



Tetra Pak Processing Systems Division

DRAWING SPECIFICATION

The Drawing Specification is the key identification for the process equipment.
It is to be filed separately under safe conditions.

Machine type: Tetra Alex[®] 25

Machine number: T5845523507

English

Operation Manual: OM - 1244364-01

Technical Manual: TeM - 2646933-01

Electrical Manual: EM - 2646934-01

Issue date: 2004-04-02

Technical Manual

CONTENTS	TAG
SAFETY PRECAUTIONS.....	1
GENERAL INFORMATION	2
INSTALLATION	3
MAINTENANCE	4
DATA	
Technical data.....	5
Test record	6
Parts list	7
Service media	8
Cleaning	9
CERTIFICATE	10

TEM_TOC_1_nosp_EN.fm



Tetra Pak Processing Components AB

Intentionally left blank

1 Safety precautions

This page intentionally left blank

Safety precautions

To ensure maximum safety for the operator, always read this section carefully before carrying out any work on the equipment.

Use of hazard information

Hazard information in this documentation is defined as follows:



DANGER!

Failure to observe this information results in immediate danger to life.



WARNING!

Failure to observe this information can result in major personal injury or loss of life

Caution!

Failure to observe this information can result in minor personal injury or damage to the equipment.

General

Only trained personnel are allowed to operate the machine. The machine may only be used in accordance with the instructions given in the manuals delivered with the equipment.

If the **Safety precautions** are not followed, there is risk of personal injury.

The machine is normally started by an external signal, therefore:

- always keep all covers closed during operation, rotating wheels and moving pistons may cause severe injuries
- make sure the mains power is turned off and secured before the service covers are opened/removed
- regard all electrical equipment as live, make sure the doors for the starter panel are closed



DANGER!

During operation:

- stay outside the safety area (approximately 1m (3 feet) around the machine)
- regard all pipes including pulsation dampers as hot
- watch out for leakage/blasts from hot media at pipe connections and from pressurized parts of the machine
- always use hearing protection
- never throttle down the product flow to or from the machine

Risk of explosion - Immediate danger to life

Make sure that the product outlet pipes not are blocked in any way. Due to high pressure, this will make a high risk of exploded pipes and dampers.

Before carrying out maintenance and repair:

- turn off the external mains power switch and lock it in position OFF
- allow the machine to cool down
- inform the operator and other relevant personnel about the work you intend to do
- post warning signs in prominent places
- when handling heavy parts; carry out the lift in a safe way and use only with safe lifting equipment

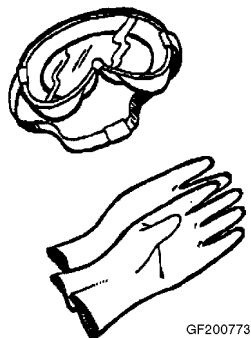
Cleaning solution

Handling of cleaning solution

Cleaning solutions normally contain caustic soda (NaOH) or nitric acid (HNO₃). These chemicals may cause burning to skin and eyes. Follow the instructions given by the supplier.

Whenever there is a risk of exposure to these chemicals, always wear:

- safety glasses
- protective gloves
- shoes made of PVC or PE plastic, or rubber
- apron.



GF200773

In the case of an accident involving cleaning solution, the basic rule is to rinse the affected area as soon as possible with as much water as possible.

For this reason, always make sure that the showers work, that there are additional washing facilities, and that an eyewash device is available at or near each machine site.

Emergency precautions

If swallowed

If you happen to swallow cleaning solution:

- drink large amounts of lukewarm water (in order to dilute the cleaning solution); then seek medical attention immediately.

Contact with eyes

If cleaning solution is splashed into your eyes:

- wash the eyes thoroughly with lukewarm water for 15 minutes (keep eyelids widely apart); then seek medical attention immediately.



GF200774

Contact with skin or clothes

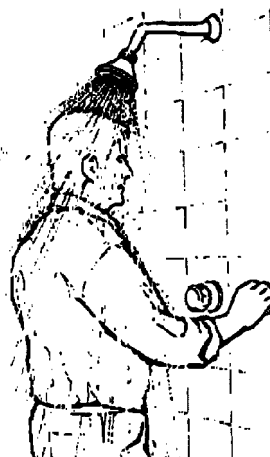
If cleaning solution comes into contact with skin or clothes:

- rinse immediately with plenty of water
- thoroughly wash the clothes before they are worn again. If skin burns appear, seek medical advice immediately.

If inhaled

If you experience irritation or pain due to having inhaled vaporized cleaning solution:

- leave the affected area to get fresh air. If the symptoms become worse, seek medical advice.



This page intentionally left blank

2 General information

This page is intentionally left blank

General information

Machine introduction



WARNING!

To ensure maximum safety for the technicians, always read the “Safety precautions” pages before doing any work on the machine or making any adjustments.

Intended use of this Tetra Pak equipment

This unit is intended for use according to the specifications in **Technical data** (see **Technical Manual**) and related documents.

Tetra Pak will not be held responsible for injury or damage if the equipment is used for any other purpose.

Service

In case of problems when operating the machine, contact the nearest Tetra Pak service station.

Manufacturer

This Tetra Pak equipment was produced by:

Tetra Pak Processing Components AB
 Ruben Rausings gata
 S-221 86 LUND
 Sweden

Machine identification

All units carry a machine plate stating:

- unit identification
- data unique to the unit

Have this information available before contacting Tetra Pak concerning this particular unit.

 **Tetra Pak**

Machine Type

Drawing Spec.

Machine No.

Manufacturer

Year of manufacture -

Document information

Product Documentation

The documentation for this equipment consists of the following parts:

- Operation Manual
- Technical Manual
- Electrical Manual

It is important that you:

- keep the manuals for the life of the equipment,
- pass the manuals on to any subsequent holder or user of the equipment.

Design modifications

The directives in this document are in accordance with the design and construction of the machine at the time it was released by the Tetra Pak machine production facility.

Document producer

This document has been produced by:

Tetra Pak Processing Components AB
Ruben Rausings gata
S-221 86 LUND
Sweden

Further copies

Additional copies can be ordered from nearest Tetra Pak service station. When ordering technical publications, always quote the document number.

Copyright © 2002

Tetra Pak Processing Systems Division

All rights reserved. No part of this document may be reproduced or copied in any form or by any means without the written permission of Tetra Pak Processing Systems Division.

3 Installation data

This page intentionally left blank

Installation

Introduction	1
Prior to operation	1
Preparatory work	3
General dimensions	3
Service area	4
Floor	5
Product supply	6
Water supply	8
Electrical supply	9
Installation instructions	11
Requirements on personnel	11
Storage	12
Unloading and transportation	12
Unpacking and inspection	12
Positioning and erection	13
Lubrication	17
Recommended oil	17
Oil amount	18
Check after installation	19

2.235343-01.toc

Table of contents

This page intentionally left blank

2.235343-01.toc

Introduction

Prior to operation

Prepare the site according to the information given in **Preparatory work** and **Technical data**.

When installing the machine, follow the instructions in **Installation instructions**.

Before starting up, make the checks according to **Check after installation**.

Technical data

Some pages refer to the following machine unique information:

- Mass and centre of gravity
- Piston diameter
- Consumption data

This information is found in **Technical data**.

Example of Technical data

Tetra Pak				Tetra Pak Processing Systems		ver. 1.1	
Technical Data for homogeniser							
Model: Tetra Alex 30		Machine No.: T584553xxxx		Customer: NN			
General:							
Capacity: 4000 / 8000 l/h	250	Working pressure: bar	3-10	Inlet pressure: bar	Noise reduction: ☐	Sound effect level (acc. to ISO 3746): B(A)	
Altitude: <1000 m	<40 °C	Ambient temperature: °C	3480	Total mass: kg	Centre of gravity (a=): mm	Sound pressure level (distance=1m): dB(A)	
Wetend design:							
Valve design: Cone ☐ Mushroom ☒ Ball ☐	Piston diameter: mm 50	Piston design: Stainless steel ☐ Chromium plated ☒ Ceramic coated ☐ Ceramic solid ☐	Piston packing: Grooved ☐ V-packing ☒	Remote ind. of product pressure: ☐			
Homogenising device design:							
Size of 1st stage: 33/43	Size of 2nd stage: 33/43	Remote indication of hydraulic pressure: 1st stage ☐ 2nd stage ☐		Remote continuous setting: 1st stage ☐ 2nd stage ☐			
Drive Motor:							
Manufacturer: ABB	Model: M2BA280SMB 4	Revolution: rpm 1481	Protection: IP55				
Power: kW 90	Voltage: V 415	Frequency: Hz 50	Full load current: Amp 165	Starting current: Amp 1106			
Hydraulic Unit:							
Manufacturer: Bosch	Model: 4722-5471-80						
Hydraulic Motor:							
Manufacturer: ABB	Model: M2AA71B 6	Revolution: rpm 920	Protection: IP55				
Power: kW 0.25	Voltage: V 415	Frequency: Hz 50	Rated current: Amp 0.9				
Drive Unit:							
V-belt type: SPC	Number of tracks: 4	Motor pulley diameter: mm 250	Gearbox pulley diameter: mm 500	V-belt length: mm 2650			
Reduction Gear:							
Manufacturer: Benzler	Model: TV151	Reduction: 5,890	Crankshaft speed sensor: ☐				
Valves:							
Cooling water valve: Solenoid ☒ Pneumatic ☐	Steam valve: Solenoid ☒ Pneumatic ☐	Press. relief valve: 1st Stage ☒ 2nd Stage ☒					
Voltage: V AC 4-7 bar	Compressed air supply: V AC 4-7 bar	Voltage: V AC 4-7 bar	Compressed air supply: V AC 4-7 bar	Voltage: 24 V DC 24 V DC			
Cooling water supply:							
Pressure: bar 2-4	Consumption: l/h 1260	Temperature: °C ≤25	Hardness: °dH ≤10				
Steam supply:							
Pressure: bar 2-4	Consumption: kg/h 45	Temperature: °C 110-115					
Date: 1997-09-04	Sign: AM	Revision: 0					
Tetra Pak Processing Systems							
Box 64 S-221 00 Lund							

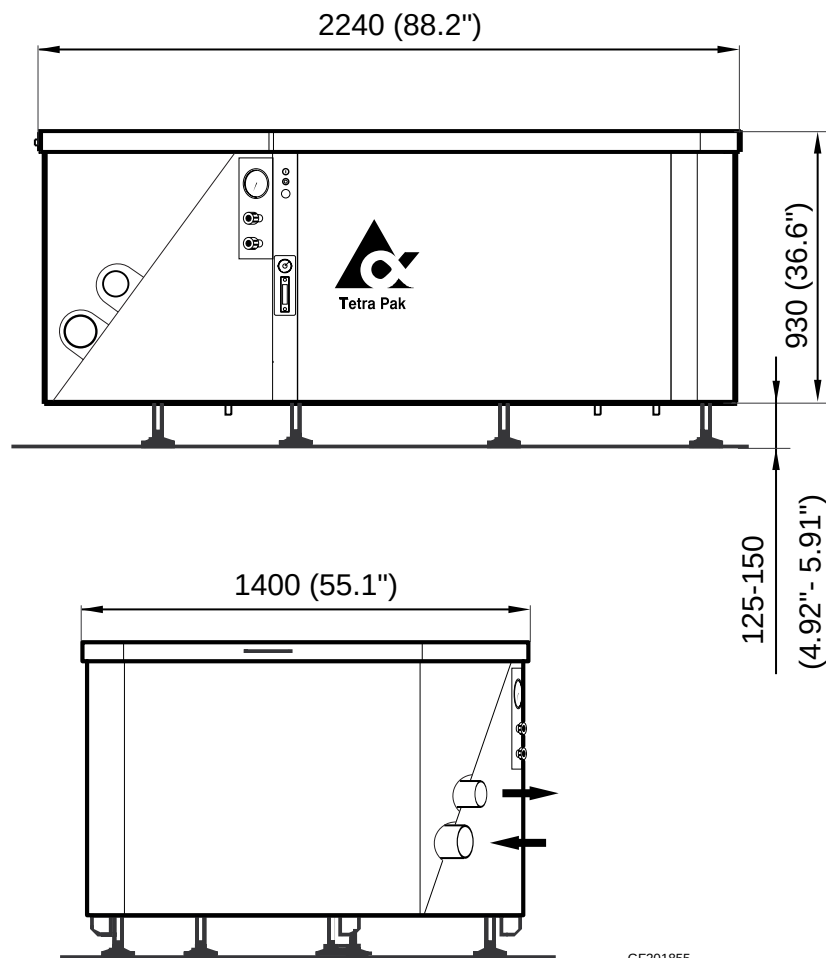
This page intentionally left blank

2.2tf201463.en

Preparatory work

General dimensions

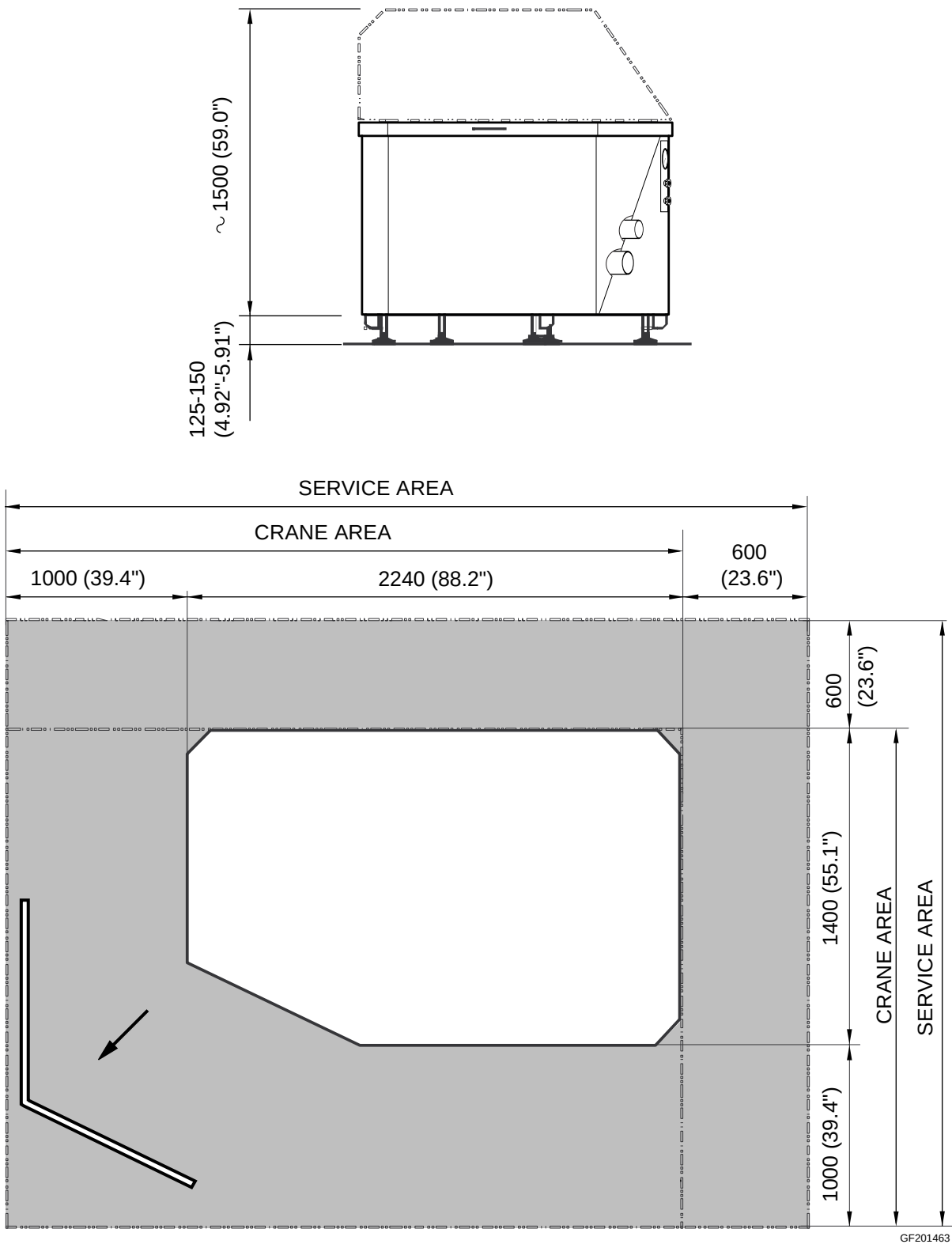
Measures: mm (inch)



GF201855

Service area

Measures: mm (inch)



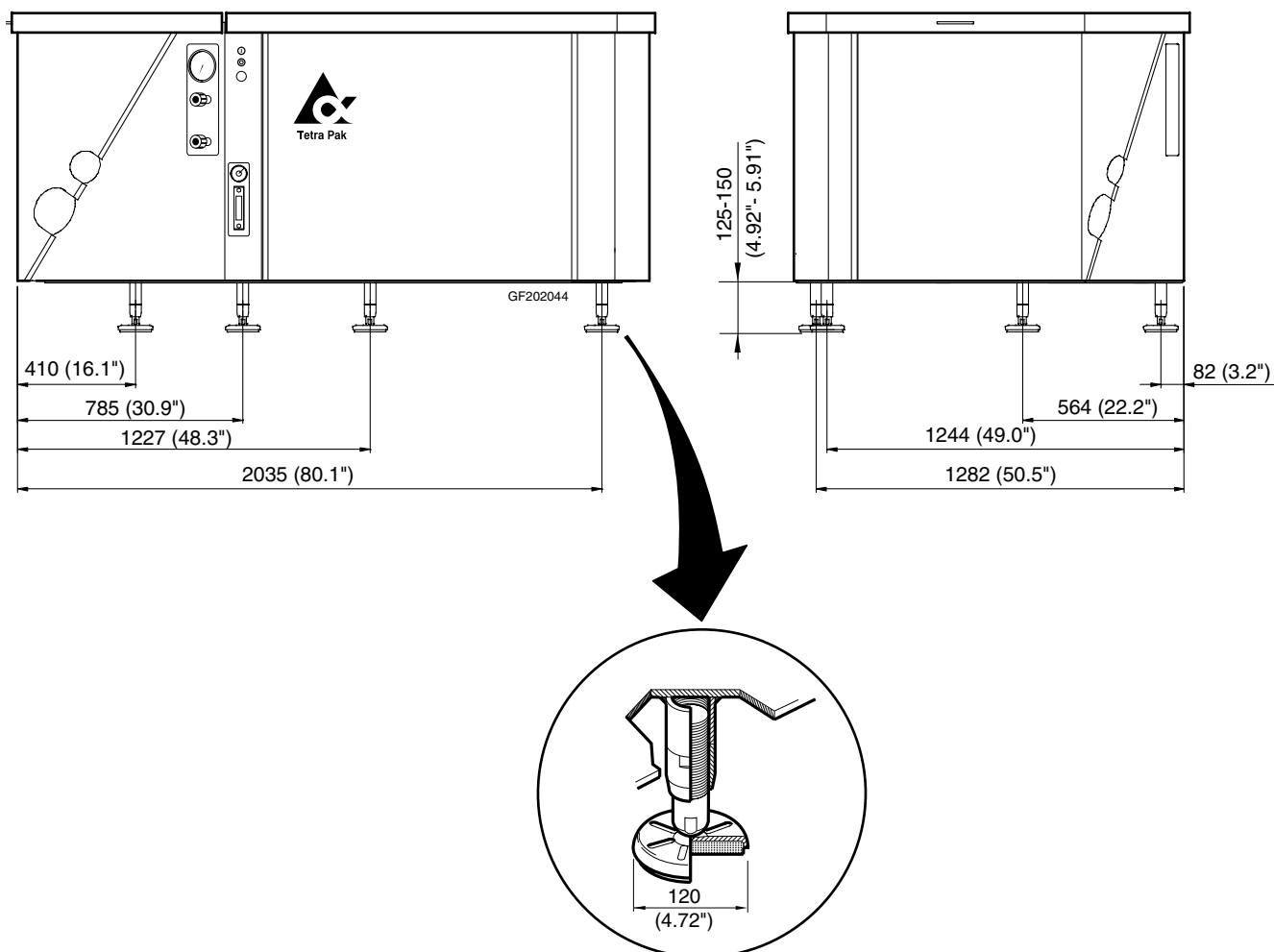
2.2tf201910.en

GF201463

Floor

Weight of machine, see **Technical data**.

Measures: mm (inch)



Product supply

The machine connections have to be welded to the product inlet- / outlet pipes.

The pipe line, inlet and outlet, shall contain as few elbows as possible.

Quality of piping and welding

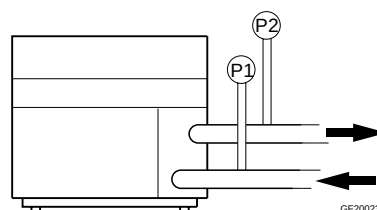
Piping: Local regulations as to pressure vessel codes and material quality vs. product properties have to be met

Welding: Methods according to standards that are acceptable for the transport of liquid food.

A “Testweld” should always be carried out and the sample piece examined by qualified persons and particularly to establish that there are no “pockets”, “cracks”, “pinholes” or “crevices” that could not be thoroughly cleaned under practical conditions.

Recommended inlet pressures

Product	P1 bar (psi)
Low viscous products e.g. milk, juice	3 - 10 (45 - 150)
High viscous products e.g. sauces, ketchups	4 - 10 (60 - 150)
Outlet pressure P2	3 - 20 bar (45 - 300 psi)



Caution! Risk of machine damage

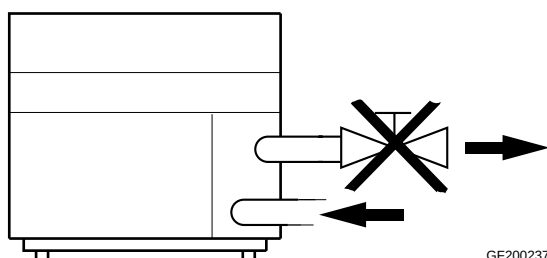
- The machine should never be allowed to run without product.
- Make sure that the machine is always fed with cleaning solution during CIP.



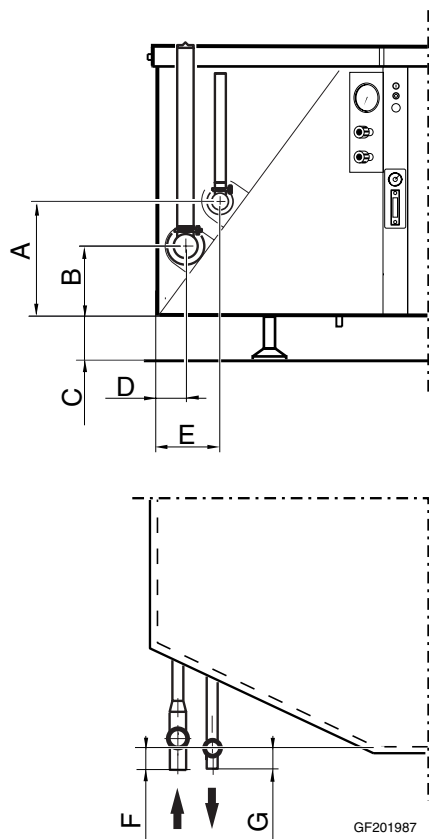
DANGER!

Risk of explosion - Immediate danger to life

- Do not install a shut off valve
- Make sure that the outlet pipes not are blocked in any way.
Due to high pressure, this will make a high risk of exploded pipes and dampers.



Product inlet - outlet



Piston diameter (Ø)

	Ø = 36, 40mm		Ø = 45, 50, 56 mm	
	mm	inch	mm	inch
A	409	16.1"	403	15.9"
B	242	9.5"	233	9.2"
C	125-150	4.9"-5.9"	125-150	4.9"-5.9"
D	135	5.3"	127	5.0"
E	257	10.1"	249	9.8"
F	97	3.8"	24	0.9"
G	39	1.5"	53	2.1"

Tetra Pak
Tetra Pak Processing Systems

Technical Data for homogeniser

Model: Tetra Alex 25 Machine No.: T5845527172 Customer: TP Latvia

General:

Capacity: 6500 l/h	Working pressure: 250 bar	Inlet pressure: 3-10 bar	Noise reduction: ☐	Sound effect level (acc. to ISO 3748): B(A)
Altitude: <1000 m	Ambient temperature: <40 °C	Total mass: 1925 kg	Centre of gravity (a-a): 1173 mm	Sound pressure level (distance=1m): dB(A)

Wetend design:

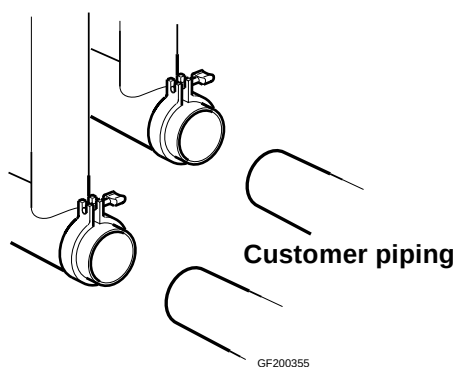
Valve design:	Piston design:	Piston packing:	Remote ind. of product pressure:
Cone ☐	stainless steel ☐	Grooved ☒	☐
Mushroom ☒	chromium plated ☒	V-packing ☐	
Ball ☐	ceramic coated ☐		
	ceramic solid ☐		

Homogenising device:
Size of 1st stroke: mm

note indication of hydraulic pressure

GF201470

Product inlet - outlet



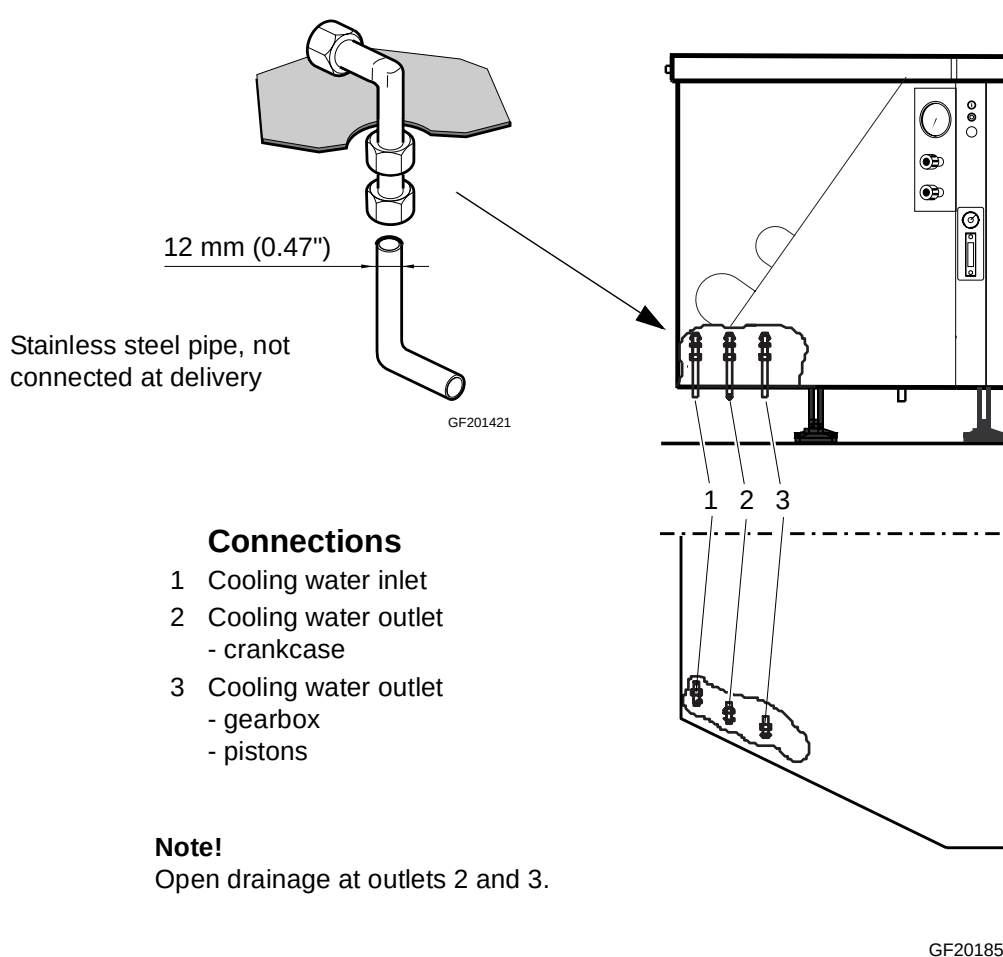
See Technical data for piston diameter (Ø)

Product pipes		Product inlet		Product outlet	
Piston diameter	mm	Ø 36, 40	Ø 45, 50, 56	Ø 36, 40	Ø 45, 50, 56
Outer diameter	mm inch	50.8 2"	76.2 3"	38.1 1.5"	50.8 2"
Pipe material thickness	mm inch	1.8 0.07"	2.2 0.09"	1.8 0.07"	1.8 0.07"

Water supply

For dimensioning pipes and drainage, see **Technical data** for consumptions.

Requirements on service media, see **Service media**.



Electrical supply

Power consumption, see **Technical data**.



WARNING!

Electrical hazard

Work to be done by authorized personnel only!

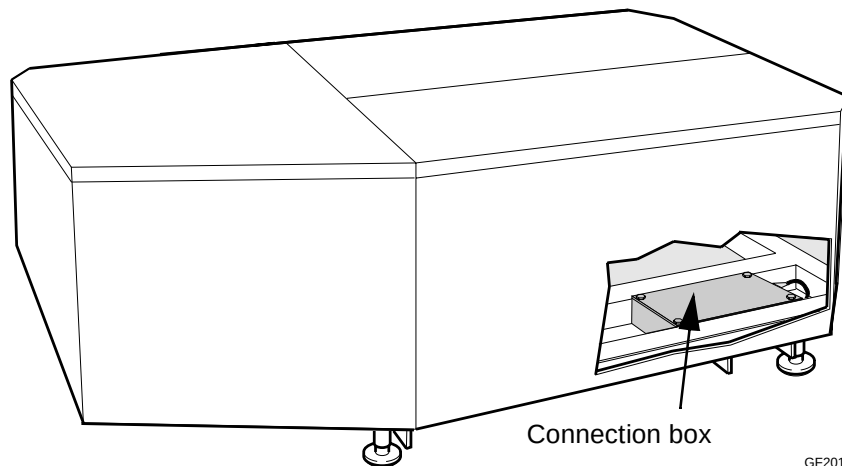
Install a mains power switch before the external starter panel.



DANGER!

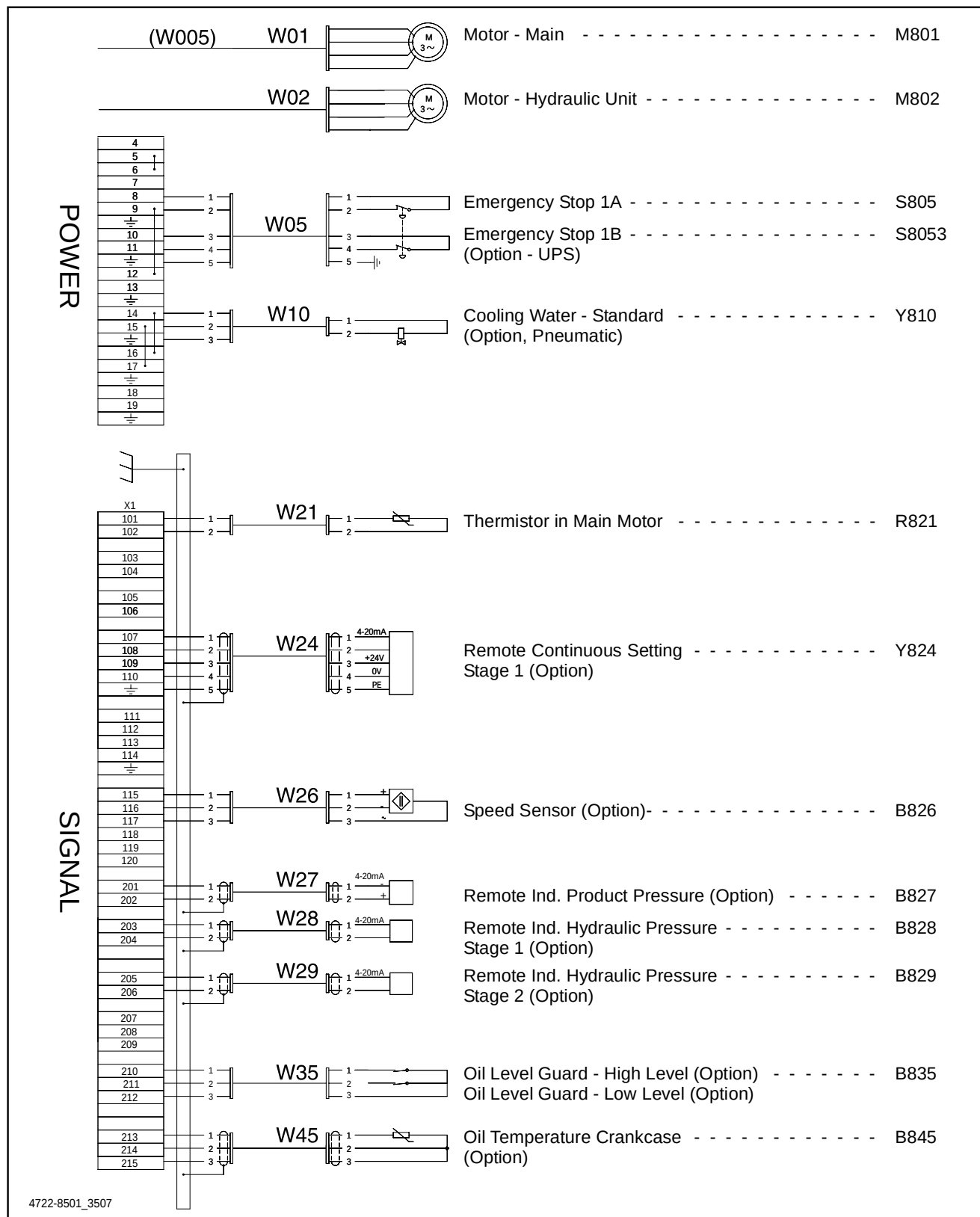
Before starting the machine, make sure that:

- all cables are undamaged
- the cables are correctly connected



GF201469

Wiring diagram



Installation instructions

Requirements on personnel

- Certified according to local regulations

Caution! Unauthorized personnel

Operation by unauthorized personnel may endanger personnel and property



GF000009

Storage

Temperatures: +10°C - +40°C (+50°F - +104°F)

Humidity: 20% - 85%

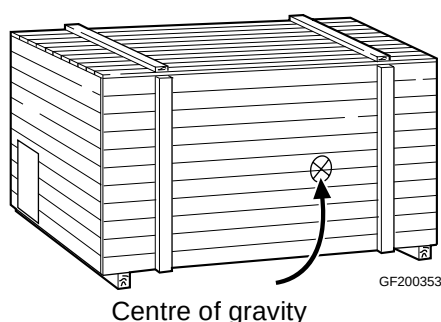
Avoid storage in the same facilities as open drums with cleaning solutions due to risk for corrosion.

Caution! Noncompliance with requirements may damage the equipment!

Unloading and transportation

Observe the signs 'centre of gravity'.

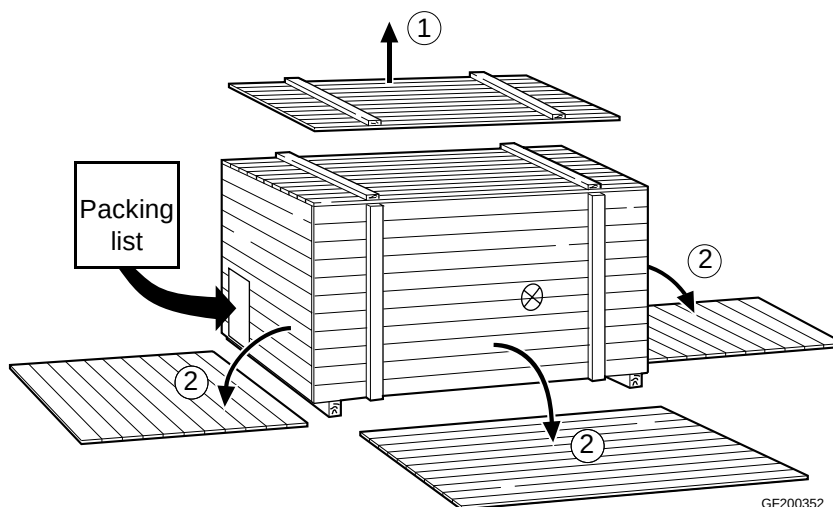
The weight is marked on the crate.



Unpacking and inspection

- Check the equipment against the packing lists attached to the crates.
- Report any damage to Tetra Pak immediately.

Note! If a mobile crane must be used to position the machine, position the crate before unpacking.

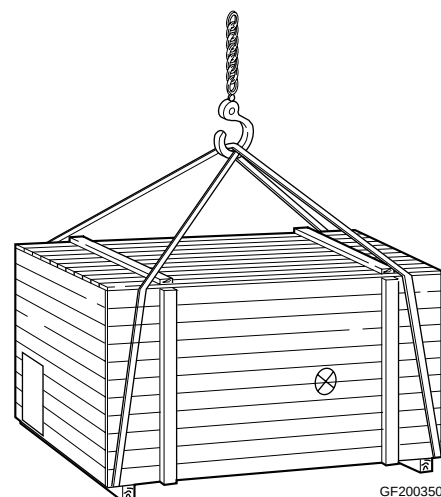
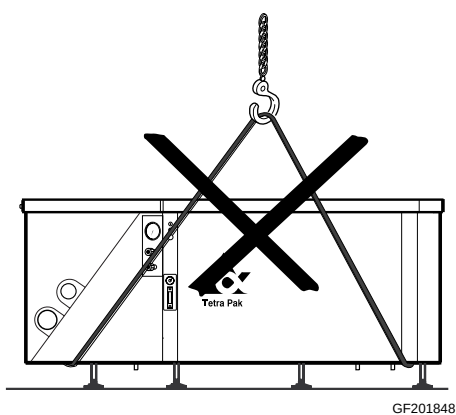


Positioning and erection

See **Technical data** for weight and centre of gravity.

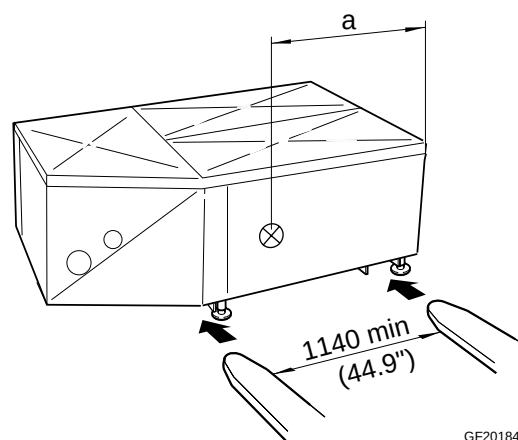
Caution! Lifting with crane

Do not attach strings directly to the machine, use the export packing.

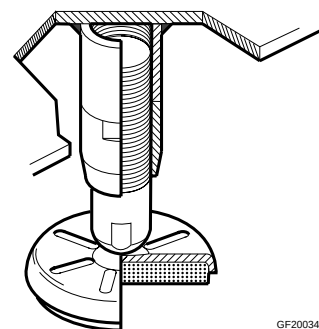


Caution! Lifting with fork lift truck

Observe the centre of gravity, see **Technical data** for **a**.



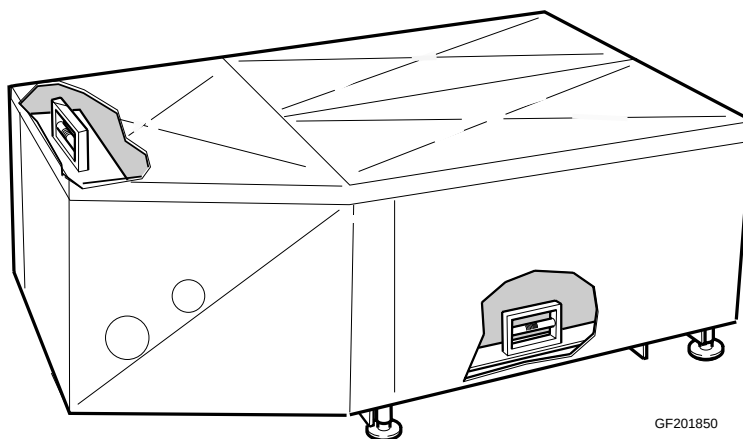
- Put the machine on the floor plates (Included in delivery)



Level the machine

Measure the level of the machine with a machinists level:

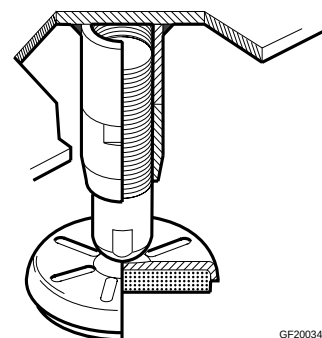
- side ways: on the pump block
- length ways: on the frame, right side



Adjust the level by turning the ball feet.

Note! In order to minimize vibrations:

- keep distance between machine and floor as low as possible
- tighten all ball feet equally against the floor

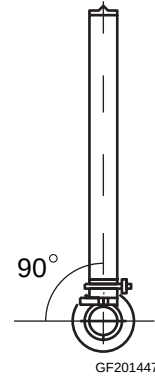


2.2tf201551.en

Pulsation dampers

(Used to level out pressure variations).

Adjust to vertical position.

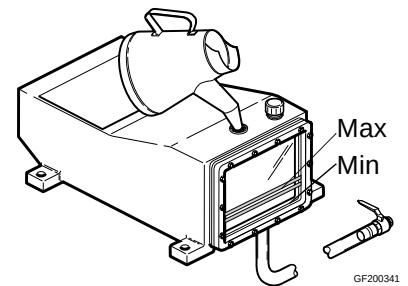
**Put oil in the crankcase**

Caution! Running the machine without oil will cause damage to the crankshaft.

The crankcase is at delivery empty of oil.
Top up to the Max. level marked on the sight glass.

(The gearbox and the hydraulic unit are at delivery filled with oil).

For oil type and oil amount, see **Lubrication**.

