

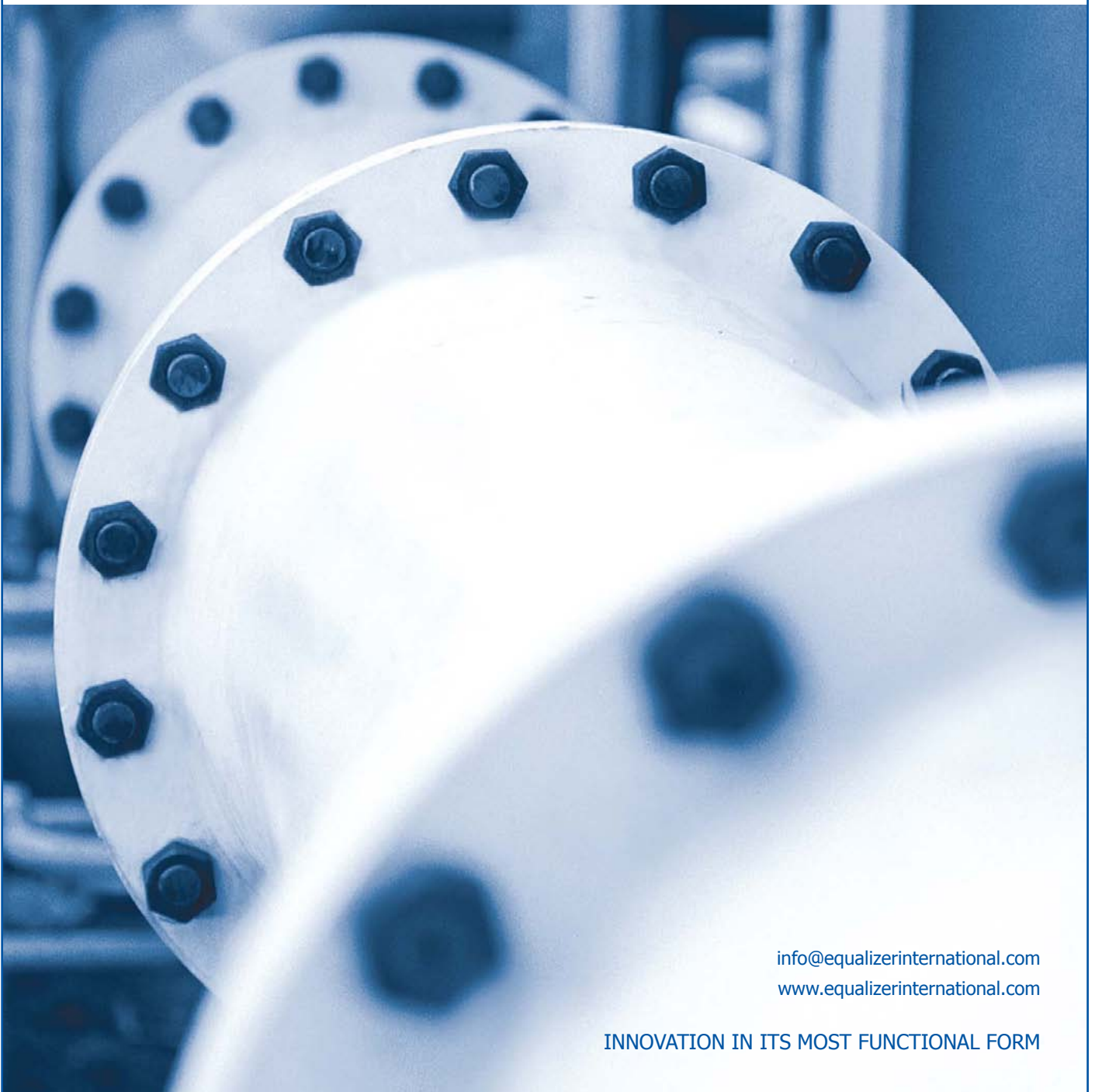
# FA1™

## FLANGE ALIGNMENT TOOL

### Operator Instruction Manual



**EQUALIZER™**  
INTERNATIONAL



[info@equalizerinternational.com](mailto:info@equalizerinternational.com)  
[www.equalizerinternational.com](http://www.equalizerinternational.com)

INNOVATION IN ITS MOST FUNCTIONAL FORM



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## 1. INTRODUCTION

The Equalizer FA1™ TOOL is an aid for use in normal maintenance and installation procedures to enable the realignment of misaligned flanges within their respective working capacities. For example, the tool can be used to assist in the replacement of ring and other types of flange joint. The use of these instructions will promote safe use, and maximize the service life of the tools.

