WORKSHOP MANUAL

DOUBLE-DRUM ROTARY CUTTERS

TF 200 - TF 400 - TF 600 - TF 800 - TF 1000 - TF 2000 - TF 3000

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Code SXNM012A08 - *ENGLISH*

TABLE OF CONTENTS

1 - GENERAL INFORMATION

Inside this manual the maintenance engineer will find all the information required for correct special maintenance and repairs to the machine. The trade name of the machine is stated on the front cover of this manual.
You are advised to follow all the instructions contained in this handbook exactly and to store it carefully in an appropriate, accessible place.
The manual must be kept for future reference until the machine is scrapped.
If the machine is sold, the vendor is required to pass on the manual to the new owner.
The information in the manual is arranged into topic-based chapters and subchapters.
The information is originally supplied by the manufacturer in Italian and may be translated into other languages.

The contents of this manual may be altered without prior notice, with no further duties ensuing, in order to include changes or upgrades made to the units already despatched.
Please note that for reasons of visibility and clarity, certain figures may show the equipment arranged in ways which do not correspond to the correct set-up for use.
In this workshop manual, the machine may be described and shown with or without the adapter plate for coupling to the prime mover.

2 - MACHINE DESCRIPTION

The double drum rotary cutter, referred to hereinafter as the machine, is a cold planer for hard, compact materials such as: rock, concrete, etc.
It can be fitted onto the majority of backhoes and is ideal for trench-cutting on hard and compact materials, as well as concrete or rock wall profiling, quarry work, demolition and dredging.
The machine proves indispensable where conventional digging systems are too weak and percussion systems have little effect.
The spoil produced by the processing is made up of small pieces and the vibrations transmitted to the surrounding area are kept low.

- Operating principle

The machine is applied directly to the end of the excavator arm, and is therefore controlled and steered towards the work by the movement of the prime mover arm.
The hydraulic radial piston motor drives the planer's horizontal drums directly, which rotate and crush up the material concerned (rock, concrete and suchlike).
The material is removed by hard metal teeth positioned on the said drum. The drive shaft is not exposed to the drums' work stresses as the drums are mounted, separately, on special bearings.
The hydraulic power is transmitted by the prime mover to the machine via hoses.

3 - FORFEITURE OF GUARANTEE RIGHTS

- The removal (and consequent refitting) must be carried out by highly qualified personnel using appropriate equipment in terms of features, size and precision.
- Removal of the motor unit during the guarantee period must be authorised by SIMEX, otherwise all guarantee rights are automatically forfeited.
- The components must be removed carefully and properly packed with protective materials; replacement is not covered by the guarantee in the event of parts that are dented, scratched, corroded or damaged in any way as a result of removal, storage, refitting, carriage, etc.
- Any polluted hydraulic oil, dirt, or incorrect lubricants and oils entering the system can lead to damage requiring repairs or replacements not covered by the guarantee.

These may also result in forfeiture of the guarantee rights:
- machine disassembly without SIMEX's written permission;
- use of parts non-original spares;
- use of lubricants or greases which do not meet the technical specifications stated in this manual (see "Lubricants chart" - chapter 21).

4 - SYMBOLS

The chart below outlines the symbols used in this manual (those considered the most important).

WARNING - HAZARD: this alerts the user to situations or problems which could either jeopardise personal safety or lead to fatal injuries.

IMPORTANT: this alerts the user to situations or problems linked to machine efficiency rather than safety.

"OPERATOR": This is the person(s) responsible for installing, starting up, adjusting, cleaning and transporting the interchangeable equipment.

"MAINTENANCE ENGINEER": This is the person(s) trained and authorised to work on the machine for special maintenance purposes.

"MACHINE": This is the interchangeable equipment outlined in section 6.1.

"PRIME MOVER": This refers to the vehicle on which the interchangeable equipment is fitted.

5 - WARNINGS FOR THE MAINTENANCE ENGINEER

- ***a*** - *All operations must be carried out with the utmost care and attention to prevent injuries and damage to the machine.*
- ***b*** - *All repairs, maintenance, inspection and cleaning work on the rotary cutter must be carried out with it detached from the prime mover.*
- ***c*** - *Clean all the machine's parts thoroughly before beginning any maintenance work on it. Use legally approved neutral detergents.*
- ***d*** - *Appropriate personal protection equipment must be used throughout the operations.*
- ***e*** - *Clean and lubricate each component before fitting it, in particular those that require precision couplings.*
- ***f*** - *Lubricate the surfaces exposed to sliding and rolling friction with a thin coat of oil to guarantee correct lubrication the first time the machine is started up.*
- ***g*** - *Seal up any holes left open after the pipes and the fittings have been removed to stop dirt entering the system.*
- ***h*** - *Replace any components showing signs of wear or whose dimensions no longer fall within the permitted tolerance limits.*
- ***i*** - *Always utilise the tools prescribed or the other suitable tools specified (see "Tooling"- chapter 22).*
- ***l*** - *Always employ hoisting means with a suitable capacity when lifting or handling any heavy parts.*

6 - "CE" IDENTIFICATION PLATE

6.1 - Location of the "CE" identification plate on the machine

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On all models except the TF 200 and TF 600, the "CE" identification plate is affixed to one of the machine's sides (as shown in the figure opposite).

7 - SAFETY AND HAZARD STICKERS

The following instructions are found on stickers affixed to the machine:

Requirement:
'YOU ARE REQUIRED TO WEAR APPROPRIATE PERSONAL PROTECTION EQUIPMENT

Code 75104

Warning:
READ THE MANUAL CAREFULLY BEFORE USING THE MACHINE

Code 20944

Warning:
READ THE MANUAL CAREFULLY AND REMOVE THE KEY FROM THE CONTROL PANEL BEFORE MAINTENANCE OR REPAIRS

Code 20943

Warning:
KEEP CLEAR OF THE MACHINE (MIN. 10 m)

Code 75572

FASTENING POINT FOR LIFTING

Code 20941

7.1 - Location of the safety and hazard stickers on the machine

Due to limited room, on the TF 200 and TF 600 models, the stickers and "CE" identification plate are affixed to the two surfaces shown in figures **A** and **B** below.

UN13-0394FD **A**

UN13-0395FD **B**

On all the other models, the safety and hazard stickers are affixed to the surface shown in figure **C**.

UN13-0396FD **C**

Always heed the warnings the safety and hazard stickers.
Failure to do so may result in death or serious injury.
Make sure the stickers are always in place and legible. If this is not the case, affix or replace them.

8 - MACHINE HANDLING

- Lifting from one surface to another (e.g. to unload from or load onto a lorry):

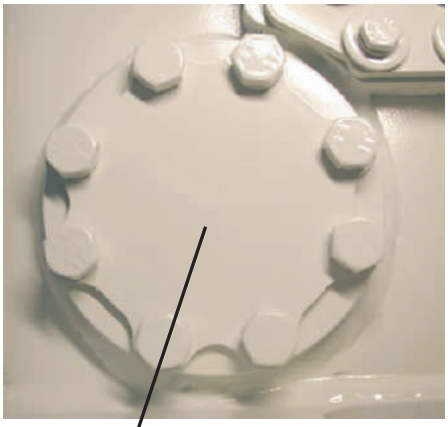
  Use a lifting crane or truck with a suitable capacity for the weight specified on the “CE” identification plate.
  Connect the cables or chains at the four points shown with the relative stickers (see chapter 7).
  For the lifting, use suitable hooks which meet legal requirements in force (see figure below).

Check that the capacities of the cables, chains and lifting and transportation means in general are compatible with the machine weight specified on the “CE” identification data plate.
All load handling operations must be carried out in compliance with the regulations in force concerning safety in the workplace.

9 - DISPOSAL

When disposing of the machine or its parts (oils, hoses, plastic parts, etc.), always comply with the laws in force in the country in which the disposal procedure is carried out.

10 - MAIN MACHINE PARTS



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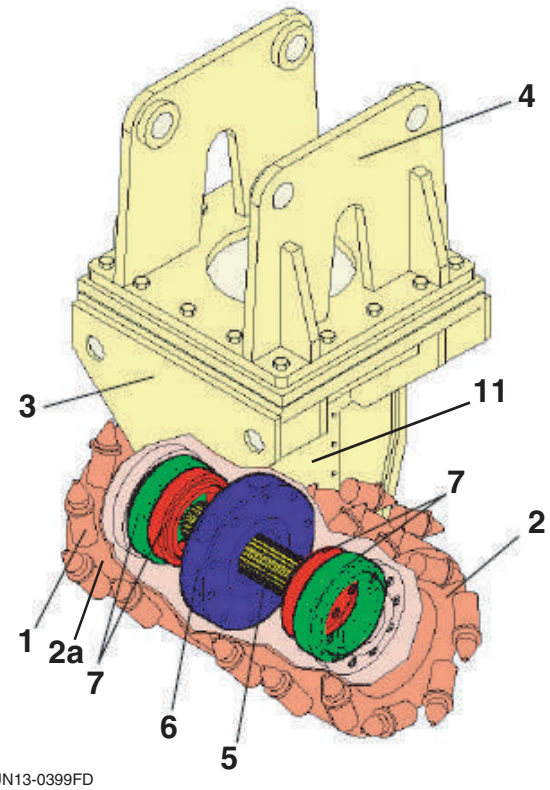
1 - Tooth holder
2 - Drum (valve cover side 11)
2a - Drum (side opposite valve cover 11)
3 - Frame
4 - Adapter plate for coupling to prime mover **(supplied by SIMEX by specific request only)**
5 - Toothed shaft
6 - Hydraulic motor
7 - Drum support bearings
8 - Drain line safety cover
9 - Oil filter on the pressure line
10 - Tooth fastening and removal wrench (supplied with the machine)
11 - Valve cover
12 - Motor unit (only for TF 200 - TF 400 - TF 600 - TF 800 - TF 1000)



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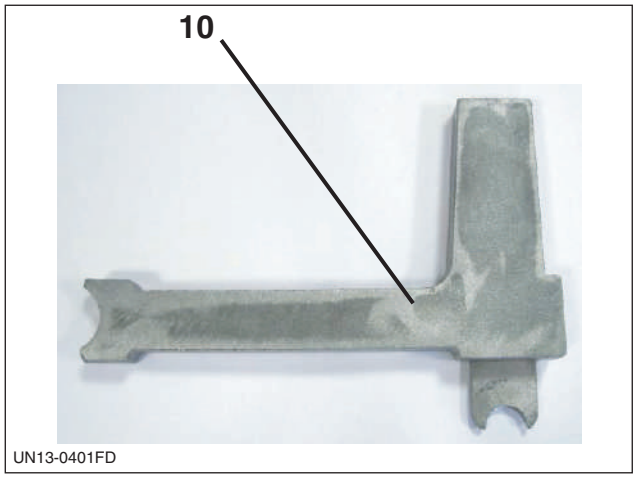

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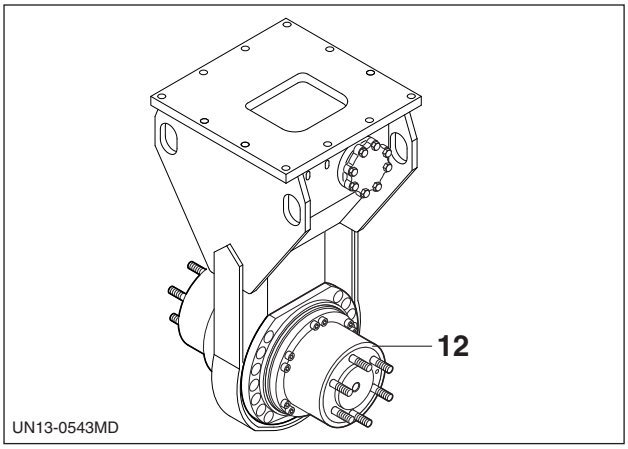

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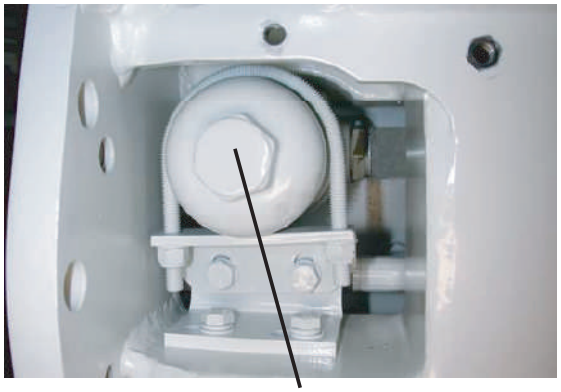

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IMPORTANT: in this workshop manual, the machine may be described and shown with or without the adapter plate for coupling to the prime mover.

11 - SPECIFICATIONS AND PERFORMANCE

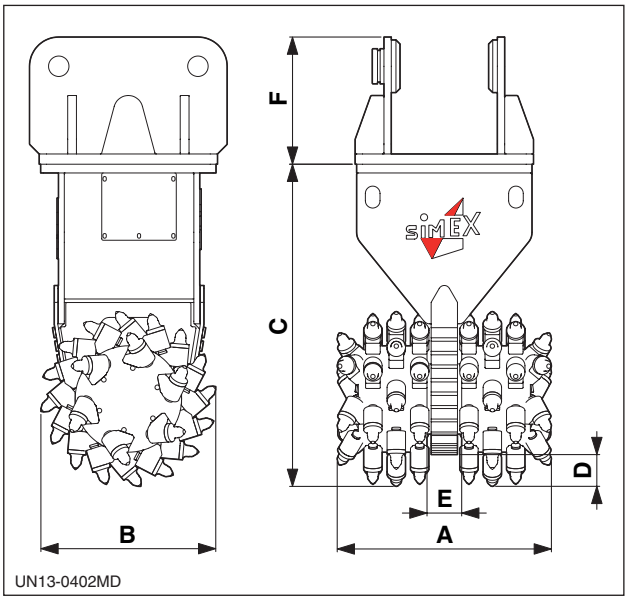
Technical characteristic	Unit of measur.	Models						
		TF 200	TF 400	TF 600	TF 800	TF 1000	TF 2000	TF 3000
Operating pressure	bar	200÷350	200÷350	200÷350	200÷350	200÷350	200÷350	200÷350
Required oil flow	l/min	45÷75	60÷105	80÷145	100÷180	140÷250	180÷330	270÷475
Drum speed	rpm	110÷180	80÷140	65÷115	60÷105	50÷90	60÷110	45÷80
Max applicable hydraulic power	kW	25	35	47	59	82	106	155
	HP	34	47	64	80	112	145	210
Weight **(*)**	kg	262	430	582	1050	1310	2205	3720

(*) Set up with standard drums, no prime mover adapter plate.

IMPORTANT: In the event of special configurations and/or if the adapter plate is supplied, the correct weight will be specified in the "CE" identification plate.

Quoting the "model" and the "serial number" will make it easier for our Service Department to respond to your enquiries quickly and effectively.
Make sure you have the machine's model and serial number to hand whenever you have to contact our Service Department.
The registration details can be found on the identification plate (see chapter 6).

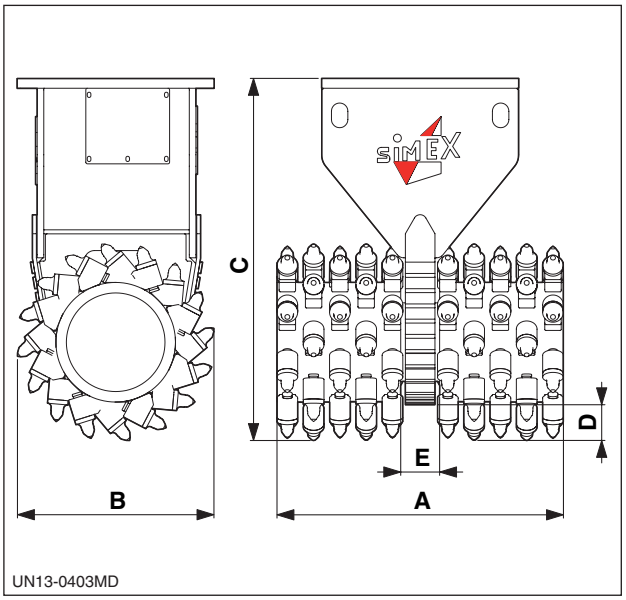
12 - OVERALL DIMENSIONS (standard set-up)



TF	A	B	C	D	E	F (*)
200	565	385	742.5	74	111	245
400	625	450	859.5	72	136	255
600	700	500	900	72	136	300
800	800	594	1097	107	150	465
1000	900	660	1180	107	160	465
2000	1100	710	1405	124	175	465
3000	1300	735	1767.5	105	290	520

(*) These values refer to the standard adapter plates, which can be supplied, on request, by SIMEX.

13 - OVERALL DIMENSIONS (with special drums for wall levelling)



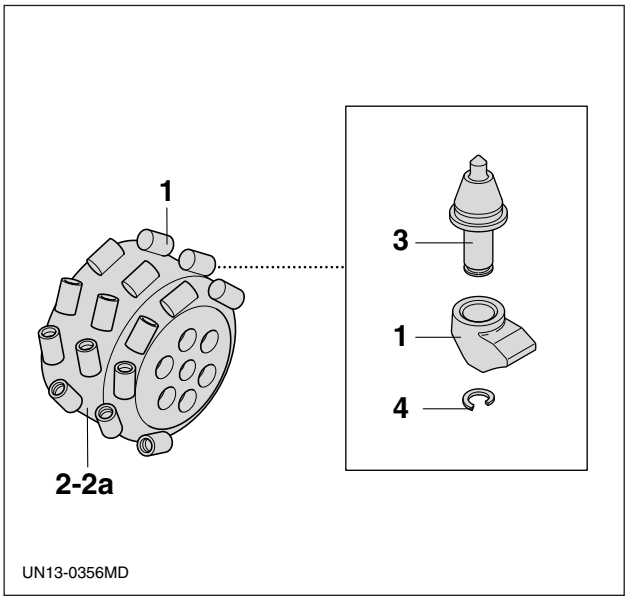
TF	A	B	C	D	E
200	650	385	742.5	74	111
400	750	450	859.5	72	136
600	850	500	900	72	136
800	1000	594	1097	107	150
1000	1200	660	1180	107	160
2000	1400	710	1405	124	175
3000	1400	735	1767.5	105	290

14 - DISASSEMBLY

Before proceeding with the disassembly:
- clean the machine with neutral, legally approved detergents;
- wash the machine with a high pressure jet of water;
- dry the machine with compressed air.

14.1 - Tool removal

1 - Tooth holder welded to drum
2 - Drum (valve cover side)
2a - Drum (side opposite valve cover)
3 - Tool
4 - Circlip



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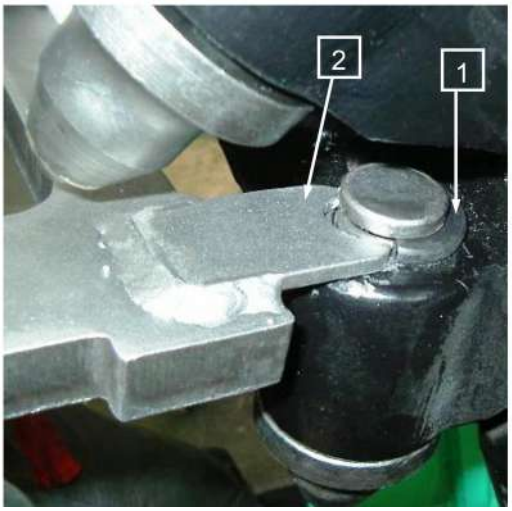
14.1.2 - Tool removal stage

The tools are held in the tooth holder by a circlip fitted at the rear (ref. **1**).

Position the special spanner (ref. **2**), supplied with the machine, as shown in the figure.

Strike the spanner with a hammer and remove the circlip (ref. **1**).



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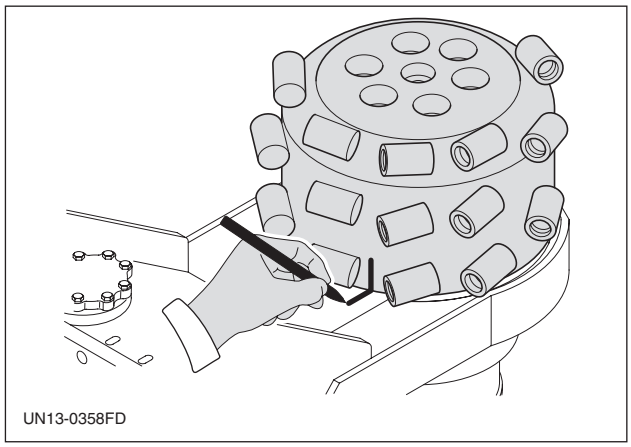
*IMPORTANT: the special spanner (**2**) for removing and fitting the tool circlip is available on request (see "Tooling" chart - chapter 22).*

14.2 - Drum removal

Position the machine with the cylinder's rotation axis vertical and work on the upper cylinder.

Mark the cylinders before removing them to avoid swapping them round and to maintain the phasing when refitting.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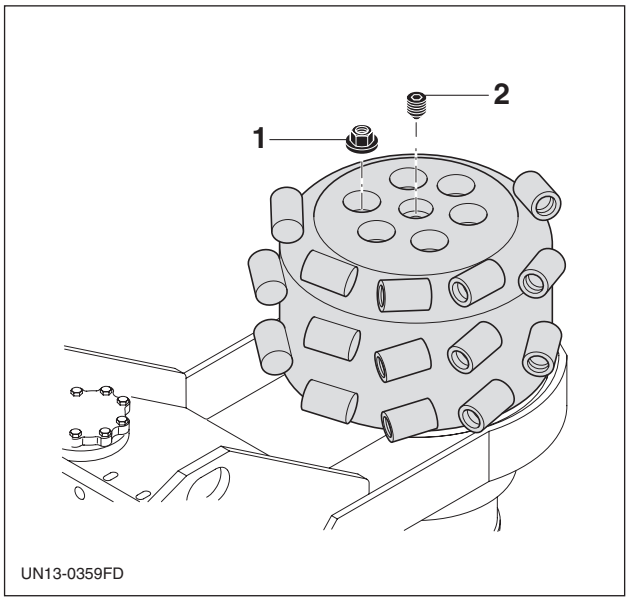
14.2.1 - Drum removal TF 200 - TF 400 - TF 600 - TF 800 - with 'Rotoblock' nuts

a - Remove the "Rotobloc" nuts (**1**) (if they are jammed, preheat them with a flame to approx. 100 °C).

b - Remove the cap (**2**).

c - If the drum is jammed, screw a 70 mm (or longer) fully threaded M20 HH screw into the central hole, until the drum is released.



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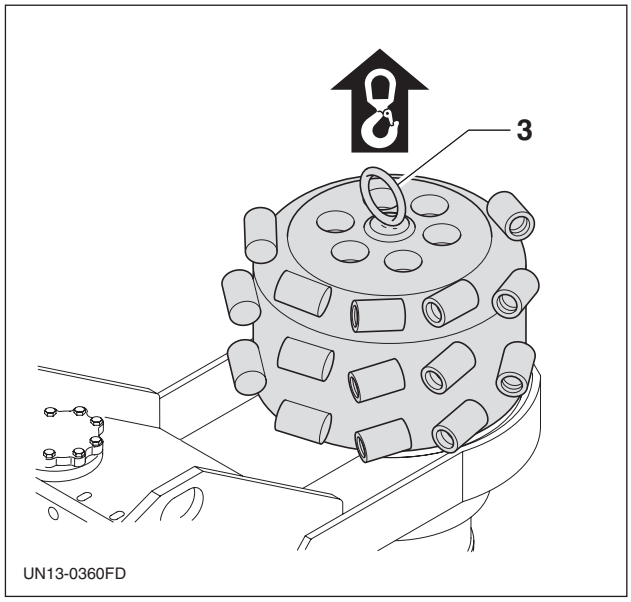
d - Screw a circular eyebolt (**3**) with M20 thread shank into the central hole, and remove the drum.



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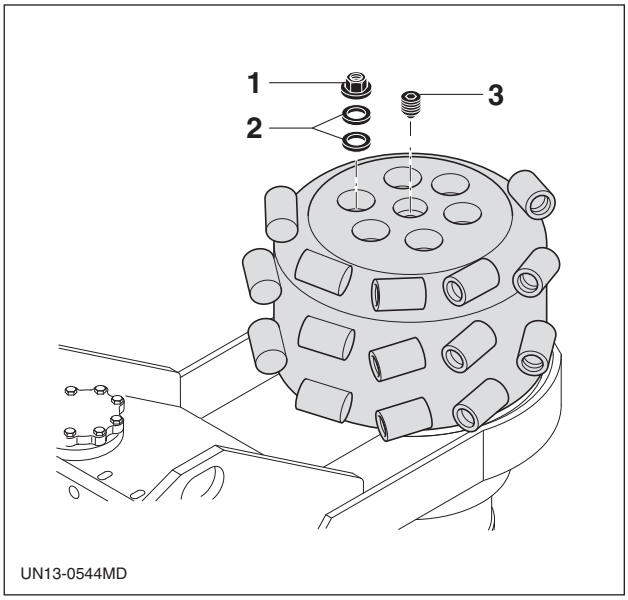
Approximate weights of standard drums		
Machine model	**Drum complete with tools kg**	**Drum without tools kg**
TF 200	55	45
TF 400	75	65
TF 600	130	115
TF 800	200	160

14.2.2 - Drum removal (TF 200 - TF 400 - TF 600 - TF 800) - with self-locking washers and nuts

a - Remove the self-locking nuts (**1**) and the self-locking washers (**2**).

b - Remove the cap (**3**).



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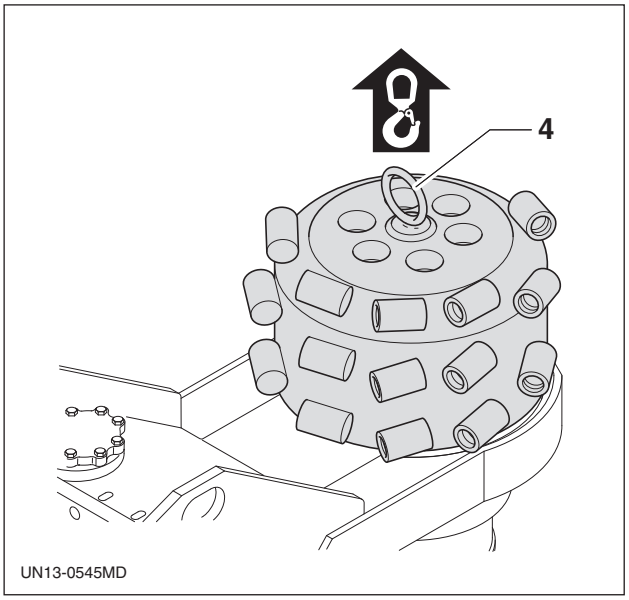
c - Screw a circular eyebolt (**4**) with M20 thread shank into the holes, and remove the drum.



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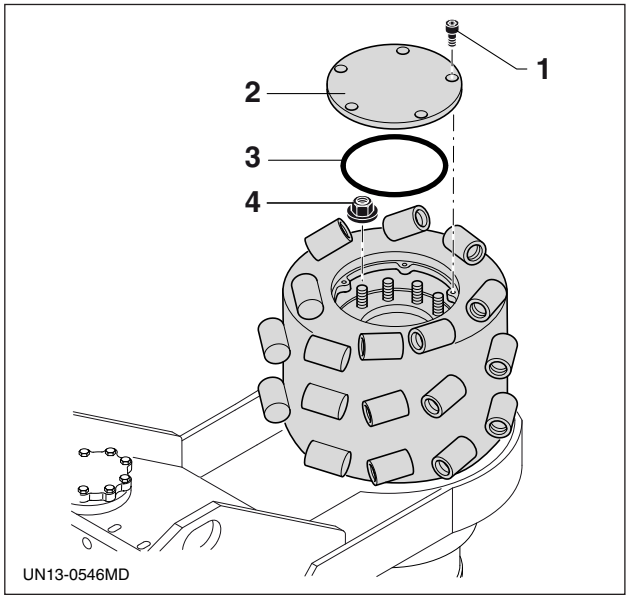
Approximate weights of standard drums		
Machine model	**Drum complete with tools kg**	**Drum without tools kg**
TF 200	55	45
TF 400	75	65
TF 600	130	115
TF 800	200	160

14.2.3 - Drum removal TF 1000 - TF 2000 - with 'Rotoblock' nuts

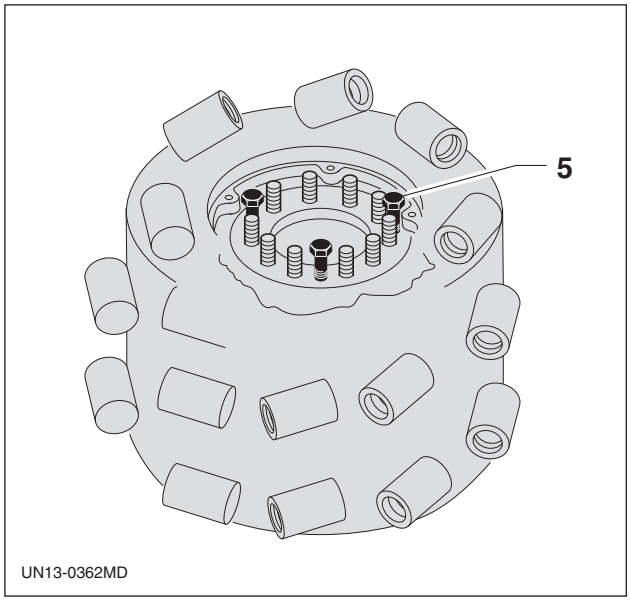
a - Undo the screws (**1**).

b - Remove the cover (**2**) that houses the O-ring (**3**).

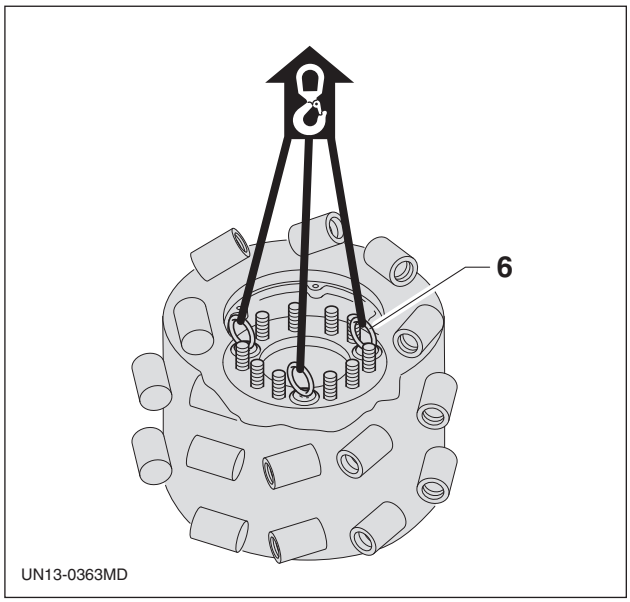
c - Remove the "Rotobloc" nuts (**4**) (if they are jammed, preheat them with a flame to approx. 100 °C).



d - If the drum is jammed, screw three 50 mm (or longer) fully threaded HH M12 screws (**5**) into the threaded holes until the drum is released.



e - Screw three M12 circular eyebolts (**6**) with threaded shanks into the holes, and remove the drum.



Approximate weights of standard drums		
Machine model	**Drum complete with tools kg**	**Drum without tools kg**
TF 1000	290	240
TF 2000	410	360

14.2.4 - Drum removal TF 1000 - TF 2000 - TF 3000 - with self-locking washers and nuts

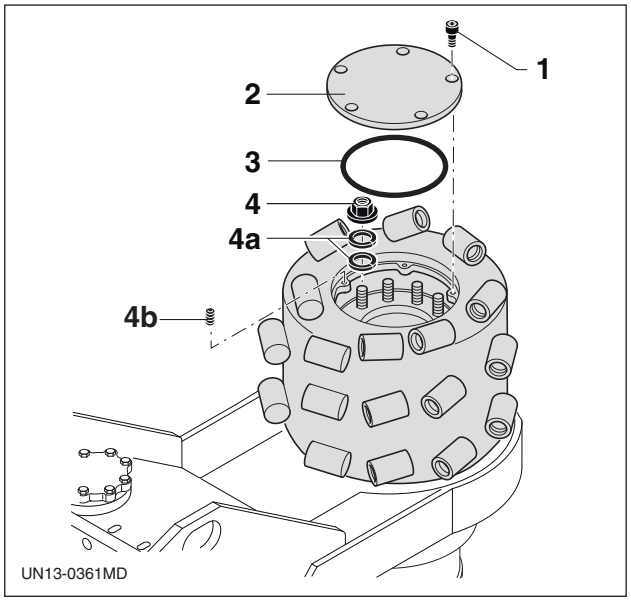
a - Undo the screws (**1**).

b - Remove the cover (**2**) that houses the O-ring (**3**).

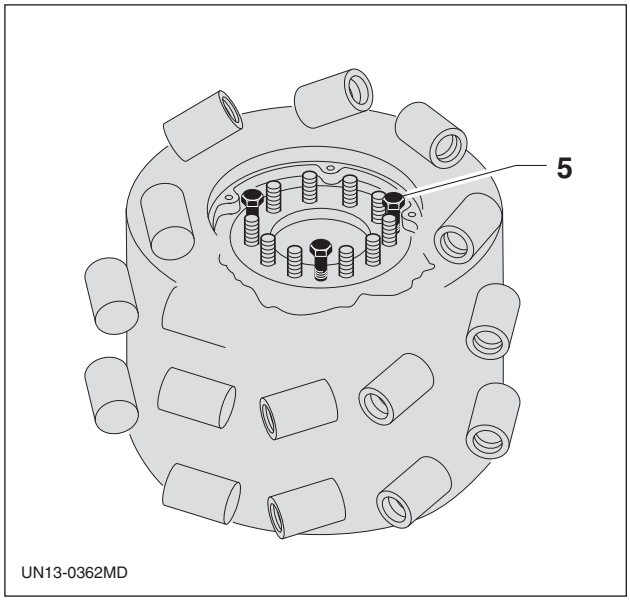
c - Remove the self-locking nuts (**4**) and the self-locking washers (**4a**).

d - Undo the three grub screws (**4b**) found on the TF 3000 only.

N.B.: *TF 3000 does not feature parts (**1** - **2** - **3**).*

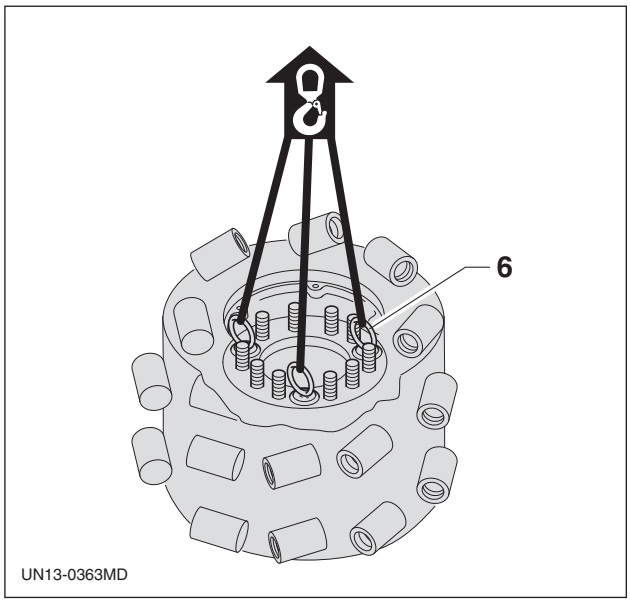


e - If the drum is jammed, screw three 50 mm (or longer) fully threaded HH M12 screws (**5**) into the threaded holes until the drum is released.



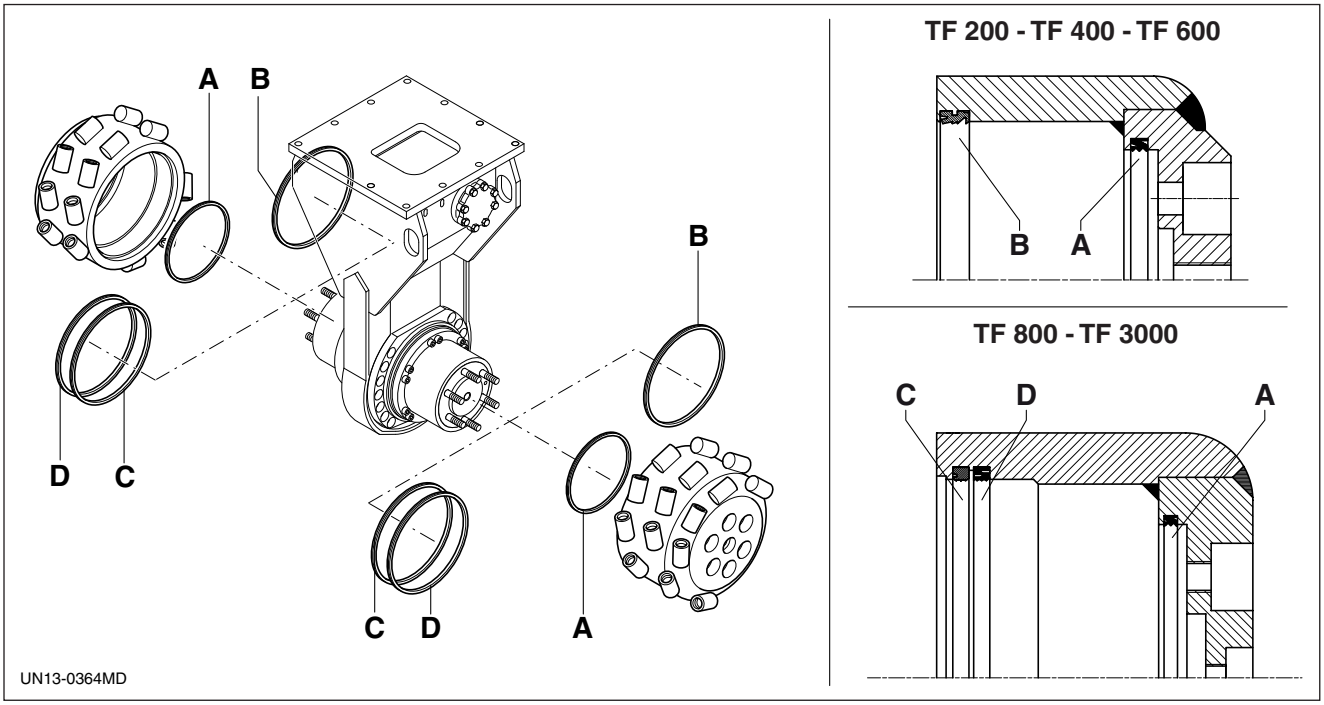
f - Screw three M12 circular eyebolts (**6**) with threaded shanks into the holes, and remove the drum.

Approximate weights of standard drums		
Machine model	**Drum complete with tools kg**	**Drum without tools kg**
TF 1000	290	240
TF 2000	410	360
TF 3000	620	550



14.3 - Drum gasket removal

14.3.1 - Drum gasket removal (TF 200 - TF 400 - TF 600 - TF 800 - TF 3000)



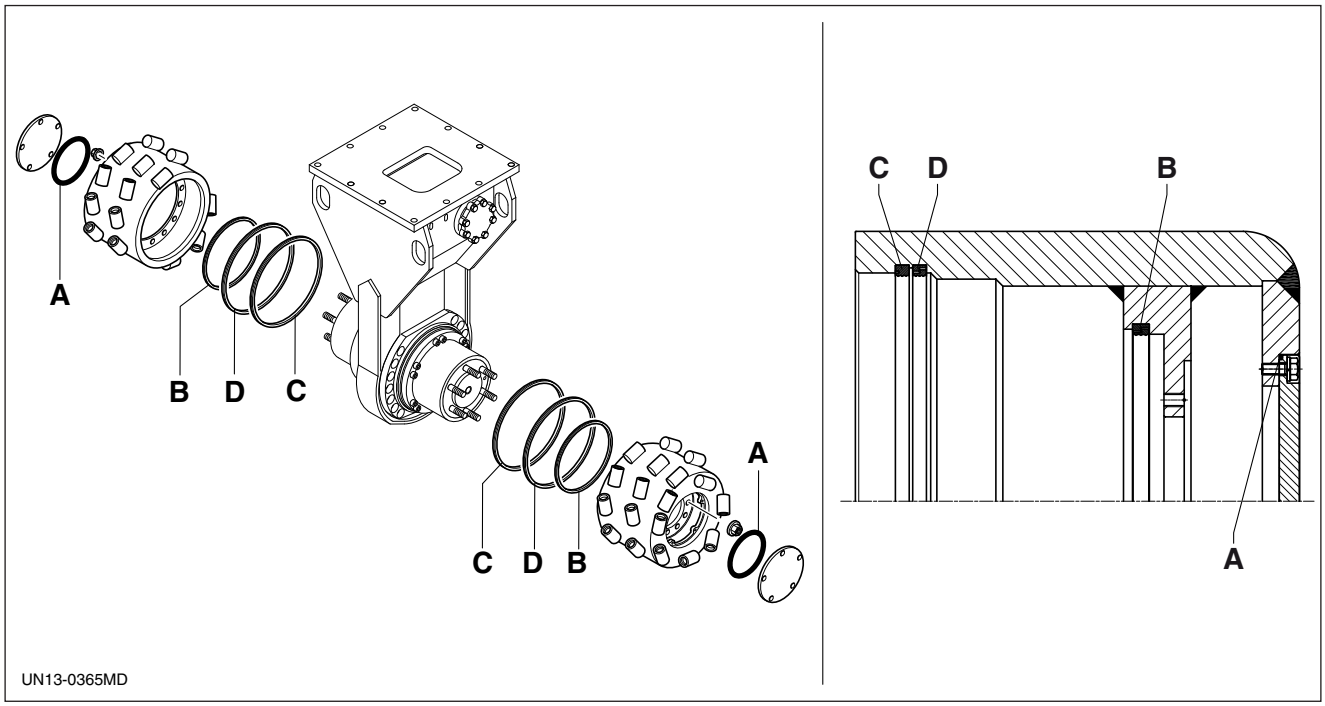
A - Gasket inside drum.

B - Gasket (integral type) outside the drum fitted on the TF 200 - TF 400 - TF 600.

C - Gasket (primary) outside the drum fitted on the TF 800 - TF 3000.

D - Gasket (secondary) outside the drum fitted on the TF 800 - TF 3000.

14.3.2 - Drum gasket removal TF 1000 - TF 2000



A - Cover gasket

B - Gasket inside drum

C - Gasket (primary) outside drum

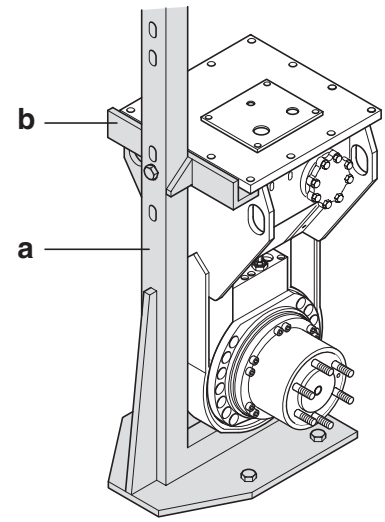
D - Gasket (secondary) outside drum

14.4 - Machine bracketing prior to disassembly

Place the machine on the support unit composed of:

a - support frame; this must be secured in an upright position so that it is stable and safe;

b - corner fastening bracket.



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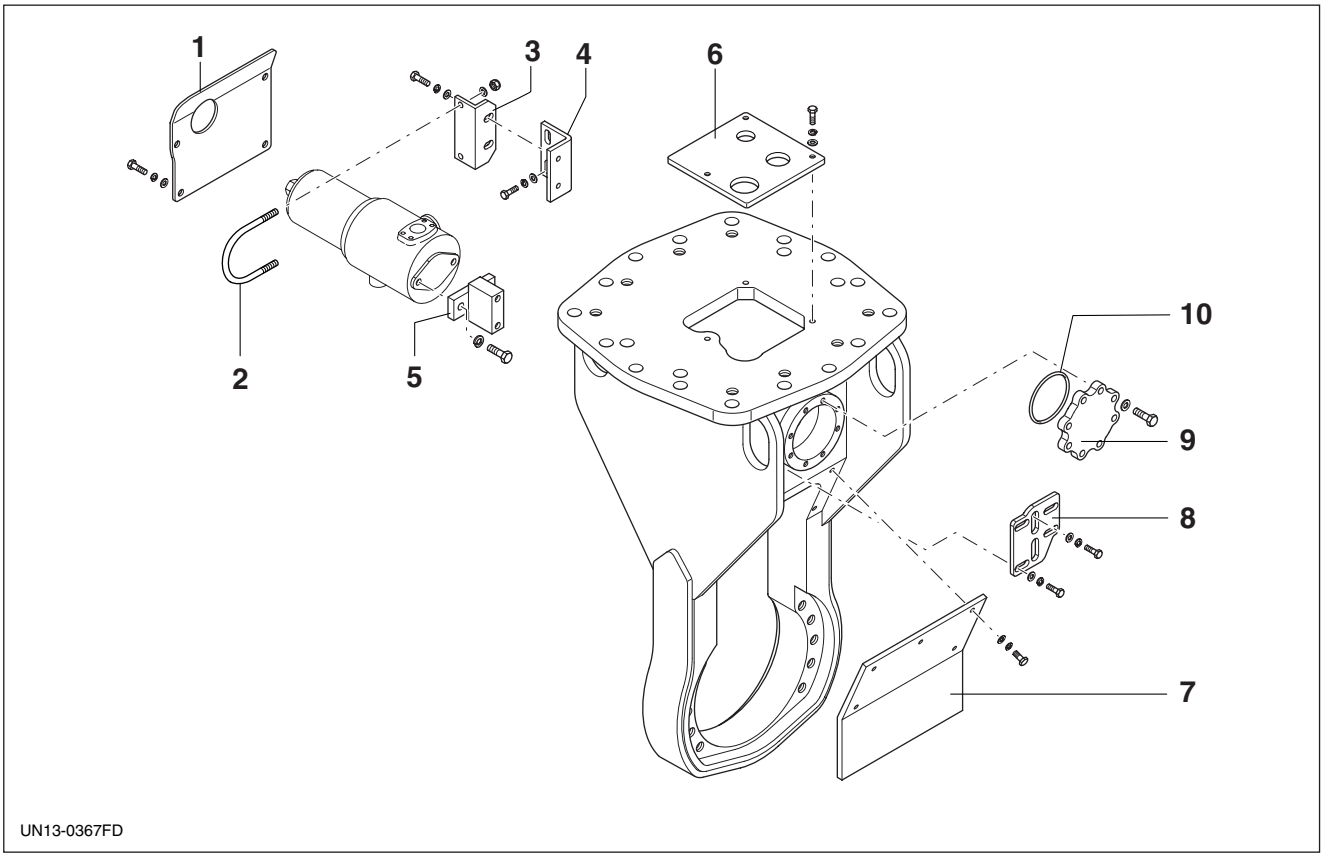
*IMPORTANT: the support frame (**a**) and corner fastening bracket (**b**) are available on request. See "Tooling" chart - chapter 22.*

14.5 - Removing the hydraulic system (TF 200)

During the removal of the hose line which runs to the oil filter and the valve unit, stop up the holes to prevent dirt entering the system.

The internal cleaning of these parts must only be carried out if the hydraulic oil is polluted.

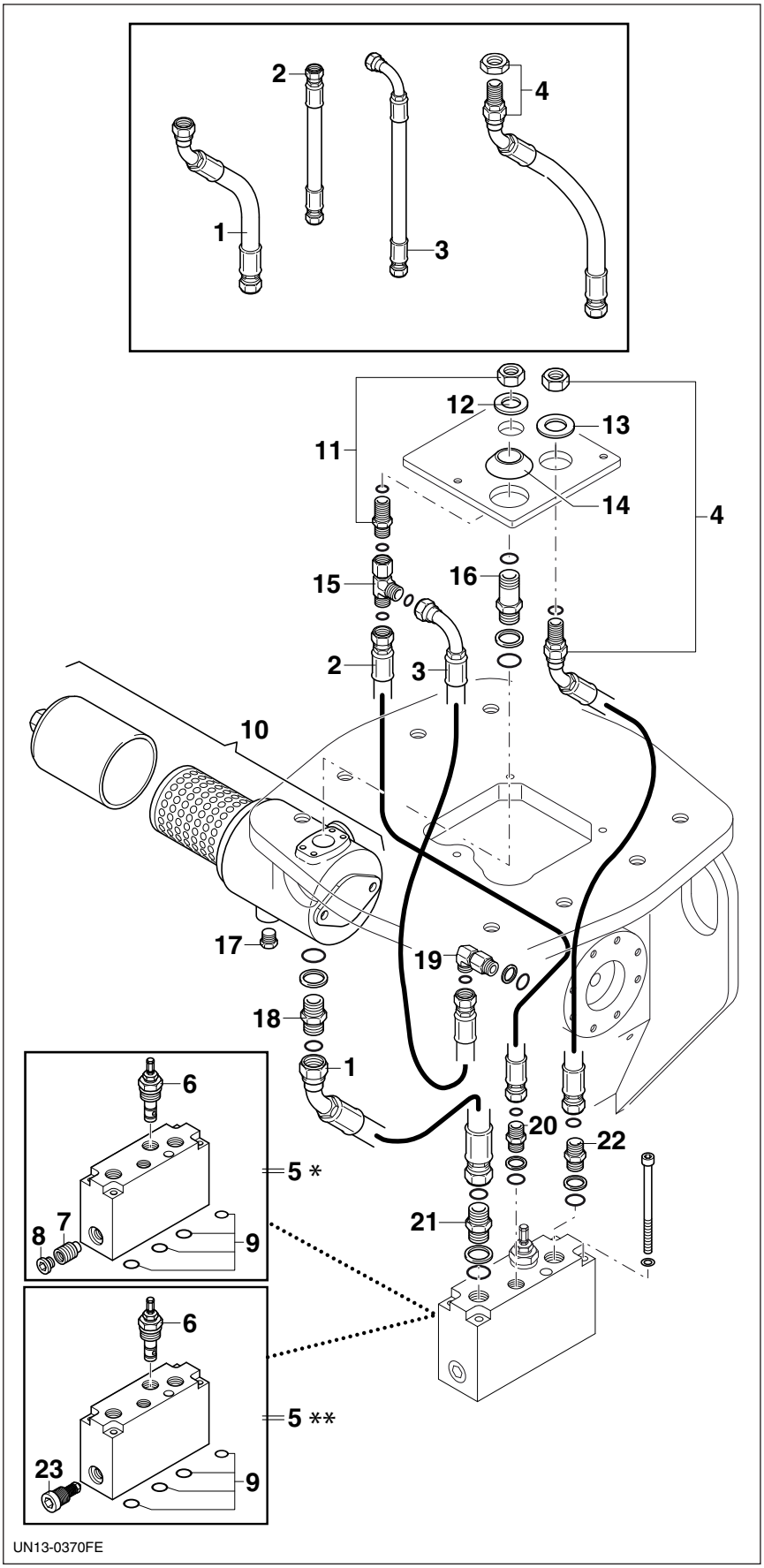
14.5.1 - Removing the oil filter supports and covers (TF 200)



Key

1 - Oil filter cover
2 - Oil filter support U-bolt
3 - Oil filter support corner bracket
4 - Oil filter-bearing corner bracket
5 - Oil filter support
6 - Upper cover
7 - Valve cover
8 - Oil filter fastening plate
9 - Drain line safety cover
10 - Drain line safety cover O-ring

14.5.2 - Removing the pipelines, the valve unit and the oil filter (TF 200)



Key

1 - Pressure line hose
2 - Drain line hose
3 - Drain line hose - safety cover
4 - Return line hose
5 - Hydraulic motor valve unit
6 - Counterpressure valve
7 - By-pass valve
8 - Cap
9 - O-ring
10 - Complete oil filter unit
11 - Panel support
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Fitting
16 - Fitting
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Buffering valve

***** **up to serial n. 2007 31 0428 (without buffering valve)**

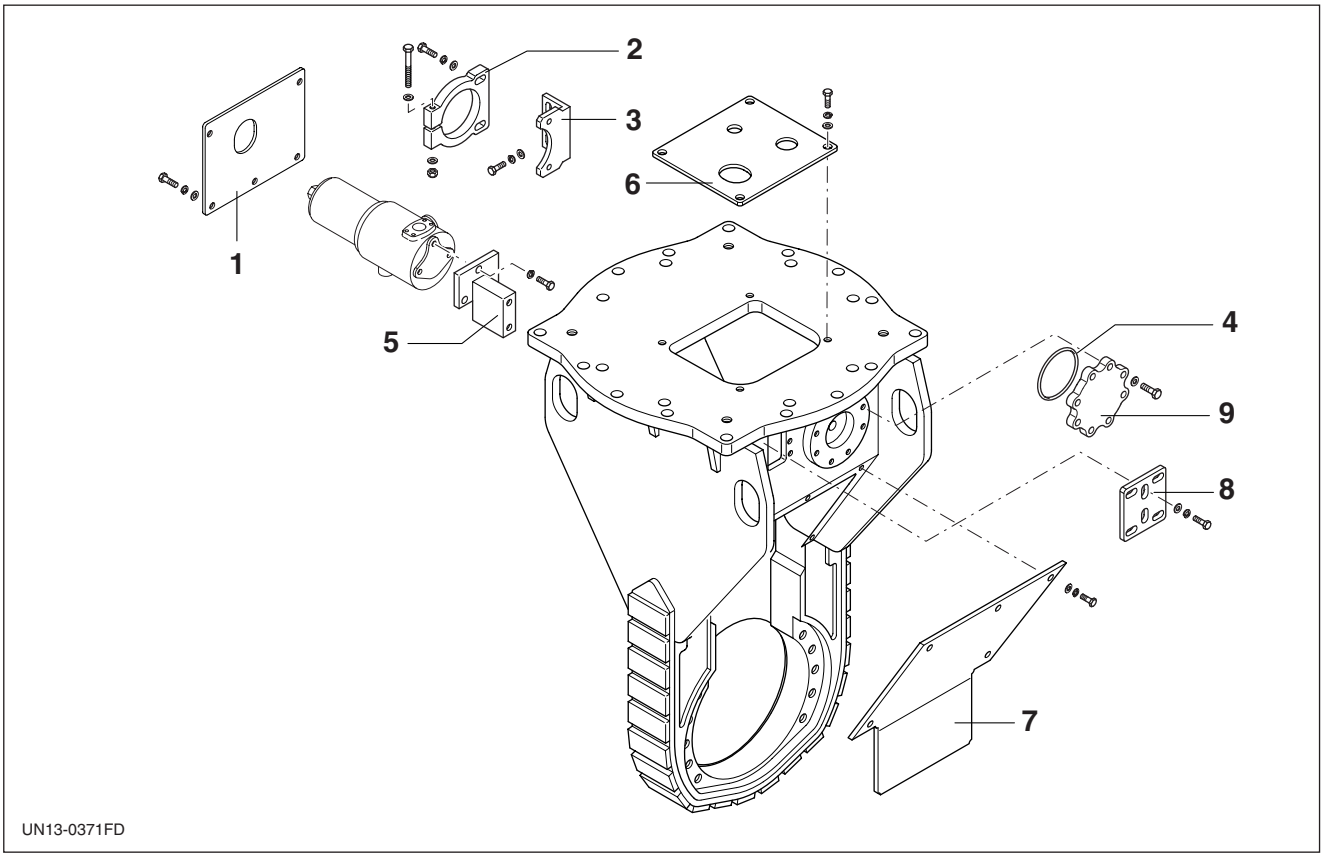
****** **from serial n. 2007 31 0429 (with buffering valve)**

14.6 - Hydraulic system removal (TF 400 - TF 600)

During the removal of the hose line which runs to the oil filter and the valve unit, stop up the holes to prevent dirt entering the system.

The internal cleaning of these parts must only be carried out if the hydraulic oil is polluted.

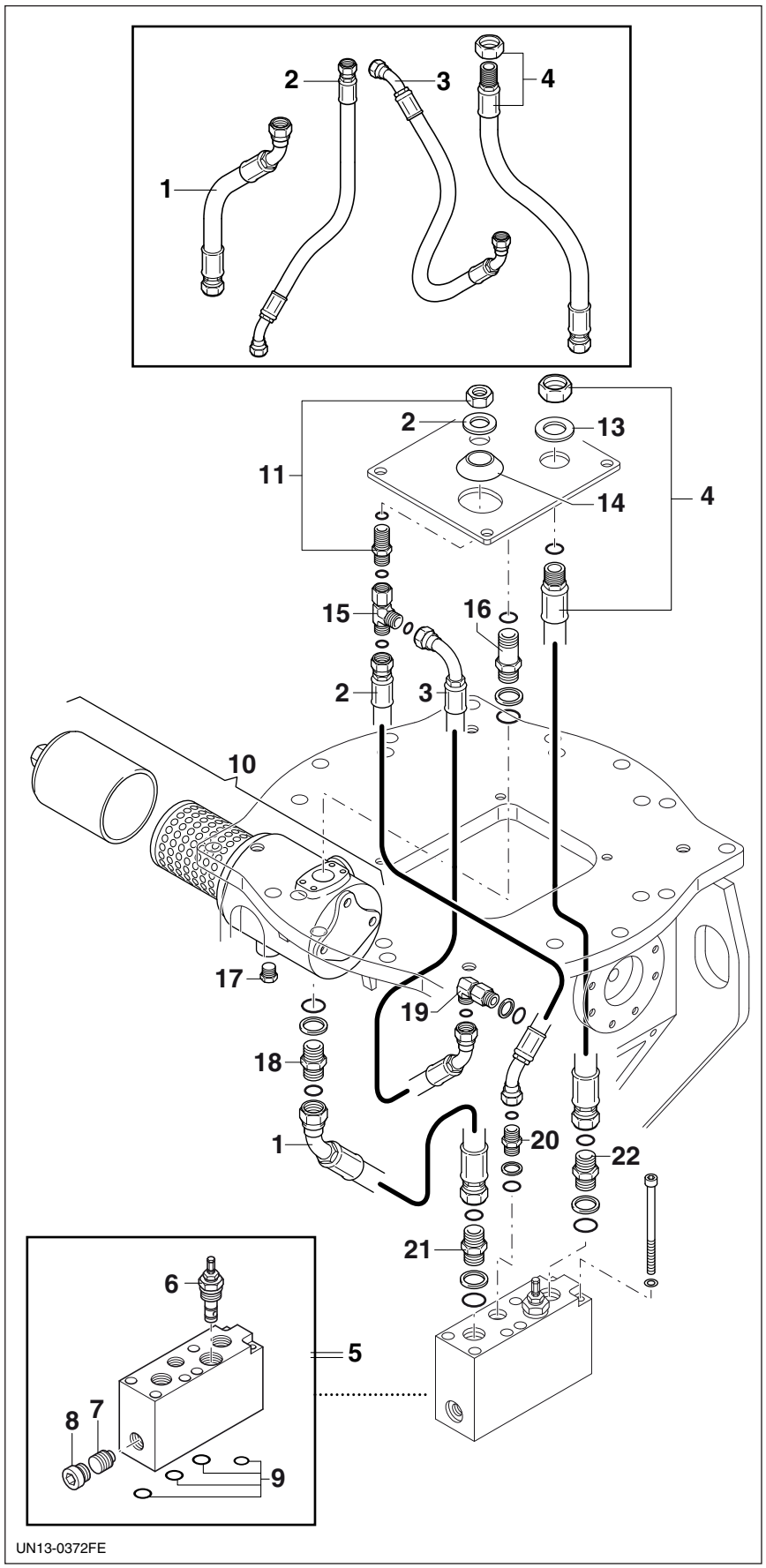
14.6.1 - Removing the oil filter support and covers (TF 400 - TF 600)



Key

1 - Oil filter cover
2 - Oil filter support clamp
3 - Oil filter support corner bracket
4 - Drain line safety cover O-ring
5 - Oil filter support
6 - Upper cover
7 - Valve cover
8 - Oil filter fastening plate
9 - Drain line safety cover

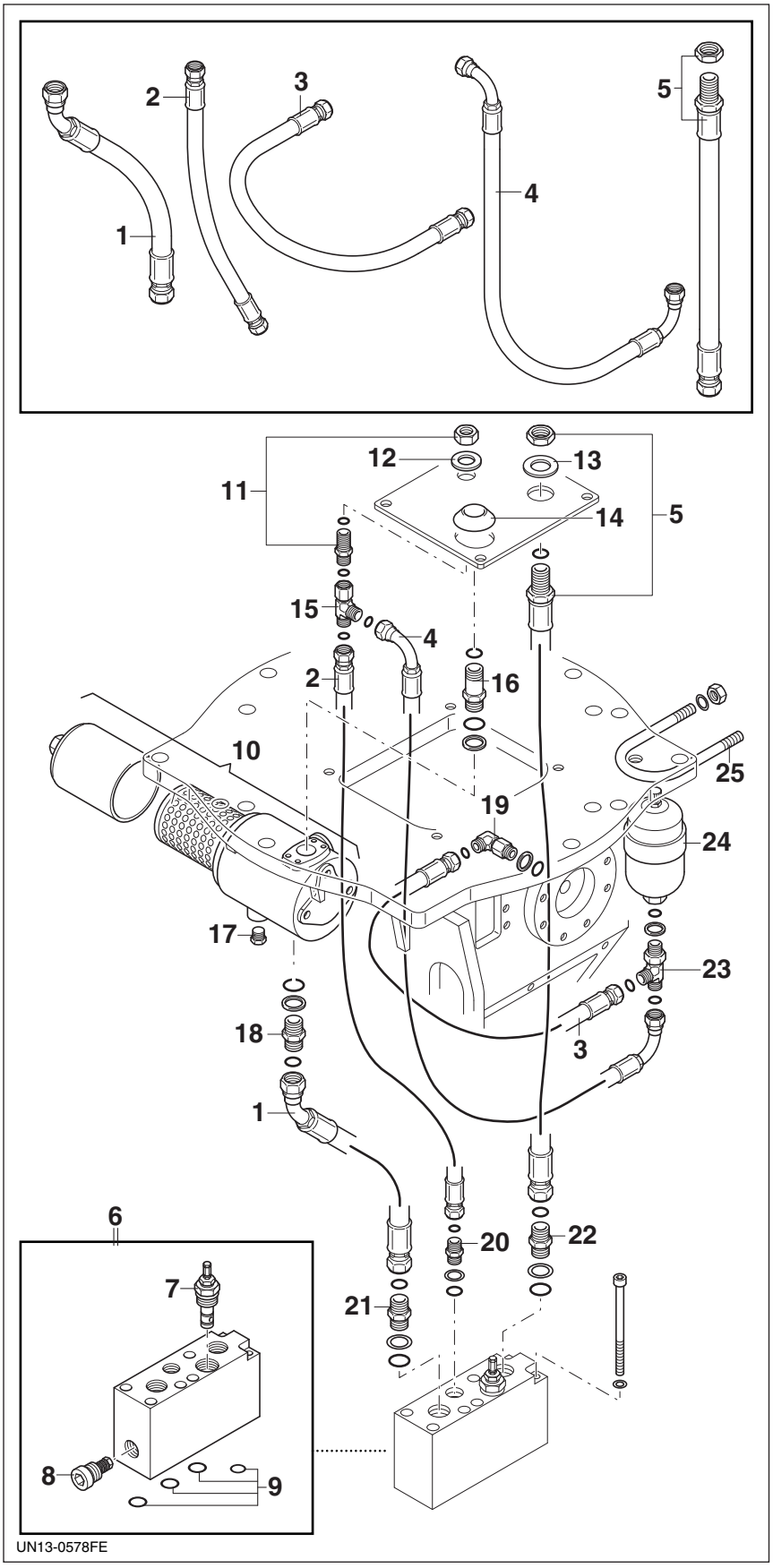
14.6.2 - Removing the pipelines, the valve unit and the oil filter (TF 400 and TF 600) (up to serial n. 2007 31 0446)



Key

1 - Pressure line hose
2 - Drain line hose
3 - Drain line hose - safety cover
4 - Return line hose
5 - Hydraulic motor valve unit
6 - Counterpressure valve
7 - By-pass valve
8 - Cap
9 - O-ring
10 - Complete oil filter unit
11 - Panel support
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Fitting
16 - Fitting
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting

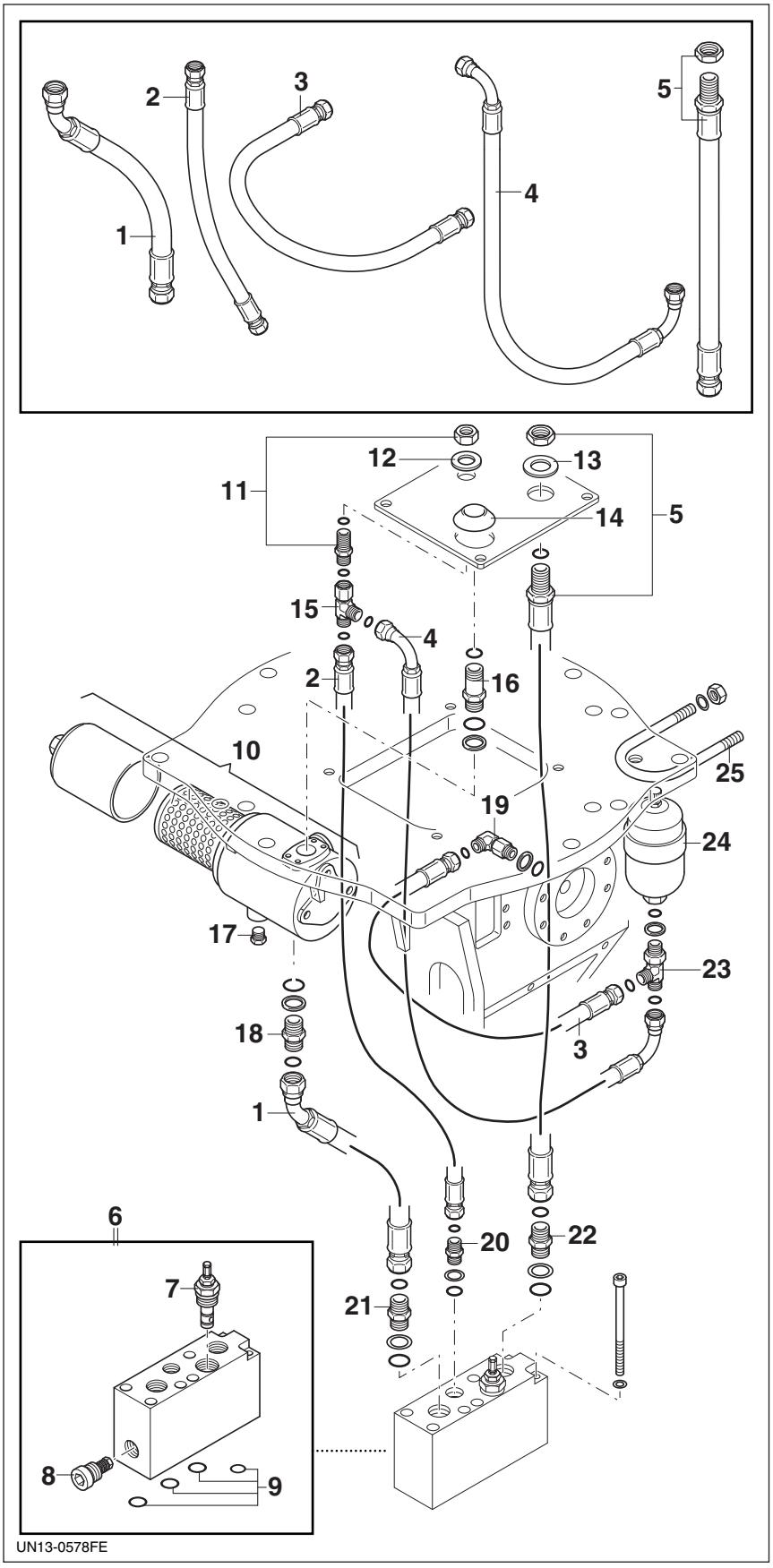
14.6.3 - Removing the system with the accumulator (TF 400) (from serial n. 2007 31 0447)



Key

1 - Pressure line hose
2 - Drain line hose
3 - Hose - safety cover
4 - Accumulator hose
5 - Return line hose
6 - Hydraulic motor valve unit
7 - Counterpressure valve
8 - Buffering valve
9 - O-rings
10 - Complete oil filter unit
11 - Panel support
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Fitting
16 - Fitting
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Accumulator
25 - Fastening element

14.6.4 - Removing the system with the accumulator (TF 600) (from serial n. 2007 31 0448)



Key

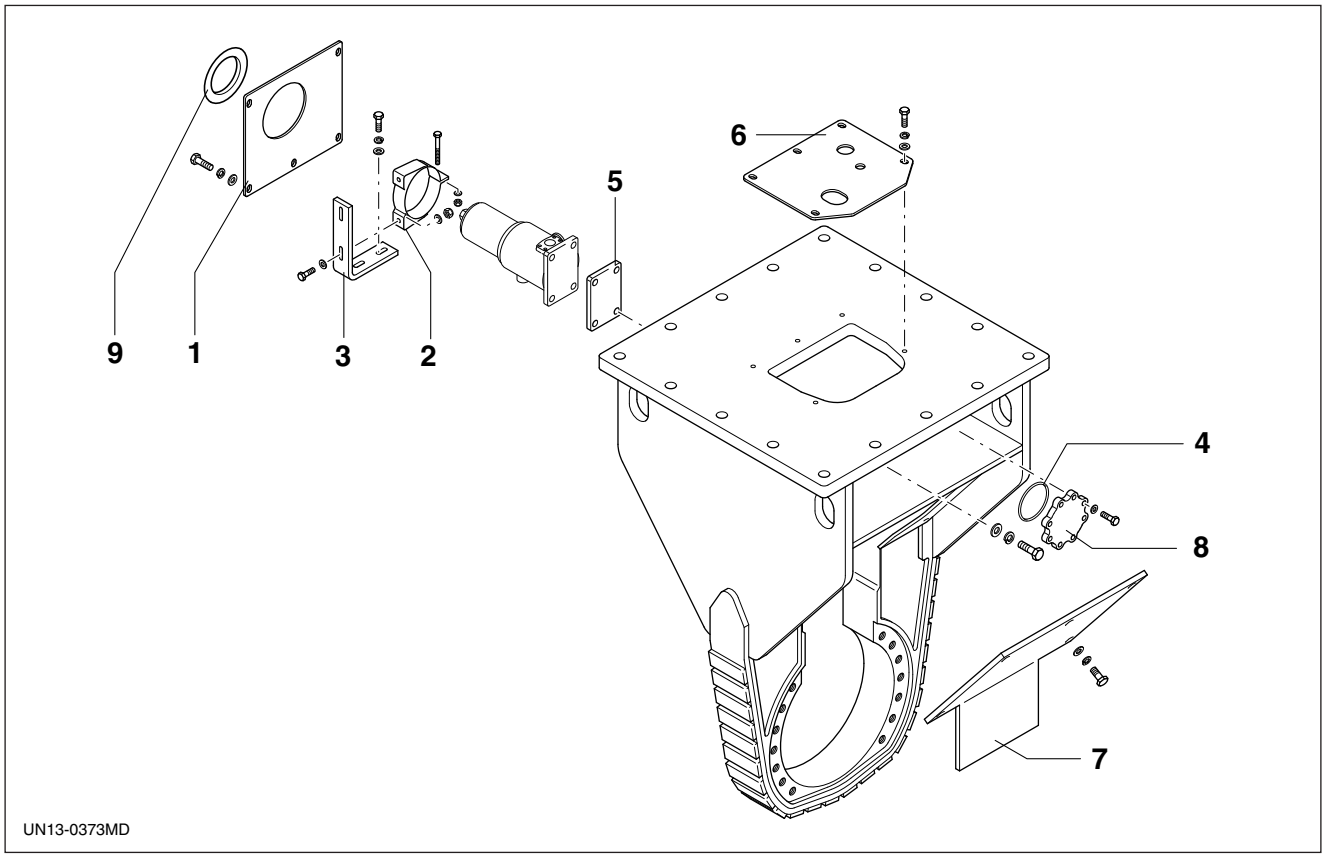
1 - Pressure line hose
2 - Drain line hose
3 - Hose - safety cover
4 - Accumulator hose
5 - Return line hose
6 - Hydraulic motor valve unit
7 - Counterpressure valve
8 - Buffering valve
9 - O-rings
10 - Complete oil filter unit
11 - Panel support
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Fitting
16 - Fitting
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Accumulator
25 - Fastening element

14.7 - Removing the hydraulic system (TF 800)

During the removal of the hose line which runs to the oil filter and the valve unit, stop up the holes to prevent dirt entering the system.