**Connect**

- product supply
- service media supply
- electric power

according to **Preparatory work**

This page intentionally left blank

2.2tf201571.en

Lubrication

Recommended oil

Crankcase

Recommended oil: Transmission oil of mineral type, viscosity* 220

TP No.: 90296-0073

Producer	Type	Viscosity*
BP	Energol GR-XP 220	220
Mobil	Mobilgear 630	220
Shell	Omala 220	220

Gearbox

Recommended oil:

Transmission oil of mineral or synthetic type, viscosity* 320

TP No.: 90296-0076 (Mineral)

Producer	Type	Viscosity*
BP	Energol GR-XP 320 (Mineral)	320
Mobil	Mobilgear 632 (Mineral)	320
Shell	Omala 320 (Mineral)	320
BP	Energol HTX (Synthetic)	320

Hydraulic unit

Recommended oil: Hydraulic oil, viscosity* 68

TP No.: 90296-0081

Producer	Type	Viscosity*
BP	Bartran 68	68
Mobil	Mobil Hydraulic Oil HP 68 N	68
Shell	Tellus S 68	68

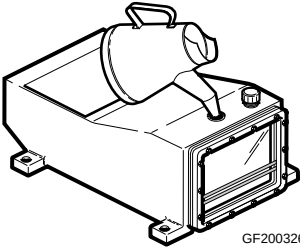
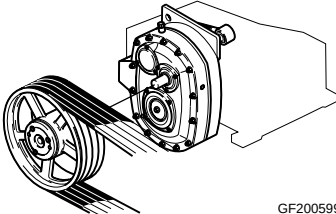
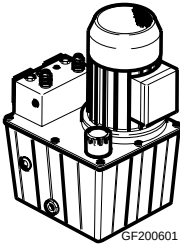
Drive motor

TP No.: 90296-0068

Producer	Type	Viscosity*
BP	Energol LS EP 1	~115
Exxon	Unirex N3	~115
Statoil	Uni Way HTC3	~115
Shell	Alvania Grease R3	~115

* Viscosity in mm²/sec (c.st) at 40°C (104°F)

Oil amount

Crankcase	Gearbox	Hydraulic unit
Approx. 28 litres (7.4 U.S. gallons)	Approx. 6 litres (1.6 U.S. gallons)	Approx. 6 litres (1.6 U.S. gallons)
 GF200326	 GF200599	 GF200601

2.2tf201939.en

Check after installation

Safety

Check:

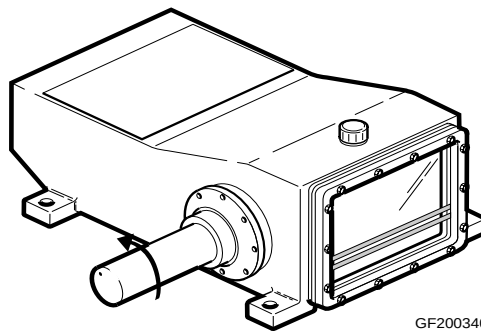
- All cables for damage
- That all cables are connected correctly
- That all covers are correctly installed
- That the product outlet pipes are not blocked in any way

**DANGER!**

Failure to make these checks will cause immediate danger to life!

Check:

- Oil level in the:
 - crankcase
 - hydraulic unit
 - gearbox
- Direction of rotation for the:
 - crankcase shaft (as illustrated)
 - hydraulic pump (marked on the pump unit)



GF200340

- That product with correct feed pressure is available
- Cooling water circulation; check the drainage outlet
- That the covers are closed
- That the power consumption corresponds to the test protocol

Caution! Failure to make these checks may cause damage to the machine

This page intentionally left blank

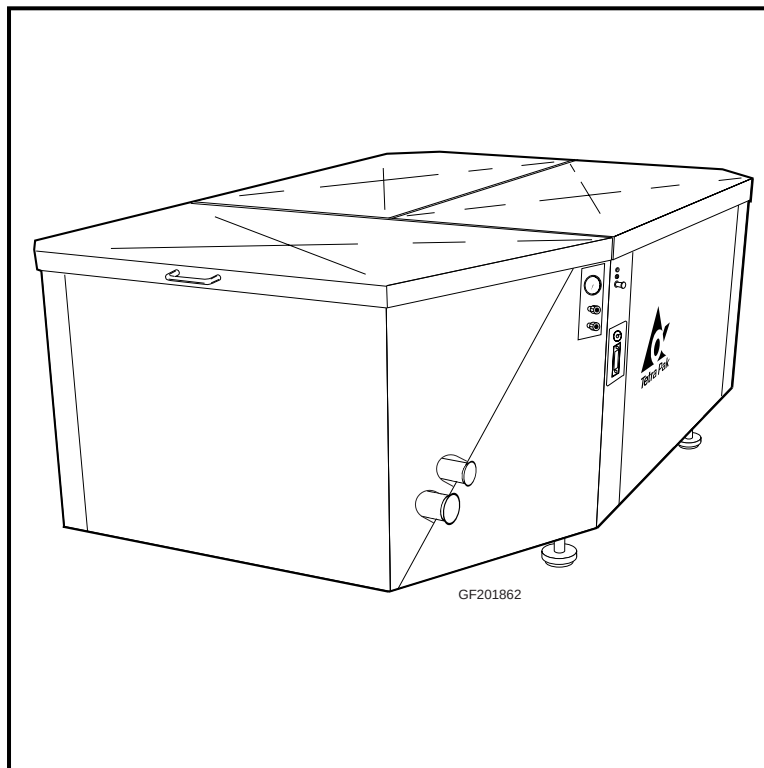
2.2tf201574.en

4 Maintenance

This page intentionally left blank

Maintenance Instructions

Tetra Alex[®] 25



2.235342-01.fro

Maintenance Instructions

Tetra Alex[®] 25

2.235342-01.fro

Doc No. TeM-1235342-01

Issue 2004-04

Tetra Pak

Tetra Pak Processing Components AB



0	INTRODUCTION	
	Service preparations	1
1	FRAME	
1.1	Covers	2
1.1-1	Covers - check	2
1.1.1-1	Gas springs - check	2
1.1.2-1	Insulation (optional) - check	2
1.2	Vibration elements	3
1.2-1	Vibration elements - check	3
2	DRIVE UNIT	
2.1	Drive motor	4
2.1-1	Drive motor - clean	4
2.1-2	Drive motor - lubricate	4
2.2	V-belts	5
2.2.1-1	V-belts - check	5
2.2.1-2	V-belts - change	6
2.2.2-1	Belt pulleys - check	6
2.3	Gearbox	7
2.3-1	Gearbox - remove	7
2.3-2	Gearbox - fit	9
2.3.1-1	Oil - check	10
2.3.1-2	Oil - change	10
2.3.2-1	Sealing rings - change	11
2.3.2-2	Vibration elements - change	11
3	CRANK CASE	
3.1	Oil	12
3.1-1	Oil - check	12
3.1-2	Oil - change	12
3.2	Oil level switch (optional)	13
3.2-1	Oil level switch - check	13
3.3	Thermometer	14
3.3-1	Thermometer - check	14
3.4	Crankshaft bearings	15
3.4-1	Crankshaft bearings - change	15

3.5	Cross head/Connecting rod	22
3.5-1	Cross head/Connecting rod - check.	22
3.6	Piston area.	23
3.6.1-1	Connections - check	23
3.6.1-2	Connections - set.	23
3.6.2-1	Bellows - check	24
3.6.2-2	Bellows - change	24
4	WET END	
4.1	Valves	25
4.1-1	Valves - disassemble	26
4.1-2	Valves - assemble	27
4.1-3	Valves - check	28
4.1.1-1	Valve seals - change	29
4.2	Piston unit	30
4.2-1	Piston unit - check	30
4.2-2	Piston unit - remove.	31
4.2-3	Piston unit - disassemble.	32
4.2-4	Piston unit - assemble	33
4.2.1-1	Piston - change	33
4.2.2-1	Piston packing - change.	33
4.3	Pressure gauge	34
4.3-1	Pressure gauge - check.	34
5	HOMOGENISATION HEAD	
5-1	Homogenisation head - check	35
5-2	Homogenisation head - remove.	36
5-3	Homogenisation head- assemble	36
5.1	Homogenisation device	37
5.1-1	Homogenisation device - disassemble	37
5.1-2	Homogenisation device - assemble.	38
5.1.1-1	Seat - check.	39
5.1.1-2	Seat - turn/change	39
5.1.2-1	Forcer - check.	40
5.1.2-2	Forcer - change.	40
5.2	Hydraulic end	41
5.2.1-1	Seals - change.	41



6	HYDRAULIC SYSTEM	
6-1	Hydraulic system - check	42
6.1	Hydraulic unit	43
6.1-1	Hydraulic unit - check	43
6.1.1-1	Oil - change	43
6.1.2-1	Hydraulic pump - change	44
6.1.3-1	Safety valve - check	45
6.2	Pressure gauge	46
6.2-1	Pressure gauge - check	46
6.3	Pressure relief valve (optional)	47
6.3-1	Pressure relief valve - check	47
7	COOLING WATER SYSTEM	
7.1	Piping	49
7.1-1	Piping - check	49
7.3	Regulating valves	50
7.3-1	Regulating valves - check	50
7.4	Water valve	51
7.4-1	Water valve - check	51
7.7	Cooling water regulator (optional)	52
7.7-1	Cooling water regulator - check	52
7.8	Flow meter (optional)	53
7.8-1	Flow meter - check	53
8	ELECTRICAL SYSTEM	
8-1	Wiring diagram	54
8.1	Cables	55
8.1-1	Cables - check	55
8.2	Electrical cabinet (optional)	56
8.2.1-1	Cooling fan filter - change	56
8.3	Temperature transmitter (optional)	57
8.3-1	Temperature transmitter - check	57
8.4	Emergency stop	58
8.4-1	Emergency stop - check	58



9	MISCELLANEOUS	
9.1	Tools	59
9.2	Lubrication	61
	Recommended oil	61
	Oil amount	62
9.3	Torque specifications	63
9.4	Trouble shooting	64

3

0 Introduction

Service preparations

Before starting any maintenance work do as follows:

- Turn off main power and lock the main power switch in off position.
- Depressurize the hydraulic system
 - Open the pressure adjusting valve in the hydraulic control device (in the two-stage version - open both valves)
- Close the shut-off devices in the product inlet pipes
- Close the cooling water inlet
- Remove the cladding

Note! When working with parts in contact with product, rinse and clean all parts before dismantling.



WARNING!

Risk of personal injury

After each service, always make sure that all covers are installed

1 Frame

1.1 Covers

1.1-1 Covers - check

Check that the covers are undamaged and fit properly.

Check that the lock nuts for the hinges are tightened.

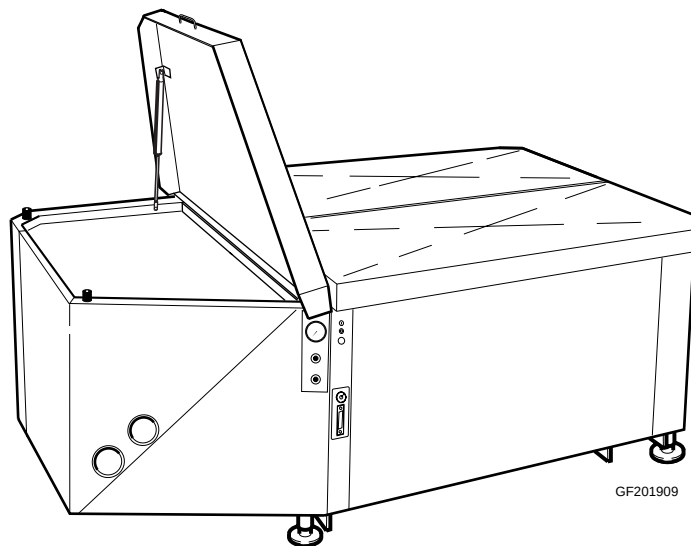
1.1.1-1 Gas springs - check

Check the function of the gas springs.

Check that the lock nuts for the gas springs are tightened.

1.1.2-1 Insulation (optional) - check

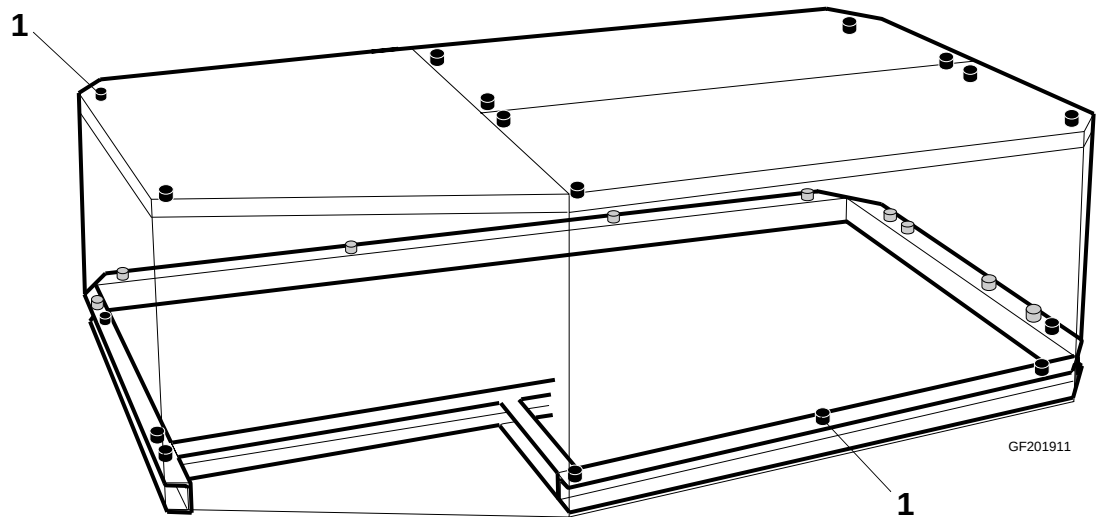
Check that the insulation material in the covers are not damaged and properly fitted.



1.2 Vibration elements

1.2-1 Vibration elements - check

Check all vibration elements (1) for wear, replace any defective.



2.2tf201678.en

2 Drive unit

2.1 Drive motor

2.1-1 Drive motor - clean

Check and if necessary clean the drive motor cooling fan (1) with compressed air.

2.1-2 Drive motor - lubricate

Use an alemite gun to lubricate the nipples (2) for the bearings.

Note! Lubricating should be done during running; otherwise grease may penetrate into the motor through the sealing.



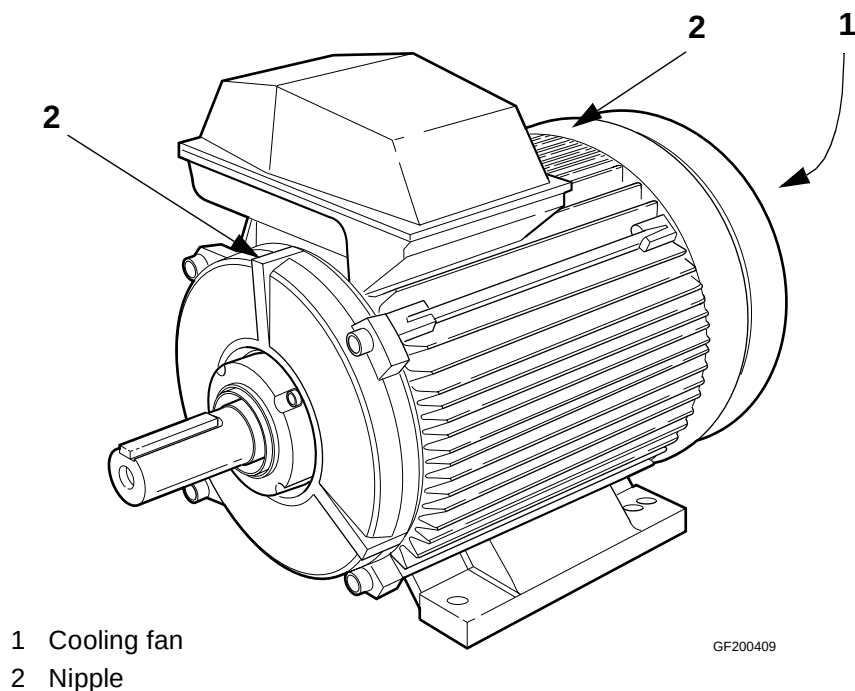
WARNING!

Risk of jam

Make sure to stay clear from V-belts and belt pulleys

If lubrication is done at standstill, do not fill all at one time. Run the motor at least once between the fillings.

See **Lubrication** for recommended type of grease.



2.2 V-belts

2.2.1-1 V-belts - check

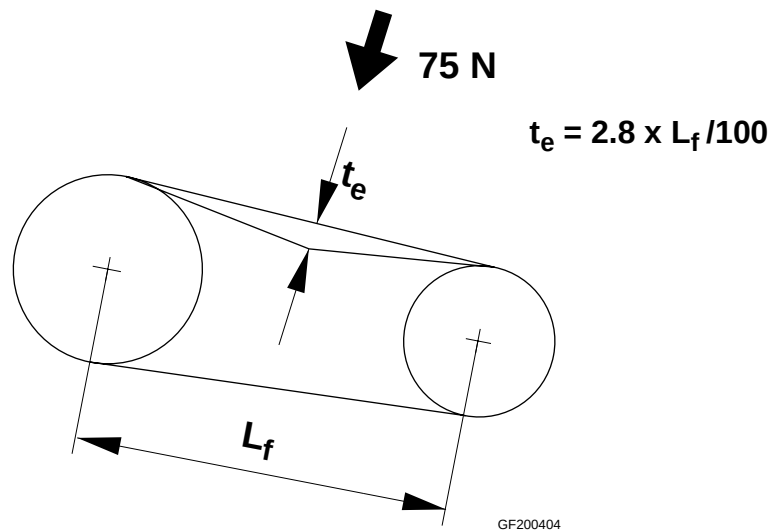
Check if the belts are worn. Replace any worn belt, see 2.2.1-2

Check the belt tension as follows:

- measure the distance L_f .
- apply a force of 75 N at one of the belts and measure the deflection t_e .

Adjust the belt tension until $t_e = 2.8 \times L_f / 100$.

Note! An incorrectly tensioned V-belt will wear out quickly.



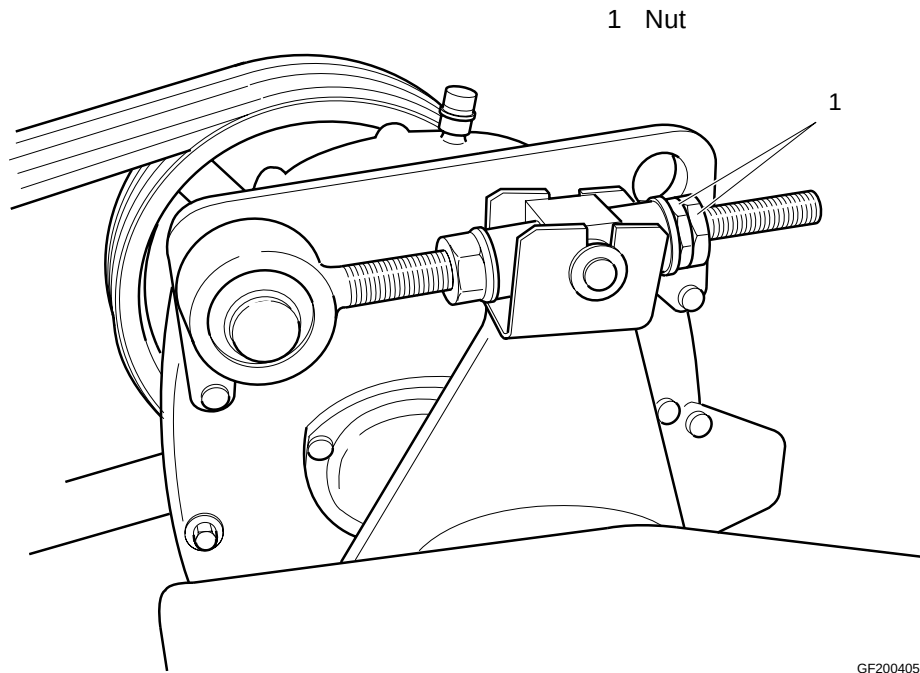
2.2.1-2 V-belts - change

Always replace all belts at the same time

Loosen the nuts (1) for the adjusting bolt and remove the V-belts.
Fit new V-belts by hand.

Caution! Do not use tools that can damage the V-belts

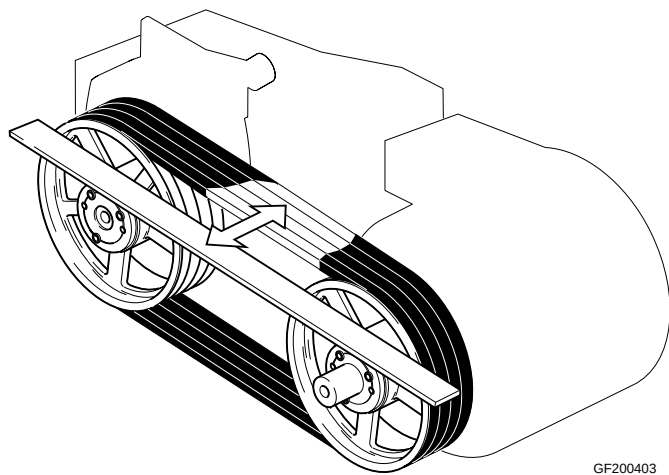
Adjust the belt tension.



2.2tf201643.en

2.2.2-1 Belt pulleys - check

Check with a ruler that the belt pulleys on the drive motor and gearbox are aligned.



2.3 Gearbox

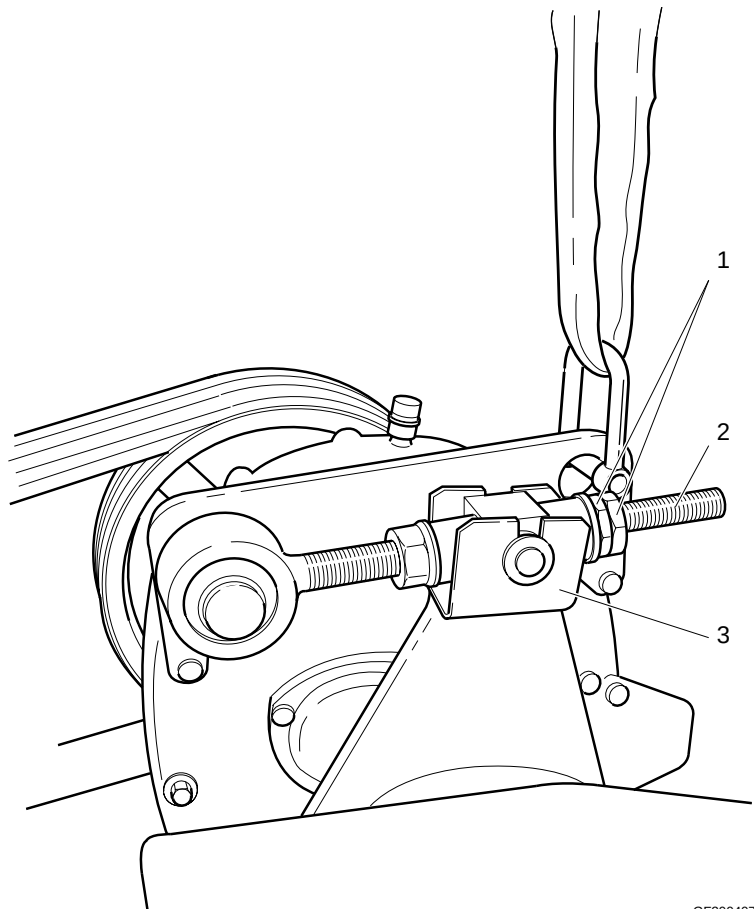
2.3-1 Gearbox - remove

Disconnect the cooling water hoses from the gear box.

Attach a sling to the gear box and hook it up to the lifting device. Undo the nuts (1), lower the gear box until the adjusting bolt (2) is free from the torque arm (3).

Remove the V-belts according to 2.2.1-2.

- 1 Nut
- 2 Adjusting bolt
- 3 Torque arm



GF200407

(Cont'd)

(Cont'd)

Depending on the dimension for the belt pulley (6), it may be necessary to remove it in order to remove the lid (4).

If needed, expand the slot (5) in the belt pulleys bushing in order to remove it from the shaft/key.

Remove the lid (4).

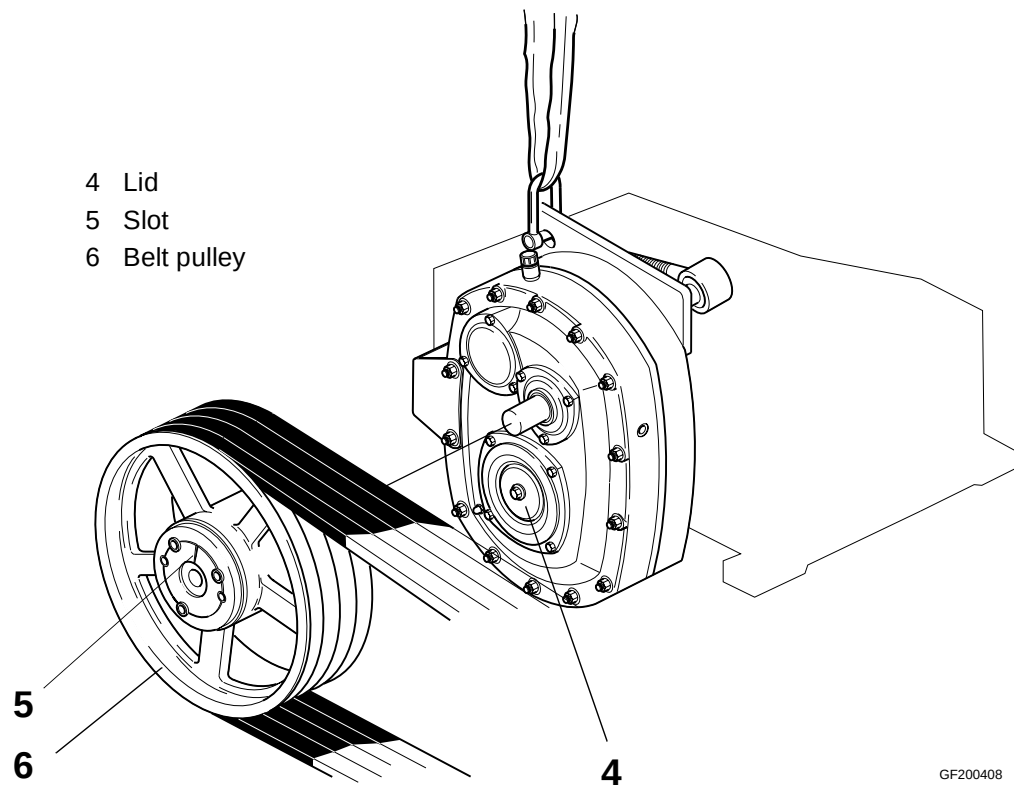
Position the lifting device above the gearbox and remove the slack from the sling.

Push/pull out the gearbox.

- Hydraulic tool to press out the gear box may be needed.

Caution! Risk of jam.

Remove the spacer sleeve from the crankshaft.



2.3-2 Gearbox - fit

Install the sleeve to the crank shaft.

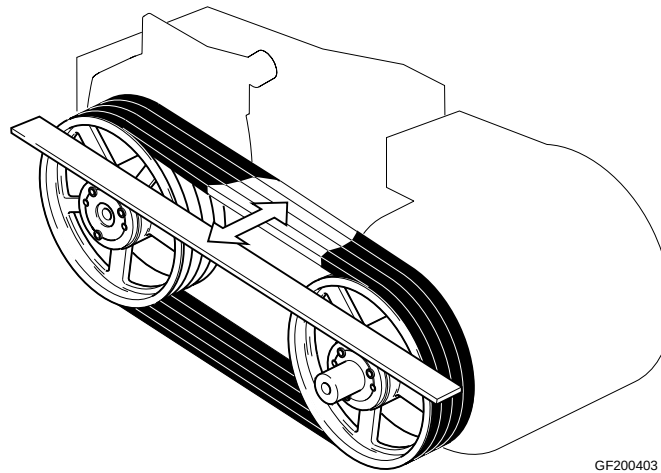
Apply some Molycote (grey) on the shaft and the key before installing the gearbox.

Install the lid, apply some Locktite 242 on the screw.

Install (if removed) the belt pulley.

Align the belt pulley to the drive motors belt pulley.

Lock the bushing with the correct torque. See **Torque specifications**.



Install the V-belts, the belt tensioner and set the belt tension, see **V-belts**.

Fit the cooling water hoses to the gearbox.

Install the cladding.

2.3.1-1 Oil - check

Unscrew the drain plug (2) and check for water in the oil. Drain until all water is drain from the gear box.

Top up with oil. Type of oil, see **Lubrication**.

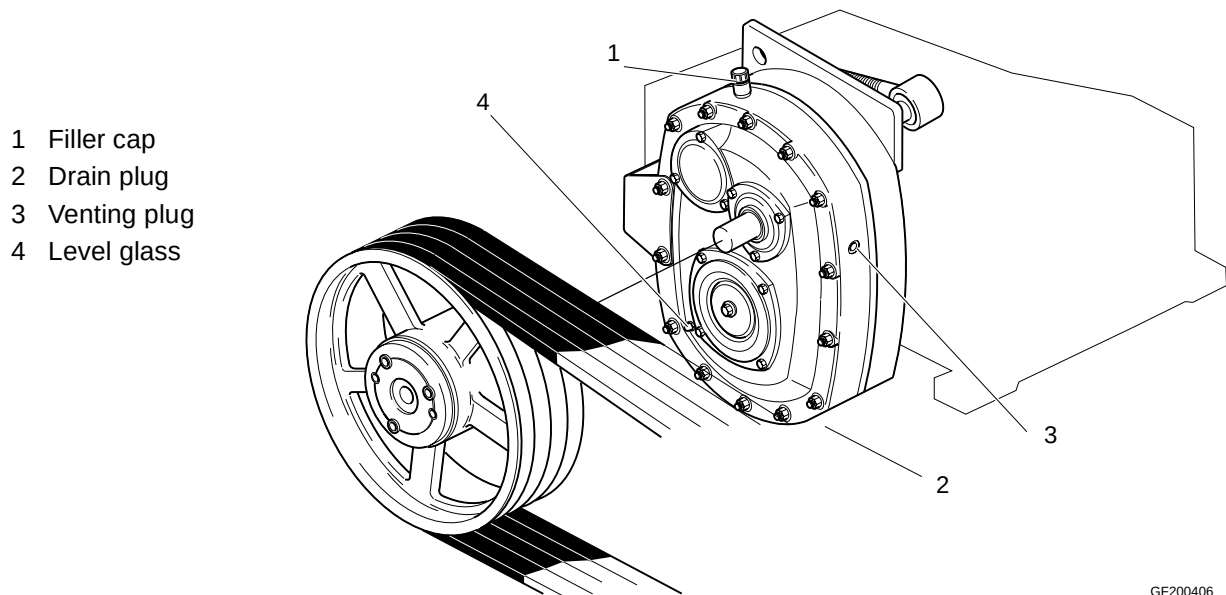
2.3.1-2 Oil - change

Remove the filler cap (1). Unscrew the drain plug (2) and drain the oil. Refit the plug.

Remove the venting plug (3) and fill up with oil.

Refit the venting plug.

Type of oil, see **Lubrication**.



2.3.2-1 Sealing rings - change

Remove the gearbox according to 2.3-1.

Remove and replace the sealing rings for the in- and out going shafts.

Install the gearbox according to 2.3-2.

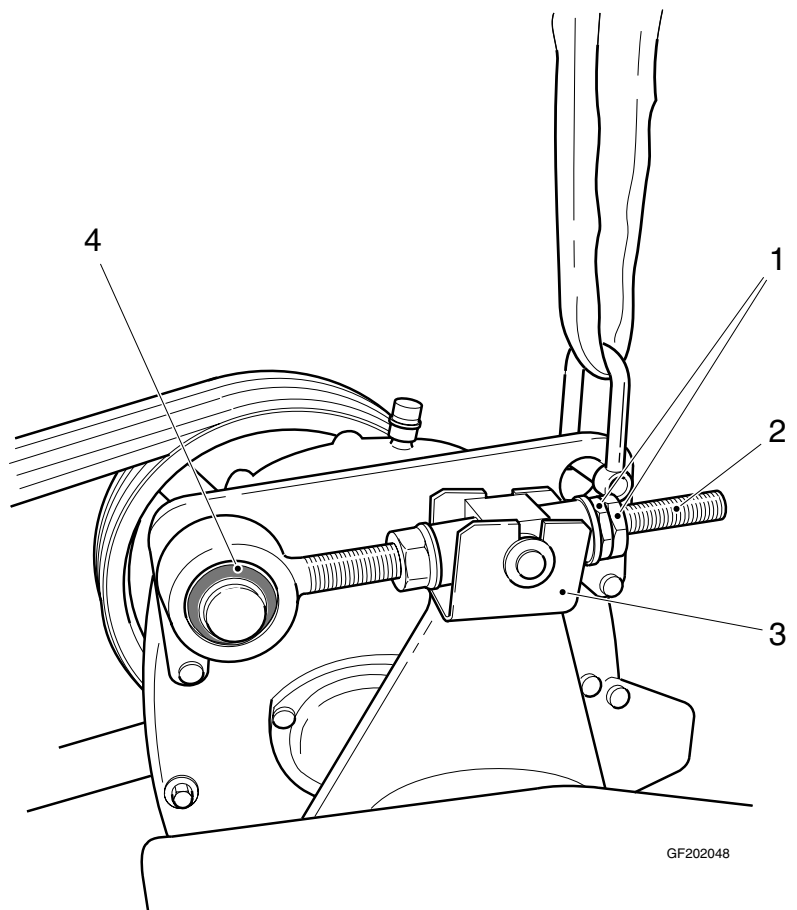
2.3.2-2 Vibration elements - change

Attach a sling to the gear box and hook it up to the lifting device. Undo the nuts (1), lower the gear box until the adjusting bolt (2) is free from the torque arm (3).

Replace the vibration element (4).

Adjust the belt tension, see **V-belts**.

- 1 Nut
- 2 Adjusting bolt
- 3 Torque arm
- 4 Vibration element



3 Crank case

3.1 Oil

3.1-1 Oil - check

Check if there is any water in the oil. Drain off any water through the drain hose.

Check that the oil level is between the min and max marks. Top up if necessary. Type and amount of oil, see **Lubrication**.

3.1-2 Oil - change

Open the drain valve (1) and drain all oil from the housing.

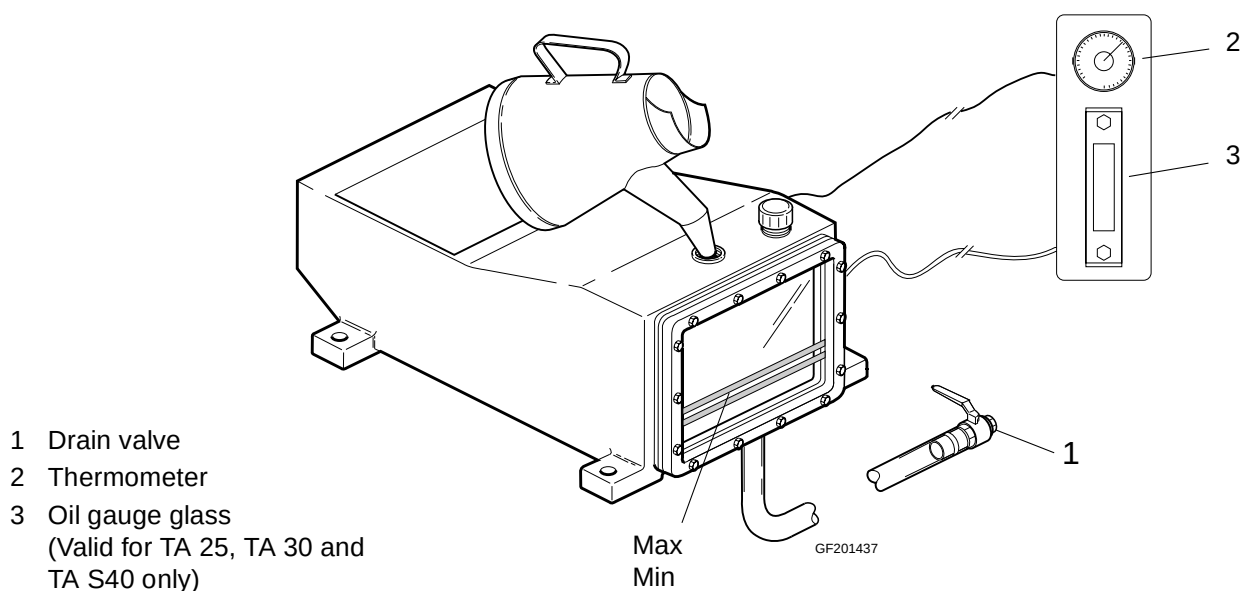
Before filling with oil, check the oil level switch (optional) according issue 3.2-1

Close the drain valve and fill up with new oil.

- Check that the oil gauge glass (3) indicates correct level.
(Valid for TA 25, TA 30 and TA S40 only)
If fault, check oil pipe for blockage or damage.

Note! Bleed the drain hose.

Type and amount of oil, see **Lubrication**.

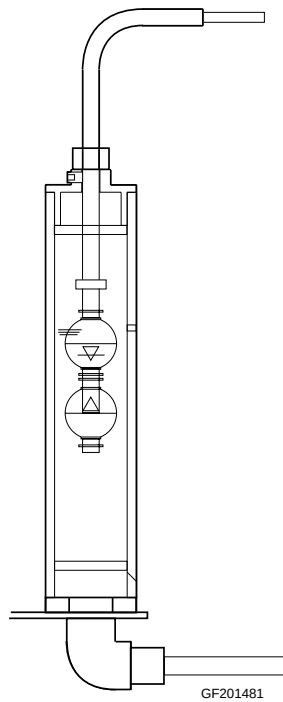


3.2 Oil level switch (optional)

3.2-1 Oil level switch - check

When filling the crank case with oil, check that signals for low- and high level are achieved.

See 8-1 Wiring diagram for connections.



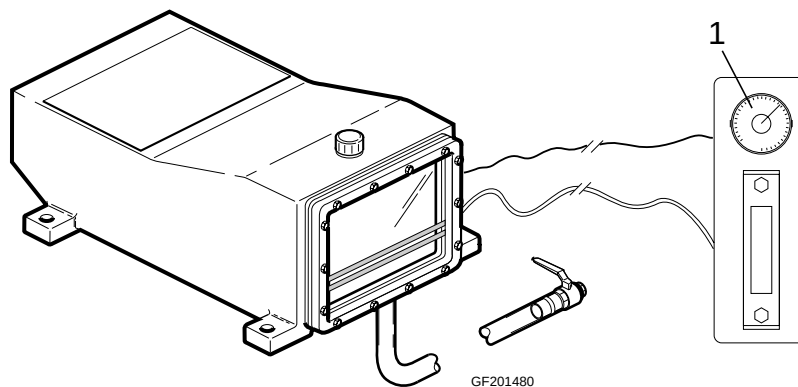
3.3 Thermometer

3.3-1 Thermometer - check

Check function of thermometer (1).

Temperature transmitter (optional), see issue 8.3.

Note! Max oil temperature at running: 55 °C



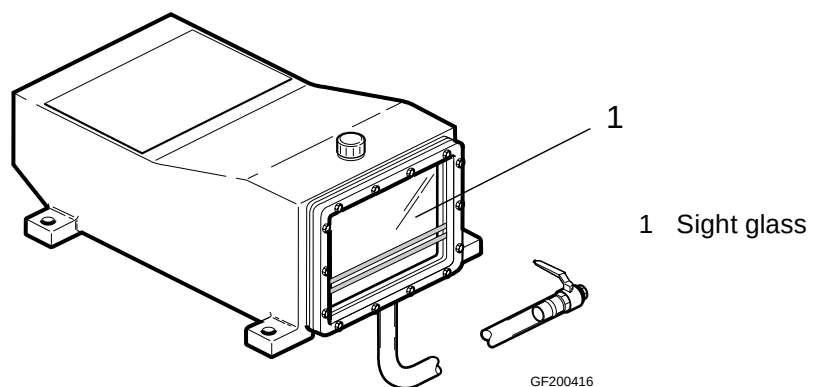
3.4 Crankshaft bearings

3.4-1 Crankshaft bearings - change

Remove:

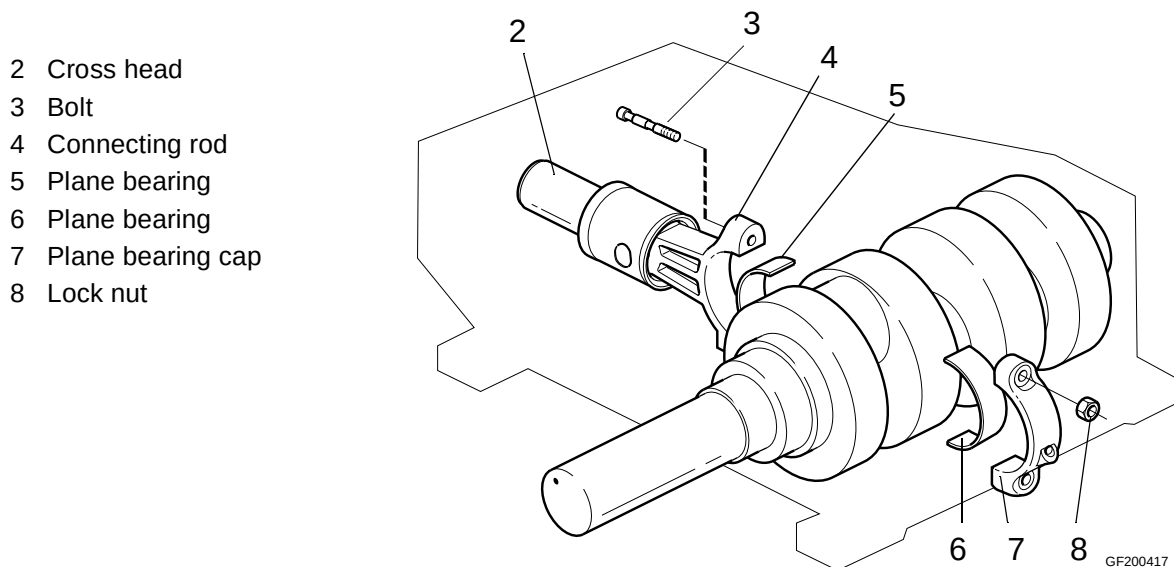
- the bellows,
- the drive motor; if necessary,
- the V-belts,
- the gearbox.

Drain the crankcase oil and remove the sight glass (1).



Remove the lock nuts (8) and the bolts (3) from the connecting rod (4). Push the cross head (2) forward and lock it in this position by help of the grub screw.

Remove the plane bearing cap (7) and the plane bearings (5) and (6).

