

HELI TILT COUPLER

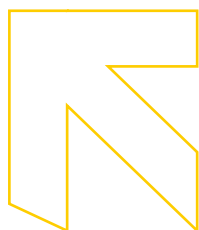
With Sure-Grip Coupler Base



**MAKING
IT EASY!**

ATTACH23
EQUIPMENT

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Introduction

This manual contains important information about the installation, maintenance, connection and safe operation of your Heli-Tilt Coupler.

You can assist in this proactive safety approach by ensuring that all persons involved with the fitting and operation of the Heli-Tilt, read and understand these basic safety features and instructions.

ATTACH2 reserves the right of modification as a result of further technical developments with regard to the information and illustrations cited in this manual:

- ATTACH2 and its suppliers have sole copyright of this manual.
- The manual is intended solely for the use of the Heli-Tilt.
- No part of this manual may be reprinted, translated or reproduced by any means without prior written permission from ATTACH2.
- Utilisation for the purposes of competition is forbidden.
- The Heli-Tilt is designed for safe and dependable service if installed, maintained and operated correctly.

We request that time be devoted to the study of installation and maintenance requirements. Users are also expected to familiarise themselves with the correct operation and use of the Sure-Grip and its advised safety procedures.

IMPORTANT NOTE

To comply with Occupational Safety and Health requirements, a record must be made of all repairs, adjustments and regular maintenance events involving your Heli-Tilt.

Heli-Tilt Coupler

➤ MAXIMUM BREAKOUT FORCE

The distance between the pivoting pin and the bucket pin has been reduced to the lowest possible height to maximise your breakout force on any application, whilst retaining strength.

➤ INTERNAL CROSS PORT RELIEF VALVE

Relief protects attachments when overloaded.

➤ ROBUST ACTUATOR

The Heli-Tilts robust actuator is manufactured from a careful selection of certified materials and is designed to withstand the toughest working conditions at all angles.

➤ LOW PROFILE

Design minimises loss of machine dig force improving fuel economy and reducing strain on your machine.

➤ UP TO 180 DEGREE TILT

The Heli-Tilt offers maximum dexterity when precision is paramount. Tilting capability ranges from 180° at the 2T-8T level, 120° above the 14T level.



FULLY COMPLIANT

Compliant with all Australian and New Zealand Safety Standards AS4772-2008 and NSW Work Cover WC01783.

Compliant with European Standard EN474-5 and ISO 13031: 2016 Earthmoving Machinery, and all other major contracting policies.

To The Owner

As the new owner and/or operator of the Sure-Grip we would recommend that you take the time to read this Operation Manual carefully before commencing work.

FOLLOW THE SAFETY INSTRUCTIONS:

- Carefully read all the safety information contained in this manual.
- Make sure all warning signs are securely fitted.
- Immediately replace any signs that are missing or damaged.
- Before starting work make sure you are familiar with the equipment and where necessary, with the machine and its control devices.

INFORMATION FOR THE USER:

The user of the Sure-Grip is obliged to ensure that the equipment is always in safe working order in accordance with accident prevention regulations, Occupational Safety and Health regulations or any other official instructions.

WARRANTY:

ATTACH2 extends its warranty policy from twelve months to three years or 3000 machine hours (whichever comes first).

In order to qualify for the full three year warranty, customers must submit a Warranty Submission Form which can be found in our warranty book or on our website: **WWW.ATTACH2.CO.NZ**

Should a Warranty Submission Form upon purchase not be submitted, the standard 12 month warranty period will apply.

The extended guarantee assumes proper operation and use as intended but will be nullified as a result of:

- Repairs or other intervention not undertaken by persons authorised by ATTACH2.
- With use of accessories or replacement parts not approved by ATTACH2 or which are not original replacement parts supplied by ATTACH2.

After the warranty period has expired, we highly recommend the use of original replacement parts and manufacturer's replacement parts approved by ATTACH2.

Safety Instructions



WARNING:

Improper operation of the Sure-Grip can cause injury or death. Before using this product make certain that every operator:

- Is instructed in safe and proper use of the attachment.
- Reads and understands the manual pertaining to the attachment.
- Reads and understands all safety decals and tags on the machine.
- Clears the area of all other persons.
- Learns and practises safely using attachment controls in a safe, clear area before operating this machine on a job site.

It is your responsibility to observe pertinent laws and regulations and follow ATTACH2's instructions for operation and maintenance.

ATTACH2 supplies a standard Heli-Tilt Coupler to fit ATTACH2 approved attachments. However, when fitting a non-standard attachment, check that the operation fitting guide for the attachment's pin range and width to suit the Heli-Tilt Coupler model.

NOTE: The Heli-Tilt Coupler base has a maximum and minimum pin centre range. Please refer to the Identification Labels section on Page 9 for more information.



WARNING:

This safety alert symbol indicates important safety messages in this manual. When you see this symbol carefully read the message that follows and be alerted to the possibility of personal injury or death.

Safety Standards

The Heli-Tilt is fully compliant with Australian and New Zealand Standards, AS4772-2008 and NSW Work-cover WC01783. EN474-5 Standards and ISO 13031 International Standard in all aspects*



FULLY COMPLIANT

Compliant with all Australian and New Zealand Safety Standards AS4772-2008 and NSW Work Cover WC01783.

Compliant with European Standard EN474-5 and ISO 13031: 2016 Earthmoving Machinery, and all other major contracting policies.



*THE ONUS FALLS ON THE INSTALLER REGARDING THE ENGAGEMENT/ DISENGAGEMENT FUNCTION TO ENSURE:

- (i) The control shall be protected against inadvertent activation.
- (ii) The acoustic signal shall be in continuous operation when the disengaging function is activated.
- (iii) Neither unlocking or disengagement shall be possible if the electrical signal for the acoustic signal device fails e.g. by cable failure/ disconnection.
- (iv) The acoustic signal operation shall be activated automatically at every engine start to allow verification of signal to the operator.

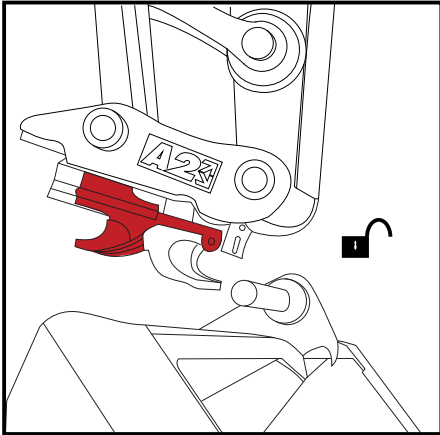
ISO Requires - slide pick ups and pin sizes for all ranges and recommended bucket widths.

NOTE: For attachments supplied to or manufactured in countries other than New Zealand and Australia, the rules for prevention of accidents and safety regulations for the respective country must be strictly adhered to.

Safety Decals

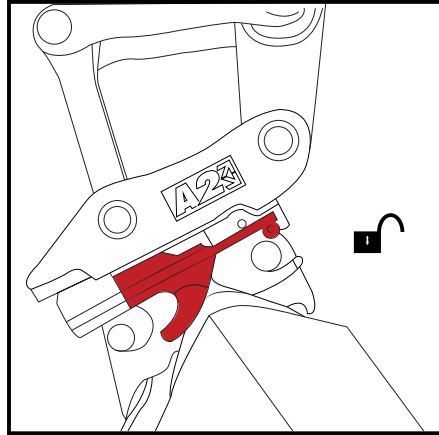
The Heli-Tilt Coupler is supplied with safety decals which are to be fitted inside the cab in clear view of the operator to identify correct operation of the Heli-Tilt.

ATTACHMENT PICK UP



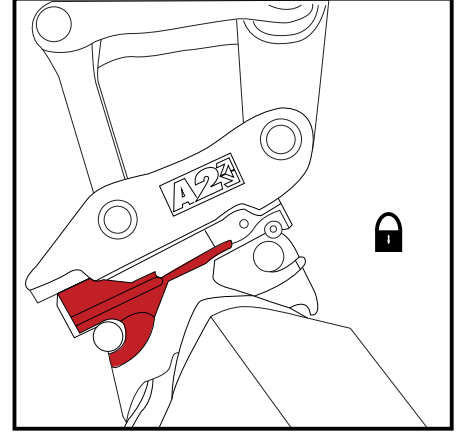
STEP 1

Disengage quick coupler (Buzzer on). With sliding jaw retracted engage Coupler onto front pin.



STEP 2

Crowd onto rear pin.



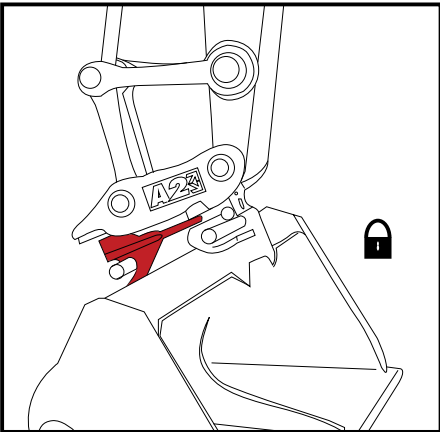
STEP 3

Engage quick coupler, jaw will slide onto rear pin which engages front safety latch.

SAFETY

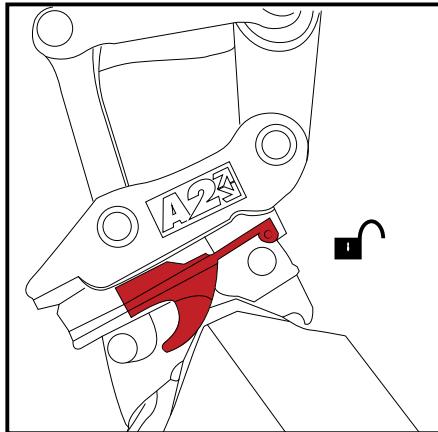
- Visually check front Latch is down.
- Crowd Bucket to visually see rear slide is wedged on to rear in.
- Physically push Attachment against ground and away from machine to confirm engagement is complete.

ATTACHMENT RELEASE



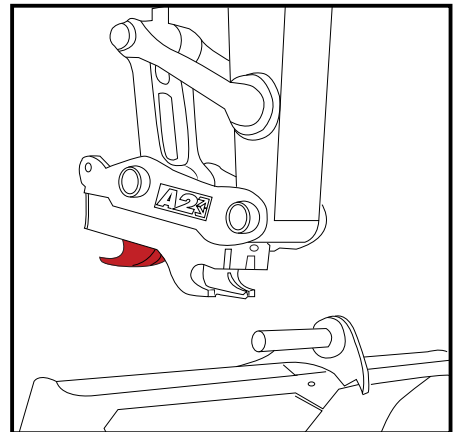
STEP 1

Place Attachment on flat ground.



STEP 2

Disengage quick coupler (buzzer on), retract slide jaw and crowd off the rear pin.



STEP 3

Front safety latch will disengage. Lift coupler away from attachment.

Identification Labels

All Sure-Grip Couplers are supplied with an Identification Label as shown below.

ATTACH2 EQUIPMENT	
MACHINE MAKE: _____	MODEL: _____
MANUFACTURE DATE: _____	WEIGHT: _____
PICKUP PIN SIZE: _____	PART #: _____
LIFTING EYE SWL: _____	SERIAL #: _____
MIN PIN CENTRE RANGE: _____	MAX: _____
<small>FULLY COMPLIANT: AS2772-2008 / NSW WC01783 New Zealand: Tel +64 6 929 5792 Australia: Tel +61 7 3557 2654 www.attach2.com </small>	

EACH IDENTIFICATION LABEL DISPLAYS THE FOLLOWING;

- Machine make
- Model
- Manufacturer date
- Attachment weight
- Pickup pin size
- Part number
- Lifting Eye Capacity
- Serial number
- The pin centre range to suit the Helit-Tilt.

The pin centre range displays the minimum and maximum travel distance for the Helit-Tilt.

It is recommended that a copy of these details be kept in office for reference.

W.L.L - Working Load Limit

The Heli-Tilt Coupler comes with an integrally designed Lifting Eye which has been designed to meet and exceed current standards.*



W.L.L is stamped on both the Sure-Grip serial plate and also clearly marked adjacent to the lifting eye as per ISO.

Stamping shows the W.L.L e.g. XXXXKG

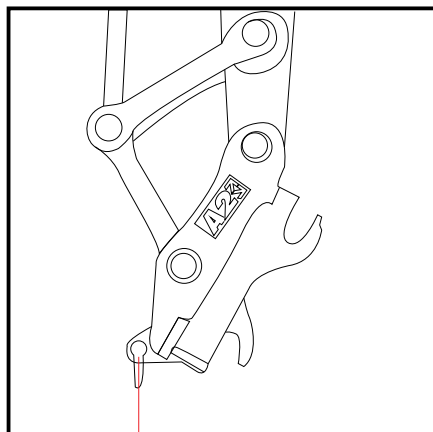
Lifting Eye

THE LIFTING EYE MUST BE USED ACCORDINGLY TO THE FOLLOWING GUIDELINES:

- Only use the Lifting Eye at the rear of the Heli-Tilt for lifting.
- Do not lift with a bucket or any other attachment fitted to the Heli-Tilt.
- Ensure that the load to be lifted does not exceed the rated W.L.L of the Heli-Tilt and Lifting Eye.
- The Lifting Eye is to be used with certified Lifting Shackle with the same or greater safe working load.
- Lifting must be carried out with the Heli-Tilt in a vertical plane so that the load can hang freely without interfering with the Heli-Tilt body.
- It is recommended that Lifting Eye and Shackle must be visually inspected daily for defects and wear.
- During normal operation, it is not recommended to keep lifting devices attached to the lifting eye.

