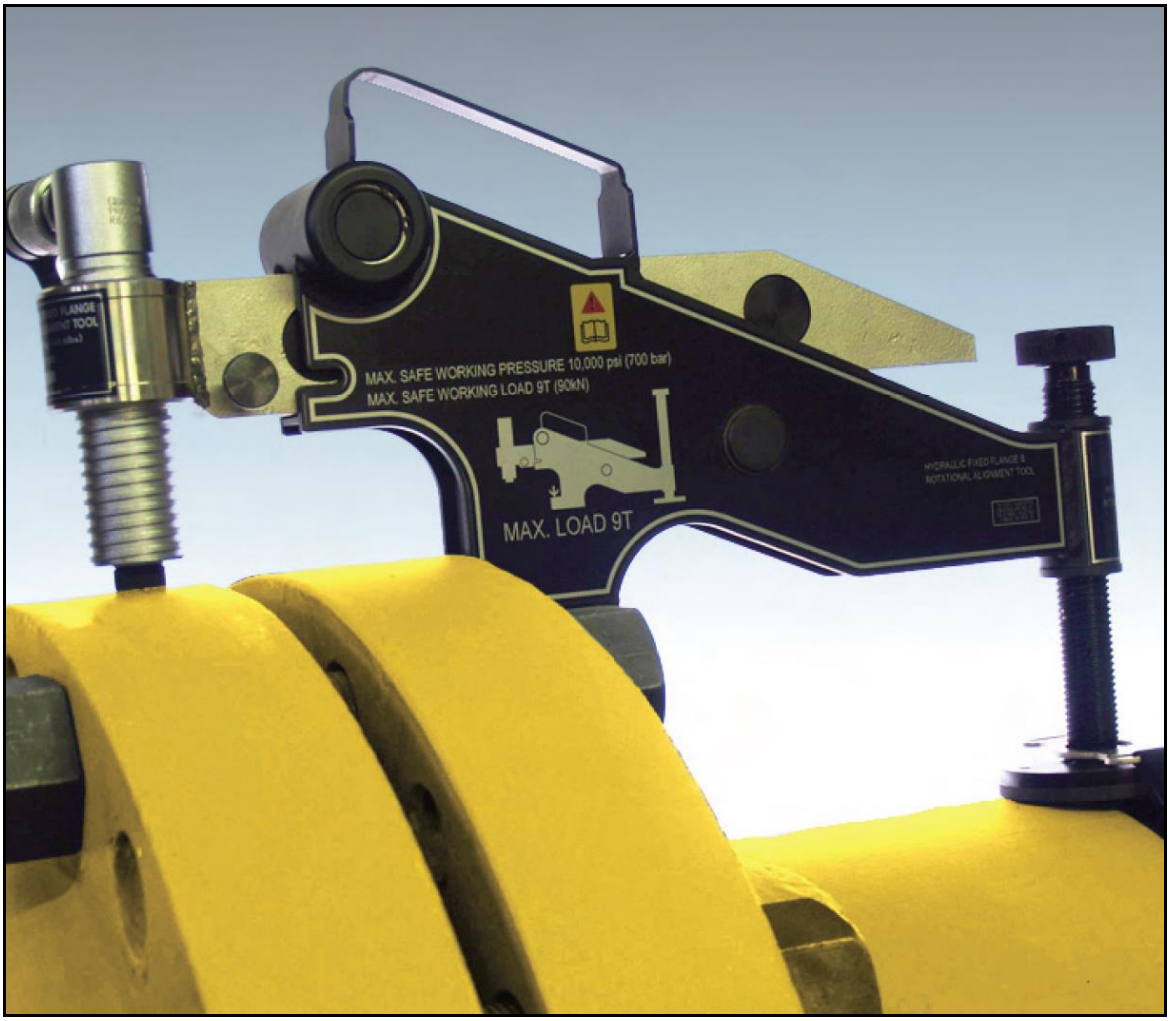
CHRISTIE
TOTAL TORQUE SOLUTIONS

WCA9TE FLANGE ALIGNMENT TOOL

OPERATOR INSTRUCTION MANUAL



CONTENTS

1 - INTRODUCTION

The Christie WCA9TE is an aid for use in normal maintenance and installation procedures, and enable the realignment of mis-aligned 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. It is recommended that the operator read the relevant sections of this instruction manual for the WCA9TE flange alignment tool.