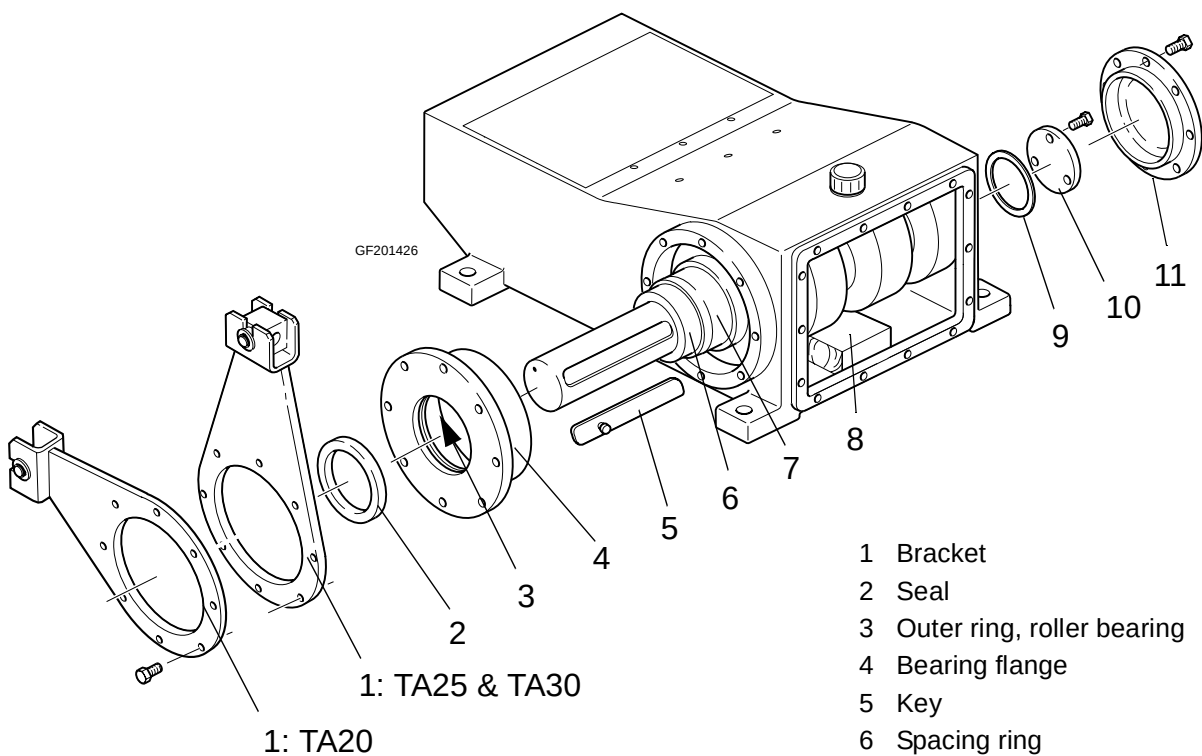


(Cont'd)

(Cont'd)

Support the crankshaft by a piece of wood (8) and remove:

- a) the bearing flange (11); put two bolts in the threaded holes and press out the bearing flange,
- b) the lid (10),
- c) the ring (9) for the roller bearing,
- d) the torque arm (1),
- e) the bearing flange (4); the seal (2) and the outer ring of the roller bearing (3) comes out with the bearing flange,
- f) the key (5) by help of a screw,
- g) the spacing ring (6).



- 1 Bracket
- 2 Seal
- 3 Outer ring, roller bearing
- 4 Bearing flange
- 5 Key
- 6 Spacing ring
- 7 Inner ring, roller bearing
- 8 Support (wood)
- 9 Ring, roller bearing
- 10 Lid
- 11 Bearing flange

2.2tf201918.en

(Cont'd)

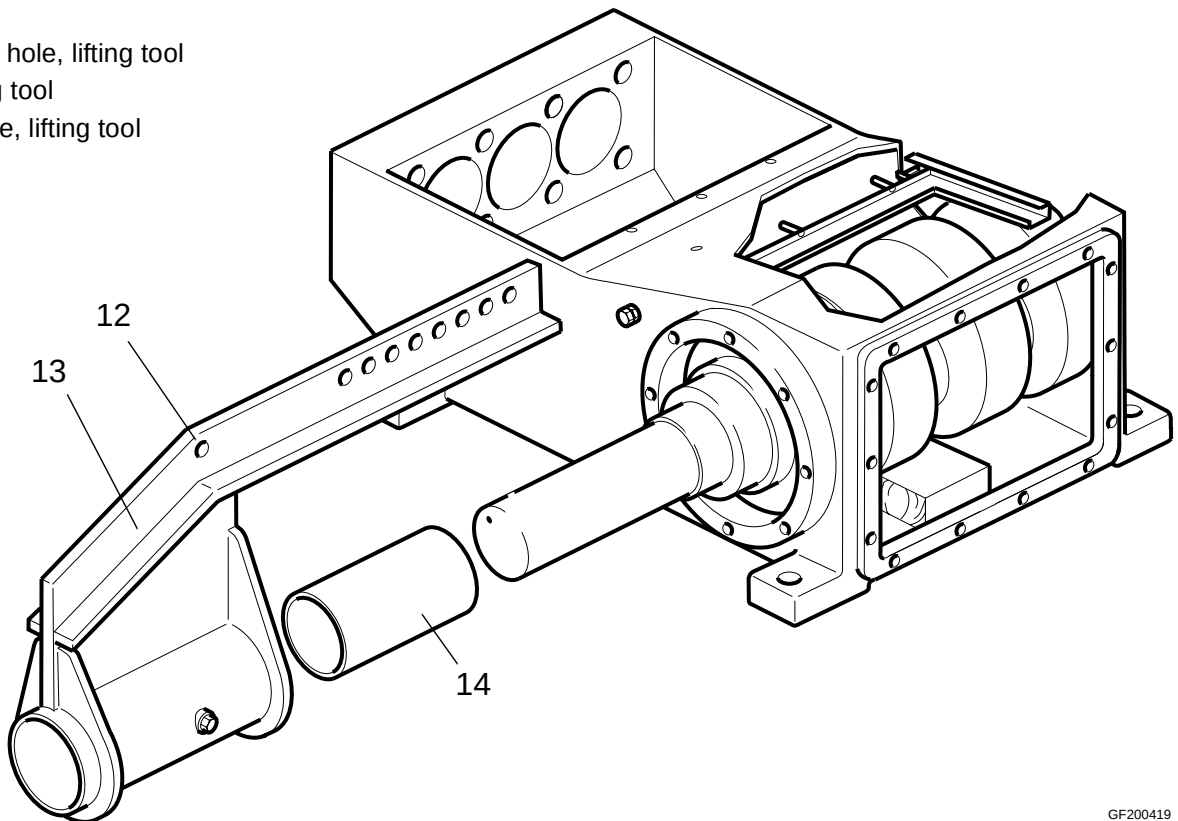
(Cont'd)

Fit the right sleeve (14) in the lifting tool (13).

Apply some grease, Molycote (grey), to the shaft before fitting the lifting tool (13).

Use the outer hole (12) for the lifting device when fitting the lifting tool to the crankshaft.

- 12 Outer hole, lifting tool
- 13 Lifting tool
- 14 Sleeve, lifting tool



GF200419

(Cont'd)

(Cont'd)

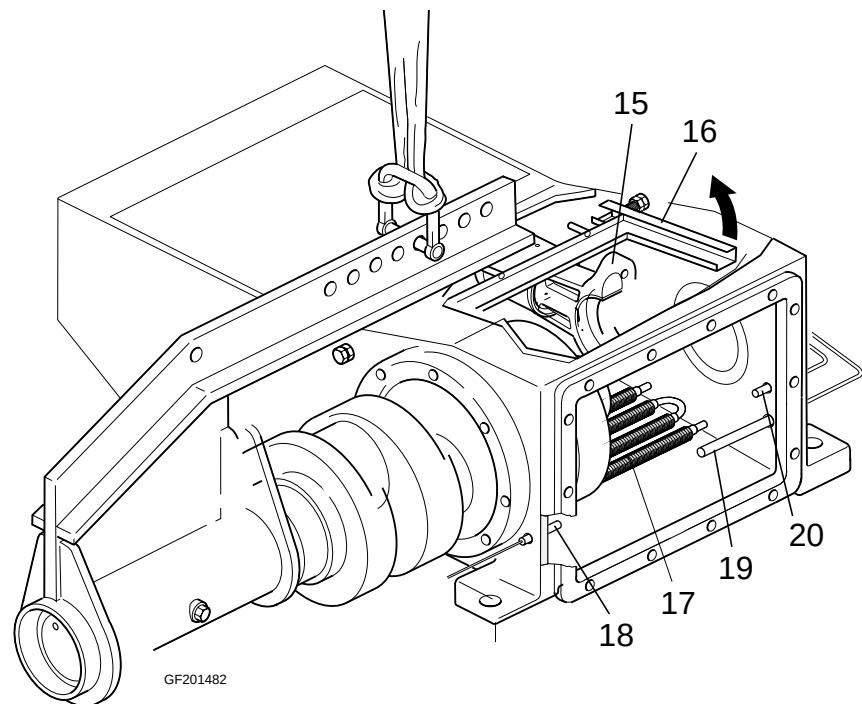
Remove the slack from the sling and remove the crankshaft.

Note! Take care not to damage the sensors (18, 19, 20).

Note! Make sure the crankshaft freely passes:

- the connecting rod (15),
- the oil distributor (16); If needed, lock the oil distributor in its top position,
- the cooler (17).

- 15 Connecting rod
- 16 Oil distributor
- 17 Cooler
- 18 Temperature transmitter (optional)
- 19 Sensor for cooling water regulator (optional)
- 20 Sensor for thermometer

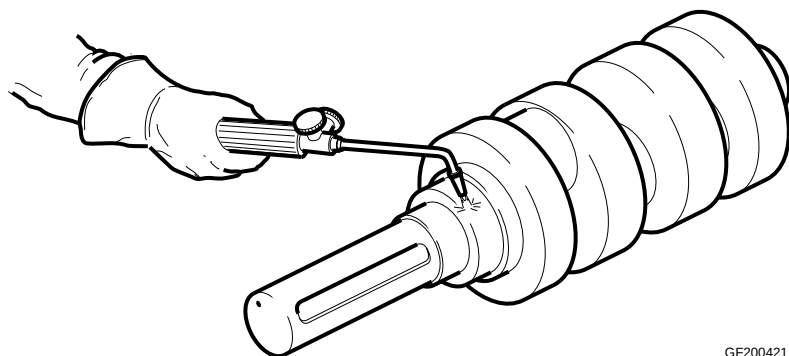


2.2tf201918.en

Replacing roller bearings

Put the crankshaft on a suitable support and heat the roller bearings inner ring evenly by help of a welding torch and pull them of the shaft. If required, knock lightly with a hammer to loosen the rings.

Caution! Wear heat protective gauntlets. .



GF200421

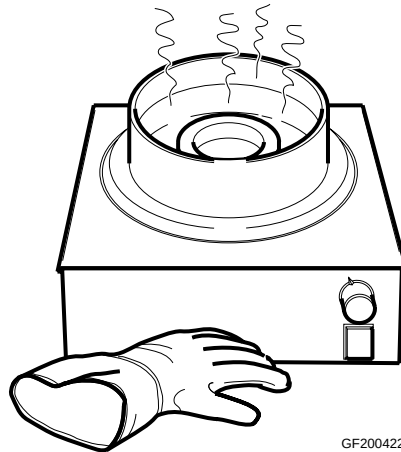
(Cont'd)

(Cont'd)

Clean the ring seat. If required, smooth the ring seat surface with oil stone and rub sparingly with Molycote (grey).

Heat the new inner rings in oil bath to approximately 80°C, slip them up to their seats and let them cool down.

Caution! Wear heat protective gauntlets.

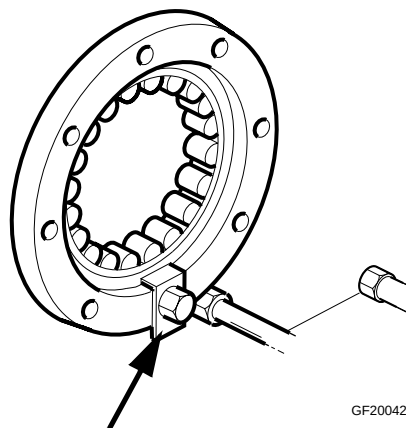


Note! Before installing the crankshaft:

- check the cross head and the connecting rod, activity 3.5-1

Fitting, crankshaft

Fabricate and install a support for the roller bearing before installing the crankshaft.



Replace:

- the seal for the bearing flange,
- the O-rings.

Rub parts with Molycote (grey) and install in reverse order.

(Cont'd)

(Cont'd)

Fitting, plane bearings

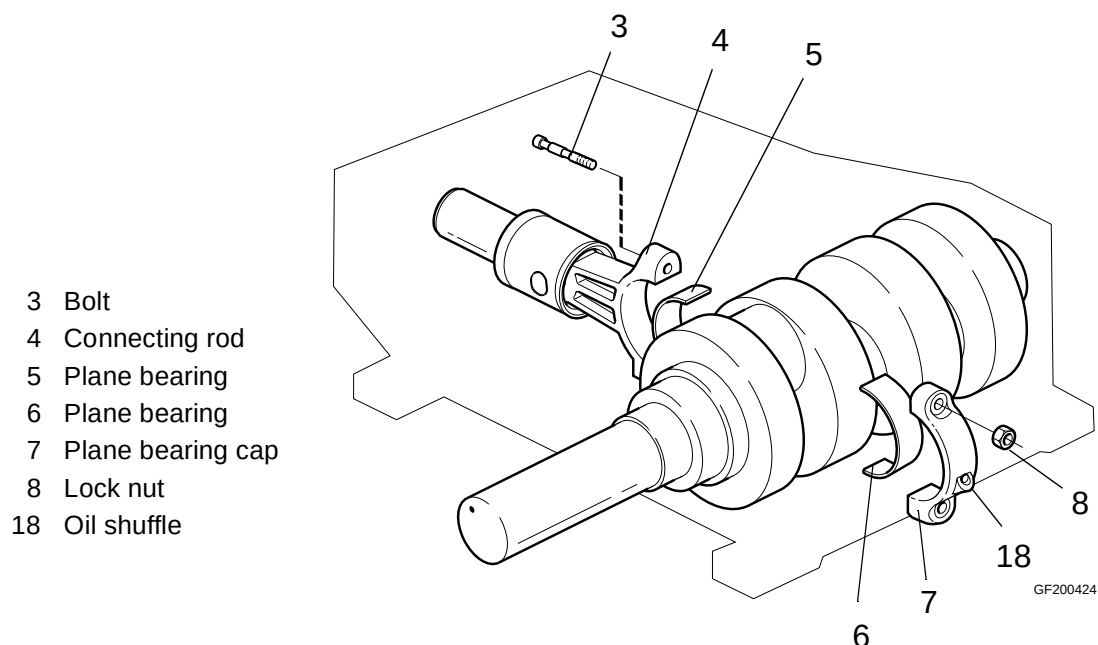
Clean and oil the plane bearings. Fit the plane bearing (5) to the connecting rod (4).

Fit the plane bearing cap (7) and the plane bearing (6) to the crankshaft and push back the connecting rod.

Note! Oil shuffle (18) turned as illustrated; oil-groove opposite the oil inlet hole.

Fit the bolts (3) and install new lock nuts (8). Tighten them evenly before applying the right torque. See **Torque specifications**.

Check that the crankshaft can be turned smoothly and without any un-normal noise.



2.2tf201918.en

(Cont'd)

(Cont'd)

Set/clean the oil distributor

Note! In order to ensure proper lubrication for the cross heads, cross head pins and connecting rods, the oil distributor (16) must be free from deposits and be correctly set.

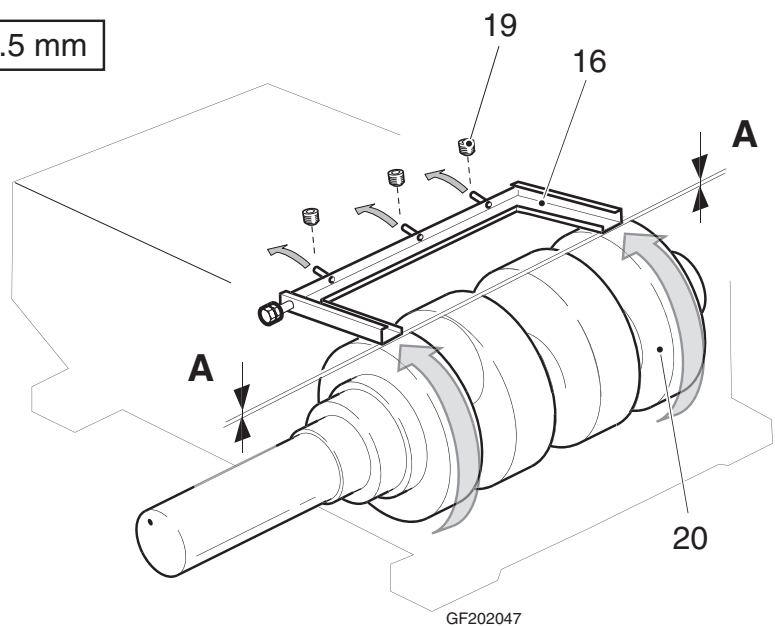
Clean the oil distributor. Make sure that the distributor pipes not are clogged.

Adjust the gap **A** between the oil distributor (16) and the cam (20) according figure. Same gap at both sides.

Check the oil distribution while running.
Remove the three plugs (19) to inspect.

$$A = 1.5 \pm 0.5 \text{ mm}$$

- 16 Oil distributor
- 19 Plug
- 20 Cam

**Install:**

- the bellows,
- the drive motor, if removed,
- the gearbox,
- the V-belts.

Clean and install the sight glass. Refill the crankcase oil.

3.5 Cross head/Connecting rod

3.5-1 Cross head/Connecting rod - check

Remove the crankshaft.

Check for play between the pin (8), cross head (3) and the bushing (9).

If the bushing is worn, replace the connecting rod (5) and base bearing cap (6). The new connecting rod is delivered with the bushing installed.

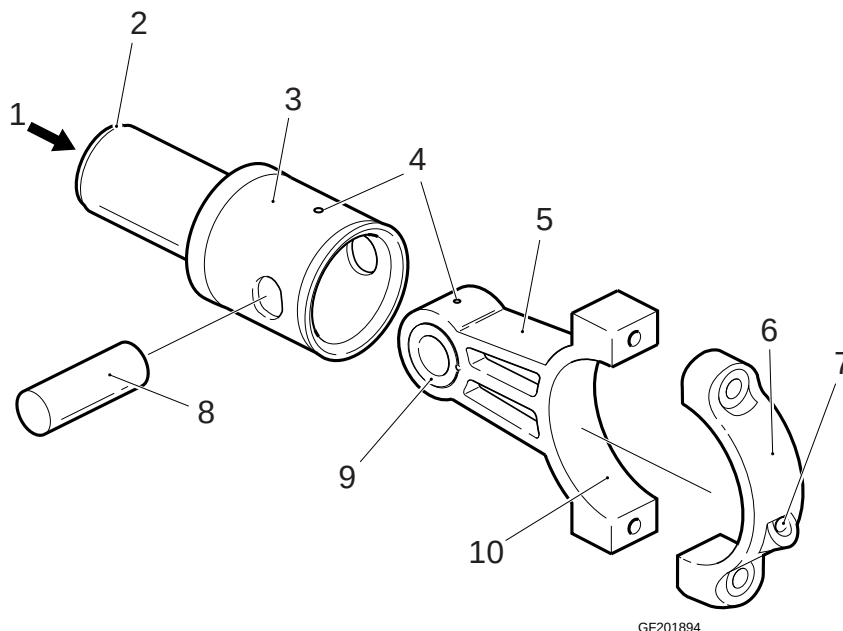
Check for the cross head:

- that the groove (2) for the bellows is intact,
 - that the threads in the three holes (1) not are damaged.
- If needed, replace with Helicoil.

Caution! When installing, make sure that:

- the oil holes (4) in crosshead and connecting rod are turned upwards
- the base bearing cap (6) is fitted to the correct connecting rod (5) (they are fabricated in pair)
- there is free passage for the oil when fitting the base bearing to the base bearing cap
- the base bearing cap is turned with the oil shuffle (7) heading upwards, as illustrated

- 1 Threaded hole
- 2 Groove
- 3 Cross head
- 4 Oil hole
- 5 Connecting rod
- 6 Base bearing cap
- 7 Oil shuffle
- 8 Pin
- 9 Bushing
- 10 Base bearing surface



2.2tf201598.en

3.6 Piston area

3.6.1-1 Connections - check

Clean the area and check that there is no gap between the piston (1) and the crosshead (10):

- during production:
 - a gap results in a hammering noise,
- during stand-still:
 - check by jerking the piston back and forth by hand.

3.6.1-2 Connections - set

Removal

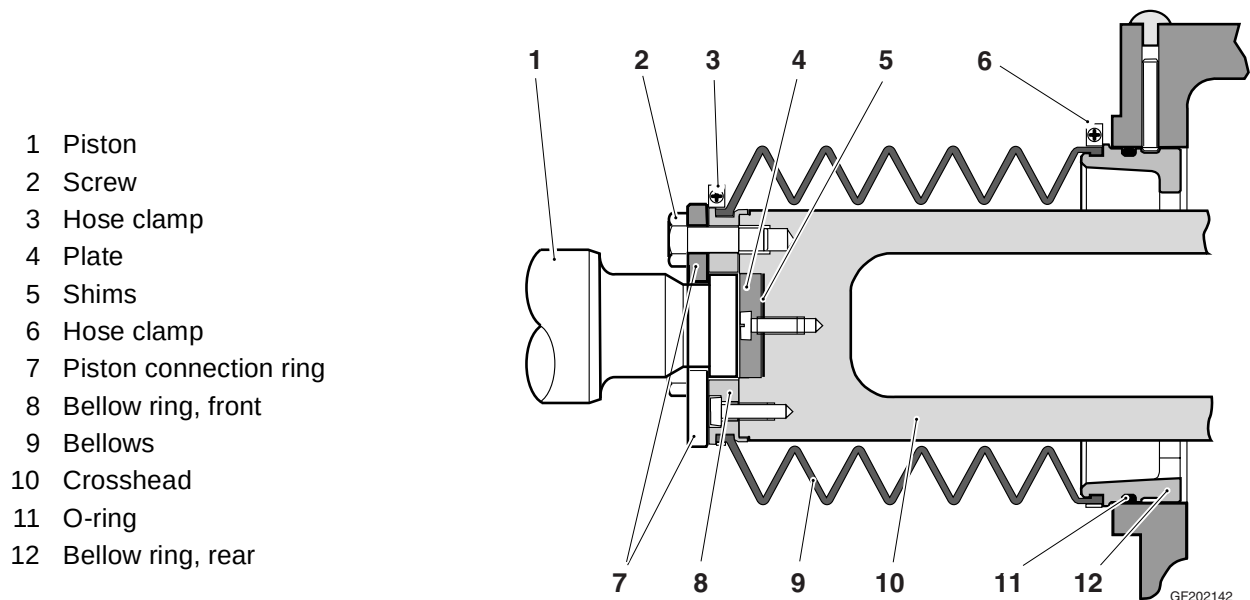
Cover the drain hole in the bottom of the crank case.

Inch the machine by hand until the piston (1) is in its back end position.

Remove the three screws (2) and slide the piston connection ring (7) over the piston.

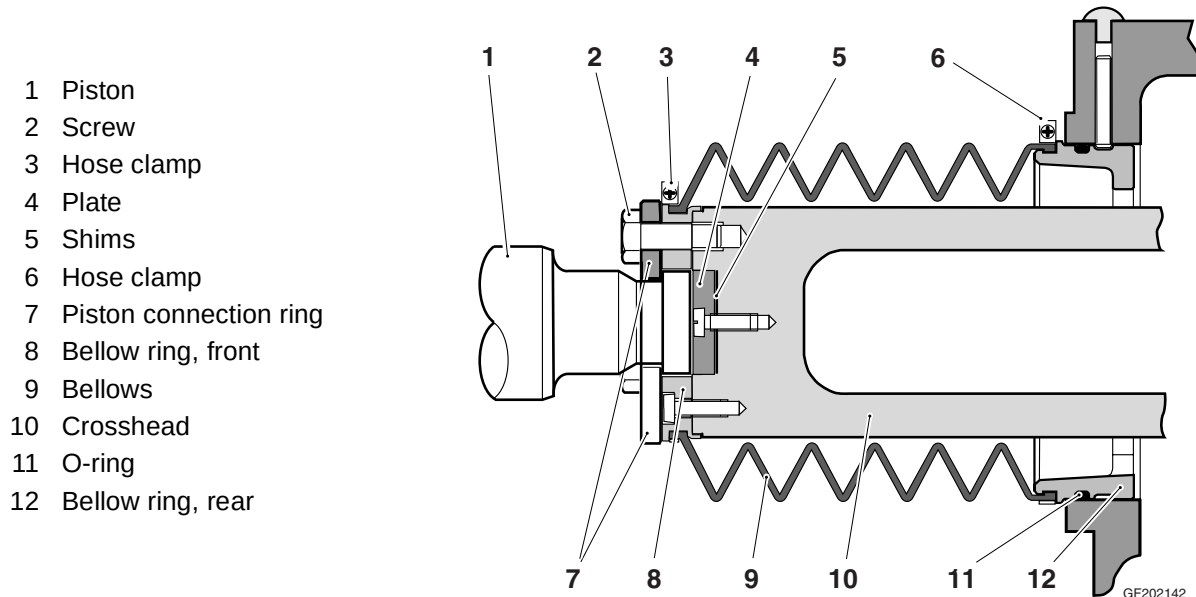
Setting

Eliminate the gap by adding shims (5) between the plate (4) and the cross head.



3.6.2-1 Bellows - check

Check the bellows (9) for leaks and damage.



3.6.2-2 Bellows - change

Removal

Remove the piston connection according to activity 3.6.1-2.

Remove the hose clamps (3, 6) and remove the bellows (9).

Fitting

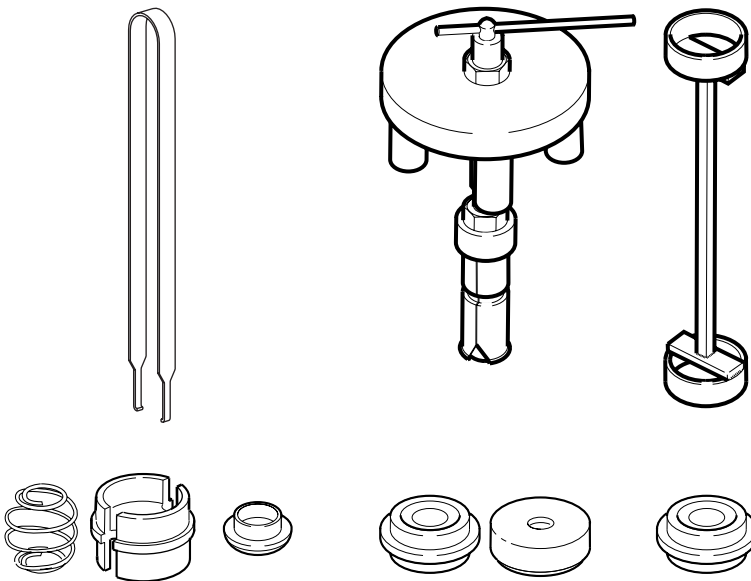
Reassemble in reverse order.

4 Wet end

4.1 Valves

Consumables	Silicon grease TP No. 90296-9
-------------	----------------------------------

Tools used for disassembly and assembly



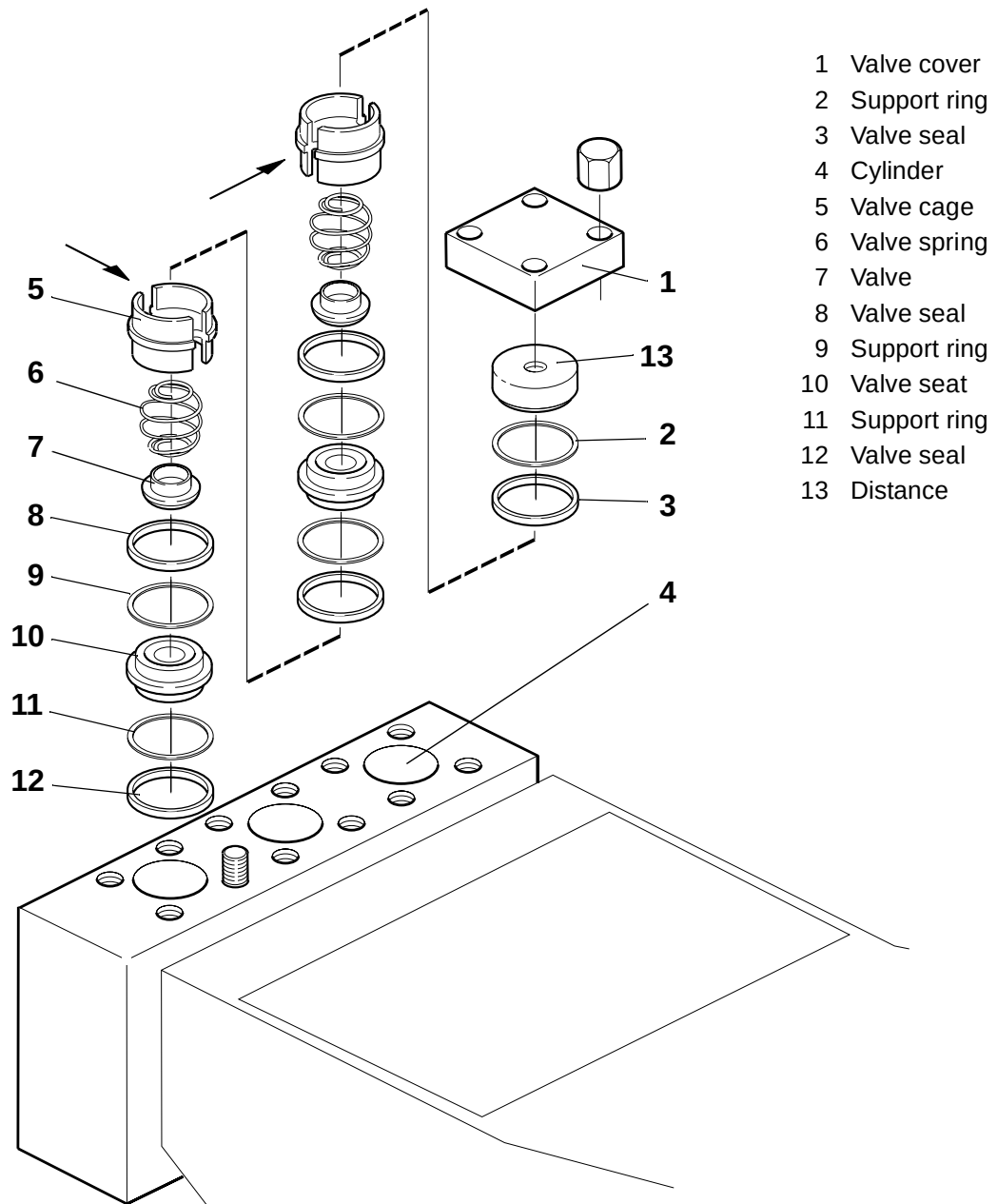
GF200991

2.2tf201530.en

4.1-1 Valves - disassemble

Remove the valve cover (1) and lift up the valve parts. Use the tools, see previous page, when removing the valve cages (5), the valve spring (6), the valves (7) and the valve seats (10). Take care not to drop parts when removing in order to avoid damages on critical surfaces as valve seats e t c.

Note! Keep the parts from each valve together. Do not mix the valve and valve seats from different valves!



GF200992

2.21f201530.en

4.1-2 Valves - assemble

Apply silicon grease on the seals before assembling the valves.

Note! Keep the parts from each valve together. Do not mix the valve and valve seats from different valves!

Use the tool (1) to fit the two pre-assembled units, each containing valve cage (2), valve spring (3), valve (4) and valve seat (5) (fig.2).

Note! Make sure that:

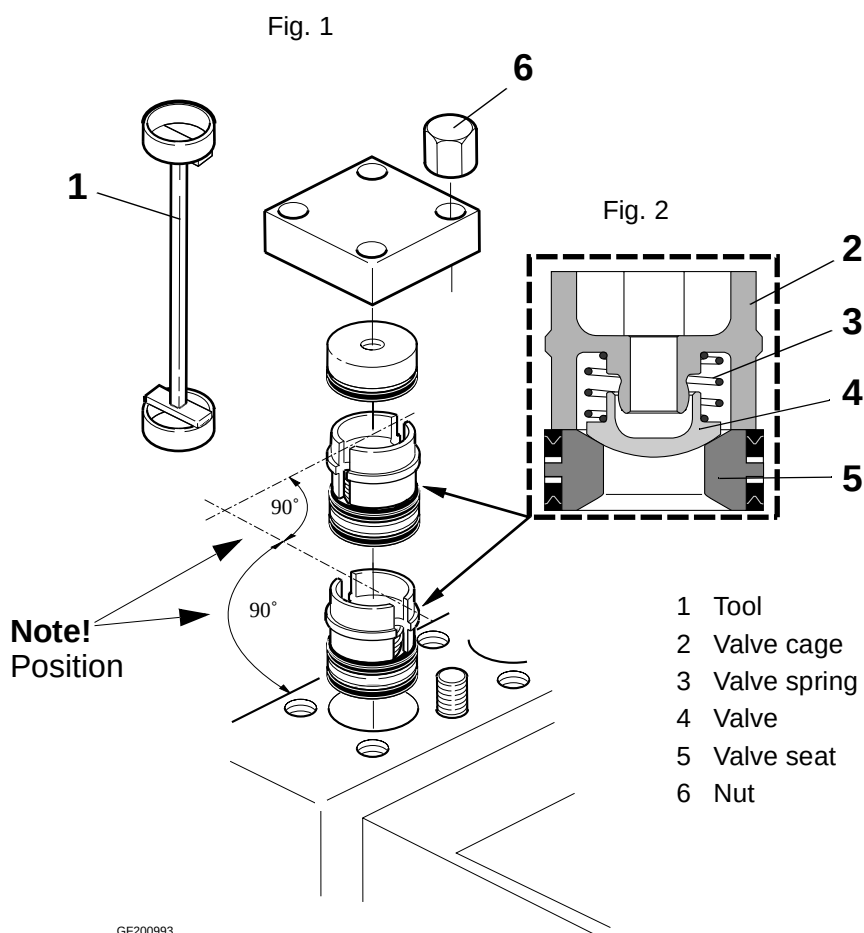
- the spring is correctly fitted to valve cage and valve as illustrated in fig. 2
- the valve cages are positioned as illustrated in fig. 1

Assemble the parts in reverse order to disassembly.

- Take care not to drop parts when assembling in order to avoid damages on critical surfaces as valve seats e t c.

Tighten the nuts (6) for the valve covers with a torque wrench.

See **Torque specifications**.



4.1-3 Valves - check

The valves must be disassembled, see activity 4.1-1.

Check the wear pattern on the contact surfaces for the valve and the seat.

Normal wear pattern, fig 1

No action is required.

The normal wear pattern on valve contact surfaces shows a dull metallic finish. After approximately 100 hours of operation the contact surface will show a slight wear mark on its entire circumference. This polished impression is quite normal.

Pitting formation, fig 2

Replace valve and seat. The seat can be turned once.

Pittings are hammered by solids contained in the product to be homogenised. They are the cause of “blow through marks” in the valve and the seat.

Blow through marks in valve and seat, fig 3

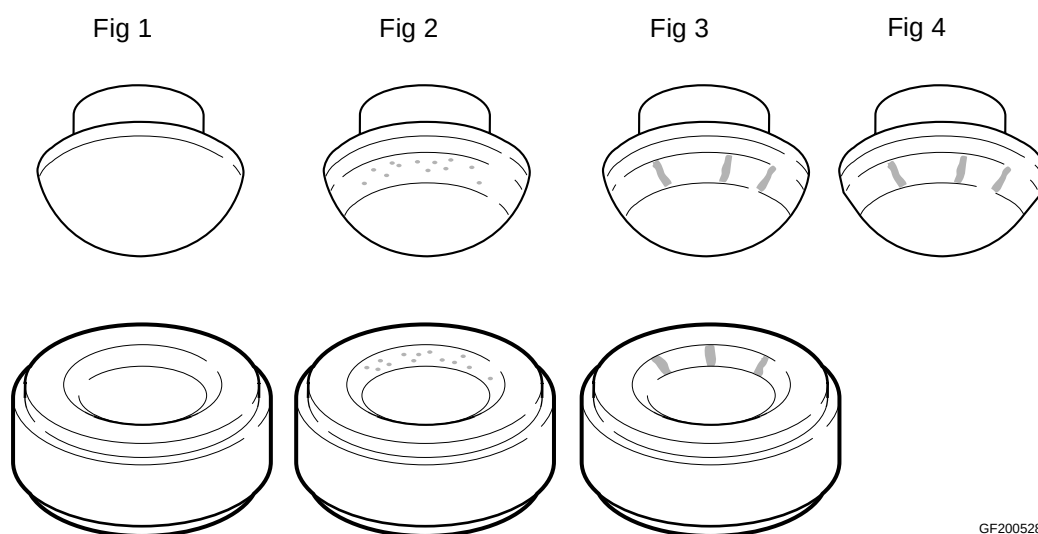
Replace valve and seat. The seat can be turned once.

Product deposits on sporadic spots of the valve contact surface have prevented the valve from seating properly. The product has “blown through” and eroded the valve and seat across the entire width of the contact surfaces.

Note! Failure of carrying out regular checks and maintenance will cause damage of this nature.

The spheric valve contact surface deformed, fig 4

Replace the valve and seat. The seat can be turned once.



GF200528

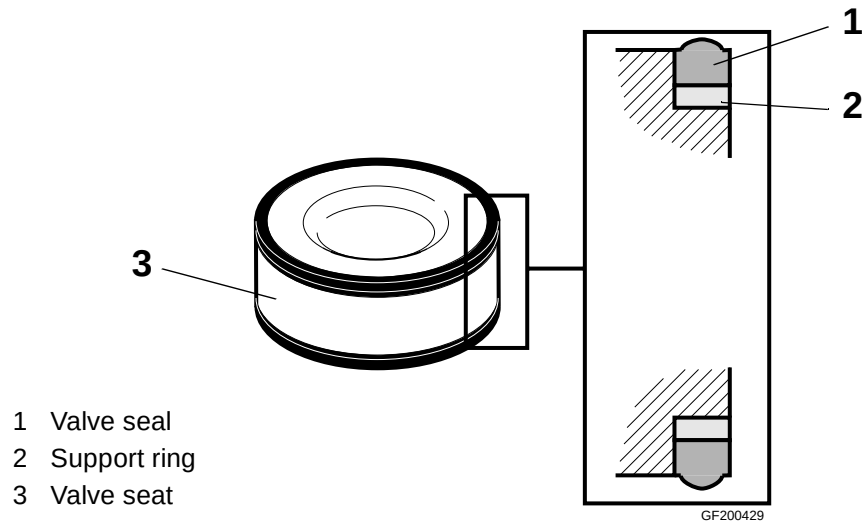
2.21f201530.en

4.1.1-1 Valve seals - change

The valves must be disassembled, see activity 4.1-1.

Clean the grooves in the valve seat (3) before putting on the new support rings (2) and valve seals (1).

Note! Direction of valve seals as illustrated.

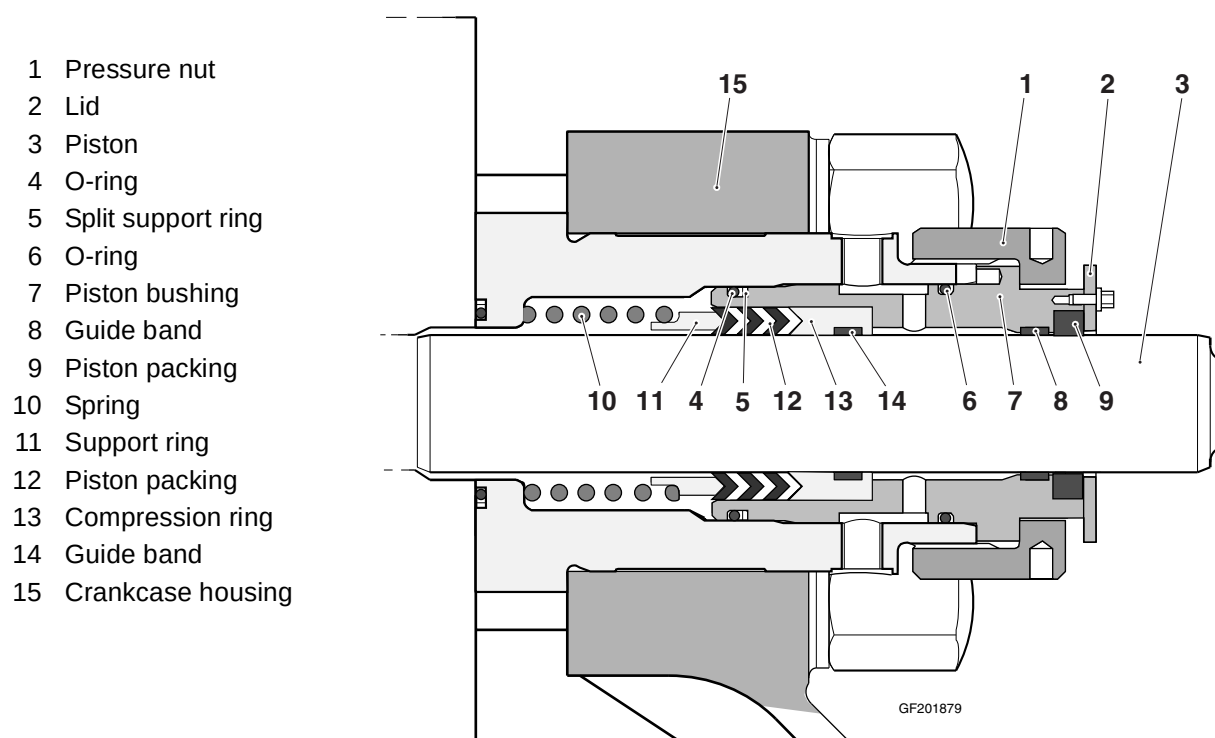


4.2 Piston unit

4.2-1 Piston unit - check

Check:

- that no product leaks through piston packing (12); check cooling water outlet for product in water
- that the piston packing (9) is not leaking water,
- that the piston (3) is not worn.



4.2-2 Piston unit - remove

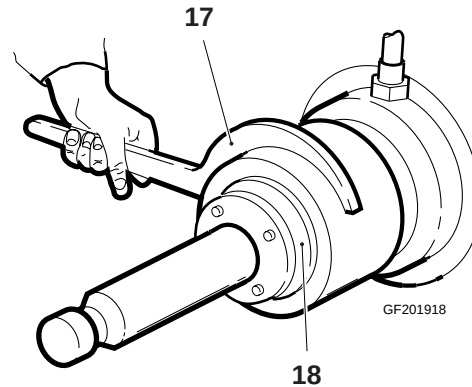
Remove the piston connection according activity 3.6.1-2.

Place the extracting device (18) in the groove of the piston bushing.

