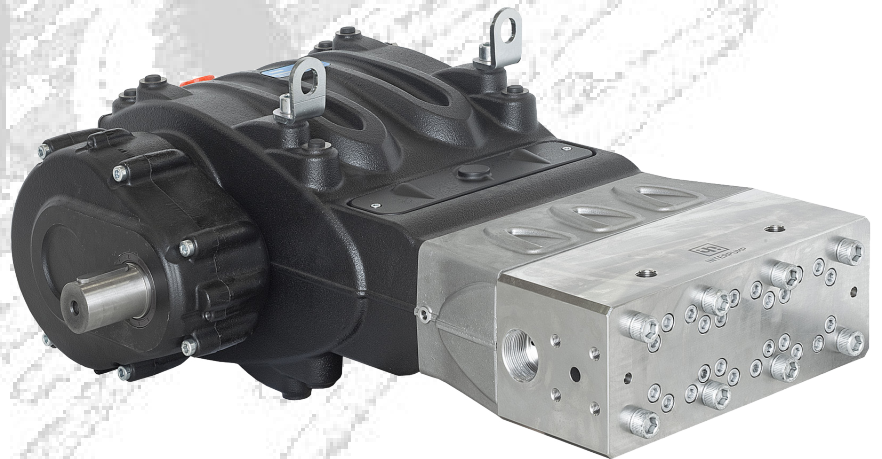


# Serie SM



**Manuale di riparazione**  
**Repair Manual**  
**Manuel de réparation**  
**Reparaturanleitung**  
**Manual de reparación**  
**Manual de reparação**

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## 1 INTRODUZIONE

Questo manuale descrive le istruzioni per la riparazione delle pompe famiglia SM e deve essere attentamente letto e compreso prima di effettuare ed eseguire qualsiasi intervento sulla pompa.

Dal corretto uso e dalla adeguata manutenzione dipende il regolare funzionamento e durata della pompa.

Interpump Group declina ogni responsabilità per danni causati da negligenza e mancata osservanza delle norme descritte in questo manuale.

### 1.1 DESCRIZIONE SIMBOLI

Leggere attentamente quanto riportato in questo manuale prima di ogni operazione.



**Segnale di Avvertenza**



Leggere attentamente quanto riportato in questo manuale prima di ogni operazione.



**Segnale di Pericolo**

Munirsi di occhiali protettivi.



**Segnale di Pericolo**

Munirsi di guanti protettivi prima di ogni operazione.

## 2 NORME DI RIPARAZIONE



### 2.1 RIPARAZIONE DELLA PARTE MECCANICA

Le operazioni di riparazione della parte meccanica devono essere eseguite dopo aver rimosso l'olio dal carter.

Per togliere l'olio occorre rimuovere il tappo di carico olio pos. ①, Fig. 1 e successivamente il tappo di scarico pos. ②, Fig. 1.

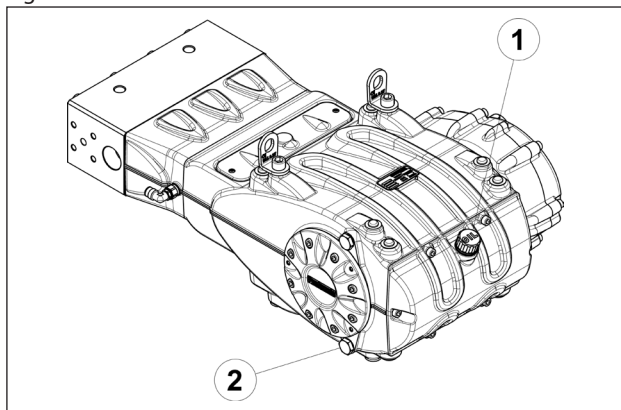


Fig. 1



**L'olio esausto deve essere messo in un apposito recipiente e smaltito negli appositi centri. Non deve essere assolutamente disperso nell'ambiente.**

### 2.1.1 Smontaggio della parte meccanica

La corretta sequenza è la seguente.

Svuotare completamente la pompa dall'olio, quindi provvedere allo smontaggio del coperchio carter (e relativo O-ring) svitando le 6 viti M10 (pos. ①, Fig. 2).

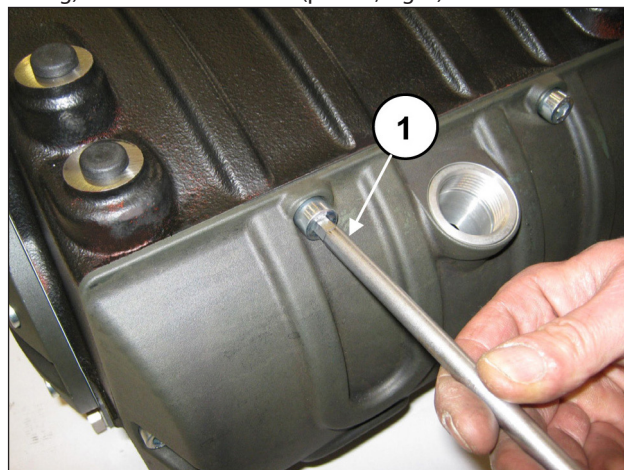


Fig. 2

Rimuovere la linguetta dall'albero PTO (pos. ①, Fig. 3).

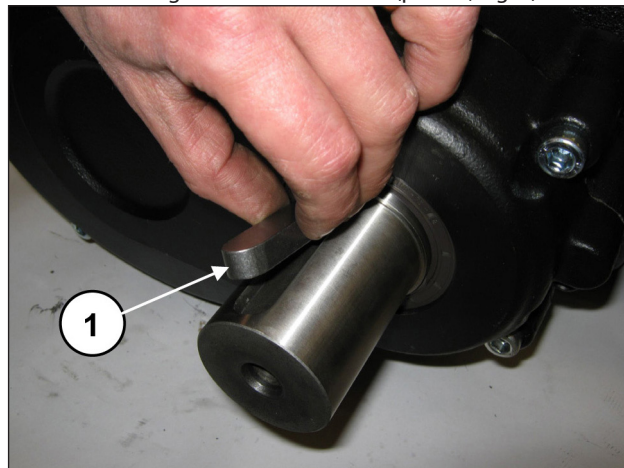


Fig. 3

Svitare le viti di fissaggio coperchio riduttore (pos. ①, Fig. 4).

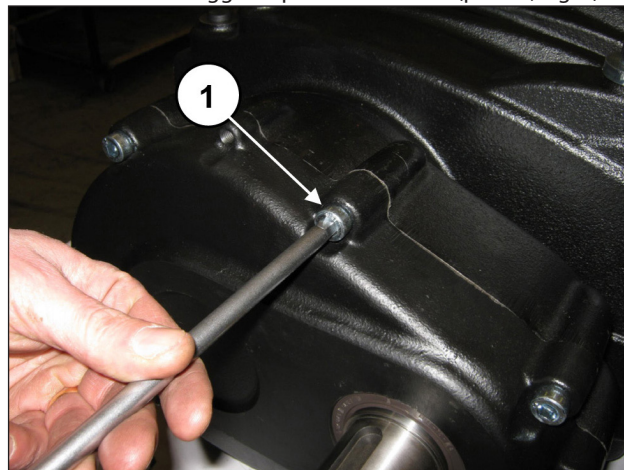


Fig. 4

Posizionare n. 3 grani o viti filettate M8 (pos. ①, Fig. 5) con la funzione di estrattori negli appositi fori e due viti M10 sufficientemente lunghe con la funzione di sostegno coperchio (pos. ②, Fig. 5).

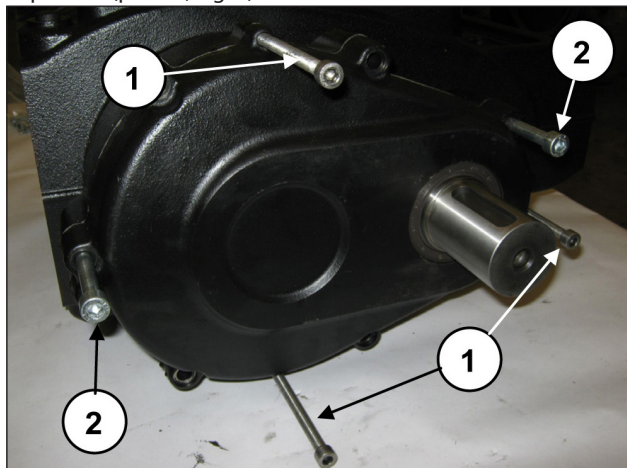


Fig. 5

Avvitare gradualmente le 3 viti M8 (pos. ①, Fig. 6) con la funzione di estrattori fino a rimuovere completamente il gruppo coperchio e pignone

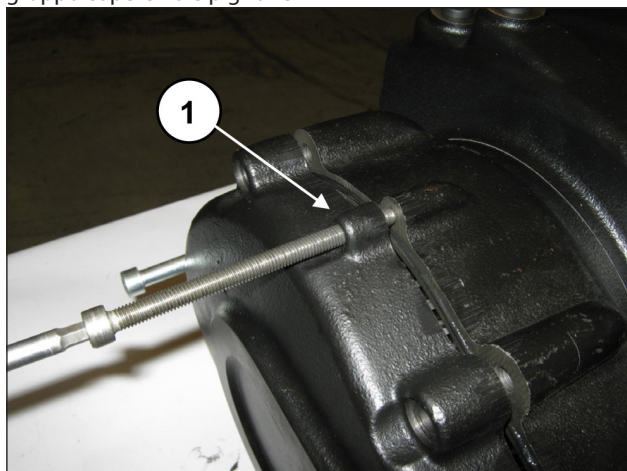


Fig. 6

È possibile provvedere allo smontaggio completo del coperchio riduttore dal pignone procedendo come segue: Rimuovere l'anello seeger Ø120 (pos. ①, Fig. 7).

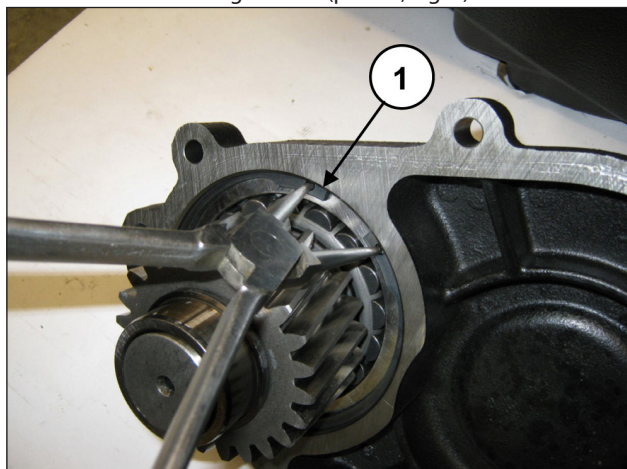


Fig. 7

Separare il pignone dal coperchio agendo mediante massa battente sul pignone stesso (pos. ①, Fig. 8).

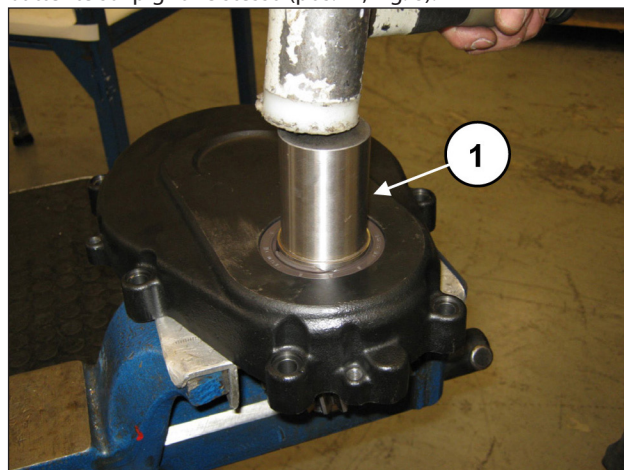


Fig. 8

Rimuovere l'anello seeger Ø55 (pos. ①, Fig. 9) e l'anello appoggio cuscinetto (pos. ①, Fig. 10) dal pignone

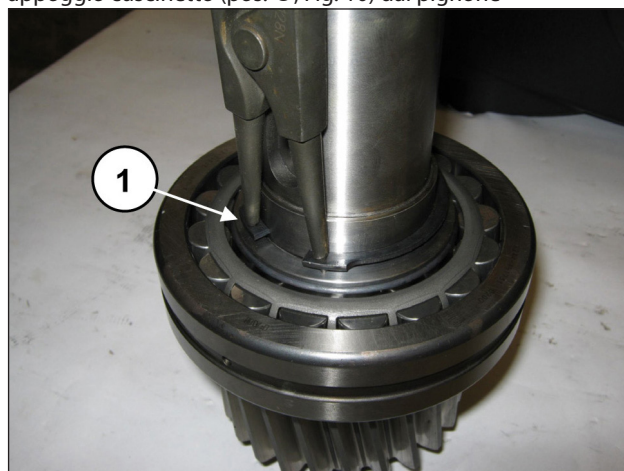


Fig. 9

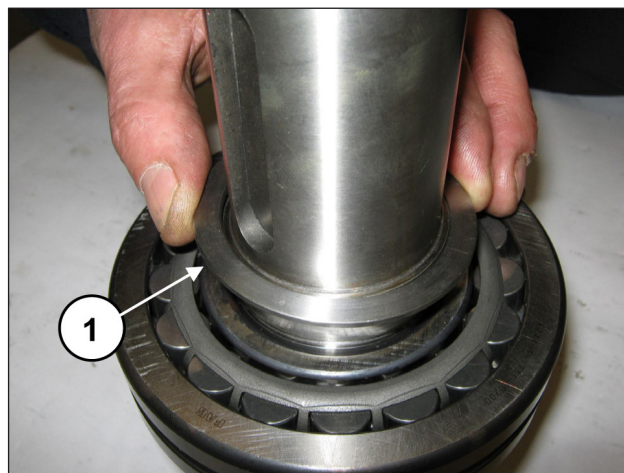


Fig. 10

Estrarre il paraolio dal coperchio riduttore agendo dal lato interno del coperchio (pos. ①, Fig. 11).

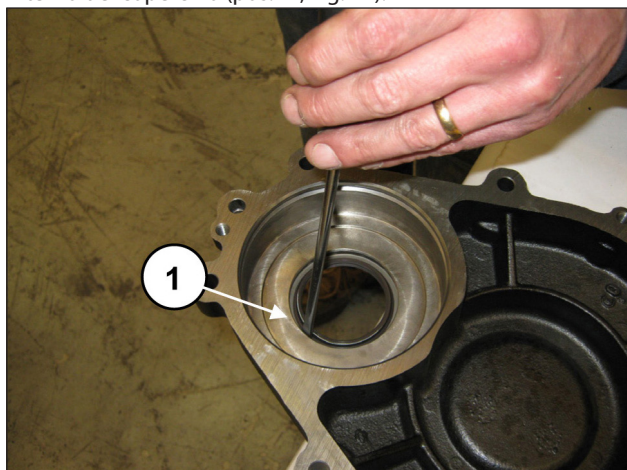


Fig. 11

Svitare le viti che fissano il fermo corona (pos. ①, Fig. 12) e rimuoverlo (pos. ①, Fig. 13).

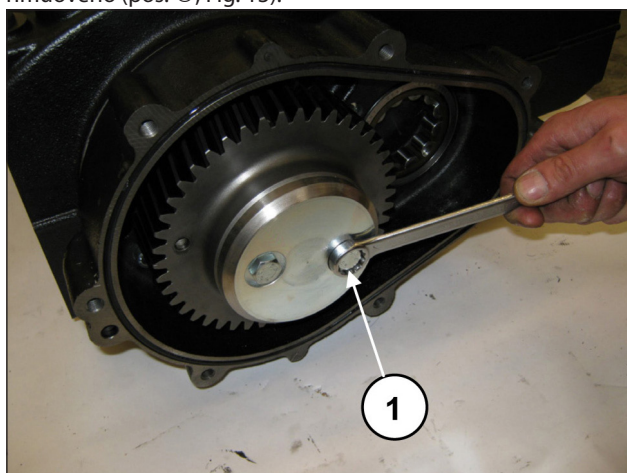


Fig. 12

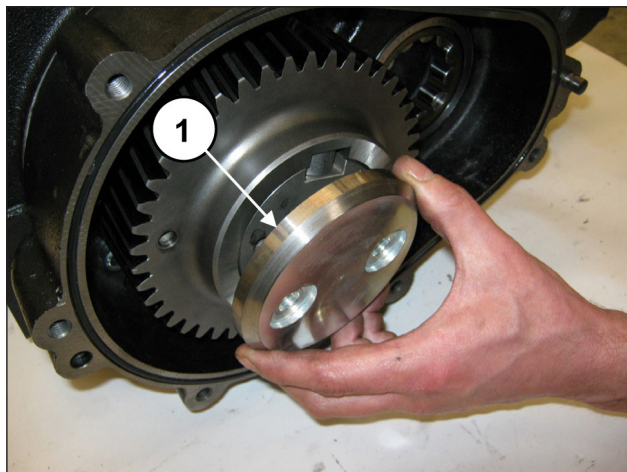


Fig. 13

Sfilare la corona (pos. ①, Fig. 14). Qualora fosse necessario è possibile utilizzare un estrattore a massa battente da applicare ai 2 fori M8 (pos. ②, Fig. 14).

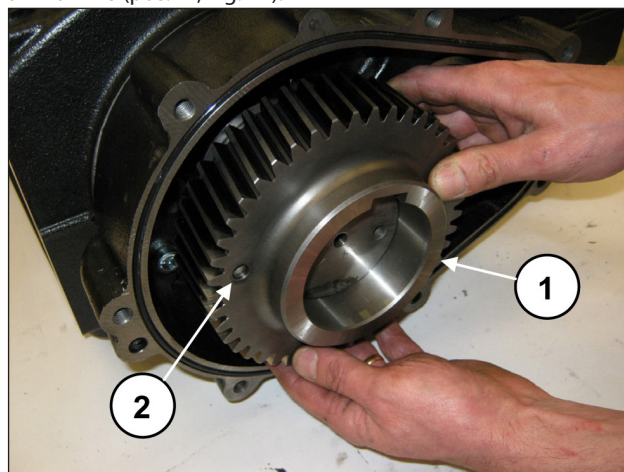


Fig. 14

Togliere la linguetta dall'albero (pos. ①, Fig. 15).

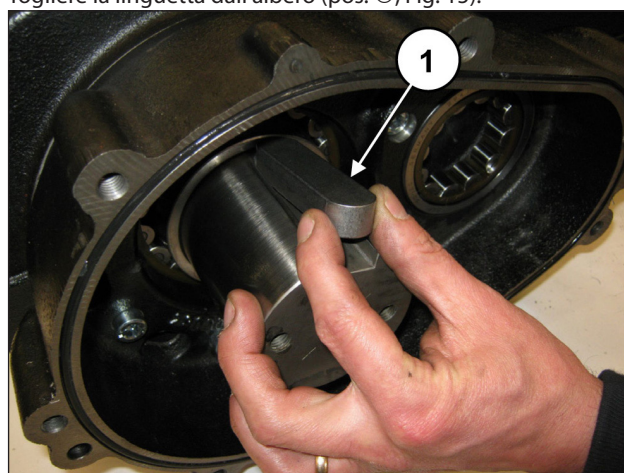


Fig. 15

Sfilare l'anello di appoggio corona (pos. ①, Fig. 16).

