



HYDRAULIC COUPLER

Installation & Operation Manual

**Important: This manual must be kept with the excavator at all times.
Please read prior to installing or operating the coupler.**



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For additional information or technical advice about the
HARFORD UNI-LOK COUPLER please contact:

Harford Attachments

Spar Road, Norwich, NR6 6BY, UK

UK: +44 (0) 1603 403099 US: +1 (727) 222 6004

E: info@harfordattachments.com W: www.harfordattachments.com

Introduction

Harford Uni-Lok Hydraulic Coupler

Thank you for choosing to purchase the **Harford Hydraulic Uni-Lok coupler** for excavators. The information contained in this manual should be thoroughly read and understood by all operators of this equipment.

The Uni-Lok is hydraulically operated, double-locking automatic coupler designed to pick up attachments manufactured to the OEM specification. The rear sliding wedge plate provides the primary locking device.

Due to the large number of excavator models available worldwide, it is not possible to provide a rigid set of installation instructions to cover every situation. It is, therefore, extremely important that the installation is carried out by a qualified, competent person, preferably with hydraulic coupler installation experience.

It is essential that the operation and maintenance instructions are followed carefully to ensure safe and reliable operation of the coupler at all times. Failure to do so could result in serious injury and invalidate product warranties.

This manual contains the installation and operation instructions specifically for the Harford Uni-Lok hydraulic coupler. For all other coupler installations, please refer to the appropriate manufacturer's manual.

Safety Features of the Harford Uni-Lok

A number of key safety features are built into this coupler, designed specifically to prevent an excavator attachment becoming disengaged unintentionally. The key features are:

1. **Pilot operated check valve.**
Incorporated into the double acting hydraulic cylinder.
The attachment will remain locked in the event of loss of hydraulic pressure.
2. **Sprung loaded rear lock.**
Ensures that a force is still maintained on the rear locking wedge in the event of loss of hydraulic pressure.
3. **Rear lock indicator bar.**
Visible to the excavator Operator from the cab.
Allows the operator to check that the rear locking wedge is in the correct operating position.
4. **Sprung loaded front lock.**
Visible to the excavator Operator from the cab.
Ensures the front pin is secure when connecting an attachment and during operation.
5. **Dual switching arrangement.**
The primary switch is a 'locked off' type to prevent inadvertent activation.
The secondary switch is a 'momentary' type to ensure that attachments are only released when it is engaged.
6. **Pressure switch fitted in the bucket extend line.**
In conjunction with the secondary switch, attachments can only be released when the bucket cylinder is fully extended and pressurized.

Installation

Fitting the Uni-Lok Coupler to your excavator

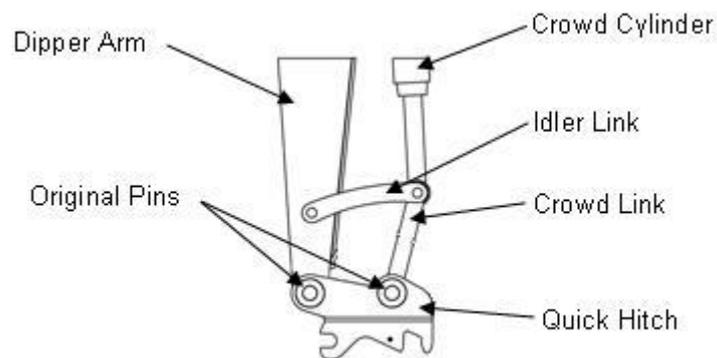


SAFETY NOTICE:

It is important that the correct PPE, including safety gloves and eye protection, is worn during the installation of the Uni-Lok coupler.