## 2. SAFETY INFORMATION

**The operator MUST read this manual prior to using the tools.**

**Failure to comply with the following cautions and warnings could cause equipment damage and personal injury; read the manual fully!**

Read all the following instructions, warnings and cautions carefully. Follow all safety precautions to avoid personal injury or property damage during system operation.

Equalizer International Ltd cannot be responsible for damage or injury resulting from unsafe product use, lack of maintenance or incorrect product and/or system operation. Contact Equalizer International Ltd when in doubt as to the safety precautions and applications.

Only people competent in the use of mechanical and hydraulic equipment should use these tools.

In all installations the site safety requirements must be adhered to. ALSO the safety of the operator, and when present, any assisting personnel, is of paramount importance along with the safety of others including, when present, the general public.

These instructions are only to cover the safe operation of THE EQUALIZER FA1™ FLANGE ALIGNMENT TOOL, during normal maintenance/installation operations. All other safety aspects must be controlled by the operation supervisor.

A **CAUTION** is used to indicate correct operating or maintenance procedures and practices to prevent damage to, or destruction of equipment or other property.

A **WARNING** indicates a potential danger that requires correct procedures or practices to avoid personal injury.

A **DANGER** is only used when your action or lack of action may cause serious injury or even death.



**IMPORTANT:** Operator must be competent in the use of hydraulic equipment. The operator must have read and understood all instructions, safety issues, cautions and warnings before starting to operate the Equalizer equipment.



**WARNING:** To avoid personal injury and possible equipment damage, make sure all hydraulic components are rated to a safe working pressure of 700 bar (10,000 psi).



**WARNING:** Do not overload equipment. Overloading causes equipment failure and possible personal injury.

The risk of overloading can be avoided by using the Equalizer Hand Pump, which has its safety valve set to 700 bar by the factory. If alternative pumps are used, ensure they are rated at a safe working pressure of 700 bar (10,000 psi).



**CAUTION:** Make sure that all system components are protected from external sources of damage, such as excessive heat, flame, moving machine parts, sharp edges and corrosive chemicals.



**CAUTION:** Avoid sharp bends and kinks that will cause severe back-up pressure in hoses. Bends and kinks lead to premature hose failure. Do not drop heavy objects onto hoses. A sharp impact may cause internal damage to hose wire strands; applying pressure to a damaged hose may cause it to rupture. Do not place heavy weights on the hoses, or allow vehicles to roll over the hoses; crush damage will lead to premature hose failure.



**WARNING:** Immediately replace worn or damaged parts with genuine Equalizer parts. Equalizer parts are designed to fit properly and withstand rated loads. For repair or maintenance service contact your Equalizer distributor or service centre.



**DANGER:** To avoid personal injury keep hands and feet away from the tool and workpiece during operation.



**WARNING:** Always wear suitable clothing and Personal Protective Equipment (PPE).



**DANGER:** Do not handle pressurised hoses. Escaping oil under pressure can penetrate the skin, causing serious injury. If oil is injected under the skin, seek medical attention immediately.



**WARNING:** Never pressurize unconnected couplers. Only use hydraulic equipment in a connected system.



**IMPORTANT:** Do not lift hydraulic equipment by the hoses or couplers. Use the carrying handle or other means of safe transport.



**CAUTION:** Do not operate the equipment without lubricating all moving parts as in section 5.4, 6.4 & 7.4. Use only high pressure molybdenum disulphide grease.

### 3. TECHNICAL DATA

	Tool Description	Aligning Force
<b>FA1TM</b>	Mechanical Fixed Flange Alignment Tool	1.0 T (10kN)