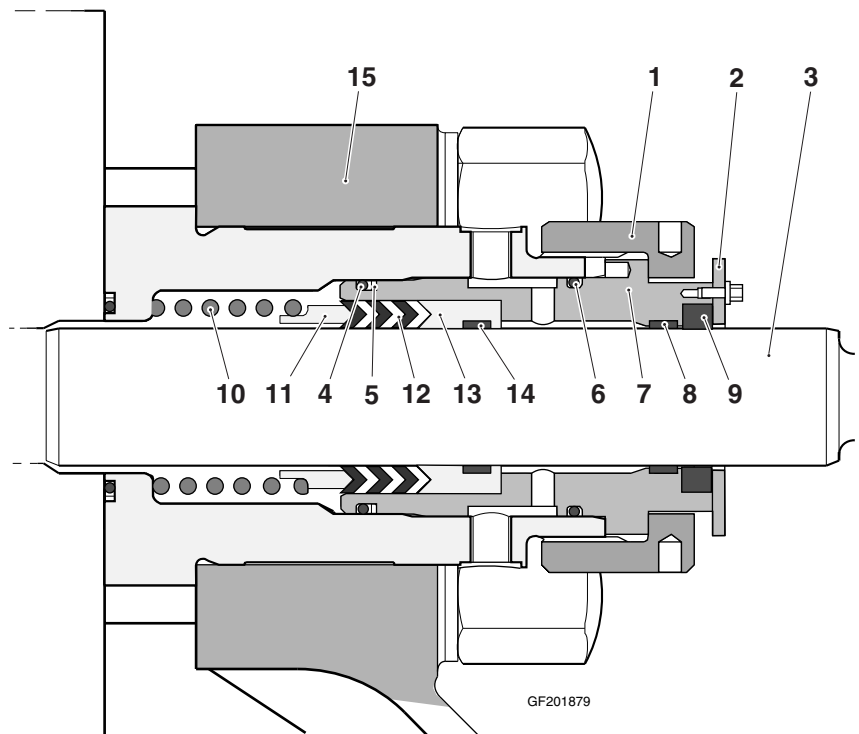
Unscrew the pressure nut by help of the sickle spanner (17). In this way, the piston bushing is extracted from the cylinder bushing.

Remove the piston seal cartridge.

- 17 Sickle spanner
Tool
- 18 Extracting device
Tool



- 1 Pressure nut
- 2 Lid
- 3 Piston
- 4 O-ring
- 5 Split support ring
- 6 O-ring
- 7 Piston bushing
- 8 Guide band
- 9 Piston packing
- 10 Spring
- 11 Support ring
- 12 Piston packing
- 13 Compression ring
- 14 Guide band
- 15 Crankcase housing

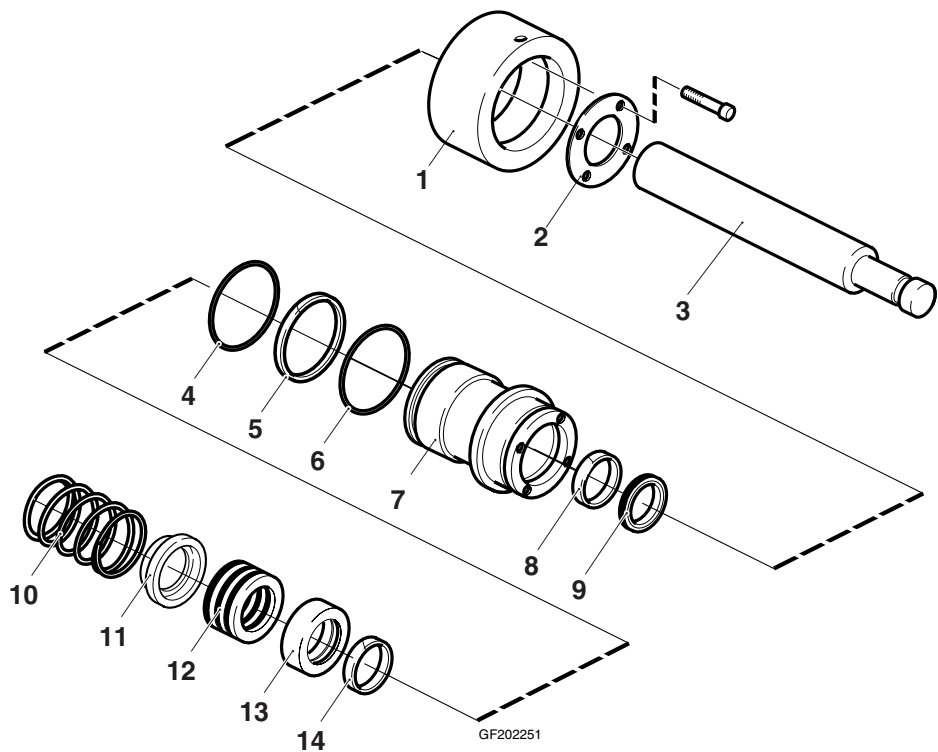


4.2-3 Piston unit - disassemble

Remove:

- a) the piston (3)
- b) the lid (2)
- c) the pressure nut (1)
- d) the spring (10)
- e) the support ring (11)
- f) the piston packing (12)
- g) the compression ring (13)
- h) the guide band (14)
- i) the piston packing (9)
- j) the guide band (8)
- k) the O-ring (4)
- l) the split support ring (5)
- m) the O-ring (6)

- 1 Pressure nut
- 2 Lid
- 3 Piston
- 4 O-ring
- 5 Split support ring
- 6 O-ring
- 7 Piston bushing
- 8 Guide band
- 9 Piston packing
- 10 Spring
- 11 Support ring
- 12 Piston packing
- 13 Compression ring
- 14 Guide band



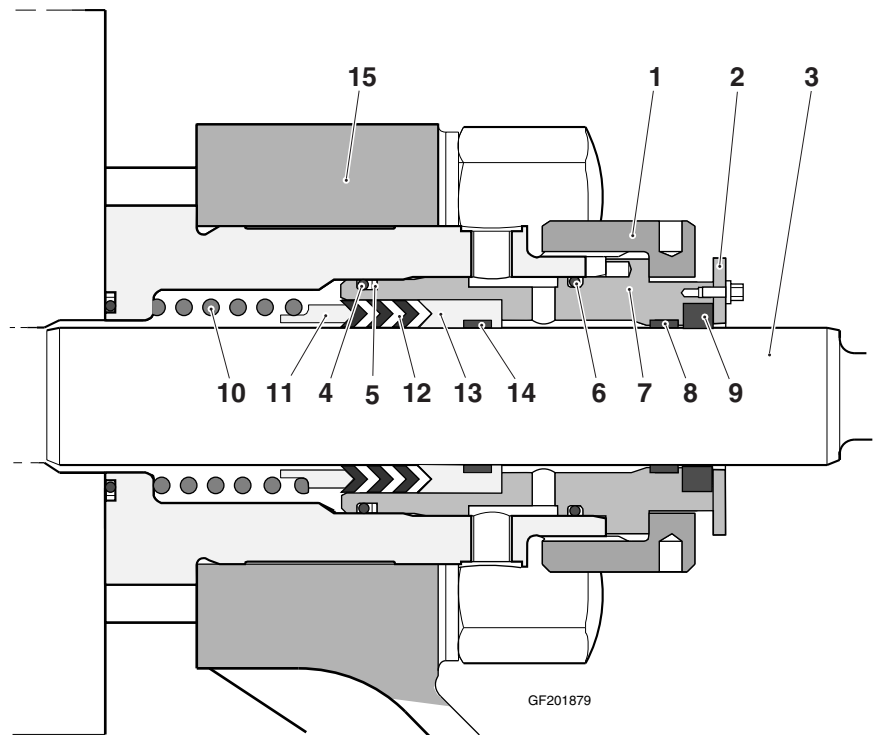
2.2tf201684.en

4.2-4 Piston unit - assemble

Apply silicon grease on the seal and on the surface between the guide bands and the piston before assembling.

Assemble the parts in reverse order.

- 1 Pressure nut
- 2 Lid
- 3 Piston
- 4 O-ring
- 5 Split support ring
- 6 O-ring
- 7 Piston bushing
- 8 Guide band
- 9 Piston packing
- 10 Spring
- 11 Support ring
- 12 Piston packing
- 13 Compression ring
- 14 Guide band
- 15 Crankcase housing



4.2.1-1 Piston - change

Replace the piston and assemble the piston unit according activity 4.2-4.

4.2.2-1 Piston packing - change

Replace:

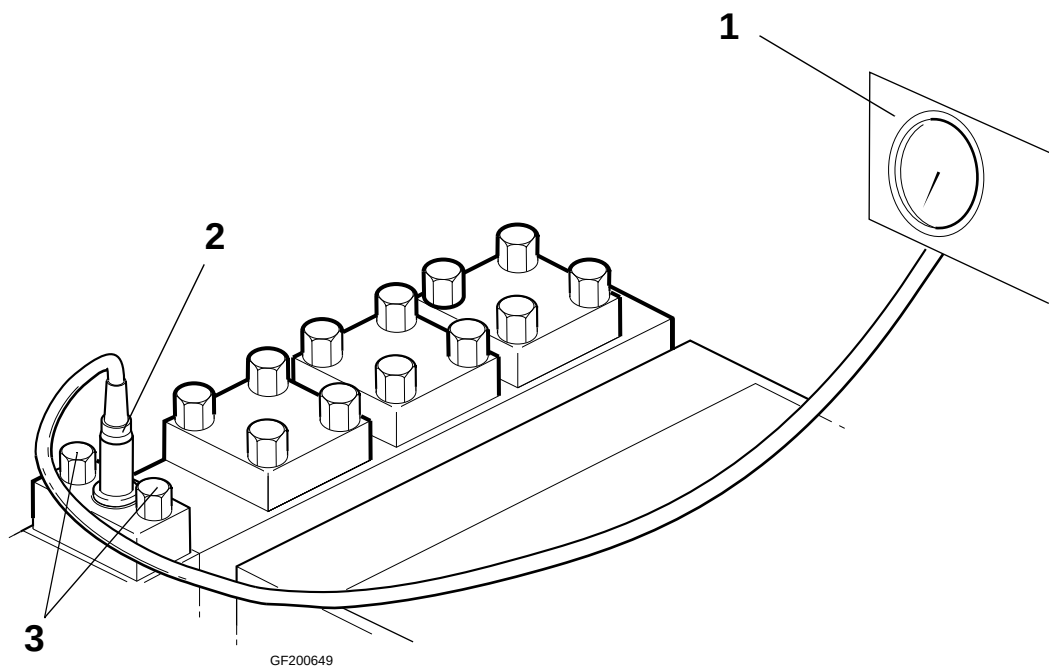
- the piston packings (9) and (12)
- the guide bands (8) and (14)
- the O-rings (4) and (6)

Assemble the piston unit according activity 4.2-4.

4.3 Pressure gauge

4.3-1 Pressure gauge - check

Check that the relation between the homogenising pressure and the hydraulic pressure corresponds to the test protocol.



- 1 Homogenising pressure gauge
- 2 Sensor, homogenising pressure
- 3 Nut - See **Torque specifications**

2.2tf201625.en

5 Homogenisation head

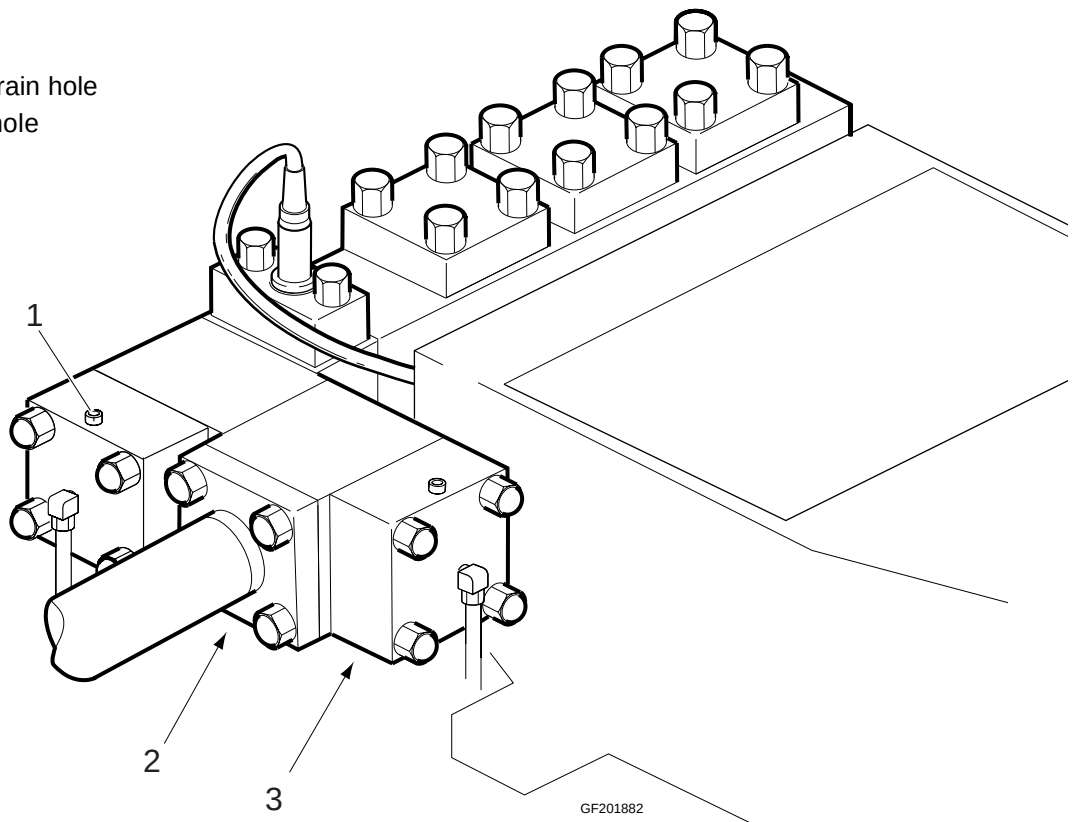
5-1 Homogenisation head - check

Check that the homogenizing pressure is achieved; if not, loosen the vent plug (1) and vent the hydraulic system.

Check that no product leaks through the product drain hole (2). If leakage, the seat and forcer have to be checked, see activities 5.1.1-1 and 5.1.2-1.

Check that no oil leaks through the oil drain hole (3).
If leakage, see activity 5-2.

- 1 Vent plug
- 2 Product drain hole
- 3 Oil drain hole



2.2H201607.en

5-2 Homogenisation head - remove

Remove the:

- product pipe
- pipe connection (1)
- hydraulic end (2)
- housing (3)
- hydraulic end (4)
- housing (5)

5-3 Homogenisation head- assemble

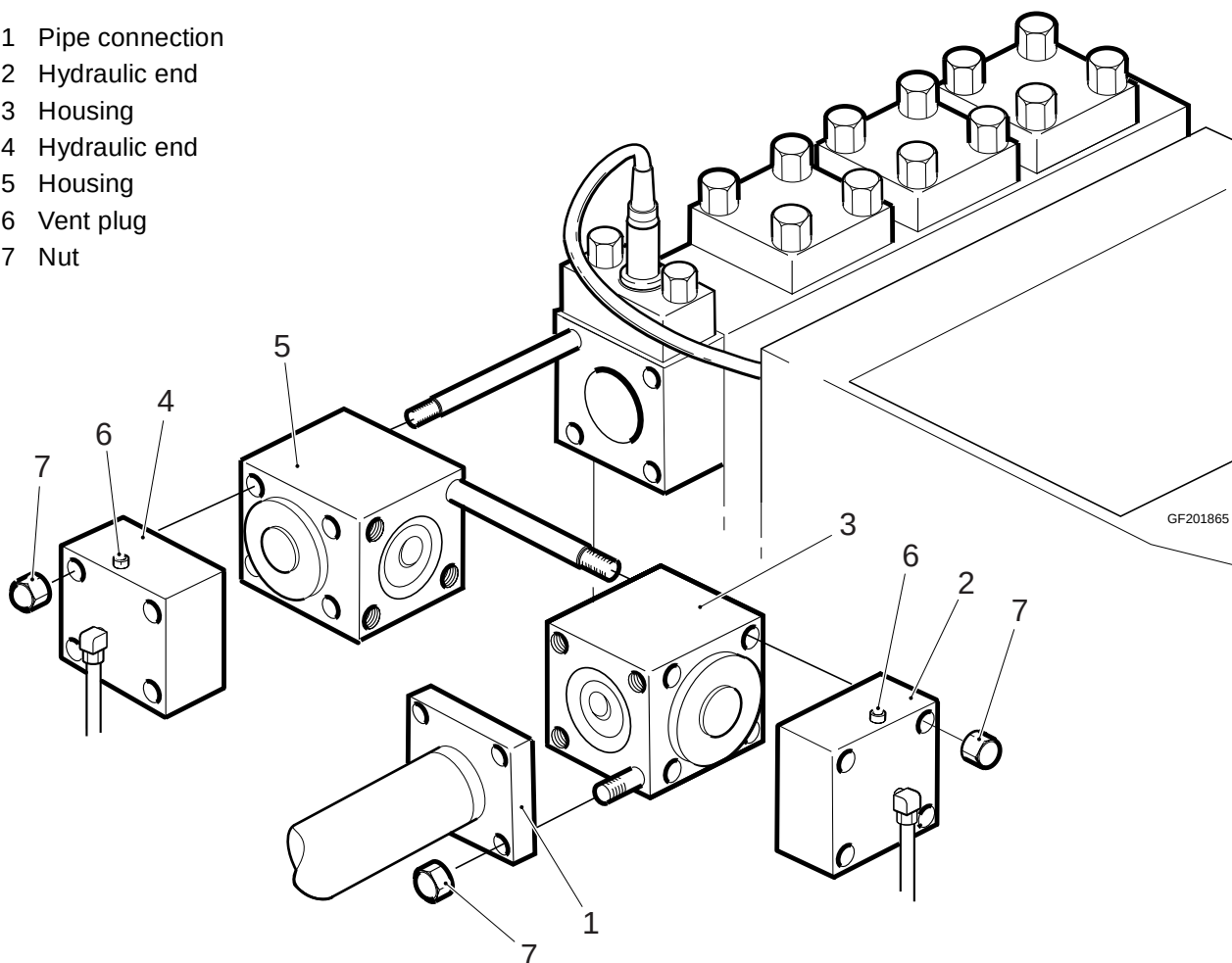
Consumables	Silicon grease TP No. 90296-9
-------------	----------------------------------

Replace all O-rings and support rings. Rub the parts with silicon grease before assembly. Fit the parts in reverse order to dissassembly.

Note! Vent plugs (6) heading upwards.

Tighten the nuts (7) with a torque wrench. See **Torque specifications**.

- 1 Pipe connection
- 2 Hydraulic end
- 3 Housing
- 4 Hydraulic end
- 5 Housing
- 6 Vent plug
- 7 Nut



2.2tf201607.en

5.1 Homogenisation device

5.1-1 Homogenisation device - disassemble

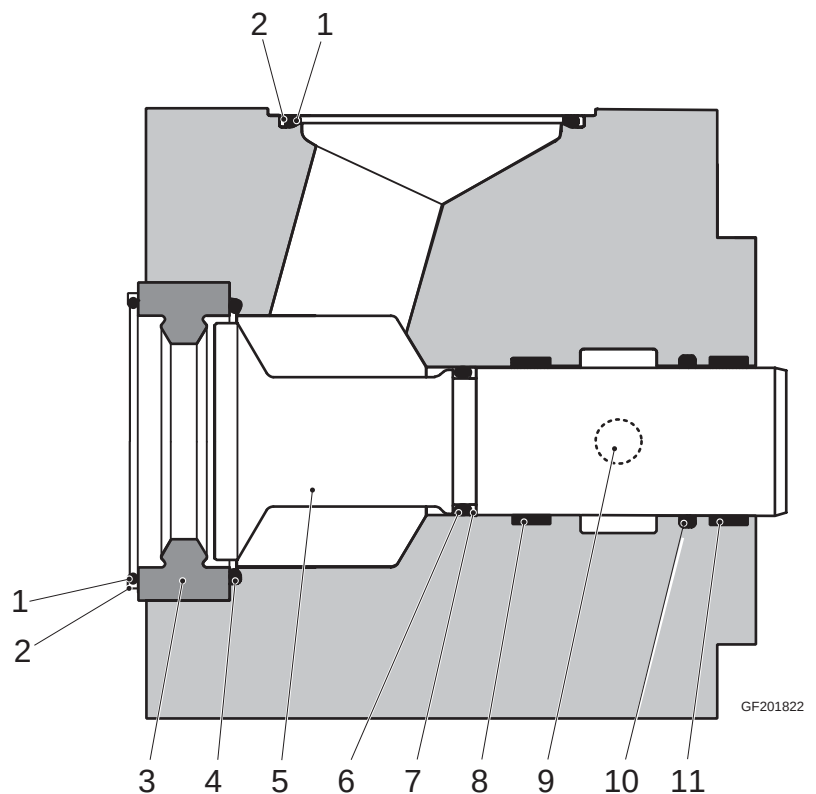
Remove:

- O-ring (1) and support ring (2)
- seat (3)
- forcer (5)
- O-ring (4)
- guide band (8)
- O-ring (10)
- guide band (11)

Remove the O-ring (6) and support ring (7) from the forcer.

Forcer, see item 5.1.2-1.

- 2.2#201508.en
- 1 O-ring
 - 2 Support ring
 - 3 Seat
 - 4 O-ring
 - 5 Forcer
 - 6 O-ring
 - 7 Support ring
 - 8 Guide band
 - 9 Product drain hole
 - 10 O-ring
 - 11 Guide band



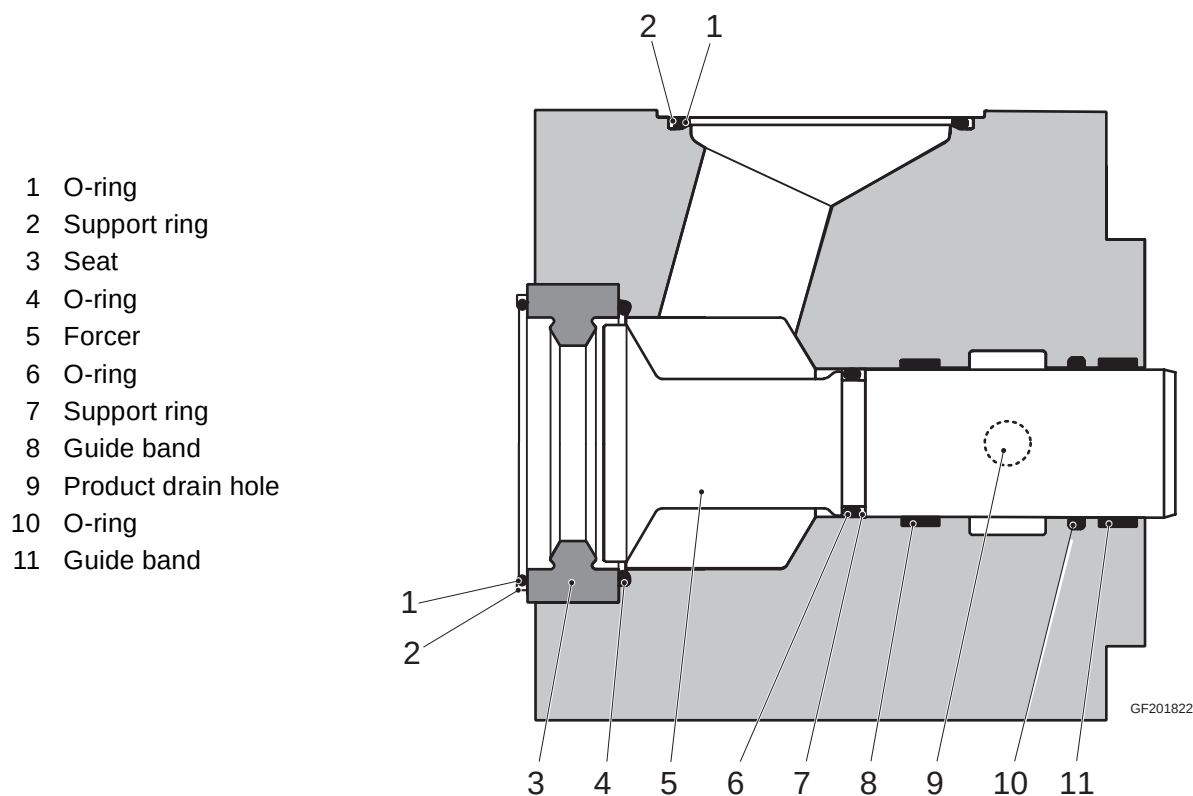
5.1-2 Homogenisation device - assemble

Rub the parts with silicon grease before assembly.

Replace O-rings, support rings and guide bands.

Assemble in reverse order to activity 5.1-1.

Install the homogenisation device according activity 5-3.

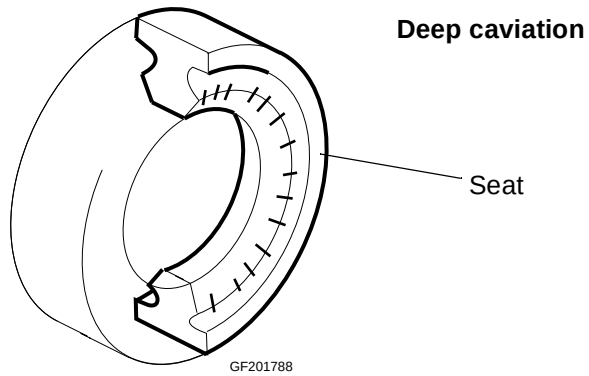


2.2tf201508.en

5.1.1-1 Seat - check

Check the condition of the seat.

Assemble according to activity 5.1-2.

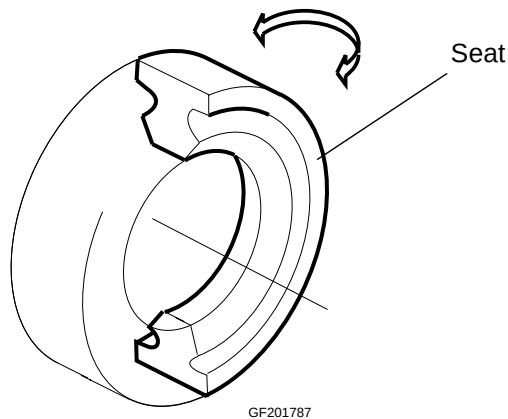


5.1.1-2 Seat - turn/change

The seat is symmetrical and its life time can be doubled by turning it.

Turn or replace the seat.

Assemble according to activity 5.1-2.



5.1.2-1 Forcer - check

Check the condition of the forcer.

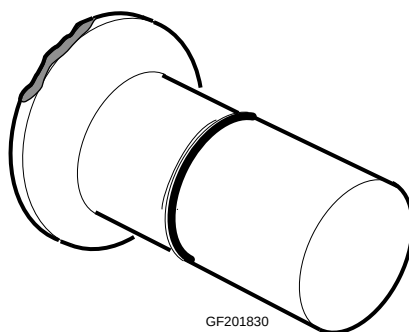
Assemble according to activity 5.1-2.

5.1.2-2 Forcer - change

Change the forcer.

Assemble according to activity 5.1-2.

Deep cavitation



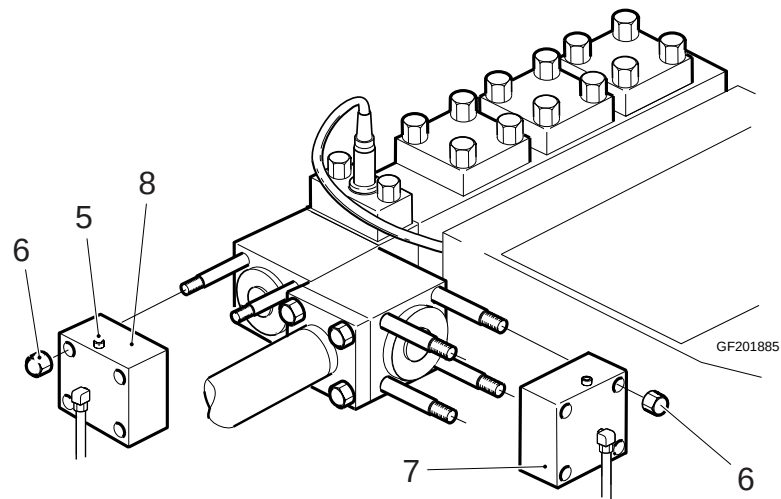
5.2 Hydraulic end

Consumables	Silicon grease TP No. 90296-9
-------------	----------------------------------

5.2.1-1 Seals - change

Undo the nuts (6) and remove the hydraulic ends (7) and (8).

- 5 Vent plug
- 6 Nut
- 7 Hydraulic end
- 8 Hydraulic end



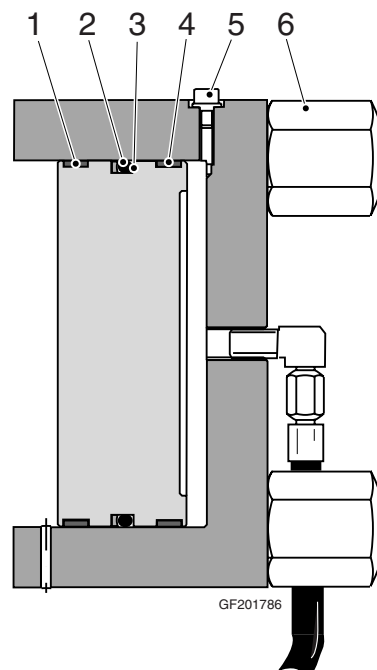
Replace guide bands (1) and (4), the O-ring (3) and the support ring (2).

Apply some silicon grease to the parts, and fit the guide bands and the O-ring by hand.

Tighten the nuts (6) with a torque wrench. See **Torque specifications**.

Vent the hydraulic system by help of the vent plug (5).

- 1 Guide band
- 2 Support ring
- 3 O-ring
- 4 Guide band
- 5 Vent plug
- 6 Nut

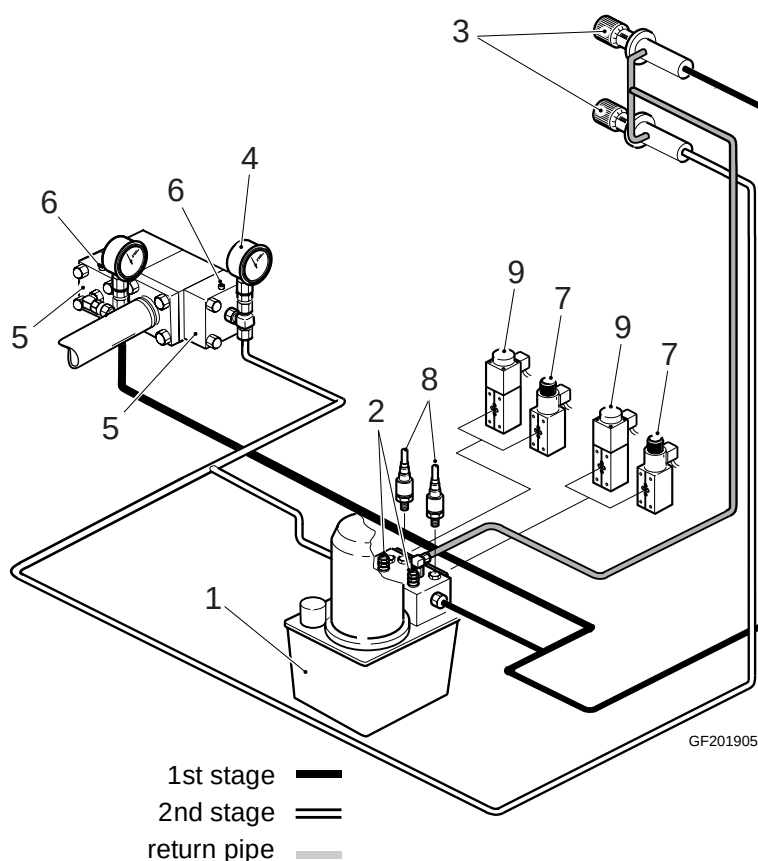


6 Hydraulic system

6-1 Hydraulic system - check

Check:

- all connections for leakage
- the function of the hydraulic system.



- 1 Hydraulic unit
- 2 Safety valve
- 3 Pressure adjusting valve
- 4 Hydraulic pressure gauge
- 5 Hydraulic end
- 6 Vent plug
- 7 Pressure relief valve (optional)
- 8 Sensor, hydraulic pressure (optional)
- 9 Remote setting valve (optional)

6.1 Hydraulic unit

6.1-1 Hydraulic unit - check

Check:

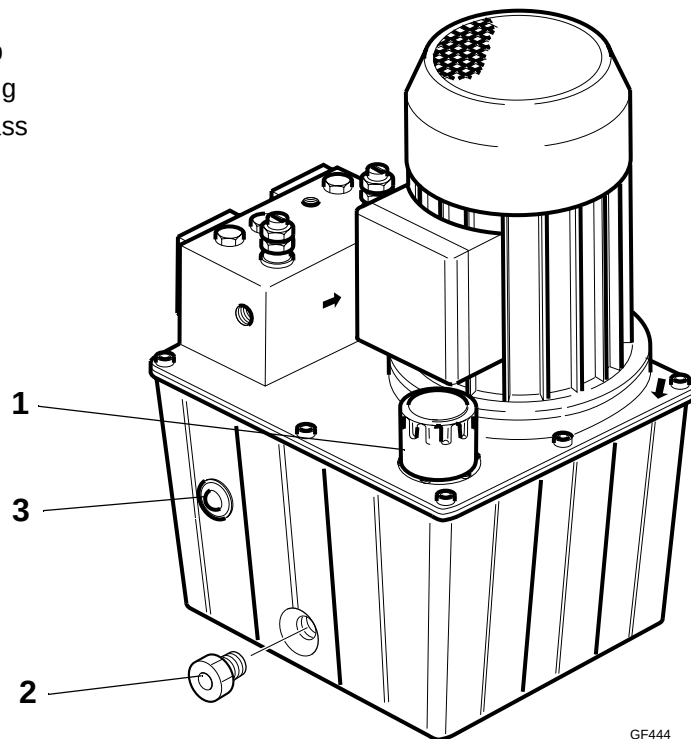
- all connections for leakage
- the oil level (if needed top up with oil according to recommendations in **Lubrication.**)

6.1.1-1 Oil - change

Unscrew the drain plug and drain all oil from the tank.

Fill oil according to recommendations in **Lubrication.**

- 1 Filler cap
- 2 Drain plug
- 3 Level glass



GF444

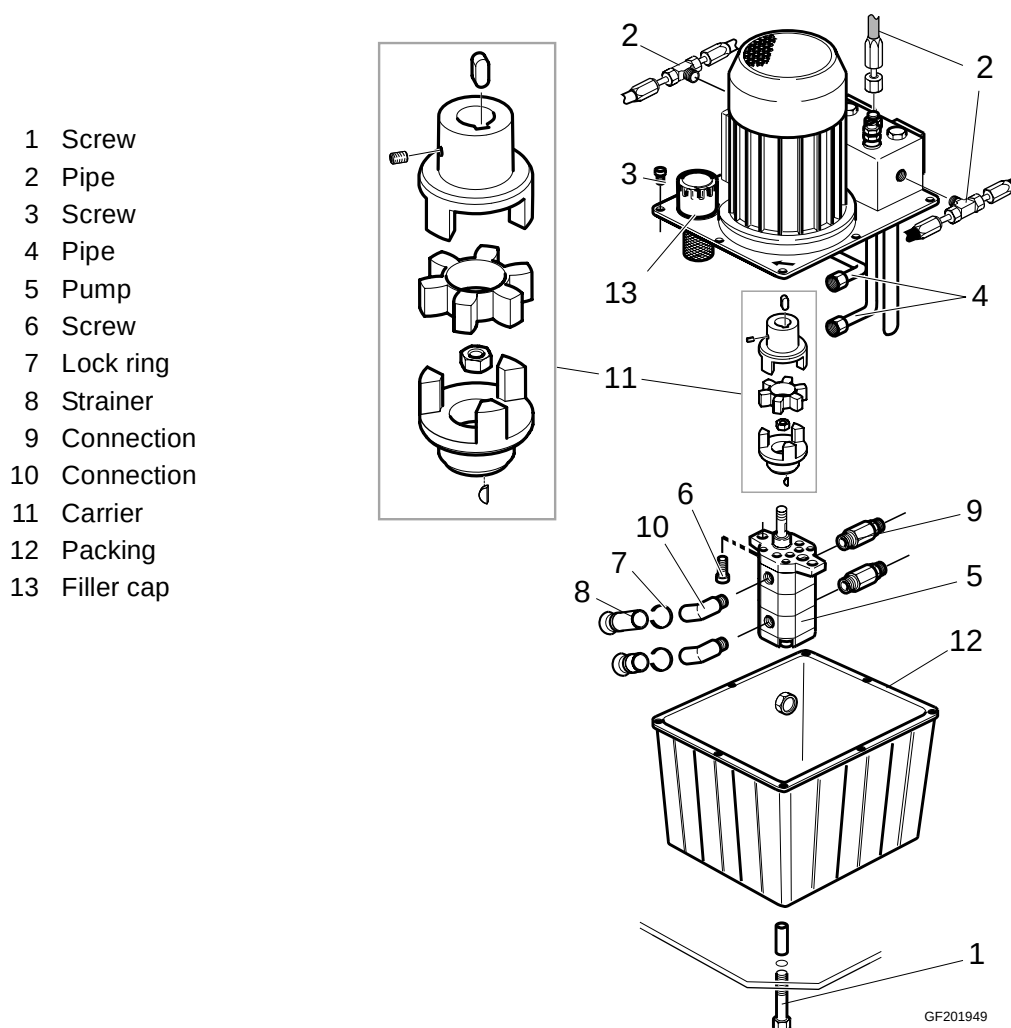
6.1.2-1 Hydraulic pump - change

Remove:

- the tank fastening screws (1), disconnect the oil pipes (2) and lift out the pump unit
- the screws (3) and lift up the motor /pump
- the oil pipes (4) from pump (5)
- the screws (6) and take out the pump
- the lock ring (7) and remove the suction strainer (8)
- the connection (9)
- the angel connection (10)
- the carrier (11)

Assemble in reverse order:

Install a new packing (12). Refill with new oil, see **Lubrications** for specifications. Bleed the hydraulic system.



6.1.3-1 Safety valve - check

Check:

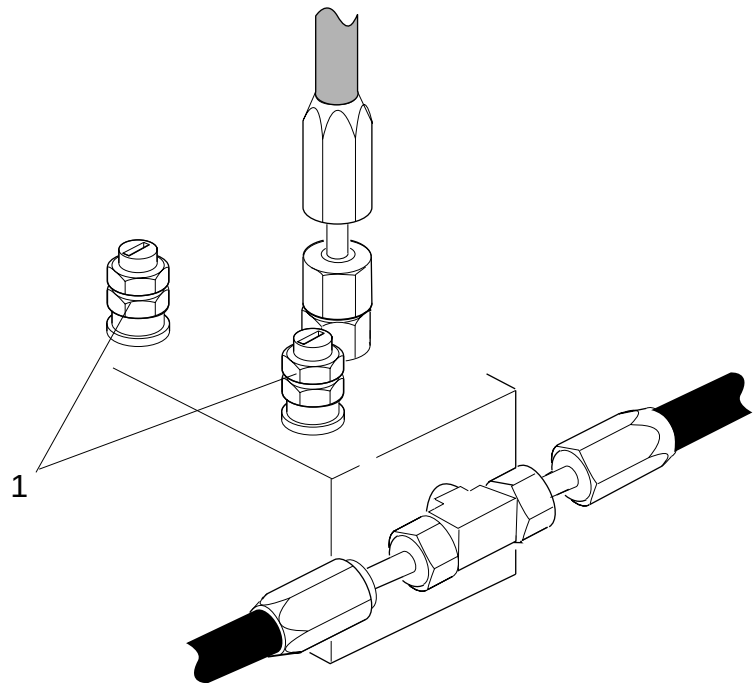
- the safety valves (1)
 - increase the homogenising pressure 5 bar (75 psi) and check that the safety valve opens.

If fault, set or change the safety valve(s).

Reset the homogenising pressure.

Caution! It is important that the safety valves are set to release the hydraulic pressure within 5 bar over the homogenising working pressure

1 Safety valve



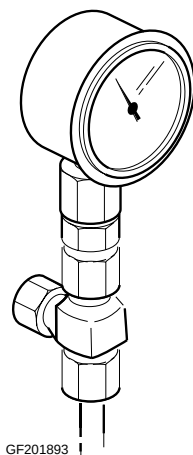
GF200979

6.2 Pressure gauge

6.2-1 Pressure gauge - check

Check:

- pressure gauge,
(pressure gauge value - homogenising pressure, see the test protocol).

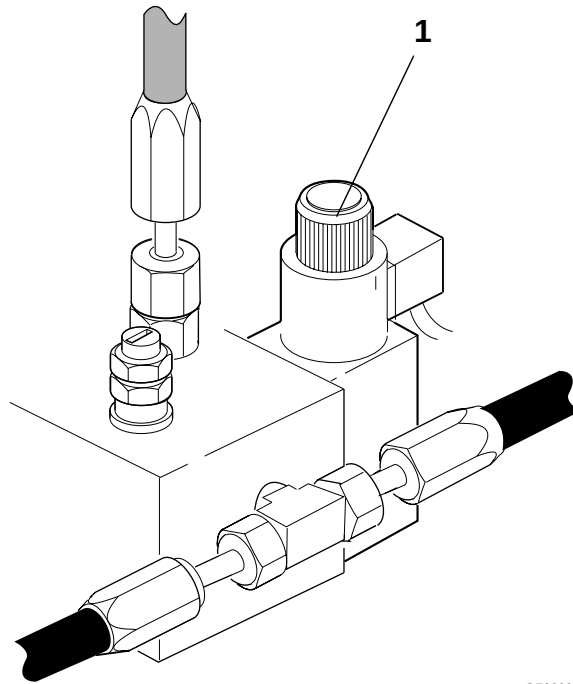


2.2tf201627.en

6.3 Pressure relief valve (optional)

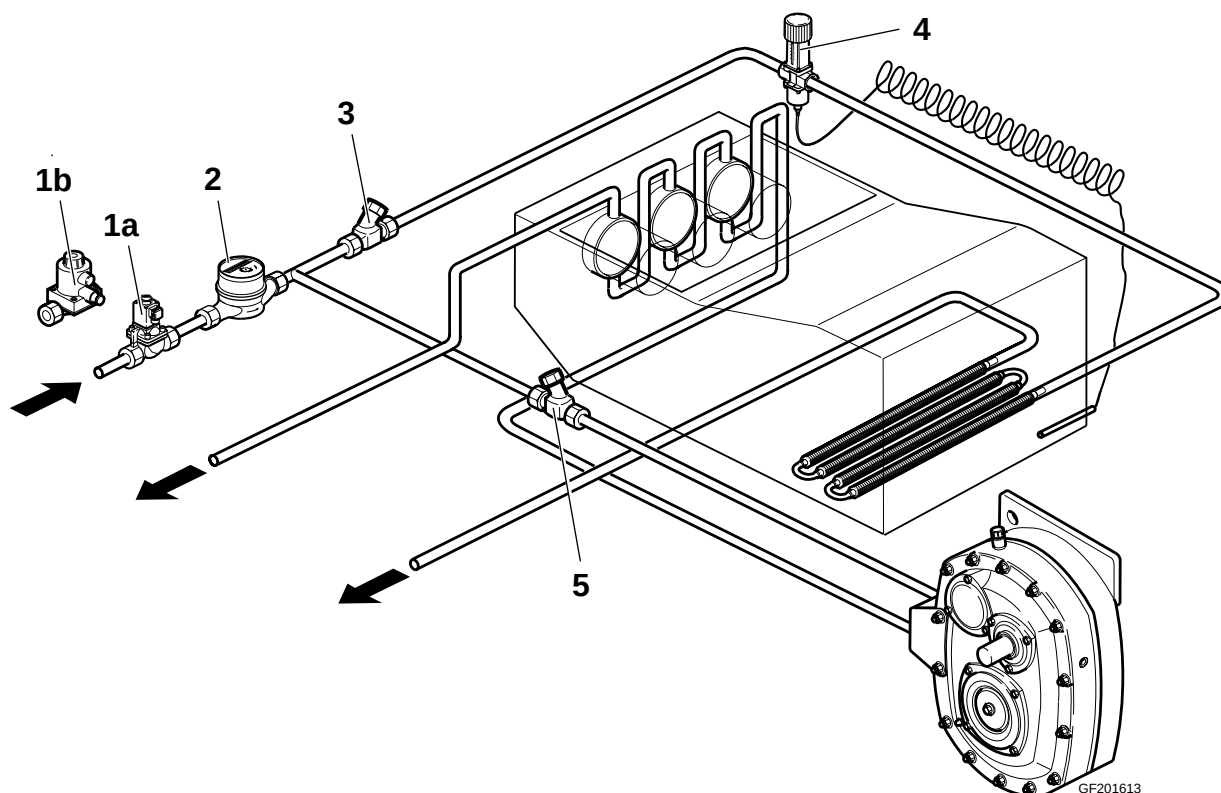
6.3-1 Pressure relief valve - check

Check that the hydraulic pressure goes on/off when the pressure relief valve (1) is activated/deactivated.



