

Installation Manual and User Instructions

TWINLOCK
POWERLATCH TILT



IMPORTANT:

This book should be kept with the machine at all times during and after coupler installation. Machine operators should be fully trained on the correct operational procedure for this particular coupler.

The Miller PowerLatch Tilt Coupler [AUTOMATIC]

(Patents Pending)



Complies with: AS4772 • EN474
• Machinery Directive 2006/42/EC
• Major Contractor Policies

PART NUMBER: VOPLTINGUIDEUK17

MILLER
Ground breaking™



Thank you for purchasing
a Miller Quick Coupler

The following information details
the correct installation & operation
procedure for your Miller Quick
Coupler.

Please take the time to read the instructions carefully and install the coupler in accordance with Miller's recommendations. This will enable you to benefit from the many features incorporated within your Miller Coupler aimed at providing you with increased versatility at the flick of a switch.

We trust that you will enjoy many trouble free years with your Miller Coupler and hope that we may look forward to being of service to you again soon.

Pioneering Attachment Changeover Technology.



Any piece of machinery can be dangerous when it is not operated correctly. Failure to follow the information provided in this manual could result in injury or death.



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PRODUCT INFORMATION

1.0 MILLER QUICK COUPLERS

The Versatility of Miller Quick Couplers

Miller Quick Couplers are designed to facilitate the easy changeover of standard buckets and work tools. The couplers can operate with a range of buckets from a variety of machine manufacturers within the same size range (fig1.0).

No modifications are required to the buckets or machine. The couplers can utilise buckets in face mode position and also work in a range of applications and with a wide variety of work tools.

Replacement Parts

Miller recommends that you fit genuine replacement parts. For advice or to order parts contact your local distributor quoting the **coupler serial number** which can be found on the coupler data plate (page 12).

Coupler Installation and Operation

Miller offers a number of services to ensure the correct installation and operation of the coupler. These include coupler inspection, installation training and operation guidance. Miller also offers a 'New for Old' scheme in which it buys back an old or alternative manufacturer's coupler in part exchange for one of its universal designs. Terms and conditions apply.

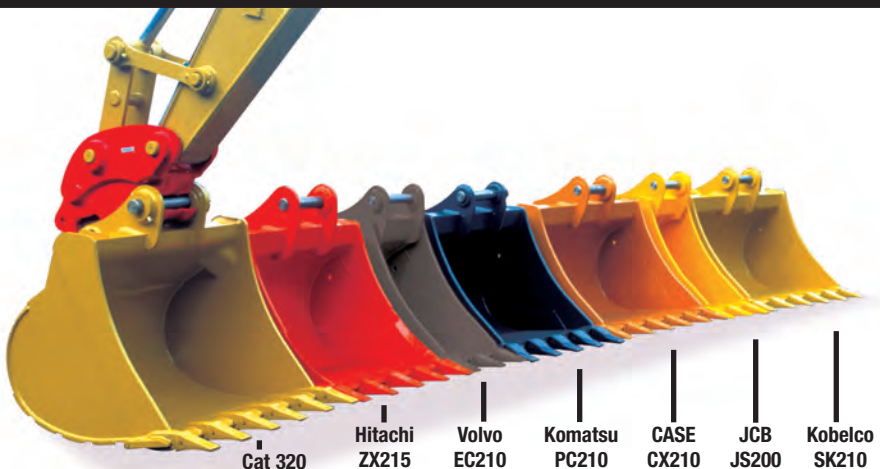


fig 1.0 The Versatility of Miller Quick Couplers
Example shown details a 20 tonne hydraulic excavator

1.1 THE POWERLATCH TILT COUPLER – HYDRAULIC TWIN LOCKING

The PowerLatch Tilt Coupler has a unique and patented Automatic Blocking System (ABS) (fig 1.3). This mechanism negates the need to manually insert a safety pin hence there is no safety pin hole in the coupler frame (fig 1.2). The ABS allows the coupler to be operated solely from the machine's cab.

The twin-locking feature of the PowerLatch Tilt coupler means that in the event of loss of engagement forces, the independent mechanical locks on both the front and rear attachments pins ensuring that the attachment remains securely attached to the coupler.

To ensure the correct attach and release mechanism of the ABS please see Section 5 – Operation, page 51.



fig 1.1



fig 1.2



Automatic Blocking System (ABS) with
Powered Latch (PL)

fig 1.3





Installation Manual and User Instructions for the PowerLatch Tilt Quick Coupler

SAFETY

Be safe, not sorry

2.0 GENERAL SAFETY INFORMATION

Miller Couplers are designed to provide a safe and reliable solution for the easy changeover of **standard OEM buckets** and attachments for most popular machines in the same operating weight.



WARNING - Miller couplers must be installed and operated by appropriately trained and experienced personnel. Miller can provide an installation service and operator training if required. Please contact Miller and/or an authorised distributor for details.

Miller cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are, therefore, not all-inclusive.

If a tool, procedure, work method or operating technique that is not specifically recommended by Miller is used; you must satisfy yourself that it is safe for you and for others.

You should also ensure that the product will not be damaged or be made unsafe by the operation, lubrication, maintenance or repair procedures that you choose.

It is the owner's and operator's responsibility therefore to ensure the coupler is in a good safe working condition.



WARNING IMPORTANT NOTICE

- This product may enable the operator to use buckets or attachments for which it is not specifically designed, i.e. oversized tools, buckets or equipment. You must always ensure that the operating capacity of the excavator is not exceeded as the excavator may become unstable and could be dangerous.



DANGER - Hydraulic Fluid Never use your hands to search for hydraulic fluid leaks, use a piece of paper or cardboard. Escaping fluid under pressure can be invisible and can penetrate the skin and cause serious injury. If affected, see a doctor at once.



WARNING - Coupler Condition A defective coupler could injure you or others. Do not operate a coupler that is defective.



WARNING - Decals To ensure the safe operation of the quick coupler you must place the coupler decal in the machine cab where it can be seen clearly. Replace unreadable or missing decals with new ones before operating the machine.



WARNING - Modification and Welding Non-approved modifications can cause injury and damage, making your coupler unsafe. Please call Miller for advice and service requirements.

**WARNING - Protective Clothing**

Oil resistant safety gloves must be worn during installation and dismantling. Field Service personnel and operators must be fully conversant with the installation and operating procedures. If in doubt, seek advice.



WARNING - Smoking Do not smoke whilst working on the hydraulic system.



WARNING - Lifting Always use the correctly rated shackle and lifting equipment. Refer to the coupler data plate (fig 2.4, page 12) to ascertain product weight. Never use worn, damaged or undersized lifting equipment.

**WARNING - Machine Operation**

Always stop the machine and shut off the engine when leaving the machine. Never keep the machine running whilst installing or servicing the coupler.

**WARNING - Maintenance Work**

Maintenance work must only be done by competent personnel.



WARNING - Manual Handling Take care when manually handling coupler & components, bucket and installation pins. Refer to the coupler data plate (fig 2.4, page 12) to ascertain product weight.



CAUTION - Metal Splinters Flying metal splinters can cause injury when driving metal pins in and out. Use a soft-faced hammer or drift to fit and remove metal pins. Always wear safety glasses.

**WARNING Safety Shutdown Procedure**

Work of any type on machinery is always more dangerous when the machine is operating. Before cleaning, lubricating or servicing this unit, the following Safety Shutdown Procedure should **always** be followed:

- 1 Move the host machines propulsion control to the neutral position and idle the engine down.
- 2 Shut off the hydraulic fluid flow to the Coupler.
- 3 Position the coupler so that it is completely resting on the ground.
- 4 Engage the host machine's park brake.
- 5 Move the host machine's throttle to slow idle, shut the engine off and remove the ignition key.

2.1 IN CAB DECALS

A safety decal detailing the safe operation of the quick coupler is supplied with the product. This must be fitted to the machine's cab where it can be clearly viewed by the operator.

Operators must be fully trained and familiar with the correct operating procedure for this particular coupler before attempting to operate the machine.

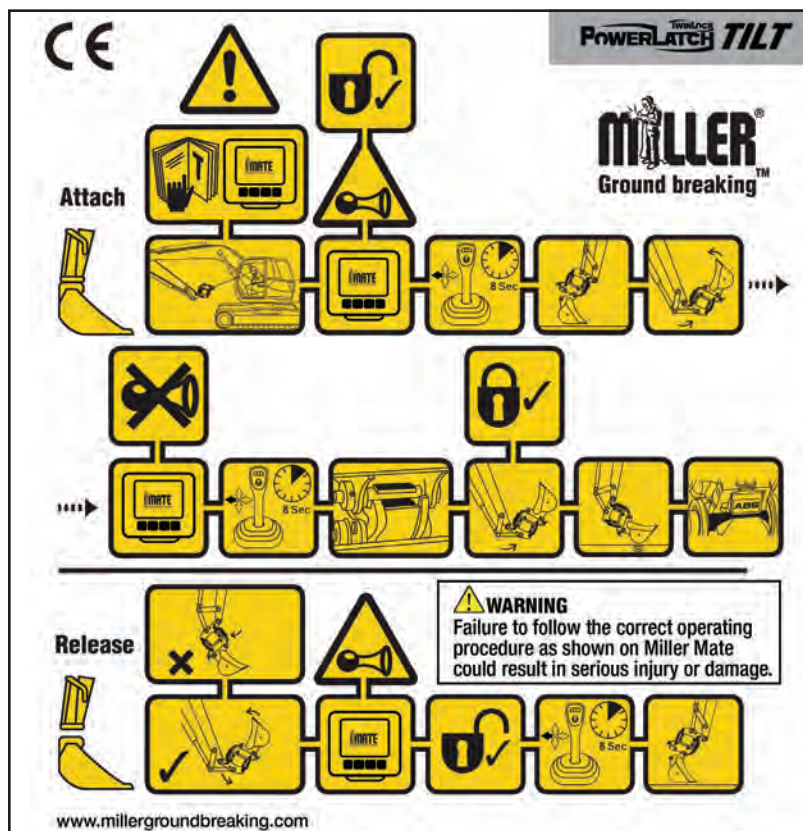


fig 2.0 PowerLatch Tilt Coupler Decal



WARNING - Quick couplers extend the length of the dipper arm (fig 2.1) and with certain attachments could hit the cab in some positions (fig 2.2).

Check this before operating the machine.



fig 2.1

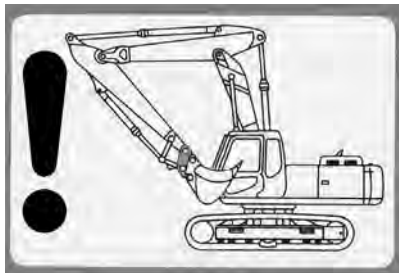


fig 2.2

2.2 COUPLER WEIGHT CHART

Machine tonnage range	Miller coupler range	Approx. coupler weight Kg	Max. tilt (deg)
3.5	P	100	180
5	R	128	180
6 - 9	3	230	180
10 - 15	4	445	180
16-18	5	613	140*
19 - 21	6	654	140*

*180° maximum tilt is available for these PowerLatch Tilt Coupler ranges on request.

Please note this will increase the overall weight of the coupler.

2.3 COUPLER IDENTIFICATION

To ascertain the serial number, weight and Safe Working Load (SWL) of the coupler please refer to the Data Plate (fig 2.4), detailed below.

Alternatively find the serial number and SWL stamped into the coupler as shown below (fig 2.4).

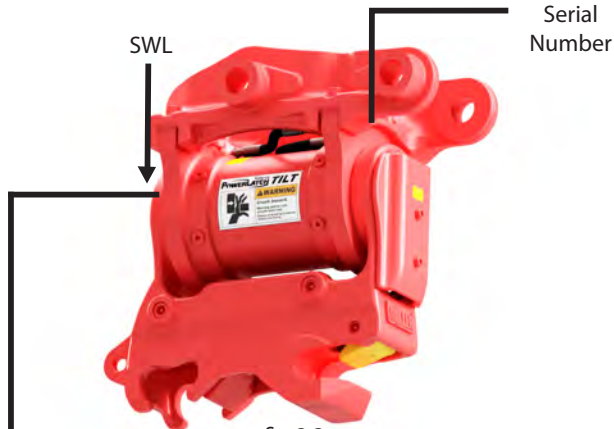


fig 2.3
Coupler Data Plate and stamp location



fig 2.4
Coupler Data Plate



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Instructions for the PowerLatch Tilt
Quick Coupler

INSTALLATION

3.0 PRE-INSTALLATION INFORMATION

SAFETY NOTE:



WARNING – Decals To ensure the safe operation of the quick coupler you must place the coupler decal in the machine cab where it can be seen clearly. Replace unreadable or missing decals with new ones before operating the machine.



WARNING – Protective Clothing Oil resistant safety gloves must be worn during installation/dismantling. Field Service personnel and operators must be fully conversant with the installation and operating procedures. If in doubt, seek advice.



WARNING – Smoking Do not smoke whilst working on the hydraulic system.