#### 3.1 KIT COMPONENTS

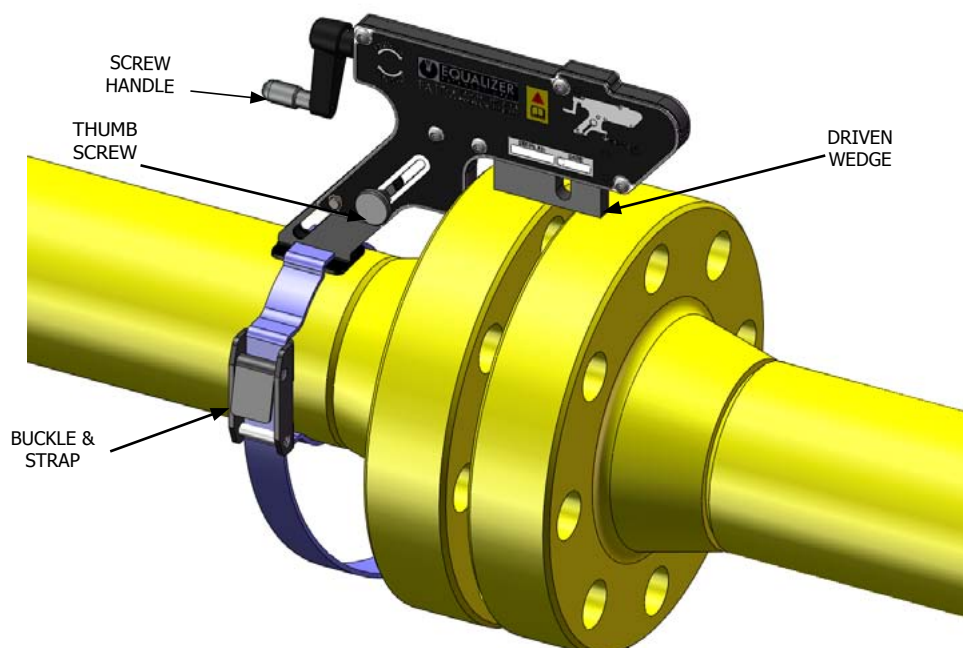
- 1 x FA1TM Tool
- 1 x Ratchet and Strap
- 1 x Instruction Manual



Product Code: FA1TMSTD

#### 3.2 HOW THE FA1TM WORKS

1. The FA1TM is secured to the lower of the two flanges by fully inserting the lift hook into the bolt-hole at the point of greatest misalignment.
2. The drop leg thumb screw is slackened and the drop leg is adjusted down to the pipe while the tool is held level in the bolt-hole.
3. The drop leg thumb screw is then tighten until firm.



## 4. FLANGE MISALIGNMENT DETERMINATION PROCEDURE

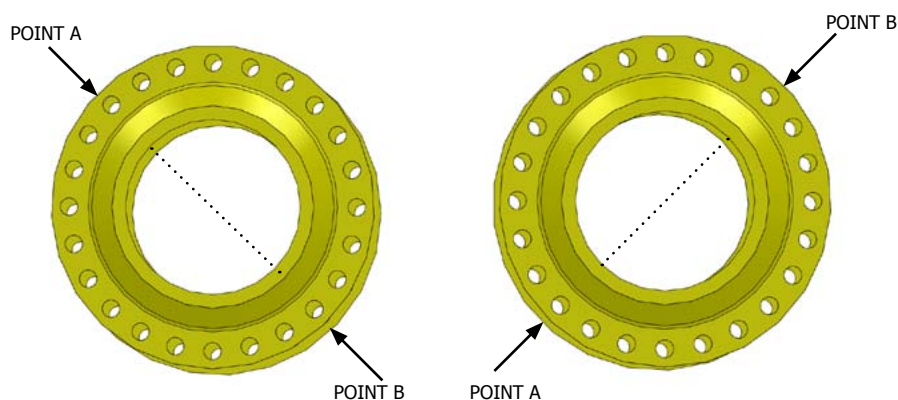
The tool being used must not be attached to a flanged joint prior to the misalignment procedure being carried out.

### 4.1 LATERAL MISALIGNMENT

1. Loosen and remove every second bolt around the flange , continue with this until misalignment occurs.

A flanged joint, once broken down, may spring out of alignment at any point, or in any direction around its circumference. Misalignment may not occur until only a few bolts remain.

2. At this point the direction of any misalignment should become obvious. The alignment tool being used should be attached at the maximum point of misalignment (point A or B in the examples shown below) as shown in sections 5.3, 6.3 & 7.3.



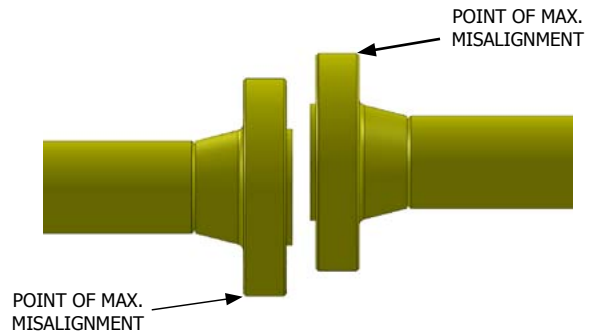


## 5. FA1™ MECHANICAL FIXED FLANGE ALIGNMENT TOOL

### 5.1 INSTALLATION AND OPERATION

1. Carry out the Flange Misalignment Determination Procedure (see section 4) to determine the points of maximum misalignment.