1. Remove any existing attachment from the machine dipper arm and crowd link arm. The two original pins that are removed from these pivot points must be used to attach the coupler to the excavator (These pins are usually hardened and have greasing facilities).
2. Carefully align the dipper arm between the two front bosses on the coupler as shown in Diagram 1. Replace any 'O' rings that were removed previously and slide one of the original pins through the coupler and dipper arm. Securely fix the pin in place by using the original or supplied retention method.
3. Repeat step 2 with the crowd link arm linkage.
4. Grease the two pins and visually check they are located and secured correctly.
5. Use the excavator hydraulics to carefully rotate the coupler to the extremes of the crowd cylinder (e.g. no stroke and full stroke). Check the clearance of the coupler with any part of the dipper arm and linkage.
6. Medium tensile pins (or better) should be used in both pin location holes of the attachment. Visually check to ensure the pins are correctly fitted and are secure before the attachment is used. Ensure any retention bolts are tightened using double nuts to lock against each other.
7. Fit the supplied stickers as follows:
 - 1 Yellow Warning Sticker in the cab in a prominent position.
 - 3 Green "Safety Pin Not Required" Stickers:
One in the cab in a prominent position and,
One either side of the dipper arm near the coupler.

Diagram 1



Installation

Fitting the hydraulic components.



IMPORTANT:

For successful installation of the Uni-Lok coupler you require a solenoid valve, pressure switch, hoses and fittings. The Harford bespoke fitting kit contains all these components. The coupler is designed to operate at the excavator's maximum working pressure. If this is more than the hydraulic cylinder's maximum pressure (stamped on the top) a pressure reducing valve must be fitted. All components must be to the correct specification and installed by a qualified, competent person.



WARNING:

Before carrying out any welding or work on the electrics of the machine, ensure that battery has been disconnected to prevent any damage occurring to the machine circuit.

Manifold block

1. The excavator geometry will determine where the manifold block should be placed
2. It should be welded as low down the dipper arm as possible on either the top or sides as shown by the photos below.
3. Ensure it is positioned so that when the hoses are fitted they are not too long, overstretched or impeded by the coupler or links during operation.



P Clips

1. Fit P-Clips & spiral wrap as shown below.
2. Ensure that the hoses are not overstretched.



Installation

Solenoid Valve



WARNING:

Ensure that the solenoid valve is not energised when the Uni-Lok coupler is in the locked position. This will prevent any potential coil burn out and will also ensure the coupler stays in the locked position in the event of an electrical failure.

1. Ensure that you have the correct Solenoid valve. For cylinders rated 3500 and 4000 PSI fit the 'Delta' Solenoid valve and the cylinder rated at 5000 PSI fit the 'Hydac' Solenoid valve.
2. Position solenoid valve in a safe, dry area close to the hydraulic pump, or main valve assembly.
3. The solenoid valve must be connected to the main pressure line of the excavator between the pump and main control valve. It is recommended that the main test port is used.
4. Ensure fixing bolts are tightened.

Pressure Switch



IMPORTANT:

This switch has been factory set so that it operates when the pressure reaches 150 bar (2175 psi) but it can be adjusted between 100-250 bar (1450–3625 psi).

1. Ensure that the pressure switch is fitted into the bucket extend line.

Hydraulic hoses



WARNING:

Hydraulic oil pressure and fluid can cause serious personal injury. When escaping under pressure it can penetrate body tissue, cause severe tissue damage, loss of limb and possible death. Always check for leaks with the use of a shield and not against any part of your skin. Alternatively shut off the pressure and allow time to de-pressurize. If fluid is injected into your skin you must seek emergency treatment straight away by medical personnel that have knowledge of this kind of injury. Remember some hydraulic fluids are also flammable. Refer to your relevant COSHH data sheets for substances that you may come into contact with.

1. Ensure all hydraulic components are suitable for the working pressure.
2. The hydraulic components must be piped according to the relevant circuit as shown on appendix 1.
3. Weld pipe clamps to the excavator arms to retain hose at appropriate positions, hydraulic hoses should follow the paths of existing hydraulic lines of the excavator. Disconnect the negative/earth lead from the battery prior to any welding operation. Remove paint from the weld area prior to welding and use anti-spatter to protect the arm. Protect hydraulic rams and any existing hoses from weld spatter.
4. Cut and fit hose protector where applicable especially where hoses attach to the hydraulic cylinder on the hitch.
5. Hydraulic hoses should be long enough to accomplish their intended function whilst ensuring that during operation the minimum bend radius stated by the hose manufacturer is adhered to. Allowance should be also made for changing characteristics of the hose under differing operating conditions.
6. Avoid contamination within the hydraulic circuit.
7. If hoses are not pre-assembled ensure any assembly follows hose manufacturers recommendations.