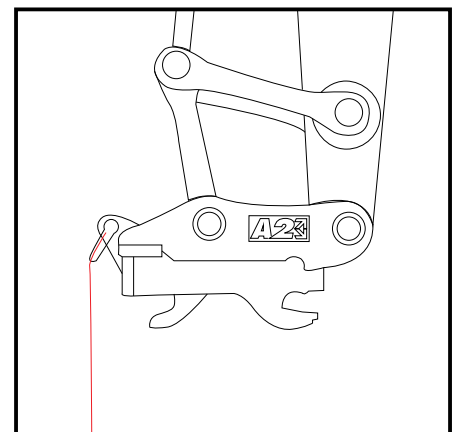
WARNING

- Use In A Safe Proper Manner At All Times.
- Report Damage Or Malfunctions Immediately.
- Do Not Exceed Rated Lift Capacity Of The Machine.
- Do Not Use If Damage Or Malfunction Has Occurred. Only Lift From Lifting Eye.
- Do Not Exceed Lifting Eye Capacity On Name Plate.



DO

Lift in vertical plane ONLY shackle MUST hang freely.



DON'T

Do not lift if the chain and shackle interfere with coupler.

Risk Assessment

Location: _____ Date: _____ Ref no: _____

Hazards Identified

- | | | |
|---|--|---|
| <input type="checkbox"/> Work Equipment | <input type="checkbox"/> Lifting Devices | <input type="checkbox"/> Access / Exit |
| <input type="checkbox"/> Ergonomics | <input type="checkbox"/> Plant Movement | <input type="checkbox"/> Slip, Trip and Fall |
| <input type="checkbox"/> Entanglement | <input type="checkbox"/> Fumes | <input type="checkbox"/> Warning Devices on Equipment |
| <input type="checkbox"/> Crushing | <input type="checkbox"/> Vibration | <input type="checkbox"/> Noise |
| <input type="checkbox"/> Environmental | | |

People Affected	Yes	No	N/A
Involved in Activity			
Close to Activity			
Everyone on Site			
Members of the Public			

Expected Precautions	Yes	No	N/A
Has the operator been adequately trained on how to use the Heli-Tilt in general?			
Is the operator competent in using the specific attachment on the machine?			
Is there a system for checking that the attachment pins are in place on the Heli-Tilt prior to work starting every time a different attachment is fitted?			
Is the operator aware that they must not operate the machine unless they are satisfied that the Heli-Tilt is secured in place.			
Does the view of the operator from inside of the cab allow them to visually see that the Heli-Tilt is secured in place?			
Does the Heli-Tilt have the approved labels stating and referring to attachment specifications?			
Is there a risk assessment for the Heli-Tilt detachment?			
Are there cab instructions for the Heli-Tilt?			

Personal Protective Equipment

Hard Hat	High Visibility Vest	Safety Boots	Gloves
Ear Protection	Safety Glasses	Other	

Management

Assessed by:	Reported to:		
Name:	Date:	Name:	Date:

Installation Checklist

Customer Details / End User

Installation Date:		Customer:	
Landline:		Mobile:	
Company Name:		Email:	
Address:			

ATTACH2 Product Details

Description:		ATTACH2 Serial Number:	
Purchase Date:		Installation Date:	

Company Completing Installation

Company:		Installer Name:	
Landline:		Mobile:	
Machine Maker:		Machine Model:	
Email:			

Installation Inspection

✓ **Compliant** ✗ **Not Yet Compliant**

CHECKS	✓	✗	CHECK	✓	✗
Verify all hose installations are as per manual and free to move through the hitches designed full movement without hose issues.			Verify installation completed as per the manuals installation plumbing circuit diagram.		
Shimming of the hitch pins complete.			Verify hydraulic system is bled and free from the air.		
Verify system pressures for the coupling circuit pressure set as per the manual. PSI.			Verify system pressures and flows for the: Tilting circuit pressure is set to: PSI Tilting flow rate set to: LPM Tilting cycle time LHS to RHS: Seconds		
Verify all hydraulic fittings are undamaged and free from leakages under operating pressure.			Verify all attachments are for use with the hitch attach and detach without operation issues or contact with machine.		

INSTALLATION SIGN OFF

Was the installation complete with proportional solenoid valves?			Was the installation complete with double P/O check valves?		
Is the hitch compliant at time of installation?			Are any follow ups required to make hitch complaint?		
Installation time/date:			Signature:		

Pre-Start Checklist

Operators Name:		ATTACH2 Model:	
ATTACH2 Serial No:		Date:	

In Cab	M	T	W	T	F	S	S
Are the heli-tilt operating controls serviceable?							
Are the operating instructions (labels) in the cabin?							
Are the operating & maintenance manuals in the cabin?							

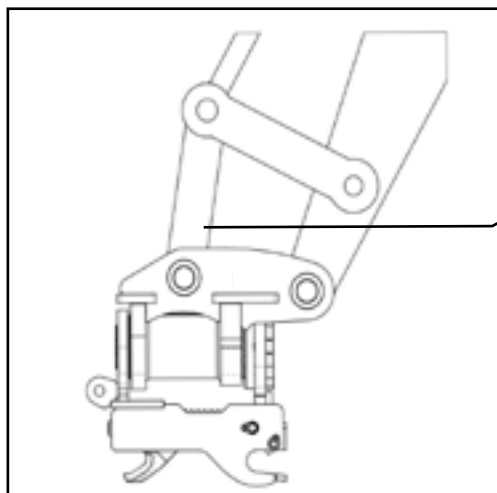
Hydraulic System	M	T	W	T	F	S	S
Check wear or damage to hoses or fittings.							
Check hoses are free from pinch points.							
Check for visible Hydraulic leaks.							

Heli-Tilt	M	T	W	T	F	S	S
Check wear and damage to hitch / attachment pins and retainers.							
Check security of mounting pins, locking bolts and nuts.							
Is the attachment safe to use? Yes or No.							

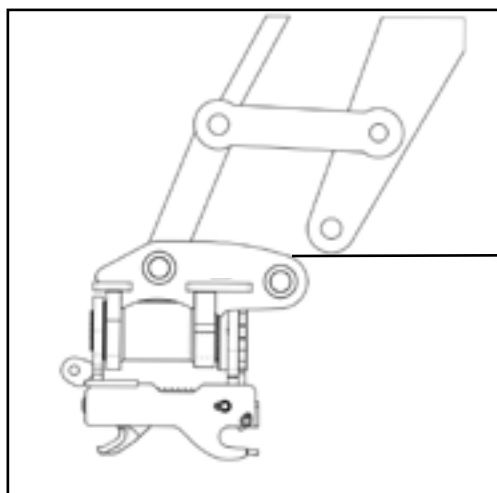
Lubrication	M	T	W	T	F	S	S
Greasing as per ATTACH2 manual.							

Operator:	Manager Signature:

Installation To Machine



- Align Heli-Tilt to the H-Link and insert the pin.
- Fit shims and O-Rings as required.



- Align Heli-Tilt to the dipper arm and insert the pin.
- Fit shims and O-Rings as required.
- Fit retaining bolts as per the OEM manual.

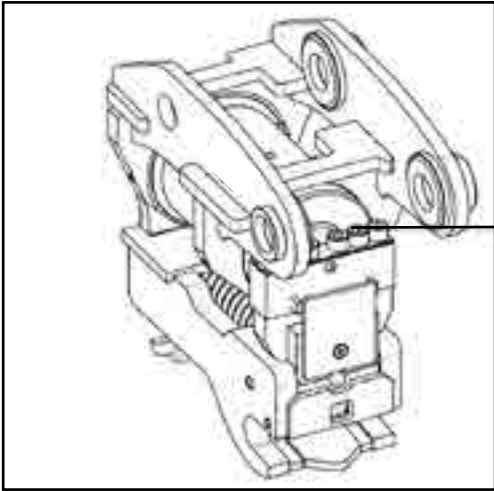


WARNING

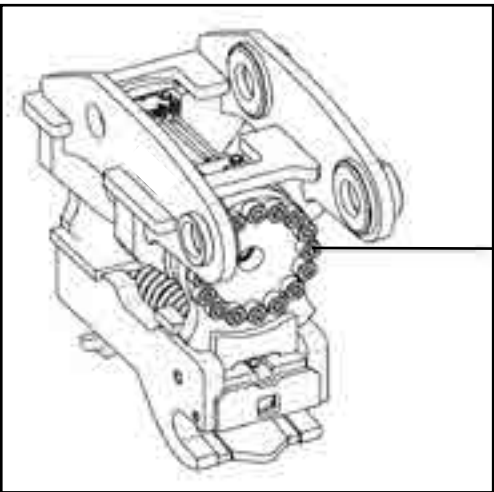
Check Pins Are Original Equipment Manufacturers Pins.

Identification Of Actuator Series

IDENTIFICATION OF ACTUATOR SERIES FOR PLUMBING PURPOSES



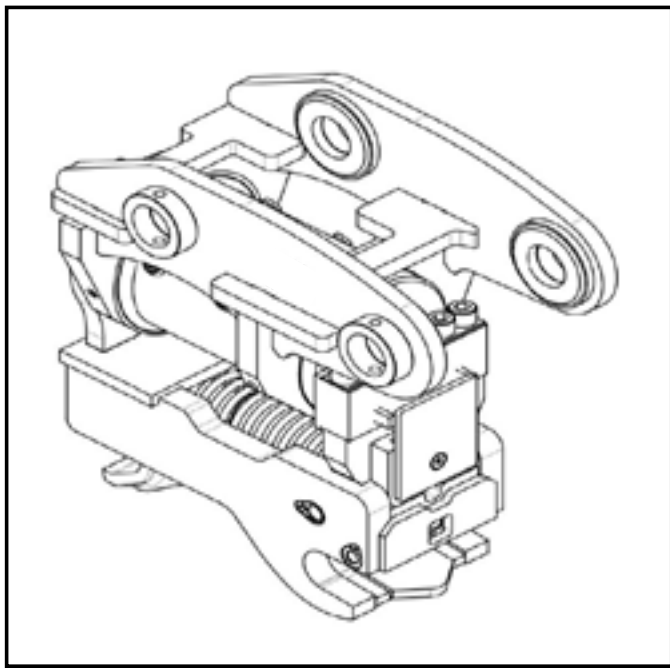
HT SERIES:
Identify by vertical capscrews



