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HANDLING YOUR WORLD

REPAIR MANUAL
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REPARATURANLEITUNG
MANUAL DE REPARACIÓN
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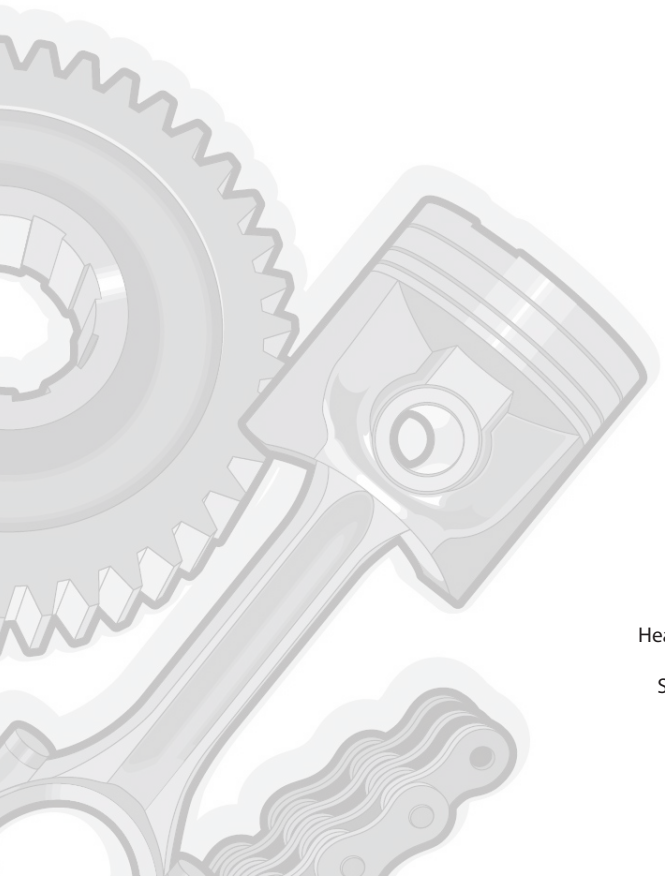

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Fuel Injectors

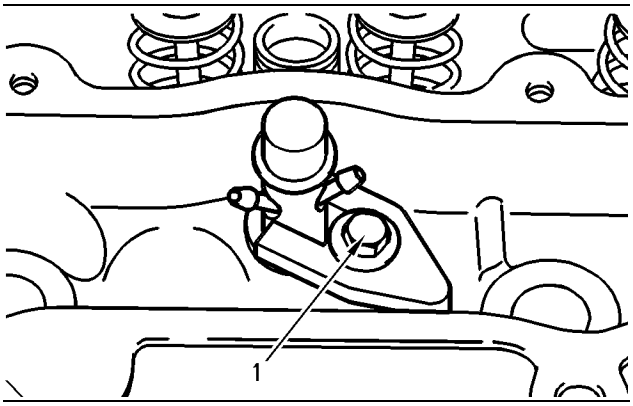

Illustration 5 g00908211

Fuel injector clamp

(1) Tighten the bolt in the clamp for the fuel injector to the following torque. ..... 35 N·m (26 lb ft)

The fuel injector should be tested at the pressure in table 1.

Leakage in 10 seconds ..... 0 drops

Table 1

Service setting for the Fuel Injector
Injection Pressure
29.4 + 0.8 MPa (4264 + 116 psi)

i02661897

Fuel Transfer Pump

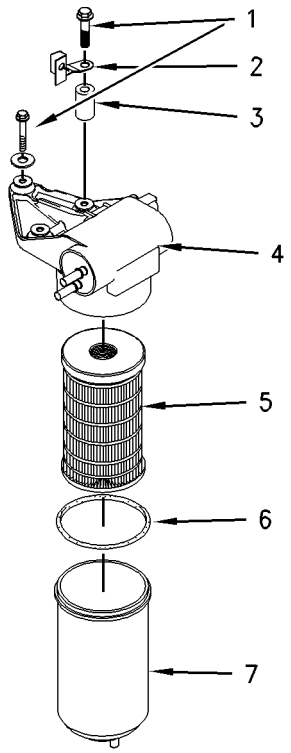

Illustration 6 g00986823

(1) Retaining bolts

(2) Clip

(3) Spacer

(4) Fuel transfer pump

Type ..... 12 or 24 volt electric motor

(5) Fuel filter element

(6) O ring

(7) Fuel filter bowl

Note: Tighten the fuel filter bowl by hand. Rotate the bowl 1/8 of a turn more by hand.

i02656269

Engine Oil Pump

Engines with Balancer Group

Type ..... Gear-driven differential rotor

Number of lobes

Inner rotor 6
Outer rotor 7

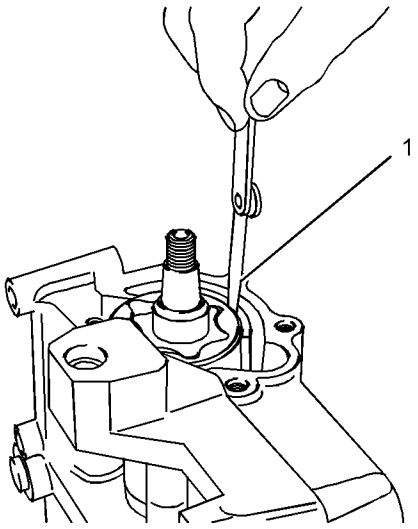

Illustration 25 g01334408

The oil pump for the balancer

(1) Clearance of the outer rotor to the body .. 0.130 to 0.24 mm (0.0050 to 0.0094 inch)

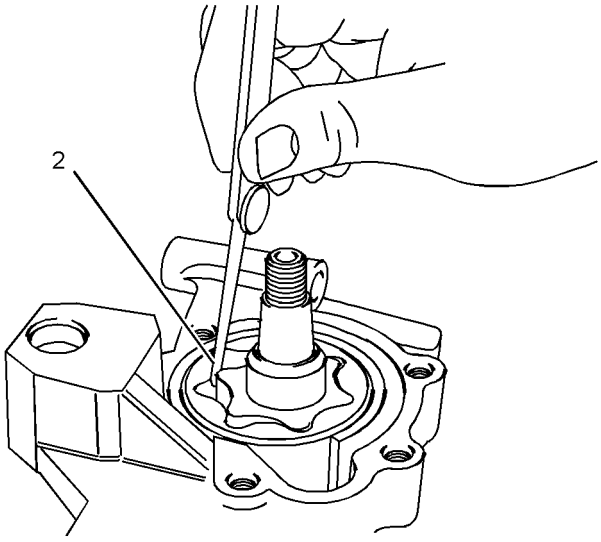

Illustration 26 g01334410

Inner rotor

(2) Clearance of inner rotor to outer rotor ..... 0.050 to 0.200 mm (0.0020 to 0.0079 inch)

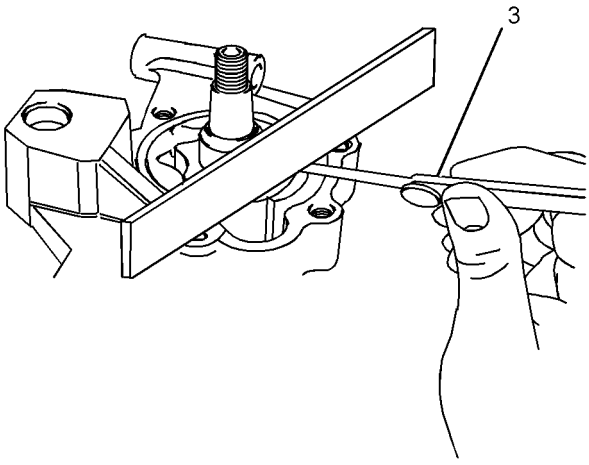

Illustration 27 g01334412

The end play for the rotor

(3) End play of rotor assembly

Inner rotor ..... 0.04 to 0.11 mm (0.0016 to 0.0043 inch)
Outer rotor ..... 0.04 to 0.11 mm (0.0016 to 0.0043 inch)

Table 12

Journal	Excessive run out
(1)	Mounting
(2)	0.08 mm (0.0031 inch)
(3)	0.15 mm (0.0059 inch)
(4)	0.08 mm (0.0031 inch)
(5)	Mounting

Refer to Specifications, “Connecting Rod Bearing Journal” for more information on the connecting rod bearing journals and connecting rod bearings.

Refer to Specifications, “Main Bearing Journal” for information on the main bearing journals and for information on the main bearings.

i02658811

Crankshaft Seals

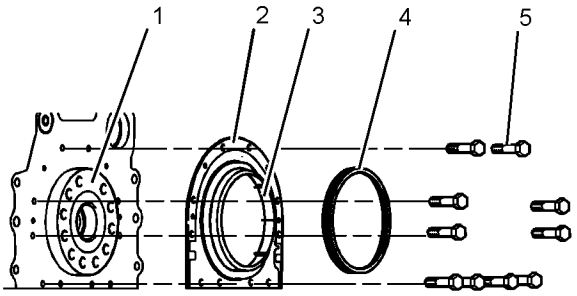

Illustration 49 g01335894

Typical example

(1) Crankshaft

(2) Crankshaft seal

(3) Plastic sleeve

(4) Alignment tool

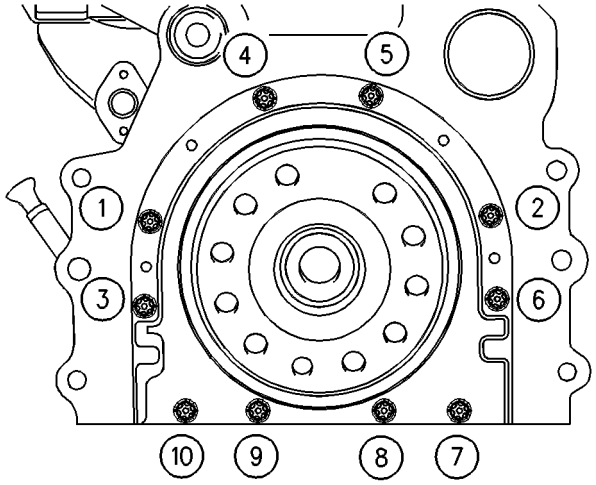

Illustration 50 g00915076

(5) Tighten bolts 1, 2, 3, 4, 5, 6, 7, and 10 in the sequence that is shown in Illustration 50 to the following torque. ..... 22 N·m (16 lb ft)

Remove the alignment tool.

Tighten bolts 8 and 9 in the sequence that is shown in Illustration 50 to the following torque. ..... 22 N·m (16 lb ft)

i02504771

Connecting Rod Bearing Journal

Refer to Specifications, “Crankshaft” for information on the undersize crankshaft journals.

The original size of the connecting rod bearing journal ... 63.47 to 63.49 mm (2.4988 to 2.4996 inch)

Maximum permissible wear of a bearing journal on a new connecting rod ..... 0.04 mm (0.0016 inch)

Width of the connecting rod bearing journals ..... 40.348 to 40.424 mm (1.5885 to 1.5915 inch)

Radius of the fillet of the connecting rod bearing journals ..... 3.68 to 3.96 mm (0.145 to 0.156 inch)

Surface finish of connecting rod bearing journals ..... Ra 0.4 microns

i01721280

Engine Lifting Bracket

All engines are equipped with two engine lifting brackets.

Tighten the two bolts on each engine lifting bracket to the following torque. .. 44 N·m (32 lb ft)

i02656398

Alternator

The 12 Volt and 24 Volt Denso Alternators

Three types of alternator are available.

Output

Two 12 volt alternators are available. ..... 100 Amp and 120 Amp
One 24 volt alternator ..... 80 Amp

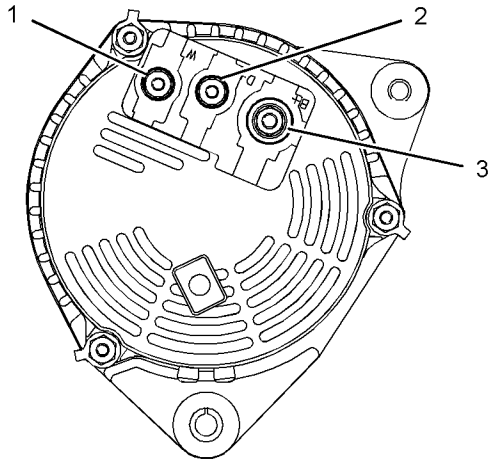

Illustration 69 g01332517
Typical example

(1) Terminal “W”

Tighten the terminal nut to the following torque. ..... 3.7 N·m (33 lb in)

(2) Terminal “D+”

Tighten the terminal nut to the following torque. ..... 3.7 N·m (33 lb in)

(3) Terminal “B+”

Tighten the terminal nut to the following torque. ..... 7 N·m (62 lb in)

The 12 Volt and 24 Volt Iskra Alternator

12 volt output

Two alternators are available. ..... 150 Amp and 175 Amp

24 volt output

The 24 volt alternator ..... 100 Amp

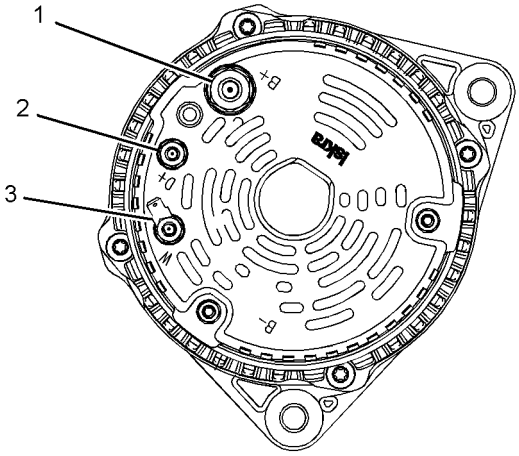

Illustration 70 g01332519
Typical example

(1) Terminal “B+”

Tighten the terminal nut to the following torque. ..... 11 N·m (97 lb in)

(2) Terminal “D+”

Tighten the terminal nut to the following torque. ..... 3 N·m (26 lb in)

(3) The terminal “W” is spade-type.

Important Safety Information

Most accidents that involve product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintenance and repair information.

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons.

The hazards are identified by the “Safety Alert Symbol” and followed by a “Signal Word” such as “DANGER”, “WARNING” or “CAUTION”. The Safety Alert “WARNING” label is shown below.

⚠ WARNING

The meaning of this safety alert symbol is as follows:

Attention! Become Alert! Your Safety is Involved.

The message that appears under the warning explains the hazard and can be either written or pictorially presented.

Operations that may cause product damage are identified by “NOTICE” labels on the product and in this publication.

Perkins 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 Perkins 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.

The information, specifications, and illustrations in this publication are on the basis of information that was available at the time that the publication was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service that is given to the product. Obtain the complete and most current information before you start any job. Perkins dealers or Perkins distributors have the most current information available.

⚠ WARNING

When replacement parts are required for this product Perkins recommends using Perkins replacement parts.

Failure to heed this warning can lead to premature failures, product damage, personal injury or death.

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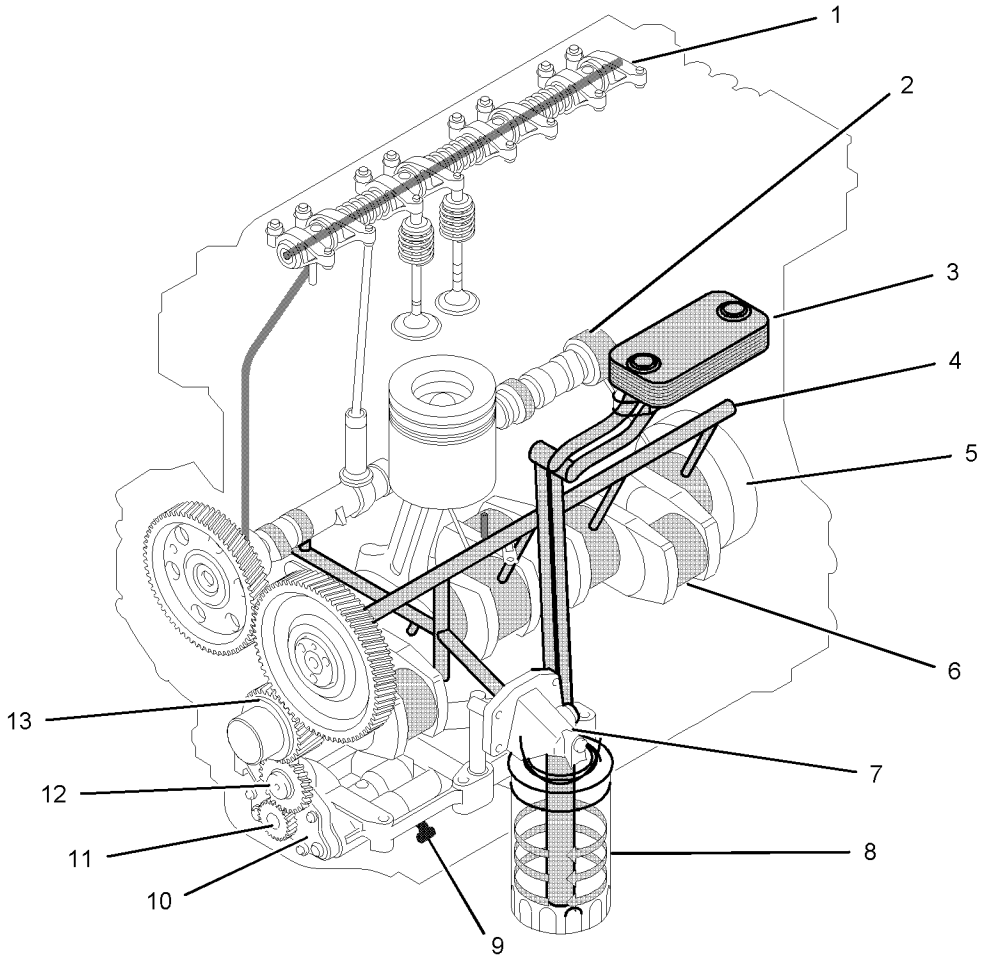
Lubrication System



g01009682

Illustration 6

Flow diagram of the lubrication system for the 1104D engine

Lubricating oil from the oil pan flows through a strainer and a pipe (9) to the suction side of the engine oil pump (10). Pressure for the lubrication system is supplied by the oil pump . The crankshaft gear (13) drives a lower idler gear (12). The lower idler gear drives the oil pump gear (11). The pump has an inner rotor and an outer rotor. The axis of rotation of the rotors are off-center relative to each other. There is an interference fit between the inner rotor and the drive shaft.

The inner rotor has five lobes which mesh with the six lobes of the outer rotor. When the pump rotates, the distance increases between the lobes of the outer rotor and the lobes of the inner rotor in order to create suction. When the distance decreases between the lobes, pressure is created.

The lubricating oil flows from the outlet side of the oil pump (10) through a passage to the oil filter head (7). The oil then flows from the oil filter head through a passage to a plate type oil cooler for the 1104D engine (3). The oil cooler is located on the left side of the cylinder block.

From the oil cooler, the oil returns through a passage to the oil filter head. The oil then flows through a bypass valve that permits the lubrication system to function if the oil filter becomes blocked. Under normal conditions, the oil then flows to the oil filter (8).

Air Inlet and Exhaust System

i02281171

Air Inlet and Exhaust System - Inspect

Do a general visual inspection of the air inlet and exhaust system. Make sure that there are no signs of leaks in the system.

There will be a reduction in the performance of the engine if there is a restriction or there is a leak in the air inlet system or the exhaust system.

⚠ WARNING

Hot engine components can cause injury from burns. Before performing maintenance on the engine, allow the engine and the components to cool.

⚠ WARNING

Making contact with a running engine can cause burns from hot parts and can cause injury from rotating parts.

When working on an engine that is running, avoid contact with hot parts and rotating parts.

1. Inspect the engine air cleaner inlet and ducting in order to ensure that the passageway is not blocked or collapsed.
2. Inspect the engine air cleaner element. Replace a dirty element with a clean element.
3. Check for dirt tracks on the clean side of the engine air cleaner element. If dirt tracks are observed, contaminants are flowing past the element.

i02755777

Turbocharger - Inspect

⚠ WARNING

Hot engine components can cause injury from burns. Before performing maintenance on the engine, allow the engine and the components to cool.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

Before you begin inspection of the turbocharger, be sure that the inlet air restriction is within the specifications for your engine. Be sure that the exhaust system restriction is within the specifications for your engine. Refer to Testing and Adjusting, “Air Inlet and Exhaust System - Inspect”.

The condition of the turbocharger will have definite effects on engine performance. Use the following inspections and procedures to determine the condition of the turbocharger.

- Inspection of the compressor and the compressor housing
- Inspection of the turbine wheel and the turbine housing
- Inspection of the wastegate

i01889427

Cooling System - Inspect

This engine has a pressure type cooling system. A pressure type cooling system gives two advantages:

- The pressure type cooling system can operate safely at a higher temperature than the boiling point of water at a range of atmospheric pressures.
- The pressure type cooling system prevents cavitation in the water pump.

Cavitation is the sudden generation of low pressure bubbles in liquids by mechanical forces. The generation of an air or steam pocket is much more difficult in a pressure type cooling system.

Regular inspections of the cooling system should be made in order to identify problems before damage can occur. Visually inspect the cooling system before tests are made with the test equipment.

Visual Inspection Of The Cooling System

1. Check the coolant level in the cooling system.
2. Look for leaks in the system.
3. Inspect the radiator for bent fins and other restriction to the flow of air through the radiator.
4. Inspect the drive belt for the fan.
5. Inspect the blades of the fan for damage.
6. Look for air or combustion gas in the cooling system.
7. Inspect the radiator cap for damage. The sealing surface must be clean.
8. Look for large amounts of dirt in the radiator core. Look for large amounts of dirt on the engine.
9. Shrouds that are loose or missing cause poor air flow for cooling.

i01964006

Cooling System - Test

Remember that temperature and pressure work together. When a diagnosis is made of a cooling system problem, temperature and pressure must be checked. The cooling system pressure will have an effect on the cooling system temperature. For an example, refer to Illustration 22. This will show the effect of pressure on the boiling point (steam) of water. This will also show the effect of height above sea level.

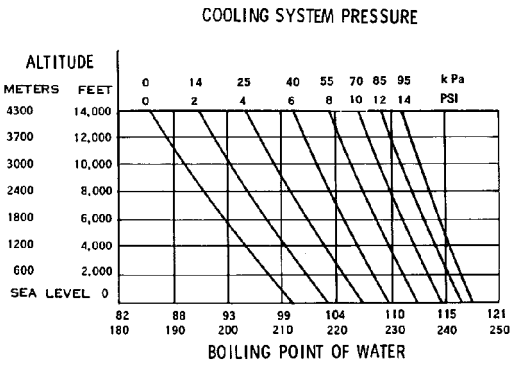


Illustration 22 g00286266

Cooling system pressure at specific altitudes and boiling points of water

WARNING

Personal injury can result from hot coolant, steam and alkali.

At operating temperature, engine coolant is hot and under pressure. The radiator and all lines to heaters or the engine contain hot coolant or steam. Any contact can cause severe burns.

Remove filler cap slowly to relieve pressure only when engine is stopped and radiator cap is cool enough to touch with your bare hand.

The coolant level must be to the correct level in order to check the coolant system. The engine must be cold and the engine must not be running.

After the engine is cool, loosen the pressure cap in order to relieve the pressure out of the cooling system. Then remove the pressure cap.

Electrical System

i02757133

Alternator - Test

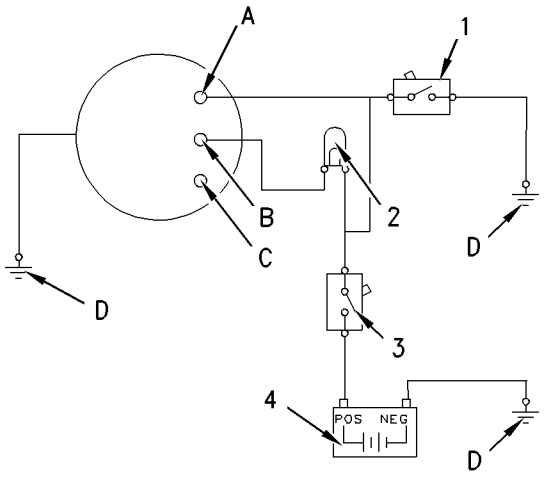


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Illustration 34

Typical wiring schematic for an alternator

(A) Terminal “B+”
(B) Terminal “D+”
(C) Terminal “W”
(D) Ground
(1) Electrical switch
(2) Dash light
(3) Ignition switch
(4) Battery

Warning Lamp Does Not Illuminate

The warning lamp for the charging system should illuminate when the ignition switch is in the ON position. Follow the steps below in order to test the system.

1. Check the light bulb. Replace the light bulb if the element is broken.
2. Use a suitable Multimeter to check the battery voltage. Check the battery voltage with the ignition switch OFF.
3. Check the voltage between the terminal (A) and ground. The measured voltage should equal the battery voltage.
4. Turn the ignition switch to the ON position. Check the voltage between terminal (B) and ground. If the voltage is more than 2 Volts the alternator needs to be replaced.

Warning Light is On When the Engine is Running

1. Start the engine and run the engine at fast idle.
2. Measure the voltage between terminal (A) and ground.
3. Measure the voltage between terminal (B) and ground.
4. The measured voltage for terminal (A) and terminal (B) should be 13 to 15 volts for a 12 volt system. The measured voltage for terminal (A) and terminal (B) should be 26 to 30 volts for a 24 volt system.
5. If the voltages do not match replace the alternator.
6. Increase the engine to high idle. Turn an electrical load ON.
7. Measure the voltage between terminal (A) and ground.
8. Measure the voltage between terminal (B) and ground.
9. The measured voltage for terminal (A) and terminal (B) should be 13 to 15 volts for a 12 volt system. The measured voltage for terminal (A) and terminal (B) should be 26 to 30 volts for a 24 volt system.
10. Replace the alternator if the voltage does not match.

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NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

1. Inspect the bore in the front housing for damage. If the bore is damaged, replace the front housing. Refer to Disassembly and Assembly, “Housing (Front) - Remove” and Disassembly and Assembly, “Housing (Front) - Install”.

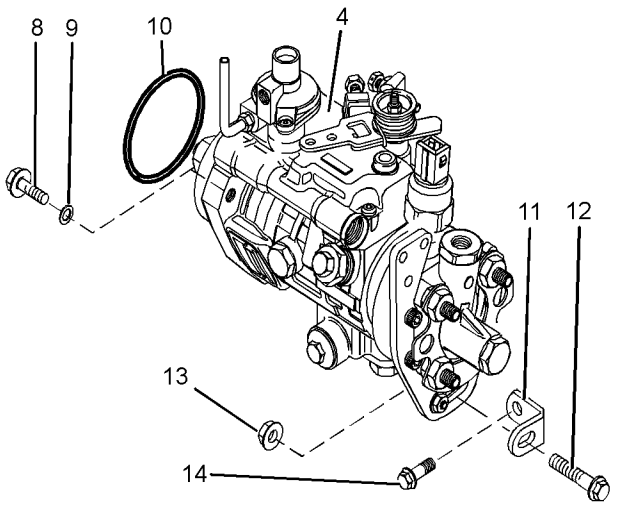


Illustration 11 g01350306
Typical example

2. Use Tooling (D) in order to lubricate O-ring seal (10). Install a new O-ring seal (10) onto the fuel injection pump (4).

3. Install the new washers (9) to bolts (8).

4. Align the holes in the fuel injection pump with the holes in the front housing. Install the fuel injection pump (4) to the housing.

Note: The fuel injection pump should be supported by hand until the bolts are installed.

5. Install bolts (8). Tighten bolts (8) to a torque of 25 N·m (18 lb ft).

6. Position support bracket (11) onto the cylinder block. Install bolt (14) finger tight.

7. Install bolt (12) and nut (13) finger tight.

8. Tighten bolt (14) to a torque of 44 N·m (32 lb ft). Tighten bolt (12) and nut (13) to a torque of 22 N·m (16 lb ft).

Note: Ensure that the fuel injection pump is not stressed as the bolts for the bracket are tightened.

9. Ensure that the No. 1 cylinder is at top dead center on the compression stroke. Refer to Systems Operation, Testing and Adjusting, “Fuel Injection Timing - Check”. If necessary, use Tooling (A) in order to rotate the crankshaft so that number one piston is at the top center position on the compression stroke. Refer to Systems Operation, Testing and Adjusting, “Finding Top Centre Position for No.1 Piston”.

Note: Either Tooling (A) can be used. Use the Tooling that is most suitable.

10. Use Tooling (B) in order to lock the camshaft in the correct position. Use Tooling (C) in order to lock the crankshaft in the correct position. Refer to Disassembly and Assembly, “Gear Group (Front) - Remove” for the correct procedure.

11. Install the fuel injection pump gear to fuel injection pump (4). Refer to Disassembly and Assembly, “Fuel Injection Pump Gear - Install” and refer to Disassembly and Assembly, “Gear Group (Front) - Install”.

Note: Ensure that the fuel injection pump is in the unlocked position after the installation of the fuel injection pump gear is completed.

Note: If the engine has a top mounted turbocharger, the tube assembly for the oil drain must be connected to the cylinder block before the exhaust manifold is installed.

6. Install new bolts (4) finger tight.

Note: Bolts (4) that were equipped with spacers. Install the spacer in the original position.

7. Remove Tooling (A). Install the remaining bolts (4) finger tight.

8. Tighten bolts (4) to a torque of 40 N·m (30 lb ft) in the sequence that is shown in Illustration 28.

End By:

a. Install the turbocharger. Refer to Disassembly and Assembly, “Turbocharger - Install”.

i02628842

Exhaust Elbow - Remove and Install

Removal Procedure

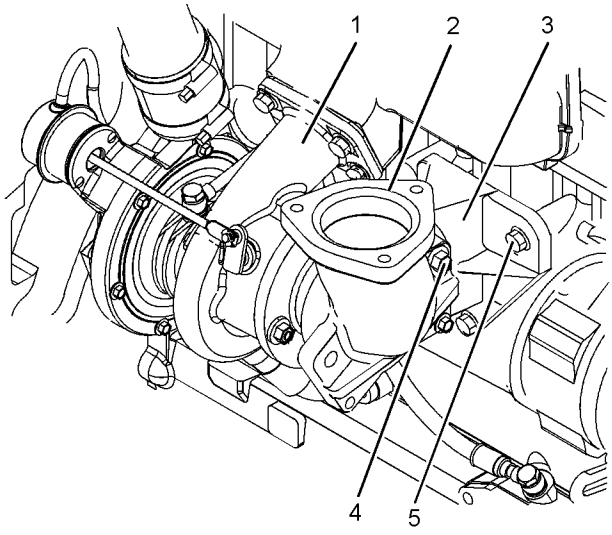


Illustration 29 g01343547

Typical example

1. Remove bolts (4) and remove exhaust elbow (2). Note the orientation of the exhaust elbow.

2. Remove bolts (5) and remove support bracket (3) from the cylinder block.

Installation Procedure

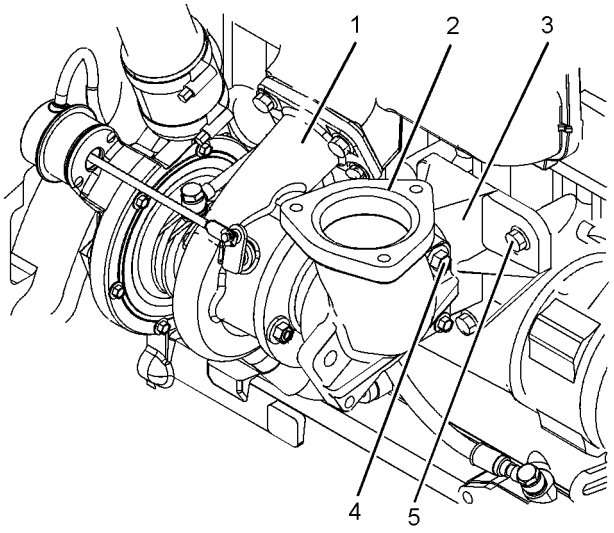


Illustration 30 g01343547

Typical example

1. Ensure that the exhaust elbow is clean and free from wear or damage.

2. Position support bracket (3) to the cylinder block and install bolts (5). Tighten bolts (5) to a torque of 44 N·m (33 lb ft).

3. Position exhaust elbow (2).

Note: Ensure the correct orientation of the exhaust elbow.

4. Install bolts (4) to support bracket (3). Tighten bolts (4) to a torque of 44 N·m (33 lb ft).

5. Use Tooling (A) to remove plunger (3) from the bore for the relief valve in the housing of engine oil pump (1).

Installation Procedure

Table 14

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
B	-	Loctite 577	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

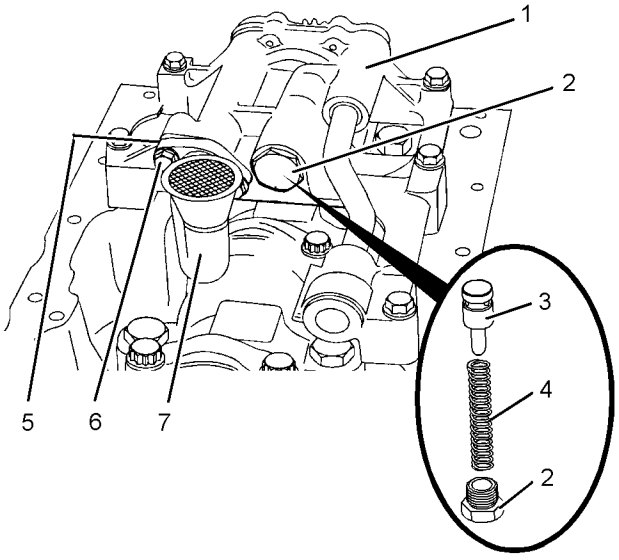


Illustration 45 g01343561
Typical example

1. Ensure that all components are clean and free from wear or damage. If necessary, replace any components that are worn or damaged. If the bore for the relief valve in the housing of engine oil pump (1) is worn or damaged, the complete assembly of the engine oil pump must be replaced.

⚠ WARNING

Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

2. Lubricate plunger (3) with clean engine oil. Use long nose pliers to install plunger (3) and spring (4) into the bore for the relief valve in the housing of engine oil pump (1).

Note: The plunger must slide freely in the bore for the relief valve.

3. Apply Tooling (A) to the threads of cap (2). Install cap (2) to engine oil pump (1). Tighten the cap to a torque of 35 N·m (26 lb ft).

Note: Ensure that the spring is properly located inside the plunger and the cap. Ensure that Tooling (A) does not contaminate the bore for the relief valve in the housing of engine oil pump.

4. Install suction pipe (7) and a new joint (5) to the assembly of the engine oil pump.

5. Install bolts (6). Tighten the bolts to a torque to 22 N·m (16 lb ft).

End By:

a. Install the engine oil pan. Refer to Disassembly and Assembly, “Engine Oil Pan - Remove and Install”.

i02628840

Engine Oil Relief Valve - Remove and Install (Engines with a Balancer Unit)

Removal Procedure

Table 15

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	-	Telescopic Magnet	1

Start By:

a. Remove the engine oil pan. Refer to Disassembly and Assembly , “Engine Oil Pan - Remove and Install”.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. If the flywheel ring gear was removed, follow Steps 1.a through 1.c in order to install a new ring gear to the flywheel.

   a. Identify the orientation of teeth (4) on the new ring gear (4).

Note: The chamfered side of the ring gear teeth must face toward the starting motor when the flywheel is installed. This will ensure the correct engagement of the starting motor.

   b. Heat flywheel ring gear (3) in an oven to a maximum temperature of 250 °C (482 °F) prior to installation.

Note: Do not use a torch to heat the ring gear.

   c. Ensure that the orientation of ring gear (3) is correct and quickly install the ring gear onto flywheel (1).

2. Inspect the crankshaft rear seal for leaks. If there are any oil leaks, replace the crankshaft rear seal. Refer to Disassembly and Assembly, “Crankshaft Rear Seal - Remove”.

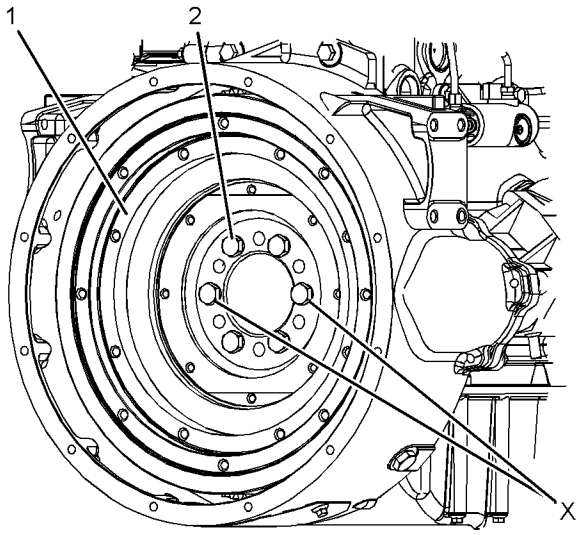


Illustration 63 g01245126
Typical example

3. Install a suitable lifting device to flywheel (1). The flywheel weighs approximately 71 kg (155 lb).

4. Install Tooling (A) to positions (X) on the crankshaft.

5. Use the lifting device in order to position flywheel (1) onto Tooling (A).

6. Install bolts (2) to flywheel (1) finger tight.

7. Remove Tooling (A) and install remaining bolts (2) to the flywheel (1).

8. Remove the lifting device from flywheel (1).

9. Use a suitable tool to prevent the flywheel from rotating. Tighten bolts (2) to a torque of 115 N·m (85 lb ft).

10. Check the run out of the flywheel. Refer to System Operation, Test and Adjusting, “Flywheel - Inspect” for further information.

End By:

a. Install the electric starting motor. Refer to Disassembly and Assembly, “Electric Starting Motor - Remove and Install”.

i02628827

Crankshaft Rear Seal - Remove

Removal Procedure

Table 22

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	-	E12 Torx Socket	1

Start By:

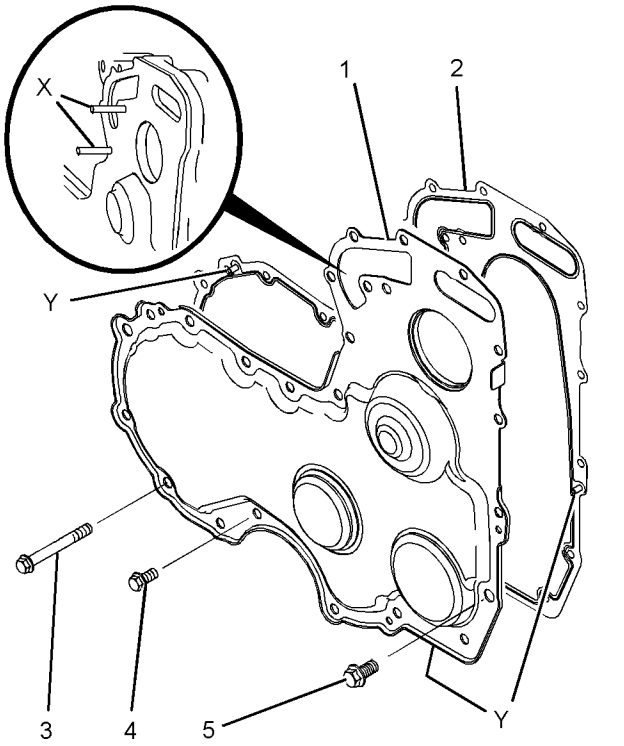
a. Remove the flywheel. Refer to Disassembly and Assembly, “Flywheel - Remove”.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.



g01343967

Illustration 85

Typical example

1. Thoroughly clean the mating surface of the front housing.

2. If the original front cover is installed, follow Steps 2.a and 2.b in order to install the joint.

   a. Thoroughly clean the front cover.

   b. Install a new joint (2) to front cover (1). Engage locators (Y) into the holes in the front cover.

3. Install Tooling (A) into holes (X) in the front housing.

4. Use Tooling (A) in order to position the front cover assembly onto the front housing.

5. Install bolts (3), (4) and (5) finger tight. Ensure that the different bolts are installed in the correct positions.

6. Loosely install the water pump assembly and remove Tooling (A). Refer to Disassembly and Assembly, “Water Pump - Install” for the correct procedure.

7. Tighten bolts (3), (4) and (5) to a torque of 22 N·m (16 lb ft).

8. Tighten the bolts for the water pump to a torque of 22 N·m (16 lb ft).

End By:

a. If the engine is equipped with a fan, install the fan. Refer to Disassembly and Assembly, “Fan - Remove and Install”.

i02628883

Gear Group (Front) - Remove and Install

Removal Procedure

Table 29

Required Tools			
Tool	**Part Number**	**Part Name**	**Qty**
A[1]	21825576	Crankshaft Turning Tool	1
A[2]	27610291	Barring Device Housing	1
	27610289	Gear	1
B	27610212	Camshaft Timing Pin	1
C	27610211	Crankshaft Timing Pin	1

Start By:

a. If the engine is equipped with an air compressor, remove the air compressor. Refer to Disassembly and Assembly, “Air Compressor - Remove and Install”.

b. If the engine is equipped with a vacuum pump, remove the vacuum pump. Refer to Disassembly and Assembly, “Vacuum Pump - Remove and Install”.

c. If the engine is equipped with an accessory drive, remove the accessory drive. Refer to Disassembly and Assembly, “Accessory Drive - Remove and Install”.

d. Remove the front cover. Refer to Disassembly and Assembly, “Front Cover - Remove and Install”.

e. Remove the valve mechanism cover. Refer to Disassembly and Assembly, “Valve Mechanism Cover - Remove and Install”.

Note: Either Tooling (A) can be used. Use the Tooling that is most suitable.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

1. Ensure that the coolant is drained into a suitable container for storage or disposal. Refer to Operation and Maintenance Manual, “Cooling System Coolant - Change” for the correct procedure.

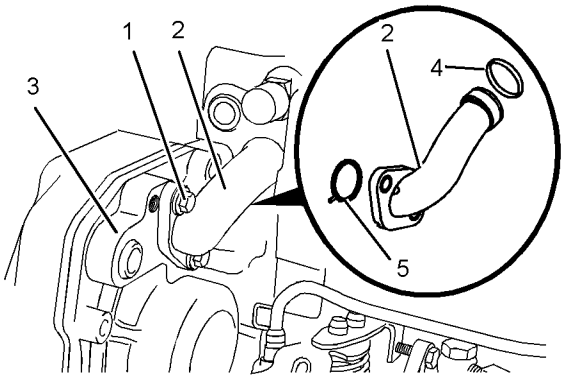


Illustration 108 g01337982
Typical example

2. Remove bolts (1) that secure bypass tube (2) to front housing (3). Note the position of any brackets that are secured by the bolts. Remove bypass tube (2). Remove O-ring seals (4) and (5) from bypass tube (2).