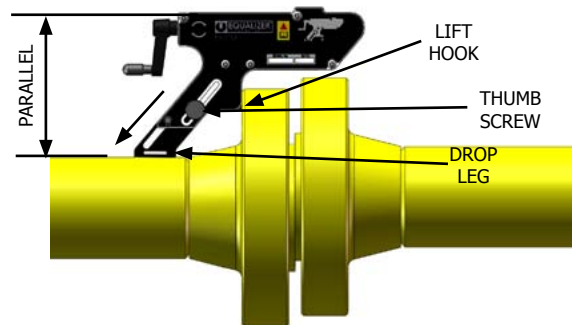
In this example the points of maximum misalignment are at the top and bottom of the joint.



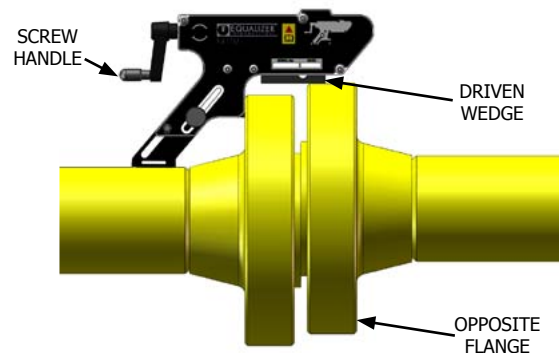
2. Guide the lift hook into the bolt-hole at the point of maximum misalignment.

Adjust the drop leg down onto the pipe by slackening the thumb screw in a anticlockwise direction. The tool should be held up level within the bolt-hole during adjustment.

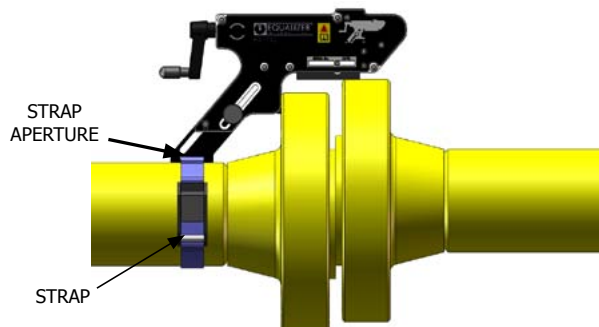
N.B. The tool must be parallel to pipe during operation.