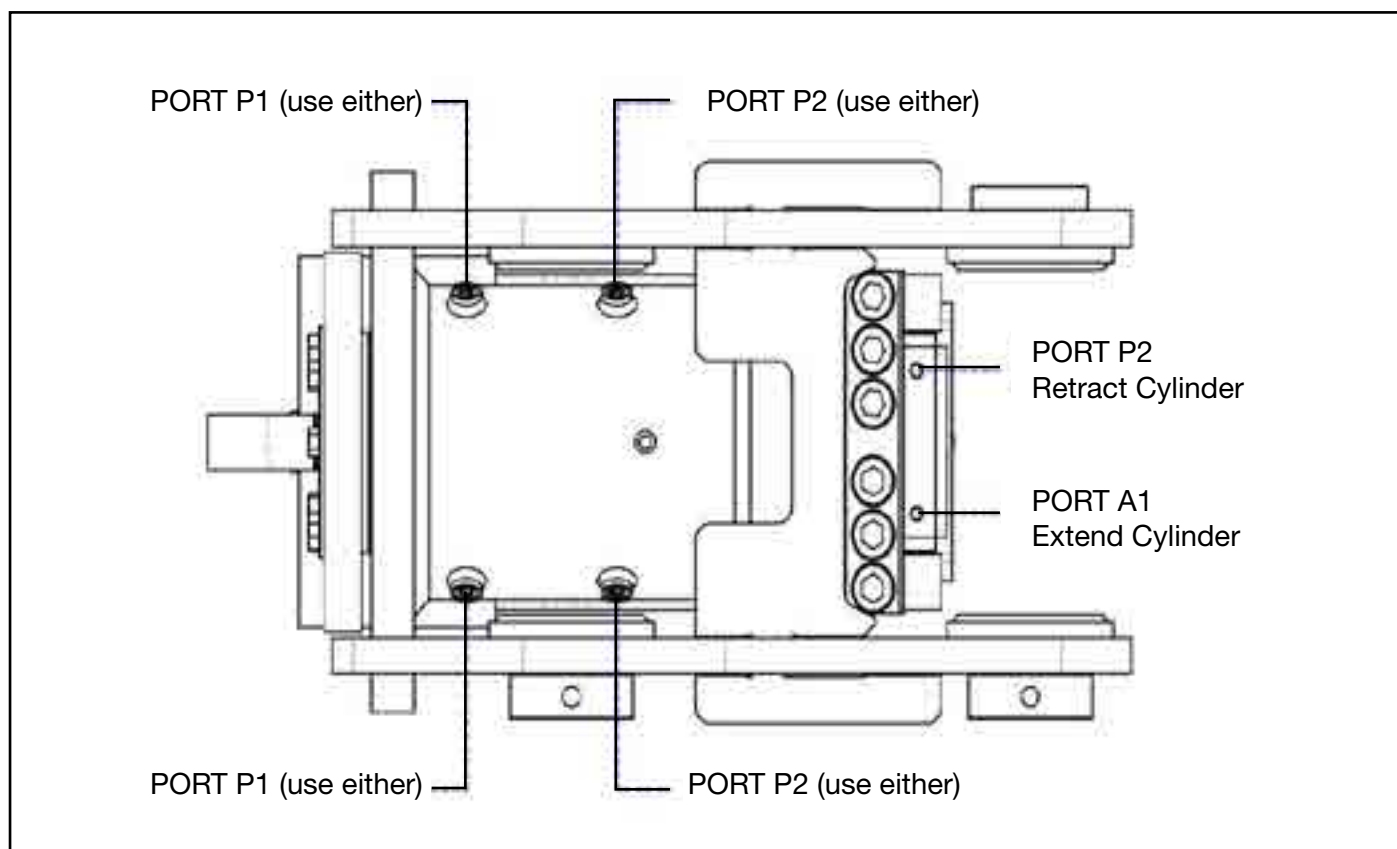
HTR SERIES:
Identify by PCD capscrews

HT Series Actuator Plumbing

VIEW FROM TOP



HT SERIES ACTUATOR PLUMBING OVERVIEW

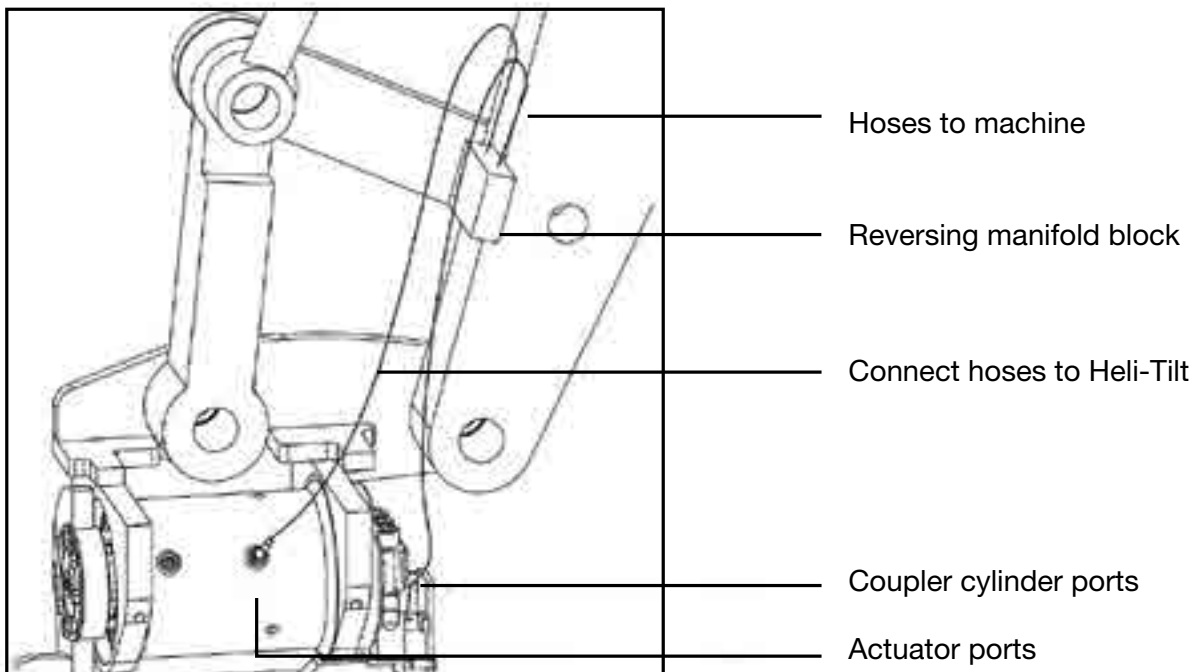


HT Series Actuator Plumbing

ATTACH2 suggests using a reversing manifold block mounted to the dipper arm for plumbing the Heli-Tilt to the machine.

This should be carried out by a professional and experienced hydraulics installer.

If you require advice on a preferred hydraulic installer, please contact your local ATTACH2 Service Department on: AUS: +61 7 3557 2654 / NZ: +64 6 929 7592



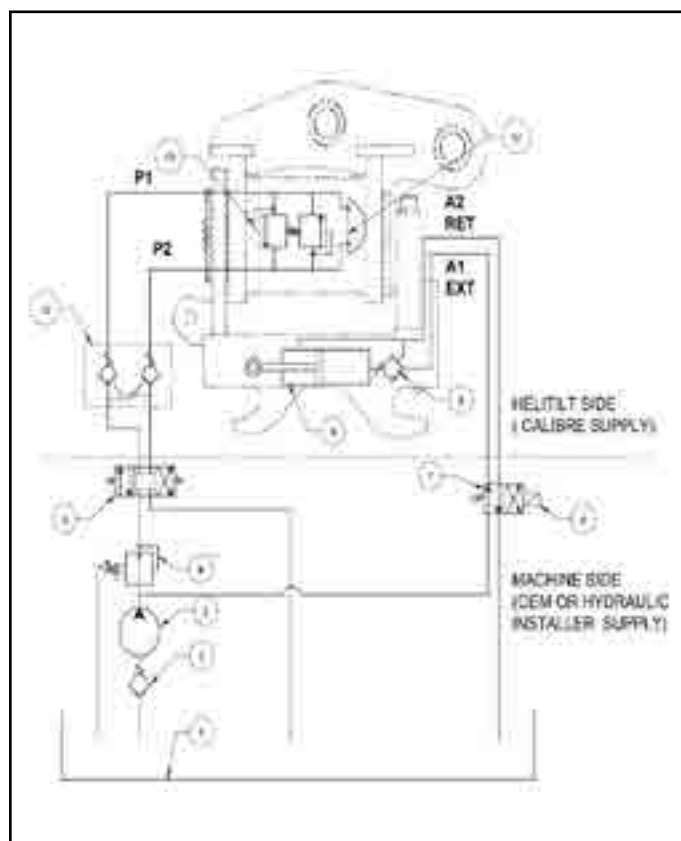
WHEN PLUMBING HELI-TILT TO MACHINE:

- Disconnect battery prior to any welding - failure to do so can result in damage to machine electronics.
- Protect hydraulic cylinder rods from weld spatter.
- Ensure that the connecting hoses will not be pinched or damaged through the entire tilting range.
- All welding to the hitch requires written approval from ATTACH2 to retain warranty conditions.

HT Series Actuator Plumbing

HT SERIES ACTUATOR PLUMBING CIRCUIT DIAGRAM

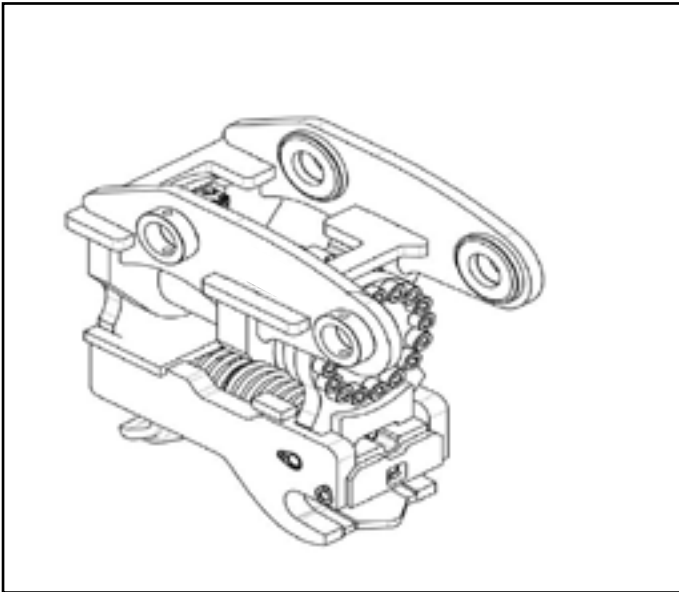
DESCRIPTION	
1	Oil Reservoir
2	Check Valve
3	Pump
4	Pressure reducing valve *Install if machine pressure is greater than 3000 PSI
5	3-Position 4-Way Closed Centre Direction Control Valve for tilt rotation
6	Connect solenoid to buzzer/alarm
7	2-Position 4-Ways Straight Flow Position Direction Control Valve for coupler
8	Pilot Operated Check Valve
9	Coupler Cylinder
10	Cross-Port Relief Valve
11	Helical Actuator HT Series
12	Double PO Check Valve Hydraulic Manifold Block. Set up as close to the actuator as possible (optional)



HTR Series Actuator Plumbing

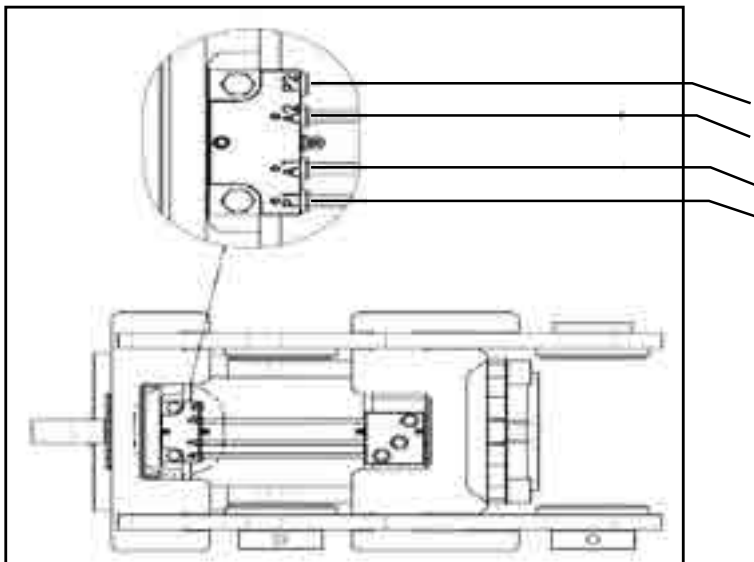
HTR SERIES ACTUATOR PLUMBING OVERVIEW

VIEW FROM TOP



IT IS CRITICAL FOR COUPLER CIRCUIT TO BE CONNECTED, AS FOLLOWS:

- A1 must be used to provide hydraulic pressure to extend coupler cylinder and to lock attachment.
- A2 must be used to provide hydraulic pressure to retract coupler cylinder and release attachment.



PORT P2: ACTUATOR PORT
 PORT A2: RETRACT CYLINDER
 PORT A1: EXTEND CYLINDER
 PORT P1: ACTUATOR PORT



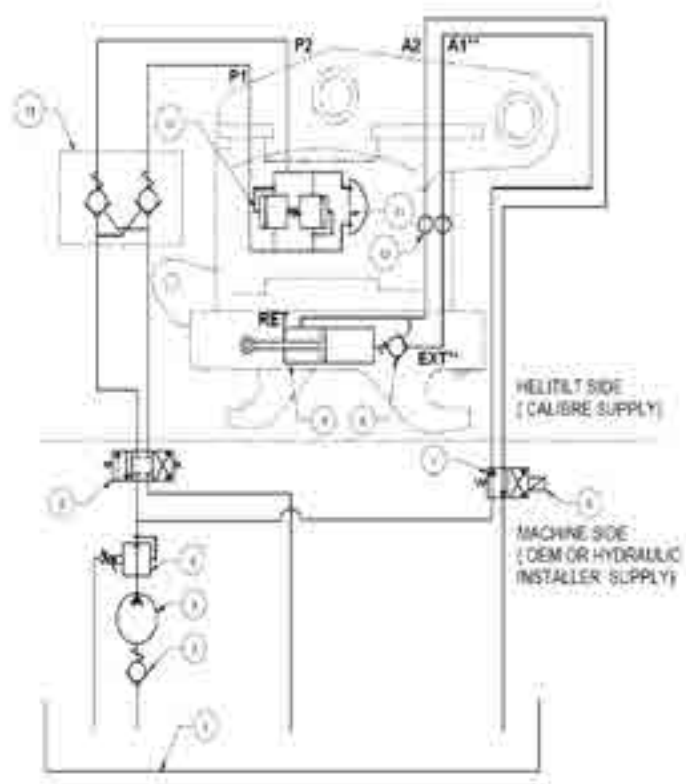
WARNING

If coupler cylinder hoses are connected the wrong way around damage to rotary seals will occur. This will void your warranty.