GF200980

7 Cooling water system



2.2tf201263.en

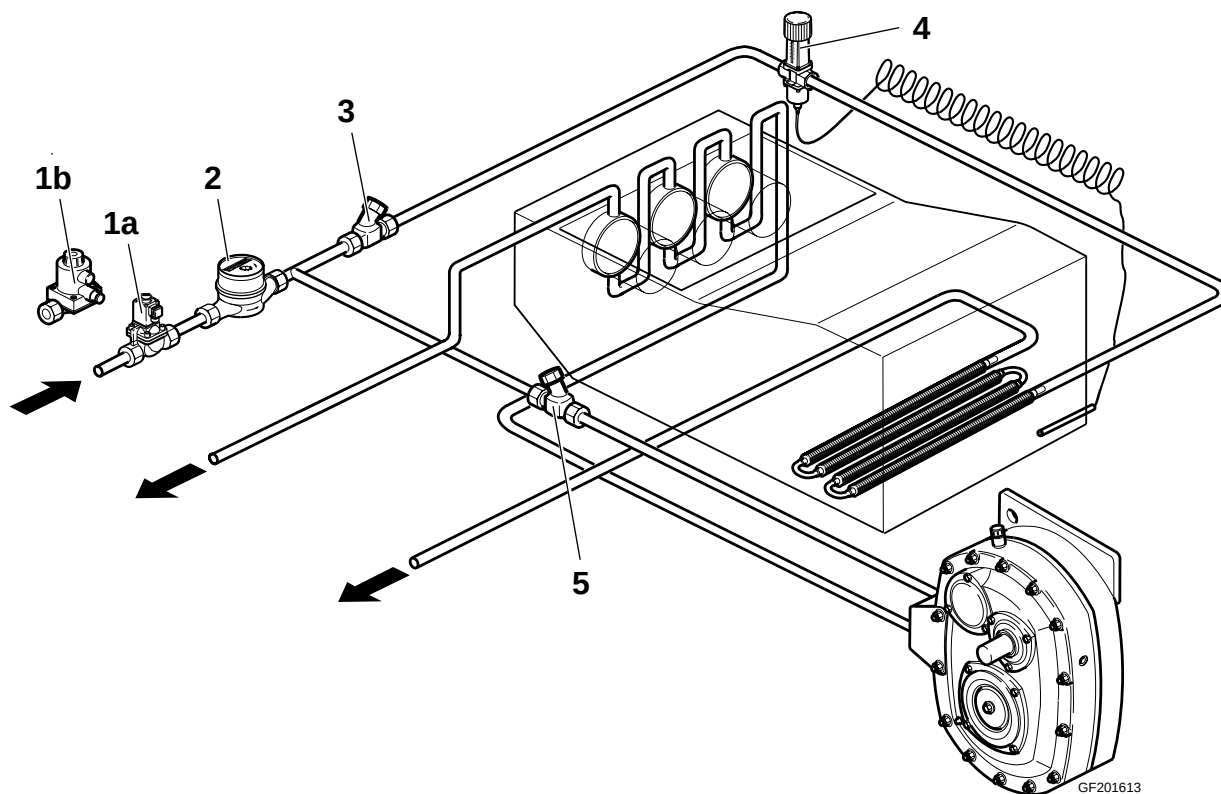
	Description	Function
1a	Cooling water valve, solenoid (standard)	Shut of valve, controlled by electrical signal
1b	Cooling water valve, pneumatic (optional)	Shut of valve, controlled by compressed air
2	Cooling water flow meter (optional)	Indicates flow rate and accumulated value Flow rate, see Technical Data
3	Cooling water regulating valve	Regulation of crank case oil temperature Max. 55 °C (131 °F)
4	Cooling water regulator (optional)	Automatic control of crank case oil temperature
5	Cooling water regulating valve	Regulation of gear box oil temperature

7.1 Piping

7.1-1 Piping - check

Check:

- all connections for leakage.



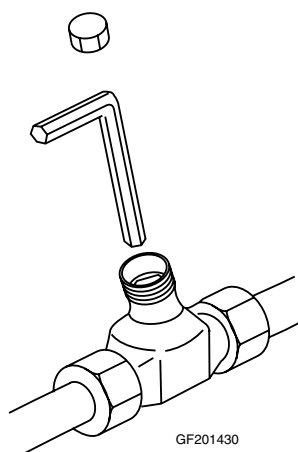
- 1a Cooling water shut off valve, solenoid (standard)
- 1b Cooling water shut off valve, pneumatic (optional)
- 2 Cooling water flow meter (optional)
- 3 Cooling water regulating valve
- 4 Cooling water regulator (optional)
- 5 Cooling water regulating valve

7.3 Regulating valves

7.3-1 Regulating valves - check

Check:

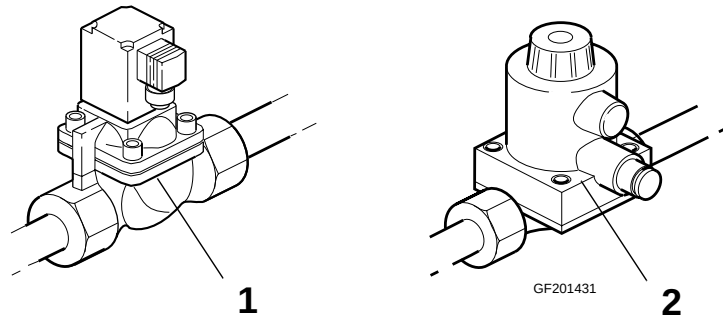
- function of regulating valves.



7.4 Water valve

7.4-1 Water valve - check

Activate and de-activate the cooling water shut off valve and check its function.



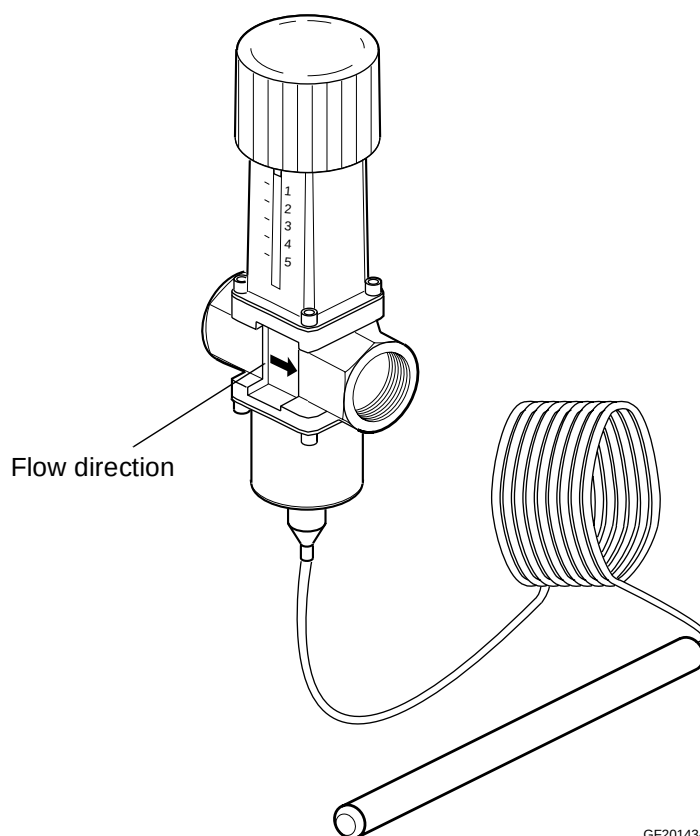
- 1 Cooling water shut off valve, solenoid (standard)
- 2 Cooling water shut off valve, pneumatic (optional)

7.7 Cooling water regulator (optional)

Controls the crank case oil temperature.

7.7-1 Cooling water regulator - check

Check function.

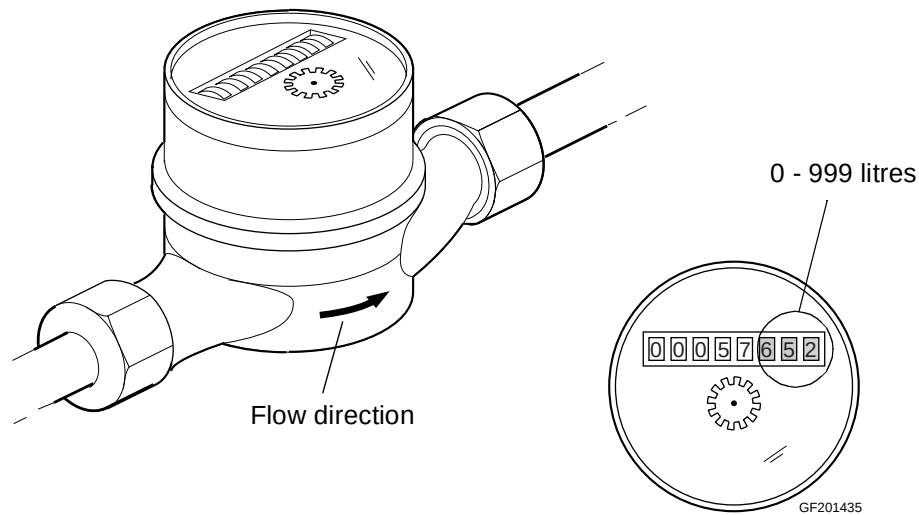


7.8 Flow meter (optional)

Indicates the flow rate and the accumulated value.

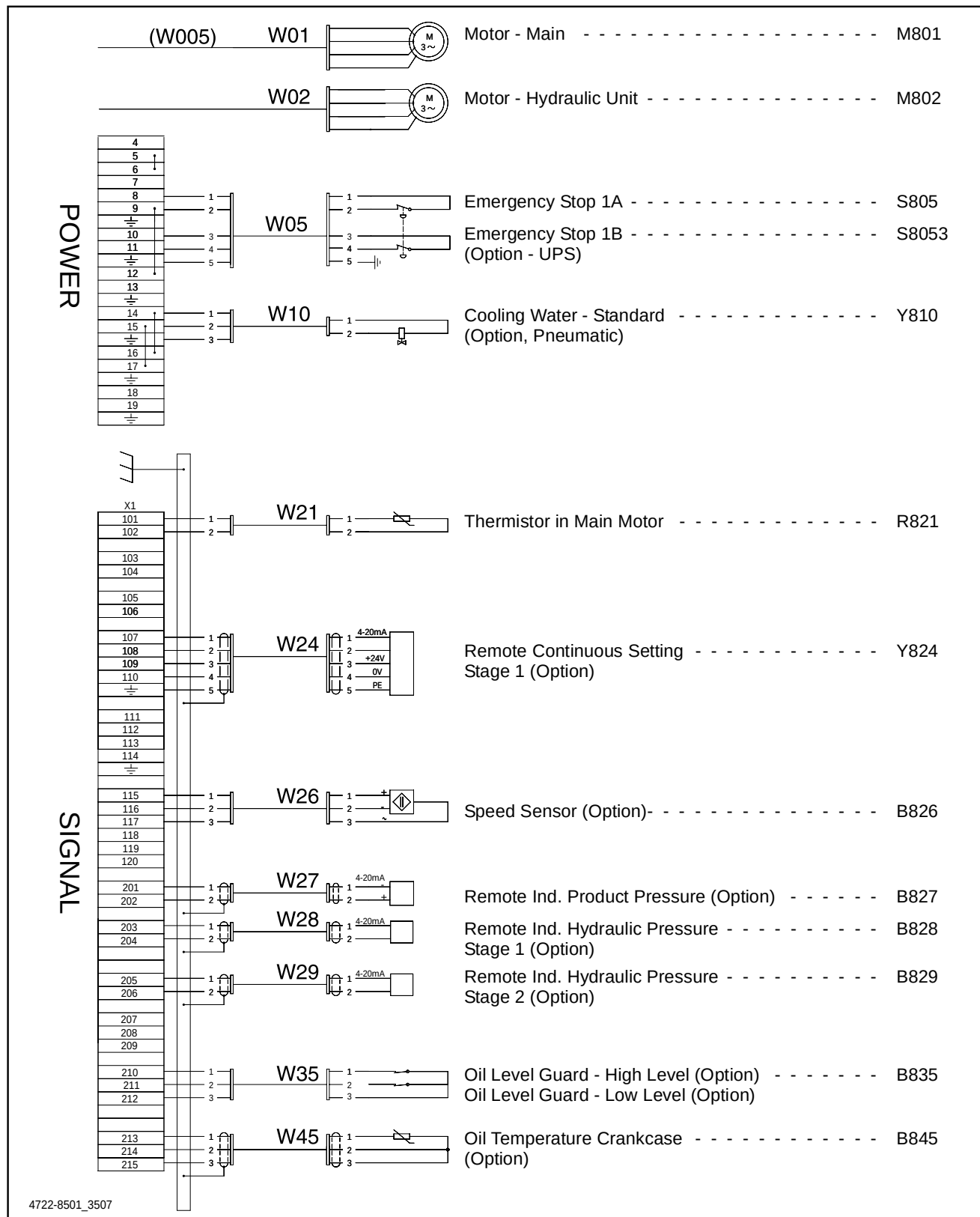
7.8-1 Flow meter - check

Check function.



8 Electrical system

8-1 Wiring diagram



2.2TF-202386.en

8.1 Cables

8.1-1 Cables - check

**WARNING!**

Electrical hazard

Make sure the power supply to the homogeniser is shut of and prevented from accidentally being turned on.

Check all cables and cable connections.

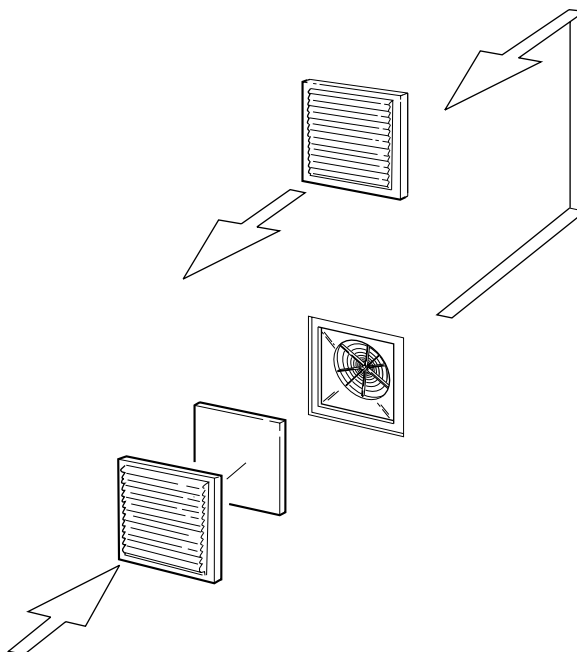
**DANGER!**

Failure to make these checks will cause immediate danger to life!

8.2 Electrical cabinet (optional)

8.2.1-1 Cooling fan filter - change

Change the in- and outlet filters.



GF200449

2.2TF-202386.en

8.3 Temperature transmitter (optional)

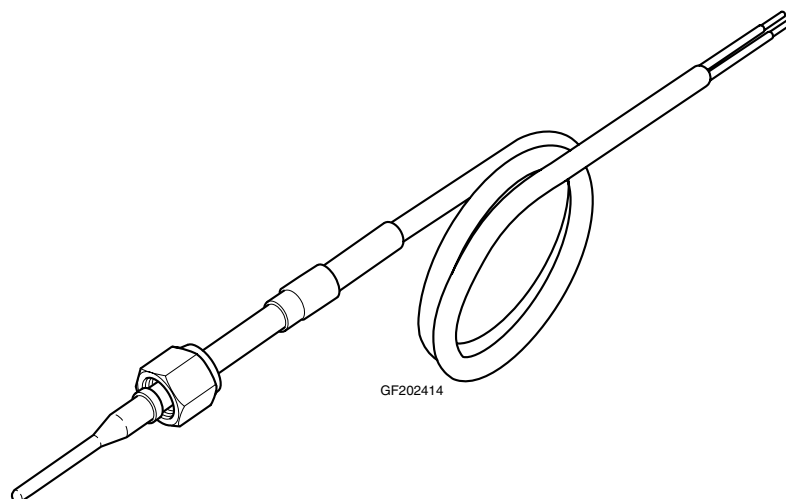
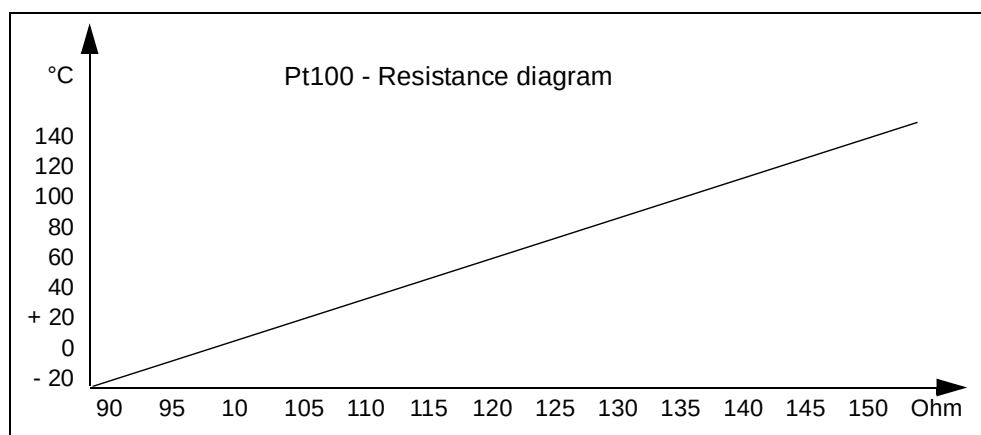
8.3-1 Temperature transmitter - check

As optional equipment, there are temperature transmitters for:

- crank case oil temperature, placed in the crank case
- condensate temperature, placed below the condensate thermometer (valid only for aseptic machines)

Check function of the temperature transmitter(s) (Pt100).

If malfunction suspected, check the resistance.



8.4 Emergency stop

8.4-1 Emergency stop - check

Check the function of the emergency stop button.

Press the emergency stop button and check:

- that the machine stops immediately

Release the emergency stop button and check:

- that the machine does not start when the button is pulled out

**WARNING!**

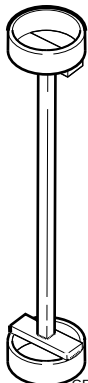
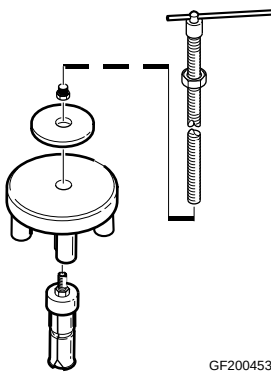
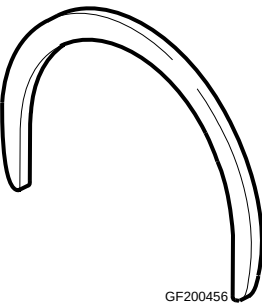
Failure to make these checks can result in major personal injury or damage to the machine

9 Miscellaneous

9.1 Tools

Tools included in tool kit

Note! Only the variants of tools used for the machine described in this manual are listed below.

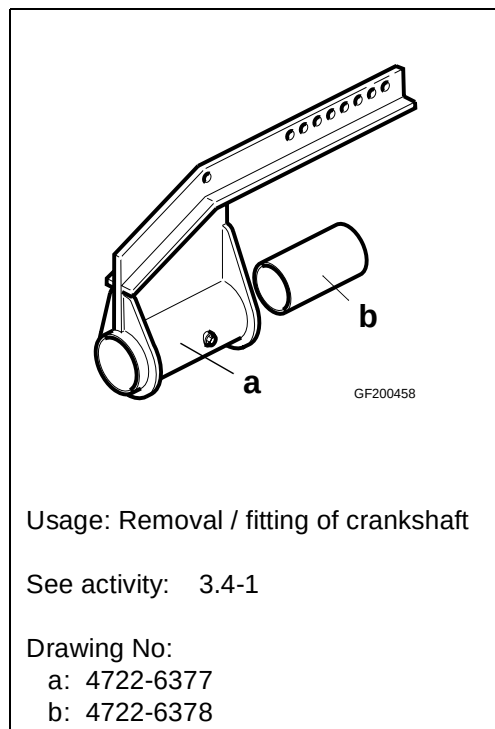
 GF202226 Usage: Valves See activities: 4.1-1, 4.1-2	 GF200454 Usage: Valves See activity: 4.1-2	 GF200453 Usage: Valves See activity: 4.1-1
 GF200457 Usage: Piston seal cartridge See activity: 4.2-2, 4.2-4	 GF200456 Usage: Piston seal cartridge See activity: 4.2-2	

(Cont'd)

(Cont'd)

Tool not included in tool kit

Drawings for local fabrication can be ordered



2.2tf201615.en

9.2 Lubrication

Recommended oil

Crankcase

Recommended oil: Transmission oil of mineral type, viscosity* 220
TP No.: 90296-0073

Producer	Type	Viscosity*
BP	Energol GR-XP 220	220
Mobil	Mobilgear 630	220
Shell	Omala 220	220

Gearbox

Recommended oil:
 Transmission oil of mineral or synthetic type, viscosity* 320
TP No.: 90296-0076 (Mineral)

Producer	Type	Viscosity*
BP	Energol GR-XP 320 (Mineral)	320
Mobil	Mobilgear 632 (Mineral)	320
Shell	Omala 320 (Mineral)	320
BP	Energol HTX (Synthetic)	320

Hydraulic unit

Recommended oil: Hydraulic oil, viscosity* 68
TP No.: 90296-0081

Producer	Type	Viscosity*
BP	Bartran 68	68
Mobil	Mobil Hydraulic Oil HP 68 N	68
Shell	Tellus S 68	68

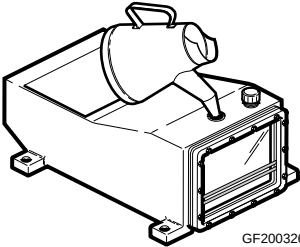
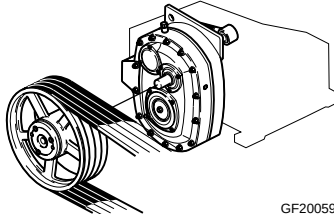
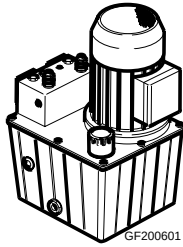
Drive motor

TP No.: 90296-0068

Producer	Type	Viscosity*
BP	Energol LS EP 1	~115
Exxon	Unirex N3	~115
Statoil	Uni Way HTC3	~115
Shell	Alvania Grease R3	~115

* Viscosity in mm²/sec (c.st) at 40°C (104°F)

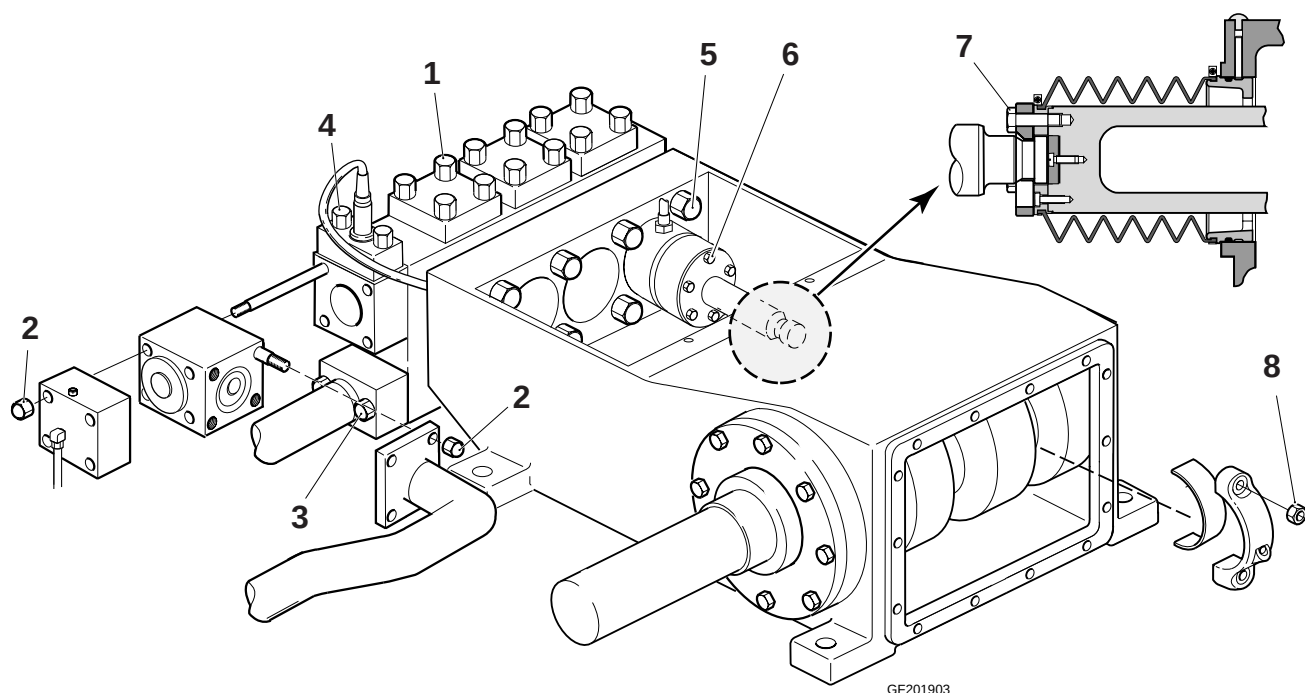
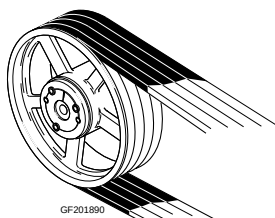
Oil amount

Crankcase	Gearbox	Hydraulic unit
Approx. 28 litres (7.4 U.S. gallons)	Approx. 6 litres (1.6 U.S. gallons)	Approx. 6 litres (1.6 U.S. gallons)
 GF200326	 GF200599	 GF200601

2.2tf201926.en

9.3 Torque specifications

1	Valve cover / Pump block	180 Nm	(133 ft lbf)
2	Homogenisation head	140 Nm	(103 ft lbf)
3	Product inlet / Pump block	140 Nm	(103 ft lbf)
4	Pressure gauge flange	140 Nm	(103 ft lbf)
5	Pump block / Crankcase	360 Nm	(265 ft lbf)
6	Piston bushing (none aseptic)	80 Nm	(59 ft lbf)
7	Piston connection	44 Nm	(32 ft lbf)
8	Plane bearing cap / Connecting rod	50 Nm	(37 ft lbf)
9	Belt pulley bushing	Allen key size	Torque
		3 mm	6 Nm (4.4 ft lbf)
		5 mm	20 Nm (15 ft lbf)
		6 mm	50 Nm (37 ft lbf)
		8 mm	90 Nm (66 ft lbf)
		10 mm	115 Nm (85 ft lbf)
		12 mm	170 Nm (125 ft lbf)
		14 mm	190 Nm (140 ft lbf)
		17 mm	270 Nm (199 ft lbf)



9.4 Trouble shooting

Fault	Possible cause	Action
No throughput	No voltage in the drive motor Motor not working Crank shaft not turning Suction or discharge pipes closed No feed pressure Gas / air in wetend or piping Valves stucked	Check fuses and leads Repair or replace motor Check the drive Open shut-off devices Switch on feed pump Vent wetend and piping Disassemble the wetend and check for damages or obstacles
Troughput to small or decreasing	Suction and discharge valves dirty or damaged Speed drop due to slipping V-belt Gas / air in wetend or piping Gas / air in product Capacaty of feed pump to small Piston packing damaged Valves stucked	Clean / change valves Adjust belt tension Vent wetend or piping Deaerate product Increase capacity of feed pump Replace piston packing Disassemble the wetend and check for damages or obstacles
Homogenisation pressure dropping or fluctuating	Suction and discharge valves dirty or damaged Gas / air in cylinder block, possibly in only one or two cylinders Hydraulic end seal leaking Pressure fluctuations or pressure drop in the hydraulic system Pressure gauge for homogenisation pressure not working	Clean / change valves Vent the wetend Replace seal Check pressure adjusting valve Vent the hydraulic system Check, and if necessary, replace pressure gauge
Homogenisation pressure not reached	Insufficient hydraulic pressure at homogenisation head Homogenisation head worn Pressure adjusting valve in hydraulic system is leaking Hydraulic pump worn Hydraulic pump not rotating	Check pressure valve Vent the hydraulic system Check forcer and seat Clean the pressure adjusting valve Note! The maximum set pressure must not be changed Replace the pump Check electrical connections

2.2tf201621.en

(Cont'd)

(Cont'd)

Fault	Possible cause	Action
Vibration in piping	Pulsation dampers full Valves worn Piston packing damaged To low inlet pressure To high inlet pressure	Drain Replace valves Check for product in cooling water Increase pressure Decrease pressure
Hammering noise during production	To low inlet pressure Pulsation damper full Feed system empty while changing balance tank	Increase pressure Drain Shut off the hydraulic pressure while switching tank

Checklist overview

Checklist overview - description

This section of the MM, **is intended for customers who do NOT use the Tetra Pak Maintenance System (TPMS)**. The checklist overview contains all the check points for a specified machine type or equipment which are needed in order to keep the equipment in good condition. The following items can be found in the checklist:

- **MM code** – shows where you can find more information about the check point.
- **Text** – name of unit and type of activity. For further information, see MM code.
- **Interval** – how often the check item should be performed in production hours.

Note! The checklist overview in this manual **may differ from the TPMS checklists** delivered by your local service station, due to the fact that TPMS checklists are continuously updated and adapted to local demands.

TPMS - description

The maintenance system used for equipment from Tetra Pak is called the **Tetra Pak Maintenance System (TPMS)**. If you are using TPMS, the checklists will be delivered directly from your local Tetra Pak service station.

The TPMS checklists are designed to match and keep pace with the ongoing development of new and existing equipment from Tetra Pak, and to meet the demands set by our customers for even higher efficiency and better economy.

Some of the advantages of TPMS are:

- TPMS maintains complete production lines.
- TPMS reduces down-time to a minimum each time maintenance is carried out.
- Updates of the maintenance schedule based on experience gained, improvements, modifications and specific customer requirements are issued.
- Recommendations regarding spare parts, rotation units, tools and templates, etc. are included.

The service life of each item in the equipment is predicted and all items are checked before they affect the efficiency of the equipment. This leads to different maintenance intervals for each item and the check list is unique for each maintenance occasion.

The results of the maintenance are sent back to the Tetra Pak service station. Statistics are evaluated regularly, giving a continuously updated maintenance system.

If you require further information regarding TPMS, please do not hesitate to contact your local Tetra Pak office

Checklist overview

Procedure code	Procedure text	Activity	Interval (h)
	PRE-MAINTENANCE CHECKS		
	WARNING! Before starting any service work, read the Safety precautions in the corresponding Technical Manual (TeM).	Check	250
	Daily/Weekly checks - Have they been carried out ? If not, then carry them out together with the operator before starting this service.	Check	250
	Leaks, Noise, Vibrations	Check	250
	FRAME		
MM 1.1-1	Covers	Check	500
MM 1.1.1-1	Gas springs	Check	500
MM 1.1.2-1	Insulation (optional)	Check	1000
MM 1.2-1	Vibration elements	Check	12000
	DRIVE UNIT		
MM 2.1-1	Drive motor	Clean	4000
MM 2.1-2	Drive motor	Lubricate	3000
MM 2.2.1-1	V-belts - wear	Check	500
MM 2.2.1-1	V-belts - tension	Check	1500
MM 2.2.2-1	Belt pulleys	Check	12000
MM 2.3.1-1	Oil	Check	250
MM 2.3.1-2	Oil	Change	4000
MM 2.3.2-1	Sealing rings	Change	4000
MM 2.3.2-2	Vibration damper	Change	12000
	CRANKCASE		
MM 3.1-1	Oil	Check	250
MM 3.1-2	Oil	Change	2500
MM 3.1-2	Sight glass	Clean	5000
MM 3.2-1	Oil level switch (optional)	Check	5000
MM 3.3-1	Thermometer	Check	5000
MM 3.4-1	Crankshaft - roller bearings	Check	12000
MM 3.4-1	Crankshaft - roller bearings	Change	24000
MM 3.4-1	Crankshaft - plane bearings	Change	12000
MM 3.4-1	Crankshaft - oil distributor	Check	2500
MM 3.4-1	Crankshaft - oil distributor	Clean	12000
MM 3.5-1	Cross head / Connecting rod	Check	12000
MM 3.6.1-1	Connections	Check	500
MM 3.6.2-1	Bellows	Check	250

2.1T1201922.en

Procedure code	Procedure text	Activity	Interval (h)
	WET END		
MM 4.1-1	Valves	Check	1500
MM 4.1.1-1	Valve seals	Change	1500
MM 4.2-1	Piston unit	Check	250
MM 4.3-1	Pressure gauge	Check	250
MM 4.3-1	Pressure gauge - Seals	Change	3000
	HOMOGENISATION UNIT		
MM 5-1	Homogenisation head	Check	1500
MM 5.1.1-1	Seat	Check	1500
MM 5.1.2-1	Forcer	Check	1500
MM 5.2.1-1	Seals	Change	3000
	HYDRAULIC SYSTEM		
MM 6-1	Hydraulic system	Check	1000
MM 6.1-1	Hydraulic unit	Check	250
MM 6.1.1-1	Oil	Change	8000
MM 6.2-1	Pressure gauge	Check	1500
MM 6.3-1	Pressure relief valve (optional)	Check	1500
	COOLING WATER- SYSTEM		
MM 7.1-1	Piping	Check	1000
MM 7.3-1	Regulating valves	Check	1000
MM 7.4-1	Water valve	Check	1000
MM 7.7-1	Cooling water regulator (optional)	Check	1000
MM 7.8-1	Flow meter (optional)	Check	1000
	ELECTRICAL SYSTEM		
MM 8.1-1	Cables	Check	2000
MM 8.2.1-1	Cooling fan filter (optional)	Change	12000
MM 8.3-1	Temperature transmitter (optional)	Check	1000
MM 8.4-1	Emergency stop	Check	2000

5 Technical data

2.25_en

This page intentionally left blank



Tetra Pak Processing Components AB

Technical Data for homogenizer

Model: Tetra Alex 25	Machine No.: 5845523507	Customer: Unilever, UK
-------------------------	----------------------------	---------------------------

General:

Capacity: 6000-8000 l/h	Working pressure: 200 bar	Inlet pressure: 3-10 bar	Noise reduction: ☐	Sound effect level (acc. to ISO 3746): B(A)
Altitude: <1000 m	Ambient temperature: <40 °C	Total mass: 1925 kg	Centre of gravity (a=): 1173 mm	Sound pressure level (distance=1m): dB(A)

Wetend design:

Valve design: Cone ☐ Mushroom ☒ Ball ☐	Piston diameter: 50 mm	Piston design: Stainless steel ☐ Chromium plated ☒ Ceramic coated ☐ Ceramic solid ☐	Piston packing: Grooved ☐ V-packing ☒	Remote ind. of product pressure: ☒ Feed: 14-30 V DC Signal: 4-20 mA
---	---------------------------	--	--	---

Homogenising device design:

Size of 1st stage: 53/59 ABR	Size of 2nd stage 53/62	Remote indication of hydraulic pressure: 1st stage ☒ 2nd stage ☒ Feed: 14-30 V DC Signal: 4-20 mA	Remote continuous setting: 1st stage ☒ 2nd stage ☒ Feed: 24 V DC Control signal: 4-20 mA <2.5 Amp.
---------------------------------	----------------------------	--	--

Drive Motor:

Manufacture: ABB	Model: M3BP280SMA4	Revolution: 1486 rpm	Protection: IP55	Thermistor: <7.5 V DC
Power: 75 kW	Voltage: 415 V	Frequency: 50 Hz	Full load current: 132 Amp.	Starting current: Amp.

Hydraulic Unit:

Manufacture: Bosch	Model: 6-4722 5471 81
-----------------------	--------------------------

Hydraulic Motor:

Manufacture: ABB	Model: M2VA71A 4	Revolution: 1410 rpm	Protection: IP55
Power: 0.25 kW	Voltage: 415 V	Frequency: 50 Hz	Rated current: 0.95 Amp.

Pressure Lubrication Motor:

Manufacture:	Model:	Revolution: rpm	Protection:
Power: kW	Voltage: V	Frequency: Hz	Rated current: Amp.

Drive Unit:

V-belt type: SPC	Number of tracks: 3	Motor pulley diameter: 355 mm	Gearbox pulley diameter: 425 mm	V-belt length 2500 mm
---------------------	------------------------	----------------------------------	------------------------------------	--------------------------

Reduction Gear:

Manufacture: Benzler	Model: TV111 ss coil	Reduction: 5,560
-------------------------	-------------------------	---------------------

Valves:

Cooling water valve: Solenoid ☒ Pneumatic ☐ Voltage: 24 V / DC	Steam valve: Solenoid ☐ Pneumatic ☐ Voltage: V AC Compressed air supply: bar VA	Press. relief valve: 1st Stage ☐ 2nd Stage ☐ Voltage: V DC Voltage: V DC Amp. Amp.
---	---	---

Cooling water supply:

Pressure: 2-4 bar	Consumption: 175 l/h	Temperature: <25 °C	Hardness: <10 °dH Machine control opt 28
----------------------	-------------------------	------------------------	--

Steam supply:

Pressure: bar	Consumption: kg/h	Temperature: °C
------------------	----------------------	--------------------

Condensate:

Other:

Fluorescent tube: ☐ Voltage: V AC	Door safety lock: ☐ Voltage: V AC W	Crankshaft speed sensor: ☐ Feed: V DC mA
Date: 2004-04-14	Sign: TP	Revision: 6

6 Test record

This page intentionally left blank



Tetra Pak Processing Components AB

Test Record for homogenizer

Model: Tetra Alex 25.	Machine No.: 5845523507
Customer: Unilever UK	

Performance data

Inlet pressure: 2,0 bar	Test liquid: Water 40-70°C	Test voltage: 400 V
----------------------------	-------------------------------	------------------------

Testing time (h)	Homogenizing pressure (bar)	Stage 1		Stage 2		Capacity (l/h)	Crankshaft revolution (rpm)	Current consumption (Amp)	Frequency (Hz)
		Hydraulic pressure (bar)	Signal (mA)	Hydraulic pressure (bar)	Signal (mA)				
1	50			28	8,7	8277	226	50	50,1
	100	38	6,7	28	8,7	8261	226	65	50,2
	150	70	9,2	28	8,7	8231	226	83	50,3
6	200	100	11,3	28	8,7	8162	226	102	50,4
1	200	100	11,3	28	8,7	6120	176	102	37,8

Manufacturing No.