WARNING – Manual Handling Take care when manually handling coupler and components. Refer to the table in section 2.2, page 7 to ascertain product weight.



WARNING - Solenoid valves supplied may be 12 or 24 volts depending on machine; check you have the correct voltage solenoid valve before installation.

PRE INSTALLATION INFORMATION

Each hydraulic coupler is supplied with the following:

- i) An electro hydraulic solenoid valve (12v or 24v)
- ii) Installation instructions (this book)
- iii) All required paperwork, certificates and decal

3.1 INSTALLATION KIT

Check List of Parts Required

- 1 x Hydraulic coupler
- 1 x Operation attach/release switch
- 1 x Warning buzzer
- 1 x Short hose A (blue tag) with Protection
- 1 x Short hose B (yellow tag) with Protection
- 1 x Long hose A (blue tag)
- 1 x Long hose B (yellow tag)
- 1 x Hose P (red tag) hydraulic pump to solenoid
- 1 x Hose T (green tag) solenoid to hydraulic tank
- 2 x Tilt Hoses (tilt motor to Dipper arm Block
- 1 x Coupler to Dipper arm Block (yellow tag)
- 1 x Coupler to Dipper arm Block (blue tag)
- 4 x (approx) Weld on hose clamps
- 1 Dipper Block
- 1 Tilt Manifold
- 1 Tilt Motor hose (tilt motor to tilt manifold)
- 1x Pack of hose fittings (number and type dictated by model of machine)
- 1 x cable ties (packet quantities)

Note: Tilting mechanism feed hoses are NOT part of the standard installation kit and would need to be sourced through a reputable hydraulics supplier and

configured to the specific machine's requirements. Please refer to the manual for correct working pressures.

All hydraulic hose specifications to 2 SN DIN – EN 853 (DIN 20022). All the hoses require the appropriate fittings to make the connection to the machine, depending on machine manufacturer.

Spare parts and hydraulic hose kits suitable for most excavators are available by contacting Miller or an authorised distributor. If in doubt, please ask.

Options which may be supplied are:

- i) Coupler installation kit and installation instructions (fig 3.0)
(Note: this does not include tilting mechanism feed hoses)
- ii) Dummy bucket and attachment pins, complete with locking bolts (fig 3.1 & 3.2)



WARNING – Dummy Pins

Do not use the dummy pins to fit the coupler directly to the machine, as it may cause damage to the coupler. The dummy pins are only intended to be attached to the bucket or attachment. Use the machine's original OEM specification hardened pins to connect the coupler to the dipper arm and link.



fig 3.0



fig 3.1



fig 3.2

3.2 COUPLER INSTALLATION

Step 1

Miller couplers should be installed using the OEM specification pins supplied with your machine.

Remove any existing attachments from the machine. Remove plugs from cylinder ports.

Install the original OEM bucket pin through the coupler and dipper arm bores and fit the locking bolt and nuts (supplied).

WARNING: Use original OEM spec hardened pins to connect coupler to dipper/link. Use the supplied dummy pins for the bucket or attachment only. **DO NOT USE DUMMY PINS TO FIT THE COUPLER TO THE MACHINE.**

Step 2



When both hydraulic hoses are fitted, the coupler should be positioned in such a way that the lifting eye is pointing away from the excavator.

Step 3

Align the coupler with the end of the dipper arm and fit seals and shims where required. Lightly grease the O-ring seals and place over the edge of the coupler.

Step 4



Align link arm then install the original OEM bucket pin through the coupler and link arm bores, fit the locking bolt and nuts (supplied).

Step 5

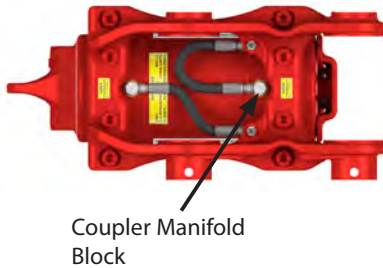


fig 3.5

Step 6

The optional manifold block should be welded into position on the dipper arm (shown in fig 3.8). Fig 3.6 shows the correct hose routing.

Hoses from the solenoid valve should be connected to port A & B (per fig 3.6)

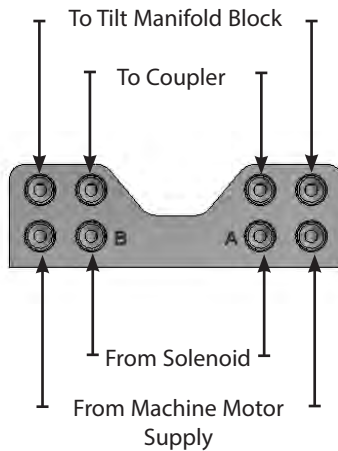


fig 3.6

Step 7

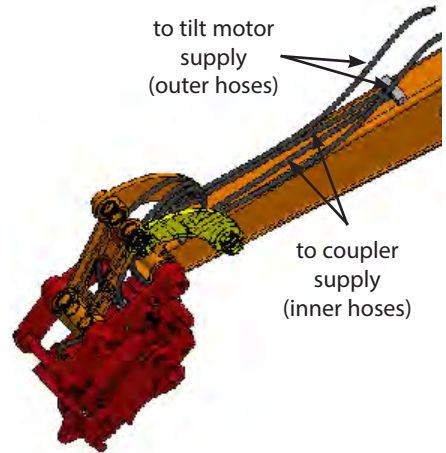


fig 3.7

Note: Tilting mechanism (motor) feed hoses are NOT part of the standard installation kit and would need to be sourced through a reputable hydraulics supplier and configured to the specific machine's requirements. Please refer to the manual for correct working pressures (pg29).



fig 3.8 (Option)

Ensure that the manifold block is welded on so that the ports run up the dipper arm (as shown in fig 3.8).

MULTI-PORT MANIFOLD POSITION

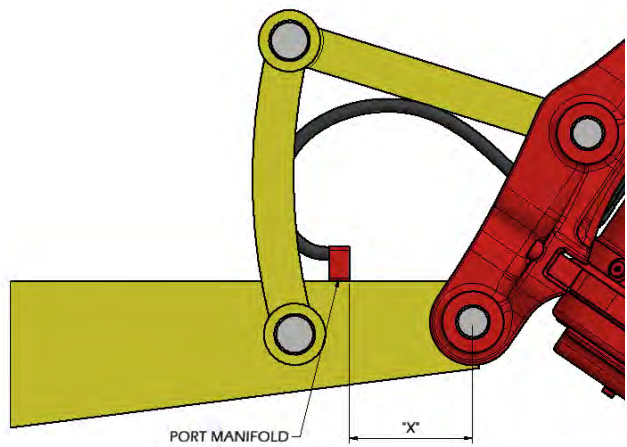


fig 3.9

The manifold block (fig 3.9) should be welded into position on the dipper arm as per the approximate dimensions in the table below. 'x' shows the distance from the seam weld to the position of the manifold block.

Note: The correct distance of the manifold block from the seam weld at the end of the dipper arm are approximate dimensions and should be used as a guide.

Model	Excavator Weight	Distance from Seam Weld (x)
P	3.5T	
R	5T	
R3	6-9T	180mm
R4	10-15T	195mm
R5	16-18T	235mm
R6	19-21T	235mm

Step 5

SOLENOID VALVE INSTALLATION

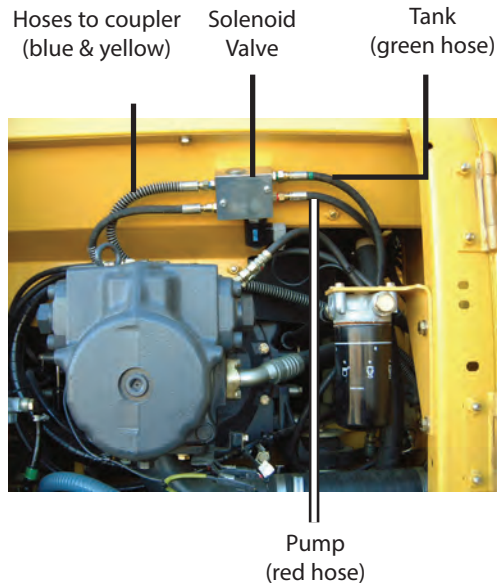


fig 3.10

Example only - location differs in other machine models



WARNING - Do not use low/servo pressure. This coupler needs full working pressure to ensure satisfactory operation.

Fit the solenoid valve in the vicinity of the hydraulic pump, in a safe and dry area near to the hydraulic pump. Locate 'take-off point' for **maximum** machine hydraulic pressure to supply to the solenoid valve, stamped **P**. Use either the pressure gauge test port or tap into the main pressure system between the pump and main control valve on the bucket cylinder circuit.

Make a connection into the tank for the return oil from the solenoid valve, stamped **T**. The tank and pressure fittings may not be supplied as they vary for different machine models. Connect up all hoses to solenoid valve, tank and pump. (Green, Red, Blue and Yellow hoses) (**maximum working pressure = 400 bar**). Please refer to 6.4 (pg 61) for torque specifications.



fig 3.11

Example of a Miller Mate system

Install the on/off operating switch inside the cab in a safe place for the operator to use.

Connect the electrical wiring. The live feed for the switch is taken from the ignition side. Connect the 12 volts DC or 24 volts DC power supply via a 5-amp fuse.



CAUTION - Do not connect a 12V solenoid to a 24V supply, or vice versa as damage to the solenoid will result.



CAUTION - Ensure the switch is installed in an area where it cannot be accidentally activated.

NOTE: The solenoid is energised when the switch is in the **release** or **off** position. In normal working conditions, the solenoid should be electrically disconnected and the switch in the **attach** or **on** position.

The buzzer should only sound when the switch is in the **release** or **off** position. Install the buzzer inside the instrument console, in a safe convenient position and fasten securely.

You should now be ready to test the coupler and the hydraulic system.

Power up machine engine revolutions to approximately quarter throttle and bottom out the bucket crowd link to put the hydraulics under pressure. Operate the switch to ensure the coupler cylinder is working correctly. This will give pressurised flow to the coupler cylinder and assist in the bleeding of the system. Repeat this procedure several times. After testing, check for leaks and rectify if necessary. If the system is free from leaks, the coupler should now be ready for use.



DANGER Hydraulic Fluid - Never use your hands to search for hydraulic fluid leaks, use a piece of paper or cardboard. Escaping fluid under pressure can be invisible and can penetrate the skin and cause serious injury. If affected, see a doctor at once.

3.3 MILLER MATE INSTALLATION INSTRUCTIONS



1. Open the undercarriage of the excavator and feed in the harness connectors to the cab (D&E), solenoid valve (A), battery compartment (B) and boom (C&F).



2. Secure the warning siren in a suitable location such as the base of the boom or the battery compartment, giving some protection from the working environment, this may require the use of the flat bracket. Connect to the harness via (F).



3. Run the harness up the boom of the excavator, secure it with a series of cable ties and give necessary slack on any moving parts. Attach the LED light to the machine's light bracket using the LED bracket if necessary. Connect LED light to the harness via (C).



4. Connect wiring harness to the solenoid via the Hirschmann plug or clutch connector (A).



5. Connect the Miller Mate wiring harness to the main battery isolator switch, ignition live side, and then attach the earth.



6. Remove the red tape from the Miller Mate bracket, place on the window in a position where the unit will not interfere with excavator operation but can easily be reached when needed. Secure Miller Mate to bracket using the two bolts, Fig. 1.

Connect the harness to the Miller Mate via connector (E) into back left port (1). Install the in cab buzzer in a suitable position where it will be heard, connect to wiring harness via connector (D).



7. When Miller Mate is fully connected, turn the machine on. The siren will sound and the LED light will flash automatically to check they are working correctly, this will last approximately 2 seconds and then stop. This is the start-up test.

THE CONTENTS



- | | |
|------------------------------|-----------------------------|
| 1. IN CAB BUZZER | 7. BRACKET FOR SC500H |
| 2. CABLE TIES | 8. HIRSCHMANN PLUS ADAPTOR |
| 3. HARNESS | 9. BATTERY/IGNITION |
| 4. LED BRACKET FOR LED | 10. MILLER MATE SC500H |
| 5. FLAT BRACKET | 11. LED LIGHT |
| 6. BOLTS FOR MILLER MATE (2) | BOLTS FOR WARNING SIREN (4) |

*Please read the manual for machine model.

HARNESS CONNECTORS

Refer to the following diagram for the correct connection of the harness connectors.



- | |
|-----------------------------|
| A. Hirschmann Plug/Socket |
| B. Ignition - Ignition Line |
| C. LED Light |
| D. In Cab Buzzer |
| E. Miller Mate Connector |
| F. Warning Siren |

3.4 COUPLER REMOVAL

Position the coupler so it is standing on the ground. Switch off the machine and operate the controls to vent residual pressure in the hydraulic system.

Unscrew the short hoses from the long hoses and 'blank off' the ends of the long hoses using blanking plugs.