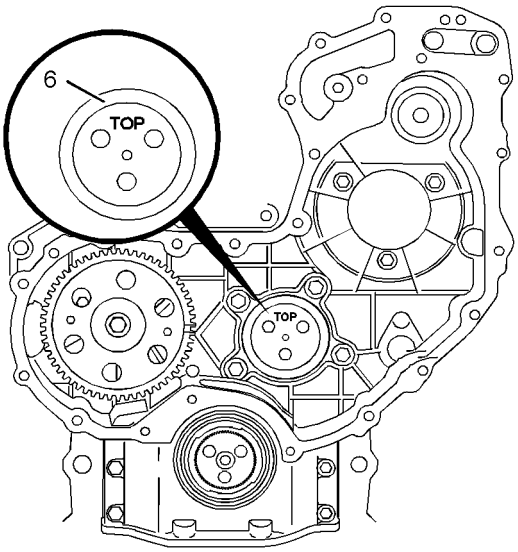


Illustration 109 g01350333

3. If the engine is equipped with a heavy duty idle gear. Remove plate (6). Refer to Disassembly and Assembly, “Idler Gear - Remove” for the correct procedure.

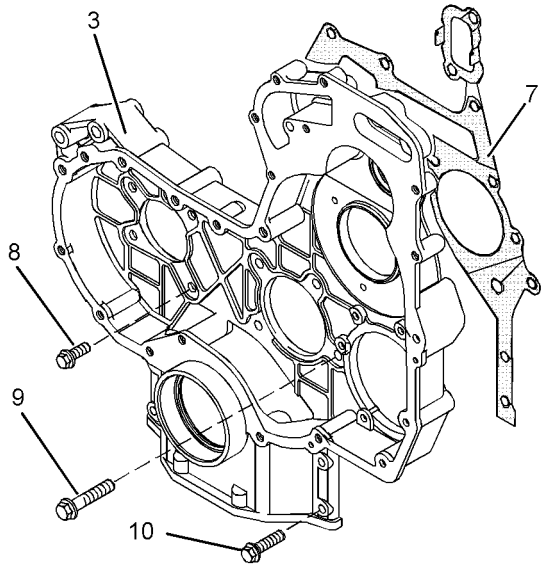


Illustration 110 g01350336
Typical example

4. Remove bolts (8), (9) and (10) from front housing (3).

Note: The bolts are three different lengths. Note the positions of the different bolts.

5. Remove front housing (3) from the cylinder block.

6. Remove joint (7).

Disassembly Procedure

⚠ WARNING

Personal injury can result from parts and/or covers under spring pressure.

Spring force will be released when covers are removed.

Be prepared to hold spring loaded covers as the bolts are loosened.

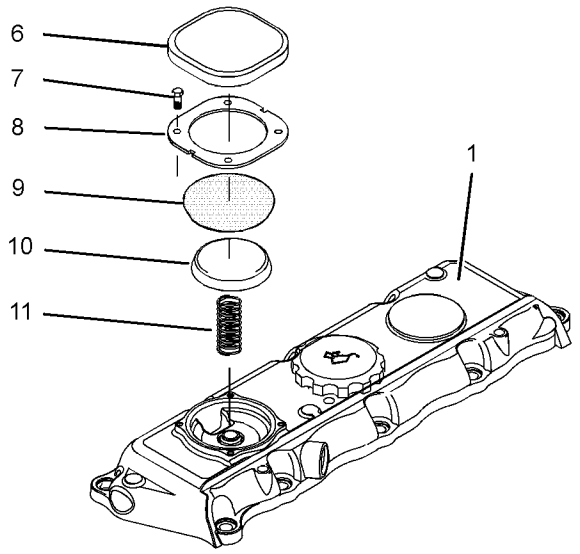


Illustration 134 g01347463
Typical example

1. Remove plastic cover (6) from valve mechanism cover (1).
2. Remove screws (7). Remove plate (8).
3. Remove assembly of diaphragm (9) and the cap (10). Remove spring (11).

Assembly Procedure

Table 40

Required Tools			
Tool	**Part Number**	**Part Name**	**Qty**
A	27610296	Torque Wrench	1

⚠ WARNING

Personal injury can result from parts and/or covers under spring pressure.

Spring force will be released when covers are removed.

Be prepared to hold spring loaded covers as the bolts are loosened.

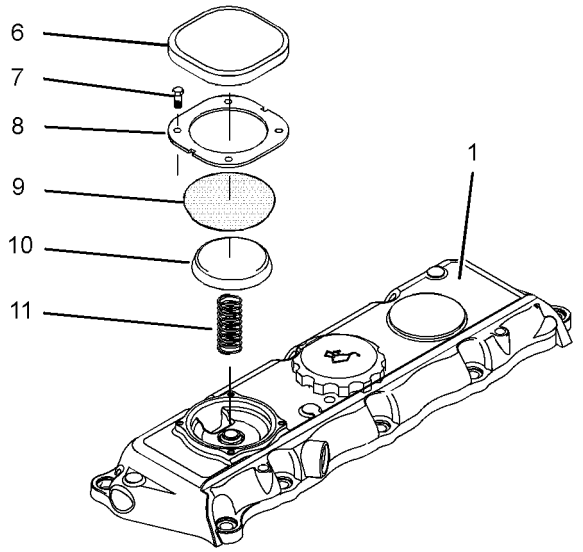


Illustration 135 g01347463
Typical example

1. Ensure that all components of the crankcase breather are clean and free from damage. Replace any components that are damaged.
2. Install spring (11). Install assembly of diaphragm (10) and cap (9).
3. Position plate (8) on valve mechanism cover (1) and install screws (7).
4. Use Tooling (A) to tighten screws (7) to a torque of 1.3 N·m (12 lb in).
5. Install plastic cover (6) to valve mechanism cover (1).

Installation Procedure

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

b. Use Tooling (B) in order to check the threads of the bolts. Refer to Illustration 154. Replace any bolts that show visual reduction in the diameter of the thread over length (Y).

9. Lubricate the threads and the shoulder of bolts (6) with clean engine oil.

10. Remove Tooling (A).

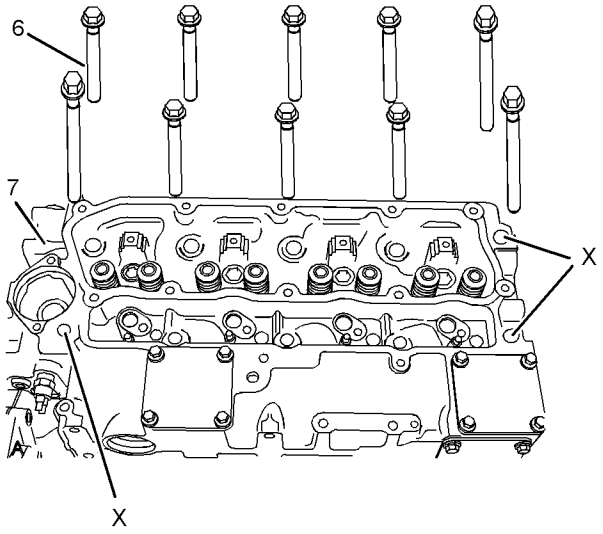


Illustration 155 g01323622

11. Install bolts (6) to cylinder head (7).

Note: There are two different lengths of bolts (6) for cylinder head (7). Install longer bolts in position (X) in the cylinder head.

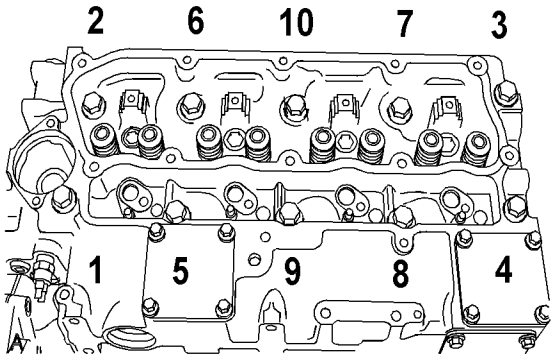


Illustration 156 g01352300

Sequence for tightening the bolts for cylinder head

12. Tighten bolts (6) to a torque of 50 N·m (37 lb ft) in the sequence that is shown in Illustration 156.

13. Tighten bolts (6) to a torque of 100 N·m (74 lb ft) in the sequence that is shown in Illustration 156.

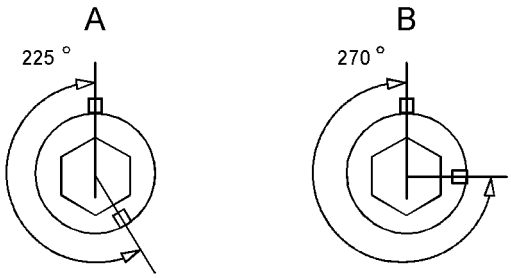


Illustration 157 g01352369

(A) Short bolts

(B) Long bolts

14. Use Tooling (C) to turn bolts (6) through an additional angle in the sequence that is shown in Illustration 156.

Turn the long bolts through 270 degrees.

Turn the short bolts through 225 degrees.

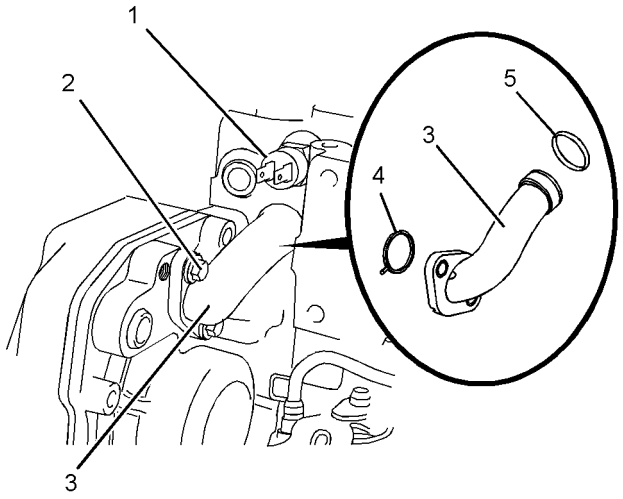


Illustration 158 g01344073

15. Install new O-ring seals (4) and (5) to bypass tube (3). Use Tooling (D) in order to lubricate the O-ring seal (5). Install the bypass tube to the cylinder head. Install bolts (2). Ensure that any brackets that are secured by the bolts are installed in the correct position. Tighten the bolts to a torque of 22 N·m (16 lb ft).

16. Connect the harness assembly to sensor (1).

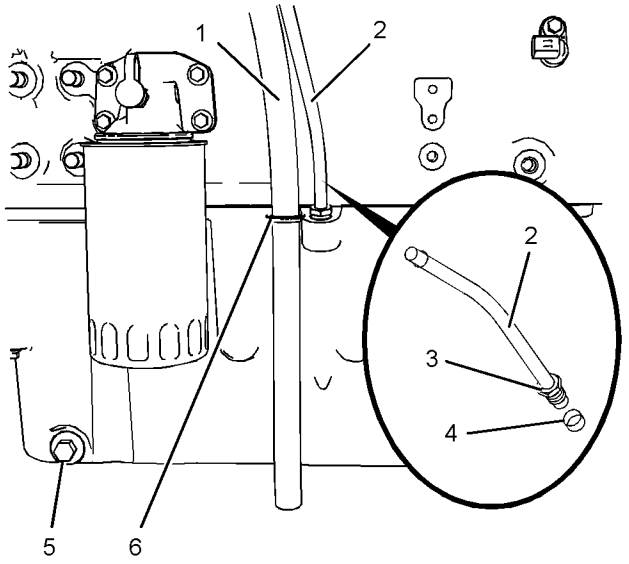


Illustration 180
g01344541
Typical example

6. Align the assembly of the engine oil pan with Tooling (A). Install the assembly of the engine oil pan to the cylinder block.

7. Install bolts (9) finger tight. Install clip (6) in the correct position.

8. Remove Tooling (A).

9. Apply Tooling (C) to bolts (10). Install bolts (10) and the remaining bolts (9).

10. Tighten bolts (9) and (10) to a torque of 22 N·m (16 lb ft).

11. Install a new O-ring seal (11) to drain plug (5). Install the drain plug to engine oil pan (8). Tighten the oil drain plug to a torque of 34 N·m (25 lb ft).

12. If necessary, follow Steps 12.a through 12.c in order to install the assembly of the dipstick tube.

a. Install a new seal (4) to tube assembly (2).

b. Apply Tooling (C) to nut (3). Install the tube assembly to the engine oil pan.

Note: Ensure that the orientation of the tube assembly is correct.

c. Tighten nut (3) to a torque of 18 N·m (13 lb ft). Install the dipstick.

13. Fill the engine oil pan to the correct level. Refer to Operation and Maintenance Manual, “Engine Oil and Filter - Change” for the procedure.

i02628835

Engine Oil Pan - Remove and Install (Cast Iron Oil Pan)

Removal Procedure

Note: In order to remove a cast iron oil pan, the engine must be removed from the machine. Ensure that the engine lubricating oil is drained. Refer to Operation and Maintenance Manual, “Engine Oil and Filter - Change” for the correct procedure.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

1. The engine should be mounted in a suitable stand and placed in the inverted position.

6. Temporarily install connecting rod cap (2) and bolts (1) to the connecting rod when the assembly is out of the engine. Tighten bolts (1) to a torque of 20 N·m (14 lb ft).

Note: Fracture split connecting rods should not be left without the connecting rod caps installed. Ensure that the etched number on connecting rod cap matches the etched number on connecting rod. Ensure the correct orientation of the connecting rod cap.

7. Repeat Steps 1 through 5 for the remaining pistons and connecting rods.

i02628898

Pistons and Connecting Rods - Disassemble

Disassembly Procedure

Table 60

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	-	Circlip Pliers	1
B	-	Piston Ring Expander	1

Start By:

a. Remove the pistons and the connecting rods. Refer to Disassembly and Assembly, “Piston and Connecting Rods - Remove”.

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Make a temporary mark on the components of the piston and connecting rod assembly. This will ensure that the components of each piston and connecting rod assembly can be reinstalled in the original cylinder. Mark the underside of the piston on the front pin boss. Do not interchange components.

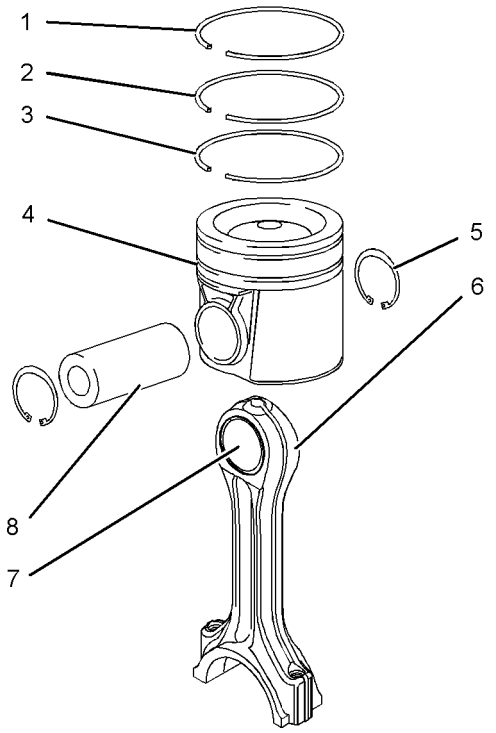


Illustration 204 g01244067

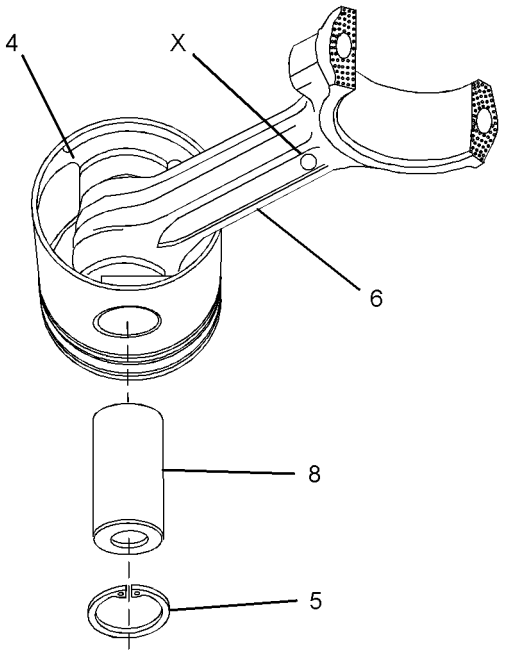


Illustration 205 g01253091
Typical example

1. Ensure that the main bearings are clean and free from wear or damage. If necessary, replace the main bearings.

2. Clean the journals of the crankshaft. Inspect the journals of the crankshaft for damage. If necessary, replace the crankshaft or recondition the crankshaft.

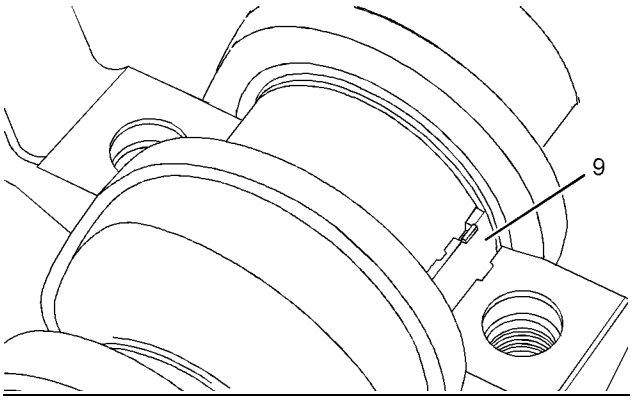


Illustration 225 g01253145
Typical example

3. Lubricate the crankshaft journal and the upper main bearing (9) with clean engine oil. Slide the upper main bearing (9) into position between the crankshaft journal and the cylinder block. Ensure that the locating tab for the upper main bearing is correctly seated in the slot in the cylinder block.

Note: The upper main bearing has a groove and two oil holes.

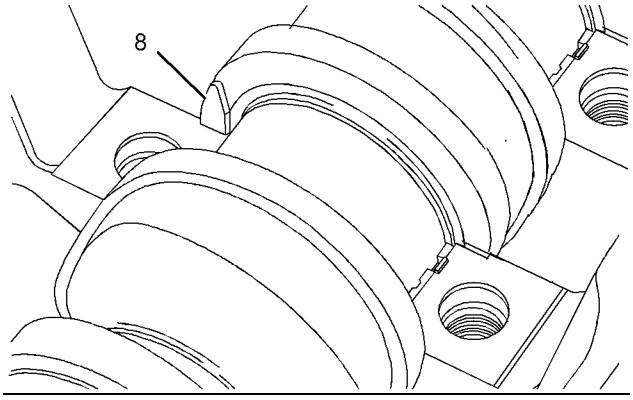


Illustration 226 g01261200
Typical example

4. For number three main bearing, ensure that thrust washers (8) are clean and free from wear or damage. If necessary, replace the thrust washers. Lubricate thrust washers (8) with clean engine oil. Slide the thrust washers into position between the crankshaft and the cylinder block. The grooves in the thrust washers must be located against the crankshaft.

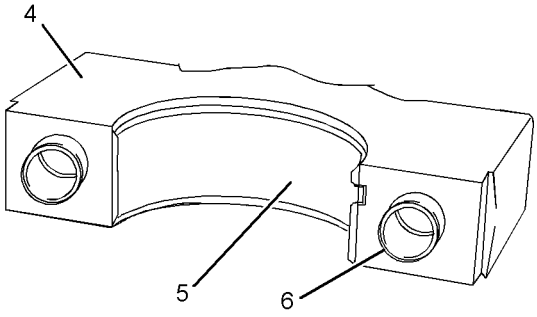


Illustration 227 g01253146
Typical example

5. Install lower main bearing (5) into main bearing cap (4). Ensure that the locating tab for the lower main bearing is correctly seated into the slot in the bearing cap.

Note: The lower main bearing is a plain bearing that has no oil holes.

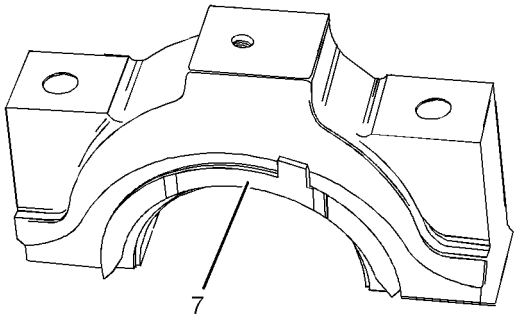


Illustration 228 g01253137
Typical example

6. For number three main bearing cap, ensure that thrust washers (7) are clean and free from wear or damage. If necessary, replace the thrust washers. Lubricate thrust washers (7) with clean engine oil. Place the thrust washers into position on the main bearing cap. Ensure that the locating tab is correctly seated in the main bearing cap.

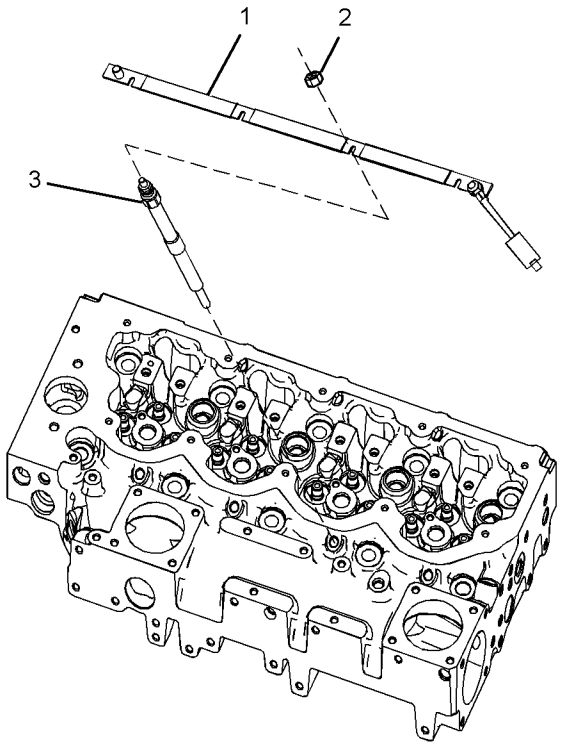


Illustration 252 g01346250
Typical example

4. Disconnect harness assembly from bus bar (1).

5. Remove nuts (2) that secure bus bar (1) to glow plugs (3).

6. Remove bus bar (1) from glow plugs (3).

7. Remove glow plugs (3) from the cylinder head.

Installation Procedure

Table 71

Required Tools			
Tool	**Part Number**	**Part Name**	**Qty**
A	27610296	Torque Wrench	1

NOTICE
Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Ensure that the threads of the glow plugs are clean and free from damage. Replace any damaged glow plugs.

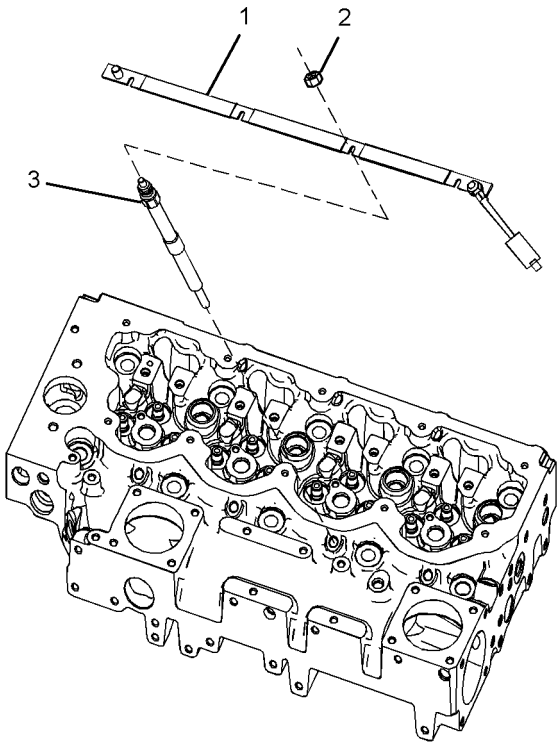


Illustration 253 g01346250
Typical example

2. Install glow plugs (3) into the cylinder head. Tighten the glow plugs to a torque of 15 N·m (132 lb in).

3. Position bus bar (1) onto glow plugs (3). Install nuts (2) onto the glow plugs. Use Tooling (A) in order to tighten the nuts to a torque of 2 N·m (17 lb in).

4. Connect harness assembly to bus bar (1).

5. Install the breather tube to the valve mechanism cover. Refer toDisassembly and Assembly, “Crankcase Breather- Remove and Install”.

6. If the engine is equipped with a cover over the fuel injectors install the cover. Refer toDisassembly and Assembly, “Fuel Injector Cover - Remove and Install”.

7. Restore the electrical supply to the engine.

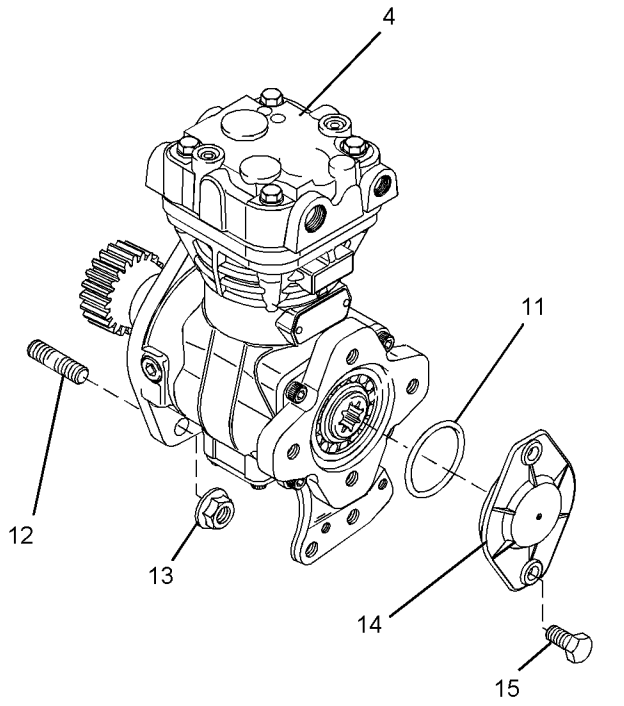


Illustration 270 g01250816
Typical example

11. Support air compressor (4). Remove nuts (13) and remove the air compressor from front housing (6).

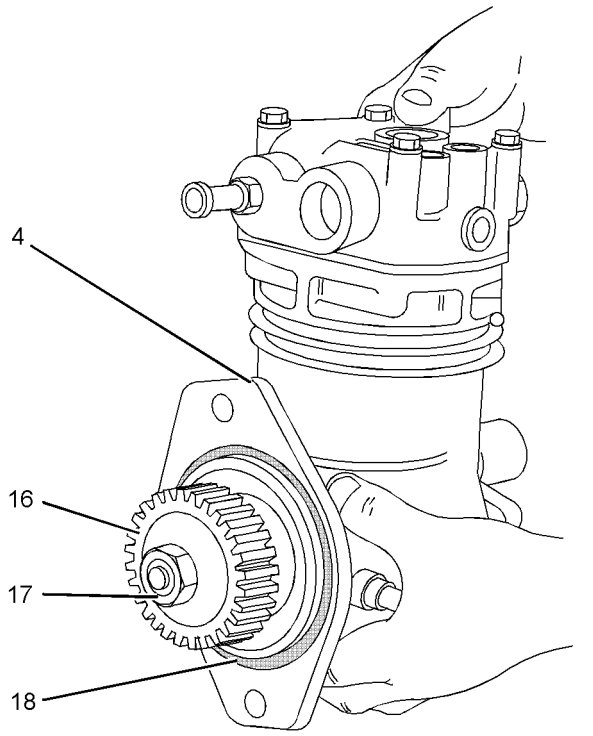


Illustration 271 g01250889
Typical example

12. Remove O-ring seal (18) from air compressor (4).

13. If necessary, remove bolts (15) and remove plate (14). Remove O-ring seal (11) from plate (14). Refer to Illustration 270.

14. If necessary, remove nut (17) and remove the spring washer. Use Tooling (C) in order to remove gear (16) from the crankshaft of the air compressor.

Installation Procedure

Table 76

Required Tools			
Tool	**Part Number**	**Part Name**	**Qty**
B	27610211	Crankshaft Timing Pin	1
D	21826051	POWERPART High Strength Retainer	-
E	21820221	POWERPART Rubber Grease	-

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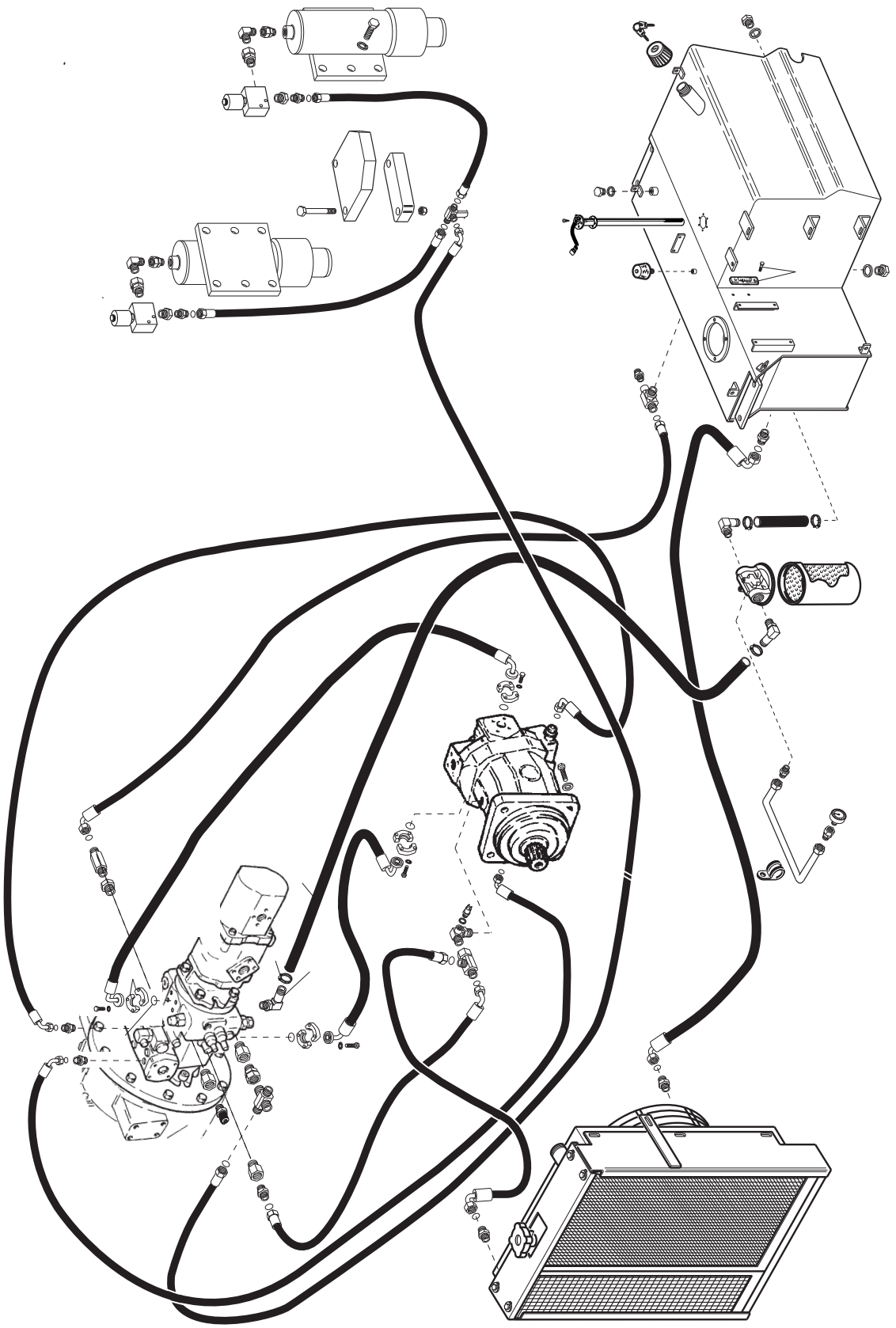
IT EN DE

TRASMISSIONE IDROSTATICA **TRANSMISSION HYDROSTAIC** **HYDROSTATISCHES GETRIEBE**



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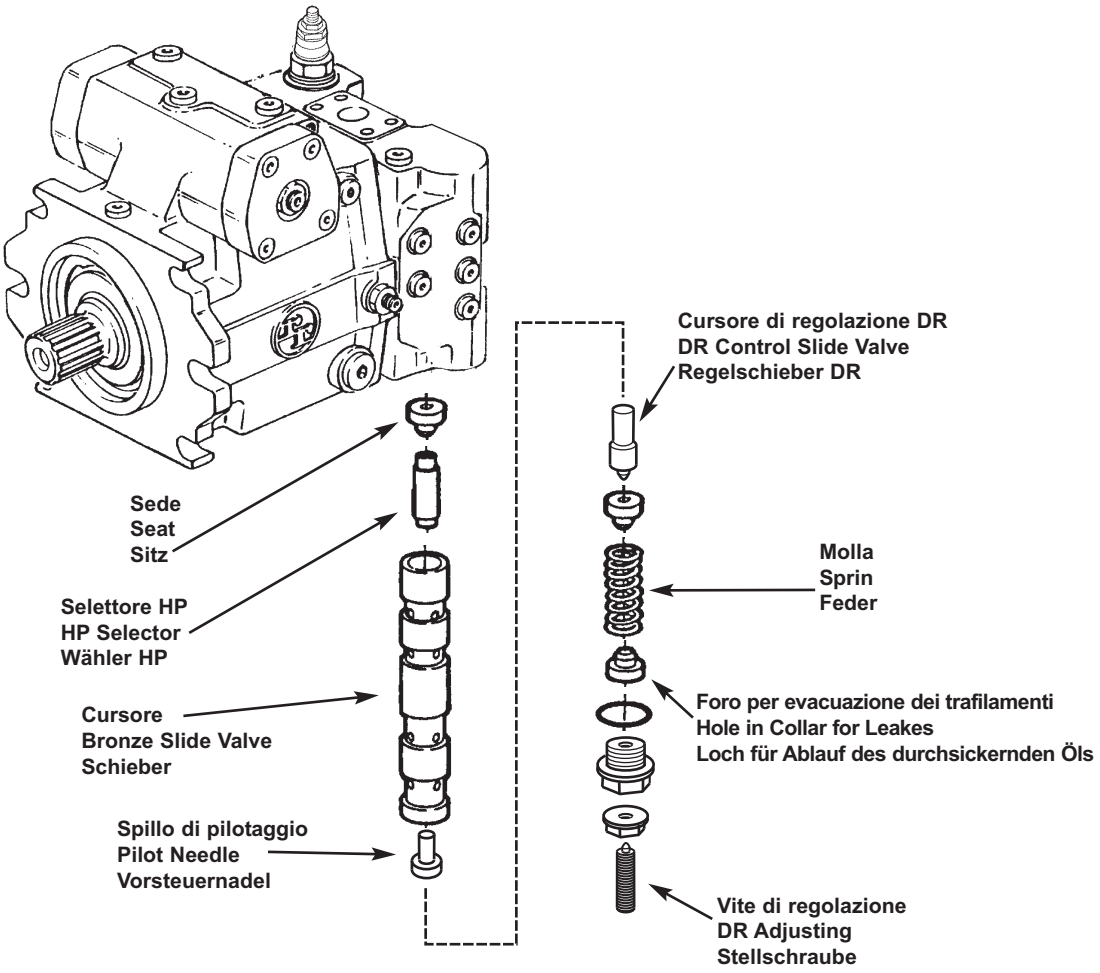
VALVOLA DR **DR VALVE** **VENTIL DR**



In caso di grande caduta del regime del motore termico, controllare che lo spillo di pilotaggio non sia "grippato" nel cursore

In the event of a considerable drop in the IC engine speed, check that the pilot needle has not become stuck in the slide valve

Bei einem starken Abfall der Drehzahlen des Verbrennungsmotors sicherstellen, dass die Vorsteuernadel nicht im Schieber festgefressen ist.

IT

REGISTRAZIONE DEI LIMITATORI HP:

• Smontare la valvola completa dal corpo.

• Svitare il grano Rif. 2, mantenendo fermo con una chiave la vite Rif. 3.

• Avvitando la vite Rif. 3 aumenta la pressione (circa 44 bar 1 giro).

• Ribloccare il grano Rif. 2.

BY PASS DEI LIMITATORI HP PER IL TRAINO DELLA MACCHINA :

• Rilevare la quota “X”

• Sbloccare il controdado “4”

• Avvitare la vite “1” fino alla pari del controdado

• Procedere in senso inverso per rimettere in funzione i limitatori HP al raggiungimento del valore della quota “X”

Il traino dovrà essere effettuato a velocità molto bassa e per breve distanza.

EN

HP LIMITERS ADJUSTMENT:

• Dismantle the valve completely from the body.

• Unscrew grub screw Ref. 2, holding screw Ref. 3 steady with a wrench.

• Tightening screw Ref. 3 will cause the pressure to increase (approx. 44 bar /turn).

• Relock grub screw Ref. 2.

VEHICLE TOWING HP LIMITERS BY PASS:

• Measure “X”

• Unscrew lock nut “4”

• Tighten screw “1” level with the lock nut

• Proceed in the reverse direction to restart working of the HP limiters when the value “X” is reached.

The vehicle must be towed at very low speed and to a very short distance.

DE

EINSTELLUNG DER BEGRENZER HP:

• Das Ventil ganz aus dem Gehäuse ausbauen.

• Die Madenschraube Bez. 2 losschrauben, wobei man die Schraube Bez. 3 mit einem Schlüssel festhält.

• Beim Anziehen der Schraube Bez. 3 nimmt der Druck zu (circa 44 bar/Umdrehung).

• Die Madenschraube Bez. 2 wieder anziehen.

BY-PASS DER BEGRENZER HP ZUM ABSCHLEPPEN DER MASCHINE:

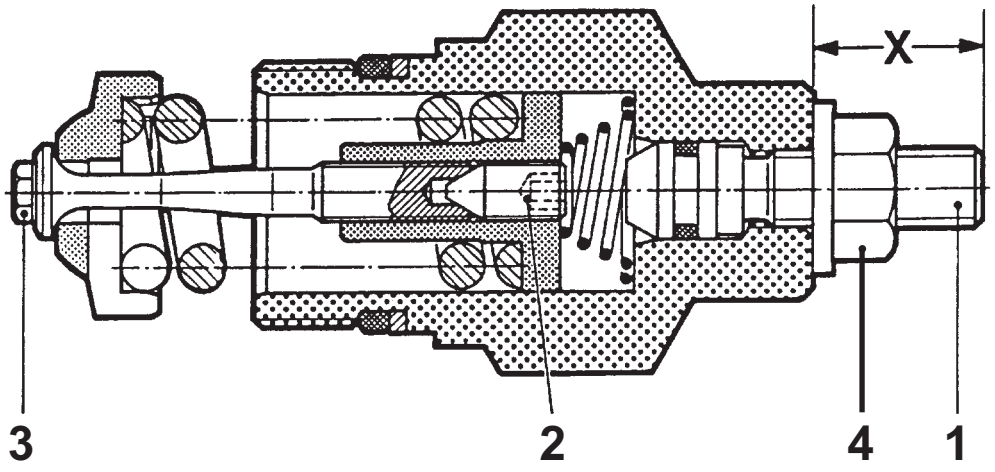
• Den Wert “X” messen.

• Die Gegenmutter “4” freigeben.

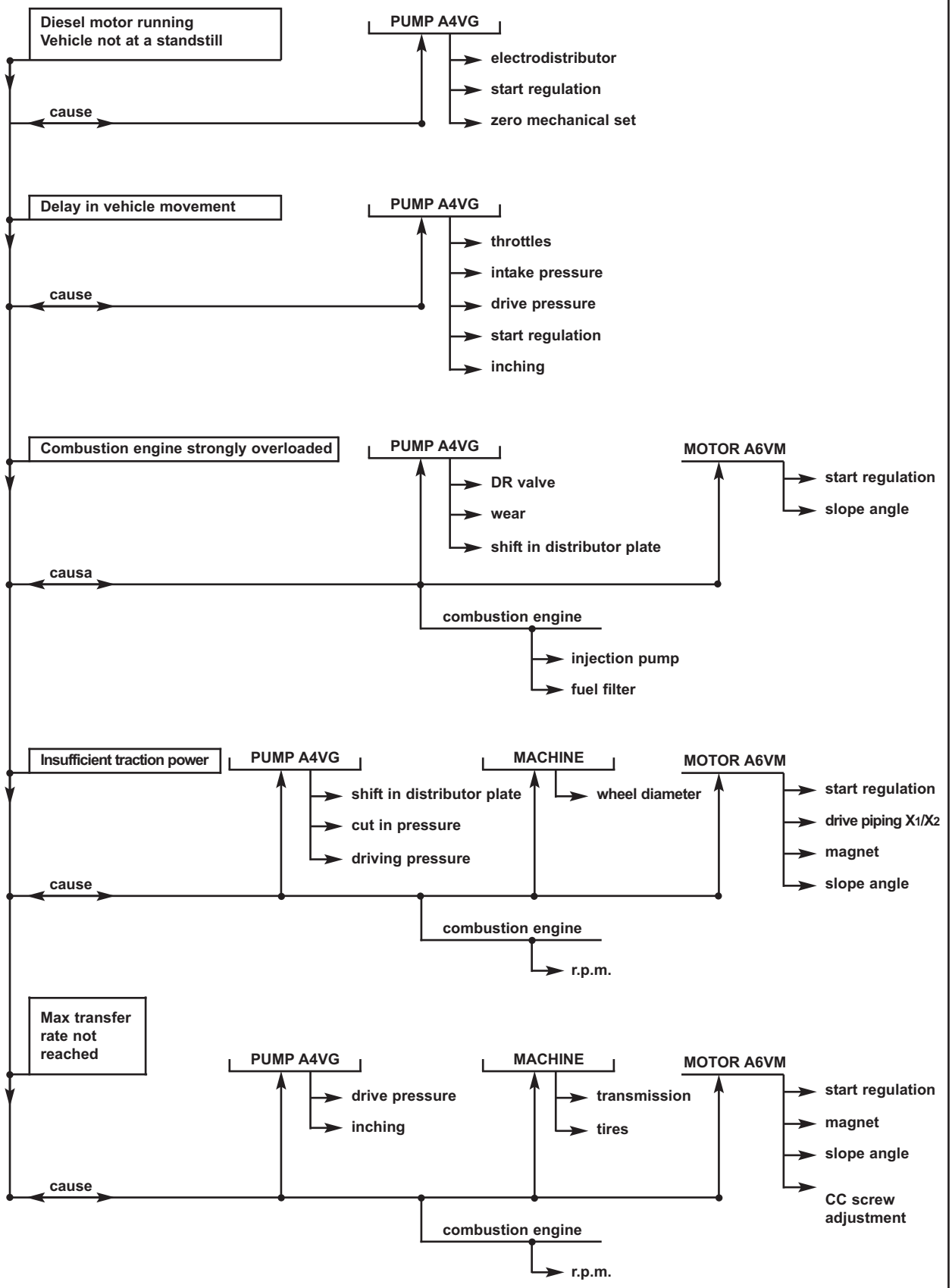
• Die Mutter “1” bis zur Gegenmutter anziehen.