Main motor	Hydraulic motor	Gearbox	Crankshaft
	3GVA072001-BSB	9872959,001	
Pump block	Pressure lubrication Motor		
A2257			

Date: 2004-04-14	Test performed by: Stefan Jönsson
Date: 2004-04-16	Test approved by: Tommy Petersson

Tetra Pak Processing Components AB

Box 103
S-221 00 Lund
BL0106EN:2

7 Parts list

2.27_en

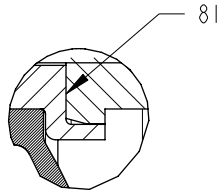
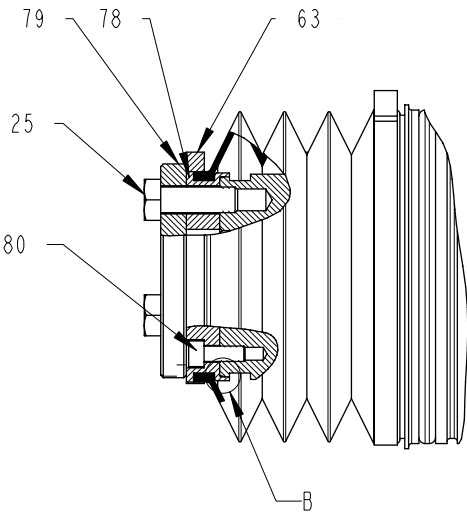
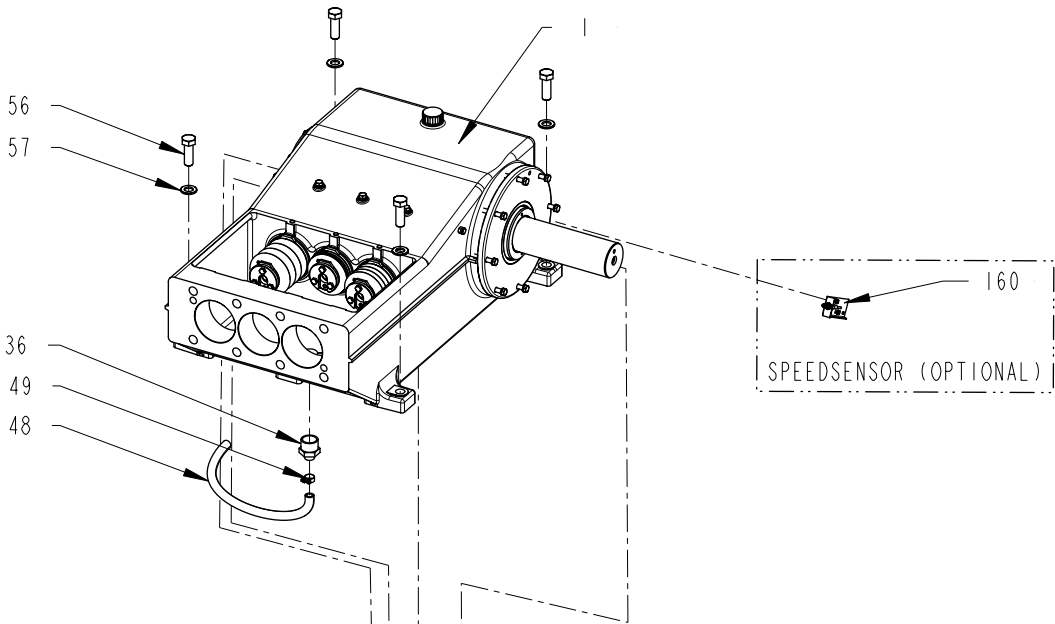
This page intentionally left blank

7 SPC

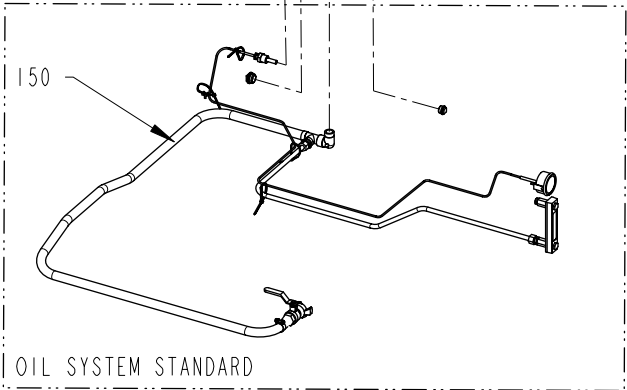
Spare Parts Catalogue

Intentionally left blank

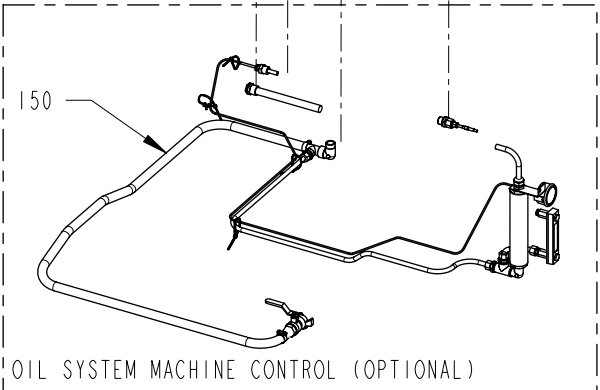
Pos	Part No	SP h	UN Qty	Description	Page No	Pos	Part No	SP h	UN Qty	Description	Page No
1	6-4722 6669 80		PC 1	CRANKCASE	4						
2	6-4722 6668 80		PC 1	COOLING CIRCUIT.....	10						
3	6-4722 6685 80		PC 1	WETEND	20						
4	6-4722 6672 80		PC 1	HOMOGENISING HEAD.....	26						
5	6-4722 6674 80		PC 1	HYDRAULIC UNIT.....	30						
7	6-4722 6670 80		PC 1	DRIVE UNIT	34						
8	6-4722 6667 80		PC 1	PRODUCT CONNECTIONS	40						
9	6-4722 6671 80		PC 1	ELECTRICAL PARTS.....	46						
10	6-4722 6675 80		PC 1	LABELS	48						
11	6-4722 6660 80		PC 1	COMMISSIONING KIT	50						



DETAILED VIEW B

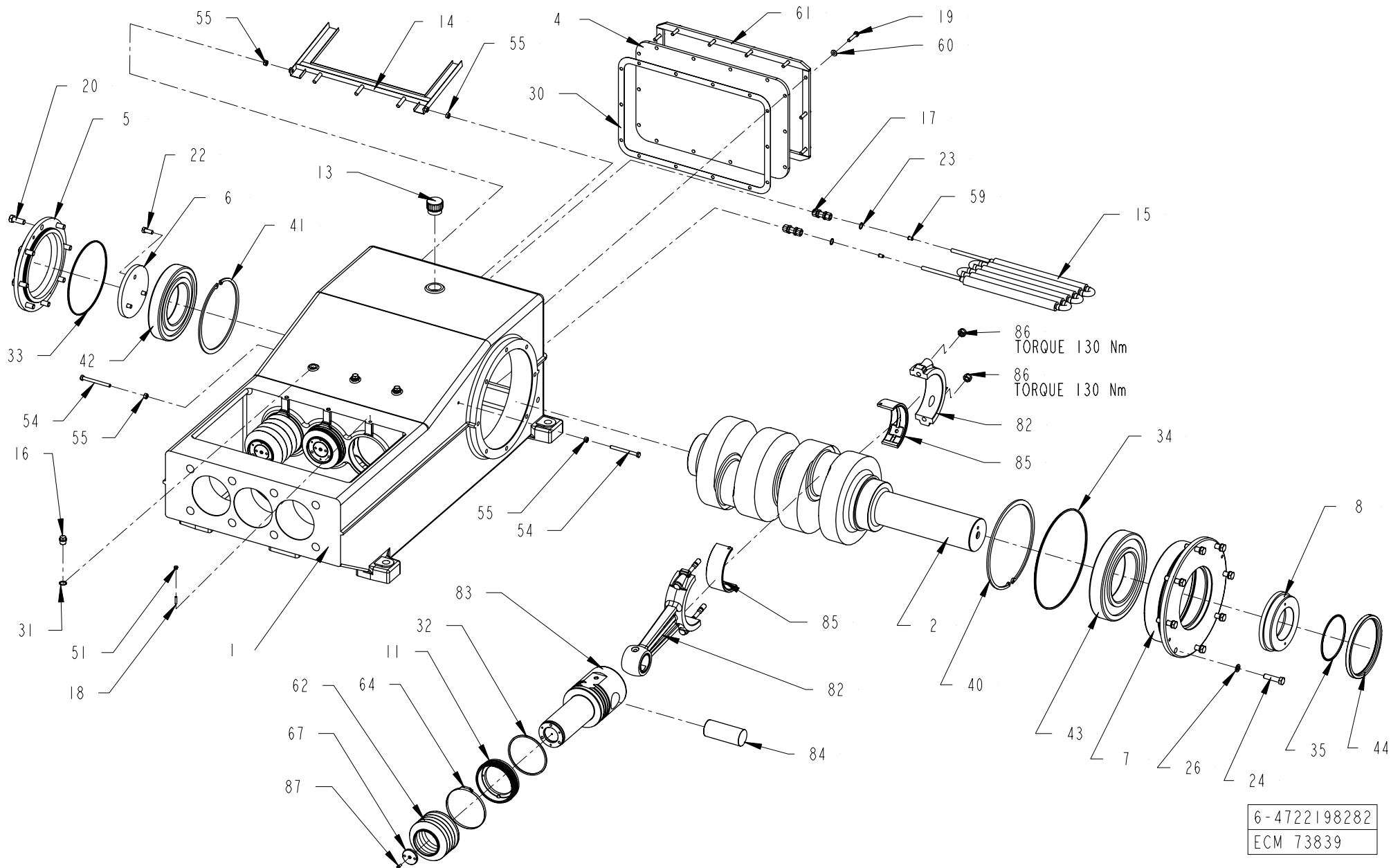


OIL SYSTEM STANDARD



OIL SYSTEM MACHINE CONTROL (OPTIONAL)

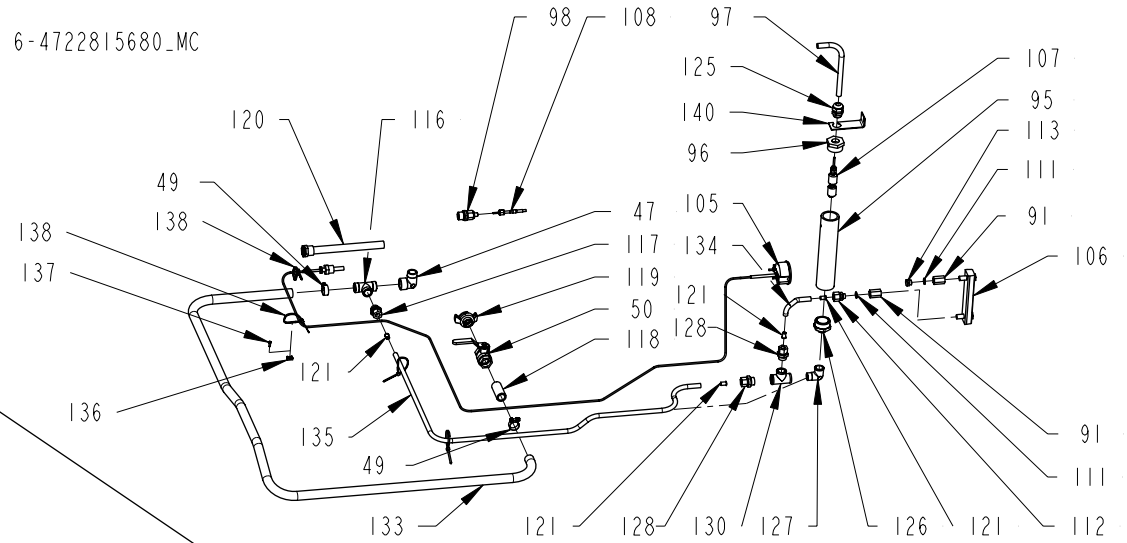
Pos	Part No	SP h	UN Qty	Description	Page No	Pos	Part No	SP h	UN Qty	Description	Page No
1	6-4722 1982 81		PC 1	CRANKCASE COMPLETE ALEX 25							
25	312105-0495		PC 9	Screw M6S ISO 4017 M10x30 A480							
36	6-4722 6557 01		PC 1	NIPPLE R 1 1/2" x Rp 3/4"							
48	6-4844 0193 25		PC 1	HOSE 25 x 4.5							
49	6-4018 0040 12		PC 3	HOSE CLIP 35/12							
56	6-4722 5649 01		PC 4	SCREW M6S 24 x 70							
57	315102-0198		PC 4	Washer Plain, BRFB 25/45 H=4							
63	6-4722 5538 01		PC 3	HOSE CLAMP 78-85							
78	6-4722 6784 01		PC 3	BELLOW RING FRONT							
79	6-4722 8082 02		PC 3	PISTON CONNECTION RING ALEX 25							
80	6-4722 5251 01		PC 9	SCREW 6x16, 8.8 FZB DIN 6912							
81	6-4722 6793 01		G 25	SEALING COMPOUND							
150	6-4722 8156 80		PC 1	OIL SYSTEM ALEX 25							



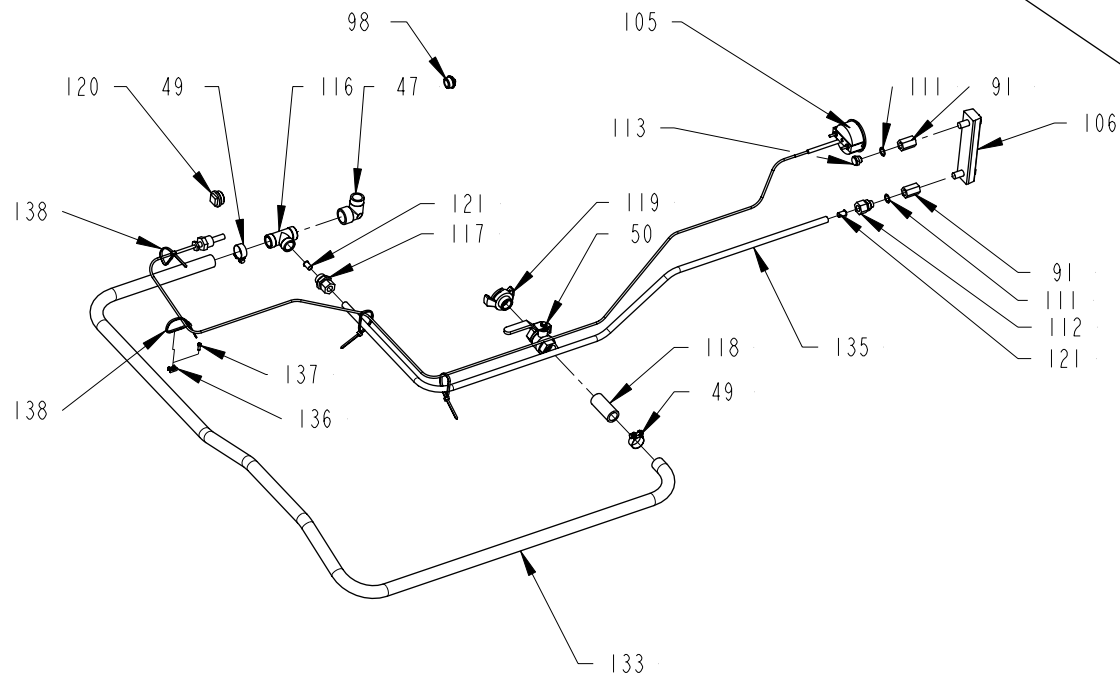
6-4722198282
ECM 73839

Pos	Part No	SP h	UN Qty	Description	Page No	Pos	Part No	SP h	UN Qty	Description	Page No
1	6-4722 0309 02		PC 1	CRANK HOUSING ALH/SHL 25		15	6-4722 8293 01		PC 1	OIL COOLER SS TA25	
2	6-4722 2001 02		PC 1	CRANK SHAFT ALH/SHL 25		17	90030-0096		PC 2	CONNECTION ELBOW 12	
4	6-4722 0935 01		PC 1	LEVEL WINDOW							
5	6-4722 0311 02		PC 1	BEARING COVER ALH/SHL 25							
6	6-4722 0312 01		PC 1	WASHER BEARING ALH/SHL 25							
7	6-4722 0313 02		PC 1	BEARING FLANGE							
8	6-4722 0752 01		PC 1	SPACER RING ALH/SHL 25 (SZO 18							
11	6-4722 6786 01		PC 3	BELLOW RING REAR							
13	6-4931 8090 09		PC 1	FILLER CAP 1.5"							
14	6-4722 0407 80		PC 1	OIL SCRAPER ALEX 25							
16	6-4722 5174 01		PC 3	SCREW							
18	90459-0277		PC 3	Screw Hex.Sock.Set Conept.MS6SS M6x30 A2							
19	312105-0455		PC 14	Screw M6S ISO 4017 M8x30 A480							
20	312101-0538		PC 8	Screw M6S M12x35 fzb							
22	312101-0536		PC 3	Screw M6S M12x30 fzb							
23	6-4300 0018 04		PC 2	SEALING RING 18 x 22 DIN 7603							
24	312101-0545		PC 8	Screw M6S M12x65 fzb							
26	315401-0178		PC 8	WASHER FBH12,2FZB							
30	6-4301 5000 11		PC 1	GASKET							
31	6-4722 5181 01		PC 3	SEAL 21 x 26 x 1.5							
32	315202-0241		PC 3	O-Ring 119,3x5,7 mm							
33	6-4302 0205 01		PC 1	O-RING 205 x 4							
34	6-4302 0490 56		PC 1	O-RING 312 x 4							
35	6-4302 0105 00		PC 1	O-RING 105 x 4							
40	6-4016 0302 70		PC 1	CIRCLIP 270 x 5 DIN 472							
41	6-4016 0302 15		PC 1	CIRCLIP 215 x 5 DIN 472							
42	6-4241 2200 04		PC 1	ROLLER BEARING RIGHT ALEX 25 NUP224							
43	6-4241 0204 10		PC 1	ROLLER BEARING LEFT ALEX 25 NU230							
44	6-4305 0015 00		PC 1	SEALING BOX 150 x 180 x 15 DIN 3760							
51	6-4648 0000 05		PC 3	PLUG 10.7							
54	312104-0506		PC 2	Screw M6S M10x75H fzb							
55	312601-0320		PC 4	NUT M6M 10-8 FZB							
60	315105-0165		PC 14	WASHER BRB8,4X16RFR							
61	6-4722 8055 01		PC 1	FRAME							
62	6-4722 1988 01	B 2500	PC 3	BELLOW							
64	6-4722 5538 06		PC 3	HOSE CLAMP 124-135							
67	6-4722 2455 02	B 2500	PC 3	PLATE							
82	6-4722 1992 80		PC 3	CONNECTING ROD COMPLETE ALEX 25							
83	6-4722 2022 01		PC 3	CROSS HEAD ALEX 25							
84	6-4722 2453 04		PC 3	CROSS HEAD BOLT							
85	6-4722 2162 01		PC 3	PLAIN BEARING ALEX 25							
86	6-4722 5356 01		PC 6	LOCK NUT M6M Tri-loc 16 DIN 6925							
87	6-4722 5251 01	B 2500	PC 3	SCREW 6x16, 8.8 FZB DIN 6912							

OIL SYSTEM - MACHINE CONTROL
MODEL 6-4722815680_MC

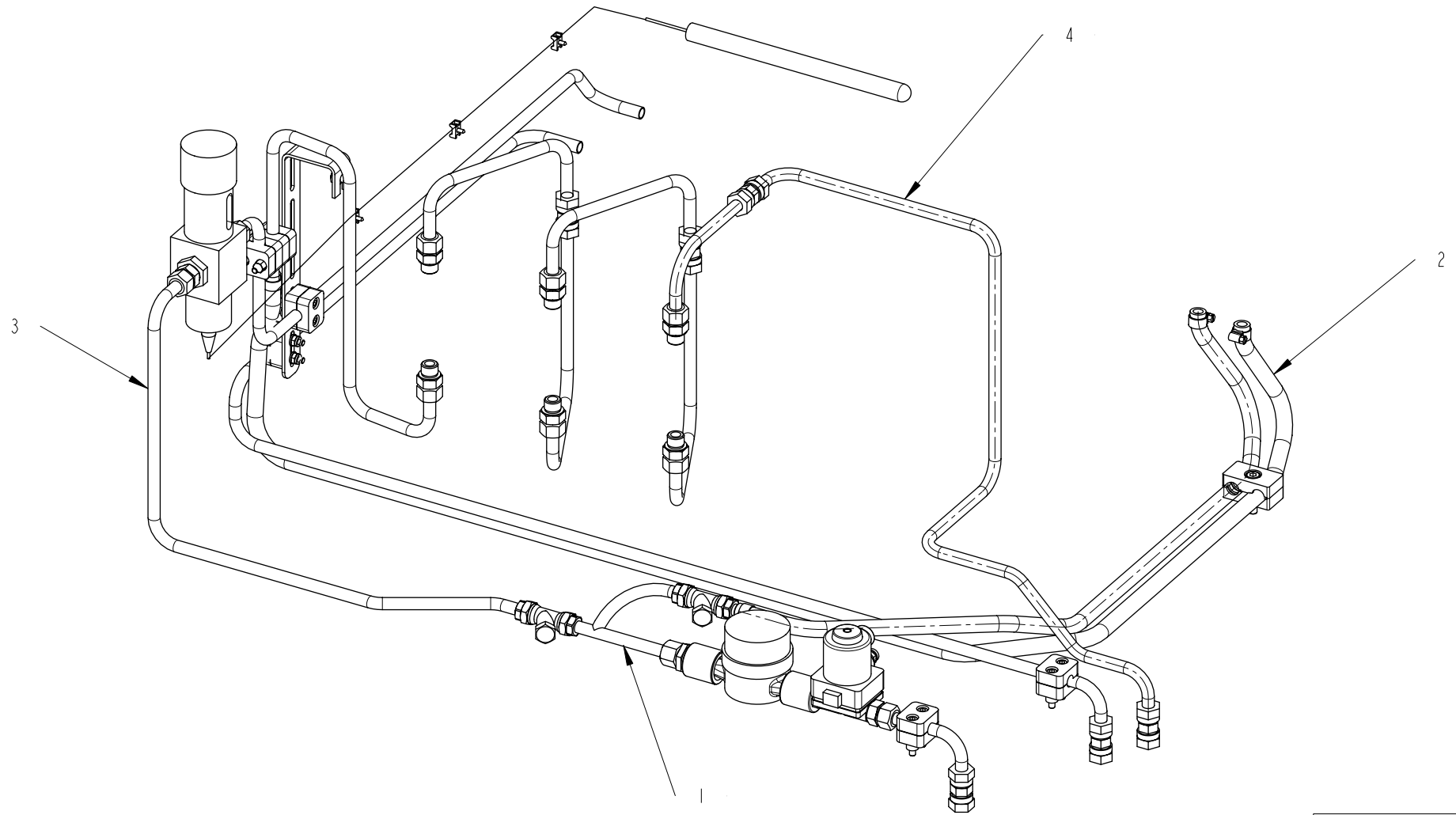


OIL SYSTEM - STANDARD
MODEL 6-4722815680

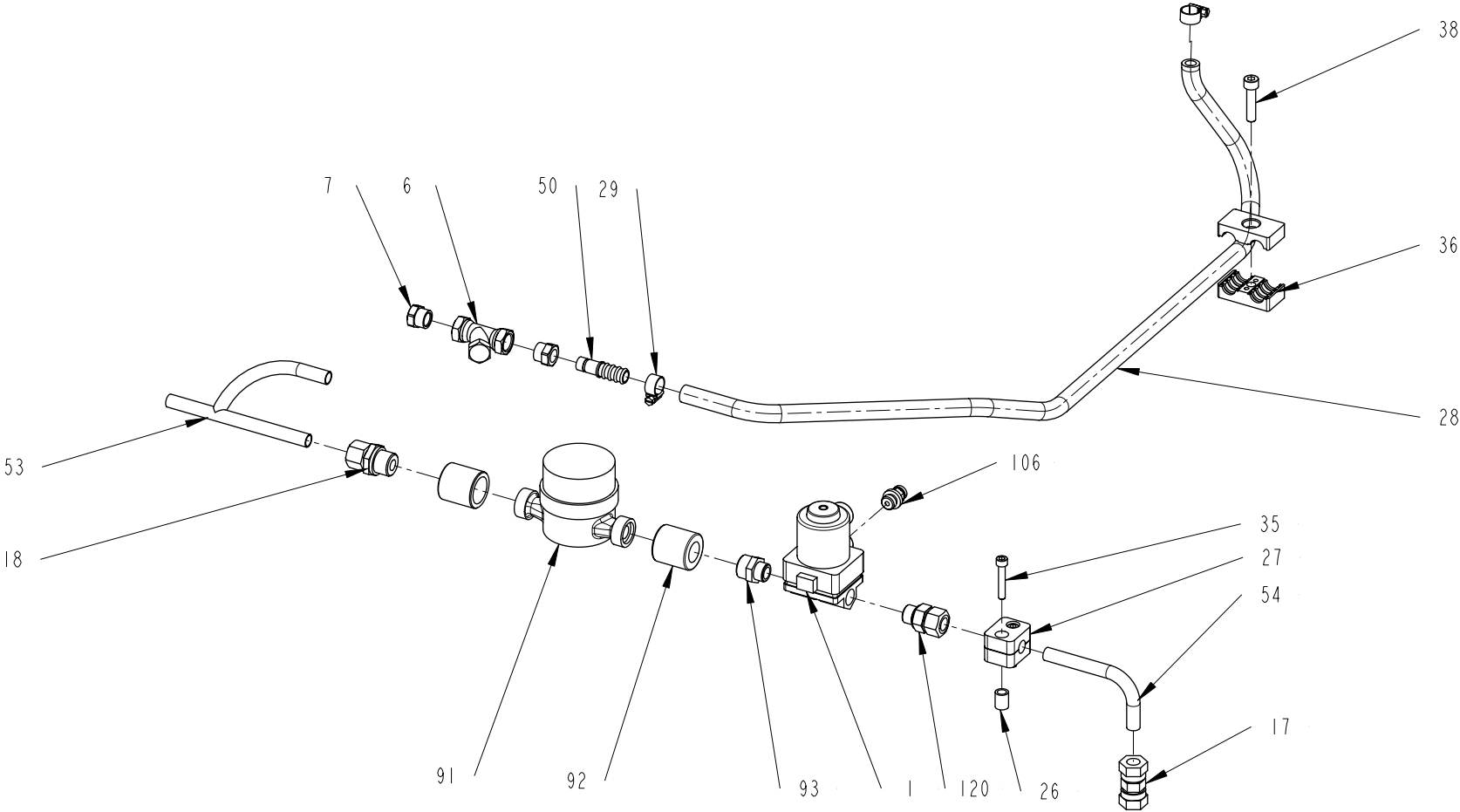


6-4722815600
ECM 73835

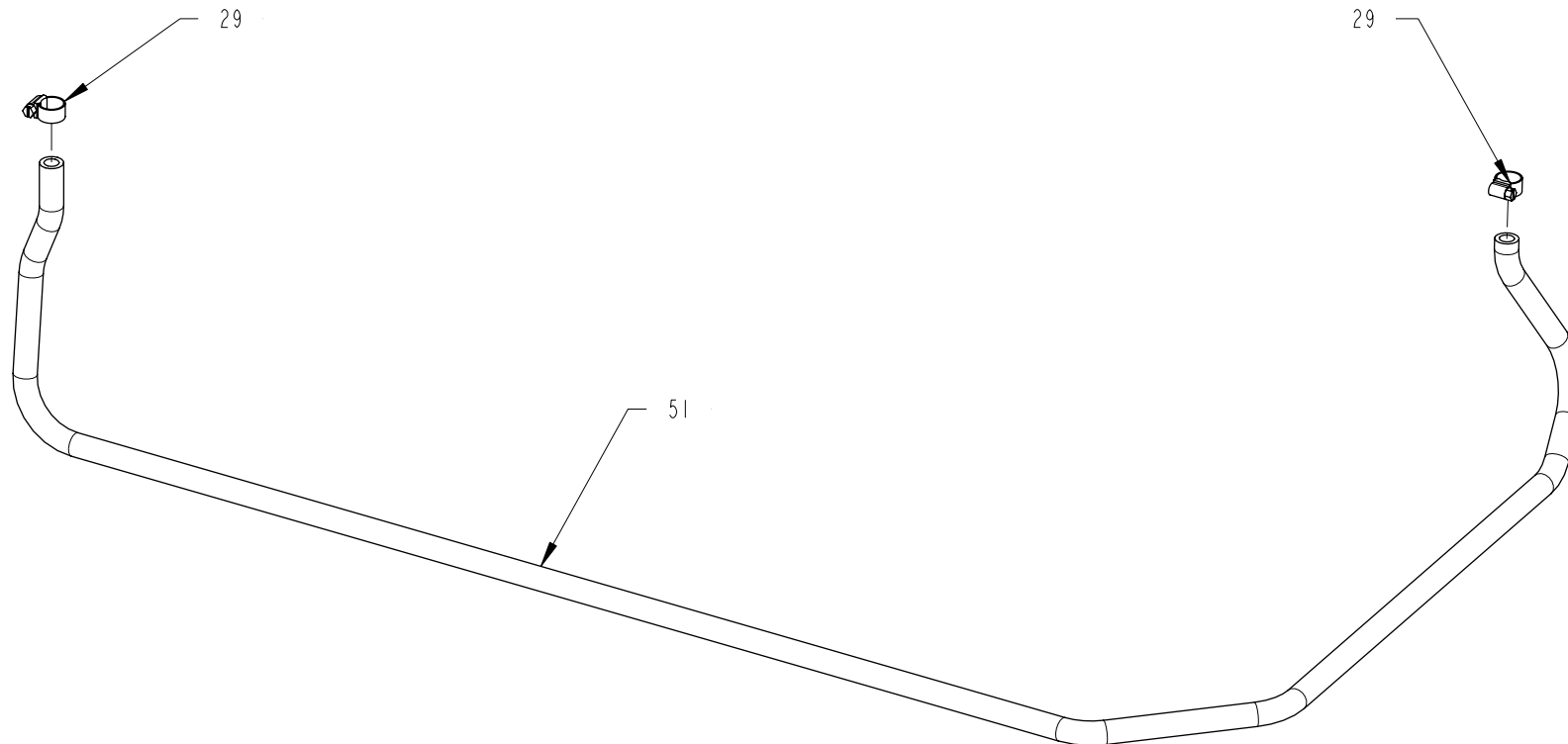
Pos	Part No	SP h	UN Qty	Description	Page No	Pos	Part No	SP h	UN Qty	Description	Page No
47	6-4722 6941 01		PC 1	CONNECTION RSK 3261 OUT 3/4"							
49	6-4018 0040 12		PC 3	HOSE CLIP 35/12							
50	6-4722 5675 01		PC 1	BALL VALVE							
91	6-4722 6940 01		PC 2	COUPLING							
95	6-4722 6922 01		PC 1	PLASTIC PIPE							
96	6-4722 6923 01		PC 1	PLUG							
97	6-4722 6924 01		PC 1	PIPE							
98	6-4722 6954 01		PC 1	COUPLING PT100							
105	6-4722 6928 01		PC 1	THERMOMETER							
106	6-4722 6927 01		PC 1	LEVEL GLASS							
107	6-4722 6926 02		PC 1	FLOAT SWITCH							
108	6-31801 5249 2		PC 1	Temp.sensor Pt-100 3w Class A 15mm 10m							
111	315233-0110		PC 2	Washer Captive Sealing G1/4							
112	90224-0186		PC 1	NIPPLE							
113	90257-0001		PC 1	FILTER PLUG PARTNO 8145-00-140 TYP F14							
116	6-4722 6931 01		PC 1	T-PIPE OUT 3/4" IN 1/2" (2X)							
117	90224-0183		PC 1	NIPPLE							
118	6-4722 6943 01		PC 1	NIPPLE PIPE 3/4"							
119	6-4722 6935 01		PC 2	CLAW CONNECTION OUT 3/4"							
120	6-4722 6939 01		PC 1	SENSOR POCKET OUT 3/4"							
121	342706-0195		PC 4	Accessories, Insert Sleeve 12 mm							
125	352103-0110		PC 1	Cable Gland, STR 16, PR22,5/PG16							
126	6-4722 6934 01		PC 1	NIPPLE RSK 3229 OUT							
127	6-4722 6941 02		PC 1	CONNECTION RSK 3261 OUT 1/2"							
128	90224-0183		PC 2	NIPPLE							
130	6-4722 6932 01		PC 1	T-PIPE RSK 3243 IN 1/2"							
133	6-4844 0193 25		PC 3	HOSE 25 x 4.5							
134	90166-0068		M 1	TUBE 12 mm PA Blue							
135	90166-0068		M 1	TUBE 12 mm PA Blue							
138	6-1995 106 510		PC 4	Stripes black TY 232MX 200X2,4mm							
140	6-4722 7034 01		PC 1	BRACKET							



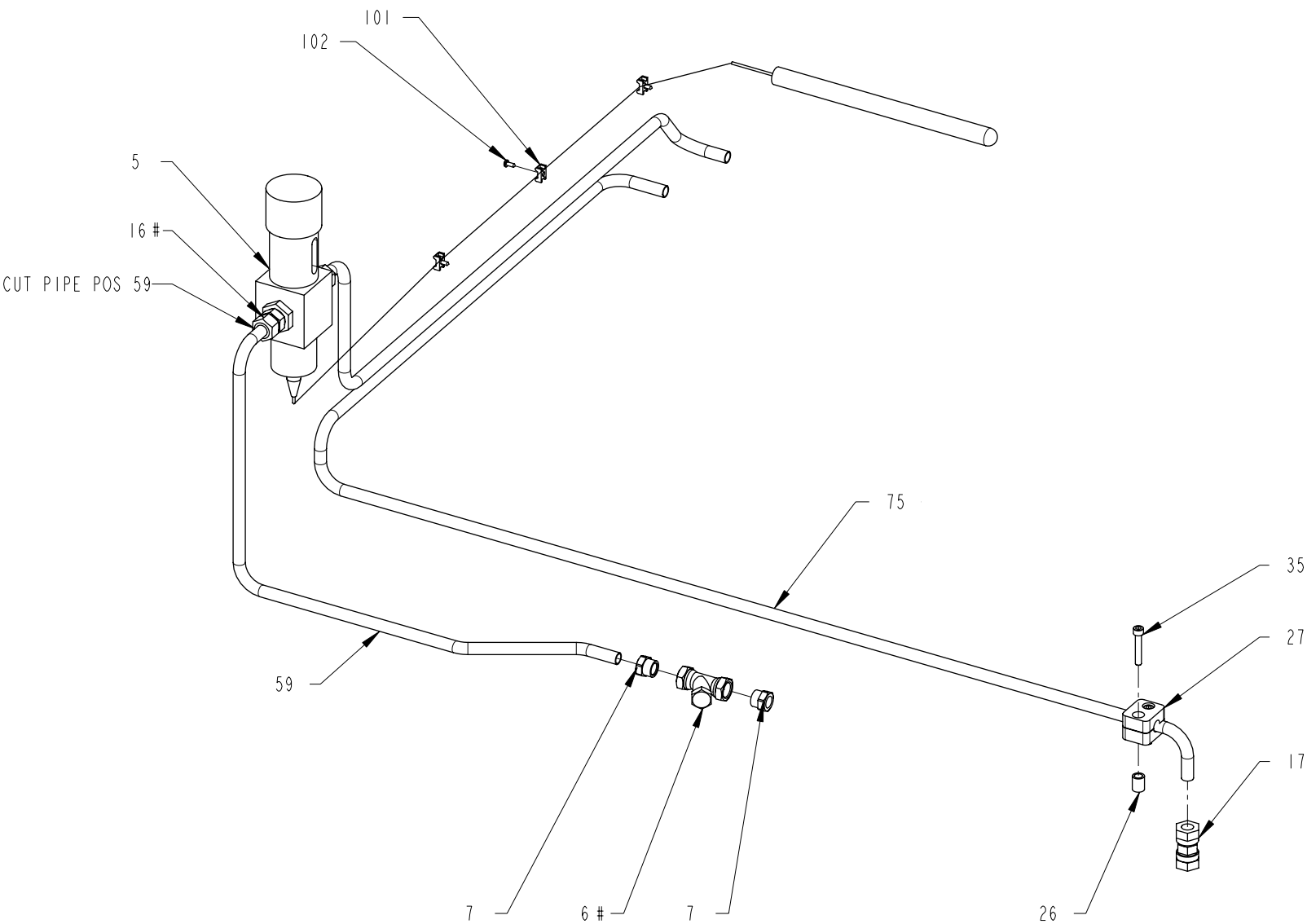
Pos	Part No	SP h	UN	Qty	Description	Page No
1	6-4722 8430 80		PC	1	COOLING SYSTEM WATER INLET ALEX 25	
2	6-4722 8431 80		PC	1	COOLING SYSTEM GEARBOX OUTLET ALEX 25	
3	6-4722 8432 80		PC	1	COOLING SYSTEM CRANKCASE CIRCUIT ALEX 25	
4	6-4722 8433 80		PC	1	COOLING SYSTEM PISTON CIRCUIT ALEX 25	



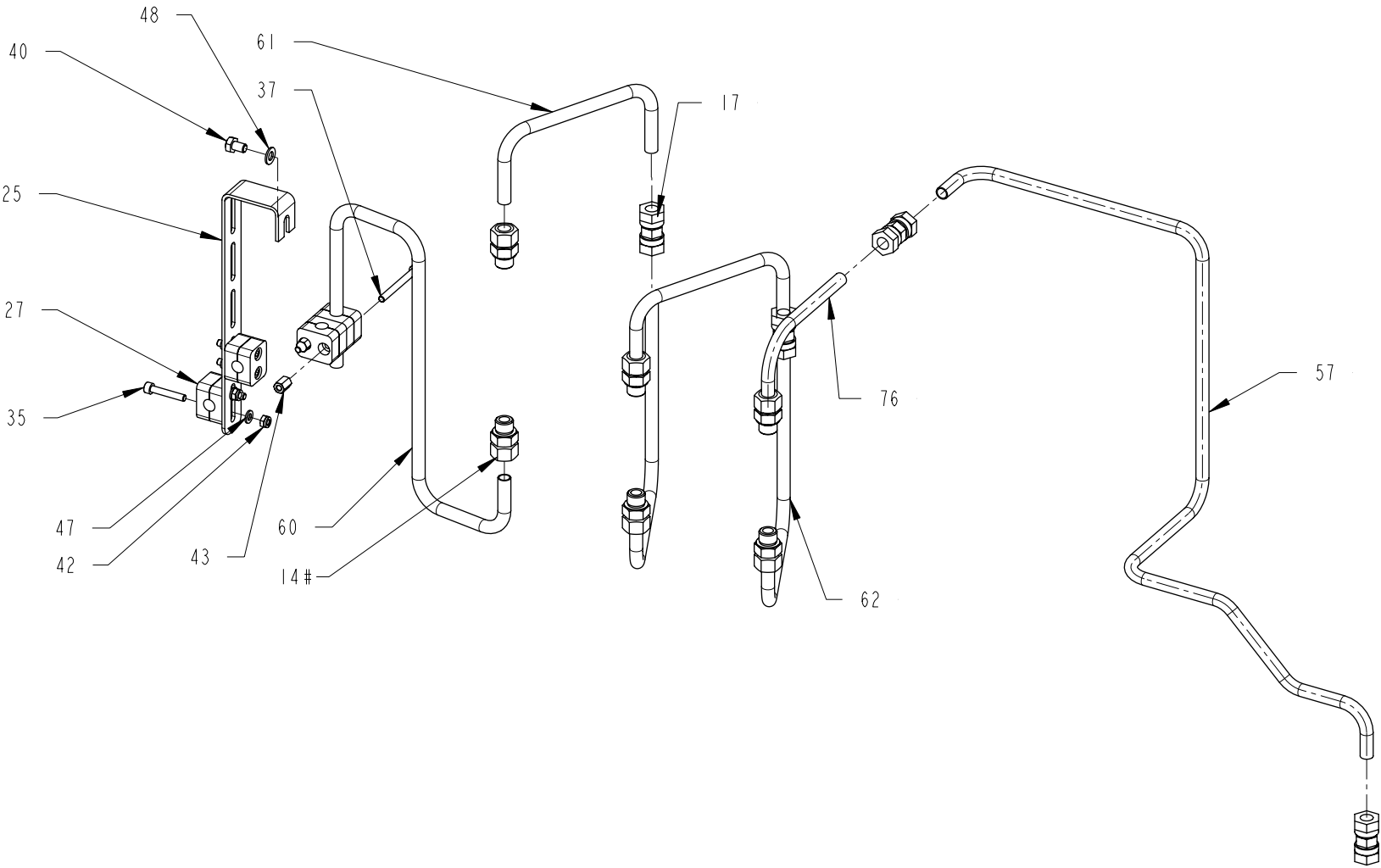
Pos	Part No	SP h	UN	Qty	Description	Page No	Pos	Part No	SP h	UN	Qty	Description	Page No
1	6-4722 7312 03		PC	1	WATER VALVE 3/8" 24V DC								
6	6-4722 6093 01		PC	1	TRIM VALVE R 3/8"								
7	6-4722 6094 01		PC	2	SCREW CONNECTION 12 R10								
17	90030-0106		PC	1	Conn. Pipe G-12								
18	6-4722 6098 01		PC	1	STRAIGHT CONNECTION GE 12-PL/R 1/2"								
26	6-4722 6095 01		PC	2	SPACER 12 x 8.2 x 15								
27	6-4722 5213 01		PC	1	PIPE HOLDER SP112A PP								
28	6-4722 5186 01		PC	1	HOSE 10 x 16								
29	342991-0101		PC	2	Hose Clip,Worm Drive Type (13)-16								
35	312115-0376		PC	2	Screw ISO4762 M6x35 A4								
36	6-4722 5539 01		PC	2	HOSE BRACKET								
38	312115-0457		PC	1	Screw ISO4762 M8x35 A4								
50	342900-0120		PC	1	Hose Nipple SN10-12								
53	6-4722 6244 03		PC	1	COOLING PIPE ø12								
54	6-4722 6244 02		PC	1	COOLING PIPE ø12								
91	6-4722 6930 01		PC	1	FLOWMETER								
92	6-4722 6946 01		PC	2	REDUCER VVS 3/4" -1/2"								
93	6-4722 6952 01		PC	1	NIPPLE VVS 1/2" -3/8"								
120	6-4350 8400 78		PC	1	STRAIGHT CONNECTION GE 12 L/R3/8								



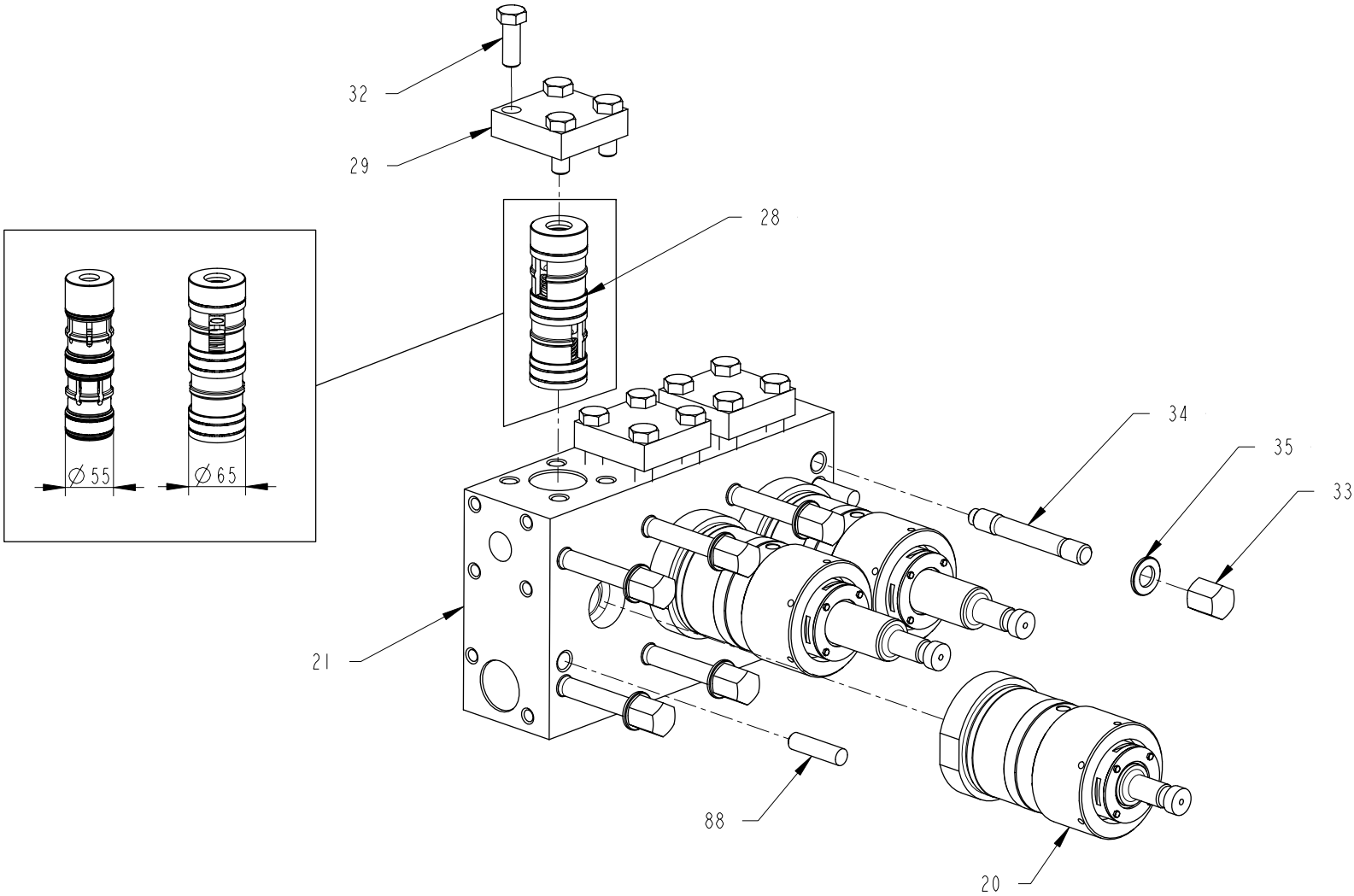
Pos	Part No	SP h	UN	Qty	Description	Page No	Pos	Part No	SP h	UN	Qty	Description	Page No
29	342991-0101		PC	2	Hose Clip,Worm Drive Type (13)-16								
51	6-4722 5186 01		PC	1	HOSE 10 x 16								