The internal cleaning of these parts must only be carried out if the hydraulic oil is polluted.

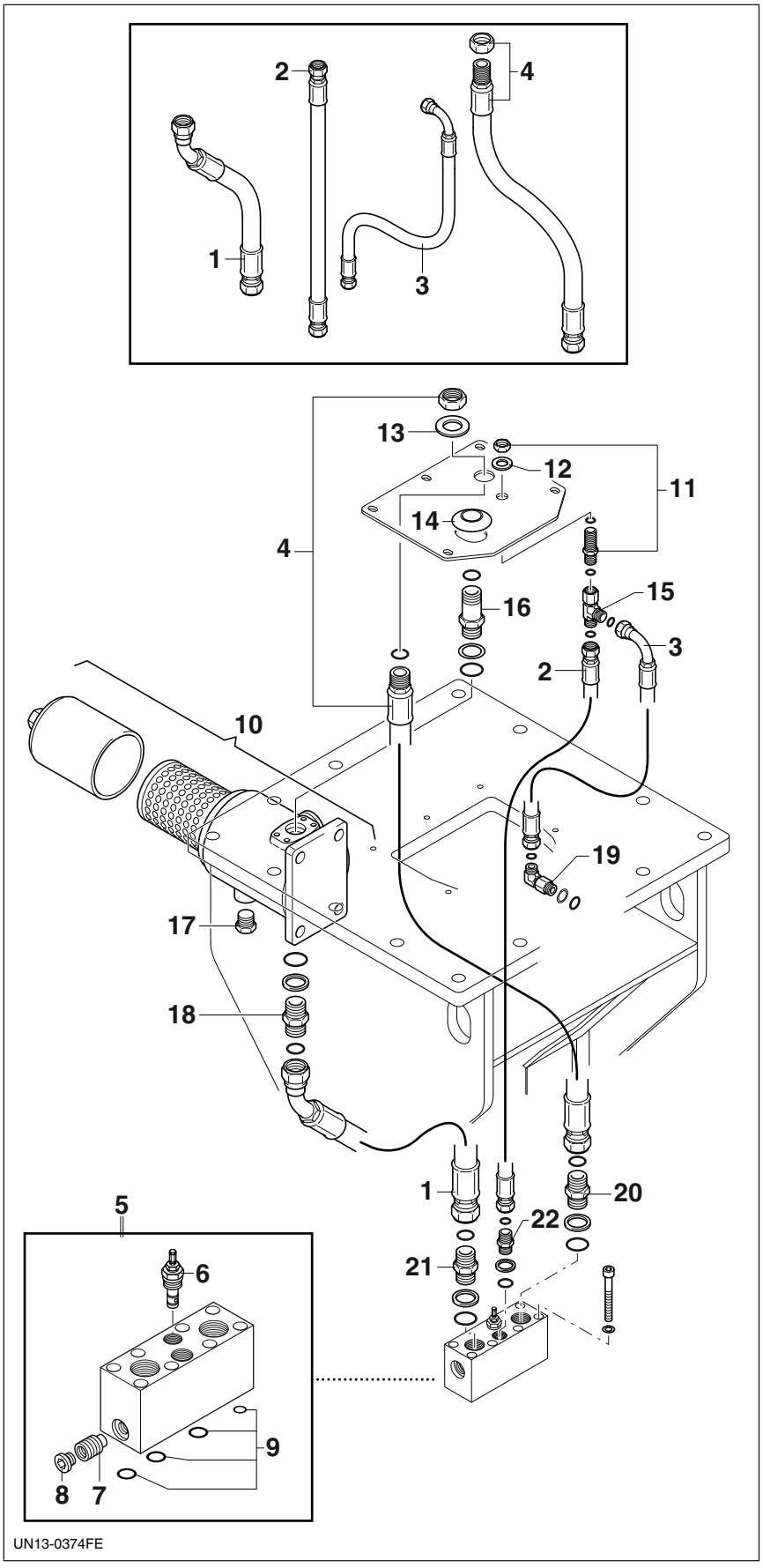
14.7.1 - Removing the oil filter supports and covers (TF 800)



Key

1 - Oil filter cover
2 - Oil filter support clamp
3 - Oil filter support corner bracket
4 - Drain line safety cover O-ring
5 - Oil filter support
6 - Upper cover
7 - Valve cover
8 - Drain line safety cover
9 - Filter cover ring

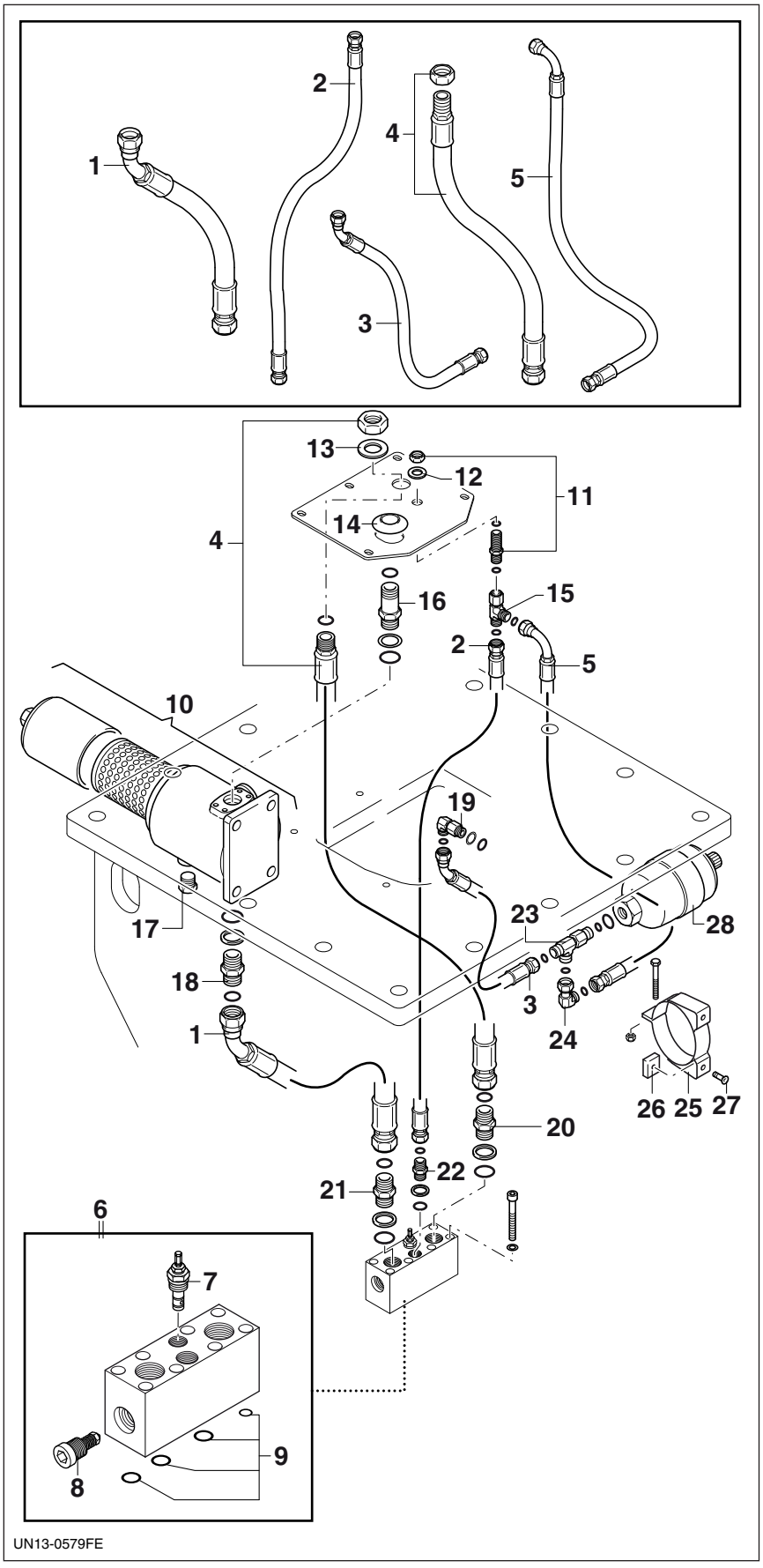
14.7.2 - Removing the pipelines, the valve unit and the oil filter (TF 800) (up to serial n. 2007 31 0439)



Key

1 - Pressure line hose
2 - Drain line hose
3 - Drain line hose - safety cover
4 - Return line hose
5 - Hydraulic motor valve unit
6 - Counterpressure valve
7 - By-pass valve
8 - Cap
9 - O-ring
10 - Complete oil filter unit
11 - Panel support
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Fitting
16 - Fitting
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting

14.7.3 - Removing the system with the accumulator (TF 800) (from serial n. 2007 31 0440)



Key

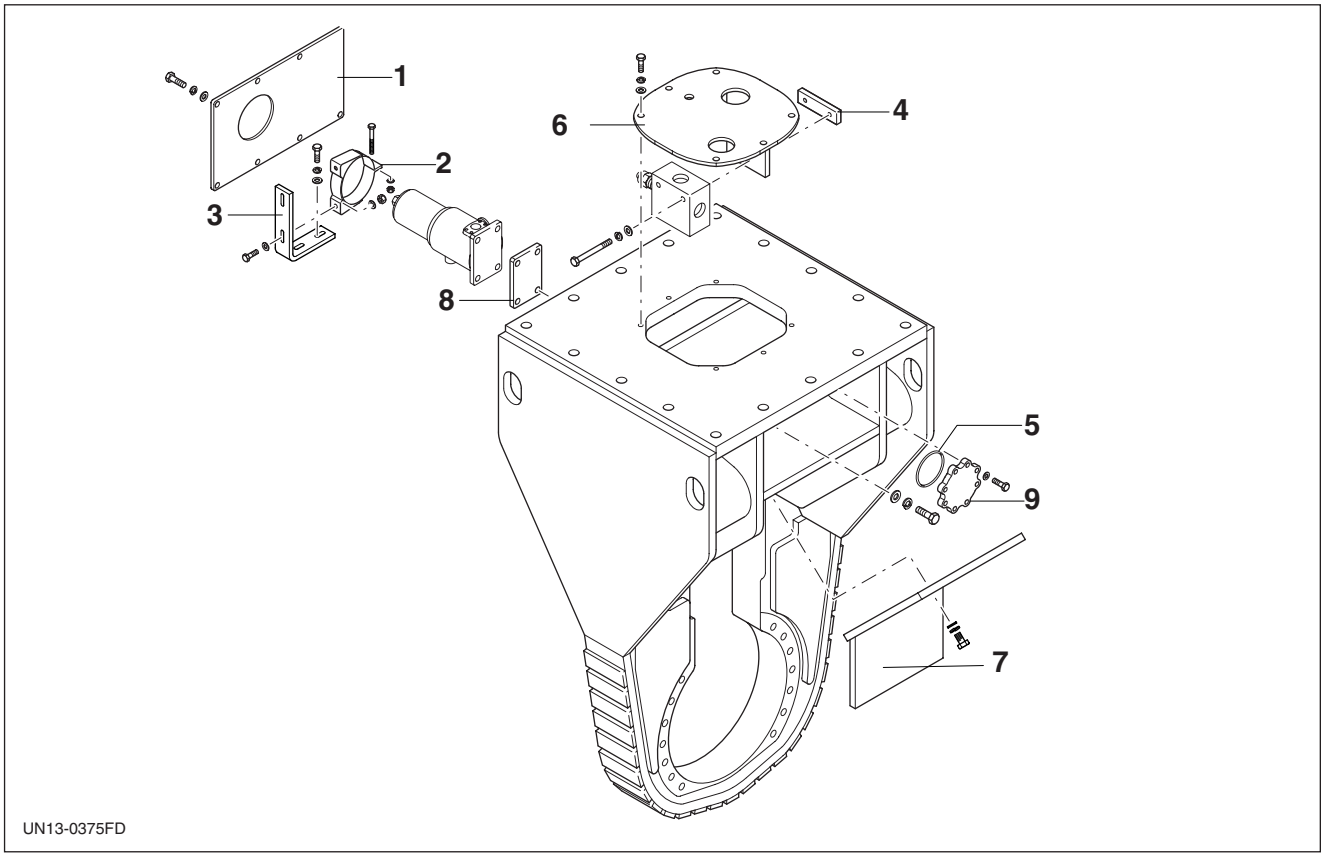
1 - Pressure line hose
2 - Drain line hose
3 - Hose - safety cover
4 - Return line hose
5 - Accumulator hose
6 - Hydraulic motor valve unit
7 - Counterpressure valve
8 - Buffering valve
9 - O-rings
10 - Complete oil filter unit
11 - Panel support
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Fitting
16 - Panel support
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Fitting
25 - Accumulator strap clamp
26 - Plate
27 - Screw
28 - Accumulator

14.8 - Removing the hydraulic system (TF 1000)

During the removal of the hose line which runs to the oil filter and the valve unit, stop up the holes to prevent dirt entering the system.

The internal cleaning of these parts must only be carried out if the hydraulic oil is polluted.

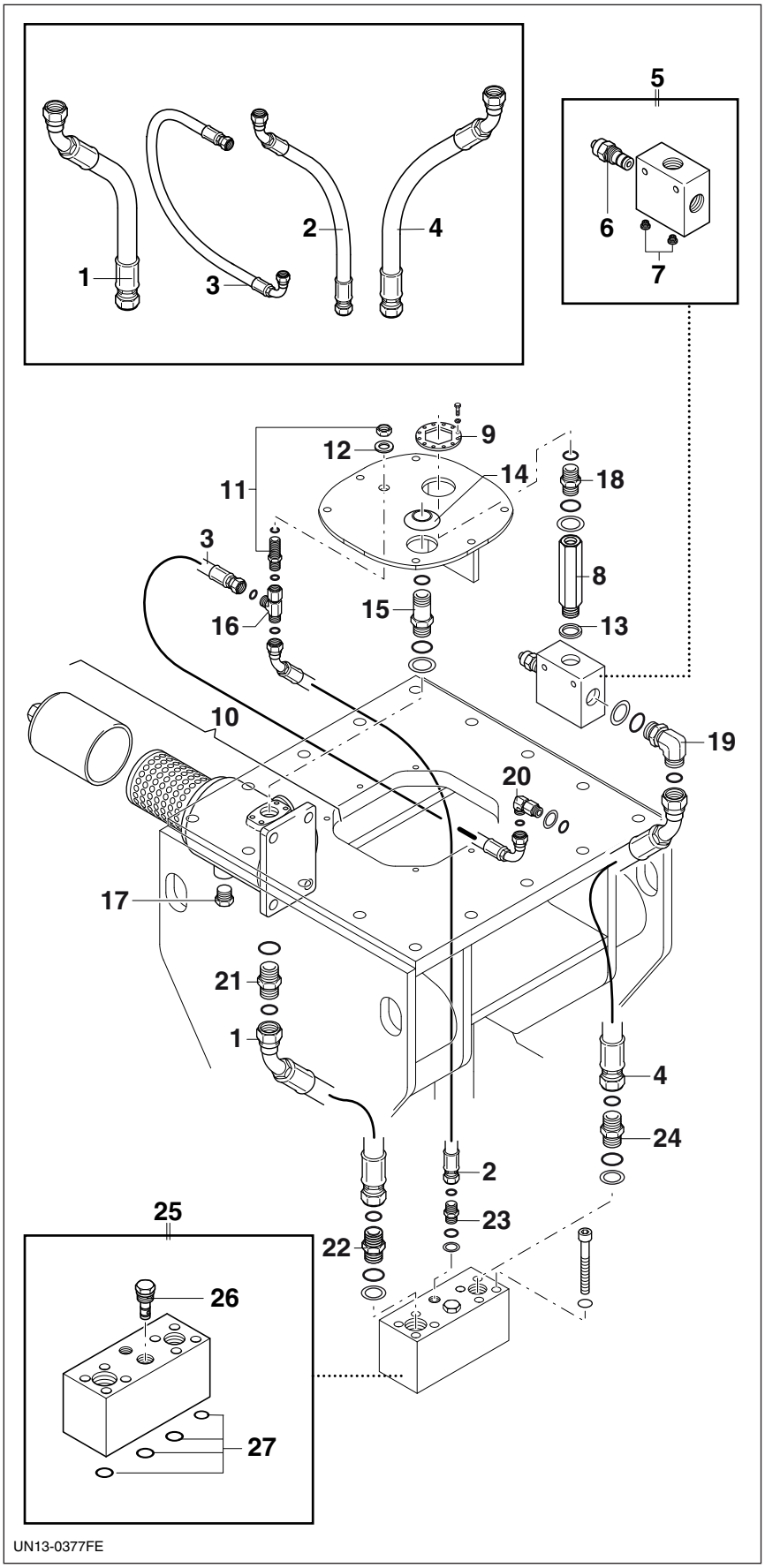
14.8.1 - Removing the oil filter supports, covers and counterpressure valve unit (TF 1000)



Key

1 - Oil filter cover
2 - Oil filter support clamp
3 - Oil filter support corner bracket
4 - Oil filter fastening plate
5 - Drain line safety cover O-ring
6 - Upper cover
7 - Valve cover
8 - Oil filter support
9 - Drain line safety cover

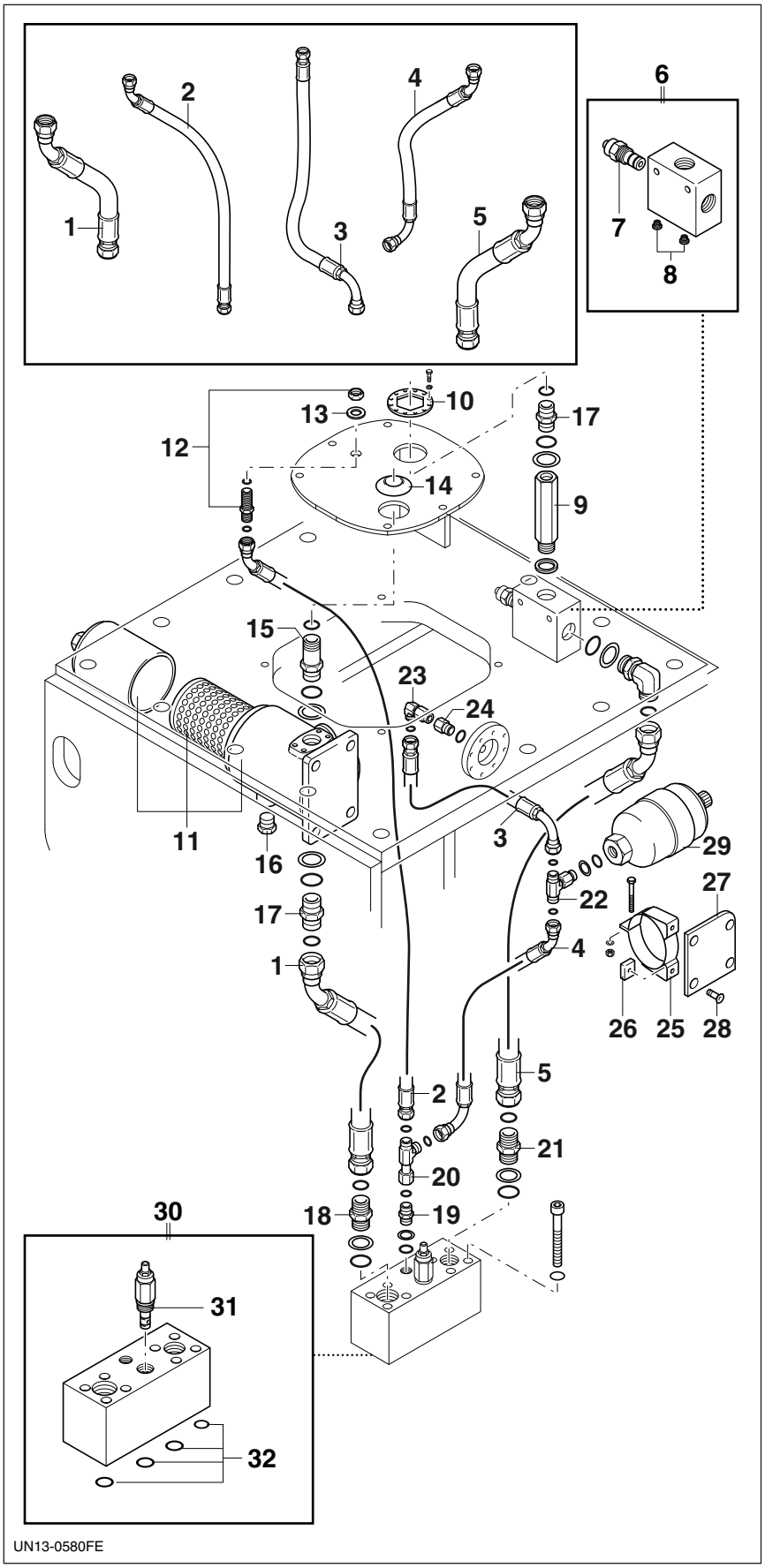
14.8.2 - Removing the pipelines and the valve and oil filter units (TF 1000) (up to serial n. 2007 31 0445)



Key

1 - Pressure line hose
2 - Drain line hose
3 - Drain line hose - safety cover
4 - Return line hose
5 - Counterpressure valve unit
6 - Counterpressure valve
7 - Caps
8 - One-way valve
9 - Clamping flange
10 - Complete oil filter unit
11 - Panel support
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Panel support
16 - Fitting
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Fitting
25 - By-pass valve unit
26 - By-pass valve
27 - O-rings

14.8.3 - Removing the system with the accumulator (TF 1000) (from serial n. 2007 31 0446)



Key

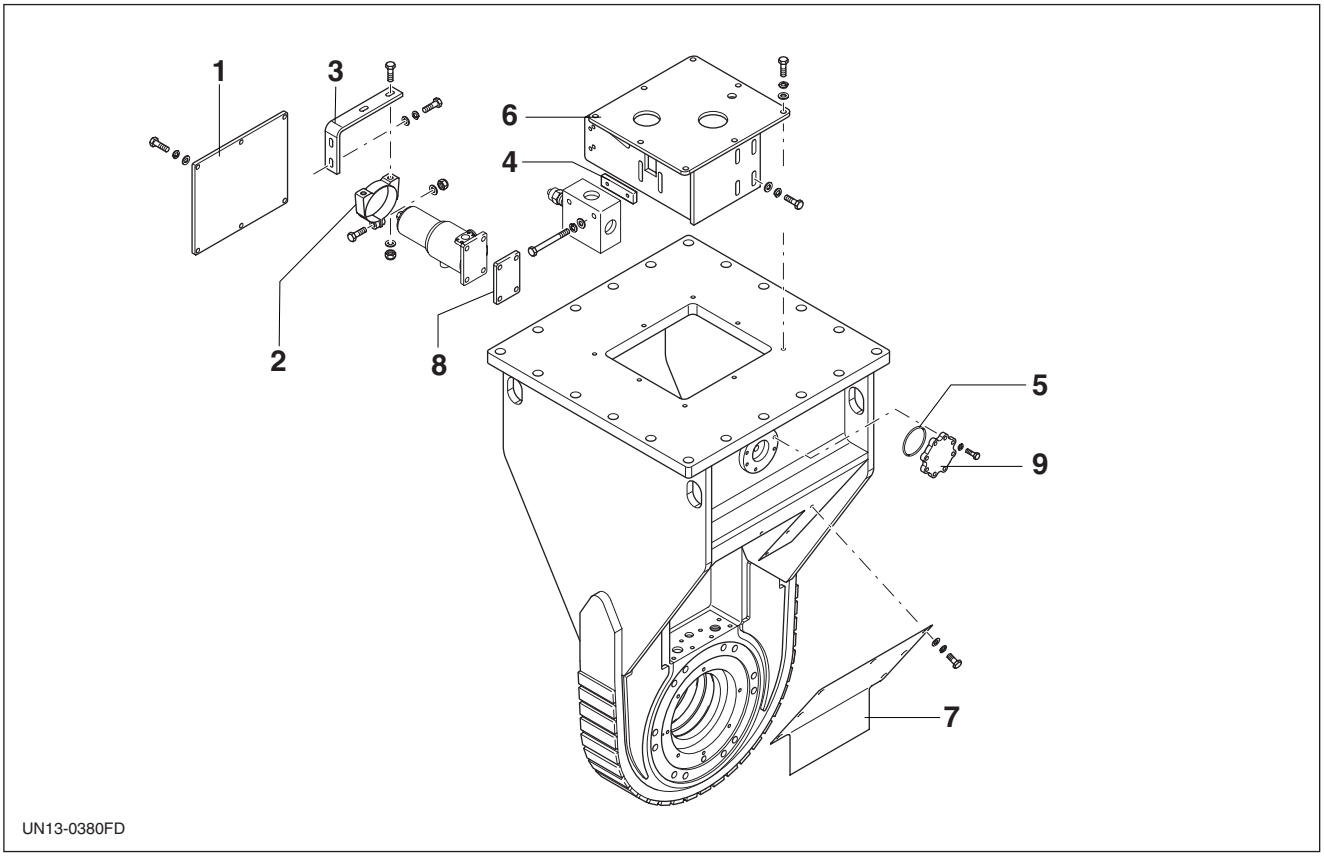
1 - Pressure line hose
2 - Drain line hose
3 - Hose - safety cover
4 - Accumulator hose
5 - Return line hose
6 - Counterpressure valve unit
7 - Counterpressure valve
8 - Caps
9 - One-way valve
10 - Clamping flange
11 - Complete filter unit
12 - Panel support
13 - Washer
14 - Washer
15 - Panel support
16 - Cap
17 - Fitting
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Stud bolt
25 - Accumulator strap clamp
26 - Plate
27 - Plate
28 - Screw
29 - Accumulator
30 - By-pass valve unit
31 - Buffering valve
32 - O-ring

14.9 - Removing the hydraulic system (TF 2000)

During the removal of the hose line which runs to the oil filter and the valve unit, stop up the holes to prevent dirt entering the system.

The internal cleaning of these parts must only be carried out if the hydraulic oil is polluted.

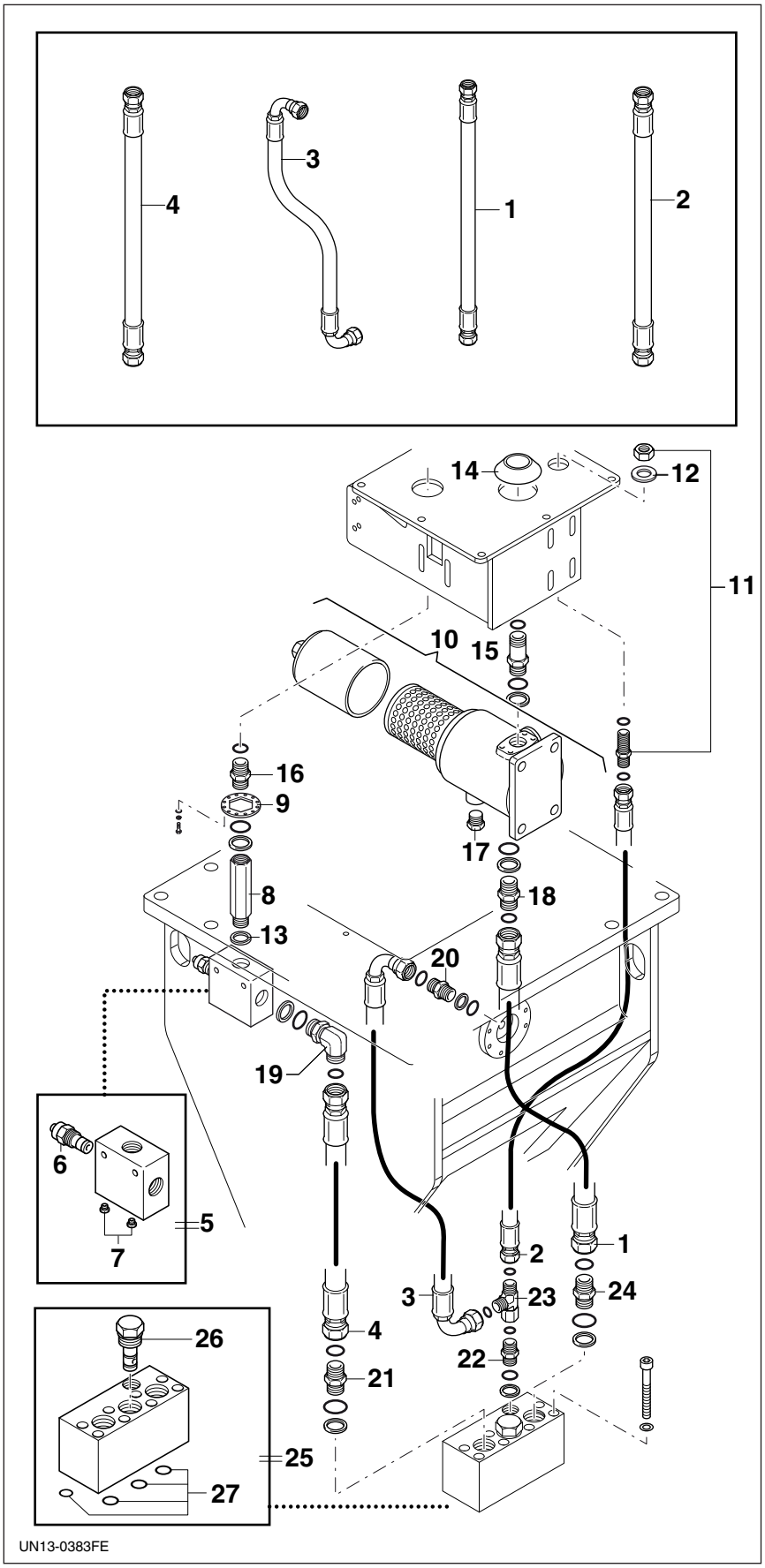
14.9.1 - Removing the oil filter supports, covers and counterpressure valve unit (TF 2000)



Key

1 - Oil filter cover
2 - Oil filter support clamp
3 - Oil filter support corner brackets
4 - Oil filter fastening plate
5 - Drain line safety cover O-ring
6 - Upper cover
7 - Valve cover
8 - Oil filter support
9 - Drain line safety cover

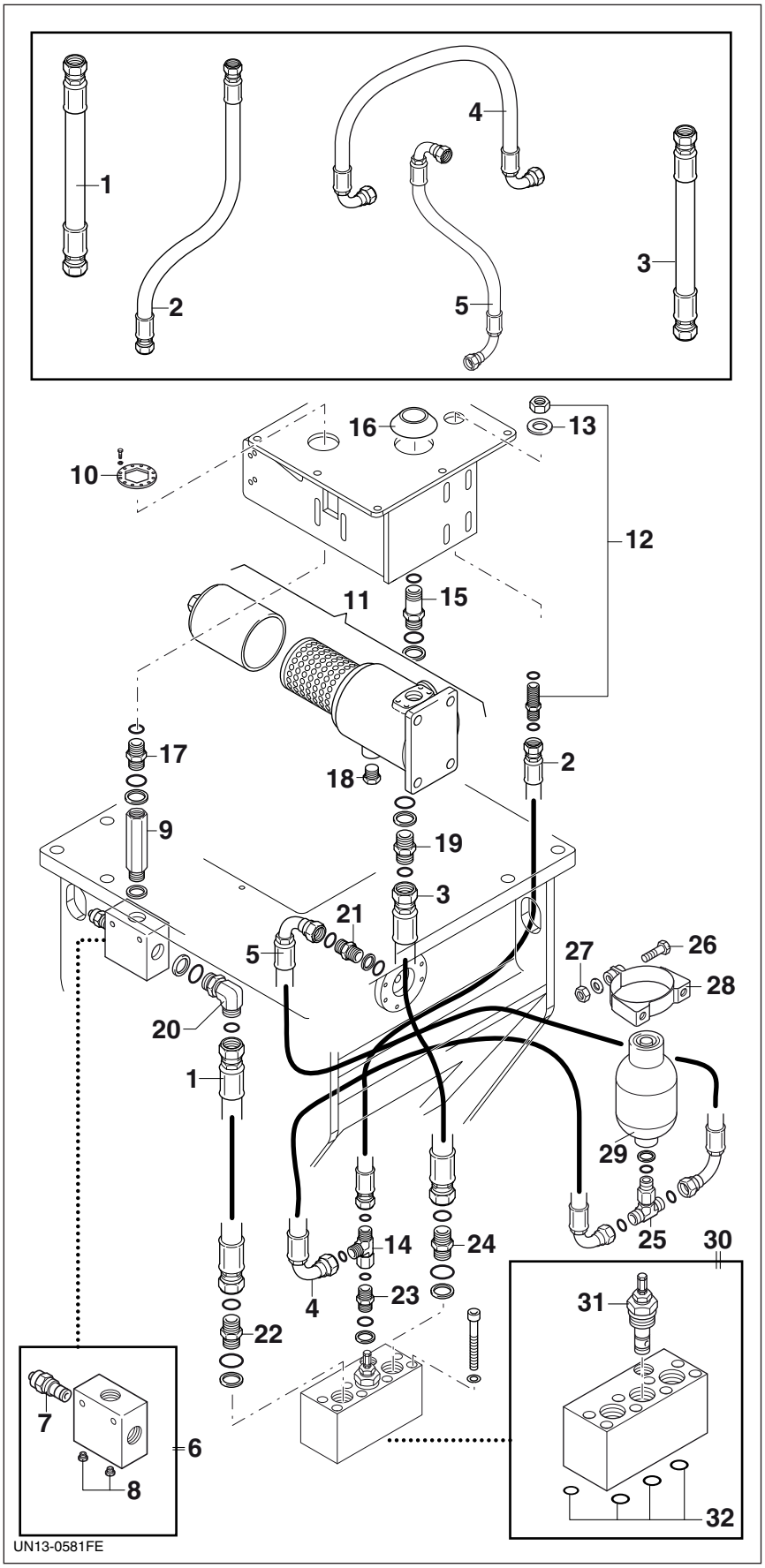
14.9.2 - Removing the pipelines and the valve and oil filter units (TF 2000) (up to serial n. 2007 31 0424)



Key

1 - Pressure line hose
2 - Drain line hose
3 - Drain line hose - safety cover
4 - Return line hose
5 - Counterpressure valve unit
6 - Counterpressure valve
7 - Caps
8 - One-way valve
9 - Clamping flange
10 - Complete oil filter unit
11 - Panel support
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Panel support
16 - Fitting
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Fitting
25 - By-pass valve unit
26 - By-pass valve
27 - O-ring

14.9.3 - Removing the system with the accumulator (TF 2000) (from serial n. 2007 31 0425)



Key

1 - Return line hose
2 - Drain line hose
3 - Pressure line hose
4 - Accumulator hose
5 - Hose - safety cover
6 - Counterpressure valve unit
7 - Counterpressure valve
8 - Caps
9 - One-way valve
10 - Clamping flange
11 - Complete filter unit
12 - Panel support

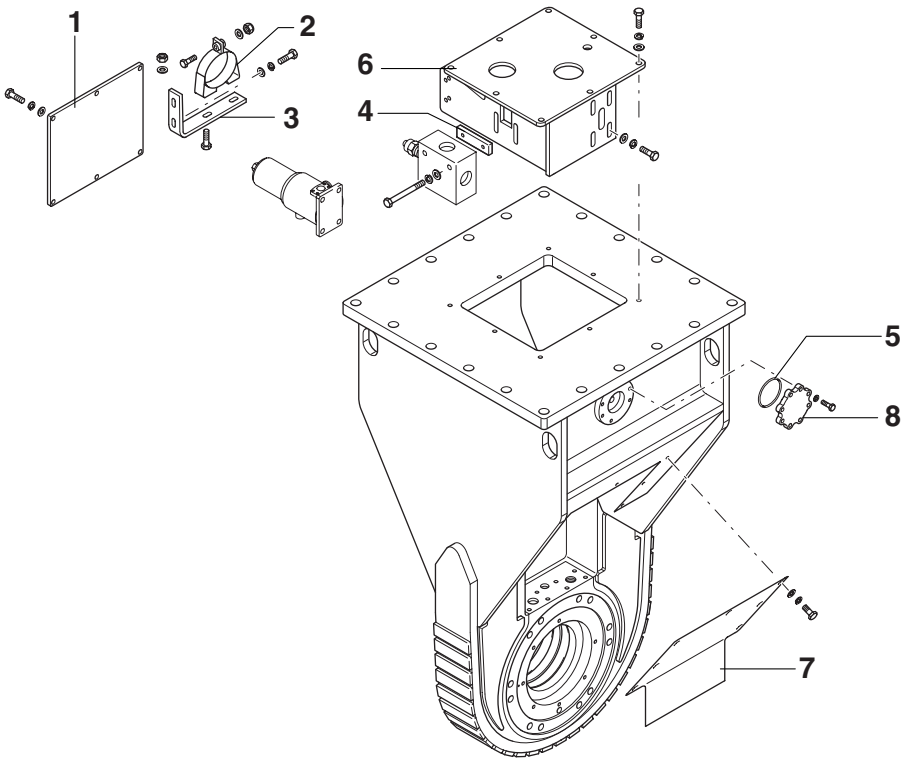
13 - Washer
14 - Fitting
15 - Panel support
16 - Hole plug ring
17 - Fitting
18 - Cap
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Fitting
25 - Fitting
26 - Screw
27 - Nut
28 - Accumulator strap clamp
29 - Accumulator
30 - By-pass valve unit
31- Buffering valve
32 - O-rings

14.10 - Removing the hydraulic system (TF 3000)

During the removal of the hose line which runs to the oil filter and the valve unit, stop up the holes to prevent dirt entering the system.

The internal cleaning of these parts must only be carried out if the hydraulic oil is polluted.

14.10.1 - Removing the oil filter supports, covers and counterpressure valve unit (TF 3000)

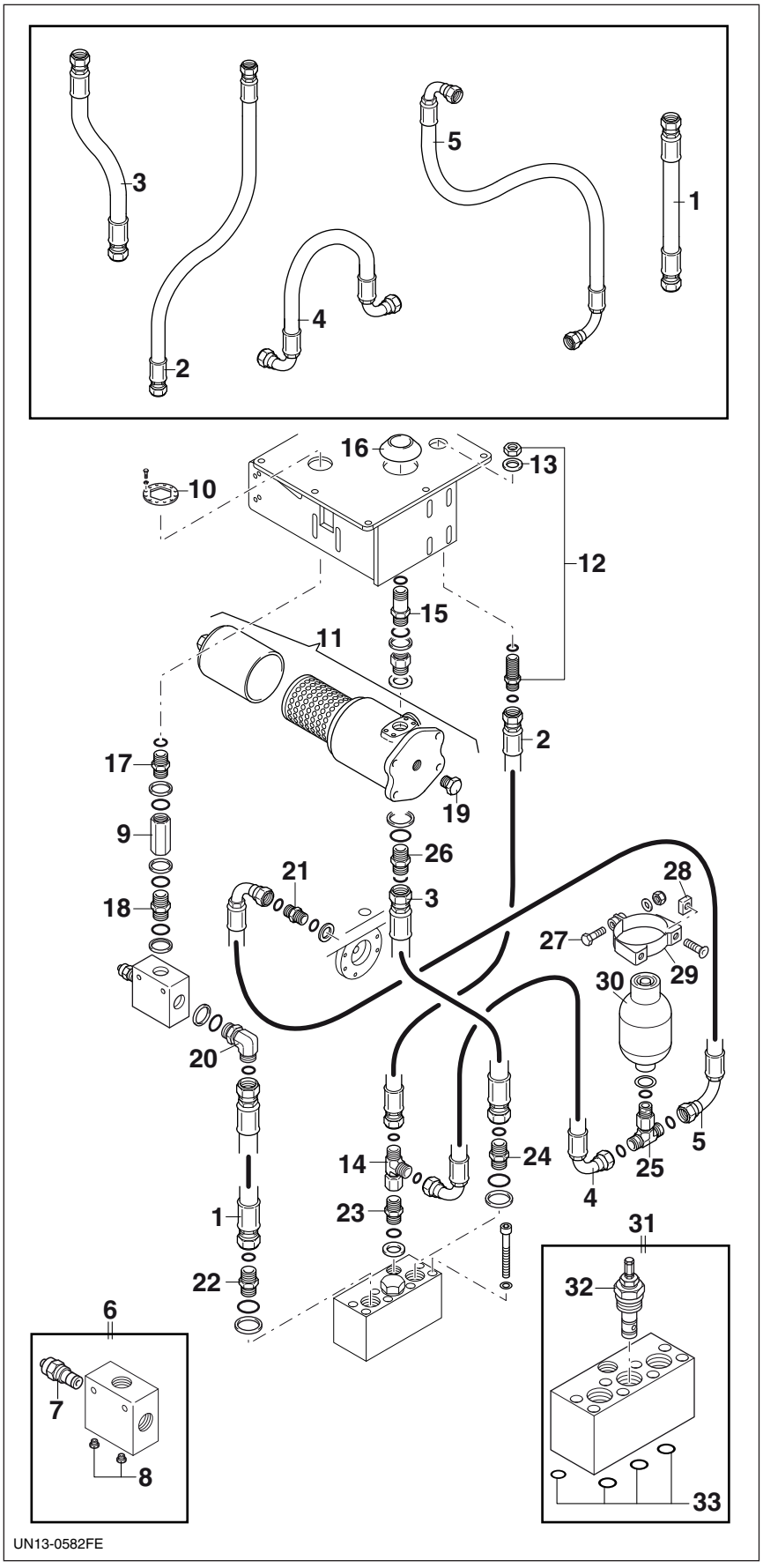


UN13-0407FD

Key

1 - Oil filter cover
2 - Oil filter support clamp
3 - Oil filter support corner brackets
4 - Oil filter fastening plate
5 - Drain line safety cover O-ring
6 - Upper cover
7 - Valve cover
8 - Drain line safety cover

14.10.2 - Removing the pipelines and the valve and oil filter units (TF 3000)



Key

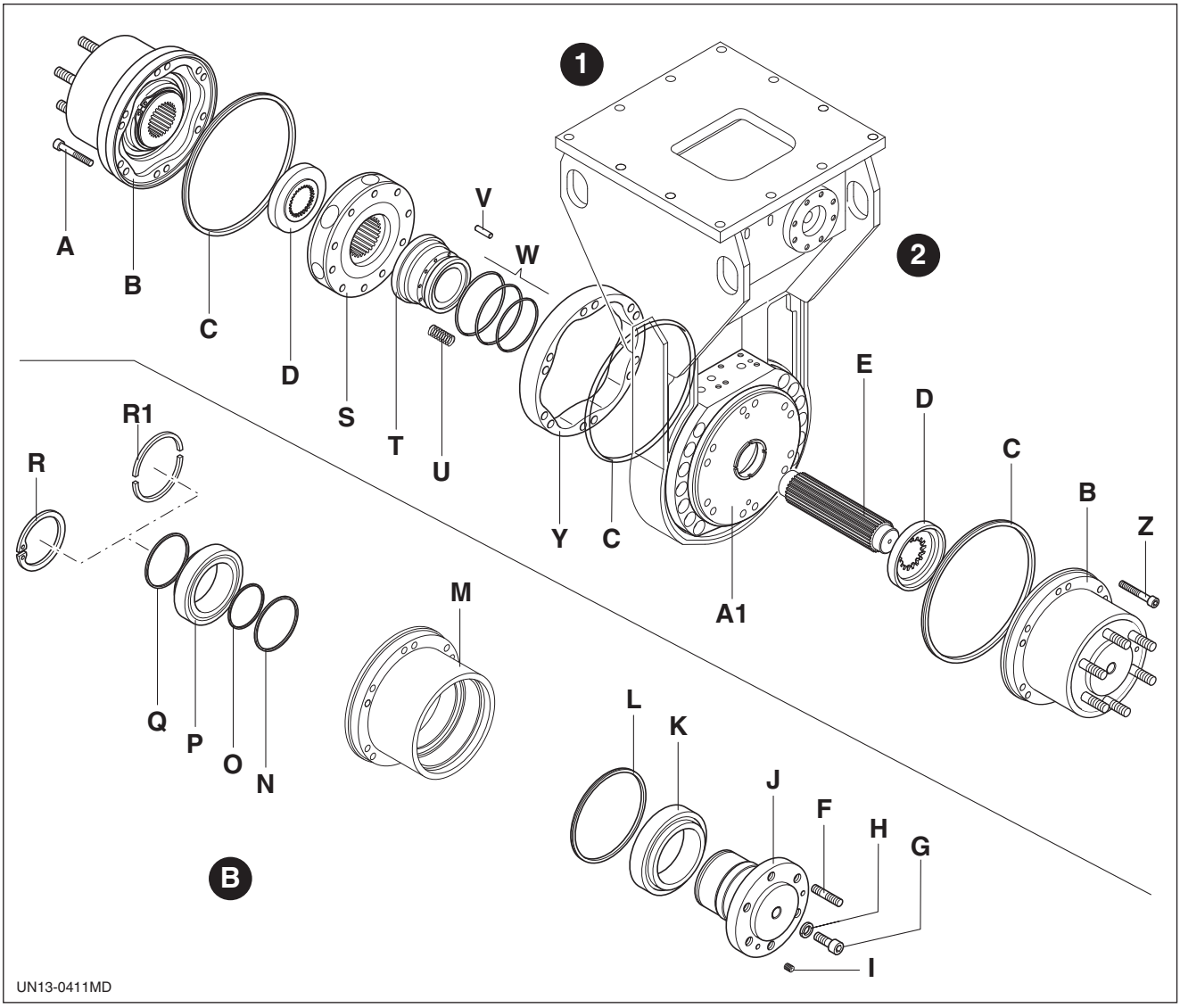
1 - Return line hose
2 - Drain line hose
3 - Pressure line hose
4 - Accumulator hose
5 - Hose - safety cover
6 - Counterpressure valve unit
7 - Counterpressure valve
8 - Caps
9 - One-way valve
10 - Clamping flange
11 - Complete filter unit
12 - Panel support
13 - Washer
14 - Fitting
15 - Panel support
16 - Hole plug ring
17 - Fitting
18 - Fitting
19 - Cap
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Fitting
25 - Fitting
26 - Fitting
27 - Screw
28 - Plate
29 - Accumulator strap clamp
30 - Accumulator
31 - By-pass valve unit
32 - Buffering valve
33 - O-rings

14.11 - Removing the motor unit

14.11.1 - Motor unit (TF 200 - TF 400 - TF 600 - TF 800 - TF 1000)

1 SIDE OPPOSITE VALVE COVER

2 VALVE COVER SIDE



Key

A - Screw
B - Hub with support
C - Gasket
D - Toothed spacer **(*)**
E - Toothed shaft
F - Double-ended stay bolt
G - Screw
H - Washer
I - Grub screw
J - Hub
K - Bearing
L - Gasket
M - Bearing support
N - Gasket
O - Gasket
P - Bearing
Q - Spacer
R - Bearing retaining part (circlip for TF 200 - TF 400 - TF 600)
R1 - Bearing retaining part (half rings for TF 800 - TF 1000)
S - Rotor with pistons
T - Distributor
U - Spring
V - Pin (TF 200 only)
W - Series of distributor gaskets
Y - Cam
Z - Screw
A1 - Motor support

N.B. (*): *the spacers are different on the TF 600 (only this model).*
The side opposite valve cover 1 *is the thicker one; while the valve cover side* 2 *is thinner.*

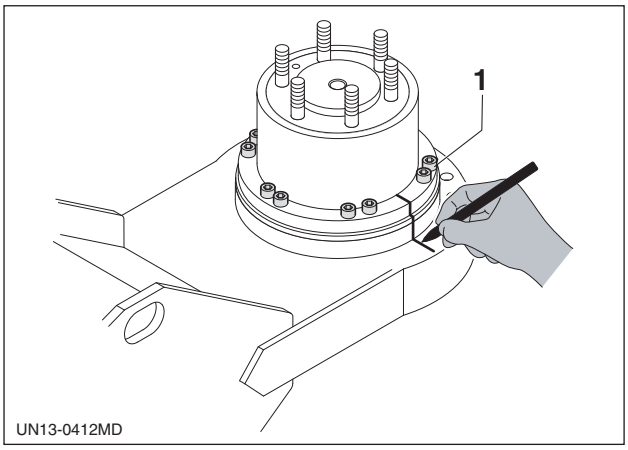
14.11.2 - Removing the hub with the support (side opposite valve cover) TF 200 - TF 400 - TF 600 - TF 800 - TF 1000

a - Position the machine with the drum rotation axis vertical and work on the upper drum (side opposite valve cover).

b - Place a suitable container underneath the hub to collect the oil that leaks out during disassembly.

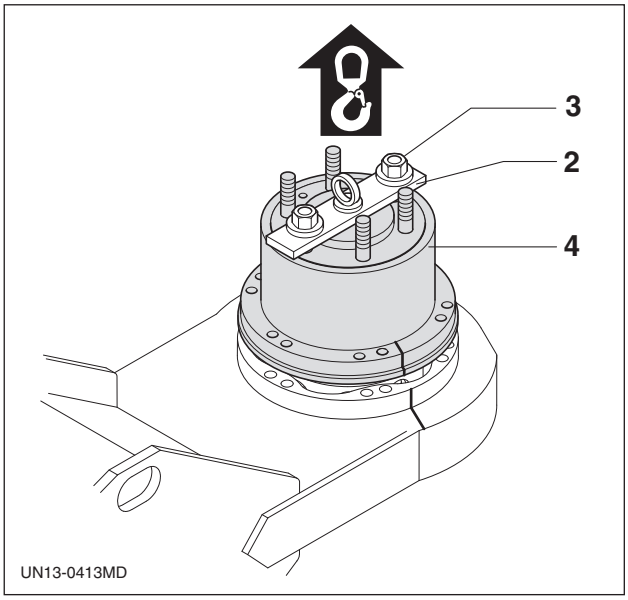
c - Mark the position of the hub and the cam in relation to the frame in order to maintain the phasing when refitting.

d - Undo the screws (**1**).



e - Fit the hoisting tool (**2**) fastening it with two nuts (**3**) (the same as those used to fasten the drum).

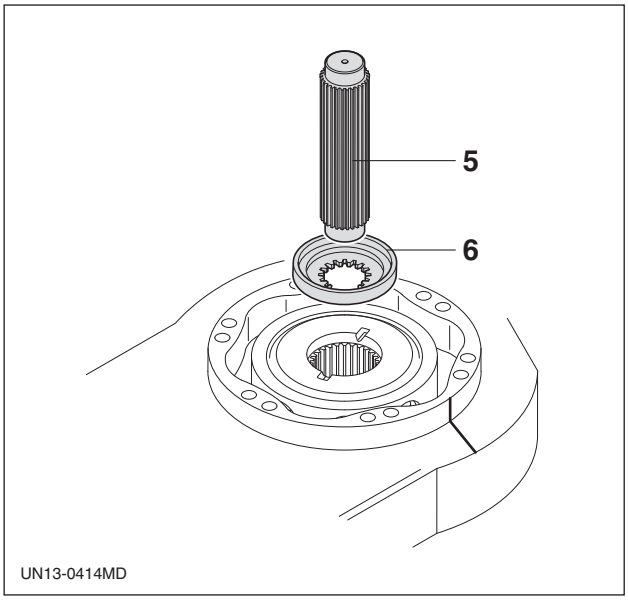
f - Lift the hub with the bearing support (**4**) attached.



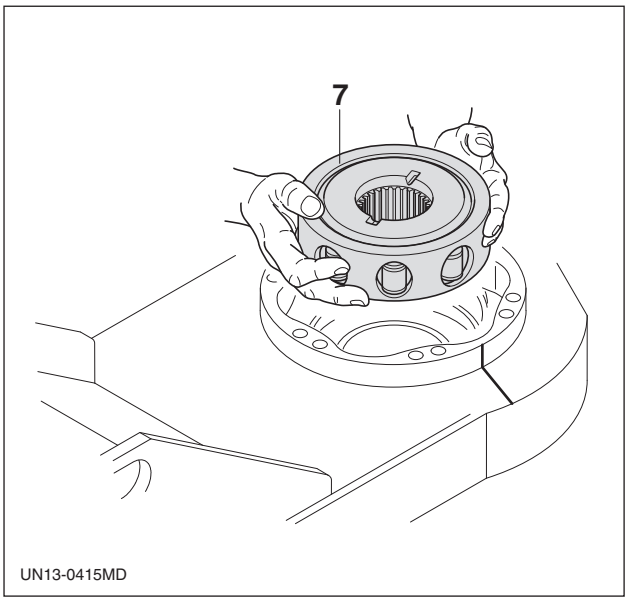
*IMPORTANT: the lifting tool (**2**) is available on request (see "Tooling" chart - chapter 22).*

g - Remove the toothed shaft (**5**).

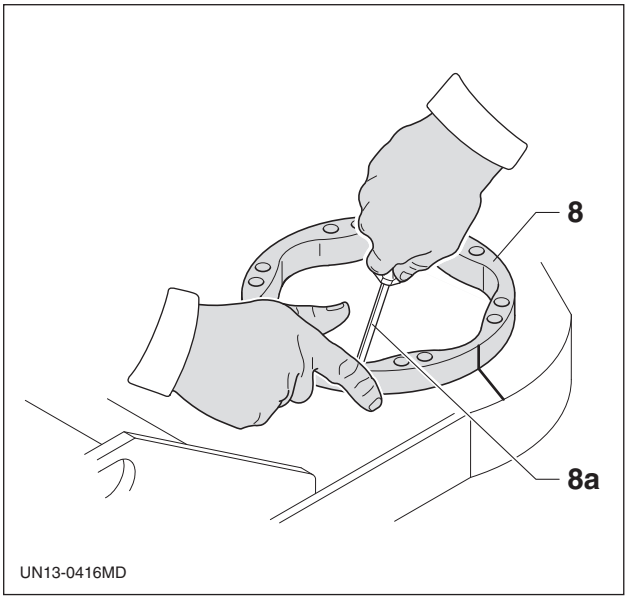
h - Remove the toothed spacer (**6**).



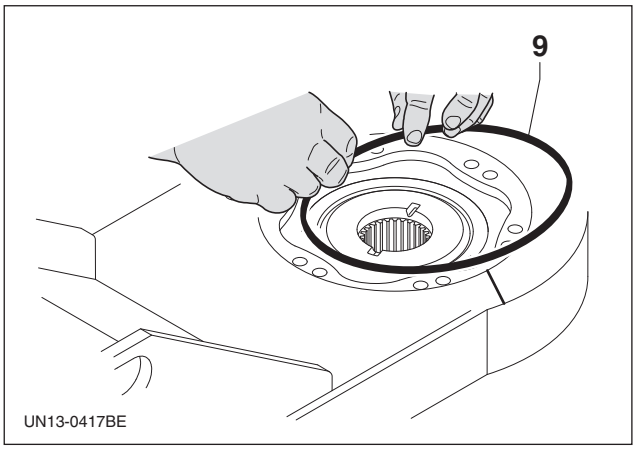
i - Remove the rotor with the pistons attached (**7**).



l - Remove the cam (**8**) using a straight screwdriver (**8a**) which must be inserted in the grooves between the cam and the motor support.



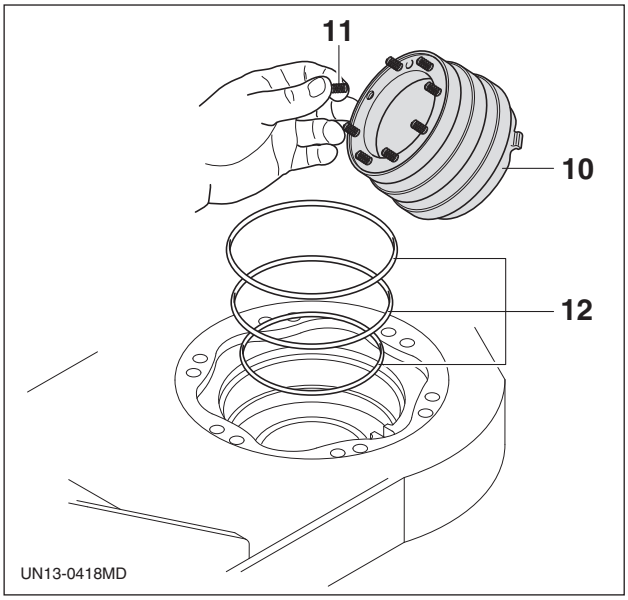
m - Remove the gasket (**9**) from the motor support.



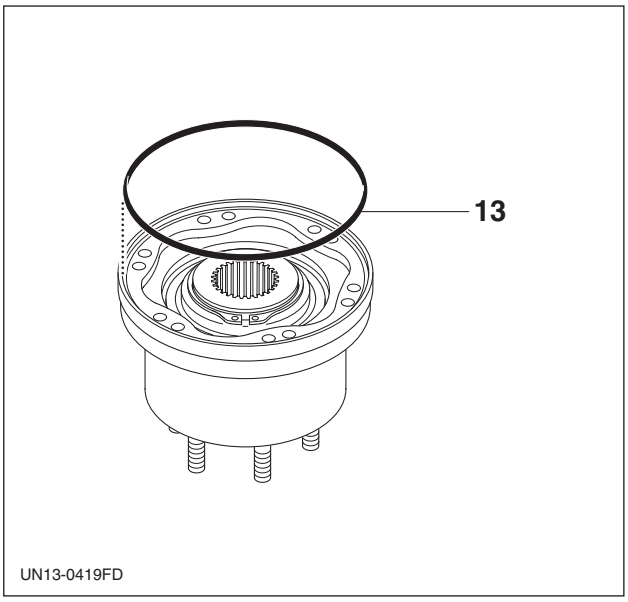
n - Remove the distributor (**10**).

o - Remove the springs (**11**).

p - Position the gaskets (**12**) fitted in the seats on the hydraulic motor support (**only if they need replacing**).



q - Remove the gasket (**13**) from the support.



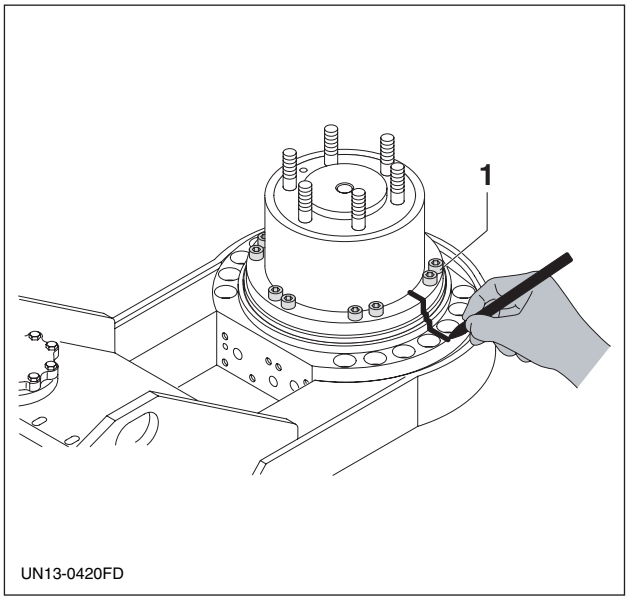
14.11.3 - Removing the hub with the support (valve cover side) TF 200 - TF 400 - TF 600 - TF 800 - TF 1000)

a - Position the machine with the drum rotation axis vertical and work on the upper drum (valve cover side).

b - Place a suitable container underneath the hub to collect the oil that leaks out during disassembly.

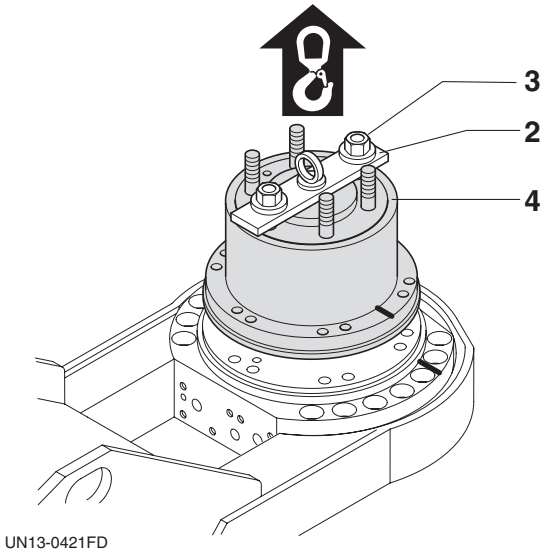
c - Mark the position of the hub in relation to the frame in order to maintain the phasing when refitting.

d - Undo the screws (**1**).



e - Fit the hoisting tool (**2**) fastening it with two nuts (**3**) (the same as those used to fasten the drum).

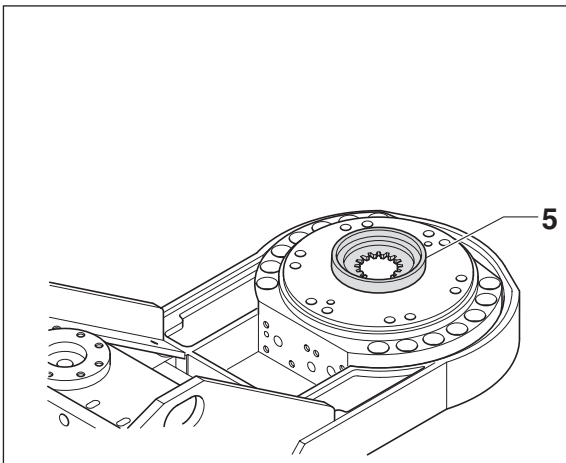
f - Lift the hub with the bearing support (**4**) attached.



UN13-0421FD

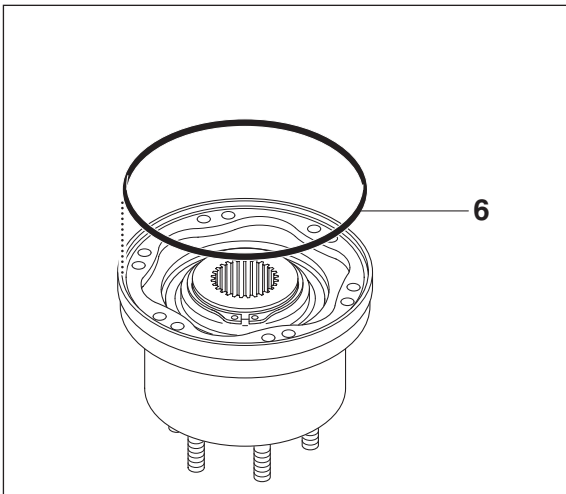
*IMPORTANT: the lifting tool (**2**) is available on request (see "Tooling" chart - chapter 22).*

g - Remove the toothed spacer (**5**).



UN13-0422FD

h - Remove the gasket (**6**) from the support.