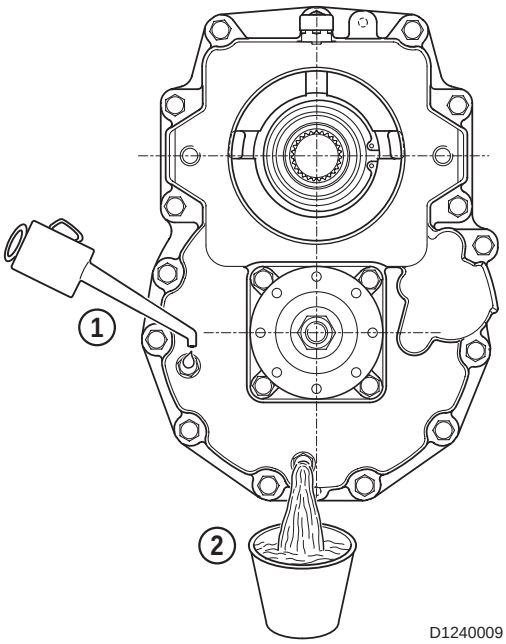
• In der umgekehrten Richtung vorgehen, um die Begrenzer HP wieder in Betrieb zu setzen, wenn der Wert von “X” erreicht ist.

Das Abschleppen ist bei minimaler Geschwindigkeit und nur über kurze Strecken vorzunehmen.



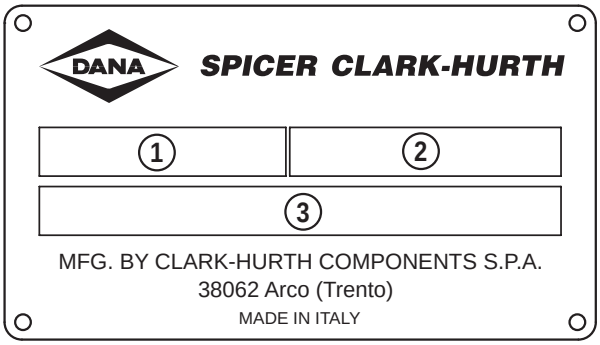
TROUBLESHOOTING - MACHINE





1 Oil fill and level plug
Tappo carico e livello olio
Öleinfüll- und Ölstandschraube
Tapón de relleno y nivel aceite
Bouchon de remplissage et jauge d'huile

2 Oil drain plug
Tappo scarico olio
Öleinfüll- und Ölablaßschraube
Tapón de vaciado nivel aceite
Bouchon de vidage huile



1 Type and model unit
Tipo e modello gruppo
Type und modell Antriebes
Tipo y modelo unidad
Type et modéle de ensemble

2 Serial number
Numero di serie
Seriennummer
Número de serie
Numero de serie

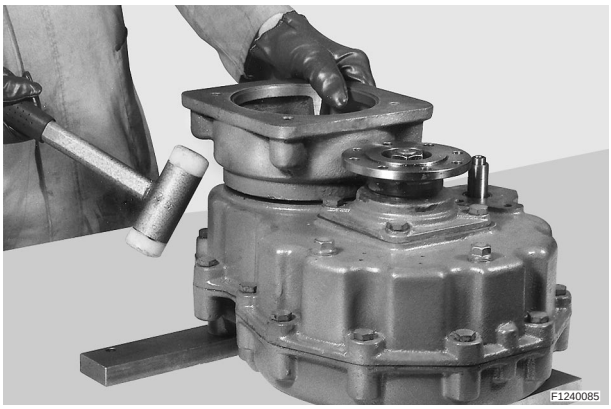
3 Lubrificant
Lubrificante
Schmieroel
Lubricante
Lubrificant

OPERATION OPERAZIONE ARBEITSVORGANG OPERACION OPERATION	FREQUENCY PERIODICITÀ ZEITABSTAND FRECUENCIA PERIODICITE	LUBRICANTS LUBRIFICANTI SCHMIERSTOFFE LUBRICANTES LUBRIFIANTS
• Check levels: • Controllo livelli: • Ölstandkontrolle: • Control niveles: • Contrôle niveaux:	monthly mensile monatlich cada mes mensuel	SAE85W90 API GL3
• Oil change: • Cambio olio: • Ölwechsel: • Cambio aceite: • Vidange huile:	every 1000 hours ✻ ogni 1000 ore alle 1000 Std. cada 1000 horas toutes les 1000 hours	

✻ Initially after 100 working hours - Inizialmente dopo 100 ore di lavoro - Erstmals nach 100 Betriebstunden - Al principio, después de 100 horas de trabajo - Initialement après 100 heures de travail

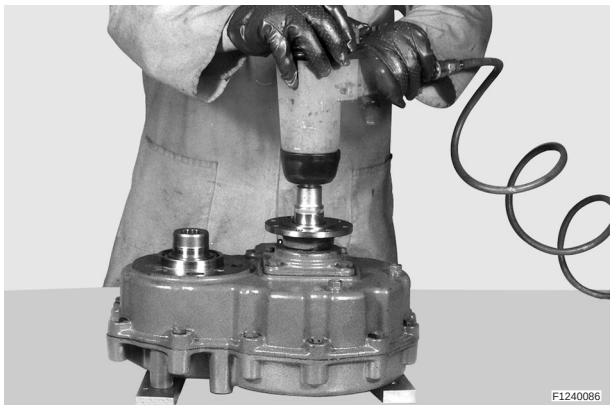
GB a

Remove screws from the motion input cover.



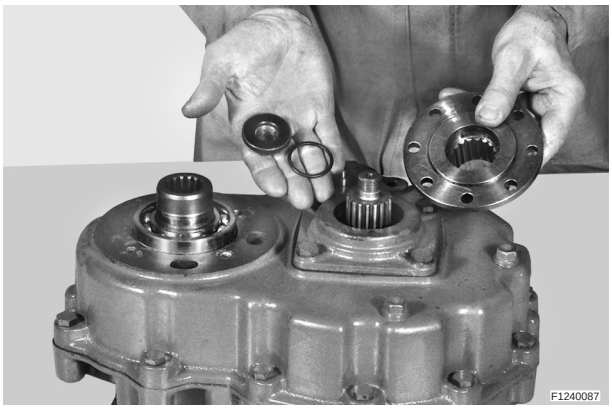
GB b

Disjoin the motion entrance cover.



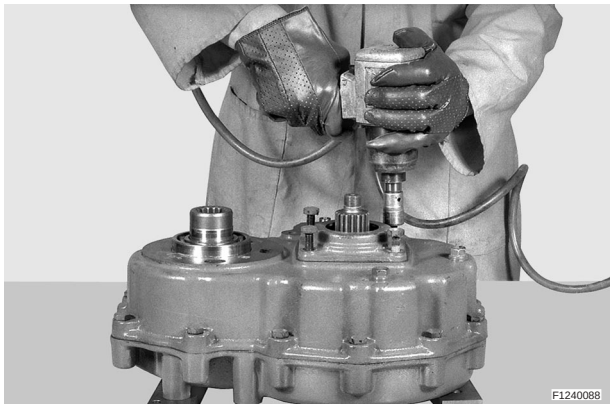
GB c

Remove the nut from the flange.



GB d

Remove the O-ring and pull out the flange.

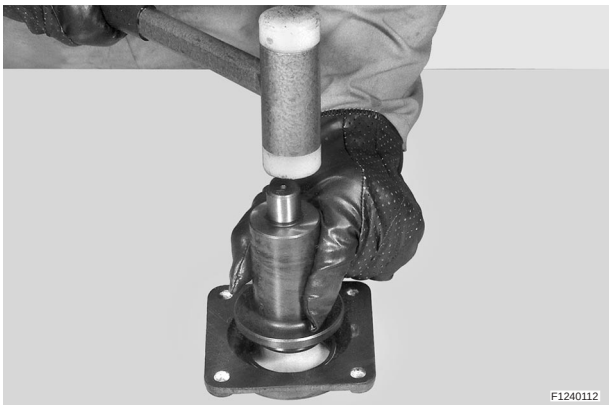


GB e

Remove screws from the cover.

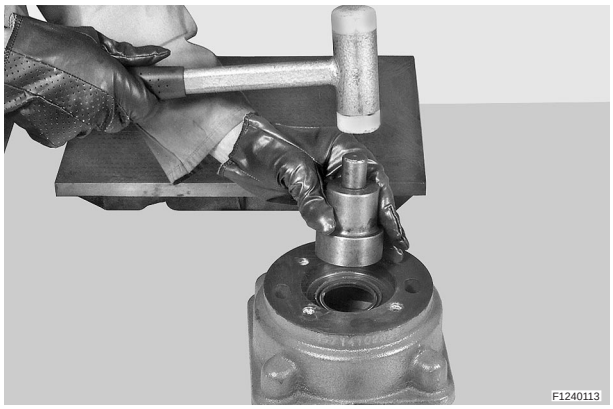
GB a

Pull out the sealing ring of the cover.



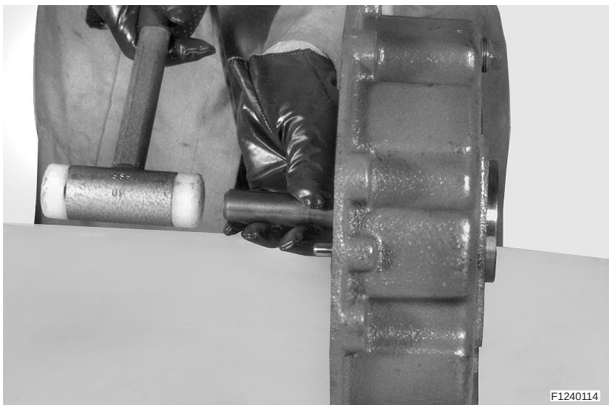
GB b

Re-insert a new sealing ring.



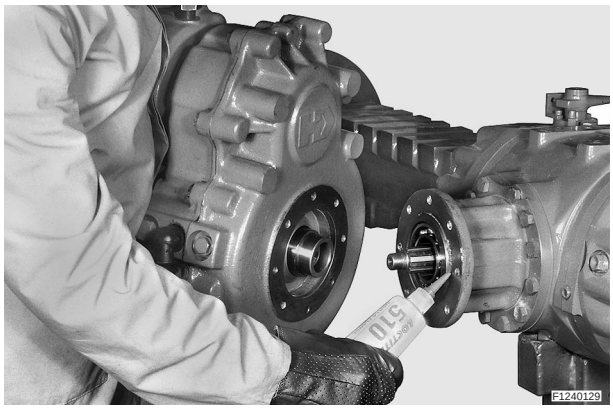
GB c

Pull out the sealing ring from the motion input cover.



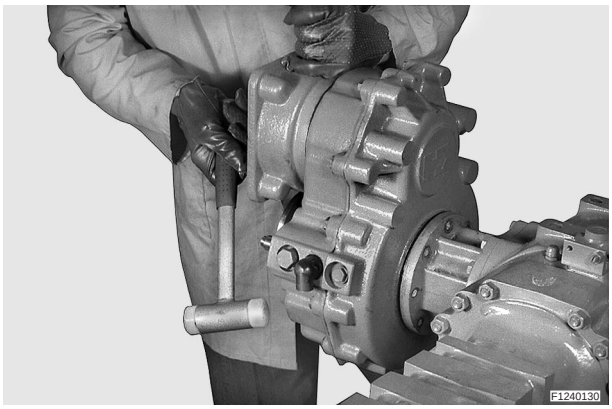
GB d

Remove the bearing from the cover of the reduction unit.



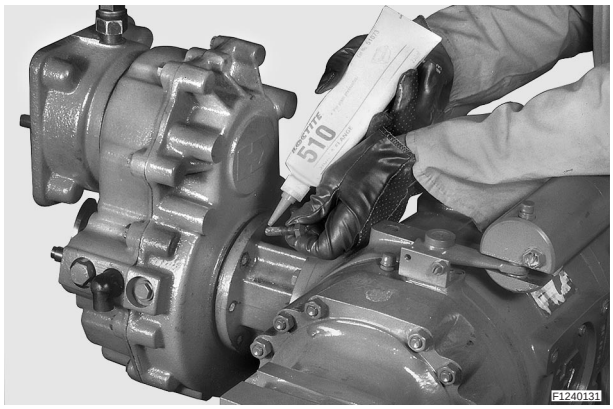
GB a

Re-fit the reduction unit onto the axle by spreading LOCTITE 510 on the planes.



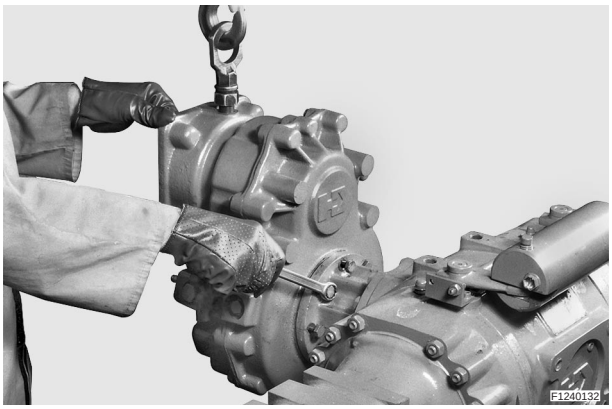
GB b

Fasten the support planes (turn flange to assist assembly).



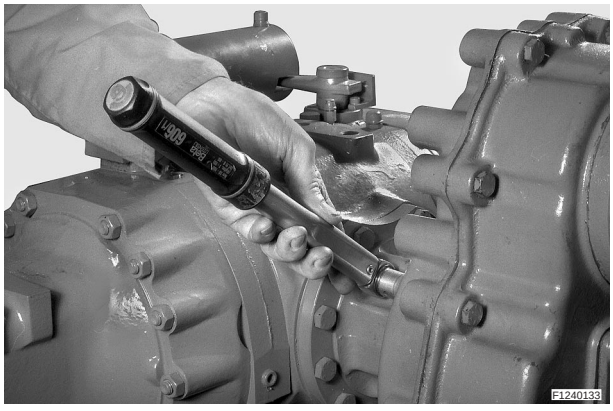
GB c

Insert screws by applying LOCTITE 510.



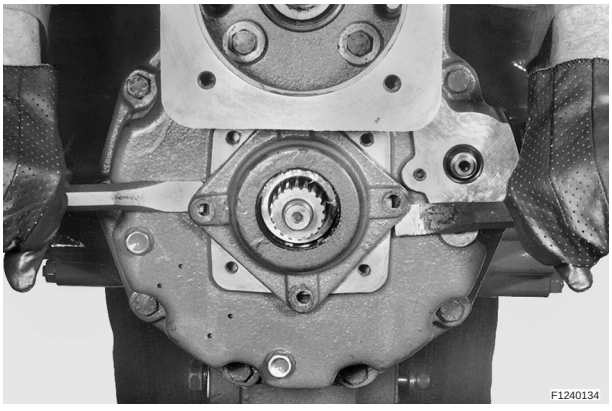
GB d

Screw down by placing the reduction unit in a vertical position in relation to the axis.



GB e

Tighten screws using a torque wrench setting of 49–51 Nm.



GB f

Extract screws and remove the temporarily assembled cover.

SMONTAGGIO DEL PONTE ANTERIORE-POSTERIORE E DEL MOTORE IDROSTATICO

DISASSEMBLING FRONT-REAR AXLE AND HYDROSTATIC MOTOR

AUSBAU DER VORDER-/HINTERACHSE UND DES HYDROSTATISCHEN MOTORS

MRT 1440-1640-1840 EASY

IT-EN-DE

IT

MONTAGGIO DEL PONTE POSTERIORE

Con la macchina stabilizzata e motore termico spento, portare l'assale posteriore in corrispondenza della sua posizione originaria e mantenerlo fermo.

Collegare l'assale al telaio tramite le viti lato anteriore (Fig. 1 - Rif. A) e lato posteriore (Fig. 2 - Rif. B).

Prima del collegamento assicurarsi che il riferimento punzonato sul telaio (Fig. 3 - Rif. C) *corrisponda col riferimento della staffa* (Fig. 3 - Rif. D).

Eseguire il collegamento dei tubi precedentemente smontati.

Ricollegare l'albero cardanico nella sua posizione predefinita (Fig. 4 - Rif. E) utilizzando loctite 270 per il fissaggio delle viti.

Ripristinare i collegamenti elettrici.

Rimontare le ruote.

EN

ASSEMBLING THE REAR AXLE

With the machine stabilised and the engine switched off, bring the rear axle to correspond with its original position and hold it in place.

Connect the axle to the chassis by means of the screws on the front (Fig. 1 - Ref. A) and rear side (Fig. 2 - Ref. B).

Before making the connection, make sure the reference punched on the chassis (Fig. 3 - Ref. C) corresponds to the reference on the bracket (Fig. 3 - Ref. D).

Connect the tubes dismantled earlier.

Re-connect the cardan shaft in its predefined position (Fig. 4 - Ref. E) using Loctite 270 to secure the screws.

Restore the electric wiring connections.

Refit the wheels.

DE

EINBAU DER HINTERACHSE

Mit stabilisierter Maschine und abgestelltem Verbrennungsmotor die Hinterachse auf die Höhe ihrer ursprünglichen Position bringen und dort festhalten.

Die Achse mit den Schrauben auf der Vorderseite (Abb. 1 - Bez. A) und der Hinterseite (Abb. 2 - Bez. B) mit dem Fahrgestell verbinden.

Vor der Verbindung sicherstellen, dass der auf dem Fahrgestell eingeschlagene Bezugspunkt (Abb. 3 - Bez. C) *mit dem Bezug auf dem Bügel* (Abb. 3 - Bez. D) *übereinstimmt.*

Die zuvor ausgebauten Leitungen wieder anschließen.

Die Gelenkwelle wieder in ihrer vorgegebenen Position (Abb. 4 - Bez. E) anschließen und zur Befestigung der Schrauben Loctite 270 benutzen.

Die elektrischen Verbindungen wiederherstellen.

Die Räder wieder montieren.

CONVERSION TABLES - TABELLE DI CONVERSIONE - UMRECHNUNGSTABELLEN
TABLAS DE CONVERSION - TABLEAUX DE CONVERSION

Units of pressure - Unità di pressione - Druckeinheiten
Unidad de presión - Unités de pression: 1 Atm ≅ 1 bar ≅ 10^5 P_A ≅ 14.4 P_{Si}

Units of weight - Unità di peso - Gewichtseinheiten
Unidad de peso - Unités de poids

	N	daN	kN	kg	lbs
1N	1	0,1	0,001	0,102	0,225
1daN	10	1	0,01	1,02	2,25
1kN	1000	100	1	102	225
1kg	9,81	0,981	0,00981	1	2,205

Units of torque - Unità di coppia - Drehmomenteinheiten
Unidad de par - Unités de couple

	Nm	daNm	kNm	kgm	lb-in
1Nm	1	0,1	0,001	0,102	8,854
1daNm	10	1	0,01	1,02	88,54
1kNm	1000	100	1	102	8854
1kgm	9,81	0,981	0,00981	1	86,8
1lb-in	0,1129	0,01129	0,0001129	0,01152	1

TIGHTENING TORQUES - COPPIE DI SERRAGGIO - ANZIEHDREHMOMENTE
PARES DE TORSION - COUPLES DE SERRAGE

Unit - Unità di misura - Meßeinheiten - Unidad de medida - Unités de mesure: Nm

SIZE OF BOLT MISURA VITE SCHRAUBENMASS TAMAÑO TORNILLO MESURE VIS		TYPE OF BOLT - TIPO VITE - GEWINDE - TIPO DE TORNILLO - TYPE DE VIS					
		8.8		10.9		12.9	
		Normali + Loctite 242	Loctite 270	Normali + Loctite 242	Loctite 270	Normali + Loctite 242	Loctite 270
COARSE PITCH - PASSO GROSSO - GROßER SCHRITT - PASO GRUESO - GROS PAS	M6 x 1	9,5-10,5	10,5-11,5	14,3-15,7	15,2-16,8	16,2-17,8	18,1-20,0
	M8 x 1,25	23,8-26,2	25,6-28,4	34,2-37,8	36,7-40,5	39,0-43,0	43,7-48,3
	M10 x 1,5	48-53	52-58	68-75	73-81	80-88	88-97
	M12 x 1,75	82-91	90-100	116-128	126-139	139-153	152-168
	M14 x 2	129-143	143-158	182-202	200-221	221-244	238-263
	M16 x 2	200-221	219-242	283-312	309-341	337-373	371-410
	M18 x 2,5	276-305	299-331	390-431	428-473	466-515	509-562
	M20 x 2,5	390-431	428-473	553-611	603-667	660-730	722-798
	M22 x 2,5	523-578	575-635	746-824	817-903	893-987	974-1076
	M24 x 3	675-746	732-809	950-1050	1040-1150	1140-1260	1240-1370
	M27 x 3	998-1103	1088-1202	1411-1559	1539-1701	1710-1890	1838-2032
	M30 x 3,5	1378-1523	1473-1628	1914-2115	2085-2305	2280-2520	2494-2757
FINE PITCH - PASSO FINE - KLEINER SCHRITT PASO FINO - PAS FIN	M8 x 1	25,7-28,3	27,5-30,5	36,2-39,8	40,0-44,0	42,8-47,2	47,5-52,5
	M10 x 1,25	49,4-54,6	55,2-61,0	71,5-78,5	78,0-86,0	86,0-94,0	93,0-103,0
	M12 x 1,25	90-100	98-109	128-142	139-154	152-168	166-184
	M12 x 1,5	86-95	94-104	120-132	133-147	143-158	159-175
	M14 x 1,5	143-158	157-173	200-222	219-242	238-263	261-289
	M16 x 1,5	214-236	233-257	302-334	333-368	361-399	394-436
	M18 x 1,5	312-345	342-378	442-489	485-536	527-583	580-641
	M20 x 1,5	437-483	475-525	613-677	674-745	736-814	808-893
	M22 x 1,5	581-642	637-704	822-908	903-998	998-1103	1078-1191
	M24 x 2	741-819	808-893	1045-1155	1140-1260	1235-1365	1363-1507
	M27 x 2	1083-1197	1178-1302	1520-1680	1672-1848	1834-2027	2000-2210
	M30 x 2	1511-1670	1648-1822	2138-2363	2332-2577	2565-2835	2788-3082

a

ITA Pulire accuratamente il pistone (9) e le sedi di scorrimento e tenuta.
Sostituire le guarnizioni OR (11) e (12) e gli anelli antiestrusione (13) e (14), rispettando il senso di montaggio.
ATTENZIONE! Controllare attentamente il posizionamento degli anelli antiestrusione (13) e (14).

D Kolben (9) sowie Gleit- und Dichtungssitze sorgfältig reinigen.
O-Ringe (11) und (12) sowie die Halteringe (13) und (14) auswechseln; dabei auf die Reihenfolge der Montage achten.
ACHTUNG! Position der Halteringe (13) und (14) sorgfältig kontrollieren.

ESP Limpiar minuciosamente el pistón (9) y los alojamientos de deslizamiento y estanqueidad.
Sustituir las juntas OR (11) y (12) y los anillos antiextrusión (13) y (14) teniendo en cuenta el sentido de montaje.
CUIDADO! Controlar atentamente el posicionamiento de los anillos antiextrusión (13) y (14).

F Nettoyer soigneusement le piston (9), les logements de coulissement et d'étanchéité.
Remplacer les garnitures OR (11) et (12), les anneaux anti-extrusion (13) et (14) en respectant le sens du montage.
ATTENTION! Contrôler soigneusement la position des anneaux anti-extrusion (13) et (14).

b

ITA Inserire a filo del pistone (9) le molle (15) per l'autoregolazione della corsa.

D Den Kolben (9) und die Federn (15) zur Selbstregelung des Hubs genau einsetzen.

ESP Introducir a ras del pistón (9) los muelles (15) para la autorregulación de la carrera.

F Introduire, au fil du bord du piston (9) les ressorts (15) pour l'autorégulation de la course.

c

ITA Lubrificare le guarnizioni (11) e (12) e montare nel braccio (3) il pistone (9).
ATTENZIONE!: Controllare che la sede del pistone imbocchi la spina di arresto (**A**) interna al braccio.

D Dichtungen (11) und (12) schmieren und Arm (3) und Kolben (9) montieren.
ACHTUNG! Der Kolben muß den Anhaltestift (**A**) im Inneren des Arms aufnehmen.

ESP Lubricar las juntas (11) y (12) y montar en el brazo (3) el pistón (9).
CUIDADO! Controlar que el alojamiento del pistón encaje en la clavija de tope (**A**) dentro del brazo.

F Lubrifier les garnitures (11) et (12), puis monter dans le bras (3) le piston (9).
ATTENTION! Contrôler que le logement du piston s'emboîte bien avec la broche d'arrêt (**A**) à l'intérieur du bras.

d

ITA Aiutare l'inserimento del pistone (9) con leggeri colpi di mazzuolo in materiale plastico distribuiti lungo la circonferenza.

D Den Kolben (9) einsetzen; diesen dazu leicht mit einem Gummihammer entlang seiner Kreislinie schlagen.

ESP Facilitar la inserción del pistón (9) con ligeros golpes de martillo de material plástico distribuidos en toda la circunferencia.

F Accompagner l'introduction du piston (9) par de légers coups de maillet en matière plastique distribués tout le long de la circonférence.

e

ITA Montare le viti a perno (10) controllando che siano tutte dello stesso colore. Bianco: gioco 1 mm
Giallo: gioco 0,75 mm
Azzurro: gioco 0,5 mm.
Spalmare la filettatura con Loctite 270.
Coppia di serraggio: 5÷7 Nm

D Die Stiftschrauben (10) einsetzen. Diese müssen alle gleichfarbig sein. Weiß: Spiel 1 mm
Gelb: Spiel 0,75 mm
Hellblau: Spiel 0,5 mm.
Das Gewinde mit Loctite 270 schmieren.
Anzugsmoment: 5÷7 Nm.

ESP Montar los pernos roscados (10) controlando que sean todos del mismo color. Blanco: juego 1 mm
Amarillo: juego 0,75 mm
Azul: juego 0,5 mm.
Pasar en la rosca Loctite 270.
Par de torsión: 5÷7 Nm.

F Monter les vis à tourillon (10) en contrôlant si elles sont toutes de ma même couleur. Blanc: jeu 1 mm
Jaune: jeu 0,75 mm
Bleu ciel: jeu 0,5 mm.
Enduire le filetage de Loctite 270.
Couple de serrage: 5÷7 Nm.

f

ITA Montare le molle (8) di ritorno del pistone (9).
ATTENZIONE! Usare molta cautela per non deformare gli attacchi delle molle.

D Die Rückzugsfedern (8) des Kolbens (9) montieren.
ACHTUNG! Sehr vorsichtig vorgehen, um die Federn am Anschluß nicht zu verformen.

ESP Montar los muelles (8) de retorno del pistón (9).
CUIDADO! Tener mucho cuidado a fin de no deformar las uniones de los muelles.

F Monter les ressorts (8) de retour du piston (9).
ATTENTION! Faire très attention à ne pas déformer les raccords des ressorts.

a

ITA Con l'aiuto di una leva verificare che il gioco verticale sia nullo.
Se non é nullo, rilevare il valore del gioco e ridurlo togliendo spessori

D Mit Hilfe eines Hebels auf vertikale Spielfreiheit überprüfen.
Falls es nicht Null ist, die Größe des Spiels messen und durch Entfernen von Unterlegscheiben reduzie-

ESP Haciendo palanca, verificar que no exista juego vertical. Si existiese reducir los espesores ya colocados.

F A l'aide d'un levier verifier que le jeu vertical soit nul.
Si est pas nul relever la valeur du jeu et reduire enmoinsavec les cales.

b

ITA Verificare la coppia di rotazione dei perni, 30-60 Nm.
Se è troppo alto è necessario aumentare gli spessori.

D Drehmoment zum Durchdrehen der Bolzen prüfen.
Es muß zwischen 30 und 60Nm betragen.
Falls es zunächst zu hoch ist, müssen die Unterlegscheiben verstärkt werden.

ESP Verificar el par de rotaciòn de los pernos que debe ser de 30 a 60 Nm . Si fuese demasiado alto aumentar los espesores.

F Verifier la couple de rotation des tourillons de 30 a 60 Nm.
Si le precharge misuree est trop haut, il faut augmenter les cales.

a

ITA Scaldare in olio il cuscinetto a circa 100°C ed infilare sul doppio giunto cardanico (4) la bussola completa (13).

D Lager in Öl auf ca. 100°C erhitzen und auf die Doppelgelenkwelle (4) die komplette Buchse (13) schieben.

ESP Calentar en aceite el cojinete a unos 100°C e introducir en el semieje (4) el manguito completo (13).

F Chauffer dans l'huile à environ 100°C le palier puis enfiler sur le joint de cardan double (4) la douille complète (13).

b

ITA Montare l'anello di ritegno (9) del gruppo bussola (13); posizionare anche la guarnizione OR (14).

D Haltering (9) des Buchsenaggregats (13) montieren; O-Ring (14) ebenfalls montieren.

ESP Montar el anillo de retención (9) del grupo del manguito (13); posicionar también la junta OR (14).

F Monter l'anneau de retenue (9) du groupe douille (13): placer également la garniture OR (14).

c

ITA Infilare il doppio giunto cardanico e serrare i grani superiore ed inferiore (2).
Coppia di serraggio: Max. 15 Nm.
NOTA. Per il doppio giunto cardanico con bussola, centrare la punta dei grani di ritegno nella cava.

D Doppelgelenkwelle einsetzen und obere und untere Stifte (2) festschrauben.
Anzugsmoment: Max. 15 Nm
BEMERKUNG. Bei der Doppelgelenkwelle mit Buchse, Stiftspitze genau zentrieren.

ESP Introducir el semieje y apretar la espiga superior y la inferior (2).
Par de torsión: Máx. 15 Nm.
NOTA. Para el semieje con manguito, centrar la punta de las espigas de retención en la ranura.

F Enfiler le joint de cardan double et serrer les grains supérieurs et inférieurs (2).
Couple de serrage: Max. 15 Nm.
NOTE. Pour le joint de cardan double à douille, centrer la pointe des grains de fixation dans le creux.

d

ITA Spalmare con Loctite 242 le porzioni sporgenti dei grani (2).

D Mit Loctite 242 die herausragenden Stifte (2) schmieren.

ESP Pasar Loctite 242 en las partes salientes de las espigas (2).

F Enduire de Loctite 242 les parties saillantes des grains (2).

e

ITA Avvitare i dadi (3) di bloccaggio dei grani (2) e bloccarli con chiave dinamometrica.
Coppia di serraggio: 122 Nm

D Muttern (3) zur Befestigung der Stifte (2) zuschrauben und mit einem Momentenschlüssel blockieren.
Anzugsmoment: 122 Nm

ESP Atornillar las tuercas (3) de bloqueo de las espigas (2) y bloquearlas con llave dinamométrica.
Par de torsión: 122 Nm

F Visser les écrous (3) de blocage des grains (2), puis bloquer à l'aide d'une clé dynamométrique.
Couple de serrage: 122 Nm

a

ITA Lubrificare la bronzina (18) e la sede della scatola snodo (3).
Utilizzando l'attrezzo **T7** montare la bronzina (18).

D Das Bronzelager (18) und das Gelenkgehäuse (3) schmieren.
Mit einem Werkzeug **T7** das Bronzelager (18) montieren.

ESP Lubricar la chumacera (18) y el alojamiento de la caja de la rótula (3).
Montar la chumacera (18) utilizando la herramienta **T7**.

F Lubrifier le coussinet (18) et le logement du boîtier articulation (3).
A l'aide de l'outil **T7** monter le coussinet (18).

b

ITA Lubrificare la superficie esterna dell'anello di tenuta (17) e dell'anello centratore (16); montarli in sede utilizzando l'attrezzo **T8**.

D Die äußere Fläche des Kolbenringes (17) und des Zentrierringes (16) schmieren; die beiden Ringe mit einem Werkzeug **T8** montieren.

ESP Lubricar la superficie exterior del segmento de compresión (17) y del anillo de centraje (16); montarlos en un alojamiento utilizando la herramienta **T8**.

F Lubrifier la surface externe de la bague d'étanchéité (17), et de l'anneau de centrage (16), puis monter ceux-ci dans leur logement à l'aide de l'outil **T8**.

c

ITA Posizionare sotto la pressa la parte inferiore dell'attrezzo **T9A** e la ralla del cuscinetto esterno (8).

D Unter einer Presse den unteren Teil des Werkzeugs **T9A** und die Scheibe des äußeren Lagers (8) positionieren.

ESP Posicionar debajo de la prensa la parte inferior de la herramienta **T9A** y la rangua del cojinete exterior (8).

F Placer sous la presse la partie inférieure de l'outil **T9A** et la crapaudine du palier externe (8).

d

ITA Lubrificare le sedi dei cuscinetti e posizionare sull'attrezzo **T9A** il mozzo portaruota (7); posizionare la ralla del cuscinetto interno (15).
NOTA. Controllare l'orientamento della ralla.

D Die Lagersitze schmieren und am Werkzeug **T9A** die Radhalternabe (7) positionieren; die Scheibe des inneren Lagers (15) positionieren.
BEMERKUNG. Die Position der Scheibe beachten.

ESP Lubricar los alojamientos de los cojinetes y posicionar en la herramienta **T9A** el cubo portarruedas (7); posicionar la rangua del cojinete interior (15).
NOTA. Controlar la orientación de la rangua.

F Lubrifier le logement des paliers et placer sur l'outil **T9A** le moyeu porte-roue (7); placer la crapaudine du palier interne (15).
NOTE. Contrôler les sens de la crapaudine.

e

ITA Posizionare la parte superiore dell'attrezzo **T9B** e pressare a fondo le ralle nel mozzo portaruota (7).

D Das obere Teil des Werkzeugs **T9B** positionieren und die Scheiben in die Radhalternabe (7) fest eindrücken.

ESP Posicionar la parte superior de la herramienta **T9B** y presionar a fondo las ranguas en el cubo portarruedas (7).

F Placer la partie supérieure de l'outil **T9B**, puis presser à fond les crapaudines du moyeu porte-roue (7).

f

ITA Montare il cuscinetto (15) nella ralla interna.

D Lager (15) in die innere Scheibe montieren.

ESP Montar el cojinete (15) en la rangua interior.

F Monter le palier (15) dans la crapaudine interne.

a

ITA Asportare le viti (8) di fissaggio del cilindro di sterzatura (9).

D Die Befestigungsschrauben (8) des Lenkzylinders (9) abnehmen.

ESP Sacar los tornillos (8) que fijan el cilindro de dirección (9).

F Enlever les vis (8) de fixation du cylindre de braquage (9).

b

ITA Estrarre il cilindro (9) utilizzando un mazzuolo in materiale plastico.
NOTA. Per lo smontaggio del cilindro, vedere «SMONTAGGIO CILINDRO DI STERZATURA».

D Den Zylinder (9) mit einem Gummihammer herausschlagen.
BEMERKUNG. Um den Zylinder abzumontieren, siehe «LENKZYLINDER ABMONTIEREN».

ESP Extraer el cilindro (9) utilizando un martillo de material plástico.
NOTA. Para desmontar el cilindro, véase «DESMONTAJE CILINDRO DE DIRECCIÓN».

F Extraire le cylindre (9) à l'aide d'un maillet en matière plastique.
NOTE. Pour démonter le cylindre, voir «DEMONTAGE DU CYLINDRE DE BRAQUAGE».

a

ITA Rimuovere l'anello elastico (1) di ritegno della testata (2).

D Kolbenring (1) vom Kopf (2) abnehmen.

ESP Remover el anillo elástico (1) de retención de la culata (2).

F Enlever l'anneau élastique (1) de retenue de la culasse (2).

b

ITA Con leggeri colpi di un mazzuolo in materiale plastico, spingere la testata (2) verso l'interno del cilindro (3).
NOTA. Inserire la testata fino a filo del cilindro.

D Mit einem Gummihammer den Kopf (2) leicht zum Zylinder (3) hin schlagen.
BEMERKUNG. Den Kopf bis an den Zylinderrand hinein schlagen.

ESP Con ligeros golpes de martillo de material plástico, empujar la culata (2) dentro del cilindro (3).
NOTA. Introducir la culata hasta que quede a ras del cilindro.

F Avec de légers coups de maillet en matière plastique, pousser la culasse (2) à l'intérieur du cylindre (3).
NOTE. Introduire la culasse jusqu'au bord du cylindre.

c

ITA Utilizzando un punteruolo, forzare l'anello di arresto (4) interno al cilindro (3) ed estrarlo utilizzando un cacciavite.

D Mit einem Dübel den Sprengring (4) in den Zylinder (3) ausdrücken und mit einem Schraubenzieher herausnehmen.

ESP Utilizando un punzón, forzar el anillo de tope (4) dentro del cilindro (3) y extraerlo utilizando un destornillador.

F A l'aide d'un pointeau forcer l'anneau de butée (4) à l'intérieur du cylindre (3), extraire ce dernier à l'aide d'un tournevis.

d

ITA Con un mazzuolo in materiale plastico, mandare in battuta il pistone (5) a ridosso della testata (2).
Proseguire fino all'espulsione della testata (2) dal cilindro (3).

D Mit einem Gummihammer den Kolben (5) bis zum Anschlag des Kopfes (2) bringen.
Weiter schlagen, bis der Kopf (2) aus dem Zylinder (3) geschlagen worden ist.

ESP Con un martillo de material plástico, mandar a tope el pistón (5) detrás de la culata (2).
Continuar hasta la expulsión de la culata (2) del cilindro (3).

F A l'aide d'un maillet en matière plastique, envoyer en butée le piston (5) à l'abri de la culasse (2).
Continuer jusqu'à l'éjection de la culasse (2) hors du cylindre (3).

e

ITA Scomporre il gruppo cilindro (3) estraendo nell'ordine la testata (2) ed il pistone (5).
ATTENZIONE! Annotare il senso di montaggio del pistone che ha la parte smussata "**A**" orientata verso la testata (2).

D Das Zylinderaggregat (3) zerlegen; dazu der Reihenfolge nach den Kopf (2) und den Kolben (5) abnehmen.
ACHTUNG! Montagerichtung des Kolbens beachten: das abgerundete Teil "**A**" muß zum Kopf (2) gerichtet sein.

ESP Descomponer el grupo cilindro (3) extrayendo en su orden la culata (2) y el pistón 5.
ATENCION! Anotar el sentido de montaje del piston que tiena la parte descantillada "**A**" orientada hacia culata (2).

F Décomposer le groupe cylindre (3) en extrayant dans l'ordre d'abord la culasse (2), puis le piston (5).
ATTENTION! Prendre note du sens de montage du piston, la partie arrondie "**A**" tournée vers la culasse (2).

f

ITA Rimuovere dalla testata (2), dal cilindro (3) e dal pistone (5) tutte le guarnizioni, gli anelli antiestrusione e gli anelli raschiatori.
NOTA. 1 - Tutte le tenute devono essere sostituite ad ogni smontaggio. 2 - Prestare molta attenzione per non rovinare le sedi delle guarnizioni e dello scorrimento del pistone.

D Vom Kopf (2), vom Zylinder (3) und vom Kolben (5) alle Dichtungen, Halteringe und Abschaber wegnehmen.
BEMERKUNG. 1 - Alle Dichtungen müssen jedesmal gewechselt werden, wenn der Zylinder zerlegt wird. 2 - Sehr vorsichtig vorgehen, um die Dichtungs- und Kolbensitze nicht zu beschädigen.

ESP Remover de la culata (2) del cilindro (3) y del pistón (5) todas las juntas, los anillos antiextrusión y los anillos raspadores.
NOTA. 1 - Todas las estanqueidades tienen que ser sustituidas a cada desmontaje. 2 - Tener mucho cuidado a fin de no dañar los alojamientos de las juntas y del deslizamiento del pistón.

F Enlever de la culasse (2), du cylindre (3) et du piston (5), toutes les garnitures, anneaux anti-extrusion et les anneaux racleurs.
NOTE. 1 - Toutes les étanchéités doivent être remplacées à chaque démontage. 2 - Faire très attention à ne pas abîmer les logements des garnitures et de coulissement du piston.

a

ITA Rimuovere gli anelli elastici (16) dai perni (17) degli ingranaggi satelliti (18).

D Kolbenringe (16) von den Stiften (17) der Plantenräder (18) entfernen.

ESP Remover los anillos elásticos (16) de los dos pernos (17) de los engranajes satélites (18).

F Enlever les anneaux élastiques (16) des tourillons (17) des engrenages satellites (18).

b

ITA Inserire tra gli ingranaggi satelliti (18) l'attrezzo **T14**.

D Zwischen den Planetenrädern (18) das Werkzeug **T14** einsetzen.

ESP Introducir entre los engranajes satélites (18) la herramienta **T14**.

F Introduire entre les engrenages satellites (18) l'outil **T14**.

c

ITA Operando con due cacciaspine, forzare l'attrezzo **T14** tra gli ingranaggi satelliti (18).
ATTENZIONE! Controllare attentamente che l'attrezzo **T14** rimanga allineato ai perni (17) quando è bloccato.

D Mit zwei Dübeln, das Werkzeug **T14** zwischen den Planetenrädern (18) fest einsetzen.
ACHTUNG: Sorgfältig darauf achten, daß das blokkierte Werkzeug **T14** mit den Stiften (17) fluchtgerecht ist.

ESP Trabajando con dos extractores de clavijas, forzar la herramienta **T14** entre los engranajes satélite (18).
CUIDADO! Controlar atentamente que la herramienta **T14** quede alineada con los pernos (17) cuando está bloqueada.