2 – SAFETY INFORMATION

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.

W. Christie (Industrial) Limited cannot be responsible for damage or injury resulting from unsafe product use, lack of maintenance or incorrect product and/or system operation. Contact W. Christie (Industrial) Limited when in doubt as to the safety precautions and applications. To protect your warranty, use only good quality hydraulic oil of the grade 32cSt.

Only people competent in the use of hydraulic equipment should use this tool.

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 CHRISTIE WCA9TE 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 Christie 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 Christie 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 Christie parts. Christie parts are designed to fit properly and withstand rated loads. For repair or maintenance service contact W. Christie (Industrial) Limited

DANGER: To avoid personal injury keep hands and feet way 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. Use only high pressure molybdenum disulphide grease.

3 – TECHNICAL DATA

TOOL	TOOL DESCRIPTION	ALIGNING FORCE
WCA9TE	Hydraulic Fixed Flange and Rotational Alignment Tool	9 T (90 kN) from 10,000 psi (700 bar) of hydraulic pressure

4 – FLANGE MISALIGNMENT DETERMINATION PROCEDURE

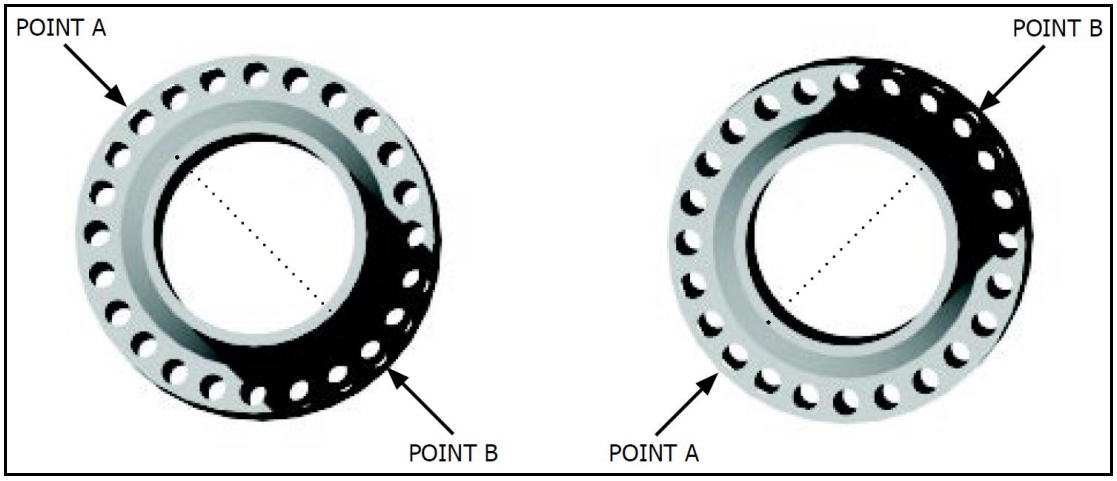
The tool being used must not be attached to a flanged joint prior to the misalignment procedure being carried out.

4.1 LATERAL MISALIGNMENT

1) Slacken 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 section 5.3.

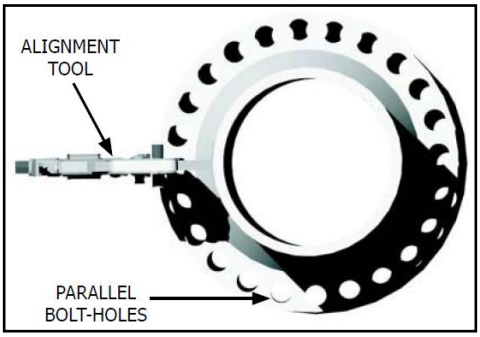


4.2 – ROTATIONAL (TWIST) MISALIGNMENT

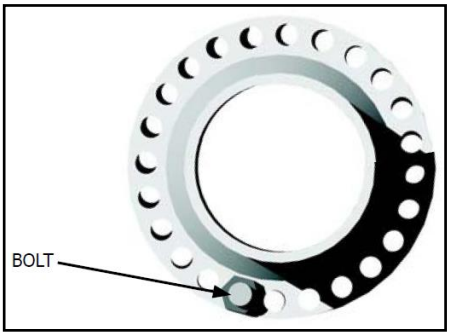
If the outer circumference of the flanges are in alignment but the operator is unable to fit the bolt into any two corresponding bolt-holes then rotational misalignment may have occurred.