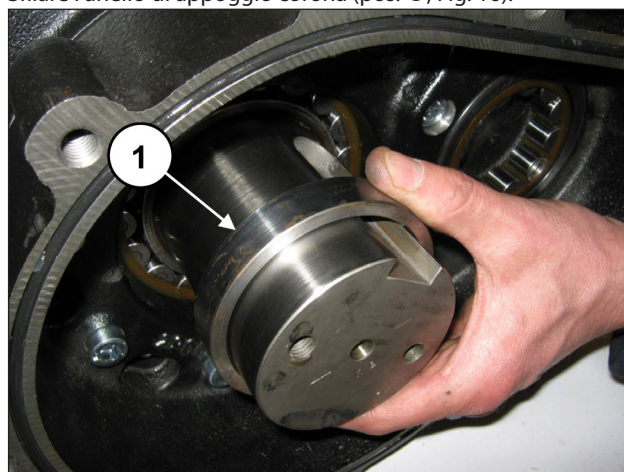


Fig. 16

Svitare le viti di biella (pos. ①, Fig. 17).

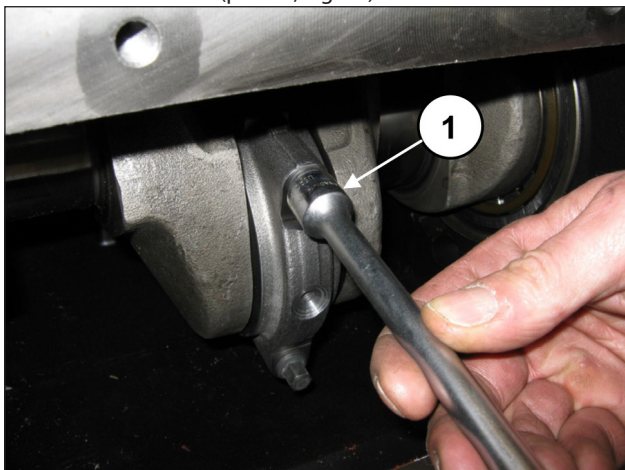


Fig. 17

Smontare i cappelli di biella con i semicuscinetti inferiori avendo particolare cura, durante lo smontaggio, dell'ordine in cui vengono smontati.



**I cappelli di biella e le relative semibielle devono essere rimontati esattamente nello stesso ordine e accoppiamento in cui sono stati smontati.**

Per evitare possibili errori cappelli e semibielle sono stati numerati su un lato (pos. ①, Fig. 18).

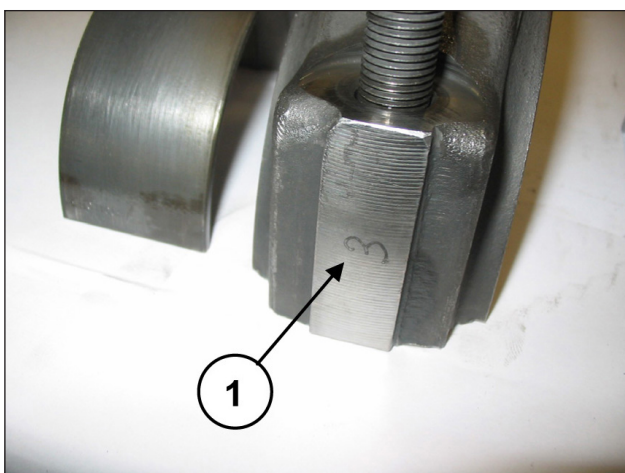


Fig. 18

Fare avanzare completamente le semibielle nella direzione della parte idraulica per consentire la fuoriuscita dell'albero a gomiti. Per facilitare l'operazione utilizzare l'apposito attrezzo (cod. 27566200), (pos. ①, Fig. 19).

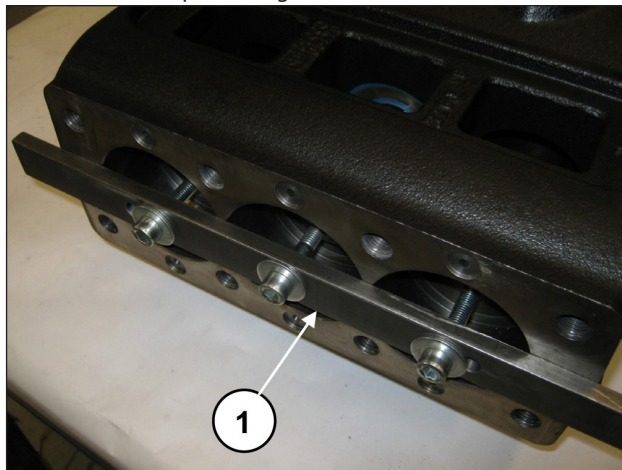


Fig. 19

Sfilare i tre semicuscinetti superiori delle semibielle (pos. ①, Fig. 20).

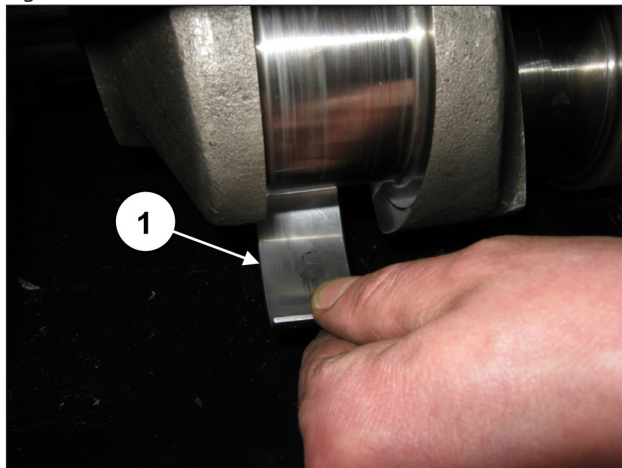


Fig. 20

Svitare le viti di fissaggio della scatola riduttore (pos. ①, Fig. 21 e Fig. 22).

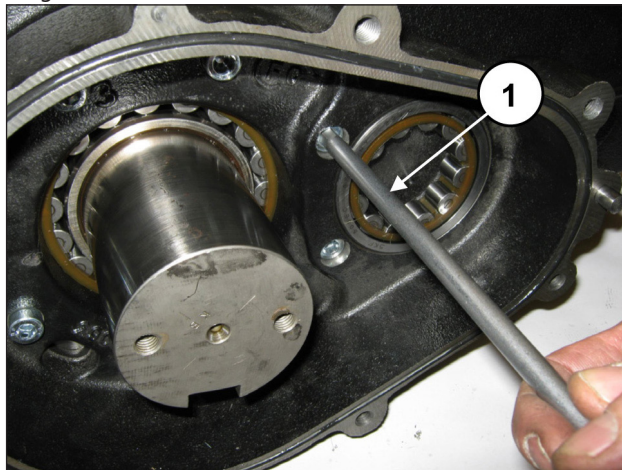


Fig. 21

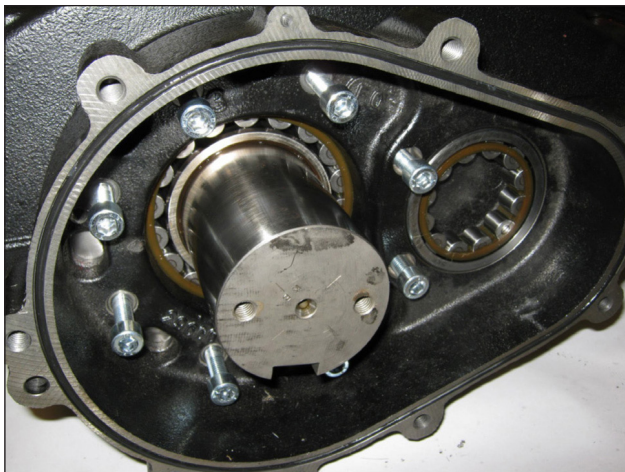


Fig. 22

Posizionare n. 3 grani o viti filettate M8 (pos. ①, Fig. 23) con la funzione di estrattori negli appositi fori e due viti M10 sufficientemente lunghe con la funzione di sostegno alla scatola riduttore (pos. ②, Fig. 23).

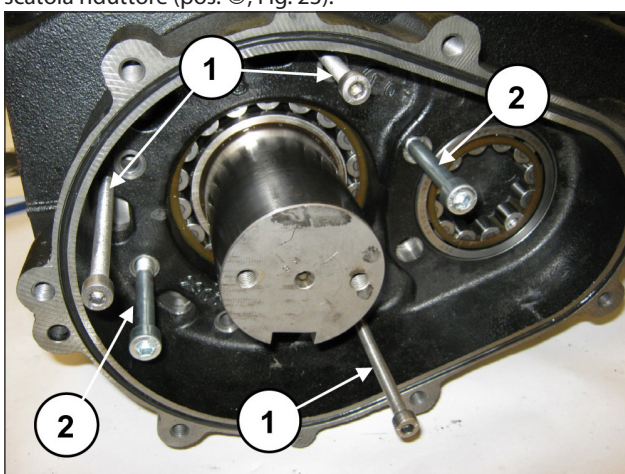


Fig. 23

Avvitare le 3 viti M8 gradualmente (pos. ①, Fig. 24) per evitare che la scatola possa inclinarsi troppo e bloccarsi in sede. Provvedere alla rimozione della scatola sostenendo l'albero per evitare danneggiamenti (pos. ①, Fig. 25).

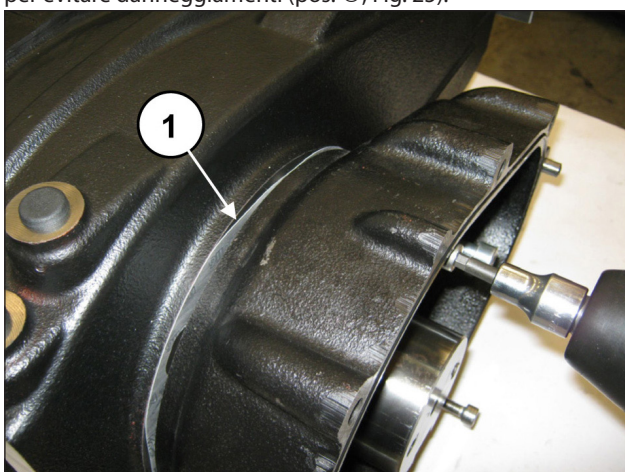


Fig. 24

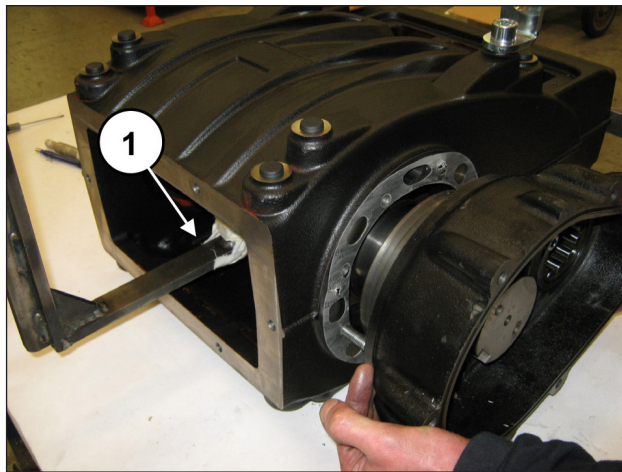


Fig. 25

Dalla parte opposta svitare le viti di fissaggio coperchio cuscinetto (pos. ①, Fig. 26 e Fig. 27).

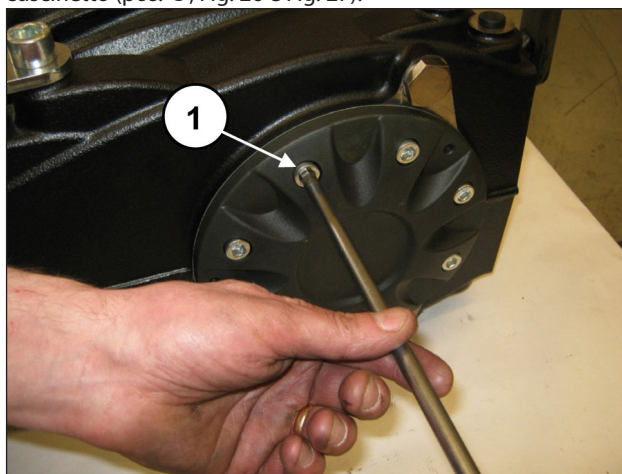


Fig. 26

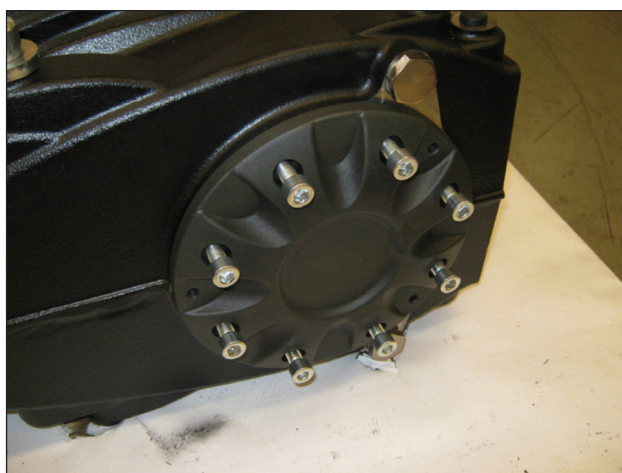


Fig. 27

Posizionare n. 3 grani o viti filettate M8 (pos. ①, Fig. 28) con la funzione di estrattori negli appositi fori

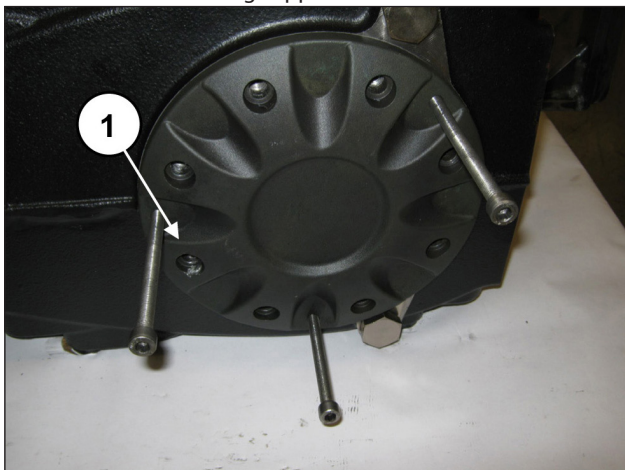


Fig. 28

Avvitare le 3 viti M8 gradualmente (pos. ①, Fig. 29) per evitare che il coperchio possa inclinarsi troppo e bloccarsi in sede. Provvedere alla rimozione del coperchio cuscinetto sostenendo l'albero per evitare danneggiamenti (pos. ①, Fig. 30).

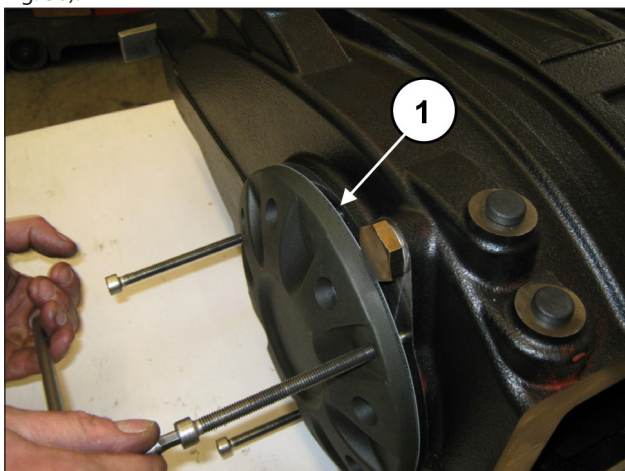


Fig. 29

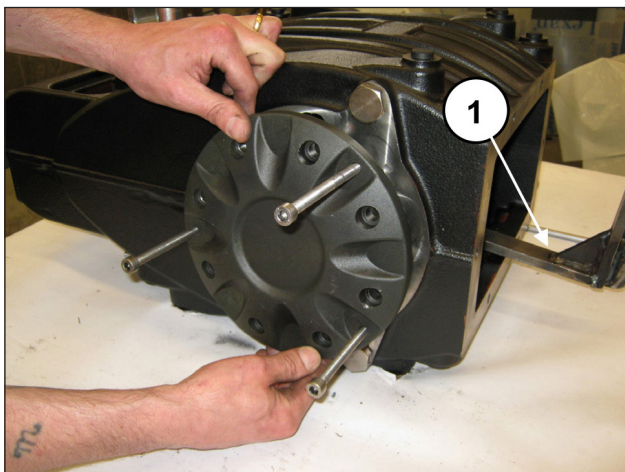


Fig. 30

Sfilare dal carter l'albero a gomiti dal lato PTO (pos. ①, Fig. 31).

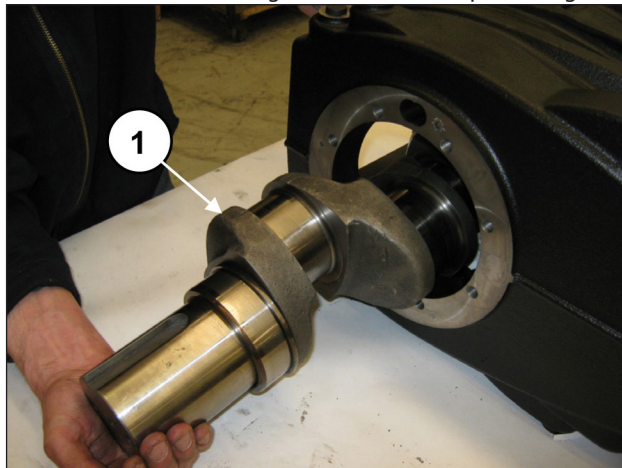


Fig. 31

Nell'eventualità fosse necessario sostituire una o più bielle o guide pistone occorre operare come segue: Procedere a svitare le viti dell'attrezzo cod. 27566200 per sbloccare le bielle (pos. ①, Fig. 32) e successivamente estrarre i gruppi biella-guida pistone dall'apertura posteriore del carter (pos. ①, Fig. 33).

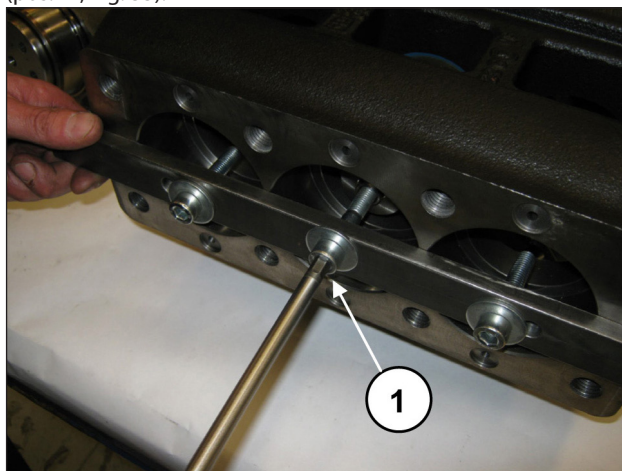


Fig. 32

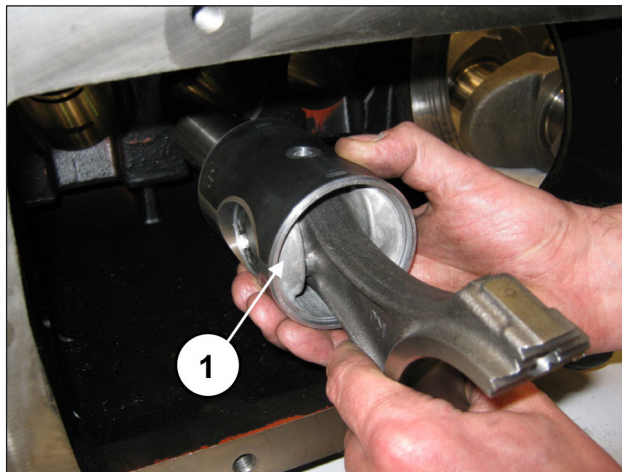


Fig. 33

Ora è possibile provvedere allo smontaggio dei paraoli guida pistone facendo attenzione a non danneggiare la canna di scorrimento del guida pistone.