HTR Series Actuator Plumbing

HTR SERIES ACTUATOR PLUMBING CIRCUIT DIAGRAM

ITEM	DESCRIPTION
1	Oil Reservoir
2	Check Valve
3	Pump
4	Pressure reducing valve *Install if machine pressure is greater than 3000 PSI
5	3-Position 4-Way Closed Centre Direction Control Valve for tilt rotation
6	Connect solenoid to buzzer/alarm
7	2-Position 4-Ways Straight Flow Position Direction Control Valve for coupler.
8	Pilot Operated Check Valve
9	Coupler Cylinder
10	Cross-Port Relief Valve
11	Helical Actuator HT Series
12	Rotary Union
13	Double PO Check Valve Hydraulic Manifold Block. Set up as close to the actuator as possible (optional).



NOTE** PORT A1 MUST CONNECT TO EXT PORT ON COUPLER CYLINDER

Hydraulic Requirements And Plumbing

SURE-GRIP COUPLER circuit requirements

Operating Pressure*	2800-5100PSI
Hoses /Tube Size	1/4" maximum up to and including 20T
	3/8" maximum 35T and over
Port connecting (ATTACH2 supplied)	7/16" JIC Male up to and including 20T
	9/16" JIC Male 35T and over

HELI-TILT circuit requirements

Machine Tonnage	Unit	2T	3/4T	6T	8T	14T	16T	20T	35T
Operating Pressure	Bar	195-207	195-207	195-207	195-207	195-207	195-207	195-207	195-207
Recommend Rotation Time	S	6	6	6	6	6-12	6-12	6-12	6-12
Suggested Oil Flow	L/min	3-6	6-10	10-15	12-18	16-22	16-24	30-35	35-45
Port Connections	Inch	1/8" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP
Maximum Allowable Circuit Back Pressure	PSI	38	38	38	38	38	38	38	38
Drive Torque @207 bar	NM	930	2870	4400	7100	10600	14690	18640	24860
Hold Torque @220 bar	NM	2270	5430	8450	12660	18900	26150	37280	54720
Weight	Kg	28	48	100	120	162	227	310	565
Displacement	Litres	0.23	0.66	1.085	1.7	1.92	2.9	3.625	4.74
Displacement	l/ rotation°	0.221	0.67	1.04	1.654	1.841	2.377	3.307	4.049
Actuator Internal Cross Port Relief	PSI	215-220	215-220	215-220	215-220	215-220	215-220	215-220	215-220

*The onus falls on the installer regarding the machine controls set up.

Checking Attachments

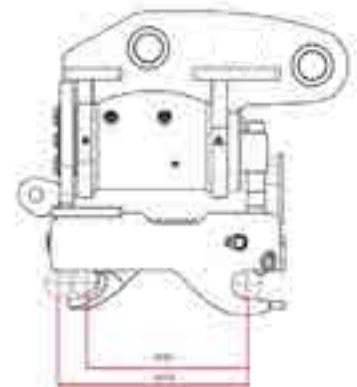


WARNING:

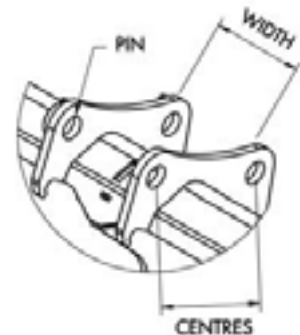
Ensure attachments being picked up suit the build Information on the Heli-Tilts Identification Label.

Identification Label will indicate Pin Centre Range (Minimum - Maximum)

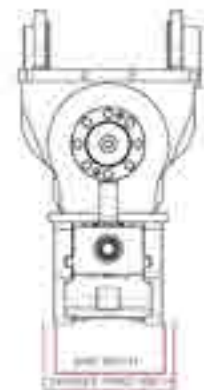
- A** Check that each individual attachment pin centre fits the Heli-Tilt by confirming the range on the label.



- B** Check the inner width of the Heli-Tilt. Width must be wider than the Heli-Tilt base.



- C** Check pin spacers can be fitted to either the base of the Heli-Tilt or between the inner side of the ears and the bosses of attachment.
- It is highly recommended to fit spacers in the case of heavier applications, particularly on machines that are 14 tonne and above.

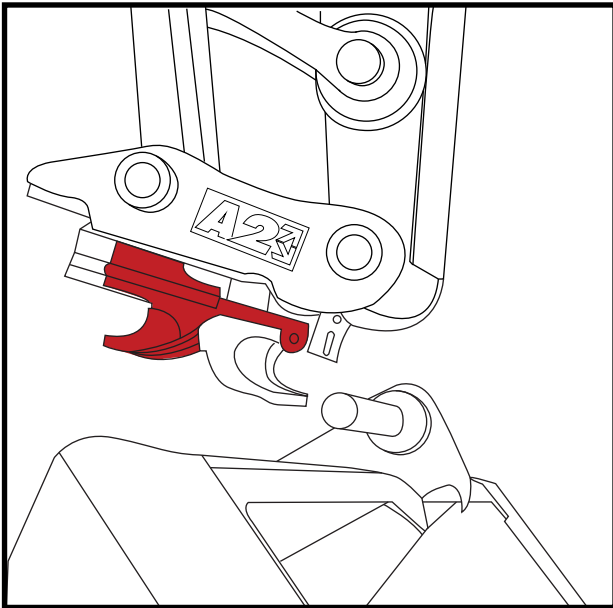


DANGER:

Do Not Use Any Attachment Unless All Safety Functions Are Serviceable And Within Specifications.

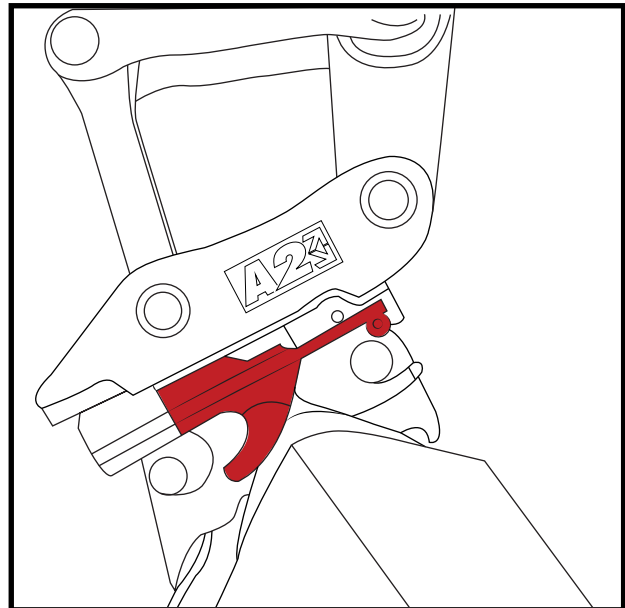
Operating & Attaching

WITH THE ADDITION OF THE LATEST, DUAL LOCKING SURE-GRIP COUPLER BASE, THE CONNECTION AND DISCONNECTION PROCESS OF THE HELI-TILT COUPLER IS A SIMPLE AND EFFICIENT PROCESS.



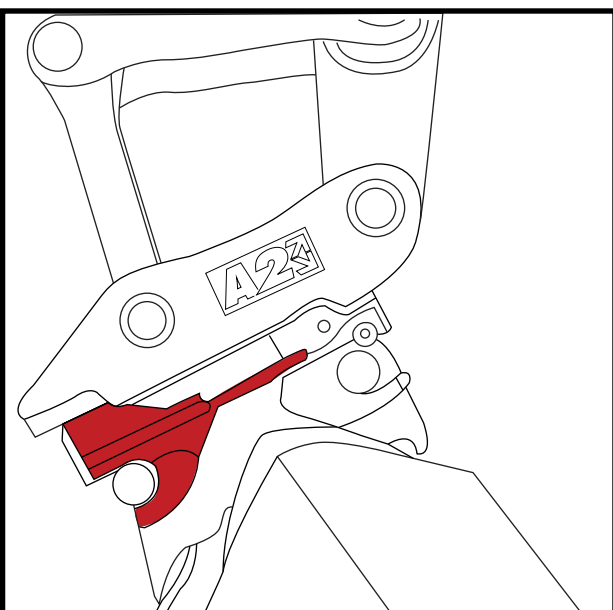
STEP 1

Buzzer on. With slide retracted engage coupler onto front pin.



STEP 2

Buzzer off. Crowd onto rear pin.



STEP 3

Extend slide onto rear pin which engages front safety latch.

TO RELEASE ATTACHMENTS

1. Place attachment on flat ground
2. Retract slide and crowd out of rear pin
3. Lift Sure-Grip away from attachment

Connection Test

Check all attachments fit correctly. The safety latch is designed to work in a closed position on the front pin. If the safety latch is not closed when attached to any attachment, check the rear jaw of the Sure-Grip base is engaged with the rear pin.

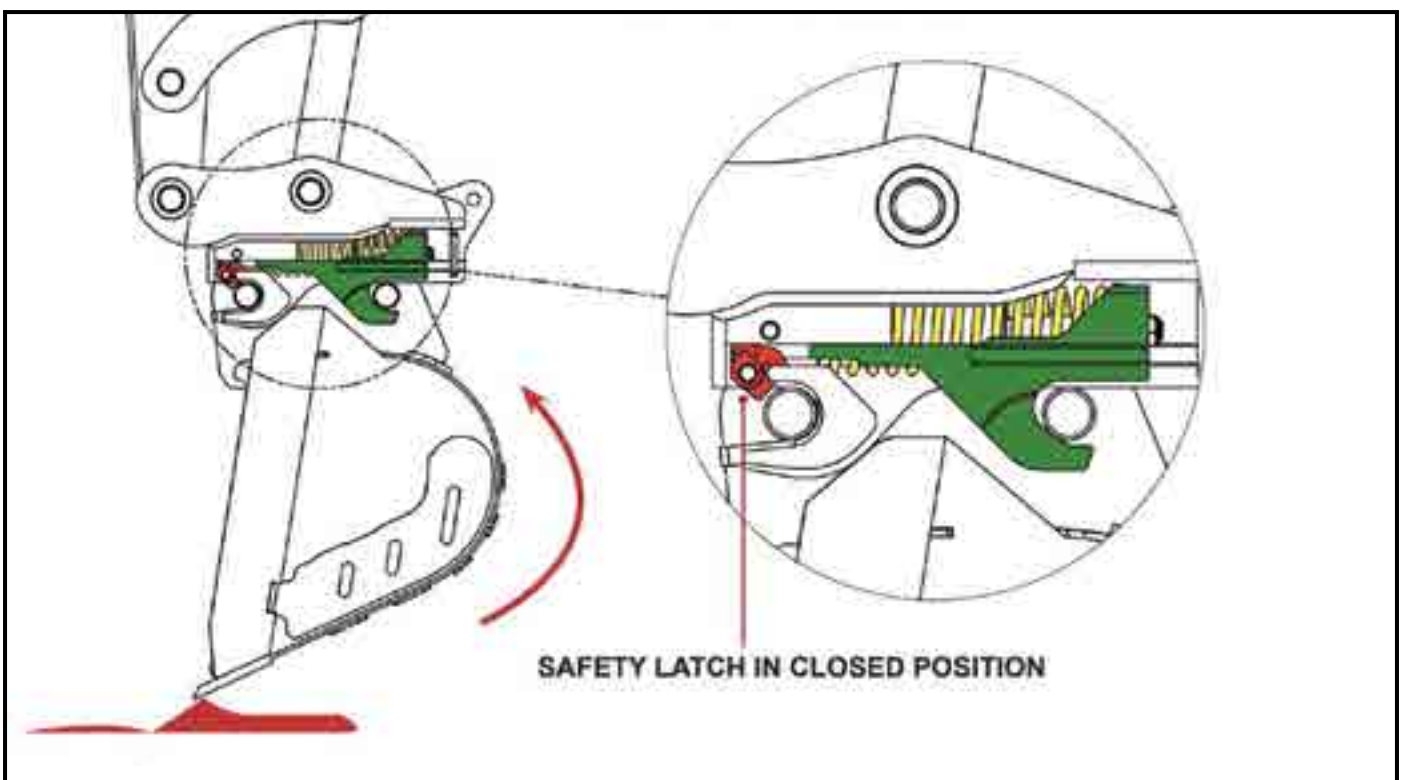
If uncertain, DO NOT USE THIS ATTACHMENT. Please refer to 'Checking Attachments' on Page 22 or alternatively, please contact your local ATTACH2 Service Department.

SAFETY LATCH IN CLOSED POSITION

To ensure the Sure-Grip Coupler base has engaged securely to pins on attachment:

- Visually check the safety latch is engaged on the pin.
- Test before operating by applying pressure to attachment by rotating against the ground and away from machine.
- Do not proceed with work unless the safety latch is in the closed position on the front pin (see below).

- If the safety latch on the front pin is open DO NOT OPERATE THE SURE-GRIP. Please contact your local ATTACH2 Service department immediately on:
AUS: +61 7 3557 2654
NZ: +64 6 929 7592



Safety Latch Inspections

Manual inspection of the front safety latch must be carried out to ensure the safety latch movement is within acceptable safety tolerances as specified below. This is in addition to a daily visual check of the safety latch and usual wear and tear assessments.