Installation

8. Do not re-use old or damaged hose or fittings. If fittings come off during use, do not re-attach but replace the whole hose assembly.
9. Do not mix hydraulic hose and adaptors from different manufacturers and ensure all fittings used are compatible.
10. Ensure all connections are tightened to correct torque e.g. 1/4" BSP = 18Nm, 3/8" BSP = 31Nm.
11. Ensure any spillages are cleaned up.

IMPORTANT:



The Harford hydraulic fitting kit supplied conforms to EN 853-2SN. All hoses must be crimped by a competent person using the correct tooling. Further information can be obtained from Harford Attachments (see Page 12).

Fitting the electrical components



IMPORTANT:

The following components are required for successful installation of this coupler: solenoid valve, pressure switch, relay, dual switch arrangement, warning buzzer, appropriate wiring and fuse. The Harford bespoke fitting kit contains all of these. All components must be to the correct specification for the excavator and be installed by a qualified, competent person.

Electrical wiring/switching

1. Ensure all electrical components are the correct voltage for the excavator.
2. The electrical components must be wired according to the switch circuit in Appendix 1.
3. The switches must be positioned in the cab within easy reach of the operator but not in a position which means they can be inadvertently operated.
4. Ensure the warning buzzer is placed in a position where it can be heard.



IMPORTANT

This Uni-Lok coupler is operated by a dual switch arrangement, a primary on/off lockable switch and a secondary momentary type switch.

Connecting an attachment

- 1 Activate the primary switch .  to sound the warning buzzer and energise the secondary switch.
- 2 Fully extend the bucket cylinder and maintain operation of the control stick to ensure the pump works at full pressure as shown in Diagram 2.
- 3 Press and release the secondary switch  to retract the rear locking wedge and open the front lock.
- 4 Lower the coupler's front 'C' shaped jaw down towards the front attachment pin ensuring the front lock is in the open position.
- 5 Engage the front jaw with the front attachment pin as shown in Diagram 3.
- 6 Lift the attachment off the ground then extend the bucket cylinder as shown in Diagram 4.
- 7 De-activate the primary switch  to extend the rear locking wedge and close the front lock. The warning buzzer will turn off.
- 8 Retract the bucket cylinder slowly to view the indicator bar and front lock to ensure correct operating positions as shown in Diagram 5. Conduct rattle test to confirm full engagement of the rear locking wedge.