**Qualora si rendesse necessaria la sostituzione dei paraoli guida pistone senza dover smontare tutta la parte meccanica, è possibile estrarre i paraoli utilizzando l'apposito attrezzo cod. 27918500 operando come segue:**



Inserire l'attrezzo tra lo stelo e il labbro del paraolio (pos. ①, Fig. 34) e mediante massa battente provvedere al completo inserimento del tratto conico all'interno del paraolio (pos. ①, Fig. 35).

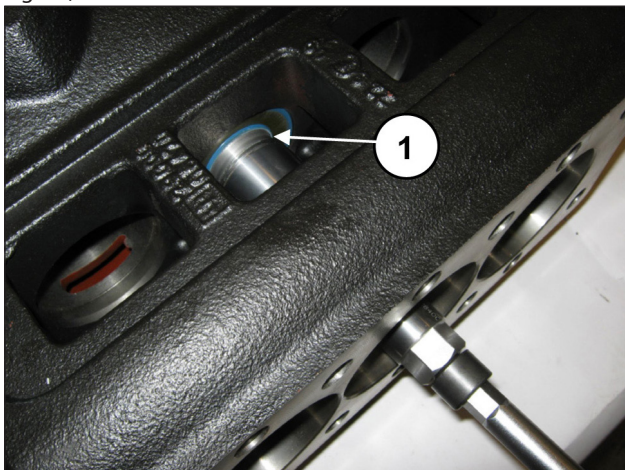


Fig. 34

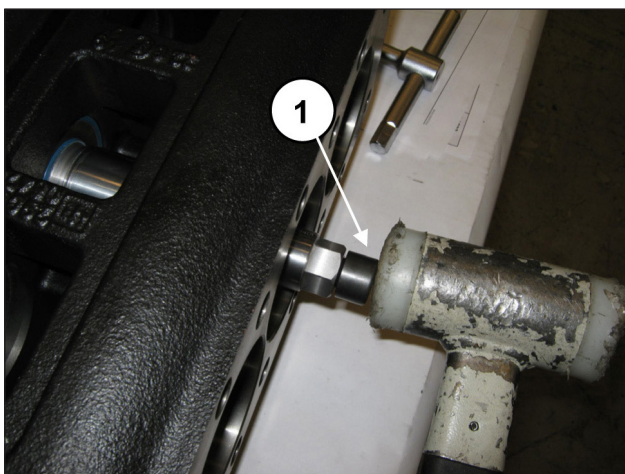


Fig. 35

Estrarre il paraolio utilizzando la massa battente dell'attrezzo (pos. ①, Fig. 36).

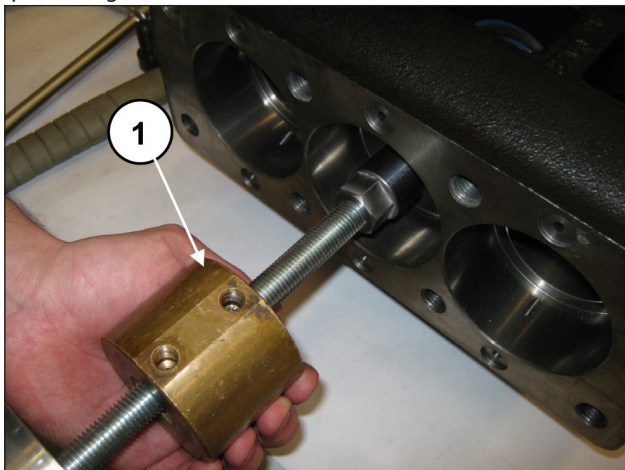


Fig. 36

Rimuovere i due anelli seeger di bloccaggio spinotto (pos. ①, Fig. 37).

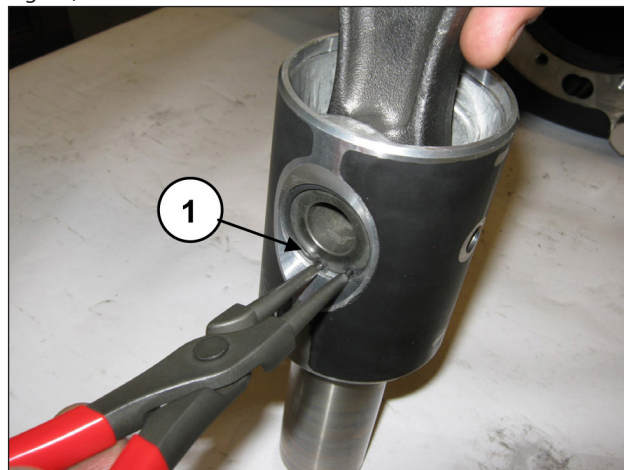


Fig. 37

Sfilare lo spinotto (pos. ①, Fig. 38) e provvedere all'estrazione della biella (pos. ①, Fig. 39).



Fig. 38

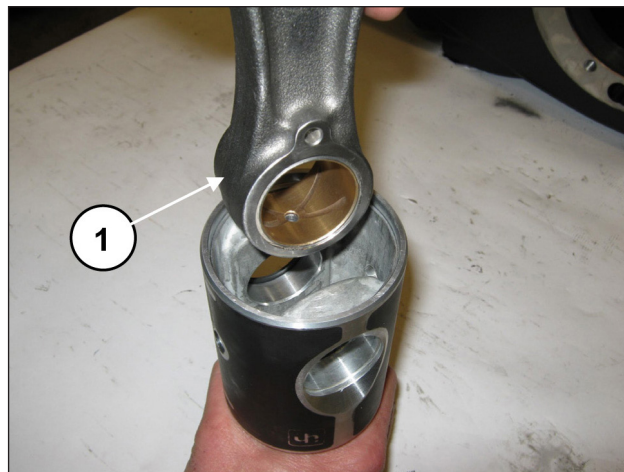


Fig. 39

Accoppiare le semibielle ai cappelli precedentemente smontati facendo riferimento alla numerazione (pos. ①, Fig. 40).

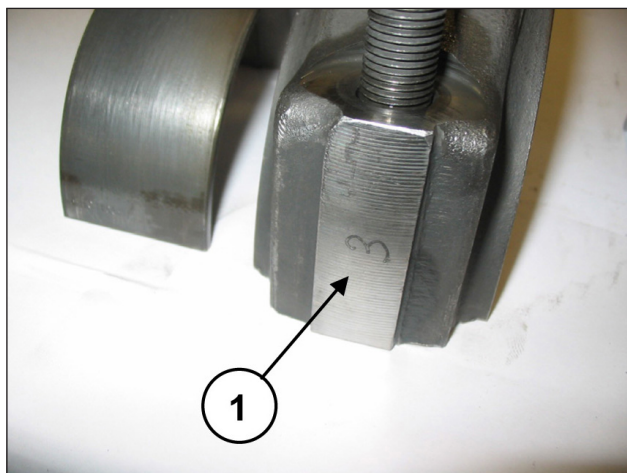


Fig. 40

Per separare lo stelo dal guida pistone occorre svitare le viti a testa cilindrica M6 mediante apposita chiave (pos. ①, Fig. 41).

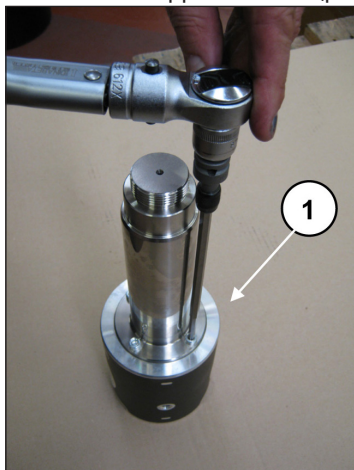


Fig. 41

### 2.1.2 Montaggio parte meccanica

Procedere al montaggio seguendo il procedimento inverso indicato al par. 2.1.1.

La corretta sequenza è la seguente:

Assemblare lo stelo al guida pistone.

Inserire lo stelo guida pistone nell'apposita sede sul guida pistone (pos. ①, Fig. 42) e fissarlo a quest'ultimo mediante le 4 viti a testa cilindrica M6x20 (pos. ①, Fig. 43).



Fig. 42



Fig. 43

Bloccare il guida pistone in morsa con l'ausilio di apposito attrezzo e procedere alla taratura delle viti con chiave dinamometrica (pos. ①, Fig. 44) come indicato nel capitolo 3.

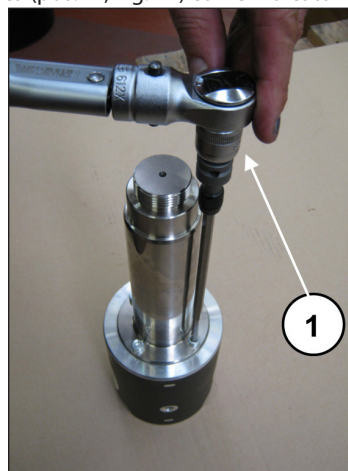


Fig. 44

Inserire la biella nel guida pistone (pos. ①, Fig. 39) e successivamente inserire lo spinotto (pos. ①, Fig. 38). Applicare i due seeger di spallamento (pos. ①, Fig. 37).



**Il corretto montaggio è garantito se piede biella, guida pistone e spinotto ruotano liberamente.**

Separare i cappelli dalle semibielle; il corretto accoppiamento sarà garantito dalla numerazione posta su un lato (pos. ①, Fig. 40).

Dopo aver verificato la perfetta pulizia del carter inserire il gruppo semibiella-guida pistone all'interno delle canne del carter (pos. ①, Fig. 33).



**L'inserimento del gruppo semibiella-guida pistone nel carter deve essere fatto orientando le semibielle con la numerazione visibile dall'alto.**

Bloccare i tre gruppi utilizzando l'apposito attrezzo cod. 27566200 (pos. ①, Fig. 32).

Premontare l'anello interno dei cuscinetti dell'albero a gomiti (da entrambi i lati dell'albero fino a battuta) utilizzando l'apposito attrezzo cod. 27604700 (pos. ①, Fig. 45) (pos. ①, Fig. 46).



**Gli anelli interni ed esterni dei cuscinetti devono essere rimontati mantenendo lo stesso accoppiamento con cui sono stati smontati.**



Fig. 45

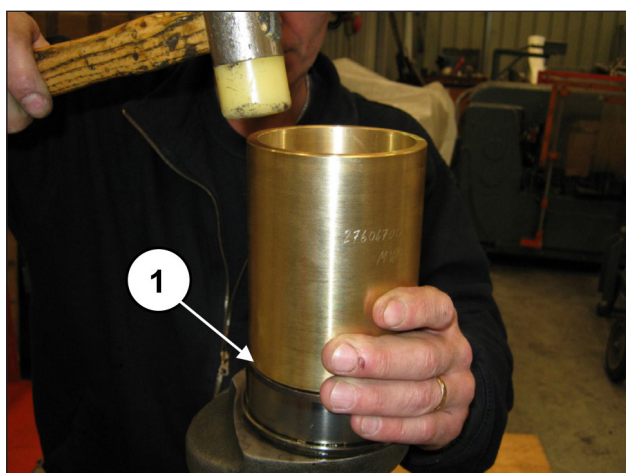


Fig. 46

Inserire l'albero dal lato PTO prestando attenzione a non urtare i fusti delle bielle montati precedentemente (pos. ①, Fig. 47) e (pos. ①, Fig. 48).

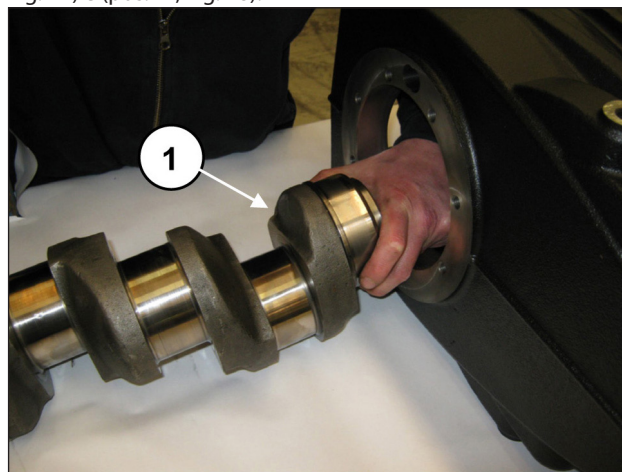


Fig. 47

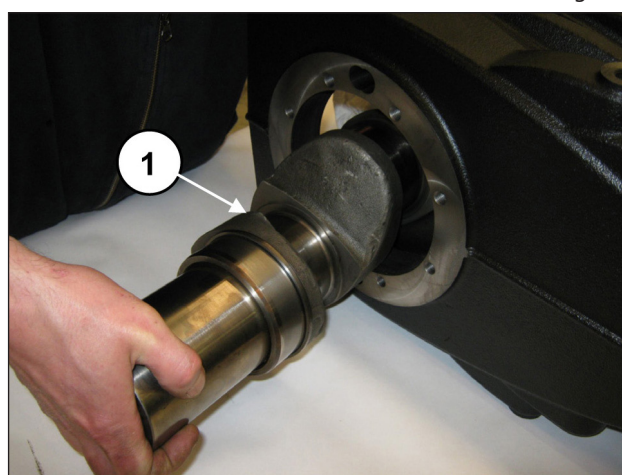


Fig. 48



**L'albero a gomiti deve essere tassativamente montato con il lato PTO dalla parte opposta rispetto ai fori G1/2" per i tappi di scarico olio del carter pompa (pos. ②, Fig. 50).**

Arrivare fino al completo inserimento dell'albero nel carter (pos. ①, Fig. 49 e Fig. 50).

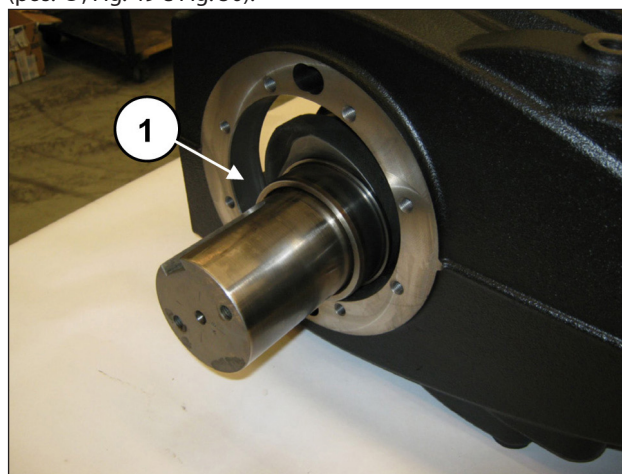


Fig. 49

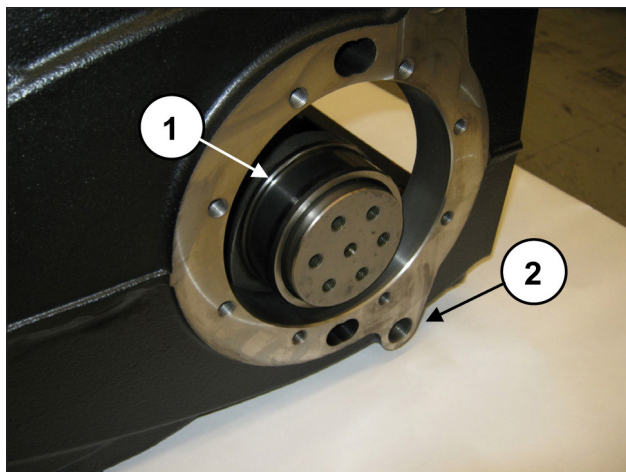


Fig. 50

Sulla scatola riduttore premontare l'anello esterno del cuscinetto pignone utilizzando l'attrezzo cod. 27604900 (pos. ①, Fig. 51) fino al suo completo inserimento a battuta (pos. ①, Fig. 52).

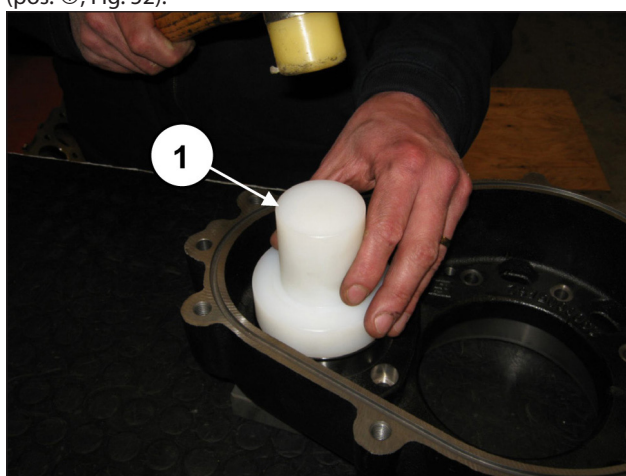


Fig. 51

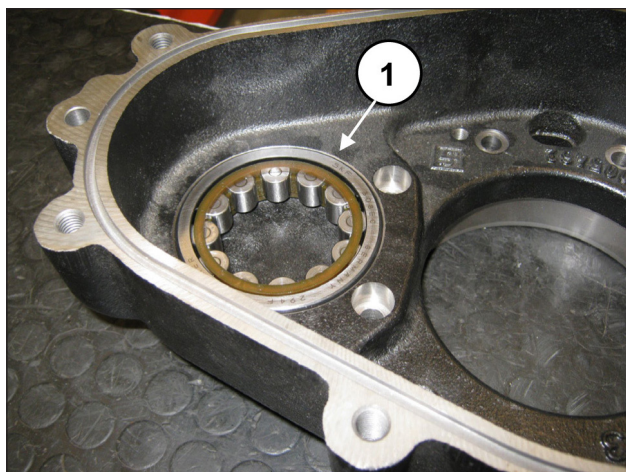


Fig. 52

Dal lato opposto della scatola riduttore premontare l'anello esterno del cuscinetto albero a gomiti utilizzando l'attrezzo cod. 27605000 (pos. ①, Fig. 53) fino al suo completo inserimento a battuta (pos. ①, Fig. 54).