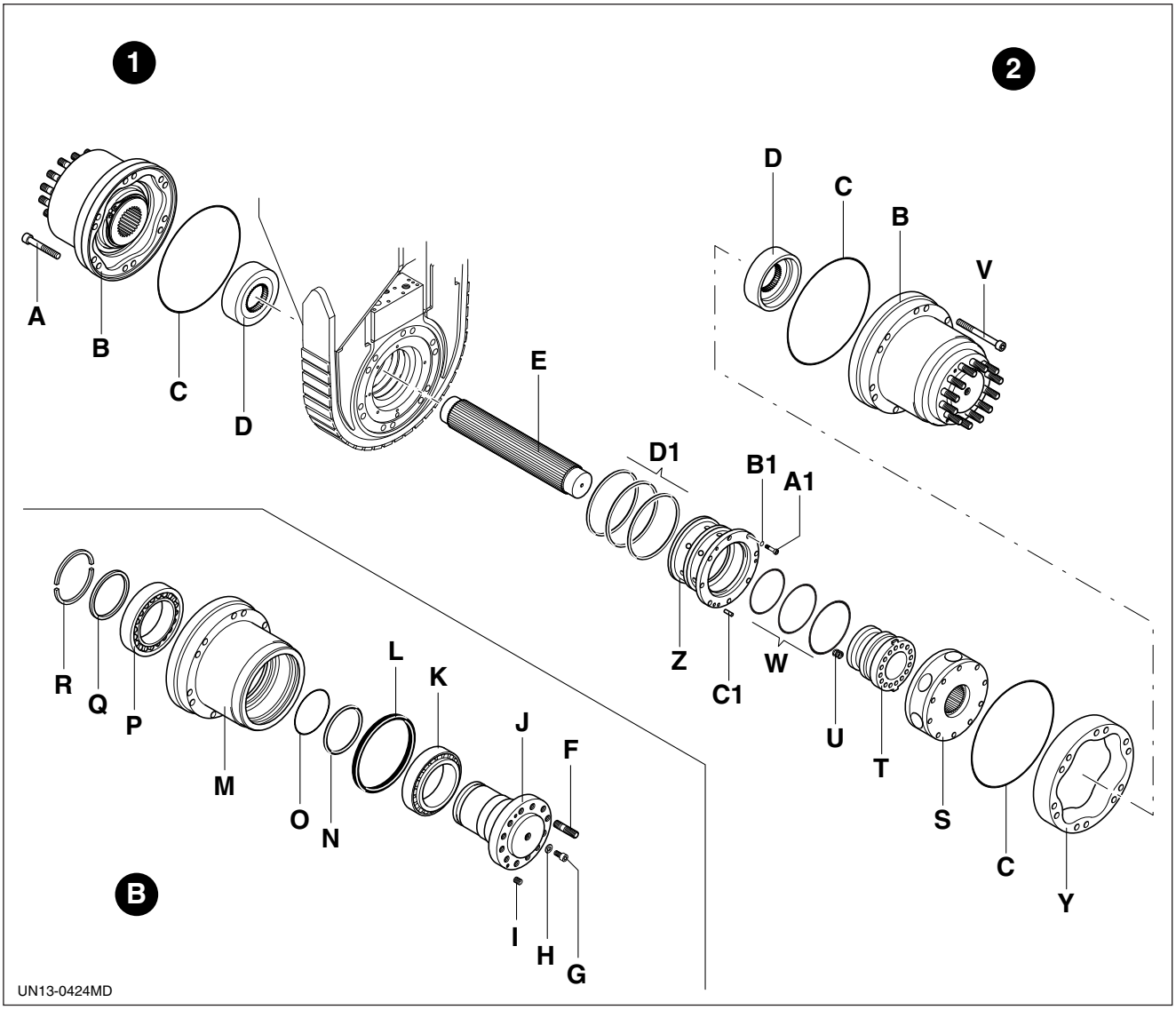


UN13-0423FD

14.11.4 - Motor unit (TF 2000)

1 SIDE OPPOSITE VALVE COVER

2 VALVE COVER SIDE



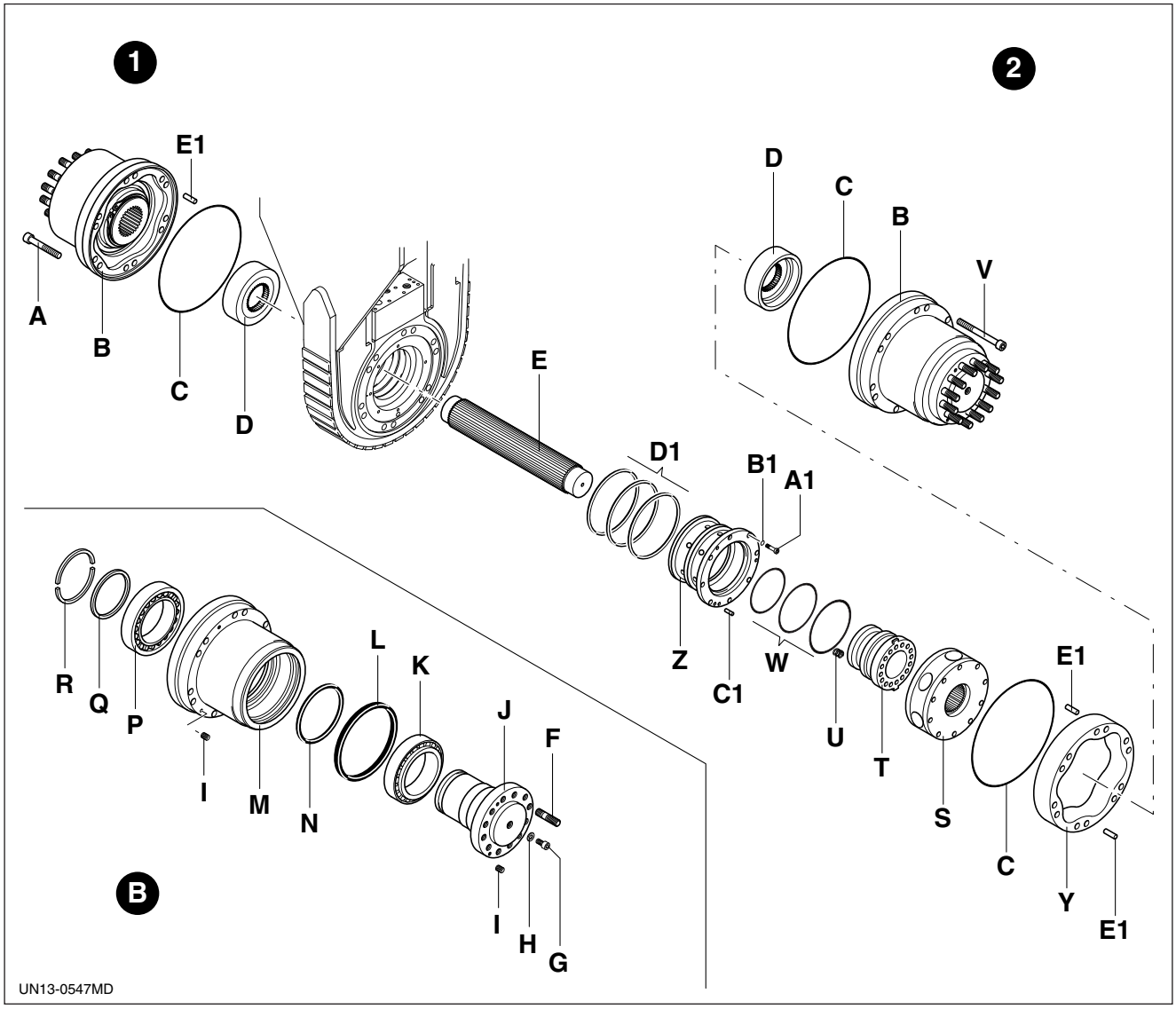
Key

A - Screw
B - Hub with support
C - Gasket
D - Toothed spacer
E - Toothed shaft
F - Double-ended stay bolt
G - Screw
H - Washer
I - Grub screw
J - Hub
K - Bearing
L - Gasket
M - Bearing support
N - Gasket
O - Gasket
P - Bearing
Q - Spacer
R - Half rings
S - Rotor with pistons
T - Distributor
U - Spring
V - Screw
W - Series of distributor gaskets
Y - Cam
Z - Distributor support
A1 - Screw
B1 - Washer
C1 - Pin
D1 - Series of distributor support gaskets

14.11.5 - Motor unit (TF 3000)

1 SIDE OPPOSITE VALVE COVER

2 VALVE COVER SIDE



Key

A - Screw
B - Hub with support
C - Gasket
D - Toothed spacer
E - Toothed shaft
F - Double-ended stay bolt
G - Screw
H - Washer
I - Grub screw
J - Hub
K - Bearing
L - Gasket
M - Bearing support
N - Gasket
P - Bearing
Q - Spacer
R - Half rings
S - Rotor with pistons
T - Distributor
U - Spring
V - Screw
W - Series of distributor gaskets
Y - Cam
Z - Distributor support
A1 - Screw
B1 - Washer
C1 - Pin
D1 - Series of distributor support gaskets
E1 - Pins

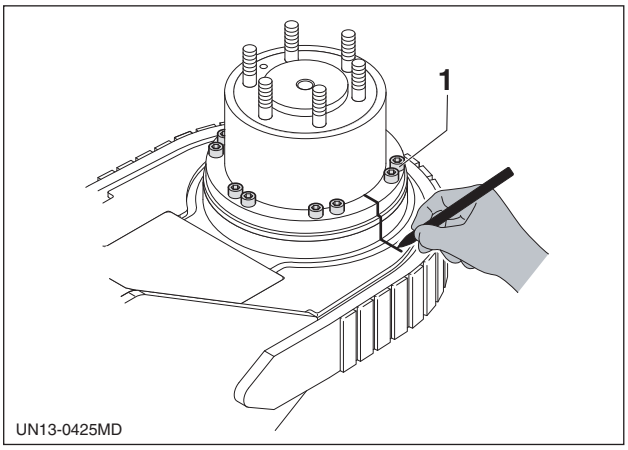
14.11.6 - Removing the hub with the support (side opposite valve cover) (TF 2000 - TF 3000)

a - Position the machine with the drum rotation axis vertical and work on the upper drum (side opposite valve cover).

b - Place a suitable container underneath the hub to collect the oil that leaks out during disassembly.

c - Mark the position of the hub in relation to the frame in order to maintain the phasing when refitting.

d - Undo the screws (**1**).

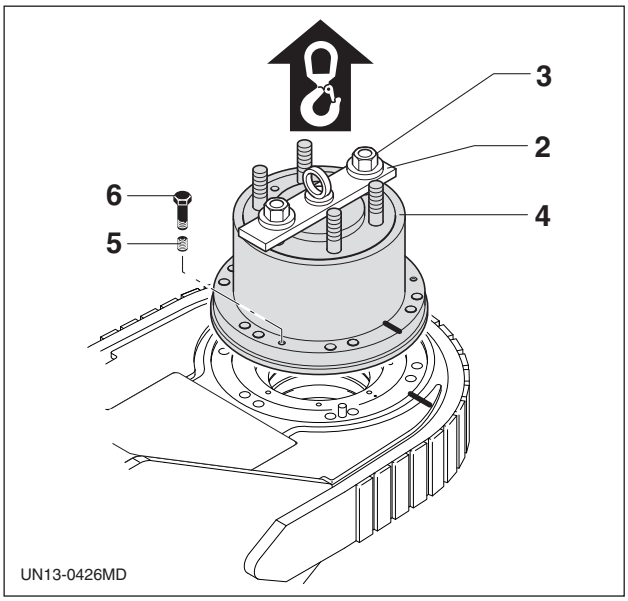


e - Fit the hoisting tool (**2**), fastening it with two nuts (**3**) (the same as those used to fasten the drum).

f - Lift the hub with the support (**4**) attached.

For the TF 3000 only

If, when lifting the hub complete with the support (**4**), it does not come out of the centring mechanism and the reference pins (**9**), remove the three grub screws (**5**) and use the three screws (**6**) as extractors. Tighten all the screws equally until the hub and support assembly (**4**) is fully extracted.

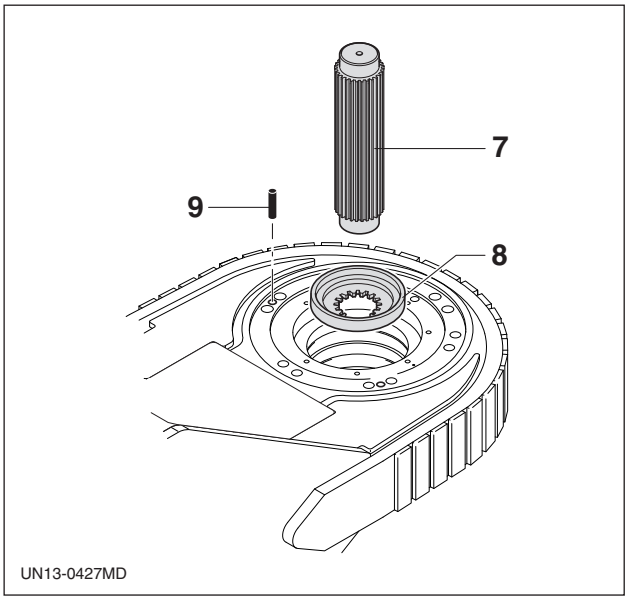


*IMPORTANT: the lifting tool (**2**) is available on request (see "Tooling" chart - chapter 22).*

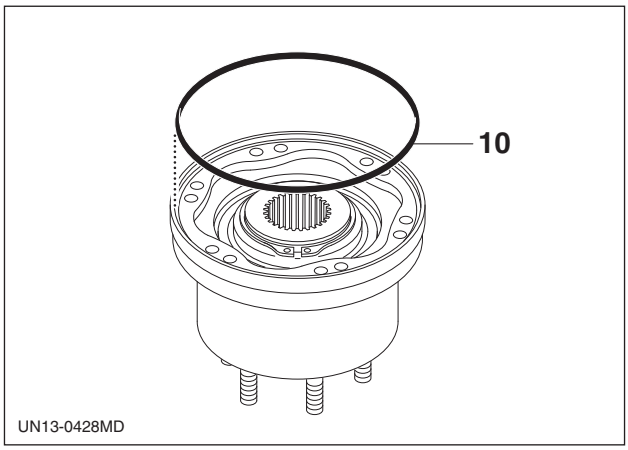
g - Remove the toothed shaft (**7**)

h - Remove the toothed spacer (**8**).

i - Remove the two pins marking the references between the hub/support assembly and the motor support (**9**) (on the TF 3000 only).



l - Remove the gasket (**10**) from the support.



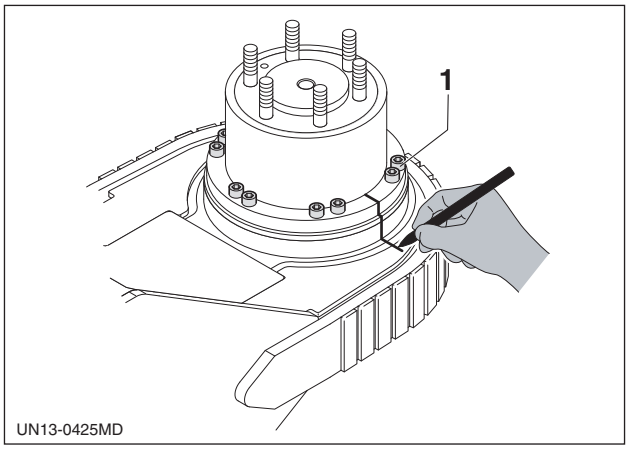
14.11.7 - Removing the hub with the support (side opposite valve cover) (TF 2000 - TF 3000)

a - Position the machine with the drum rotation axis vertical and work on the upper drum (valve cover side).

b - Place a suitable container underneath the hub to collect the oil that leaks out during disassembly.

c - Mark the position of the hub and the cam in relation to the frame order to maintain the phasing when refitting.

d - Undo the screws (**1**).

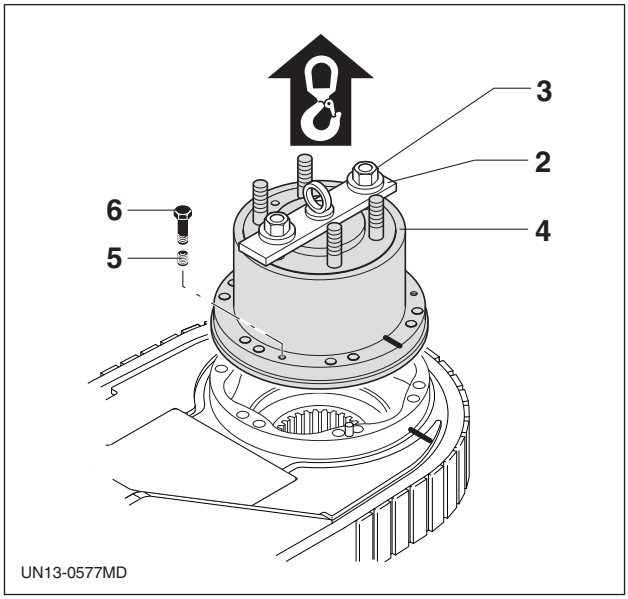


e - Fit the hoisting tool (**2**), fastening it with two nuts (**3**) (the same as those used to fasten the drum).

f - Lift the hub with the support (**4**) attached.

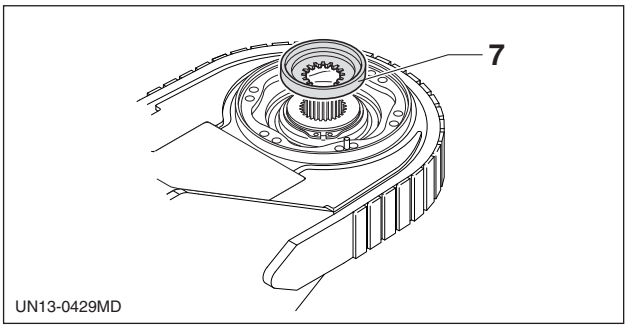
<u>For the TF 3000 only</u>

If, when lifting the hub complete with the support (**4**), it does not come out of the centring mechanism and the reference pins (**11**), remove the three grub screws (**5**) and use the three screws (**6**) as extractors. Tighten all the screws equally until the hub and support assembly (**4**) is fully extracted.

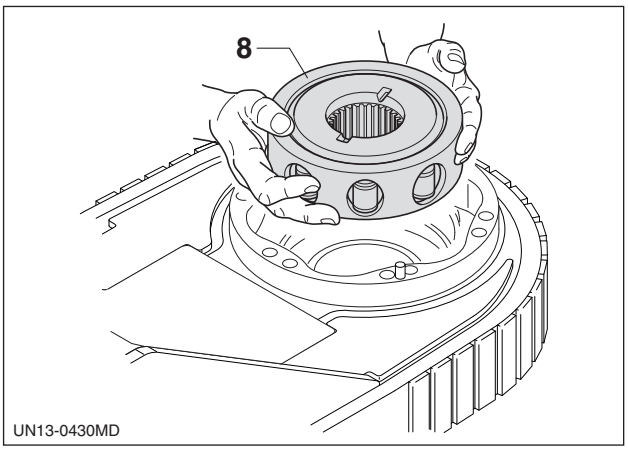


*IMPORTANT: the lifting tool (**2**) is available on request (see "Tooling" chart - chapter 22).*

g - Remove the toothed spacer **(7)**.



h - Remove the rotor with the pistons (**8**) attached.

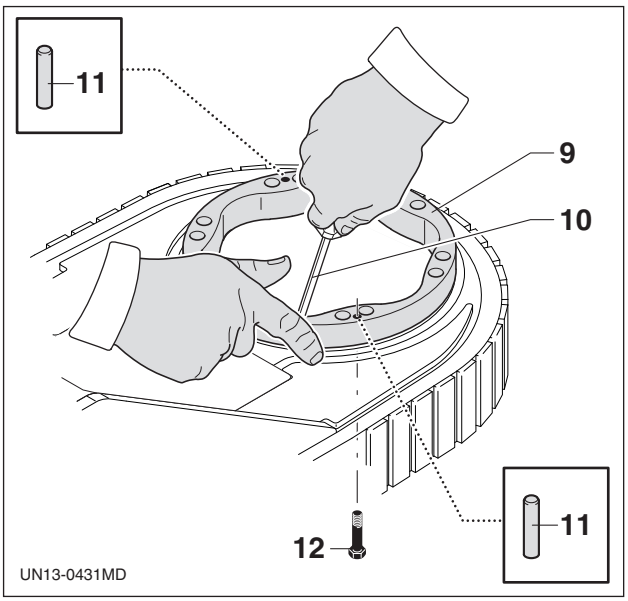


i - Remove the cam (**9**) using a straight screwdriver (**10**), which must be inserted in the grooves between the cam and the fixed motor support on the frame.

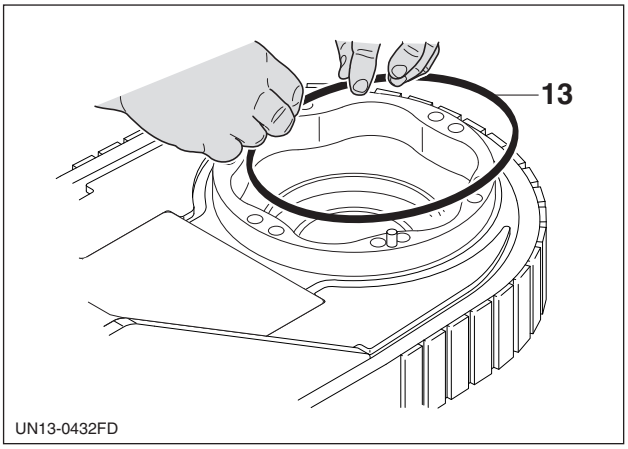
l - Remove the two pins marking the references between the hub/support assembly and the cam, and the two reference pins between the cam and the motor support (**11**) (on the TF 3000 only).

For the TF 3000 only

If the cam does not come out, insert three screws (**12**) in the opposite side (frame said) to use as extractors. Tighten all the screws equally until the cam (**9**) is fully extracted.



m - Remove the gasket (**13**) from the motor support.

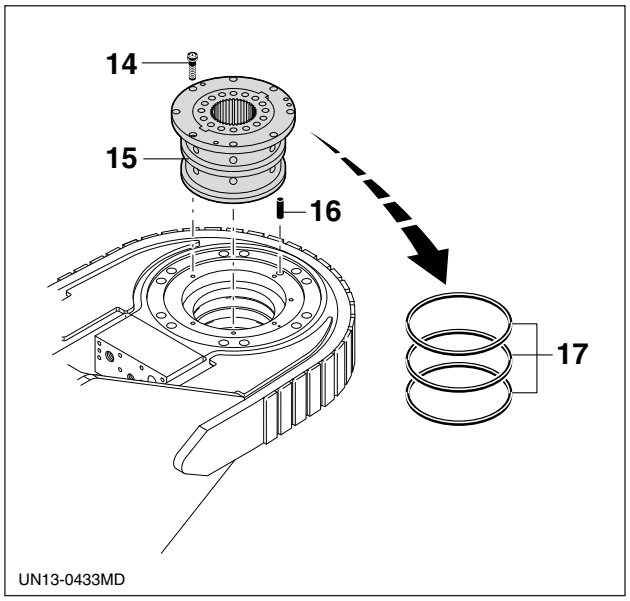


n - Undo the screws (**14**).

o - Remove the distributor holder with the distributor (**15**) attached.

p - Remove the pin (**16**).

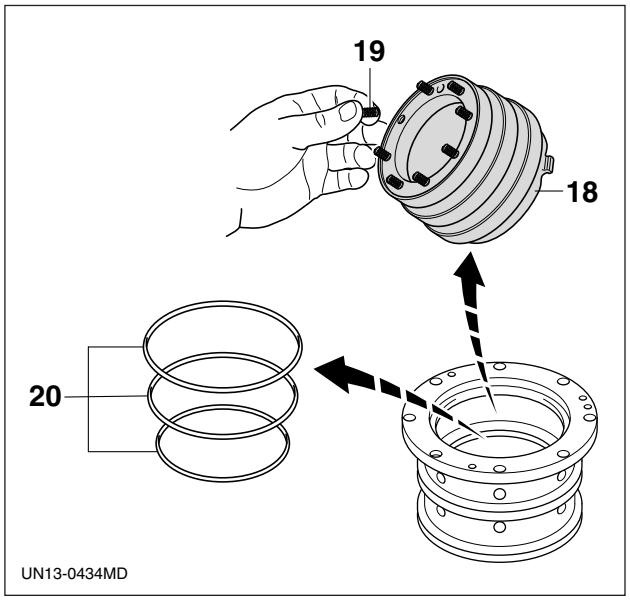
q - Position the gaskets (**17**) fitted in the external seats on the distributor holder (**only if they need replacing**).



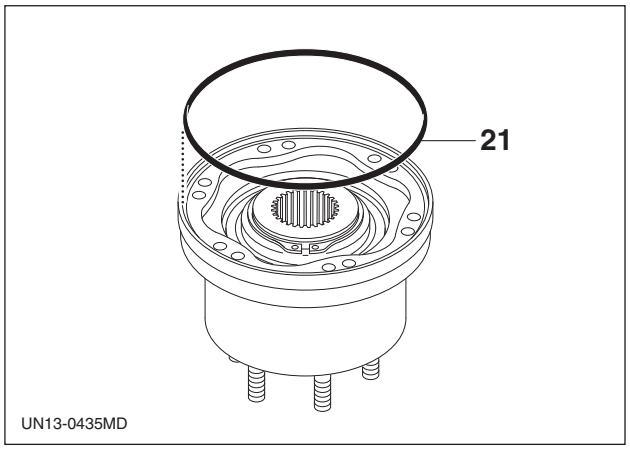
r - Remove the distributor (**18**) from the distributor holder.

s - Remove the springs (**19**).

t - Position the gaskets (**20**) fitted in the internal seats on the distributor holder (**only if they need replacing**).



i - Remove the gasket (**21**) from the support.



14.11.8 - Removing the hub from the support (TF 200 - TF 400 - TF 600 - TF 800 - TF 1000 - TF 2000 - TF 3000)

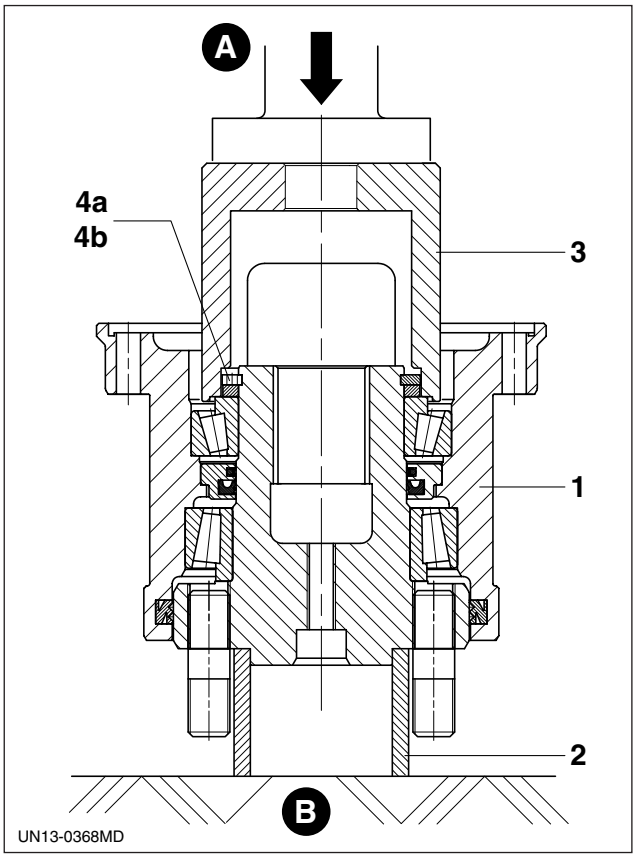
a - Position the hub complete with the support (**1**) on the press table.

b - Place the drum hub support ring (**2**) between the hub and the press table, in the centre of the hub.

c - Insert the block for preloading the bearings (**3**) in the centre of the inner ring of the bearing.

d - Apply slight pressure until the bearing retaining part (**4a**) or (**4b**) is released, and then remove it via the slot provided in the block for bearing preloading (**3**).

- (**4a**): circlip in the TF 200 - TF 400- TF 600
- (**4b**): half rings in the TF 800 - TF 1000 - TF 2000 - TF 3000



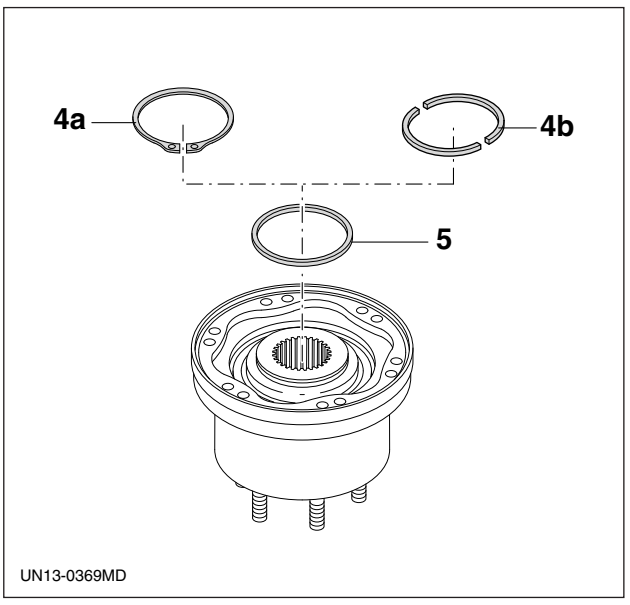
A THRUST CYLINDER (PRESS)

B PRESS TABLE

*IMPORTANT: for compression rating to apply (**F** - prescribed force) see the chart on page 53.*

IMPORTANT: the following tools:
*- (**2**) drum hub support ring:*
*- (**3**) block for preloading bearings*
are available on request (See "Tooling" chart - chapter 22).

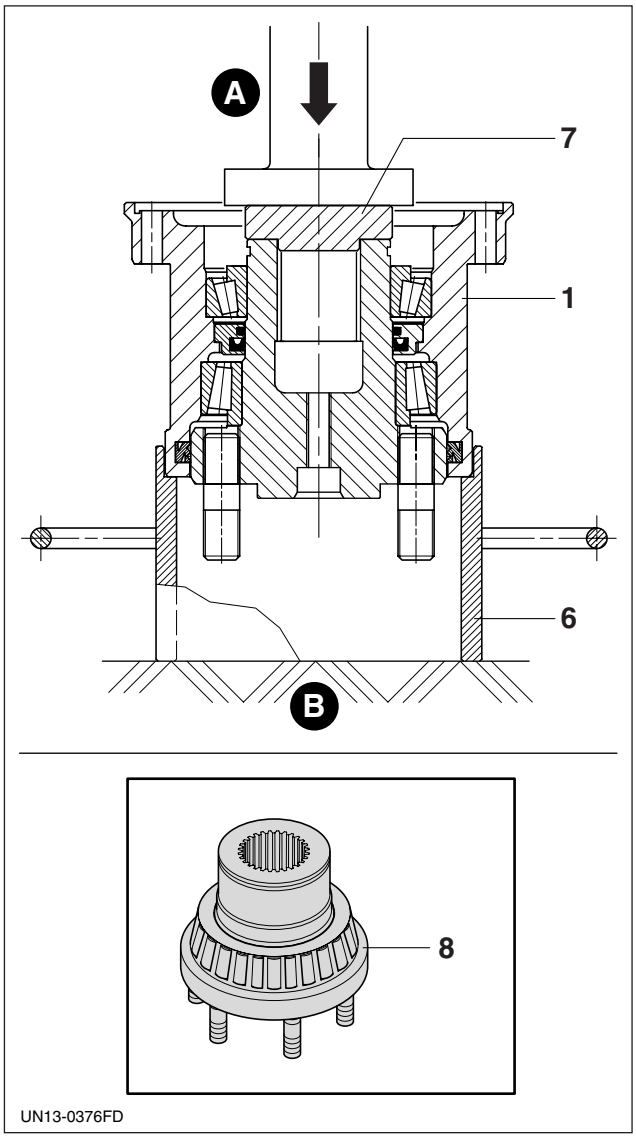
e - Remove the toothed spacer (**5**).



f - Position the hub with the support (**1**) attached on the press table, placing the support cylinder for drum hub extraction (**6**) between the support and the press table (in the centre of the support).

g - Place the drum hub extraction block (**7**) in the centre of the hub.

h - Apply pressure with the press until the drum hub (**8**) comes out.

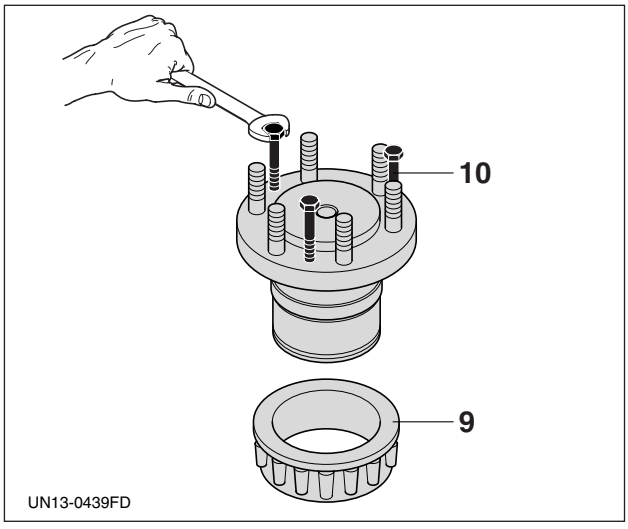


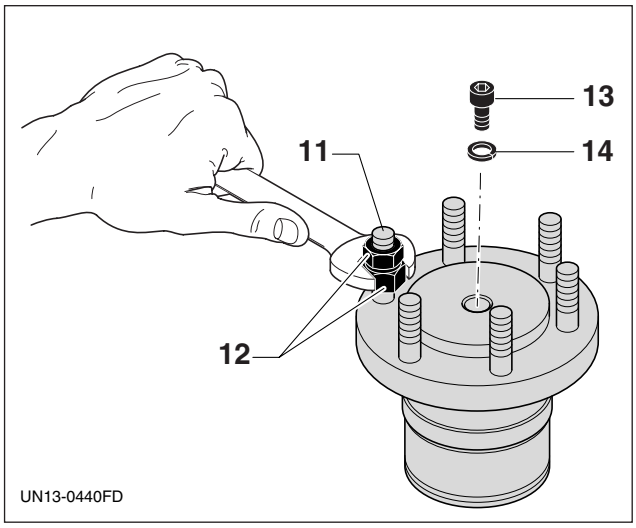
A THRUST CYLINDER (PRESS)

B PRESS TABLE

i - Remove the bearing with the tapered rollers (**9**) from the hub using the screws (**10**).

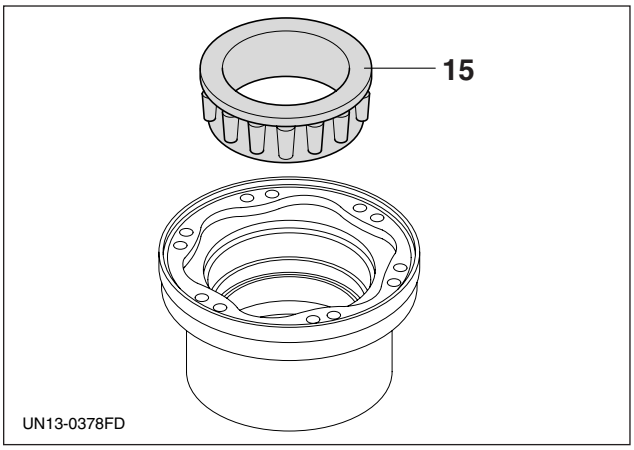
Tighten all the screws equally until the bearing with the tapered rollers is fully extracted from the hub.



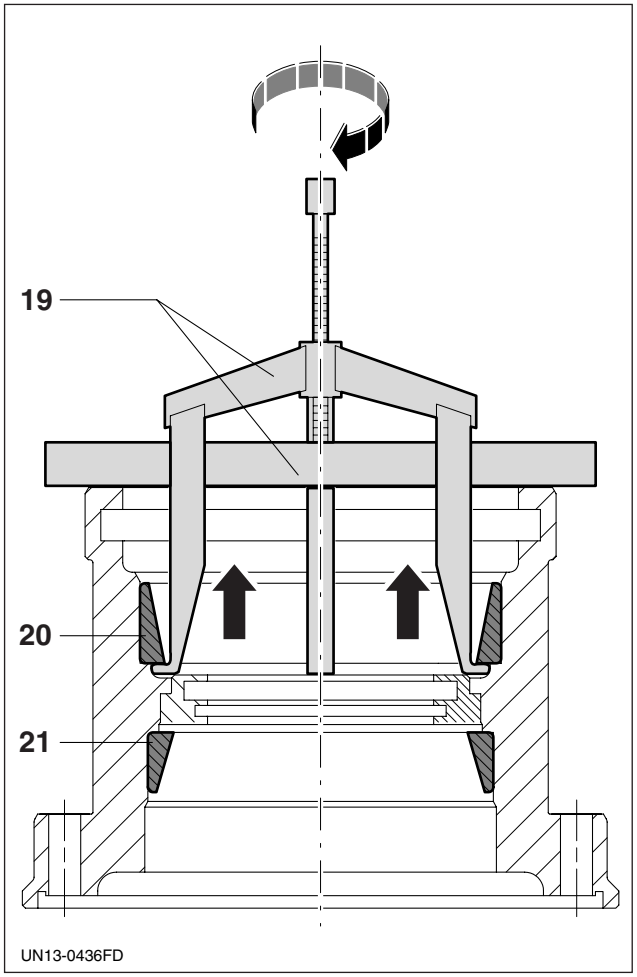


l - Unscrew the double-ended stay bolts (**11**) using the two nuts (nut and lock nut) (**12**) (only if they need replacing).

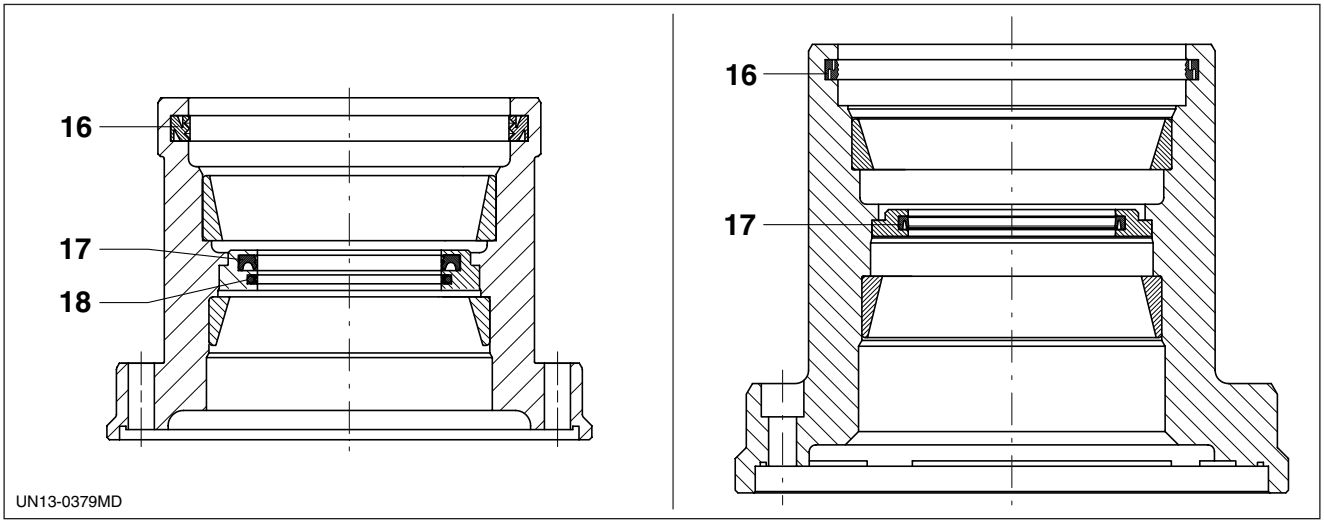
m - Undo the screw (**13**) and remove the central washer (**14**).



n - Remove the bearing with the tapered rollers (**15**) left inside the support.



p - Using the relative extractor (**19**), remove the external rings from the two bearings (**20** and **21**) (only if they need replacing).



o - Remove the gaskets from the bearing support (**16**) - (**17**) - (**18**) (only if they need replacing).

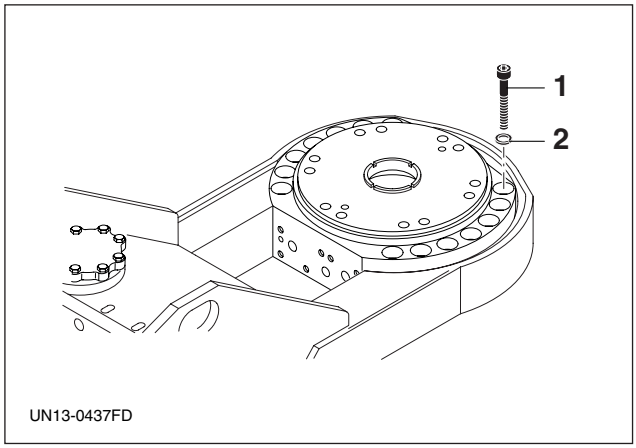
For the TF 3000 only

Remove the gaskets from the bearing support (**16**) and the monogasket (**17**) - **only if they need replacing**.

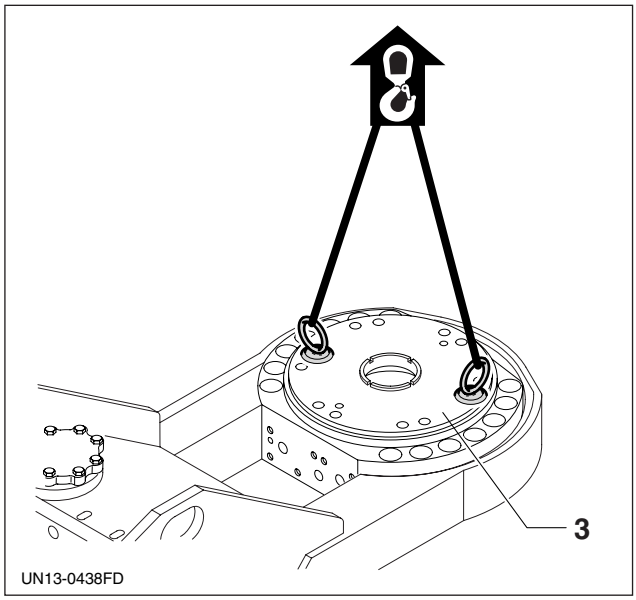
14.12 - Removing the motor support (TF 200 - TF 400 - TF 600 - TF 800 - TF 1000)

IMPORTANT: the motor support must be removed only if clearly necessary (for gasket or frame replacement or repairs).

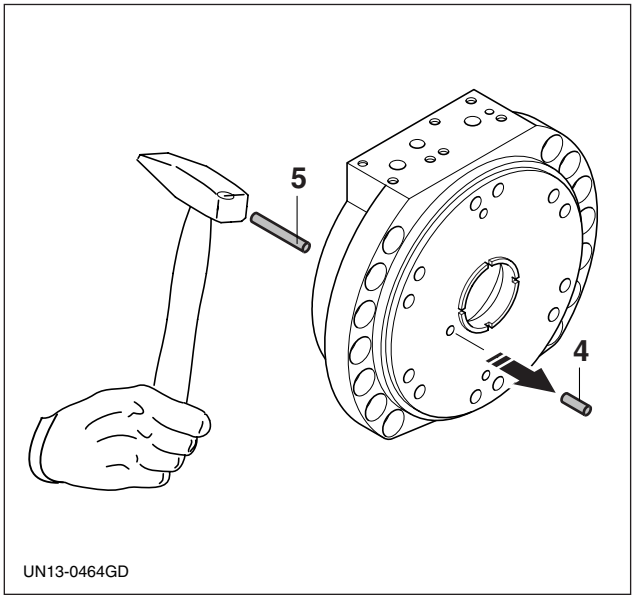
a - Undo the screws (**1**) and remove the washers (**2**).



b - Screw in two circular eye rings with threaded shanks, and remove the motor support (**3**).



c - Extract the "motor timing" reference pin (**4**) using a calibrated bar (featured on the TF 200 only).

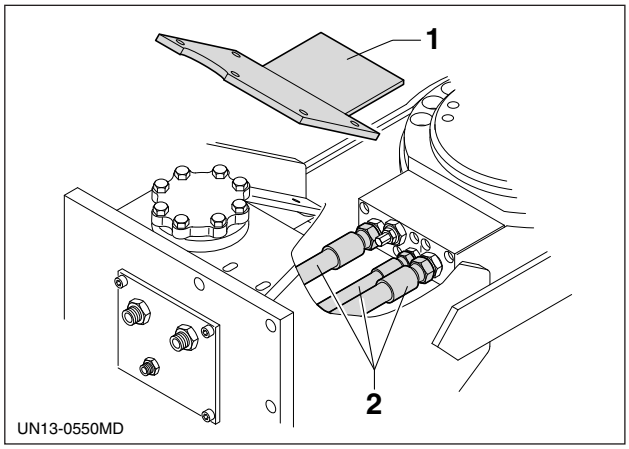


14.13 - Removing the entire motor unit (TF 200 - TF 400 - TF 600 - TF 800 - TF 1000)

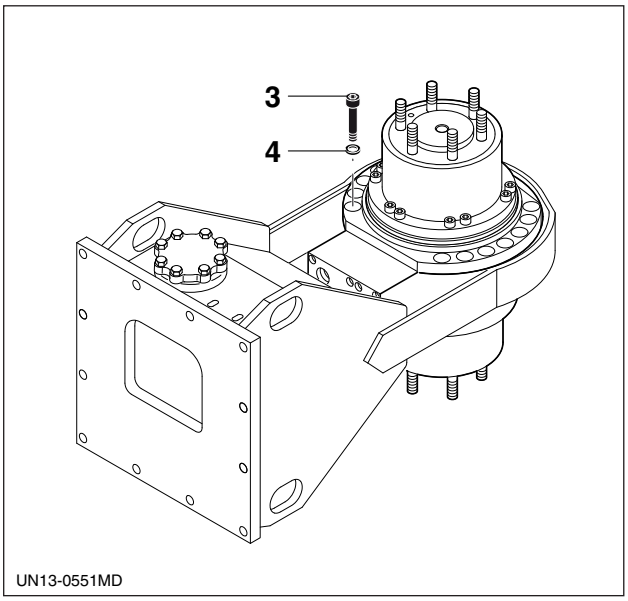
If the entire motor unit needs replacing, proceed as outlined below.

a - Remove the valve cover (**1**).
b - Disconnect the hose lines (**2**) from the valve arm.

IMPORTANT: keep the holes stopped up to prevent dirt entering the system.

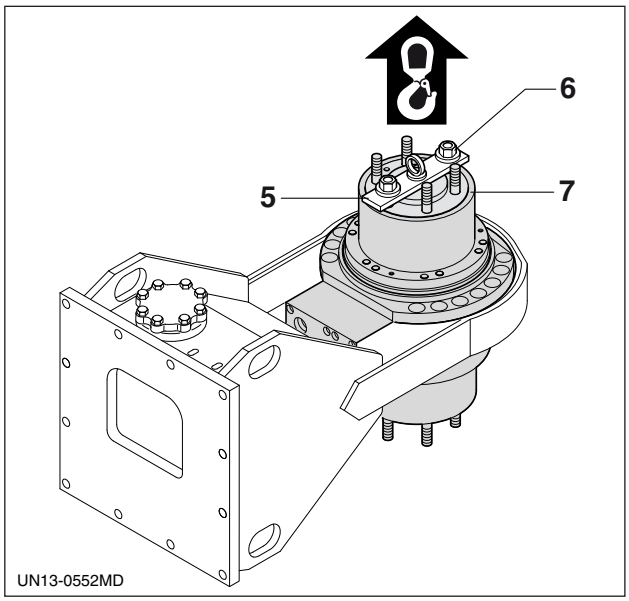


c - Undo the screws (**3**) and remove the washers (**4**).



d - Fit the hoisting tool (**5**), fastening it with the two nuts (**6**) (the same as those used to fasten the drum).
e - Hoist the entire motor unit (**7**).

*IMPORTANT: the lifting tool (**2**) is available on request (see "Tooling" chart - chapter 22).*



15 - HYDRAULIC MOTOR SERVICING

The parts removed and the new parts must be perfectly clean (and lubricated if necessary) and all their parts thoroughly checked before proceeding with the assembly.

Ensure the workplace is kept clean.

15.1 - Rotor / piston assembly inspection

- Check the rollers on the piston head: they must not have any marks or deep scoring (noticeable by running your nails over them) nor any slight cavities. The rollers must be able to turn freely in their seats and should not be either brown or bluish in colour.
- Check, at the base of the rollers, that there is no plastic material (used to prevent roller/piston seizure) coming out.
- Using a magnet, pull the pistons out the cylinder unit without extracting them fully: make sure the outer surface of the piston does not have any heavy scoring (surface scoring is normal as it is a result of the piston rubbing against the cylinder unit), or bluish or brown areas. If any of these problems are encountered, the entire piston must be replaced, including the piston-ring. The same check must also be carried out on the piston seat in the cylinder units. Usually, one condition accompanies the other.
- Also check the area in contact with the distribution, as this must not have any deep scoring. Again, if any of the problems described are encountered, the cylinder unit must be replaced. You are advised to proceed with extreme caution as this area has a special coating to keep it sealed and guarantee the volumetric efficiency on contact with the distribution.
- During reassembly, oil the infeed area.


UN13-0540MD

*IMPORTANT - **Warning**! There are two types of piston, known as class 0 and class 1: standard pistons are class 0, while the diameter of class 1 pistons is 0.1 mm bigger. If there is a class 1 piston fitted in the cylinder unit, there will be a "1" engraved on the cylinder unit, in the seat area of the piston in question; during refitting, ensure the class 1 pistons are all repositioned in the correct seats. Do not put the wrong class piston in the seats as this will cause seizures or excessive seeping.*

15.2 - Cam inspection

If the piston roller track (the shinier section in the middle) is flaking, or has small holes or dents, or brown or bluish areas, it must be replaced.

Small scored areas (not noticeable to the touch) do not jeopardise the cam's condition.

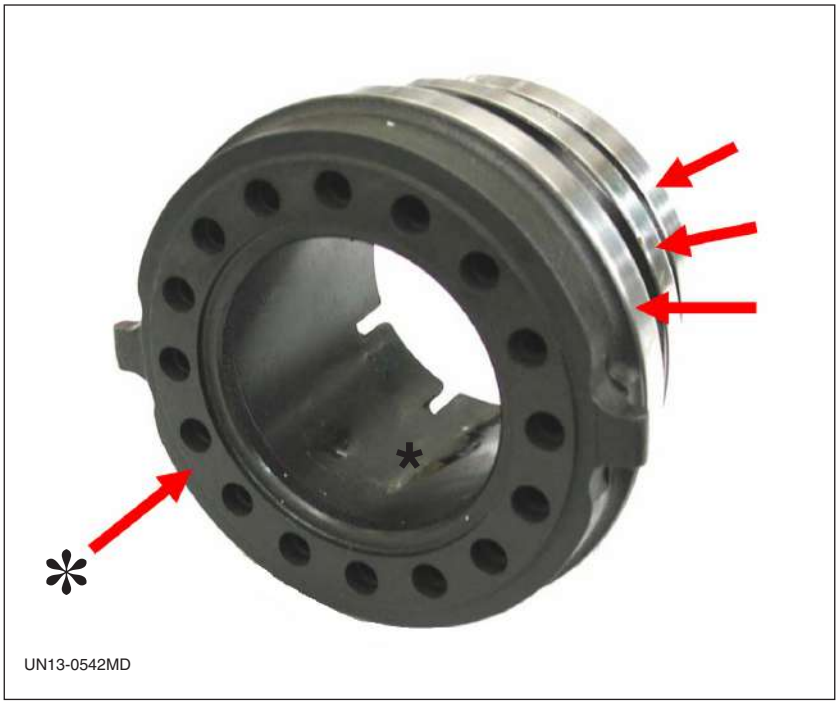
If you are in doubt as to the component's condition, it is advisable to replace it.


UN13-0541MD

15.3 - Distributor inspection

Check that the distributor plate (shown]) does not have any marks or particularly noticeable scoring and that there are no marks or scoring on the gasket retainer tracks; if marks or scoring are found, proceed by replacing the distributor and the gaskets.
Oil the distributor plate before refitting.

*IMPORTANT - **Warning**! Do not do anything to the distributor plate, (i.e. lapping or straightening) as the coating would be removed, which would soon lead to distribution / cylinder block seizures.*



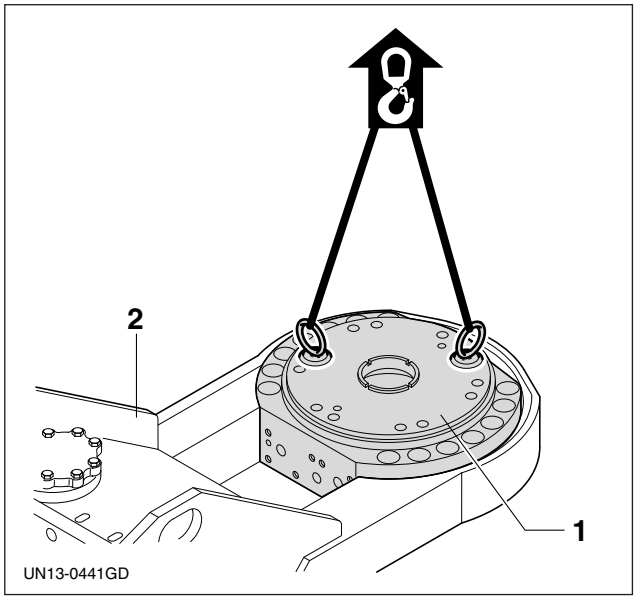
UN13-0542MD

16 - ASSEMBLY

The parts removed and the new parts must be perfectly clean (and lubricated if necessary) and all their parts thoroughly checked before proceeding with the assembly.

16.1 - Fitting the motor support (TF 200 - TF 400 - TF 600 - TF 800 - TF 1000)

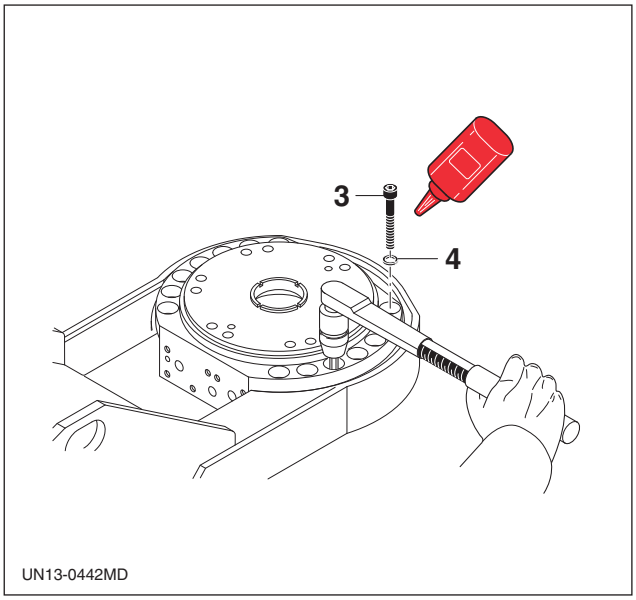
a - Screw two circular eye rings with threaded shanks onto the motor support (**1**) and position it on the frame (**2**).



b - Apply a few drops of thread lock to the motor support fastening bolts on the frame (**3**) (type: **Loctite 243**).

c - Insert new self-locking washers (**4**) and tighten the fastening bolts (**3**) with a torque wrench.

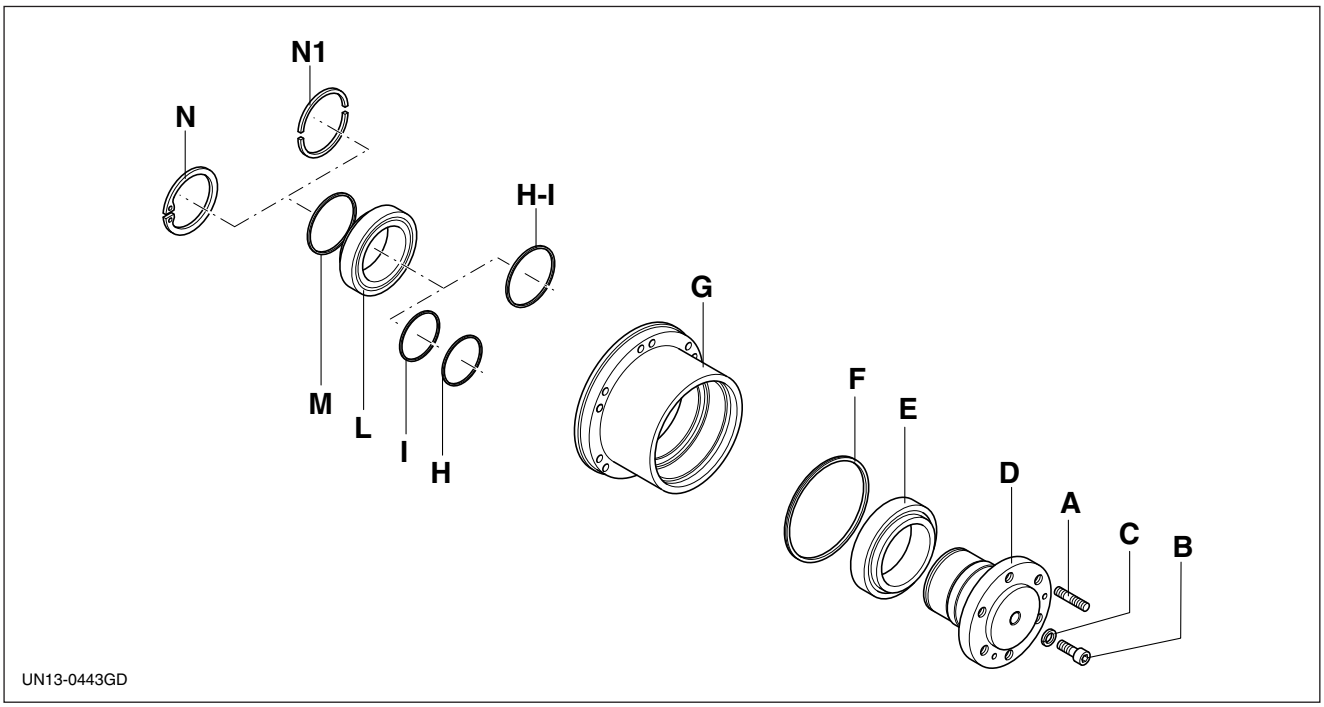
Always comply with the torque ratings specified in the chart below.



Machine model	Tightening torque Nm	Part	Position
TF 200	210	Screws fastening the motor support to the frame	3
TF 400	210		
TF 600	210		
TF 800	450		
TF 1000	450		

16.2 - Fitting the motor unit

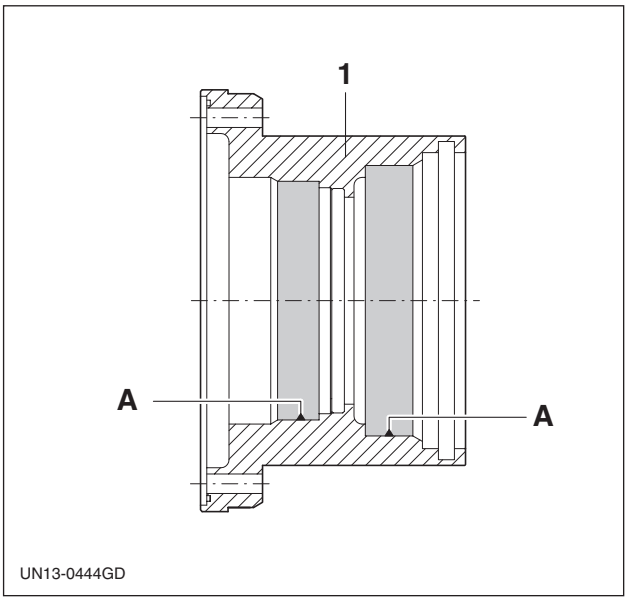
16.2.1 - Fitting the hub onto the support (TF 200 - TF 400 - TF 600 - TF 800 - TF 1000 - TF 2000 - TF 3000)



Key

A - Double-ended stay bolt
B - Screw
C - Washer
D - Hub
E - Bearing
F - Gasket
G - Bearing support
H - Gasket
I - Gasket
L - Bearing
M - Spacer
N - Bearing retaining part (circlip for TF 200 - TF 400 - TF 600)
N1 - Bearing retaining parts (half rings for TF 800 - TF 1000 - TF 2000 - TF 3000)
H-I - Monogasket on TF 3000 only

a - Check the overall condition of the bearing support (**1**), in particular the bearing seats (**A**), and clean carefully.



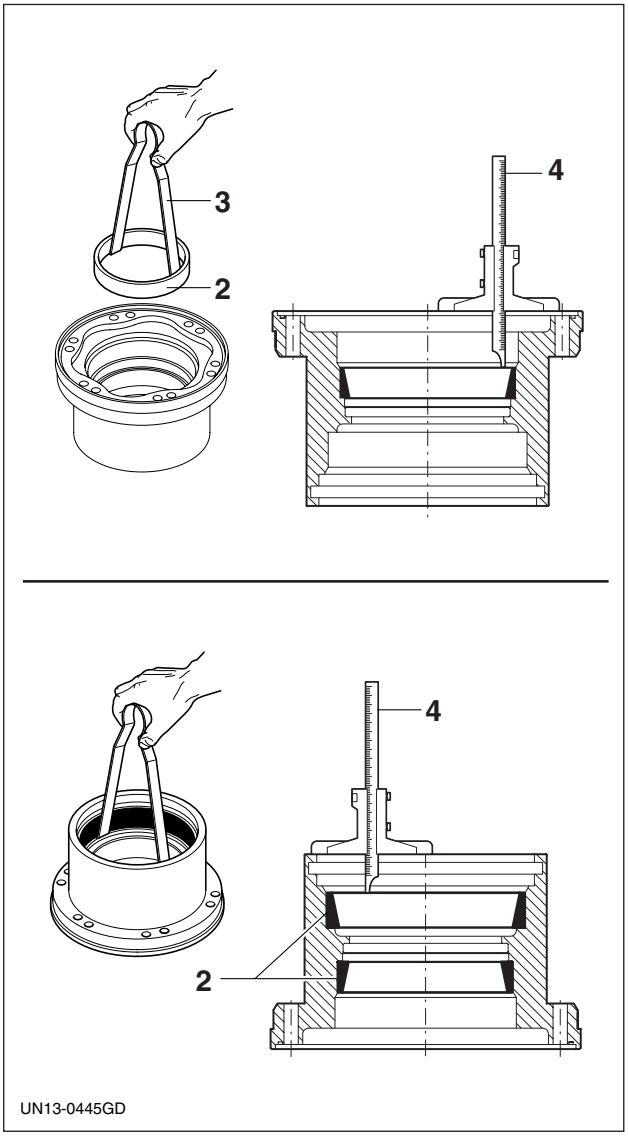
Always wear appropriate personal safety gear and clothing when using liquid nitrogen.

b - Cool down the outer rings of the bearings (**2**), by dipping in liquid nitrogen and, using spring pliers for lifting bearing rings (**3**), position them in the relative seats and check the positioning is a correct with a depth gauge (**4**).

Take at least three equidistant measurements.

***N.B.**: if there is no liquid nitrogen available, the outer bearing rings (**2**) must be inserted using a press.*

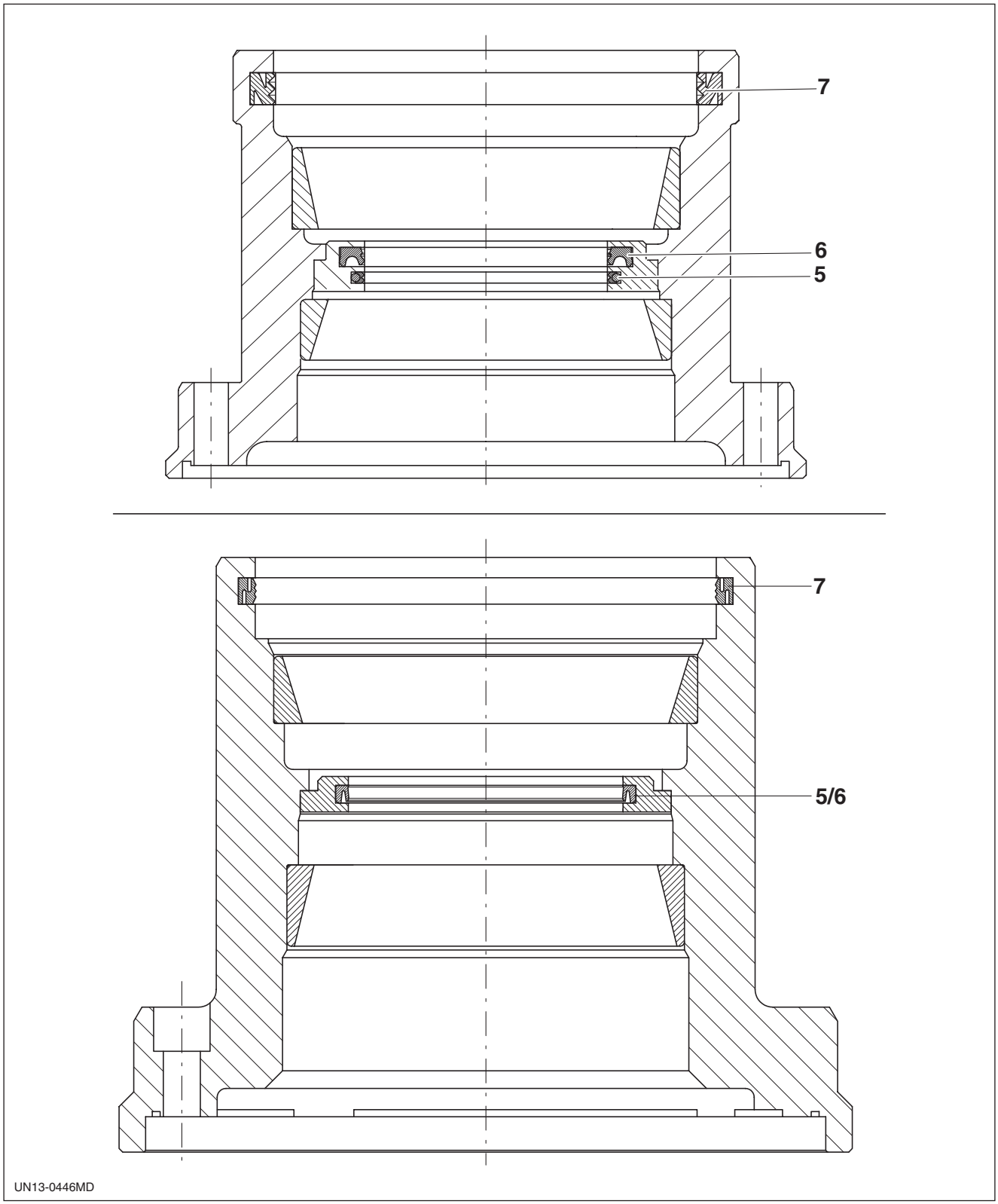
IMPORTANT: the following tools:
*- (**3**) spring pliers for lifting bearing rings) are available on request (see "Tooling" chart - chapter 22).*



c - As shown in the figure, fit the new gaskets, (**5**) (**6**) and (**7**), in the bearing support and apply plenty of lubrication to the cavities of the internal seals.

For the TF 3000 only

The gasket (**5/6**) is a monogasket.



IMPORTANT: lubricate with specific grease for gaskets (see "Lubricants" chart in chapter 21).

d - Clean the double-ended stay bolts (**8**) carefully.

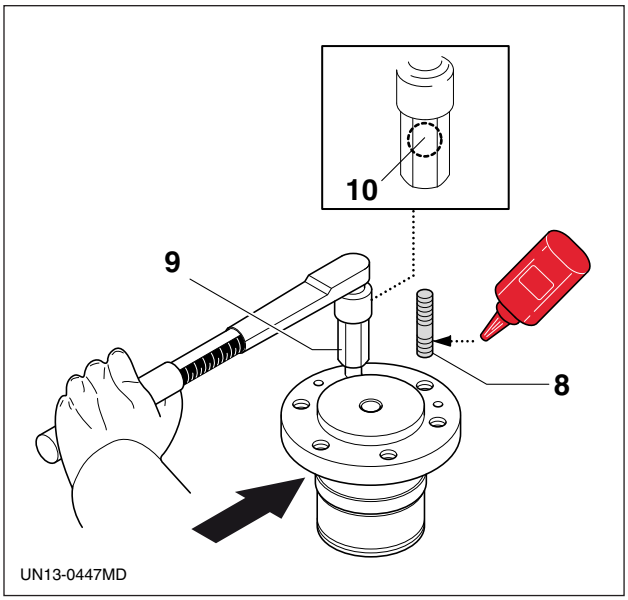
Apply a sufficient amount of thread lock to the root of the double-ended stay bolt (**8**) (**type: Loctite 270**).

e - Tighten the double-ended stay bolts with the torque wrench, using the stay bolt tightening bush (**9**) with the ball (**10**) inside.

Always comply with the torque ratings specified in the chart below.

f - Check whether the thread lock is coming out at the rear (shown with the arrow) and if it is, clean carefully before fitting the bearing.

***N.B.**:functional resistance of the thread lock is attained at least 6 hours after application.*



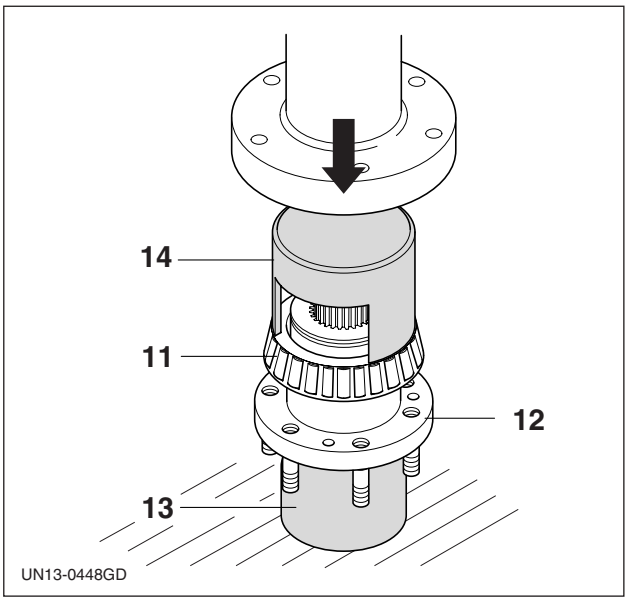
Machine model	Tightening torque Nm	Part	Position
TF 200	280	Drum hub double-ended stay bolt	8
TF 400	280		
TF 600	500		
TF 800	500		
TF 1000	500		
TF 2000	500		
TF 3000	950		

IMPORTANT: the following tools:
*- (**9**) double-ended stay bolt tightening bush*
*- (**10**) ball*
are available on request (see "Tooling" chart - chapter 22).

g - Position the inner ring with the tapered rollers (**11**) in the relative seat of the drum hub (**12**), facing the direction shown in the figure.

h - Place the drum hub support ring (**13**) between the hub and the press work surface (in the centre of the hub).

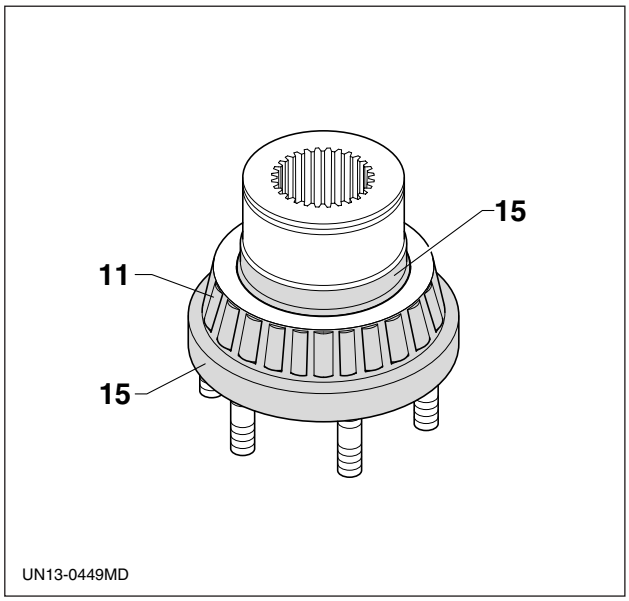
i - Insert the bearing assembly lock (**14**) between the bearing and the press's thrust cylinder and apply pressure until it is flush with the drum hub.