To remove the coupler follow the installation procedure in reverse order starting at Step 4 page 16.



fig 3.11

3.5 COUPLER ELECTRICAL & HOSE INSTALLATION DIAGRAMS

Please turn to the inside back cover for a full colour version of these diagrams.

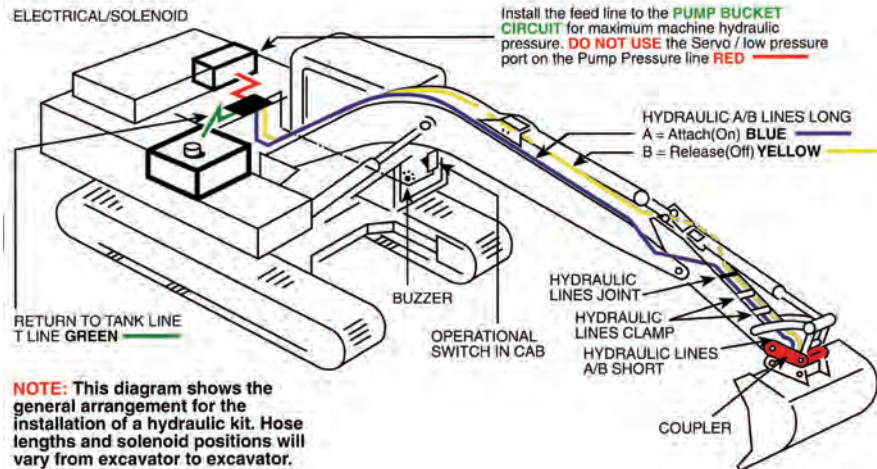


fig 3.12

Coupler Hydraulic Hose Installation

COUPLER ELECTRICAL & HOSE INSTALLATION DIAGRAMS (CONT.)

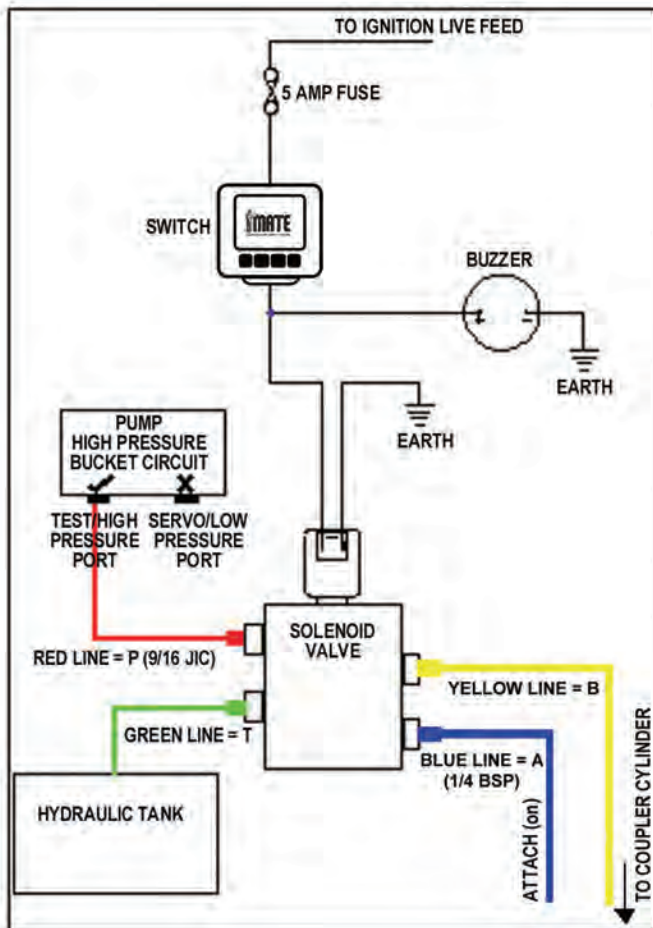


fig 3.13

Coupler Solenoid & Hose Arrangement



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Quick Coupler

HKS ACTUATOR

HKS Dreh-Antriebe GmbH® rotary actuators are products for applications with limited pivoting areas and high torques. Rotary actuators are available in different designs for all special applications.

Our rotary actuators are of sturdy design, guaranteeing a long service life.

HKS Dreh-Antriebe GmbH® rotary actuators meet all valid safety requirements. These requirements must always be followed during installation, use and repair. This applies to the safety instructions in this manual, for safety instructions in the construction machine's operating instructions as well as to local safety instructions applicable to the area in which the construction machine is used.

Changes to the rotary actuators and exceedance of the technical specifications are only permissible with our written approval. Otherwise the guarantee provisions shall not be valid.

These assembly instructions are product related and form the basis for an appropriate and professional installation. Read these assembly instructions prior to commissioning your machine and keep it in a place where it is always accessible

Please follow the instructions in this manual to avoid accidents, faults and failures.

On hand-over, the documents correspond to the current state at the incomplete machine's date of commissioning. HKS Dreh-Antriebe GmbH® shall not assume any liability if a fault, damages, malfunctions and resulting stoppages arise from non-compliance with the individual points of these assembly instructions. Should any failures occur nevertheless, please do not hesitate to contact us via www.hkseurope.com

For the purpose of improving the depiction of facts and circumstances, illustrations in these instructions are not necessarily true to scale and may slightly deviate from the actual design of the device.

Please treat this manual as confidential. They are exclusively intended for persons working with the device. Distributing the manual to third parties without written permission by the manufacturer is not permissible.

Duplications of any kind and form – even in extracts – as well as the utilisation and/or communication of the contents are forbidden without the manufacturer's written declaration. Contraventions make you liable for compensation. We reserve the right to further claims.

Specifications in respect of contents, texts, drawings, pictures and other illustrations are protected by copyright and are subject to industrial property rights. Any improper utilisation is liable to prosecution.

(4.0) SERIAL ID PLATE



Fig 4.0 Serial Data Plate

MEANING OF THE SERIAL ID PLATE

SIGNAL WORD	DEFINITION
DESIGNATION	Designates the product group
TYPE	Designates the product type
ITEM NO.	Designates the product's item number
YEAR OF CONSTRUCTION (MM/YYYY)	Designates the product's year of construction
ORDER NO.	Designates the product's order number
WEIGHT	Designates the product's overall weight
PMAX	Designates the product's maximum operating pressure in bar

Fig 4.1 Meaning of the Serial Data Plate



Wir drehen die Welt:

EC Declaration of Incorporation according to the Machinery Directive 2006/42/EC

The manufacturer:

HKS Dreh-Antriebe GmbH®

Leipziger Straße 55

D-63607 Wächtersbach-Aufenau

fon +49 (0) 6053 6163-0

fax +49 (0) 6053 6163-39

Product designation:	
Type designation:	
Article number:	
Serial number:	
Year of construction:	(Special number/year of wheel/consecutive number)
	(MM/YY)

Complies with the following essential requirements of the Machine Directive 2006/42/EG: Annex I, Section 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4 and 1.5.1

The incomplete machine must not put into operation until the machinery into which it is incorporated has been declared to be in conformity with the **Machinery Directive 2006/42/EC and Electrical Equipment (2006/95/EG)**.

The following harmonised standards have been applied:

- DIN EN ISO 12100 Safety of Machinery – Basic Concepts, General Principles for Design
- DIN ISO/TR 14121-1 Safety of machinery - Risk assessment - Part 1: Principles (ISO 14121-1:2007)
- DIN EN 982/ISO4413 Hydraulic fluid power - General rules and safety requirements for systems and their components - Hydraulic
- DIN EN 60204-1 Safety of Machinery – Electrical Equipment of Machines, Part 1: General requirements

Upon request the manufacturer must undertake to send the special documents for the incomplete machine to individual states electronically.

The special technical documents according to Annex VII Part B belonging to the machine have been created.

The following person has been responsible for the documentation:

Jens Heck

construction engineer

fon +49 (0) 6053 6163-13

j.heck@hks-parmer.com

12.10.2010, Günter Höhn (Managing Director)

HKS Dreh-Antriebe GmbH®

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Ust-Id-Nr. DE 113 957 516

Managing Director: Günter Höhn

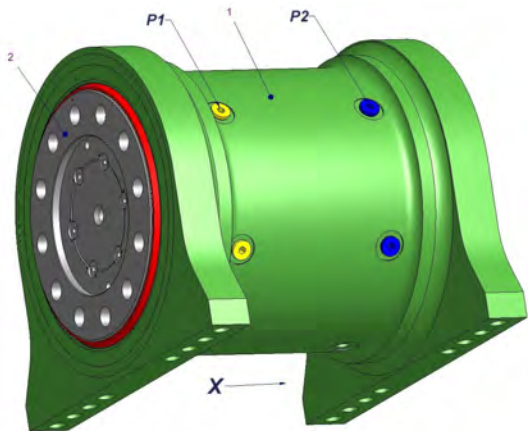
HBP 11628

Amtsgerecht Gelnhausen

Fig 4.2 EC Declaration of Incorporation

(4.1) TECHNICAL SEPCIFICATIONS / FUNCTION

Configuration



POS.	Designation
1	Housing
2	Shaft
P1	Pressure connections
P2	Pressure connections
X	Viewing direction

Fig 4.3 HKS configuration

4.1.1 FUNCTION

The oil pressure fed via the connections P1 and P2 causes a rotary motion at the actuator shaft [2]. In the course of this, the linear motion of the piston is converted by multi-gear counter rotating steep threads into a rotary motion on casing [1], piston and shaft [2].

Following functions possible at:

- Pivoting the shaft [2] by 180°.
- With viewing direction X and the pressure

entering at P1, the actuator shaft [2] and seal ring turn from the centre position to the left (anti-clockwise). With the pressure entering at P2, the actuator shaft [2] and the seal ring

turn from the centre position to the right (clockwise). The piston centre position is identified with markings (punch marks) on casing [1] and shaft [2].

4.1.2 TEMPERATURE RANGE

The operating temperature may not exceed the specified limits (-18°C/+60°C) up to which the system and all components can be safely used.

The temperature range can be gathered from the corresponding installation drawing (see "9.1 Installation drawing / product catalogue") for the actuator.

4.1.3 OPERATING FLUIDS

- Flame-resistant hydraulic fluids or bio oils may only be used with our written approval.
- BV: corresponding hydraulic oils depending on the temperature: HLP 16 to HLP 46.
- Mineral oils according to group HLP DIN 51524 / Part 2 and VDMA sheet 2431.
- Viscosity: between 15 mm²/s (cSt.) and 250 mm²/s (cSt.).
- Filtering between pump and actuator.
- Oil purity acc. to NAS 1638 – NAS class 7 (22/18/14).
- Recommended filter unit VG16.

Lubricating Greases

- BV: Use lubricating greases according to NLGI 3 (e.g.: Lubcon Turmsilon HV 3).

Cleaning Agents

- Cold solvents (e.g. white spirit, diesel oil, Kaltryl KEV).

Preservative Agents

- Corrosion protection according to corrosion protection regulation VW: PV 52.01 (e.g. TECUM Ferrotec-F). The corrosion protection can be removed with solvents (e.g. TECUM Teculan-100).

(4.2) WORKING PRESSURE

Machine tonnage range	Miller coupler range	Max.working pressure
3.5	P	190 bar / 2755 psi
5	R	190 bar / 2755 psi
6 - 9	3	210 bar / 3045 psi
10 - 15	4	250 bar / 3626 psi
16-18	5	250 bar / 3626 psi
19 - 21	6	250 bar / 3626 psi

4.2.1 SAFETY CLASS

The actuator is taking into account the standards DIN 40 050 Part 9, DIN EN 60529 and ISO 20653:2006-08 approved with IP65 safety class.

4.2.1 RECOMMENDED POWER DENSITIES FOR THE HKS ACTUATOR

In the HKS actuators, the flow rates / liter are calculated using the displacement and the desired swing time.

Example: BVC 260 140°

Displacement = 4.61 l / 140°

Swing time = 7 sec

$4.61 \text{ l} / 7 \text{ s} * 60 \text{ s/min} = 39.5 \text{ l/min}$

(4.3) TORQUE SPECIFICATION - ACTUATOR

If screws are used Nord-Lock lock washers must be used.

Screws must be greased with a screw paste.

Fastening screws (cheese head screws 12.9) + Nord-Lock.

Oil-lubricated μ g (thread friction coefficient) = 0.13

THREADS	M4	M5	M6	M8	M10	M12	M14	M16
M _A in Nm	4.6	9.1	15.8	38	75	128	204	311

Fig 4.4 Tightening torques cheese head screws 1

THREADS	M18	M20	M24	M27	M30	M33	M36
M _A in Nm	437	610	1052	1533	2091	2815	3633

Fig 4. 5 Tightening torques cheese head screws 2

Screw Connections (inch thread)

THREADS	G1/8	G1/4	G3/8	G1/2	G3/4	G1	G1 1/4	G1 1/2
M _A in Nm	15	33	70	90	150	220	500	500

Fig 4.6 Tightening torques screw connections inch thread

Screw Connections (fine thread)

THREADS	M10x1	M12x1.5	M14x1.5	M16x1.5	M18x1.5	M20x1.5	M22x1.5	M26x1.5
M _A in Nm	13	30	40	60	70	90	100	120

Fig 4.7 Tightening torques screw connections fine thread



Installation Manual and User
Instructions for the PowerLatch Tilt
Quick Coupler

ACTUATOR SAFETY

(4.4) SAFETY / MAXIMUM BUCKET WIDTHS

This actuator has been built according to recognised safety standards. Nevertheless, dangers to life and limb of the user or third parties or impairments to the machines and other material assets may arise during the use.