In this case the alignment tool can be attached to the most accessible point as misalignment occurs at all bolt-holes to the same degree.

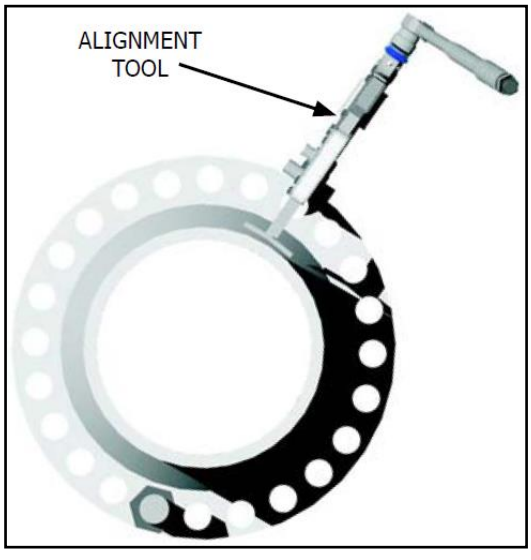
1) Attach the alignment tool at the most accessible/convenient point (as shown in section 5.3) and use it to push the flanges out of alignment until one pair of bolt-holes becomes parallel.



2) Insert the bolt into the aligned bolt- hole and release the alignment tool. The load will transfer onto the bolt.



3) Repeat steps 1 and 2 at other points around the flange until all of the remaining bolt-holes are parallel and the rest of the bolts can be inserted.



5 – WCA9TE MECHANICAL FIXED FLANGE AND ROTATIONAL ALIGNMENT TOOL

5.1 – KIT COMPONENTS

1 x WCA9TE Tool complete with Hydraulic Cylinder

1 x 10,000 psi (700 bar) Hydraulic Hose, 2m (78.75")

1 x 10,000 psi (700 bar) HP350S Sealed Hand Pump with Gauge

1 x Instruction Manual

1 x Carry Case.

1 x Ratchet and Strap

5.2 – HOW THE WCA9TE WORKS

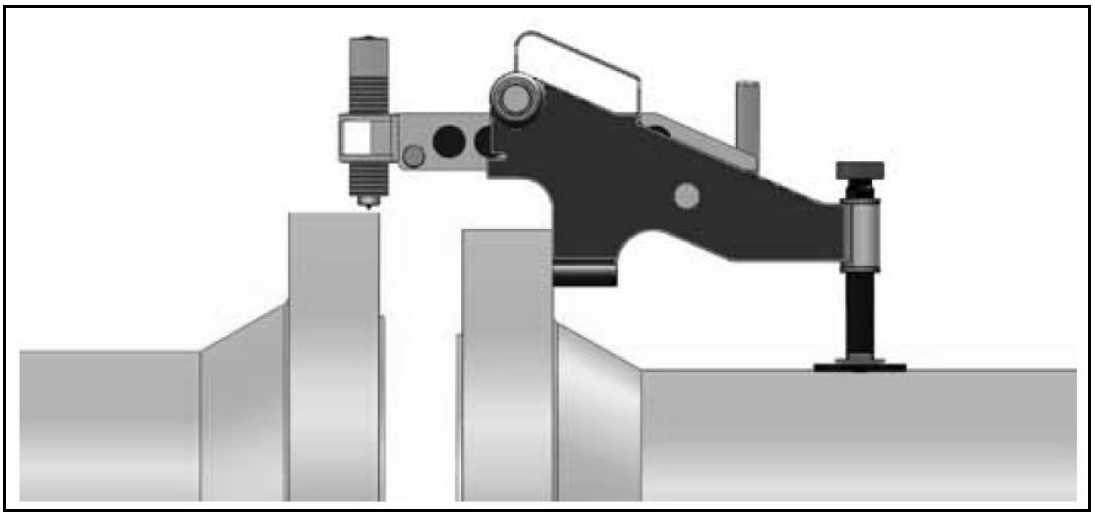
1) The WCA9TE is secured to the lower of the two flanges by fully inserting the lift hook into the bolt-hole which is parallel with the bolt-hole at the point of greatest misalignment.