IMPORTANT: the following tools:
*- (**13**) drum hub support ring*
*- (**14**) bearing assembly block*
are available on request (see "Tooling" chart - chapter 22).

l - Lubricate the bearing (**11**) with specific grease for bearings. Lubricate the outer and inner surfaces of the drum hub (**15**) using specific grease for gaskets - (see "Lubricants" chart in chapter 21).

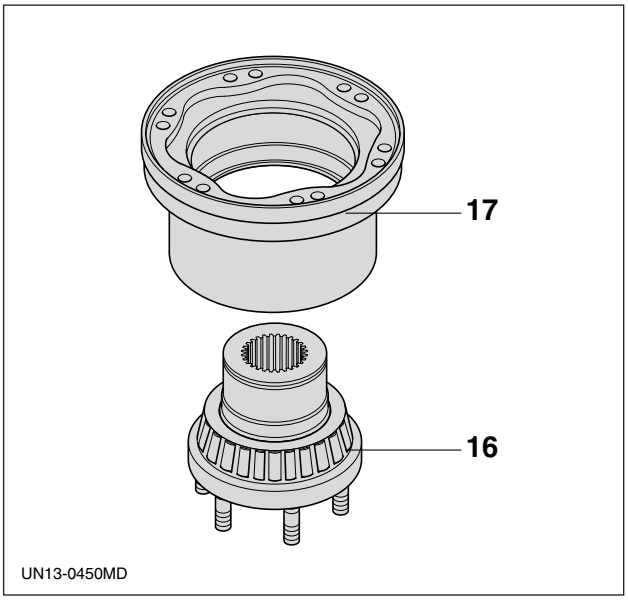
Always use the quantity of grease specified in the chart below.



Machine model	Quantity of grease to apply to each bearing kg	Part to grease	Position
TF 200	0.050	Drum hub outer bearing	11
TF 400	0.070		
TF 600	0.120		
TF 800	0.175		
TF 1000	0.190		
TF 2000	0.310		
TF 3000	0.400		

IMPORTANT: the quantities of grease to apply correspond to approximately 70% of the total volume.

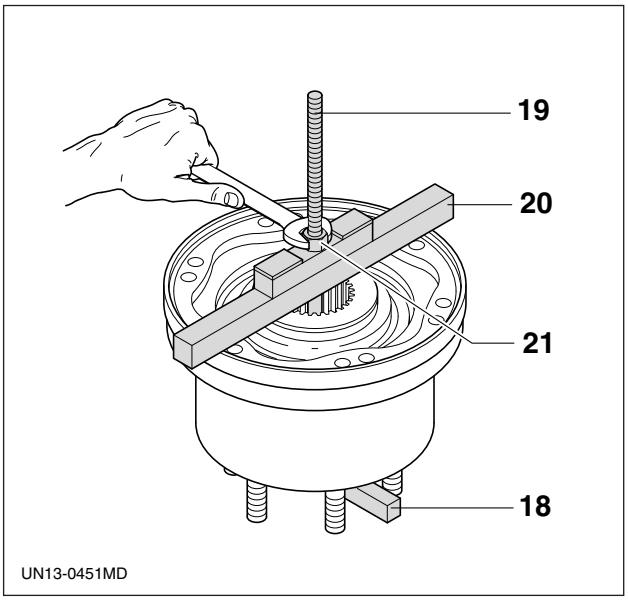
m - Fit the drum hub (**16**) onto the support (**17**).



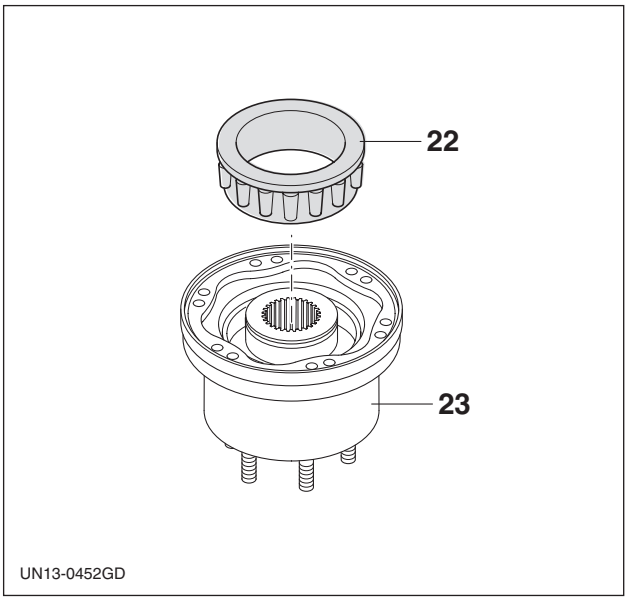
n - Press using the following tools:
- (**18**) strip for threaded bar tightening
- (**19**) threaded bar
- (**20**) guide strip for threaded bar

Tighten the assembly with the nut (**21**).

IMPORTANT: the following tools:
*- (**18**) strip for threaded bar tightening*
*- (**19**) threaded bar*
*- (**20**) guide strip for threaded bar*
are available on request (see "Tooling" chart - chapter 22).



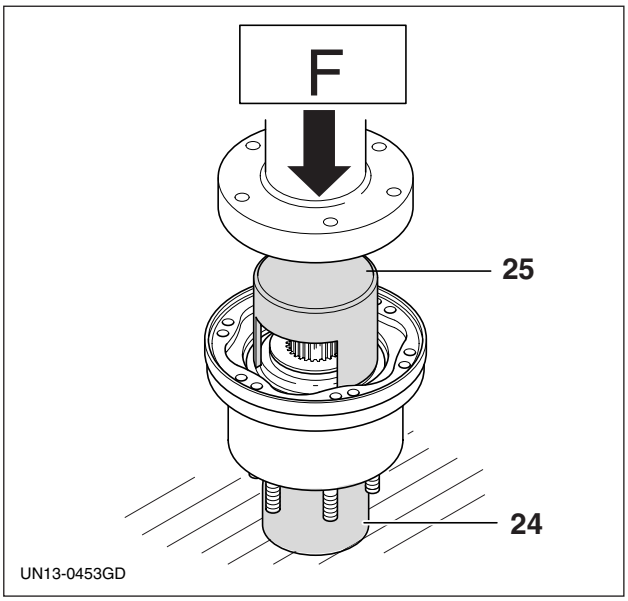
o - Fit the inner bearing ring (**22**) into the hub/ bearing support assembly (**23**).



p - Place the drum hub ring (**24**) between the hub and the press work surface (in the centre of the hub).

q - Insert the bearing preload block (**25**) between the bearing and the press's thrust cylinder.

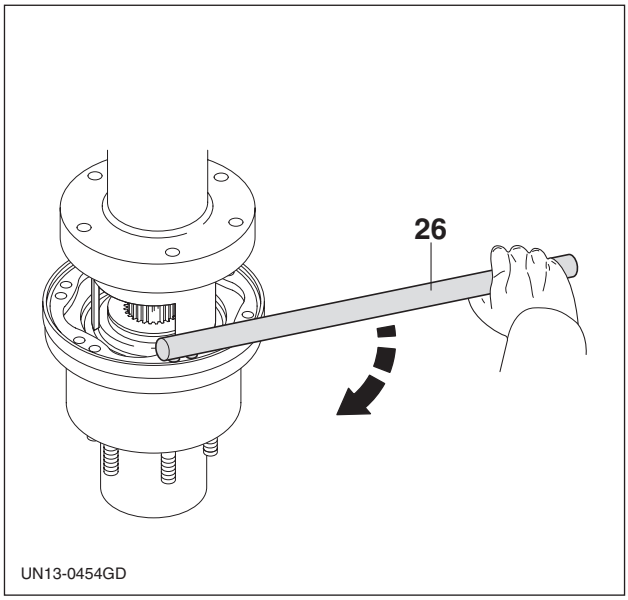
r - Start the bearing settling stage, maintaining a preload of 1/3 of the prescribed force (see chart below).



s - Maintaining a pressure of 1/3 of the prescribed force, rotate the bearing support through two turns, using the rotation bearing support tool (**26**).

t - Increase the pressure to 2/3 of the prescribed force (see chart below) and rotate the bearing support through two turns, using the rotation bearing support tool (**26**).

u - Increase the pressure to the prescribed force (see chart below).



Machine model	F Prescribed force	
	daN	kg
TF 200	4500	4588
TF 400	7000	7138
TF 600	10000	10197
TF 800	12000	12236
TF 1000	17000	17335
TF 2000	21000	21414
TF 3000	32000	32630

v - Maintaining the pressure at the prescribed force "F", fit the bearing retaining ring:

- (**27**) circlip in the TF 200 - TF 400 - TF 600
- (**27a**) half-rings in the TF 800 - TF 1000 - TF 2000 - TF 3000.

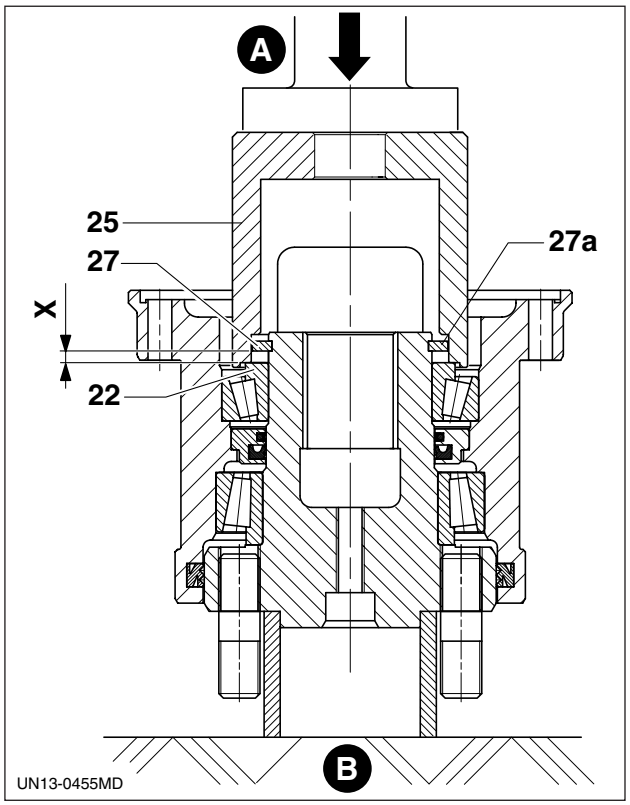
Using the check blocks (or thickness gauge), measure the distance (X) between the retaining ring and the inner ring of the bearing (**22**).

Flatten the spacer (**28**) to the measurement calculated (rounding up to the nearest decimal) using a machine tool (flat grinder or lathe) that ensures the two surfaces are perfectly parallel.

Example:

- if (**X**) is 7,01 mm round up to 7,1 mm
- if (**X**) is 7,09 mm round up to 7,2 mm

w - Lift the press thrust cylinder, remove the bearing preload block (**25**) and the bearing retaining ring (**27** or **27a**, and then fit the spacer flattened to size (**28**).



A THRUST CYLINDER (PRESS)

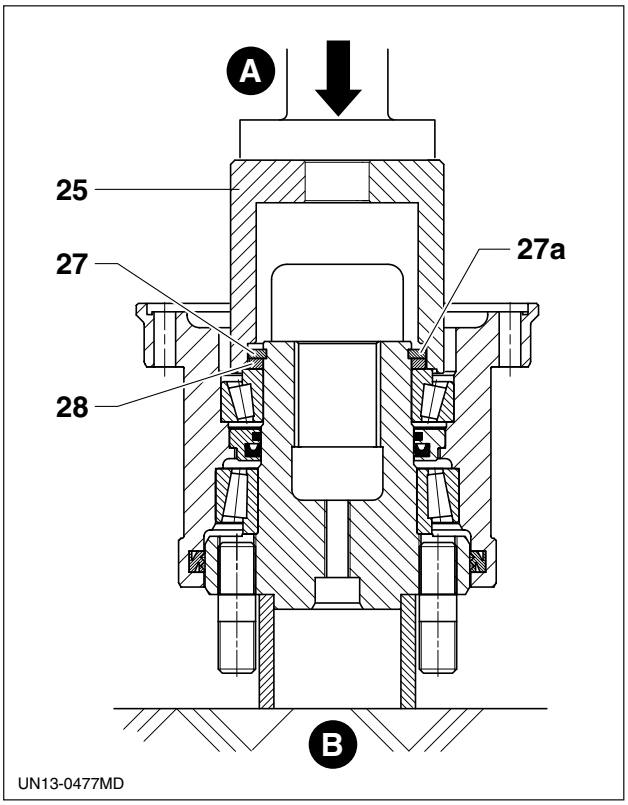
B PRESS TABLE

y - Refit the bearing preload block (**25**). Apply pressure until the prescribed force "**F**" is reached, and then proceed as follows:

- for TF 200 - TF 400 - TF 600: fit the circlip (**27**), making sure it is perfectly positioned in its seat;

- for the TF 800 - TF 1000 - TF 2000 - TF 3000: fit a half-ring only (**27a**), then lift the press thrust cylinder, rotate the bearing preload block (**25**) by 180°, reapply pressure with the press cylinder until the prescribed force "**F**" is reached, then fit the half-ring (**27a**).

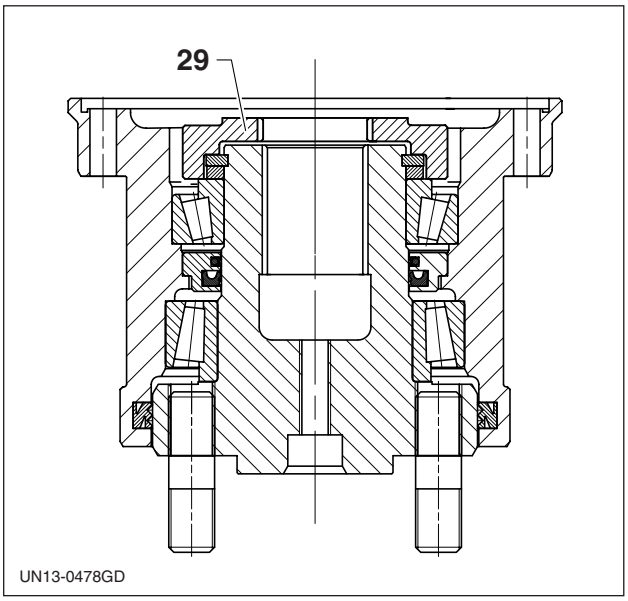
- Release the load, checking that the component is fitted perfectly.



A THRUST CYLINDER (PRESS)

B PRESS TABLE

z - Check whether the bearing retaining rings are fully inserted, using the tooted spacer (**29**) which should enter without any effort, as shown in the figure.



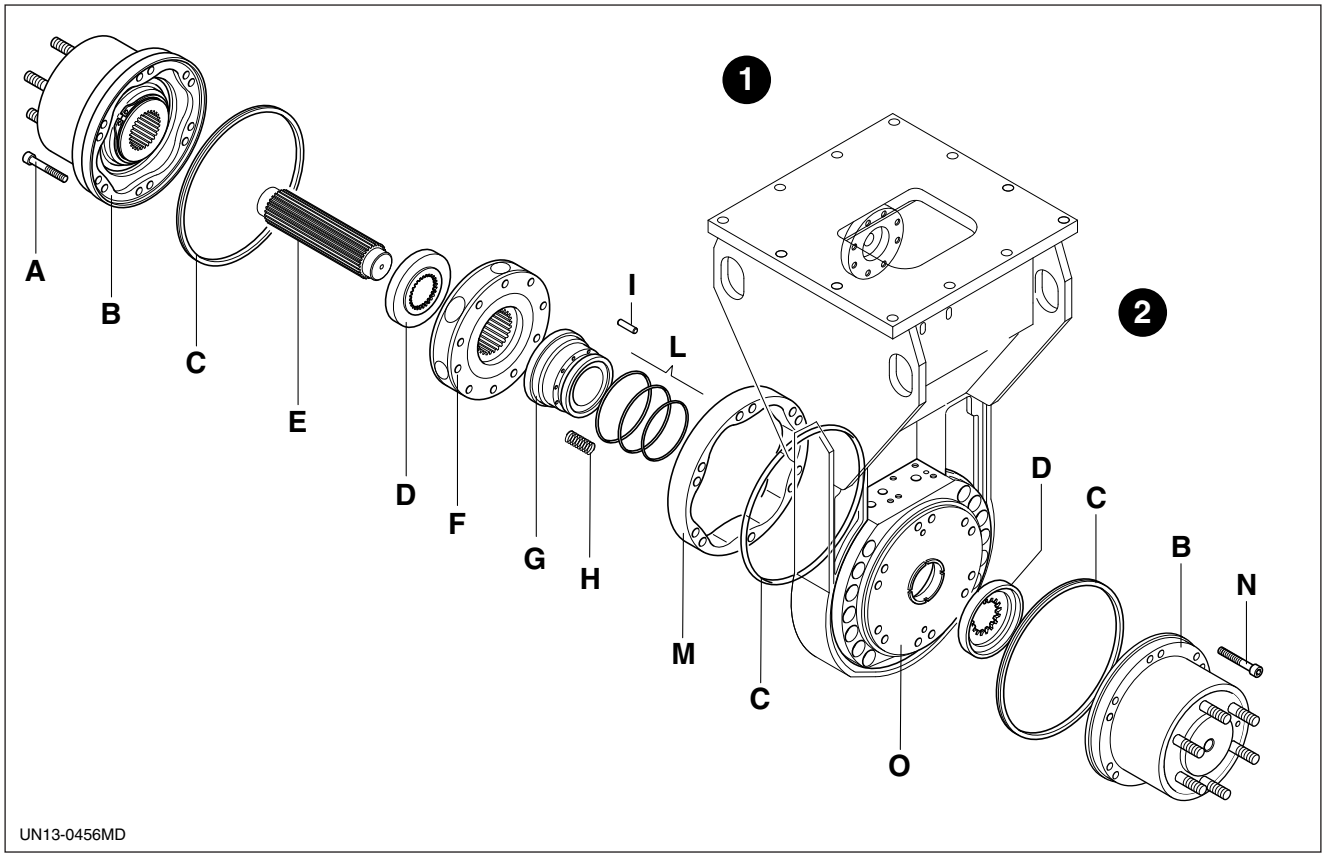
IMPORTANT: the following tools
*- (**24**) drum hub support ring*
*- (**25**) bearing preload block*
*- (**26**) bearing support rotation tool*
are available on request (see "Tooling" chart - chapter 22).

16.3 - Fitting the motor unit

16.3.1 - Motor unit (TF 200 - TF 400 - TF 600 - TF 800 - TF 1000)

1 SIDE OPPOSITE VALVE COVER

2 VALVE COVER SIDE



Key

A - Screw
B - Hub with support
C - Gasket
D - Toothed spacer
E - Toothed shaft
F - Rotor
G - Distributor
H - Springs
I - Pin (TF 200 only)
L - Series of distributor gaskets
M - Cam
N - Screw
O - Motor support

16.3.2 - Fitting the support and hub unit (side opposite valve cover) to the motor support (TF 200 - TF 400 - TF 600 - TF 800 - TF 1000)

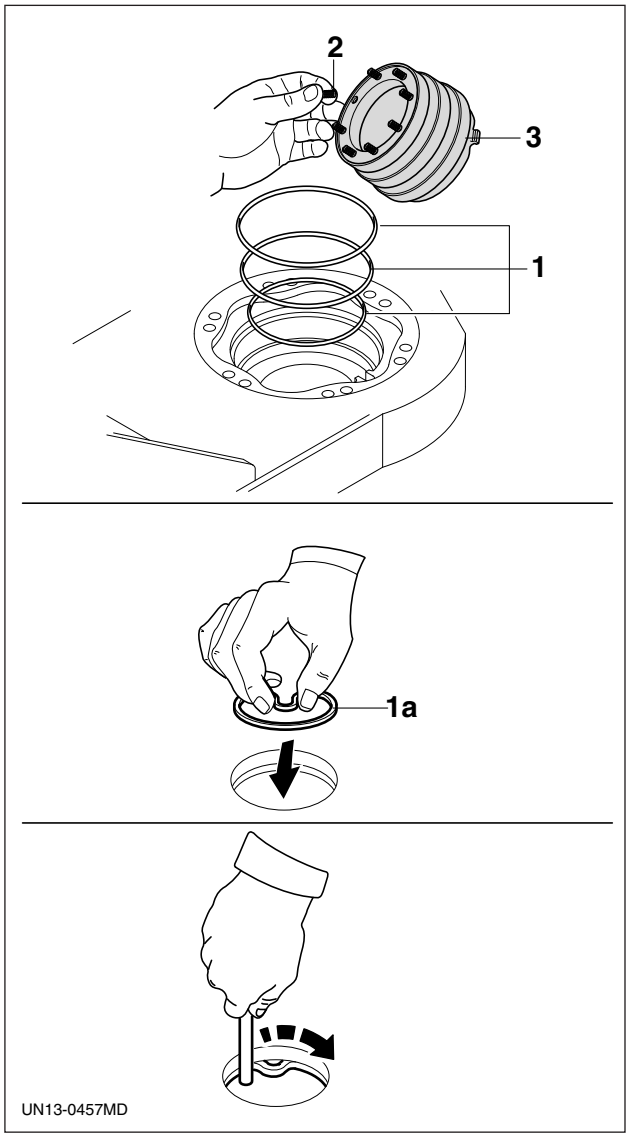
a - Fit the new O-rings (**1**) in the relative seats on the motor support, then slightly bend the new gaskets (**1a**), as shown in the figure, and reposition in the relative seats.

Insert fully with a smooth cylindrical tool, ensuring the gaskets are correctly positioned.

IMPORTANT: lubricate the gaskets with oil (see "Lubricants" chart - chapter 21).

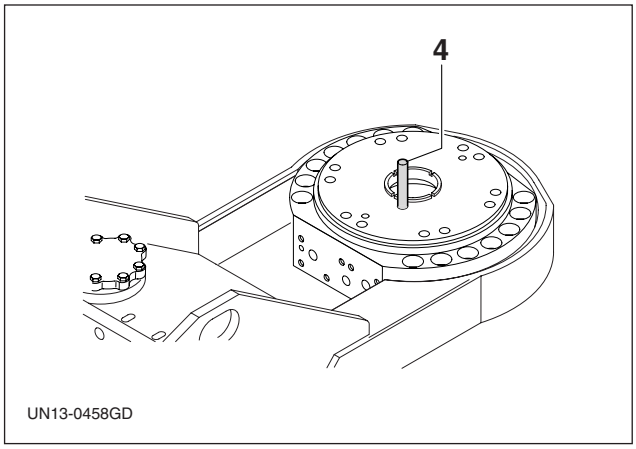
b - Lubricate the springs (**2**) to prevent them falling out during assembly, fit them in the relative seats on the distributor (**3**) then position the distributor (**3**) on the motor support.

IMPORTANT: use specific grease (with very high adhesive properties) for bearings (see "Lubricants" chart - chapter 21).

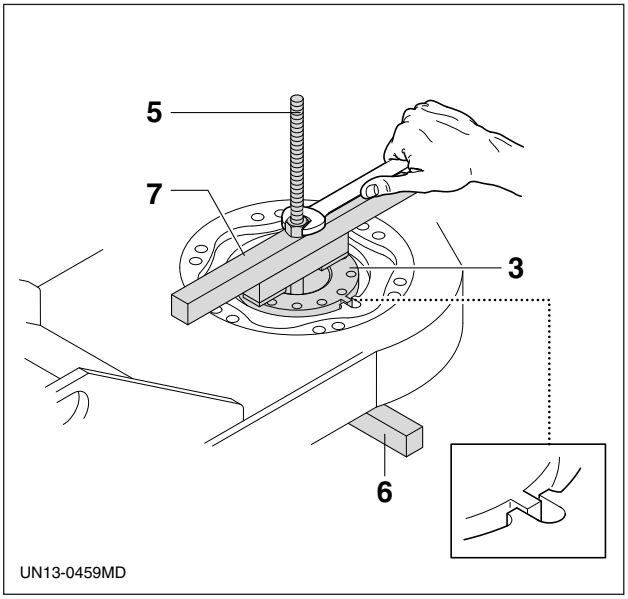


c - **<u>For the TF 200 only.</u>**

Fit a calibrated bar (**4**) in the hole in the motor support to align the distributor on the motor support with the correct motor timing position, which must be protruding on the side opposite the cam so that it can be removed at a later stage before the final marker pin is inserted.



d - Fit the distributor (**3**) on the motor support.



IMPORTANT: position the tongues on the distributor aligned with the seats on the motor support.

For the TF 200 position the distributor using the calibrated bar fitted earlier as a guide.

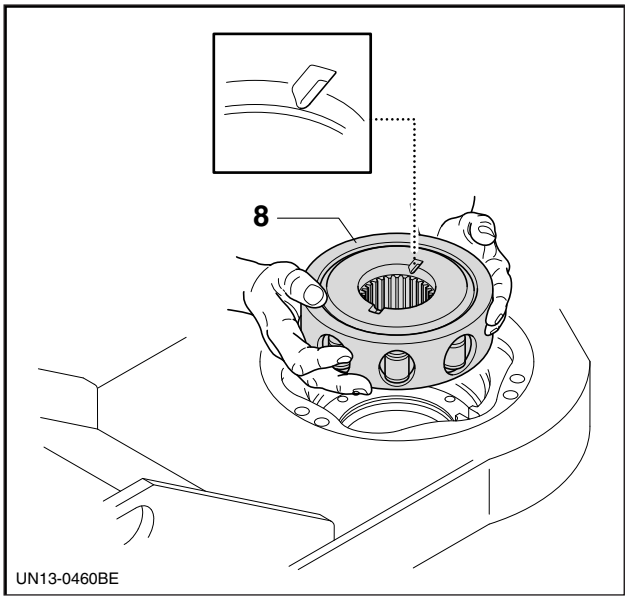
e - Load the springs to fine adjust the distributor until the upper surface of the tongues is flush with the surface of the motor support.

Use the following tools:

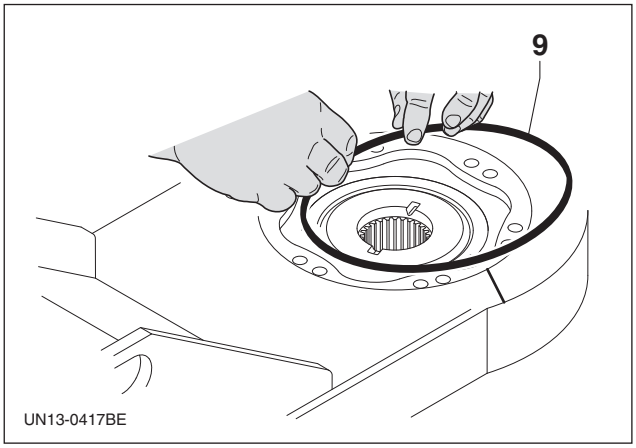
- (**5**)) threaded bar M10
- (**6**) strip for threaded bar tightening
- (**7**) guide strip for threaded bar (keep all the rubber parts facing the distributor).

Then remove all the tools.

f - After checking that the rotor pistons are lubricated and slide well, fit the rotor (**8**) with the notches facing upwards.



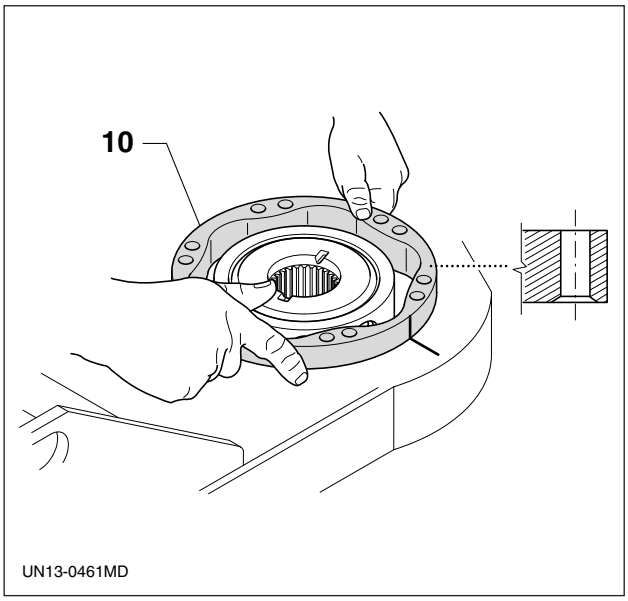
g - Fit the new gasket (**9**) in the seat on the motor support.



IMPORTANT: lubricate with specific grease for gaskets (see “Lubricants” chart - chapter 21).

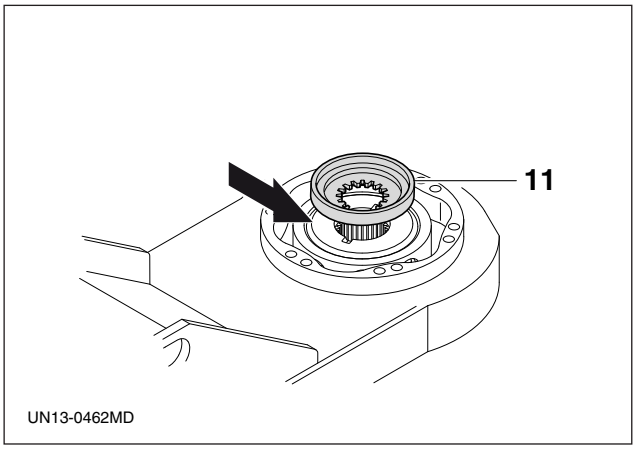
IMPORTANT: the following tools:
*- (**4**) calibrated bar*
*- (**5**) threaded bar*
*- (**6**) strip for threaded bar tightening*
*- (**7**) guide strip for threaded bar*
are available on request (see "Tooling" chart - chapter 22).

h - Clean and lubricate the cam (**10**) very carefully.
Fit the cam with the wider part of the holes for the fastening screws facing downwards (towards the motor support), and position it aligned with the 'motor timing' reference made during removal.



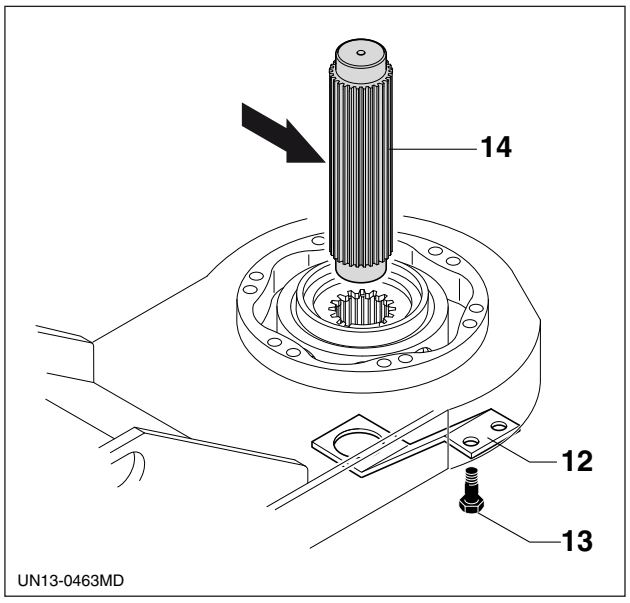
i - Place the toothed spacer (**11**) in position, as shown in the figure.

IMPORTANT: lubricate the contact surface between the rotor and the toothed spacer using oil (see "Lubricants" chart - chapter 21).



l - Fit the retaining bracket for the toothed shaft (**12**) with two screws (**13**). Then fit the toothed shaft (**14**).

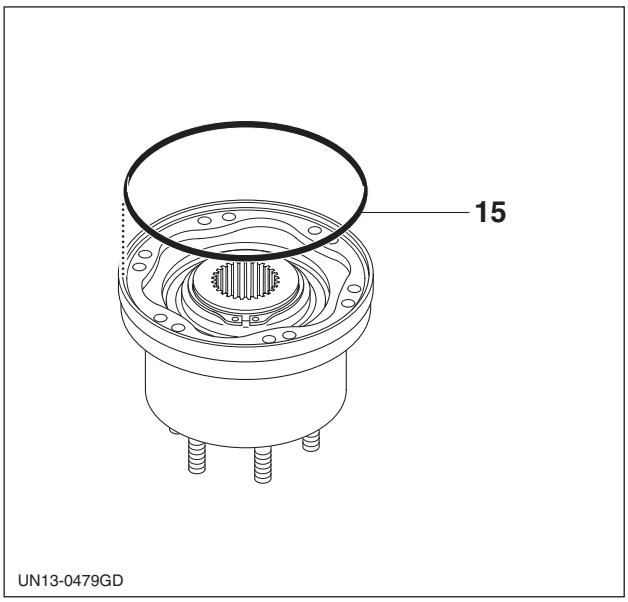
IMPORTANT: lubricate the toothed shaft with oil (see "Lubricants" chart - chapter 21).



IMPORTANT: the following tools:
*- (**12**) retaining bracket for the toothed shaft) are available on request (see "Tooling" chart - chapter 22).*

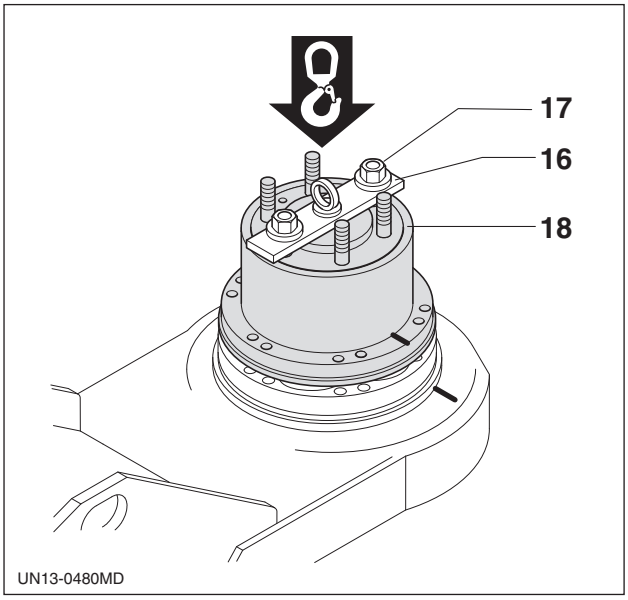
m - Fit the new gasket (**15**) in the seat on the support.

IMPORTANT: lubricate with specific grease for gaskets (see "Lubricants" chart - chapter 21).



n - Fit the hoisting tool (**16**), fastening it with two nuts (**17**) (the same as those used to fasten the drum). Lift the hub with the support (**18**) attached and position it using the markers inserted during the removal stage.

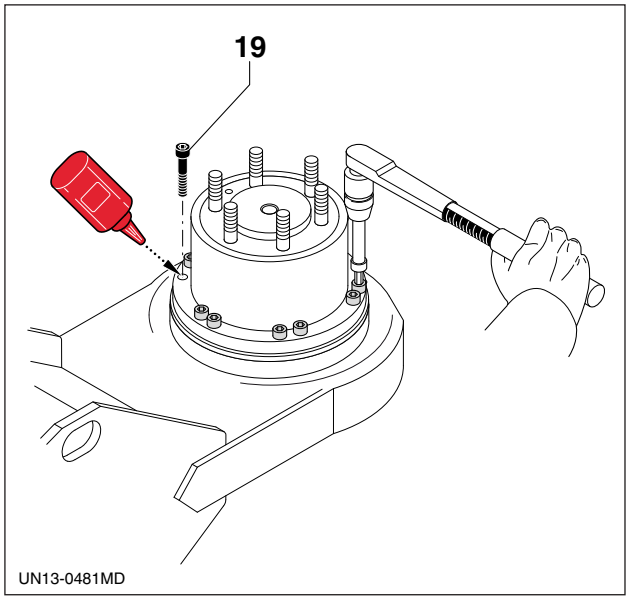
*IMPORTANT: the hoisting tool - (**16**) èis available on request (see "Tooling" chart - chapter 22).*



o - Apply a few drops of thread lock to the seats (female) on the motor support (**type: Loctite 243**).

p - Tighten the screws (**19**).

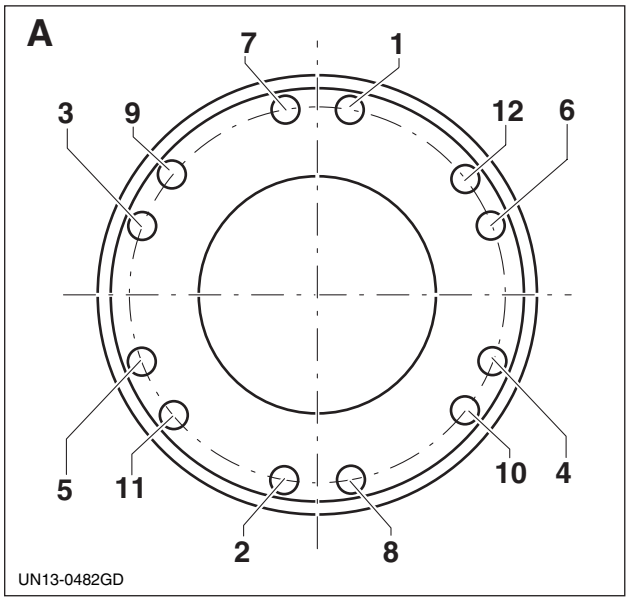
Always comply with the torque ratings specified in the chart below.



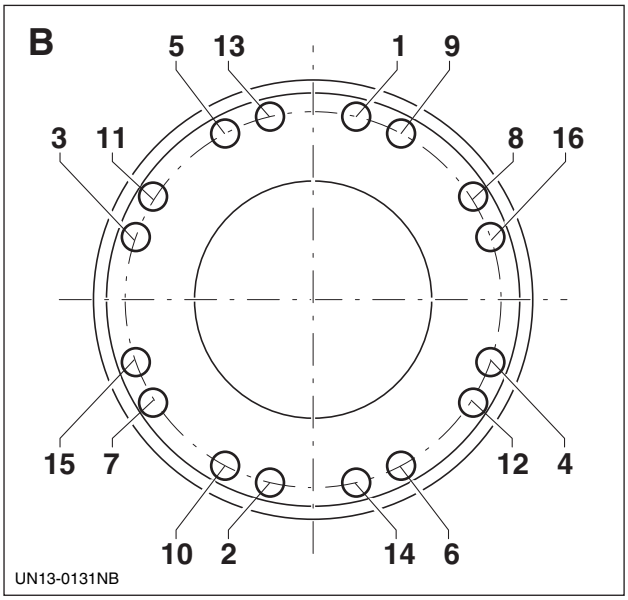
Machine model	Tightening torque Nm	Part	Position
TF 200	83	Bolts fastening support and hub unit to the motor support.	19
TF 400	145		
TF 600	145		
TF 800	355		
TF 1000	355		

IMPORTANT: tighten the bolts, proceeding gradually in a crosswise fashion, until the prescribed torque is reached.
*Always follow the tightening order, as shown in the following figures (**A** and **B**).*

A - TF 200
TF 400
TF 800

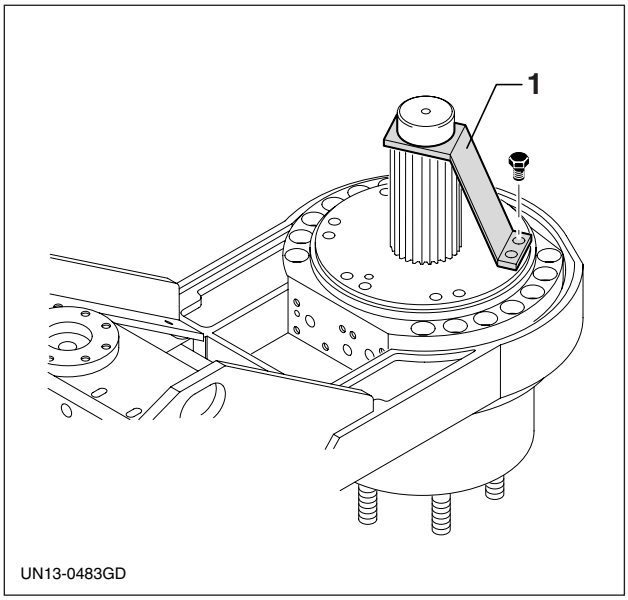


B - TF 600
TF 1000



16.3.3 - Fitting the support and hub unit (valve cover side) to the motor support (TF 200 - TF 400 - TF 600 - TF 800 - TF 1000)

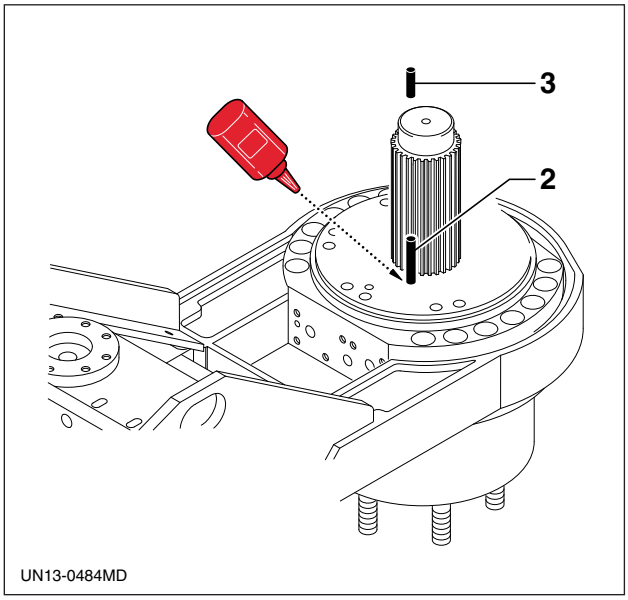
a - Turn the frame round and remove the retaining bracket for the toothed shaft (**1**).



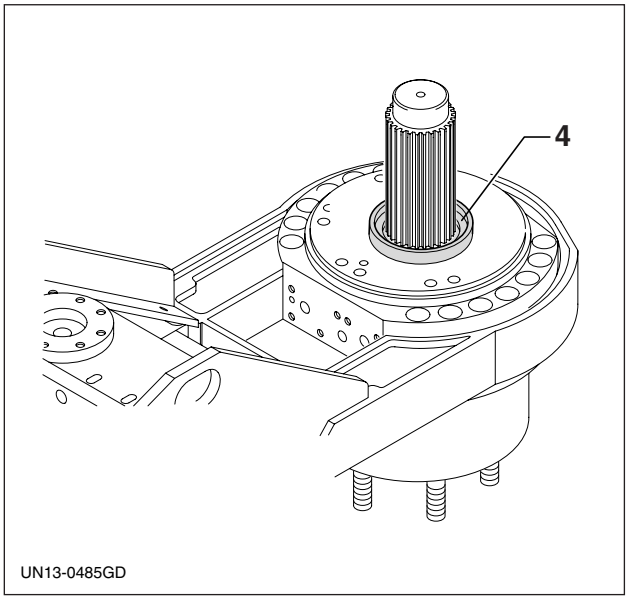
b - For the TF 200 only.

Extract the calibrated bar (**2**) and insert the 'motor timing' marker pin (**3**).

Apply a few drops of locking liquid to the seat on the motor support (**type: Loctite 270**).

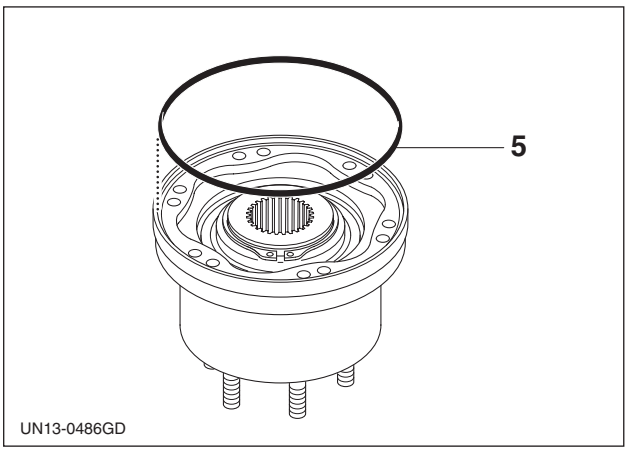


c - Place the toothed spacer (**4**) in position, as shown in the figure.



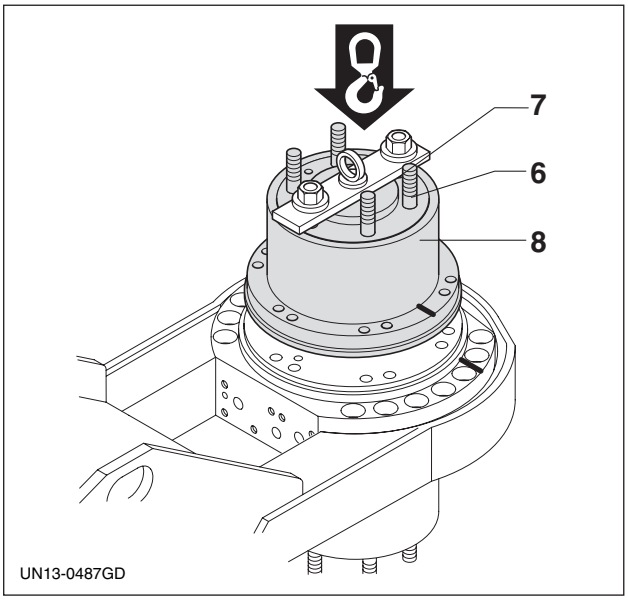
d - Fit the new gasket (**5**) in the bearing support seat.

IMPORTANT: lubricate with specific grease for gaskets (see "Lubricants" chart - chapter 21).



e - Fit the hoisting tool (**6**), fastening it with two nuts (**7**) (the same as those used to fasten the drum). Lift the hub with the support (**8**) attached and position it using the markers inserted during the removal stage.

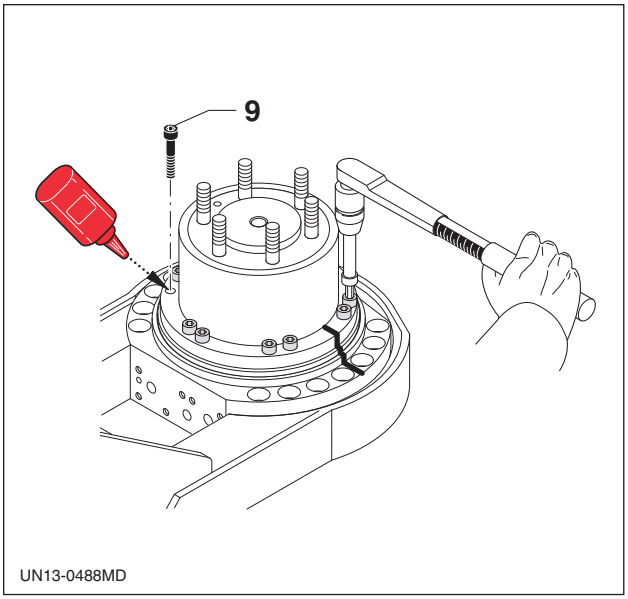
*IMPORTANT: the hoisting tool - (**6**) is available on request (see "Tooling" chart - chapter 22).*



f - Apply a few drops of thread lock to the seats (female) on the motor support (**type: Loctite 243**).

g - Tighten the screws (**9**).

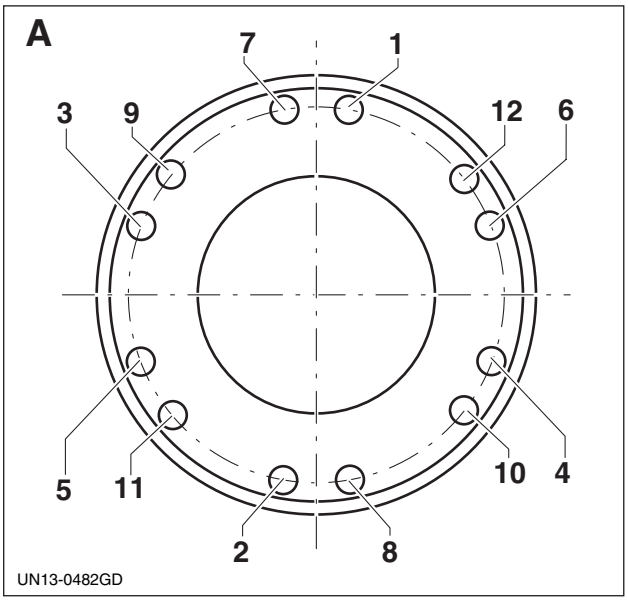
Always comply with the torque ratings specified in the chart below.



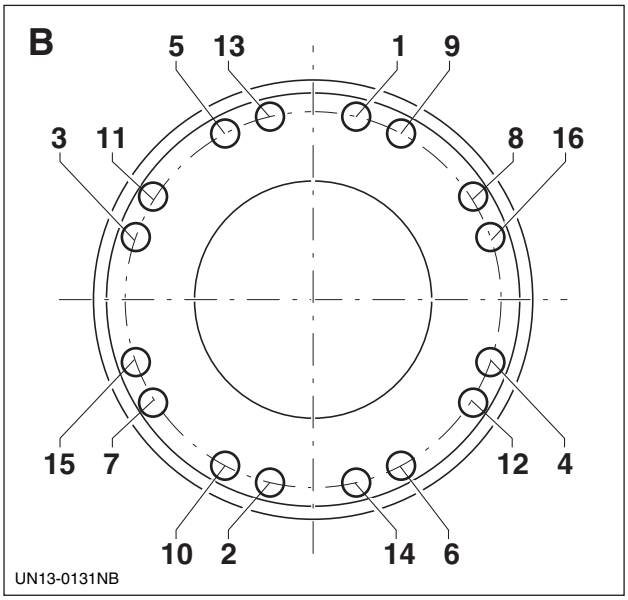
Machine model	Tightening torque Nm	Part	Position
TF 200	83	Bolts fastening support and hub unit to the motor support	9
TF 400	145		
TF 600	145		
TF 800	355		
TF 1000	355		

IMPORTANT: tighten the bolts, proceeding gradually in a crosswise fashion, until the prescribed torque is reached.
*Always follow the tightening order, as shown in the following figures (**A** and **B**).*

A - TF 200
TF 400
TF 800



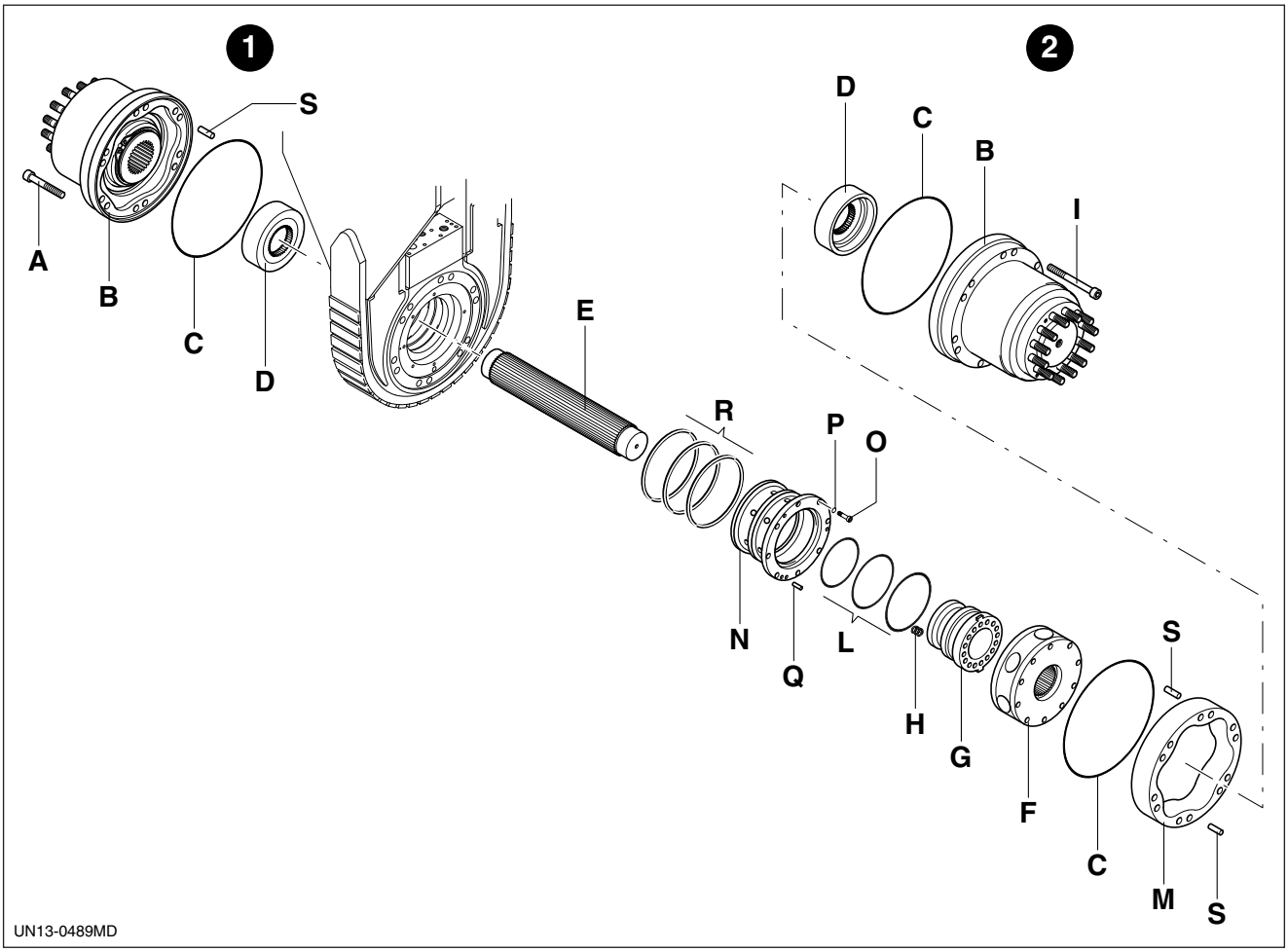
B - TF 600
TF 1000



16.3.4 - Motor unit (TF 2000 - TF 3000)

1 SIDE OPPOSITE VALVE COVER

2 VALVE COVER SIDE



Key

A - Screw
B - Hub with support
C - Gasket
D - Toothed spacer
E - Toothed shaft
F - Rotor with pistons
G - Distributor
H - Spring
I - Screw
L - Series of distributor gaskets
M - Cam
N - Distributor support
O - Screw
P - Washer
Q - Pin
R - Series of distributor support gaskets
S - Pins (TF 3000 only)

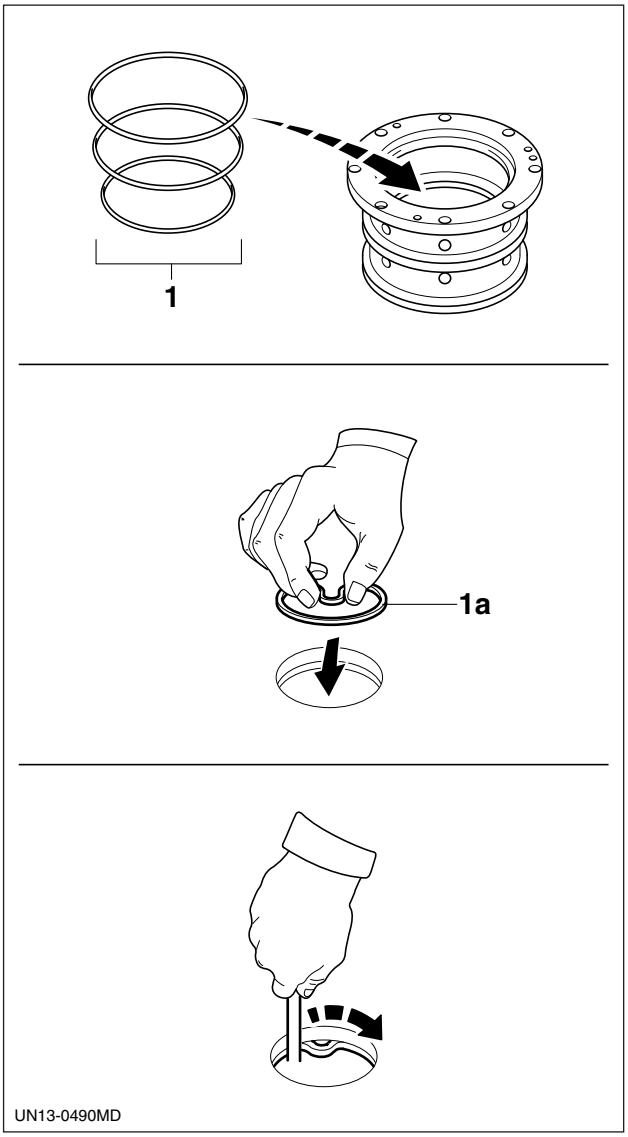
16.3.5 - Fitting the support and hub unit (valve cover side) to the (fixed) motor support TF 2000 - TF 3000

a - Fit the new inner gaskets, (**1**) and (**1a**), in the distributor support.

IMPORTANT: lubricate with specific grease for gaskets (see "Lubricants" chart - chapter 21).

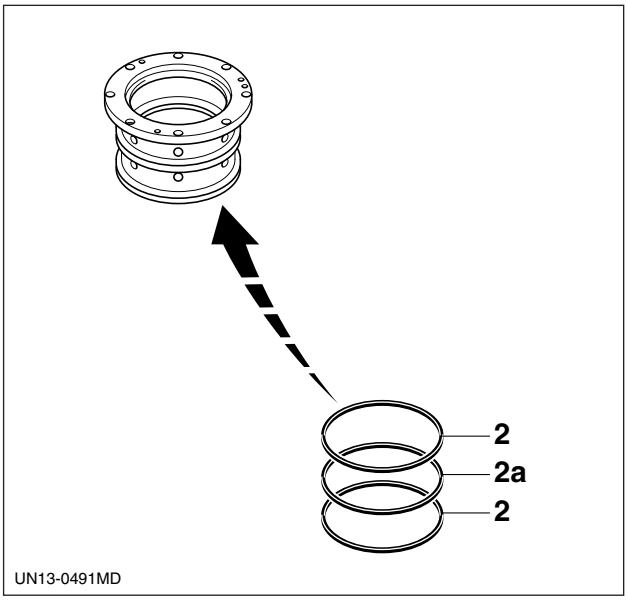
To fit them in:

- fit the O-rings (**1**) in their seats;
- bend the gaskets (**1a**) slightly, as shown in the figure, and position them in the seat;
- insert fully with a smooth cylindrical tool; make sure the gaskets are correctly positioned.

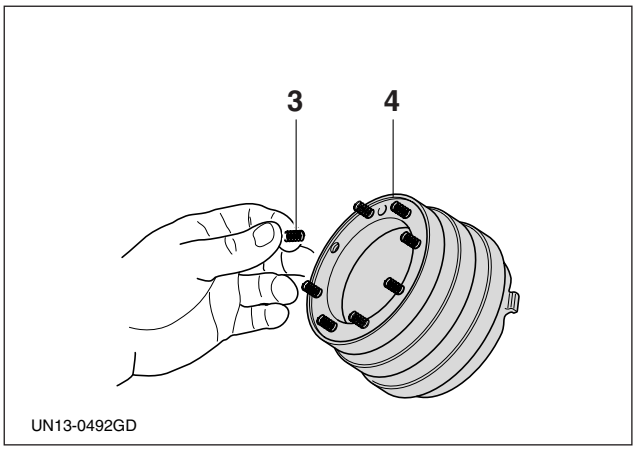


b - Fit the new inner gaskets, (**2**) and (**2a**), in the distributor support.

IMPORTANT: lubricate the gaskets with oil (see "Lubricants" chart - chapter 21).

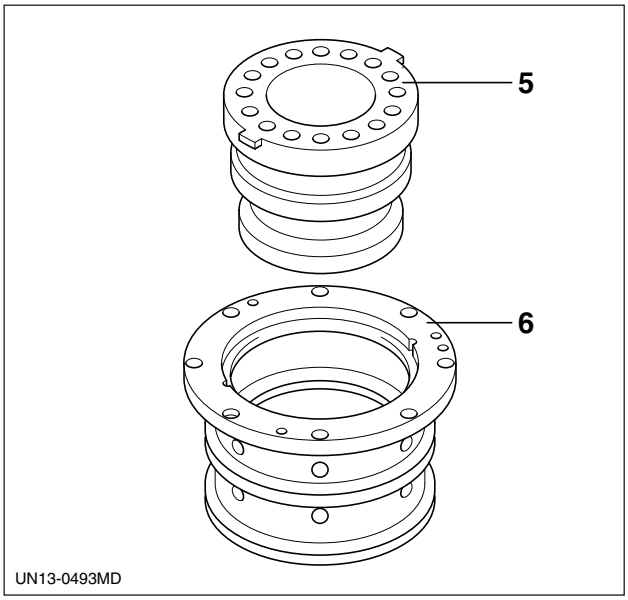


c - Grease the springs (**3**) to prevent them falling out during assembly, and then position them in their seats on the distributor (**4**).



IMPORTANT: use specific grease (with very high adhesive properties) for bearings (see "Lubricants" chart - chapter 21).

d - Fit the distributor (**5**) on the distributor support (**6**).



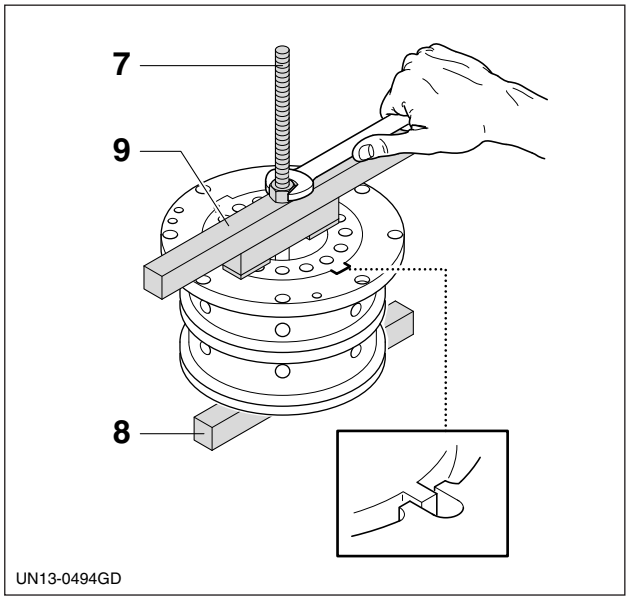
IMPORTANT: position the tongues on the distributor aligned with the seats on the distributor support.

e - Load the springs to fine adjust the distributor until the upper surface of the tongues is flush with the surface of the distributor support.

Use the following tools:

- (**7**) threaded bar M10
- (**8**) strip for threaded bar tightening
- (**9**) threaded bar guide strip (keep all the rubber parts facing the distributor).

Then remove all the tools.

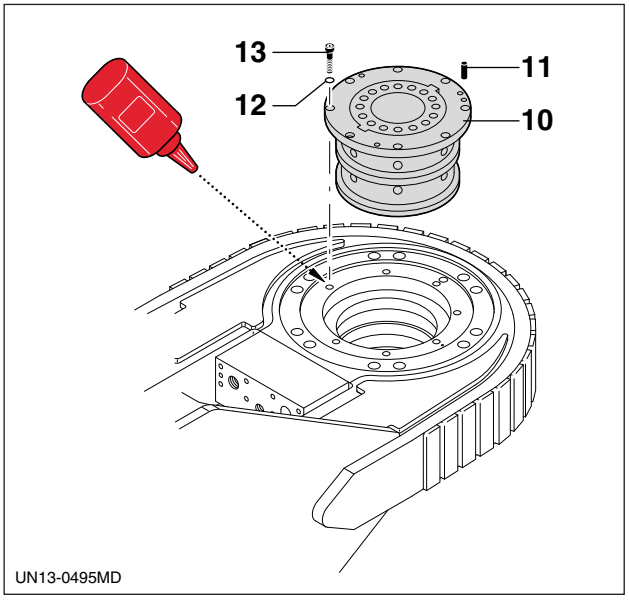


IMPORTANT: the following tools:
*- (**7**) threaded bar*
*- (**8**) strip for threaded bar tightening*
*- (**9**) guide strip for threaded bar*
are available on request (see "Tooling" chart - chapter 22).

f - Fit the distributor/distributor support unit (**10**) in to the motor body.

Fit the elastic marker pin (**11**) between the distributor/distributor support unit and the motor body.

Apply a few drops of thread lock to the seats (female) on the motor body **(type: Loctite 270**).



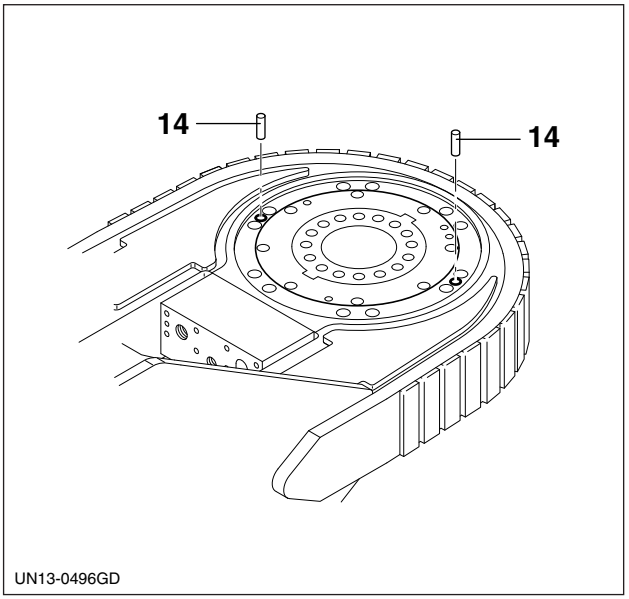
g - Insert new washers (**12**) and tighten the screws (**13**).

Always comply with the torque ratings specified in the chart below (use a torque wrench).

Machine model	Tightening torque Nm	Part	Position
TF 2000	40	Bolts fastening the distributor/distributor support unit to the motor body	13
TF 3000	40		

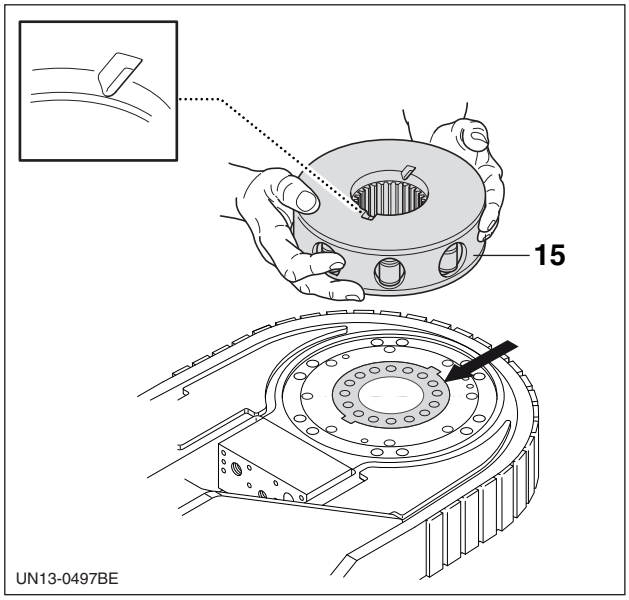
h - For the TF 3000 only.

Insert two cam marker pins (**14**) in the motor body.



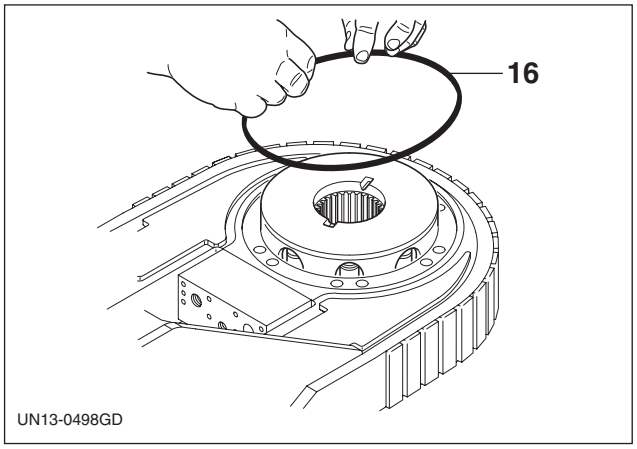
i - After checking that the rotor pistons are lubricated and slide well, fit the rotor (**15**) with the notches facing upwards.

IMPORTANT: lubricate the distributor plate shown with oil (see "Lubricants" chart - chapter 21).



l - Fit the new gasket (**16**) in the seat on the motor body.

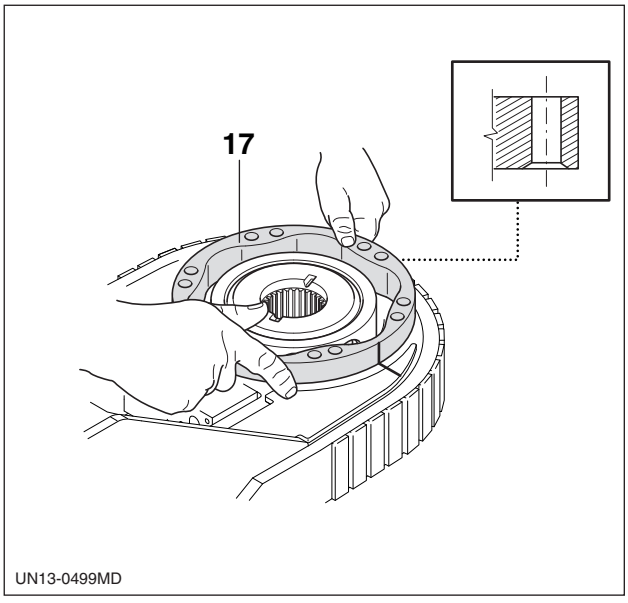
IMPORTANT: lubricate with specific grease for gaskets (see "Lubricants" chart - chapter 21).



m - Clean and lubricate the cam (**17**) very carefully.

