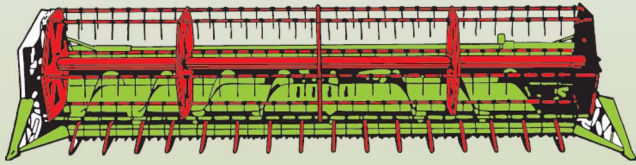


# **CLAAS**



**C490-C370**

## **Repair manual**

***SERVICE & PARTS***

**Please read and follow the safety instructions!**

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# Introduction

## General Information

87193

### Using the manual

This repair manual should help you to maintain ongoing operational capacity. The high value of the harvesting machine is ensured through careful maintenance and technical monitoring by customer service.

This repair manual is a compilation of our service technicians' and shop-floor experience.

The image sequence demonstrates the steps in a repair procedure. The text provides you with the information required for making adjustments, using special tools and further similar information.

Essential repairs are listed in such a way that even individual and small repairs can be easily found and followed.

Supplements are added to reflect the ongoing technical development of the machines and the manual is thereby continuously being updated as a reference book.

As a precaution, always compare the setting values and fill quantities with the most recent operator's manual for the respective machine.

### Texts and figures

Pictures and graphics are neutral. Differences are pointed out by notes beneath the figure.

Texts are short and not machine-specific as far as possible. Differences are pointed out by intermediate headings.

Different types of texts can easily be distinguished from one another by their formats. The following formats are distinguished:

| Formatting     | Meaning   | Description                                               |
|----------------|-----------|-----------------------------------------------------------|
| Description    | Text      | Further information on the subject.                       |
| – Instructions | Operation | Operations which must be carried out one after the other. |
| <i>Result</i>  | Result    | Consequence of operations carried out.                    |

References can easily be distinguished by suitable symbols. The following symbols are distinguished:

| Symbol                                                                           | Meaning                                                   | Description                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | See index                                                 | The symbol  points out that further information on this subject-matter can be found in another section of this manual.                                                  |
|  | See index of the relevant Operator's manual               | The symbol  points out that further information on this subject-matter can be found in the Operator's manual of the machine or the implement in question.               |
|  | See index of the relevant Technical Systems documentation | The symbol  points out that further information on this subject-matter can be found in the Technical Systems documentation of the machine or the implement in question. |
|  | See index of the relevant repair manual                   | The symbol  points out that further information on this subject-matter can be found in the repair manual of the machine or the implement in question.                   |

### Document structure based on subassemblies

As far as the contents permit, the chapters of this manual are structured according to subassemblies. The structure of these subassemblies is the same in all chapters.

Different product groups have different document structures based on subassemblies. CLAAS always takes care to keep these document structures based on subassemblies identical in any documents.

### Search and find

The wanted subject can easily be found with the recurring subassembly structure, using the table of contents or the header line of this manual.

In addition, the index of this manual is a useful tool for locating a specific subject. The index can be found on the last pages of this manual.

### Directions

Text elements such as front, rear, right and left always apply to the direction of travel. In figures, the direction of travel may be indicated by a direction arrow.

*Your CLAAS Service Department*

**Validity of instructions**

The present Manual applies to the following machine / front attachment:

| Designation          | Type | Serial number |    |
|----------------------|------|---------------|----|
|                      |      | from          | to |
| C490<br>C430<br>C370 | 527  | 52700011      | —  |

44966

## General repair instructions

2475

### Specifications

Technical data, dimensions and weights are given as an indication only. CLAAS reserves the right to make changes subsequently as technical developments continue. Responsibility for errors or omissions not accepted.

14015

### Reason of damage

Identify reason of damage, limit the case of damage and safeguard the machine.

67982

### Spare parts

Use original CLAAS spare parts and the appropriate special tools.

With all spare part orders and technical questions, please provide the machine number of the forage harvester as well as the corresponding serial numbers for the diesel engine and the implements. This is required as otherwise it may result in a delivery of incorrect spare parts.