2) The drop leg is released onto the pipe while the tool is held up level in the bolt-hole.

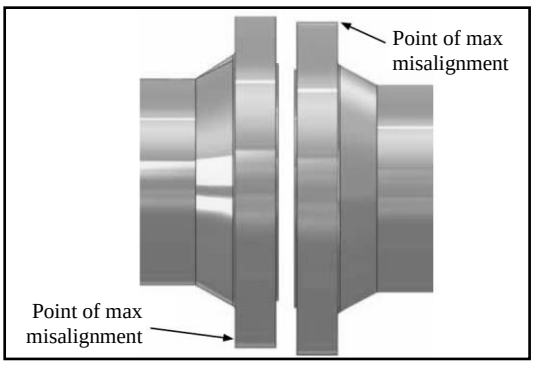
3) The release knob should be loosened to allow the wing to be extended out to the required distance.

4) The hydraulic cylinder should then be adjusted down onto the circumference of the flange opposite by rotating it in a clockwise direction.

5) The hydraulic hose and pump are attached to the cylinder and the hand pump is primed, bringing the joint into alignment.

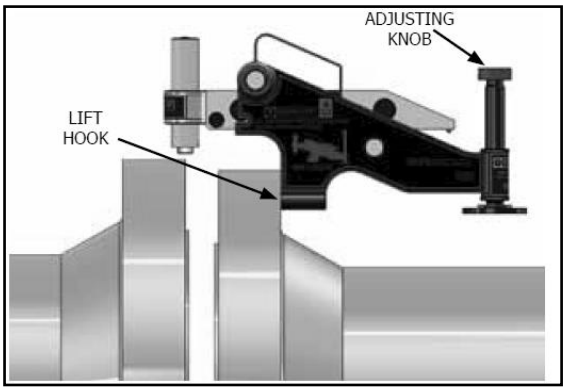


5.3 – INSTALLATION AND OPERATION



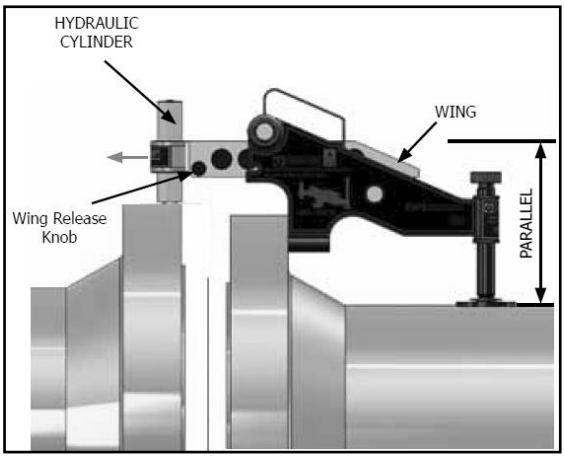
1) Carry out the Flange Misalignment Determination Procedure (see section 4) to determine the points of maximum misalignment.

   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 maximum point of misalignment.

   Adjust the drop leg onto the pipe (using the adjusting knob) while holding the lift hook up level with the bolt-hole.

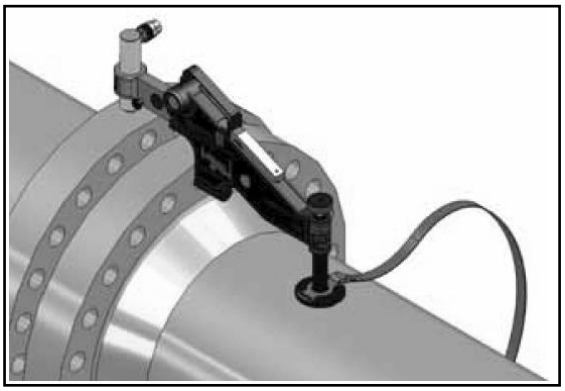


3) Loosen the wing release knob and extend the wing out to the required distance.