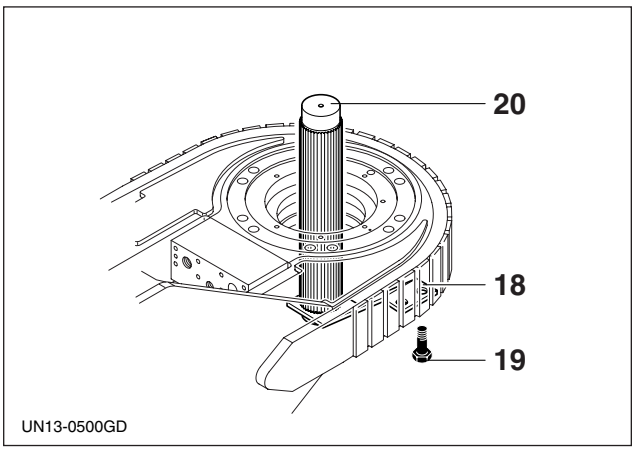
Position the cam with the wider part of the holes for the fastening screws facing downwards (towards the motor body), and position it aligned with the 'motor timing' reference made during removal.

IMPORTANT: for the TF 3000 only. Check that the two marker pins are inserted in the cam correctly.



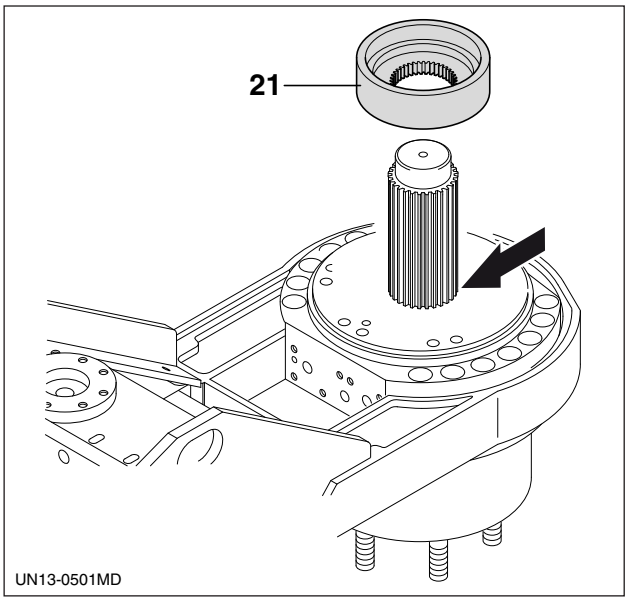
n - Fit the retaining bracket for the toothed shaft (**18**) with two screws (**19**). Then fit the toothed shaft (**20**).

IMPORTANT: the following tools:
*- (**18**) retaining bracket for the toothed shaft) are available on request (see "Tooling" chart - chapter 12).*



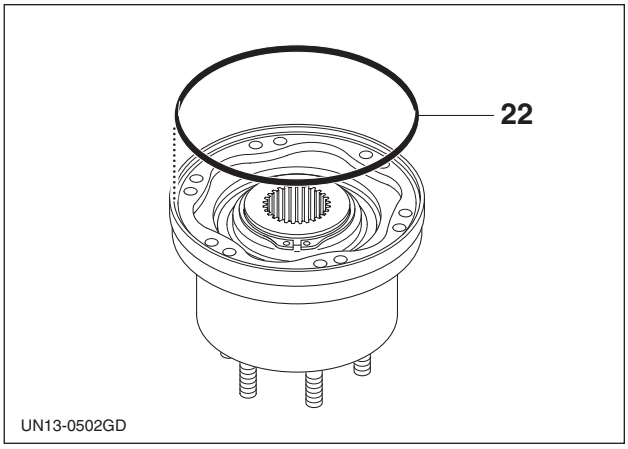
o - Place the toothed spacer (**21**) in position, as shown in the figure.

IMPORTANT: lubricate the contact surface between the rotor and the toothed spacer using oil (see "Lubricants" chart - chapter 21).

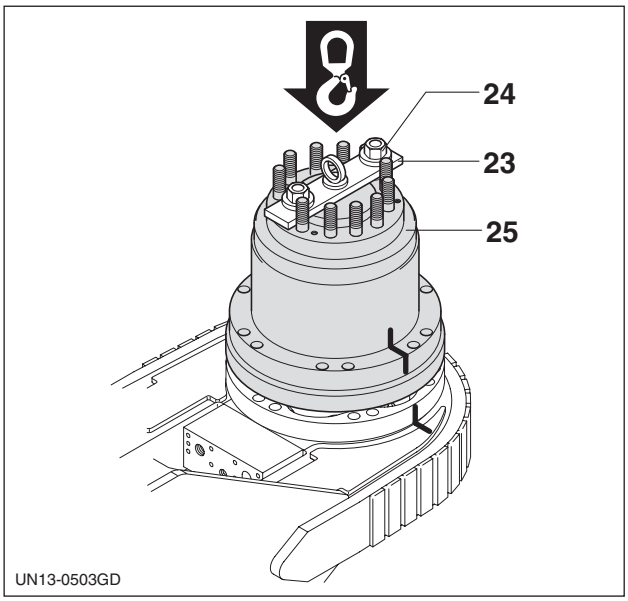


p - Fit the new gasket (**22**) in the bearing support seat.

IMPORTANT: lubricate with specific grease for gaskets (see "Lubricants" chart - chapter 21).



q - Fit the hoisting tool (**23**), fastening it with two nuts (**24**) (the same as those used to fasten the drum). Lift the hub with the support (**25**) attached and position it using the markers inserted during the removal stage.

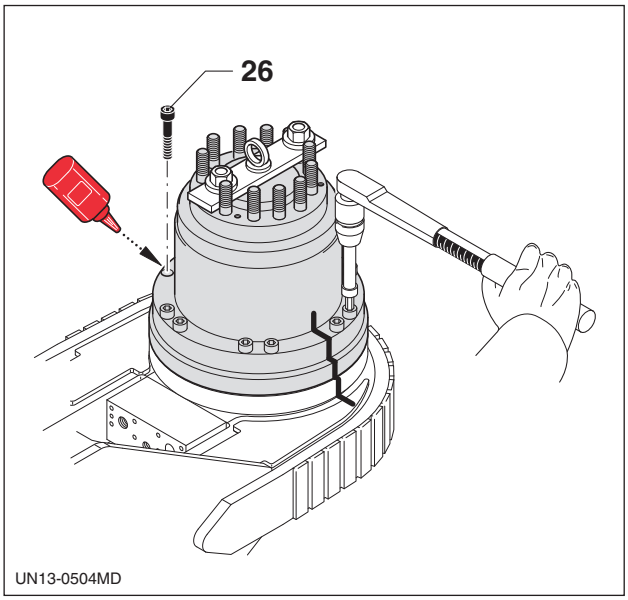


*IMPORTANT: the hoisting tool - (**23**) is available on request (see "Tooling" chart - chapter 22).*

r - Apply a few drops of thread lock to the seats (female) on the (fixed) motor support (**type: Loctite 243**).

s - Tighten the screws (**26**).

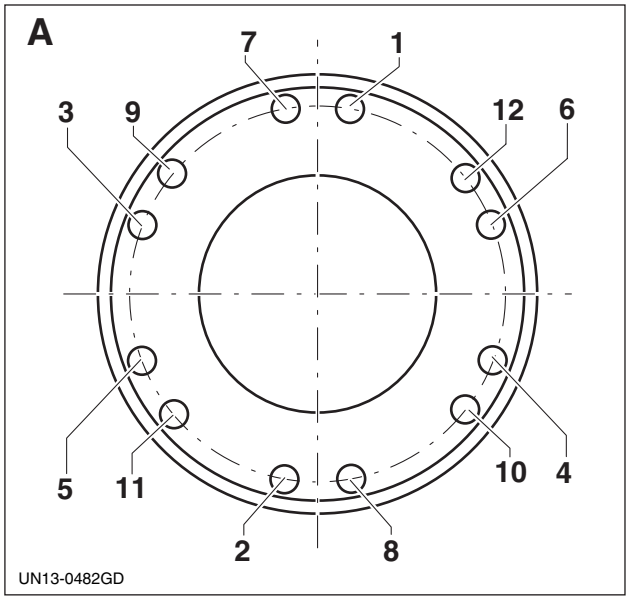
Always comply with the torque ratings specified in the chart below.



Machine model	Tightening torque Nm	Part	Position
TF 2000	690	Bolts fastening support and hub unit to the motor body	26
TF 3000	690		

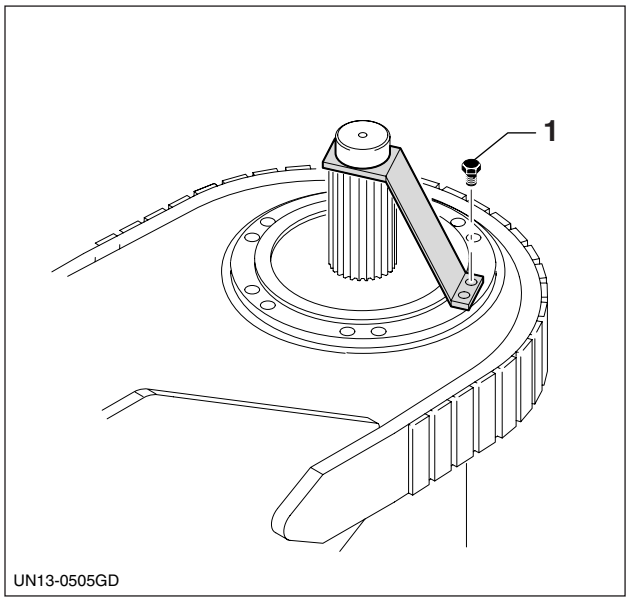
IMPORTANT: tighten the bolts, proceeding gradually in a crosswise fashion, until the prescribed torque is reached.
*Always follow the tightening order, as shown below in figure **A**.*

A - TF 2000
TF 3000

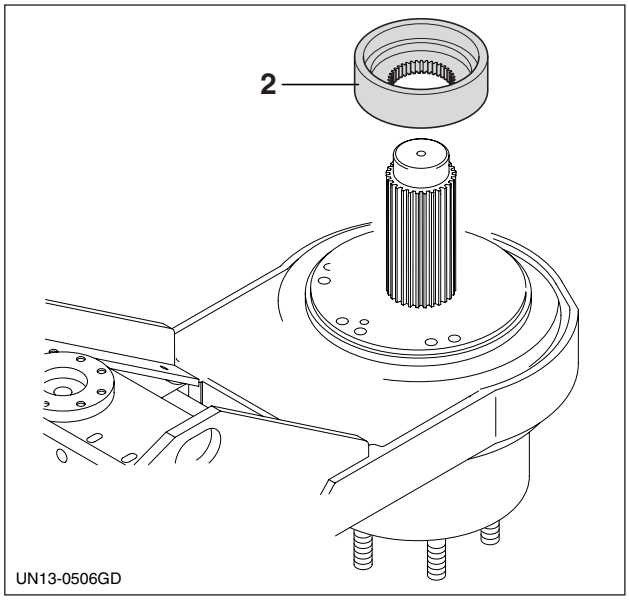


16.3.6 - Fitting the support and hub unit (side opposite valve cover) to the motor support (fixed) (TF 2000 - TF 3000)

a - Turn the frame round and remove the retaining bracket for the toothed shaft (**1**).

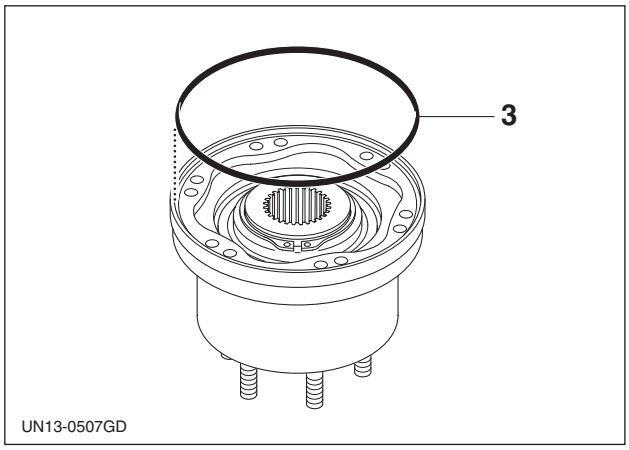


b - Place the toothed spacer (**2**) in position, as shown in the figure.

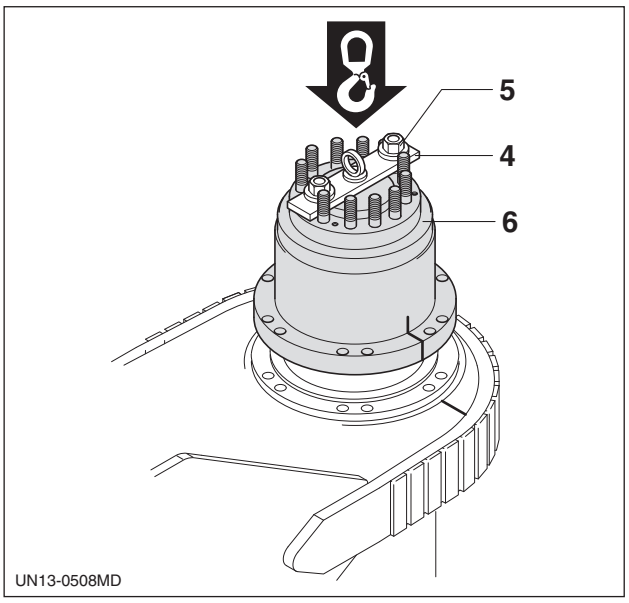


c - Fit the new gasket (**3**) in the seat on the support.

IMPORTANT: lubricate with specific grease for gaskets (see "Lubricants" chart - chapter 21).



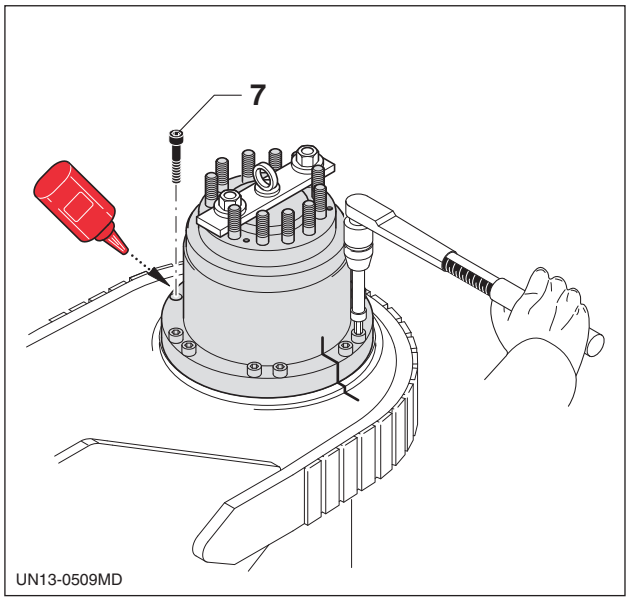
d - Fit the hoisting tool (**4**), fastening it with two nuts (**5**) (the same as those used to fasten the drum). Lift the hub with the support (**6**) attached and position it using the markers inserted during the removal stage.



IMPORTANT: the hoisting tool
*- (**4**) is available on request (see "Tooling" chart - chapter 22).*

e - Apply a few drops of thread lock to the seats (female) on the motor support (**type: Loctite 243**).

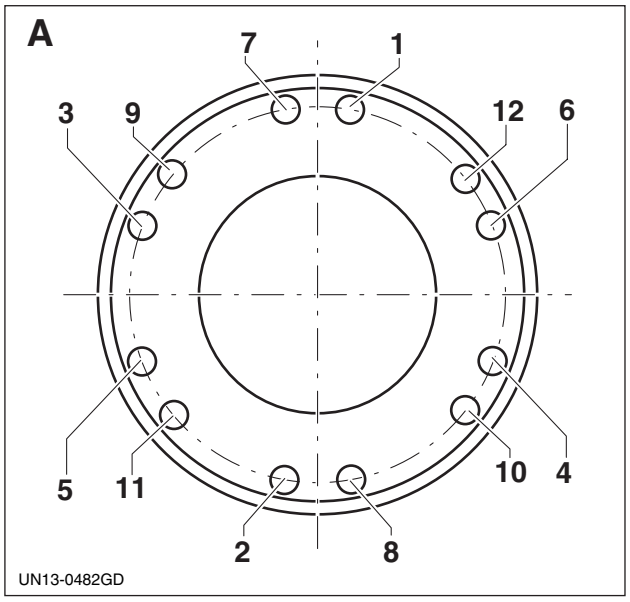
f - Tighten the screws (**7**).
Always comply with the torque ratings specified in the chart below.



Machine model	Tightening torque Nm	Part	Position
TF 2000	690	Bolts fastening support and hub unit to the motor body	7
TF 3000	690		

IMPORTANT: tighten the bolts, proceeding gradually in a crosswise fashion, until the prescribed torque is reached.
*Always follow the tightening order, as shown below in figure **A**.*

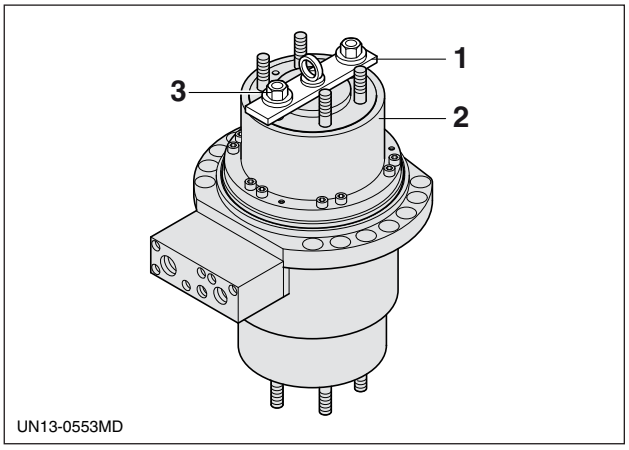
A - TF 2000
TF 3000



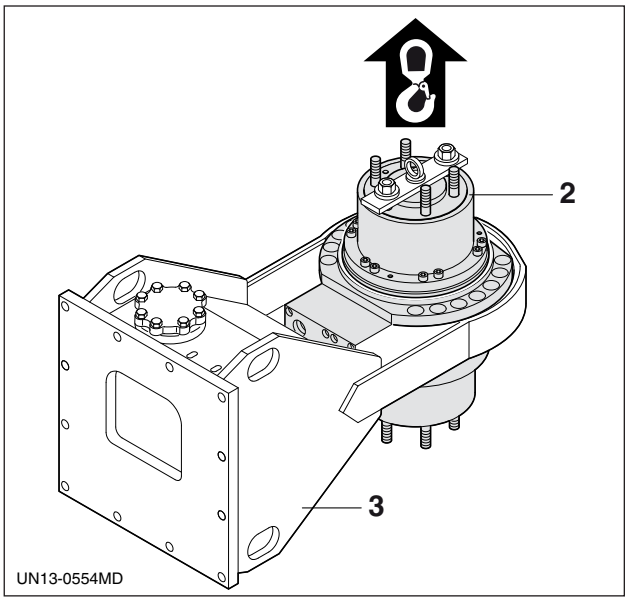
16.4 - Fitting the entire motor unit (TF 200 - TF 400 - TF 600 - TF 800 - TF 1000)

If the entire motor unit needs fitting, proceed as outlined below.

a - Fit the hoisting tool (**1**) on the entire motor unit (**2**), fastening it with two nuts (**3**) (the same as those used to fasten the drum).



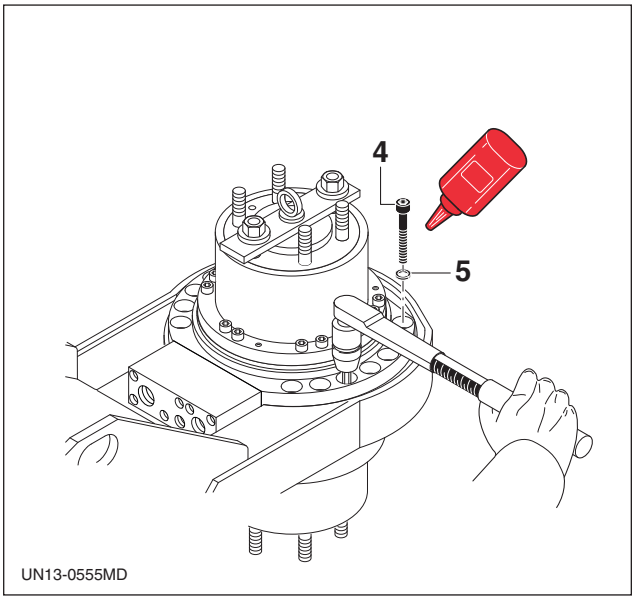
b - Hoist the entire motor unit (**2**) and fit it in the frame (**3**).



c - Apply a few drops of thread lock to the bolts fastening the entire motor unit to the frame (**4**) (**type: Loctite 243**).

d - Insert new self-locking washers (**5**) and tighten the fastening bolts (**4**) with a torque wrench.

Always comply with the torque ratings specified in the chart below.



Machine model	Tightening torque Nm	Part	Position
TF 200	210	Screws fastening the entire motor unit to the frame	4
TF 400	210		
TF 600	210		
TF 800	450		
TF 1000	450		

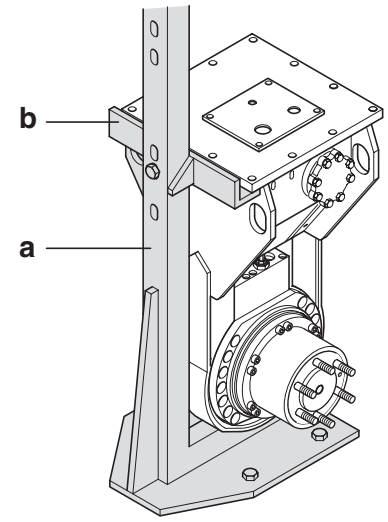
IMPORTANT: the hoisting tool
*- (**1**) is available on request (see "Tooling" chart - chapter 22).*

16.5 - Machine bracketing prior to fitting the hydraulic system

Place the machine on the support unit composed of:

a - Support frame.
This must be secured in an upright position so that it is stable and safe.

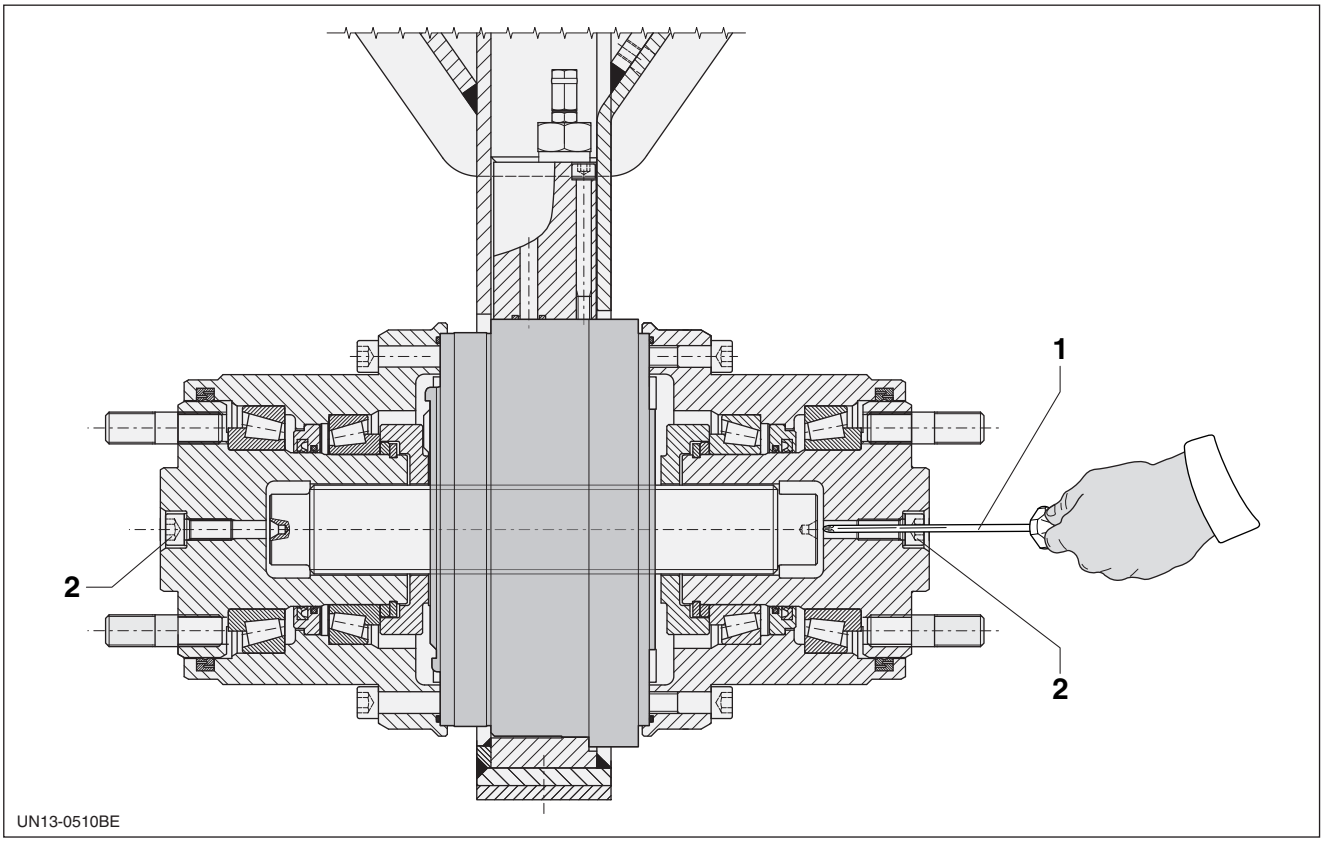
b - Corner bracket for fastening.



UN13-0366FD

*IMPORTANT: the support frame (**a**) and corner bracket for fastening (**b**) are available on request (see "Tooling" chart - chapter 22).*

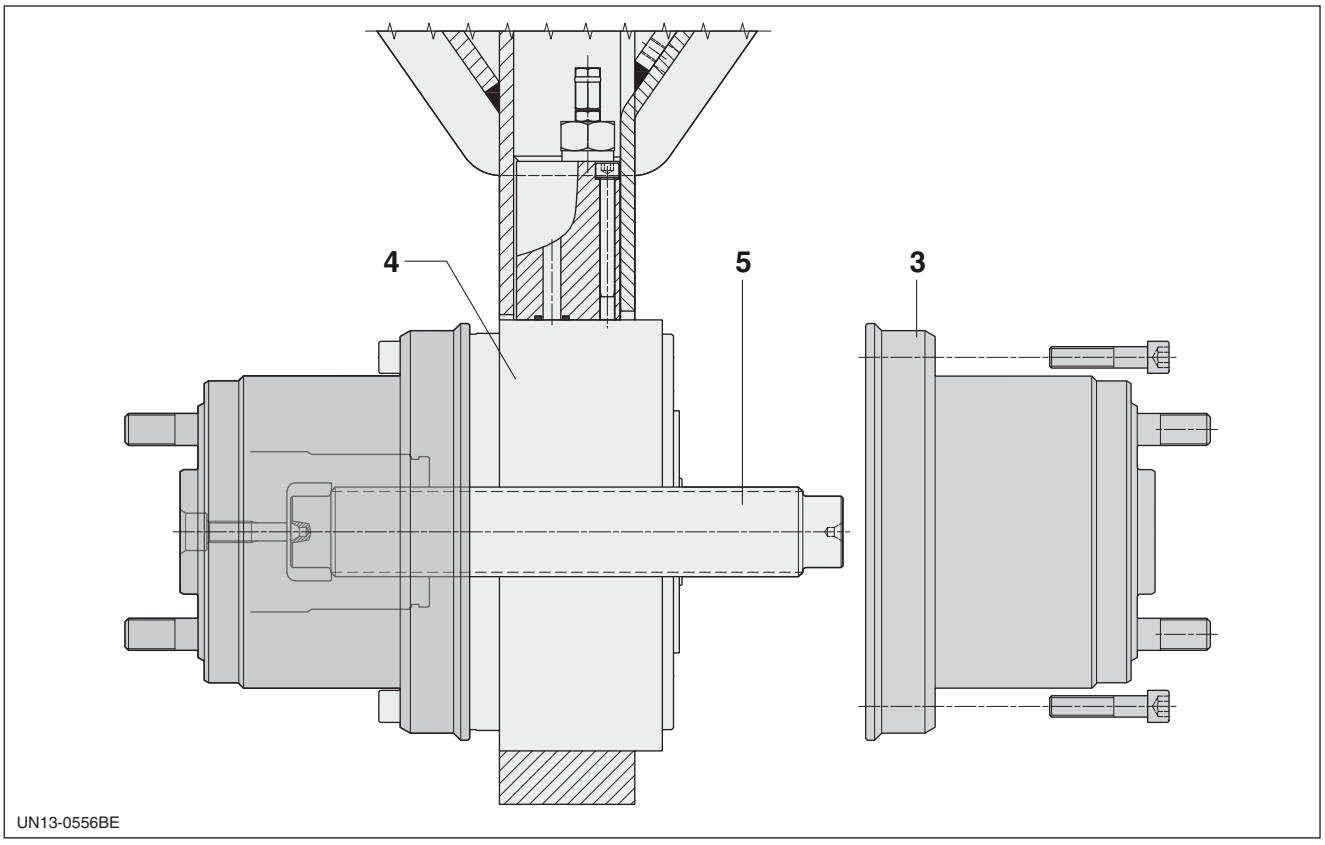
16.6 - Inspecting the toothed shaft (TF series)



a - Insert a pricker (**1**) through the holes (**2**) in the hubs and check that the toothed shaft slides freely from right to left and vice versa. **If the toothed shaft does not slide smoothly, proceed as follows.**

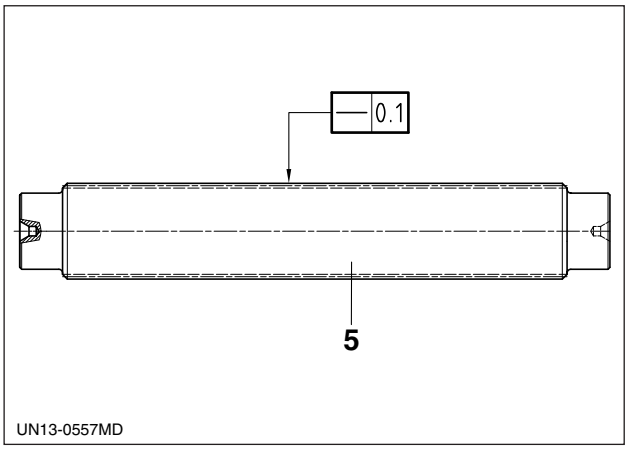
b - Remove the hub unit with the bearing support (**3**) on the side opposite the cam (**4**) still attached.

c - Remove the toothed shaft (**5**).



d - Check that the toothed shaft (**5**) is straight and falls within the range of deviation shown in the figure. It is out of range, it must be replaced.

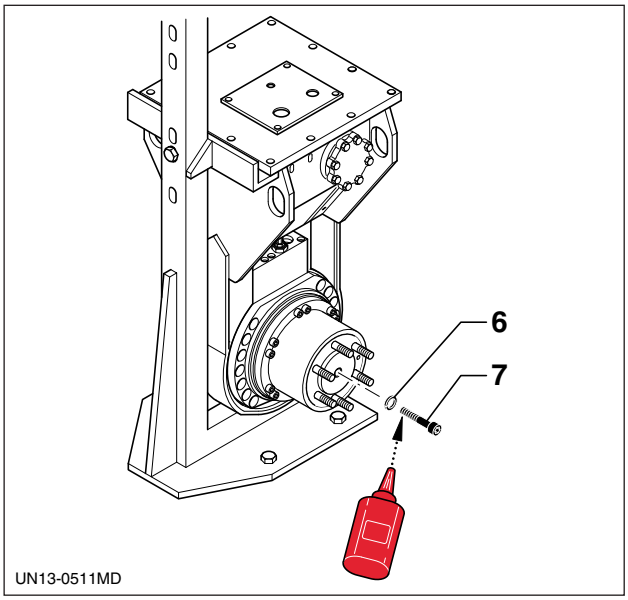
e - Refit the toothed shaft (**5**) and the hub unit with the support (**3**) attached, proceeding as shown in section 16.3.3 for TF 200 - TF 400 - TF 600 - TF 800 - TF 1000 and section 16.3.6 for TF 2000 - TF 3000.



f - Apply a few drops of thread lock to the locking screw (**type: Loctite 542**).

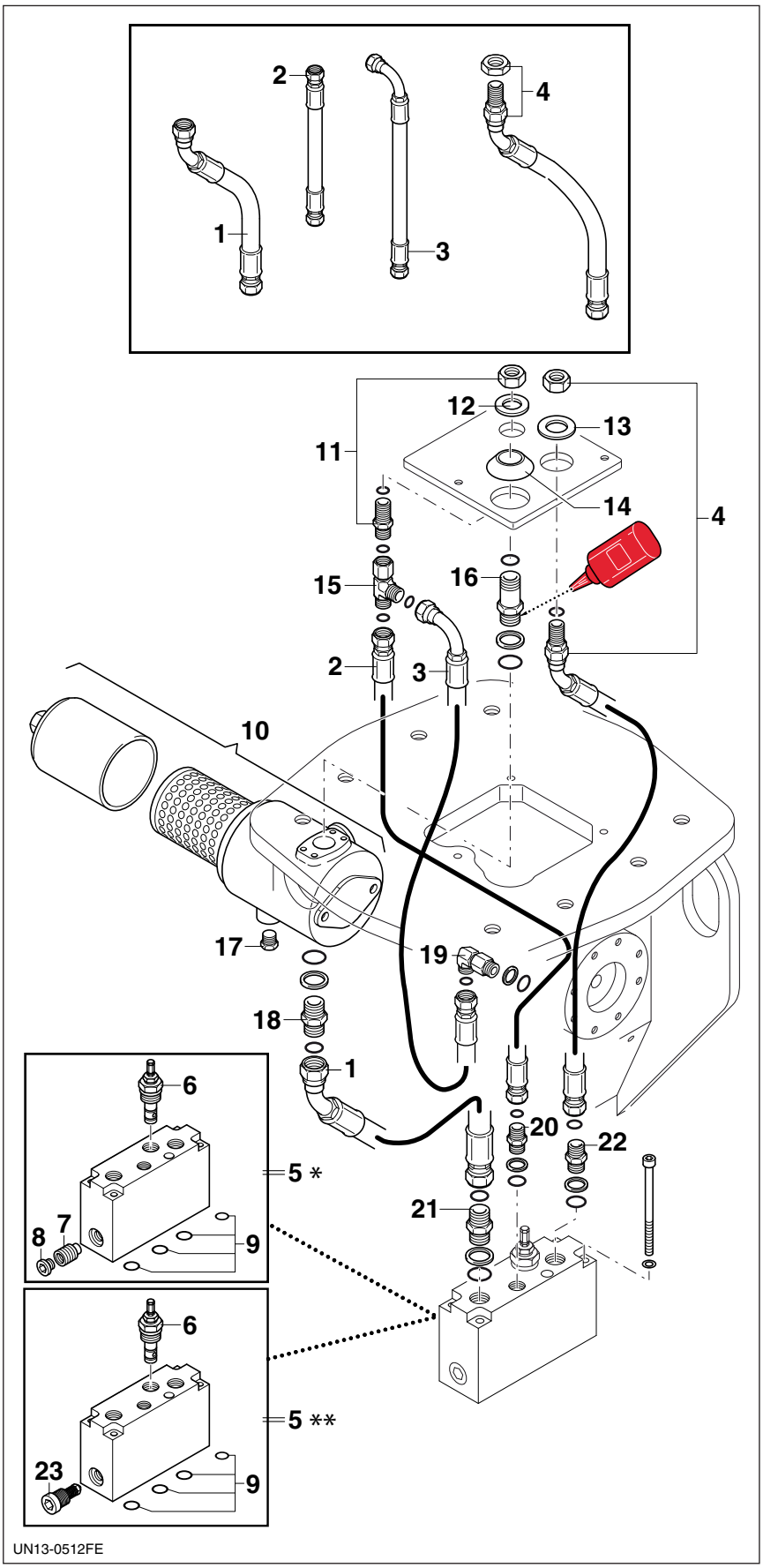
g - Insert new copper washers (**6**) and tighten the screws (**7**).

IMPORTANT: always comply with the torque ratings specified for the screws in the chart ("Tightening torques" - chapter 21).



16.7 - Fitting the hydraulic system (TF 200)

16.7.1 - Fitting the pipelines and the valve and oil filter unit (TF 200)



UN13-0512FE

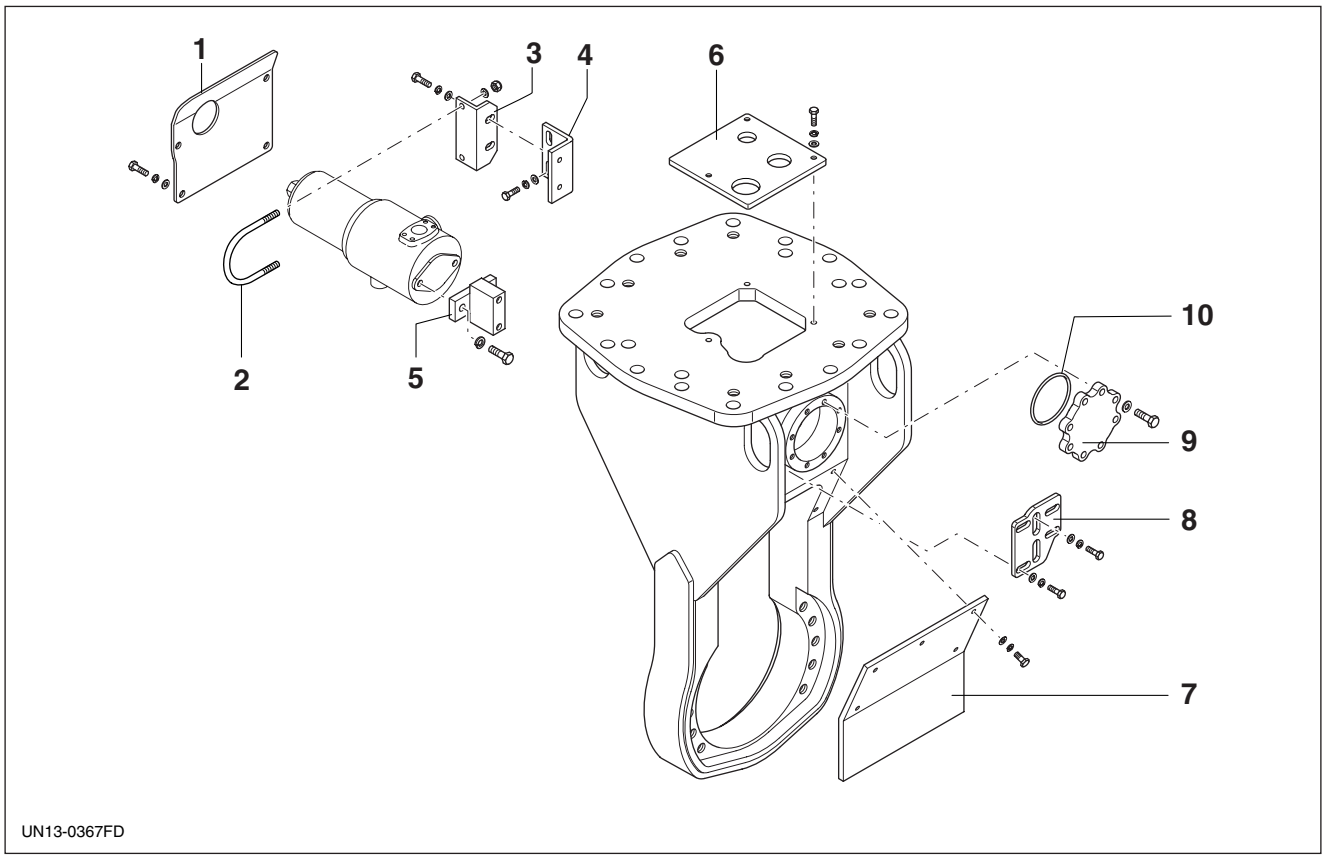
Key

1 - Pressure line hose
2 - Drain line hose
3 - Drain line hose - safety cover
4 - Return line hose
5 - Hydraulic motor valve unit
6 - Counterpressure valve
7 - By-pass valve
8 - Cap
9 - O-rings
10 - Complete oil filter unit
11 - Bulkhead
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Fitting
16 - Fitting
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Buffering valve

Apply a few drops of fitting sealant to the fitting (**type: Loctite 542**).

IMPORTANT: check the condition of all the parts and replace if damaged.
*The O-ring (**9**) and the filter cartridge (**10**) must always be replaced.*

16.7.2 - Fitting the oil filter supports and covers (TF 200)



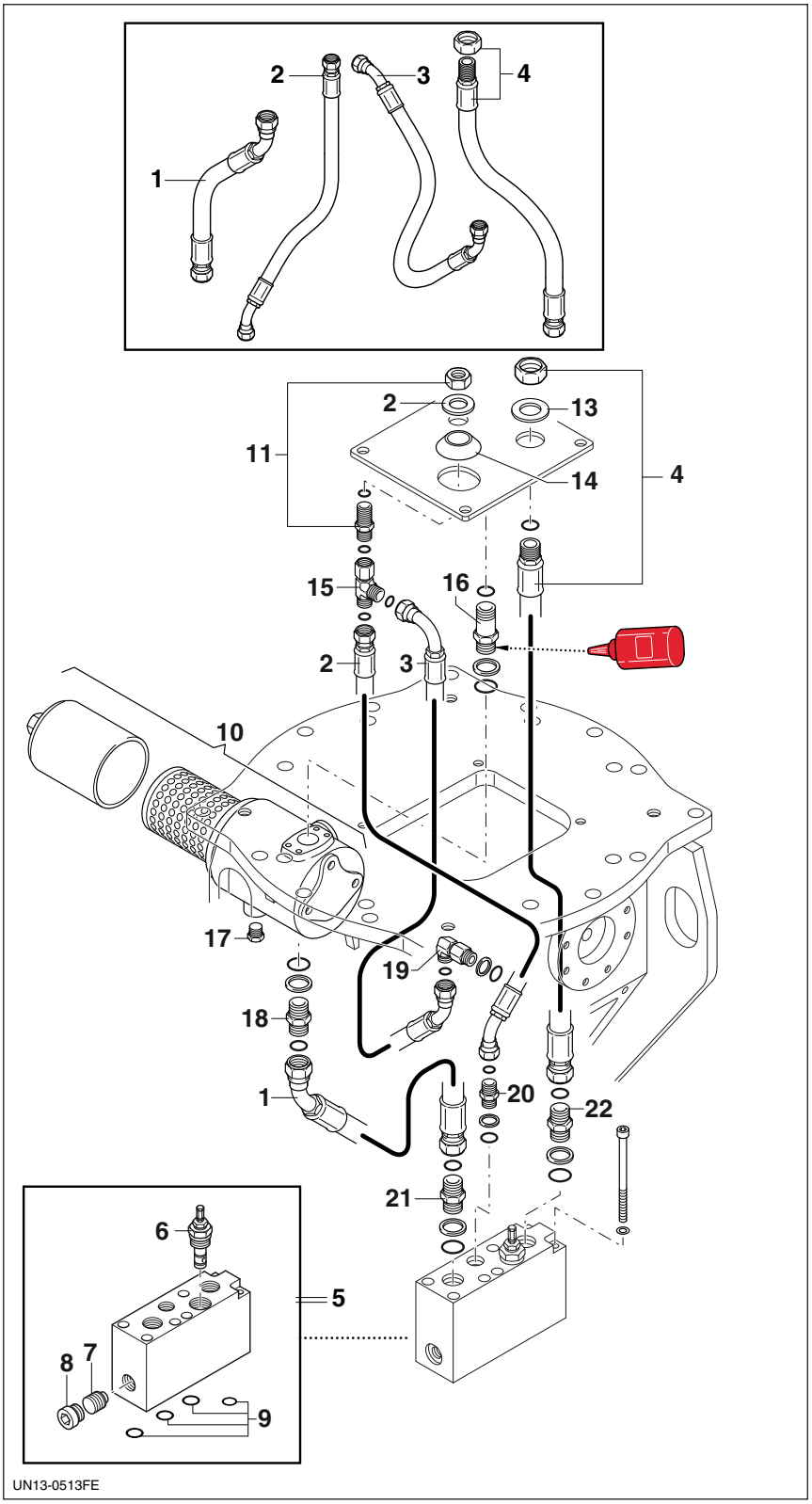
Key

1 - Oil filter cover
2 - Oil filter support U-bolt
3 - Oil filter support corner bracket
4 - Oil filter-bearing corner brackets
5 - Oil filter support
6 - Upper cover
7 - Valve cover
8 - Oil filter fastening plate
9 - Drain line safety cover
10 - Drain line safety cover O-ring

IMPORTANT: always comply with the torque ratings specified for the screws and fittings in the chart ("Tightening torques" - chapter 21).

16.8 - Fitting the hydraulic system (TF 400 - TF 600)

16.8.1 - Fitting the pipelines and the oil filter and valve unit (TF 400 - TF 600) (up to serial n. 2007 31 0446)



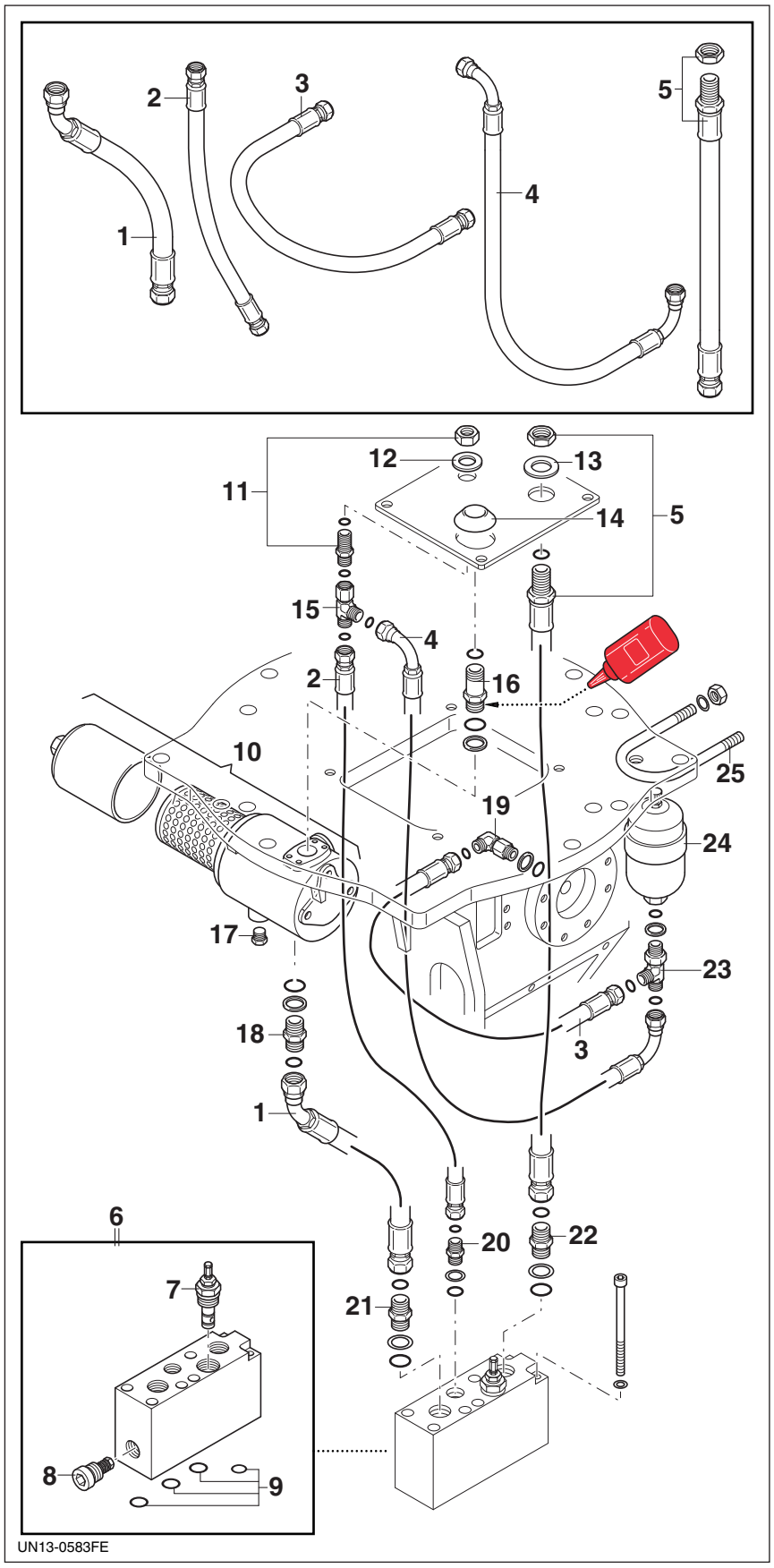
Key

1 - Pressure line hose
2 - Drain line hose
3 - Drain line hose - safety cover
4 - Return line hose
5 - Hydraulic motor valve unit
6 - Counterpressure valve
7 - By-pass valve
8 - Cap
9 - O-ring
10 - Complete oil filter unit
11 - Bulkhead
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Fitting
16 - Fitting
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting

Apply a few drops of fitting sealant to the fitting (**type: Loctite 542**).

IMPORTANT: check the condition of all the parts and replace if damaged.
*The O-ring (**9**) and the filter cartridge (**10**) must always be replaced.*

16.8.2 - Fitting the system with the accumulator (TF 400) (from serial n. 2007 31 0447)



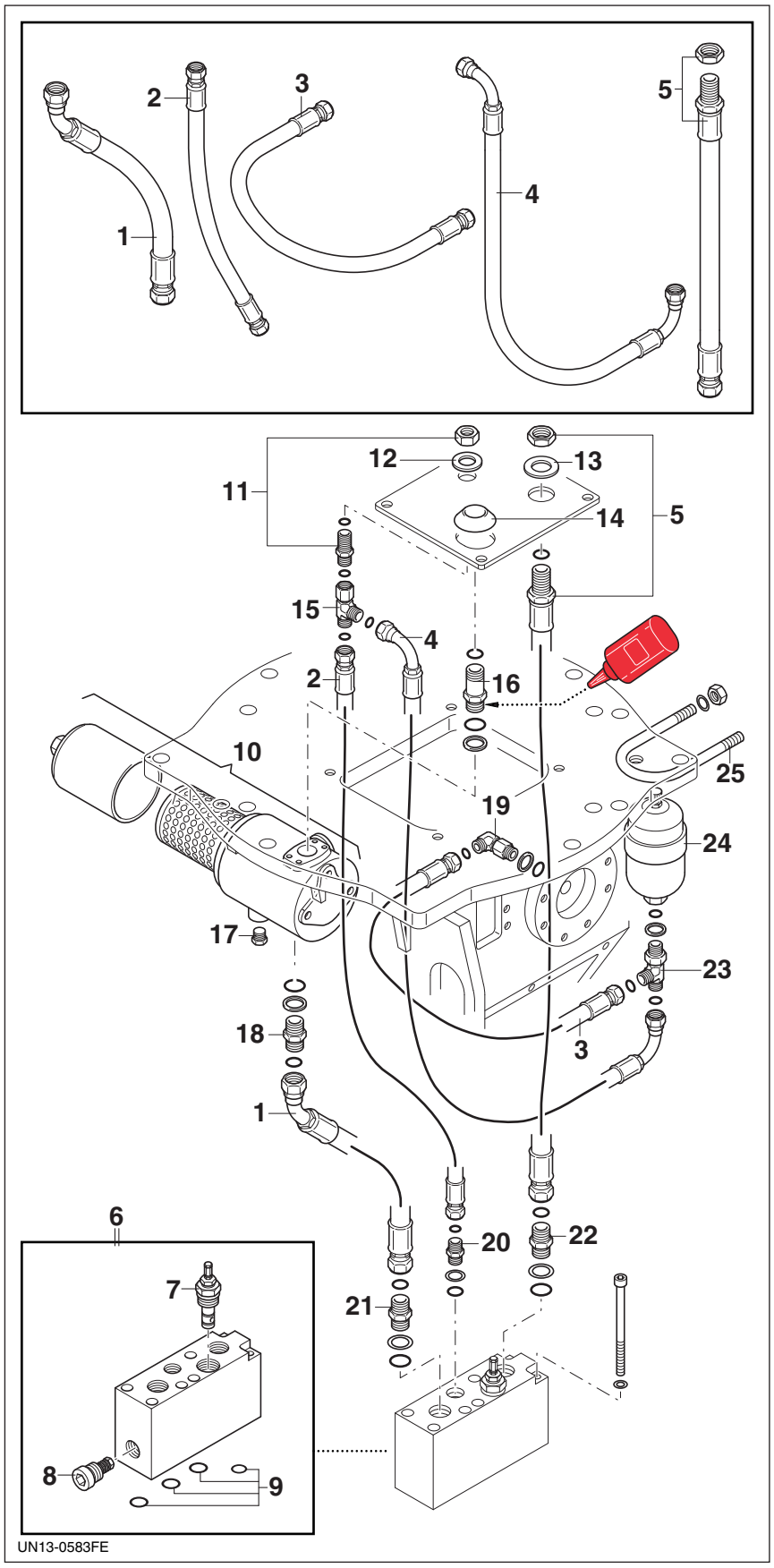
Key

1 - Pressure line hose
2 - Drain line hose
3 - Hose - safety cover
4 - Accumulator hose
5 - Return line hose
6 - Hydraulic motor valve unit
7 - Counterpressure valve
8 - Buffering valve
9 - O-rings
10 - Complete oil filter unit
11 - Bulkhead
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Fitting
16 - Fitting
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Accumulator
25 - Fastening element

Apply a few drops of fitting sealant to the fitting (**type: Loctite 542**).

IMPORTANT: check the condition of all the parts and replace if damaged.
*The O-ring (**9**) and the filter cartridge (**10**) must always be replaced.*

16.8.3 - Fitting the system with the accumulator (TF 600) (from serial n. 2007 31 0448)



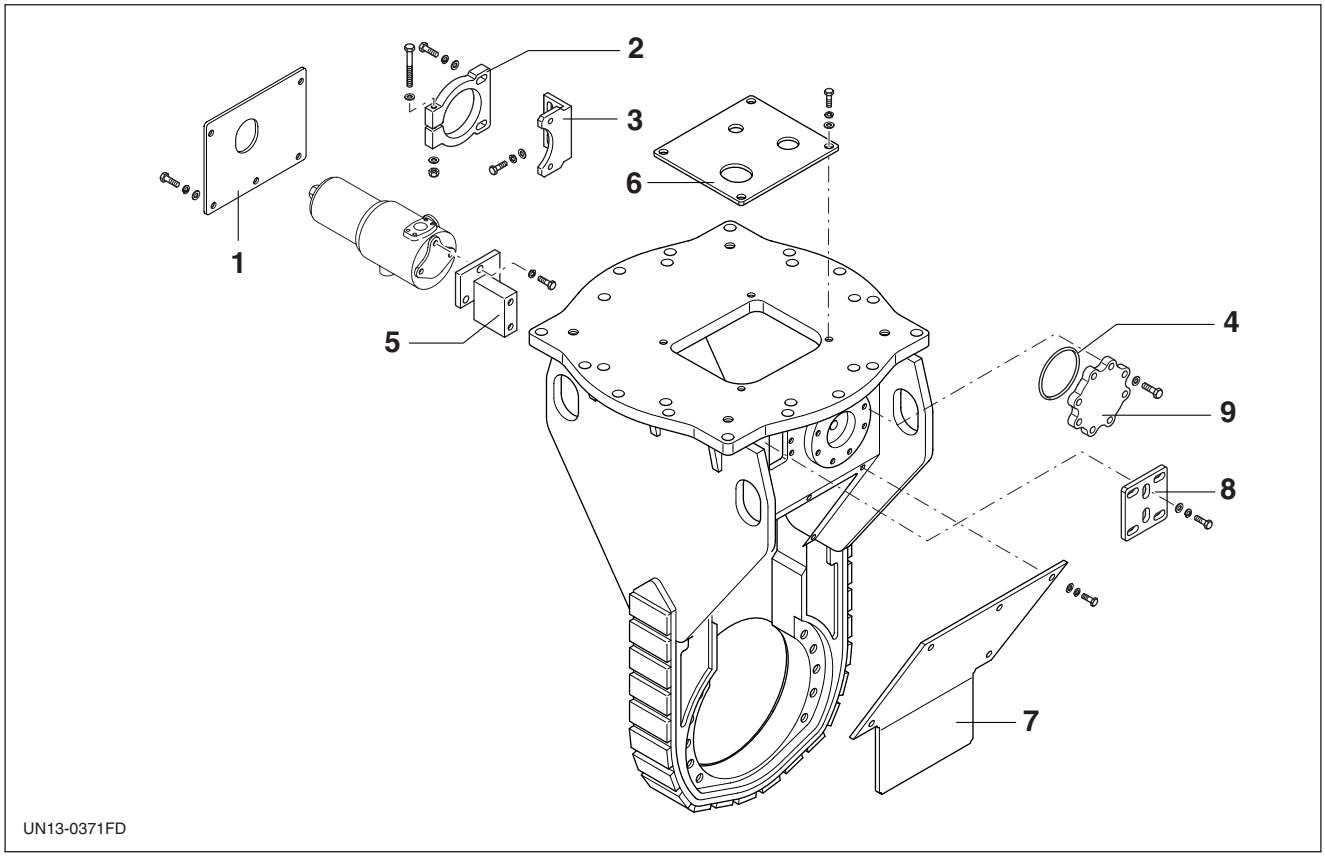
Key

1 - Pressure line hose
2 - Drain line hose
3 - Hose - safety cover
4 - Accumulator hose
5 - Return line hose
6 - Hydraulic motor valve unit
7 - Counterpressure valve
8 - Buffering valve
9 - O-rings
10 - Complete oil filter unit
11 - Bulkhead
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Fitting
16 - Fitting
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Accumulator
25 - Fastening element

Apply a few drops of fitting sealant to the fitting (**type: Loctite 542**).

IMPORTANT: check the condition of all the parts and replace if damaged.
*The O-ring (**9**) and the filter cartridge (**10**) must always be replaced.*

16.8.4 - Fitting the oil filter supports and covers (TF 400)



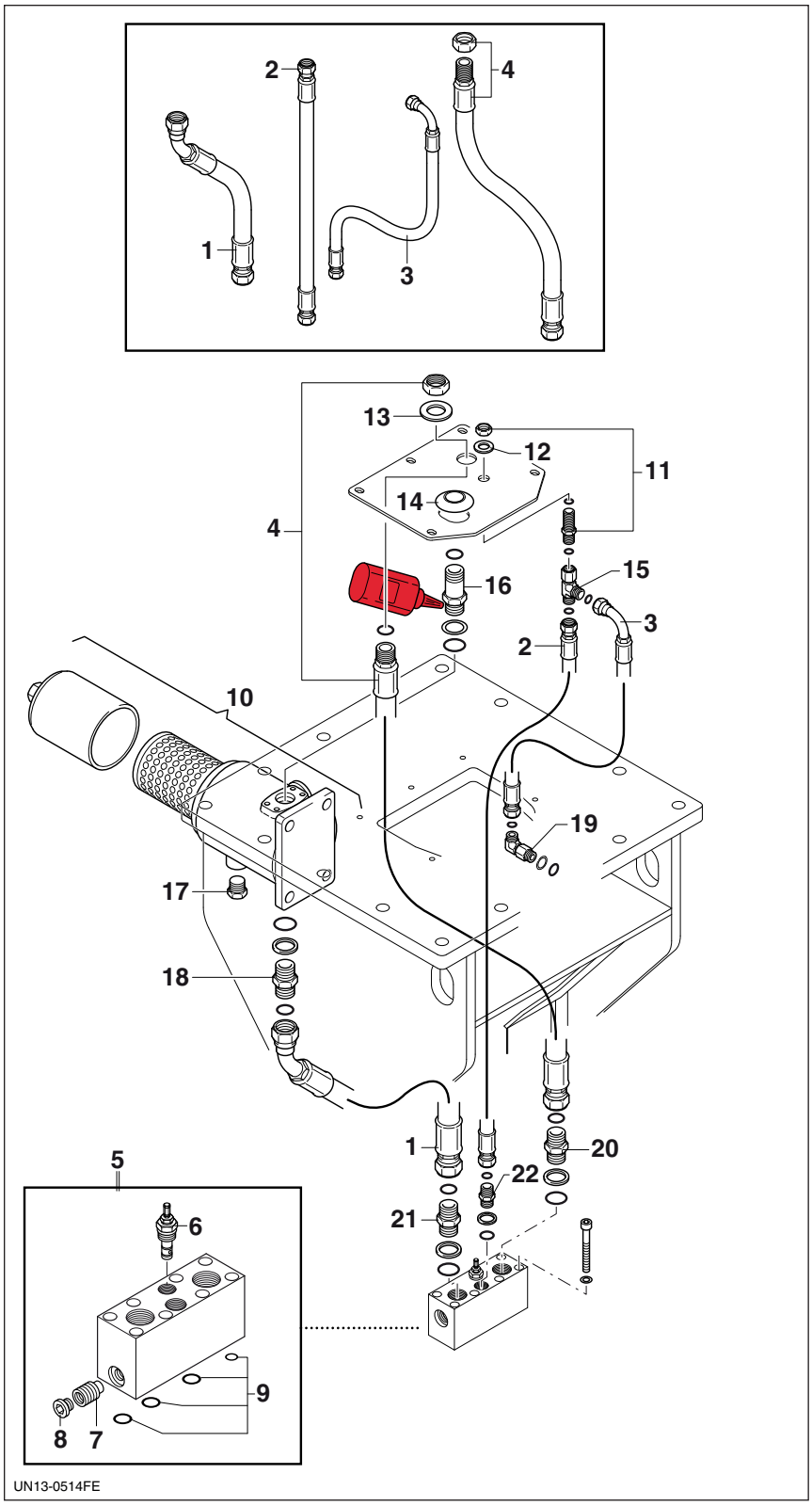
Key

1 - Oil filter cover
2 - Oil filter support clamp
3 - Oil filter support corner bracket
4 - Drain line safety cover O-ring
5 - Oil filter support
6 - Upper cover
7 - Valve cover
8 - Oil filter fastening plate
9 - Drain line safety cover

IMPORTANT: always comply with the torque ratings specified for the screws and fittings in the chart ("Tightening torques" - chapter 21).

16.9 - Fitting the hydraulic system (TF 800)

16.9.1 - Fitting the pipelines and the valve and oil filter unit (TF 800) (up to serial n. 2007 31 0439)



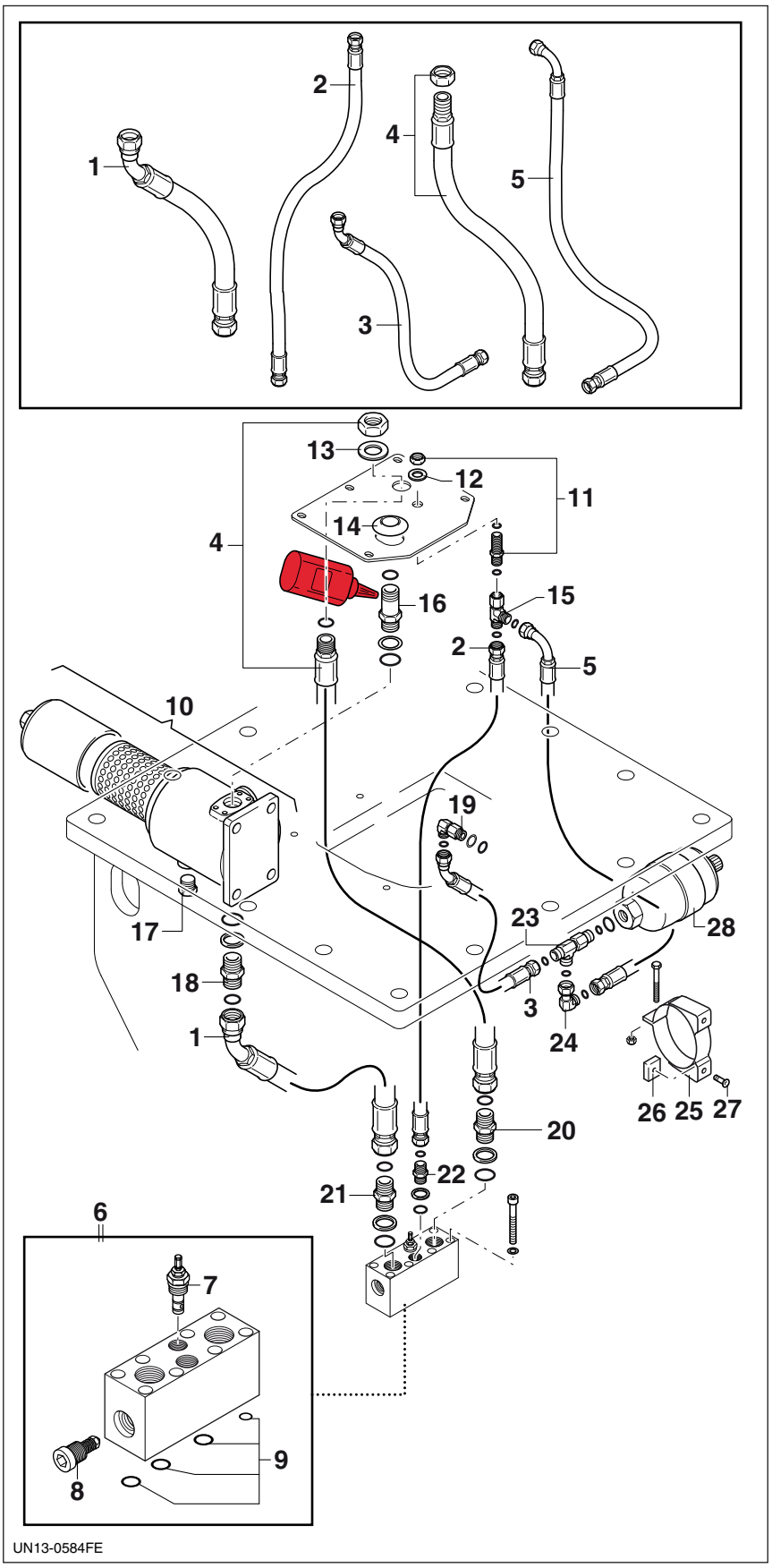
Key

1 - Pressure line hose
2 - Drain line hose
3 - Drain line hose - safety cover
4 - Return line hose
5 - Hydraulic motor valve unit
6 - Counterpressure valve
7 - By-pass valve
8 - Cap
9 - O-ring
10 - Complete oil filter unit
11 - Bulkhead
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Fitting
16 - Fitting
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting

Apply a few drops of fitting sealant to the fitting (**type: Loctite 542**).