F En oeuvrant avec deux chasse-goupilles, forcer l'outil **T14** entre les engrenages satellites (18).
ATTENTION! Contrôler attentivement si l'outil **T14** reste aligné aux tourillons (17) quand il est bloqué.

d

ITA Sistemare il corpo differenziale (15) sotto una pressa, posizionare la boccola **T15** ed inserire lo spinotto **T16A**. Pressare lo spinotto **T16A** fino a fondo corsa.

D Das Differentialgehäuse (15) unter eine Presse legen und die Buchse **T15** positionieren; Bolzen **T16A** einsetzen. Drücken, bis der Bolzen **T16A**.

ESP Colocar la caja del diferencial (15) debajo de una prensa; posicionar el casquillo **T15** e introducir la cruceta **T16A**. Presionar la cruceta **T16A**.

F Ajuster le boîtier différentiel (15) sous la presse, placer la bague **T15** et introduire le goujon **T16A**.
Presser le goujon **T16A**.

e

ITA Asportare lo spinotto **T16A** e la bussola **T15**.
NOTA. In questa condizione, il perno (17) è contenuto nell'attrezzo **T14**.

D Bolzen **T16A** und die Buchse **T15** abnehmen.
BEMERKUNG. In diesem Zustand, ist der Stift (17) im Werkzeug **T14** enthalten.

ESP Sacar la cruceta **T16A** y el manguito **T15**.
NOTA. En esta condición el perno (17) se encuentra en la herramienta **T14**.

F Enlever le goujon **T16A** et la douille **T15**.
NOTE. Dans cette condition le tourillon (17) se trouve dans l'outil **T14**.

f

ITA Rimuovere l'attrezzo **T14** e con esso il perno (17) del satellite.

D Das Werkzeug **T14** und damit den Stift (17) des Planetenrades abnehmen.

ESP Remover la herramienta **T14** y con ella el perno (17) del satélite.

F Enlever l'outil **T14** et, avec ce dernier, le tourillon (17) du satellite.

a

ITA **NOTA.** Se le ghiere (1) vengono rimosse, spalmarle con Loctite 242.
Serrare le ghiere dal lato corona fino ad azzerare i giochi tra pignone e corona e bloccarla; ritornare indietro di circa 1/4÷1/2 giro.

D **BEMERKUNG.** Wenn die Nutmuttern (1) ausgewechselt werden, diese mit Loctite 242 schmieren.
Nutmuttern an der Kranzseite fest ziehen bis kein Spiel mehr zwischen Rad und Kranz übrig bleibt ; danach um 1/4÷1/2 Umdrehung wieder aufschrauben.

ESP **NOTA.** Si se remueven las virolas (1) pasarles Loctite 242.
Apretar las virolas del lado corona hasta acerar los juegos entre el pinon y la corona y bloquearla, volver atras de 1/4÷1/2 giro approx.

F **NOTE.** Si les anneaux (1) sont enlevés, les enduire avec du Loctite 242.
Serrer les anneaux de fixation du côté couronne jusqu'à mettre à zéro les jeux entre pignon et couronne et bloquer: revenir en arrière d'environ 1/4÷1/2 tour.

b

ITA Precaricare i cuscinetti tramite la ghiera lato opposto corona per incrementare la coppia di rotazione pignone fino a 140÷210 Ncm.
ATTENZIONE! Con cuscinetti usati, controllare la coppia di spunto; con cuscinetti nuovi, controllare la coppia di rotazione continua.

D Lager durch die Nutmutter an der dem Kranz entgegengesetzten Seite vorladen, um das Gegenmoment des Rades auf 140÷210 Ncm zu bringen.
ACHTUNG! Bei verbrauchten Lagern, das Anlaufdrehmoment kontrollieren; bei neuen Lagern, das kontinuierliche Drehmoment kontrollieren.

ESP Precargar los cojinetes atraves la virola lado opuesto corona para incrementar el par de rotacion pinon hasta 140÷210 Ncm.
CUIDADO! Con cojinetes usados, controlar el par de inicio, con cojinetes nuevos, controlar el par de rotación continua.

F Précharger les paliers au moyen d'anneaux de fixation du côté opposé de la couronne pour augmenter le couple de rotation pignon jusqu'à 140÷210 Ncm.
ATTENTION! Avec les paliers usés, contrôler le couple de pointe; avec les paliers neufs, contrôler le couple de rotation continu.

c

ITA Posizionare, attraverso il foro per il tappo superiore (10), un comparatore a tasto orientabile "**A**".
Posizionarlo sul centro di un dente della corona (12), precaricarlo di circa 1 mm ed azzerarlo.

D Durch das Loch des oberen Stopfens (10) eine schwenkbare Meßuhr "**A**" in der Mitte eine Kranzzahnes (12) anbringen. Die Meßuhr auf 1 mm vorladen und auf Null stellen.

ESP Posicionar, a través del orificio para el tapón superior (10), un comparador de tecla orientable "**A**".
Posicionarlo en el centro de un diente de la corona (12), precargarlo de aproximadamente 1 mm y ponerlo a cero.

F Placer, par le trou du bouchon supérieur (10), un comparateur à touche orientable "**A**".
Placer ce dernier au centre d'une dent de la couronne (12), précharger d'environ 1 mm, puis le mettre à zéro.

d

ITA Muovere manualmente nei due sensi la corona (12) per controllare il gioco esistente tra pignone e corona.

D Den Kranz (12) von Hand in beide Richtungen bewegen und das Spiel zwischen Rad und Kranz prüfen.

ESP Mover manualmente en los dos sentidos la corona (12) para controlar el juego que hay entre el piñón y la corona.

F Déplacer la couronne (12) manuellement dans les deux sens pour contrôler le jeu existant entre pignon et couronne.

e

ITA Regolare il gioco tra pignone e corona allentando una ghiera (1) e serrando la ghiera opposta in egual misura.
Gioco normale: vedere tabella.

D Das Spiel zwischen Rad und Kranz einstellen; dazu eine Nutmutter (1) lockern und die entgegengesetzte Nutmutter auf dieselbe Weise zuschrauben.
Normales Spiel: siehe Tabelle.

ESP Regular el juego entre el piñón y la corona aflojando una virola (1) y apretando la virola opuesta en la misma medida.
Juego normal: véase la tabla.

F Régler le jeu entre pignon et couronne en desserrant un collier de serrage (1) puis en serrant le collier de serrage opposé avec la même mesure de jeu.
Jeu normal: voir tableau.

a

ITA Utilizzando un piano di riscontro, azzerare sull'anello di misura **T24** (di spessore conosciuto pari a 30,2 mm) un comparatore centesimale "**DG**".
Precaricare il comparatore di circa 2 mm.

D Mit Hilfe eines Anschlags am Meßring **T24** (bekannte Stärke 30,2 mm) eine hundertteilige Meßuhr "**DG**" auf Null stellen.
Meßuhr auf 2 mm vorladen.

ESP Utilizando una superficie para la comparación, poner a cero en el anillo de medida **T24** (del que se conoce el espesor igual a 30,2 mm) un comparador centesimal "**DG**".
Precargar el comparador en 2 mm aproximadamente.

F A l'aide d'un plan de comparaison, mettre à zéro sur l'anneau de mesurage **T24** (d'une épaisseur connue égale à 30,2 mm), un comparateur centésimal "**DG**".
Précharger le comparateur d'environ 2 mm.

b

ITA Portare sotto il comparatore "**DG**" il cuscinetto interno (9) completo di ralla.
Determinare lo spessore totale "**D**" del cuscinetto controllando lo scostamento rispetto la misura dell'anello di misura.
ATTENZIONE! Premere la ralla in modo centrato ed eseguire più volte la misurazione ruotando la ralla.

D Unter die Meßuhr "**DG**" das innere Lager (9) samt Scheibe legen.
Gesamte Stärke "**D**" des Lagers messen und die Abweichung im Verhältnis zum Meßring kontrollieren.
ACHTUNG! Die Scheibe muß zentriert sein und den Meßvorgang mehrmals bei gedrehter Scheibe wiederholen.

ESP Poner debajo del comparador "**DG**" el cojinete interior (9) con la rangua.
Determinar el espesor total "**D**" del cojinete controlando la diferencia con respecto al tamaño del anillo de medida.
CUIDADO! Presionar la rangua de manera centrada y ejecutar varias veces la medida girando la rangua.

F Amener sous le comparateur "**DG**" le palier interne (9) équipé de crapaudine.
Définir l'épaisseur totale "**D**" du palier en contrôlant l'écart par rapport à celle mesurée par l'anneau de mesurage.
ATTENTION! Presser la crapaudine vers le centre, puis en effectuer plusieurs fois le mesurage en tournant la crapaudine.

c

ITA Inserire parzialmente nel corpo centrale (12) la ralla del cuscinetto esterno (13).

D Auf den zentralen Körper (12) die Scheibe des äußeren Lagers (13).

ESP Introducir parcialmente en el cuerpo central (12) la rangua el cojinete exterior (13).

F Introduire, partiellement dans le corps central (12), la crapaudine du palier externe (13).

d

ITA Montare il tirante **T25C**, l'anello di misura **T24**, ed infine l'attrezzo anteriore **T25A** di guida della ralla (13) del cuscinetto esterno.

D Die Spannstange **T25C**, den Meßring **T24**, und zuletzt das vordere Werkzeug **T25A** zur Führung der Scheibe (13) des äußeren Lagers montieren.

ESP Montar el tirante **T25C**, el anillo de medida **T24**, y por último la herramienta anterior **T25A** guía de la rangua (13) del cojinete exterior.

F Monter la tringle **T25C**, l'anneau de mesurage **T24**, et enfin l'outil antérieur **T25A** de guidage de la crapaudine (13) du palier externe.

e

ITA Collegare il tirante alla pressa e mandare in sede la ralla del cuscinetto esterno (13).
Scollegare la pressa e rimuovere il tirante.
NOTA. Prima di proseguire, assicurarsi dell'inserimento totale della ralla.

D Spannstange mit der Presse verbinden und die Scheibe in ihren Sitz im äußeren Lager (13) einsetzen.
Von der Presse abnehmen und Spannstange abnehmen.
BEMERKUNG. Sorgfältig kontrollieren, ob die Scheibe richtig eingesetzt worden ist.

ESP Conectar el tirante a la prensa y colocar en el alojamiento la rangua del cojinete exterior (13).
Sacar la prensa y remover el tirante.
NOTA. Antes de continuar, asegurarse de que la rangua está completamente insertada.

F Brancher la tringle à la presse, puis envoyer dans son logement la crapaudine du palier externe (13).
Débrancher la presse et enlever la tringle.
NOTE. Avant de continuer, s'assurer que la crapaudine est complètement insérée.

f

ITA Inserire l'attrezzo **T26B** completo di cuscinetto esterno (13) anello di misura **T24** e ghiera di altezza calibrata **T26C**.
Serrare a fondo manualmente.

D Werkzeug **T26B** mit dem äußeren Lager (13), Meßring **T24** und in der Höhe kalibrierte Nutmutter **T26C** einsetzen.
Von Hand festschrauben.

ESP Introducir la herramienta **T26B** con el cojinete exterior (13), el anillo de medida **T24** y la virola de altura calibrada **T26C**.
Apretar a fondo manualmente.

F Introduire l'outil **T26C** équipé du palier externe (13), l'anneau de mesurage **T24** et le collier de serrage de hauteur taraudé **T26C**.
Serrer à fond manuellement.

a

ITA Lubrificare la superficie esterna del nuovo anello di tenuta (6) e montarlo nel corpo centrale (12) utilizzando l'attrezzo **T27**.

D Die äußere Fläche des neuen Ringes (6) schmieren und den zentralen Körper (12) mit Hilfe des Werkzeugs **T27** montieren.

ESP Lubricar la superficie exterior del nuevo segmento de compresión (6) y montarlo en el cuerpo central (12) utilizando la herramienta **T27**.

F Lubrifier la surface externe de la bague d'étanchéité neuve (6), puis monter celle-ci dans le corps central (12) à l'aide de l'outil **T27**.

b

ITA Montare il supporto oscillante (5).
NOTA: Controllare attentamente l'orientamento.

D Die schwenkbare Halterung (5) montieren.
BEMERKUNG. Richtung sorgfältig kontrollieren.

ESP Montar el soporte oscilante (5).
NOTA. Controlar atentamente la orientación.

F Monter le support oscillant (5).
NOTE. Contrôler attentivement le sens.

c

ITA Montare la flangia (2) completa della protezione (4) e mandarla in battuta.
Se necessario, per il calettamento della flangia (2), usare un mazzuolo in materiale plastico.
NOTA. Controllare che la protezione (4) sia ben forzata sulla flangia e che non sia deformata.

D Flansch (2) samt Schutzteil (4) montieren und bis zum Anschlag bringen.
Wenn nötig, den Flansch (2) mit einem Gummihammer einschieben.
BEMERKUNG. Kontrollieren ob das Schutzteil (4) richtig auf dem Flansch sitzt und nicht verformt ist.

ESP Montar la brida (2) con su protección (4) y llevarla hasta el tope.
Si fuera necesario, para ensamblar de la brida (2) usar un martillo de material plástico.
NOTA. Controlar que la protección (4) está bien forzada en la brida y que no está deformada.

F Monter la flasque (2) équipée de protection (4), puis envoyer celle-ci en butée.
Si besoin, pour caler la flasque (2) utiliser un maillet en matière plastique.
NOTE. Veiller à ce que la protection (4) est bien forcée sur la flasque et qu'elle n'est pas déformée.

d

ITA Spalmare la porzione filettata del pignone (8) con Loctite 242.
Montare l'attrezzo **T20A** (oppure **T20B**) ed impegnarlo per evitare la rotazione. Montare l'anello OR (3) ed il dado (1); serrare con chiave dinamometrica.
Coppia di serraggio: 280÷310 Nm

D Das Gewinde des Rads (8) mit Loctite 242 schmieren.
Das Werkzeug **T20A** (**T20B**) montieren und blokkieren, damit es nicht drehen kann.
O-Ring (3) und Mutter (1) montieren und mit einem Momentenschlüssel festschrauben.
Anzugsmoment: 280÷310 Nm

ESP Pasar en la parte roscada del piñón (8) Loctite 242.
Montar la herramienta **T20A** (o **T20B**) y bloquearla para evitar la rotación.
Montar el anillo OR (3) y la tuerca (1) y apretarlos con llave dinamométrica.
Par de torsión: 280÷310 Nm

F Enduire la partie filetée du pignon (8) avec du Loctite 242. Monter et fixer l'outil **T20A** (ou **T20B**) pour éviter la rotation.
Monter le OR (3) et l'écrou (1), puis serrer à l'aide de la clé dynamométrique.
Couple de serrage: 280÷310 Nm

e

ITA Asportare i blocchi **T23** montati per l'estrazione del pignone e rimontare i bracci.
Per i dettagli, vedere «CONTROLLO USURA E SOSTITUZIONE DISCHI FRENO».

D Blöcke **T23** abnehmen, die zum Herausnehmen des Rads montiert wurden und Arme wieder montieren.
Siehe «VERSCHLEISS KONTROLLIEREN UND BREMSSCHEIBEN AUSWECHSELN».

ESP Sacar los bloques **T23** montados para la extracción del piñón y volver a montar los brazos.
Para los detalles, véase «CONTROL DEL DESGASTE Y SUSTITUCION DE LOS DISCOS DEL FRENO».

F Enlever les blocs **T23** montés pour l'extraction des pignons, puis remonter les bras.
Pour de plus amples détails, voir «CONTROLE DE L'USURE ET SUBSTITUTION DES FREINS».

PROBLEM - PROBLEMA - PROBLEM - PROBLEMA - PROBLEME	CAUSE - CAUSE - URSACHE - CAUSAS - CAUSE	CORRECTION - RIMEDI - ABHILFE - REMEDIOS - REMEDE
Soft brake pedal *Pedale del freno non risponde* Leichtes Bremspedal *El pedal del freno no funciona* Pedale du frein ne repond pas	6. Air in brake circuit *6. Aria nel circuito frenante* 6. Luft in der Bremsanlage *6. Aire en el circuito frenante* 6. Air dans le circuit	Bleed brakes as described in the vehicle's service manual. *Spurgare il circuito frenante come da istruzioni di spurgo del manuale del veicolo.* Bremsen entlüften gemäß Anweisungen im Handbuch des Failrzeuges. *Purgar el circuito frenante se acuerdo con las instrucciones de purga del manual del vehículo.* Purger le circuit de frein selon «instructions de purge» du manuel du véhicule.
Ineffective safety brake *Freno negativo inefficiente* Federspeicherbremse ohne Funktion. *Freno negativo ineficiente* Inefficacite du frein negatif	7. Incorrect adjustment *7. Registrazione incorretta* 7. Fehlerhafte Einstellung des Bremsscheibenspieles *7. Ajuste incorrecto* 7. Mauvais reglage	See correction N. 1. *Vedere rimedio N. 1.* Siehe Abhilfe N. 1. *Véase remedio N.1.* Voir remède N. 1.
	8. Brake disc worn out *8. Dischi freno usurati* 8. Bremslamellen verschlissen *8. Discos del freno gastados* 8. Usure disques frein	See correction N. 2. *Vedere rimedio N. 2.* Siehe Abhilfe N. 2. *Véase remedio N. 2.* Voir remède N. 2.
Overheating *Surriscaldamento* Überhitzung *Sobrecalentamiento* Surchauffe	9. Oil level wrong *9. Livello olio non corretto* 9. Niedriger Ölspiegel-Falscher Ölstand *9. Nivel de aceite no correcto* 9. Niveau d'huile pas incorrect	Drain, flush and refill oil to proper level. *Scaricare, eseguire un lavaggio e riempire d'olio fino a livello.* Öl ablassen, reinigen und richtigen Ölstand wieder herstellen. *Descargar, ejecutar un lavado y llenar con aceite hasta el nivel.* Vidanger, rincer et refaire le niveau d'huile.
	10. Too small of a brake gap *10. Poco gioco tra i dischi freno* 10. Zu wenig Spiel zwischen den Bremslamellen *10. Poco juego entre los discos del freno* 10. Peu de jeu entre les disques frein	Readjust brakes to the specifications in the vehicle's service manual. *Registrare il freno come istruzioni da manuale del veicolo.* Spiel gemäß Anweisungen im Handbuch des Fahrzeuges herstellen. *Ajustar el freno de acuerdo con las instrucciones del manual del vehículo* Regler le frein selon les instructions du manuel du véhicule.
	11. Park brake dragging *11. Freno di parcheggio in trazione* 11. Feststellbremse zieht *11. Freno de estacionamiento en tracción* 11. Frein de parc mal réglé	Unlock the brake and adjust the correct gap. *Sbloccare il freno ripristinando il gioco corretto.* Bremsen lösen und richtiges Lamellenspiel einstellen. *Desbloquear el freno restableciendo el juego correcto.* Débloquer le frein et régler le jeu.

a

ITA **NOTA.** Lo smontaggio è uguale per i due bracci e può essere eseguito solo a leve (3) libere.
Scollegare dalla scatola snodo il tirante di sterzatura.
Per i dettagli, vedere «RIMOZIONE CILINDRO DI STERZATURA».

D **BEMERKUNG.** Beide Arme werden auf dieselbe Weise abmontiert; dies kann jedoch nur erfolgen, wenn die Hebel (3) frei sind.
Spannstange vom Gelenkgehäuse abtrennen.
Weitere Einzelheiten im Paragraph «LENKZYLINDER ABMONTIEREN».

ESP **NOTA** El desmontaje es ugual por los dos brazos y puede ser efectuado solo a palancas (3) libres.
Desconectar del carter de las rotulas el tirante de direccion.
Para los detalles, vease «REMOCION CILINDRO DE DIRECCION».

F **NOTE.** Le démontage est pareil pour les deux bras et ne peut être effectué que lorsque les leviers (3) sont libres.
Débrancher de la boîte articulation la tringle de braquage.
Pour tout détail, voir «DEPOSE CYLINDRE DE BRAQUAGE».

b

ITA Asportare la vite (1) di bloccaggio della rondella (2) di ritegno della leva (3).

D Die Schraube (1) zur Befestigung der Unterlegscheibe (2) des Hebels (3) abschrauben.

ESP Sacar el tornillo (1) de bloqueo de la arandela (2) de retencion palanca (3).

F Enlever la vis (1) de blocage de la rondelle (2) de fixation du levier (3).

c

ITA Rimuovere la rondella (2), la leva (3) e le guarnizioni OR (4).
Contrassegnare le posizioni delle leve (3) rispetto le leve di spinta (12) e (13).

D Unterlegscheibe (2), Hebel (3) und O-Ringe (4) abnehmen.
Die Positionen der Hebel (3) im Verhältnis zu den Druckhebeln (12) und (13) kennzeichnen.

ESP Remover la arandela (2), la palanca (3) y las guarniciones OR (4).
Senalar las posiciònes de las palancas (3) respecto a las palancas de empuje (12)

F Enlever la rondelle (2), le levier (3) et les garnitures OR (4).
Marquer les positions des leviers (3) par rapport aux leviers (12) et (13).

d

ITA Asportare le viti (5) e rimuovere la boccola (6) completa di guarnizione OR (7).

D Schrauben (5) abschrauben und Buchse (6) samt O-Ring (7) abnehmen.

ESP Sacar los tornillos (5) y remover el casquillo (6) completo de guarniciones OR (7).

F Enlever les vis (5) et extraire la douille (6) équipée de garnitures OR (7).

e

ITA Agganciare il braccio completo (8) ad un mezzo di sollevamento e mettere il leggera tensione la fune.
Rimuovere il braccio completo; per i dettagli, vedere «CONTROLLO E SOSTITUZIONE DISCHI FRENI».

D Vollständigen Arm (8) mit einem Hebekarren anheben bis das Seil gespannt ist.
Vollständigen Arm abtrennen; weitere Einzelheiten im Paragraph «BREMSSCHEIBEN KONTROLLIEREN UND AUSWECHSELN».

ESP Enganchar el brazo completo (8) y un medio de levantamiento y poner en ligera tension el cable.
Remover el brazo completo; por los detalles, vease «CONTROL Y SUSTITUCION DISCOS FRENOS».

F Accrocher le bras complet (8) à un moyen de relevage et mettre la corde légèrement en tension.
Enlever le bras complet: pour tout détail, voir «CONTROLE ET SUBSTITUTION DES DISQUES FREINS».

f

ITA Rimuovere i dischi freni (9) ed il pistone completo (10).
Per i dettagli, vedere «CONTROLLO E SOSTITUZIONE DISCHI FRENI».

D Bremsscheiben (9) und den ganzen Kolben (10) abnehmen. Weitere Einzelheiten im Paragraph «BREMSSCHEIBEN KONTROLLIEREN UND AUSWECHSELN».

ESP Remover los discos frenos (9) y el piston completo (10).
Por los detalles, vease «CONTROL Y SUSTITUCION DISCOS FRENOS».

F Enlever les disques freins (9) et le piston complet (10).
Pour tout détail, voir «CONTROLE ET SUBSTITUTION DES DISQUES FREINS».

a

ITA Immettere lentamente il raccordo del corpo cilindro (9) per espellere il pistone (13).
ATTENZIONE! Trattenere il pistone che può essere espulso velocemente ed essere danneggiato.

D Langsam das Anschlußstück des Zylinderkörpers (9) einsetzen, um den Kolben (13) auszustoßen.
ACHTUNG! Den Kolben halten, denn er könnte plötzlich herausspringen und beschädigt werden.

ESP Meter lentamente el empalme del cuerpo cilindro (9) para la expulsion del piston (13).
ATENCION! Tener el piston que puede ser expulso rapidamente y danarse.

F Introduire lentement le raccord du corps cylindre (9) et expulser le piston (13).
ATTENTION! Retenir le piston qui expulsé rapidement peut par conséquent s'endommager.

b

ITA Rimuovere dal pistone (13) le guarnizioni (14) e l'anello di guida (15).
NOTA. Annotare il senso di montaggio delle guarnizioni.

D Den Kolben (13), die Dichtungen (14) und den Führungsring (15) abnehmen.
BEMERKUNG. Montagerichtung der Dichtungen bemerken.

ESP Remover del piston (13) las guarniciones (14) y el anillo de guìa (15).
NOTA. Anotar el sentido de desmontaje de las guarniciones.

F Enlever du piston (13) les garnitures (14) et la bague de guidage (15).
NOTE. Prendre note du sens de montage des garnitures.

c

ITA **SOLO SE NECESSARIO**
Rimuovere dalla sede molla (10) l'anello di guida (11).
ATTENZIONE! Se l'anello di guida (11) viene smontato, deve essere sostituito.

D **NUR WENN NOTWENDIG**
Aus dem Federsitz (10) den Führungsring (11) nehmen.
ACHTUNG! Falls der Führungsring (11) abmontiert wird, muß er ausgewechselt werden.

ESP **SOLO SI NECESARIO**
Remover de la sede muelle (10) el anillo de guìa (11).
ATENCION! Si el anillo de guìa (11) viene desmontado, debe de ser sobstituido.

F **SEUL SI BESOIN**
Enlever du siège ressort (10), la bague de guidage (11).
ATTENTION! Si la bague de guidage (11) est démontée, il faut la substituer.

a

ITA Rimuovere dal pistone (23) le guarnizioni (24) e l'anello di guida (25).
NOTA. Annotare il senso di montaggio delle guarnizioni.

D Den Kolben (23) und die Dichtungen (24) sowie den Führungsring (25) abnehmen.
BEMERKUNG. Montagerichtung der Dichtungen bemerken.

ESP Remover del pistòn (23) las guarniciones (24) y el anillo de guìa (25).
NOTA. Anotar el sentido de desmontaje de las guarniciones.

F Enlever le piston (23), les garnitures (24) et la bague de guidage (25).
NOTE. Noter le sens du montage des garnitures

b

ITA **SOLO SE NECESSARIO**
Rimuovere dalla sede molla (20) l'anello di guida (21).
ATTENZIONE! Se l'anello di guida (21) viene smontato, deve essere sostituito.

D **NUR WENN NÖTIG**
Vom Federsitz (20) den Führungsring (21) abnehmen.
ACHTUNG! Wird der Führungsring (21) abmontiert, muß er ausgewechselt werden.

ESP **SOLO SI FUERA NECESARIO**
Remover del alojamiento muelle (20) el anillo de guìa (21).
ATENCION! Si el anillo de guìa (21) viene desmontado, debe de ser sobstituido.

F **SEULEMENT SI BESOIN**
Enlever du siège ressort (20) la bague de guidage (21).
ATTENTION! Une fois la bague de guidage (21) démontée, elle doit être substituée.

a

ITA Rimuovere l'anello di tenuta (12) e scartarlo.
NOTA. Annotare il senso di montaggio.

D Dichtung (12) abnehmen und nicht mehr verwenden.
BEMERKUNG. Montagerichtung bemerken.

ESP Remover la junta (12) y descartarla.
NOTA. Anotar el sentido de montaje.

F Enlever la garniture (12) puis l'éliminer.
NOTE. Prendre note du sens du montage.

b

ITA Rimuovere le viti (13) di fissaggio del supporto freno (14).

D Schrauben (13) zur Befestigung der Bremsenhalterung (14) abschrauben.

ESP Remover los tornillos (13) de fijación del soporte del freno (14).

F Enlever les vis (13) de fixation du support du frein (14).

c

ITA Rimuovere il supporto freno (14).

D Bremsenhalterung (14) abnehmen.

ESP Remover el soporte del freno (14).

F Enlever le support du frein (14).

d

ITA Rimuovere il distanziale (15).
NOTA. Se si deve intervenire sul gruppo pignone conico, vedere il paragrafo specifico dell'assale.

D Distanzstück (15) abnehmen.
BEMERKUNG. Falls Eingriffe am Kegelrad nötig sind, siehe entsprechender Abschnitt betreffend Achsen.

ESP Remover el separador (15).
NOTA. Si hay que intervenir en el grupo piñón cónico, véase el apartado específico del eje.

F Enlever l'entretoise (15).
NOTE. Si on doit intervenir sur le groupe pignon conique, voir le paragraphe concernant spécifiquement l'essieu.

a

ITA **SOLO PER VERSIONE A 3 FUNZIONI**
Rimuovere le molle (32) di ritorno del pistone (33).

D **NUR FÜR AUSFÜHRUNG MIT 3 FUNKTIONEN**
Rückzugsfeder (32) des Kolbens (33) abnehmen.

ESP **SOLO POR VERSION A 3 FUNCIONES**
Sacar los muelles (32) de vuelta del piston (33).

F **SEULEMENT DANS LES VERSIONS A 3 FONCTIONS.**
Enlever les ressorts (32) de retour du piston (33).

b

ITA **SOLO PER VERSIONE A 3 FUNZIONI**
Immettere lentamente aria compressa attraverso l'attacco del freno di servizio per estrarre il pistone (33).
ATTENZIONE! Trattenere il pistone (33) che può essere espulso velocemente ed essere danneggiato.

D **NUR FÜR AUSFÜHRUNG MIT 3 FUNKTIONEN**
Langsam Druckluft durch den Anschluß der Hilfsbremse einlassen, um den Kolben (33) auszustoßen.
ACHTUNG! Den Kolben (33) halten, denn er könnte plötzlich herausgestoßen und beschädigt werden.

ESP **SOLO POR VERSION A 3 FUNCIONES**
Introducir lentamente aire comprimida atraves el ataque del freno de servicio para sacar el piston (33).
ATENCION. Tener el piston (33) que puede ser expulso rapidamente y ser danado.

F **SEULEMENT DANS LES VERSIONS A 3 FONCTIONS.**
Emettre lentement de l'air comprimé à travers le point de montage du frein de service pour en extraire le piston (33).
ATTENTION! Retenir le piston (33) qui expulsé rapidement peut être par conséquent endommagé.

c

ITA **SOLO PER VERSIONE A 2 FUNZIONI**
Asportare il distanziale (39).

D **NUR FÜR AUSFÜHRUNG MIT 2 FUNKTIONEN**
Distanzstück (39) abnehmen.

ESP **SOLO POR VERSION A 3 FUNCIONES**
Sacar el distancial (39).

F **SEULEMENT DANS LES VERSIONS A 2 FONCTIONS.**
Enlever l'entretoise (39).

d

ITA Rimuovere dal coperchio (8) l'anello di tenuta (38).
NOTA. Annotare il senso di montaggio dell'anello (38) e sostituirlo ad ogni smontaggio.

D Vom Deckel (8) den Dichtring (38) abnehmen.
BEMERKUNG. Montagerichtung des Ringes (38) bemerken und beim Abmontieren jedesmal auswechseln.

ESP Remover de la tapa (8) el segmento de compresiòn (38).
NOTA. Anotar el sentido de montaje del segmento (38) y sobstituirlo cada desmontaje.

F Enlever du couvercle (8) la bague d'étanchéité (38).
NOTE. Prendre note du sens de montage de la bague (38), la remplacer à chaque démontage.

e

ITA Rimuovere dal pistone (12) gli anelli di tenuta (13) e (15) e gli anelli antiestrusione (14) e (16).
NOTA. Gli anelli di tenuta (13), (15) ed antiestrusione (14), (16) devono essere sostituiti ad ogni smontaggio.

D Vom Kolben (12) Dichtringe (13) und (15) sowie die Halteringe (14) und (16) abnehmen.
BEMERKUNG. Die Dichtringe (13), (15) und Halteringe (14). (16) müssen bei jedem Abmontieren ausgewechselt werden.

ESP Sacar el piston (12) los segmentos de compresion (13) y (15) y los segmentos anti-extrusiòn (14) y (16).
NOTA. Los segmentos de compresiòn (13) y (15) y anti-axtrusiòn (14), (16) deben de ser cambiados cada desmontaje.

F Enlever le piston (12) les bagues d'étanchéité (13) et (15) et les anneaux anti-extrusion (14), et (16).
NOTE. Les bagues d'étanchéité (13), (15) et anti-extrusion (14), (16) doivent être remplacées à chaque démontage.

f

ITA **SOLO PER VERSIONE A 3 FUNZIONI**
Rimuovere dal pistone (33) gli anelli di tenuta (34) e (36) e gli anelli antiestrusione (35) e (37).
NOTA. Gli anelli di tenuta (34), (36) ed antiestrusione (35), (37) devono essere sostituiti ad ogni smontaggio.

D **NUR FÜR AUSFÜHRUNG MIT 3 FUNKTIONEN**
Vom Kolben (33) die Dichtringe (34) und (36) sowie die Halteringe (35) und (37) abnehmen.
BEMERKUNG. Die Dichtringe (34), (36) und Halteringe (35), (37) jedesmal auswechseln, wenn sie abmontiert werden.

ESP **SOLO POR VERSION DE 3 FUNCIONES**
Remover del piston (33) los segmentos de compresiòn (34) y (36) y los segmentos anti-extrusiòn (35) y (37).
NOTA. Los segmentos de compresion (34), (36) y anti-extrusiòn (35), (37) deben de ser sobstituidos a cada desmontaje.

F **SEULEMENT DANS LES VERSIONS A 3 FONCTIONS.**
Enlever du piston (33) les bagues d'étanchéité (34) et (36) et les anneaux anti-extrusion (35) et (37).
NOTE. Les bagues d'étanchéité (34), (36) et anti-extrusion (35), (37) doivent être remplacées à chaque démontage.

a

ITA Spalmare il piano di appoggio del distanziale (23) con Loctite 510.
Montare sul pignone il gruppo dischi-mozzo-distanziale preparato nelle fasi precedenti e mandarlo in battuta.

D Die Auflagefläche des Distanzstückes (23) mit Loctite 510 schmieren.
Auf den Kolben das Aggregat Scheiben-Nabe-Distanzstück montieren, das zuvor vorbereitet wurden und bis zum Anschlag einsetzen.

ESP Pasar la superficie de apoyo del distancial (23) con Loctite 510.
Montar sobre el pinòn el grupo discos-cubo-distancial preparado en la fase precedente y mandarlo a tope.

F Enduire le plan d'appui de l'entretoise (23) avec du Loctite 510.
Monter sur le pignon le groupe disques-moyeu-entretoise préparé lors des phases précédentes et l'envoyer en butée.

b

ITA Lubrificare la guarnizione OR (24) e montare il cilindro (18) completo di pistone (12).

D O-Ring (24) schmieren und den Zylinder (18) samt Kolben (12) montieren.

ESP Lubrificar la guarnicion OR (24) y montar el cilindro (18) completo de piston (12).

F Lubrifier la garniture OR (24) et monter le cylindre (18) équipé du piston (12).

c

ITA Inserire le viti (17) ed avvitarle a fondo in modo incrociato; serrarle con una coppia di 9,5÷10,5 Nm.
NOTA. Prima del serraggio finale, allineare le superfici esterne dei componenti.

D Schrauben (17) einsetzen und bis zum Anschlag im Kreuz mit einem Anzugsmoment von 9,5÷10,5 Nm fest schrauben.
BEMERKUNG. Bevor die Teile endgültig festgezogen werden, die äußeren Flächen ausrichten.

ESP Introducir los tornillos (17) y atornillarlos a tope de manera cruzada; apretarlos con un par de 9,5÷10,5 Nm.
NOTA. Antes de apretarlos definitivamente, alinear las superficies exteriores de los componentes.

F Introduire les vis (17) et visser à fond de façon croisée; serrer celles-ci à un couple de 9,5÷10,5 Nm.
NOTE. Avant le serrage final, aligner les surfaces externes des composants.

d

ITA **SOLO PER VERSIONE A 2 FUNZIONI**
Utilizzando un mazzuolo in materiale plastico, mandare a fondo corsa il pistone (12).

D **NUR FÜR AUSFÜHRUNG MIT 2 FUNKTIONEN**
Mit einem Gummihammer den Kolben (12) bis zum Anschlag schlagen.

ESP **SOLO POR VERSION A 2 FUNCIONES**
Utilizando un martillo en material plastico, mandar a final carrera el piston (12).

F **SEULEMENT DANS LES VERSIONS A 2 FONCTIONS.**
A l'aide du maillet en matière plastique, envoyer le piston (12) en fin de course.

e

ITA **SOLO PER VERSIONE A 2 FUNZIONI**
Montare sul coperchio (8) l'anello di battuta (10) delle molle a tazza, rilevare la misura "**B**" e trascriverla.
Rilevare la misura "**A**" necessaria al calcolo dei rasamenti (9) con la formula: **S = A–(B + 18,4)** ove: S = Spessori rasamenti - 18,4 mm = misura fissa delle molle a tazza.

D **NUR FÜR AUSFÜHRUNG MIT 2 FUNKTIONEN**
Auf den Deckel (8) den Anschlagring (10) der Tellerfedern montieren. Das Maß "**B**" messen und anmerken.
Das Maß "**A**" messen, das zur Rechnung der Scheiben (9) mit nachstehender Formel nötig ist: **S = A–(B + 18,4)** wo:
S = Scheibenstärke - 18,4 mm = feste Maß für Tellerfedern.

ESP **SOLO POR VERSION A 2 FUNCIONES**
Montar sobre la tapa (8) el segmento a tope (10) de los muelles a taza, relevar la medida "**B**" y registrarla.
Relevar la medida "**A**" necesaria al calculo de las raspaduras (9) con la formula: **S = A–(B + 18,4)** donde: S = espesor raspaduras - 18,4 mm = medida fija de los muelles a taza.

F **SEULEMENT DANS LES VERSIONS A 2 FONCTIONS.**
Monter sur le couvercle (8) l'anneau de butée (10) des ressorts Belleville, relever la mesure "**B**" et enregistrer cette dernière. Relever la mesure "**A**" nécessaire pour calculer les rasages (9) avec la formule: **S = A–(B + 18,4)** ou: S = Cales rasages - 18,4 mm = mesure fixe des ressorts Belleville.

f

ITA Lubrificare leggermente gli spessori (9) calcolati e l'anello (10) di battuta delle molle a tazza.
Montare spessori ed anello sul coperchio (8).
NOTA. Posizionare lo spessore maggiore a ridosso del coperchio.

D Die Scheiben (9) und den Anschlagring (10) der Tellerfedern leicht schmieren.
Scheiben und Ring auf den Deckel (8) montieren.
BEMERKUNG. Die größere Scheibe sollte am Deckel anliegen.

ESP Lubrificar ligermente los espesores (9) calculados y el segmento (10) a tope de los muelles a taza.
Montar el espesor major detras de la tapa.
NOTA. Colocar el espesor major detras de la tapa.

F Lubrifier légèrement les cales (9) calculées et l'anneau (10) de butée des ressorts belleville.
Monter cales et anneau sur le couvercle (8).
NOTE. Placer la cale la plus grande au-dessus du couvercle.

a

ITA Rimuovere l'attrezzo **T14** ed asportare dal corpo differenziale (9) gli ultimi due ingranaggi satelliti (12), il 2° ingranaggio planetario (6) ed il relativo gruppo di frizione (7) completo.

D Das Werkzeug **T14** abnehmen und vom Differentialkörper (9) die letzten beiden Zahnräder des Planetengetriebes (12), das 2. Planetengetriebe und das entsprechende Kupplungsaggregat (7) abnehmen.

ESP Remover la herramienta **T14** y sacar del cuerpo diferencial (9) los ultimos dos engranajes satelites (12), el 2° engranaje planetario (6) y el relativo grupo de friciòn (7) completo.

F Enlever l'outil **T14** puis extraire du corps différentiel (9) les deux derniers engrenages satellites (12), le 2° engrenage planétaire (6) et le groupe de friction relatif (7) complet.

a

ITA Rimuovere le viti (14) e rimuovere il coperchio intermedio (13).
NOTA. Sostenere il gruppo differenziale con una leva.

D Die Schrauben (14) abnehmen und den mittleren Dekkel (13) entfernen.
BEMERKUNG. Das Differentialaggregat mit einem Hebel stützen.

ESP Remover los tornillos (14) y remover la tapa intermedia (13).
NOTA. Sostener el grupo diferencial con una palanca.

F Enlever les vis (14) puis enlever le couvercle intermédiaire (13).
NOTE. Soutenir le groupe différentiel à l'aide d'un levier.

b

ITA Scollegare dal pistone (6) la forcella (5) e, tenendola sollevata, rimuovere il gruppo differenziale (15).

D Vom Kolben (6) die Gabel (5) abtrennen. Die anheben und des Differentialaggregat (15) entfernen.

ESP Desconectar del pistòn (6) la horquilla y, teniendola levantada, remover el grupo diferencial (15).

F Débrancher du piston (6) la fourchette (5) et en tenant cette dernière soulevée, enlever le groupe différentiel (15).

c

ITA Estrarre la forcella (5).

D Die Gabel (5) heraus nehmen.

ESP Extraer la harquilla (5).

F Extraire la fourchette (5).

d

ITA Rimuovere l'anello elastico (12) ed il pistone completo (6).

D Den Kolbenring (12) und den vollständigen Kolben (6) abnehmen.

ESP Remover el segmento elastico (12) y el pistòn completo (6).

F Enlever l'anneau à ressort (12) et le piston complet (6).

e

ITA Asportare l'anello di guida (11) e la guarnizione OR (10).
NOTA. L'anello di guida (11) e la guarnizione (10) devono essere sostituiti ad ogni smontaggio.

D Den Führungsring (11) und den O-Ring (10) abnehmen.
BEMERKUNG. Der Führungsring (11) und die Dichtung (10) müssen jedesmal ausgewechselt werden, wenn sie abmontiert werden.

ESP Sacar el segmento de guìa (11) y la guarniciòn OR (10).
NOTA. El segmento de guìa (11) y la guarniciòn (10) deben de ser sobstituidos a cada desmontaje.

F Enlever la bague de guidage (11) et la garniture OR (10).
NOTE. La bague de guidage (11) et la garniture (10) doivent être substituées à chaque démontage.

f

ITA Rimuovere l'anello elastico (9) e scomporre il gruppo pistone (6) in tutti i suoi componenti (7), (8).

D Den Kolbenring (9) abnehmen und das Kolbenaggregat (6) auseinander nehmen, um die Teile (7) und (8) frei zu setzen.

ESP Remover el segmento elastico (9) y descomponer el grupo pistòn (6) en todos sus componentes (7) y (8).

F Enlever l'anneau à ressort (9) et désassembler le groupe piston (6) de tous ses composants (7), (8).

a

ITA Rimuovere le viti (7), (8) di ritegno del coperchio (9) e le relative rondelle (10).

D Befestigungsschrauben (7) und (8) des Deckels (9) mit den Unterlegscheiben (10) abschrauben.

ESP Remover los tornillos (7), (8) de retencion de la tapa (9) y las relativas arandelas (10).