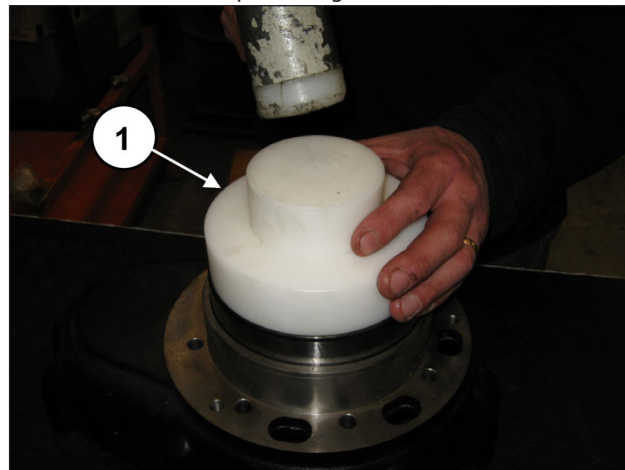


Fig. 53

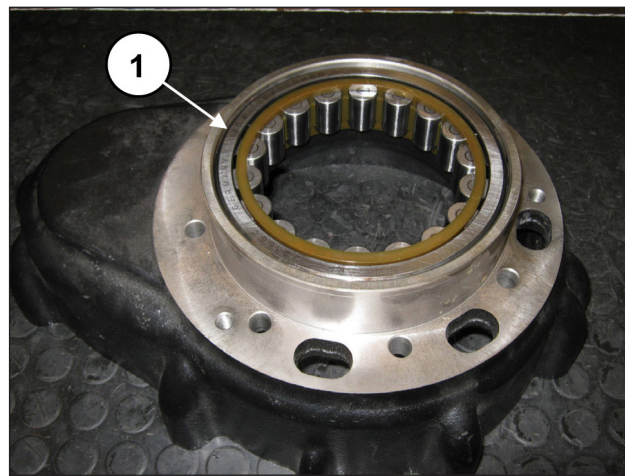


Fig. 54

Ripetere l'operazione sul coperchio cuscinetto premontando l'anello esterno del cuscinetto albero a gomiti mediante l'attrezzo cod. 27605000 (pos. ①, Fig. 55) fino al suo completo inserimento a battuta (pos. ①, Fig. 56).

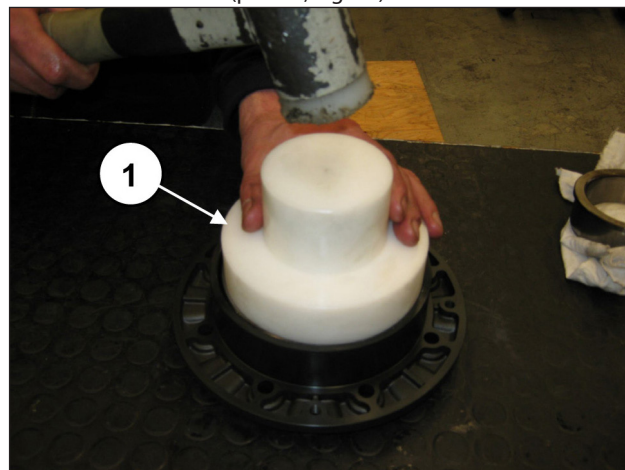


Fig. 55

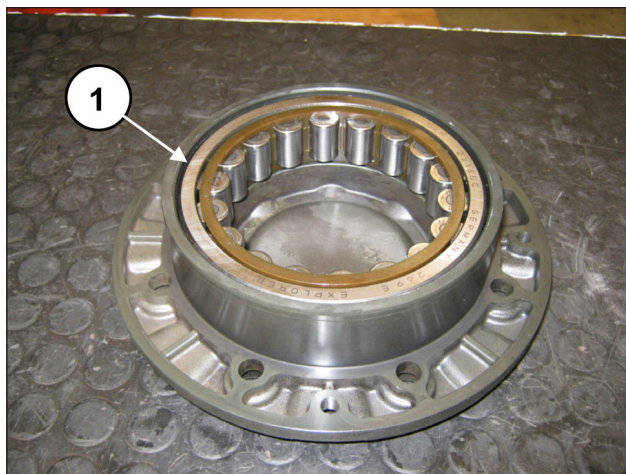


Fig. 56

Inserire la guarnizione laterale sul coperchio cuscinetto (pos. ①, Fig. 57) e sollevare l'albero a gomiti per favorire l'inserimento del coperchio (pos. ①, Fig. 58).

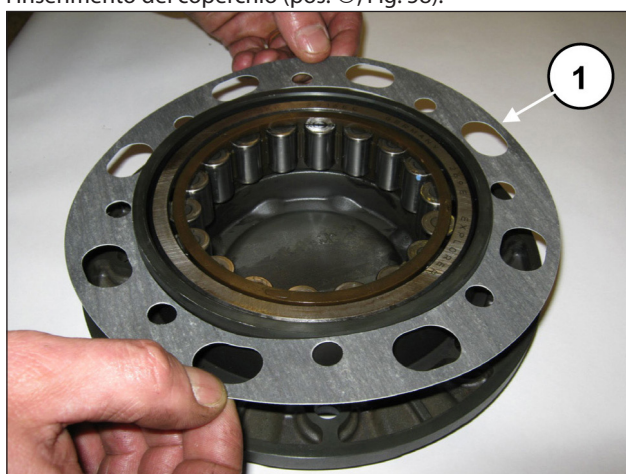


Fig. 57

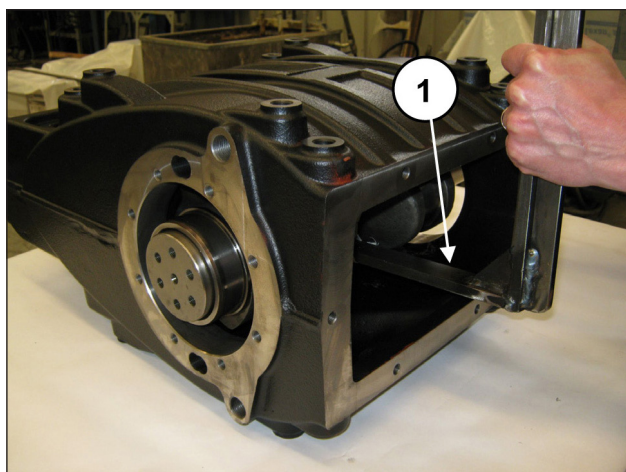


Fig. 58

Montare il coperchio cuscinetto (e relativa guarnizione) utilizzando una massa battente (pos. ①, Fig. 59)



**Orientare il coperchio cuscinetto in modo che il logo "Pratissoli" risulti perfettamente orizzontale.**

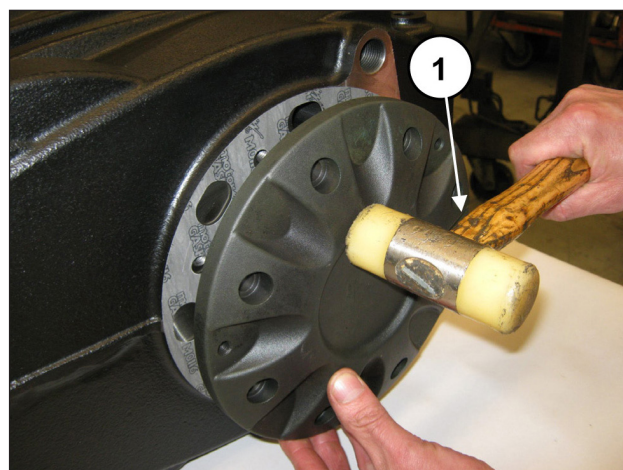


Fig. 59

Serrare le 8 viti M10x30 (pos. ①, Fig. 60).

Tarare le viti con chiave dinamometrica come indicato nel capitolo 3.

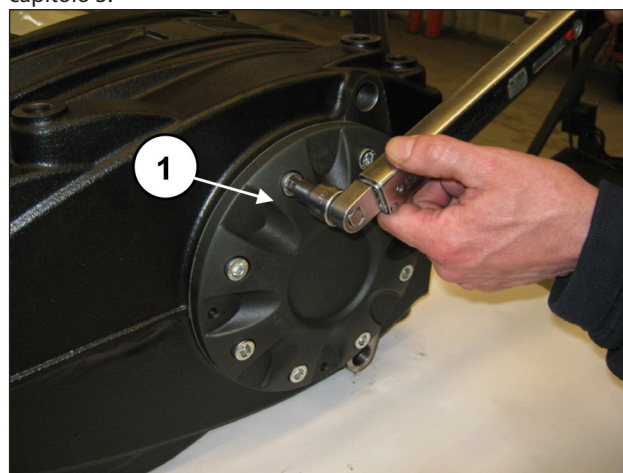


Fig. 60

Dal lato opposto inserire la guarnizione laterale sulla scatola riduttore (pos. ①, Fig. 61) e sollevare l'albero a gomiti per favorire l'inserimento del coperchio (pos. ①, Fig. 62).

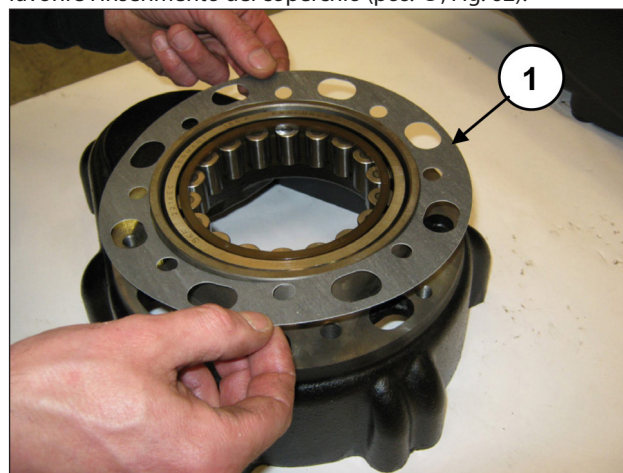


Fig. 61

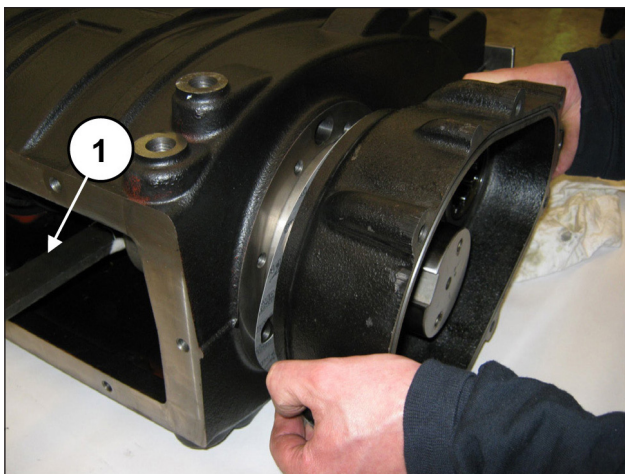


Fig. 62

Montare la scatola riduttore (e relativa guarnizione) utilizzando una massa battente (pos. ①, Fig. 63).

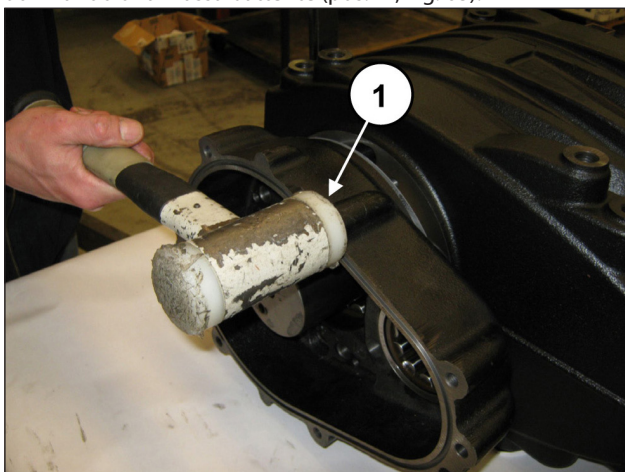


Fig. 63

Serrare le 8 viti M10x40 (pos. ①, Fig. 64).  
Tarare le viti con chiave dinamometrica come indicato nel capitolo 3 TARATURE SERRAGGIO VITI.

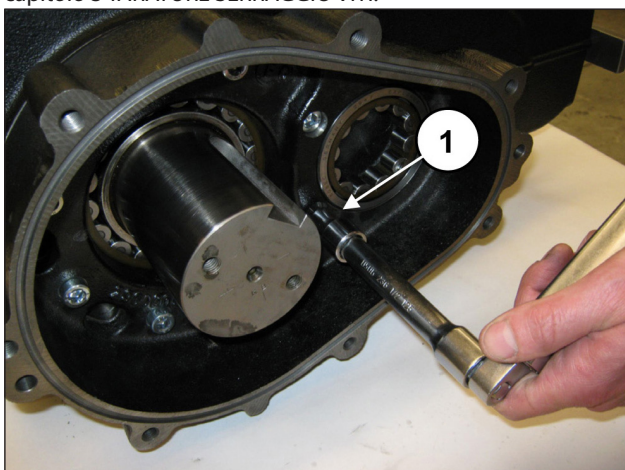


Fig. 64

Rimuovere l'attrezzo per il bloccaggio delle bielle cod. 27566200 (pos. ①, Fig. 32).

Inserire i semicuscinetti superiori tra le bielle e l'albero (pos. ①, Fig. 65).



**Per un corretto montaggio dei semicuscinetti assicurarsi che la linguetta di riferimento dei semicuscinetti venga posizionata nell'apposito alloggiamento sulla semibiella (pos. ①, Fig. 66).**

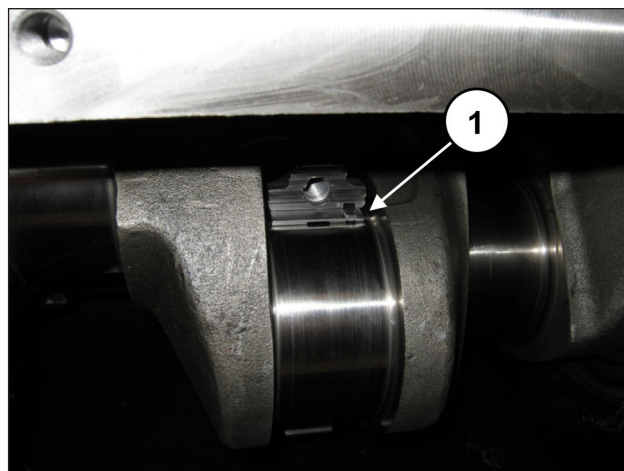


Fig. 65

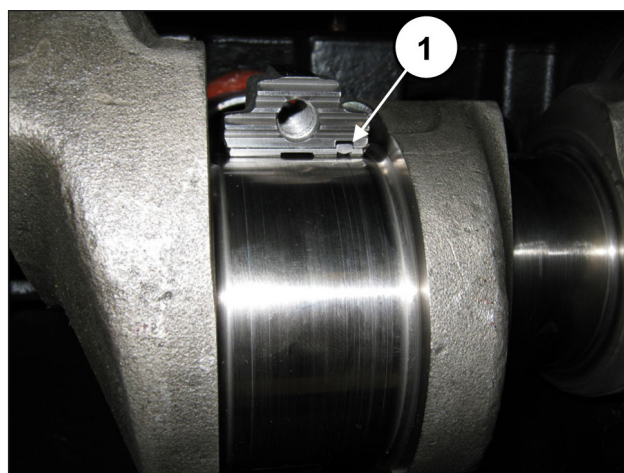


Fig. 66

Applicare i semicuscinetti inferiori ai cappelli (pos. ①, Fig. 67) assicurandosi che la linguetta di riferimento dei semicuscinetti venga posizionata nell'apposito alloggiamento sul cappello (pos. ②, Fig. 67).  
Fissare i cappelli alle semibielle mediante le viti M10x1.5x80 (pos. ①, Fig. 68).



**Prestare attenzione al corretto senso di montaggio dei cappelli. La numerazione deve essere rivolta verso l'alto.**

Tarare le viti con chiave dinamometrica come indicato nel capitolo 3 TARATURE SERRAGGIO VITI, portando le viti alla coppia di serraggio contemporaneamente.

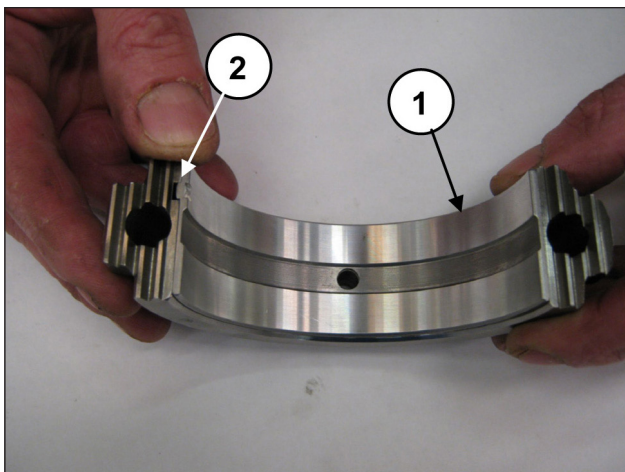


Fig. 67

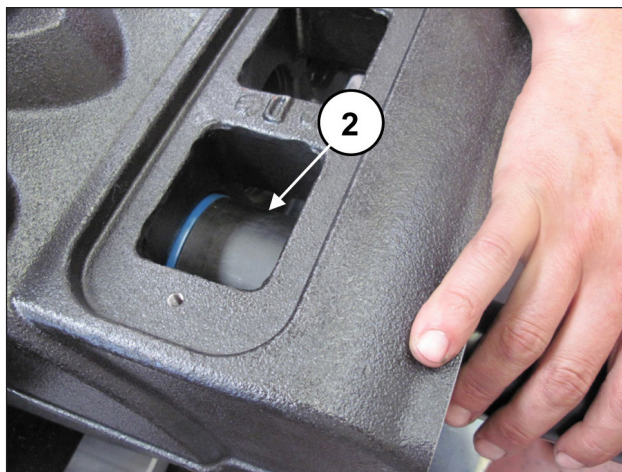


Fig. 69/b

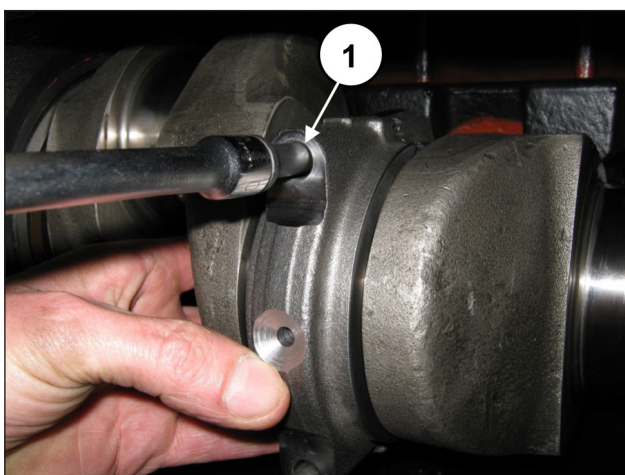


Fig. 68



**Ad operazione conclusa verificare che le bielle abbiano gioco assiale in entrambe le direzioni.**

Inserire i paraoli guida pistone nella sede sul carter mediante l'utilizzo dell'apposito attrezzo cod.27605300. Posizionare il particolare sullo stelo (pos. ①, Fig. 69/a) e battere sull'attrezzo fino al completo inserimento del paraolio in sede (pos. ①, Fig. 69/b)

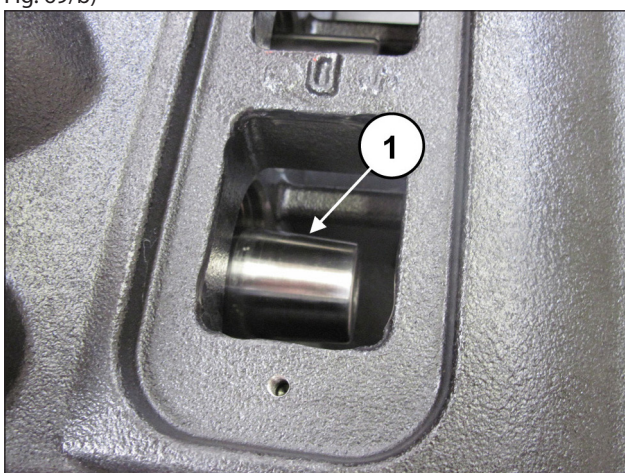


Fig. 69/a

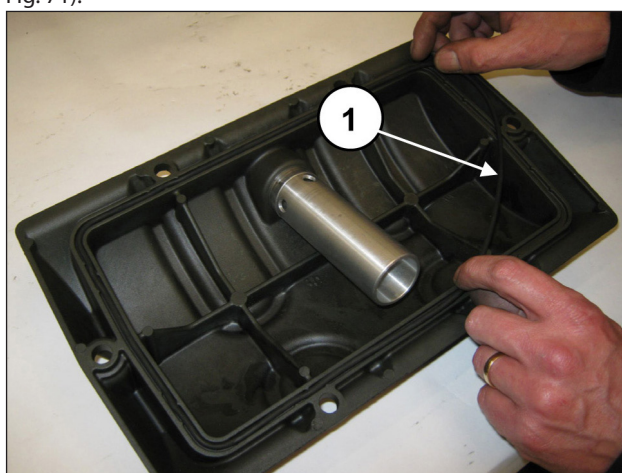


Fig. 70

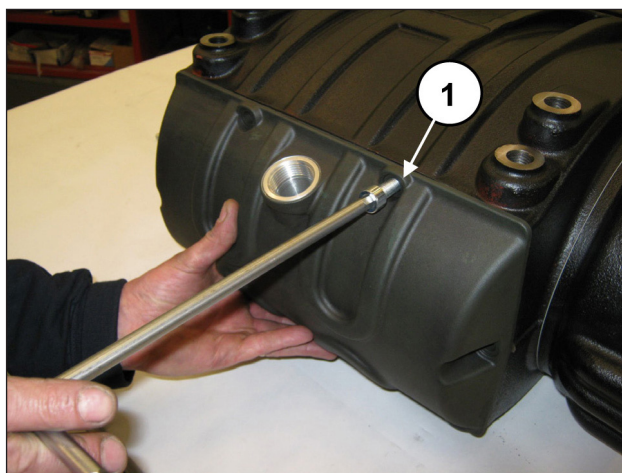


Fig. 71



**Prestare attenzione al corretto e completo inserimento dell'O-ring nell'apposita sede sul coperchio per evitare che possa danneggiarsi durante il serraggio delle viti.**

Tarare le viti con chiave dinamometrica come indicato nel capitolo 3 TARATURE SERRAGGIO VITI.

