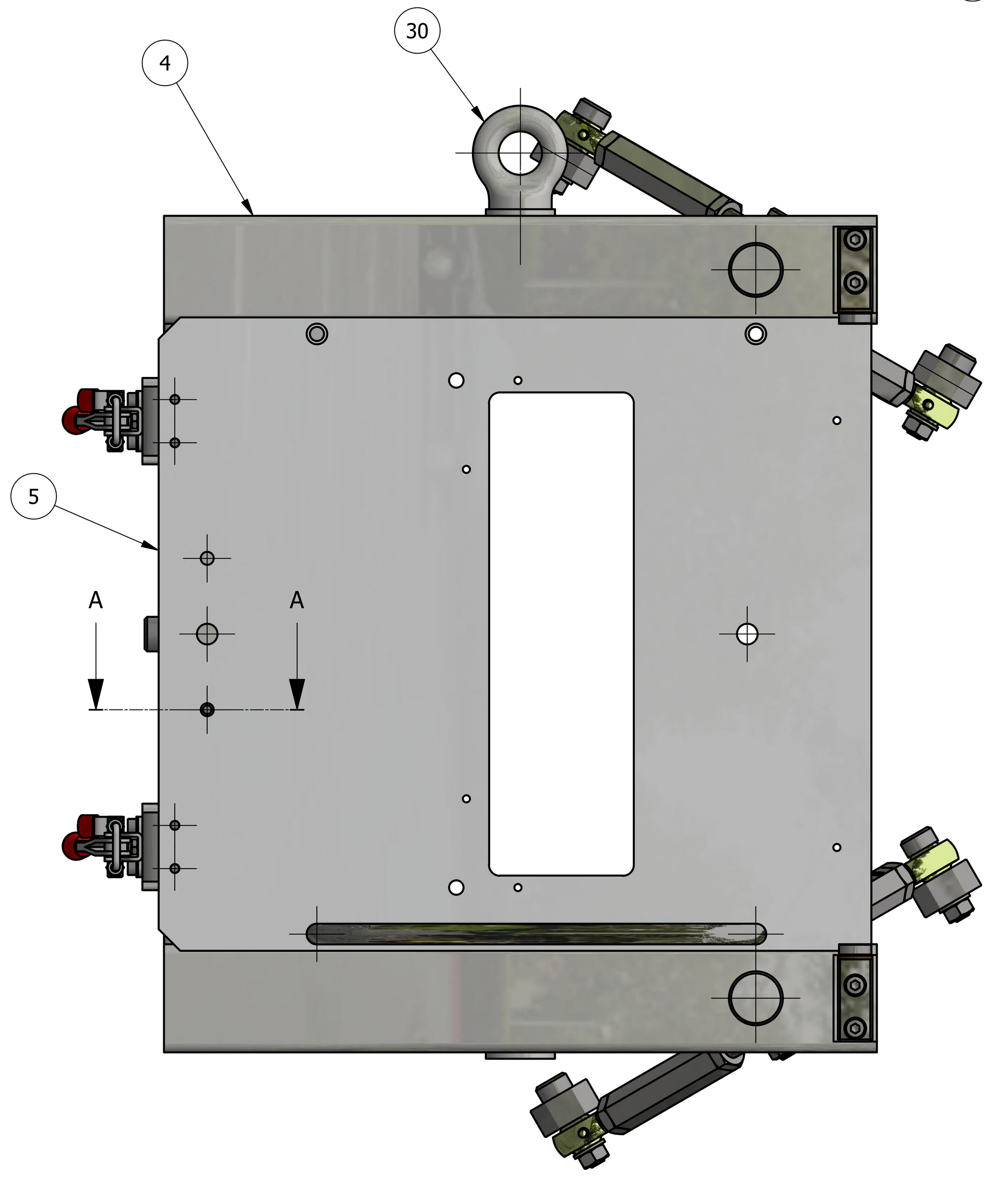


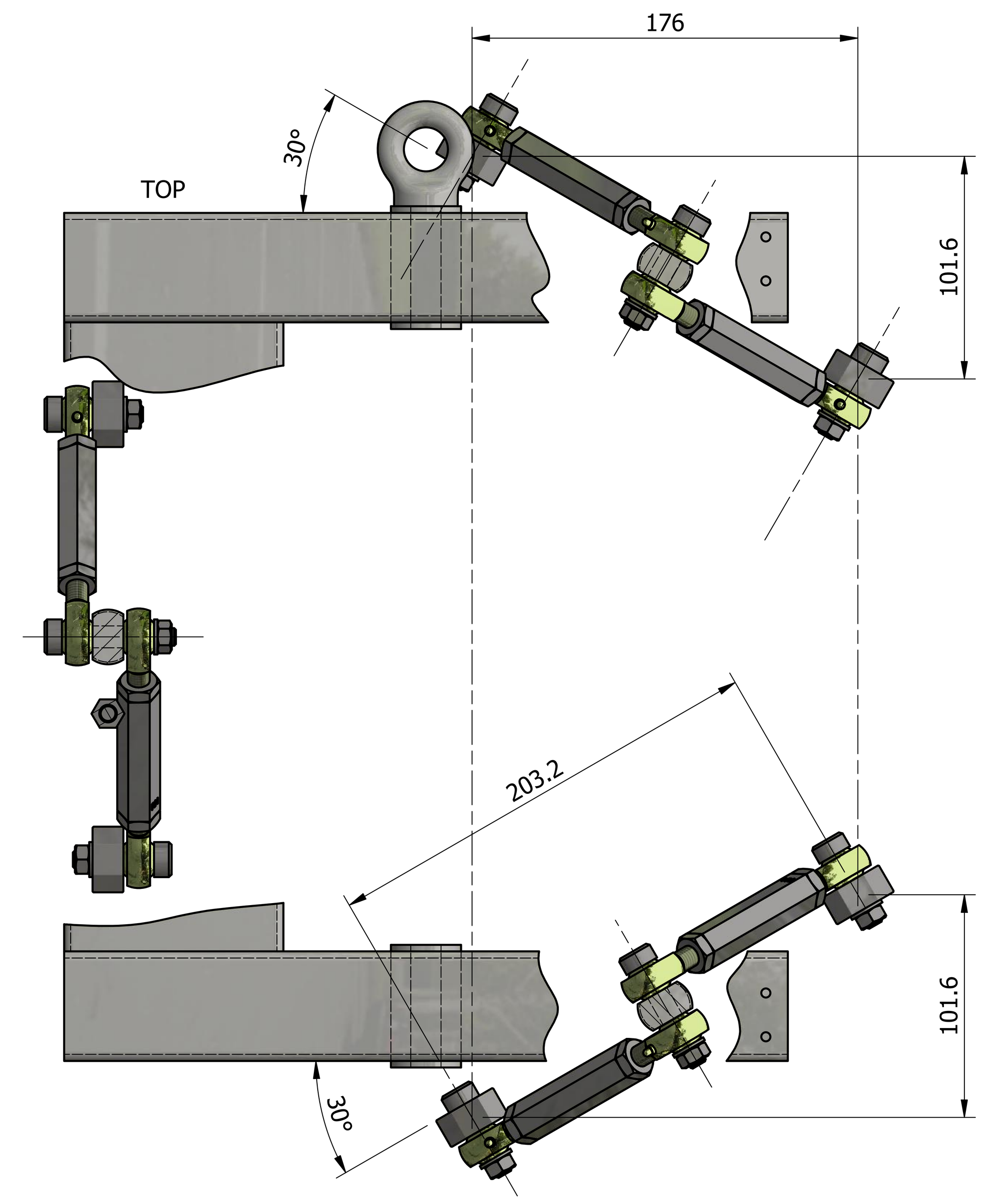


TYP. TURNBUCKLE DETAIL (SCALE 1:1)

USE A SMALL AMOUNT OF ANTI-GALLING THREAD SEALANT WHEN INSERTING SCREWS INTO S/ST BLOCKS (SGC STOCK No. H04647)