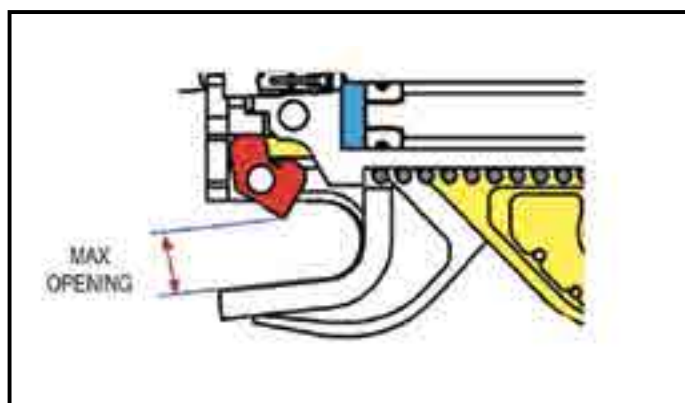
The maximum opening distance should be measured and compared to the safe allowable variation table.

If the maximum opening distance is LESS than the maximum allowable opening distance for the Sure-Grip model, it is safe to use.

FRONT SAFETY LATCH MEASUREMENT

- Slide must be extended to lock safety latch
- Measure gap as shown

MAXIMUM OPENING DISTANCE



SAFE VARIATION TABLE

PIN	MAX OPENING
30	27
35	32
40	36
45	41
50	45
55	50
60	54
65	59
70	63
80	72
90	81
100	90
110	99
120	108



DANGER:

If the maximum opening distance is greater than the maximum allowable opening value for that Sure-Grip base, do not use the Sure-Grip.

Please contact your local ATTACH2 Service department immediately on AUS: +61 7 3557 2654 / NZ: +64 6 929 7592

Maintenance

GENERAL MAINTENANCE

All maintenance is to be performed by a qualified and competent trades person.

Before beginning maintenance work on the Sure-Grip Coupler, there are several cautionary notices that should be considered.

If you are not comfortable with the repair or maintenance of this product, please contact your local ATTACH2 Service Department on: AUS: +61 7 3557 2654 / NZ: +64 6 929 7592



DANGER

Never use hands to search for hydraulic leaks. Escaping fluid under pressure can be invisible and can penetrate the skin and cause serious injury.



WARNING

Only fit the Sure Grip with genuine replacement parts. Quote serial number stamped on the Identification Label when ordering.



WARNING

To ensure that your Sure-Grip works safely to a maximum efficiency, it is imperative that it is properly maintained in accordance with the manual.



WARNING

A defective Sure-Grip could injure you or others. Do not operate a Sure-Grip that is defective.

WARNING

Ensure that hoses aren't loose and don't come into contact with the spring mechanism, preventing safe operation of the blocking bar.

OTHER SAFETY REQUIREMENTS

1. Sure-Grip should only be used to perform tasks for which it was designed. Abusing the product and/or using it for purposes for which it was not intended can expose the operator and others to hazards as well as result in damage to the Sure-Grip, carrier and/or other attachments.
2. Modification to the Sure-Grip is done at the owner's risk and may void warranty.
3. The Sure-Grip is designed for a maximum bucket width. Applying the full force of the excavator or backhoe to the corner of a wide bucket (e.g. corner digging with a wide bucket) may cause premature wear and/or reduced equipment life. It is also recommended that the bucket widths are not exceeded.
4. It is the owners responsibility to be sure all safety equipment is in place and operating properly at all times. If safety decals fade, are damaged or become unreadable they should be replaced immediately.

Maintenance Schedule

Daily

- ☐ Ensure cabin control safety guards are serviceable.
- ☐ Grease Heli-Tilt (max 2 pumps per nipple).
- ☐ Check lifting point for any damage or wear.
- ☐ Check attachment for signs of damage, wear or cracking.
- ☐ Ensure cabin control safety guards are serviceable.
- ☐ Ensure all safety decals and instructions are clear and legible.
- ☐ Test the attachment is safe to operate and all safety features are operational as per the manual.
- ☐ Check attachment hydraulics for leaks and signs of wear.

Weekly

- ☐ Check attachment for any signs of cracking.
- ☐ Check base and attachments for signs of wear on pin engagement.
- ☐ Check attachments for loose bolts/pins.
- ☐ Check attachment operation and notify ATTACH2 of any defects found.

6 Monthly

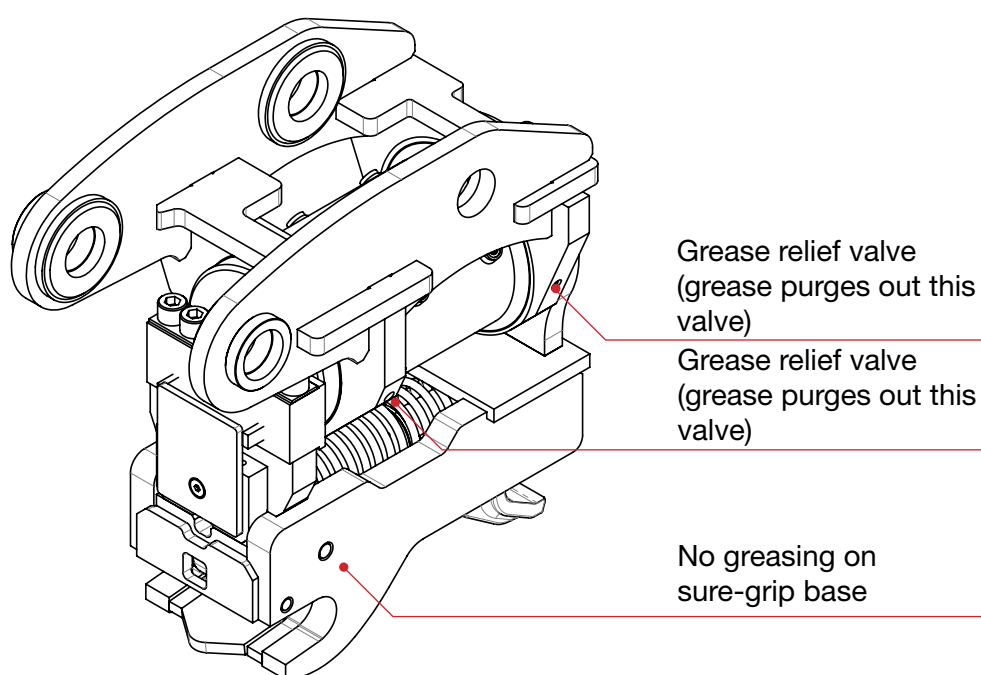
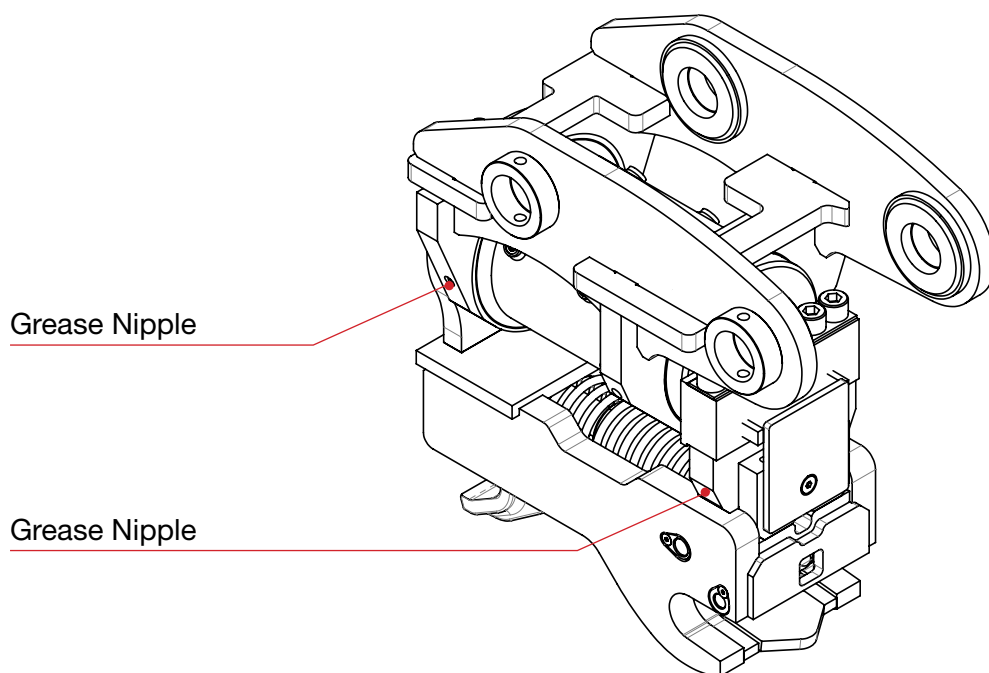
- ☐ Ensure operating and maintenance manuals are in cabin and pre-start check have been documented.
- ☐ Flush oil through the actuator in both directions until oil runs clean.
- ☐ Check attachment hydraulics for leaks and signs of wear.
- ☐ Test the attachment is safe to operate and all safety features are operational as per the manual.
- ☐ Check attachment for signs of damage, wear or cracking.
- ☐ Bleed all air from the actuator/hydraulic install.
- ☐ Check lifting point for any damage, wear or cracking.
- ☐ Check and adjust actuator end play as per manual.
- ☐ Grease Heli-Tilt (max 2 pumps per nipple).
- ☐ Check and re-torque bolts as per the manual.
- ☐ Check base wear as per the manual.
- ☐ Check slide wear as per the manual.

Notes / Remarks

Description:		ATTACH2 Serial Number:	
Machine Make:		Machine Model:	
Company:		Contact:	
Email:		Phone:	
Company:		Trades Person Number:	
Date:		Sign:	
Phone:		Email:	

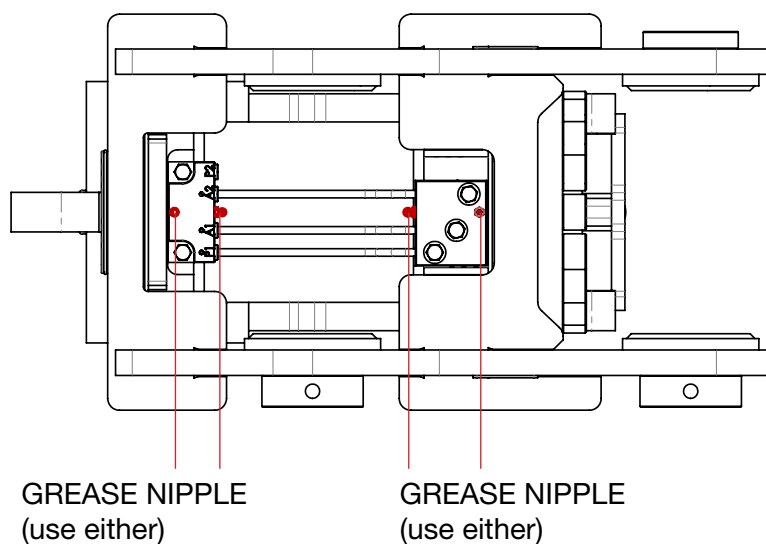
HT Series Greasing Information

GREASE AND TILT SIDE TO SIDE



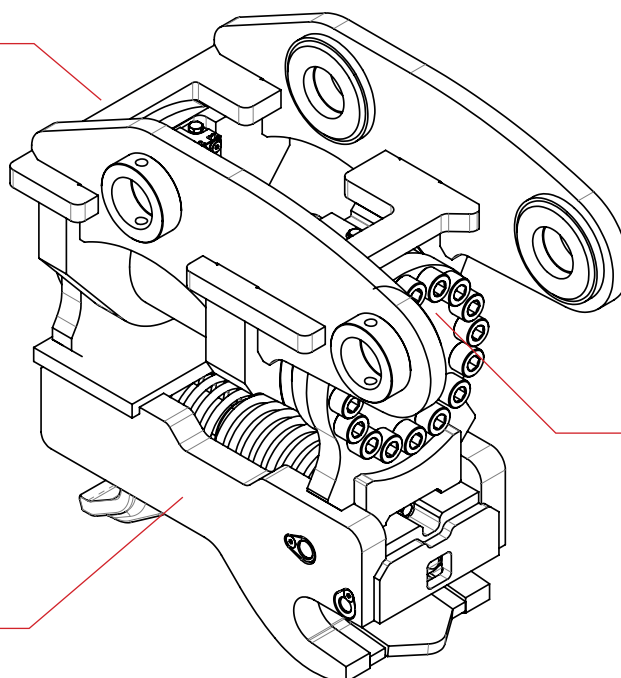
HTR Series Greasing

GREASE AND TILT SIDE TO SIDE



VIEW FROM TOP

Grease Purges Centre Of Top
On Exclusion Seal On Shaft



Grease Purges Centre
Of Top On Exclusion
Seal On Shaft

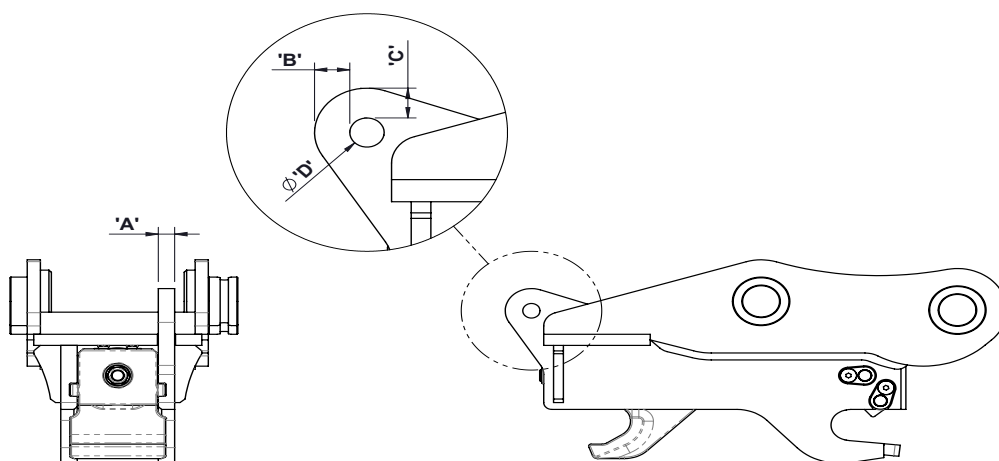
No Greasing On
Sure-Grip Base

Lifting Eye Inspection

(CHECK DAILY)

WARNING: The Lifting Eye requires visual inspection.