Inserire l'anello appoggio corona nel codolo dell'albero a gomiti (pos. ①, Fig. 72) fino a battuta (pos. ①, Fig. 73).

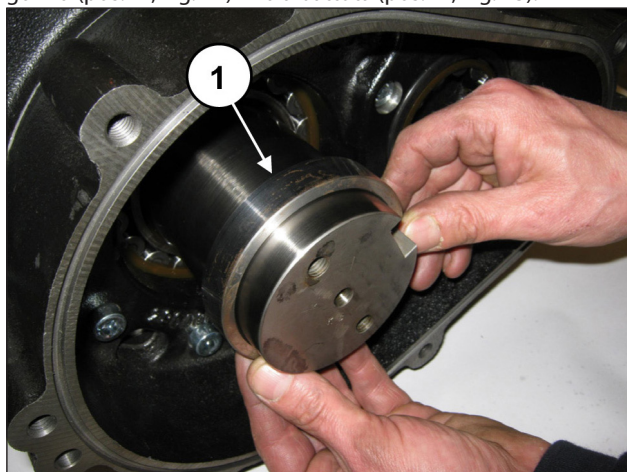


Fig. 72

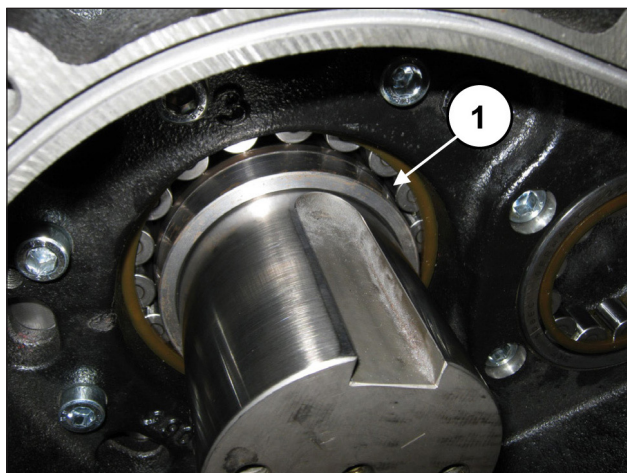


Fig. 73

Applicare la linguetta 22x14x80 nella sede dell'albero (pos. ①, Fig. 74) e inserire la corona sull'albero (pos. ①, Fig. 75).



**La corona deve essere montata assicurandosi che i due fori M8 (da utilizzarsi per l'estrazione) risultino rivolti verso l'esterno della pompa (pos. ②, Fig. 75).**



Fig. 74

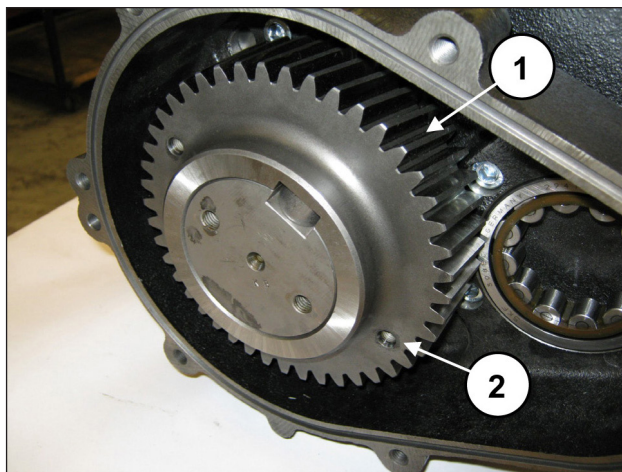


Fig. 75

Fissare il fermo corona (pos. ①, Fig. 76) utilizzando le 2 viti M10x25.

Tarare le viti con chiave dinamometrica come indicato nel capitolo 3 (pos. ①, Fig. 77).

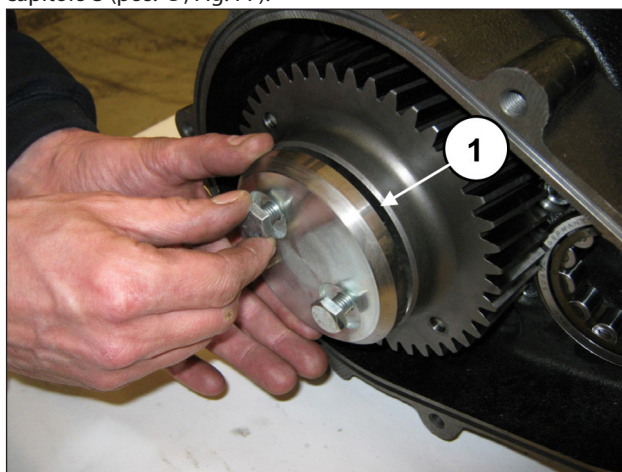


Fig. 76

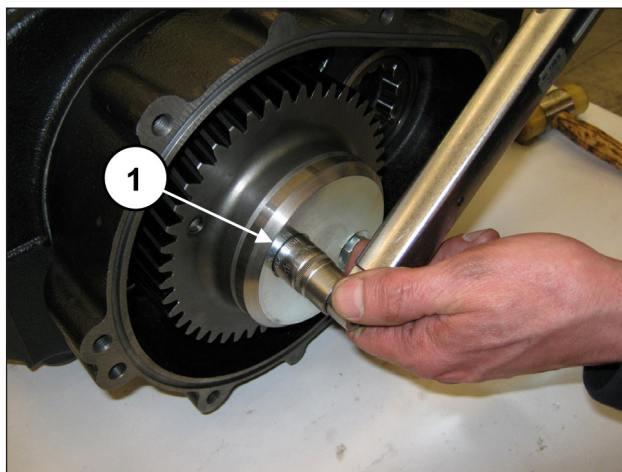


Fig. 77



Applicare le 2 spine  $\varnothing 10 \times 24$  alla scatola riduttore (pos. ①, Fig. 78) e inserire l'O-ring (pos. ①, Fig. 79).

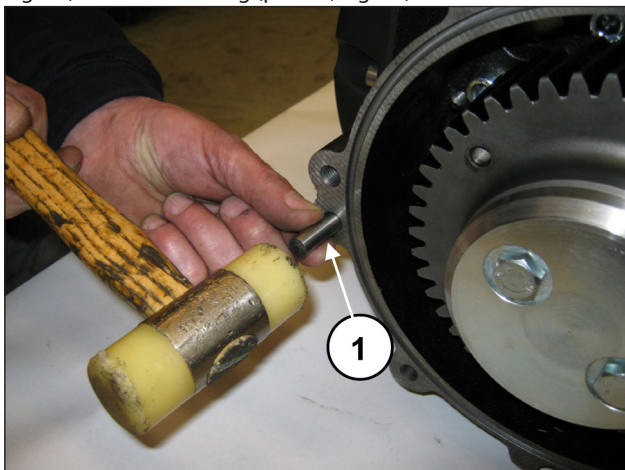


Fig. 78

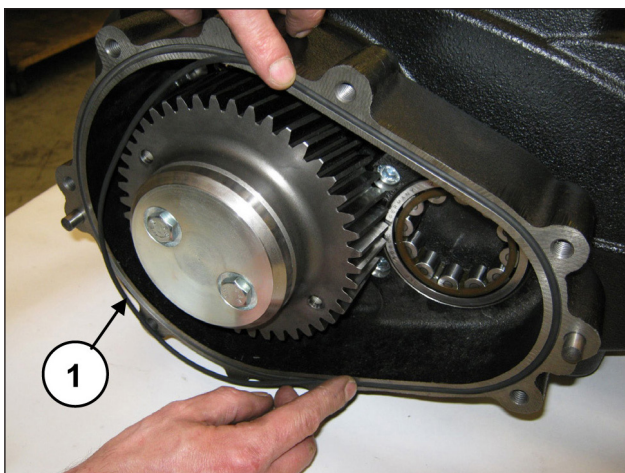


Fig. 79

Proseguire con l'assemblaggio del pignone sul coperchio riduttore procedendo come segue:

Premontare sul pignone l'anello interno del cuscinetto  $40 \times 90 \times 23$  (pos. ①, Fig. 80) posizionandolo fino a battuta.

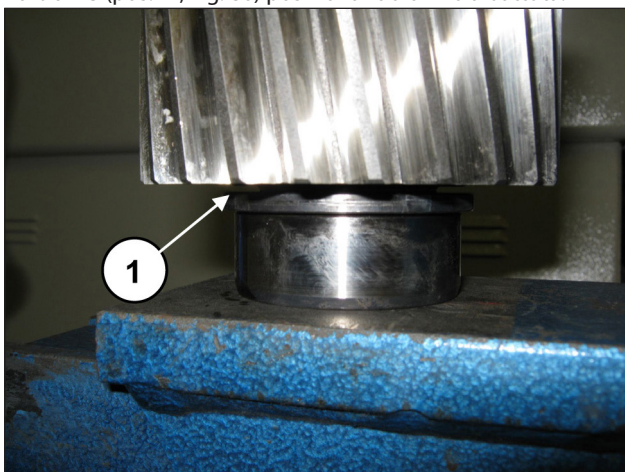


Fig. 80

Dall'altro lato del pignone premontare il cuscinetto  $55 \times 120 \times 29$  (pos. ①, Fig. 81) posizionandolo fino a battuta utilizzando l'attrezzo cod. 27604800 (pos. ①, Fig. 82).

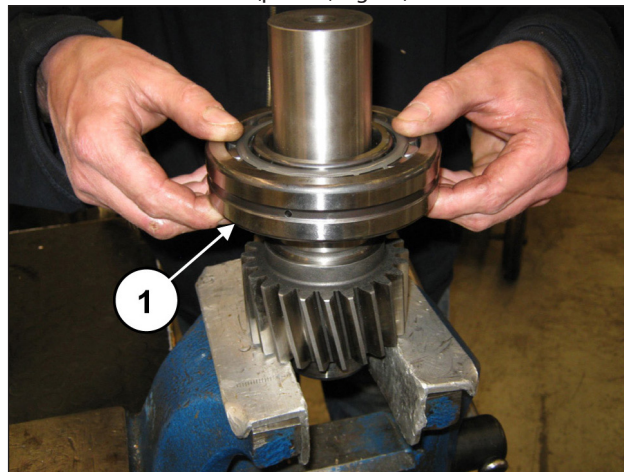


Fig. 81

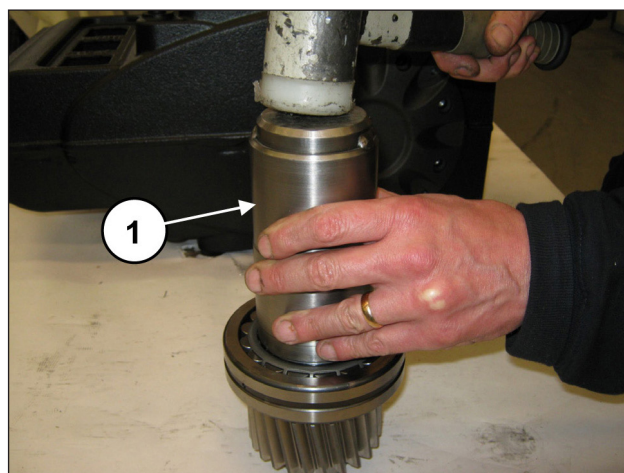


Fig. 82

Inserire l'anello appoggio cuscinetto (pos. ①, Fig. 83) e posizionare l'anello seeger  $\varnothing 55$  (pos. ①, Fig. 84).

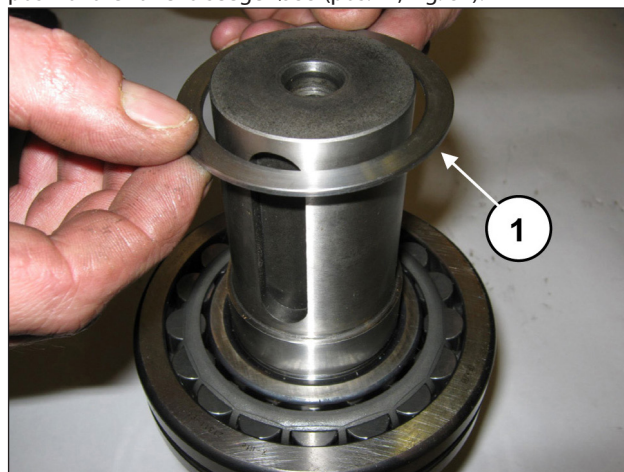


Fig. 83

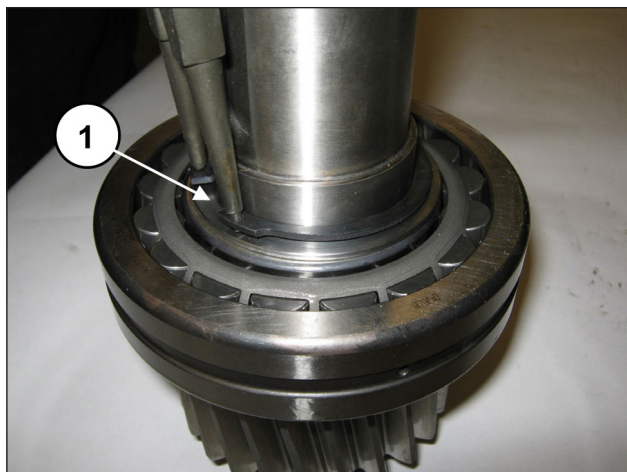


Fig. 84

Inserire il pignone premontato all'interno dell'apposita sede nel coperchio riduttore mediante l'utilizzo di una massa battente (pos. ①, Fig. 85).

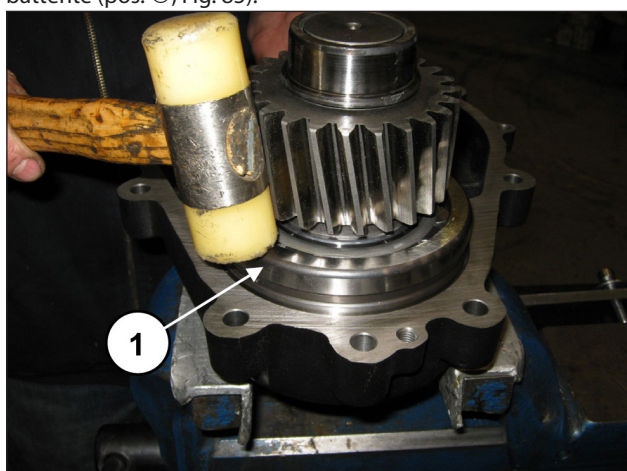


Fig. 85

Inserire in sede l'anello seeger Ø120 (pos. ①, Fig. 86).

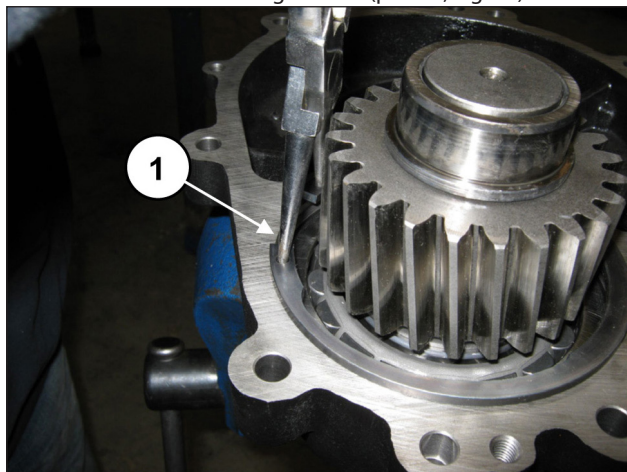


Fig. 86

Montare il coperchio riduttore mediante massa battente (pos. ①, Fig. 87) e fissarlo mediante 7 viti M10x40 (pos. ①, Fig. 88).

Prestare attenzione al corretto accoppiamento dei due elementi del cuscinetto 40x90x23.

Tarare le viti con chiave dinamometrica come indicato nel capitolo 3.