Only use original CLAAS spare parts, accessories and ancillary equipment that have been tested and approved by CLAAS. This is the only way to ensure that the design-related characteristics of the harvesting machine as well as its functional efficiency are maintained. In addition, original CLAAS parts maintain the active and / or passive driving safety as well as occupational safety of the machine.

CLAAS is not subject to any liability for damages insofar as they were caused through the use of non-genuine CLAAS parts, CLAAS accessories and CLAAS ancillary equipment.

14021

### Gearboxes

When removing the gearboxes, always drain the gearbox oil first and then remove the gearbox. Separate parts which are firmly connected with each other by means of a soft metal-tip or plastic-tip hammer.

14045

### Welding Work



#### Note!

All information regarding this subject-matter can be found in the current Operator's manual of the machine.

## Tensioning the steel roller chains

Find the centre point in the slack span between sprockets. With the tight span slightly under load, push in the centre point of the slack span with the thumb. The chain tension is correct when its slack span deflects about **2%** of the centre distance between shafts. Check chain tension more frequently when using new chains.

**Example:** Distance between shafts **500 mm** = Deflection of slack span is roughly **10 mm**.

14027

## Taper ring fasteners

Even when transmitting high forces from the drive element to the shaft and vice versa, taper ring fasteners are a safe joint when properly pre-loaded.

The important point for assembly is that the shaft, hub, parallel key and tapered rings are thoroughly cleaned, some semi-fluid lubricant of NLGI class 00, e.g. CLAAS AGRIGREASE LC 00 / 000, is applied and tightening is to the specified torque and in the correct sequence of assembly.



### Warning!

Gluing on taper ring fasteners.

- **No** solid grease must be used when assembling the parts.

### Disassembly:

After loosening the axial clamping, loosen the taper ring fastener with a sharp blow, using a block-ended tube.



### Warning!

Damage to the taper ring fastener.

- The inside diameter of the block-ended tube must be large enough to extend over the tapered ring.

85677

## Gib head key joints

Prior to installation, the shaft, the hub and the keyway must be cleaned so they are free of grease, paint and rust.

When delivered as a spare part, the gib head key is in its raw condition, it is therefore too high and would stick out too far after arresting it. Consequently the gib head key must be matched to the component in question by milling or grinding of the **bottom** face so that it will not stick out more than necessary after arresting, but can still be dismounted perfectly using the CLAAS special tools (straight or cranked key extractor). The conical **top** face must not be machined. Treatment with a file is not recommended.



**Caution!**

Damage to the gib head key joint.

- Arrest the gib head key with a suitable hammer that is not too heavy and with the right touch.

Never use force for arresting the gib head key in order to avoid damage to the components (especially the brake discs) and to enable loosening with the CLAAS special tool.

14029

**Self-locking bolts with micro-encapsulated adhesive**

Replace self-locking bolts, e.g. Verbus-Plus / Imbus-Plus upon each assembly. In exceptional cases, they may be reused up to three times.

Always tighten self-locking bolts with microencapsulated adhesive rapidly to the specified tightening torque.

Always observe the specified tightening torque.

When removing self-locking bolts, quickly unscrew them completely. Self-locking bolts must never get in contact with sealing compound.

Self-locking bolts with microencapsulated adhesive may be used only where operating temperatures will not exceed **+ 90 °C** max.

These bolts can be subjected to full stress after 24 hours at **+ 20 °C**. The complete curing period can be shortened by heating, e.g. to 15 minutes at **+ 70 °C**.

In individual cases, bolts with liquid locking compound can be used instead of self-locking bolts only where these bolts can be heated up to approx. **200 °C** for removing them. Comply with the specified quality grade of bolts, e.g. 8.8 or 10.9 here as well.

14031

**Liquid locking compound**

Use liquid locking compound only where specified by the manufacturer.

**Correct application:**

Metal surfaces where liquid locking compound is to be applied must be absolutely free from grease. Use the "Activator" included in the workshop package for cleaning.

Before applying the liquid locking compound, the activator, i.e. the cleaning agent on the metal surfaces must have dried. Especially in blind holes, no activator residues are allowed.