   Rotate the hydraulic cylinder down until the base of the cylinder locates onto the surface of the opposite flange.

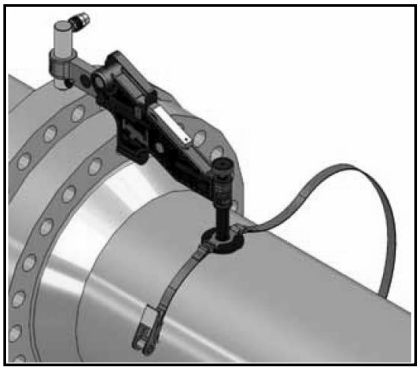
   Ensure that the tool is sitting level and that the cylinder is in full and even contact with the surface of the opposite flange.

   N.B. Ensure tool is parallel to pipe

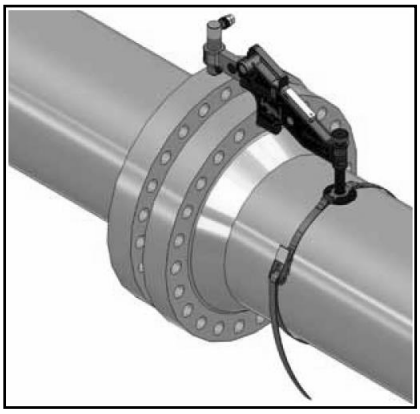


4) Attach the hook on the strap through the base plate as shown.

5) Now place the hook of the ratchet mechanism through the base on the opposite side as shown.

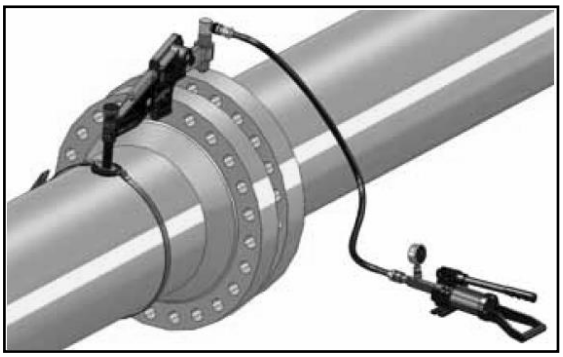


6) Feed the open end of the strap through the ratchet mechanism as shown. Tighten the strap using the ratchet mechanism.



7) Connect the hydraulic pump to the hydraulic hose, and the hose to the hydraulic adjusting cylinder.

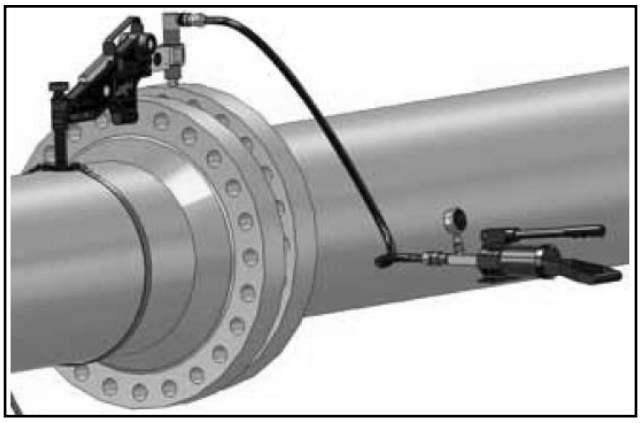
   Prime the pump until the joint comes into alignment.



8) 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 WCA9TE is located), remove the tool by reversing steps 2 – 4.

   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.