3. Rotate the screw handle clockwise until then driven wedge makes contact with opposite flange.

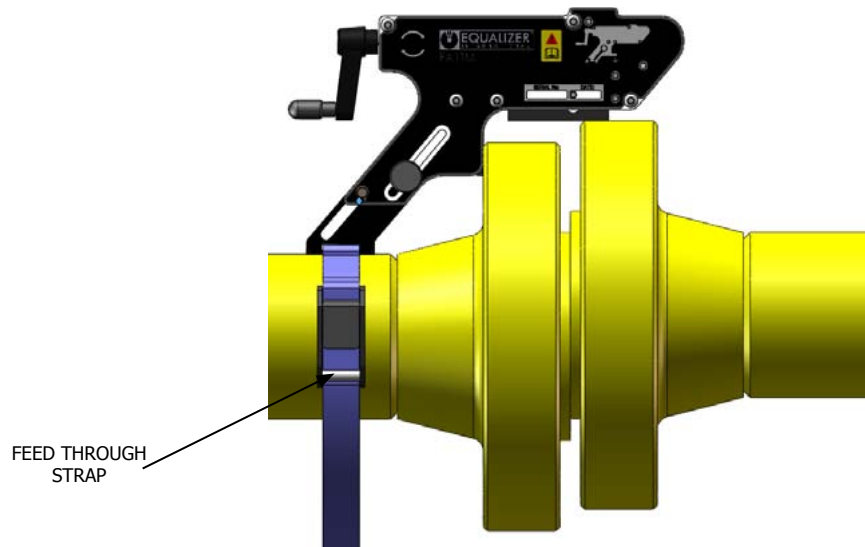


4. Thread the strap through the aperture on the base of the drop leg as shown.

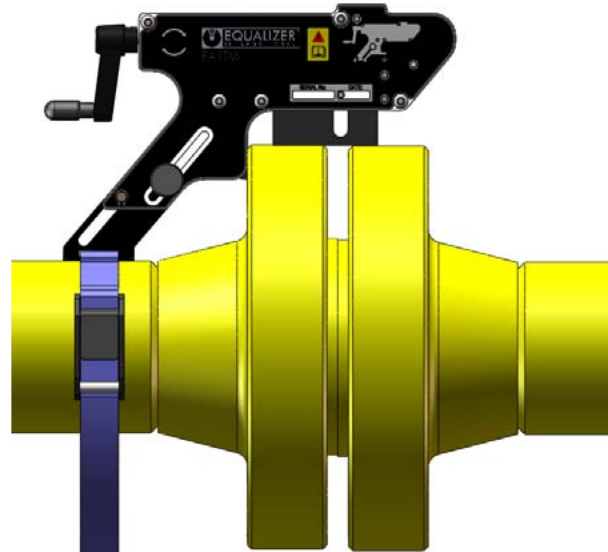
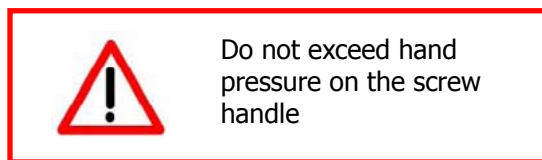




5. Feed the open end of the strap through the buckle mechanism as shown.  
Close the clasp to secure strap.



6. Now that everything is secured, rotate the handle clockwise to apply pressure to the circumference of the opposite flange and bring the flange joint in alignment.



7. Once in alignment the bolts may be inserted and tightened. After replacing all of the bolts (apart from the bolt which will go into the bolt-hole in which the FA1™ is located), remove the tool by reversing steps 2 - 6. Insert the last bolt and tighten.



Care should be taken not to drop any of the component parts when removing them from the flange joint. This action will prevent injuries to either the operator's lower limbs, or to passers-by.

## 5.2 EXAMINATION AND STORAGE

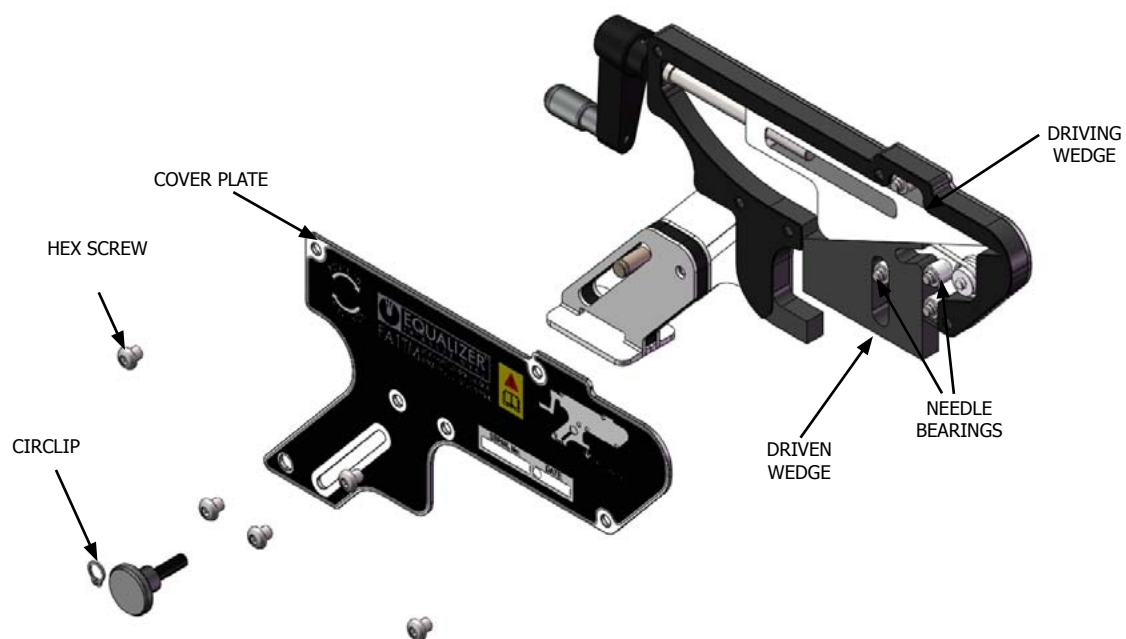
- 1 On return from each job and before allocation against subsequent work the completeness of the Equalizer FA1™ kit must be established and items examined to ensure that they are serviceable
- 2 Any missing or damaged items are to be replaced as soon as possible and prior to the tool being used again
- 3 Store the FA1™ in a cool dry place and ensure all machined surfaces are greased
- 4 Ensure wedges, pins and leg remain grit free and that parts move freely

## 5.3 MAINTENANCE

- 1 Secure the tool upright on a bench.
- 2 Using a small flat screw driver, lever out 1 Circlip and unscrew 5x 4mm hex screws.
- 3 Remove cover plate and remove any dirt or corrosion from moving parts
- 4 Inspect components for wear and damage, replace if necessary! If there is no damage present then they can be greased and re-assembled by reversing steps 1-4