44966

In threaded assemblies, apply the liquid locking compound only to the internal thread of the nut in drops if possible. In blind holes only wet approx. 1d (d = nominal Ø of bolt) at the thread bottom. The same applies to any extra-long female threads. When applying the liquid locking compound to the bolt or at the top end of a female thread, the liquid locking compound will spread over the entire thread length when screwing the bolt in. As a result, too much break-away torque is required to remove the bolt – Danger of breaking!

Threaded assemblies secured with liquid locking compound can be easily unscrewed by heating them up to approx. **200 °C**.

14033

### Lock collar bearing

Lock collar bearings are arrested on the shaft by twisting the eccentric ring over the inside bearing race.

Before inserting, it is useful to apply some semi-fluid lubricant of NLGI class 00, e.g.

CLAAS AGRIGREASE LC 00 / 000 to the inner race and the shaft to enable easier dismounting of bearings at a later date.

Always arrest the eccentric ring moderately in direction of rotation of the shaft and lock it with a set screw. To loosen the bearing, drive off the eccentric ring against the sense of rotation of the shaft.

14035

### Adapter sleeve bearing

Adapter sleeve bearings do not require a specially machined bearing seat. They may be mounted on any drawn or scalped shaft. This is an advantage because it allows the shaft to be axially moved as required to obtain correct alignment.

Always install adapter sleeve bearings according to the conical inside ring. Clean the taper lock adapter sleeve and the shaft and check that the sleeve nut runs easily so the taper lock adapter sleeve will not turn on the shaft when tightening.

#### Tightening the bearing:

First tighten the sleeve nut to the point where the taper lock adapter sleeve has no more play and is under slight preload. Now tighten the nut by approx. **90°** and continue turning until the next nearest slot fits the tab. Secure sleeve nut with the tab.

#### Loosening the bearing:

Loosen the unlocked sleeve nut only by a few turns for the time being. The thread must still carry the full load. Loosen the taper lock adapter sleeve with a sharp blow, using a block-ended tube.

## **Ferrule fittings on hydraulic lines**

When pre-assembling the unit and for pre-assembled factory-delivered ferrule fittings, the following applies: installation is in the associated, well-oiled threaded joint with half a turn of the union nut beyond the point where resistance is felt.

### **Pre-assembly:**

- Cut off the tube at right angles.  
Do not use a pipe cutter! This will slant the tube wall, causing heavy inside and outside burrs.
- Slightly deburr the inside and outside tube ends.  
Do not chamfer!
- Clean the tube end.

In case of tube bends, the straight tube end up to where the bending radius starts must be at least twice the height of the union nut.

- Push the union nut and the ferrule on the tube.
- Push the tube against the stop in the union and tighten the union nut until the ferrule catches the tube.  
The tube must not rotate. This point can be felt because increased power is needed from here.
- Tighten the union nut half a turn beyond the point where resistance is felt.
- Check the cut produced by the cutting edge.  
A visible collar must fill up the space ahead of the ferrule face. The ferrule may rotate, but axial displacement must not be possible.

### **Final assembly**

- Insert the pre-assembled tube into the well-oiled screw fitting.
- Tighten the union nut until considerably more force is needed.
- Then add another half a turn.

### **Repeated assembly**

- Every time the ferrule fitting has been loosened, retighten the union nut without using increased force.

### **Ferrule fitting leaks**

- If a fitting leaks, first loosen the union nut until some oil escapes.
- Then tighten the union nut as specified.

14039

## **Progressive ring fittings on hydraulic lines**

When pre-assembling the unit and for pre-assembled factory-delivered profiled ring fittings, the following applies: installation is in the associated, well-oiled threaded joint with half a turn of the union nut beyond the point where resistance is clearly felt.

**Pre-assembly**

- Cut off the tube at right angles.  
Do not use a pipe cutter! This will slant the tube wall, causing heavy inside and outside burrs.
- Slightly deburr the inside and outside tube ends.  
Do not chamfer!
- Clean the tube end.

In case of tube bends, the straight tube end up to where the bending radius starts must be at least twice the height of the union nut.