IMPORTANT: check the condition of all the parts and replace if damaged.
*The O-ring (**9**) and the filter cartridge (**10**) must always be replaced.*

16.9.2 - Fitting the system with the accumulator (TF 800 - from serial n. 2007 31 0440)



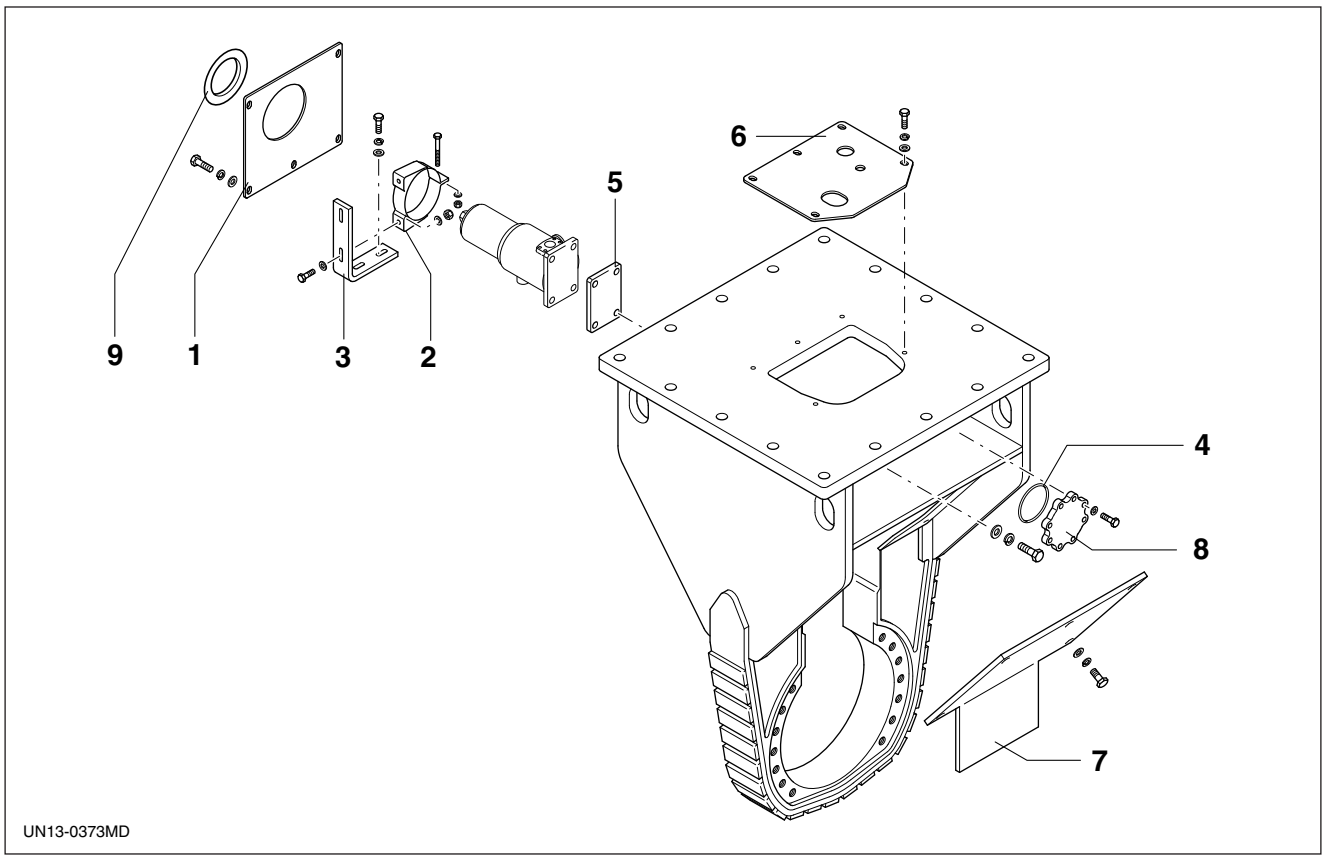
Key

1 - Pressure line hose
2 - Drain line hose
3 - Hose - safety cover
4 - Return line hose
5 - Accumulator hose
6 - Hydraulic motor valve unit
7 - Counterpressure valve
8 - Buffering valve
9 - O-rings
10 - Complete oil filter unit
11 - Bulkhead
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Fitting
16 - Bulkhead
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Fitting
25 - Accumulator strap clamp
26 - Plate
27 - Screw
28 - Accumulator

Apply a few drops of fitting sealant to the fitting (**type: Loctite 542**).

IMPORTANT: check the condition of all the parts and replace if damaged.
*The O-ring (**9**) and the filter cartridge (**10**) must always be replaced.*

16.9.3 - Fitting the oil filter supports and covers (TF 800)



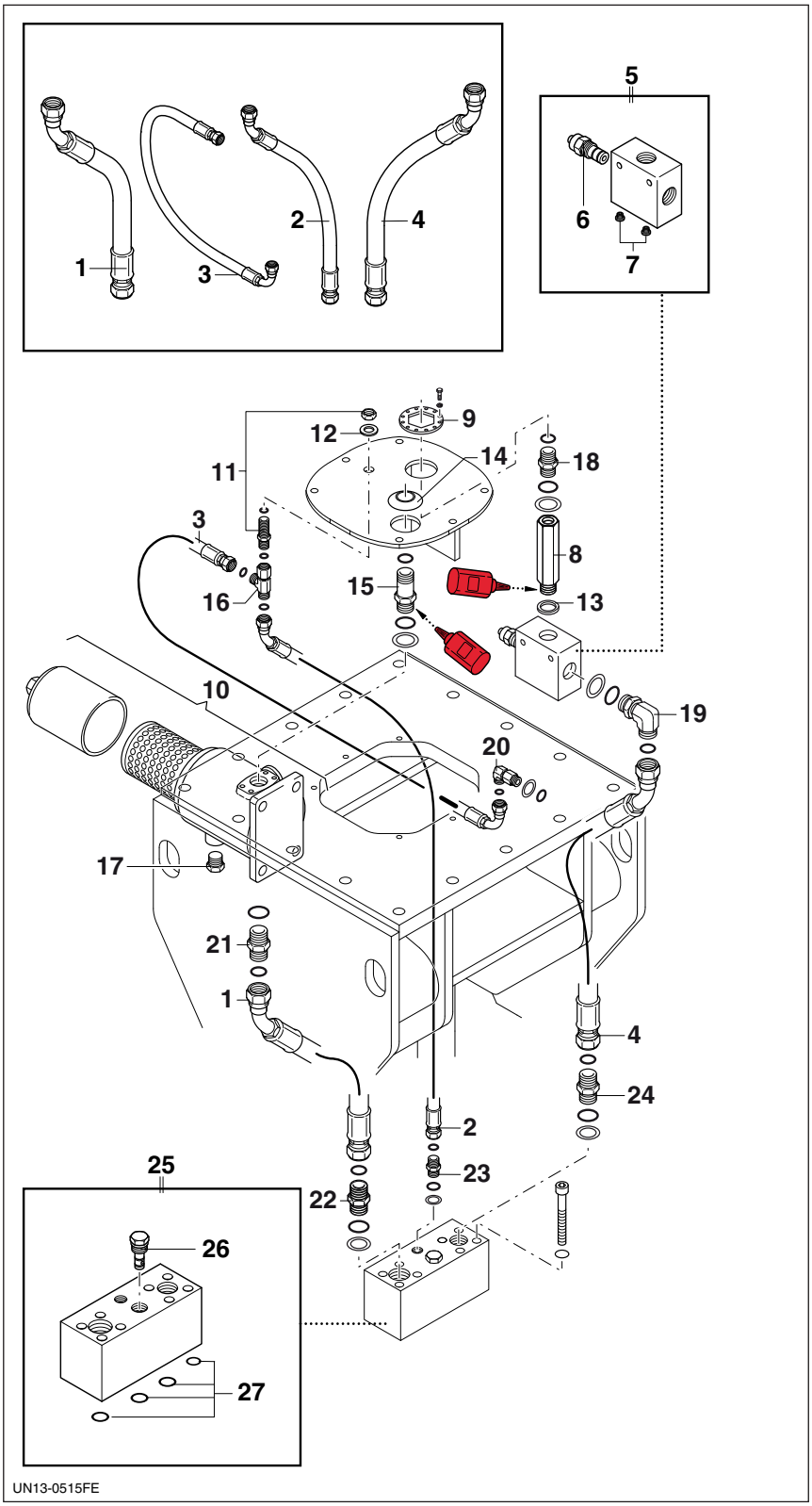
Key

1 - Oil filter cover
2 - Oil filter support clamp
3 - Oil filter support corner bracket
4 - Drain line safety cover O-ring
5 - Oil filter support
6 - Upper cover
7 - Valve cover
8 - Drain line safety cover
9 - Filter cover ring

IMPORTANT: always comply with the torque ratings specified for the screws and fittings in the chart ("Tightening torques" - chapter 21).

16.10 - Fitting the hydraulic system (TF 1000)

16.10.1 - Fitting the pipelines, and the valve and oil filter units (TF 1000) (up to serial n. 2007 31 0445)



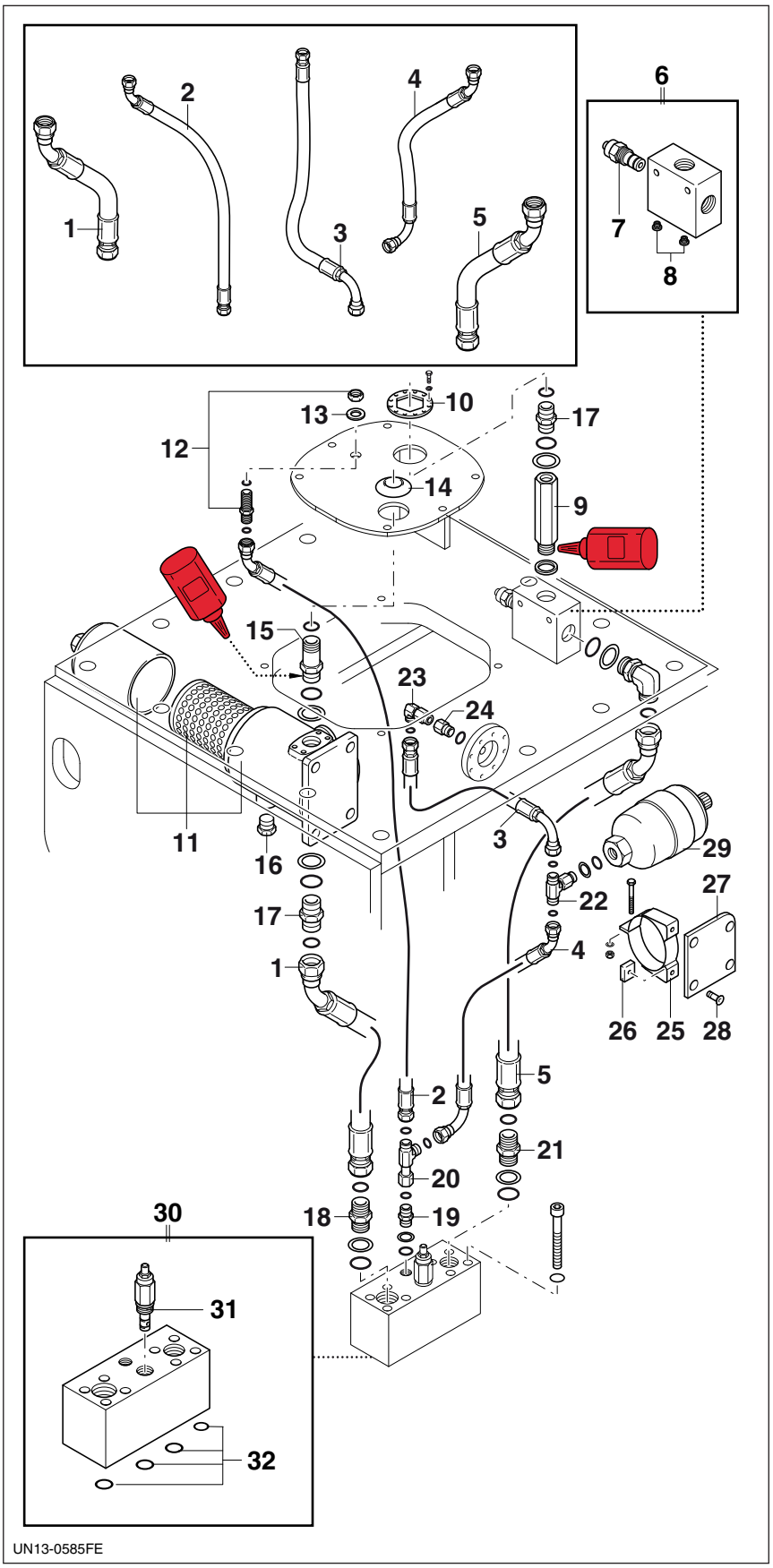
Key

1 - Pressure line hose
2 - Drain line hose
3 - Drain line hose - safety cover
4 - Return line hose
5 - Counterpressure valve unit
6 - Counterpressure valve
7 - Caps
8 - One-way valve
9 - Clamping flange
10 - Complete oil filter unit
11 - Bulkhead
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Bulkhead
16 - Fitting
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Fitting
25 - By-pass valve unit
26 - By-pass valve
27 - O-ring

Apply a few drops of fitting sealant to the fitting (**type: Loctite 542).**

IMPORTANT: check the condition of all the parts and replace if damaged.
*The O-ring (**27**) and the filter cartridge (**10**) must always be replaced.*

16.10.2 - Fitting the system with the accumulator (TF 1000 - from serial n. 2007 31 0446)



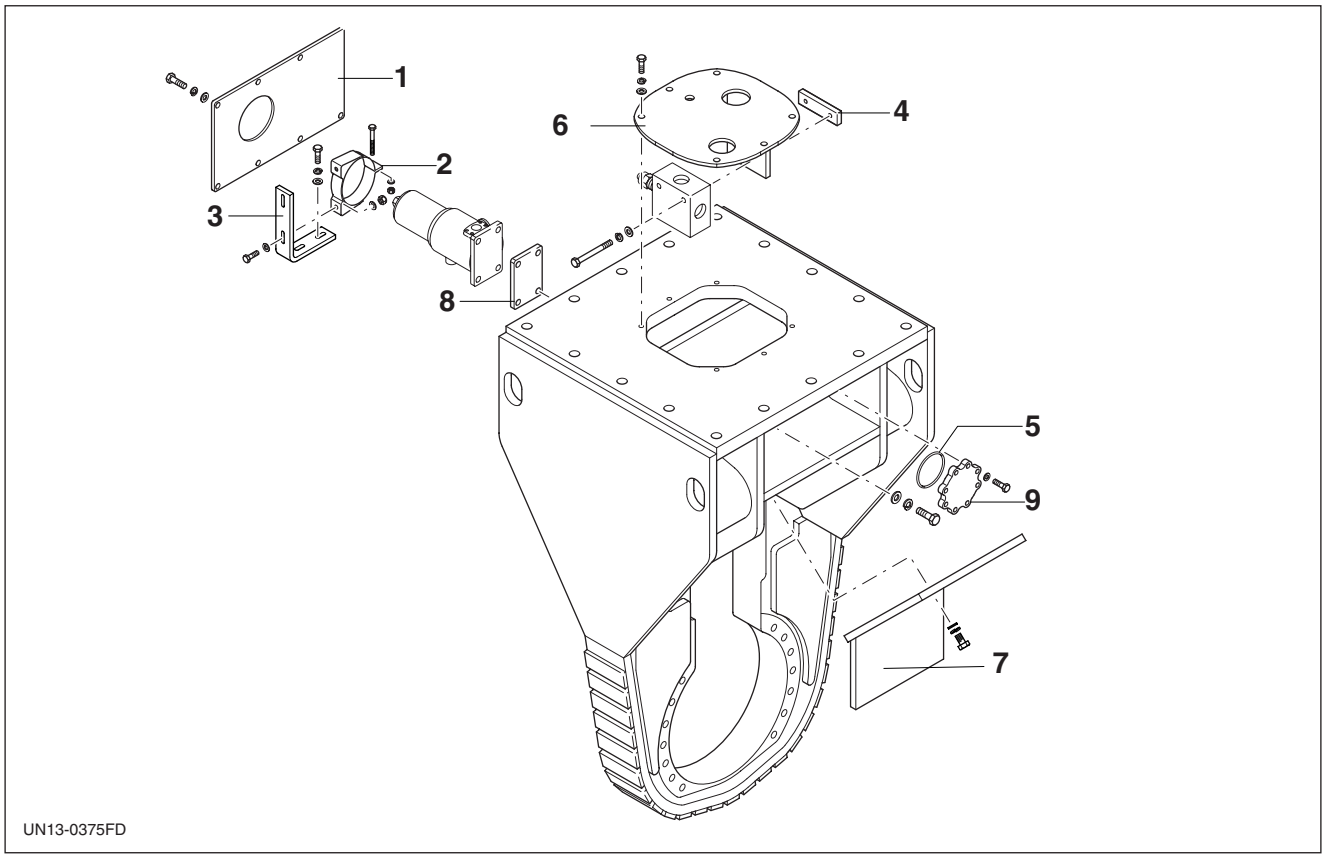
Key

1 - Pressure line hose
2 - Drain line hose
3 - Hose - safety cover
4 - Accumulator hose
5 - Return line hose
6 - Counterpressure valve unit
7 - Counterpressure valve
8 - Caps
9 - One-way valve
10 - Clamping flange
11 - Complete filter unit
12 - Bulkhead
13 - Washer
14 - Washer
15 - Bulkhead
16 - Cap
17 - Fitting
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Stud bolt
25 - Accumulator strap clamp
26 - Plate
27 - Plate
28 - Screw
29 - Accumulator
30 - By-pass valve unit
31 - Buffering valve
32 - O-rings

Apply a few drops of fitting sealant to the fitting (**type: Loctite 542**).

IMPORTANT: check the condition of all the parts and replace if damaged.
*The O-ring (**32**) and the filter cartridge (**11**) must always be replaced.*

16.10.3 - Fitting the oil filter supports, covers and counterpressure valve unit (TF 1000)



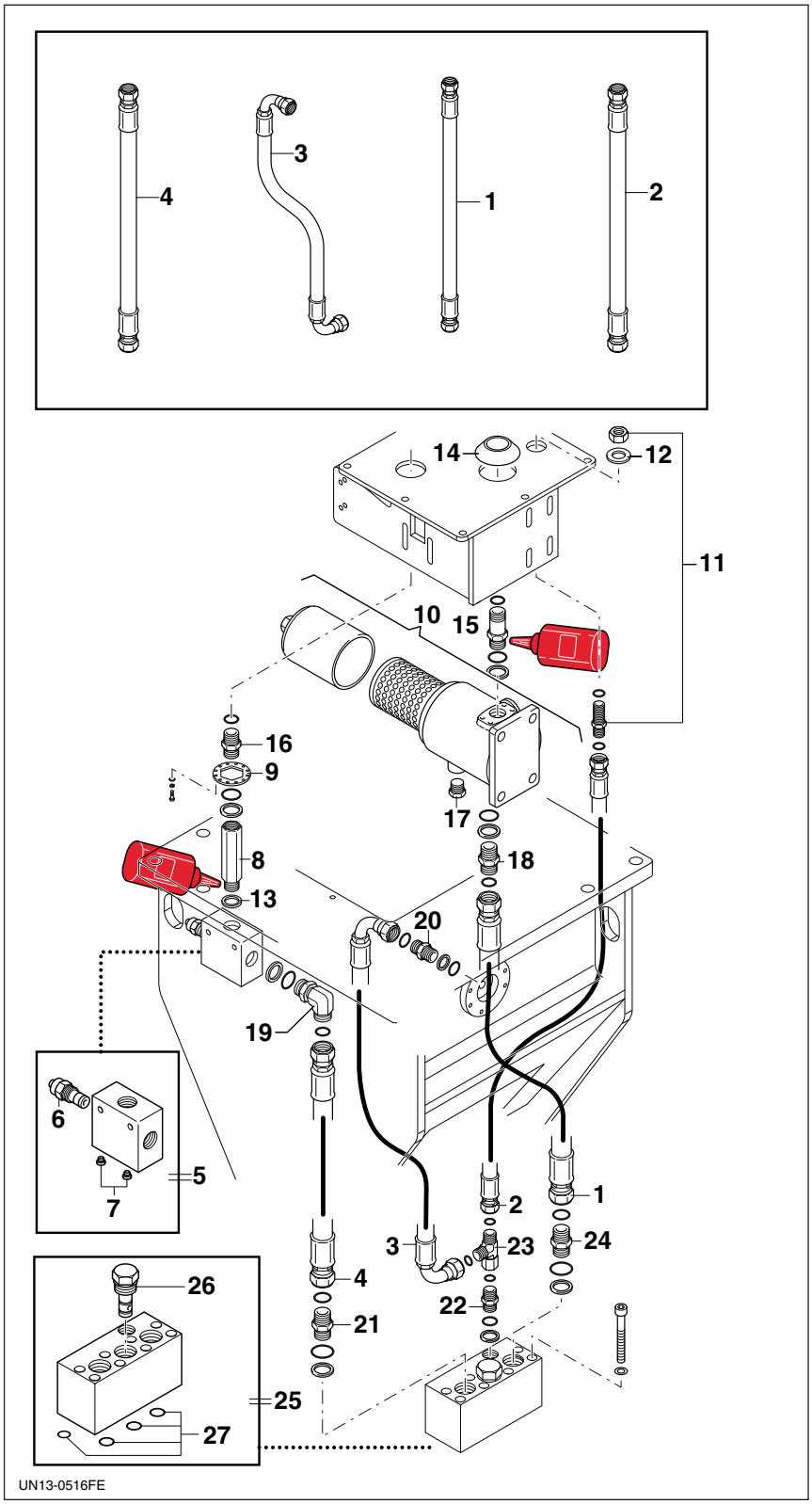
Key

1 - Oil filter cover
2 - Oil filter support clamp
3 - Oil filter support corner bracket
4 - Oil filter fastening plate
5 - Drain line safety cover O-ring
6 - Upper cover
7 - Valve cover
8 - Oil filter support
9 - Drain line safety cover

IMPORTANT: always comply with the torque ratings specified for the screws and fittings in the chart ("Tightening torques" - chapter 21).

16.11 - Fitting the hydraulic system (TF 2000)

16.11.1 - Fitting the pipelines, and the valve and oil filter units (TF 2000) (up to serial n. 2007 31 0424)



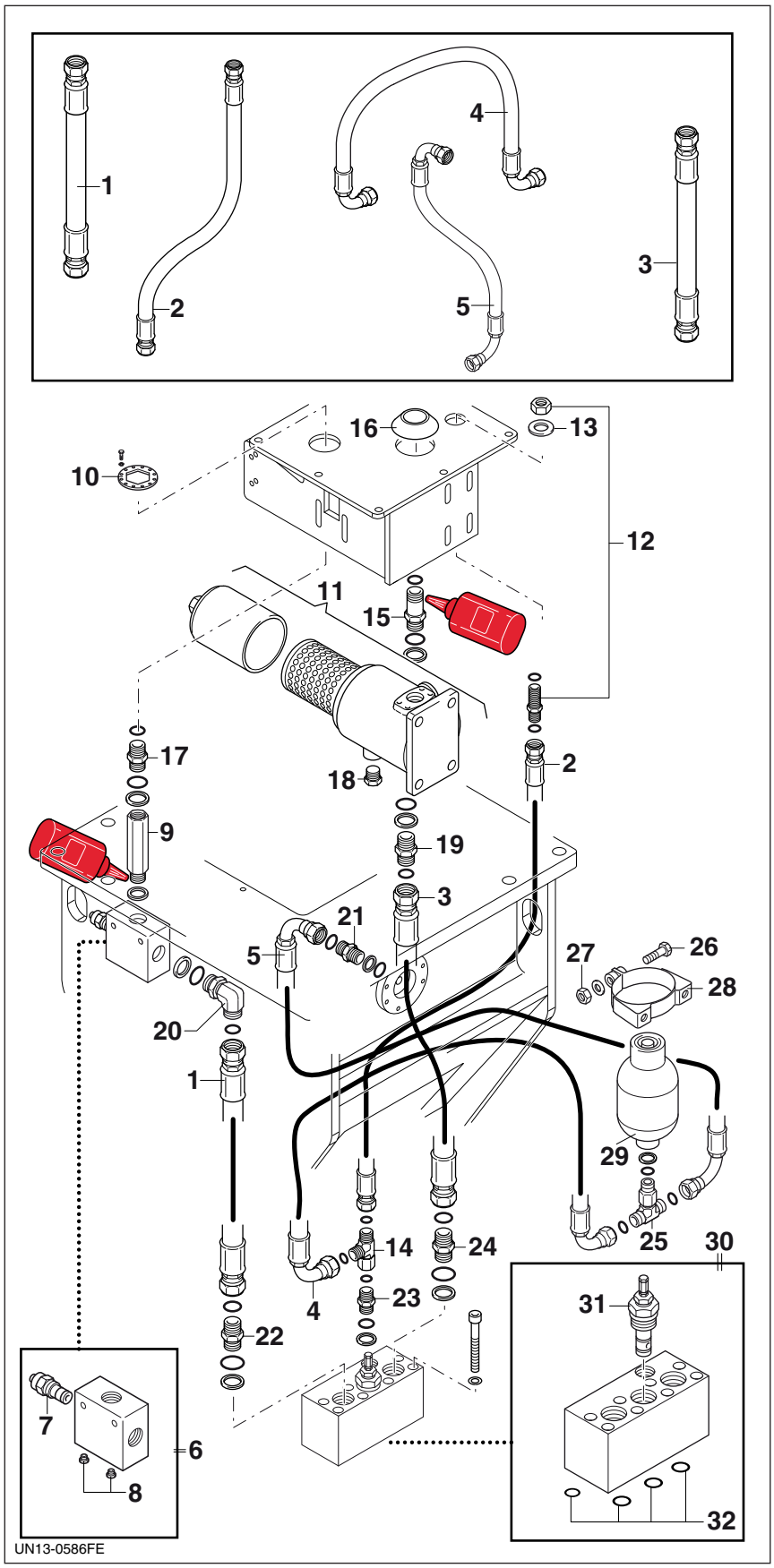
Key

1 - Pressure line hose
2 - Drain line hose
3 - Drain line hose - safety cover
4 - Return line hose
5 - Counterpressure valve unit
6 - Counterpressure valve
7 - Caps
8 - One-way valve
9 - Clamping flange
10 - Complete oil filter unit
11 - Bulkhead
12 - Washer
13 - Washer
14 - Hole plug ring
15 - Bulkhead
16 - Fitting
17 - Cap
18 - Fitting
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Fitting
25 - By-pass valve unit
26 - By-pass valve
27 - O-ring

Apply a few drops of fitting sealant to the fitting (**type: Loctite 542**).

IMPORTANT: check the condition of all the parts and replace if damaged.
*The O-ring (**27**) and the filter cartridge (**10**) must always be replaced.*

16.11.2 - Fitting the system with the accumulator (TF 2000) (from serial n. 2007 31 0425)



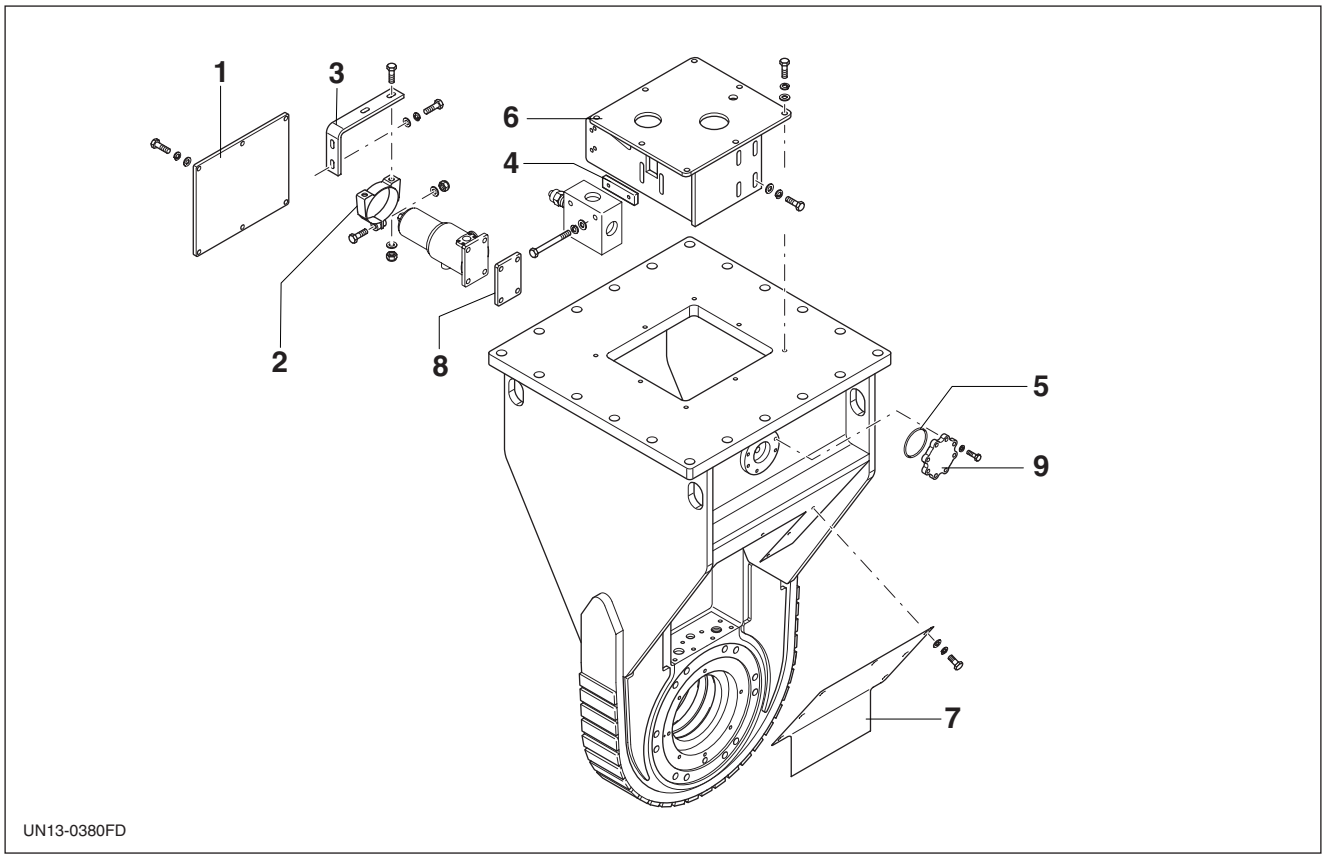
Key

1 - Return line hose
2 - Drain line hose
3 - Pressure line hose
4 - Accumulator hose
5 - Hose - safety cover
6 - Counterpressure valve unit
7 - Counterpressure valve
8 - Caps
9 - One-way valve
10 - Clamping flange
11 - Complete filter unit
12 - Bulkhead
13 - Washer
14 - Fitting
15 - Bulkhead
16 - Hole plug ring
17 - Fitting
18 - Cap
19 - Fitting
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Fitting
25 - Fitting
26 - Screw
27 - Nut
28 - Accumulator strap clamp
29 - Accumulator
30 - By-pass valve unit
31 - Buffering valve
32 - O-rings

Apply a few drops of fitting sealant to the fitting (**type: Loctite 542**).

IMPORTANT: check the condition of all the parts and replace if damaged.
*The O-ring (**33**) and the filter cartridge (**11**) must always be replaced.*

16.11.3 - Fitting the oil filter supports, covers and counterpressure valve unit (TF 2000)



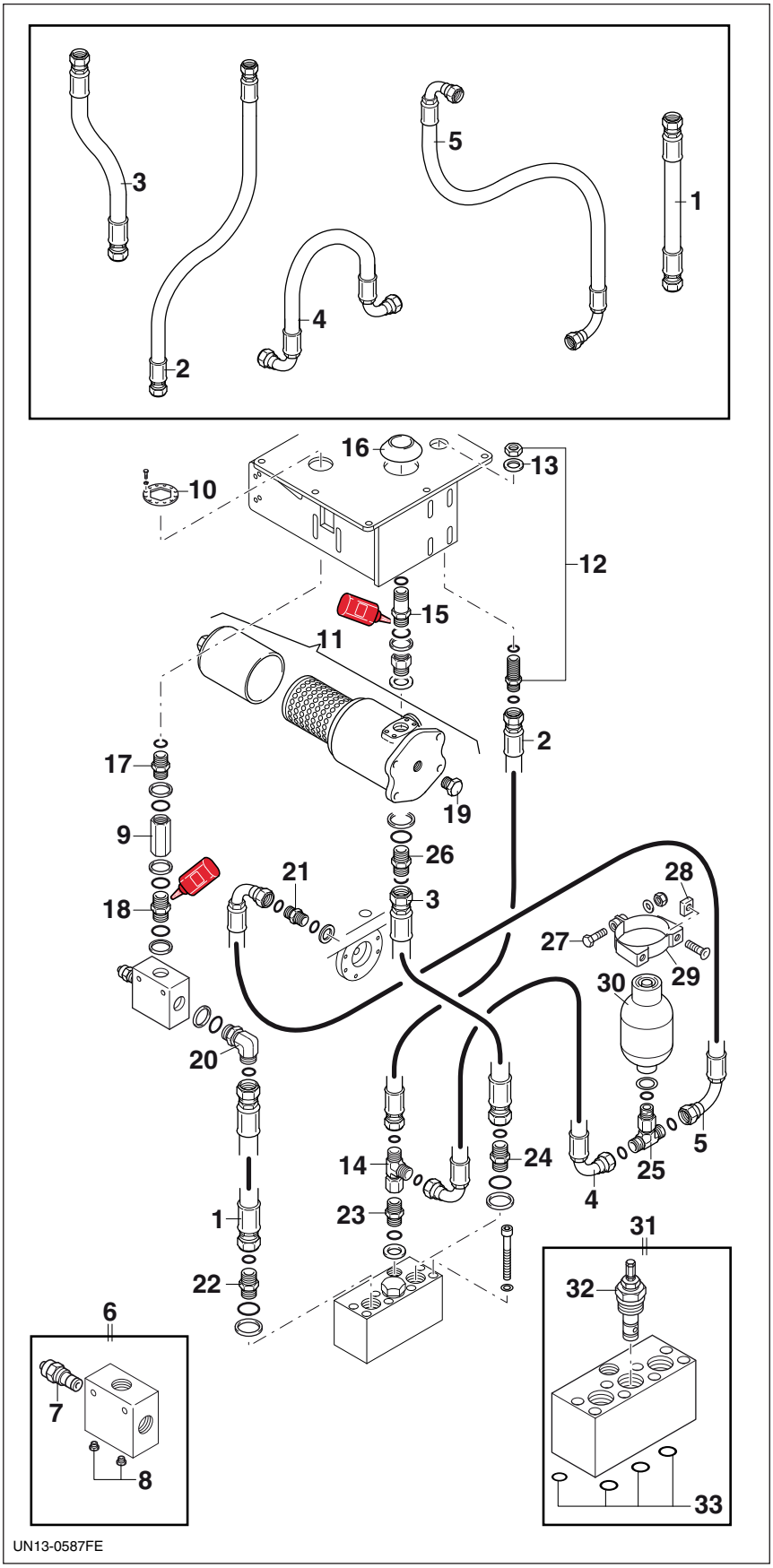
Key

1 - Oil filter cover
2 - Oil filter support clamp
3 - Oil filter support corner brackets
4 - Oil filter fastening plate
5 - Drain line safety cover O-ring
6 - Upper cover
7 - Valve cover
8 - Oil filter support
9 - Drain line safety cover

IMPORTANT: always comply with the torque ratings specified for the screws and fittings in the chart ("Tightening torques" - chapter 21).

16.12 - Fitting the hydraulic system (TF 3000)

16.12.1 - Fitting the pipelines, and the valve and oil filter units (TF 3000 with accumulator)



UN13-0587FE

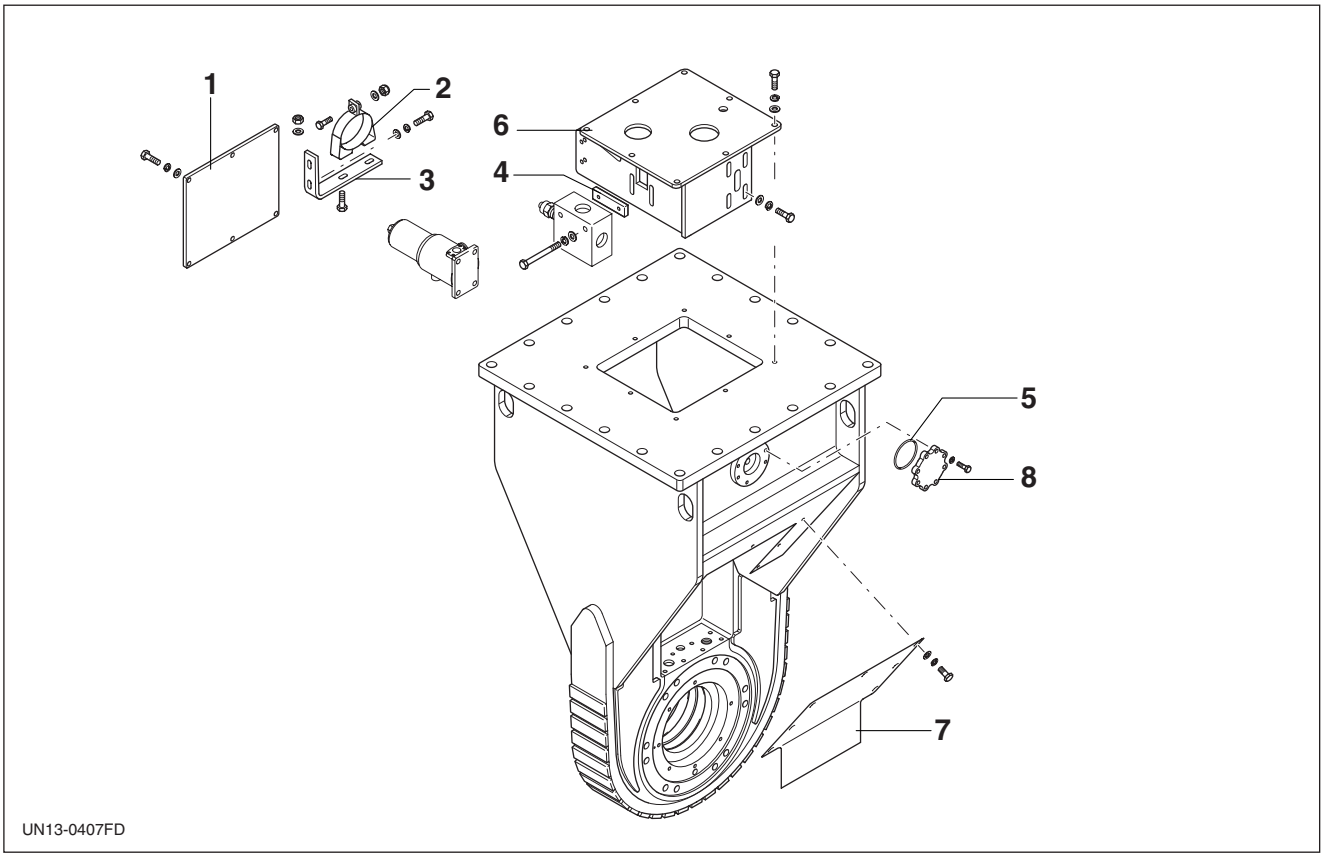
Key

1 - Return line hose
2 - Drain line hose
3 - Pressure line hose
4 - Accumulator hose
5 - Hose - safety cover
6 - Counterpressure valve unit
7 - Counterpressure valve
8 - Caps
9 - One-way valve
10 - Clamping flange
11 - Complete filter unit
12 - Bulkhead
13 - Washer
14 - Fitting
15 - Bulkhead
16 - Hole plug ring
17 - Fitting
18 - Fitting
19 - Cap
20 - Fitting
21 - Fitting
22 - Fitting
23 - Fitting
24 - Fitting
25 - Fitting
26 - Fitting
27 - Screw
28 - Plate
29 - Accumulator strap clamp
30 - Accumulator
31 - By-pass valve unit
32 - Buffering valve
33 - O-rings

Apply a few drops of fitting sealant to the fitting (**type: Loctite 542**).

*IMPORTANT: check the condition of all the parts and replace if damaged. The O-ring (**33**) and the filter cartridge (**11**) must always be replaced.*

16.12.2 - Fitting the oil filter supports, covers and counterpressure valve unit (TF 3000)



Key

1 - Oil filter cover
2 - Oil filter support clamp
3 - Oil filter support corner brackets
4 - Oil filter fastening plate
5 - Drain line safety cover O-ring
6 - Upper cover
7 - Valve cover
8 - Drain line safety cover

IMPORTANT: always comply with the torque ratings specified for the screws and fittings in the chart ("Tightening torques" - chapter 21).

17 - REFILLING

17.1 - Refilling (TF 200 - TF 400 - TF 600 - TF 800 - TF 1000)

a - Remove the valve cover (**1**).

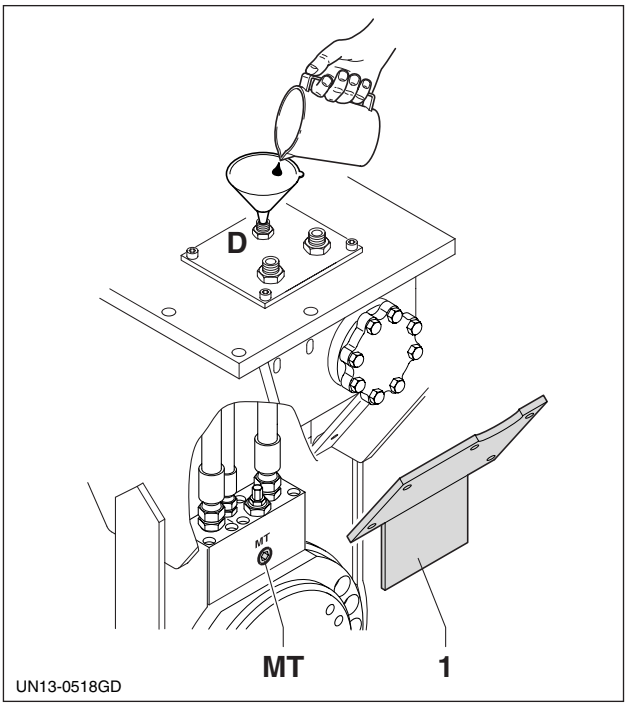
b - Remove the cap marked "**MT**".

c - Top up the oil via the drainage line "**D**" until it comes out the hole marked "**MT**".

d - Refit the cap marked "**MT**" and the motor valve cover (**1**).

IMPORTANT: use oil with the characteristics stated in the "Lubricants" chart - chapter 21.

APPROXIMATE AMOUNT REQUIRED FOR REFILLING	
Machine model	**Quantity (kg)**
TF 200	0,4
TF 400	0,95
TF 600	2,1
TF 800	3



17.2 - Refilling (TF 1000 - TF 2000 - TF 3000)

a - Remove the oil filter cover (**1**).

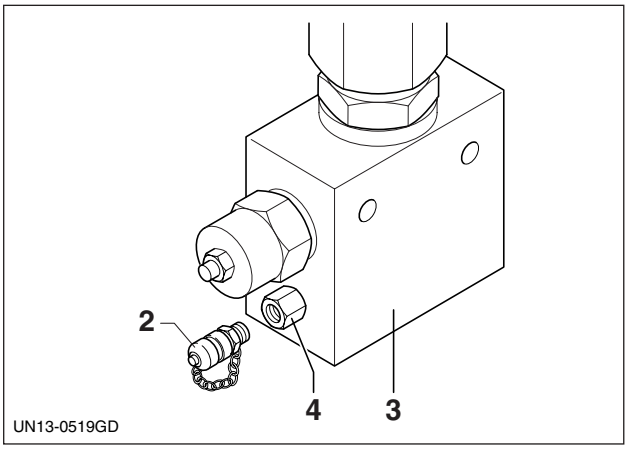
b - Remove the pressure fitting (**2**) from the hydraulic motor control valve unit (**3**).

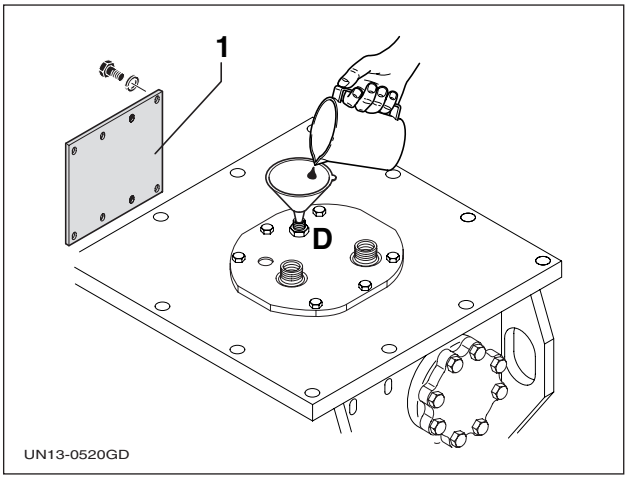
c - Top up the oil via the drainage line "**D**" until it comes out the hole in the fitting (**4**).

d - Refit the pressure fitting (**2**) and the oil filter cover (**1**).

IMPORTANT: use oil with the characteristics stated in the "Lubricants" chart - chapter 21.

APPROXIMATE AMOUNT REQUIRED FOR REFILLING	
Machine model	**Quantity (kg)**
TF 1000	4,5
TF 2000	6
TF 3000	9





18 - TESTING

The (Simex) machine may be inspected on the test bench or fitted on the prime mover.

IMPORTANT: testing must be carried out with the drums detached.

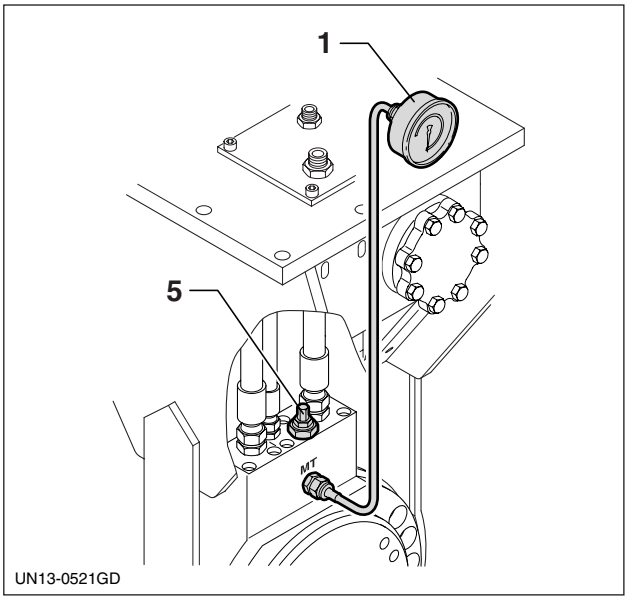
18.1 - Testing (TF 200 - TF 400 - TF 600 - TF 800)

a - Fit a precision pressure gauge (**1**) with a scale of 0 to 60 bar onto the valve unit hole ("**MT**").

b - Fit a precision pressure gauge (**2**) with a scale of 0 to 16 bar in the pipeline of the drain line (**D**) already connected to the tank.

c - Fit a precision pressure gauge (**3**) with a scale of 0 to 60 bar into the pipeline of the return line (**T**).

d - Fit an adjustable throttle check valve (**4**) on the return line "**T**", downstream of the pressure gauge's pressure fitting (**3**).



Beware of moving parts and use appropriate protection.

e - Power up the motor slowly and gradually until the hydraulic oil temperature reaches ≥ 40 °C.

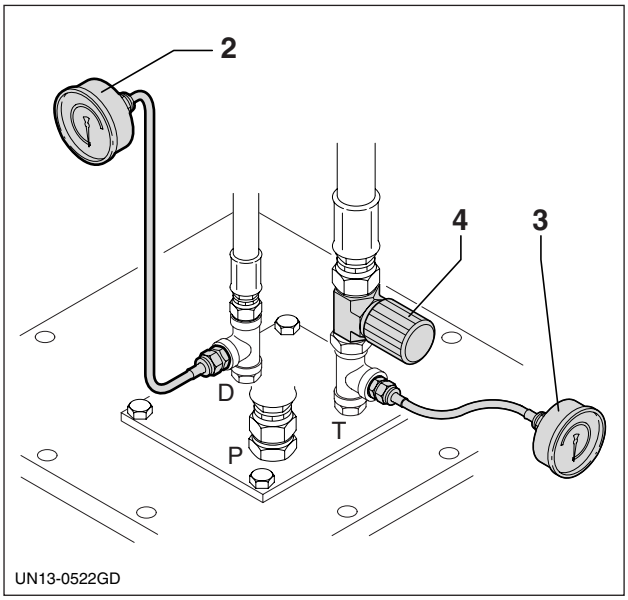
f - Using a flow meter, set the oil flow to the rate (Q l/min) stated in the table below.

g - Check there are no leaks.

h - Turn the throttle check valve (**4**) until the pressure gauge (**3**) reads 8 ± 1 bar.

i - Check that the drain line pressure gauge (**2**) never exceeds a pressure of 1 bar.

l - Adjust the counterpressure valve (**5**) until the pressure gauge (**1**) shows the required level (cP) has been reached (see rate specified in chart below).



Machine model	**Rate of oil flow at flow meter for counterpressure** (cP) **rate calculation purposes**(**Q** l/min)	**Counterpressure rate with o il flow rate** (Q) (**cP** bar)
TF 200	60 ± 5	22 ± 1
TF 400	110 ± 5	26 ± 1
TF 600	125 ± 5	30 ± 1
TF 800	160 ± 5	35 ± 1

- During work, the prime mover's oil flow rate must be within the range shown in the chart below.

- The operating pressure is limited by the main valve fitted on the prime mover and must be within the range shown in the chart below.

Machine model	**Prime mover oil flow** (l/min)	**Prime mover operating pressure** (bar)
TF 200	45 ÷ 75	200 ÷ 350
TF 400	60 ÷ 105	200 ÷ 350
TF 600	80 ÷ 145	200 ÷ 350
TF 800	100 ÷ 180	200 ÷ 350

IMPORTANT: the maximum hydraulic power applicable (HP - kW) must never exceed the rate specified in chart below.

- Calculation example: $\frac{\text{Flow (l/min) x Pressure (bar)}}{450}$ = Power (HP) (HP/1.36 = Power in kW)

Machine model	**Maximum hydraulic power**	
	HP	kW
TF 200	34	25
TF 400	47	35
TF 600	64	47
TF 800	80	59

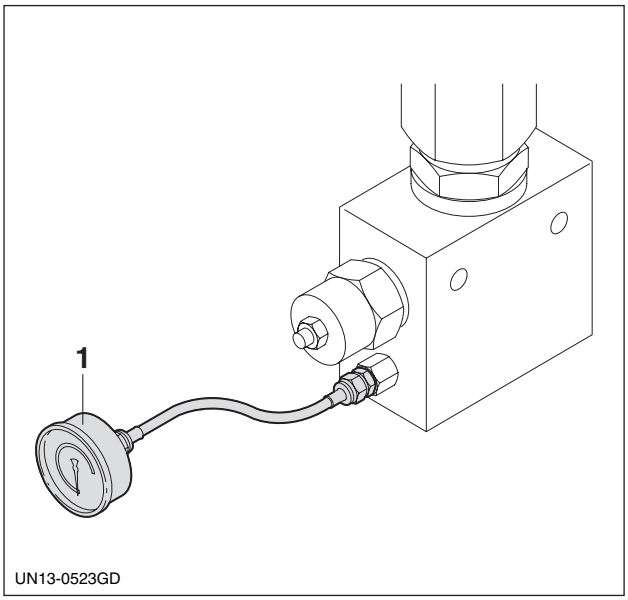
18.2 - Testing (TF 1000 - TF 2000 - TF 3000)

a - Fit a precision pressure gauge (**1**) with a scale of 0 to 60 bar in the pressure fitting hole in the valve unit.

b - Fit a precision pressure gauge (**2**) with a scale of 0 to 16 bar in the pipeline of the drain line (**D**) already connected to the tank.

c - Fit a precision pressure gauge (**3**) with a scale of 0 to 60 bar into the pipeline of the return line (**T**).

d - Fit an adjustable throttle check valve (**4**) on the return line "**T**", downstream of the pressure gauge's pressure fitting (**3**).



Beware of moving parts and use appropriate protection.

e - Power up the motor slowly and gradually until the hydraulic oil temperature reaches ≥ 40 °C.

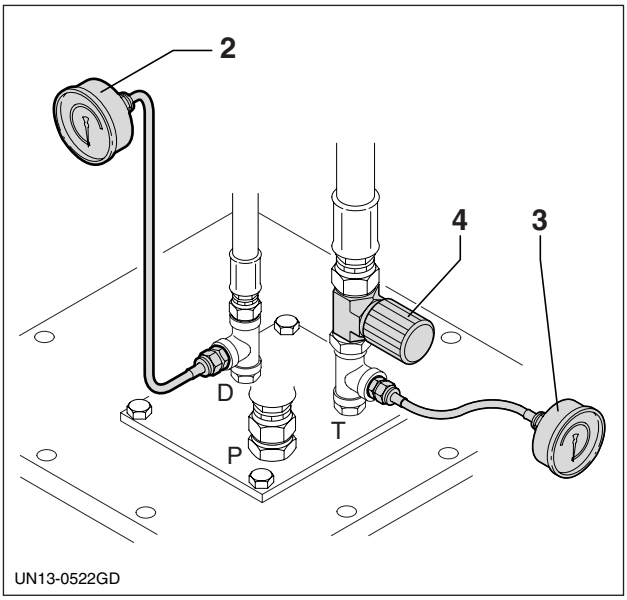
f - Using a flow meter, set the oil flow to the rate (Q l/min) stated in the table below.

g - Check there are no leaks.

h - Turn the throttle check valve (**4**) until the pressure gauge (**3**) reads 8 ± 1 bar.

i - Check that the drain line pressure gauge (**2**) never exceeds a pressure of 1 bar.

l - Adjust the counterpressure valve (**4**) until the pressure gauge (**1**) shows the required level (cP) has been reached (see rate specified in chart below).



Machine model	Rate of oil flow at flow meter for counterpressurer ate calculation purposes (cP) (**Q** l/min)	Counterpressure rate with oil flow rate (Q) (**cP** bar)
TF 1000	160 ± 5	25 ± 1
TF 2000	200 ± 5	24 ± 1
TF 3000	270 ± 5	26 ± 1

- During work, the prime mover's oil flow rate must be within the range shown in the chart below.

- The operating pressure is limited by the main valve fitted on the prime mover and must be within the range shown in the chart below.

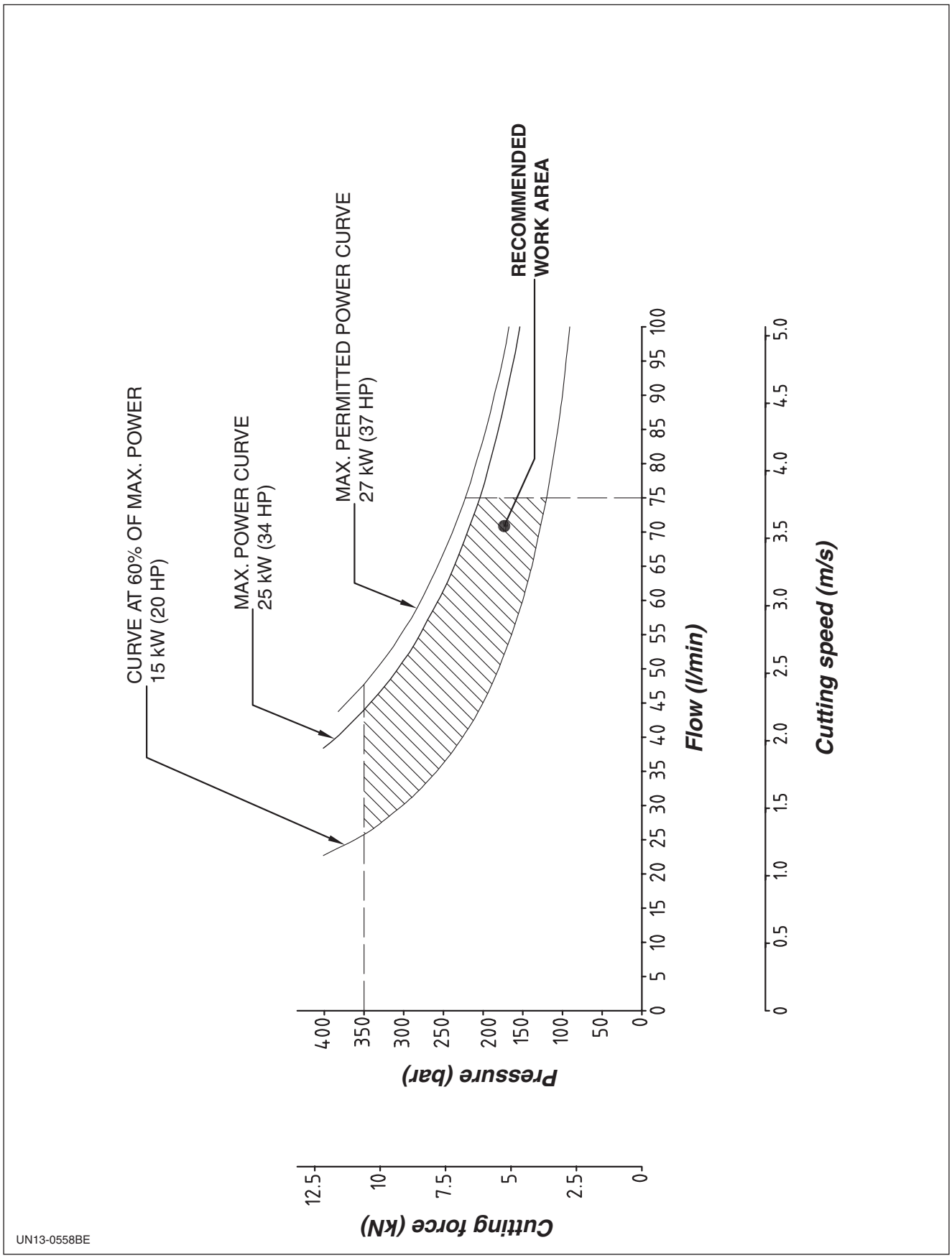
Machine model	**Prime mover oil flow** (l/min)	**Prime mover operating pressure** (bar)
TF 1000	140 ÷ 250	200 ÷ 350
TF 2000	180 ÷ 330	200 ÷ 350
TF 3000	270 ÷ 475	200 ÷ 350

IMPORTANT: the maximum hydraulic power applicable (HP - kW) must never exceed the rate specified in chart below.

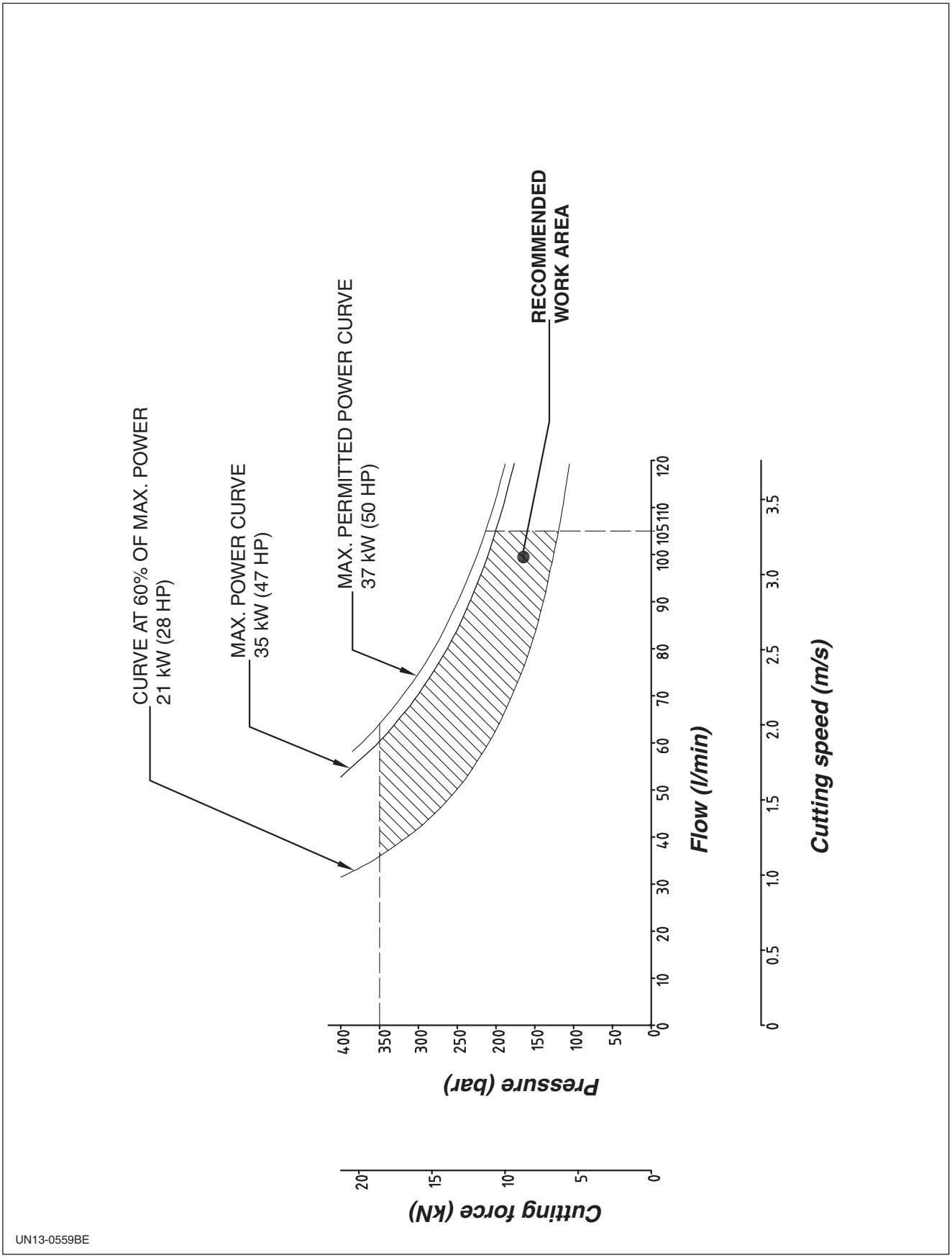
- Calculation example: $\frac{\text{Flow (l/min) x Pressure (bar)}}{450}$ = Power HP (HP/1.36 = Power in kW)

Machine model	**Maximum hydraulic power**	
	HP	kW
TF 1000	112	82
TF 2000	145	106
TF 3000	210	155

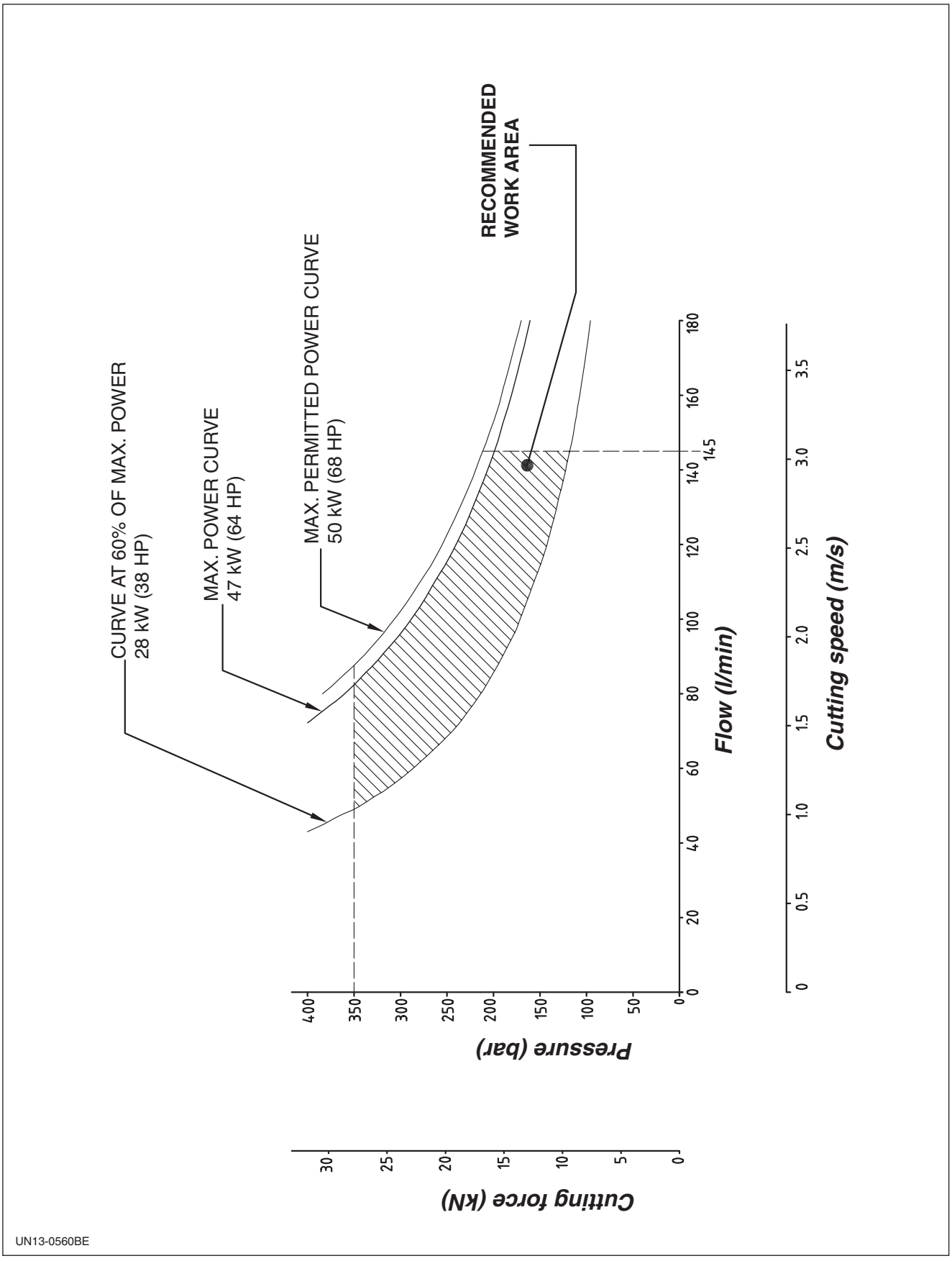
18.3 - Prime mover calibration curve for TF 200



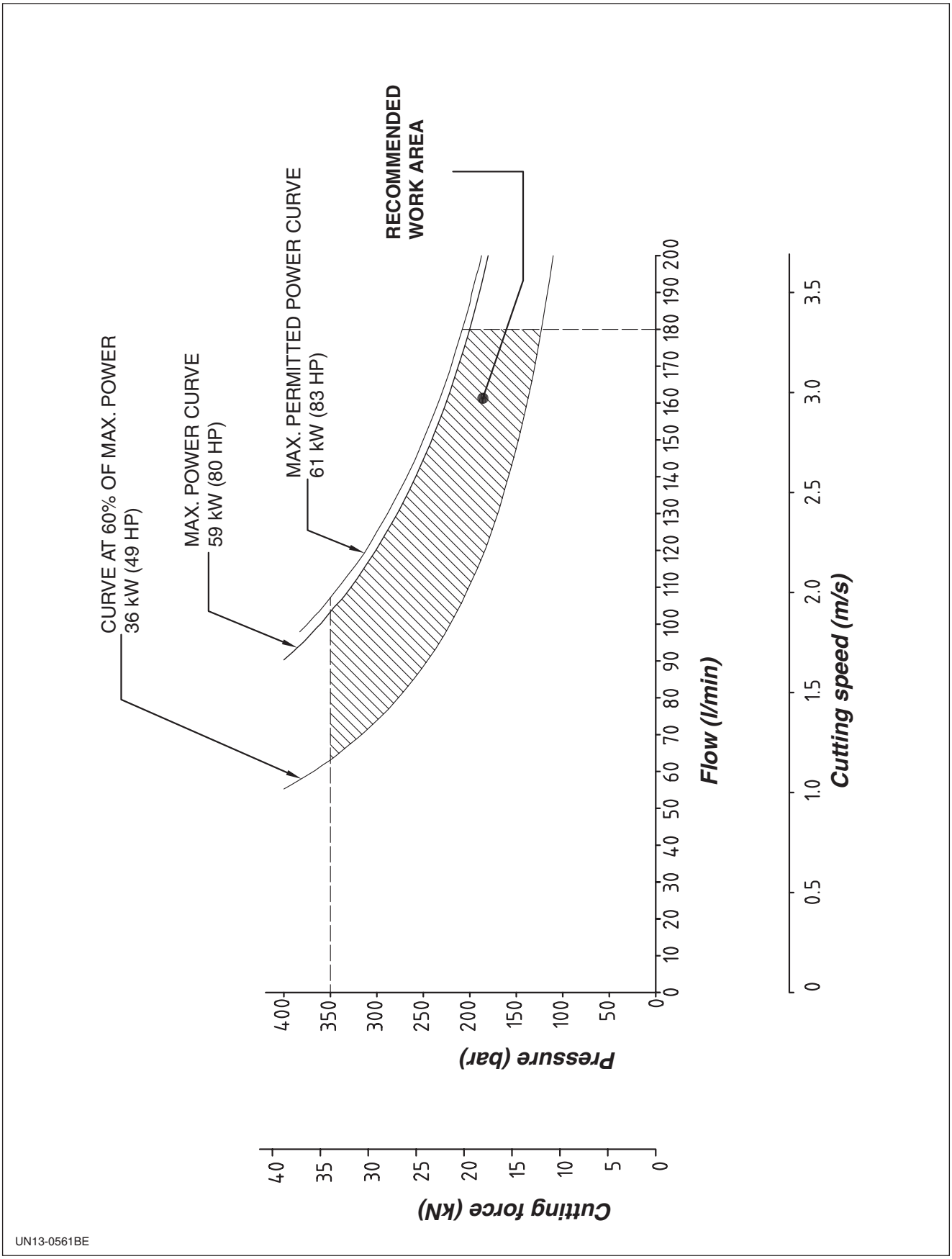
18.4 - Prime mover calibration curve for TF 400