Diagram 2 - Extend the bucket cylinder

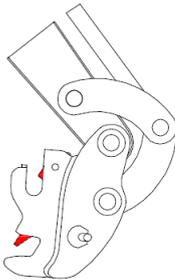


Diagram 3 - Engage the front jaw

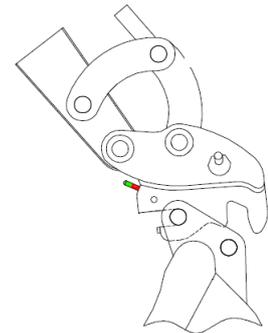


Diagram 4 – Lift the attachment
ar : ram

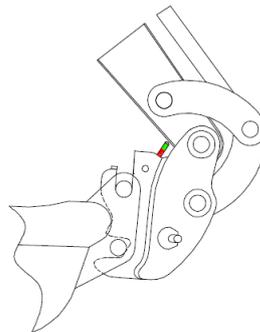
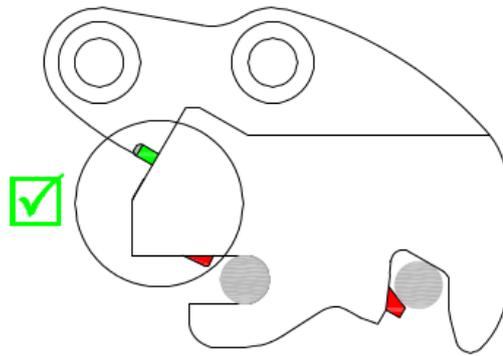
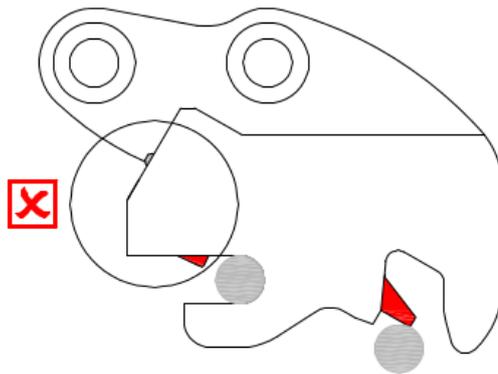


Diagram 5

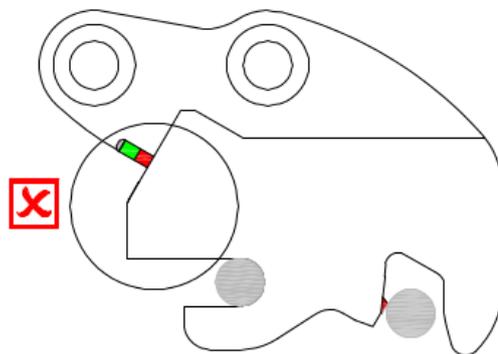
Correct operating position



Incorrect operating position



Incorrect operating position



**WARNING:**

During operation there should be no movement between the coupler and attachment. If any movement is detected, stop operation immediately, lower attachment to the ground and inspect both the coupler and attachment.

**WARNING:**

The coupler extends the length of the dipper arm and some attachments could hit the cab or boom in certain positions.

**WARNING:**

The coupler is designed to accept attachments which are manufactured to OEM specifications and capacities. The use of oversized attachments with this coupler could be hazardous and invalidate the product warranty.

**WARNING:**

Ensure the Safe Working Load of the excavator is not exceeded. Refer to the excavator manufacturer's information.

**IMPORTANT:**

If hammers are to be used for long periods of time the coupler should be removed to prevent unnecessary wear.

**IMPORTANT:**

The use of pallet forks with this coupler is not permitted by the manufacturer and will invalidate the product warranty.

Releasing an attachment

- 1 Ensure people and property are well clear of the immediate area.
- 2 Activate the primary switch  to sound the warning buzzer and energize the secondary switch.
- 3 Extend the bucket cylinder fully and maintain operation of the control stick to ensure full pressure.
- 4 Press and release the secondary switch  to open the front lock and retract the rear locking wedge.
- 5 When the front lock is fully open carefully retract the bucket cylinder to disengage the attachment from the coupler. Use the control sticks to position the dipper and boom to ensure the attachment is positioned close to the ground before release.
- 6 De-activate the primary on/off switch  to turn off the warning buzzer.
- 7 The Uni-Lok coupler is now ready to pick up another attachment.

Lifting a load

**IMPORTANT:**

This section applies to couplers with a Harford factory-fitted lifting eye.

1. Ensure that the load to be lifted does not exceed the safe working load of the lifting eye (stamped on the coupler).
2. The lifting eye is designed to be used with a lifting shackle with the same safe working load rating.
3. Release the attachment from the quick hitch prior to using it to lift load.

**IMPORTANT:**

Ensure the safe lifting capacity of the excavator is not exceeded. Refer to excavator manufacturer's information.

Maintenance of the Harford Uni-Lok Hydraulic Coupler



WARNING:

Hydraulic oil pressure and fluid can cause serious personal injury. When escaping under pressure can penetrate body tissue, cause severe tissue damage, loss of limb and possible death. Always check for leaks with the use of a shield and not against any part of your skin. If fluid is injected into your skin you must seek emergency treatment straight away by medical personnel that have knowledge of this kind of injury. Remember some hydraulic fluids are also flammable. Refer to relevant COSHH data sheets for substances that you may come into contact with.