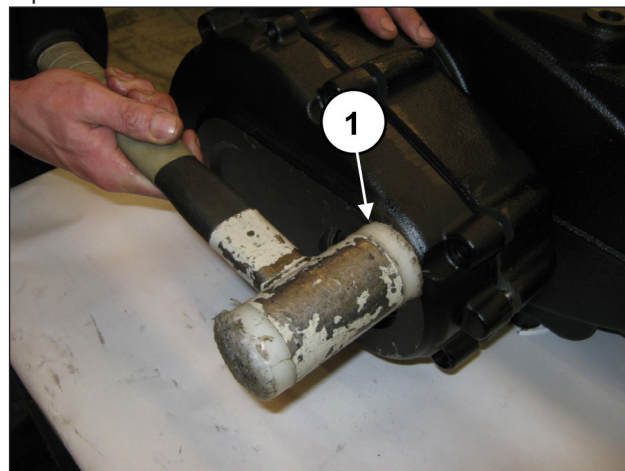


Fig. 87

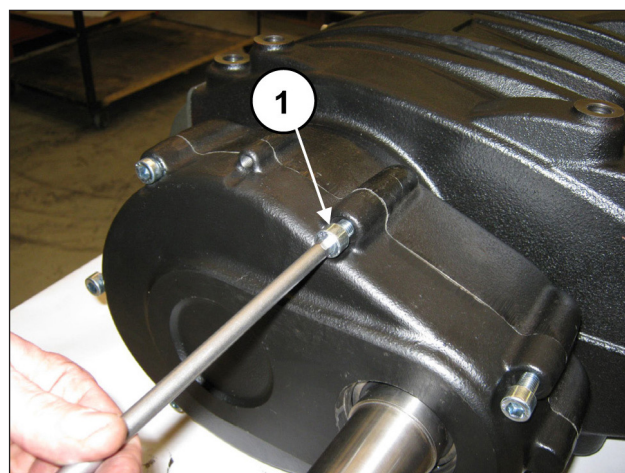


Fig. 88

Inserire il paraolio all'interno del coperchio riduttore mediante l'utilizzo dell'attrezzo cod. 27605200 (pos. ①, Fig. 89).

Prima di procedere al montaggio del paraolio verificare le condizioni del labbro di tenuta. Se si rende necessaria la sostituzione posizionare il nuovo anello sul fondo della cava come indicato in Fig. 90.



**Qualora l'albero presentasse una usura diametrale corrispondente al labbro di tenuta per evitare l'operazione di rettifica si può posizionare l'anello in seconda battuta come indicato nella Fig. 90.**



Fig. 89

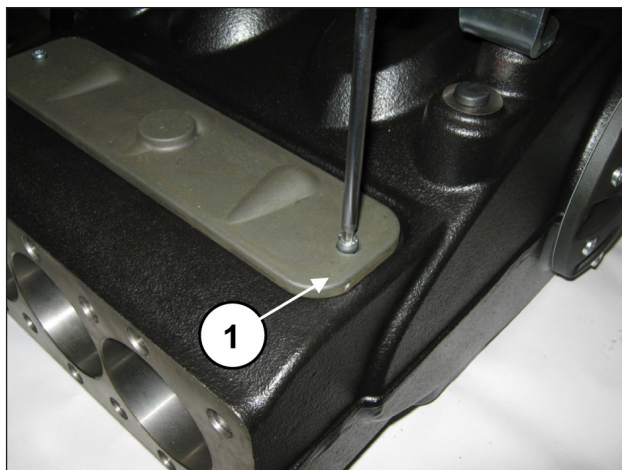


Fig. 92

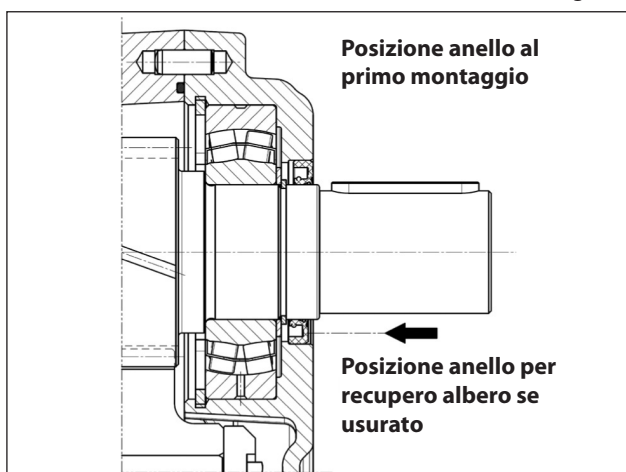


Fig. 90



**Per evitare di danneggiare il paraolio prestare particolare attenzione all'inserimento della paraolio sul pignone.**

Applicare i coperchi ispezione con O-ring (pos. ①, Fig. 91) e serrare mediante 2+2 viti M6x14 (pos. ①, Fig. 92).

Tarare le viti con chiave dinamometrica come indicato nel capitolo 3 TARATURE SERRAGGIO VITI.

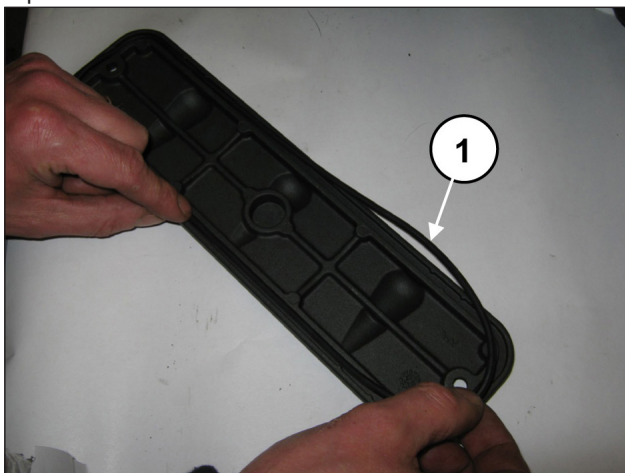


Fig. 91

Inserire la linguetta 14x9x60 nel pignone.  
Applicare i tappi e le staffe di sollevamento mediante le apposite viti M16x30 (pos. ①, Fig. 93).  
Tarare le viti con chiave dinamometrica come indicato nel capitolo 3 TARATURE SERRAGGIO VITI.



Fig. 93

Inserire l'olio nel carter come indicato nel **Manuale uso e manutenzione**, par. 7.4.

### 2.1.3 Classi di maggiorazione e minorazione previste

TABELLA MINORAZIONE PER ALBERO A GOMITI E SEMICUSCINETTI DI BIELLA			
Classi di recupero (mm)	Codice Semicuscinetto Superiore	Codice Semicuscinetto Inferiore	Rettifica sul diametro perno dell'albero (mm)
0.25	90928100	90928400	Ø79.75 0/-0.02 Ra 0.4 Rt 3.5
0.50	90928200	90928500	Ø79.50 0/-0.02 Ra 0.4 Rt 3.5

TABELLA MAGGIORAZIONE PER CARTER POMPA E GUIDA PISTONE		
Classi di recupero (mm)	Codice Guida Pistone	Rettifica sulla sede Carter Pompa (mm)
1.00	73050543	Ø71 H6 +0.019/0 Ra 0.8 Rt 6

## 2.2 RIPARAZIONE DELLA PARTE IDRAULICA

### 2.2.1 Smontaggio della testata – camicie - valvole

La testata non necessita di manutenzione periodica.

Gli interventi sono limitati all'ispezione o sostituzione delle valvole, qualora necessario.

Per l'estrazione dei gruppi valvola operare come segue:

Allentare, senza rimuovere, le viti M10x140 fissaggio camicie a testata (pos. ①, Fig. 94), in modo da renderle libere.

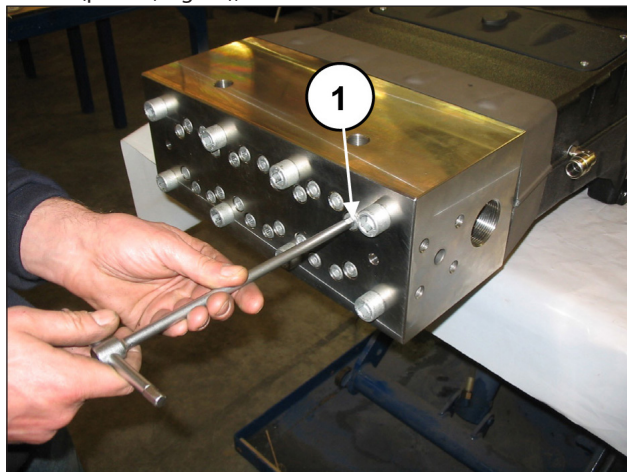


Fig. 94

Svitare due viti fissaggio testata M16x320 diametralmente opposte (pos. ① e ②, Fig. 95) sostituendole con due viti-spina di servizio (cod.27540200) (pos. ①, Fig. 96), quindi procedere alla rimozione delle restanti viti.

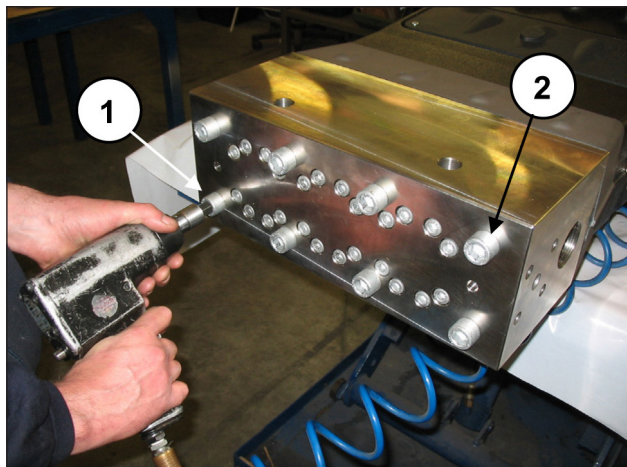


Fig. 95

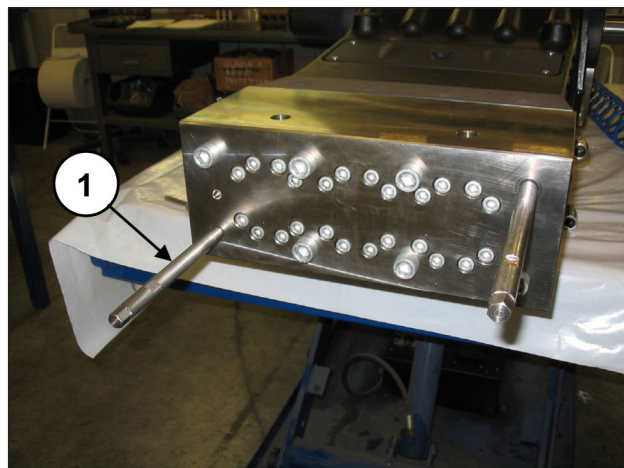


Fig. 96

Separare la testata e il distanziale per camicie dal carter pompa (pos. ①, Fig. 97).

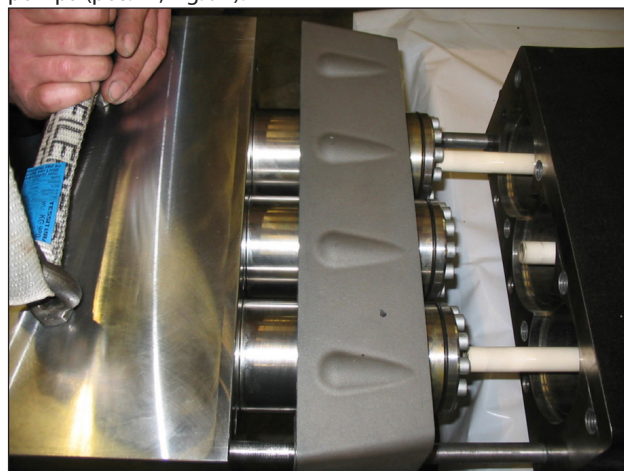


Fig. 97

Sfilare il distanziale per camicie dai gruppi camicie (pos. ①, Fig. 98).

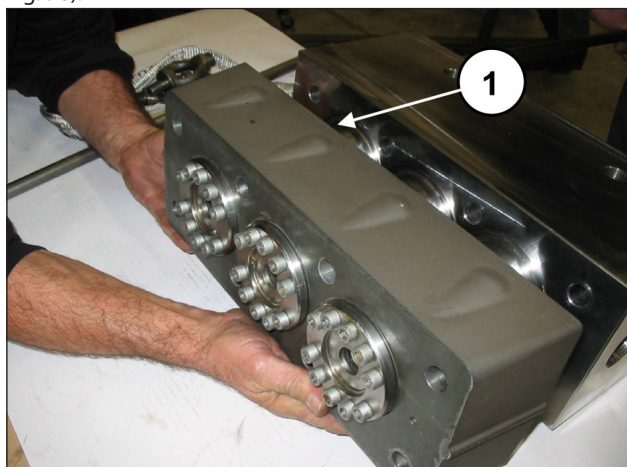


Fig. 98

Rimuovere le viti M10x140 fissaggio camicie a testata (pos. ①, Fig. 99) ed estrarre i gruppi camicie (pos. ①, Fig. 100).

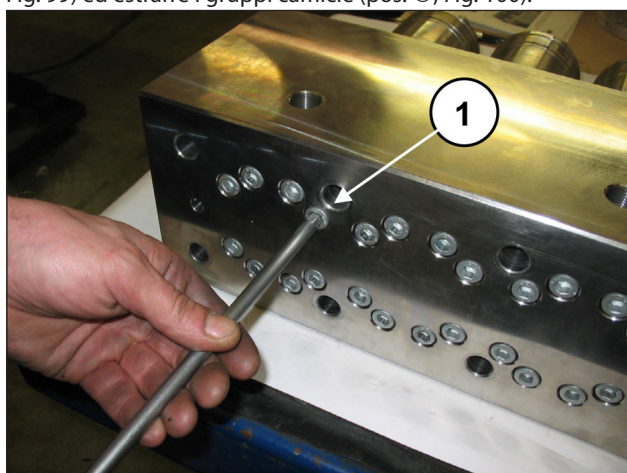


Fig. 99

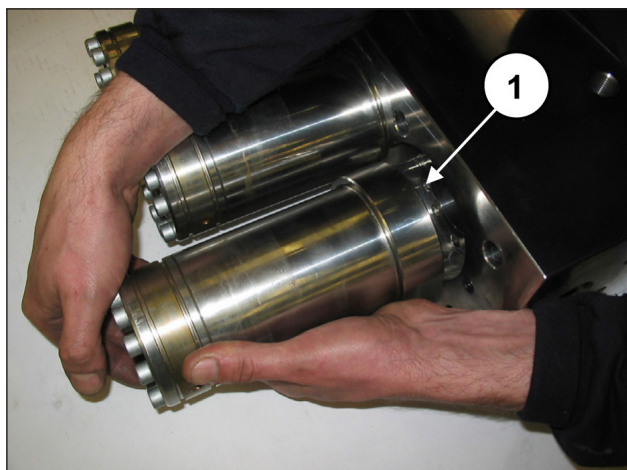


Fig. 100



**Durante lo smontaggio delle camicie fare attenzione a non disperdere molle valvola e le valvole piane (pos. ① e ②, Fig. 101) in quanto non essendo bloccate potrebbero cadere.**

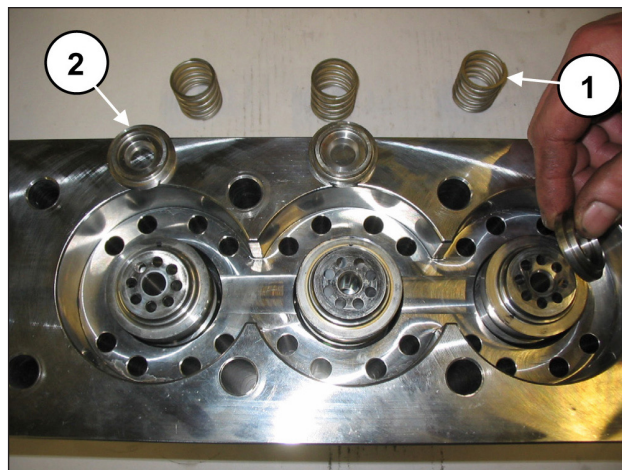


Fig. 101



**Qualora le sedi valvola risultassero bloccate sulla testata a causa della formazione di calcare o di ossido devono essere sbloccate inserendo l'apposito attrezzo (cod. 034300020) nel foro di mandata (pos. ①, Fig. 102).**

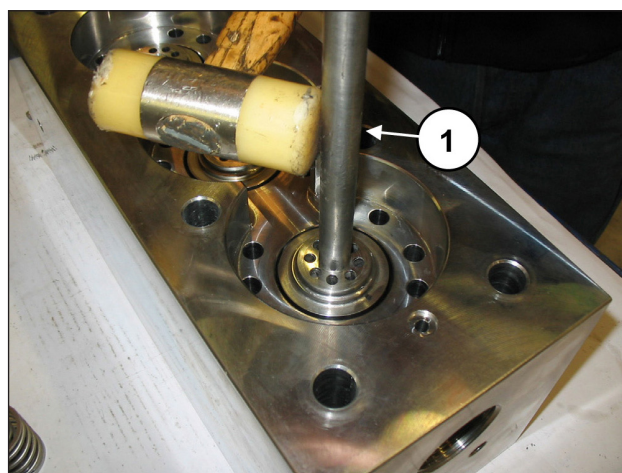


Fig. 102

Estrarre le sedi valvola e controllare lo stato di usura delle guarnizioni.

Se necessario eseguire eventuali sostituzioni (pos. ①, Fig. 103).

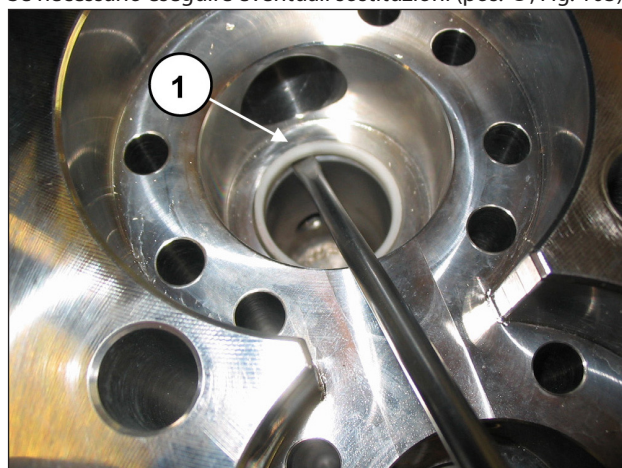


Fig. 103



**Ad ogni ispezione delle valvole sostituire gli anelli di tenuta e i relativi O-ring di tenuta frontale tra camicia e testata, e tra testata e distanziale camicie nella zona del foro di ricircolo. Prima del rimontaggio pulire ed asciugare i vari componenti e tutti i relativi alloggiamenti all'interno della testata.**

Estrarre i piattelli di mandata (pos. ①, Fig. 104), e le rispettive guide (pos. ①, Fig. 106), con relative molle (pos. ①, Fig. 105), controllare il loro stato di usura ed eseguire, se necessario, eventuali sostituzioni, e comunque negli intervalli indicati nel capitolo 11 del **Manuale uso e manutenzione**.