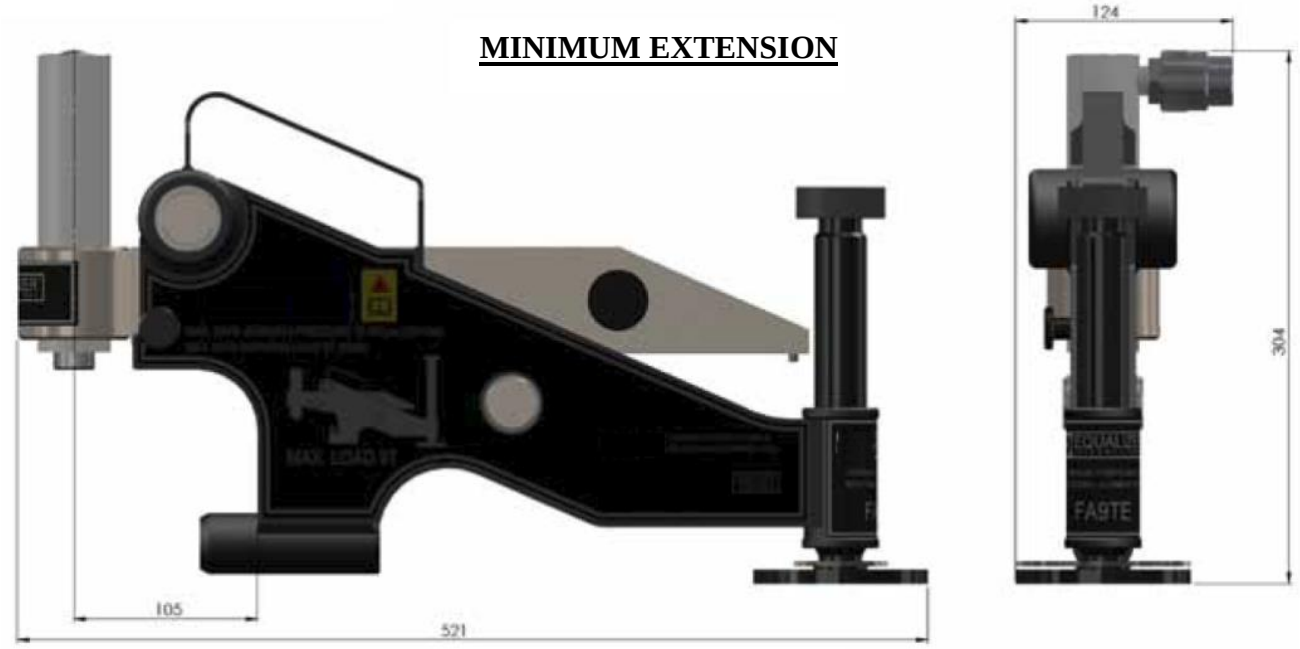
5.4 – WEIGHTS AND DIMENSIONS

WEIGHTS

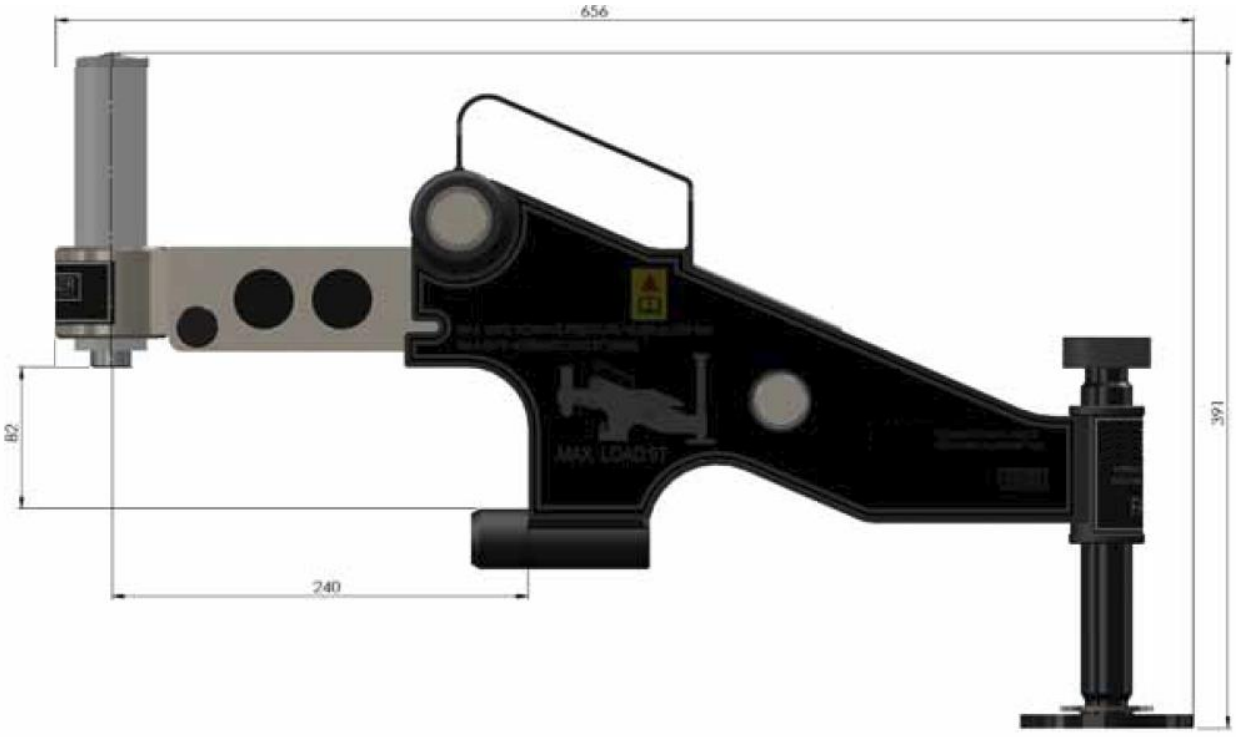
Tool with Hydraulic Cylinder	= 15.5 kg (34.1 lbs)
Hand Pump	= 4.5 kg (9.9 lbs)
Hydraulic Hose	= 1 kg (2.2 lbs)
Plastic Carry Case	= 7.5 kg (16.5 lbs)
GROSS KIT WEIGHT	= 28.5 kg (62.8 lbs)