Tonne Range	Minimum Lifting Eye Width (mm)	Minimum Distance To Edge (mm)	Minimum Distance to Edge (mm)	Maximum Lifting Eye Hole (mm)
	A	B	C	D
2T	16	12	12	14.5
3T	20	16	16	20.5
4T	20	16	16	20.5
6T	18	19	19	23.5
8T	23	20.5	20.5	26.5
14T	38	24.5	24.5	32.5
20T	48	28.5	28.5	40.5
35T	56	35.5	35.7	46.5
45T	58	37.5	37.5	54.6

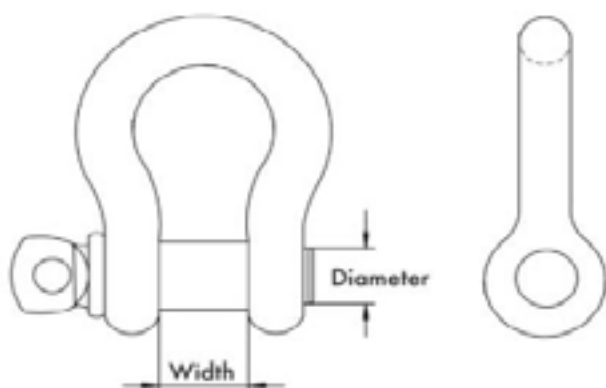


1. Visually check for cracking or deformation - if present.
2. Check for wear on the above chart.
3. Damage to outer surface (A, B, C, D) must be within the measurements in above chart.
If the Lifting Eye has exceeded recommended ratings - immediately stop using attachment.

Should you find any deformations or cracks anywhere on the Lifting Eye, please contact your local ATTACH2 Service Department on:
AUS: +61 7 3557 2654
NZ: +64 6 929 7592

Shackle Table

Model	W.L.L	Pin Diameter	Width	Standard
2T	1.00	11	17	AS2741
3T	2.00	16	20	AS2741
4T	2.00	16	22	RR-C-271
	2.00	16	20	AS2741
	2.00	16	22	RR-C-271
6T	3.25	19	27	AS2741
	3.25	19	27	RR-C-271
8T	4.25	22	32	AS2741
	4.75	22	31	RR-C-271
14T	8.50	28	43	AS2741
	8.50	28	43	RR-C-271
20T	12.00	35	51	AS2741
35T	12.00	35	51	RR-C-271
	17.00	41	60	AS2741
	17.00	41	60	RR-C-271
	22.00	50	74	RR-C-271



Daily/Weekly Checks

VISUAL STRESS POINTS CHECK:

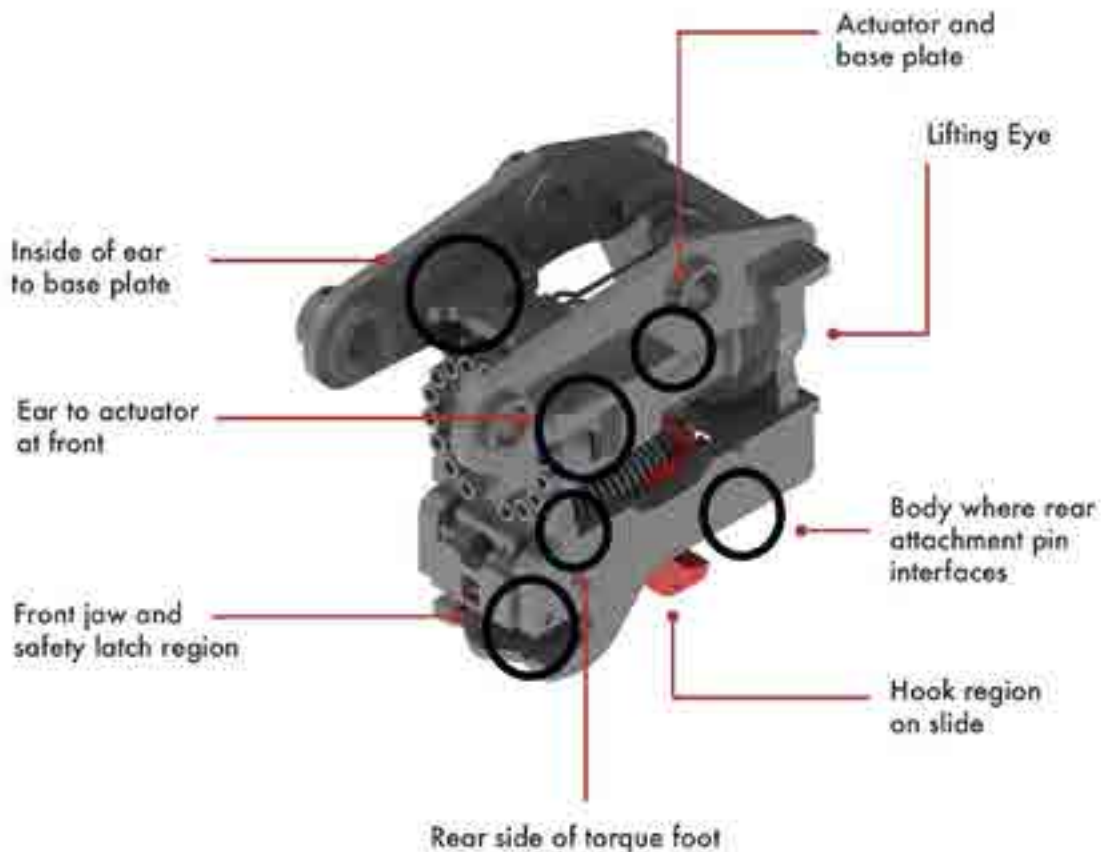
Visually check the entire Heli-Tilt for any cracks, damage and excessive wear.

The image below highlights major stress areas, where particular attention should be given during checks.

Should you find any cracks, damage or excessive wear, please contact your local ATTACH2 Service Department on:

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NZ: +64 6 929 7592



6 Monthly Slide Wear

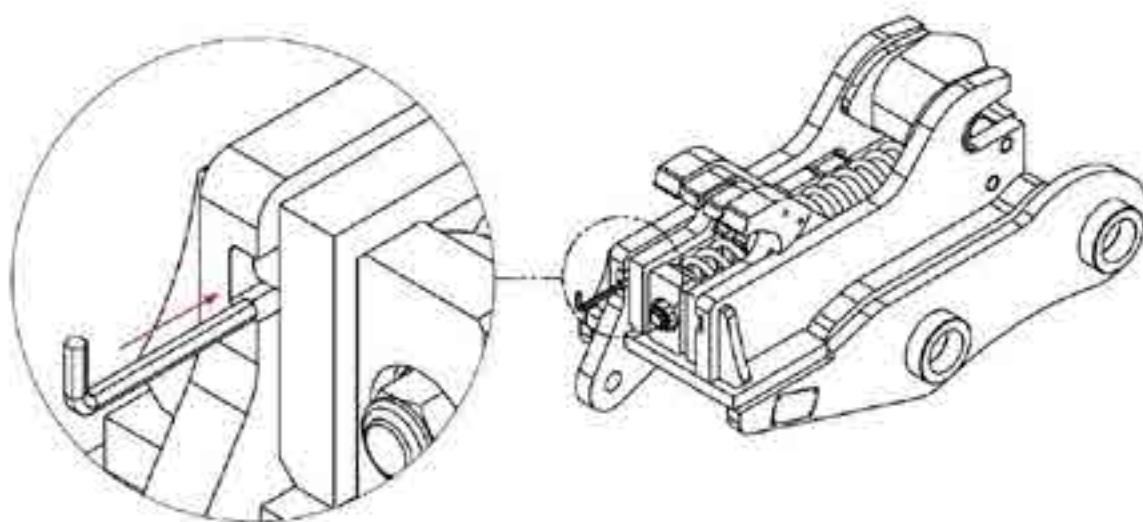
VISUAL STRESS POINTS CHECK:

The slide will have free movement when new.
To gauge the wear of the body and slide, place an allen key as shown below to test the space between the slide hook and body.

Please see the table below to verify the maximum wear of the body.

GUIDELINE FOR MAXIMUM WEAR

6T, 8T, 14T	5mm
20T, 35T, 45T	7mm



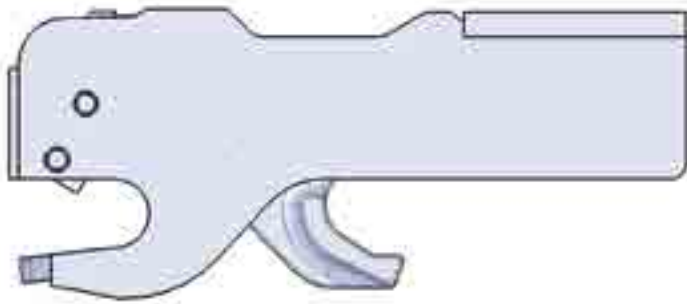
WARNING:

If the Sure-Grip base becomes worn or damaged in this area, please contact your local ATTACH2 Service Department immediately on:
AUS: +61 7 3557 2654 / NZ: +64 6 929 7592

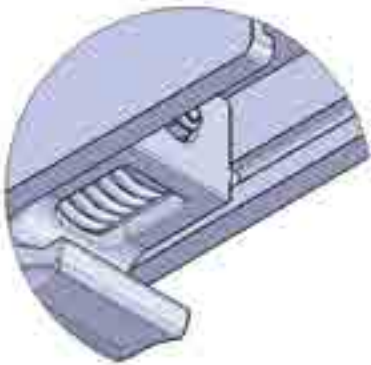
6 Monthly Base Wear Tolerance

WEAR TOLERANCE OF THE SURE-GRIP COUPLER BASE

5mm Allowable Wear



Wear allowance
on both sides



If the Sure-Grip base becomes worn or damaged in this area or in excess of 5mm, please contact your local ATTACH2 Service Department immediately on:

AUS: +61 7 3557 2654

NZ: +64 6 929 7592

6 Monthly End Play Checks

HT SERIES END PLAY CHECKS (6 Monthly)

1. Rotate the actuator to the central position and lower attachments with the edge of the bucket on the ground.
2. Set the magnetic dial indicator gauge onto the actuator pedestal and position to record movement of the shaft end play.
3. “Lightly rock” the bucket tilt circuit to record end float movement.
4. If the measurement is outside of the recommended specification, please adjust end float as per the manual.

END PLAY ADJUSTMENT SPECIFICATIONS

MODEL	TORQUE (NM)	TPI	°/0.1MM	MAX ROTATION °
HT02	135-150	-	-	-
HT04	475-680	16	2.3	11
HT06	750-910	14	2.0	10
HT08	1360-1630	8	1.1	6
HT14	1770-2175	12	1.7	8
HT16	2210-3330	8	1.1	6
HT20	2780-3330	8	1.1	6
HT35	3500-4200	8	1.1	6

To align the holes, rotate the spigot to a spline that gives the best hole alignment. If the holes are slightly misaligned then the endcap can be rotated to max rotation to suit.

NOTE: HTR series actuators require shims for end play adjustment, please contact your local ATTACH2 Service Department on:

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NZ: +64 6 929 7592

Adjusting End Play

1. Remove lock ring retaining bolt



4. Install lock ring back onto shaft ensuring end cap bolt holes and spline are aligned correctly.



2. Remove lock ring jacking hole grub screws and use the same thread bolt size to assist jacking off the locking from the shaft splines and remove lock ring.

5. Install grub screws back into jacking bolt holes to ensure threads are kept in serviceable condition for the next disassembly.



3. Tighten the end cap in a clock-wise direction to the required specification using a customised end cap tool.

6. Install lock ring retaining bolts and torque to required specification.




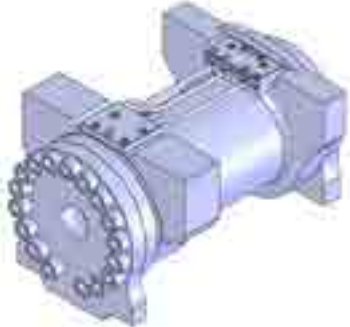
7. Ensure the hitch is in a safe and serviceable condition before returning machine to work.