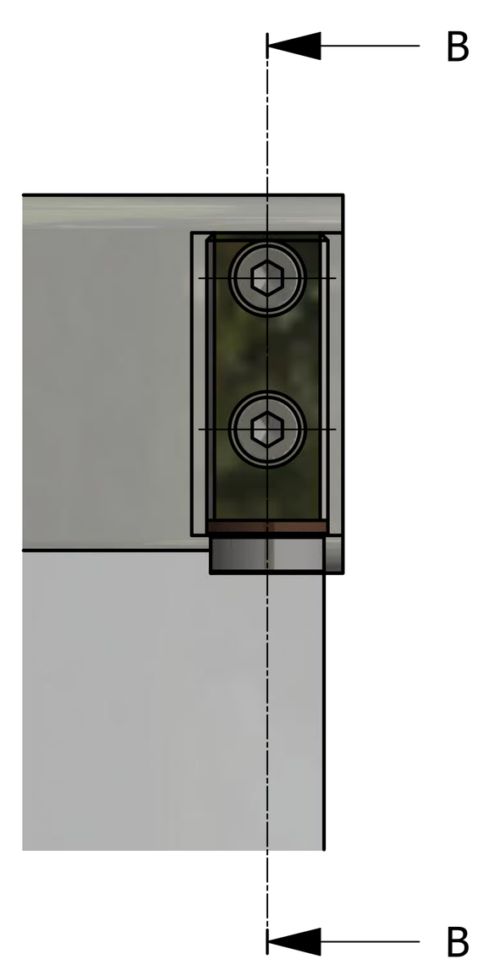


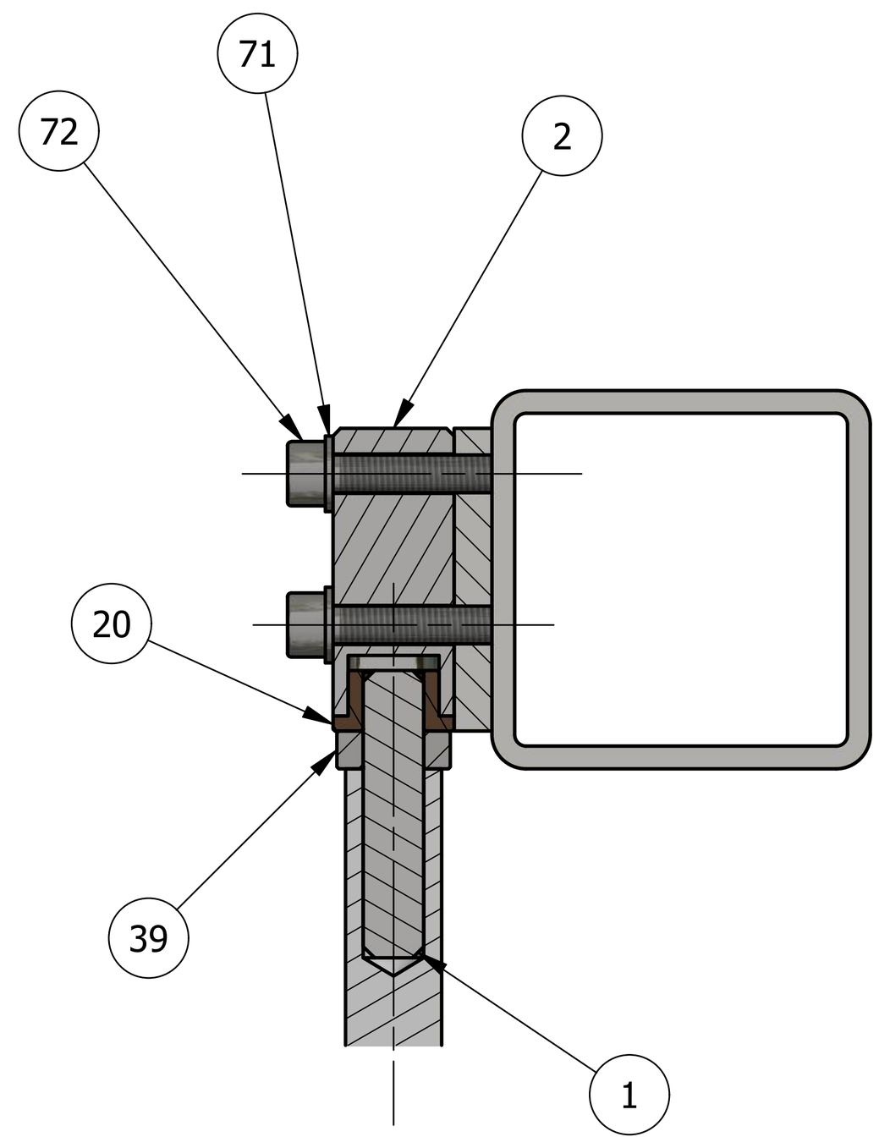




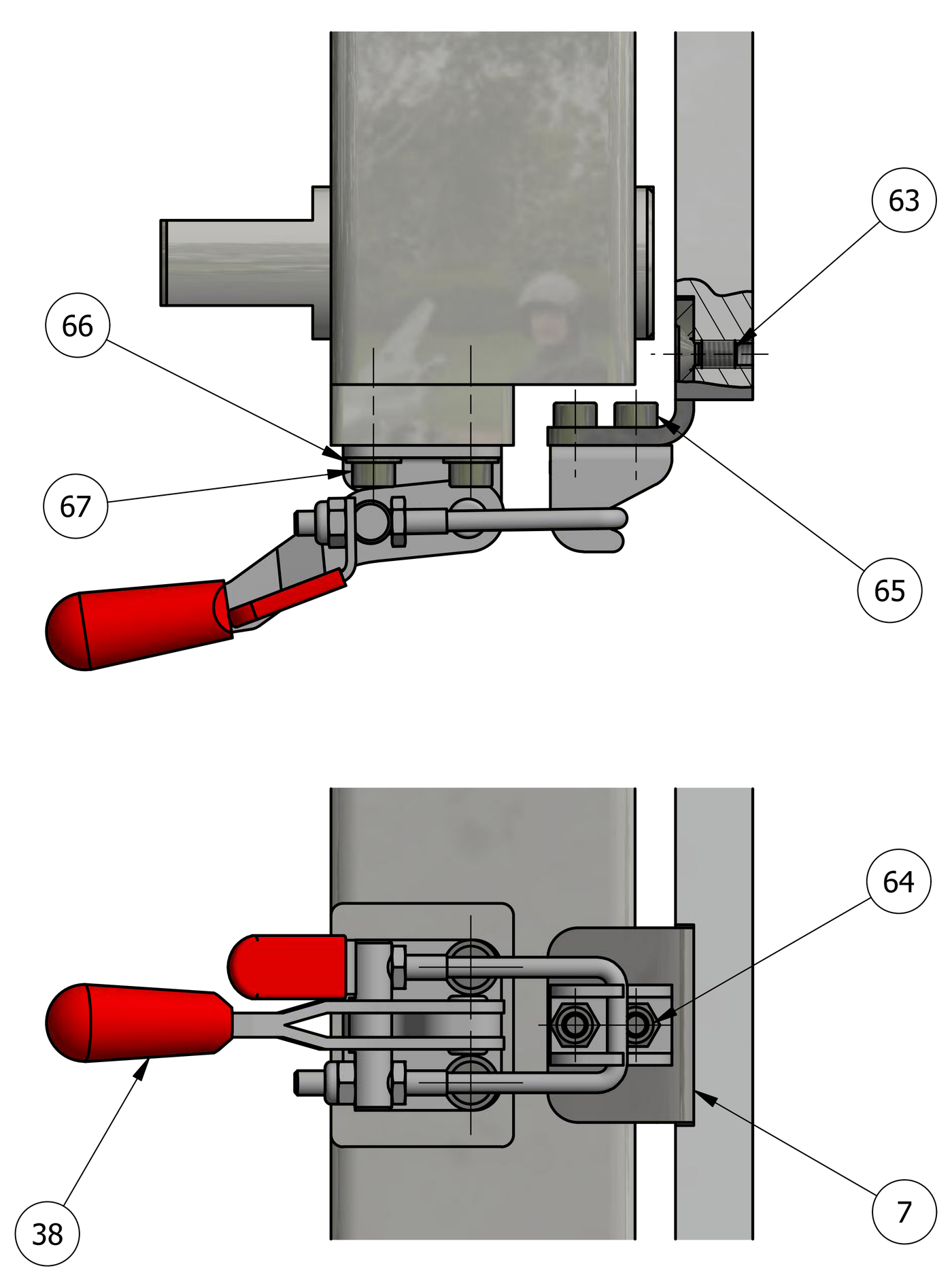
TURNBUCKLE ARM CONFIGURATION