F Enlever les vis (7), (8) de fixation du couvercle (9) et ses relatives rondelles (10).

b

ITA Inserire alternativamente nelle cave predisposte uno spintore e, con leggeri colpi di martello, separare il coperchio (9) dal corpo riduttore (11).

D Abwechselnd, in die Nuten einen Stößel stecken und diesen mit einem Hammer leicht schlagen, bis sich der Deckel (9) vom Reduziererkörper (11) löst.

ESP Introducir alternativamente en los orificios propuestas un empuje y, con ligeros golpes de martillo, separar la tapa (9) del cuerpo reductor (11).

F Introduire alternativement dans les creux prédisposés un poussoir et, à l'aide de légers coups de maillet, séparer le couvercle (9) du corps réducteur (11).

c

ITA Inserire due leve nelle cave predisposte ed allontanare il coperchio (9) dal corpo riduttore (11).

D Zwei Hebel in die Nuten stecken und den Deckel (9) vom Reduziererkörper (11) abheben.

ESP Introducir dos palancas en los orificios propuestas un empuje y alejar la tapa (9) del cuerpo reductor (11).

F introduire deux leviers dans les creux prédisposés et éloigner le couvercle (9) du corps réducteur (11).

d

ITA Battere leggeri colpi con un mazzuolo per disimpegnare il coperchio (9) dall'ingranaggio superiore (12).

D Mit leichten Hammerschlägen, den Deckel (9) vom oberen Zahnrad (12) trennen.

ESP Golpear con ligeros golpes con un martillo para desconectar la tapa (9) del engranaje superior (12).

F Donner de légers coups de maillet pour dégager le couvercle (9) de l'engrenage supérieur (12).

e

ITA Asportare il coperchio (9) e rimuovere ogni traccia di sigillante.

D Deckel (9) abnehmen und Dichtungsmaße vollständig entfernen.

ESP Introducir la tapa (9) y remover cada mancha de cola.

F Enlever le couvercle (9) et nettoyer toute trace de colle.

f

ITA Asportare l'ingranaggio inferiore (13).

D Das untere Zahnrad (13) entfernen.

ESP Sacar el engranaje inferior (13).

F Enlever l'engrenage inférieur (13).

a

ITA Rimontare il gruppo differenziale (18) ed il coperchio intermedio (17).
ATTENZIONE! Se è stata sostituita la corona, ristabilire i giochi.
Per i dettagli, vedere «ASSEMBLAGGIO ED INSTALLAZIONE GRUPPO DIFFERENZIALE».

D Das Differentialaggregat (18) und den mittleren Deckel (17) wieder montieren.
ACHTUNG! Falls der Kranz ausgewechselt worden ist, Spiele wieder herstellen.
Weitere Einzelheiten im Paragraph «ZUSAMMENBAU UND INSTALLATION DES DIFFERENTIALAGGREGATS».

ESP Remontar el grupo diferencial (18) y la tapa intermedia (17).
CUIDADO! Si ha sido cambiada la corona, restabilizar los juegos.
Para los detalles, vease «ASEMBLAJE Y INSTALACION GRUPO DIFERENCIAL».

F Remonter le groupe différentiel (18) et le couvercle intermédiaire (17).
ATTENTION! Si la couronne a été substituée, rétablir les jeux.
Pour tout détail, voir «ASSEMBLAGE ET INSTALLATION GROUPE DIFFERENTIEL».

b

ITA Rimontare il braccio completo, controllando la planarità e bloccandolo con le modalità indicate nel paragrafo «ASSEMBLAGGIO DEI GRUPPI DI FRENATURA».
Collegare anche la barra di sterzatura.

D Den gesamten Arm wieder montieren und Ebenheit laut Anweisungen des Paragraphs «ZUSAMMENBAU DER BREMSAGGREGATE» kontrollieren.
Lenkstange ebenfalls anschließen.

ESP Remontar el brazo completo, controlando la planaridad y bloqueando con las modalidades indicadas en al capitulo «ASEMBLAJE DE LOS GRUPOS DE FRENADURA».
Conectar tambien la barra de direccion.

F Remonter le bras complet, en contrôler l'uniformité et le bloquer suivant le mode indiqué au paragraphe «ASSEMBLAGE DES GROUPES DE FREINAGE».
Brancher également la barre de braquage.

c

ITA Montare sul pignone (20) l'ingranaggio inferiore (13).

D Das untere Zahnrad (13) auf das Rad (20) montieren.

ESP Montar sobre el pinon (20) el engranaje inferior (13).

F Monter sur le pignon (20) l'engrenage inférieur (13).

d

ITA Inserire nel corpo riduttore (11) il gruppo ingranaggio superiore (12).

D Das obere Zahnradaggregat (12) in den Reduziererkörper (11) einsetzen.

ESP Introducir en el cuerpo reductor (11) el grupo engranaje superior (12).

F Introduire dans le corps réducteur (11) le groupe engrenage supérieur (12).

e

ITA Spalmare la superficie di chiusura del corpo riduttore (11) con Loctite 510.
Lubrificare gli anelli di tenuta (6) e (15); montare il coperchio (9) assestandolo (se necessario) con leggeri colpi di un mazzuolo in materiale plastico.

D Die Schließfläche des Reduziererkörpers (11) mit Loctite 510 schmieren.
Kolbenringe (6) und (15) schmieren; Deckel (9) montieren und wenn nötig, mit einem Gummihammer leicht schlagen.

ESP Pasar la superficie de cierre del cuerpo reductor (11) con Loctite 510.
Lubrificar los segmentos de compresion (6) y (15); montar la tapa (9) arreglando (si necesario) con ligeros golpes de martillo en material plastico.

F Enduire la surface de fermeture du corps réducteur (11) avec du Loctite 510.

f

ITA Bloccare il coperchio (9) con le viti (7) e (8) e le relative rondelle (10) serrando con il metodo di serraggio incrociato.
Coppia di serraggio: 82÷91 Nm

D Deckel (9) mit den Schrauben (7) und (8) und den Unterlegscheiben (10) festschrauben; die Schrauben im Kreuz abwechselnd fest ziehen.
Anzugsmoment: 82÷91 Nm.

ESP Bloquear la tapa (9) con los tornillos (7) y (8) y las relativas arandelas (10) apretando con el metodo de torsion cruzado.
Par de torsion : 82÷91 Nm.

F Bloquer le couvercle (9) avec les vis (7) et (8) et leurs relatives rondelles (10) en serrant à l'aide du système de serrage croisé.
Couple de serrage: 82÷91 Nm.

a

ITA Prima di rimuovere il pistone del freno negativo, segnare la posizione di montaggio.

D Auf die Bremse der Montage und achten Gegenscheibe (10) abnehmen .

ESP Anotar el orden de montaje y remover los freno (10).

F Prenant note de l 'ordre de montage, enlever les frein (10).

b

ITA Immettere lentamente aria compressa a bassa pressione attraverso l'attacco per il freno negativo per estrarre il pistone (3).
ATTENZIONE! Trattenere il pistone (3) che può essere espulso velocemente ed essere
danneggiato.

D Langsam Druckluft bei Niederdruck durch den An schluû der Federspeicherbremse einlassen, um den Kolben (3) heraus zu drucken.
ACHTUNG! Den Kolben (3) halten, da er ploetzlich heraus springen und beschadigt werden koennte.

ESP Introducir lentamente aire comprimida a baja presiòn atraves el empalme por el freno negativo para sacar el piston (3).
ATENCION! Tener el piston (3) que puede ser expulso rapidamente y estropearse.

F Envoyer lentement de l'air comprimè a basse pression à travers le raccord du frein nègatif pour extraire le piston (3).
ATTENTION! Tenir le piston (3) qui pourrait è tre expulser rapidement et endommager.

c

ITA Rimuovere i dischi di frenatura (14) e (15) annotando l'ordine di montaggio.
NOTA. Se i dischi non devono essere sostituiti, evitare lo scambio di posizione.

D Bremsscheiben (14) und (15) abnehmen und Montagerichtung notieren.
BEMERKUNG. Falls die Scheiben ausgewechselt werden mussen, ihre Position nicht verwechseln.

ESP Remover los discos de frenadura (14) y (15) anotando el orden de montaje.
NOTA. Si los discos no deben de ser sobstituidos, evitar el cambio de possiciòn.

F Enlever les disques de freinage (14) et (15) et prendre note de l'ordre du montage.
REMARQUE. Si les disques doivent étre substitués, éviter d'échanger leur position.

d

ITA Rimuovere i dischi di frenatura (16)e spessori (24) annotando l 'ordine di montaggio.
NOTA.Se i dischi non devono essere sostituiti, evitare lo scambio di posizione.

D Bremsscheiben (16)und Scheibe (24) abnehmen und Montagerichtung notieren.
BEMERKUNG.Falls die Scheiben ausgewechselt werden mussen,ihre Position nicht verwechseln.

ESP Remover los discos de frenadura (16) y espesores (24) anotando el orden de montaje.
NOTE.Si los discos no deben de ser sobstituidos,evitar el cambio de possiciòn.

F Enlever les disques de freinage (16)et cales (24) et prendre note de l 'ordre du montage.
REMARQUE.Si les disques doivent étre substitués,éviter d 'échanger leur position.

a

ITA Con pressione inserita 30bar rilevare la misura tra disco intermedio e coperchio.
ESEMPIO: 25,4mm

D Bei angelegtem Druck von 30 bar, das Maß von der Zwischenscheibe zur Deckelfläche ermitteln.

ESP Con la presion a 30 Bar medir la distancia enre el disco intermedio y la tapa.

F En donnant pressure de 30 Bar relever la mesure enre le flasque intermediaire et couvercle .
Example: 25,4mm

b

ITA Posizionare il pacco freni completo di distanziale sotto la pressa,
caricare con 1000Kg e rilevare la misura “V”.
ESEMPIO: V = 40mm

D Das Bremsscheibenpaket komplett mit Distanzstück unter eine Presse legen, mit 1000 kg belasten und das Maß “V” ermitteln.
EXAMPLE: V = 40mm

ESP Poner el paquete de frenos(discos) completo con el distancial. Debajo la prensa cargar con 1000Kg e medir la distanca V.
Ejemplo: V = 40mm

F Positionner le sabot des freins avèc la entretoise sous la presse.

c

ITA Quota fissa per il braccio = 68 mm

D Festes Maß = 68 mm

ESP Profundidad fija para el brazo = 68mm

F Mesure fix pou le bras: 68mm

d

ITA **S = 68mm - (x + y + v)** = Spessori da inserire sotto il distanziale.

D **S = 68mm - (x + y + v)** = Maß der Zwischenlegs-cheiben, die unter die Distanzscheibe gelegt werden müssen.

ESP **S = 68mm - (x + y + v)** = Espesores para poner debajo del distancial.

F **S = 68mm - (x + y + v)** = èpaisseurs de èposition sous la entretoise.

IT

Con l'aiuto del carro ponte o l'elevatore, trarre il braccio molto lentamente e con molta cautela verso il lato anteriore della macchina di qualche centimetro in modo che il perno di incernieramento del cilindro di compensazione esca dalla sagoma della torretta (Fig. 23). Durante questa operazione avere cura di mantenere il braccio pressochè orizzontale, prestare la massima attenzione per non compiere movimenti bruschi ed evitare di urtare col braccio (solo parzialmente svincolato) agli altri componenti della macchina.

Smontare la vite di fermo (Fig. 23 - Rif. A) e sfilare il perno di incernieramento del cilindro di compensazione con l'ausilio di un eventuale estrattore (Fig. 24 - Rif. B).

Con l'ausilio del carro ponte o dell'elevatore togliere il braccio dalla sede della torretta (Fig. 25).

EN

Using the bridge crane or elevator, extract the boom very slowly and with great care towards the front of the machine by about a few centimetres so that the compensation cylinder pivot pin projects from the turret outline (Fig. 23). During this operation, take care to keep the boom more or less horizontal, avoid sudden movements and avoid knocking the other machine components against the boom (only partially released).

Remove the stop screw (Fig. 23 - Ref. A) and extract the compensation cylinder pivot pin using a suitable extractor (Fig. 24 - Ref. B).

Using the bridge crane or elevator, remove the boom from the turret seating (Fig. 25).

DE

Mit der Hilfe des Laufkrans oder des Gabelstaplers den Ausleger sehr langsam und mit größter Vorsicht ein paar Zentimeter zur Vorderseite der Maschine ziehen, damit der Kippbolzen des Ausgleichszylinders aus der Konturlinie des Turms heraustritt (Abb. 23). Während dieses Vorgangs sollte der Ausleger fast horizontal gehalten werden. Besonders darauf achten, dass es nicht zu plötzlichen Bewegungen kommt und dass man mit dem Ausleger (der nur teilweise freigegeben ist) nicht gegen die anderen Bestandteile der Maschine stößt.

Die Feststellschraube (Abb. 23 - Bez. A) entfernen und den Kippbolzen des Ausgleichszylinders mit der Hilfe eines etwaigen Abziehers (Abb. 24 - Bez. B) herausziehen.

Den Ausleger mit der Hilfe des Laufkrans oder des Gabelstaplers aus seiner Aufnahme im Turm entfernen (Abb. 25).

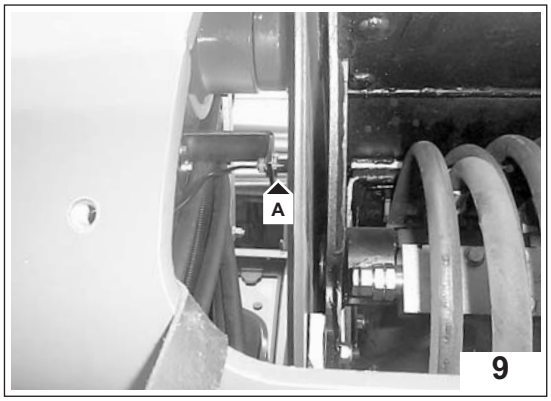
SMONTAGGIO E RIMONTAGGIO DALLA MACCHINA DEL BRACCIO TELESCOPICO

DISASSEMBLING AND REASSEMBLING THE TELESCOPIC BOOM FROM THE MACHINE

AUSBAU UND WIEDEREINBAU DES TELESKOPFAUSLEGERS AUS DER MASCHINE

MRT 1440-1640 EASY

IT-EN-DE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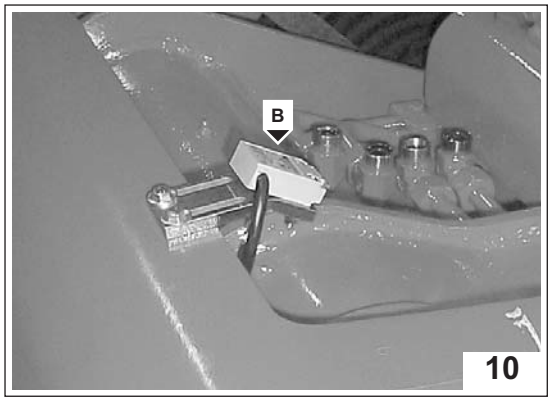
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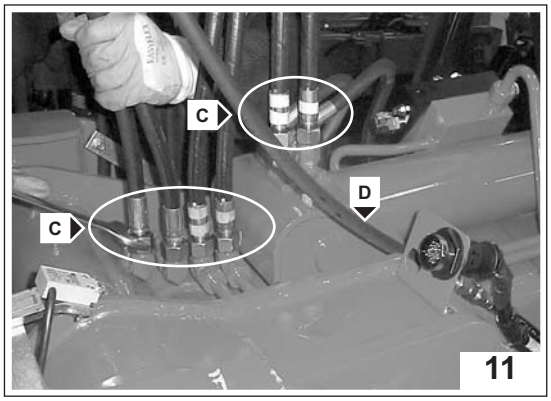
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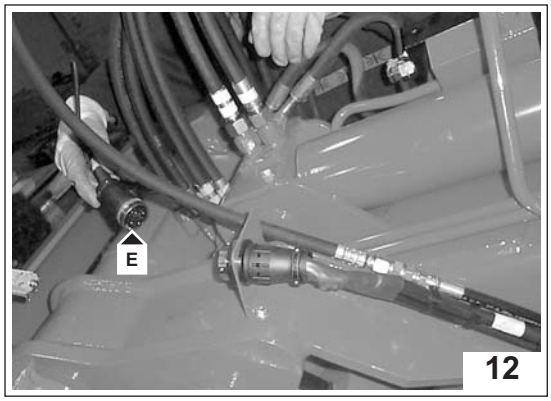
11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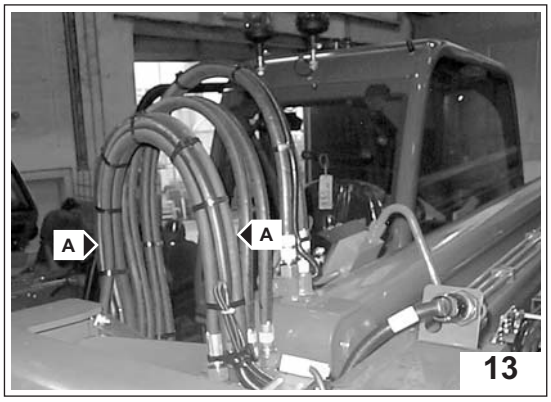
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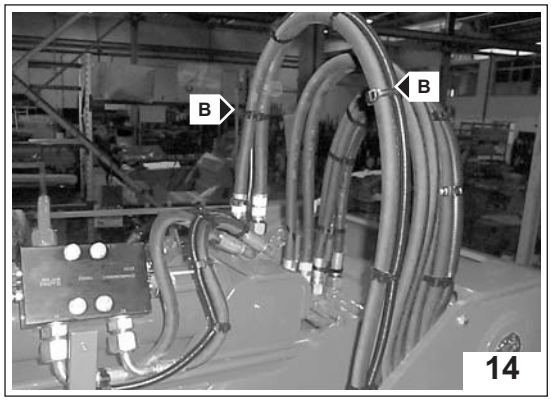
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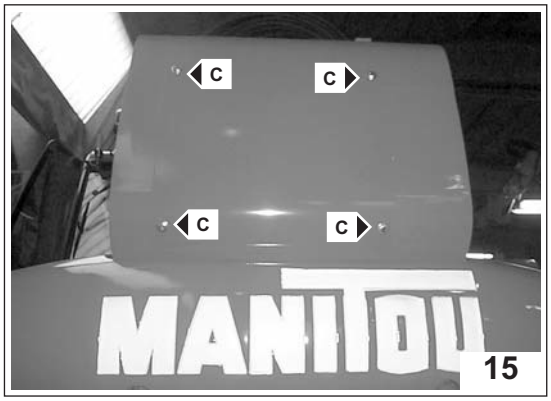
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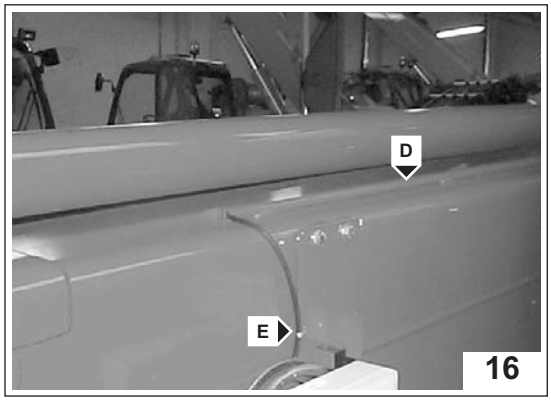
15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16

IT

Smontare la catena portatubi togliendo le viti (Fig. 17 - Rif. A) nella parte anteriore del tubolare portacatene.

Smontare il pattino (Fig. 18 - Rif. B) basculante sulla forcella del I° sfilo.

Smontare le forcelle di supporto canalina su I° e II° sfilo (Fig. 19 - Rif. C/D).

Smontare il tubolare (Fig. 20 - Rif. E) portacatene sul lato destro del braccio esterno.

Smontaggio del braccio 2° sfilo dal 1° sfilo

Smontare la protezione martinetto 1° sfilo in testa al braccio telescopico (Fig. 21 - Rif. A).

Scollegare i tubi in ferro dalla valvola martinetto di brandeggio (Fig. 22 - Rif. B).

Svitare la ghiera (Fig. 23 - Rif. C) di bloccaggio perno incernieramento (Fig. 23 - Rif. D) lato stelo martinetto brandeggio con attacco rapido.
Sfilare il perno incernieramento (Fig. 23 - Rif. D) lato stelo martinetto brandeggio con attacco rapido.

Assicurare l'attacco rapido al carro ponte o ad un elevatore.

Svitare la vite (Fig. 24 - Rif. E) di bloccaggio perno di incernieramento attacco rapido con braccio 2° sfilo.
Sfilare il perno (Fig. 24 - Rif. F) di incernieramento attacco rapido con braccio 2° sfilo.

EN

Dismantle the tubeholder chain after removing the screws (Fig. 17 - Ref. A) in the front part of the chainholder tube.

Dismantle the pivot pad (Fig. 18 - Ref. B) on the 1st extension fork.

Dismantle the channel support fork on the 1st and 2nd extension (Fig. 19 - Ref. C/D).

Dismantle the chainholder tube (Fig. 20 - Ref. E) on the right side of the external boom

Dismantle the 2nd extension boom from the 1st extension.

Dismantle the 1st extension cylinder guard at the top of the telescopic boom (Fig. 21 - Ref. A).

Disconnect the iron tubes from the tilting cylinder valve (Fig. 22 - Ref. B).

Unscrew the ring nut (Fig. 23 - Ref. C) for locking the pivot pin (Fig. 23 - Ref. D) on the tilting cylinder rod side with quick-release coupling.
Extract the pivot pin (Fig. 23 - Ref. D) on the tilting cylinder rod side with quick-release coupling.

Secure the quick-release coupling to a bridge crane or elevator.

Unscrew the screws (Fig. 24 - Ref. E) for locking quick-release coupling pivot pin with 2nd extension boom.
Extract the pivot pin (Fig. 24 - Ref. F) for quick-release coupling with 2nd extension boom.

DE

Die Schlauchtragekette ausbauen, indem man die Schrauben (Abb. 17 - Bez. A) im vorderen Teil des Kettentragerohrs entfernt.

Den auf der Gabel des 1. Auszugs kippend befestigten Gleitschuh (Abb. 18 - Bez. B) ausbauen.

Die Tragegabeln des Kabelkanals auf dem 1. und 2. Auszug ausbauen (Abb. 19 - Bez. C/D).

Das Kettentragerohr (Abb. 20 - Bez. E) auf der rechten Seite des externen Auslegers ausbauen.

Ausbau des 2. Auszugs aus dem 1. Auszug

Den Zylinderschutz des 1. Auszugs am Kopf des Teleskopauslegers (Abb. 21 - Bez. A) ausbauen.

Die Eisenrohre vom Ventil des Schwenkzylinders abtrennen (Abb. 22 - Bez. B).

Die Ringmutter (Abb. 23 - Bez. C) zur Blockierung des Kippbolzens (Abb. 23 - Bez. D) auf der Schaftseite des Schwenkzylinders mit Schnellkupplung losschrauben.
Den Kippbolzen (Abb. 23 - Bez. D) auf der Schaftseite des Schwenkzylinders mit Schnellkupplung herausziehen.

Die Schnellkupplung am Laufkran oder dem Gabelstapler absichern.

Die Schraube (Abb. 24 - Bez. E) zur Blockierung des Kippbolzens an der Schnellkupplung des 2. Auszugs losschrauben.
Den Kippbolzen (Abb. 24 - Bez. F) der Schnellkupplung mit dem 2. Auszug herausziehen.

IT

RIMONTAGGIO DEL BRACCIO TELESCOPICO COMPLETO

ATTENZIONE: Ogni volta che si deve fissare il pattino alla struttura del braccio si consigliano le seguenti modalità di montaggio (Fig. 1) :
- inserire il pattino (A) nella sede di lavoro.
- avvitare la vite di fissaggio (B) lasciando una distanza di circa 4-5 mm dalla superficie di lavoro del pattino.
- bloccare la vite con un dado autobloccante (C).

Rimontaggio del braccio 1° sfilo

Il gioco tra i pattini e gli elementi del braccio é di circa 1 mm. Dopo la regolazione é importante verificare che non si produca del gioco o del blocco eccessivo durante il rientro o l'uscita degli sfili.

Montare tutti i pattini del braccio 1° sfilo, lato posteriore (Fig. 2 - Rif. D).

Ingrassare le superfici interne del braccio esterno dove lavoreranno i pattini del 1° sfilo.

Con l'uso del carro ponte o un elevatore inserire il braccio 1° sfilo nel braccio esterno lasciandolo fuori di circa 0,5 metri.

Montare gli spessori alti 20 mm e i pattini nella parte inferiore del braccio esterno, lato anteriore (Fig. 2 - Rif. E).

Assicurarsi che il perno di articolazione braccio esterno (Fig. 3 - Rif. F) sia perfettamente parallelo alla parte anteriore interna 1° sfilo (Fig. 3 - Rif. G).

Spessorare, se necessario, i pattini nella parte inferiore del braccio esterno, lato anteriore (Fig. 2 - Rif. E).

Bloccare i pattini con le viti di fissaggio.

EN

REASSEMBLING THE ENTIRE TELESCOPIC BOOM

ATTENTION: Each time it is necessary to fix the pad to the boom frame, proceed as follows (Fig. 1) :
- insert pad (A) in the working position.
- tighten fixing screws (B) leaving a gap of about 4-5 mm from the pad operating surface.
- block the screw using a self-locking nut (C).

Reassembling the 1st extension boom

Clearance between the pads and boom elements is about 1 mm. After adjustment, check to ensure that there is no excessive play or block during extension or retraction of the boom.

Fit all the pads of the 1st extension boom, on the back (Fig. 2 - Ref. D).

Grease the inner surfaces of the external boom in which the 1st extension pads operate.

Using a bridge crane or elevator, insert the 1st extension boom in the external boom, leaving it projecting out by about 0.5 m.

Fit the 20 mm thick shims and the pads in the lower part of the external boom, at the front (Fig. 2 - Ref. E).

Make sure the external boom pivot pin (Fig. 3 - Ref. F) is perfectly parallel to the 1st extension internal front part (Fig. 3 - Ref. G).

Fit shims if necessary, on the pads in the front of the external boom, front (Fig. 2 - Ref. E).

Lock the pads using fixing screws.

DE

WIEDEREINBAU DES KOMPLETTEN TELESKOPAUSLEGERS

ACHTUNG: Jedes Mal, wenn ein Gleitschuh an der Struktur des Auslegers befestigt werden muss, sind die folgenden Montageanleitungen zu beachten (Abb. 1):
- Den Gleitschuh (A) in seinen Arbeitssitz einführen.
- Die Befestigungsschraube (B) anziehen, wobei ein Abstand von circa 4-5 mm von der Arbeitsfläche des Gleitschuhs zu lassen ist.
- Die Schraube mit einer selbstsperrenden Mutter (C) blockieren.

Wiedereinbau des 1. Auszugs

Das Spiel zwischen den Gleitschuhen und den Elementen des Auslegers beträgt circa 1 mm. Nach der Einstellung ist es wichtig zu prüfen, dass während des Aus- und Einfahrens der Auszüge kein Spiel entsteht oder ein zu fester Sitz besteht.

Alle Gleitschuhe des 1. Auszugs der Rückseite montieren (Abb. 2 - Bez. D).

Die Innenfläche des externen Auslegerarms schmieren, wo die Gleitschuhe des 1. Auszugs arbeiten.

Unter Benutzung eines Laufkrans bzw. eines Gabelstaplers den 1. Auszug in den externen Auslegerarm einstecken und ihn circa 0,5 Meter überstehen lassen.

Die 20 mm hohen Beilagen und die Gleitschuhe im unteren Teil des externen Auslegerarms auf der Vorderseite montieren (Abb. 2 - Bez. E).

Sicherstellen, dass der Gelenkbolzen des externen Auslegerarms (Abb. 3 - Bez. F) vollkommen parallel zum inneren Vorderteil des 1. Auszugs steht (Abb. 3 - Bez. G).

Die Gleitschuhe im unteren Teil des externen Arms auf der Vorderseite bei Bedarf mit Beilagen versehen (Abb. 2 - Bez. E).

Die Gleitschuhe mit den Befestigungsschrauben blockieren.

IT

Collegare il tubo flessibile (Fig. 29 - Rif. L Pag. 19) al tubo in ferro (Fig. 31- Rif. A).

Fissare il tubo in ferro al braccio tramite gli appositi collari (Fig. 31 - Rif. B).

Collegare il tubo flessibile al martinetto 1° sfilo (Fig. 32 - Rif. C).

Collegare il tubo in ferro (Fig. 32 - Rif. D) al tubo flessibile (Fig. 32 - Rif. E).

Collegare i tubi flessibili al martinetto 2° sfilo (Fig. 33 - Rif. F).

Montare la guida tubi flessibili (Fig. 33 - Rif. G).

Collegare i tubi optional ai raccordi passaparete (Fig. 34 - Rif. H) e bloccarli con l'apposito collare (Fig. 34 - Rif. I).

Montare i tubi in ferro orientati verso i raccordi attacchi rapidi (Fig. 35 - Rif. A/B) :
- montare il tubo in ferro (Fig. 35 - Rif. A) col flessibile (Fig. 36 - Rif. C);
- montare il tubo in ferro (Fig. 35 - Rif. B) col flessibile (Fig. 36 - Rif. D).

Inserire nella sede del braccio telescopico il martinetto di brandeggio (Fig. 37).

Avvitare i tubi in ferro circa di 2 giri di filetto alla valvola sul martinetto di brandeggio:
- montare il tubo in ferro (Fig. 35 - Rif. A) col raccordo (Fig. 38 - Rif. E);
- montare il tubo in ferro (Fig. 35 - Rif. B) col raccordo (Fig. 38 - Rif. F).

EN

Connect the flexible tube (Fig. 29 - Ref. L - Page 21) to the iron tube (Fig. 31- Ref. A).

Fix the iron tube to the boom by means of collars (Fig. 31 - Ref. B).

Connect the flexible tube to the 1st extension cylinder (Fig. 32 - Ref. C).

Connect the iron tube (Fig. 32 - Ref. D) to the flexible tube (Fig. 32 - Ref. E).

Connect the flexible tubes to the 2nd extension cylinder (Fig. 33 - Ref. F).

Fit the flexible tubes guide (Fig. 33 - Ref. G).

Connect the optional tubes to the through-connectors (Fig. 34 - Ref. h) and block them by means of the collar (Fig. 34 - Ref. I).

Fit the iron tubes oriented towards the quick-release couplings (Fig. 35 - Ref. A/B) :
- fit the iron tube (Fig. 35 - Ref. A) with the flexible tube (Fig. 36 - Ref. C);
- fit the iron tube (Fig. 35 - Ref. B) with the flexible tube (Fig. 36 - Ref. D).

Insert the tilting cylinder in the telescopic boom housing (Fig. 37).

Tighten the iron tube by about two turns of the thread to the valve on the tilting cylinder:
- fit the iron tube (Fig. 35 - Ref. A) with the connection (Fig. 38 - Ref. E);
- fit the iron tube (Fig. 35 - Ref. B) with the connection (Fig. 38 - Ref. F).

DE

Den Schlauch (Abb. 29 - Bez. L Seite 19) am Eisenrohr (Abb. 31- Bez. A) anschließen.

Das Eisenrohr am Ausleger mit den dafür vorgesehenen Anschlagbünden befestigen (Abb. 31 - Bez. B).

Den Schlauch am Zylinder des 1. Auszugs anschließen (Abb. 32 - Bez. C).

Das Eisenrohr (Abb. 32 - Bez. D) am Schlauch (Abb. 32 - Bez. E) anschließen.

Die Schläuche am Zylinder des 2. Auszugs anschließen (Abb. 33 - Bez. F).

Die Schlauchführung montieren (Abb. 33 - Bez. G).

Die Schläuche der Optionen an den wanddurchführenden Anschlüssen (Abb. 34 - Bez. H) anschließen und mit dem dafür vorgesehehen Anschlagbund blockieren (Abb. 34 - Bez. I).

Die Eisenrohre in Richtung auf die Anschlüsse der Schnellkupplungen montieren (Abb. 35 - Bez. A/B) :
- Das Eisenrohr (Abb. 35 - Bez. A) mit dem Schlauch (Abb. 36 - Bez. C) montieren;
- das Eisenrohr (Abb. 35 - Bez. B) mit dem Schlauch (Abb. 36 - Bez. D) montieren.

Den Schwenkzylinder in seine Aufnahme im Teleskopausleger stecken (Abb. 37).

Die Eisenrohre circa um 2 Gewindeumdrehungen am Ventil auf dem Schwenkzylinder anschrauben:
- Das Eisenrohr (Abb. 35 - Bez. A) mit dem Anschluss (Abb. 38 - Bez. E) montieren;
- das Eisenrohr (Abb. 35 - Bez. B) mit dem Anschluss (Abb. 38 - Bez. F) montieren.