For this reason, this chapter provides information on:

- Intended use.
- Reasonably foreseeable misuses.
- Warning notices used.
- Obligations and qualifications of personnel.
- Avoidance of dangers.
- Please follow the safety instructions in this manual.

INTENDED USE

The rotary actuators always form part of another machine. Commissioning this machine is forbidden until it has been proven, that the machine complies with the safety and health requirements of the Machinery Directive 2006/42/EC.

The rotary actuator may be exclusively used for positioning:

- excavator buckets
- bank mowing devices
- grab buckets
- and for suspension of a driver's cab in loading cranes
- special milling cutters
- trench excavation buckets
- high dump buckets;

The following specifications must be adhered to:

- The actuator must be positioned before excavator operation.
- Using the actuator in explosive areas is forbidden.
- Maintenance work must be adhered to.
- The actuator must be designed for the size of the construction machine.
- Construction machine and attached equipment must be suitable or converted for installation of the actuator.
- Attached equipment that is taken up with the actuator must be matched to the respective size of the construction machines (EC Machinery Directive 2006/42/EC).
- Suitable attached equipment (e.g. load hook) must be available for lifting and transporting loads.
- Mount hydraulic hammers, special milling cutters or similar attached equipment only after consultation with Miller UK Ltd.
- Do not technically modify or intervene with the actuators.
- Further intended uses can be gathered from the operating instructions of the respective quick-change device manufacturers

- For digging work, the attached equipment must be wider than the actuator's attachment periphery to avoid damage to hoses and connections.

Range	P	R	R3	R4 & R5	R6
Bucket width mm	1100	1200	1500	1800	1900

Fig 4.8 Max bucket width

Any use not coordinated with Miller UK shall be considered as not in accordance with the intended use. Solely the operating company shall be responsible for any damages and dangers resulting thereof.

Compliance with these assembly instructions and adherence to the maintenance instructions as well as the environmental conditions is a prerequisite for using the rotary actuator in accordance with the regulations.

4.4.1 REASONABLY FORESEEABLE MISUSE

Reasonably foreseeable misuse of the rotary actuator shall invalidate the manufacturer's warranty obligations and the operating company shall bear the sole responsibility.

Reasonably foreseeable misuses are:

- Using the actuator for transporting persons in attached equipment.
- Using the actuator in explosive areas is forbidden.
- Using the actuator in contaminated areas is forbidden.
- Using the actuator under extreme temperatures (extreme heat or cold) is forbidden.
- Using the actuator to tear down walls with the attached equipment.
- Spraying with high-pressure cleaners or fire extinguishing equipment.
- Neglected wear part changes.
- Non-observed maintenance intervals.
- Neglected maintenance work.
- Incorrectly performed maintenance work.
- Using the actuator as a hammer or knocking device.
- Using the quick-changing device's adaptor hook as load hook.

4.4.2 WARNING NOTICES

Structure of Warning Notices

	SIGNAL WORD
Warning Symbol	Type and source of the danger Result of the danger How to fight off the danger

SIGNAL WORD	DEFINITION
 DANGER!	Designates an immediate threatening danger. Failure to avoid it may result in death or serious injury.
 WARNING!	Designates a potentially dangerous situation. Failure to avoid it may result in death or serious injury.
 CAUTION!	Designates a potentially dangerous situation. Failure to avoid it may result in slight or minor injuries.
NOTE!	Designates a potentially dangerous situation. Failure to avoid it may result in damage to property.

Fig 4.9 Meaning of signal words

Warning Symbols Used

The warning symbol is a graphical representation of the source of danger.



Warning of general dangers

This warning sign precedes activities accompanied by several hazards, possibly with fatal consequences.



Warning of rotating parts

This warning sign precedes activities accompanied by hazards caused by rotating machine parts, possibly with fatal consequences.



Warning of suspended and tilting loads

This warning sign precedes activities accompanied by hazards caused by dropping objects, possibly with fatal consequences.



Warning of danger of crushing

This warning sign precedes activities accompanied by hazards caused by crushing, possibly with fatal consequences.

4.4.3 POSITION ON THE ROTARY ACTUATOR

Warning notices are fitted on the rotary actuator casing. The warning notices on the rotary actuator must always be complete and in an easily legible state. Replace the warning notices if they no longer meet these conditions.



Fig 4.10 Position of warning notices

4.4.4 BASIC SAFETY INSTRUCTIONS

- Carry the manual with you at all times.
- Keep all warning notices on the rotary actuator in an easily legible condition.
- Train your personnel in safety-conscious working with the rotary actuator.
- Do not carry out any modifications, extensions or conversions to the rotary actuator without the written permission of the manufacturer / supplier.
- Outside the Federal Republic of Germany, the regulations for the prevention of accidents and safety regulations of the respective country shall apply.

4.4.5 NOISE EMISSION

The rotary actuator's sound pressure amounts to ≤ 70 dB(A).

4.4.6 QUALIFICATION AND DUTIES OF PERSONNEL

Independent working with the rotary actuator is only permitted to persons who:

- Have reached the age of 18.
- Are physically and mentally suited for this type of work.
- Have been instructed with regard to the general regulations in respect of occupational health and safety and the prevention of accidents.
- Have been trained in first aid and are able to render it.
- Have been trained and instructed in accordance with their responsibilities in handling the rotary actuator.
- Have read and understood the entire assembly instructions – in particular the safety relevant sections.
- Have proven their qualification to operate such equipment to the employer.
- Only carry out training and instruction courses with persons who are qualified and experienced in this regard.

Personnel must pay attention that:

- Only personnel who have been assigned this task work with the rotary actuator.
- The rotary actuator is only operated in a fully functional and safe condition.
- The rotary actuator is immediately stopped in case of defects and is only started up again after a fully completed repair.
- Repairs have been arranged with the manufacturer.
- Warning notes are complete and legible.

4.4.7 SAFETY INSTRUCTIONS FOR OPERATION

- Only use the rotary actuator in a safe and fully functional condition.
- The rotary actuator must be immediately stopped in case of defects and the defects must be eliminated.
- Refrain from any inappropriate use or use that is of questionable safety.
- It is forbidden for persons to stay within the danger area of the rotary actuator. Exceptions are possible if they cannot be avoided for operational reasons and the employer has on an individual basis defined adequate protective measures based on a concrete hazard assessment.
- In case of danger for persons, the machine operator must give noticeable warning signs.
- Wear tight-fitting clothing.

- Immediately stop operation in case of changes and report these to the safety representative or supervisor.
- Remove ties, scarves, rings or chains which could cause you to get caught on moving parts.
- Tie up long hair.
- Wear the required protective clothing.

4.4.8 SAFETY INSTRUCTIONS REGARDING THE INSTALLATION / REPAIR

- Installation and repair work may only be carried out by qualified personnel trained by HKS Dreh-Antriebe GmbH®.
- Switch off the machine prior to any installation and repair work and reliably secure it against unauthorized and unintentional restart as well as against unintentional movement.
- Fasten larger assemblies on hoisting gear and diligently secure them.
- Always tighten unscrewed screw connections according to manufacturer's specifications.
- Reinstall dismantled safety equipment immediately after completion of work and check its proper functioning.
- Only release the machine for operation once operational safety has been completely restored.
- When handling oils, greases and other chemical substances, observe the safety data sheets applicable for the product as well as the regulations for the protection of the environment. Dispose of operating fluids in a professional manner.

4.4.9 SAFETY INSTRUCTIONS IN RESPECT OF THE HYDRAULIC SYSTEM

- Pay attention that no dirt penetrates the hydraulic system. In particular the connections must be free of dirt at all times.
- Work on the hydraulic system may only be carried out by trained qualified personnel.
- Regularly check all lines, hoses and screw connections for leaks and damages.
- Hydraulic fluid escaping under high pressure causes an injury, explosion and fire hazard. Therefore immediately eliminate any damages.
- Regularly replace hydraulic hoses in accordance with the valid regulations.
- Lay and install hydraulic lines in a professional manner (no crushing points / kinks, no tension).
- Fittings as well as length and quality of the hose lines must meet the requirements.
- Do not swap any connections.
- Switch off the machine prior to any repair work and secure it against unintentional re-start.
- Depressurize the hydraulic system prior to any repair work.
- Vent the hydraulic system after a repair or a transfer.
- Prevent oil from penetrating into the soil.

(4.5) TRANSPORT/STORAGE/ COMMISSIONING

The HKS actuator may only be commissioned by persons who are qualified in this regard (described in Section 4.4 - Safety) and who follow the instructions in these assembly instructions.

4.5.2 CONNECTING HYDRAULIC HOSES

Requirements

- Machine has been prepared for installation of the PowerLatch Tilt Coupler
- All required hydraulic hoses are available.
- All hydraulic connections have been cleaned.
- A constant supply of oil from the main hydraulic system is guaranteed.

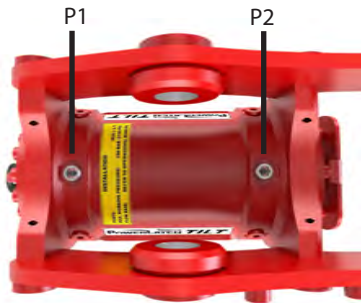


Fig 4.11 Hydraulic connections HKS

1. Connect hydraulic hoses.
P1 / P2 (max. 190 bar - 250 bar)
Each connection P1 and P2 can be used individually.
2. Check connections for correct execution.

4.5.3 BLEEDING



Fig 4.12 Bleeding HKS Actuator

1. Bleeding ports [E1 and E2] used to vent air are located on both sides of the drive. The bleeding ports

can also be used as connection ports [P1 and P2]. Bring the HKS Rotary actuator into optimum position so that they are facing up. When in a different mounting position, please consult factory. Miniature connections can be purchased for the ventilation of HKS.

- Remove all load from the drive (remove the attachment, etc.).
- Then align the drive so that the vent holes [E1 and E2] are up.
- Rotate the actuator to an end position.
- Depressurise the system (Note: otherwise there is danger of accident!).
- Turn the bleeding screws [E1 and E2] out max. one complete turn (caution risk of accident).
- Then apply pressure to the actuator on the port P1/P2 (attention: max 8 bar otherwise danger of accident) that was used to bring it to the respective end position.
- The bleeding screws [E1 and E2] should now be leaking air or frothy oil. Continue operation until the leaking oil is free of air. Then tighten the bleeding screws [E1 and E2].
- Repeat for other direction and bleeding screws.
- Several repetitions of the process may be required.

4.5.4 PIVOTING TIMES BV ACTUATOR

It is recommended to set the pivoting speed by means of orifice plates in the hydraulic lines (described in 2.7. Recommended power densities for the HKS Actuator).

HYDRAULIC REQUIREMENTS AND PIPE CONNECTIONS

Please refer to the following table for recommended hose and pipe sizes.



DANGER!

Hazards caused by hydraulic fluids. Hydraulically actuated parts may move unexpectedly.

If individual components are damaged, hydraulic fluid may escape under high pressure and sever parts of the body.

- Depressurise the actuator before the start of work
- Never touch the fluid jet
- Avoid skin contact

(4.6) RECOMMENDED HOSE ROUTING

Depending on the installation of the hoses, it will be necessary to sheath the hoses with a splashing and chafing protection. When laying the hoses, a sufficient hose radius must be observed (hose manufacturer).

If new hydraulic hoses are laid, these must be rinsed with hydraulic oil.

(4.7) ACTUATOR OPERATION

The rotary actuator may only be operated by persons who are qualified in this regard (described in Actuator Safety section page 30) and who follow the instructions in this manual.



 **CAUTION!**

Danger of bruising for fingers.
Do not stay in the danger area during operation.



 **DANGER!**

Danger of crushing due to moving machine parts.
Do not stay in the danger area during operation.

NOTE!

Damage to the rotary actuator during installation.

Only pick up the rotary actuator when it is locked and always pay attention to the following prior to installation:

Clean and angular contact surfaces.

4.7.1 CONTINUOUS OPERATION

The load values specified on the installation drawing are effective values which may not be exceeded. In case of multi-shift operation, fast cycle times and very high continuous loads, we recommend to take into account a safety factor of 70% of the maximum permissible torque.

4.7.2 FAILURES

In the following, possible failures and their elimination are described. In case of failures not listed in the following table, please consult us directly. The fault table contains a remark as to who may eliminate faults. Work on the electrical system may only be carried out by trained electricians.

 **DANGER!**

Hazards caused by hydraulic fluids.
Hydraulically actuated parts may move unexpectedly.