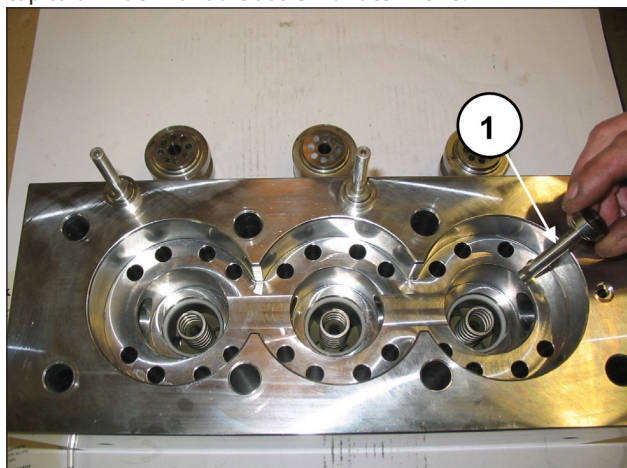


Fig. 104

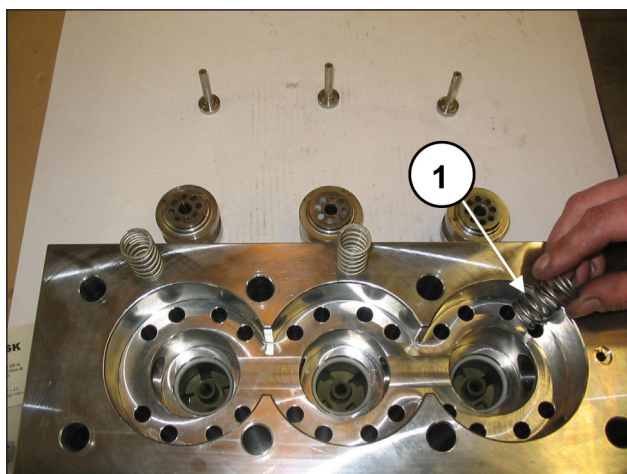


Fig. 105

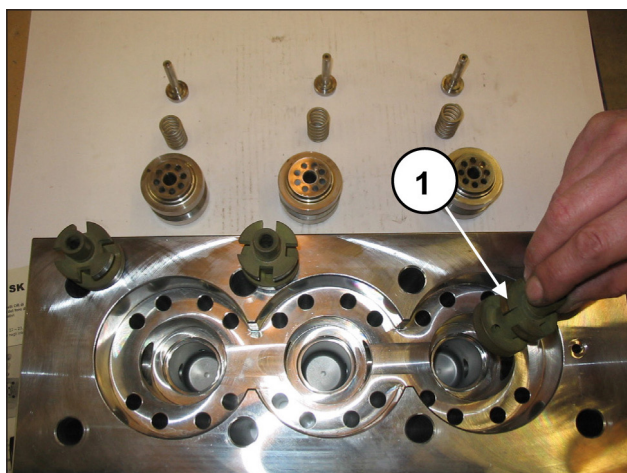


Fig. 106

### 2.2.2 Montaggio della testata - camicie - valvole

Per rimontare i vari componenti invertire le operazioni precedentemente elencate facendo particolarmente attenzione al montaggio corretto del distanziale per camicie: il foro  $\varnothing 6$  (circuito di raffreddamento tenute) deve risultare in corrispondenza dell'analogo foro sulla testata (con O-ring).

**Testate - camicie: procedere al montaggio e alla taratura delle viti fissaggio testata e poi procedere alla taratura delle viti fissaggio camicie.**

Per i valori delle coppie di serraggio e per la sequenza di serraggio delle viti rispettare le indicazioni riportate nel capitolo 3.

### 2.2.3 Smontaggio del gruppo pistone - supporti - tenute

Il gruppo pistone non necessita di manutenzione periodica. Gli interventi sono limitati al solo controllo visivo del drenaggio del circuito di raffreddamento. Qualora si presentassero anomalie / oscillazioni sul manometro di mandata o pulsazioni del tubo di drenaggio del circuito di raffreddamento (se elastico), sarà necessario procedere al controllo e alla eventuale sostituzione del pacco tenute. Per l'estrazione dei gruppi pistone operare come segue: Separare la testata e il distanziale per camicie dal carter pompa come indicato nel par. 2.2.1 (da Fig. 94 a Fig. 100). Rimuovere il coperchio di ispezione superiore svitando le 2 viti di fissaggio (pos. ①, Fig. 107).



Fig. 107

Rimuovere i pompanti con una chiave a forchetta (pos. ①, Fig. 108) e controllare il loro stato di usura (pos. ①, Fig. 109). Sostituirli se necessario.

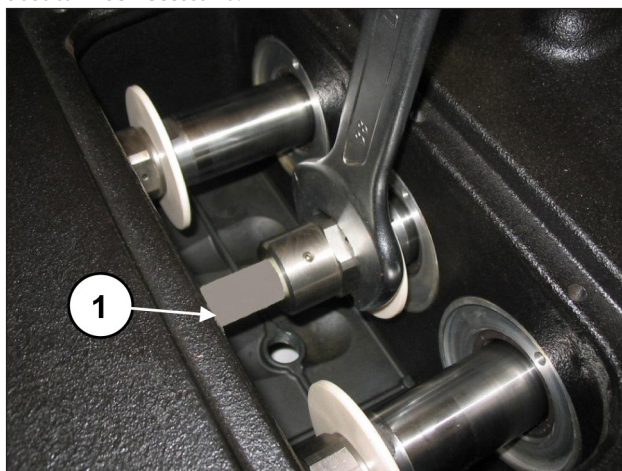


Fig. 108

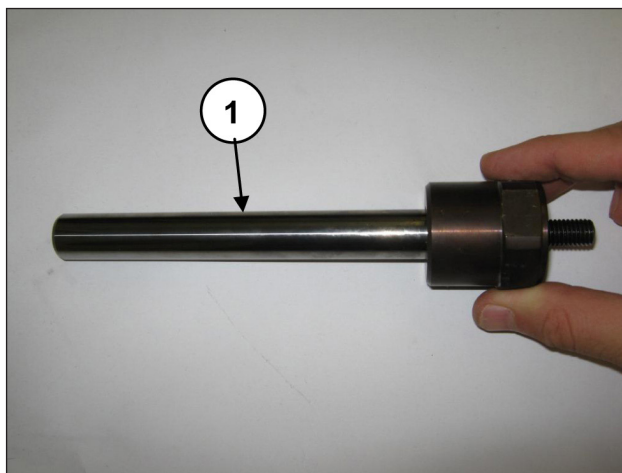


Fig. 109

Rimuovere le viti M8x50 fissaggio supporto a camicia (pos. ①, Fig. 110) e procedere alla separazione del supporto dalla camicia (pos. ①, Fig. 111).

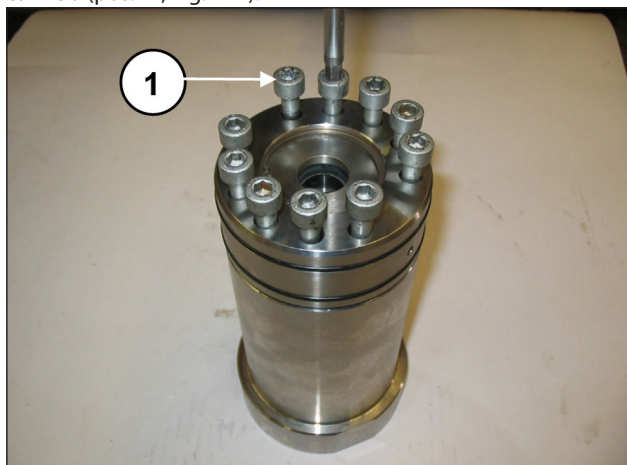


Fig. 110

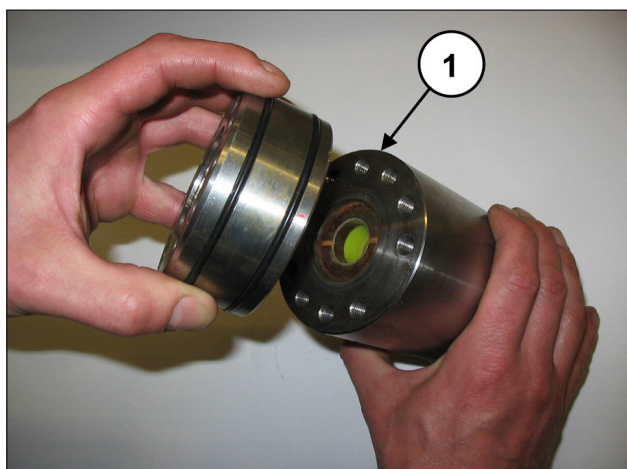


Fig. 111

Rimuovere l'anello seeger e l'anello di ritegno tenute (pos. ①, Fig. 112) e con una apposita spina in materiale plastico estrarre la guarnizione di tenuta LP (bassa pressione) (pos. ①, Fig. 113).

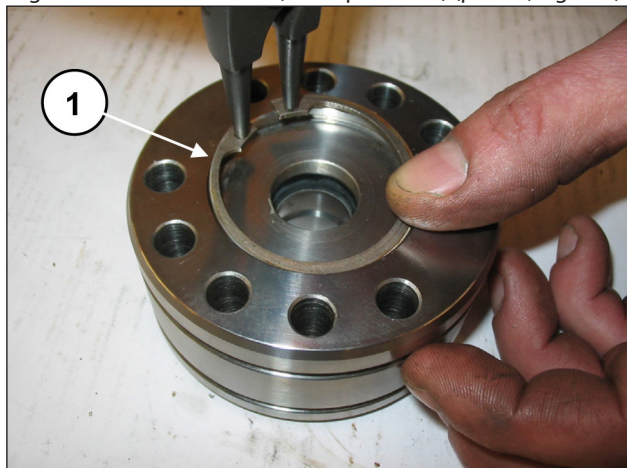


Fig. 112

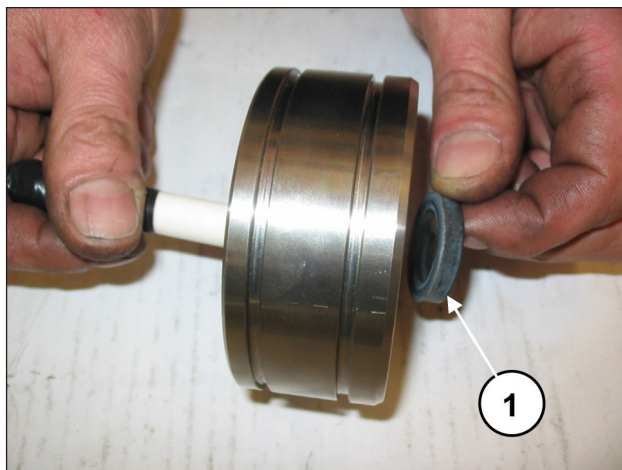


Fig. 113



**Ad ogni smontaggio le tenute di bassa pressione e gli anelli O-ring devono essere sostituiti.**

Con la camicia separata dal supporto tenute e con una apposita spina in materiale plastico (pos. ①, Fig. 114) fare fuoriuscire il pacco HP (alta pressione) (pos. ①, Fig. 115).



**Ad ogni smontaggio il pacco HP (pos. ①, Fig. 115) dovrà essere sostituito.**

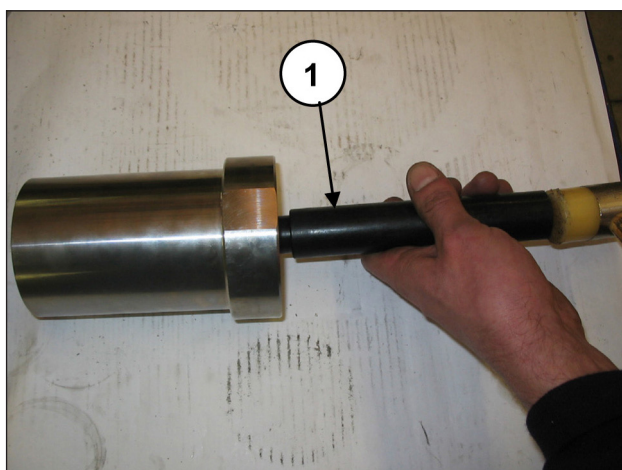


Fig. 114

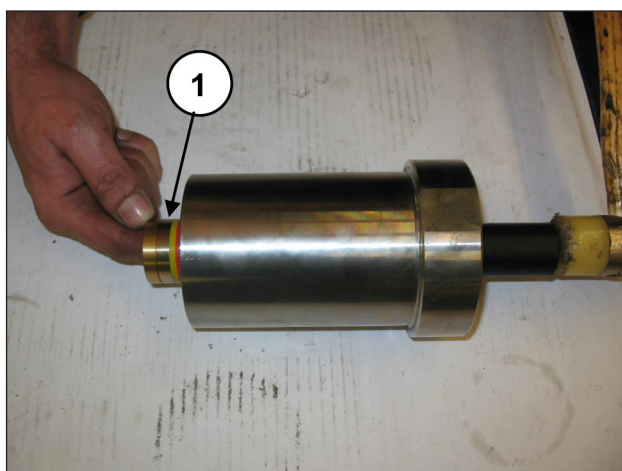


Fig. 115

### 2.2.4 Montaggio del gruppo pistone - supporti - tenute

Per il rimontaggio dei vari componenti invertire le operazioni facendo particolare attenzione alle sequenze sotto elencate; per i valori delle coppie di serraggio e per la sequenza di serraggio rispettare le indicazioni riportate nel capitolo 3. Inserire la bussola superiore nella camicia.



**Per un corretto posizionamento assiale della bussola utilizzare l'apposito attrezzo (cod. 27921100 per SM14, cod. 27921200 per SM16, cod. 27921300 per SM18, cod. 27911200 per SM20, cod. 27911400 per SM22 e cod. 27911500 per SM24) (pos. ①, Fig. 117 e Fig. 118).**

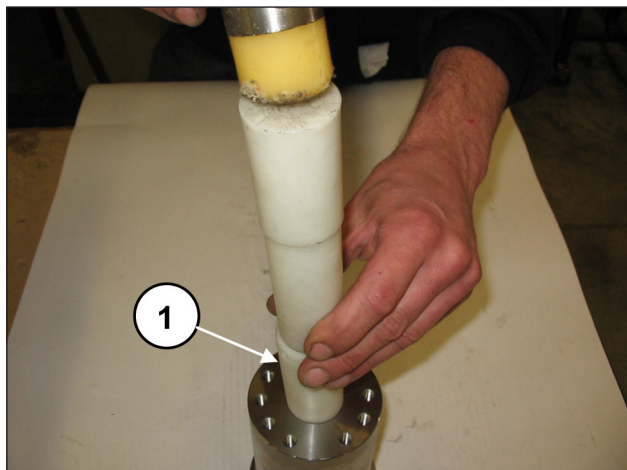


Fig. 116

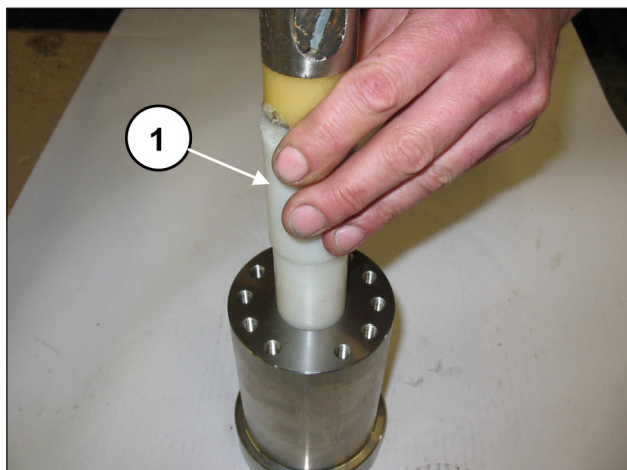


Fig. 117

Introdurre il pacco H.P. (alta pressione) (pos. ①, Fig. 118); data la leggera interferenza tra la tenuta e la camicia per evitare eventuali danneggiamenti si consiglia l'utilizzo dell'apposito attrezzo (cod. 27673200 per SM14, SM16 e SM18, cod. 27673300 per SM20, per SM22 e per SM24) (pos. ①, Fig. 119).

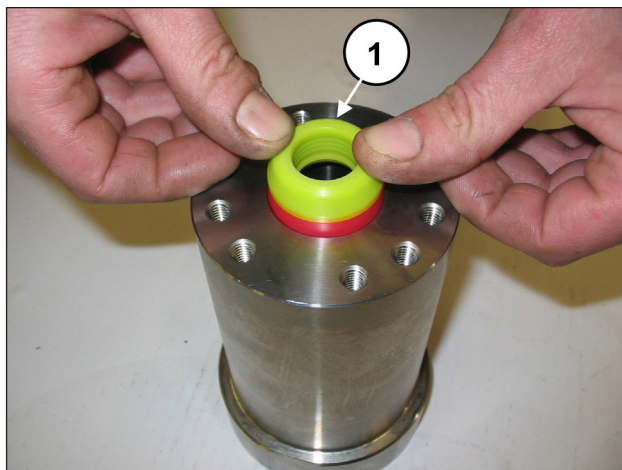


Fig. 118

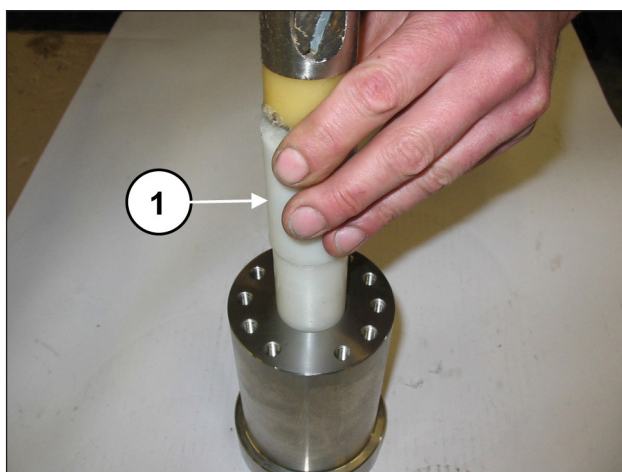


Fig. 119



**La tenuta H.P. deve essere introdotta nella camicia come indicato in Fig. 121 e Fig. 122.**



**Prima del montaggio in sede le tenute di H.P. devono essere lubrificate con grasso al silicone tipo OKS 1110 attenendosi alle operazioni sotto indicate:**

**Il diametro esterno deve risultare solo leggermente lubrificato;**

**Sul diametro interno il grasso deve essere applicato prestando particolare cura al riempimento di tutte le sacche comprese tra i labbri di tenuta come indicato in Fig. 122.**

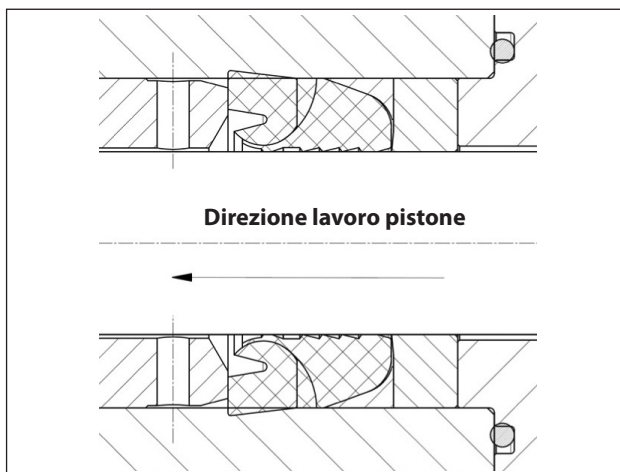


Fig. 120



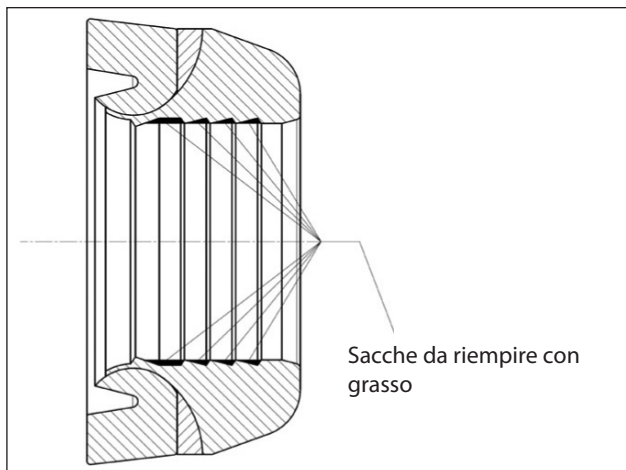


Fig. 121

Introdurre l'anello antiestrusione e la bussola guarnizioni (pos. ① e ②, Fig. 122, Fig. 123 e Fig. 124).