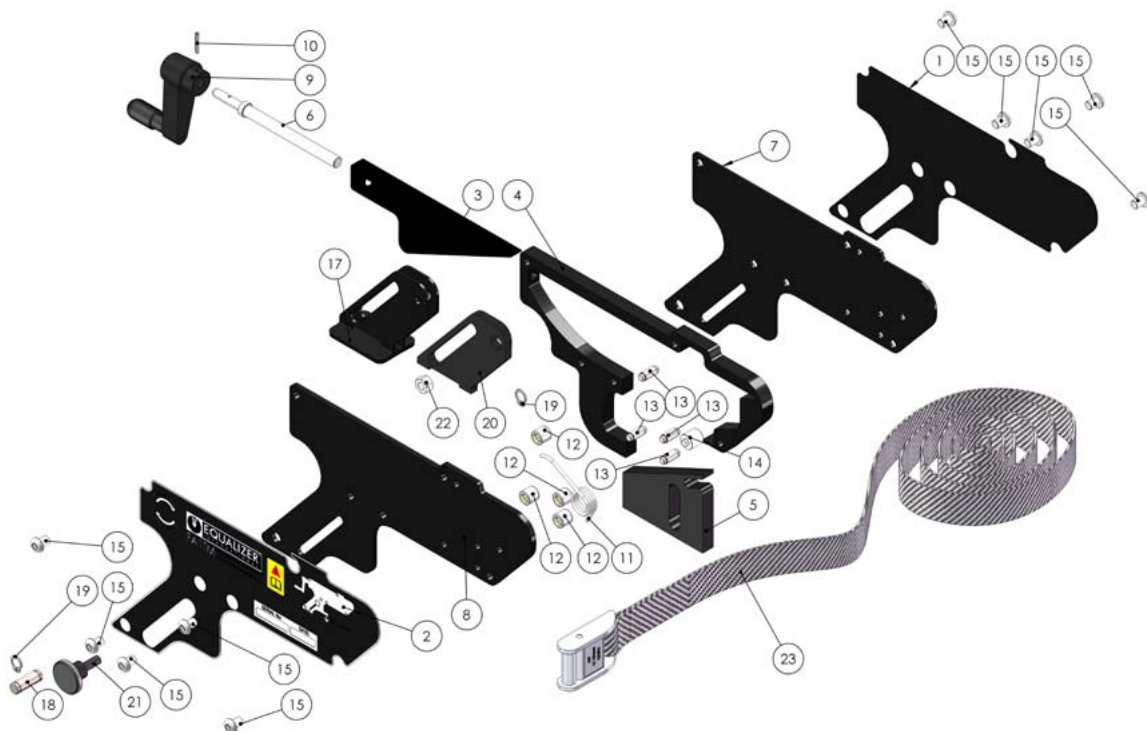
Recommended grease -

Rocol Sapphire Hi-Load or equivalent good quality hi load bearing grease



## 5.4 PARTS LIST

NO.	PART NO	DESCRIPTION	QTY.
1	070280-01	BODY PLATE STICKER L	1
2	070281-01	BODY PLATE STICKER R	1
3	210100-01	DRIVING WEDGE	1
4	210200-01	BODY FRAME	1
5	210300-01	DRIVEN WEDGE	1
6	210400-01	DRIVE SCREW	1
7	210500-01	COVER PLATE	1
8	210501-01	COVER PLATE RIGHT	1
9	210600-01	CRANK HANDLE	1
10	210700-01	SPRING PIN	1
11	210800-01	TORSION SPRING	1
12	210900-01	NEEDLE BEARING	4
13	211100-01	BEARING SHAFT	4
14	211200-01	SPRING MANDREL	1
15	211300-01	M6X8 SCKT FL. SCREW	10
16	211600-01	DISTANCE PLATE	1
17	211800-01	DROP LEG	1
18	211900-01	LEG PIN 8MM	1
19	212000-01	SPRING RING 8MM	2
20	212200-01	LEG PLASTIC INSERT	1
21	230203-01	M6 RELEASE KNOB	1
22	771801-01	M6 HEX NUT	1
23	220800-01	RATCHET STRAP	1



## 5.5 WEIGHTS AND DIMENSIONS

### WEIGHTS

Tool only

= 1.6 kg (18.96 lbs)