- Push the union nut and the profiled ring on the tube.
- Push the tube against the stop in the union and tighten the union nut until the profiled ring catches the tube.  
The tube must not rotate.  
This point can be felt because increased power is needed from here.
- Tighten the union nut half a turn beyond the point where resistance is felt.
- Check the cut produced by the cutting edge:  
A visible collar must fill up the space ahead of the profiled ring face. The profiled ring may rotate, but axial displacement must not be possible.

**Final assembly**

- Insert the pre-assembled tube into the well-oiled screw fitting.
- Tighten the union nut until considerably more force is needed and then add another half a turn.  
**Important:** Back up the threaded joint with a spanner!

**Repeated assembly**

- Every time the profiled ring fitting has been loosened, retighten the union nut until resistance is felt and then continue for half a turn beyond that point.  
**Important:** Back up the threaded joint with a spanner!

**Profiled ring fitting leaks**

If a fitting leaks, first loosen the union nut until some oil escapes and then tighten it as specified.

Any deviating tightening torques reduce the rated pressure resistance and the service life of the screw fitting. This results in leaks and the tube slipping out.

## Taper fittings on hydraulic lines

### Installation:

- Oil the O-ring on the sealing cone. Tighten the union nut a third of a turn beyond the point where resistance is felt.

**Important:** Back up the threaded joint with a spanner!

Any deviating tightening torques reduce the rated pressure resistance and the service life of the screw fitting. This results in leaks and the tube slipping out.

49921

## Hydraulic hoses

### Hydraulic fittings:

Observe the final assembly instructions:

- For ferrule fittings on hydraulic lines see above.  
For progressive ring screw fittings on hydraulic lines see above. For sealing cone screw fittings on hydraulic lines see above.

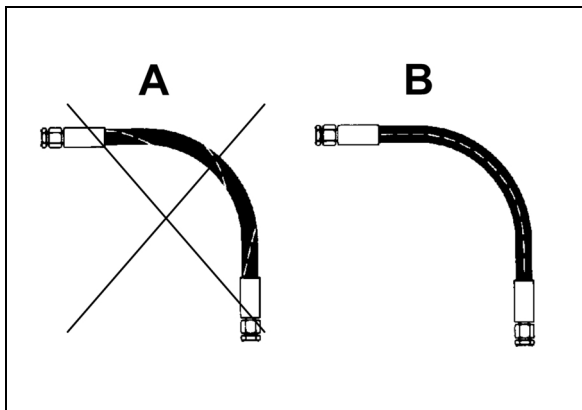
### Laying the hoses:

Observe the information provided with the five figures below.

- Avoid twisting the hoses during installation.

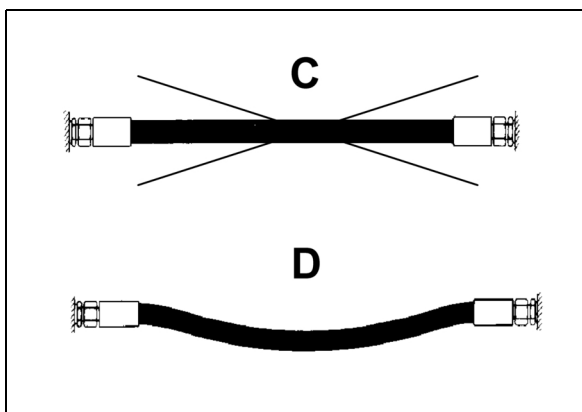
**A** = incorrect installation

**B** = correct installation



1

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2

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### Warning!

Hoses laid in a straight line become shorter due to the internal hydraulic pressure.

Fittings may be torn out.

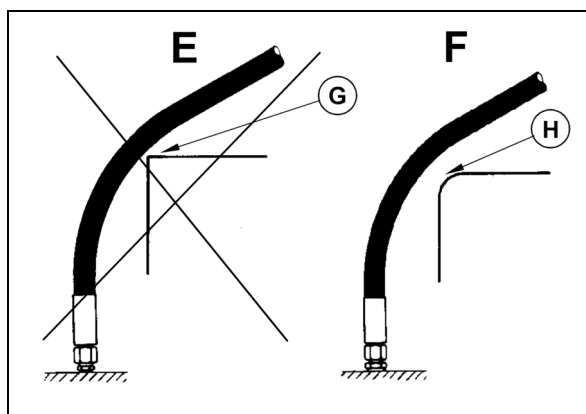
- Always install hoses with a slight sag. Even in static positions.