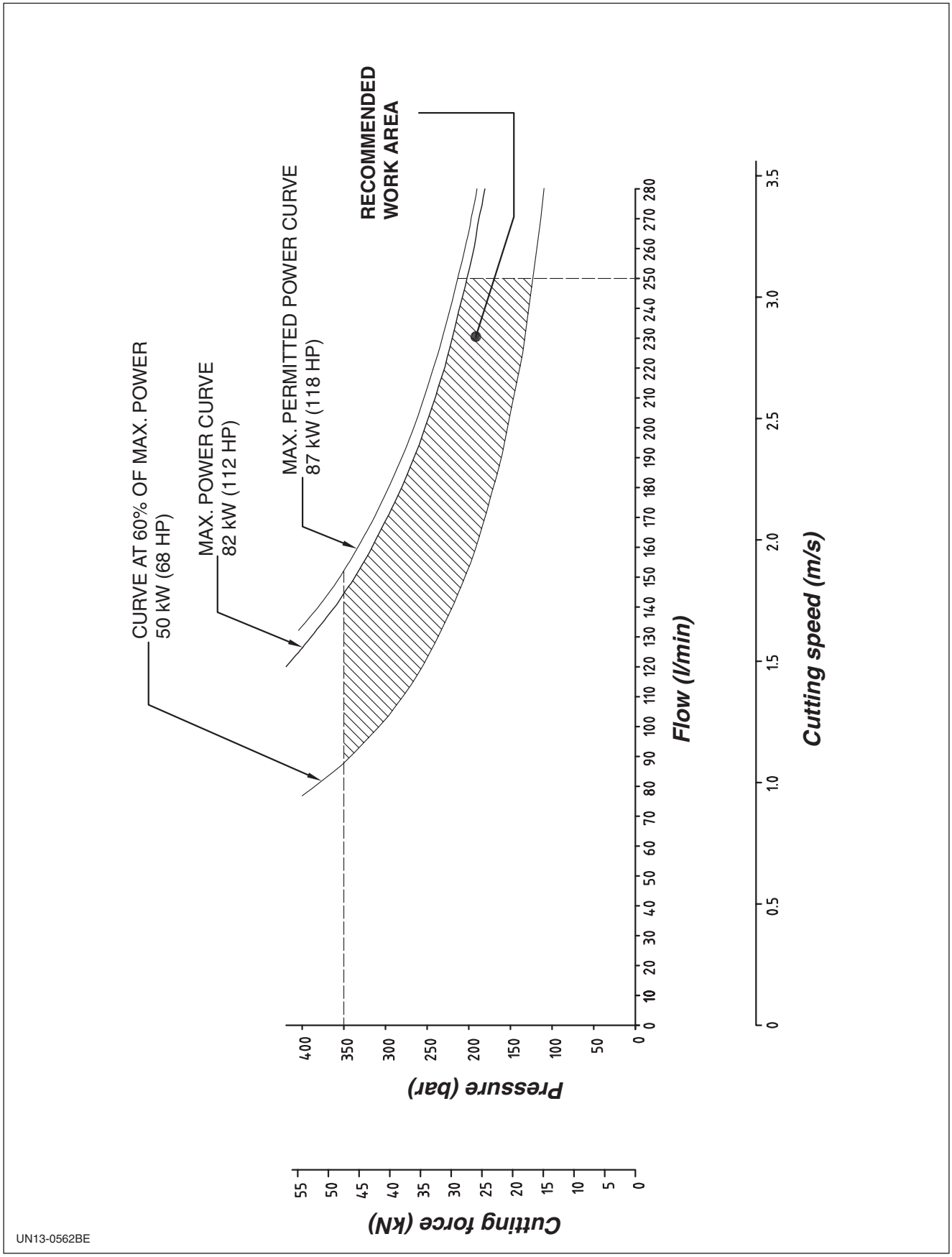
18.5 - Prime mover calibration curve for TF 600



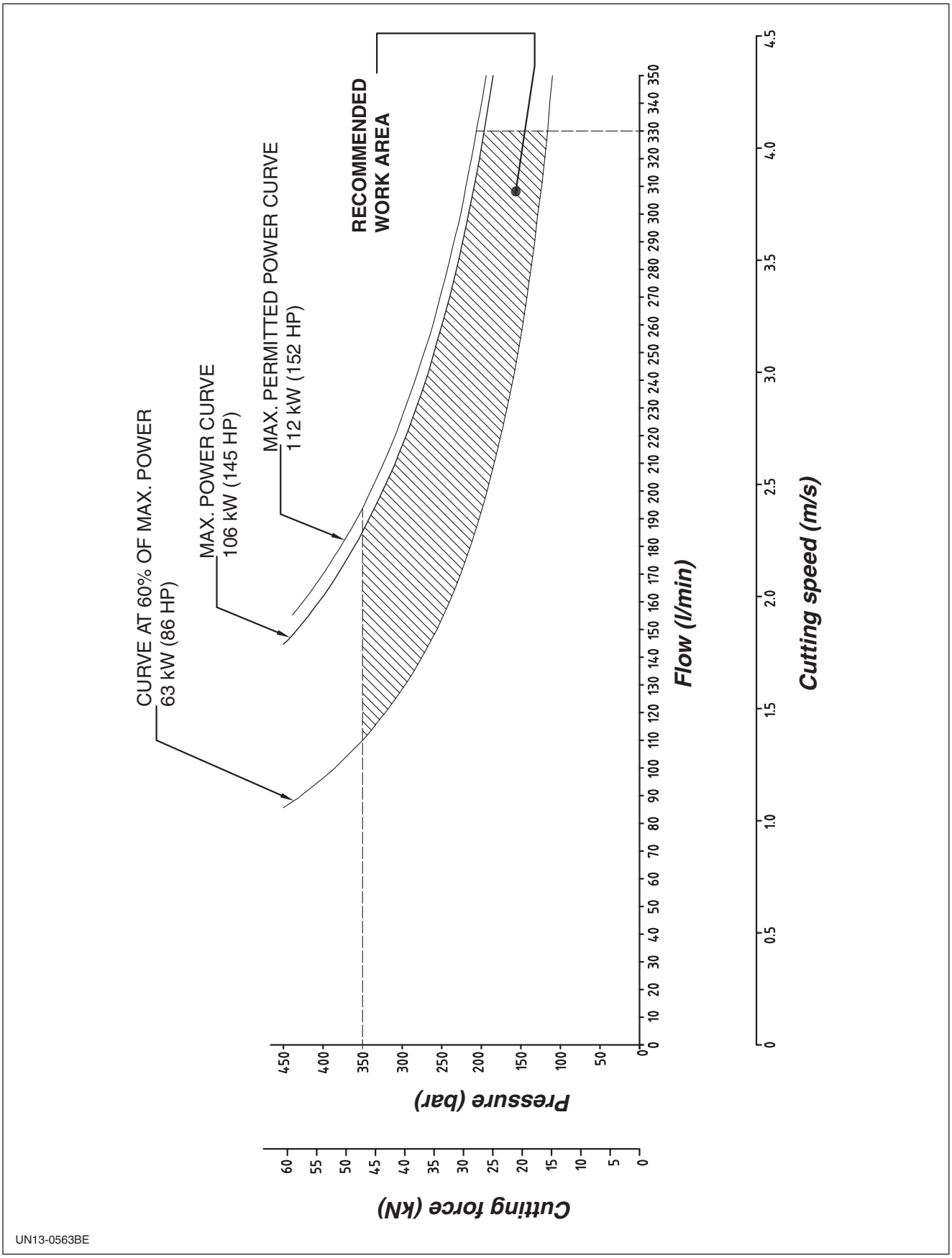
18.6 - Prime mover calibration curve for TF 800



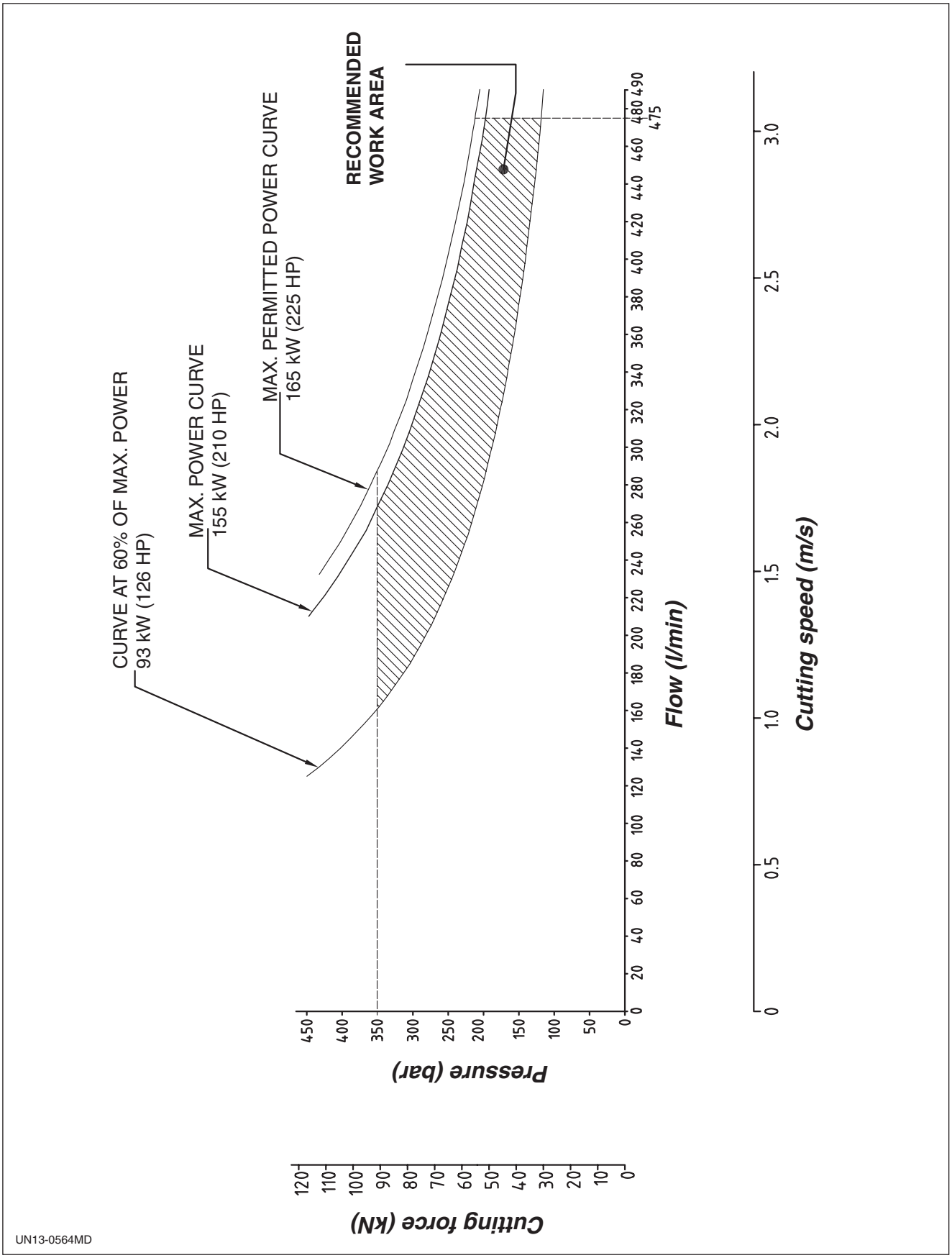
18.7 - Prime mover calibration curve for TF 1000



18.8 - Prime mover calibration curve for TF 2000

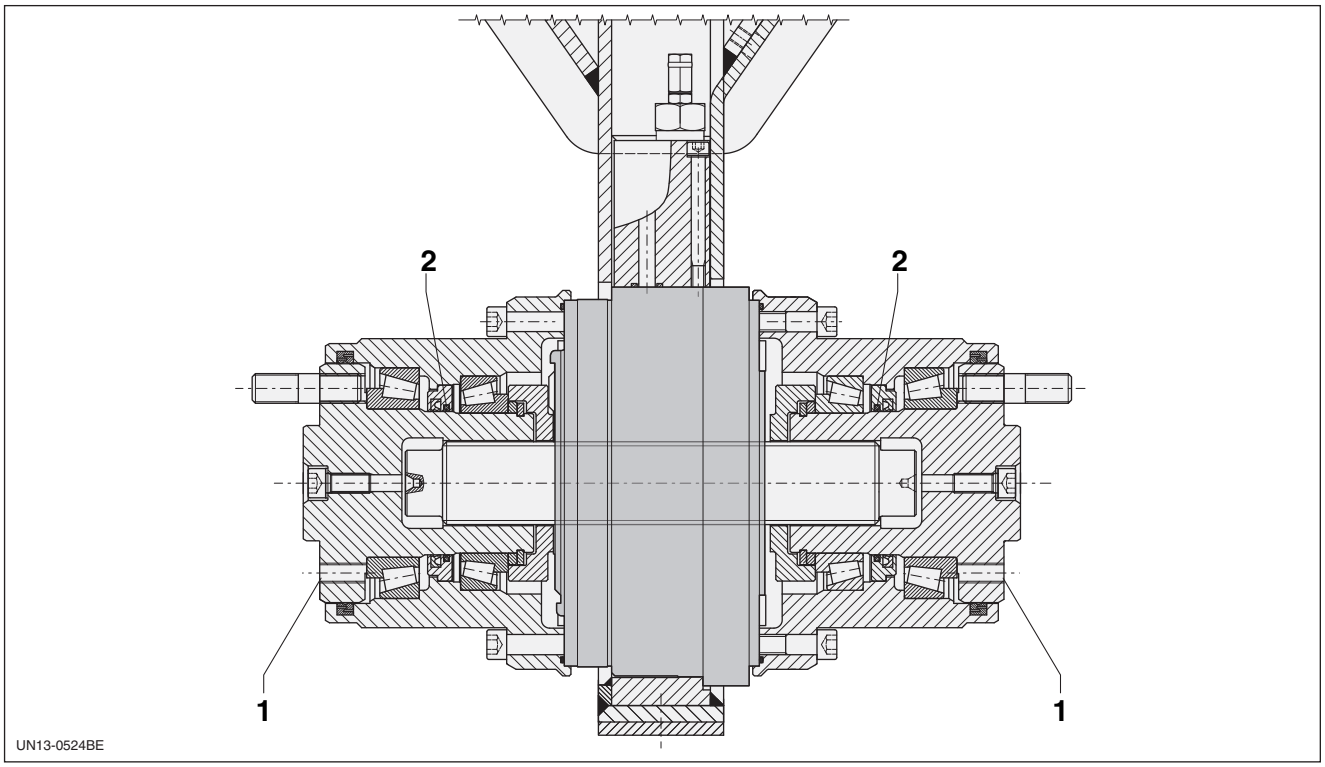


18.9 - Prime mover calibration curve for TF 3000

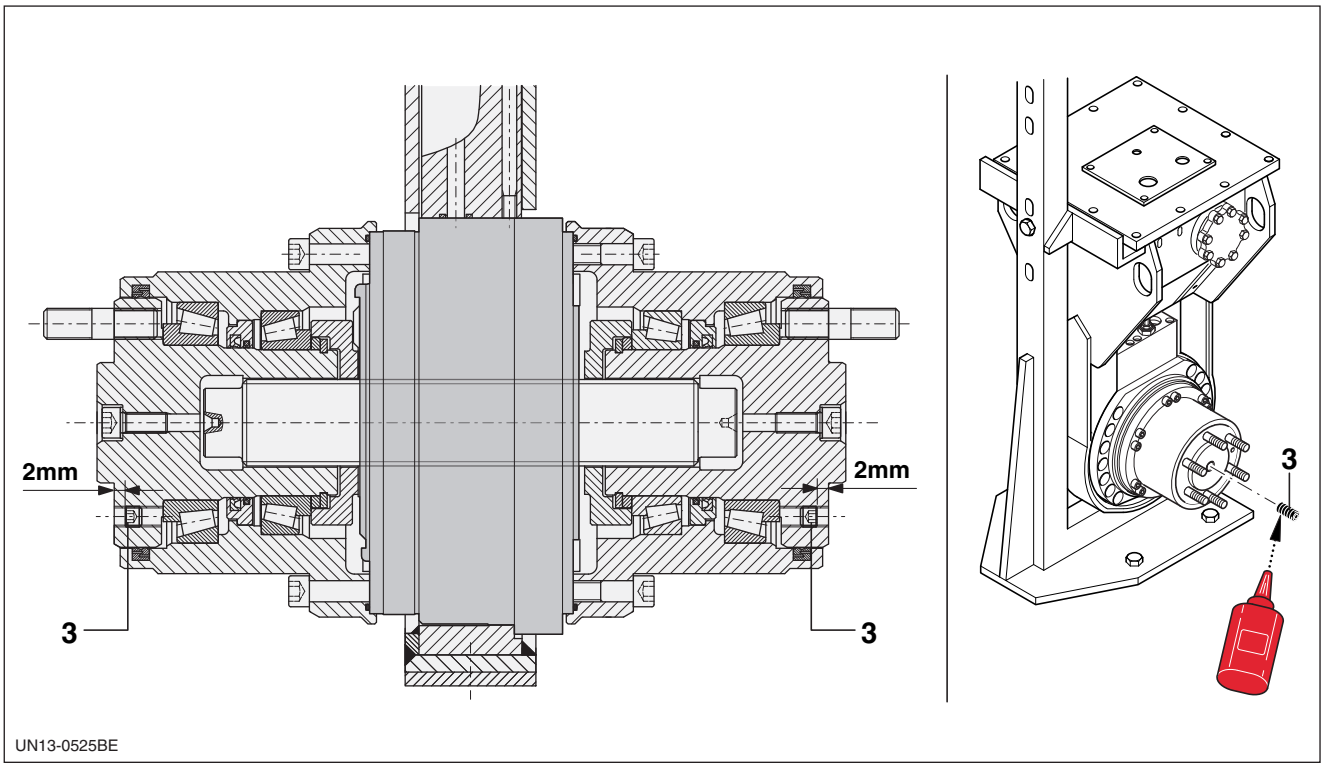


18.10 - Internal gasket seal

18.10.1 - Inspecting the seal of the internal gaskets on the bearing supports (TF 200 - TF 400 - TF 600 - TF 800 - TF 1000 - TF 2000)

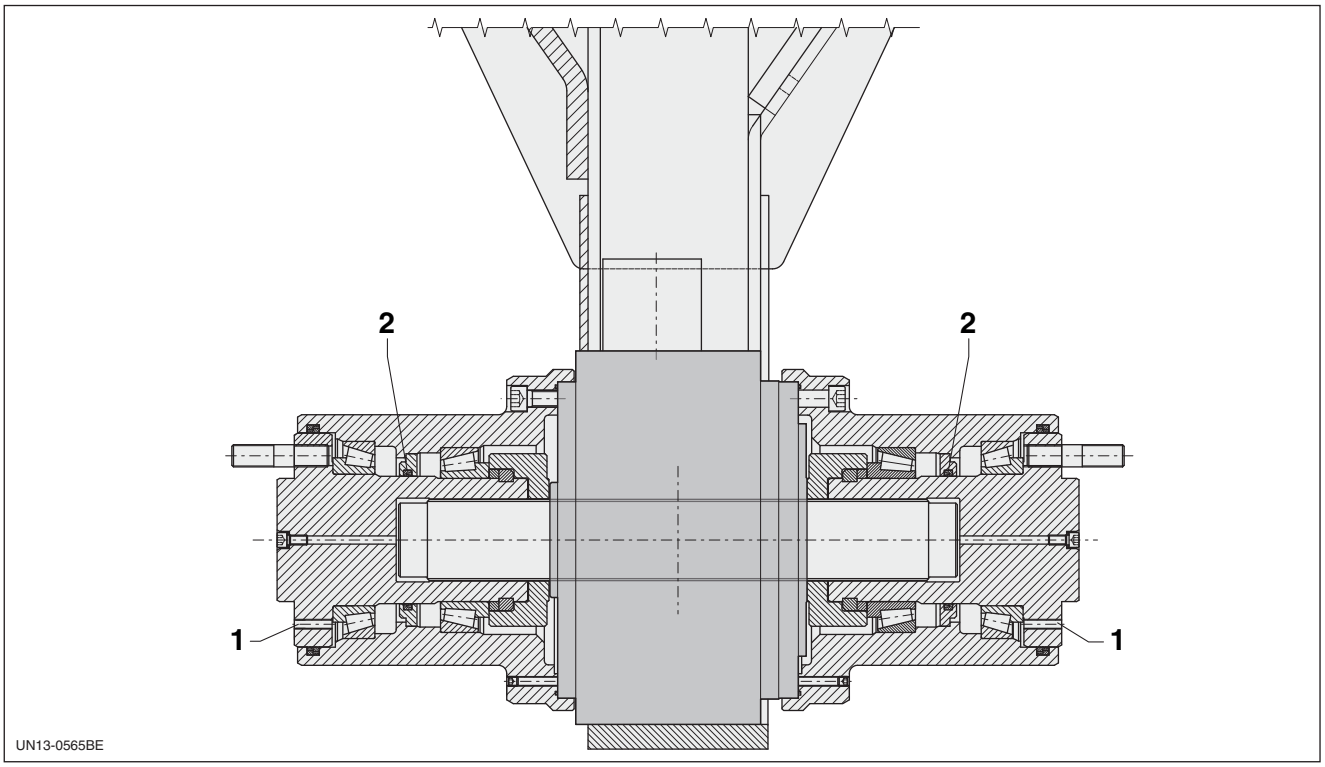


a - When the testing is complete, check that there is no oil coming out of the three threaded holes (**1**). This shows the gaskets (**2**) are correctly fitted and perfectly tight.

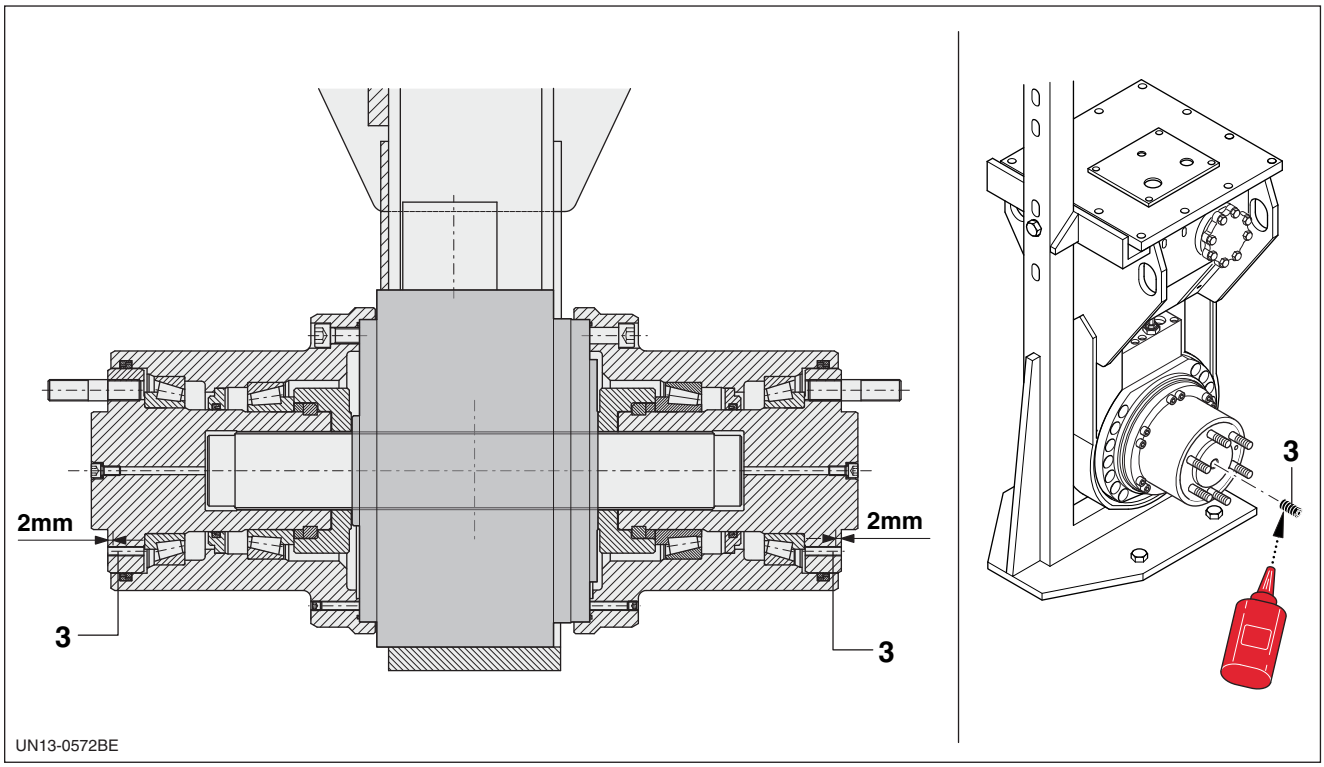


b - Apply a few drops of thread lock to the grub screws (**type: Loctite 243**).
Tighten the grub screws (**3**) so they are embedded in the surface of the drum hub by approximately 2 mm.

18.10.2 - Inspecting the seal of the internal gaskets on the bearing supports (TF 3000)



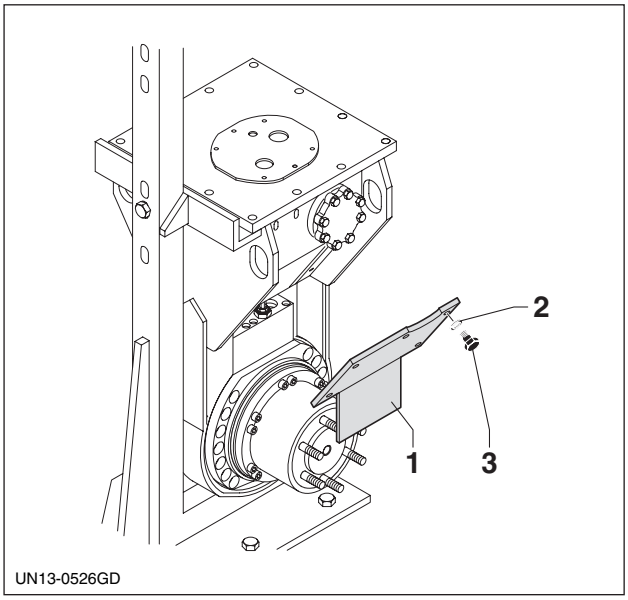
a - When the testing is complete, check that there is no oil coming out of the three threaded holes (**1**). This shows the gaskets (**2**) are correctly fitted and perfectly tight.



b - Apply a few drops of thread lock to the grub screws (**type: Loctite 243**).
Tighten the grub screws (**3**) so they are embedded in the surface of the drum hub by approximately 2 mm.

18.10.3 - Fitting the valve cover (TF 200 - TF 400 - TF 600 - TF 800)

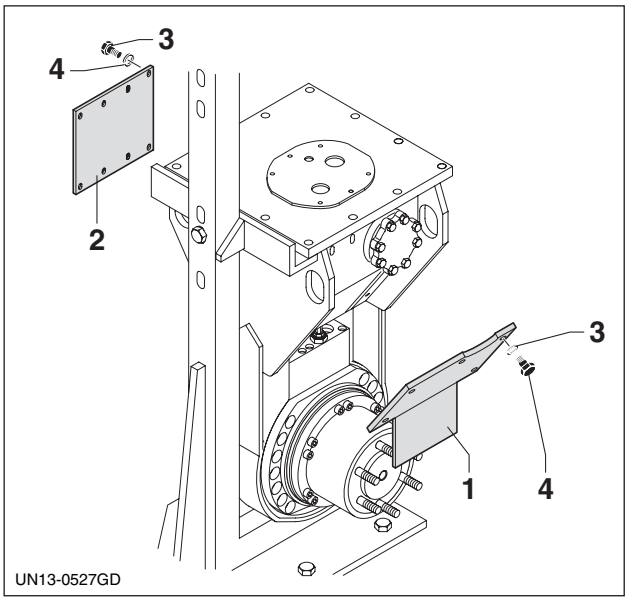
a - Fit the valve cover (**1**).
Insert new washers (**2**) and tighten the screws (**3**).



IMPORTANT: always comply with the torque ratings specified for the screws in the chart below ("Tightening torques" - chapter 21).

18.10.4 - Fitting the valve cover and the oil filter covers (TF 1000 - TF 2000 - TF 3000)

a - Fit the valve cover (**1**) and the oil filter cover (**2**).
Insert new washers (**3**) and tighten the screws (**4**).



IMPORTANT: always comply with the torque ratings specified for the screws in the chart below ("Tightening torques" - chapter 21).

19 - DRUM ASSEMBLY

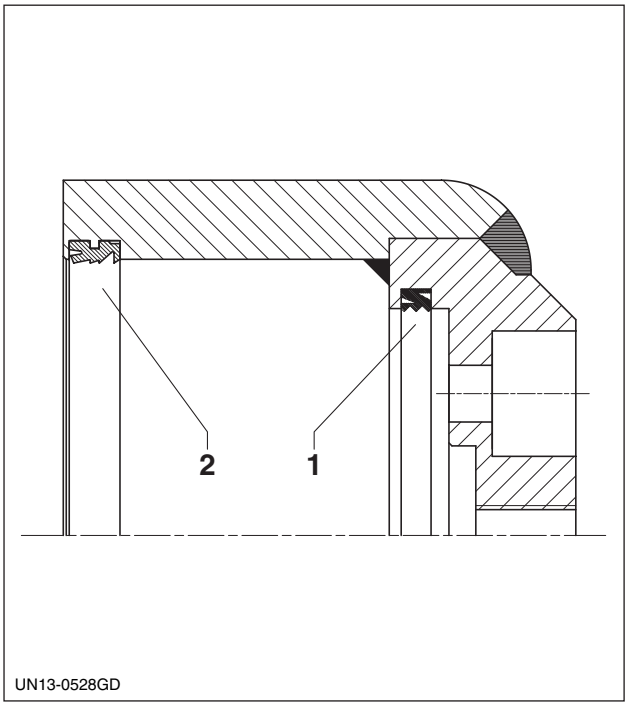
19.1 - Fitting the drum gaskets

19.1.1 - Fitting the drum gaskets (TF 200 - TF 400 - TF 600)

a - Fit the new gaskets, (**1**) and (**2**), in their seats on the drum and lubricate, filling the grooves of the internal seals with oil.

IMPORTANT: lubricate with specific grease for gaskets (see "Lubricants" chart in chapter 21).

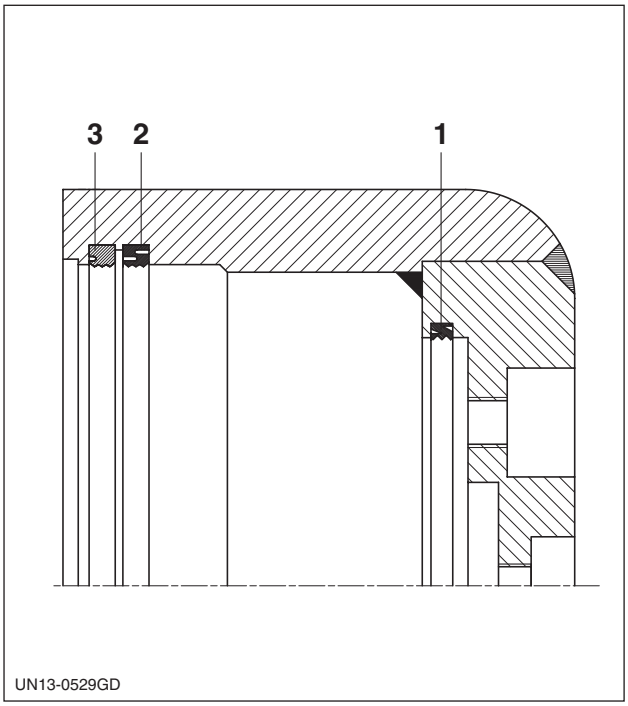
***N.B.**: the gaskets (**2**) may be made of two parts. It does not matter whether they are made up of one part or two.*



19.1.2 - Fitting the drum gaskets (TF 800 - TF 1000 - TF 2000 - TF 3000)

a - Fit the new gaskets, (**1**) (**2**) and (**3**), in their seats on the drum and lubricate, filling the grooves of the internal seals with oil.

IMPORTANT: lubricate with specific grease for gaskets (see "Lubricants" chart in chapter 21).



19.2 - Drum assembly

19.2.1 - Fitting the drums (TF 200 - TF 400 - TF 600 - TF 800)

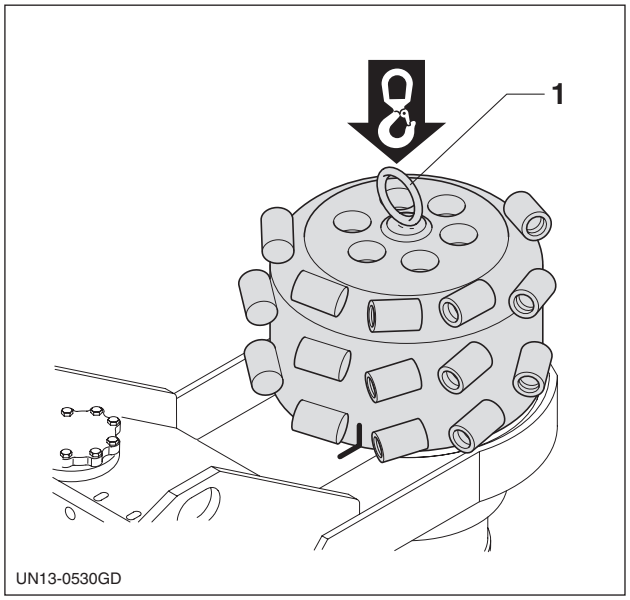
a - Screw a circular eyebolt (**1**) with M20 thread shank into the central hole, and lift the drum.

b - Position the machine with the drum's rotation axis vertical.

c - Position the drum using the markers inserted during the removal stage.

***N.B.**: the drums must be fitted slowly and accurately to ensure the gaskets remain in good condition.*

See the weights stated in section 14.2.1.

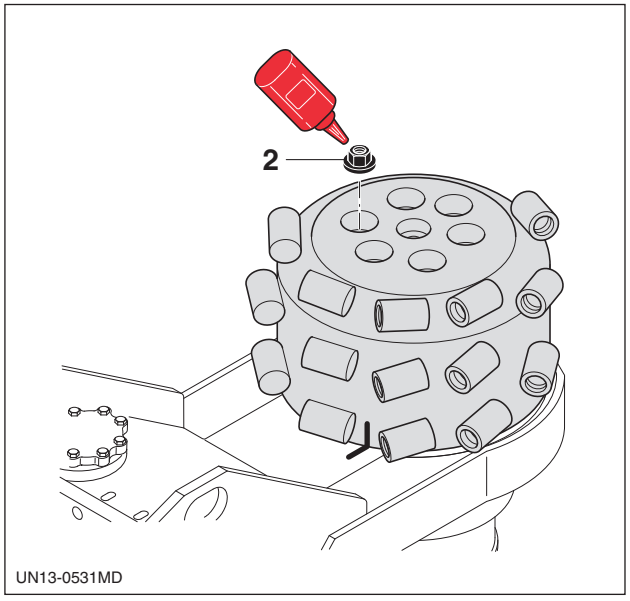


UN13-0530GD

With 'Rotoblock' nuts

d - Apply a few drops of thread lock to the drum fastening nuts (**2**) (**type: Loctite 243**).

e - Tighten the drum fastening nuts (**2**) with a torque wrench, setting it according to the ratings specified in the chart below.



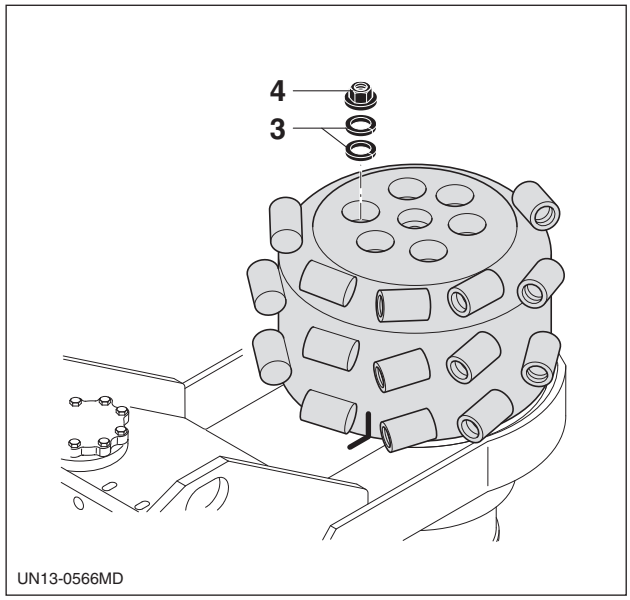
UN13-0531MD

With self-locking washers and nuts

f - Fit the self-locking washers (**3**).

g - Tighten the drum fastening nuts (**4**) with a torque wrench, setting it according to the ratings specified in the chart below.

Machine model	Tightening torque (Nm)	Part	Pos.
TF 200	350	"Rotobloc" version fastening nuts for drum and nuts with self-locking washers	2/4
TF 400	350		
TF 600	650		
TF 800	650		

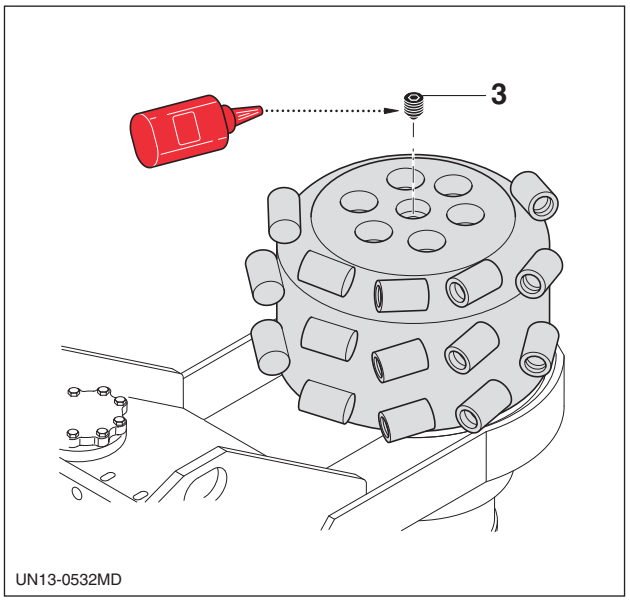


UN13-0566MD

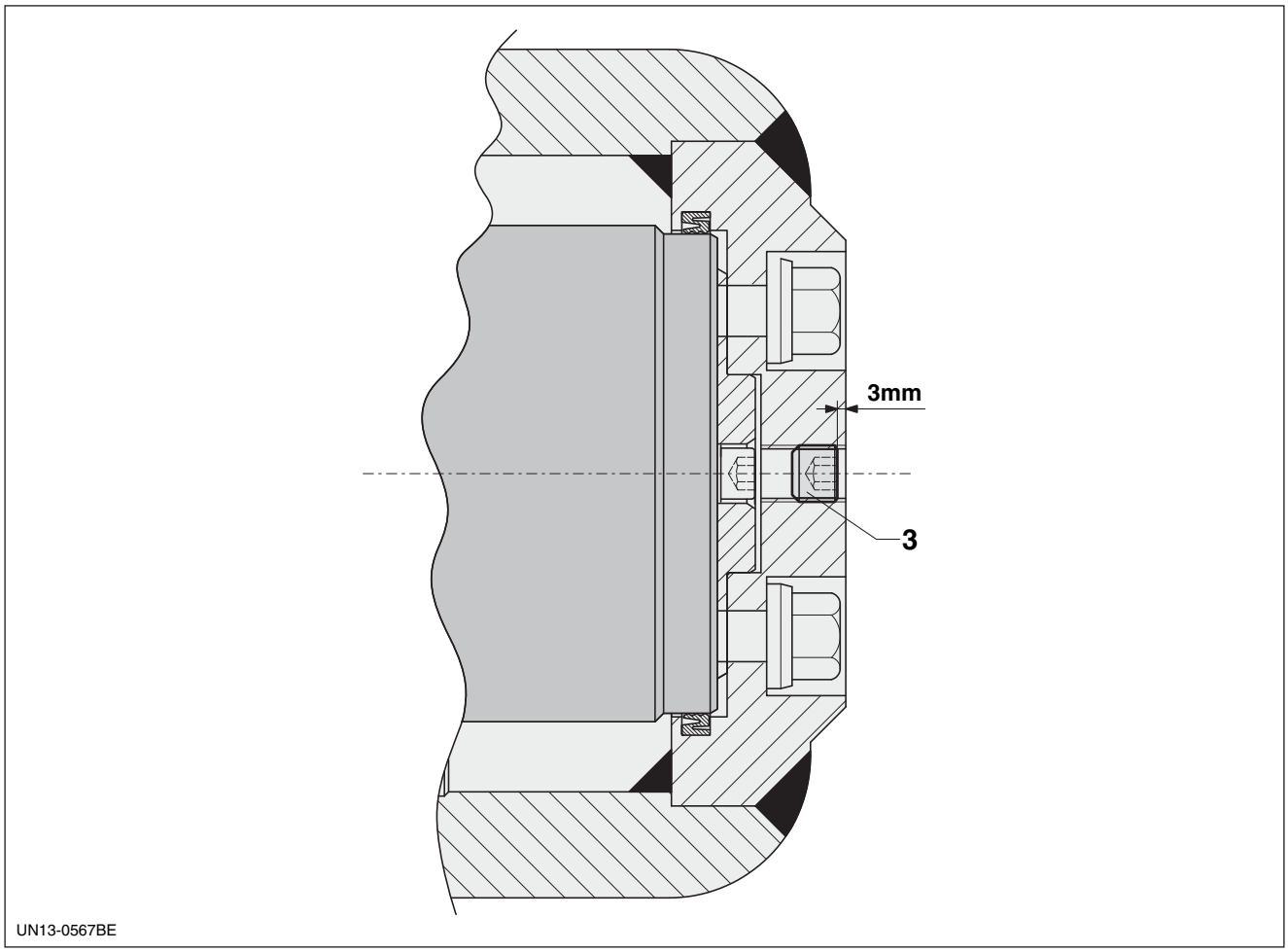
h - Apply a few drops of thread lock to the grub screw (**type: Loctite 243**).

i - Tighten the grub screw (**3**) so it is embedded in the outer surface of the drum by approximately 3 mm (see drawing below).

l - Rotate the machine by 180° and repeat the same operations to fit the second drum.



UN13-0532MD



UN13-0567BE

19.2.2 - Fitting the drums (TF 1000 - TF 2000 - TF 3000)

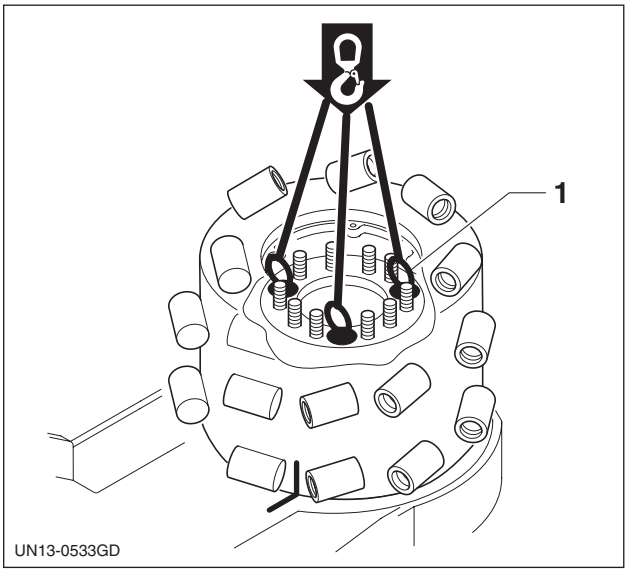
a - Screw three circular eyebolts (**1**) with M12 thread shanks into the holes, and lift the drum.

b - Position the machine with the drum's rotation axis vertical.

c - Position the drum using the markers inserted during the removal stage.

***N.B.**: the drums must be fitted slowly and accurately to ensure the gaskets remain in good condition.*

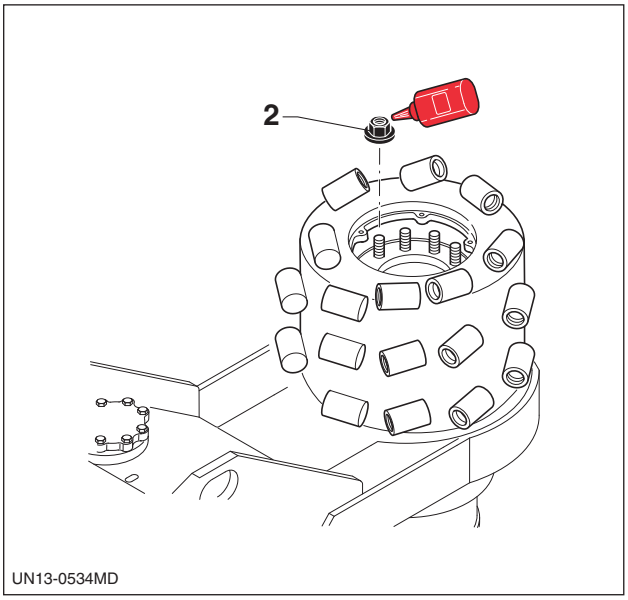
See the weights stated in section 14.2.4.



With 'Rotoblock' nuts

d - Apply a few drops of thread lock to the drum fastening nuts (**2**) (**type: Loctite 243**).

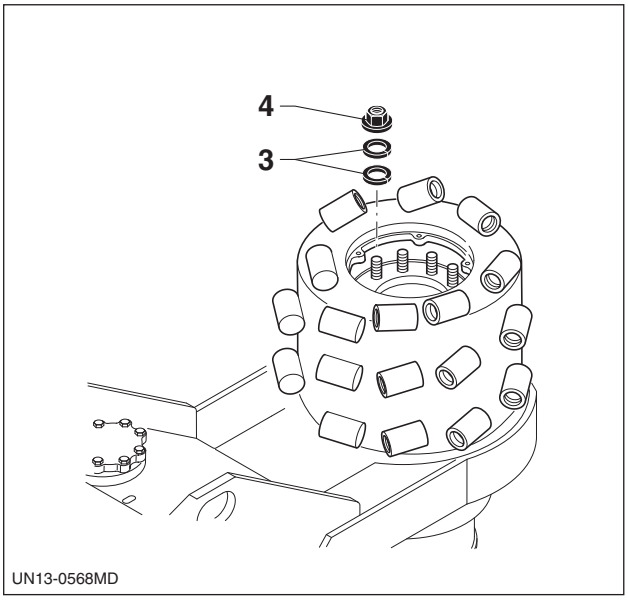
e - Tighten the drum fastening nuts (**2**) with a torque wrench, setting it according to the ratings specified in the chart below.



With nuts with self-locking washers

f - Fit the self-locking washers (**3**).

g - Tighten the drum fastening nuts (**4**) with a torque wrench, setting it according to the ratings specified in the chart below.

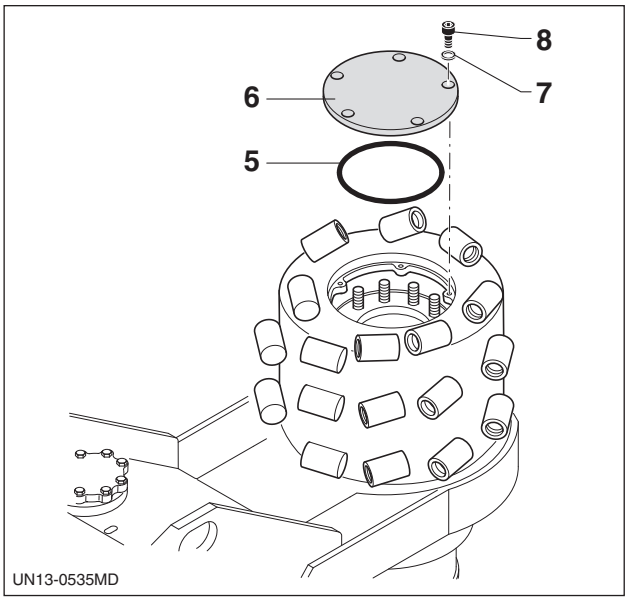


Machine model	Tightening torque (Nm)	Part	Pos.
TF 1000	650	"Rotobloc" version fastening nuts for drum and nuts with self-locking washers	2/4
TF 2000	650		
TF 3000	1000		

h - For the TF 1000 and TF 2000 only

Fit the O-rings (**5**) in their seat on the cover (**6**).

Insert new washers (**7**) and tighten the screws (**8**).



IMPORTANT: always comply with the torque ratings specified for the screws in the chart below ("Tightening torques" - chapter 21).

i - Rotate the machine by 180° and repeat the same operations to fit the second drum.

19.3 - Fitting the tools (teeth)

19.3.1 - Tool integrity assessment (teeth)

Every tooth is subject to constant wear due to contact with the material cut.
The tooth is fitted in the tooth holder and a ring fitted afterwards prevents it coming out. The tooth rotates freely around its own axis: this rotation guarantees even, symmetrical wear.
The greater the wear, the less the tooth's capacity for breaking into the material.
As tooth wear increases, the work progress slows.
This means that, if you use very worn teeth, the machine's productivity drops noticeably. Replacing worn teeth promptly will ensure the machine is always used to its full potential and the drums will be kept in good condition.
The tooth only really performs well throughout its working life if it is worn down in the best possible way.

- Tooth wear

A - Features of an ideally worn tooth.

The remaining part of the carbide tip is symmetrically shaped.
The body has a uniform, tapered shape.
The body has enough bulk to support the carbide core.

B - Tooth that has worked on soft, abrasive material.

If a tooth has been used on an overly soft, abrasive material, the body will wear quicker than the tip, and the tip will end up snapping off.
Additionally, the wear on the tooth body will increase tooth holder wear.
Tooth nearing replacement.

C - Tooth which has not rotated properly.

The case of teeth that have experienced uneven (and therefore excessively fast) wear is different.
Wear of this kind is due to the tooth not turning round in its holder.
The wear may be due to a worn tooth holder or the presence of small particles of planed material between the tang of the tooth and the seat in which it is fitted.
In this instance, clean the seat and lubricate with diesel fuel.

IMPORTANT: The tooth shown in the picture is a standard model for the TF 800 - TF 1000 - TF 2000 - TF 3000 but the concepts apply to all teeth models.

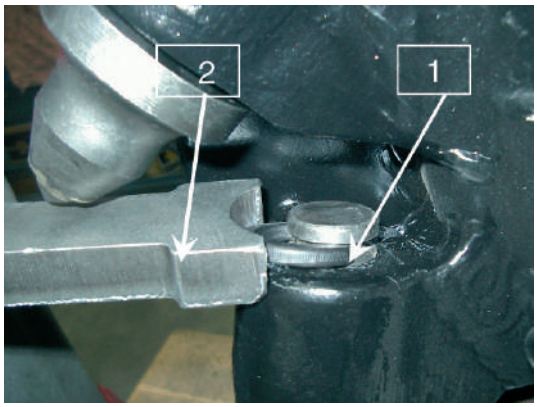
19.3.2 - Tool (teeth) fitting stage

a - Before fitting either used or new tools (teeth), clean and lubricate the seat with diesel fuel.

b - Fit the tools in the tool holder.

c - Fit the rear circlip (**1**).

d - Insert the special spanner (**2**) and strike with a hammer until the circlip is correctly fitted.

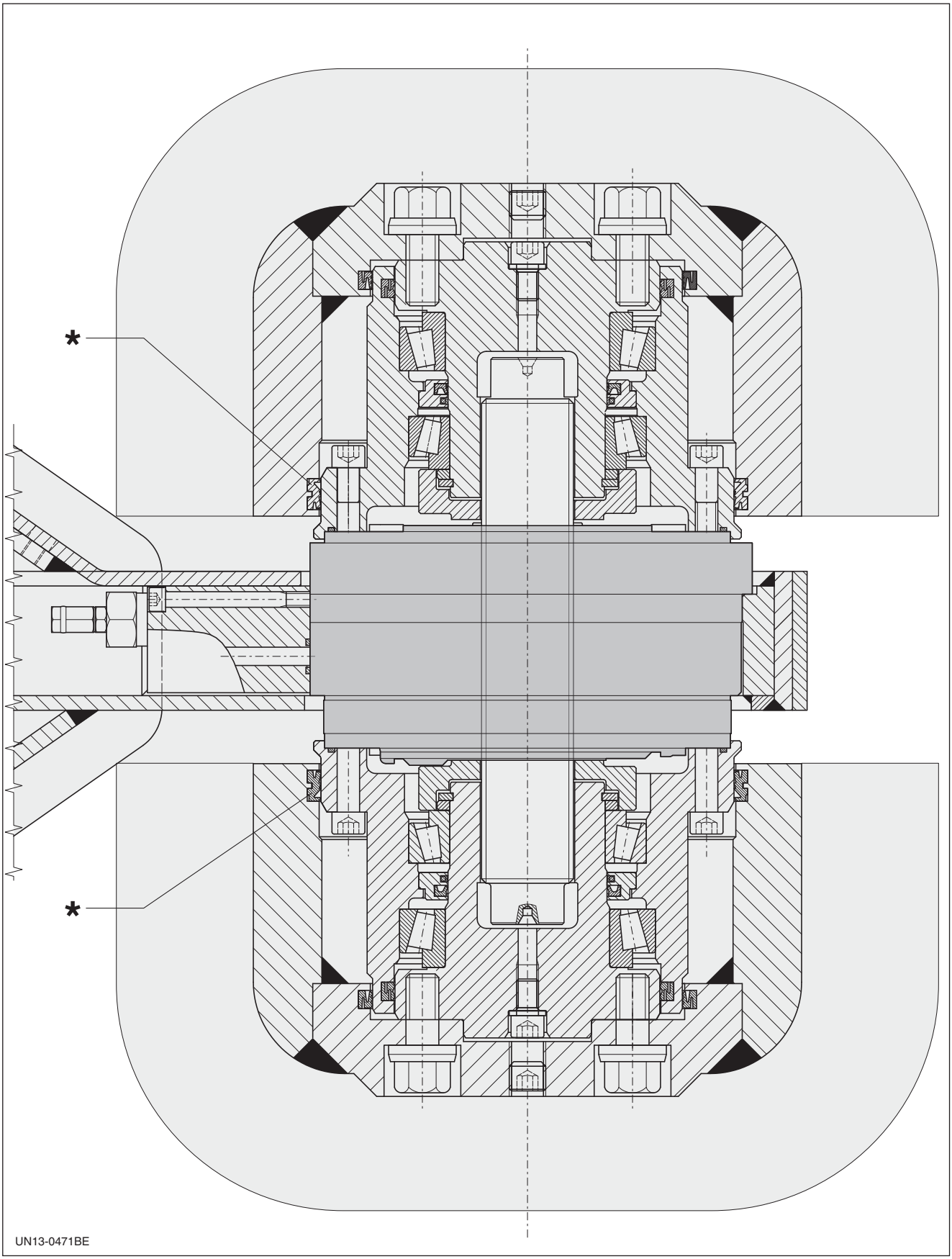


UN13-0466GD

*IMPORTANT: the special spanner (**2**) for removing and fitting the tool circlip is available on request. See "Tooling" chart - chapter 22.*

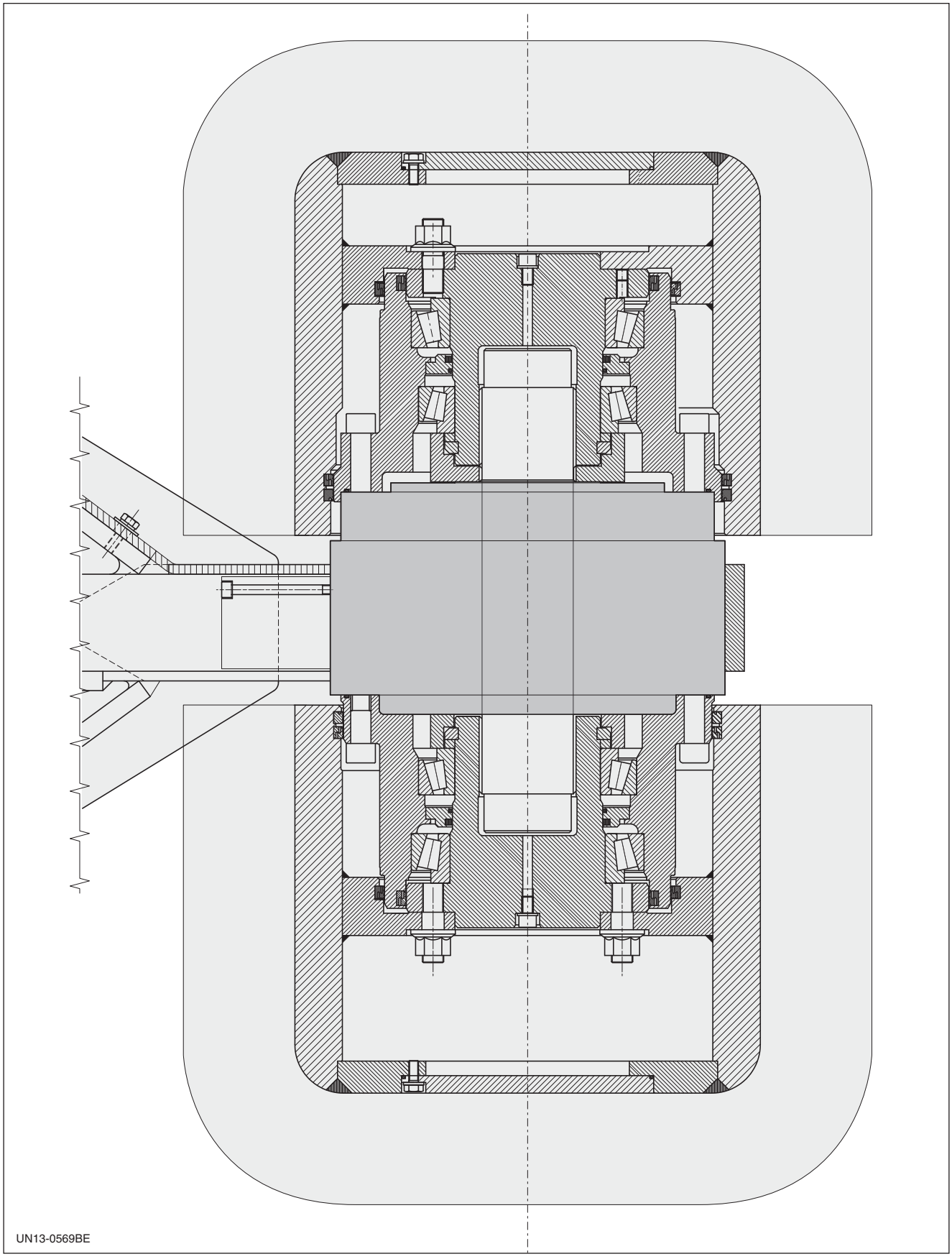
20 - DIAGRAMS

20.1 - Motor unit mechanical diagram (TF 200 - TF 400 - TF 600 - TF 800 - TF 1000)



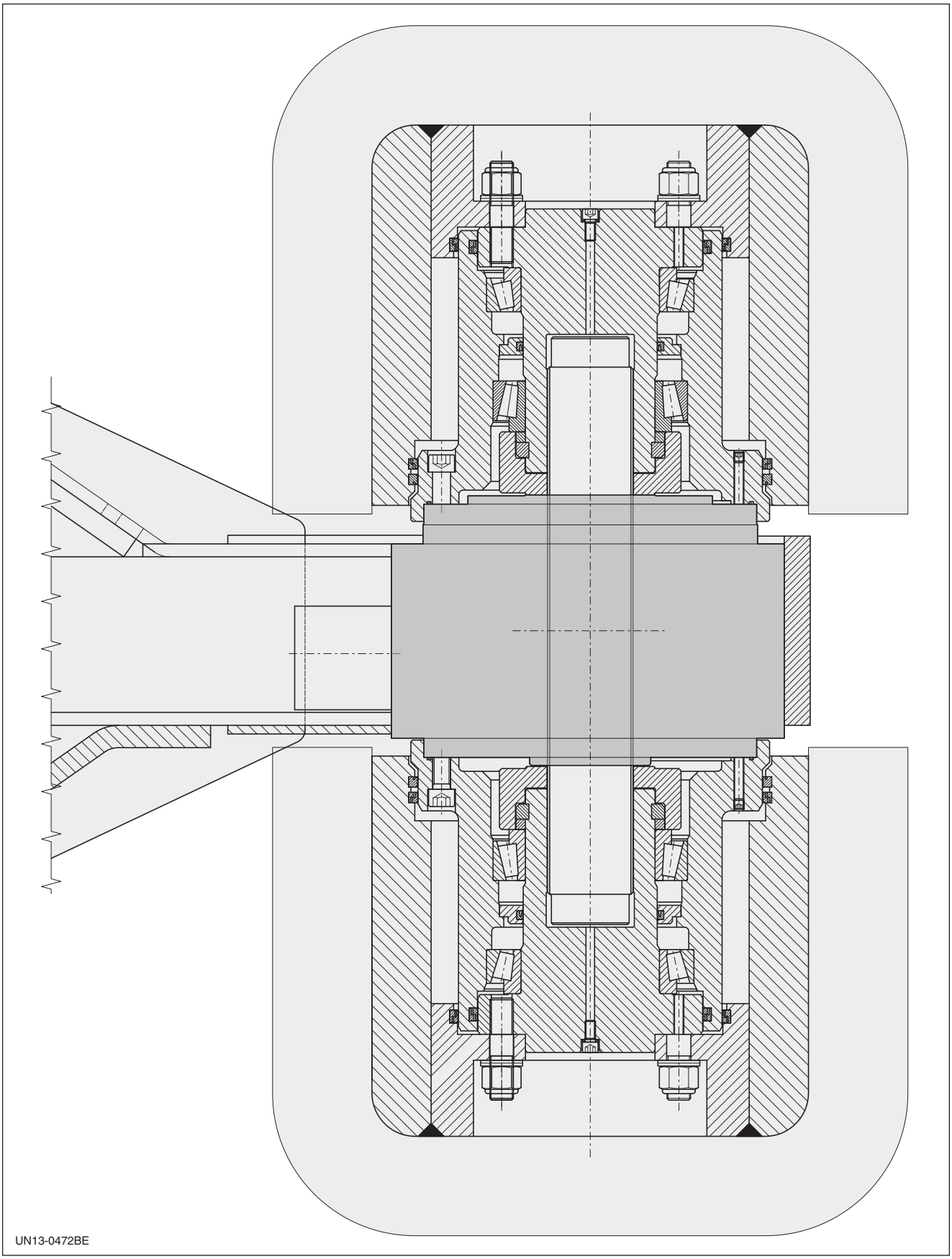
(*) there are two gaskets in the TF 800 - TF 1000 models.

20.2 - Motor unit mechanical diagram (TF 2000)



UN13-0569BE

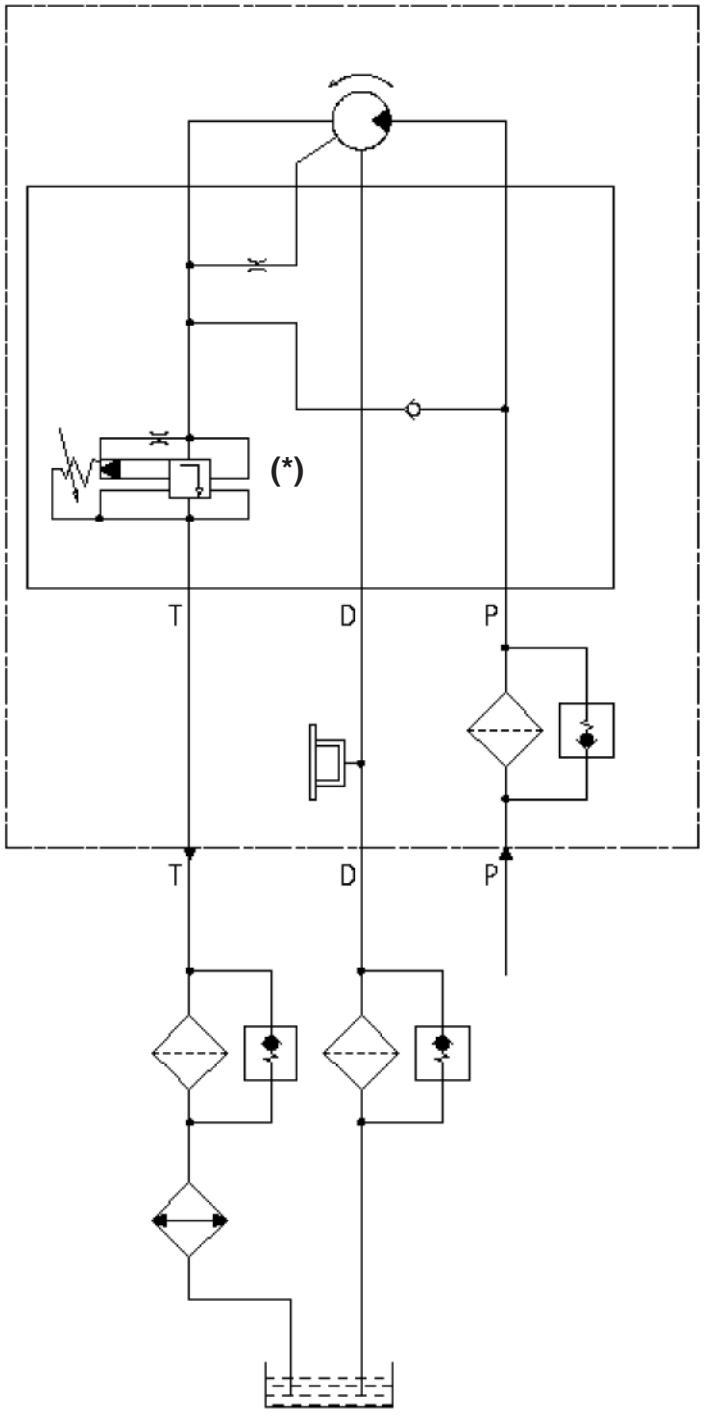
20.3 - Motor unit mechanical diagram (TF 3000)



UN13-0472BE

20.4 - Hydraulic system diagram for double-drum rotary cutters (TF 200 - TF 400 - TF 600 - TF 800)

- TF 200 - up to serial number 2007 31 0428
- TF 400 - up to serial number 2007 31 0431
- TF 600 - up to serial number 2007 31 0429
- TF 800 - up to serial number 2007 31 0439

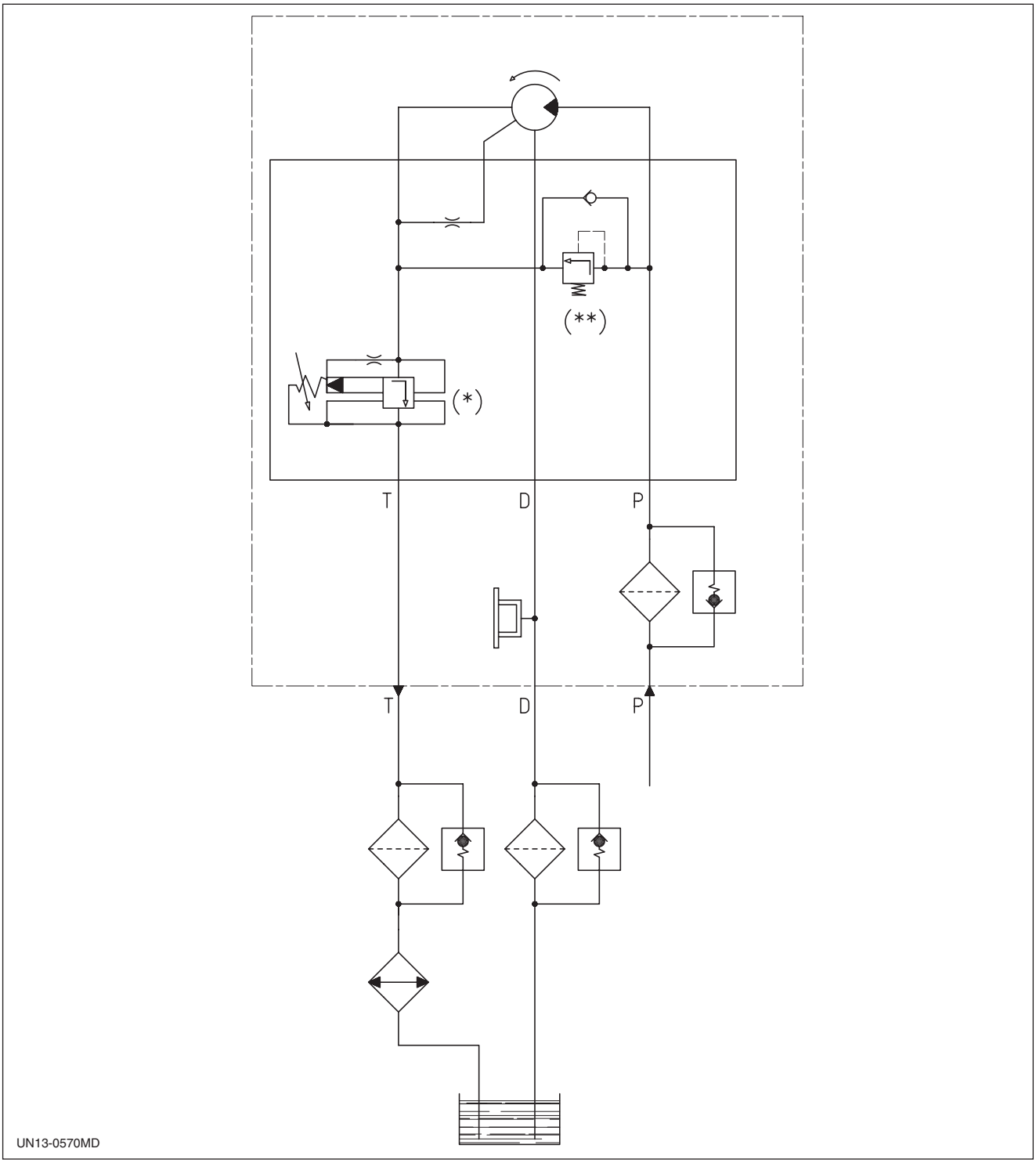


UN13-0468GD

(*) - Counterpressure valve

20.5 - Hydraulic system diagram for double-drum rotary cutters (TF 200)

- TF 200 - from serial number 2007 31 0429

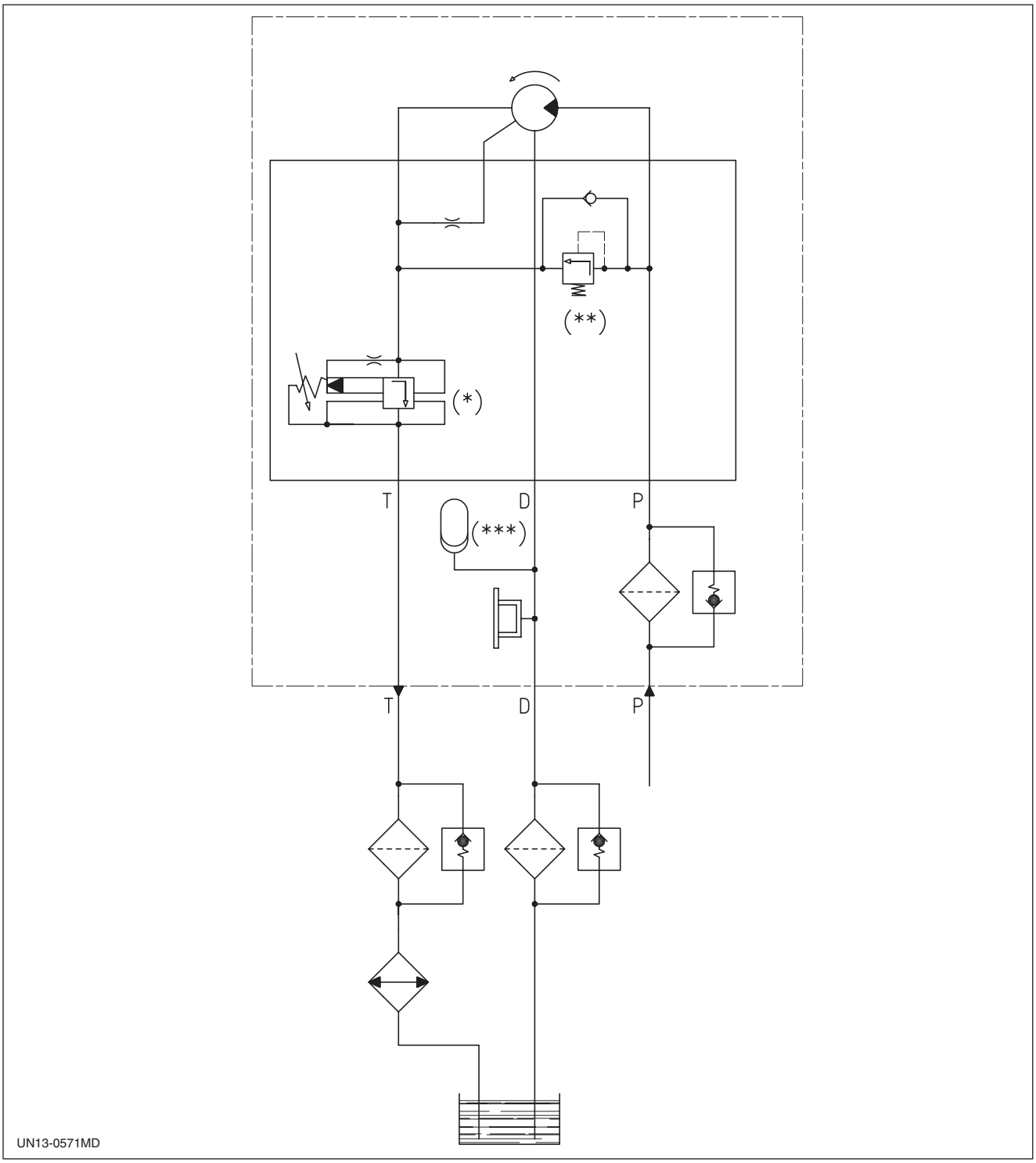


(*) - Counterpressure valve

(**)- Buffering valve calibrated to 380 bar (settable on test bench only).
The pressure rate refers to a flow rate of 2 to 3 l/min (start of opening).