Ratchet & strap

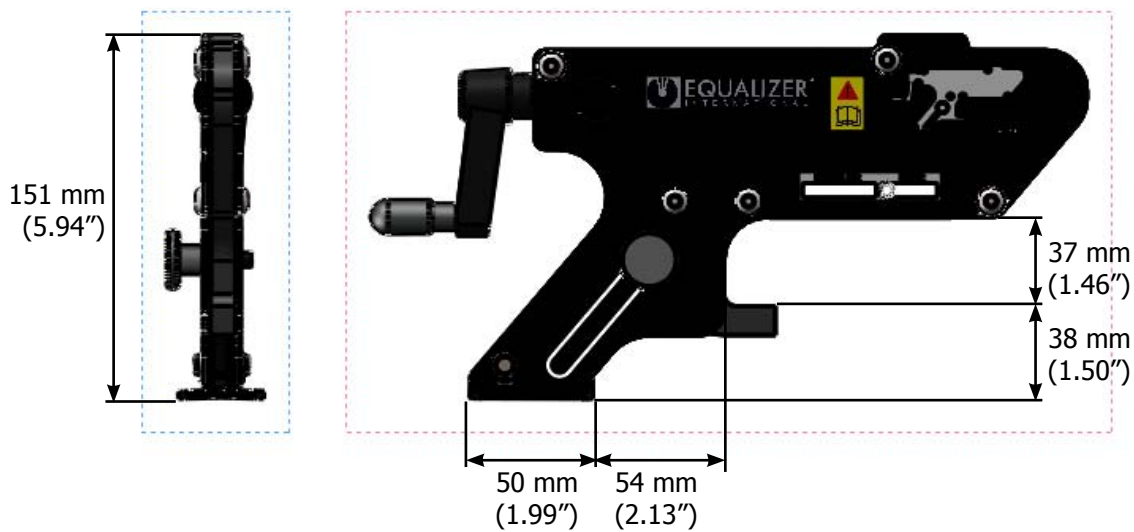
= 0.28 kg (0.62 lbs)

GROSS KIT WEIGHT

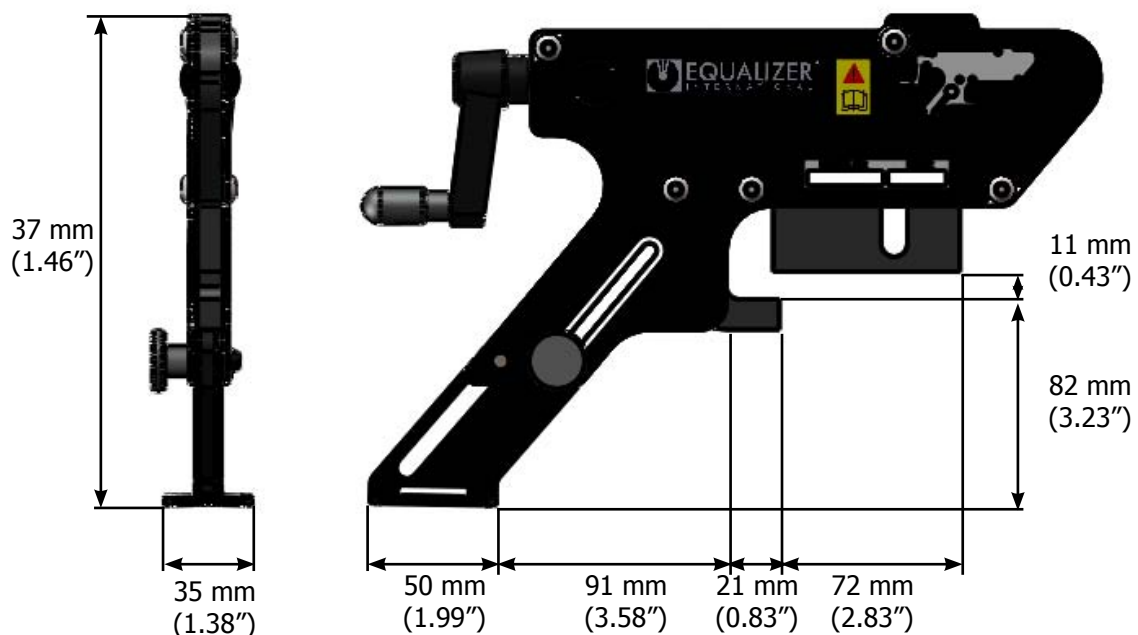
= 8.88 kg (19.58 lbs)

### DIMENSIONS

#### MINIMUM EXTENSION



#### MAXIMUM EXTENSION



## 5.6 TROUBLESHOOTING

Problem: The tool is attached and appears to be functioning properly, but the joint will not align

There may be something restricting the joint from aligning.

Check the area around the joint to establish if there is an obstruction to the joint

The joint may require more than 1.0T (10 kN) force to align.