- Hoses must be installed in such a way that neither tensile loads will occur in any operating condition nor compression loads on short hose lines.

**C** = incorrect installation

**D** = correct installation

- As a guideline, the total play of the hose should be 1 cm min. when moving the hose back and forth in the middle between two holders/connectors (e.g. clamps).



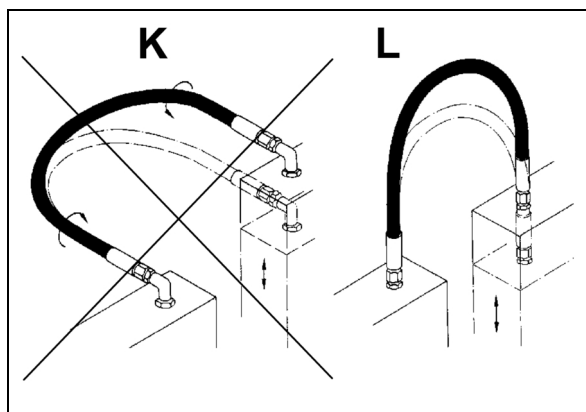
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**3**

#### Avoiding external damage:

- Avoid external mechanical effects on hoses at (G).
- Avoid chafing of hoses against one another or against components by ensuring useful arrangement and fixing.
- Keep a sufficient clearance from components (H).
- Cover up sharp-edged components permanently.

**E** = incorrect installation

**F** = correct installation


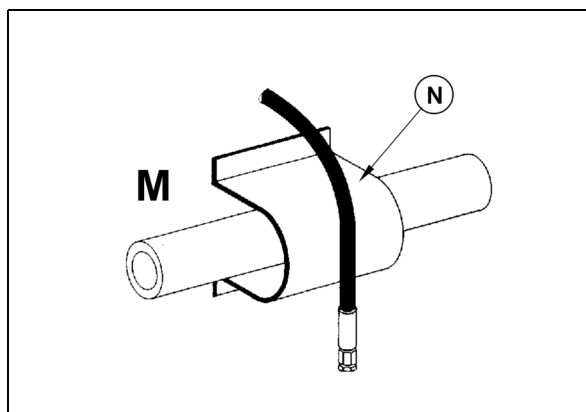
5729

**4**

#### Avoiding torsional loads:

- When connecting a hose to moving parts, avoid twisting the hose, especially when the movement and the bending occur in the same plane.

**K** = incorrect installation

**L** = correct installation


5730

**5**

#### Protection against external temperature effects:

- When major external temperature effects occur, install hoses at a sufficient distance from heat-emitting components.
- Or protect hose by a shielding (N).

### Some advice for speedy and correct repair work

- Mark machine parts prior to disassembly to ensure their correct left-to-right positions and balance when reassembled.
- Fit expansion pins with the slot facing the side under load. When fitted with a **quarter** turn from this position, they will get loose, fall out or shear off.
- Replace split pins, locking wires, locking plates, tab washers and lock washers when carrying out repairs.
- Install greasable ball and sliding bearings with the grease specified for them.
- Align sprockets and V-belt pulleys toward each other.
- Care for strict cleanliness when working on hydraulic systems.
- Never mix different oil types.
- Run the machine or operate machine assemblies at low speed after any repair.