Re-Torque Specifications

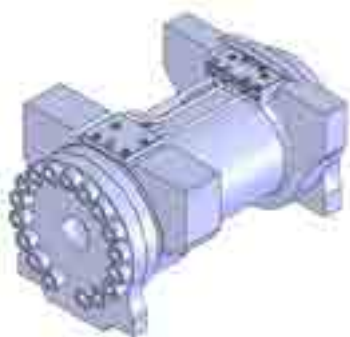
6 MONTHLY CHECKS

TORQUE SPECIFICATION

HT SERIES				
	SIZE	BOLT	TORQUE (Nm)	
TORQUE FOOT END	HT04 PTA06	M16 X 2.00 - GR 12.9	310 ± 7	
	HT06 PTA07	M20 X 2.50 - GR 12.9	615 ± 20	
	HT08 PTA08	M24 X 3.00 - GR 12.9	1100 ± 27	
	HT14 PTA09			
	HT16 PTA10	M30 X 3.50 - GR 12.9	2150 ± 41	
	HT20 PTA11			
	HT35 PTA12			
IDLER FOOT END	HT04 PTA06	M12 X 1.75 - GR 10.9	75 ± 4	
	HT06 PTA07			
	HT08 PTA08	M16 X 2.00 - GR 10.9	187 ± 5	
	HT08 PTA09			
	HT08 PTA10			
	HT08 PTA11			
	HT08 PTA12	M20 X 2.50 - GR 10.9	365 ± 14	

HTR SERIES				
TORQUE FOOT END	HTR03 PT030	M12 X 1.75 - GR 12.9	125 ± 5	
	HTR04 PT050	M16 X 2.00 - GR 12.9	310 ± 7	
	HTR06 PT070	M20 X 2.50 - GR 12.9	615 ± 20	
	HTR08 PT100			
	HTR14 PT180	M24 X 3.00 - GR 12.9	1100 ± 27	
	HTR20 PT240	M30 X 3.50 - GR 12.9	2150 ± 41	
	HTR35 PT300			

TORQUE SPECIFICATION

HTR SERIES				
	SIZE	BOLT	TORQUE (Nm)	
IDLER FOOT END	HTR03 PT030	M16 X 1.5 - GR 12.9	340 ± 7	
	HTR04 PT050			
	HTR06 PT070	M20 X 1.50 - GR 12.9	660 ± 20	
	HTR08 PT100			
	HTR14 PT180			
	HTR20 PT240	M24 X 2.00 - GR 12.9	1140 ± 27	
	HTR35 PT300	M30 X 2.00 - GR 12.9	2270 ± 41	

Actuator Backlash Check

TROUBLESHOOTING

Please ensure end play is within specification before attempting the actuator backlash, please refer to Page 40.

The actuator backlash shows the tolerances allowed for total side to side movement, which includes actual gear backlash, hydraulic seal movement / compression, and oil compression.

A total allowable movement of 1 1/2° is the acceptable backlash of factory standard allowance.

Ensure measurements are taken with the bucket in the air and the machine is turned off and pressure is relieved to 0PSI.

With a wide bucket installed, a weight of approximately 100kgs is required at one corner of the bucket. Make matching marks on the shaft and pedestal as per the illustration on page 45. Shift the weight of approximately 100kgs to the other side of the bucket and make a second mark on the pedestal, take a measurement between these marks.

This method is not exact but can be useful to help determine where the movement is coming from.

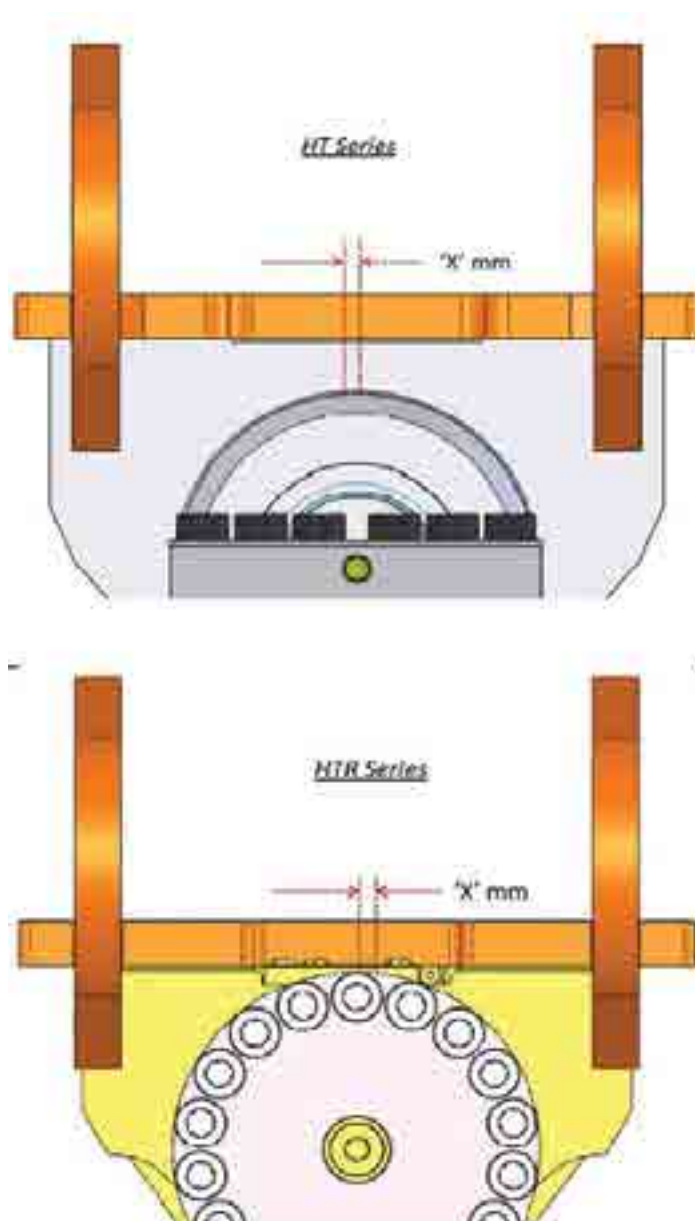
Maximum Backlash Measured at Outside Diameter of Shaft.

NOTE: Air in the system or shaft endplay can contribute to the perceived backlash and should be investigated before attempting this backlash check.

Actuator Backlash Check

TROUBLESHOOTING

TONNAGE	HT	HTR*	MAX. MM
2T	HT02	HTR03	1.7
3T			
4T	HT04		2.1
	HTR04		1.9
61	HT06		2.5
	HTR06		2.2
8T	HT08		2.8
	HTR08		2.4
14T	HT14		3.1
14T/16T	HTR14		3.6
1GT	HT16		3.5
20T	HT20		7.7
	HTR20		4.0
35T	HT35		4.1
	HTR35		4.2
45T	HTR45		4.6



MEASUREMENT STEPS:

- Put initial mark on the shaft before tilt.
- Post tilt use Vernier Calipers to measure the total side movement.

Troubleshooting Guide

HELI-TILT

1. Hitch is making a squealing noise

- 1.1 Installation pressure setting too high creating relief noise.
- 1.2 Cross Port Relief valve is relieving at low pressures.
- 1.3 Installation Relief Valves are relieving creating noise.

- 1.1 Check installation is set to correct specification as specified in the ATTACH2 Manual. Adjust installation pressures to ATTACH2 manual recommendations if required.
- 1.2 Check Cross Port Relief is set to correct specifications as per the ATTACH2 Manual. Replace Cross Port Relief Valve if required.
- 1.3 Check / Adjust installation relief valves pressure settings. Consult the contractor who completed the installation.

2. Hitch does not hold position in one direction

- 2.1 Installation pressure is too low.
- 2.2 Internal seal bypass.

- 2.1 Check installation for low pressures or pressure drop.
Inspect installation Valve is seating correctly or for damage / foreign material, replace with new if required.
Check installation is set to correct specifications as per ATTACH2 manual. Adjust or replace if required.
Ensure installation solenoids and electrical circuits are servicable, adjust or replace components if required.
- 2.2 Hydraulically cap off hitch from installation while the hitch is in the faulting position. If the hitch no longer faults when capped off, it is confirmed the fault is in the installation. If the fault remains, please contact your ATTACH2 service department on:
AUS: +61 7 3557 2654
NZ: +64 6 929 7592

Troubleshooting Guide

HELI-TILT

3. Hitch does not hold position in both directions.

- 3.1 Installation pressure is too low.
- 3.2 Cross port relief bypass.
- 3.3 Internal seal bypass.
- 3.4 Shaft failure.

3.1 Check installation for low pressures or pressure drop.

Inspect installation valve is seating correctly or for damage / foreign material, replace with new bypass. if required.

Check installation is set to correct specification as per the ATTACH2 Manual. Adjust or replace if required.

Ensure installation solenoids and electrical circuits are servicable, adjust or replace components if required.

3.2 Check actuator cross port relief pressure are as per the ATTACH2 manual. Adjust or replace cross port relief valve if required.

3.3 Hydraulically cap off hitch from installation while the hitch is in the faulting position. If the hitch no longer faults when capped off, it is confirmed the fault is in the installation. If the fault remains, please contact your ATTACH2 service department on:

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NZ: +64 6 929 7592

3.4 Shaft failures are extremely rare, this can result in the hitch becoming "floppy" and swinging freely LHS to RHS. If the fault remains, please contact your ATTACH2 service department on:

AUS: +61 7 3557 2654

NZ: +64 6 929 7592

Troubleshooting Guide

HELI-TILT

4. Hitch has Actuator backlash movement

- 4.1 Air in the Installation / Actuator.
- 4.2 Install lines cushioning.
- 4.3 Piston seal compression under weight.
- 4.4 End Play from thrust washer wear.
- 4.5 Normal backlash from factory.

4.1 Purge installation lines and actuator until clean clear stream of oil is seen, small amounts of air in the system will increase movement and create a "spongy" operation.

4.2 Installation system checks / isolate hitch and a check if the fault remains. Loss of pressure in the installation will cause increased movement and create a "spongy" operation.

4.3 1 1/2 degrees is the factory allowable movement, Complete actuator backlash checks as per the ATTACH2 manual.

4.4 Ensure hitch end play is not creating excessive backlash symptoms. Complete End play adjustments as per the ATTACH2 Manual.

4.5 1 1/2 degrees is the factory allowable movement, Complete actuator backlash checks as per the ATTACH2 manual. Excessive backlash is not adjustable, this is actual gear meshing. If the fault remains, please contact your ATTACH2 service department on:

AUS: +61 7 3557 2654

NZ: +64 6 929 7592

5. Hitch has end play movement.

- 5.1 Wearing of internal thrust (HT Series).
- 5.2 May require re-torque of end cap (HT series) and/or shims (HTR Series).

5.1 Removed lock ring and adjust end cap to removed end play as play movement. thrust washers per the ATTACH2 manual. washer wear will increase end play. If the fault remains, please contact your ATTACH2 service 5.2 May require re-torque department on
AUS: +61 7 3557 2654 of end cap (HT series) and/or shims 9400 / NZ: +64 6 929 7592

5.2 Re-torque end cap bolts as per (HTR Series). the ATTACH2 manual, shimming may be required if end play does not improve. If the fault remains, please contact your ATTACH2 service department on:

AUS: +61 7 3557 2654

NZ: +64 6 929 7592

Troubleshooting Guide

SURE-GRIP

<p>6. Actuator does not accept grease.</p>	<p>6.1 Grease relief or nipples may be damaged or blocked.</p>	<p>6.1 Clean and / or replace grease relief valves and grease nipples. Purge with grease with relief valves removed. If the fault remains, please contact your ATTACH2 service department on:</p> <p>AUS: +61 7 3557 2654 NZ: +64 6 929 7592</p>
<p>7. Actuator tilting occurs without being controlled, tilting is not smooth or tilting is jerky.</p>	<p>7.1 Faults may be related to installation issues.</p> <p>7.2 Fault may be due to internal gear “arcing” from unauthorised welding.</p>	<p>7.1 Check installation for low pressures or pressure drop.</p> <p>Check installation flow is set as per the ATTACH2 manual.</p> <p>Check installation hose sizes are as per the ATTACH2 manual.</p> <p>Inspect installation valves are seating correctly or for damage / foreign materials, replace with new if required.</p> <p>Check installation is set to correct specification as per the ATTACH2 manual.</p> <p>Ensure installation solenoids and electrical circuits are servicable, adjust or replace components if required.</p> <p>If the fault remains. please contact your ATTACH2 service department on:</p> <p>AUS: +61 7 3557 2654 NZ: +64 6 929 7592</p> <p>7.2 Check the hitch for signs of welding, GPS brackets or additional guarding. All welding works require prior written consent from ATTACH2. Full strip, repairs and reseal may be required. Please contact your ATTACH2 service department on:</p> <p>AUS: +61 7 3557 2654 NZ: +64 6 929 7592</p>

Sure-Grip Troubleshooting Guide

SURE-GRIP		
<p>1. Slide will not dis-engage correctly</p> <p>or</p> <p>Slide will not engage correctly.</p>	<p>1.1 Install pressures not at specification.</p> <p>1.2 Damaged base jamming slide operation.</p> <p>1.3 Slide Jamming in rail.</p> <p>1.4 Check cylinder pilot operated check valve.</p>	<p>1.1 Check and adjust pressures. Ensure installation is as per the ATTACH2 manual.</p> <p>1.2 Check base for damage interfering with sliding action. Repairs as required to allow free movement of the slide.</p> <p>1.3 Check rail tolerance as per the ATTACH2 manual, excessive movement in rail may cause the slide to jam.</p> <p>1.4 Check cylinder pilot operated valve may require replacement; even small amount of foreign material can cause the check valve to fault. If the fault remains, please contact your ATTACH2 service department on:</p> <p>AUS: +61 7 3557 2654 NZ: +64 6 929 7592</p>
<p>2. Hitch will not fit attachments.</p>	<p>2.1 Incorrect attachments</p> <ul style="list-style-type: none"> Pin sizes Pin centres Between the ears measurements <p>2.1 Incorrect hitch build specification.</p>	<p>2.1 Check attachment pin sizes and centres are within the range on the hitch serial plate. As per checking attachment section in the ATTACH2 manual.</p> <p>2.2 Contact ATTACH2 with hitch serial number to confirm ordered build specifications.</p> <p>NOTE: Hybrid hitches have differing top specification and differing bottom specification and will be built as ordered. Loan units are extremely rare for Hybrid builds.</p>

Troubleshooting Guide

SURE-GRIP

3. Attachment engagement is loose

- 3.1 Attachment may not suit the coupler specification.
- 3.2 Install pressures not at specification.
- 3.3 Special pickup may require modified coupler slide.
- 3.4 Check C-section, Base and Slide for damages, wear or defects.