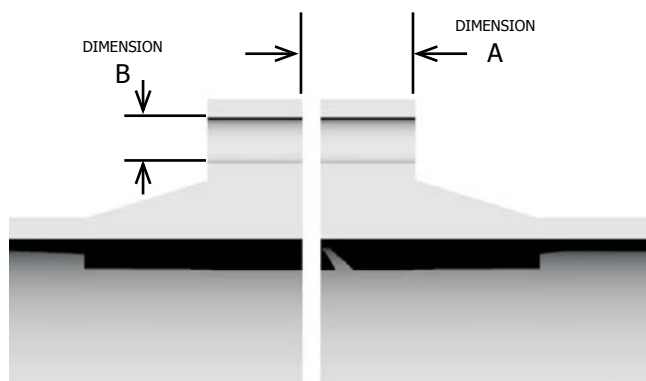
If the joint requires more force than that of the 4.0 T (40kN) tool, attach a second tool or another method of aligning should be adopted.

## 5.7 APPLICATION DIMENSIONS

### MINIMUM AND MAXIMUM FLANGE SIZES

Dimension A: must be between 14 and 82mm (0.55" and 3.29")

Dimension B: bolt-hole diameter must be 16 mm (0.63") or greater



## 6.1 BS10 FLANGE RANGE OF APPLICATION

CLASS A	TOOL	FA1TM																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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### API6B WELD NECK FLANGE RANGE OF APPLICATION

CLASS 2K												
	NPS 1/2"	3/4"	1"	1/4"	1/2"	2"	3"	4"	5"	6"	7"	8"
TOOL	FA1TM											
CLASS 3K												
	NPS 1/2"	3/4"	1"	1/4"	1/2"	2"	3"	4"	5"	6"	7"	8"
TOOL	FA1TM											
CLASS 5K												
	NPS 1/2"	3/4"	1"	1/4"	1/2"	2"	3"	4"	5"	6"	7"	8"
TOOL	FA1TM											

### API6B WELD NECK FLANGE RANGE OF APPLICATION

CLASS 2K												
	NPS 2 1/2"	2 9/16"	3 1/8"	4 1/16"	5 1/8"	7 1/16"	9"	11"	13 5/8"	16 3/4"	21 1/4"	
TOOL	FA1TM											
CLASS 3K												
	NPS 2 1/2"	2 9/16"	3 1/8"	4 1/16"	5 1/8"	7 1/16"	9"	11"	13 5/8"	16 3/4"	21 1/4"	
TOOL	FA1TM											
CLASS 5K												
	NPS 2 1/2"	2 9/16"	3 1/8"	4 1/16"	5 1/8"	7 1/16"	9"	11"	13 5/8"	16 3/4"	21 1/4"	
TOOL	FA1TM											



## ASME B16.47 FLANGE RANGE OF APPLICATION

CLASS 900	CLASS 600	CLASS 400	CLASS 300	CLASS 150
TOOL	TOOL	TOOL	TOOL	TOOL
NPS	NPS	NPS	NPS	NPS
22"	22"	22"	22"	22"
26"	26"	26"	26"	26"
28"	28"	28"	28"	28"
30"	30"	30"	30"	30"
32"	32"	32"	32"	32"
34"	34"	34"	34"	34"
36"	36"	36"	36"	36"
38"	38"	38"	38"	38"
40"	40"	40"	40"	40"
42"	42"	42"	42"	42"
44"	44"	44"	44"	44"
46"	46"	46"	46"	46"
48"	48"	48"	48"	48"

	SUITABLE FOR FATM TOOL
	SUITABLE FOR FATM TOOL
	SUITABLE FOR FAIRTE TOOL
	NOT SUITABLE FOR TOOLS



## 6.3 SPO FLANGE RANGE OF APPLICATION

CLASS 150	TOOL	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
	TOOLINPS	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
CLASS 300	TOOL	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
	TOOLINPS	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
CLASS 600	TOOL	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
	TOOLINPS	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
CLASS 900	TOOL	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
	TOOLINPS	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
CLASS 1500	TOOL	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
	TOOLINPS	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
CLASS 2500	TOOL	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
	TOOLINPS	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
CLASS 5000	TOOL	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
	TOOLINPS	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
CLASS 7500	TOOL	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
	TOOLINPS	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
CLASS 10000	TOOL	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
	TOOLINPS	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
CLASS 15000	TOOL	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"
	TOOLINPS	2 1/2"	3"	3 1/2"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"

SUITABLE FOR FA1TM TOOL
SUITABLE FOR FA4TM TOOL
SUITABLE FOR FA9TE TOOL
NOT SUITABLE FOR TOOLS