NOTE: DIMENSIONS SHOWN ABOVE REFER TO MOUNTING POSITIONS ON TOWER MODULE

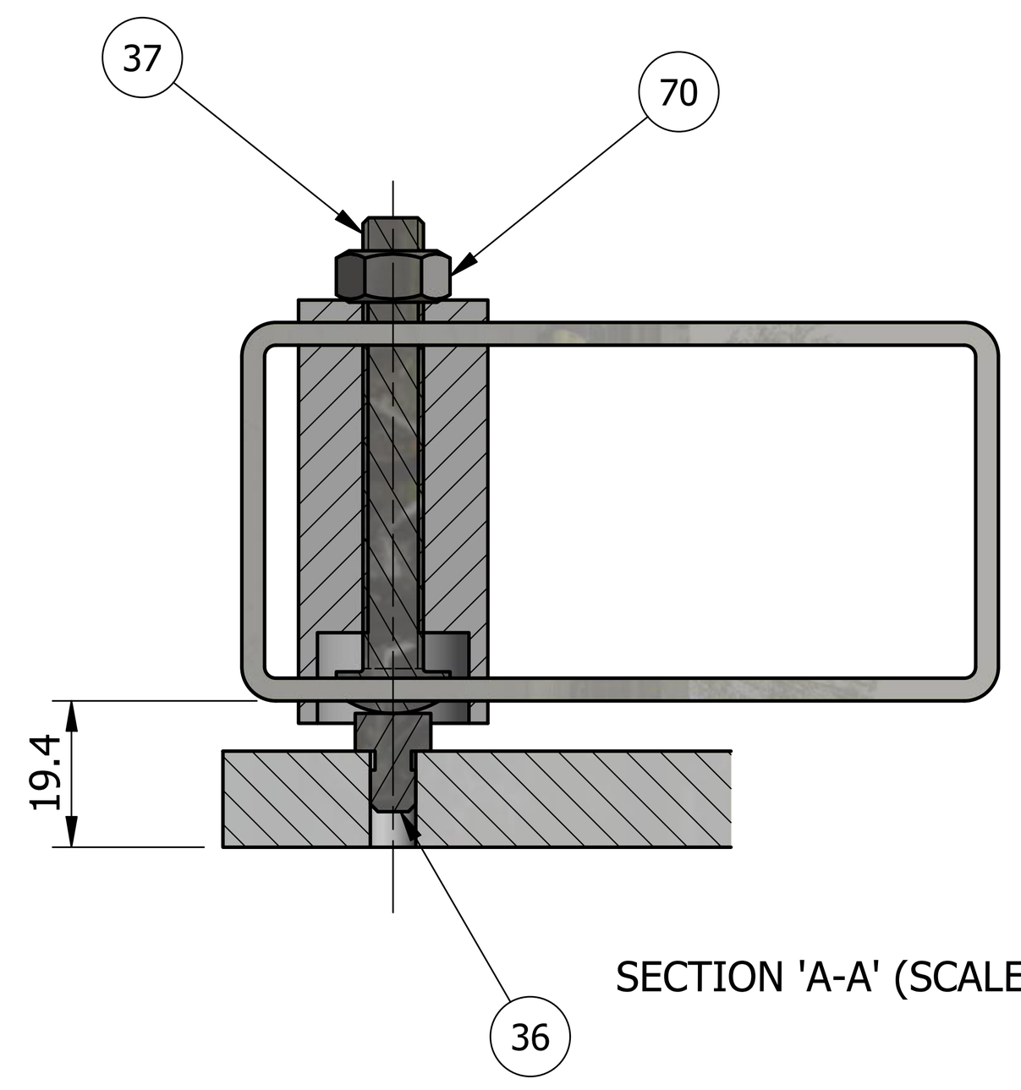




SECTION 'B-B'
TYP. PIVOT PIN DETAIL (SCALE 1 : 1)