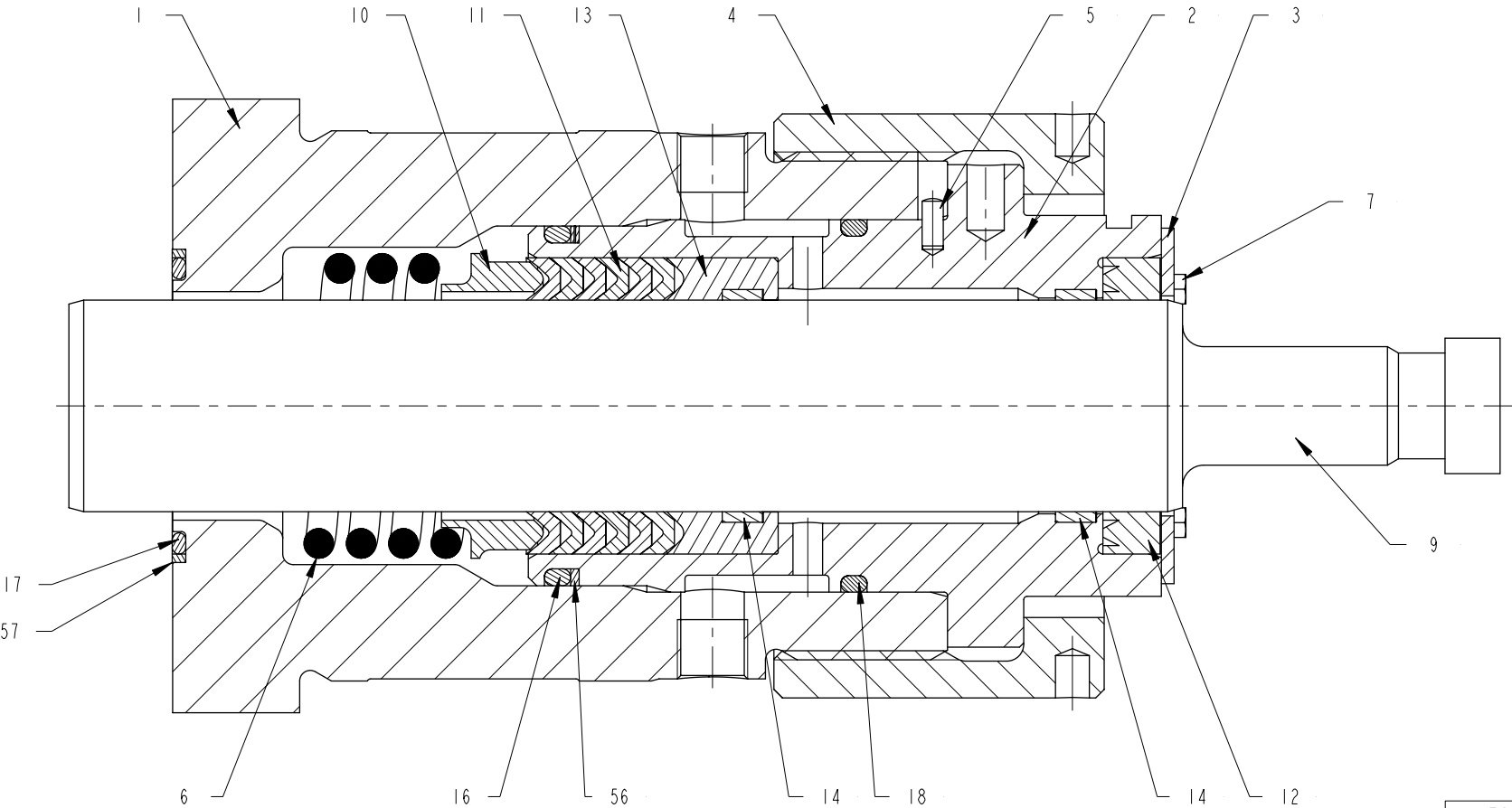
Pos	Part No	SP h	UN	Qty	Description	Page No	Pos	Part No	SP h	UN	Qty	Description	Page No
5	90187-0069		PC	1	Temp. Contr. Valve, R3/8 25-68øC								
6	6-4722 6093 01		PC	1	TRIM VALVE R 3/8"								
7	6-4722 6094 01		PC	2	SCREW CONNECTION 12 R10								
16	6-4350 8400 78		PC	2	STRAIGHT CONNECTION GE 12 L/R3/8								
17	90030-0106		PC	1	Conn. Pipe G-12								
26	6-4722 6095 01		PC	2	SPACER 12 x 8.2 x 15								
27	6-4722 5213 01		PC	1	PIPE HOLDER SP112A PP								
35	312115-0376		PC	2	Screw ISO4762 M6x35 A4								
59	6-4722 8172 01		PC	1	COOLING PIPE ø12								
75	6-4722 8172 02		PC	1	COOLING PIPE ø12								
101	352113-0205		PC	3	Anchor plates for strips, type TM2S8-C10								
102	312125-0287		PC	3	Screw ISO 1207 M4x8 A4								



Pos	Part No	SP h	UN	Qty	Description	Page No	Pos	Part No	SP h	UN	Qty	Description	Page No
14	6-4350 8400 78		PC	6	STRAIGHT CONNECTION GE 12 L/R3/8								
17	90030-0106		PC	4	Conn. Pipe G-12								
25	6-4722 6349 01		PC	1	CANTILEVER								
26	6-4722 6095 01		PC	2	SPACER 12 x 8.2 x 15								
37	312115-0382		PC	2	Screw ISO4762 M6x60 A4								
40	312105-0447		PC	1	Screw M6S ISO 4017 M8x12 A480								
42	312812-0316		PC	4	Hexagon Nut, Ny-Lock M6 A480								
43	6-4722 6310 01		PC	2	JOINT NUT M6 x 14								
47	315105-0153		PC	4	WASHER BRB6,4X12RFR								
48	315105-0165		PC	1	WASHER BRB8,4X16RFR								
57	6-4722 8172 06		PC	1	COOLING PIPE ø12								
60	6-4722 8172 03		PC	1	COOLING PIPE ø12								
61	6-4722 8172 28		PC	2	COOLING PIPE ø12								
62	6-4722 8172 29		PC	2	COOLING PIPE ø12								
76	6-4722 8172 31		PC	1	COOLING PIPE ø12								

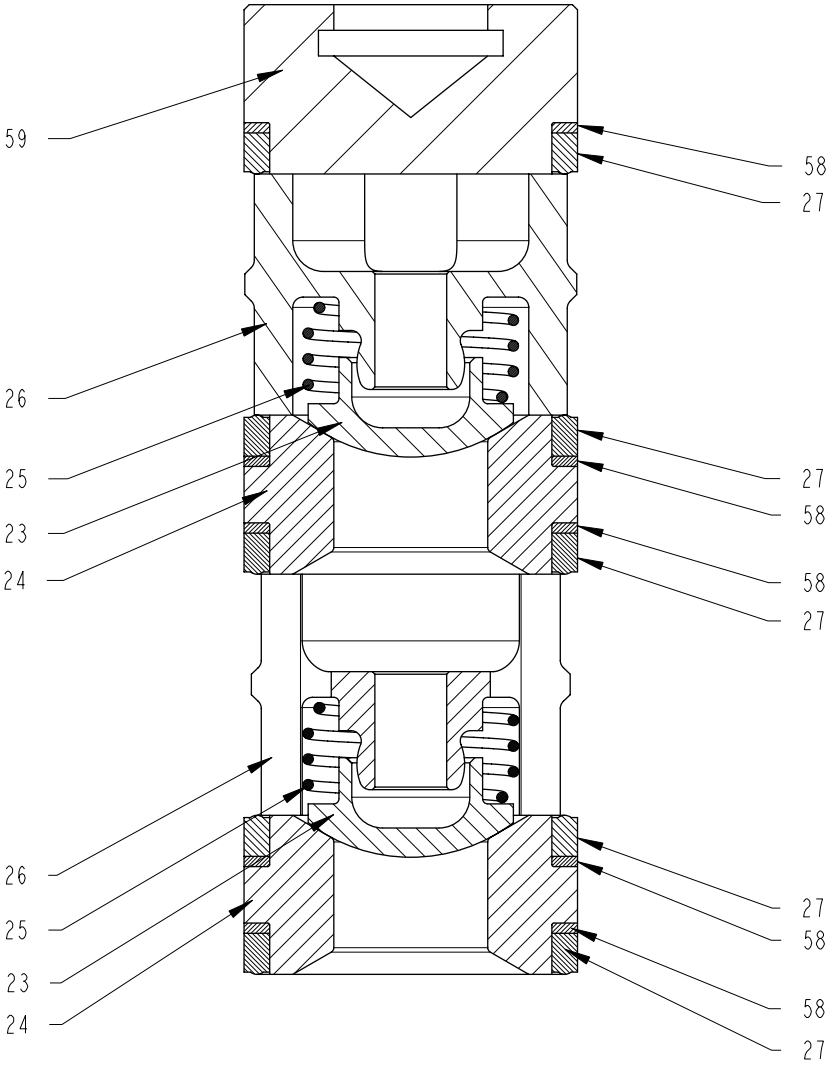


Pos	Part No	SP h	UN	Qty	Description	Page No	Pos	Part No	SP h	UN	Qty	Description	Page No
20	6-4722 8147 56		PC	3	PISTON CARTRIDGE ALEX 25 ø56 ASEPTIC								
21	6-4722 6846 01		PC	1	PUMP BLOCK ø65 US-3A								
28	6-4722 8161 80		PC	3	VALVE CARTRIDGE ø65 MUSHROOM								
29	6-4722 2911 01		PC	3	VALVE COVER								
32	6-4722 7446 01		PC	12	SCREW M6S 20 x 55								
33	6-4010 6240 02		PC	8	CAP NUT M24								
34	6-4722 6852 38		PC	8	STUD BOLT M24 x 168								
35	6-4015 0025 05		PC	8	WASHER BRB 25 DIN125								
88	6-4722 5084 02		PC	2	GUIDE PIN CP m6 20 x 80 SMS 2374								
	6-4722 8047 01		PC	1	Protection TA25 for pistons								
	312607-0322		PC	16	Hexagon Nut, EN 24032 M6M M12 A480								
	315105-0178		PC	8	WASHER BRB13X24RFR								
	6-4722 8058 01		PC	4	BRACKET								
	6-31801 5471 6		M	1	ROD								

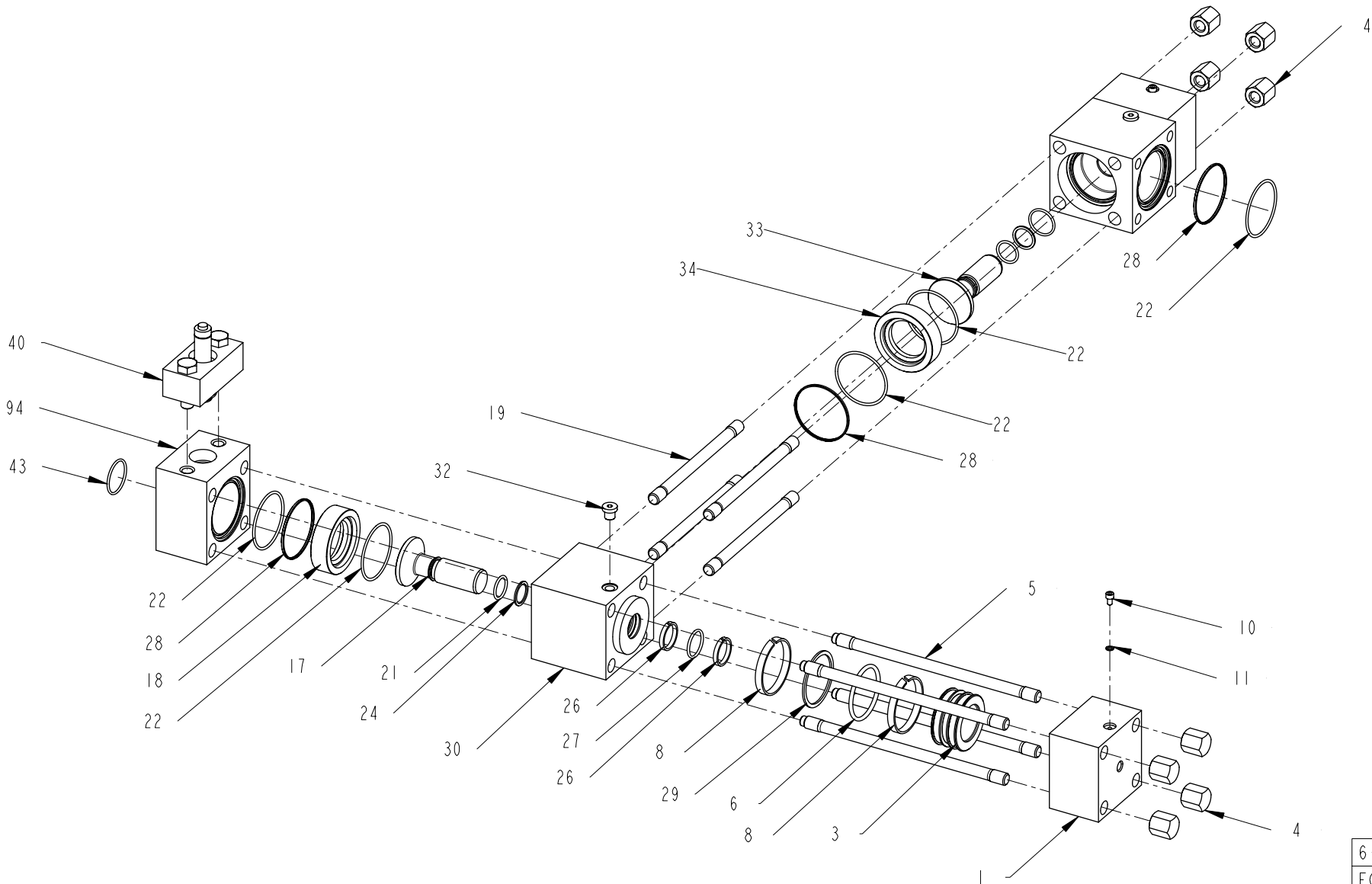


6-4722814750
ECM 73830

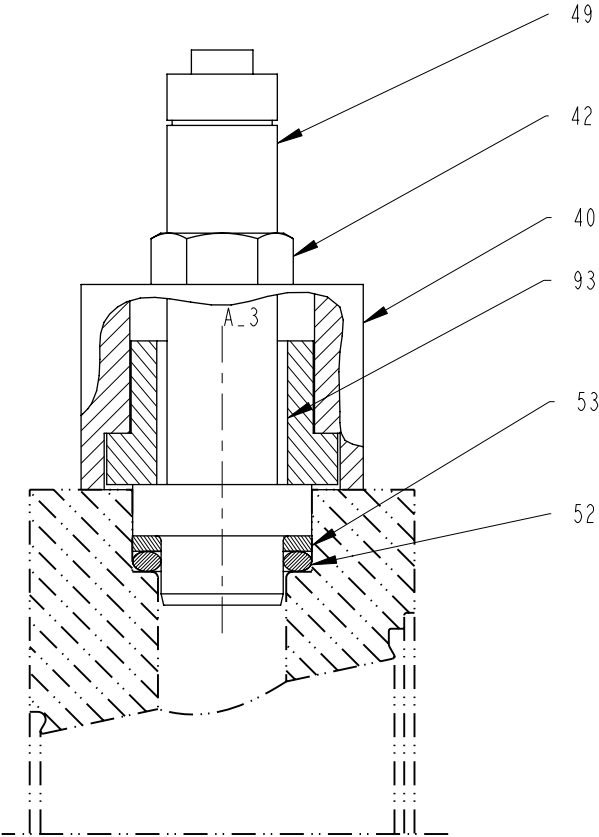
Pos	Part No	SP h	UN Qty	Description	Page No	Pos	Part No	SP h	UN Qty	Description	Page No
1	6-4722 6900 02		PC 3	CYLINDER BUSHING 40-50 US-3A							
2	6-4722 6903 02		PC 3	PISTON BUSHING 50 US-3A							
3	6-4722 6122 13		PC 3	COVER ø50							
4	6-4722 3003 01		PC 3	PRESSURE NUT 40-56							
5	311103-0306		PC 3	Parallel Pin ISO 2338 5m6X12 A1							
6	6-4722 5843 02		PC 3	SPRING 7.0 x 65 x 80 x 6 US-3A							
7	312105-0287		PC 12	Screw M6S ISO4017 M4x8 A470							
9	6-4722 1585 01	B 2500	PC 3	PISTON 50-CR							
10	6-4722 0388 56		PC 3	SUPPORT RING 50 V-TYP US-3A							
11	6-4722 2873 01	B 500	PC 3	PISTON SEAL 50-V							
12	6-4722 0931 10	B 500	PC 3	PISTON SEAL 50							
13	6-4722 1837 19	B 1250	PC 3	COMPRESSION RING 50-V US-3A							
14	6-4722 1418 10	B 500	PC 6	GUIDE BAND 50							
16	6-4722 6562 22	B 500	PC 3	O-RING 75 x 5							
17	6-4722 6562 09	B 2500	PC 3	O-RING 62 x 4							
18	6-4722 6562 22	B 500	PC 3	O-RING 75 x 5							
56	6-4722 1178 17	B 500	PC 3	SUPPORT RING 85							
57	6-4722 1178 23	B 2500	PC 3	SUPPORT RING 74							



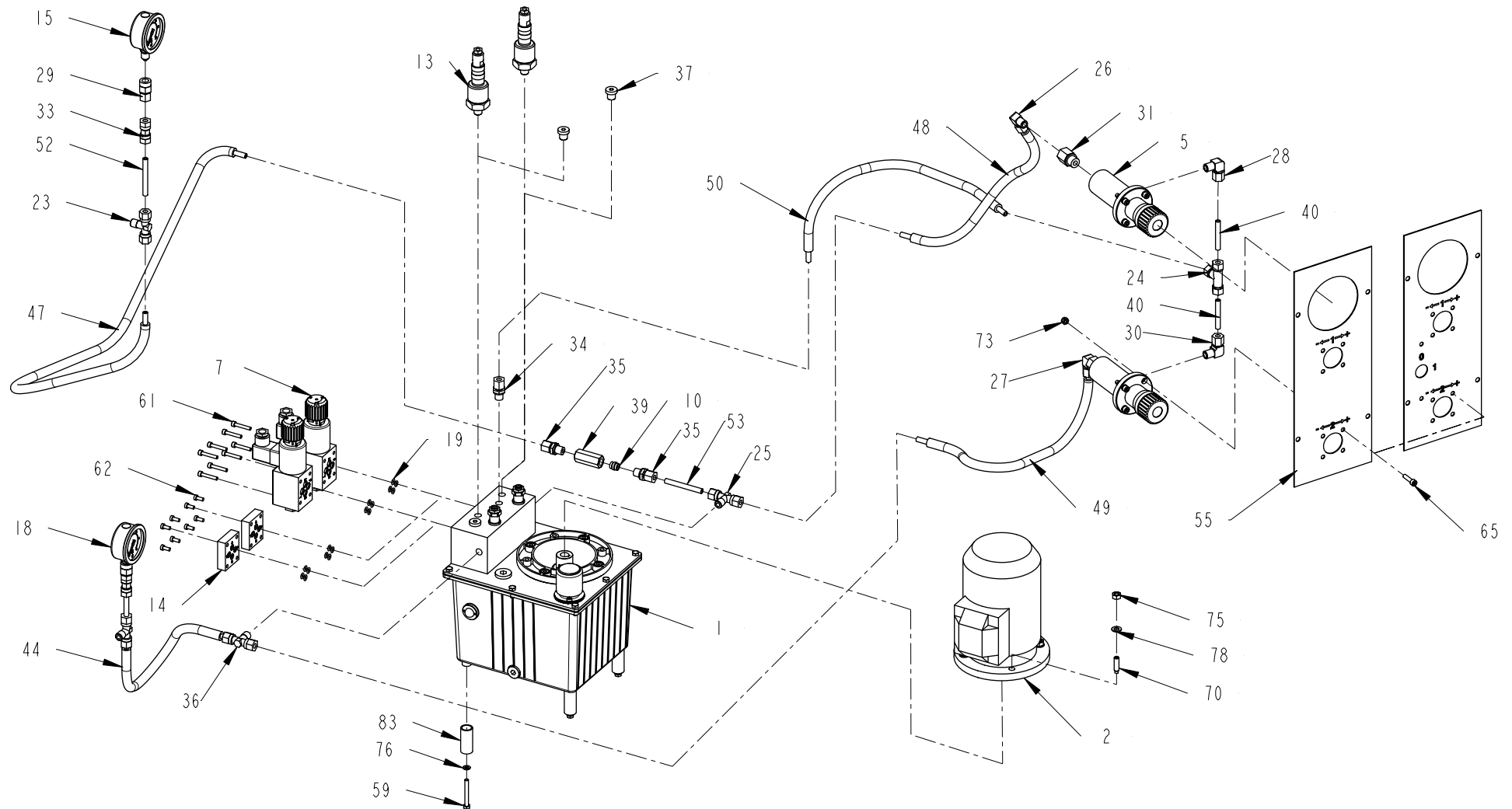
Pos	Part No	SP h	UN	Qty	Description	Page No	Pos	Part No	SP h	UN	Qty	Description	Page No
23	6-4722 6648 01		PC	6	MUSHROOM VALVE 65								
24	6-4722 6649 03		PC	6	VALVE SEAT 65								
25	6-4722 6652 01	B 2500	PC	6	VALVE SPRING 65								
26	6-4722 6650 01		PC	6	VALVE CAGE 65								
27	6-4722 0942 02	B 2500	PC	15	VALVE SEALING 55 x 65 x 8								
58	6-4722 1178 18	B 2500	PC	15	SUPPORT RING 65								
59	6-4722 6651 01		PC	3	SPACER 65								



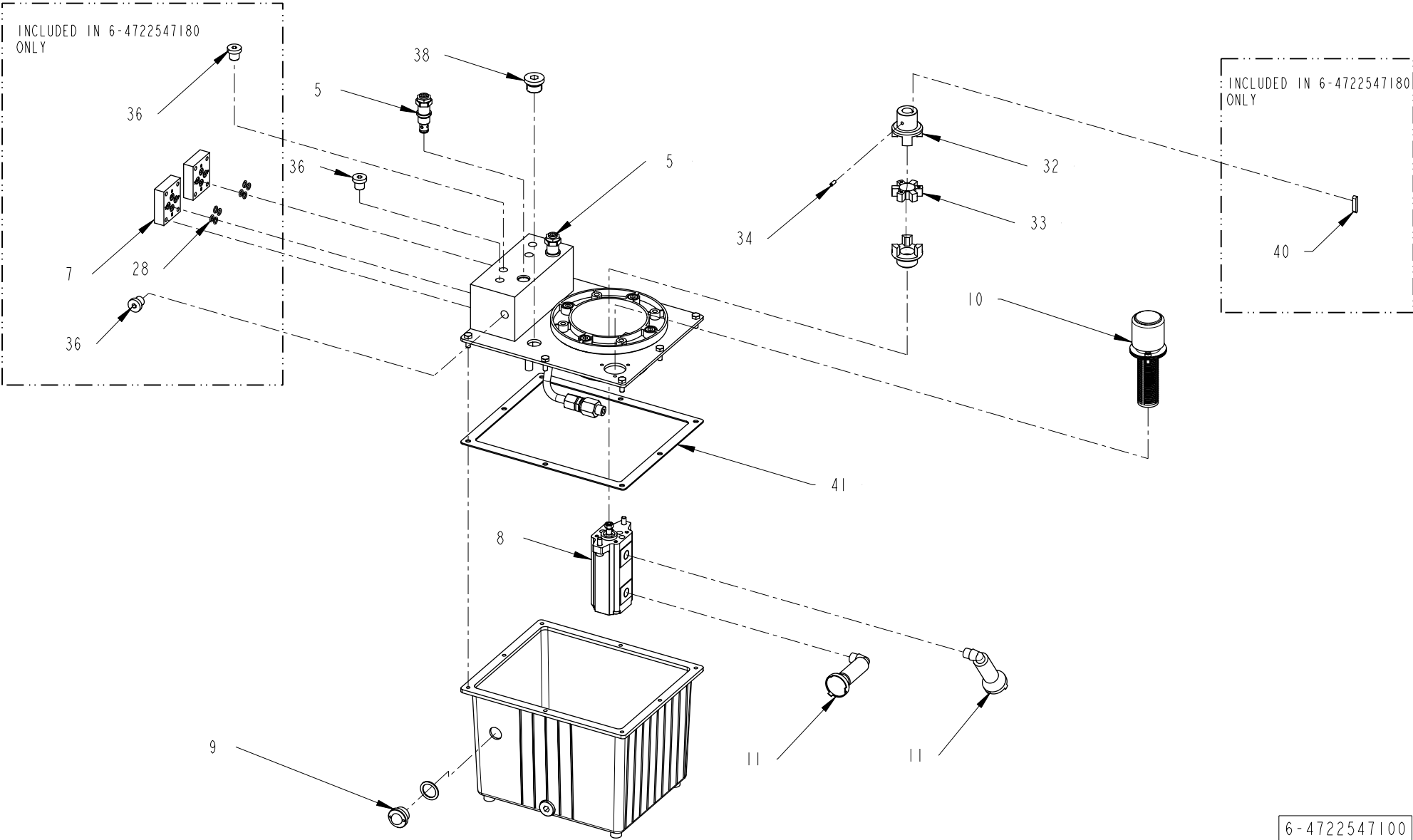
Pos	Part No	SP h	UN Qty	Description	Page No	Pos	Part No	SP h	UN Qty	Description	Page No
1	6-4722 7041 01		PC 2	HYDRAULIC CYLINDER 75							
3	6-4722 7042 01		PC 2	HYDRAULIC PISTON 75							
4	6-4010 6240 09		PC 8	CAP NUT M16							
5	6-4722 6852 43		PC 4	STUD BOLT M16 x 296							
6	6-4722 6562 47	B 5000	PC 2	O-RING 62.87 x 5.33							
8	6-4306 0000 05	B 5000	PC 4	GUIDE BAND 75							
10	312115-0364		PC 2	Screw ISO4762 M6x10 A4							
11	6-4722 5233 01	B 5000	PC 2	SEALING RING 6 x 10							
17	6-4722 7043 02	B 5000	PC 1	FORCER 53/63 ABR							
18	6-4722 7044 02	B 5000	PC 1	SEAT 53/59 ABR							
19	6-4722 6852 44		PC 4	STUD BOLT M16 x 220							
21	6-990322 10	B 5000	PC 2	O-ring 24.99x3.53, EPDM ,ALEX 20							
22	6-990322 18	B 5000	PC 5	O-ring 69.44x3.53 AL113 3030-70 EPDM							
24	6-4722 7151 03	B 5000	PC 2	Support ring axial 3.53 x 32.2							
26	6-4722 1418 16	B 5000	PC 4	GUIDE BAND 32							
27	6-990257 18	B 5000	PC 2	O-ring 31.34x3.53 AL113 3030-70 EPDM							
28	6-4722 7152 03	B 5000	PC 3	SUPPORT RING RADIAL 3.53 x 79.8							
29	6-4722 7153 03	B 5000	PC 2	SUPPORT RING AXIAL 5.33 x 75							
30	6-4722 7045 01		PC 2	HOUSE							
32	90087-0015		PC 2	Plug, Ext. Thread Hex. Socket VSTI 1/4-E							
33	6-4722 7043 01		PC 1	FORCER 53/63							
34	6-4722 7044 01		PC 1	SEAT 53/62							
40	6-4722 8099 80		PC 1	FLANGE MANOMETER							
43	6-990322 14	B 2500	PC 1	O-ring 40.87x3.53 AL113 3030-70 EPDM							
94	6-4722 7046 02		PC 1	INTERMEDIATE FLANGE 86							



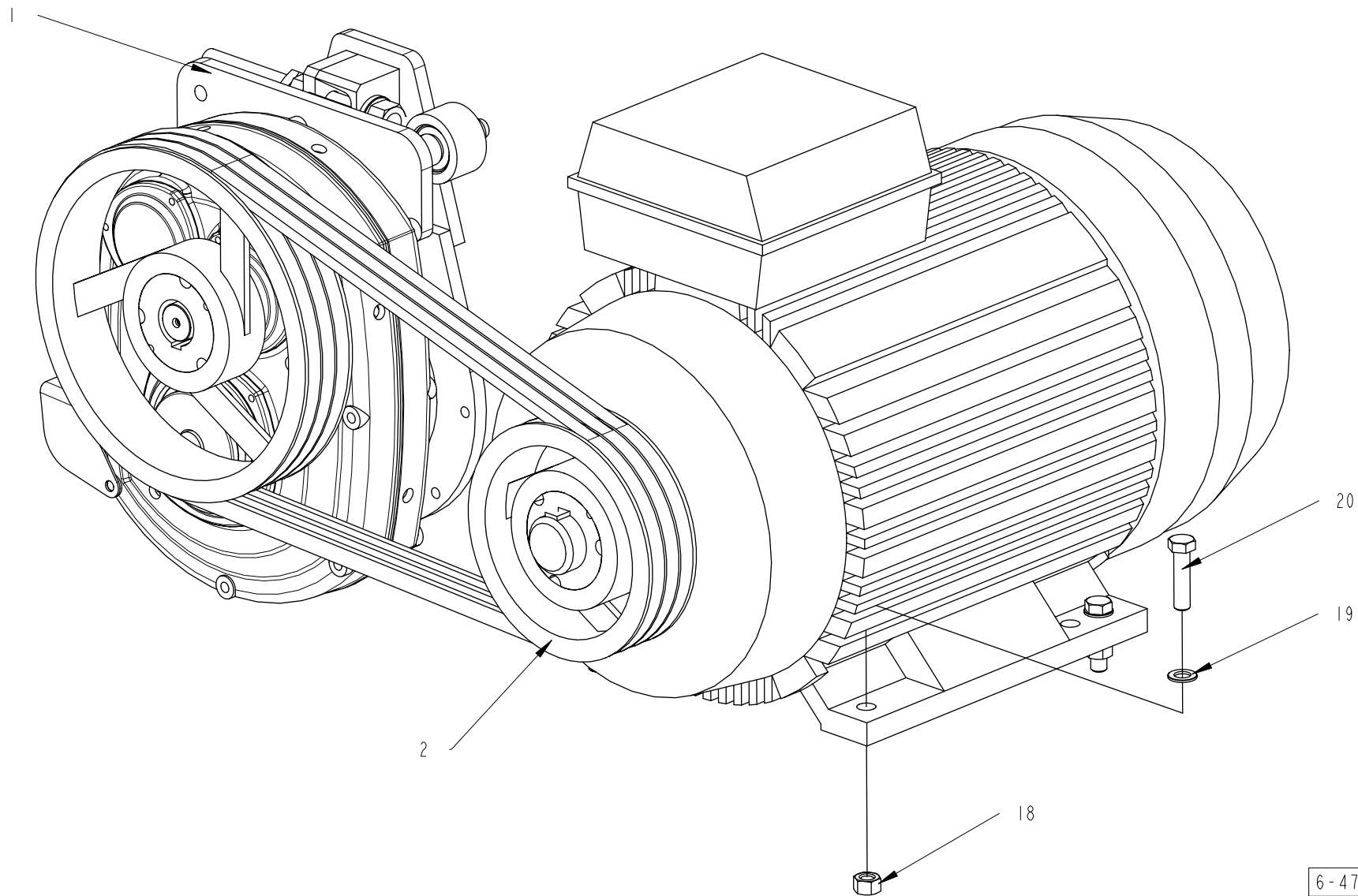
Pos	Part No	SP h	UN	Qty	Description	Page No	Pos	Part No	SP h	UN	Qty	Description	Page No
40	6-4722 2596 01		PC	1	PRESSURE GAUGE FLANGE								
42	312105-0631		PC	2	Screw M6S ISO 4014 M16x55 A480								
49	6-4722 6396 02	B 5000	PC	1	PRESSURE GAUGE WITH REMOTE READING								
49	6-4722 6432 01	B 5000	PC	1	DIGITAL PRESSURE GAUGE PR5531A								
52	6-4722 6562 01	B 5000	PC	1	O-RING 25 x 5								
53	6-4722 1178 09	B 5000	PC	1	SUPPORT RING 35 x 23.8 x 3								
93	6-4722 0912 01		PC	1	RING								



Pos	Part No	SP h	UN Qty	Description	Page No	Pos	Part No	SP h	UN Qty	Description	Page No
1	6-4722 5471 81		PC 1	HYDRAULIC UNIT BOSCH							
2	6-4722 5265 01		PC 1	MOTOR 220V/50Hz, 380V/50Hz							
9	6-4722 6760 01		PC 1	PROPORTIONAL VALVE BOSCH 4-20 mA 180 BAR							
13	6-4722 6430 02		PC 2	HYDRAULIC PRESSURE TRANSMITTER 0-210 BAR							
15	6-4932 2002 25		PC 1	HYDRAULIC PRESSURE GAUGE 250 BAR							
17	6-4722 6760 02		PC 1	PROPORTIONAL VALVE BOSCH 4-20 mA 80 BAR							
18	6-4932 2002 26		PC 1	HYDRAULIC PRESSURE GAUGE 60 BAR							
19	6-4722 6515 01		PC 4	O-RING							
23	342741-0103		PC 2	Conn. T-Pipe TA-8-R1/4							
25	6-4353 8302 12		PC 1	SCREW CONNECTION ELBOW WE 8 LR							
29	6-4350 8405 07		PC 2	CONNECTION LR/G 1/4"							
34	90087-0015		PC 1	Plug, Ext. Thread Hex. Socket VSTI 1/4-E							
36	6-4353 8302 12		PC 1	SCREW CONNECTION ELBOW WE 8 LR							
44	6-4722 6746 05		PC 1	HYDRAULIC HOSE 500							
47	6-4722 6746 11		PC 1	HYDRAULIC HOSE 1100							
55	6-4722 8255 01		PC 1	PANEL PLATE ALEX 25, 30							
59	312101-0380		PC 4	Screw M6S M6x50 fzb							
61	312115-0335		PC 8	Screw ISO4762 M5x30 A4							
70	312311-0455		PC 4	Screw ISO4028 M8X30 FZB							
72	312812-0312		PC 8	Hexagon Nut, Ny-Lock M4 A480							
75	312605-0318		PC 4	Hexagon Nut, M6M M8 A280							
76	315105-0153		PC 4	WASHER BRB6,4X12RFR							
78	315105-0165		PC 4	WASHER BRB8,4X16RFR							
83	6-4722 6747 01		PC 4	DISTANCE							
86	6-4722 6399 01		PC 2	COVER							

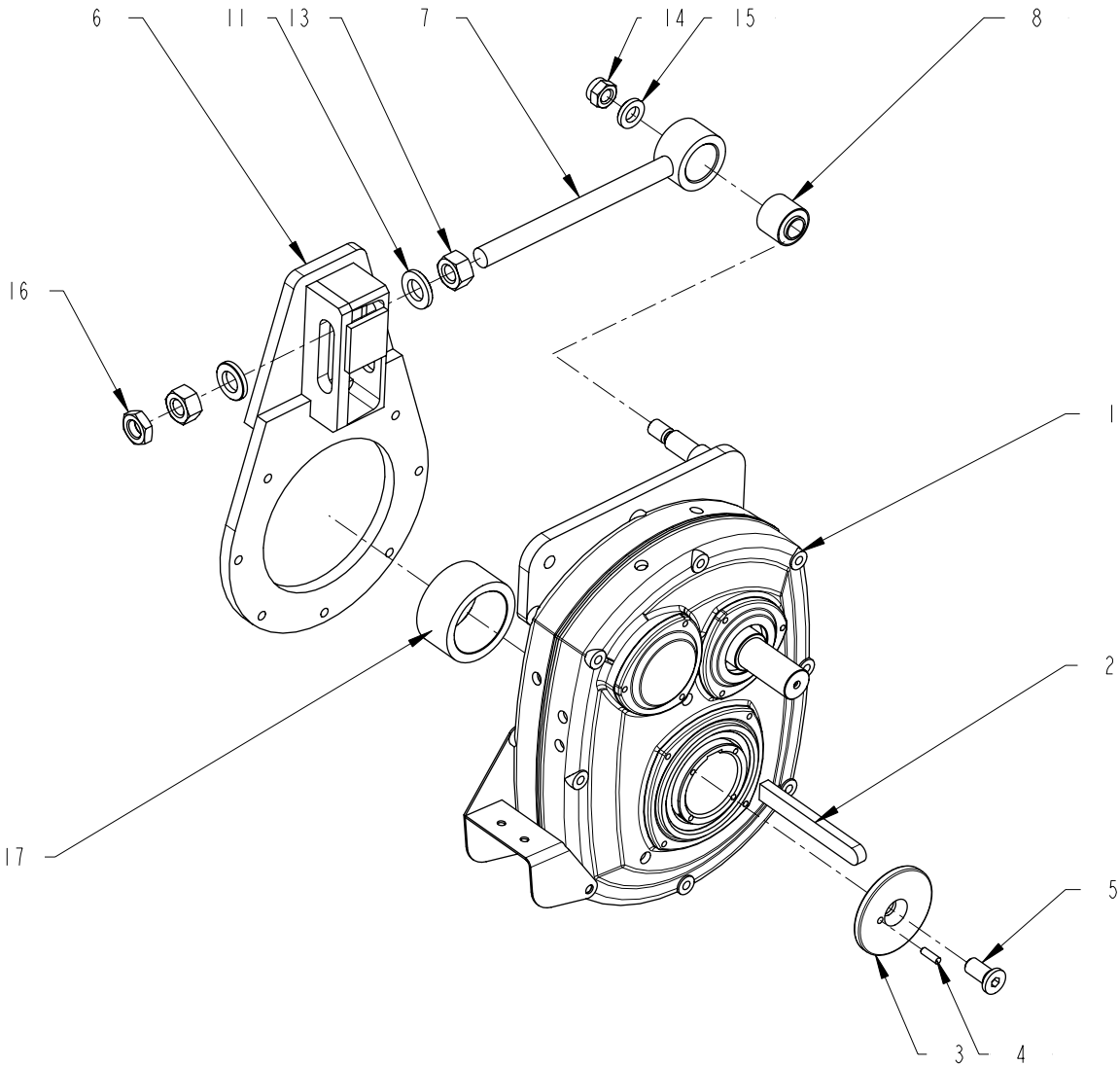


Pos	Part No	SP h	UN	Qty	Description	Page No	Pos	Part No	SP h	UN	Qty	Description	Page No
5	6-4722 6542 01		PC	2	VALVE PRESSURE LIMIT								
8	6-4722 6541 02		PC	1	PUMP TWO STAGES BOSCH								
9	6-4722 7553 01		PC	1	SIGHT GLASS								
10	6-4722 7554 01		PC	1	FILTER								
11	6-4722 7552 01		PC	2	FILTER								
24	90287-0049		PC	8	SCREW MLC6S 5x12 10.9								
32	6-4722 7550 01		PC	1	SHAFT COUPLING								
33	6-4722 7551 01		PC	1	RUBBER CROSS								
34	312318-0289		PC	1	Screw ISO4029 M4X10 A4								
35	6-4722 7555 01		PC	1	KEY 2 X 2 6 DIN 6888								
36	90087-0015		PC	1	Plug, Ext. Thread Hex. Socket VSTI 1/4-E								
38	90087-0024		PC	1	Plug, Ext. Thread Hex. Socket VSTI 1/2-E								
39	312605-0316		PC	1	Hexagon Nut, M6M M6 A280								
40	315701-0203		PC	1	Parallel key w. round ends 5x5x25 mm								
41	6-4722 7549 01		PC	1	PACKING								

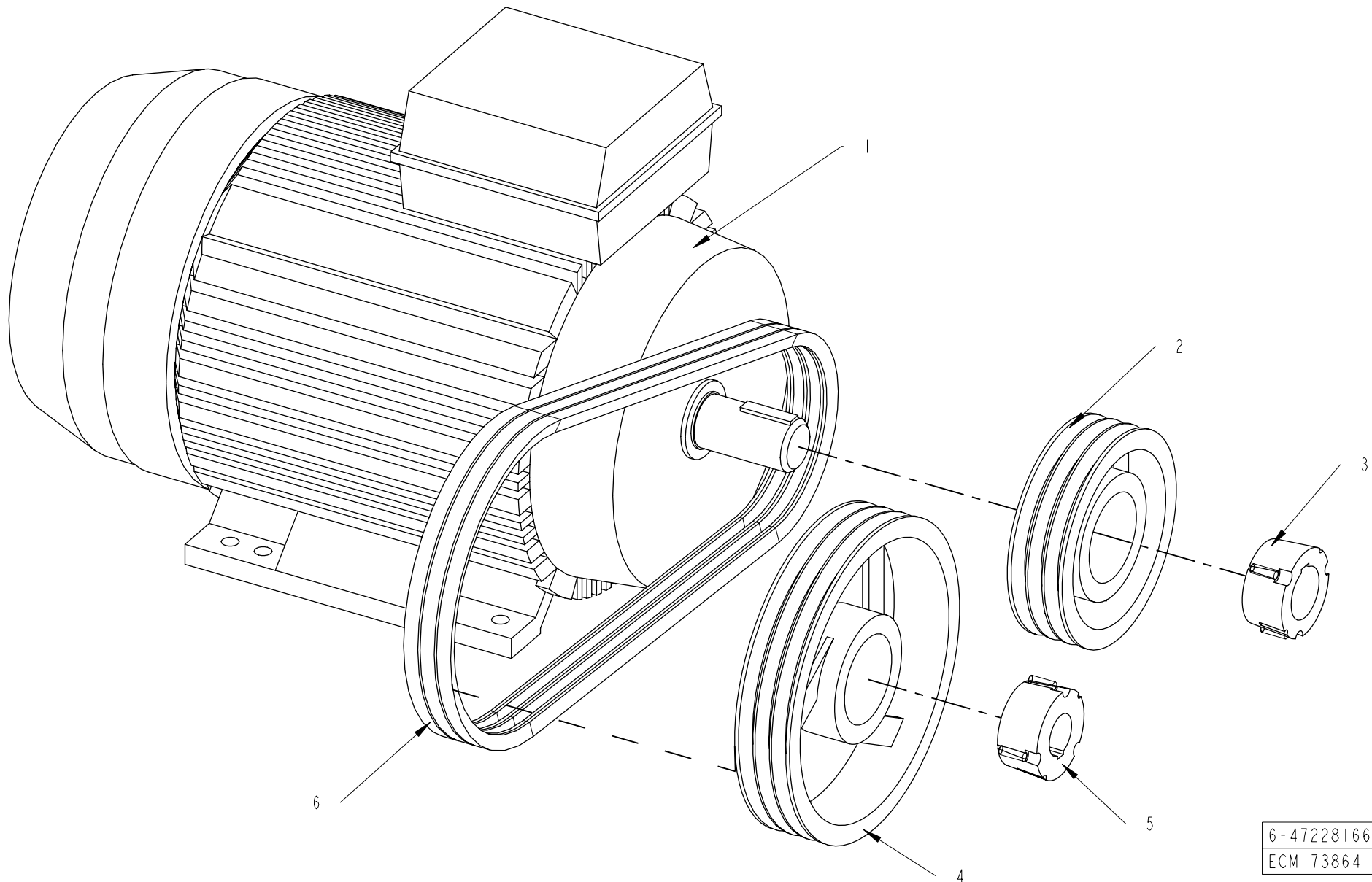


6-4722553600
ECM 73853

Pos	Part No	SP h	UN	Qty	Description	Page No
1	6-4722 8164 80		PC	1	DRIVE UNIT ALEX 25	
2	6-4722 8166 80		PC	1	DRIVE UNIT	
18	6-4722 5202 01		PC	4	NUT M6M M20 DIN 934	
19	315102-0192		PC	8	Washer Plain, BRFB 21/36 H=3	
20	312101-0680		PC	4	Screw M6S M20x80 fzb	