## Torque settings

### Tightening torques for metric standard threads

The tightening torques specified below apply only if:

- a coefficient of friction of  $\mu_{\text{tot}} = 0.14$  is reached in connection with thread grease.  
To achieve this, surface protection such as A3C+L, Dacromet or Termosil is recommended.
- no other tightening torque is specified in the descriptive text.
- no additional screw locking such as microencapsulated bolts or liquid locking compound is used.

|                                    |            | Tightening torque in Nm for a coefficient of friction |      |      |
|------------------------------------|------------|-------------------------------------------------------|------|------|
| Bolts and nuts                     |            | $\mu_{\text{tot}} = 0.14$                             |      |      |
| Property class                     |            | 8.8                                                   | 10.9 | 12.9 |
|                                    | Dimensions |                                                       |      |      |
| Hex. bolts<br>ISO 4014 to ISO 4018 | M 4        | 2.9                                                   | 4.3  | 5    |
|                                    | M 5        | 5.8                                                   | 8.5  | 10   |
|                                    | M 6        | 10                                                    | 14.5 | 17   |
|                                    | M 8        | 24.5                                                  | 36   | 42   |
|                                    | M 10       | 48.5                                                  | 71   | 83.5 |
|                                    | M 12       | 83.5                                                  | 123  | 144  |
| Cheese-head screws<br>ISO 4762     | M 14       | 133                                                   | 196  | 229  |
|                                    | M 16       | 207                                                   | 304  | 355  |
|                                    | M 18       | 296                                                   | 422  | 494  |
|                                    | M 20       | 417                                                   | 594  | 695  |
| Hex. nuts<br>ISO 4032              | M 22       | 570                                                   | 813  | 951  |
|                                    | M 24       | 718                                                   | 1022 | 1196 |
|                                    | M 27       | 1058                                                  | 1506 | 1763 |
|                                    | M 30       | 1437                                                  | 2046 | 2395 |
|                                    | M 33       | 1944                                                  | 2770 | 3240 |
|                                    | M 36       | 2500                                                  | 3561 | 4167 |
|                                    | M 39       | 3237                                                  | 4610 | 5394 |

## Tightening torques for metric fine threads

The tightening torques specified below apply only if:

- a coefficient of friction of  $\mu_{\text{tot}} = 0.14$  is reached in connection with thread grease.  
To achieve this, surface protection such as A3C+L, Dacromet or Termosil is recommended.
- no other tightening torque is specified in the descriptive text.
- no additional screw locking such as microencapsulated bolts or liquid locking compound is used.

|                                  |             | Tightening torque in Nm for a coefficient of friction |      |      |
|----------------------------------|-------------|-------------------------------------------------------|------|------|
| Bolts and nuts                   |             | $\mu_{\text{tot}} = 0.14$                             |      |      |
| Property class                   |             | 8.8                                                   | 10.9 | 12.9 |
|                                  | Dimensions  |                                                       |      |      |
| Hex. bolts<br>ISO 8765, ISO 8876 | M 8 x 1     | 26                                                    | 38.5 | 45   |
|                                  | M 10 x 1    | 54                                                    | 79   | 92.5 |
|                                  | M 10 x 1.25 | 51                                                    | 74.5 | 88   |
|                                  | M 12 x 1.25 | 90.5                                                  | 134  | 156  |
|                                  | M 12 x 1.5  | 87                                                    | 128  | 150  |
|                                  | M 14 x 1.5  | 143                                                   | 210  | 246  |
|                                  | M 16 x 1.5  | 219                                                   | 323  | 378  |
|                                  | M 18 x 1.5  | 331                                                   | 470  | 551  |
|                                  | M 18 x 2    | 313                                                   | 446  | 522  |
|                                  | M 20 x 1.5  | 459                                                   | 655  | 766  |
| Hex. nuts<br>ISO 4032            | M 22 x 1.5  | 622                                                   | 886  | 1037 |
|                                  | M 24 x 1.5  | 809                                                   | 1152 | 1348 |
|                                  | M 24 x 2    | 778                                                   | 1108 | 1297 |
|                                  | M 27 x 1.5  | 1173                                                  | 1672 | 1956 |
|                                  | M 27 x 2    | 1135                                                  | 1617 | 1892 |
|                                  | M 30 x 2    | 1580                                                  | 2251 | 2634 |
|                                  | M 33 x 2    | 2116                                                  | 3015 | 3528 |
|                                  | M 36 x 2    | 2773                                                  | 3951 | 4623 |
|                                  | M 39 x 2    | 3557                                                  | 5067 | 5930 |

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