LATCH DETAIL TYP. IN 2 POS'NS (SCALE 1:1)



SECTION 'A-A' (SCALE 1 : 1)

ASSEMBLY NOTE:

THIS ASSEMBLY CAN BE BUILT AS SHOWN AND ALSO AS AN OPPOSITE HAND VERSION AS PER SHEET No.1

REFER TO THE TOP LEVEL TOWER LAYOUT DRAWING TO DETERMINE WHICH HAND.

SG Controls Limited

DRAWN: thedger | DATE: 05/06/2015

DO NOT SCALE
IF IN DOUBT ASK
UNLESS OTHERWISE STATED DIMENSIONS ARE IN mm
DIM TOL 0 ± 0.3
0.0 ± 0.1
ANGULAR TOL ±0.5
SURFACE FINISH 1.6 µm
REMOVE ALL SHARP EDGES

TITLE: SINGLE UV LAMP MOUNT ASSY RH

USED ON: | DRG No. 288569A | SHEET 1 OF 2 | REV 1

MATERIAL:

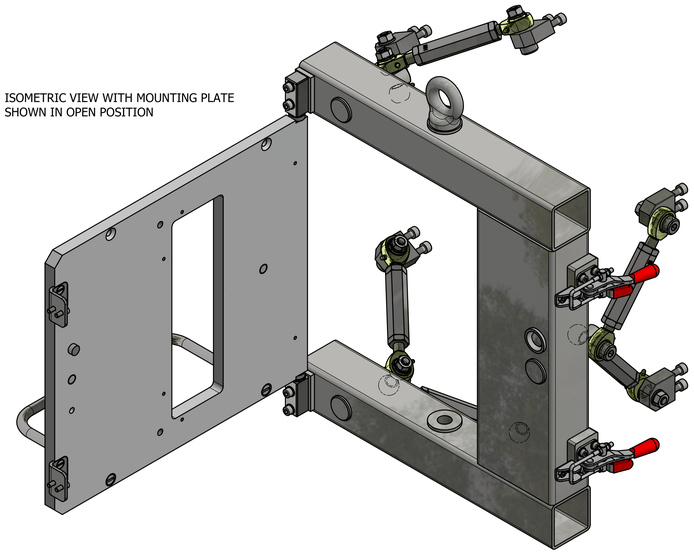
FINISH:

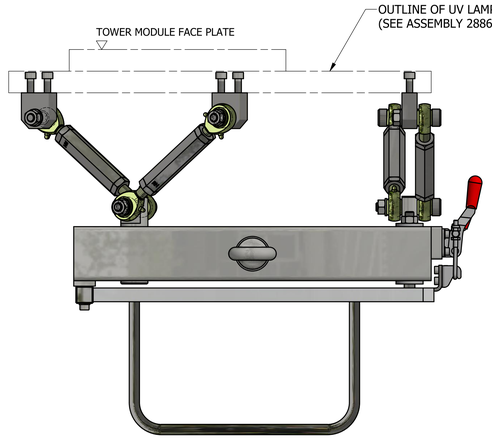
ORIG SCALE 1:2

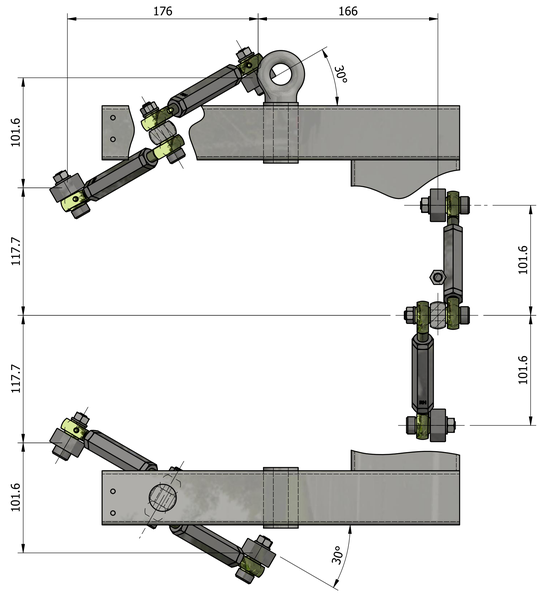
ORIG SHEET A0

REVISION HISTORY				
REV	DESCRIPTION	DCR No.	DATE	APPROVED
1	FIRST ISSUE		12.08.15	T.H.