SAFETY NOTICE:

It is recommended that the correct PPE, including safety gloves and eye protection, are worn during the maintenance of the Harford Uni-Lok coupler.

Daily checks:

1. Clean away any material build up around the front lock, cylinder, springs and wedge.
2. Grease wedge slide housing points.
3. Check all pin retainers bolts & nuts for tightness on coupler and attachments.
4. Check hydraulic hoses for damage, leakage or weeping, stiffness (as hose ages it can become stiff causing it to crack when flexed), blistering and general wear. Replace as required.
5. Check hose fittings at connection points for leaks, poor interfacing with hose or other connectors. Tighten and replace as required.
6. Check coupler operation by connecting an attachment.
7. Check operation of warning buzzer.
8. Inspect coupler for evidence of wear, fatigue or weld failure.



IMPORTANT:

Due to the self-tightening and infinite wear feature accommodated with the hydraulic cylinder, if any attachment is fitted to the coupler for long periods of time it should be released daily. If the daily maintenance tasks are adhered to, this will happen automatically.



WARNING:

If the coupler is damaged in any way and/or there is any doubt as to its continued safe operation please contact Technical Dept., Harford Attachments Ltd, UK +44 (0)1603 403099 or email info@harfordattachments.com.



WARNING:

If your coupler has a Harford factory-fitted lifting eye, it must be inspected at regular intervals by a competent person for signs of damage and/or defects, in accordance with HSE LOLER 1998 guidelines which can be found at www.hse.gov.uk.

TROUBLE SHOOTING

ALL WORK TO BE CARRIED OUT BY A COMPETENT PERSON.

PROBLEM	DIAGNOSTICS	CAUSE	SOLUTION
REAR LOCKING WEDGE NOT RELEASING	Primary switch not illuminated when pressed, buzzer not sounding.	Blown fuse	Check fuse and if necessary replace.
		Faulty primary switch	Check primary switch and if necessary replace.
		Faulty ground wire	Check ground wire
	Primary switch illuminated when pressed, buzzer sounding, secondary switch not illuminated when pressed.	Bucket extend line not pressurizing	Ensure bucket cylinder is fully extended and maintain pressure while pressing secondary switch.
		Faulty pressure switch	Check pressure switch and if necessary replace.
		Faulty secondary switch	Check secondary switch and if necessary replace.
	Primary switch illuminated when pressed, buzzer sounds, secondary switch illuminated when pressed, coupler hoses are not pressurizing.	Faulty solenoid	Check solenoid coil for loose wiring, replace if necessary.
		Faulty relay	Check relay and if necessary replace.
	Primary switch illuminated when pressed, buzzer sounds, secondary switch illuminated when pressed, coupler hoses are pressurizing.	Low pressure in hitch line	Increase engine revs to raise hydraulic pressure.
		Rear lock jammed	Check coupler for any debris that may be blocking the rear lock.
Faulty check valve		Check coupler cylinder 'check valve' and if necessary replace.	
REAR LOCKING WEDGE NOT STAYING OPEN WHEN CHANGING ATTACHMENT	Rear lock closes immediately after releasing secondary switch	Faulty relay	Check relay and if necessary replace.
	Rear lock closes slow after releasing secondary switch	Faulty check valve	Check coupler cylinder 'check valve' and if necessary replace.
		Faulty cylinder seal	Check seals and if necessary replace.
FRONT LOCK NOT OPENING	Front lock not releasing once rear lock is released	Faulty front lock	Check front lock and if necessary replace.
FRONT LOCK NOT CLOSING	Front lock not closing once rear lock in engaged	Front lock jammed	Check for any debris that may be blocking the front lock.
		Faulty front lock spring	Check spring and if necessary replace.