If individual components are damaged, hydraulic fluid may escape under high pressure and sever parts of the body.

- Depressurise the rotary actuator before the start of work
- Never touch the fluid jet
- Avoid skin contact

4.7.3 CONDUCT IN CASE OF FAULTS

1. Execute emergency stop function
2. Switch off machine and secure against restart
3. Determine reason for the fault
4. Immediately inform the responsible person at the place of use
5. Eliminate fault

(4.8) FAULT TABLE

WHAT IS THE PROBLEM?	WHAT COULD BE THE REACTION?	WHAT NEEDS TO BE DONE?	WHO CARRIES OUT THE ACTIVITY?
Unit does not pivot	Hydraulic system not correctly connected	Check connection	Operator
	Defective hydraulic lines	Check hydraulic lines and replace if necessary	Qualified person
	Unit no function	Forward actuator to the manufacturer	Manufacturer
	Unit / contact surface deformed	Forward actuator to the manufacturer	Manufacturer
Unit is leaking	Seals defective	Replace seals	Manufacturer
	Connections not correctly tightened	Check connections and possibly tighten	Qualified person
Unit does not retain the activated position	Excessive contact force of the loader	Do not expose actuator to excessive contact forces	Operator
	Seals defective	Replace seals	Qualified person
Unit pivoting operations are imprecise	There is air in the hydraulic system	Vent	Qualified person
Unit moves to the side	Due to mechanic and hydraulic angular play, a lateral movement is normal	The normal angular play ranges between 1° and 1.5°. If the angular play is larger, the actuator must be returned to the manufacturer	Qualified person Manufacturer

Fig 4.13 Fault Table

WHAT IS THE PROBLEM?	WHAT COULD BE THE REACTION?	WHAT NEEDS TO BE DONE?	WHO CARRIES OUT THE ACTIVITY?
Unit is smouldering	Actuator is too hot Actuator is being turned too fast	Reduce speed and cool down actuator	Operator
	Steam in case of rain or moisture	No action necessary	
	Defective hydraulics line	Check hydraulic lines and replace if necessary	Qualified person

4.8.1 REPAIR & MAINTENANCE

The rotary actuator may only be serviced by persons who are qualified in this regard (described in Section 3 - Safety) and who follow the instructions in these assembly instructions.

Repair work not described in this chapter must be carried out on site at our premises or at one of our service branches.

We do not assume any liability for damage and loss of profits caused by inadequate re-pair.

Only use original spare parts for any maintenance work. We shall not assume any liability for damages caused by the use of non-original spare parts.

Collect exchanged hydraulic fluid in suitable containers and dispose of in accordance with the valid local regulations.



Hazards caused by hydraulic fluids. Hydraulically actuated parts may move unexpectedly.

If individual components are damaged, hydraulic fluid may escape under high pressure and sever parts of the body.

- Depressurize the rotary actuator before the start of work
- Never touch the fluid jet
- Avoid skin contact

4.8.2 AUXILIARY TOOLS

The calibrating sleeve must be manufactured at our factory according to the seal diameter.

All auxiliary tools are available from Miller.

Matching calibrating sleeve
for piston seal change



Seal Lifter



Fabric tape to mount system seal



2 hexagon socket head
cap screws per actuator



Assembly lever



Steel hammer 500g



Hexagon socket wrench
kit 3-34mm



Torque wrench kit 0-400Nm



Extractors (pull pins)



Grease gun



Plastic hammer



Carry out the following steps after completion of repair work:

- Check all loosened screw, bolt and cotter-pin connections for tight seat.
- Correctly reinstall all removed protective devices and covers.
- Remove all tools, materials and other equipment used from the working area.
- Clean working area and remove any possibly leaked substances, such as liquids, processing materials or similar.
- Ensure that all safety devices are functioning correctly.

(4.9) SECTIONAL DRAWING (FIGURE SIMILAR)

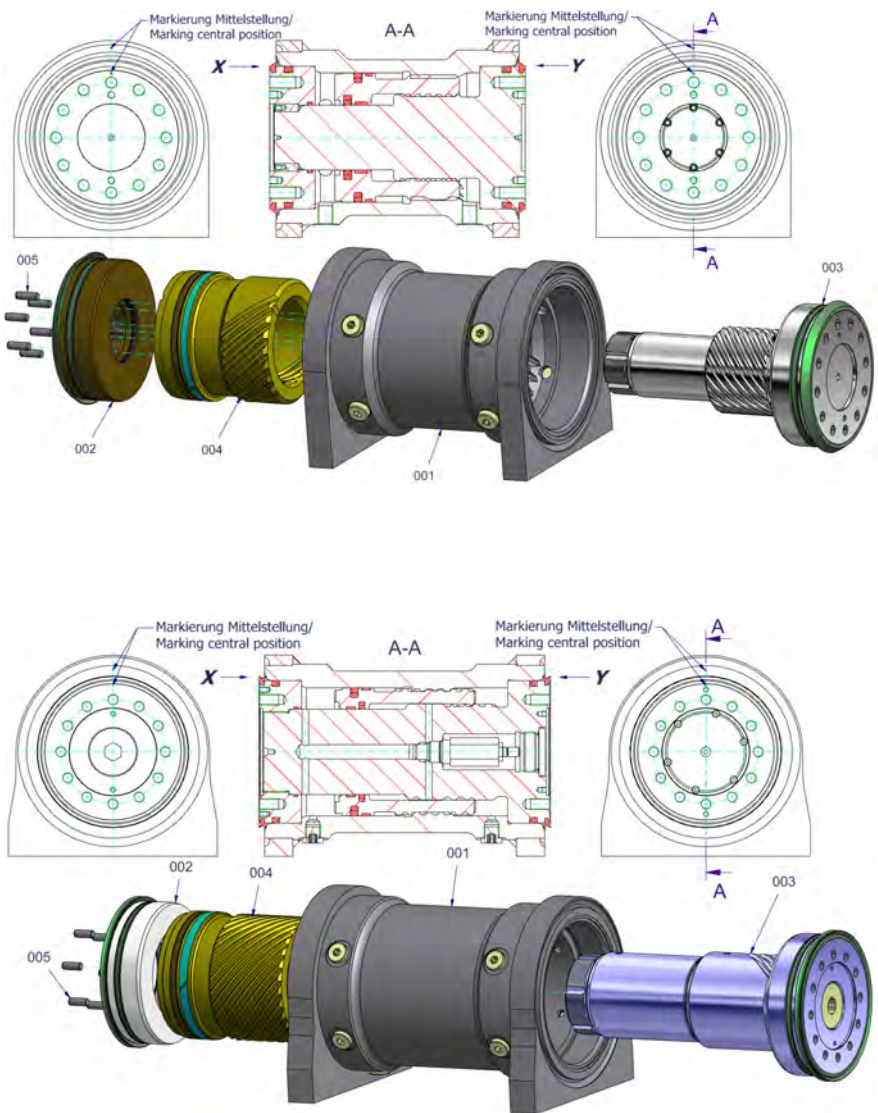


Fig 4.14 Sectional Drawing

(4.10) MAINTENANCE

The rotary actuator is maintenance-free. However, it is recommended to replace the wiper rings every 1800 operating hours to increase the service life.

The following must be observed when cleaning the rotary actuator:

- High pressure could press dirt into the rotary actuator and cause damage.
- Do not use any high-pressure cleaners or steam jets for cleaning.

REPLACING THE WIPER RINGS

Requirements

- Rotary actuator is dismantled from the machine
- Rotary actuator is dismantled and depressurised
- Rotary actuator is in a stable horizontal position
- Rotary actuator is secured against tilting and shifting

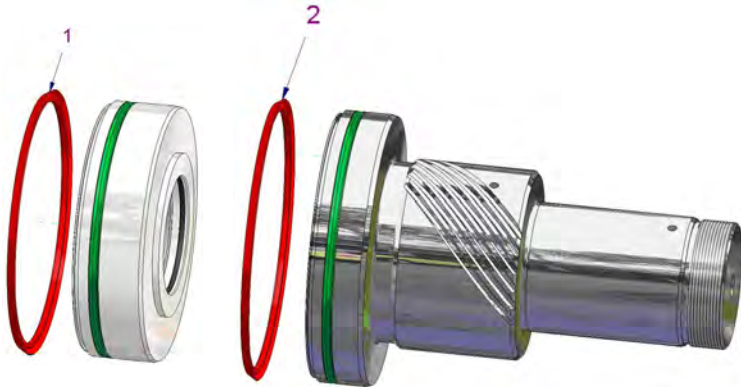


Fig 4.15 Replacing the wiper rings

1. Remove seals [1 and 2] from sealing grooves using a seal lifter.
2. Clean sealing grooves.
3. Completely grease all sealing grooves and seals [1 and 2] with acid-free grease.
4. Push seals [1 and 2] into sealing grooves.

4.10.1 REPAIR WORK

All installation work is carried out in reverse order of the dismantling work. For installation, structural units must be pre-assembled.

(4.11) DISMANTLING THE ACTUATOR



! DANGER!

Dropping machines or machine parts may cause serious injuries or even be fatal.

Secure the rotary actuator with retaining straps and crane.

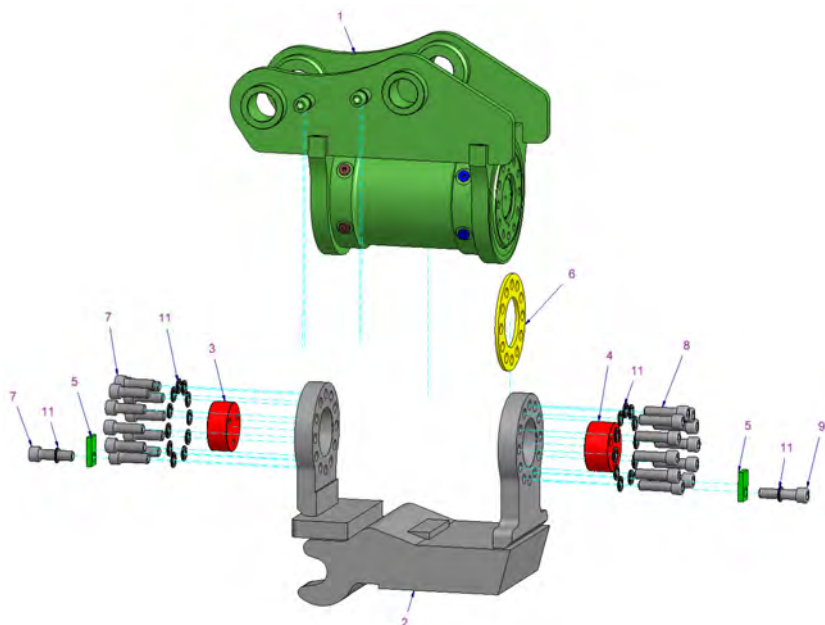


Fig 4.16 Dismantling the actuator unit

Dismantling the rotary actuator from the machine.

1. Slightly raise the rotary actuator [1] on the casing with the aid of a crane
2. Release and undo the fastening screws
3. Pull the rotary actuator [1] off the machine

(4.12) REPLACING THE SEALS

Seals may only be replaced by personnel trained by HKS Dreh-Antriebe GmbH®. The unit can only be operated in the position in which it is mounted. During installation, pay attention to the markings of the gear teeth.

Therefore conscientiously carry out the assembly, as otherwise you have to forward the actuator to our factory for assembly.

In addition, observe the following general information:

- Only dismantle the BV in a horizontal position.
- Seals must be removed with seal lifters. The sealing surfaces may not be damaged in the process.
- After dismantling, clean all parts with compressed air and degrease.
- Before installation, slightly grease sliding parts and threads.
- Seals may not be damaged during installation.
- The open side of the seal must point in direction of the pressure face.
- Tighten all cheese head screws crosswise at first only hand-tight, then tighten completely crosswise according to the tightening torques in fig 4.7 (pg 28).

Dismantling Unit - Requirements

- Rotary actuator is dismantled from the machine
- Rotary actuator is dismantled and depressurized
- Rotary actuator is in a stable horizontal position
- Rotary actuator is secured against tilting and shifting

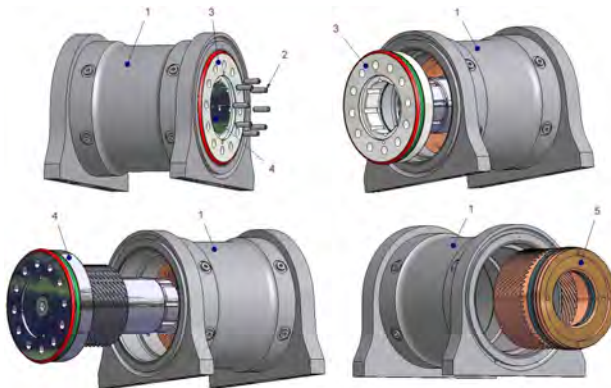


Fig 4.17 HKS Dismantling Steps

(4.13) SPARE PARTS

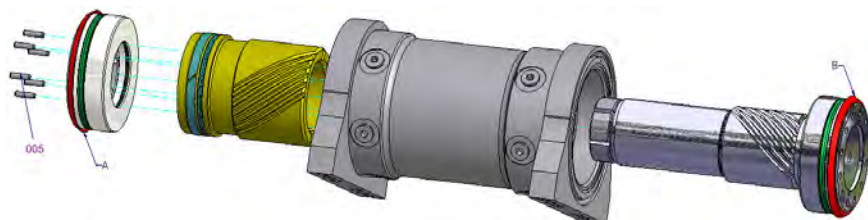


Fig 4.18 Spare Parts BV

POS	DESIGNATION	ITEM NUMBER
005	Cylinder pin	On Request
	Seal ring	
	Piston	
	Casting	
	Shaft	
A	Wiper ring seal ring	On Request
B	Wiper ring shaft	On Request
	Seal kit	On Request

Fig 4.21 Spare Parts Actuator

Spare part numbers must be queried at HKS Dreh-Antriebe GmbH*.