ISOMETRIC VIEW WITH MOUNTING PLATE
SHOWN IN OPEN POSITION

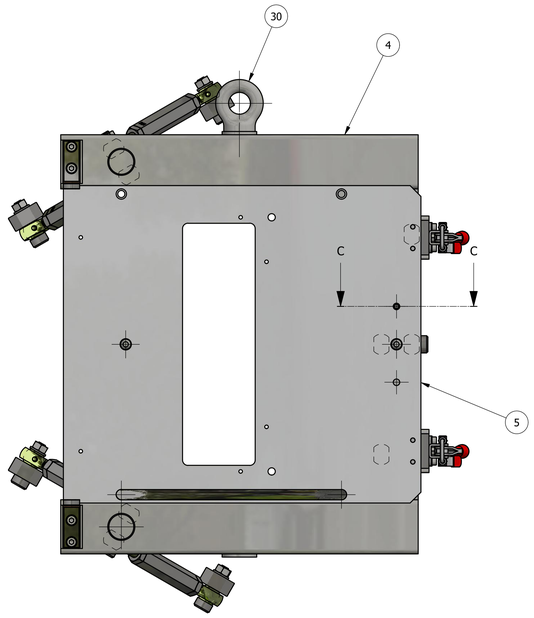


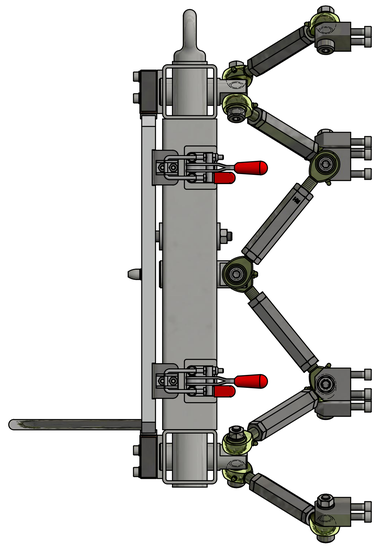




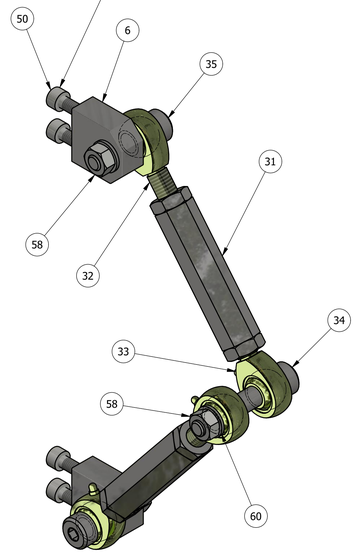
TURNBUCKLE ARM CONFIGURATION

NOTE: DIMENSIONS SHOWN ABOVE REFER TO MOUNTING POSITIONS ON TOWER FRAME

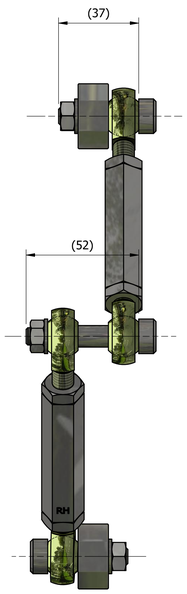


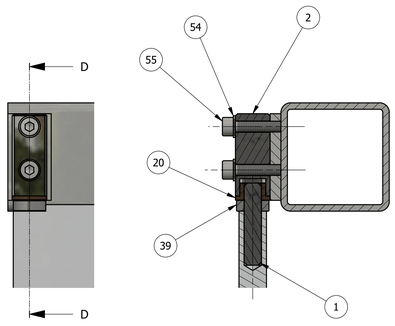


USE A SMALL AMOUNT OF ANTI-GALLING THREAD
SEALANT WHEN INSERTING SCREWS INTO S/ST BLOCKS
(SGC STOCK No. H04647)

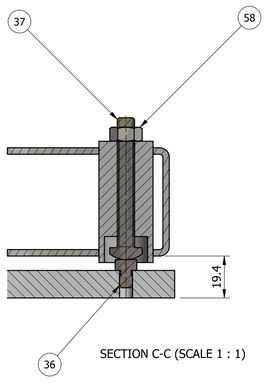


TYP. TURNBUCKLE DETAIL (SCALE 1:1)

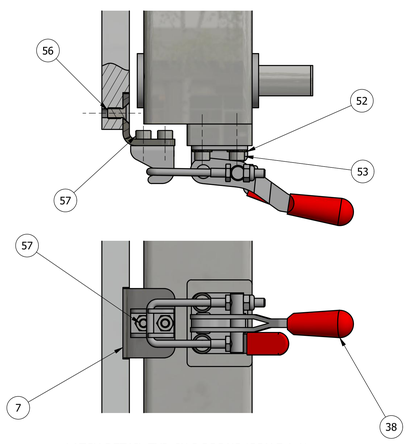




D-D (1 : 1)



SECTION C-C (SCALE 1 : 1)



LATCH DETAIL TYP. IN 2 POS'NS (SCALE 1:1)

ASSEMBLY NOTE:

THIS ASSEMBLY CAN BE BUILT AS SHOWN AND ALSO AS AN OPPOSITE HAND VERSION AS PER SHEET No.1

REFER TO THE TOP LEVEL TOWER LAYOUT DRAWING TO DETERMINE WHICH HAND.