3.1 Check attachment pin sizes and centres are within the range on the hitch serial plate. As per Checking attachment section in the ATTACH2 manual.

3.2 Check for installation for low pressures or pressure drop.

Check installation flow is set as per the ATTACH2 manual.

Check installation hose sizes are as per the ATTACH2 manual.

Inspect installation valves are seating correctly or for damage/foreign material, replace with new if required.

Check installation is set to correct specification as per the ATTACH2 Manual. Adjust or replace if required.

Ensure installation solenoids and electrical circuits are serviceable. Adjust or replace components if required.

If the fault remains, please contact your ATTACH2 service department on:
AUS: +61 7 3557 2654
NZ: +64 6 929 7592

If the attachment is within the serial plate specification and is still loose, the hitch may be a hybrid and require a special modified slide. Please contact your ATTACH2 service department on:

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NZ: +64 6 929 7592

3.4 Complete visual and maintenance checks as per the ATTACH2 manual. If the fault remains, please contact your ATTACH2 service department on:

AUS: +61 7 3557 2654
NZ: +64 6 929 7592

Troubleshooting Guide

SURE-GRIP		
4. Safety Latch stuck open or closed.	<p>4.1 Damaged or cracked safety latch.</p> <p>4.2 Foreign material is jamming spring operation.</p> <p>4.3 Safety latch springs damaged.</p> <p>4.4 Damage / snapped Slide tail section.</p>	<p>4.1 Check Safety latch for damages and replace.</p> <p>NOTE: Forcing the attachment pin over the safety latch will cause wear and damages to the safety latch. See Operating and attaching in the ATTACH2 manual.</p> <p>4.2 Clean all foreign materials from behind the safety latch and springs to ensure clear and free operation.</p> <p>4.3 Replace broken or worn springs to allow correct operation.</p> <p>4.4 Replace slide - When fully retracted the slide tail section mechanically opens the safety latch.</p>
5. Wear/ Defects on base.	<p>5.1 Damages due to external operational contact.</p> <p>5.2 Wear on pin contact area.</p>	<p>5.1 Contact ATTACH2 for repair instructions if required. Please contact your ATTACH2 service contact. department on:</p> <p>AUS: +61 7 3557 2654 NZ: +64 6 929 7592</p> <p>5.2 Check wear tolerance specification as per the ATTACH2 manual. Contact ATTACH2 for repair instructions if required. Please contact your ATTACH2 service department on:</p> <p>AUS: +61 7 3557 2654 NZ: +64 6 929 7592</p> <p>NOTE: Hardened attachment pins or high tensile pins may wear into base, after initial wear in periods the base wear normally will not develop any further.</p>

Troubleshooting Guide

SURE-GRIP

6. Damage / Wear / Defects on slide rail.	<p>6.1 Damages due to external operational contact.</p> <p>6.2 Wear on rail slide area.</p>	<p>6.1 Please contact ATTACH2 service department for repair instructions on:</p> <p>AUS: +61 7 3557 2654 NZ: +64 6 929 7592</p> <p>6.2 Check rail wear tolerance specification as per the ATTACH2 manual. Please contact ATTACH2 service department for repair instructions if required on:</p> <p>AUS: +61 7 3557 2654 NZ: +64 6 929 7592</p>
7. Damage / Wear / Defects on C-Section.	<p>7.1 Damages due to external contact.</p> <p>7.2 C-Section pulled open due to misuse.</p>	<p>7.1 Contact ATTACH2 for repair instructions if required. Please contact your ATTACH2 service department on:</p> <p>AUS: +61 7 3557 2654 NZ: +64 6 929 7592</p> <p>7.2 A misused C-Section can cause loose attachment engagement and increase wear to pin engagement surfaces. Please contact your ATTACH2 service department on:</p> <p>AUS: +61 7 3557 2654 NZ: +64 6 929 7592</p>
8. Damage / Wear / Defects on Slide.	<p>8.1 Damages due to external contact.</p> <p>8.2 Wear on pin contact area.</p>	<p>8.1 Replace Slide</p> <p>8.2 Replace Slide</p> <p>Check installation for low pressures or pressure drop.</p> <p>Check installation flow is set as per the ATTACH2 manual.</p> <p>Check installation hose sizes are as per the ATTACH2 manual.</p> <p>Inspect installation valves are seating correctly or for damage/ foreign material, replace with new if required.</p> <p>Check installation is set to the correct specification as per the ATTACH2 manual. Adjust or replace if required.</p>

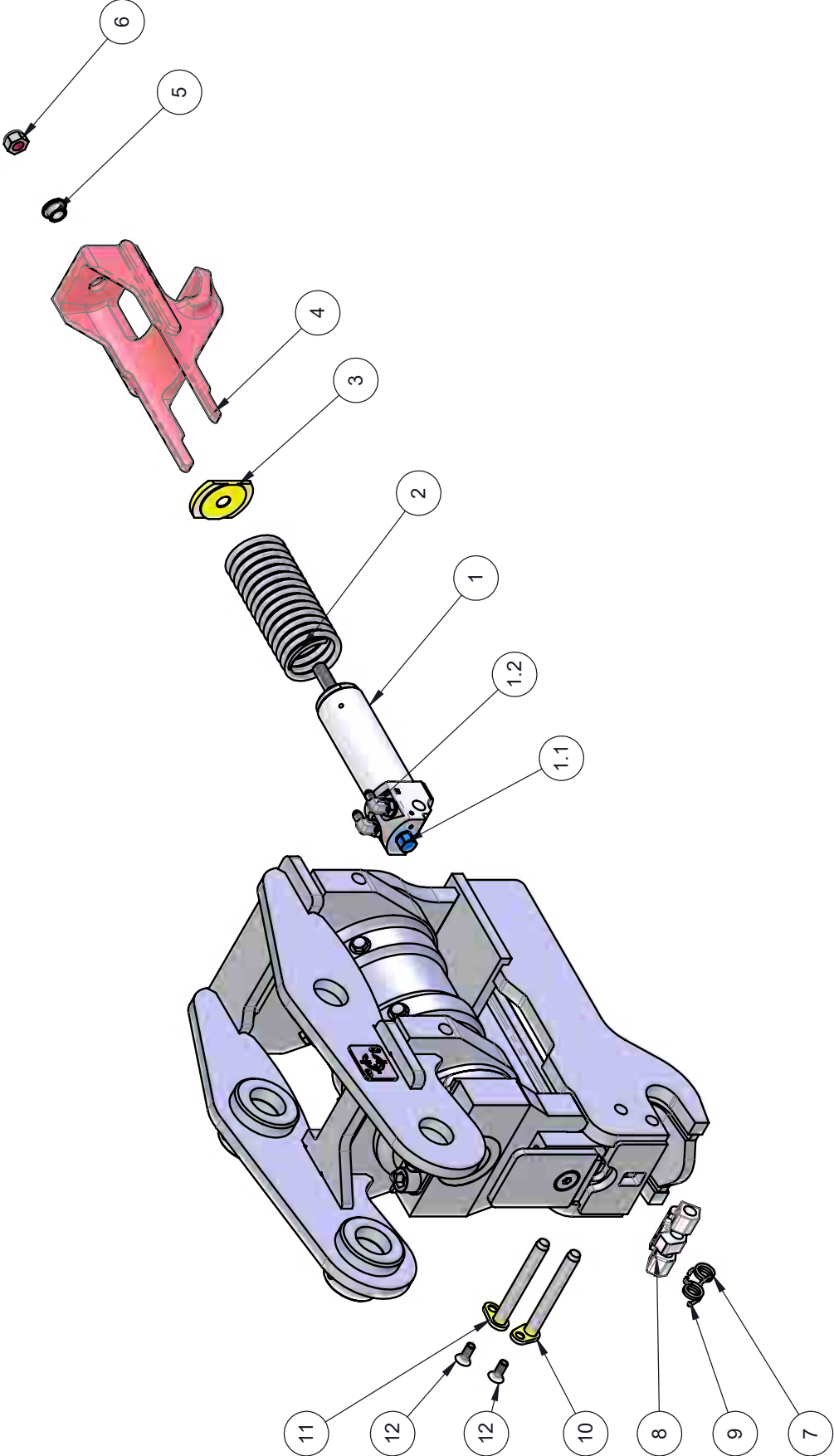
Troubleshooting Guide

SURE-GRIP		
8. Damage / Wear / Defects on Slide.	8.2 Wear on pin contact area. 8.3 Wear on slide rail area. 8.4 Broken slide tail.	<p>8.2 Ensure installation solenoids and electrical circuits are serviceable, Adjust or replace components if required.</p> <p>If the attachment is within the serial plate specification and is still loose, the hitch may be a hybrid and require a special modified slide. Please contact your ATTACH2 service department on:</p> <p>AUS: +61 7 3557 2654 NZ: +64 6 929 7592</p> <p>8.3 Replace Slide, Check rail wear tolerance specification as per the ATTACH2 manual. Contact ATTACH2 for repair instructions if required. Please contact your ATTACH2 service department on:</p> <p>AUS: +61 7 3557 2654 NZ: +64 6 929 7592</p> <p>8.4 Replace slide. Please contact your ATTACH2 service department on:</p> <p>AUS: +61 7 3557 2654 NZ: +64 6 929 7592</p> <p>NOTE: Broken slide tails could be a result of excessive rail tolerances.</p>

Maintenance & Repair Log

DATE	FAULT	REPAIR	BY WHOM

Parts Diagram



Parts List

	DESCRIPTION	2T PN	3T PN	4T PN	6T PN	8T PN	14T PN	20T PN	35T PN	45T PN
1	Cylinder Assembly	304312	304112	304112	303207	304189	303821	303521	304212	304712
1.1	Check Valve	303184	10325	10325	10325	10325	10325	10325	10325	10325
1.2	90 Elbow	304130	304130	304130	30324	30324	30324	30324	30324	30324
2	Safety Spring	304317	304117	304117	303212	304027	303827	303527	304217	304717
3	Plate Rod End	304318	304118	304118	303213	304020	303828	303528	304218	304718
4	Slide	304326	304121	304121	303850	302287	304198	304199	304636	304708
5	Boss Top Hat	304332	304127	304127	203115	303826	303826	303226	303226	304738
6	Nut Nyloc	20265	20266	20266	20268	20271	20271	303541	303541	20379
7	Spring R/H	304330	304125	304125	303205	303839	303839	303539	304224	304736
8	Latch Safety	304327	304122	304122	303217	304021	303838	303538	304236	304733
9	Spring L/H	304331	304126	304126	303206	303840	303840	303540	304225	304739
10	Pin Latch	304333	304123	304123	303214	304024	303170	303542	304237	304739
11	Pin CYL	304328	304128	304128	303214	304022	303837	303547	304220	304734
12	Capscrew	20265	303220	303220	20189	20189	20189	20189	20189	
12.1	Capscrew								20359	20359



ATTACH2 EQUIPMENT - NZ

PO Box 905
Masterton, 5840
New Zealand
T: +64 6 929 7592
E: nzsales@attach2.com
www.attach2.co.nz
FREEPHONE 0800 100 683

ATTACH2 PTY LTD - AU

18 Success St,
Acacia Ridge, QLD 4110
Australia
T: +61 7 3557 2654
E: ausales@attach2.com
www.attach2.com.au
FREEPHONE: 1800 095 689