(4.14) CERTIFICATES



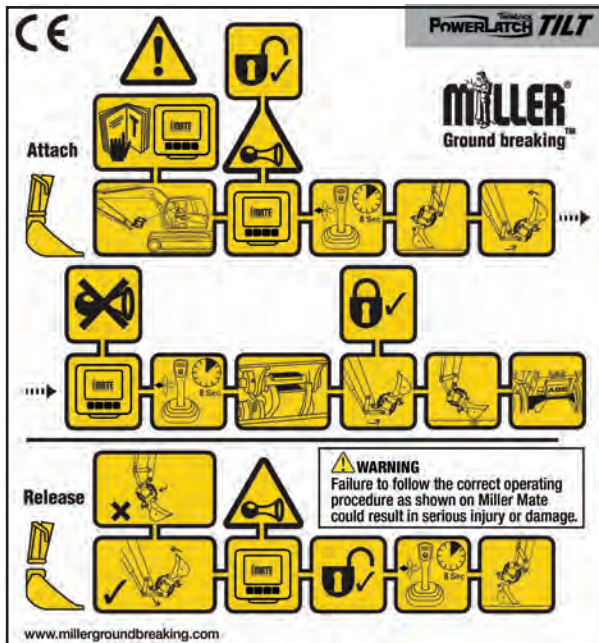
Fig 4.19 HKS ISO Certificates



Installation Manual and User Instructions for the PowerLatch Tilt Quick Coupler

OPERATION

FOR YOUR SAFETY: The Miller PowerLatch Tilt has an innovative locking mechanism. Please familiarise yourself with the following section before operating the PowerLatch.



Machine operators **MUST** be fully trained and familiar with the correct operating procedure for this particular coupler before attempting to operate the machine.

(5.0) POWERLATCH TILT COUPLER OPERATION - TO ATTACH

⚠ WARNING - Never place your hands inside the coupler, or attempt to make adjustments or repairs while the hydraulic system is pressurised. Never switch to the **release** or **off** position while the coupler is in use. Never use the front or back of the hydraulic hook/jaw as a lifting device.

⚠ WARNING - The operator should be competent and fully trained on the correct use of the coupler before operation.

⚠ WARNING - Place the coupler decal in the machine cab where it can be seen clearly. Replace unreadable ones with new ones before operating the machine.

⚠ WARNING - The operator must ensure that all steps of the PowerLatch Tilt coupler operation attach/release procedure, found on Miller Mate and also on the in-cab decal, are followed in the correct order. Failure to do so may result in the bucket or attachment being inadvertently released due to incorrect operation.

⚠ WARNING - Buckets/attachments must **NEVER** be lifted or moved without **BOTH** bucket/attachment pins being **FULLY ENGAGED**. Failure to do so could result in serious injury or fatality.

Step 1



fig 5.0

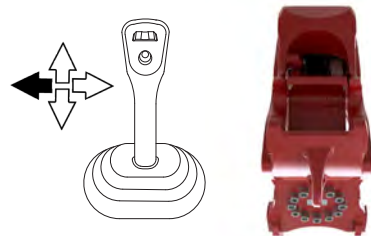


fig 5.1

Place coupler in the curled/crowded position. Turn switch to **release** or **off** position (buzzer will sound) hold the bucket crowd lever for approx. 5-10 seconds to allow the hook to fully retract. Visually inspect to check the hook is fully retracted (fig 5.0 & 5.1).

Step 2



fig 5.2

Ensure the hook and ABS are fully retracted before attempting to engage the bucket/attachment. Place the coupler above the bucket /attachment.

Step 3



fig 5.3

Curl the coupler to engage the bucket pins.

Step 4



fig 5.4

Step 5

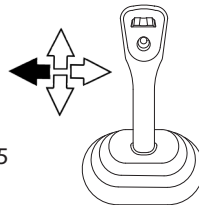


fig 5.5

Fully curl/crowd the bucket. Switch to the **attach** or **on** position, the buzzer will cease. Hold the bucket crowd lever for approx. 5-10 seconds to allow the hook to fully engage and clamp the bucket pin (fig 5.5).

Below figure 5.6 shows the hook fully engaged and clamping the bucket pin.

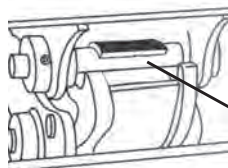


fig 5.6



DANGER - If the bucket/attachment pins have not been correctly engaged the hook **MUST NOT** be retracted. This could force the bucket/attachment to be unintentionally released from the coupler and could result in machine damage or personal injury. Please refer to step 9 of this section for remedial action.

Step 6

fig 5.7

Visually inspect and check that the hook is engaged.

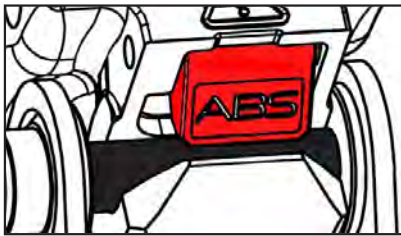
Step 7

fig 5.8

Check that the ABS is visible.

Step 8

fig 5.9

To ensure that the bucket/attachment pins are securely held by the coupler, apply pressure to the bucket/attachment by rotating it against the ground and away from the machine before operating. This is often referred to as a 'Bump Test'.

Step 9

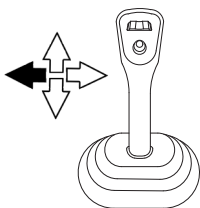
If the hook is correctly engaged then the coupler is ready for operation. If it is not correctly engaged then place the bucket/attachment on the ground and release the bucket/attachment then repeat steps 1 – 8.

(5.1) POWERLATCH TILT COUPLER OPERATION - TO RELEASE

Step 1



fig 5.10



Place attachment and dipper arm in a fully crowded/curled position. Switch the coupler operating switch to the **release** or **off** position, the buzzer will sound. Hold the bucket crowd lever for approx. 5-10 seconds to allow the hook to fully retract (fig 5.11).

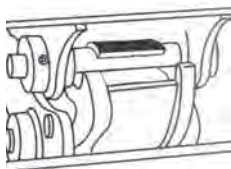


fig 5.11



WARNING - Do not try to release or change the attachment near any persons or in any area that may result in an accident or injury occurring. The switch should be in the **attach** or **on** position at all times, except during bucket/attachment changeover.

Step 2



fig 5.12

Slowly roll out the bucket until the teeth are horizontal. Lower the boom until the bucket is on the ground.

Step 3



fig 5.13

Once the attachment is on the ground, continue to curl out the coupler.

Step 4



fig 5.14

Lift the coupler clear of the attachment. The coupler is now safely disengaged.

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(5.3) COUPLER OPERATION - TROUBLE SHOOTER

PowerLatch Tilt

If the coupler will not release the bucket/attachment then the movement of the ABS should be checked to ensure that the lever is not jammed with debris.

To rectify, switch the coupler operating switch to the attach or on position. Switch the machine off before checking that the ABS and lever are free from debris.

Then repeat steps 1 – 4 of the release process.

Do not try to force the bucket off, as this may cause damage to the internal parts.

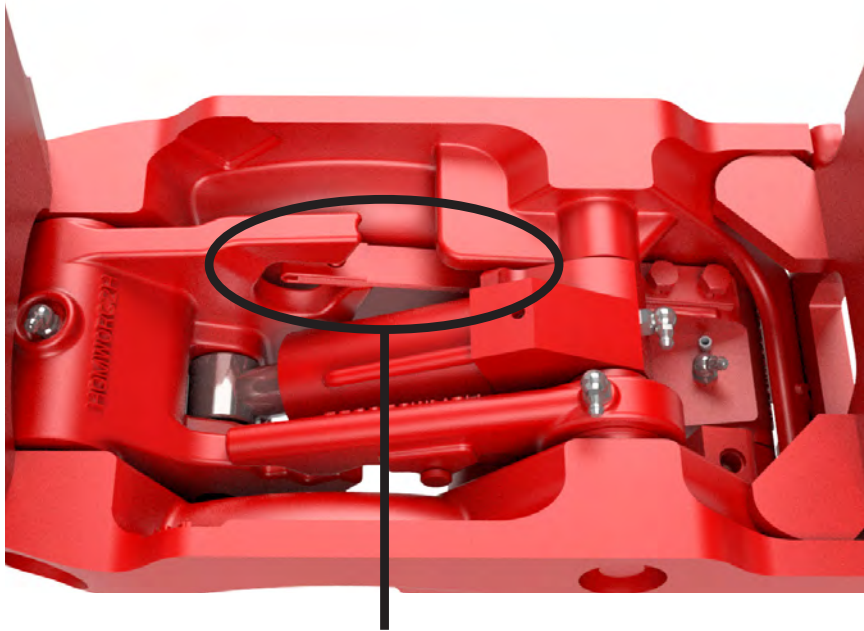


fig 5.15

The correct position of the ABS lever

(5.4) LIFTING WITH THE POWERLATCH TILT COUPLER



WARNING – Lifting Always use the correctly rated shackle and lifting equipment. Refer to the coupler data plate to ascertain product weight. Never use worn, damaged or undersized lifting equipment.

The coupler has an integral and certified lifting eye, the Safe Working Load of which can be found stamped into the coupler frame (on lifting eye). Do not lift over the SWL limit of the coupler. The lifting capability of the machine should also be checked prior to lifting. Lift with the coupler in a vertical position.

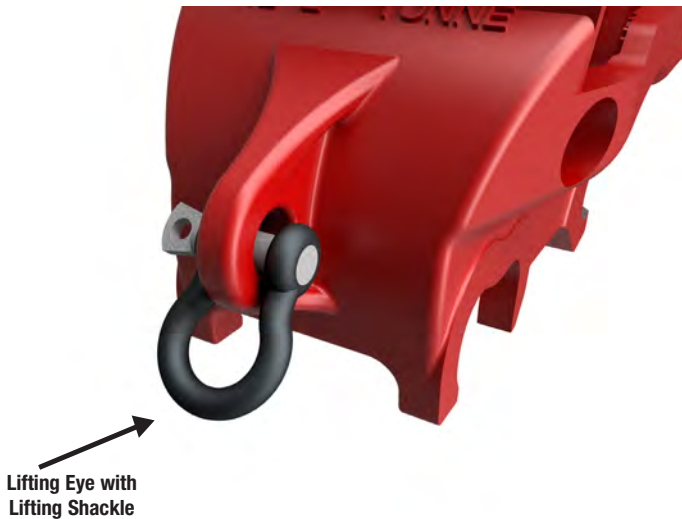


fig 5.16

(5.5) USING DEMOLITION ATTACHMENTS & WORK TOOLS

Miller Couplers are able to work with various attachments, and work tools, depending on pin spread and weight.



CAUTION - Do not use any tool that is not in the correct tonnage class i.e. that is larger than that specified by the machine manufacturers. When operating a breaker you must always use it in the vertical position when ever possible. Never use the breaker as a lever. If using other attachments, the same procedure applies.



WARNING - If the coupler is fitted with a hydraulic breaker it should not be used for long periods without a periodic inspection of all working parts. If the hydraulic breaker has to be used continuously for long periods of time Miller recommend the coupler should be removed and the breaker mounted directly to the machine, as it has not been designed to work with prolonged excessive vibration.

(5.6) INCORRECT COUPLER USE

The following information highlights some of the operating bad practices that occur in the field. This is not fully exhaustive, for illustration purposes only. **Miller strongly advises against these practices and recommends that the coupler should only be used as per the operating instructions.**

INCORRECT USE OF COUPLER TO PICK UP AND MOVE ATTACHMENTS



1. Moving attachments by front pin only



2. Using hook only to lift attachments



3. Picking up items before the hook is retracted



4. Nipping or jamming the rear pin with the hook

USING THE JAW AS A LIFTING TOOL OR HAMMER



1. Moving items held in the jaw

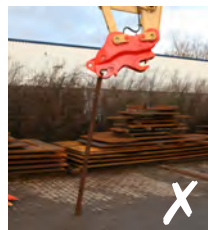


2. Using jaw or hook to hammer products into the ground

USING THE HOOK TO LIFT AND MANOEUVRE ITEM



1. Moving items using the hook



2. Positioning items gripped with hook

INCORRECT USE OF COUPLER TO PICK UP PRODUCTS USING CHAINS OR SLINGS



1. Using the jaw to pick up items with chains.



2. Using the corner of the jaw to pick up items with chains.



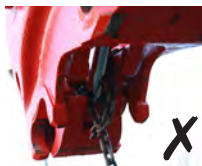
3. Using the hook to pick up items with chains.