SG Controls Limited

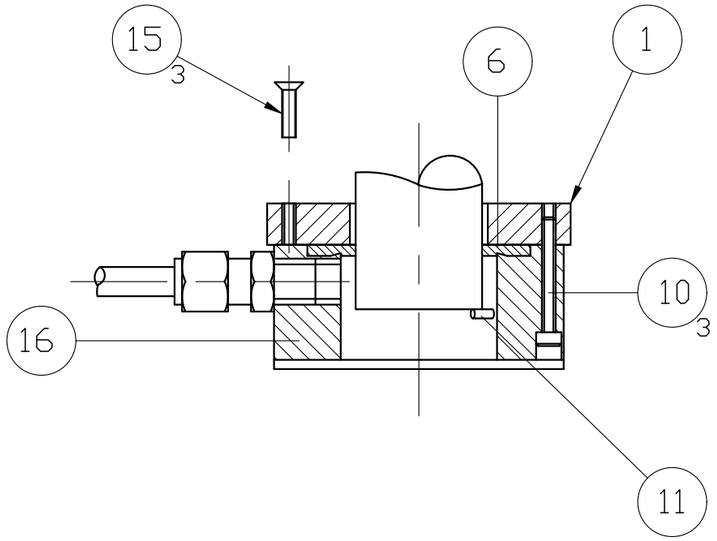
DO NOT SCALE IF IN DOUBT ASK

UNLESS OTHERWISE STATED DIMENSIONS ARE IN mm
TOLERANCES
FINISH
MATERIAL

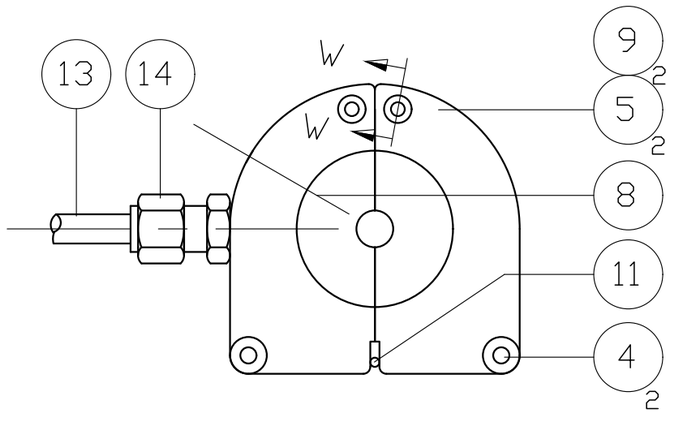
TITLE: SINGLE UV LAMP MOUNT ASSY LH
DWG NO: 288569A
SHEET 1 OF 2
REV 1
DRG SCALE 1:5
DRG SHEET A3

DWG. No.	DO NOT SCALE	DRAWING TO BS308	DO NOT SCALE
284023A			

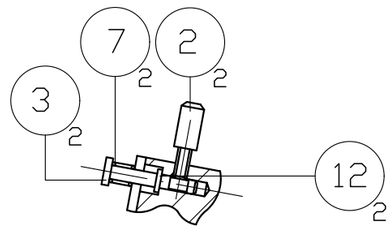
REVISION HISTORY				
REV.	DESCRIPTION	DCR No.	DATE	APPROVED
1	FIRST ISSUE		21/3/07	BWC



FIT SPIROL PIN TO
PROTRUDE 5mm



VIEW ON ARROW Z
(SCALE 1:1)



SECTION W-W
(SCALE 1:1)