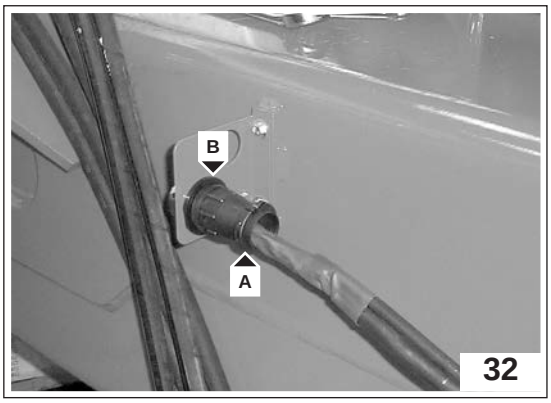
SMONTAGGIO E RIMONTAGGIO DEL BRACCIO TELESCOPICO COMPLETO

DISASSEMBLING AND REASSEMBLING ENTIRE TELESCOPIC BOOM

AUSBAU UND WIEDEREINBAU DES KOMPLETTEN TELESKOPAUSLEGERS

MRT 1840 EASY

IT-EN-DE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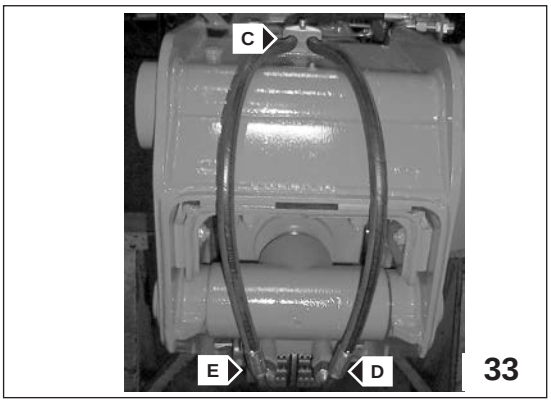
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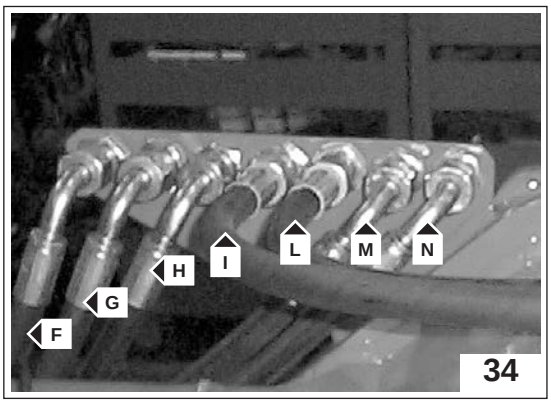
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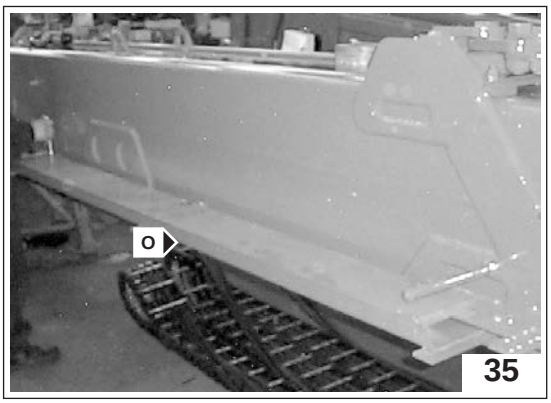
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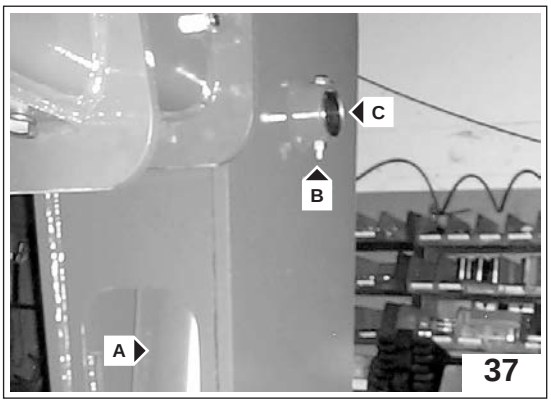
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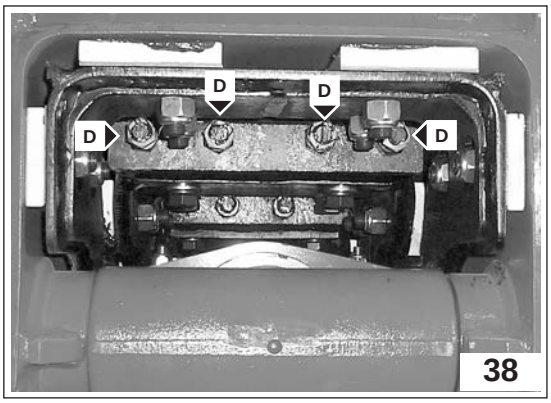
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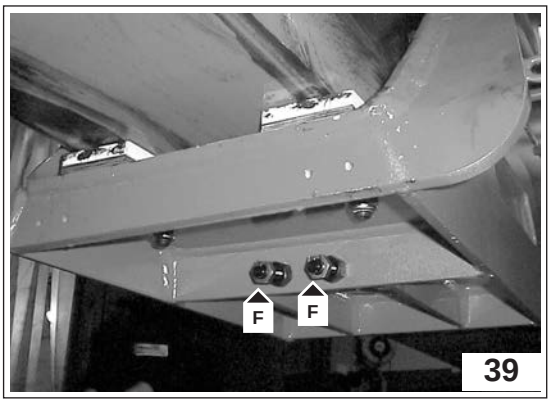
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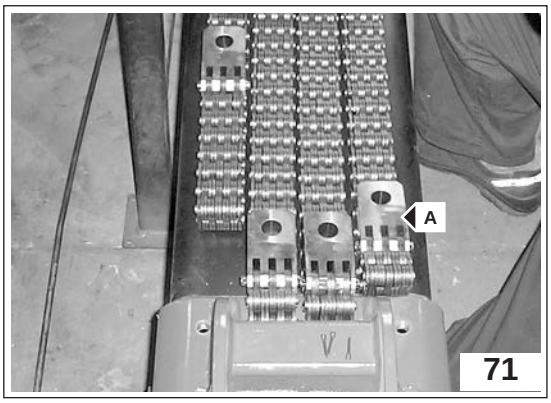
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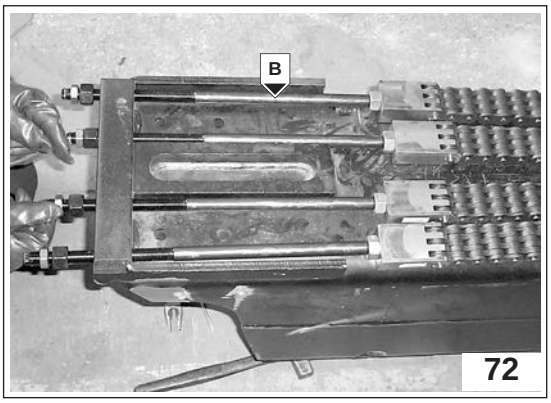
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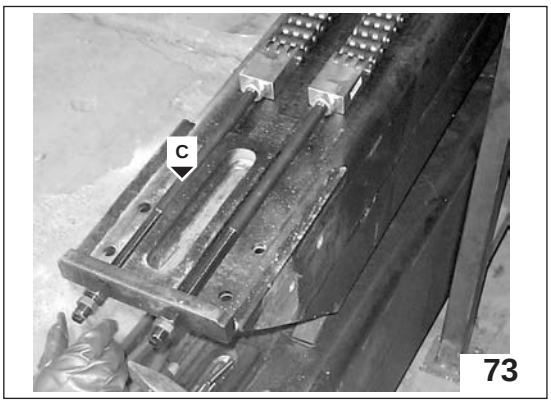
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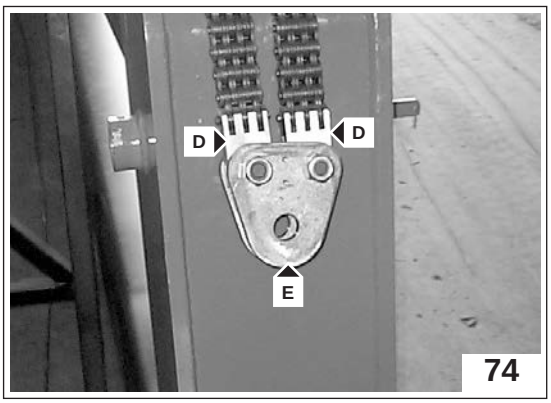
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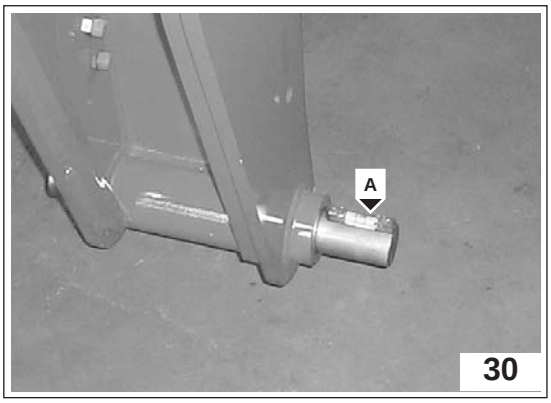
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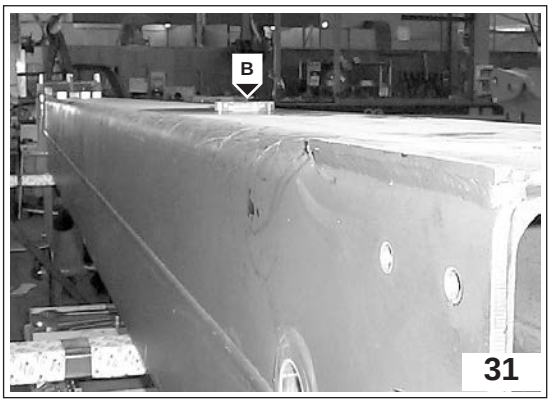
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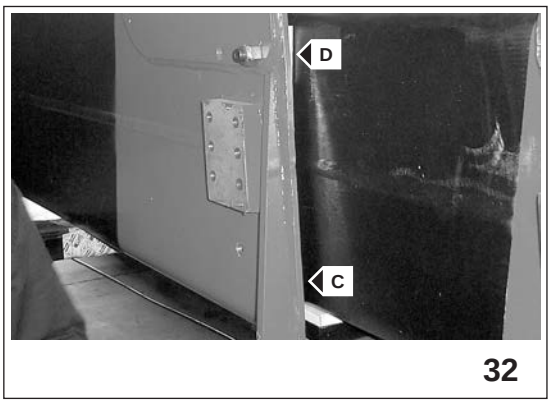
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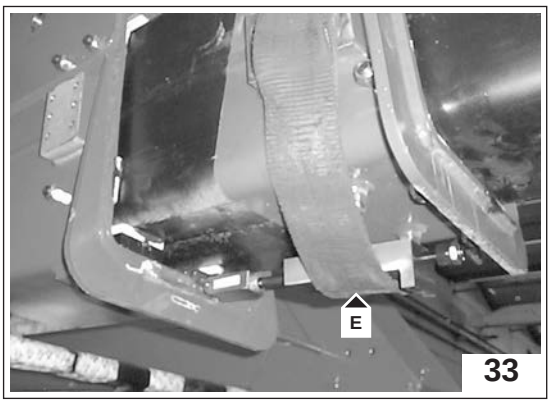
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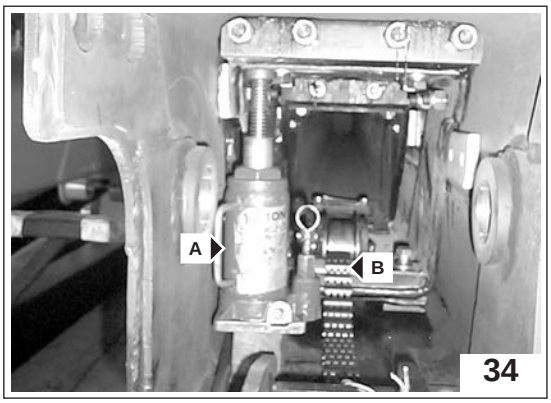
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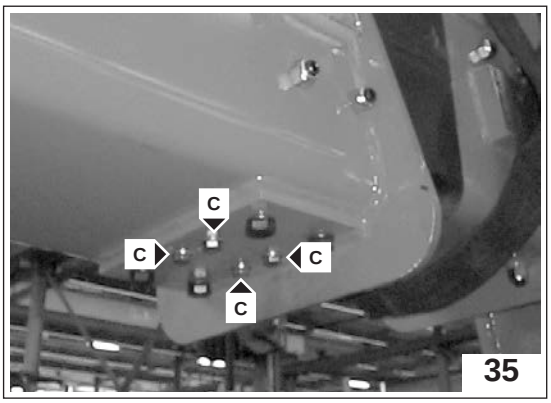
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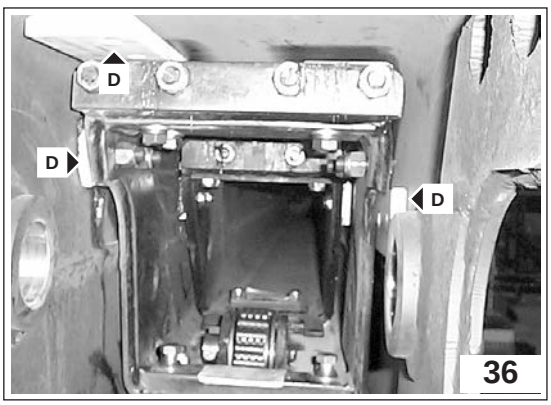
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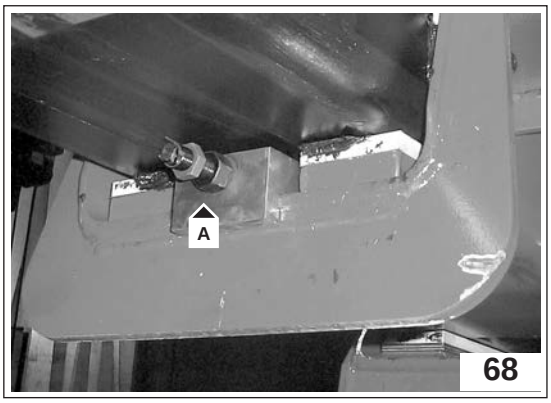
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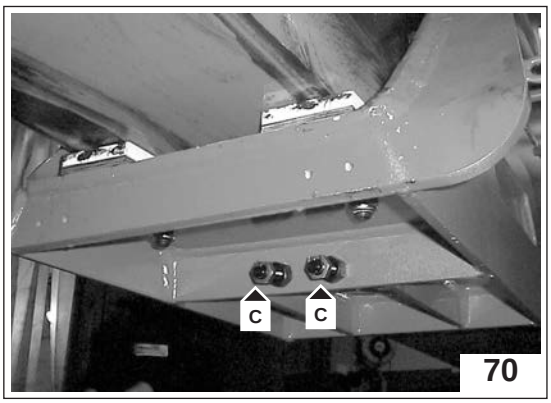
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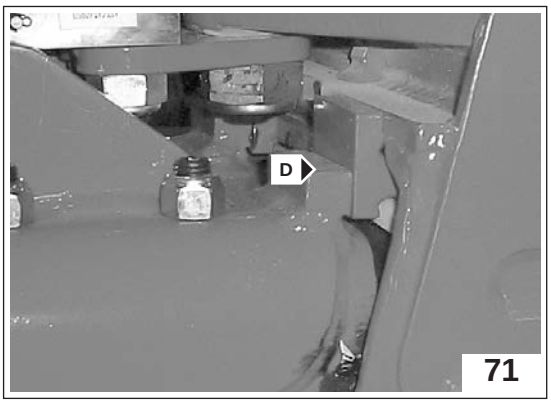
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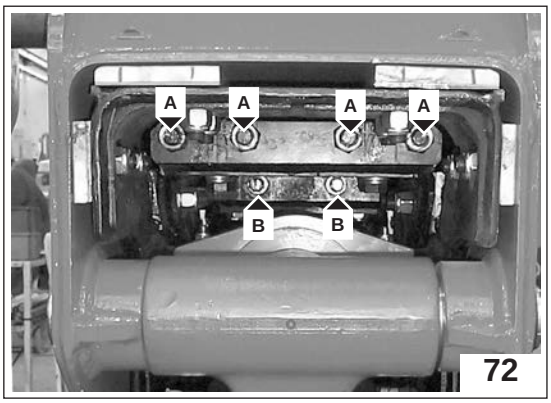
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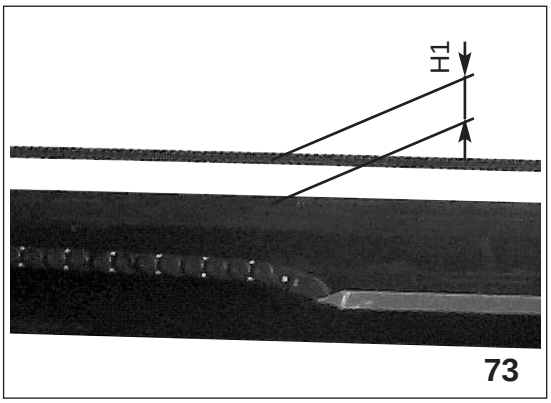
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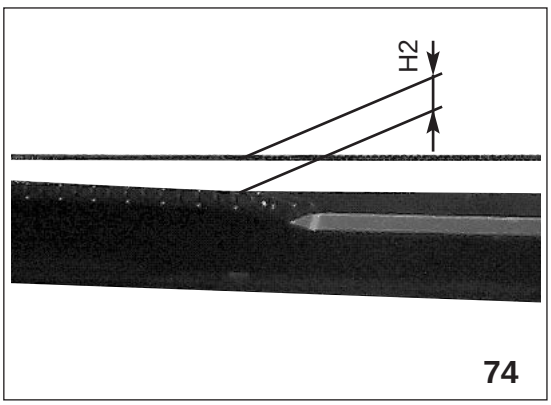
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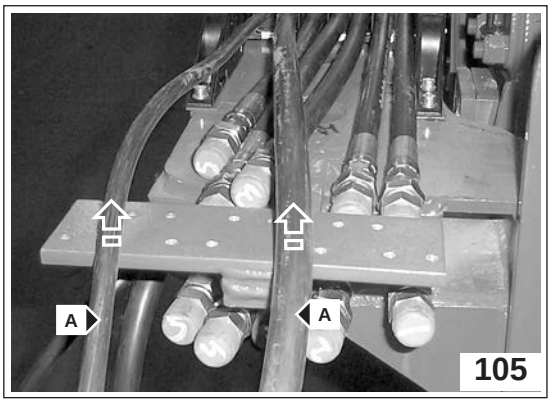
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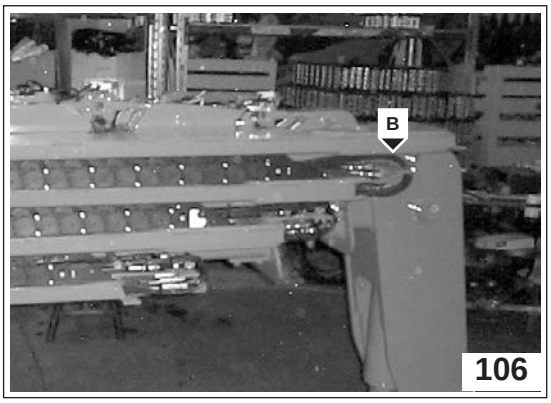
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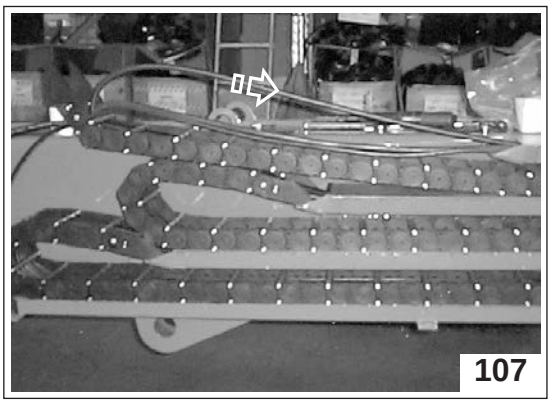
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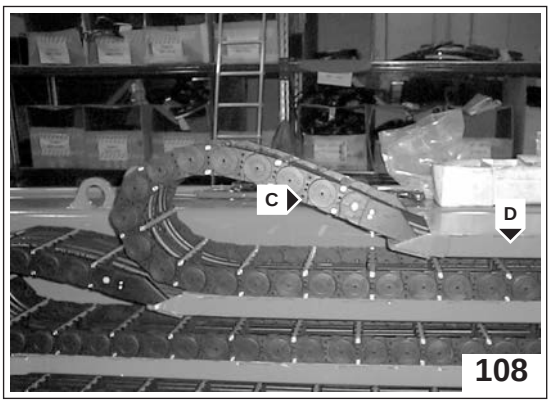
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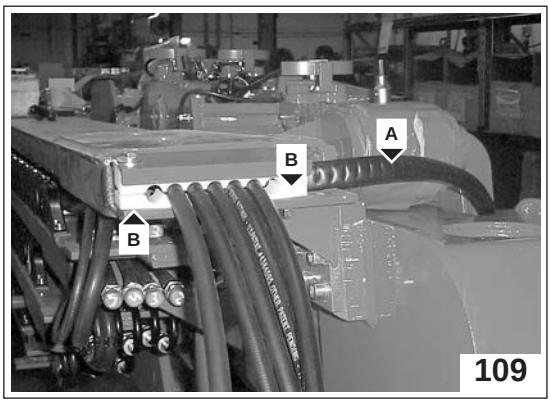
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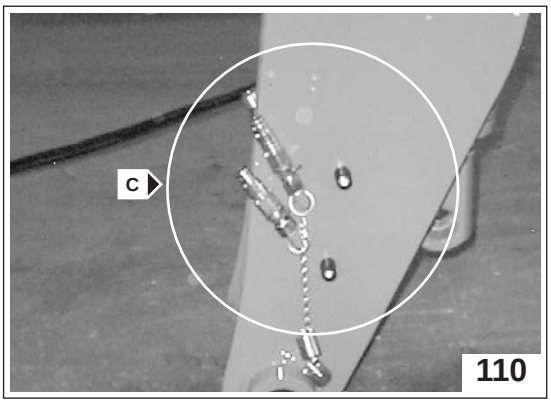
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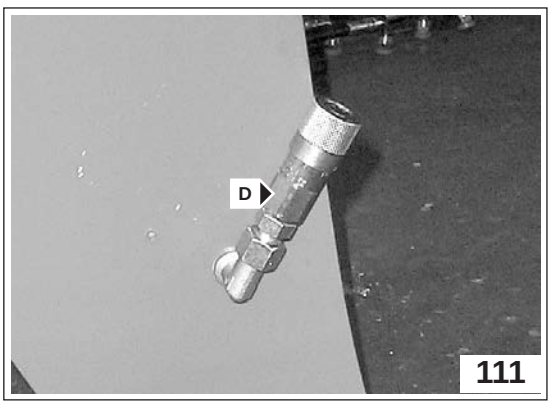
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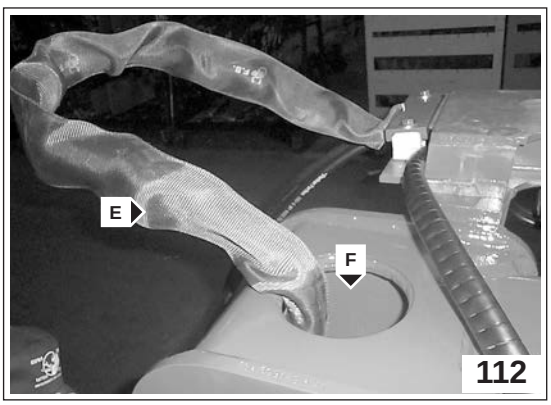
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IT

SMONTAGGIO DEL COLLETTORE IDRAULICO DI ROTAZIONE

- Posizionare la macchina su una superficie piana e sollevare completamente il braccio telescopico.
- Spegnere il motore termico e scollegare i morsetti della batteria.
- Smontare il coperchio (Rif. A-Fig. 1).
- Smontare le fascette di gomma (Rif. B-Fig. 2).
- Scollegare il cablaggio elettrico dalla scatola di derivazione carro "C21" (Rif. C-Fig. 3) e dal supporto sul serbatoio olio "C17-C18" (Rif. D-Fig. 2).
- Tagliare le fascette a stringa (Rif. A-Fig. 4).
- Scollegare il cablaggio elettrico (Rif. B-Fig. 4) dalla cabina posizionato sotto il cruscotto stabilizzatori "C1.-C2".
- Smontare le orecchiette di trascinamento collettore di rotazione idraulico (Rif. C-Fig. 4).
- Scollegare tutti i tubi dal collettore di rotazione idraulico (vedere tebella COLLETTORE ROTANTE IDRAULICO).
- Assicurare il collettore di rotazione idraulico/elettrico ad un elevatore o un carro ponte, svitare le viti di fissaggio (Rif. D-Fig. 5) e rimuoverlo dalla macchina.

EN

DISASSEMBLING ROTATION HYDRAULIC MANIFOLD

- Position the vehicle on level ground and raise the telescopic boom completely.
- Switch off the engine and disconnect the battery terminals.
- Remove the cover (Ref. A-Fig. 1).
- Remove the rubber bands (Ref. B-Fig. 2).
- Disconnect the electric wiring from the-controls junction box "C21" (Ref. C-Fig. 3) and the support on the oil tank "C17-C18" (Ref. D-Fig. 2).
- Cut the string band (Ref. A-Fig. 4).
- Disconnect the electric wiring (Ref. B-Fig. 4) from the cab positioned under the outriggers control panel."C1.-C2"
- Dismantle the hydraulic rotation collector drive tabs (Ref. C-Fig. 4).
- Disconnect all the pipes from the hydraulic rotation manifold (see HYDRAULIC ROTARY MANIFOLD Table).
- Secure the hydraulic/electric manifold to a bridge crane or an elevator, unscrew the fixing screws (Ref. D-Fig. 5) and remove it from the vehicle.

DE

AUSBAU DES ROTATIONSVERTEILERS

- Die Maschine auf einer ebenen Fläche abstellen und den Teleskopausleger ganz heben.
- Den Verbrennungsmotor abstellen und die Batterieklemmen abtrennen.
- Den Deckel ausbauen (Bez. A-Abb. 1).
- Die Kabelbinder aus Gummi entfernen (Bez. B-Abb. 2).
- Die elektrische Verkabelung von der Abzweigdose der Bedienelemente (Bez. C-Abb. 3) und dem Träger auf dem Ölbehälter abtrennen (Bez. D-Abb. 2).
- Die einfachen Kabelbinder durchschneiden (Bez. A-Abb. 4).
- Die elektrische Verkabelung (Bez. B-Abb. 4) von der Kabine unter dem Armaturenbrett der Stabilisatoren abtrennen.
- Die Mitnehmeransätze des Rotations-verteilers abmontieren (Bez. C-Abb. 4).
- Alle Leitungen vom Rotationsverteiler abtrennen (siehe Tabelle ROTATIONS-VERTEILER).
- Den elektrischen Teil des Rotations-verteilers mit einem Gabelstapler oder einem Laufkran absichern, die Befestigungsschrauben (Bez. D-Abb. 5) losdrehen und es aus der Maschine herausnehmen.

CONNETTORE “C17” (FEMMINA)

NR.	CORRISP. CABLAGGIO	DESCRIZIONE
A	Bianco 012	Strumento livello combustibile
B	Bianco 013	Spia stabilizzatori sfilati
C	Bianco 015	Segnale marcia lenta-veloce inserita
D	Bianco 023	Spia allineamento ponte anteriore
E	Bianco 017	Elettrovalvola esclusione circuito idraulico
F	Bianco 002	Segnale stabilizzatori appoggiati
G	Bianco 008	Elettrovalvola stabilizzatore posteriore destro
H	Bianco 009	Elettrovalvola stabilizzatore posteriore sinistro
J	Bianco 011	Elettrovalvola stabilizzatore anteriore sinistro
K	Bianco 003	Elettrovalvola stabilizzatore anteriore destro
L	Bianco 004	Elettrovalvola rientro stabilizzatori
M	Bianco 006	Elettrovalvola trave posteriore destra
N	Bianco 005	Elettrovalvola trave posteriore sinistra
P	Bianco 007	Elettrovalvola trave anteriore destra
R	Bianco 010	Elettrovalvola trave anteriore sinistra
S	Blu	Luci di direzione destre
T	Blu nero	Luci di direzione sinistre
U	Bianco 040	Elettrovalvola freno stazionamento
V	----	----

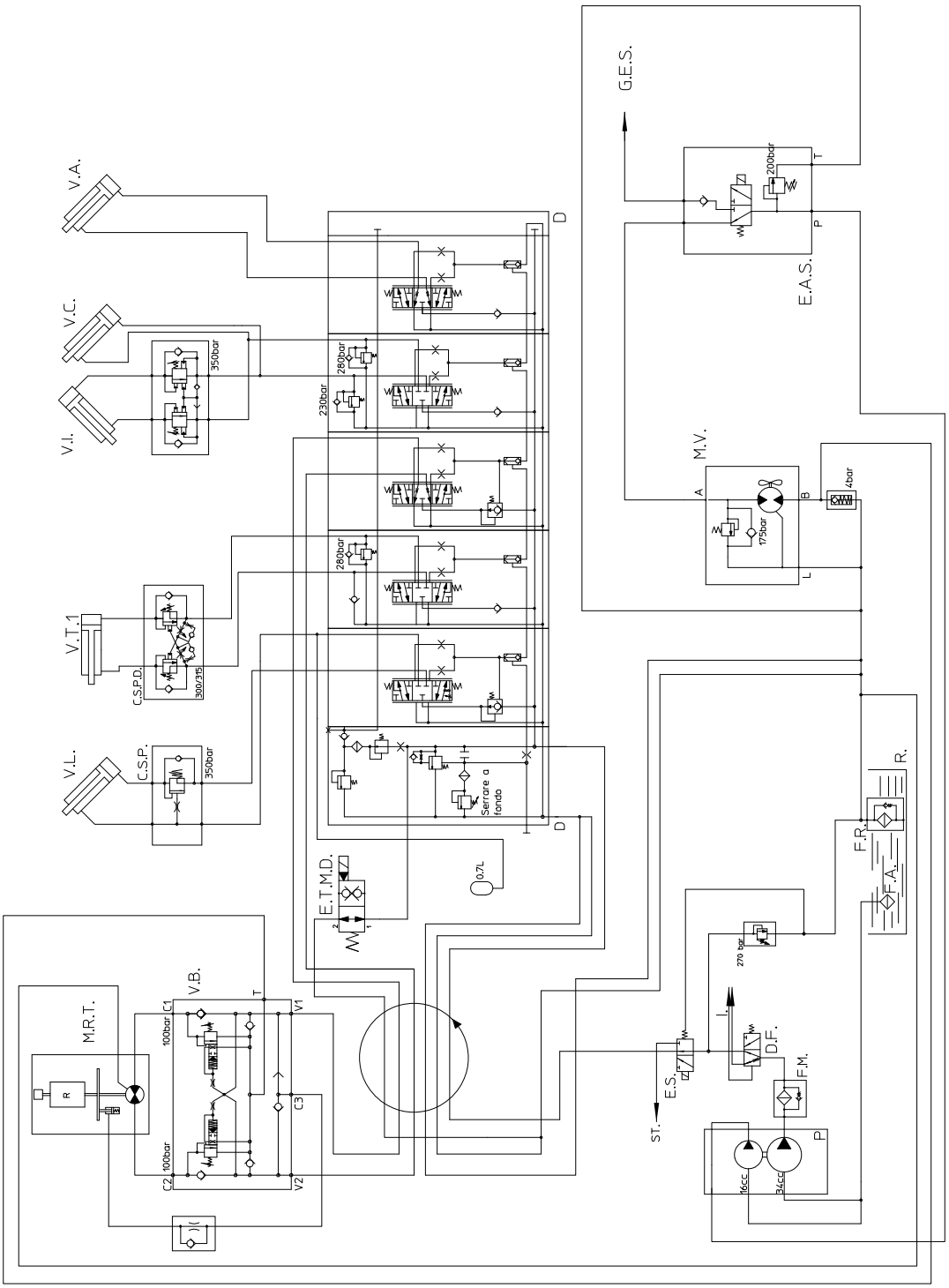
CONNETTORE “C18” (MASCHIO)

NR.	CORRISP. CABLAGGIO	DESCRIZIONE
A	Marrone sez. 2,5 (044)	Positivo batteria
B	Marrone sez. 2,5 (044)	Positivo batteria
C	Marrone sez. 2,5 (044)	Positivo batteria
D	Marrone sez. 2,5 (044)	Positivo batteria
E	Blu sez. 2,5 (041)	Negativo batteria (solo con staccabatteria)
F	Blu sez. 2,5 (041)	Negativo batteria (solo con staccabatteria)
G	Blu sez. 2,5 (041)	Negativo batteria (solo con staccabatteria)
H	Blu sez. 2,5 (041)	Negativo batteria (solo con staccabatteria)
I	Nero sez. 2,5 (043)	Massa telaio
J	Nero sez. 2,5 (043)	Massa telaio
K	Nero sez. 2,5 (043)	Massa telaio
L	Nero sez. 2,5 (043)	Massa telaio
1	Bianco 016	Spia allineamento ponte posteriore
2	Bianco 018	Elettrovalvola, relè e cicalino retromarcia
3	Giallo marrone	Elettrovalvola, relè e cicalino retromarcia
4	Bianco 022	Spia intasamento filtro aria
5	Bianco 028	Elettrovalvola marcia avanti
6	Bianco 024	Elettrovalvola sterzatura granchio
7	Bianco 025	Elettrovalvola sterzatura concentrica
8	----	----
9	Bianco 026	Luci di direzione destre
10	----	----
11	Bianco 027	Luci di direzione sinistre
12	----	----
13	Bianco 034	Spia carica batteria
14	Bianco 035	Spia bassa pressione olio motore
15	Bianco 038	Spia eccessiva temperatura acqua motore
16	Bianco 036	Elettrovalvola arresto motore
17	Marrone 1,5	Elettrovalvola arresto motore
18	Bianco 039	Eccitazione relè pompa emergenza
19	----	----

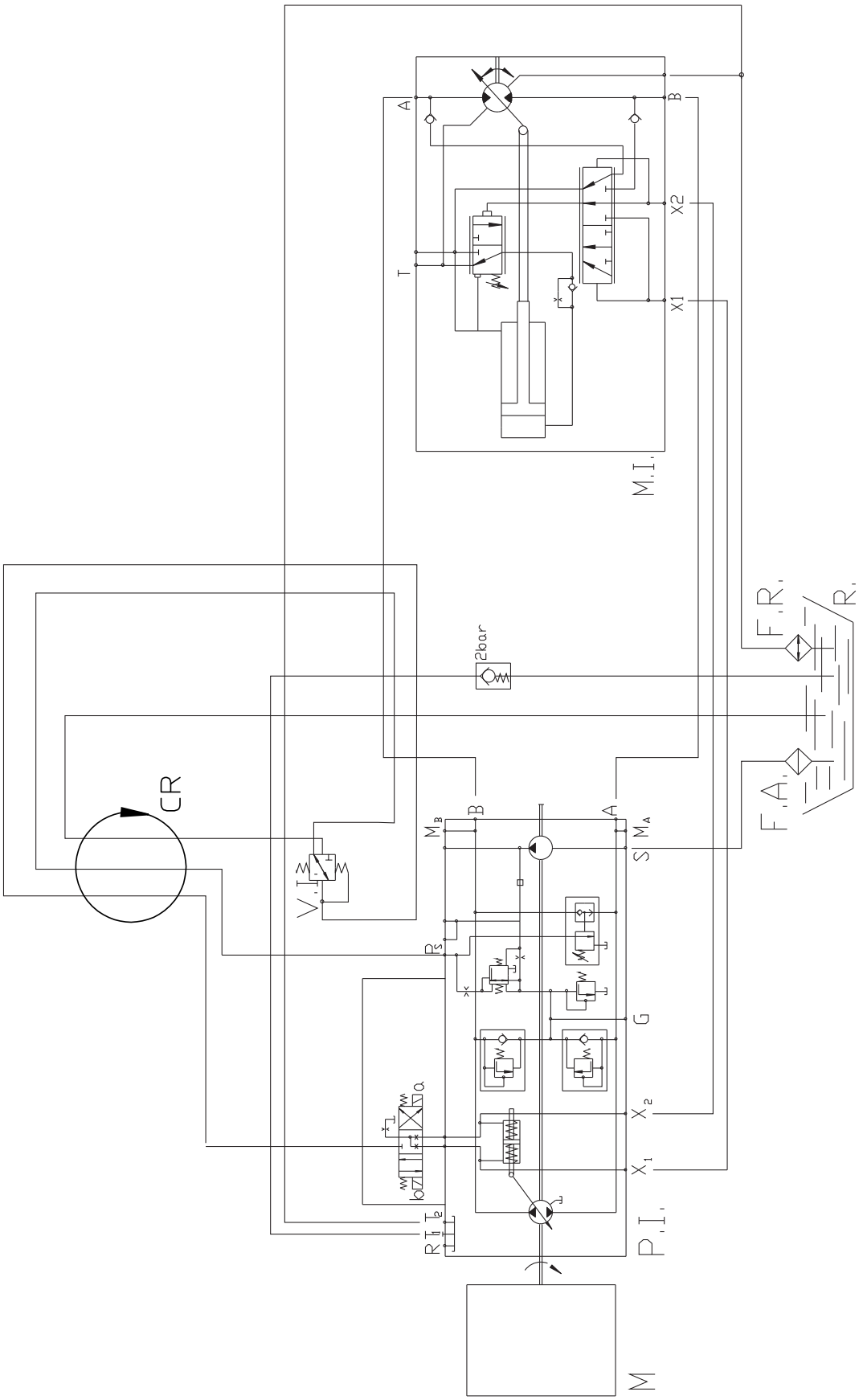
CONNETTORE “C21” (FEMMINA)

NR.	CORRISP. CABLAGGIO	DESCRIZIONE
1	Bianco 042	Positivo per scatola logica e sistema antiribaltamento
2	----	----
A	Bianco 001	Eccitazione relè luci anabbaglianti e abbaglianti
B	Bianco 014	Eccitazione relè elettrovalvola generale stabilizzatori
C	Bianco 019	Segnale consenso avviamento
D	Bianco 020	Segnale proximity 55°
E	Bianco 021	Luci di posizione
F	Bianco 029	Elettrovalvola di livellamento
G	Bianco 030	Elettrovalvola di livellamento
H	Bianco 031	Eccitazione relè termoavviatore
J	Bianco 032	Eccitazione relè servizi
K	Bianco 033	Eccitazione relè avviamento
L	Bianco 037	Elettrovalvola bloccaggio ponte posteriore
M	Giallo marrone	Elettrovalvola, relè e cicalino retromarcia

Schema impianto idraulico dei movimenti
Moviment hydraulic system
Hydrauliknanlage der bewegungsablaufe



Impianto idraulico trasmissione
Transmission hydraulic system
Hydraulikanlage - antrieb



IT

CONTROLLO DELLE PRESSIONI

Movimenti braccio.
Pompa P1: Effettuare il controllo dalla presa di pressione “A” della figura 1,2 o 3 a seconda del modello ed agire sulla val vola nel distributore per regolare la pressione.

EN

CHECKING PRESSURE

Boom movements.
Pomp P1: Check pressure through intake “A” in Figure 1,2 or 3 depending on the model and act on the distributor valve to adjust the pressure.

DE

PRÜFUNG DER DRÜCKE

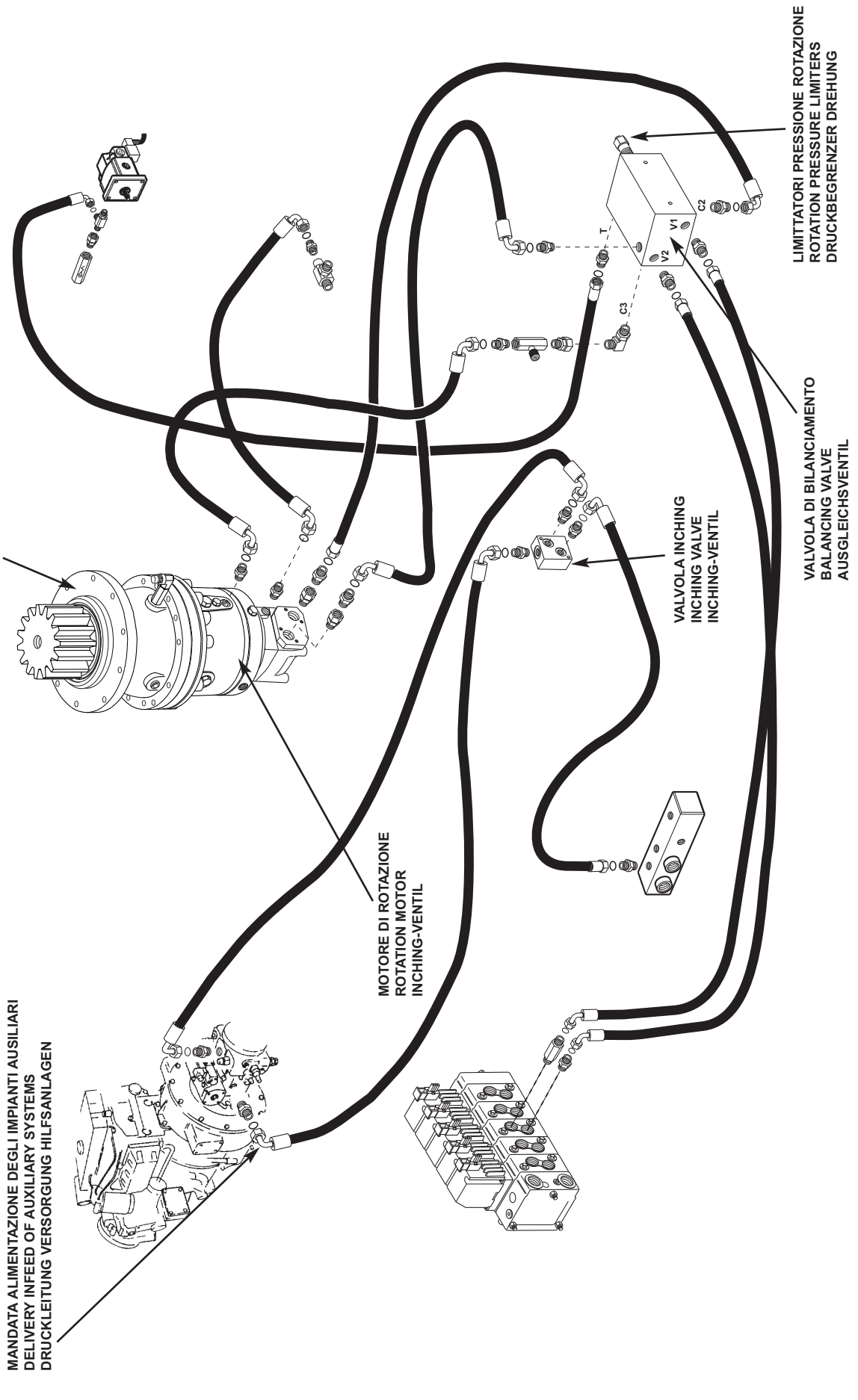
Auslegerbewegungen
Pumpe P1: Je nach Modell die Prüfung von Druckanschluss “A” der Abbildung 1,2 oder 3 vornehmen und zum Einstellen des Drucks das Ventil im Steuergerät benutzen.

CONTROLLO PRESSIONI	VALORE	REGOLAZIONE
- Pressione distributore principale Danfoss	275-280b	limitatore principale del distributore Danfoss
- Sfilo lato stelo	230b	valvola anti-urto pre-regolata
- Brandeggio e compensazione lato stelo	250-260b	valvola anti-urto pre-regolata
- Rotazione torretta	110-120b al min. rpm	limitatore di pressione sul blocco d’alimentazione di motore
- Direzione (Sterzo)	175b al max	limitatore di pressione nel corpo dell’idroguida Danfoss

PRESSURE CHECK	VALUE	ADJUSTMENT
- Danfoss main valve system pressure	275-280b	Danfoss main valve system limiter
- Rod side extension	230b	valvola anti-urto pre-regolata
- Rod side tilting and compensation	250-260b	valvola anti-urto pre-regolata
- Rod side tilting and compensation	110-120b at min. rpm	pressure limiter on block motor power supply
- Direction (Steering)	175b at max	pressure limiter in Danfoss power steering body

PRÜFUNG DER DRÜCKE	WERT	EINSTELLUNG
- Druck Hauptsteuergerät Danfoss	275-280b	Hauptdruckbegrenzer Steuergerät Danfoss
- Auszug Schaftseite	230b	voreingestelltes Antischockventil
- Schwenken und Ausgleich Schaftseite	250-260b	voreingestelltes Antischockventil
- Turmdrehung	110-120b bei Mind.drehzahl	Druckbegrenzer auf Block der Motorversorgung
- Lenkung	175b max.	Druckbegrenzer auf Körper der Hydrolenkung Danfoss

IMPIANTO IDRAULICO CIRCUITO ROTAZIONE TORRETTA - TURRET ROTATION CIRCUIT HYDRAULIC SYSTEM - HYDRAULISCHE ANLAGE KREISLAUF TURMDREHUNG



IT

SMONTAGGIO MARTINETTO SALITA E DISCESA STABILIZZATORI

1) Per smontare il martinetto inclinazione è necessario smontare il parafango onde evitare rotture accidentali.

2) Dai comandi in cabina portare il piede dello stabilizzatore vicino al suolo.

3) Agganciare con un carro ponte o un elevatore il braccio dello stabilizzatore lato piede.

4) Svitare la vite di fermo e sfilare il perno (Rif. A-Fig. 1).

5) Adagiare il braccio stabilizzatori lato piede al suolo.

6) Dai comandi in cabina rientrare completamente lo stelo dello stabilizzatore.

7) Smontare i tubi idraulici posti sulla valvola del martinetto inclinazione stabilizzatori

8) Chiudere gli orifizi con appositi tappi onde evitare che possano entrare eventuali sporcizie.

9) Assicurare il martinetto ad un carro ponte o un elevatore con apposita fascia.

10) Svitare la vite di fermo e sfilare il perno (Rif. B-Fig. 1)

11) Estrarre il martinetto dalla sede.

RIMONTAGGIO: Eseguire le operazioni (con procedura inversa) allo smontaggio dal punto n° 11 al n° 1.

EN

DISMANTLING OUTRIGGERS UP/DOWN CYLINDER

1) To dismantle the tilting cylinder, remove the mudguard to prevent accidental breakage.

2) Using the cab controls, bring the outrigger feet close to the ground.

3) Hook the foot side outrigger boom to a bridge crane or elevator.

4) Unscrew the stop screws and extract the pin (Ref. A-Fig. 1).

5) Rest the left foot side outrigger arm on the ground.

6) Using the cab controls, retract the outrigger rod completely.

7) Dismantle the hydraulic pipes on the outriggers tilting cylinder valve

8) Cap the holes to prevent dirt from entering.

9) Secure the cylinder to a bridge crane or an elevator by means of the band provided.

10) Unscrew the stop screws and extract the pin (Ref. B-Fig. 1)

11) Extract the cylinder from its seating.

REASSEMBLY: Follow disassembly operations from Point 1 to No. 11 (in reverse order).

DE

AUSBAU DES STABILISATOREN-HEBE- UND -SENKZYLINDERS

1) Zum Ausbau des Neigungszylinders ist der Kotflügel auszubauen, um ein unbeabsichtigtes Beschädigen zu vermeiden.

2) Mit den Bedienelementen in der Kabinen den Fuß des Stabilisators in Bodennähe bringen.

3) Den Stabilisatorarm auf der Fußseite mit einem Laufkran oder Gabelstapler absichern.

4) Die Feststellschraube losschrauben und den Bolzen herausziehen (Bez. A-Abb. 1).

5) Den Stabilisatorenarm auf der Fußseite am Boden abstellen.

6) Mit den Bedienelementen in der Kabinen den Stabilisatorenschaft ganz einfahren.

7) Die hydraulischen Leitungen auf dem Ventil des Stabilisatorenneigezylinders ausbauen.

8) Die Öffnungen mit den Stopfen verschließen, damit kein Schmutz eindringt.

9) Den Zylinder mit einem Gurt an einem Laufkran oder Gabelstapler absichern.

10) Die Feststellschraube losschrauben und den Bolzen herausziehen (Bez. B-Abb. 1)

11) Den Zylinder aus seiner Aufnahme herausziehen.

WIEDEREINBAU: Die Vorgänge umgekehrter Reihenfolge zum Ausbau) von Punkt 11 bis Punkt 1 ausführen.

IT

SMONTAGGIO E RIMONTAGGIO GUARNIZIONI DELLA GHIERA DI CHIUSURA

NOTA:
Non usare in nessun caso utensili taglienti (Cacciaviti, lame, etc.) per il montaggio e lo smontaggio delle guarnizioni.
Si consiglia di lavorare su banchi puliti, senza trucioli.

SMONTAGGIO

- Togliere le guarnizioni della ghiera di chiusura.
- Attenzione: evitare di danneggiare gli spigoli e le gole.

CONTROLLO
- Togliere il grasso e pulire la ghiera di chiusura.
- Controllare che le gole e le superfici siano lisce ed esenti da rigature.
- Le gole non devono avere corpi estranei.
- Infilare la ghiera sullo stelo facendola correre su tutta la lunghezza.
- Il gioco non deve essere eccessivo, ma non si deve nemmeno bloccare rigidamente la ghiera.

RIMONTAGGIO

- Posizionare le guarnizioni seguendo il montaggio riportato in Fig. 1.
  Le labbra della guarnizione devono essere orientate lato pressione.
- Per il montaggio della guarnizione dello stelo, inserirla nella gola tenendola con il pollice o con un puntale “F” (Fig. 2) che non abbia spigoli vivi.
- Spingere la guarnizione nella gola con l’altra mano o con un punzone liscio “G” (Fig. 3). Se la resistenza della guarnizione è notevole, la si può ridurre mettendola a bagno in olio idraulico alla temperatura di 50°C.
  Posizionare il raschiaolio “D” (Fig. 1) servendosi di un tampone e di un mazzuolo. Montare manualmente gli O-ring “A” e “C” (Fig. 1) e la guarnizione antiestrusione Pos. “B” (Fig. 1).

EN

REMOVAL AND REASSEMBLY OF THE SEALS AND RINGS ON THE LOCKING

NOTE :
Never use cutting or sharp tools (screw drivers, blades, etc.) when assembling and removing seals.
Ensure that there are no chippings on the work bench.

REMOVAL

- Remove the locking ring seals and rings.
- Take care not to damage the edges or the bottom of the grooves.

INSPECTION
- Degrease and clean the locking ring.
- Check that the groove bottoms and sides are smooth, and without scratches.
- There should be no extraneous bodies in the grooves.
- Thread the bare ring on the stem and slide it over its whole length.
- The gap should not be excessive, but it should not grip either.

REASSEMBLY

- Fit the seals and rings as in Fig. 1. The lips of the stem seal should face the pressure side.
- When fitting the stem seal, first introduce it in the groove, holding it back either with your thumb or a bit (item F) with no sharp edges (Fig. 2).
- Push it into the groove with the other hand or a smooth die (item G) (Fig. 3). If the seal is too tight, dip it into hydraulic oil heated to 50°C.
  Fit scraper ring D (Fig. 1) using a plug and a mallet. O-rings A and C (Fig. 1) and extrusion proof ring B (Fig. 1) will be fitted by hand.

DE

AUSBAU UND WIEDEREINBAU DER DICHTUNGEN DER VERSCHLUSSMUTTER

ANMERKUNG:
Auf keinen Fall schneidende Werkzeuge (Schraubenzieher, Klingen etc.) für den Ein- und Ausbau der Dichtungen verwenden. Man sollte auf saubenen, spanfreien Werkbänken arbeiten.