4. Using the coupler body to pick up items with chains.



5. Using the dipper arm to pick up items with chains.

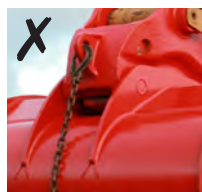


6. Using the cylinder to pick up items with chains.

INCORRECT USE OF THE LIFTING EYE



1. When the bucket is still attached it is not possible to see the shackle and what is happening to the chain



2. Close up of the above.

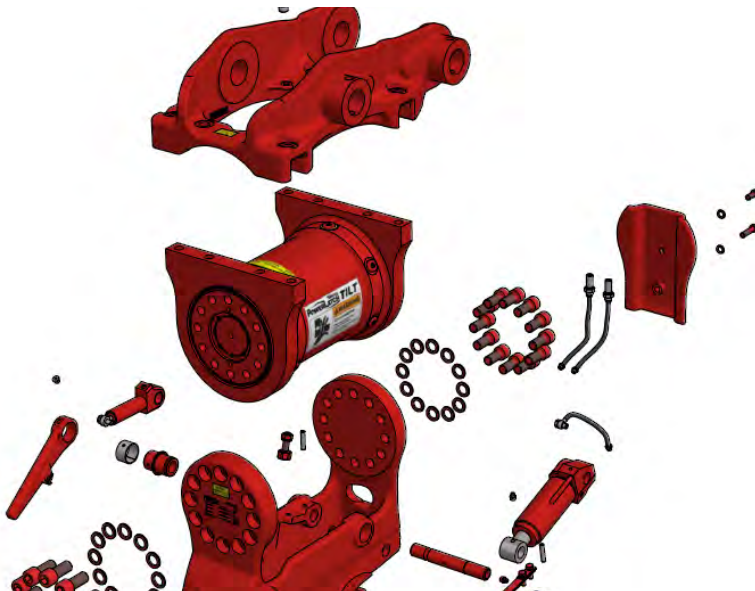


Installation Manual and User Instructions for PowerLatch Tilt Quick Couplers

MAINTENANCE

Be safe, not sorry

Ensure that the correct maintenance checks are carried out to prevent potentially huge financial costs and endangering the lives of those onsite.



(6.0) POWERLATCH GENERAL MAINTENANCE



WARNING - Maintenance Work

Maintenance work must only be done by competent personnel or ask Miller to assist.



DANGER - Hydraulic Fluid

Never use your hands to search for hydraulic fluid leaks, use a piece of paper or cardboard. Escaping fluid under pressure can be invisible and can penetrate the skin and cause serious injury. If affected, see a doctor at once.



WARNING - Coupler Condition

A defective coupler could injure you or others. Do not operate a coupler that is defective.



WARNING - Hose Arrangement

Ensure that the hoses are not too slack and do not come into contact with the lever mechanisms as this will prevent the safe operation of the blocking bar.

Maintenance and Service

To ensure that your quick coupler works safely and to maximum efficiency it is imperative that it is properly maintained in accordance with the following service guidelines.

Replacement Parts

We recommend that you fit genuine replacement parts. You will need to quote the **coupler serial number** stamped on the coupler data plate (fig 2.4).

(6.1) THOROUGH EXAMINATION AND TEST

Where an excavator/backhoe is regarded as lifting equipment, it requires thorough examination by a competent person at least every 12 months*. (See LOLER Regulation 9).

Front end loaders, not modified or adapted for lifting operations, do not require thorough examination under LOLER, but still require regular inspection under PUWER which will be to a similar standard. If the loader is used for object handling it will require thorough examination under LOLER at least every 12 months.

A report of a thorough examination of lifting equipment is not required where the employer has an EC Declaration of Conformity dated within the last 12 months.

Where a quick hitch is permanently mounted on an excavator then the thorough examination for the excavator will also cover the quick hitch. If the quick hitch is moved from one machine to the other it is classed as an accessory and should be thoroughly examined every 6 months.

Slings, loose hooks, chain slings, polyester slings, shackles etc are classed as lifting accessories and must be thoroughly examined every 6 months.

Buckets with integrated hooks/lifting eyes are also classed as lifting accessories and should be thoroughly examined every 6 months.

*In the absence of a written examination scheme drawn up by a competent person.

(6.2) POWERLATCH TILT DAILY SAFETY CHECKS

1. Thoroughly clean the coupler.
2. Check the coupler for cracked, bent or broken components, distressed welds, missing parts and oil leaks. Replace broken parts if required.
3. Check that the hook notch area (back of hook) is free from dirt or debris.
4. Check the security of the mounting pins, locking bolts and nuts.
5. Check the condition of the hydraulic hoses, fittings and hydraulic system generally. Replace any that are damaged.
6. Check the condition of the internal lever for defects and that the bolts are tight.
Do not operate the coupler if broken and replace any broken or damaged parts immediately. Once the cover is worn through, the lever must be replaced.
7. Open and close the ram to check that it is working correctly.
8. Check that the switch/buzzer is working.

(6.3) POWERLATCH TILT WEEKLY SAFETY CHECKS

It is recommended that the following procedures are carried out at least once per week.

1. Ensure daily checks have been carried out.
2. Lubrication points - Ensure that all grease points are greased regularly (at least once a week minimum). If damaged, replace and grease. It is important to follow the lubrication instructions in sequence i to viii so that none of the grease nipples are overlooked.
 - i. Release the bucket/attachment.
(Refer to the operation instructions- page 52).
 - ii. Retract the coupler cylinder. Switch off the engine.
 - iii. Apply grease, via grease nipple **D & E** to the cylinder.

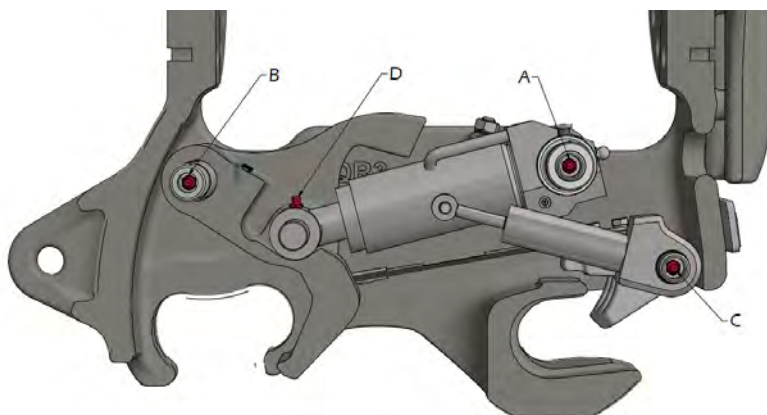


fig 6.0

- iv. Apply grease via nipple **B** to the hook.
 - v. Start the engine. Extend the bucket cylinder in order to position the coupler so the cylinder grease nipples are accessible.
Switch off the engine.
 - vii. Grease the ABS via nipple **C**.
 - viii. Grease the blocking bar via nipple **A**.
3. Check coupler frame for signs of wear (see page 71 for example).

(6.4) TORQUE SPECIFICATIONS

The torque specifications are as follows:

Securing bolts for lever (PowerLatch)	30lb.ft	40Nm (Fit Thread locking adhesive)
Check valve	30lb.ft	40Nm
B hose connection male (cylinder hose)	15lb.ft	20Nm
A hose connection male (cylinder hose)	26lb.ft	35Nm
Pressure hose connection female	20lb.ft	27Nm
Tank return hose connection female	55lb.ft	75Nm
Weld on block	20lb.ft	27Nm
Solenoid Valve		
A Line filter fitting ¼ BSP M/M Adapter	25lb.ft	34Nm
B Line filter fitting 7/16 JIC x 7/16 UNF	15lb.ft	20Nm
P Line 9/16 JIC x 9/16 UNF	26lb.ft	35Nm
T Line 3/8 BSP M/M Adapter	55lb.ft	75Nm
Spool Valve	40.6lb.ft	54.2Nm
Check Valve	33.8lb.ft	40.6Nm
Electro-magnetic lock nut	5.4lb.ft	8.1Nm
Plug	9.3lb.ft	13Nm

(6.5) TROUBLE SHOOTER GUIDE



DANGER - Hydraulic Fluid

Never use your hands to search for hydraulic fluid leaks, use a piece of paper or cardboard. Escaping fluid under pressure can be invisible and can penetrate the skin and cause serious injury. If affected, see a doctor at once.



WARNING - Ensure the bucket attachment or work tool is placed on the ground before carrying out any of the following activities.



WARNING - Always vent the hydraulic tank before working on the coupler.



WARNING - Ensure that all personnel are clear of the coupler before carrying out any of the checks.

If the coupler begins to work erratically or fails to work, check the following:

GENERAL - Check:

1. Snapped, bent or lost pins.
2. Hydraulic leaks.
3. Hose leaks, wear or damage to hoses.
4. Damaged or bent cylinder.
5. Loose or broken nuts and bolts.

ELECTRICAL - Check:

1. The in line fuse to the cab switch has not blown.
2. The magnetic coil on the solenoid valve has not become loose or burnt out through vibration.
3. That no electrical wires are broken.
4. That the switch and/or buzzer is not broken.
5. That the voltage to the magnetic coil is correct (24 volts main line feed, to a 24 volt system).
6. Electrical wiring. (fig 3.11, page 20).

HYDRAULIC - Check:



WARNING - Always remove the electrical supply to the switch before commencing work on the hydraulics (Remove machine key and disconnect battery). Contamination - The most common cause of coupler failure is contaminated hydraulic oil (dirty oil or rubber hose particles in the system, caused by incorrect installation of hose lines). If this occurs, the coupler may work slowly, release/attach erratically, or lock **on** or **off**. In this situation the following procedure needs to be applied:

1. Check the solenoid valve block assembly for contamination as follows:
 - i. Switch off the machine and operate the controls to vent residual pressure in the hydraulic system.
 - ii. Vent pressure from the hydraulic tank by releasing the hydraulic tank filler cap.
 - iii. Remove the solenoid valve and dismantle and inspect it for blockages or damaged seals.
 - iv. Clean and replace all seals if necessary.
 - v. Clean or change filter fittings.
 - vi. Re-assemble solenoid unit and install to the machine. If in doubt, change solenoid valve unit.
2. Re-connect up all hydraulic hoses to correct ports as detailed in the installation procedure. Ensure the pressure feed hose connects to the port marked **P** and the tank return hose connects to the port marked **T** (fig 3.11, page 20).
3. Check that the coupler hydraulic cylinder has not 'locked on' due to contamination as follows:
 - i. switching the coupler to the release position and disengage the machine hydraulics.
 - ii. When the cylinder is fully retracted, switch off the machine and operate the controls to vent residual pressure in the hydraulic system.



WARNING - Care must be taken whilst unscrewing the check valve as there may be some residual pressure in the hydraulic cylinder. Unscrew the valve slowly to allow any trapped pressure to escape.

- iii. Slowly unscrew the check valve in the hydraulic cylinder.
- iv. Inspect the check valve, clean or replace the O-ring seals.
- v. Clean all cavities including the cylinder
- vi. Reassemble the check valve into the cylinder.
- vii. If there is any damage to the cylinder replace the complete unit including the check valve.

OPERATION - Check: If the coupler is switched to the **attach** or **on** position but the bucket can be powered off, then the cylinder or the cylinder check valve is losing hydraulic pressure and may need re-sealing or replacing. To check for loss of pressure, place the bucket on the ground and attempt to move the coupler on the bucket. If the coupler does not hold firmly, this means the coupler is losing hydraulic pressure due to a failed cylinder or check valve.



WARNING Do not operate the coupler in this condition. Have repairs carried out immediately.