OVERALL DIMENSIONS

MINIMUM EXTENSION



MAXIMUM EXTENSION



5.5 – TROUBLESHOOTING

Problem: The tool is advancing but does not reach full pressure

• Air could be present in the hydraulic system	Use the airlock removal procedure as follows:- 1. Connect the hand pump to the tool with the hydraulic hose 2. Close the release valve on the pump, and prime the pump until the hydraulic cylinder is fully extended and a small pressure is achieved 3. With the hand pump held above the tool and the tool in an upright position, open the release valve causing any air that is within the system to be forced up through the pump and vented into the oil reservoir 4. Repeat steps 1 - 3 three or four times to ensure that all air is removed from the system and the tool will reach full working pressure 5. Disconnect the hand pump from the hydraulic hose, grip the base plate of the hand pump body in a vice with the pump body vertical and the main handle at the top 6. Remove the four nuts holding the main handle and lift off 7. Grip the refilling plug with pliers and extract it by pulling and twisting simultaneously. Ensure the reservoir body is held down when removing the refilling plug as pulling up on the reservoir body will release the bladder within, and oil will spill out. 8. Fill the reservoir to the top with a good quality hydraulic oil of the grade 32 cSt 9. Reinsert the refilling plug, wipe away any oil, and reassemble by reversing the disassembly process

Problem:	The Friction pad is sliding in the circumference of the opposite flange as the tool is aligning the joint
- Grit or dirt on wing, rollers or bearings	- Ensure the rollers are rotating freely and that there is no restriction to the rollers on the wing surfaces such as dirt or grit
- Wing is at full extension	- Check that the wing is not at full extension when aligning the joint. Ensure that there is enough extension left to allow the tool to expand as the joint is aligned.

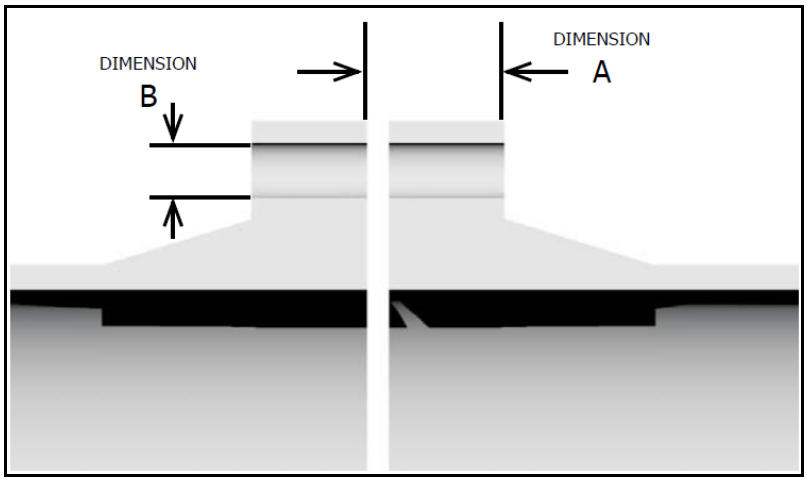
Problem:	The tool is attached and appears to be functioning properly, but the joint will not align
- There may be something restricting the joint at a point close to the flanges	- Check the area around the joint to establish if there is an obstruction to the joint
- The joint may require more than 9 T (90 kN) force to align	- If the joint requires more force than that of the 9 T (90 kN) tool, then another method of aligning the joint should be adopted