AUSBAU

- Die Dichtungen von der Verschlussmutter entfernen.
- Achtung: Vermeiden, die Kanten und die Rillen zu beschädigen.

KONTROLLE
- Das Fett entfernen und die Verschlussmutter reinigen.
- Sicherstellen, dass die Rillen und die Oberflächen glatt und nicht gerillt sind.
- In den Rillen dürfen keine Fremdkörper vorhanden sein.
- Die Verschlussmutter auf den Schaft stecken und auf der ganzen Länge gleitern lassen.
- Das Spiel darf nicht zu groß sein, aber die Verschlussmutter darf auch nicht starr sitzend montiert werden.

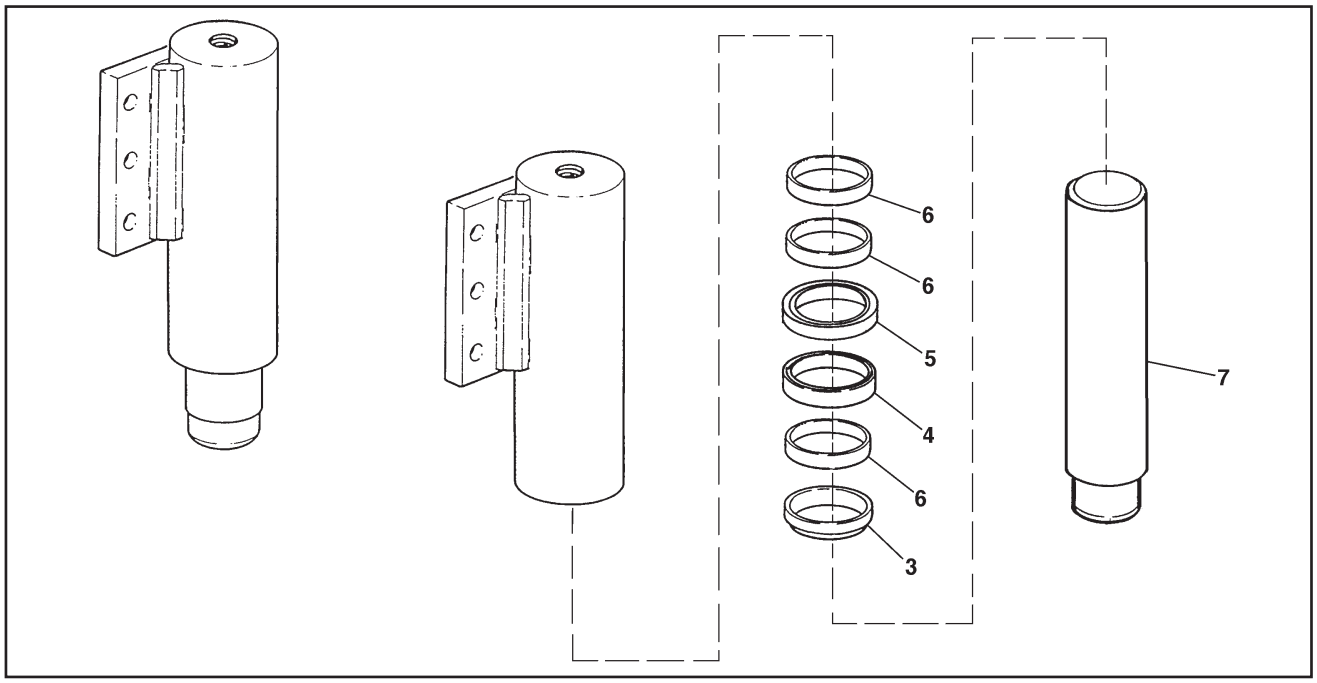
WIEDEREINBAU

- Die Dichtungen gemäß der Montage von Abb. 1 anordnen. Die Dichtlippen müssen in Richtung der Druckseite zeigen.
- Für die Montage der Schaftdichtung ist sie in die Rille zu stecken, wobei man sie mit dem Daumen oder einer Bolzenspitze “F” (Abb. 2) hält, die keine scharfen Kanten haben darf.
- Die Dichtung mit der anderen Hand oder mit einer glatten Bolzenspitze “G” in die Rille drücken (Abb. 3). Wenn die Dichtung einen zu großen Widerstand abgibt, kann man ihn verringern, indem man sie bei einer Temperatur von 50° C ein Bad mit hydraulischem Öl legt.
  Den Ölabstreifring “D” (Abb. 1) mit einem Dorn und einem Hammer positionieren. Die O-Ringe “A” und “C” (Abb. 1) und den Stützring Pos. “B” (Abb. 1) von Hand montieren.

SMONTAGGIO MARTINETTO BLOCCAGGIO ASSE POSTERIORE

DISASSEMBLING REAR AXLE BLOCK CYLINDER

AUSBAU DES SPERRZYLINDERS DER HINTERACHSE



SMONTARE

- Estrarre dalla camicia del martinetto lo stelo Rif. 7.
- Smontare la guarnizione Rif. 3, le guarnizioni anti-estrusione Rif. 4, 5 e gli anelli di guida Rif. 6 del cilindro Rif. 2.
- Cambiare le guarnizioni e i componenti se necessario (vedi capitolo “Norme generali per lo smontaggio martinetti”).

RIMONTAGGIO

Operazione inversa dello smontaggio.
Nota:
- Spalmare le guarnizioni di olio idraulico (vedi capitolo “Norme generali per lo smontaggio martinetti”).

DISASSEMBLY

- Extract the liner of the rod cylinder Ref. 7.
- Dismantle gaskets Ref. 3, anti-extrusion seals Ref. 4, 5 and guide rings Ref. 6 of cylinder Ref. 2.
- Replace the gaskets and components, if necessary (see Chapter “General rules for disassembling cylinders”).

REASSEMBLY

Operation reverse to disassembly.
Note :
- Smear the gaskets with hydraulic oil (see Chapter “General rules for disassembling cylinders”).

AUSBAU

- Die Laufbuchse des Zylinders vom Schaft Bez. 7 abziehen.
- Die Dichtung Bez. 3, die Stützringe Bez. 4, 5 und die Leitringe Bez. 6 des Zylinders Bez. 2 ausbauen.
- Die Dichtungen und Komponenten ersetzen, wenn es erforderlich ist (siehe Kapitel “Allgemeine Normen für den Ausbau der Zylinder”).

WIEDEREINBAU

Umgekehrte Richtung des Ausbaus.
Anm.:
- Die Dichtungen mit hydraulischem Öl ein schmieren (siehe Kapitel “Allgemeine Normen für den Ausbau der Zylinder”).

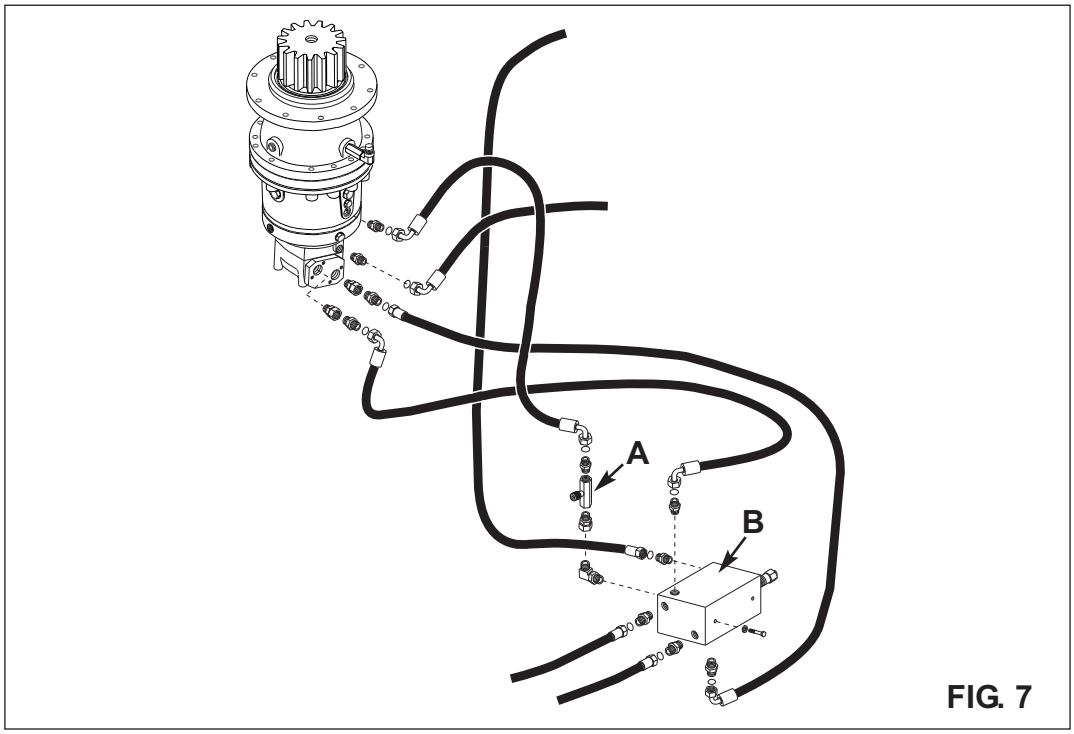


FIG. 7

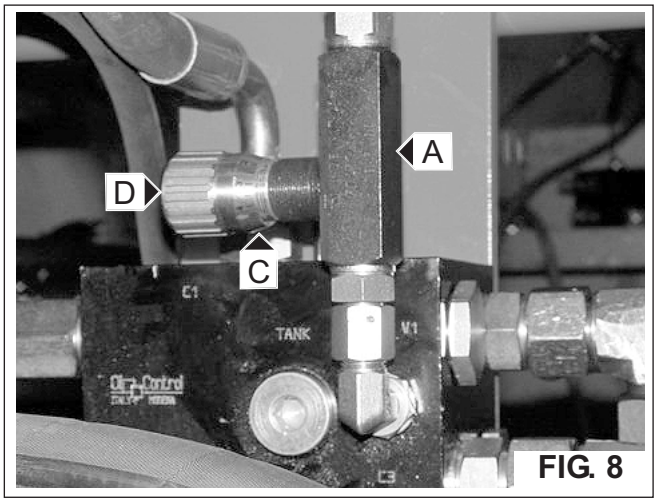
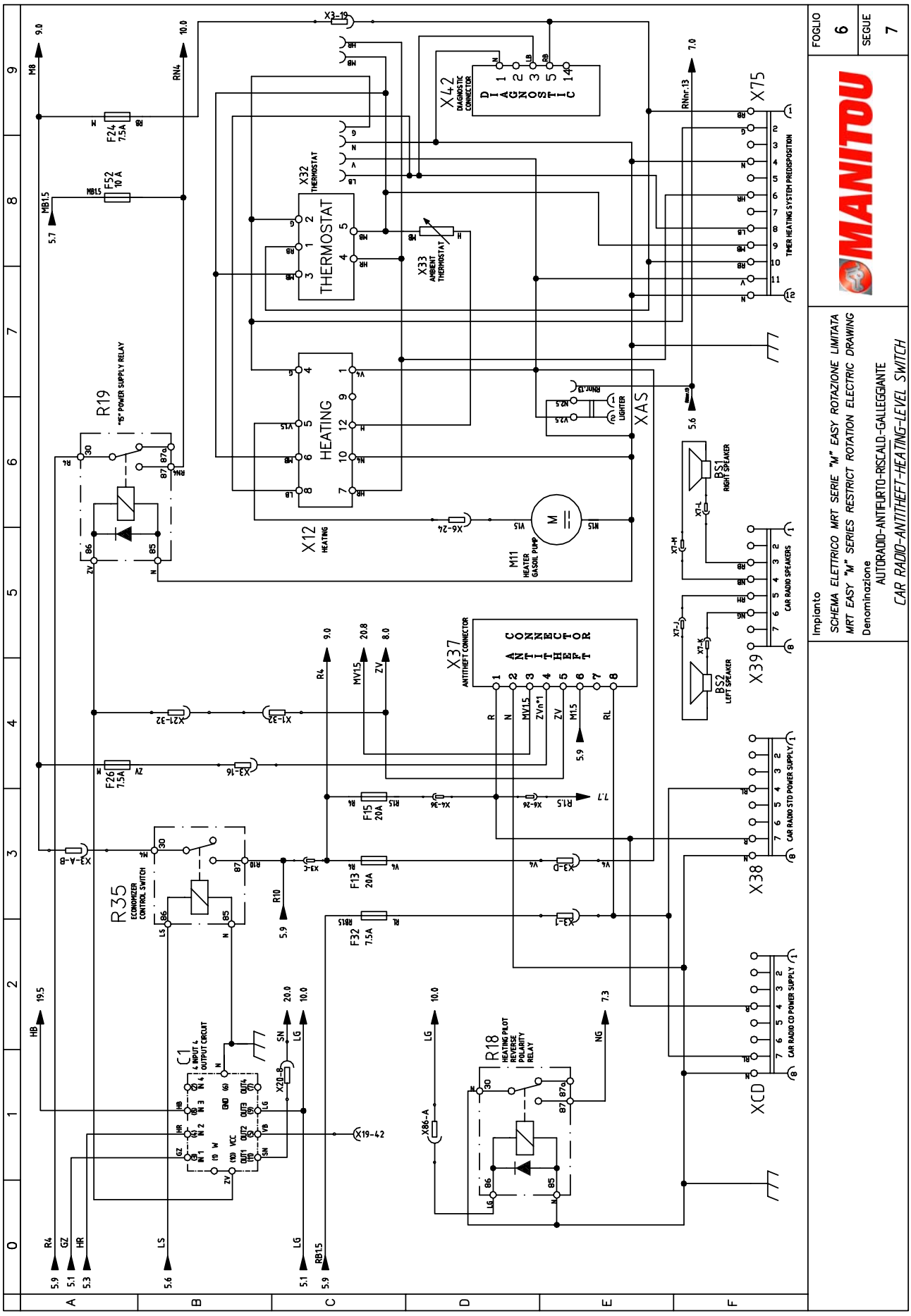


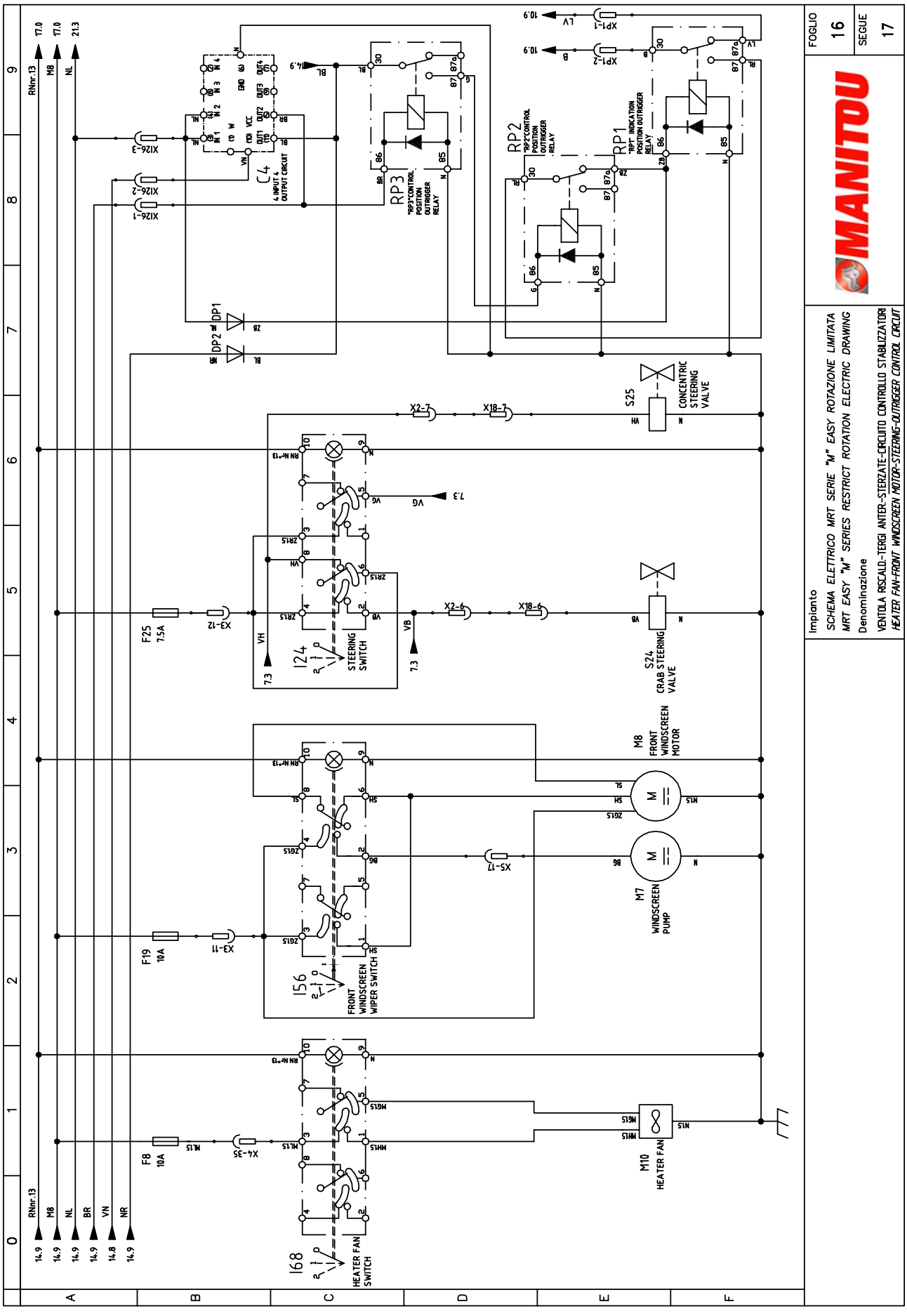
FIG. 8

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	F50 pag. 12	FUSIBILE OSCILLAZIONE PONTE POST. REAR AXEL OSCILLATION CONSENT FUSE
	F51 pag. 11	FUSE PRESA AUSIL. CARRO + CENTR. LIVELLAM. CHASSIE AUXILIARY PLUG & HEAD BOX FUSE
	F52 pag. 6	FUSIBILE POMPA CARBURANTE + ARRICCHITORE FUEL PUMP & FUEL ENRICHER FUSE
	F53 pag. 12	FUSIBILE MICRO CAMBIO E STABILIZZATORI SFILATI GEAR MICRO & EXTENDED OUTRIGGERS FUSE
	F54 pag. 10	FUSE ALLIN. ASSI+MICRO STAB. ABB.+LUCI STOP AXLE ALIGN.&DOWN OUTRIGGER&STOP LIGHT FUSE
	F55 pag. 13	FUSIBILE EV GENERALE STABILIZZATORI GENERAL OUTRIGGER FUSE
	F56 pag. 9	FUSIBILE LUCI ANABBAGLIANTI DIPPED HEADLAMPS FUSE
	F57 pag. 9	FUSIBILE LUCI ABBAGLIANTI MAIN DRIVING BEAMS FUSE
	F58 pag. 5	FUSIBILE 50 AVVIAMENTO STARTING ENGINE FUSE
	F59 pag. 10	FUSE STABILIZZATORI ABBASSATI LOWERED OUTRIGGER FUSE
	F60 pag. 10	FUSIBILE PRESSOSTATI PRESSURE SWITCH FUSE

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	F61 pag. 9	FUSIBILE LUCI POSIZIONE POSITION LIGHTS FUSE
	F62 pag. 9	FUSIBILE LUCI POSIZIONE POSITION LIGHTS FUSE
	F63 pag. 5	FUSIBILE PRESA AUSILIARIA PARTE CARRO CHASSIE AUXILIARY PLUG FEEDING FUSE
	F65 pag. 13	DIODO 6 A DIODE 6 A
	F66 pag. 13	DIODO 6 A DIODE 6 A
	F67 pag. 13	DIODO 6 A DIODE 6 A
	F73 pag. 5	FUSIBILE AUSILIO AVVIAMENTO AUXILIARY STARTING ENGINE FUSE
	F74 pag. 5	DIODO 16A AUSILIO AVVIAMENTO STARTING AUXILIARY DIODE 16A
	F75 pag. 5	FUSIBILE GENERALE GENERAL FUSE
	F76 pag. 5	FUSIBILE RELE' CANDELETTE PRE-HEATING RELAY FUSE
	F77 pag. 20	DIODO 3A DIODE 3A

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	F78 pag. 20	DIODO 3A DIODE 3A
	F79 pag. 15	DIODO 6A DIODE 6A
	F80 pag. 15	DIODO 6A DIODE 6A
	F81 pag. 15	DIODO 6A DIODE 6A
	F82 pag. 15	DIODO 6A DIODE 6A
	F83 pag. 15	DIODO 6A DIODE 6A
	F84 pag. 15	DIODO 6A DIODE 6A
	FADX pag. 9	FANALE ANTERIORE DESTRO RIGHT FRONT LIGHT
	FASX pag. 9	FANALE ANTERIORE SINISTRO LEFT FRONT LIGHT
	FLA1 pag. 19	FARO LAVORO ANTERIORE 1 FRONT WORKING LIGHT 1
	FLA2 pag. 19	FARO LAVORO ANTERIORE 2 FRONT WORKING LIGHT 2


FOGLIO 6
SEGUE 7
MANITOU
Impianto
SCHEMA ELETTRICO MRT SERIE "M" EASY ROTAZIONE LIMITATA
MRT EASY "M" SERIES RESTRICT ROTATION ELECTRIC DRAWING
Denominazione
AUTORADIO-ANTIFURTO-RISCALD.-GALLEGGIANTE
CAR RADIO-ANTITHEFT-HEATING-LEVEL SWITCH
X42 DIAGNOSTIC CONNECTOR
X32 THERMOSTAT
X33 AMBIENT THERMOSTAT
X12 HEATING
M11 HEATER GASOIL PUMP
X37 ANTITHEFT CONNECTOR
X75 TIMER HEATING SYSTEM PREDISPOSITION
X39 CAR RADIO SPEAKERS
X38 CAR RADIO STD POWER SUPPLY
XCD CAR RADIO CD POWER SUPPLY
BS1 RIGHT SPEAKER
BS2 LEFT SPEAKER
R19 "85" POWER SUPPLY RELAY
R35 ECONOMIZER CONTROL SWITCH
R18 HEATING PILOT REVERSE POLARITY RELAY
C1 4 INPUT 4 OUTPUT CIRCUIT
F24 7.5A
F52 10 A
F26 7.5A
F15 20A
F13 20A
F32 7.5A


FOGLIO 16
SEGUE 17
MANITOU
Impianto
SCHEMA ELETTRICO MRT SERIE "M" EASY ROTAZIONE LIMITATA
MRT EASY "M" SERIES RESTRICT ROTATION ELECTRIC DRAWING
Denominazione
VENTOLA RISCALD.-TERGI ANTER.-STERZATE-CIRCUITO CONTROLLO STABILIZZATORI
HEATER FAN-FRONT WINDSCREEN MOTOR-STEERING-OUTRIGGER CONTROL CIRCUIT
RP2 "RPT" CONTROL POSITION OUTRIGGER RELAY
RP1 "RPT" INDICATION POSITION OUTRIGGER RELAY
RP3 "RPT" CONTROL POSITION OUTRIGGER RELAY
C4 4 INPUT 4 OUTPUT CIRCUIT
S25 CONCENTRIC STEERING VALVE
S24 CRAB STEERING VALVE
124 STEERING SWITCH
156 FRONT WINDSCREEN WIPER SWITCH
168 HEATER FAN SWITCH
M8 FRONT WINDSCREEN MOTOR
M7 WINDSCREEN PUMP
M10 HEATER FAN
F25 7.5A
F19 10A
F8 10A
DP1
DP2

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	FLB1 pag. 19	FARO LAVORO BRACCIO 1 BOOM WORKING LIGHT_1
	FLB2 pag. 19	FARO LAVORO BRACCIO 2 BOOM WORKING LIGHT_2
	FLP1 pag. 19	FARO LAVORO POSTERIORE 1 REAR WORKING LIGHT 1
	FLP2 pag. 19	FARO LAVORO POSTERIORE 2 REAR WORKING LIGHT 2
	FPDX pag. 9	FANALE POSTERIORE DESTRO RIGHT REAR LIGHT
	FPSX pag. 9	FANALE POSTERIORE SINISTRO LEFT REAR LIGHT
	FX pag. 11	FUSIBILE TELERUTTORE POMPA EMERGENZA EMERG.PUMP REMOTE CONTROL FUSE
	G pag. 5	ALTERNATORE ALTERNATOR
	GF pag. 11	GIROFARO ROTATING LAMP
	HEAD pag. 15	CENTRALINA 3B6 3B6 CENTRAL UNIT
	HL1 pag. 11	LAMPADA ROSSA RED LAMP

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	HL2 pag. 9	LUCE CABINA CABIN LIGHT
	I1 pag. 8	INTERRUTTORE FRENO A MANO PARKING BRAKE SWITCH
	I2 pag. 8	INTERRUTTORE LENTA - VELOCE SLOW/FAST GEAR SWITCH
	I3 pag. 8	MICRO CAMBIO GEAR MICRO
	I4 pag. 12	INTERRUTTORE RESET CAMBIO GEAR RESET SWITCH
	I5 pag. 10	PRESSOSTATO LUCI STOP STOP LIGHT PRESSURE SWITCH
	I6 pag. 10	PROXIMITI ALLINEAMENTO PONTE POSTERIORE REAR AXLE ALIGNAMENT PROXY
	I7 pag. 19	INTERR. BENNA MISCEL. PICCOLA LITTLE BUCKET SWITCH
	I8 pag. 10	PROXIMITI ALLINEAMENTO PONTE ANTERIORE FRONT AXLE ALIGNAMENT FEEDING
	I9 pag. 11	INTERRUTTORE POMPA DI EMERGENZA EMERGENCY PUMP SWITCH
	I10 pag. 5	CHIAVE ESCLUSIONE CESTELLO EXCLUSION BASKET KEY

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	I11 pag. 11	PROXIMITI ROTAZIONE LIMITATA 2 LIMITED ROTATION 2 PROXY
	I12 pag. 7	FILTRO ARIA AIR FILTER
	I13 pag. 7	BULBO PRESSIONE OLIO MOTORE ENGINE OIL PRESSURE SWITCH
	I14 pag. 12	PROXIMITY CABINA CENTRATA 1 CENTRED CAB PROXY 1
	I15 pag. 12	PROXIMITY ALLINEAMENTO TORRE TURRET ALIGNAMENT PROXY
	I16 pag. 10	MICRO TRAVE POSTERIORE DX ABBASSATA REAR RIGHT LOWERED BEAM MICRO
	I17 pag. 10	MICRO TRAVE POSTERIORE SX ABBASSATA REAR LEFT LOWERED BEAM MICRO
	I18 pag. 10	MICRO TRAVE ANTERIORE SX ABBASSATA FRONT LEFT LOWERED BEAM MICRO
	I19 pag. 10	PRESSOSTATO STABILIZZATORI ABBASSATI LOWERED OUTRIGGERS PRESSURE SWITCH
	I20 pag. 17	INTERRUTTORE ABILIT. POTENZ. OPTIONAL OPTIONAL POTENTIOM. ENABLING SWITCH
	I20 pag. 10	PRESSOSTATO STABILIZZATORI ABBASSATI LOWERED OUTRIGGERS PRESSURE SWITCH

Impianto

SCHEMA ELETTRICO MRT SERIE "M" EASY ROTAZIONE LIMITATA
MRT EASY "M" SERIES RESTRICT ROTATION ELECTRIC DRAWING

Denominazione

LEGENDA FUNZIONI
COMPONENTS LEGEND

MANITOU

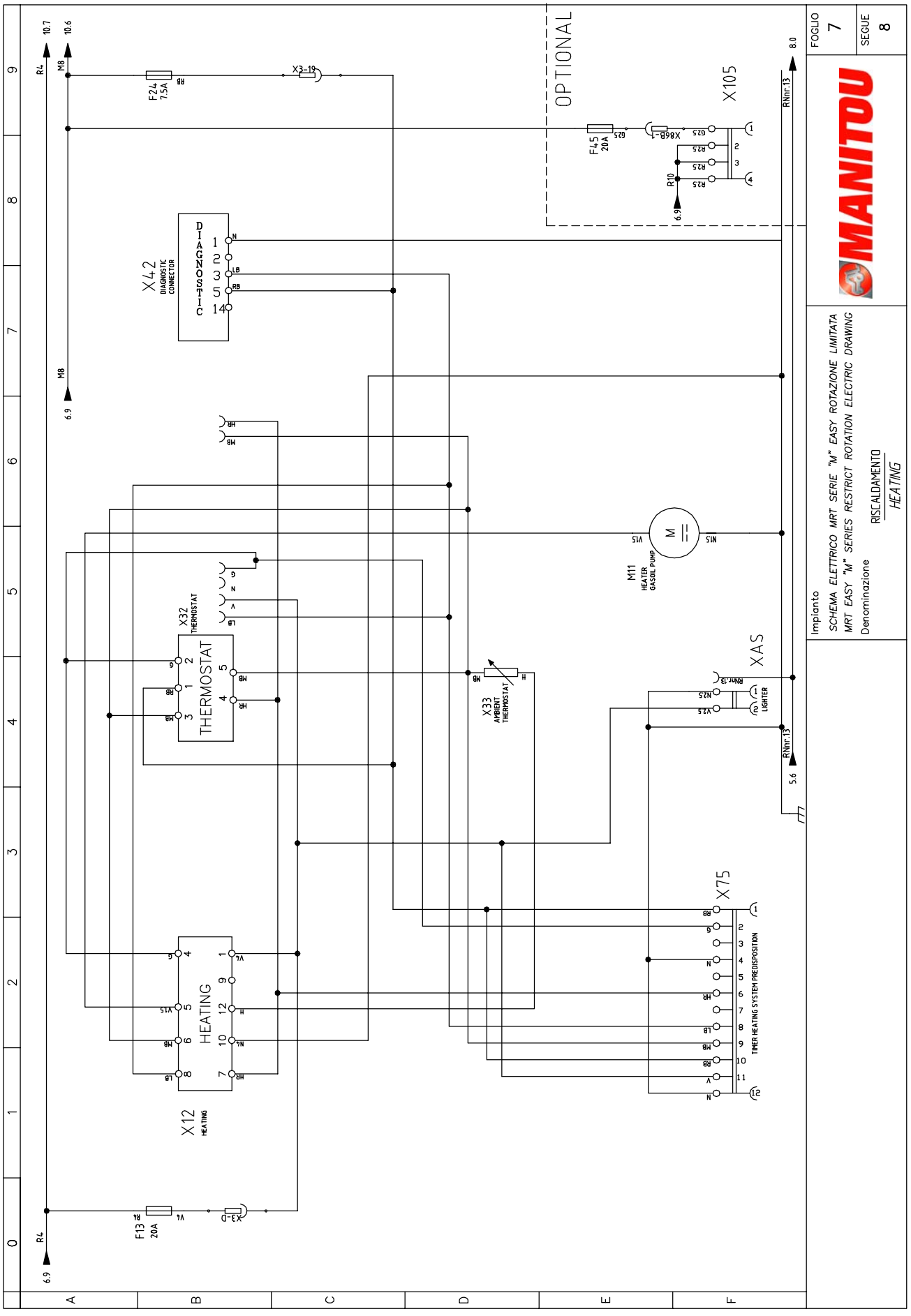
FOGLIO 26

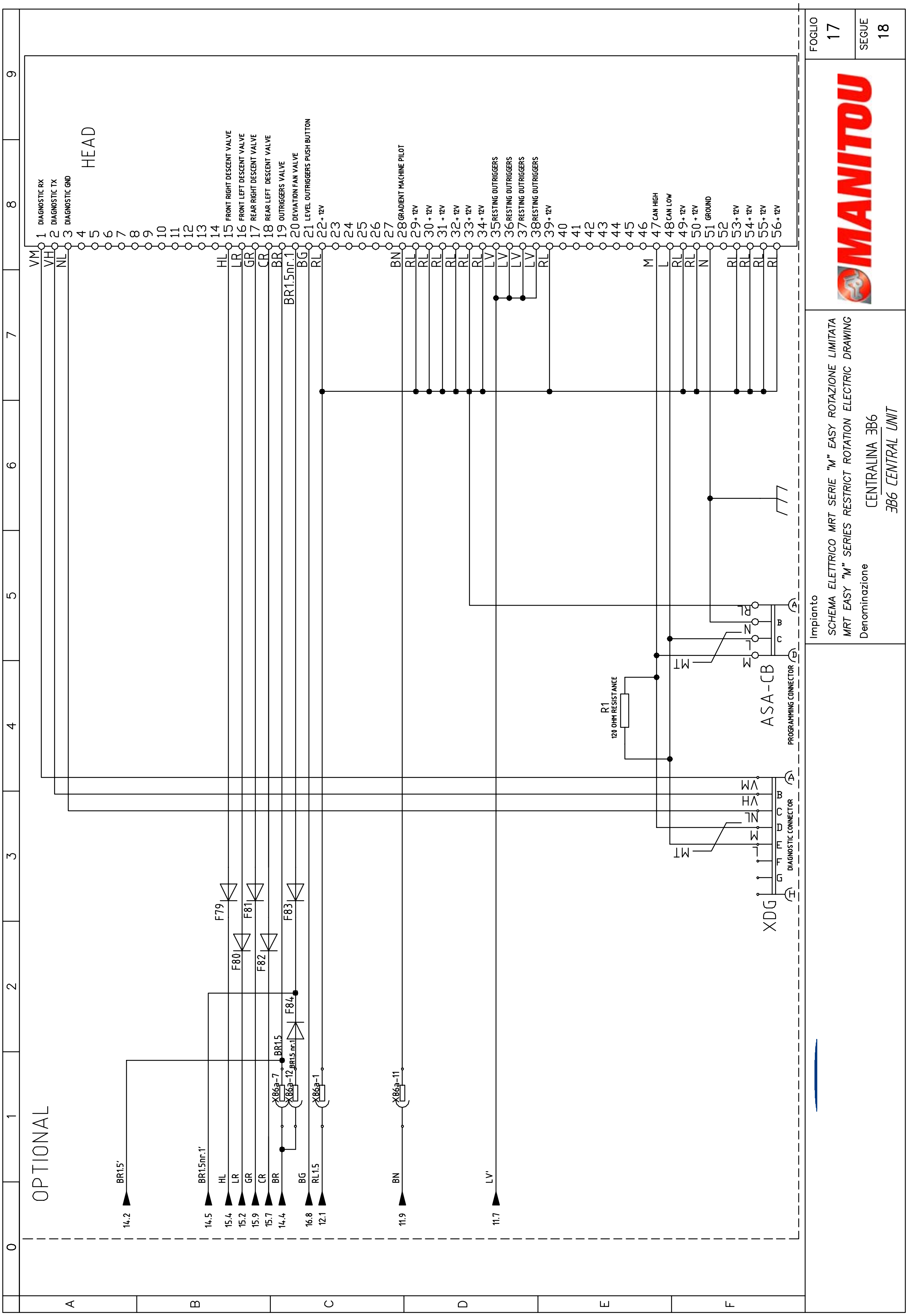
SEGUE 27

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	F17 pag. 12	FUSIBILE GIROFARO + LAMPADA ROSSA ALLARME RED ALARM LAMP & ROTATING LAMP FUSE
	F18 pag. 13	FUSIBILE DOPPIA / TRIPLA USCITA + OPTIONAL DOUBLE/TRIPLE EXIT OPTIONAL FUSE
	F19 pag. 18	FUSIBILE TERGILAVAVETRO ANTERIORE FRONT WINDSCREEN WIPER FUSE
	F20 pag. 21	FUS. ALIM. ESCL. CIRCUITO IDRAULICO HYDRAULIC CIRCUIT EXLUSION FUSE
	F21 pag. 19	FUSIBILE TERGI POST. E SUP. REAR & UPPER WINDSCREEN WIPER FUSE
	F22 pag. 19	FUSIBILE ALIMENTAZIONE MANIPOLATORI JOYSTICK FEEDING FUSE
	F23 pag. 22	FUSIBILE ALIM. ILLUM. INTERRUT. SWITCHES LIGHT FEEDING FUSE
	F24 pag. 7	FUSIBILE ALIMENTAZIONE TERMOSTATO THERMOSTAT FEEDING FUSE
	F25 pag. 18	FUSIBILE INTERRUTTORE STERZATE STEERING SWITCH FUSE
	F26 pag. 6	FUS. DEVIO MARCE+RELE' ALIM. "15" REVERSE/FORWARD GEAR LEVER FUSE
	F27 pag. 10	FUSIBILE LUCI DI DIREZIONE DIRECTION LIGHT FUSE

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	F28 pag. 13	FUSIBILE MICRO ALLINEAMENTO CABINA ALIGNAMENT CABIN MICRO FUSE
	F29 pag. 5	FUSE ALIMENTZIONE CESTELLO BASKET FEEDING FUSE
	F30 pag. 5	FUSIBILE CHIAVE ESCLUS. ANTIRIBALTAMENTO ANTI-TILT KEY FUSE
	F31 pag. 5	FUSIBILE RELE' ECCITAZIONE ECONOMIZZATORE ECONOMIZER EXCITATION FUSE RELAY
	F32 pag. 6	FUSE ALIM. AUTORADIO + ANTIFURTO RADIO FEEDING & ANTITHEFT FUSE
	F33 pag. 22	DIODO 3A DIODE 3A
	F34 pag. 19	DIODO 3A DIODE 3A
	F35 pag. 5	DIODO 3 A DIODE 3 A
	F36 pag. 9	DIODO 3A DIODE 3A
	F37 pag. 9	DIODO 3A DIODE 3A
	F38 pag. 9	DIODO 3A DIODE 3A

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	F39 pag. 9	DIODO 3A DIODE 3A
	F40 pag. 16	DIODO 3A DIODE 3A
	F41 pag. 12	DIODO 3A DIODE 3A
	F42 pag. 12	DIODO 3A DIODE 3A
	F43 pag. 12	DIODO 3A DIODE 3A
	F44 pag. 12	DIODO 3A DIODE 3A
	F45 pag. 7	FUSIBILE ALIMENTAZIONE AC AC FEEDING FUSE
	F46 pag. 12	DIODO 3A DIODE 3A
	F48 pag. 12	DIODO 3A DIODE 3A
	F49 pag. 11	FUSIBILE RELE' LUCI RETROMARCIA REVERSE GEAR LIGHTS RELAY FUSE
	F50 pag. 13	FUSIBILE OSCILLAZIONE PONTE POST. REAR AXEL OSCILLATION CONSENT FUSE


OPTIONAL
X105
X42
DIAGNOSTIC CONNECTOR
DIAGNOSTIC
X32
THERMOSTAT
THERMOSTAT
X33
AMBIENT THERMOSTAT
M11
HEATER GASOIL PUMP
XAS
LIGHTER
X75
TIMER HEATING SYSTEM PREDISPOSITION
X12
HEATING
HEATING
F24
7.5A
F45
20A
F13
20A
FOGLIO
7
SEGUE
8
MANITOU
Impianto
SCHEMA ELETTRICO MRT SERIE "M" EASY ROTAZIONE LIMITATA
MRT EASY "M" SERIES RESTRICT ROTATION ELECTRIC DRAWING
Denominazione
RISCALDAMENTO
HEATING


HEAD
1 DIAGNOSTIC RX
2 DIAGNOSTIC TX
3 DIAGNOSTIC GND
15 FRONT RIGHT DESCENT VALVE
16 FRONT LEFT DESCENT VALVE
17 REAR RIGHT DESCENT VALVE
18 REAR LEFT DESCENT VALVE
19 OUTRIGGERS VALVE
20 DEVIATION FAN VALVE
21 LEVEL OUTRIGGERS PUSH BUTTON
28 GRADIENT MACHINE PILOT
35 RESTING OUTRIGGERS
36 RESTING OUTRIGGERS
37 RESTING OUTRIGGERS
38 RESTING OUTRIGGERS
47 CAN HIGH
48 CAN LOW
51 GROUND
R1
120 OHM RESISTANCE
ASA-CB
PROGRAMMING CONNECTOR
XDG
DIAGNOSTIC CONNECTOR
OPTIONAL
F79
F80
F81
F82
F83
F84
X86a-7
X86a-12
X86a-1
X86a-11
MANITOU
FOGLIO
17
SEGUE
18
Impianto
SCHEMA ELETTRICO MRT SERIE "M" EASY ROTAZIONE LIMITATA
MRT EASY "M" SERIES RESTRICT ROTATION ELECTRIC DRAWING
Denominazione
CENTRALINA 3B6
3B6 CENTRAL UNIT

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	F17 pag. 12	FUSIBILE GIROFARO + LAMPADA ROSSA ALLARME RED ALARM LAMP & ROTATING LAMP FUSE
	F18 pag. 13	FUSIBILE DOPPIA / TRIPLA USCITA + OPTIONAL DOUBLE/TRIPLE EXIT OPTIONAL FUSE
	F19 pag. 18	FUSIBILE TERGILAVAVETRO ANTERIORE FRONT WINDSCREEN WIPER FUSE
	F20 pag. 21	FUS. ALIM. ESCL. CIRCUITO IDRAULICO HYDRAULIC CIRCUIT EXLUSION FUSE
	F21 pag. 19	FUSIBILE TERGI POST. E SUP. REAR & UPPER WINDSCREEN WIPER FUSE
	F22 pag. 19	FUSIBILE ALIMENTAZIONE MANIPOLATORI JOYSTICK FEEDING FUSE
	F23 pag. 22	FUSIBILE ALIM. ILLUM. INTERRUT. SWITCHES LIGHT FEEDING FUSE
	F24 pag. 7	FUSIBILE ALIMENTAZIONE TERMOSTATO THERMOSTAT FEEDING FUSE
	F25 pag. 18	FUSIBILE INTERRUTTORE STERZATE STEERING SWITCH FUSE
	F26 pag. 6	FUS. DEVIO MARCE+RELE' ALIM. "15" REVERSE/FORWARD GEAR LEVER FUSE
	F27 pag. 10	FUSIBILE LUCI DI DIREZIONE DIRECTION LIGHT FUSE

Sim.\Sym.	Sigla\Item	Funzione\Use Type
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	F31 pag. 5	FUSIBILE RELE' ECCITAZIONE ECONOMIZZATORE ECONOMIZER EXCITATION FUSE RELAY
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	F33 pag. 22	DIODO 3A DIODE 3A
	F34 pag. 19	DIODO 3A DIODE 3A
	F35 pag. 5	DIODO 3 A DIODE 3 A
	F36 pag. 9	DIODO 3A DIODE 3A
	F37 pag. 9	DIODO 3A DIODE 3A
	F38 pag. 9	DIODO 3A DIODE 3A