20.6 - Hydraulic system diagram for double-drum rotary cutters (TF 400 - TF 600 - TF 800)

- TF 400 from serial n. 2007 31 0432 with buffering valve only - 2007 31 0447 with buffering valve and accumulator
- TF 600 from serial n. 2007 31 0430 with buffering valve only - 2007 33 0448 with buffering valve and accumulator
- TF 800 from serial n. 2007 31 0440



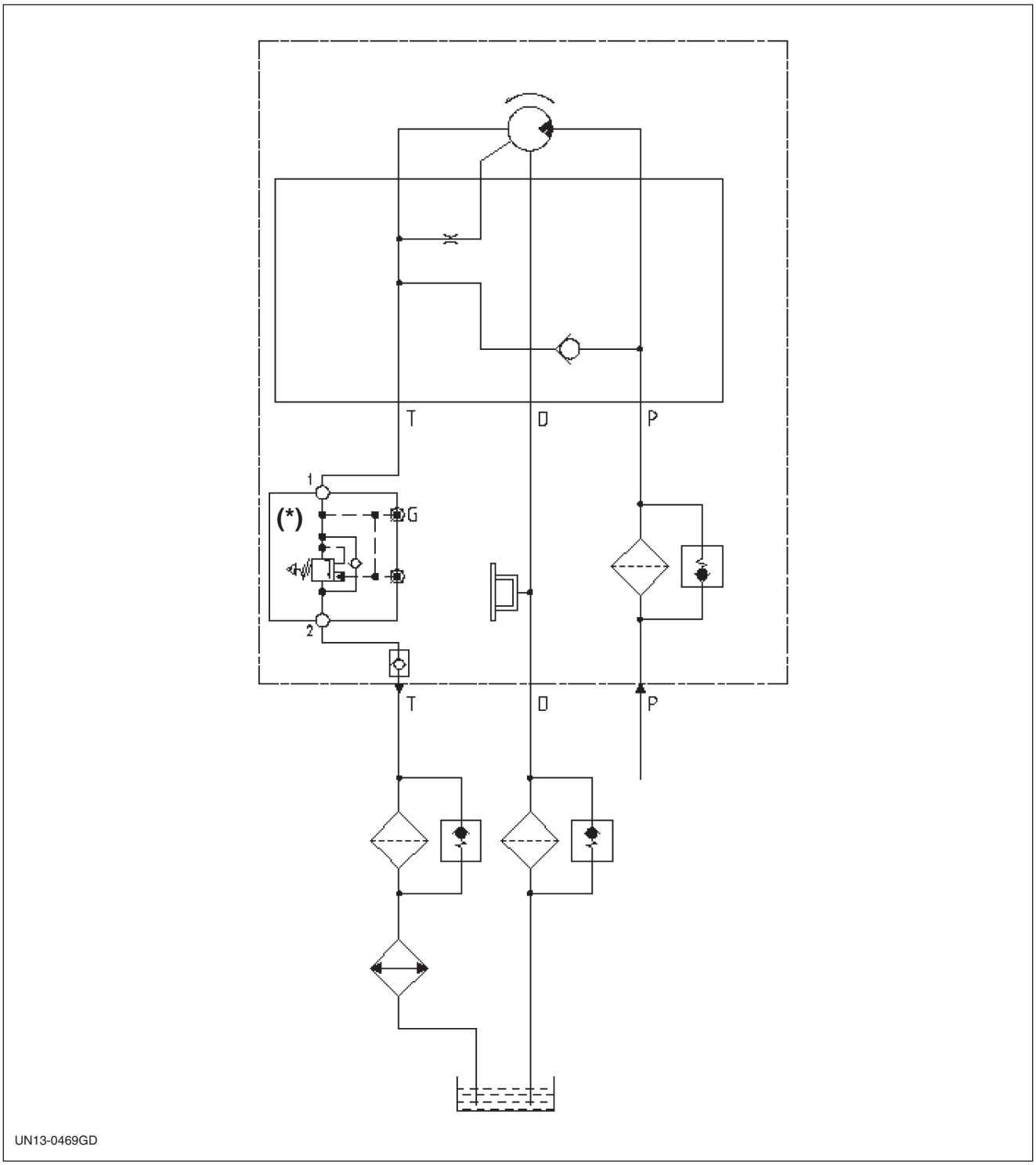
(*) - Counterpressure valve

(**) - Buffering valve calibrated to 380 bar (settable on test bench only).
The pressure rate refers to a flow rate of 2 to 3 l/min (start of opening).

(***) - Accumulator with 2 bar nitrogen precharge pressure.

20.7 - Hydraulic system diagram for double-drum rotary cutters (TF 1000 - TF 2000)

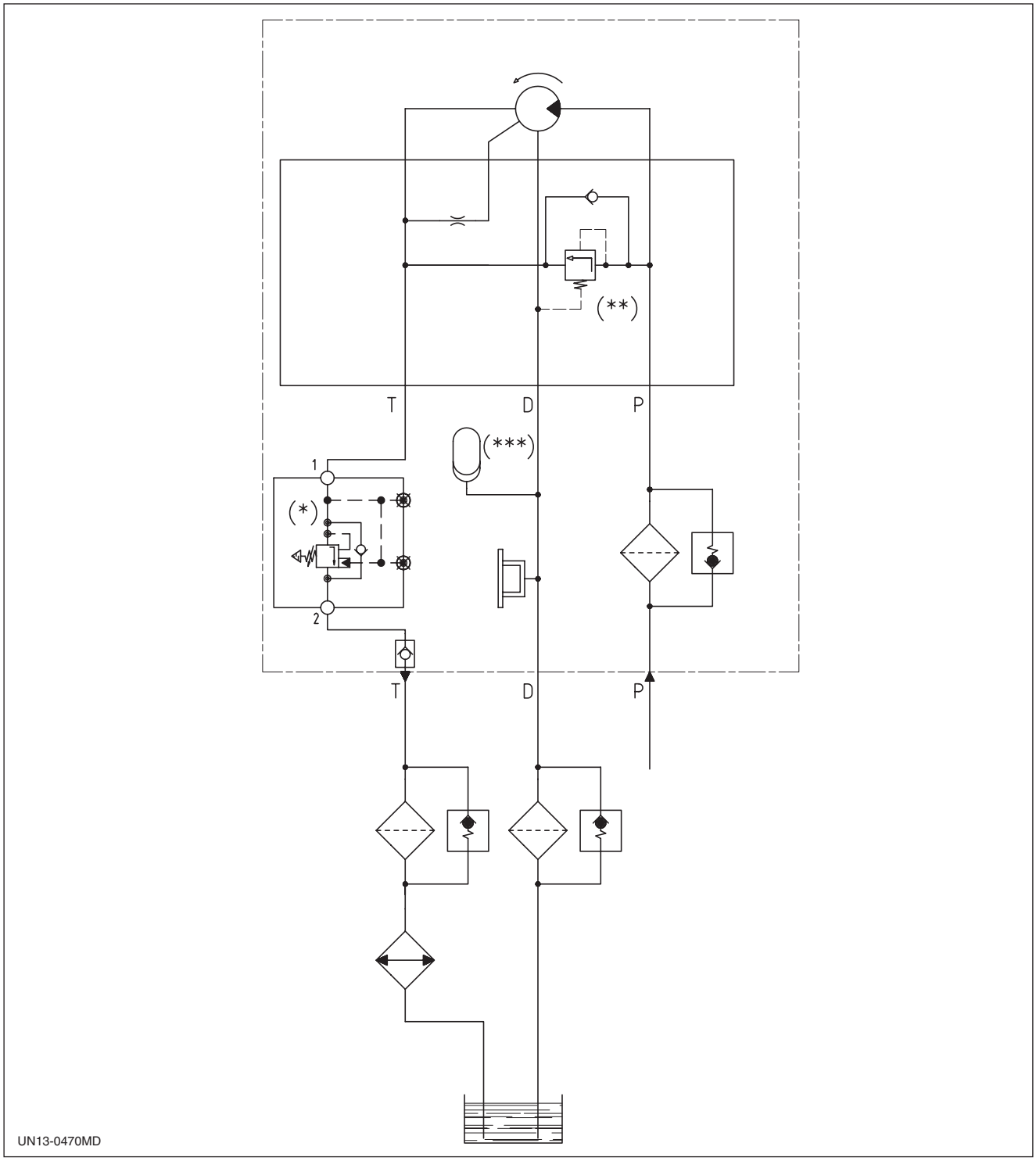
- TF 1000 - up to serial number 2007 31 0430
- TF 2000 - up to serial number 2007 31 0423



(*) - Counterpressure valve

20.8 - Hydraulic system diagram for double-drum rotary cutters (TF 1000 - TF 2000 - TF 3000)

- TF 1000 from serial n. 2007 31 0431 with buffering valve only - 2007 31 0446 with buffering valve and accumulator
- TF 2000 from serial n. 2007 31 0424 with buffering valve only - 2007 31 0425 with buffering valve and accumulator



(*) - Counterpressure valve
(**) - Buffering valve calibrated to 380 bar (settable on test bench only).
The pressure rate refers to a flow rate of 2 to 3 l/min (start of opening).
(***) - Accumulator with 2 bar nitrogen precharge pressure.

21 - CHARTS

21.1 - Lubricants chart

21.1.1 - Grease for gaskets

Simex - code n. **75742**
Type Lc Synt P Grease TEF
450 cc filter

21.1.2 - Grease for bearings

Simex - code n. **75820**
Tipo Greenplex EP Grease TEF
0.9 kg can

21.1.3 - Hydraulic oil for refilling TF coupled to prime mover equipped with mineral-based lubricant

STANDARDS AND SPECIFICATIONS	PAKELO	SHELL	ESSO	MOBIL	BP	ENI spa	ELF
- SAE 10 W - VICKERS 34VQ25A PUMP TESTINE - ALLISON C4 - API CF/CD/CF.2/SF - ACEA E1	UNIVERSAL DIESEL FK-2 10 W	RIMULA X 10 W	EXXTRANS 10 W	DELVAC HYDRAULIC 10 W	VANELLUS C3 10 W	AGIP DOESEL GOMMA S 10 W - 20	DISAL SUPREMA 10 W

21.1.4 - Hydraulic oil for refilling TF coupled to prime mover equipped with biodegradable lubricant

STANDARDS AND SPECIFICATIONS	PAKELO	PANOLIN	SHELL	ESSO	MOBIL / USA	TAMOIL	BP	ENI spa
HEES-TYPE BIODEGRADABLE SYNTHETIC OIL DIN 51 524 PART. 3	GEO LUBE HYDRAULIC EP ISO 46	HLP SYNTH 46	NATURELLE HF-E 46	UNIVIS HEES 46	ENVIROSYN 46 H	GREEN HYDRO SAFETY 46	BIOHYD SE - S 46	AGIP ARNIA S 46

STANDARDS AND SPECIFICATIONS	Q8	TOTAL FINA ELF	VALVOLINE
HEES-TYPE BIODEGRADABLE SYNTHETIC OIL DIN 51 524 PART. 3	HOLBEIN 46	BIOHYDRAN TMP 46	UNISYN HLP 32/68

*IMPORTANT: the **biodegradable** hydraulic oil stated in the chart is compatible with mineral-based lubricants (mixable up to 2%) and with prime movers supplied with biodegradable synthetic oil (not vegetable-oil derived).*

21.1.5 - Consumables

- Thread lock type: **Loctite 243** (medium hold)
- Thread lock type: **Loctite 270** (strong hold)
- Fitting sealant type: **Loctite 542**

21.2 - Tightening torques chart

21.2.1 - Maximum screw tightening torques

Screw class		Screw diameter - torque (nm) - 0.10 friction coefficient													
ISO	DIN	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30
8.8	8G	2.4	4.9	8	20	40	69	110	170	235	330	446	570	840	1150
10.9	10K	3.3	7	12	28	66	98	155	240	330	465	620	800	1200	1600
12.9	12K	4	8	14	34	67	116	185	285	395	560	750	960	1400	1950

Fitting advice

- The screws must be lubricated with engine oil.
- For parts fastened with two or more screws, the screws must be tightened progressively and alternately until the prescribed torque is reached.
- If flat washers are needed, steel washers with a minimum resistance of 80 kg/mm^2 must be used.

21.2.2 - Tightening torques for hose fittings

FITTINGS	
"Gas" diameter	Torque (Nm)
1/4"	35
3/8"	70
1/2"	100
3/4"	190
1"	300
1"1/4	330
1"1/2	400

21.2.3 - Tightening torques for hoses

WITH ORFS FITTINGS	
"W" diameter (inches)	Torque (Nm)
9/16"	25
11/16"	40
13/16"	55
1"	86
1"3/16	125
1"7/16	165
1"11/16	200
2"	245

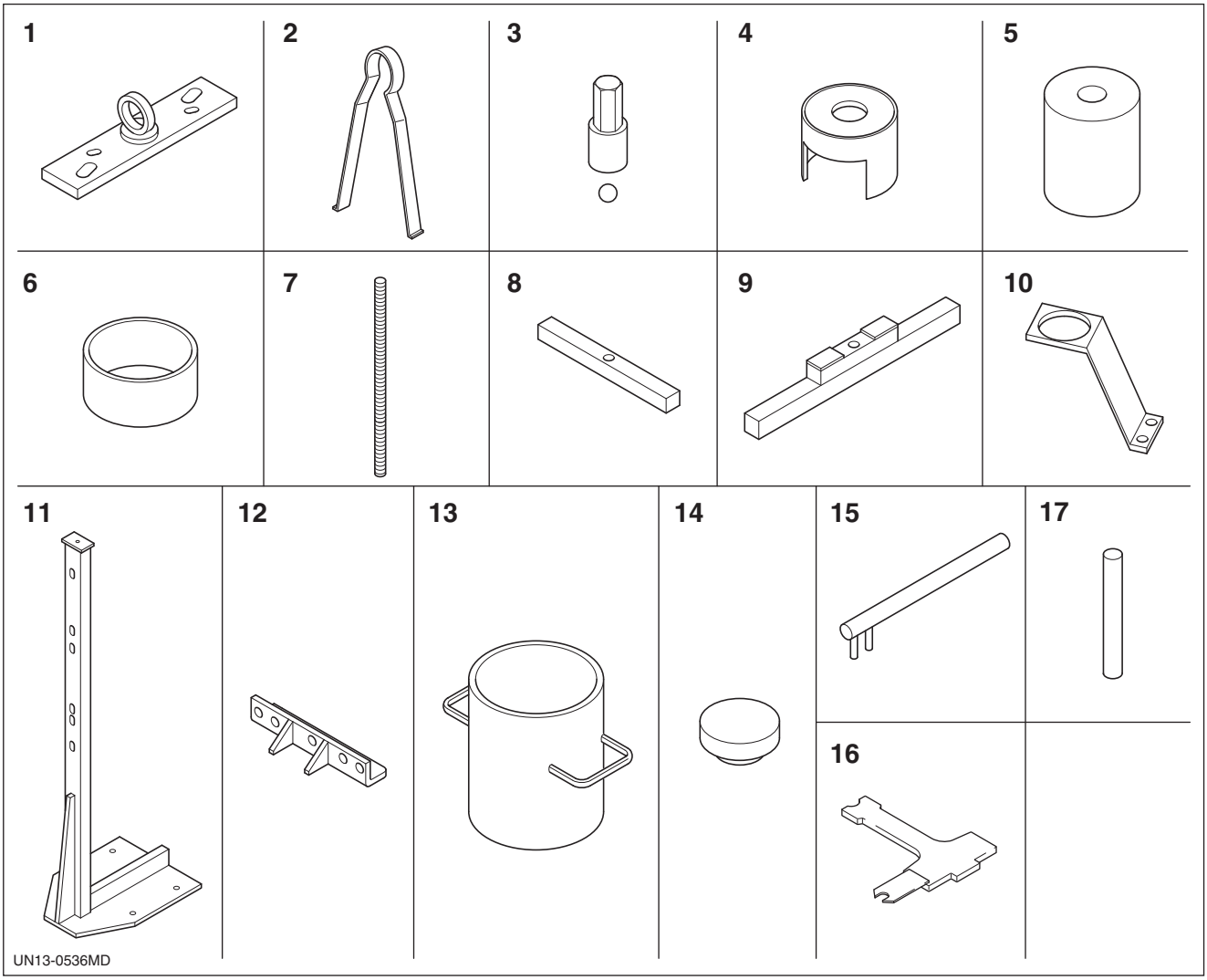
WITH JIC FITTINGS	
"W" diameter (inches)	Torque (Nm)
9/16"	30
3/4"	50
7/8"	70
1"1/16	100
1"3/16	130
1"5/16	145
1"5/8	190
1"7/8	240

WITH GAS FITTINGS	
"Gas" Diameter	Torque (Nm)
1/4"	15
3/8"	28
1/2"	60
5/8"	70
3/4"	110
1"	140
1"1/4	190
1"1/2	245

22 - TOOLING

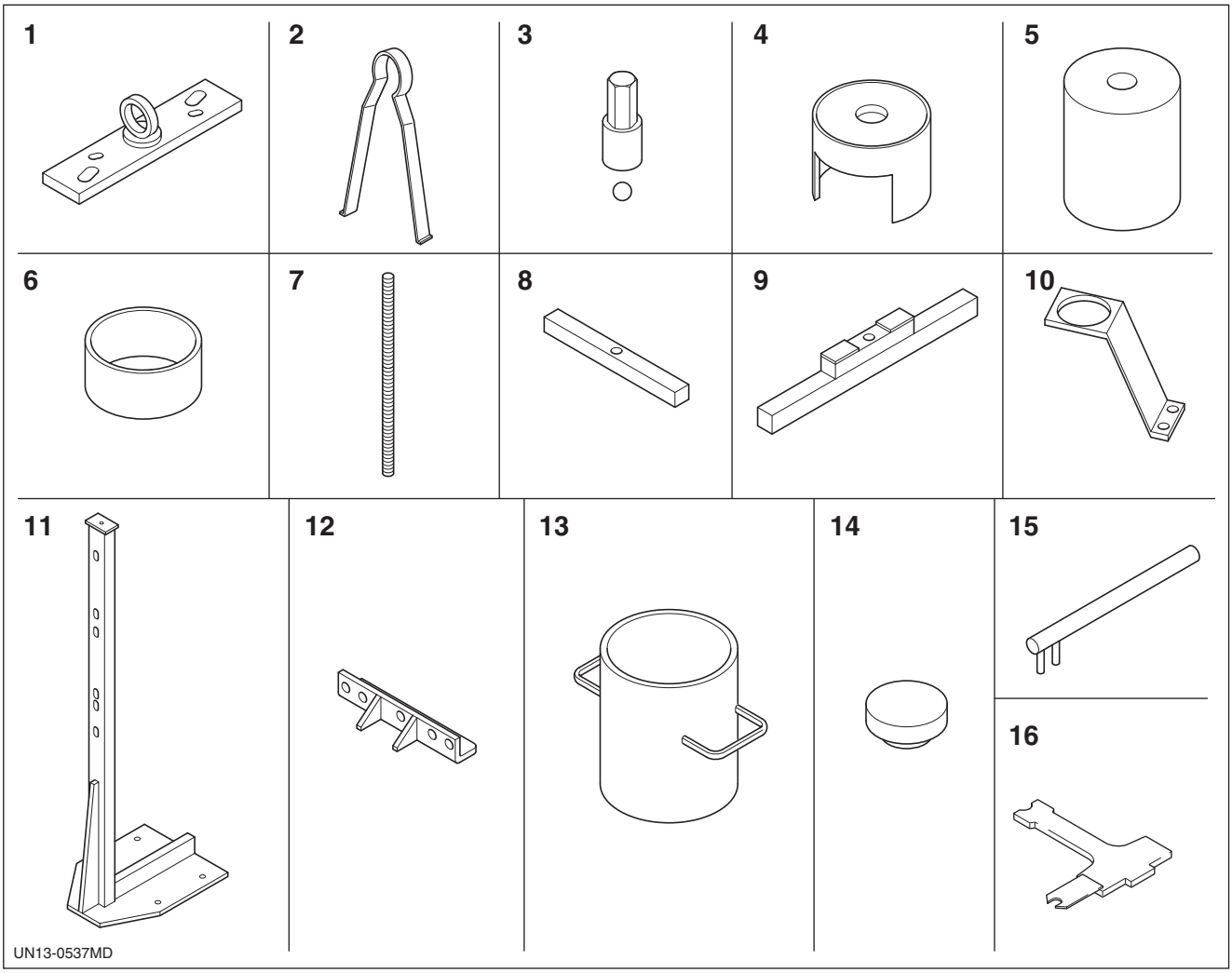
Tooling can be ordered as individual items or in a full kit.

22.1 - Tooling for TF 200



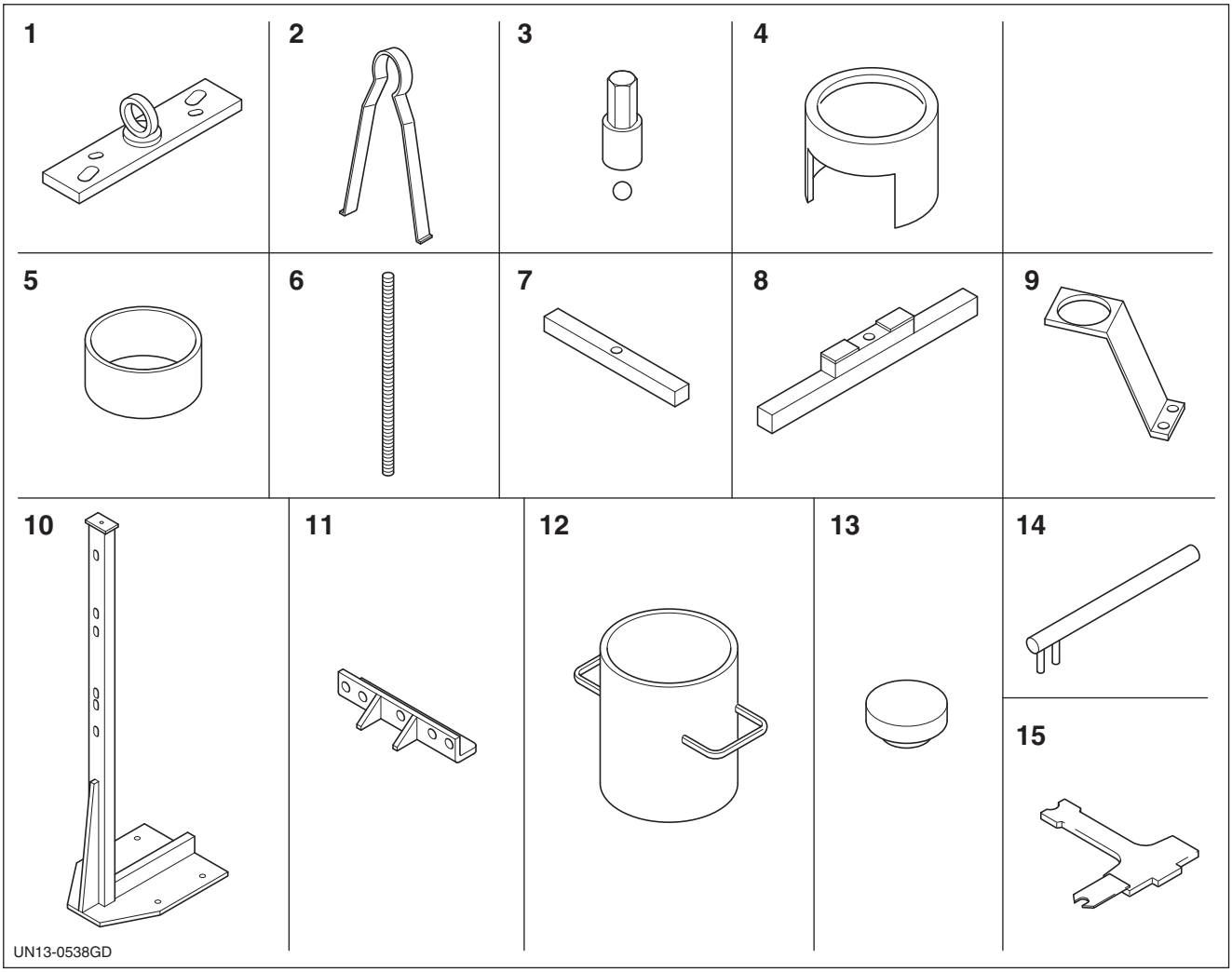
Position	Name	Code n.
1	HOISTING TOOL FOR ENTIRE HUB UNIT	25991
2	SPRING PLIERS FOR FITTING OUTER BEARING RINGS	25990
3	BUSH WITH Ø 15 BALL FOR TIGHTENING DOUBLE-ENDED STAY BOLTS	28660
4	BLOCK FOR PRELOADING BEARINGS	26005
5	BEARING ASSEMBLY BLOCK	28146
6	DRUM HUB SUPPORT RING	25999
7	M10 THREADED BAR	28969
8	STRIP FOR THREADED BAR TIGHTENING	25988
9	GUIDE STRIP FOR THREADED BAR	25989
10	RETAINING BRACKET FOR TOOTHED SHAFT	28967
11	SUPPORT FRAME	25995
12	CORNER BRACKET FOR FRAME FASTENING	25998
13	SUPPORTING CYLINDER FOR DRUM HUB EXTRACTION	26688
14	DRUM HUB EXTRACTION BLOCK	26693
15	BEARING SUPPORT ROTATION LEVER	26698
16	SPANNER FOR FITTING AND REMOVING SEEGER TOOLS	28290
17	CALIBRATED BAR FOR DISTRIBUTOR POSITIONING	28968
1 ÷ 17	TOOLING KIT FOR TF 200	29338

22.2 - Tooling for TF 400



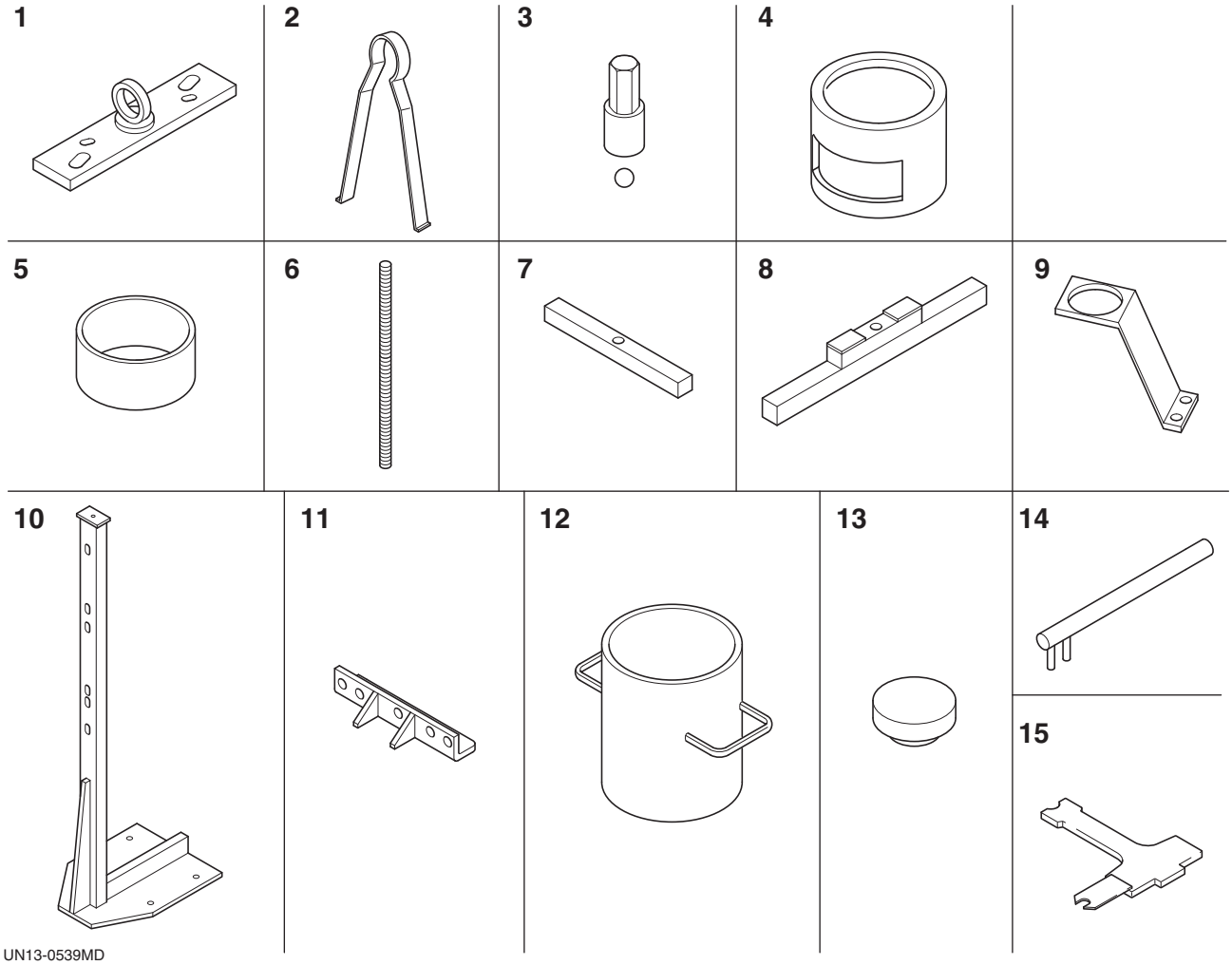
Position	Name	Code n.
1	HOISTING TOOL FOR ENTIRE HUB UNIT	25991
2	SPRING PLIERS FOR FITTING OUTER BEARING RINGS	25990
3	BUSH WITH Ø 15 BALL FOR TIGHTENING DOUBLE-ENDED STAY BOLTS	28660
4	BLOCK FOR PRELOADING BEARINGS	26006
5	BEARING ASSEMBLY BLOCK	28150
6	DRUM HUB SUPPORT RING	26000
7	M10 THREADED BAR	25986
8	STRIP FOR THREADED BAR TIGHTENING	25988
9	GUIDE STRIP FOR THREADED BAR	25989
10	RETAINING BRACKET FOR TOOTHED SHAFT	28999
11	SUPPORT FRAME	25995
12	CORNER BRACKET FOR FRAME FASTENING	25998
13	SUPPORTING CYLINDER FOR DRUM HUB EXTRACTION	26689
14	DRUM HUB EXTRACTION BLOCK	26694
15	BEARING SUPPORT ROTATION LEVER	26698
16	SPANNER FOR FITTING AND REMOVING SEEGER TOOLS	28290
1 ÷ 16	TOOLING KIT FOR TF 400	29339

22.3 - Tooling for TF 600



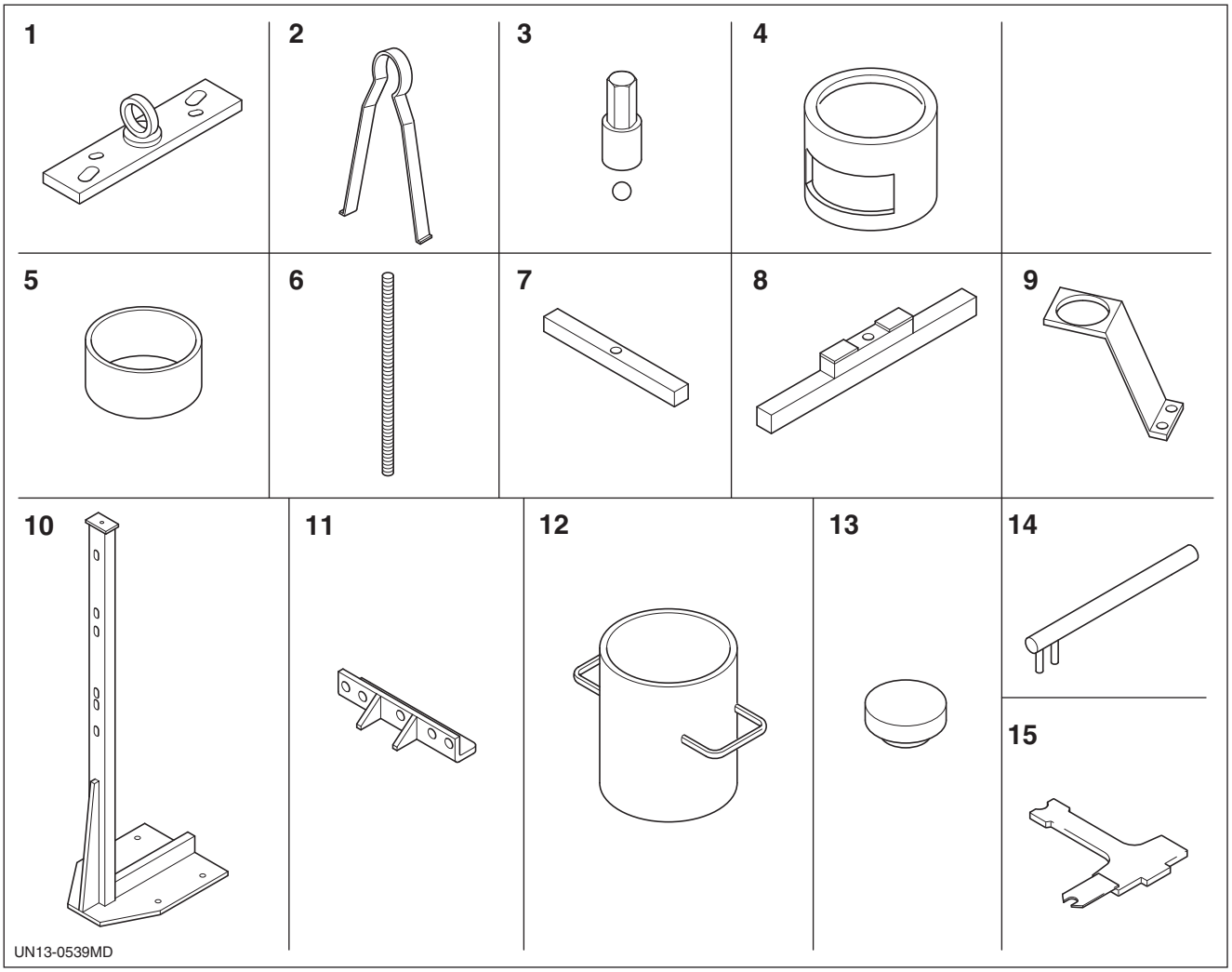
Position	Name	Code n.
1	HOISTING TOOL FOR ENTIRE HUB UNIT	25991
2	SPRING PLIERS FOR FITTING OUTER BEARING RINGS	25990
3	BUSH WITH Ø 19 BALL FOR TIGHTENING DOUBLE-ENDED STAY BOLTS	25987
4	BLOCK FOR PRELOADING BEARINGS	26007
5	DRUM HUB SUPPORT RING	26001
6	M10 THREADED BAR	25986
7	STRIP FOR THREADED BAR TIGHTENING	25988
8	GUIDE STRIP FOR THREADED BAR	25989
9	RETAINING BRACKET FOR TOOTHED SHAFT	29345
10	SUPPORT FRAME	25995
11	CORNER BRACKET FOR FRAME FASTENING	25998
12	SUPPORTING CYLINDER FOR DRUM HUB EXTRACTION	26690
13	DRUM HUB EXTRACTION BLOCK	26695
14	BEARING SUPPORT ROTATION LEVER	26698
15	SPANNER FOR FITTING AND REMOVING SEEGER TOOLS	28323
1 ÷ 15	TOOLING KIT FOR TF 600	29340

22.4 - Tooling for TF 800



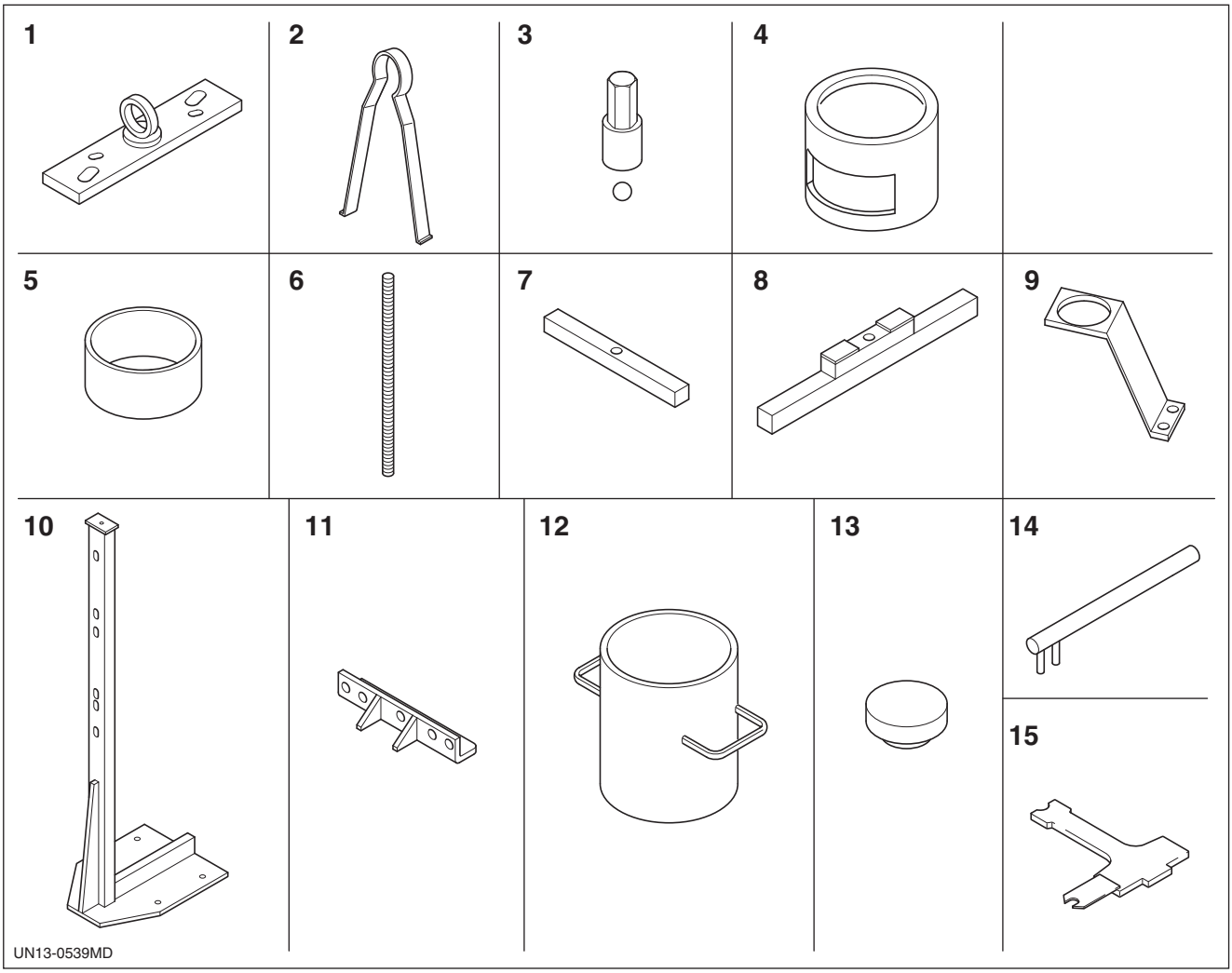
Position	Name	Code n.
1	HOISTING TOOL FOR ENTIRE HUB UNIT	25991
2	SPRING PLIERS FOR FITTING OUTER BEARING RINGS	25990
3	BUSH WITH Ø 19 BALL FOR TIGHTENING DOUBLE-ENDED STAY BOLTS	25987
4	BLOCK FOR PRELOADING BEARINGS	26008
5	DRUM HUB SUPPORT RING	26002
6	M10 THREADED BAR	25986
7	STRIP FOR THREADED BAR TIGHTENING	25988
8	GUIDE STRIP FOR THREADED BAR	25989
9	RETAINING BRACKET FOR TOOTHED SHAFT	29346
10	SUPPORT FRAME	25995
11	CORNER BRACKET FOR FRAME FASTENING	25998
12	SUPPORTING CYLINDER FOR DRUM HUB EXTRACTION	26691
13	DRUM HUB EXTRACTION BLOCK	26696
14	BEARING SUPPORT ROTATION LEVER	26699
15	SPANNER FOR FITTING AND REMOVING SEEGER TOOLS	27978
1 ÷ 15	TOOLING KIT FOR TF 800	29341

22.5 - Tooling for TF 1000



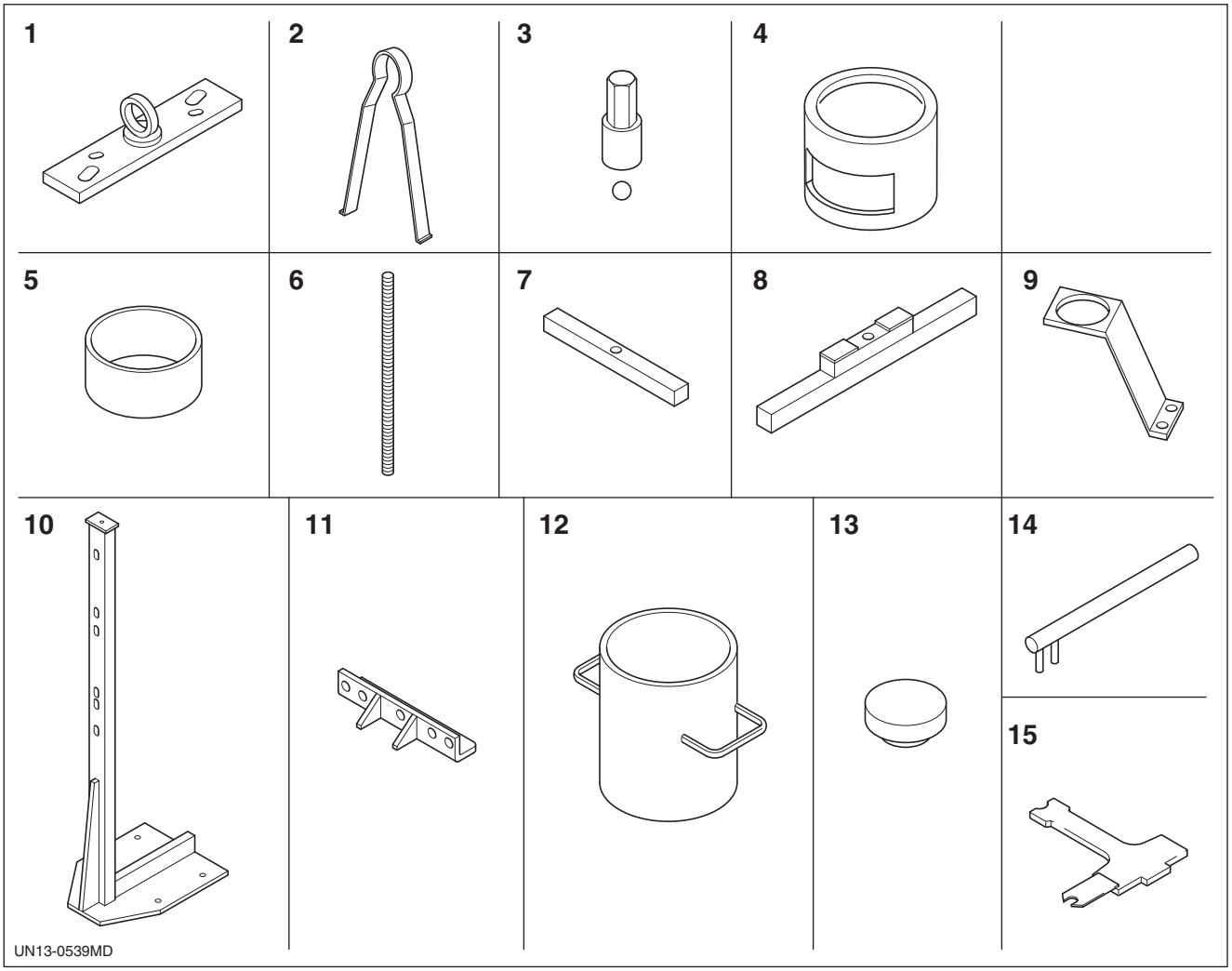
Position	Name	Code n.
1	HOISTING TOOL FOR ENTIRE HUB UNIT	25991
2	SPRING PLIERS FOR FITTING OUTER BEARING RINGS	25990
3	BUSH WITH Ø 19 BALL FOR TIGHTENING DOUBLE-ENDED STAY BOLTS	25987
4	BLOCK FOR PRELOADING BEARINGS	26009
5	DRUM HUB SUPPORT RING	26003
6	M10 THREADED BAR	25986
7	STRIP FOR THREADED BAR TIGHTENING	25988
8	GUIDE STRIP FOR THREADED BAR	25989
9	RETAINING BRACKET FOR TOOTHED SHAFT	29347
10	SUPPORT FRAME	25995
11	CORNER BRACKET FOR FRAME FASTENING	25998
12	SUPPORTING CYLINDER FOR DRUM HUB EXTRACTION	26692
13	DRUM HUB EXTRACTION BLOCK	26697
14	BEARING SUPPORT ROTATION LEVER	26699
15	SPANNER FOR FITTING AND REMOVING SEEGER TOOLS	27978
1 ÷ 15	TOOLING KIT FOR TF 1000	29342

22.6 - Tooling for TF 2000



Position	Name	Code n.
1	HOISTING TOOL FOR ENTIRE HUB UNIT	25991
2	SPRING PLIERS FOR FITTING OUTER BEARING RINGS	25990
3	BUSH WITH Ø 19 BALL FOR TIGHTENING DOUBLE-ENDED STAY BOLTS	25987
4	BLOCK FOR PRELOADING BEARINGS	26010
5	DRUM HUB SUPPORT RING	26004
6	M10 THREADED BAR	25986
7	STRIP FOR THREADED BAR TIGHTENING	25988
8	GUIDE STRIP FOR THREADED BAR	25989
9	RETAINING BRACKET FOR TOOTHED SHAFT	29348
10	SUPPORT FRAME	25995
11	CORNER BRACKET FOR FRAME FASTENING	25998
12	SUPPORTING CYLINDER FOR DRUM HUB EXTRACTION	28215
13	DRUM HUB EXTRACTION BLOCK	28216
14	BEARING SUPPORT ROTATION LEVER	26699
15	SPANNER FOR FITTING AND REMOVING SEEGER TOOLS	27978
1 ÷ 15	TOOLING KIT FOR TF 2000	29343

22.7 - Tooling for TF 3000



Position	Name	Code n.
1	HOISTING TOOL FOR ENTIRE HUB UNIT	25991
2	SPRING PLIERS FOR FITTING OUTER BEARING RINGS	25090
3	BUSH WITH Ø 24 BALL FOR TIGHTENING DOUBLE-ENDED STAY BOLTS	28379
4	BLOCK FOR PRELOADING BEARINGS	29521
5	DRUM HUB SUPPORT RING	28372
6	M10 THREADED BAR	25986
7	STRIP FOR THREADED BAR TIGHTENING	25988
8	GUIDE STRIP FOR THREADED BAR	25989
9	RETAINING BRACKET FOR TOOTHED SHAFT	29349
10	SUPPORT FRAME	-
11	CORNER BRACKET FOR FRAME FASTENING	-
12	SUPPORTING CYLINDER FOR DRUM HUB EXTRACTION	28698
13	DRUM HUB EXTRACTION BLOCK	28216
14	BEARING SUPPORT ROTATION LEVER	26699
15	SPANNER FOR FITTING AND REMOVING SEEGER TOOLS	27978
1 ÷ 15	TOOLING KIT FOR TF 3000	29344

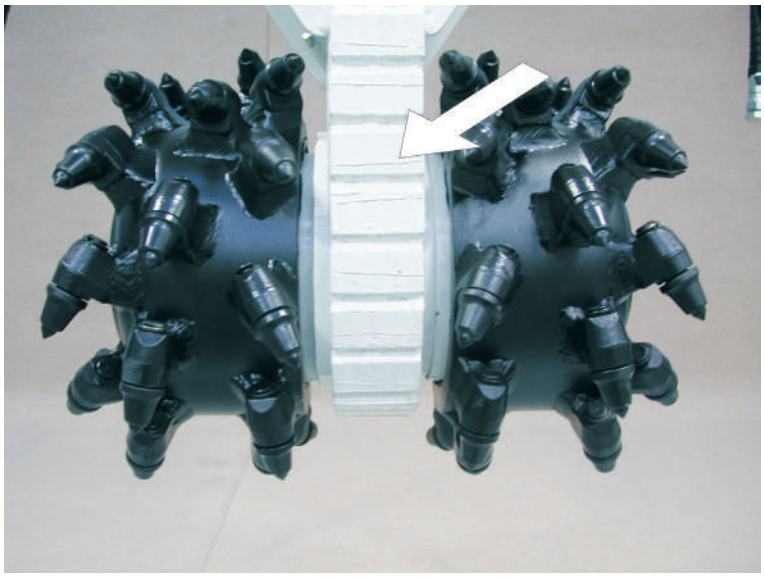
23 - REPLACEMENT OF PARTS SUBJECT TO WEAR

23.1 - Wear plate assessment

The wear plates welded to the central section of the frame (between the two drums, as shown in the figure), are comprised of two layers:
- the outer layer, made of hard, wear-resistant material;
- the inner layer (welded to the frame), made of weldable steel.

When the hard part (outer) shows signs of wear, the plates must be replaced with new ones (to prevent damage to the frame).

IMPORTANT: not featured on the TF 200.



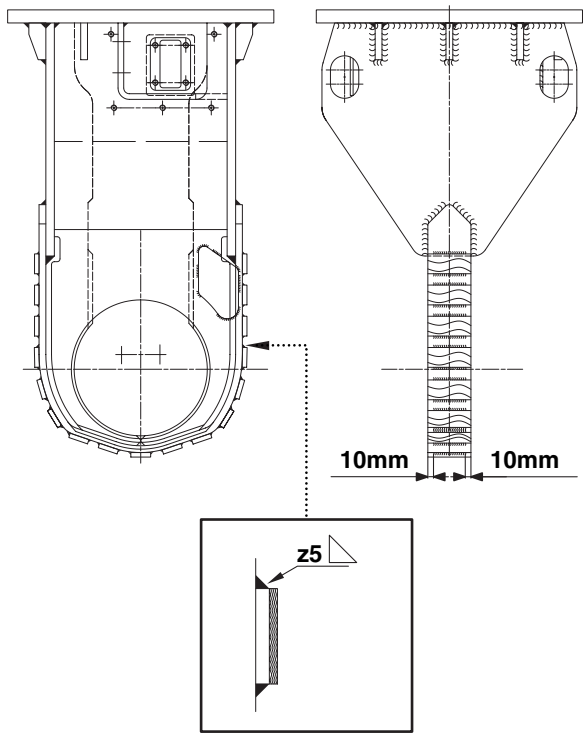
UN13-0467GD

23.1.1 - Wear plate replacement

a - Detach the plates by removing the welding fastening them to the frame, using the specific equipment (e.g. angle grinder).

b - Weld on the new plates, leaving an unwelded section at both ends, approximately 10 mm in length.

IMPORTANT: use EN 12534 - AWS A5.28. class welding wire.
Welding size **z5** .



UN13-0476MD

23.2 - Tool holder inspection

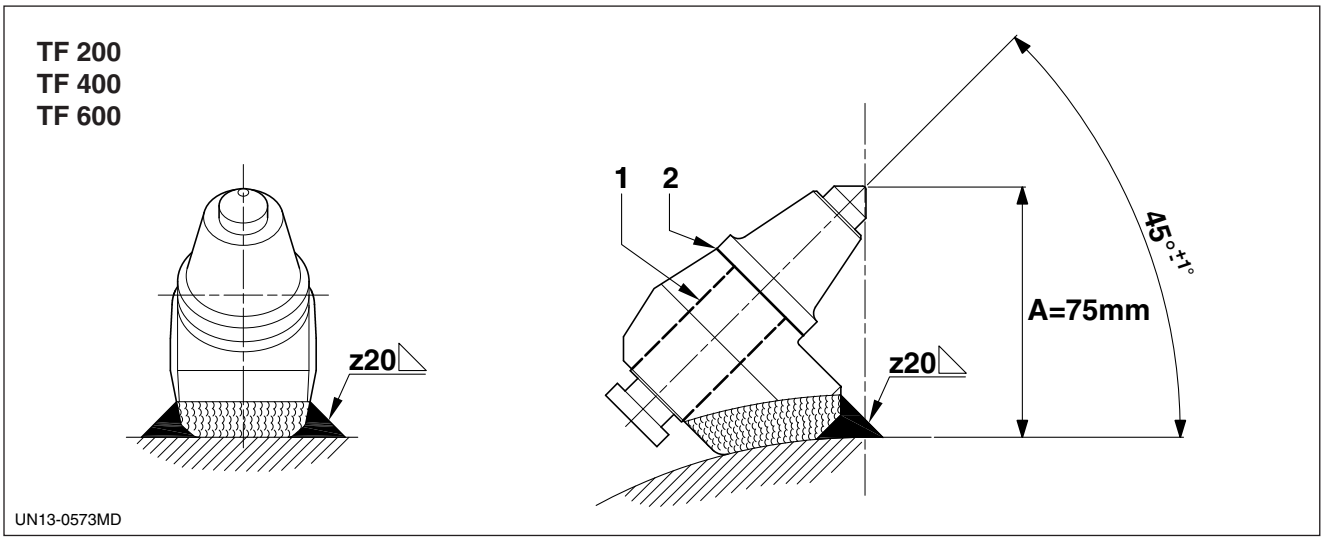
Check that the inner hole (**1**) housing the tool has not ovalised and that the tool's resting surface (**2**) is in good condition; if it is not, replace the tool holder.

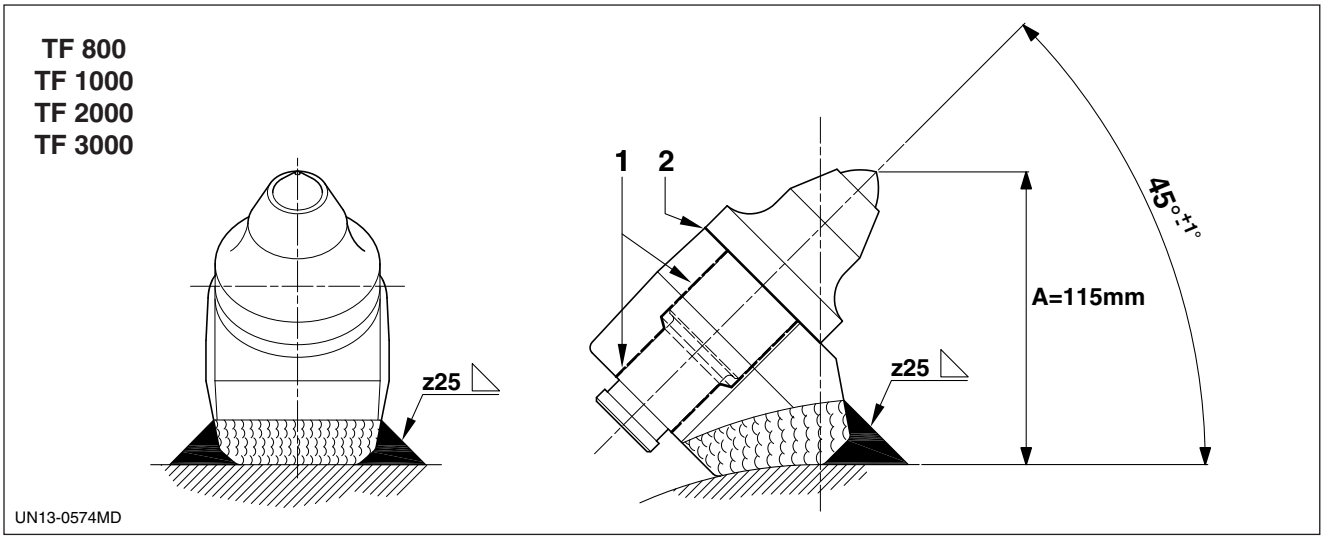
23.2.1 - Tool holder replacement

a - Before detaching a tool holder, position a marker jig on the carrier temporarily to mark the positioning and angle in relation to the drum axis.

b - Detach the tool holder, using specific equipment (e.g.: angle grinder or oxyhydrogen flame), and clean the area where the new tool holder will be fitted perfectly.

c - Position the new tool holder as marked (angle and height "**A**") in the diagrams below. For the direction and angle in relation to the drum axis, see the marker jig mentioned in section **a**.





d - Without the tool inserted, spot-weld the three sides proceeding in an overlapping fashion, as shown in the figure.

***N.B.**: do not weld the rear side.*

IMPORTANT: use EN 758 - AWS 5.18 class flux cored welding wire.

IMPORTANT: to replace the tooth carriers, remove the drum and the inner gaskets.

24 - TROUBLESHOOTING

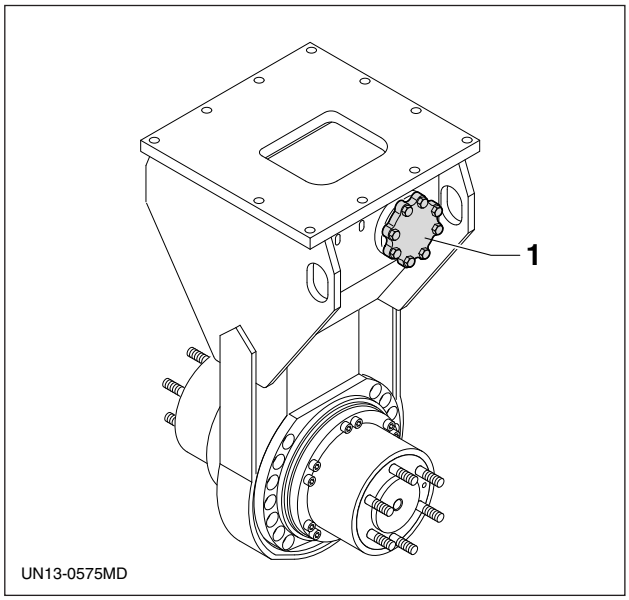
24.1 - Drain line safety cover inspection

To prevent damage to the hydraulic motor due to high counterpressure in the drain line, a safety cover (**1**) has been fitted which allows excess pressure to be relieved. More specifically, when the draining line counterpressure exceeds 1 bar, the cover deforms and allows oil out, thereby releasing the excess pressure. Before replacing the cover, check that the drain line is correctly installed and not damaged, and that the filter fitted on the line is not clogged.

24.1.1 - Safety cover replacement

a - Carefully clean the safety cover (**1**) and the surrounding area well, making sure no dirt enters the system.

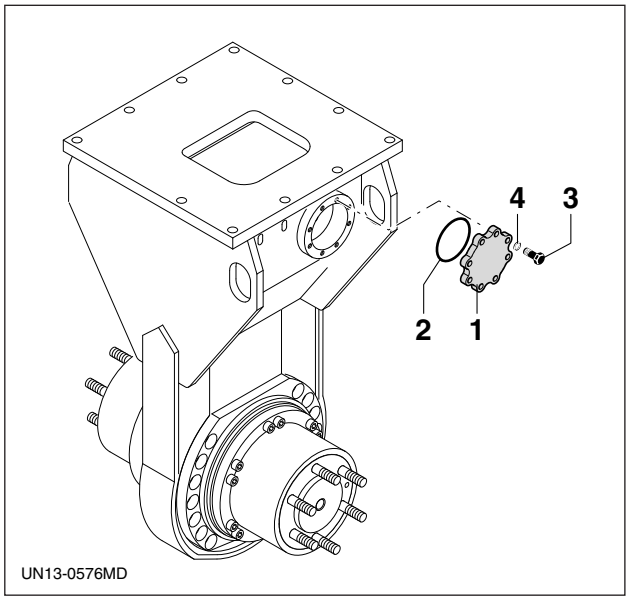
b - Undo the screws (**3**) and remove the washers (**4**).



c - Remove the safety cover (**1**), including the O-ring (**2**).

d - Fit the new safety cover, including the new O-ring.

IMPORTANT: the new cover fitted MUST have the same thickness as the original one.



If the safety cover is warped and the hydraulic system features an accumulator, the nitrogen pre-charge pressure must be checked at a specialised centre (pressure must be 2 bar).

24.2 - Troubleshooting

This section aims to provide the maintenance engineer with solutions to the most commonly experienced problems (malfunctions).
Do not carry out any maintenance or repairs which would affect machine safety.

*- The remedies marked with the letter **R** require the intervention of the authorised dealer.*
*- The remedies marked with the letter **P** require the intervention of qualified personnel.*
*- The remedies marked with the letter **O** can be carried out by the operator.*

FAULT	LIKELY CAUSE	REMEDY	
SLOW CUTTING, LOW PERFORMANCE	TEETH TIPS WORN OR BROKEN	REPLACE THE TOOLS AND CLEAN THEIR SEATS	**O**
	LOW FLOW AND/OR HYDRAULIC PRESSURE	MAKE SURE ALL THE CONNECTIONS REQUIRED TO ENSURE CORRECT OPERATION WITH THE CUTTER ATTACHED HAVE BEEN MADE PROPERLY. CONTACT THE PRIME MOVER'S SERVICE DEPARTMENT, AS THE FLOW AND HYDRAULIC PRESSURE DEPEND ON THE PRIME MOVER.	**R**
	INTERNAL LEAKAGE AT BY-PASS VALVE ON HYDRAULIC MOTOR VALVE BLOCK	REPLACE THE BY-PASS VALVE GASKETS.	
VIBRATIONS	LOOSE OR MISSING SCREWS/BOLTS	CHECK THE TIGHTENING TORQUES OF THE SCREWS/BOLTS (DRUMS, ADAPTOR PLATE, HYDRAULIC MOTOR, ETC.). REPLACE THE MISSING SCREWS/BOLTS.	**P**
	WORN OR MISSING TOOLS	REPLACE THE TOOLS AND CLEAN THEIR SEATS	**O**
	WHEN WORKING ON WALLS, THE DRUM ROTATION DIRECTION TENDS TO MAKE THE ARM MOVE UPWARDS	ROTATE THE ADAPTER PLATE BY 180° AND WORK IN THE OPPOSITE DIRECTION	**P**
CUTTER HYDRAULIC MOTOR NOISY OR JAMMED	PROBLEMS INSIDE THE MOTOR	CONTACT AN AUTHORISED SIMEX SERVICE CENTRE	**R**
	PRESSURISER VALE JAMMED	REMOVE, CLEAN OR REPLACE (SEE WORKSHOP MANUAL)	**P**
CUTTER DOES NOT TURN	NO HYDRAULIC FLOW AND/OR PRESSURE	CHECK THE PRIME MOVER'S HYDRAULIC SYSTEM	**P**
	PRESSURE AND RETURN LINES INVERTED	SWAP ROUND THE PRESSURE AND RETURN CONNECTIONS	**O**
	VALVES ON ARM CLOSED	OPEN VALVES	
CUTTER TURNS TOO SLOWLY OR TOO QUICKLY	INCORRECT CUTTER/PRIME MOVER COUPLING	CONTACT AN AUTHORISED SIMEX SERVICE CENTRE	**R**
EXTERNAL OIL LEAKS	FITTINGS ARE LOOSE	TIGHTEN FITTINGS	**O**
	HOSING DAMAGED	REPLACE HOSING	**P**
	COUPLINGS DAMAGED	REPLACE COUPLINGS	
	LEAKS FROM THE HYDRAULIC MOTOR OIL SEALS	CONTACT AN AUTHORISED SIMEX SERVICE CENTRE	**R**
SAFETY COVER SWOLLEN	DRAIN LINE MISSING OR FITTED INCORRECTLY	ALWAYS CONNECT THE DRAIN LINE DIRECTLY TO THE PRIME MOVER'S TANK	**R**
	HOSING DAMAGED	REPLACE HOSE	**P**
	COUPLING DAMAGED	REPLACE COUPLING	
	CUTTER STARTS SHARPLY WITH THE DIESEL ENGINE (ON THE PRIME MOVER) RUNNING AT TOP SPEED	START UP THE CUTTER WITH THE ENGINE IDLING, THEN - AFTER A FEW SECONDS - ACCELERATE SLOWLY AND GRADUALLY UNTIL OPERATING SPEED IS REACHED	**O**
	COUNTERPRESSURE IN PRIME MOVER'S DRAIN LINE IS TOO HIGH	CONTACT A SIMEX AUTHORISED SERVICE CENTRE TO HAVE THE COUNTERPRESSURE CHECKED (LIMIT = < 1 BAR)	**R**
	DRAIN FILTER CLOGGED	REPLACE FILTER CARTRIDGE	**P**
	ACCUMULATOR NITROGEN PRECHARGE LEVEL LOW	CARRY OUT NITROGEN PRECHARGE OR REPLACE ACCUMULATOR	**P**

NOTES

NOTES

Importatore / *Importer* / **Importateur** / *Importeur* / **Importador**