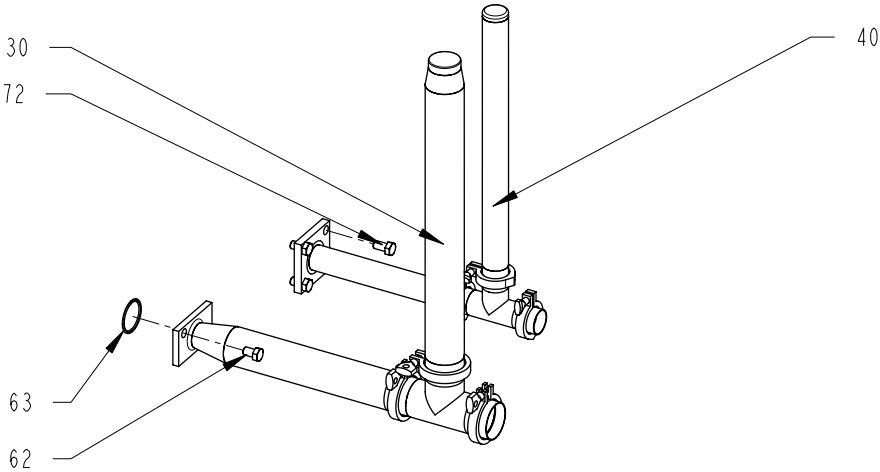
Pos	Part No	SP h	UN Qty	Description	Page No	Pos	Part No	SP h	UN Qty	Description	Page No
1	6-4722 5383 02		PC 1	GEAR BOX TV 111 TA25 SS							
2	6-4016 2509 18		PC 1	FLAT WEDGE 28 x 16 x 260 DIN 6885							
3	6-4722 5689 01		PC 1	WASHER BENZLER							
4	311103-0460		PC 1	Parallel Pin ISO 2338 10m6X35 A1							
5	6-4722 5690 01		PC 1	SCREW MF6S 24 x 55 DIN 7991							
6	6-4722 5413 01		PC 1	TORQUE ARM							
7	6-4722 5415 01		PC 1	ADJUSTING BOLT							
8	6-4722 5457 01		PC 1	SLEEVE 30 x 60 x 55							
11	315111-0205		PC 2	WASHER TBRB33X58FZB							
13	6-4722 5618 01		PC 1	NUT M6M 30							
14	312810-0328		PC 1	Hexagon Nut, Ny-Lock M24 fzb							
15	315111-0198		PC 1	Washer Plain, TBRB 25/45 H=8							
16	6-4722 5621 01		PC 2	NUT ML6M 30							
17	6-4722 5537 01		PC 1	SPACER SLEEVE BENZLER							



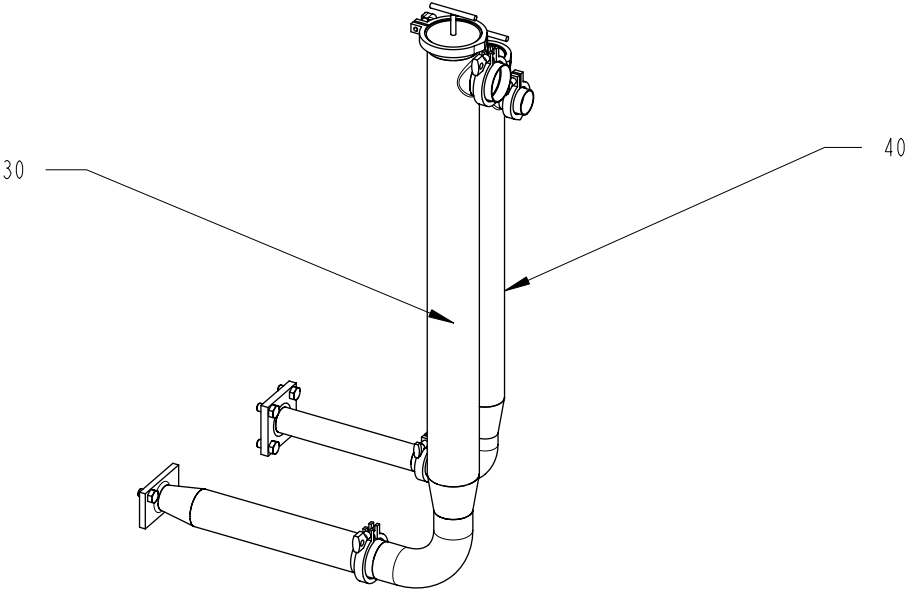
6-4722816600
ECM 73864

Pos	Part No	SP h	UN Qty	Description	Page No	Pos	Part No	SP h	UN Qty	Description	Page No
1	6-4722 6017 23		PC 1	MOTOR M3BP280SMA 4 75kW 380V/50Hz							
2	6-4722 5918 01		PC 1	PULLEY 3 SPC 355							
3	6-4722 5971 12		PC 1	BUSHING 3525 ø75							
4	6-4722 5950 01		PC 1	PULLEY 3 SPC 425							
5	6-4722 5971 06		PC 1	BUSHING 3525 ø48							
6	6-4722 5858 05		PC 3	V-BELT SPC 2500 MC							
			PC 1	SAFETY PROTECTION FOR THE V-BELTS							
	6-4722 8090 01		PC 1	Protection TAS15 for pistons							
	315105-0165		PC 4	WASHER BRB8,4X16RFR							
	312105-0451		PC 4	Screw M6S ISO 4017 M8x20 A480							
	312605-0318		PC 4	Hexagon Nut, M6M M8 A280							

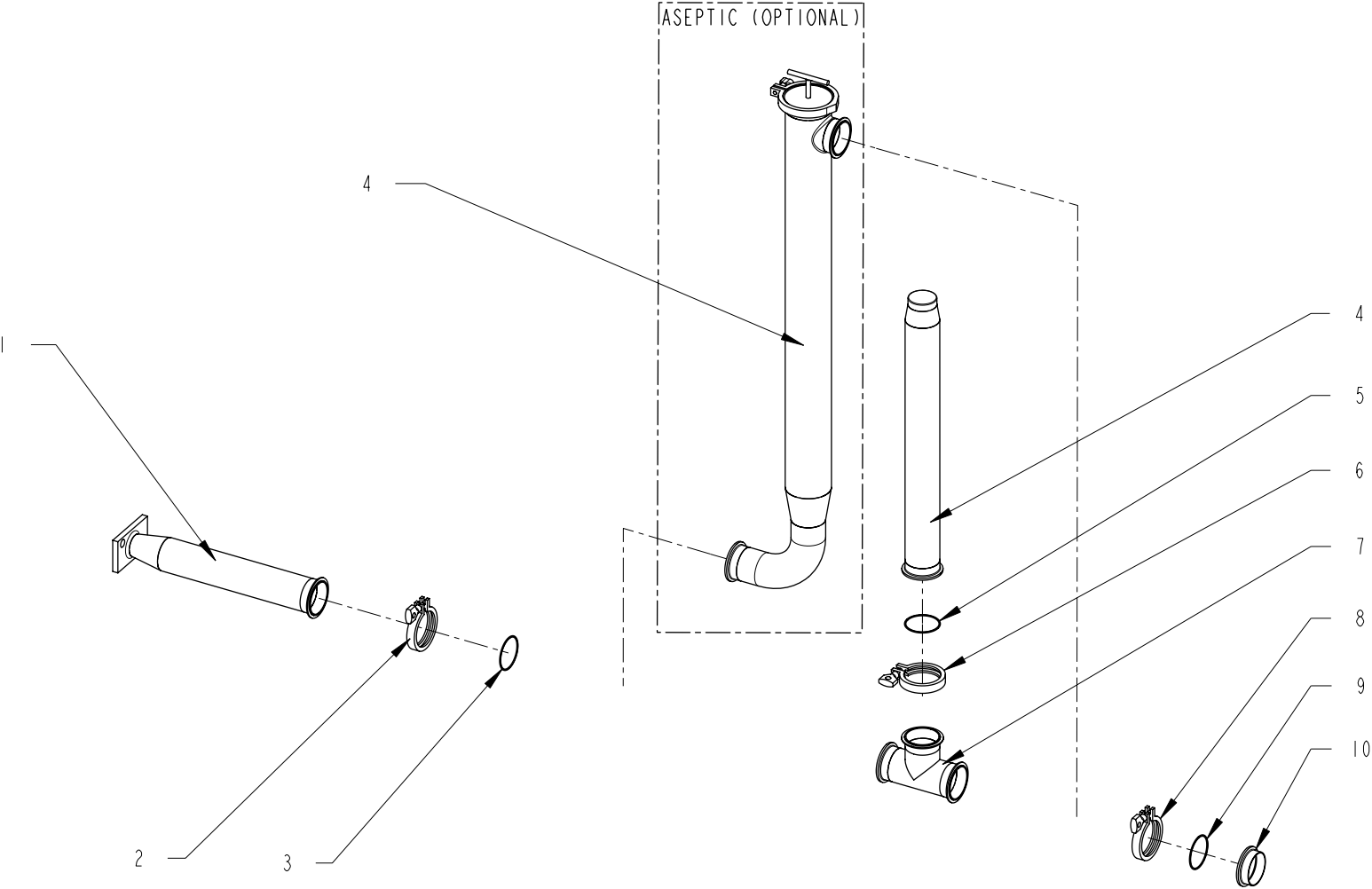
BASIC



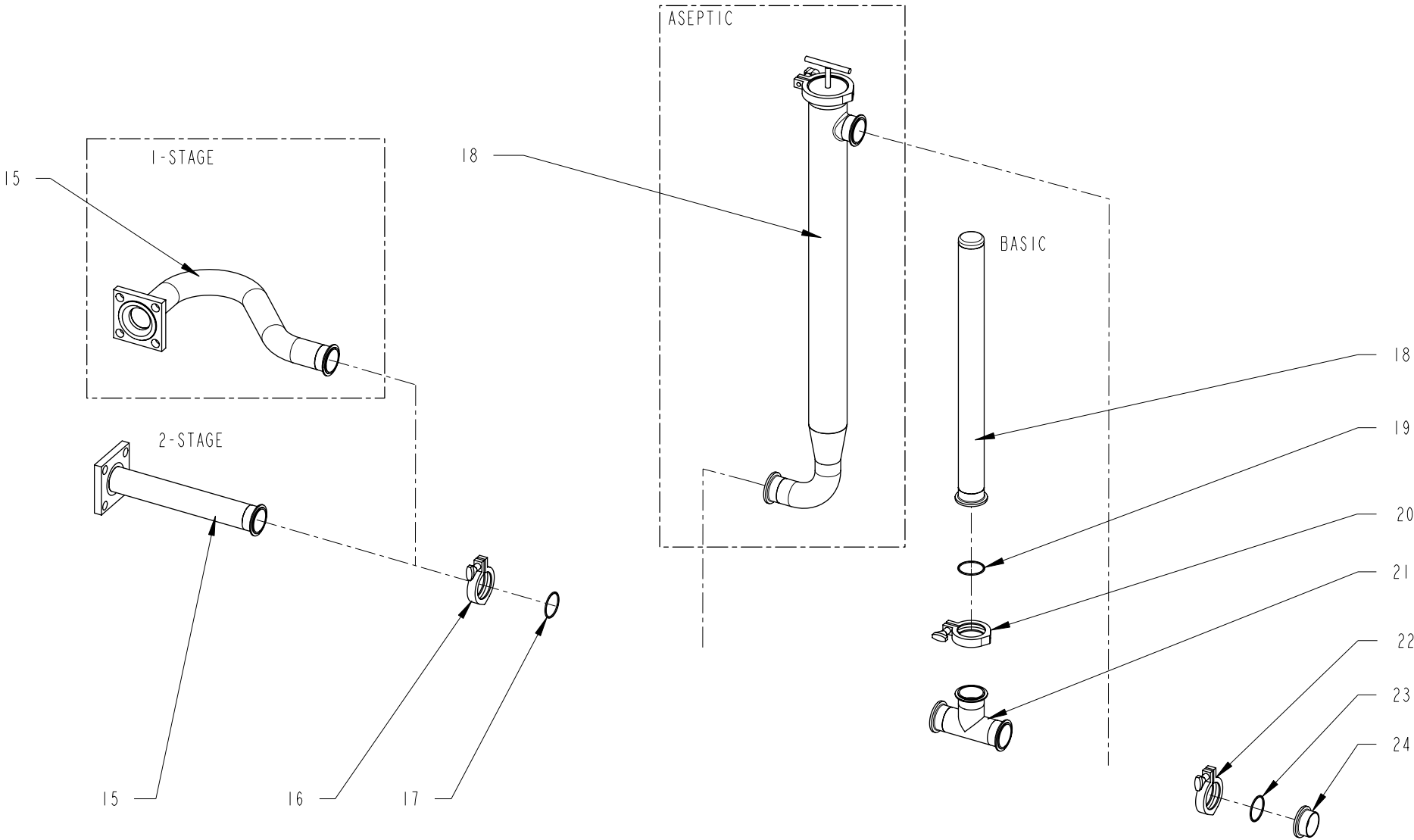
ASEPTIC



Pos	Part No	SP h	UN	Qty	Description	Page No
30	6-4722 8124 80		PC	1	PRODUCT CONNECTIONS INLET ALEX 25	
40	6-4722 8125 80		PC	1	PRODUCT CONNECTIONS OUTLET ALEX 25	
62	312105-0622		PC	2	Screw M6S ISO 4017 M16x25 A480	
63	6-990257 30	B 2500	PC	1	O-ring 63.09x3.53 AL113 3030-70 EPDM	
72	312105-0624		PC	4	Screw M6S ISO 4017 M16x30 A480	



Pos	Part No	SP h	UN Qty	Description	Page No	Pos	Part No	SP h	UN Qty	Description	Page No
1	6-4722 6817 01		PC 1	INLET FLANGE CLAMP 76.1							
2	342840-0107		PC 1	CLAMPING PIECE							
3	6-9635 11 7115	B 2500	PC 1	Seal ring Tri-Clover H40-X-3							
4	6-4722 6075 01		PC 1	DAMPER BASIC CLAMP 76							
5	6-9635 11 7115	B 2500	PC 1	Seal ring Tri-Clover H40-X-3							
6	342840-0107		PC 1	CLAMPING PIECE							
7	6-4722 5848 01		PC 1	ATTACHMENT PIPE CLAMP 76							
8	342840-0107		PC 1	CLAMPING PIECE							
9	6-9635 11 7115	B 2500	PC 1	Seal ring Tri-Clover H40-X-3							
10	6-9611 34 2053		PC 1	Clamp Ferrule,H-line-3A,female,(316L)-3"							



Pos	Part No	SP h	UN Qty	Description	Page No	Pos	Part No	SP h	UN Qty	Description	Page No
15	6-4722 7049 04		PC 1	OUTLET FLANGE CLAMP 51 2-ST							
16	90217-0304		PC 1	Clamp, ISO2852 for Pipe 50,8 mm							
17	6-9635 11 7113	B 2500	PC 1	Seal ring Tri-Clover H40-X-2							
18	6-4722 6085 01		PC 1	DAMPER BASIC CLAMP ø51							
19	6-9635 11 7113	B 2500	PC 1	Seal ring Tri-Clover H40-X-2							
20	90217-0304		PC 1	Clamp, ISO2852 for Pipe 50,8 mm							
21	6-4722 6081 01		PC 1	ATTACHMENT PIPE CLAMP ø51							
22	90217-0304		PC 1	Clamp, ISO2852 for Pipe 50,8 mm							
23	6-9635 11 7113	B 2500	PC 1	Seal ring Tri-Clover H40-X-2							
24	6-9611 34 2051		PC 1	Clamp Ferrule,H-line-3A,female,(316L)-2"							

Intentionally left blank

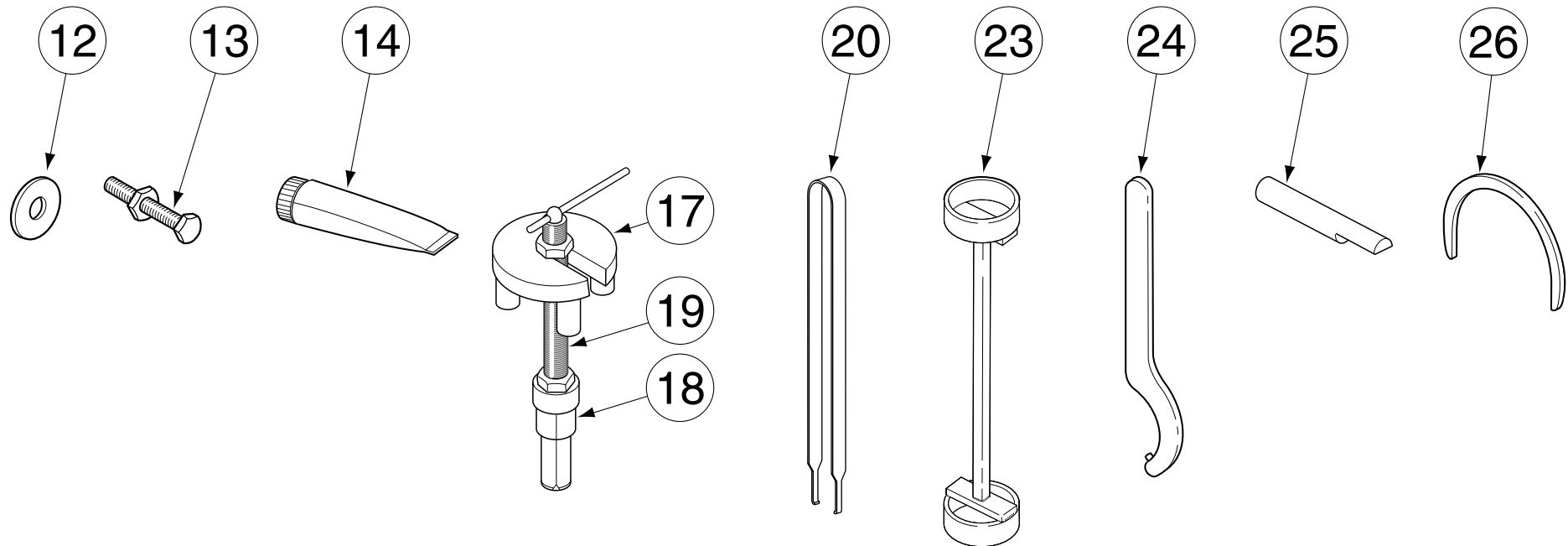
Pos	Part No	SP h	UN	Qty	Description	Page No	Pos	Part No	SP h	UN	Qty	Description	Page No
1	6-4722 7592 80		PC	1	COMMON ELECTRIC PARTS								
	6-4722 8065 01		PC	1	MANOEUVRE BOX								
	6-4722 6993 80		PC	1	CONNECTION BOX ALEX 20, 25, 30								
1	6-4722 6949 01		PC	1	CONNECTION BOX 280 x 380								
2	6-4722 6950 01		PC	1	SHEET								
3	6-4722 8507 01		PC	1	TERMINAL BLOCK POWER								
4	6-4722 7018 01		PC	1	TERMINAL BLOCK/SIGNAL								
5	6-4722 6991 01		PC	1	FLANGE 12 x Pg16								
6	6-4722 6982 01		PC	1	FLANGE 4 x Pg11/21 + 7 x Pg16								
8	6-4722 5528 01		PC	2	SCREW								
9	6-4722 5430 01		PC	2	GASKET								
10	6-4722 6942 01		PC	1	SCREW								
11	90062-0016		PC	6	Lock Washer Serrat.ext.gear,8,4/15 H=0,8								
12	90099-0003		PC	1	NUT								
13	90135-0035		PC	1	Earth wire, L=250 mm 16 mm2								
14	90135-0040		PC	1	Earth wire, L=150 mm 16 mm2								
15	90165-0056		PC	2	Pipe Clip for Tube d=4 mm								
16	90165-0058		PC	7	Pipe Clip for Tube d=25 mm								
17	352103-0110		PC	1	Cable Gland, STR 16, PR22,5/PG16								
18	312115-0368		PC	4	Screw ISO4762 M6x16 A4								
20	312125-0287		PC	9	Screw ISO 1207 M4x8 A4								
21	312125-0323		PC	5	Screw ISO 1207 M5x8 A4								
22	312605-0318		PC	2	Hexagon Nut, M6M M8 A280								
23	315105-0146		PC	4	WASHER BRB5,3X10RFR								
24	315105-0165		PC	3	WASHER BRB8,4X16RFR								
25	90005-0114		PC	1	Washer Plain Round 5,3(M5)/15, H=1								
26	90062-0060		PC	4	LOCK WASHER SERRAT.EXT.GEAR,5,3/10 H=0,6								
	6-4722 7022 80		PC	1	CABLING								
3	6-4722 6976 01		PC	1	PROTECTION PLATE - TA25								
6	312715-0116		PC	2	Wing Nut DIN 315 A2 MVM-K M6								
8	6-4722 6997 01		PC	2	REDUCING NIPPEL Pg9-Pg7								
	312115-0368		PC	4	Screw ISO4762 M6x16 A4								
	90152-0033		M	3	Spiral Conduit for PR 15,2(PG 9)								
	90459-1719		PC	2	Sealing Ring 16mm for Elektroflex 160EHD								
	90459-1716		M	20	Spiral Conduit 16x12, 160 EHD 12mm								
	90459-1718		PC	18	Sealing Ring 12mm for Elektroflex 160EHD								

Intentionally left blank

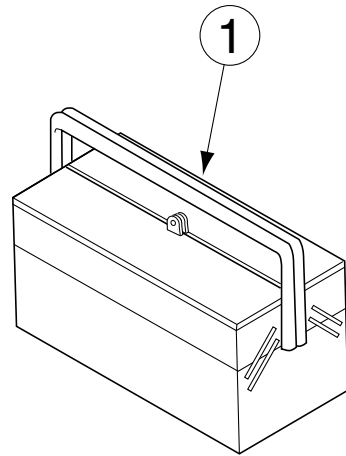
Pos	Part No	SP h	UN	Qty	Description	Page No	Pos	Part No	SP h	UN	Qty	Description	Page No
3	6-4722 5658 03		PC	1	SIGN COOLING WATER OUTLET ENG								
4	6-4722 5658 04		PC	1	SIGN COOLING WATER INLET ENG								
9	6-4722 5686 01		PC	1	SIGN CLEANING OF PIPE SYSTEM ENG/GER								
10	6-4722 5696 01		PC	1	SIGN CHECK WATER IN OIL ENG/GER								
15	359705-0002		PC	1	Warning Sign ISO, Entaglement								
20	6-1995 106 321		PC	4	SCREW MCS 2,5X6 RFR.								

Intentionally left blank

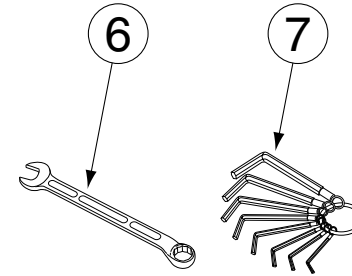
Pos	Part No	SP h	UN	Qty	Description	Page No	Pos	Part No	SP h	UN	Qty	Description	Page No
	6-4722 6660 80				COMMISSIONING KIT			6-4722 8099 91				COMM. KIT FLANGE MANOMETER	
	6-4722 6664 80		PC	1	COMMISSIONING KIT ALEX 25		52	6-4722 6562 01		PC	1	O-RING 25 x 5	
	6-4722 7569 01		L	28	MOBILGEAR 630		53	6-4722 1178 09		PC	1	SUPPORT RING 35 x 23.8 x 3	
	90458-0863		L	6	MOBILGEAR 632								
	90458-0861		L	6	ESSO NUTO HP 68			6-4722 6836 91				COMM. KIT PRODUCT CONNECTIONS ALEX 25	
	6-4722 6332 01		PC	3	ATTACHMENT PIPE WATER/STEAM		63	6-990257 30		PC	1	O-ring 63.09x3.53 AL113 3030-70 EPDM	
	6-4722 5642 01		PC	3	SHIM 0.1								
	6-4722 5642 02		PC	3	SHIM 0.2								
	6-4722 5642 03		PC	3	SHIM 0.3								
	6-4722 6152 01		PC	7	VIBRATION ABSORBER								
	6-4722 6664 80				COMMISSIONING KIT ALEX 25								
	6-4722 6682 80		PC	1	TOOLS ALEX 25								
	6-4722 8147 91		PC	3	COMM. KIT PISTON CARTRIDGE ALEX 25 ASEPT								
	6-4722 8161 91		PC	3	COMM. KIT VALVE CARTRIDGE ø65 MUSHROOM								
	6-4722 7040 89		PC	1	COMM. KIT HOMOGENISING HEAD								
	6-4722 8099 91		PC	1	COMM. KIT FLANGE MANOMETER								
	6-4722 6836 91		PC	1	COMM. KIT PRODUCT CONNECTIONS ALEX 25								
	6-4722 8147 91				COMM. KIT PISTON CARTRIDGE ALEX 25 ASEPTIC								
11	6-4722 2873 01		PC	3	PISTON SEAL 50-V								
12	6-4722 0931 10		PC	3	PISTON SEAL 50								
13	6-4722 1837 19		PC	3	COMPRESSION RING 50-V US-3A								
14	6-4722 1418 10		PC	6	GUIDE BAND 50								
16	6-4722 6562 22		PC	3	O-RING 75 x 5								
18	6-4722 6562 22		PC	3	O-RING 75 x 5								
56	6-4722 1178 17		PC	3	SUPPORT RING 85								
	6-4722 8161 91				COMM. KIT VALVE CARTRIDGE ø65 MUSHROOM								
27	6-4722 0942 02		PC	15	VALVE SEALING 55 x 65 x 8								
58	6-4722 1178 18		PC	15	SUPPORT RING 65								
	6-4722 7040 89				COMM. KIT HOMOGENISING HEAD								
6	6-4722 6562 47		PC	2	O-RING 62.87 x 5.33								
21	6-990322 10		PC	2	O-ring 24.99x3.53, EPDM ,ALEX 20								
22	6-990322 18		PC	5	O-ring 69.44x3.53 AL113 3030-70 EPDM								
24	6-4722 7151 03		PC	2	Support ring axial 3.53 x 32.2								
27	6-990257 18		PC	2	O-ring 31.34x3.53 AL113 3030-70 EPDM								
28	6-4722 7152 03		PC	3	SUPPORT RING RADIAL 3.53 x 79.8								
43	6-990322 14		PC	1	O-ring 40.87x3.53 AL113 3030-70 EPDM								



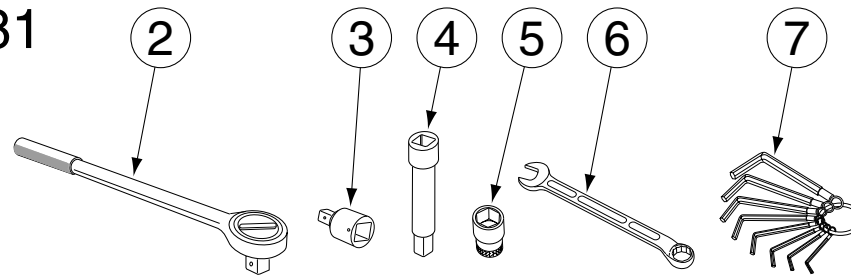
Pos	Part No	SP h	UN Qty	Description	Page No	Pos	Part No	SP h	UN Qty	Description	Page No
1	6-4722 8025 82		PC 1	STANDARD TOOLS ALEX 20, 25							
12	315102-0198		PC 1	Washer Plain, BRFB 25/45 H=4							
13	312101-0380		PC 2	Screw M6S M6x50 fzb							
14	6-4722 8039 01		PC 1	ASSEMBLY PASTE							
14	6-1995 109 012		PC 1	UNISILICONE							
17	6-4722 6800 01		PC 1	EXTRACTOR PLATE 162							
18	6-4690 0260 00		PC 1	PULLER 21/5 30-37							
19	6-4722 6803 81		PC 1	EXTRACTOR EXTENSION							
20	6-4722 8026 01		PC 1	TONGS							
23	6-4722 8038 01		PC 1	VALVE MOUNTING TOOL 65/55							
24	6-4722 1839 02		PC 1	HOOK SPANNER D130							
25	6-4722 7435 01		PC 1	TOOL PISTON BUSHING							
26	6-4722 8287 02		PC 1	PULLER RING ALEX 25, 30, 400							



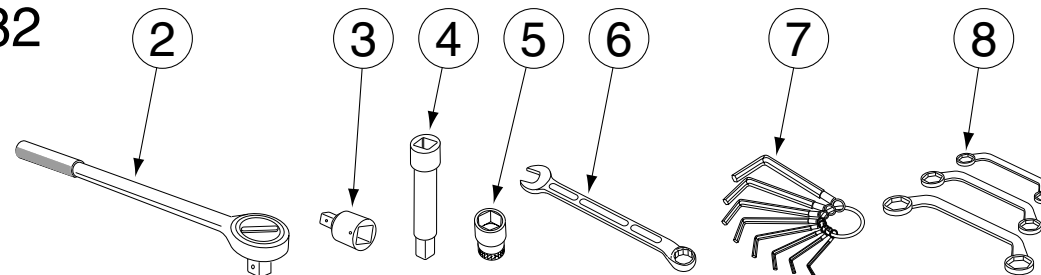
-80



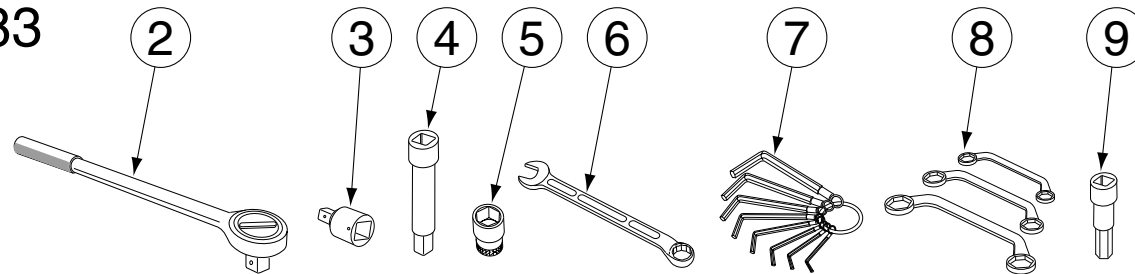
-81



-82



-83



4722-8025

Pos	Part No	SP h	UN Qty	Description	Page No	Pos	Part No	SP h	UN Qty	Description	Page No
1	6-4722 8024 01		PC 1	TOOL BOX							
2	6-4722 8021 01		PC 1	CATCH HANDLE 3/4"							
3	6-4722 8022 01		PC 1	REDUCING ADAPTER 3/4" -1/2"							
4	6-4722 8023 01		PC 1	EXTENSION 125 x 1/2"							
5	6-4722 8016 18		PC 1	HEXAGON SOCKET 18 x 1/2"							
5	6-4722 8016 24		PC 1	HEXAGON SOCKET 24 x 1/2"							
5	6-4722 8016 27		PC 1	HEXAGON SOCKET 27 x 1/2"							
5	6-4722 8016 30		PC 1	HEXAGON SOCKET 30 x 1/2"							
5	6-4722 8016 36		PC 1	HEXAGON SOCKET 36 x 3/4"							
6	6-4722 8017 07		PC 1	BOX WRENCH 7							
6	6-4722 8017 19		PC 1	BOX WRENCH 19							
6	6-4722 8017 22		PC 1	BOX WRENCH 22							
6	6-4722 8017 46		PC 1	BOX WRENCH 46							
7	6-4722 8018 01		PC 1	ALLEN KEY SET							
8	6-4722 8020 01		PC 1	OFFSET END WRENCH SET 11/13 14/15 17/19							



8 Service media

This page intentionally left blank

Service media

Water

General requirements

For consumption and pressure data, see 'Technical data'.

- The supply pressure must be constant.

Water hardness

If the water is hard (high concentration of Calcium carbonate, CaCO_3), the wear and tear of the piston and piston seals will be excessive.

Hardness:	< 10° dH max 180 mg/l CaCO_3
-----------	--

Corrosion

In order to minimize corrosion:

Chlorine:	max. 0.2 mg/l Cl_2
Chloride:	max. 30 mg/l Cl^-
pH:	7 - 8.5

Abrasiveness

If the water contains too much of solid particles, the pistons will rapidly wear down

Turbidity:	max. 3 NTU
------------	------------

Caution! Noncompliance with these requirements may endanger the equipment

(Cont'd)

(Cont'd)

Water used for cooling, product flushing, rinsing and cleaning should meet the WHO guidelines (stated below) or the European drinking water directive.

Characteristics	
Taste	none
Smell	none
Turbidity	max. 3 NTU
Colour	max. 20 mg/l Pt
Oxygen demand	max. 20 mg/l KMnO_4
Tot. dissolved solids	max. 500 mg/l
pH	7 - 8.5
Hardness	<10° dH (max. 180 mg/l CaCO_3)
Ammonium	trace amounts
Ammonia	max. 0.5 mg/l NH_4
Iron	none
Manganese	none
Nitrate	max. 30 mg/l NO_3
Sulphate	max. 100 mg/l SO_4
Chlorine (M, S)	max. 0.2 mg/l Cl_2
Chloride (M, S)	max. 30 mg/l Cl^-
Aggressive carbon acid	max. 0 mg/l CO_2
Total amount of bacteria	max. 100/ml
Total amount of 35°C coliform bacteria	max. 1/100 ml
Total amount of 44°C coliform bacteria	0/100 ml
Copper	max. 0.05 mg/l Cu
Zinc	max. 1.0 mg/l Zn

2.2tf200017.en

9 Cleaning

9 Cleaning

This page intentionally left blank

Cleaning

**WARNING!****Chemical hazard**

Cleaning solution contains Caustic soda (NaOH) or Nitric acid (HNO₃).

These chemicals may cause severe burning to skin and eyes. Use protective clothes, goggles and gloves during handling.

If exposed - wash with water for at least 15 minutes. Seek medical assistance. Follow the instructions given by the supplier.

CIP

When Cleaning In Place observe following:

- Max 2 % at max 85°C (185 °F) Lye
- Max 1.5 % at max 85°C (185 °F) Acid
- Inlet pressure > 2 bar (30 psi)

Cleaning

- Cleaning programme as for the process equipment

Sterilisation

- Max 85°C (185 °F) at 30 minutes

This page intentionally left blank

2.2tf200021.en

10 Certificates

2211b_01.en.fm

This page intentionally left blank

DECLARATION OF CONFORMITY

We Tetra Pak Processing Components AB, Box 103, S-221 00 LUND, Sweden

declare that the machinery/machinery part/equipment

Homogenizer Tetra Alex25

Machine No T5845523507

is in conformity with the following harmonized standards:

EN 292-1:1991, EN 292-2:1991,

EN 418:1992, EN 50081-2:1993, EN 50082-2:1995

EN 60204-1:1997, EN 1672-2

following the provisions of the Directive(s) including amendments:



98/37/EC (machinery)



89/336/EEC (electromagnetic compatibility)



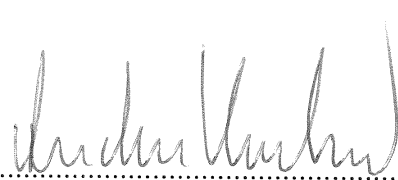
73/23/EEC (electrical equipment designed for use
within certain voltage limits)



.....

Done at Lund

Date 2004-02-05

Anders Karlsson / Manager.....

This page intentionally left blank

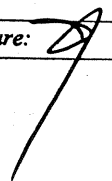
PENTRONIC

Kund / Customer: Tetra Pak Processing Components AB
Kundreferens / Customer reference: 900966210
Vårt ordernummer / Our order number: 56354

Utcheckning av Pt 100-givare / Test of Pt 100-sensor

Artikelnummer / Article number: 5207004-000
Kontrolltemperatur / Test temperature: 0°C
Standard / Standard: SS-IEC 751
Isolation / Isolation: 500 V DC
Nominellt värde / Nominal value: 100,000 ± 0,059 Ohm
Klass / Class: DIN 1/2

Nummer/ Number:	Mätvärde/ Measured value:	Nummer/ Number:	Mätvärde/ Measured value:	Nummer/ Number:	Mätvärde/ Measured value:
320575	99,981	320576	99,978	320577	100,003
320578	100,005	320579	99,981		

Datum / Date: 04-03-16 Ansvarig för kontroll / Responsible for control: Susanne Johansson Signatur / Signature: 

Vid leveranskontrollen har använts utrustning vars prestanda och egenskaper, via Pentronics ackrediterade lab (AKL 0076), är spårbara till normaler hos riksmätplatsen.

The test was carried out using equipment whose accuracy and performance is traceable, via Pentronic's accredited laboratory (AKL0076), to National Standards at the Swedish National Testing Institute.

Pentronic AB
S-590 93 GUNNEBO
SWEDEN

Telefon / Phone:
+46 490 25 85 00

Telefax / Facsimile:
+46 490 237 66

Org. nummer / Org. number:
08 - 556042 - 5141

This page intentionally left blank



CALIBRATION CERTIFICATE

Customer : TETRA PAK PROCESSING
P.O.No. : 153731
Type :
Range : 0 - 6000 PSI
Serial No. : 7158600012

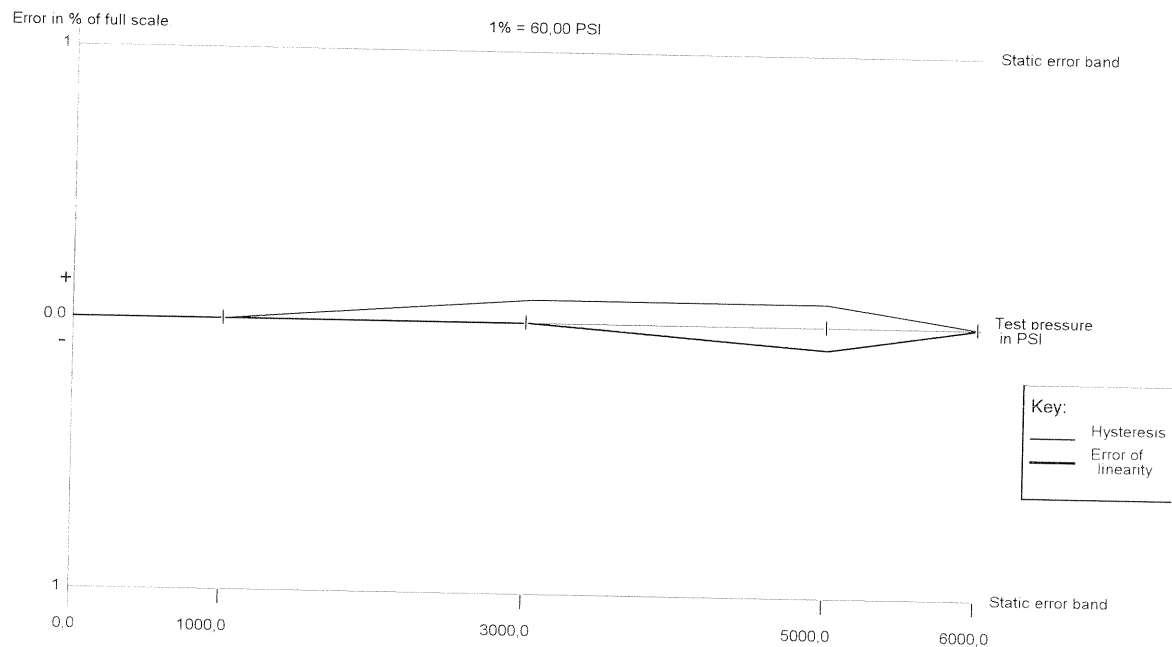
Accuracy : EN 837-1: Class 1
Test instrument : M0089
Operator : HEE

References:

Type:	Name:	Range:	Traceability:
Dead-weight.	Ametek	0.01 - 20 bar	Force Institute. DK
Dead-weight.	Lucas Barnet	10 - 700 bar	DTI. DK
Dead-weight.	Budenberg	300 - 3000 bar	Desgranges. F

Test condition and procedure acc. to: 8900-060.

Gauges with zero adjustment: Offset is not part of accuracy and should be adjusted before test or installation.



Actual value	Gauge reading increasing	Gauge reading decreasing	Actual hysteresis
0,00	0,00	0,00	0,00
1000,00	1000,00	1000,00	0,00
3000,00	3000,00	3005,00	5,00
5000,00	4995,00	5000,00	5,00
6000,00	6000,00	6000,00	0,00

Date of calibration: 22-03-2004

Approved by: Dorthe K. Christensen

Page 1/1



Calibration Certificate

Kunde: TETRA PAK PROCESSING

Kundeordre nr.: _____

Tempress ordre: CO 153731

M-ordre nr.: _____

Instrumenttype: _____

Klasse: 0,6 ____ 1,0 X 1,6 ____ 2,5 ____ ANDET _

Test instrument: M0089

Måleområde: 4-20 MA

Remarks: _____

Operator: HEE

Serial No: M7158600012		
Unit: 4-20 MA		
Actual value	Increasing gauge reading	Decreasing gauge reading
0 PSI $\approx$ 4,00 MA	4,06 MA	4,06 MA
1500 PSI $\approx$ 8,00 MA	8,00 MA	8,00 MA
3000 PSI $\approx$ 12,00 MA	12,00 MA	12,00 MA
4500 PSI $\approx$ 16,00 MA	15,98 MA	15,98 MA
6000 PSI $\approx$ 20,00 MA	20,00 MA	20,00 MA

Bemærkninger:

04.03.22

Form no. 8990-045-A4