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	F39 pag. 9	DIODO 3A DIODE 3A
	F40 pag. 16	DIODO 3A DIODE 3A
	F41 pag. 12	DIODO 3A DIODE 3A
	F42 pag. 12	DIODO 3A DIODE 3A
	F43 pag. 12	DIODO 3A DIODE 3A
	F44 pag. 12	DIODO 3A DIODE 3A
	F45 pag. 7	FUSIBILE ALIMENTAZIONE AC AC FEEDING FUSE
	F46 pag. 12	DIODO 3A DIODE 3A
	F48 pag. 12	DIODO 3A DIODE 3A
	F49 pag. 11	FUSIBILE RELE' LUCI RETROMARCIA REVERSE GEAR LIGHTS RELAY FUSE
	F50 pag. 13	FUSIBILE OSCILLAZIONE PONTE POST. REAR AXEL OSCILLATION CONSENT FUSE

Impianto

SCHEMA ELETTRICO MRT SERIE "M" EASY ROTAZIONE LIMITATA
MRT EASY "M" SERIES RESTRICT ROTATION ELECTRIC DRAWING

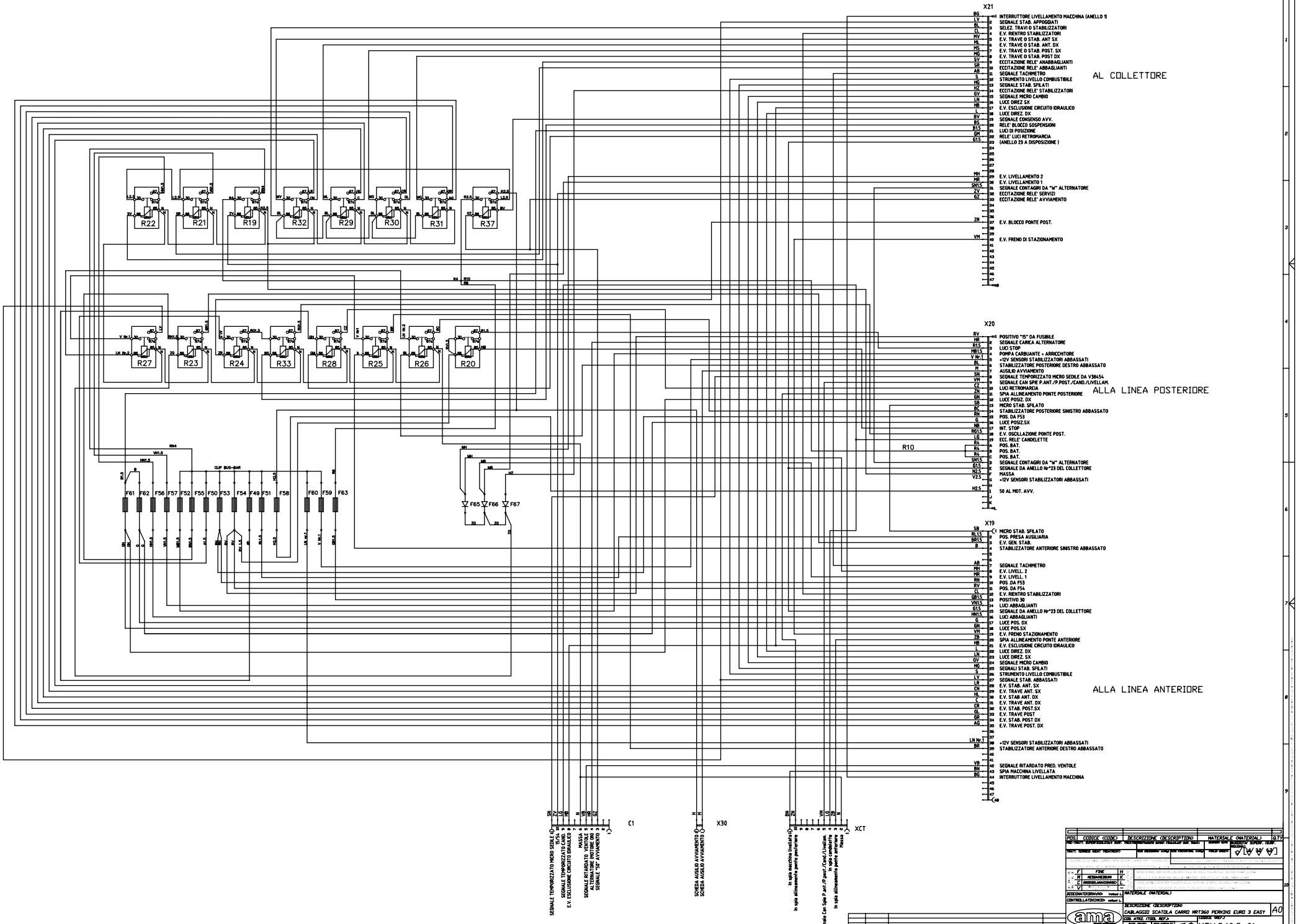
Denominazione

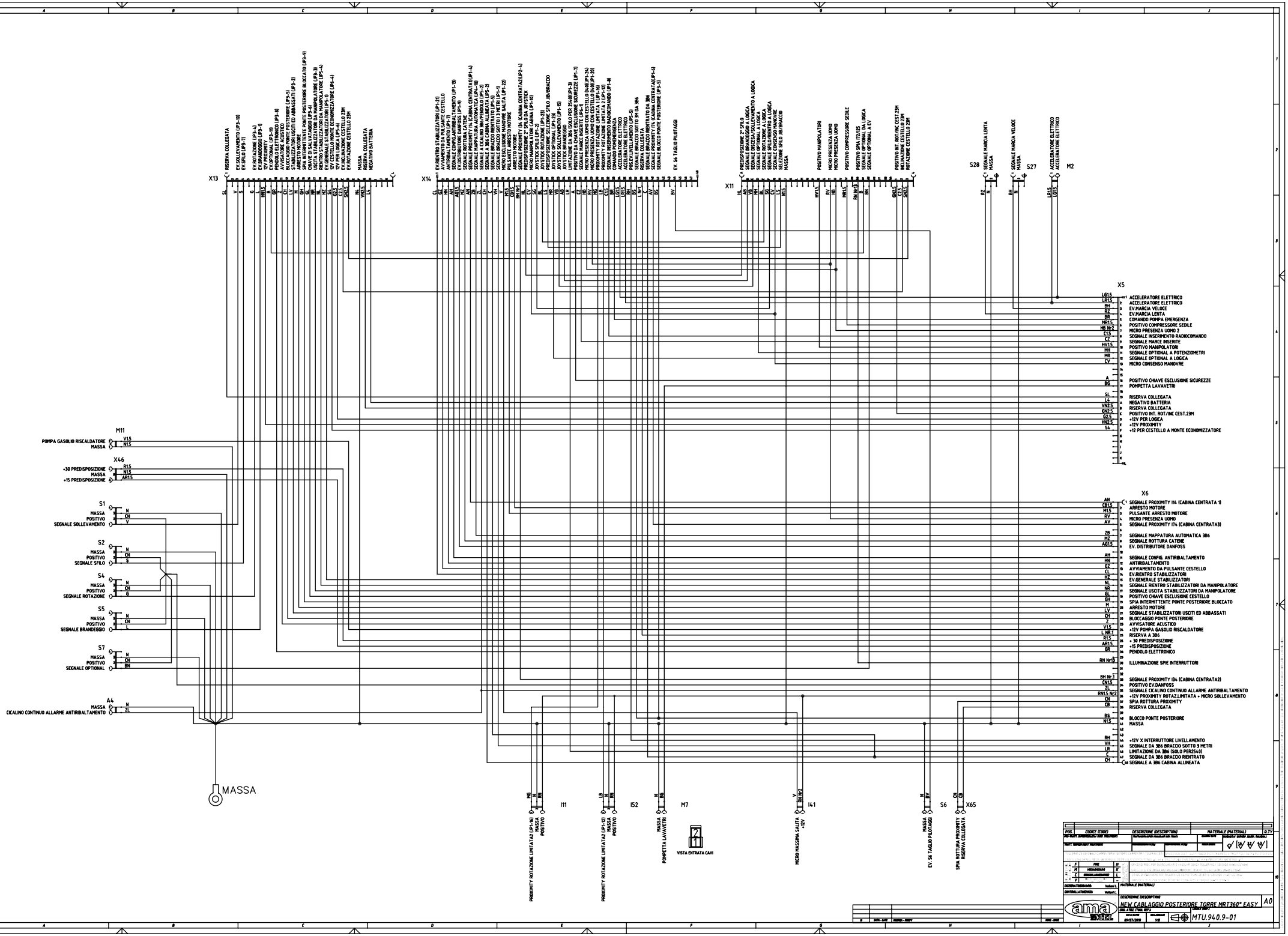
LEGENDA FUNZIONI
COMPONENTS LEGEND

MANITOU

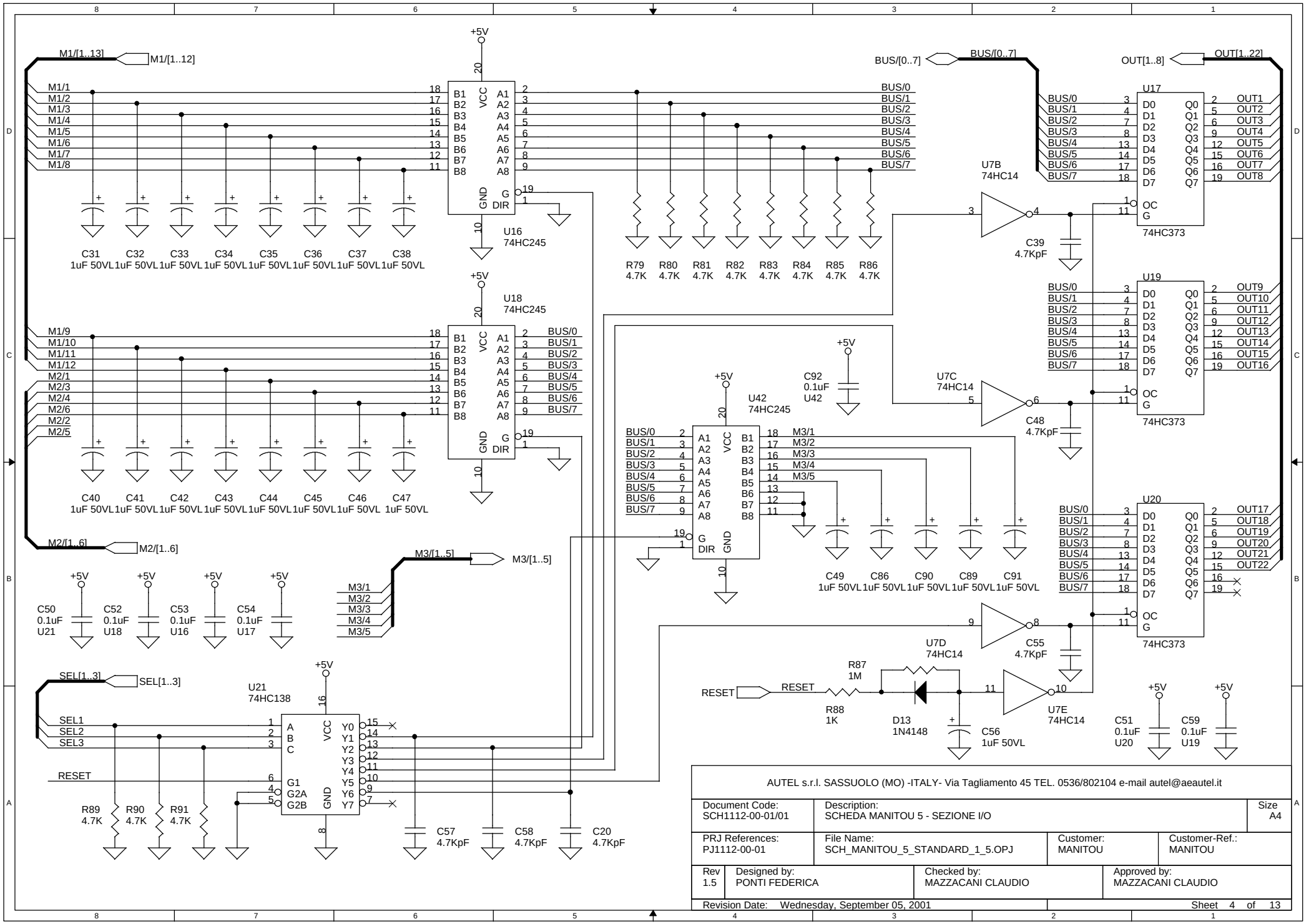
FOGLIO 27

SEGUE 28


X21
BG 01 INTERRUTTORE LIVELLAMENTO MACCHINA (ANELLO 1)
LV 02 SEGNALE STAB. APPOGGIATI
BL 03 SELEZ. TRAVI O STABILIZZATORI
CL 04 E.V. RIENTRO STABILIZZATORI
MV 05 E.V. TRAVE O STAB. ANT SX
ML 06 E.V. TRAVE O STAB. ANT. DX
MS 07 E.V. TRAVE O STAB. POST. SX
MG 08 E.V. TRAVE O STAB. POST DX
SV 09 ECCITAZIONE RELE' ANABBAGLIANTI
SR 10 ECCITAZIONE RELE' ABBAGLIANTI
AB 11 SEGNALE TACHIMETRO
S 12 STRUMENTO LIVELLO COMBUSTIBILE
NG 13 SEGNALE STAB. SFILATI
NZ 14 ECCITAZIONE RELE' STABILIZZATORI
GV 15 SEGNALE MICRO CAMBIO
LN 16 LUCE DIREZ. SX
MB 17 E.V. ESCLUSIONE CIRCUITO IDRAULICO
L 18 LUCE DIREZ. DX
BV 19 SEGNALE CONSENSO AVV.
BS 20 RELE' BLOCCO SOSPENSIONI
BI15 21 LUCI DI POSIZIONE
GN 22 RELE' LUCI RETROMARCIA
G15 23 (ANELLO 23 A DISPOSIZIONE)
MH 29 E.V. LIVELLAMENTO 2
MR 30 E.V. LIVELLAMENTO 1
SN15 31 SEGNALE CONTAGIRI DA "W" ALTERNATORE
ZV 32 ECCITAZIONE RELE' SERVIZI
GZ 33 ECCITAZIONE RELE' AVVIAMENTO
ZR 37 E.V. BLOCCO PONTE POST.
VM 40 E.V. FRENO DI STAZIONAMENTO
AL COLLETTORE
X20
RV 01 POSITIVO "15" DA FUSIBILE
HR 02 SEGNALE CARICA ALTERNATORE
R15 03 LUCI STOP
MR15 04 POMPA CARBURANTE + ARRICCHITORE
V Nr.1 05 +12V SENSORI STABILIZZATORI ABBASSATI
BL 06 STABILIZZATORE POSTERIORE DESTRO ABBASSATO
M 07 AUSILIO AVVIAMENTO
SN 08 SEGNALE TEMPORIZZATO MICRO SEDILE DA V38454
VM 09 SEGNALE CAN SPIE P.ANT./P.POST./CAND./LIVELLAM.
CZ 10 LUCI RETROMARCIA
ZN 11 SPIA ALLINEAMENTO PONTE POSTERIORE
GN 12 LUCE POSIZ. DX
SB 13 MICRO STAB. SFILATO
BC 14 STABILIZZATORE POSTERIORE SINISTRO ABBASSATO
RN 15 POS. DA F53
G 16 LUCE POSIZ.SX
NB 17 INT. STOP
RG15 18 E.V. OSCILLAZIONE PONTE POST.
LG 19 ECC. RELE' CANDELETTE
R4 A POS. BAT.
R4 B POS. BAT.
R4 C POS. BAT.
SN15 D SEGNALE CONTAGIRI DA "W" ALTERNATORE
G15 E SEGNALE DA ANELLO Nr°23 DEL COLLETTORE
N2.5 F MASSA
V2.5 G +12V SENSORI STABILIZZATORI ABBASSATI
H2.5 L 50 AL MOT. AVV.
ALLA LINEA POSTERIORE
R10
X19
SB 1 MICRO STAB. SFILATO
RL15 2 POS. PRESA AUSILIARIA
BR15 3 E.V. GEN. STAB.
B 4 STABILIZZATORE ANTERIORE SINISTRO ABBASSATO
AB 7 SEGNALE TACHIMETRO
MH 8 E.V. LIVELL. 2
MR 9 E.V. LIVELL. 1
RN 10 POS. DA F53
RV 11 POS. DA F54
CL 12 E.V. RIENTRO STABILIZZATORI
GR15 13 POSITIVO 30
VN15 14 LUCI ABBAGLIANTI
G15 15 SEGNALE DA ANELLO Nr°23 DEL COLLETTORE
HN15 16 LUCI ABBAGLIANTI
G 17 LUCE POS. DX
GN 18 LUCE POS.SX
VM 19 E.V. FRENO STAZIONAMENTO
Z9 20 SPIA ALLINEAMENTO PONTE ANTERIORE
MB 21 E.V. ESCLUSIONE CIRCUITO IDRAULICO
L 22 LUCE DIREZ. DX
LN 23 LUCE DIREZ. SX
GV 24 SEGNALE MICRO CAMBIO
HG 25 SEGNALI STAB. SFILATI
S 26 STRUMENTO LIVELLO COMBUSTIBILE
LV 27 SEGNALE STAB. ABBASSATI
LR 28 E.V. STAB. ANT. SX
CN 29 E.V. TRAVE ANT. SX
HL 30 E.V. STAB ANT. DX
C 31 E.V. TRAVE ANT. DX
CR 32 E.V. STAB. POST.SX
GL 33 E.V. TRAVE POST
GR 34 E.V. STAB. POST DX
AG 35 E.V. TRAVE POST. DX
LN Nr.1 38 +12V SENSORI STABILIZZATORI ABBASSATI
BR 39 STABILIZZATORE ANTERIORE DESTRO ABBASSATO
VB 42 SEGNALE RITARDATO PRED. VENTOLE
BN 43 SPIA MACCHINA LIVELLATA
BG 44 INTERRUTTORE LIVELLAMENTO MACCHINA
ALLA LINEA ANTERIORE
R22 R21 R19 R32 R29 R30 R31 R37
R27 R23 R24 R33 R28 R25 R26 R20
R4 R10 R6
RN4
VM1.5
HN1.5
CLIP BUS-BAR
F61 F62 F56 F57 F52 F55 F50 F53 F54 F49 F51 F58 F60 F59 F63
F65 F66 F67
MH MR H7
C1
SEGNALE TEMPORIZZATO MICRO SEDILE (-)
SEGNALE TEMPORIZZATO CAND. (-)
E.V. ESCLUSIONE CIRCUITO IDRAULICO (-)
SEGNALE RITARDATO - MASSA
ALTERNATORE (MOTORE ON)
SEGNALE "50" AVVIAMENTO
X30
SCHEDA AUSILIO AVVIAMENTO
SCHEDA AUSILIO AVVIAMENTO
XCT
In spia macchina livellata (+)
In spia allineamento ponte posteriore
Segnale Can Spie P.ant./P.post./Cand./Livellam.
In spia candeletta
In spia allineamento ponte anteriore
Massa
POS. CODICE (CODE) DESCRIZIONE (DESCRIPTION) MATERIALE (MATERIAL) QTY
DESCRIZIONE (DESCRIPTION)
MATERIALE (MATERIAL)
CABLAGGIO SCATOLA CARRO MRT360 PERKINS EURO 3 EASY
A0
MTU.940.3-01


X13
X14
X11
S28
S27
M2
X5
X6
M11
X46
S1
S2
S4
S5
S7
A4
MASSA
I11
I52
M7
I41
S6
X65
VISTA ENTRATA CAVI
NEW CABLAGGIO POSTERIORE TORRE MRT360° EASY
MTU.940.9-01

SCATOLA LOGICA
80-8-8-M96 IT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M1/4
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M1/8
+5V
U16
74HC245
B1 B2 B3 B4 B5 B6 B7 B8
A1 A2 A3 A4 A5 A6 A7 A8
VCC GND G DIR
C31 1uF 50VL
C32 1uF 50VL
C33 1uF 50VL
C34 1uF 50VL
C35 1uF 50VL
C36 1uF 50VL
C37 1uF 50VL
C38 1uF 50VL
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BUS/1
BUS/2
BUS/3
BUS/4
BUS/5
BUS/6
BUS/7
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R80 4.7K
R81 4.7K
R82 4.7K
R83 4.7K
R84 4.7K
R85 4.7K
R86 4.7K
U7B
74HC14
C39 4.7KpF
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OUT[1..22]
U17
74HC373
D0 D1 D2 D3 D4 D5 D6 D7
Q0 Q1 Q2 Q3 Q4 Q5 Q6 Q7
OC G
OUT1 OUT2 OUT3 OUT4 OUT5 OUT6 OUT7 OUT8
U18
74HC245
M1/9
M1/10
M1/11
M1/12
M2/1
M2/3
M2/4
M2/6
M2/2
M2/5
C40 1uF 50VL
C41 1uF 50VL
C42 1uF 50VL
C43 1uF 50VL
C44 1uF 50VL
C45 1uF 50VL
C46 1uF 50VL
C47 1uF 50VL
U42
74HC245
C92 0.1uF
U7C
74HC14
C48 4.7KpF
U19
74HC373
OUT9 OUT10 OUT11 OUT12 OUT13 OUT14 OUT15 OUT16
M2/[1..6]
M2/[1..6]
M3/[1..5]
M3/[1..5]
M3/1
M3/2
M3/3
M3/4
M3/5
C49 1uF 50VL
C86 1uF 50VL
C90 1uF 50VL
C89 1uF 50VL
C91 1uF 50VL
U20
74HC373
OUT17 OUT18 OUT19 OUT20 OUT21 OUT22
C50 0.1uF U21
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U7D
74HC14
C55 4.7KpF
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74HC138
A B C G1 G2A G2B VCC GND
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SEL2
SEL3
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R88 1K
D13 1N4148
C56 1uF 50VL
U7E
74HC14
C51 0.1uF U20
C59 0.1uF U19
R89 4.7K
R90 4.7K
R91 4.7K
C57 4.7KpF
C58 4.7KpF
C20 4.7KpF
AUTEL s.r.l. SASSUOLO (MO) -ITALY- Via Tagliamento 45 TEL. 0536/802104 e-mail autel@aeautel.it
Document Code: SCH1112-00-01/01
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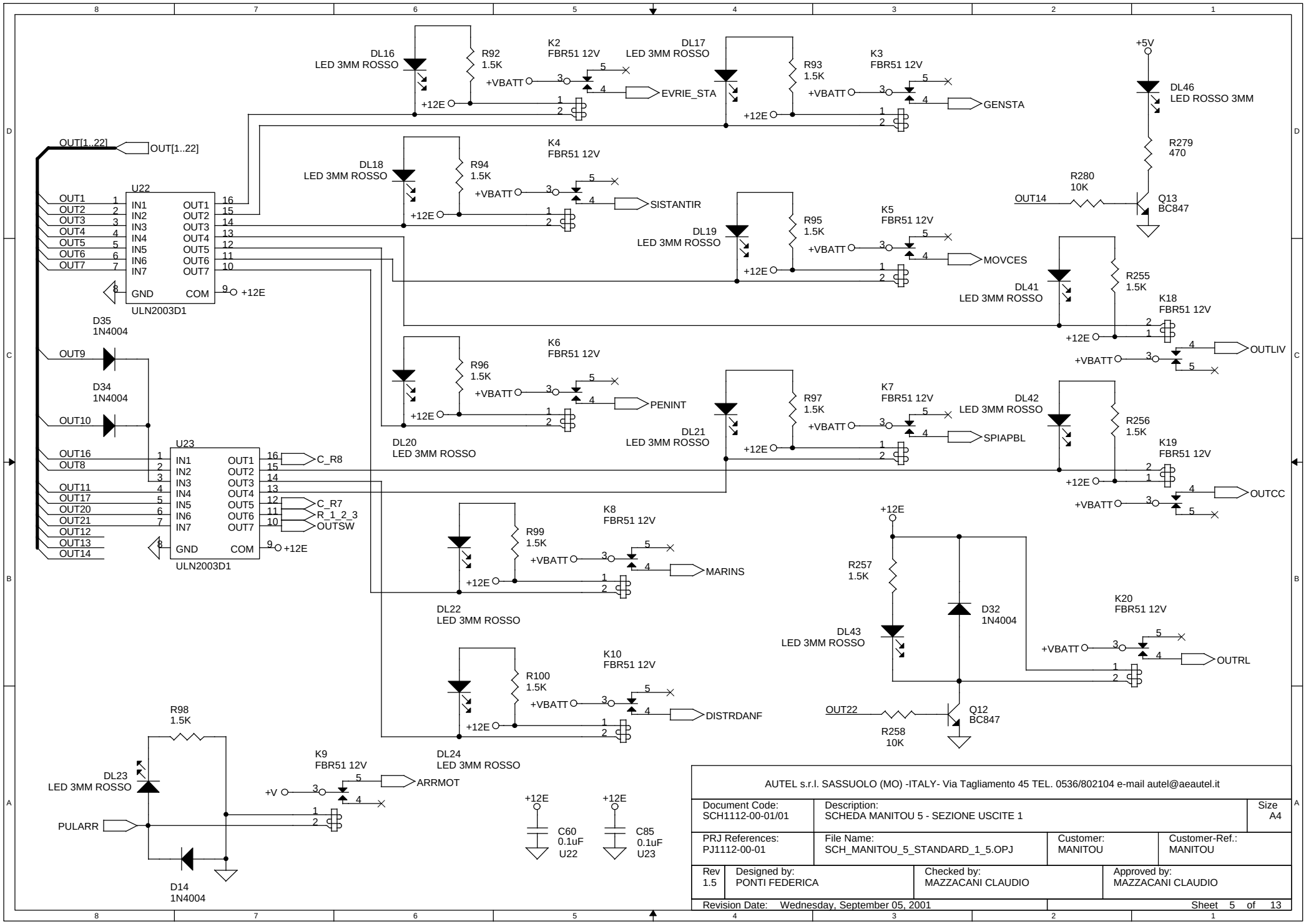
Size A4
PRJ References: PJ1112-00-01
File Name: SCH_MANITOU_5_STANDARD_1_5.OPJ
Customer: MANITOU
Customer-Ref.: MANITOU
Rev 1.5
Designed by: PONTI FEDERICA
Checked by: MAZZACANI CLAUDIO
Approved by: MAZZACANI CLAUDIO
Revision Date: Wednesday, September 05, 2001
Sheet 4 of 13

ELECTRONIC BOX
80-8-8-M96 EN



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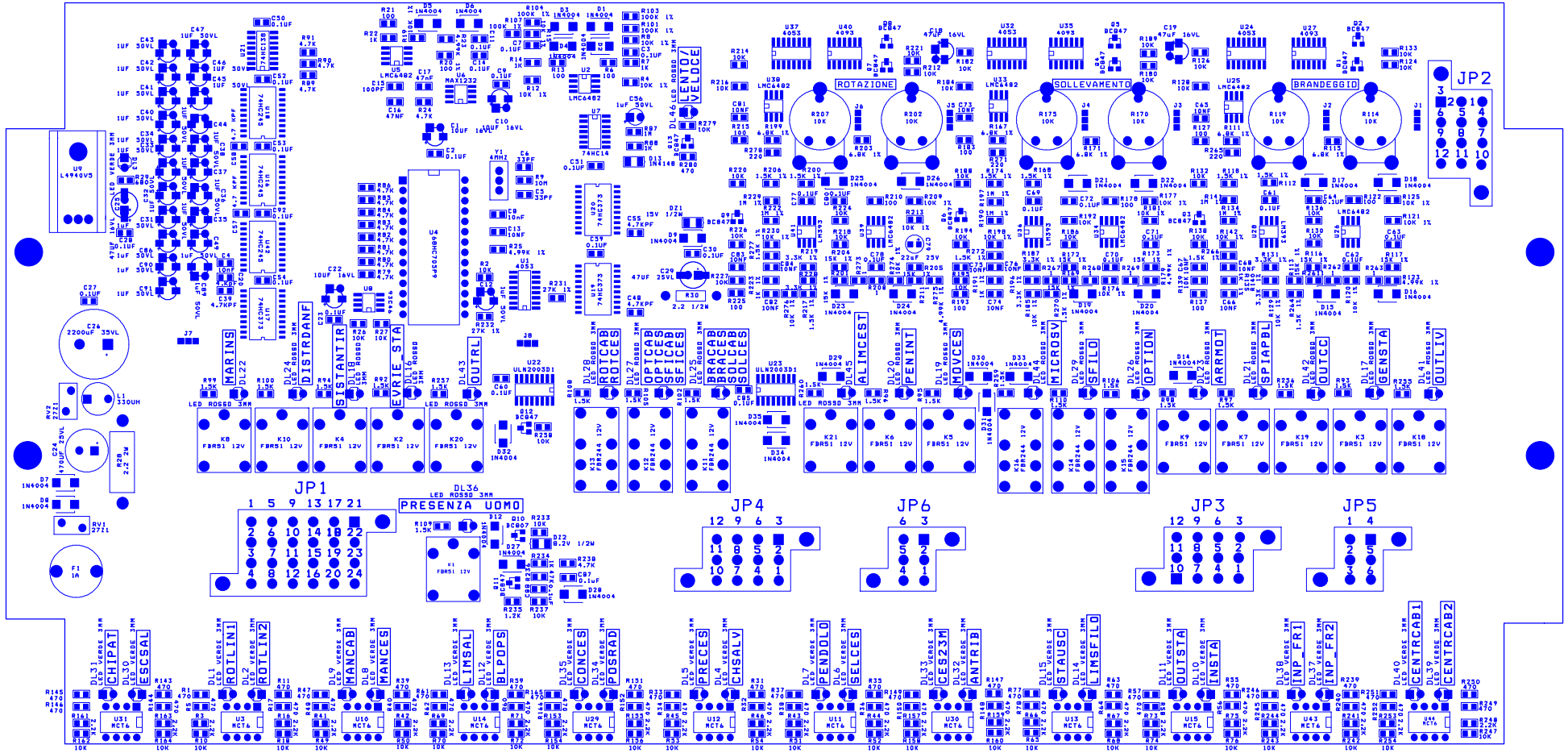
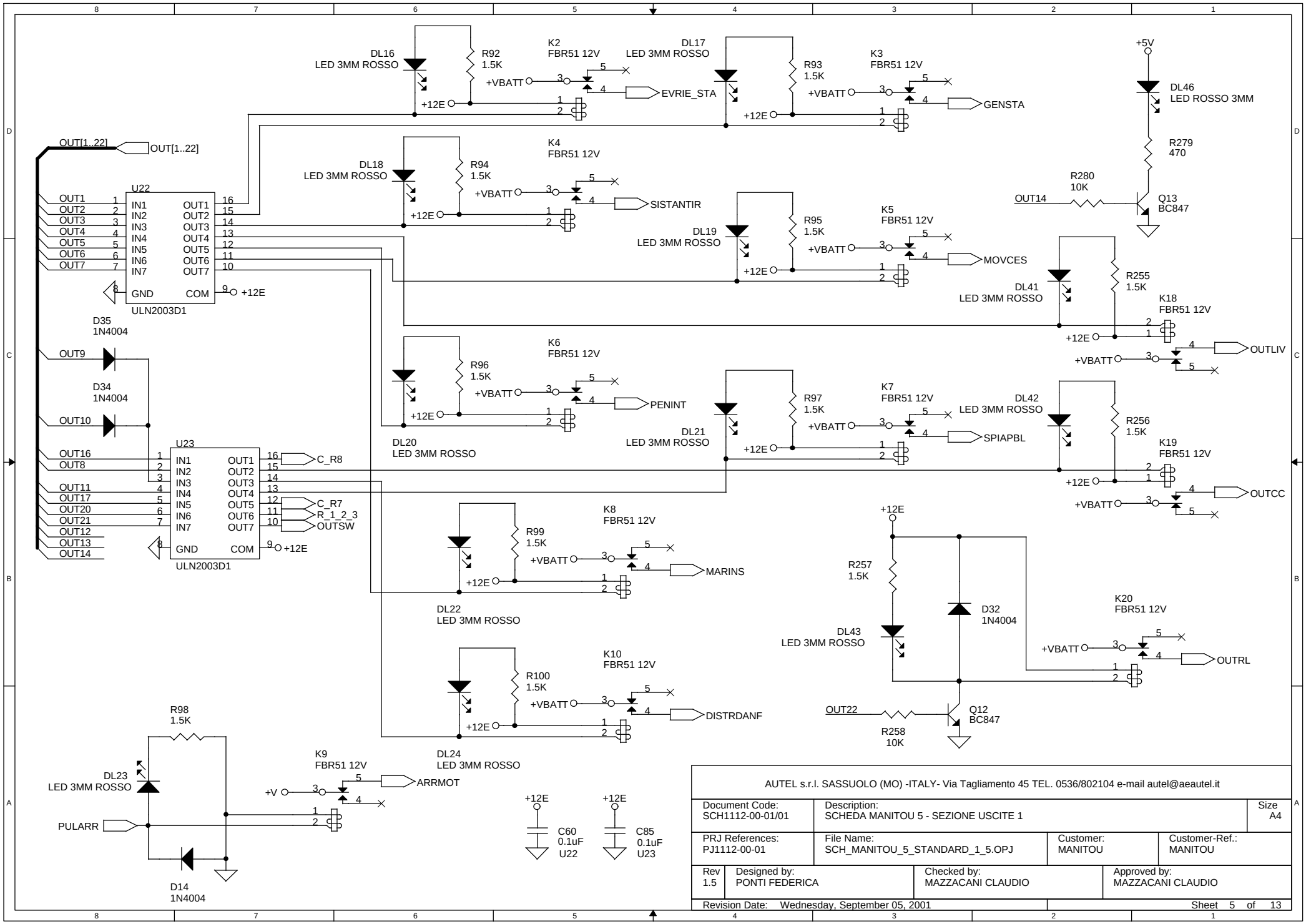
Rev 1.5	Designed by: PONTI FEDERICA	Checked by: MAZZACANI CLAUDIO	Approved by: MAZZACANI CLAUDIO
Revision Date: Wednesday, September 05, 2001			Sheet 5 of 13



05/09/01
LAYOUT LATO COMPONENTI
MANITOU 5 1.3
STANDARD
REV 1.1



AUTEL s.r.l. SASSUOLO (MO) -ITALY- Via Tagliamento 45 TEL. 0536/802104 e-mail autel@aeautel.it			
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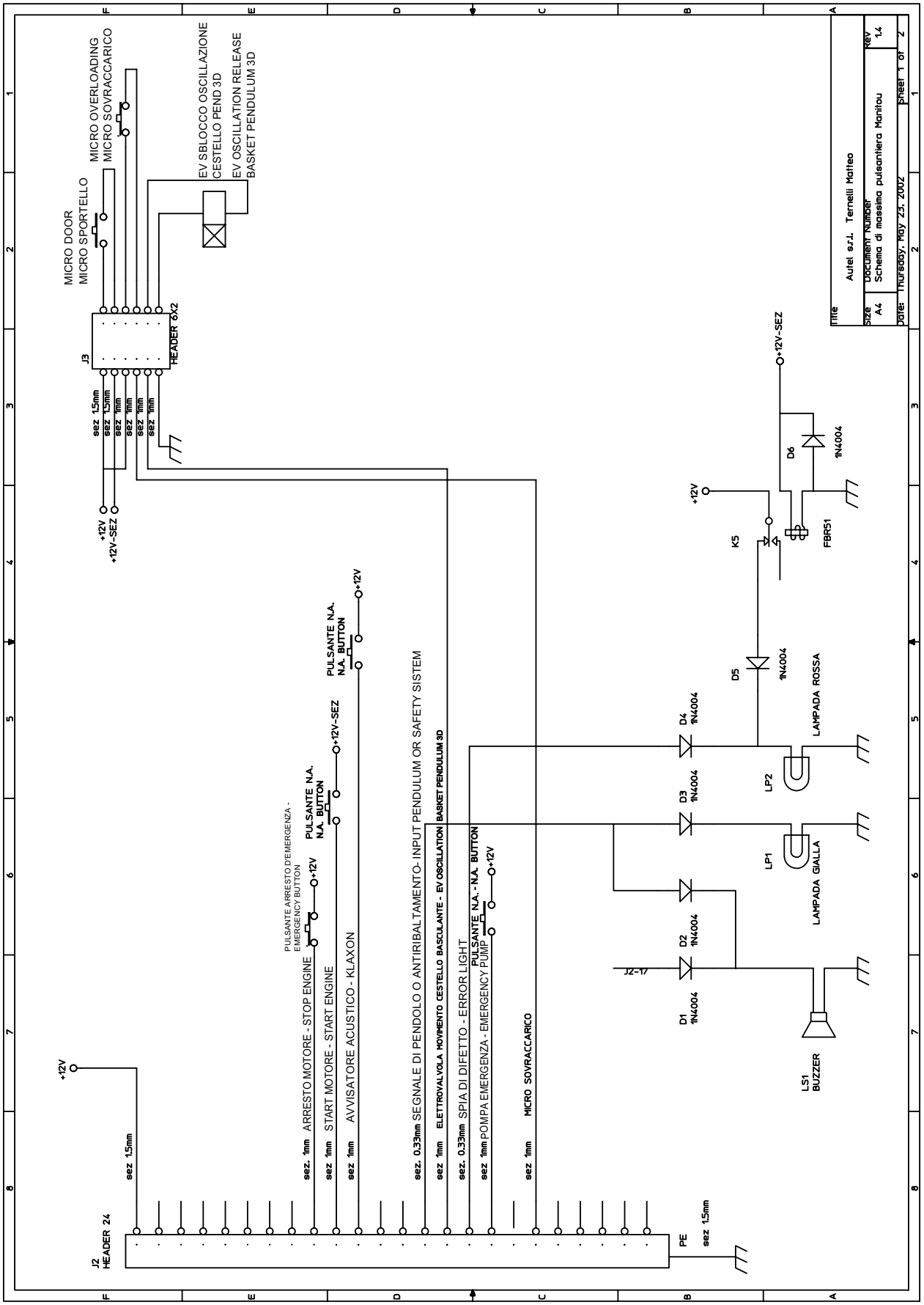
Rev 1.5	Designed by: PONTI FEDERICA	Checked by: MAZZACANI CLAUDIO	Approved by: MAZZACANI CLAUDIO
Revision Date: Wednesday, September 05, 2001			Sheet 5 of 13

Tavola pulsantiera 1 / Table remote control 1 / Tafel druckknopftafel 1



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Le informazioni contenute nel presente manuale sono soggette a modifiche senza preavviso e non rappresentano un impegno da parte della ditta Autec. Per nessun motivo possono essere riprodotte, in qualsiasi forma o mezzo parti del libretto senza il permesso scritto di Autec srl (inclusa registrazione e fotocopia).

Certificato di garanzia

Le condizioni che regolano la garanzia del radiocomando sono riportate sul "Certificato di Garanzia" contenuto nel presente manuale. **Le parti elettroniche con 3 anni di garanzia sono: MTX_____, MRX_____, RD97_____, RI_____ e CH_____.**

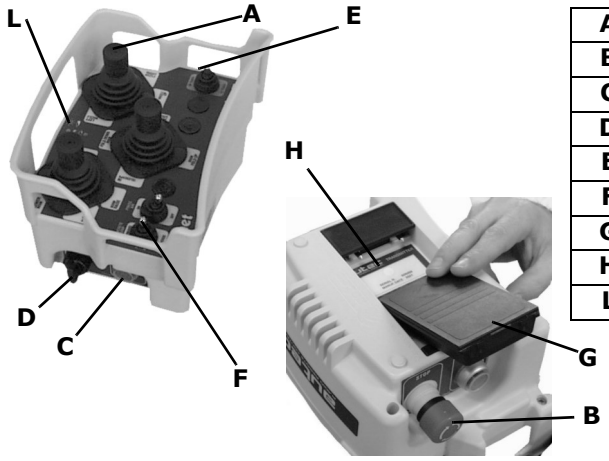
Scheda tecnica

La scheda tecnica rappresenta lo schema di cablaggio dell'unità ricevente con la macchina. Deve essere compilata e controllata dall'installatore il quale ha la responsabilità del corretto cablaggio. L'installatore, inoltre, deve firmare la scheda tecnica che deve sempre rimanere allegata al manuale d'uso (nel caso in cui la si utilizzi per pratiche amministrative tenerne sempre una copia).

Targhette identificazione

I dati di identificazione e di omologazione del radiocomando sono riportati su apposite targhette presente nell'unità trasmittente e ricevente.
Tali targhette NON DEVONO essere né rimosse dalla loro posizione né alterate o rovinate per nessun motivo. La rimozione comporta l'immediata decadenza della garanzia.

9 UNITÀ TRASMITTENTE E SUO FUNZIONAMENTO



A	attuatori (a joystick o a selettore)
B	pulsante di STOP
C	pulsante di START / clacson
D	chiave d'accensione
E	selettore rpm +/-
F	selettore velocità
G	batteria
H	targhetta d'identificazione
L	led di segnalazione (verde e rosso)

Accensione ed avviamento

Accertarsi che la chiave d'accensione sia nella posizione "O", inserire la batteria nell'apposita sede senza forzare. Verificare che né il pulsante di stop né gli attuatori siano azionati.
Girare la chiave d'accensione in posizione "I" e azionare il pulsante di START fino a quando il led verde inizia a lampeggiare.

⇨ **L'accensione avviene solo se la batteria è sufficientemente carica e se tutti gli attuatori sono disinseriti.**

Comandi

Si possono far eseguire i comandi alla macchina radiocomandata solo dopo che il collegamento radioelettrico tra unità trasmittente e ricevente è avvenuto (segnalato dall'accensione della spia ENABLE presente nell'unità ricevente (vedere capitolo 10)).
Azionare gli attuatori relativi alle manovre che si intendono comandare.
Tutti i comandi protetti dalla funzione SAFETY sono approvati in categoria 3 secondo la EN 954 - 1 per la protezione dei movimenti non voluti dalla posizione di riposo (UMFS - Unintended Movement From Standstill).

Alcuni dei comandi disponibili nell'unità trasmittente sono i seguenti:

Clacson

Con unità trasmittente accesa premendo il pulsante di START, si aziona il clacson/allarme della macchina.