DRAWN	BWC	DATE 21/3/07
CHECKED		DATE
APPROVED		DATE

SG controls — SG Controls Limited

UNLESS OTHERWISE STATED DIMENSIONS ARE IN mm
DIM. TOL. 0 ±
0.0 ±
ANGULAR TOL. ±
SURFACE FIN. –
REMOVE ALL SHARP EDGES

TITLE: LOWER SHUTTER ASSEMBLY

USED ON	DWG. No.	SHEET	REV
	284023A	1 OF 1	1
THIRD ANGLE PROJECTION	MATERIAL	ORIG. SCALE	1:1
	FINISH	ORIG. SHEET	A2

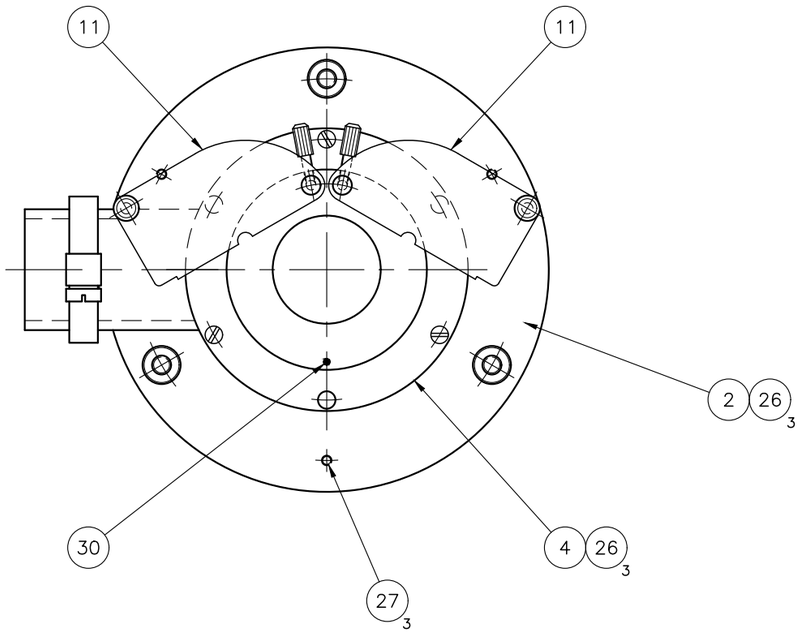
DWG. No. 189081A

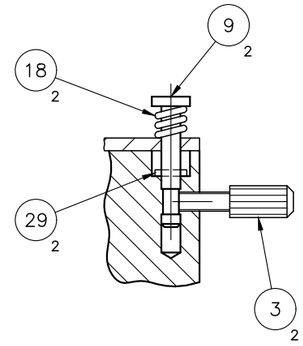
DO NOT SCALE

DRAWING TO BS308

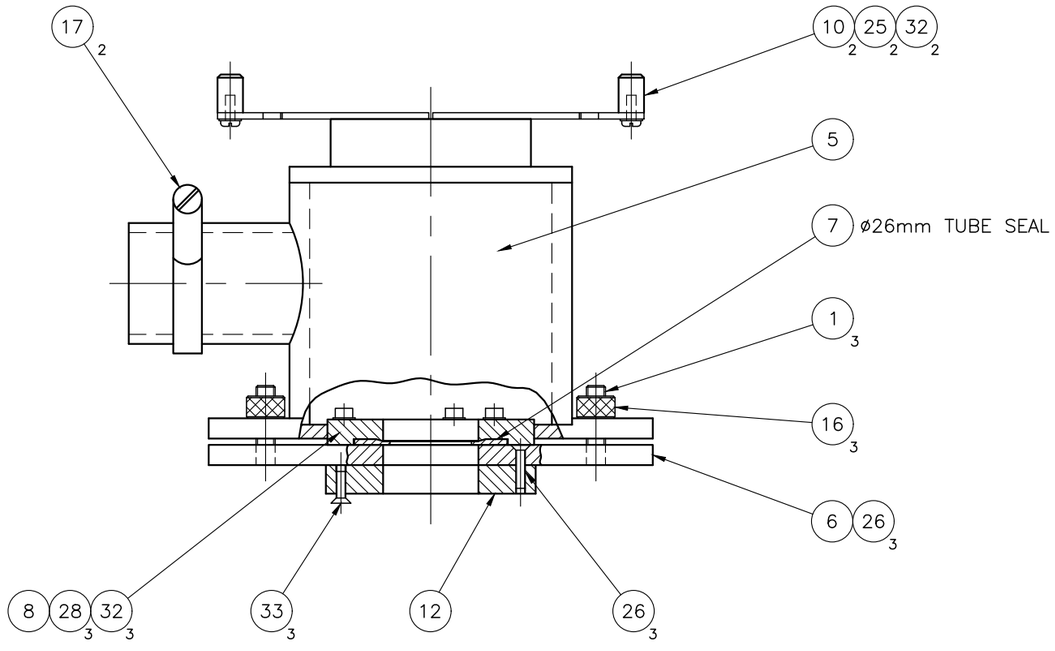
IF IN DOUBT ASK

REVISION HISTORY				
REV.	DESCRIPTION	DCR No.	DATE	APPROVED
1	FIRST ISSUE		03.96	T.H.
2	REDRAWN ON CAD		19.12.00	T.H.
3	ITEMS 12 & 33 ADDED		03.09.15	T.H.





ENLARGED DETAIL SHOWING
SHUTTER PIVOT TYP. IN 2 POS'NS



DRAWN	T.Hedger	DATE 19–12–00
CHECKED		DATE
APPROVED		DATE

SG controls

SG Controls Limited

UNLESS OTHERWISE STATED DIMENSIONS ARE IN mm
DIM. TOL. 0 ±
0.0 ±
ANGULAR TOL. ±
SURFACE FIN. –
REMOVE ALL SHARP EDGES

TITLE: UV FUME EXTRACT ASSEMBLY

USED ON 280876A	DWG. No. 189081A	SHEET 1 OF 1	REV 3
THIRD ANGLE PROJECTION	MATERIAL	ORIG. SCALE	1–1
	FINISH	ORIG. SHEET	A1