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Warranty

Earthmoving attachment

Harford Attachments Ltd (the seller) warrants their couplers as follows:

1. The seller shall repair or replace at the seller's option any of the goods which are, or which become, defective within 12 months from delivery due to faulty workmanship, materials or faulty design, provided that the buyer shall have notified the seller in writing of such defect and have given the seller a reasonable opportunity to inspect the defective goods.
2. If, in the opinion of the seller, the goods have not been operated or maintained in accordance with the instructions in this manual, or have been subject to unauthorised repair or modification, the warranty will be invalidated.
3. The seller's liability in respect of defects in the goods shall be limited to those stated in this clause and subject to Clause 2(1) of the **Unfair Contract Terms Act 1997**, the seller shall not be liable whether in contract or in tort, including but not limited to negligence, or by reason of breach of statutory duty or otherwise, for any damage or loss whatsoever suffered by the buyer arising out of or attributable to such defects.

Item Checklist

The following products are supplied.

<u>Item</u>	<u>Supplied</u>
Uni-Lok Hydraulic quick hitch	✓
Installation and operation manual	✓
Warning label	✓
Safety pin not required stickers	✓
Electrical fitting kit	<u>see note 1</u>
Hydraulic fitting kit	<u>see note 1</u>

Notes

1. The electrical and hydraulic kits are essential parts of the hydraulic coupler's operational system but may not have been supplied or fitted by Harford Attachments Ltd. In that case, the seller does not accept any warranty claim for defective goods or their incorrect installation.

Harford Attachments Ltd

Spar Road, Norwich. NR6 6BY. England

UK: +44 (0) 1603 403099

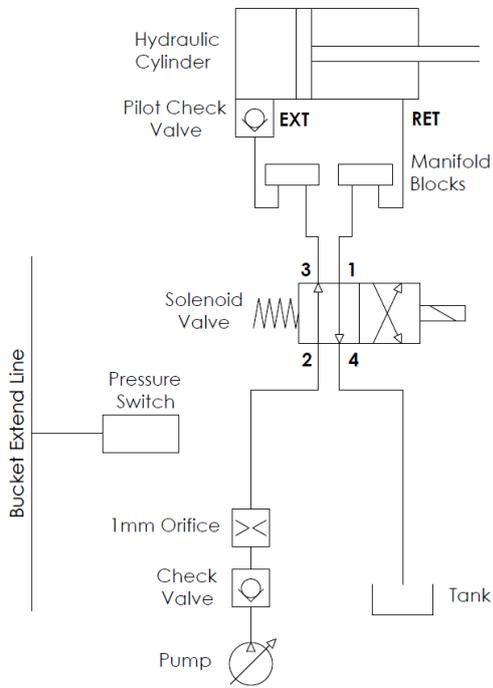
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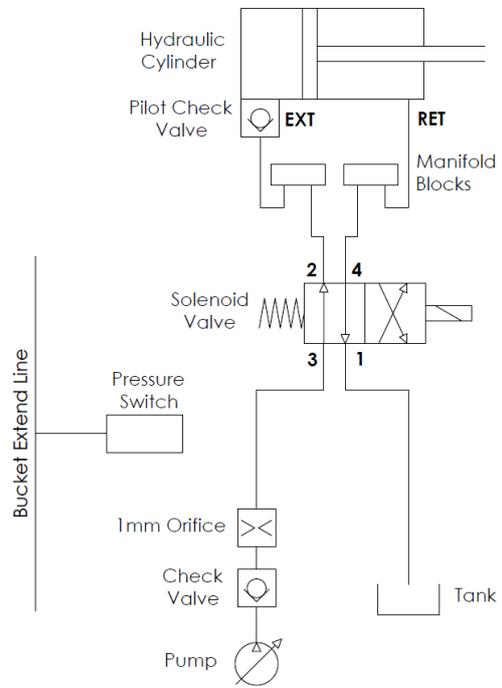
website: www.harfordattachments.co

Appendix 1

Hydraulic Circuit (Delta Solenoid Valve)



Hydraulic Circuit (Hydac High Pressure Solenoid Valve)



Switch Circuit