(6.6) POWERLATCH TILT COUPLER COMPONENTS LIST

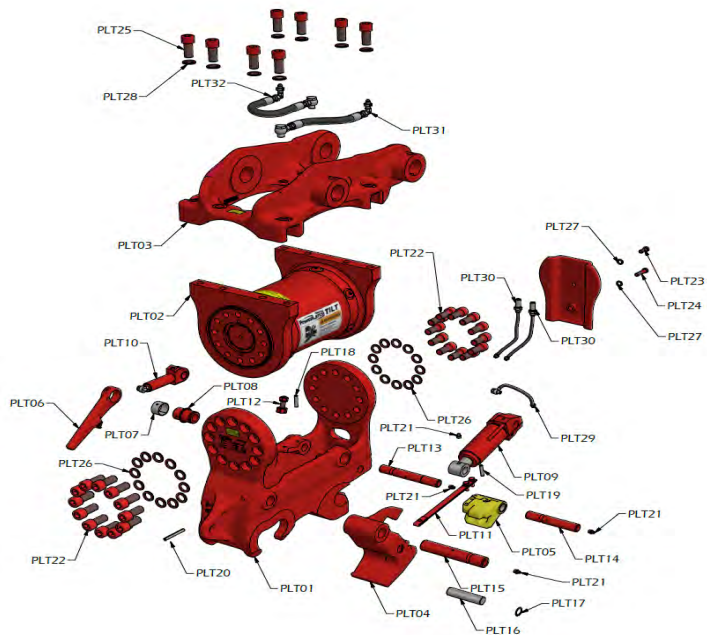


fig 6.1
PowerLatch Tilt Coupler Components

PowerLatch Coupler Parts Reference Guide

PLT1	Cylinder	PLT17	Circlip (Cylinder pin) x2
PLT2	Hook	PLT18	Circlip (Blocking Bar Pivot)
PLT3	Cylinder pin	PLT19	ABS Pin Bush x2
PLT4	Roll Pin	PLT20	Nord-Lock Washers
PLT5	Hook Pin	PLT21	Locating Pin
PLT6	Cylinder Hook Pin	PLT22a	Socket Head Bolts (arms)
PLT7	Cast ABS	PLT22b	Socket Head Bolts (actuator)
PLT8	ABS Lever	PLT22c	Socket Head Bolts (short)
PLT9	Grease Nipple (45°/90°/Straight)	PLT23	Tilt Coupler Hoses
PLT10	ABS Pin	PLT24	Rotary Actuator
PLT11	Blocking Bar Cylinder	PLT25	Arms
PLT12	Blocking Bar bush	PLT26	Front Cover
PLT13	Blocking Bar	PLT27	Circlip (Cylinder Hook pin)
PLT14	Blocking Bar Pivot Boss	PLT28	Manifold Block
PLT16	Circlip (Hook Pin)	PLT29	Manifold Hose

Miller reserves the right to amend detail or specification without prior notification

(6.7) POWERLATCH TILT ABS UNIT AND LEVER REMOVAL AND REPLACEMENT

WARNING - Manual Handling Take care when manually handling coupler & components, bucket and installation pins. Refer to the table section 2.2 page 7 to ascertain product weight.

Removal

1. Uncouple the bucket/attachment/work tool from the coupler.
(Refer to the Operation - page 52).
2. Open the hook by moving the coupler switch to the unlock/off position.
3. Remove the coupler from the machine. (Refer to Coupler Removal - Section 3.3, page 19).
4. Remove the HKS Actuator. (Refer to page 44)
5. Refer to Coupler Component lists on page 66 to identify the parts detailed in the removal procedure below.



fig 6.2



fig 6.3

6. Remove the roll pin securing the ABS unit (**PLT19**).



fig 6.4

7. Remove the ABS pivot pin (**PLT14**).



fig 6.5

8. Remove the ABS unit (**PLT05**).



fig 6.6

9. Remove the ABS lever from the ABS unit (**PLT11**).

Procedure for Replacement

Replacement is the reverse of the removal procedure.



fig 6.7



fig 6.8

When replacing the ABS unit the lever must be **BELOW** the thumb on the back of the hook (**PLT04**). See fig 6.7 for correct position and fig 6.8 for incorrect position.

(6.8) POWERLATCH TILT HYDRAULIC CYLINDER REMOVAL AND REPLACEMENT

WARNING - Please make sure you **do not contaminate** any hydraulic fittings during the replacement procedure



WARNING - Manual Handling Take care when manually handling coupler & components, bucket and installation pins.
Refer to page 11 to ascertain product weight.

Removal

1. Uncouple the bucket/attachment/work tool from the coupler.
(Refer to the Operation - page 52).
2. Lock the hook by moving the coupler switch to the lock/on position.
3. Remove the coupler from the machine. (Refer to Coupler Removal - Section 3.3, page 19).
4. Remove the HKS Actuator. (Refer to page 44).
5. Refer to Coupler Component lists on page 66 to identify the parts detailed in the removal procedure below.
6. Remove hydraulic hoses A + B from the cylinder.

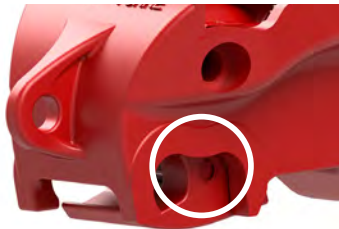


fig 6.9

7. Remove the circlips/roll pin (**PLT17**) from the hook.



fig 6.10

8. Remove the cylinder hook pin (**PLT16**).



fig 6.11

9. Remove the roll pin (**PLT18**) securing the cylinder pin (**PLT13**). Then remove the cylinder pin (**PLT13**).



fig 6.12

9. Remove the hydraulic cylinder (**PLT09**).

Hook and Cylinder Removal

On some couplers the small cylinder pin (**PLT16**) is inaccessible because of the coupler frame. To change this remove the long hook pin (**PLT15**) and lift out the hook and cylinder as one assembly then remove the small cylinder pin.

Procedure for Replacement

Replacement is the reverse of the removal procedure.

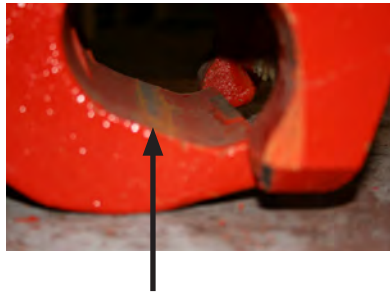
(6.9) INSPECTING THE COUPLER FRAME

It is possible that over time the coupler could become worn or damaged in the horseshoe area of the frame (shown below).



fig 6.13

To determine if the horseshoe area of the coupler is worn to an unacceptable level Miller recommends that you check the contact area on the coupler hook.



Contact Point

fig 6.14

Inspect the coupler hook to see where the bucket pin is coming into contact with the hook. The image above highlights the contact mark on the hook. This is an acceptable area for the bucket pin to come into contact with the hook. Please use the diagram below to establish if the contact point on your hook is in an acceptable location, if the bucket pin comes into contact with the protruding wear indicators this is unacceptable contact.

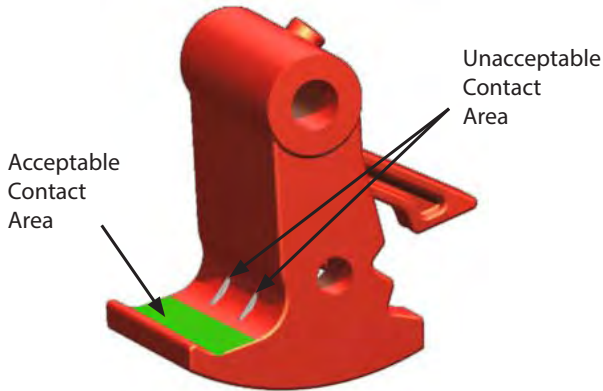


fig 6.15

If the bucket pin is secured by the hook in the unacceptable contact area this is an indication that the horseshoe area of the coupler frame is worn and will need repairing.

(6.10) REPAIRING THE COUPLER FRAME

If the coupler frame becomes worn or damaged in the area shown below (see fig 6.16) then the following procedure must be adopted for repair.

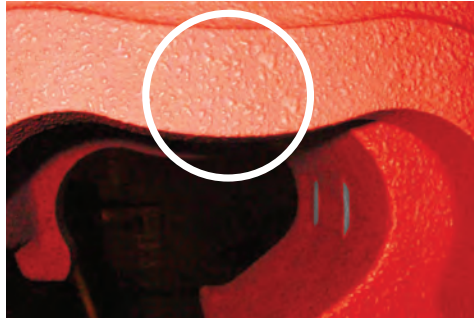


fig 6.16

The maximum wear allowed around this area is 5mm. If the wear is more than this then repairs must be carried out.

1. Contact Miller for a template for the coupler quoting serial number and coupler type.
2. The worn area should be prepared with use of a grinder before being built up with weld to match the appropriate shape. Mig welding is recommended for these repairs. Alternatively, welding with low hydrogen electrodes (E7018 or equivalent) can be used. All welds should be blended in and smooth to avoid stress areas.
3. Once fully welded the repaired areas must be allowed to cool slowly in controlled conditions.
4. Fully dress the welded areas by grinding and check to ensure that they do not interfere with the movement of the hook or other parts of the coupler. Check that the dressed areas match that of the template provided.
5. Clean off all sharp edges and repaint the coupler. Carry out a maintenance check (pg 60-63) before refitting the coupler to the machine.

Please contact Miller for more detailed information about the above process.



Installation Manual and User
Instructions for Hydraulic
Adjustable Quick Couplers

WARRANTY

(7.0) WARRANTY

Warranty Period

The warranty period is twenty four (24) months.

Limitation of Liability

Miller shall not be liable for or in respect of:

1. Repair or replacement of **(i)** any normal wearing parts, **(ii)** any ageing or deterioration caused by foreign substances or by exposure to the natural elements or **(iii)** any consumable items, such as oil, grease, filters etc.
2. Any cost of repairs, alterations or replacements made without official Miller authorisation.
3. Any warranted product which has been subjected to:-
 - (a)** Misuse, improper operation or misapplication, including but not limited to operation beyond the rated capacity expressly prohibited by the manufacturer of the prime moving machine, as shown in the operator's manual or rated capacity charts furnished with the prime moving machine.
 - (b)** Neglect, including but not limited to **(i)** improper maintenance and storage, **(ii)** use of the product while any parts are loose, broken or out of order.
 - (c)** Accident.
 - (d)** Improper or unauthorised installation, adjustment, repair or alteration, including but not limited to **(i)** adjustment or assembly procedures, not recommended or authorised in the User Guide manual. **(ii)** use of unauthorised parts or attachments, **(iii)** unauthorised modification or alteration.
4. Any corrosive damage caused by misapplication (e.g. salt water environment) unless disclosed and approved in writing at point of order.

Miller shall be liable only for repair or replacement of parts as described under 'warranty coverage', and Miller shall not be liable, whether under breach of warranty, negligence or strict liability, for any other injury, loss, damage or expenses, whether direct or consequential, including but not limited to loss of use, income, profit or production, increased cost of operation, or spoilage of or damage to material.

Alterations

Miller reserves the right to make alterations or modifications to their products and literature at any time, which in their opinion may improve the performance and efficiency of the product. Miller shall not be obliged to make such alterations or modifications to products already in service.

The foregoing warranty is exclusively and in lieu of all other warranties, including warranties concerning merchantability or fitness for a particular purpose, which are expressly disclaimed, whether written, oral, express or implied.

Miller assumes no other obligations or responsibility with respect to the products whatsoever, and no employee or representative is authorized to change or extend this warranty in any way or grant any other warranty whatsoever.

If in doubt please contact Miller for free advice and assistance, please find contact details on back cover.

Warranty Claims

In the event of any warranty claim being honoured, the following information must be provided to the Seller:-

i) Serial No., ii) hours worked, iii) host machine model and hours worked, iv) working environment/application, v) failure details including photographic evidence and vi) general overview of the concern and how the failure occurred.

ELECTRICAL & HOSE INSTALLATION DIAGRAMS

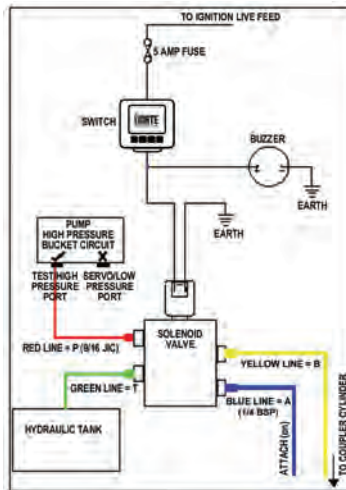


fig 3.11
Solenoid & Hose Arrangement

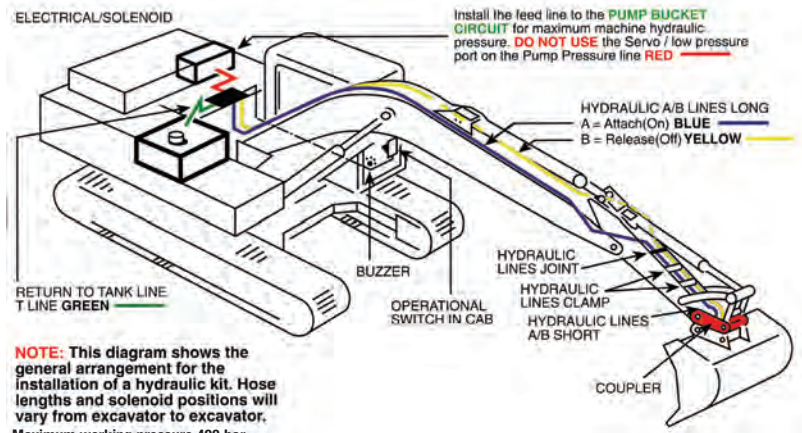


fig 3.12
Hydraulic Hose Installation



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