5.6 – RANGE OF APPLICATION

MINIMUM AND MAXIMUM FLANGE SIZES

Dimension A: must be between 93 and 228 mm (3.75” and 9”)

Dimension B: bolt-hole diameter must be 31.5 mm (1.25”) or greater



BY FLANGE TYPE, CLASS AND DIAMETER

ANSI B 16.5

THREADED FLANGES

600#	20” Thru 24”
900#	18” Thru 24
1500#	8” Thru 12”
2500#	5” Thru 12”

SLIP-ON FLANGES

600#	18” Thru 24”
900#	14” Thru 24”

LAP JOINT FLANGES

600#	24”
900#	18” Thru 24”
1500#	10” Thru 24”
2500#	6” Thru 12”

WELD NECK FLANGES

600#	18” Thru 24”
900#	14” Thru 24”
1500#	6” Thru 24”
2500#	5” Thru 12”

API

API STANDARD 605
WELD NECK FLANGES
300# 30” Thru 60”

API TYPE 6B
INTEGRAL FLANGES
2,000# 263/4” Thru 30”
3,000# 263/4” Thru 30”
5,000# 135/8” Thru 211/4”
10,000# 71/16” Thru 163/4”
15,000# 71/16” Thru 135/8”
20,000# 41/16” Thru 9”

API TYPE 6BX
WELD NECK FLANGES
10,000# 71/16” Thru 163/4”
15,000# 71/4”
20,000# 41/16” Thru 71/16”

API TYPE 6BX
INTEGRAL FLANGES
3,000# 203/4”
5,000# 9” Thru 11”

BS 3293

SLIP-ON FLANGES

300#	30” Thru 36”
400#	26” Thru 36”
600#	26” Thru 36“

WELD NECK FLANGES

300#	28” Thru 36”
400#	26” Thru 36”
600#	26” Thru 36”

SLIP-ON FLANGES RTJ

300#	28” Thru 36”
400#	26” Thru 36”
600#	26” Thru 36“

WELD NECK FLANGES RTJ

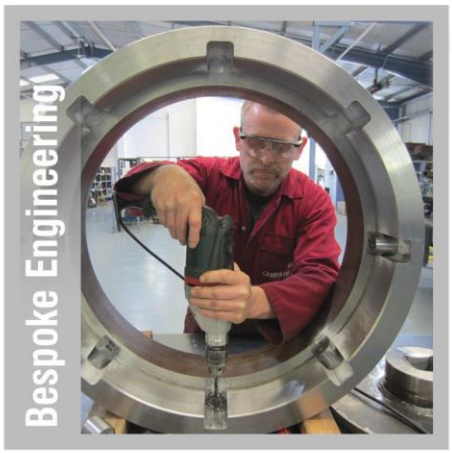
300#	28” Thru 36”
400#	26” Thru 36”
600#	26” Thru 36”

MSS SP-44

WELD NECK FLANGES RTJ

300#	28” Thru 36”
400#	26” Thru 36”
600#	26” Thru 36”
900#	26” Thru 36”

If the flange to be aligned is not listed please use the Minimum and Maximum Flange Sizes guide above



W. CHRISTIE (INDUSTRIAL) LTD
Christie House, Meadowbank Road,
Rotherham, South Yorkshire, S61 2NF

t: +44(0)1709 550088
e: info@wchristie.com
f: +44(0)1709 550030
w: www.wchristie.com

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TOTAL TORQUE SOLUTIONS