**La bussola guarnizioni ② deve essere introdotta nella camicia con i due scarichi rivolti verso l'esterno (lato carter) come indicato in Fig. 123.**

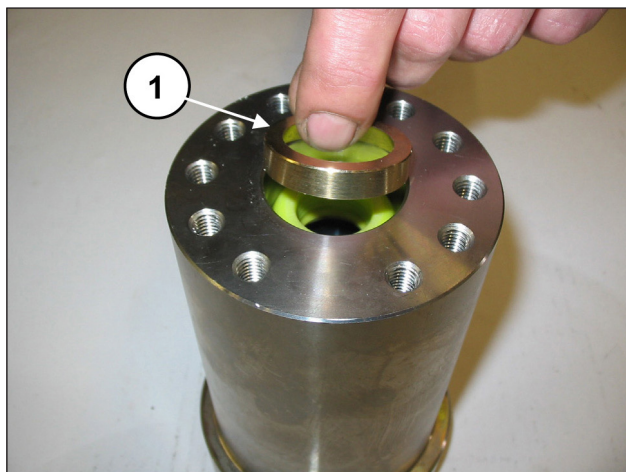


Fig. 122

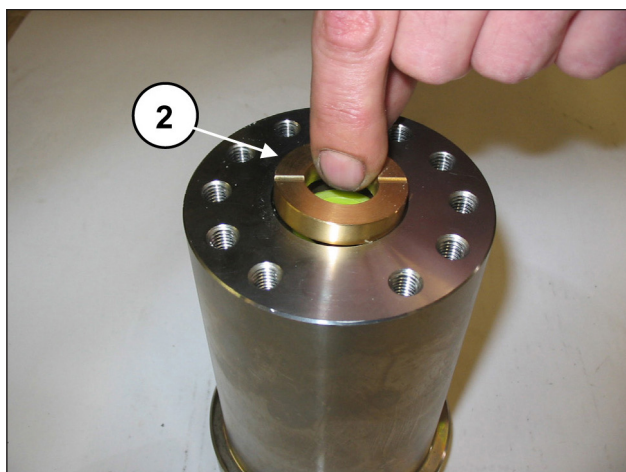


Fig. 123

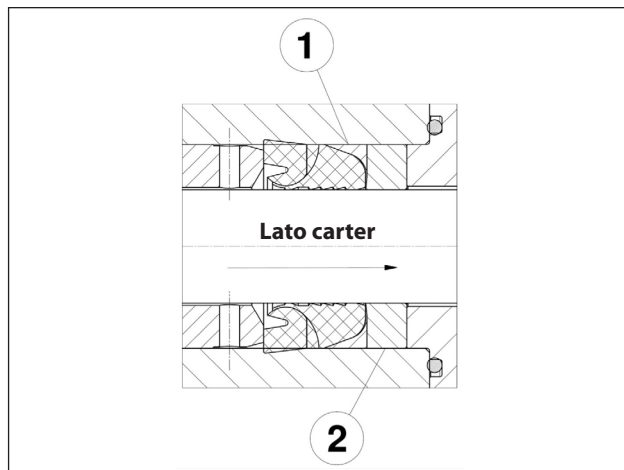


Fig. 124



**La tenuta L.P. deve essere introdotta nella camicia con il labbro di tenuta nella direzione di lavoro del pistone (pos. ①, Fig. 125 e Fig. 126), lubrificando leggermente il diametro esterno con grasso al silicone tipo OKS 1110. Sostituire la tenuta L.P. qualora si presentasse usurata.**



Fig. 125

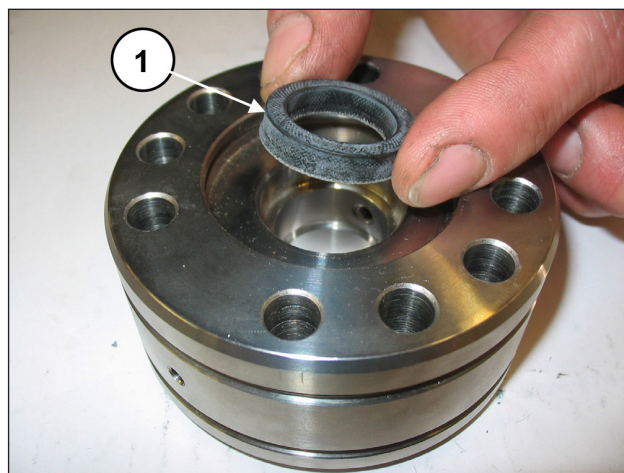


Fig. 126

Rimontare il gruppo supporto tenute (Fig. 127 e Fig. 128) sostituendo i componenti ① e ②.

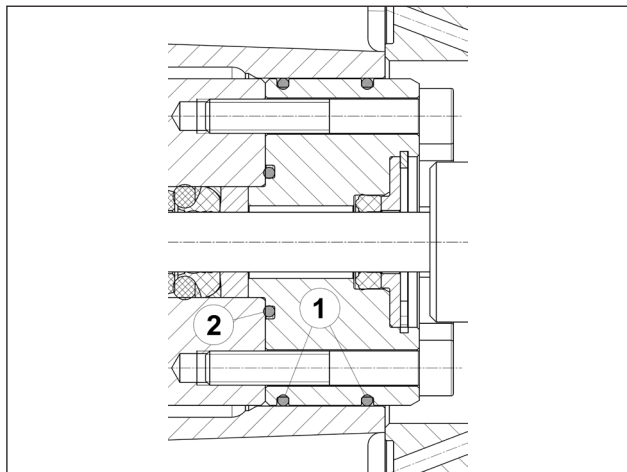


Fig. 127

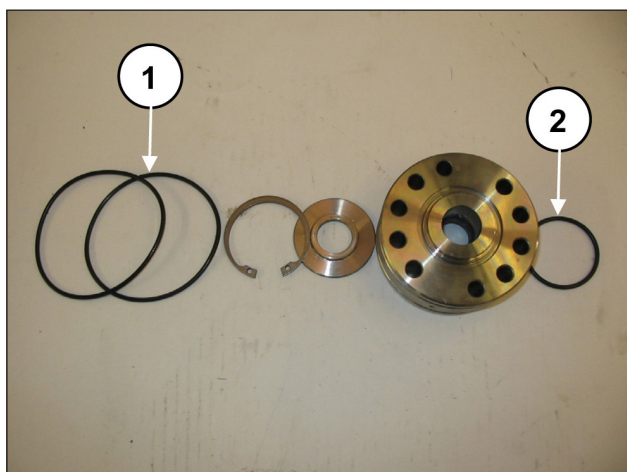


Fig. 128

Assemblare il gruppo supporto - camicia avvitando manualmente le viti M8x50 come indicato in Fig. 129, successivamente procedere alla taratura con chiave dinamometria come indicato nel capitolo 3.

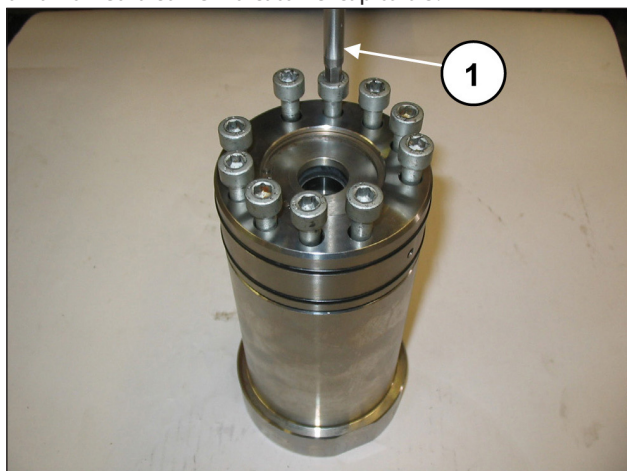


Fig. 129

### 3 TARATURE SERRAGGIO VITI

Il serraggio delle viti è da eseguirsi esclusivamente con chiave dinamometrica.

Descrizione	Posizione Esploso	Coppia Serraggio Nm
Vite M10x30 coperchio carter	79	45
Tappo G1/2x13 carter	81	40
Vite M16x30 staffa di sollevamento	41	200
Vite M10x40 coperchio riduttore	71	45
Vite M10x25 fermo corona	66	45
Vite M10x40 scatola riduttore	71	45
Vite M6x14 coperchi super. e infer.	50	10
Vite M10x30 coperchio cuscinetto	79	45
Vite M10x1.5x80 serraggio biella	43	65*
Vite M6x20 guida pistone	37	10
Pistone completo	15	40
Raccordo strozz. D.3 3/8M-3/8F	29	45
Vite M8x50 supporti	22	40**
Vite M16x280 testata	1	280***
Vite M10x140 camicie	26	83****

\* Raggiungere la coppia di serraggio serrando le viti contemporaneamente.



**Le viti - posiz. 1-22-26 devono essere serrate con la chiave dinamometrica lubrificando il gambo filettato con grasso al Bisolfuro di Molibdeno cod.12001500.**

\*\* Le viti fissaggio supporti devono essere serrate rispettando le fasi e l'ordine riportato nello schema di Fig. 130.

\*\*\* Le viti fissaggio testata devono essere serrate rispettando le fasi e l'ordine riportato nello schema di Fig. 131.

\*\*\*\* Le viti fissaggio camicie devono essere serrate rispettando le fasi e l'ordine riportato nello schema di Fig. 131.

#### Serraggio viti supporto guarnizioni pos. 22

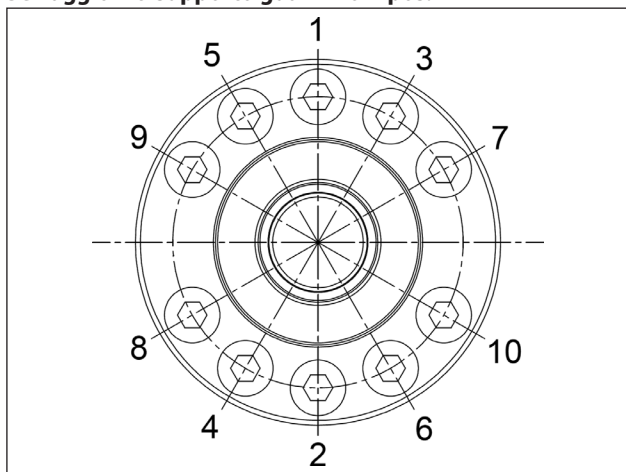


Fig. 130

Serraggio viti M8x50 secondo la sequenza indicata (1-2-3-4-5-6-7-8-9-10) eseguita in un'unica fase della coppia indicata

#### Serraggio viti testata e camicie pos. 1 e pos. 26

**OPERAZIONE 1:** Serraggio viti M16x320 (pos. 1) in due fasi rispettando la sequenza indicata in figura: (A-B-C-D-E-F-G-H)  
**Fase 1 = 200 Nm**  
**Fase 2 = 280 Nm**

**OPERAZIONE 2:** Serraggio viti M10x140 (pos. 26) in quattro fasi rispettando la sequenza indicata in figura: (1-2-3-4-5-6-7-8)  
**Fase 1 = 40 Nm**  
**Fase 2 = 65 Nm**  
**Fase 3 = 83 Nm**  
**Fase 4 = 83 Nm**

Fig. 131

#### 4 ATTREZZI PER LA RIPARAZIONE

La manutenzione della pompa può essere eseguita tramite semplice attrezzi per lo smontaggio e il rimontaggio dei componenti.

Sono disponibili i seguenti attrezzi:

##### Per il montaggio:

Albero (bloccaggio bielle)	cod. 27566200
Cuscinetto su albero a gomiti	cod. 27604700
Cuscinetto pignone su scatola riduttore	cod. 27604900
Cuscinetto albero a gomiti su scatola riduttore	cod. 27605000
Cuscinetto albero a gomiti su coperchio cuscinetto	cod. 27605000
Paraolio guida pistone	cod. 27605300
Cuscinetto su pignone	cod. 27604800
Paraolio pignone	cod. 27605200
Bussola per pistone	cod. 27921100 (SM14)
	cod. 27921200 (SM16)
	cod. 27931300 (SM18)
	cod. 27911200 (SM20)
	cod. 27911400 (SM22)
	cod. 27911500 (SM24)
Pacco tenute HP	cod. 27673200 (SM14 - SM16 - SM18)
	cod. 27673300 (SM20 - SM22 - SM24)
Testata / distanziale camicie	cod. 27540200

##### Per lo smontaggio:

Paraolio guida pistone	cod. 27918500
Albero (bloccaggio bielle)	cod. 27566200
Sede valvola	cod. 034300020
Testata / distanziale camicie	cod. 27540200

### 5 SOSTITUZIONE DELLA BOCCOLA DI PIEDE BIELLA

Eseguire il piantaggio a freddo della bronzina e le successive lavorazioni attenendosi alle dimensioni e tolleranze della sottostante Fig. 132.

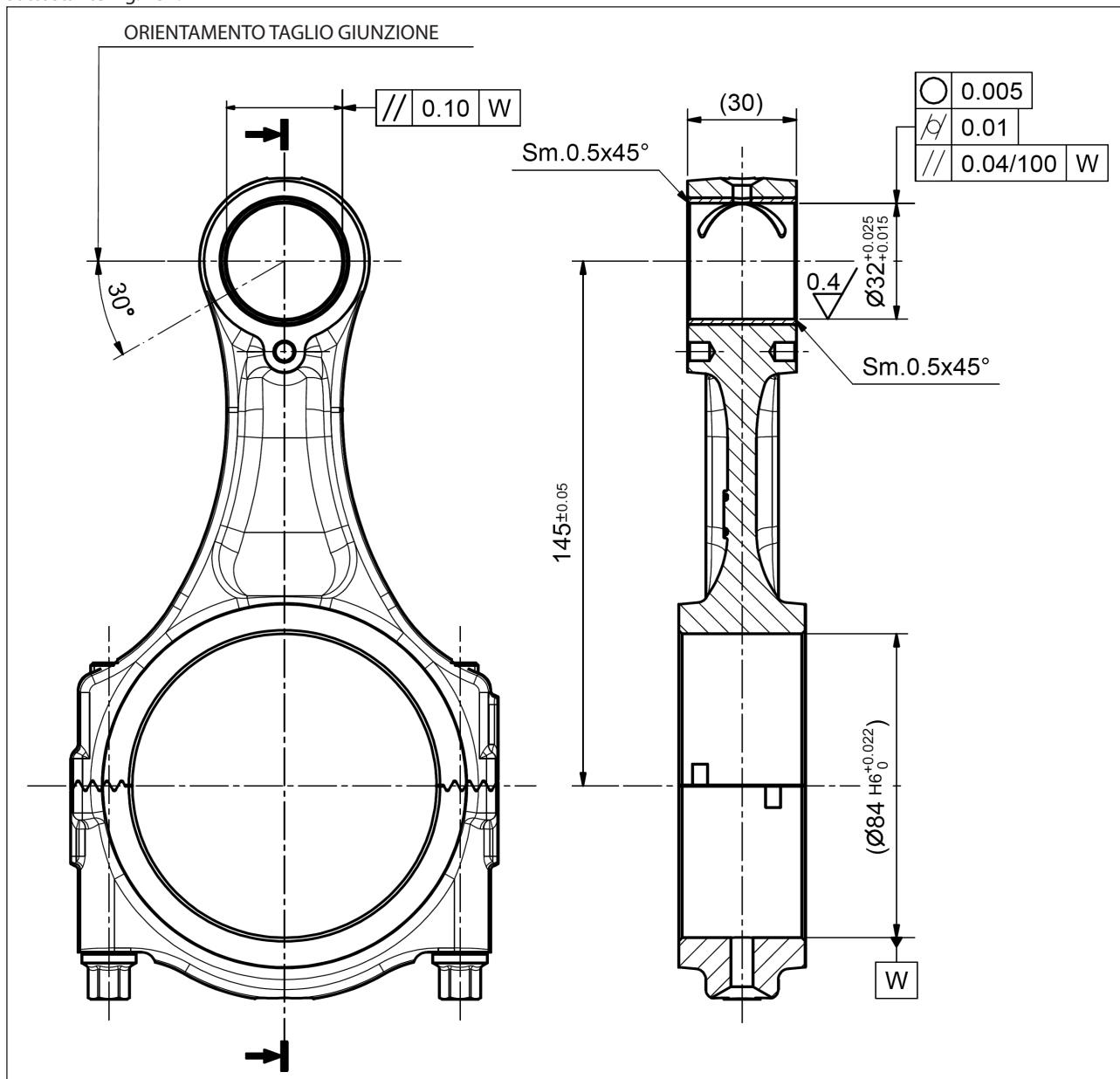


Fig. 132

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# 1 INTRODUCTION

This manual describes the instructions for repairing SM series pumps and should be carefully read and understood before any intervention on the pump.

Proper pump operation and duration depend on correct use and maintenance.

Interpump Group disclaims any responsibility for damage caused by negligence or failure to observe the standards described in this manual.

## 1.1 DESCRIPTION OF SYMBOLS

Read the contents of this manual carefully before each operation.



**Warning Sign**



Read the contents of this manual carefully before each operation.



**Danger Sign**

Wear protective goggles.



**Danger Sign**

Put on protective gloves before each operation.

# 2 REPAIR GUIDELINES



## 2.1 REPAIRING MECHANICAL PARTS

Mechanical parts must be repaired after the oil has been removed from the casing.

To remove oil, you must remove the oil filler cap pos. ①, Fig. 1 and then the drain plug pos. ②, Fig. 1.

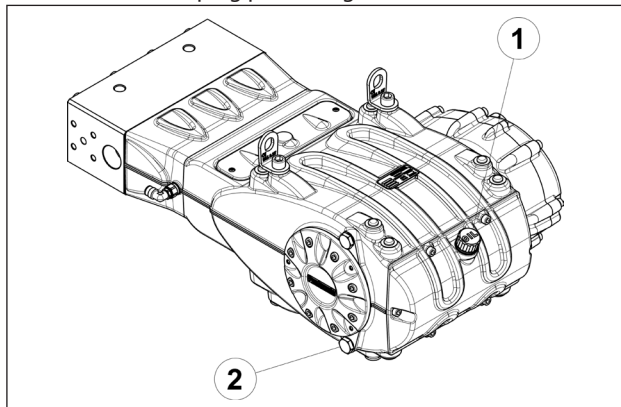


Fig. 1



**The used oil must be placed in a suitable container and disposed of in special centres. It absolutely should not be discarded into the environment.**

### 2.1.1 Disassembly of mechanical parts

The correct sequence is as follows.

Fully empty the oil from the pump, then disassemble the casing cover (and relative O-ring), unscrewing the 6 M10 screws (pos. ①, Fig. 2).

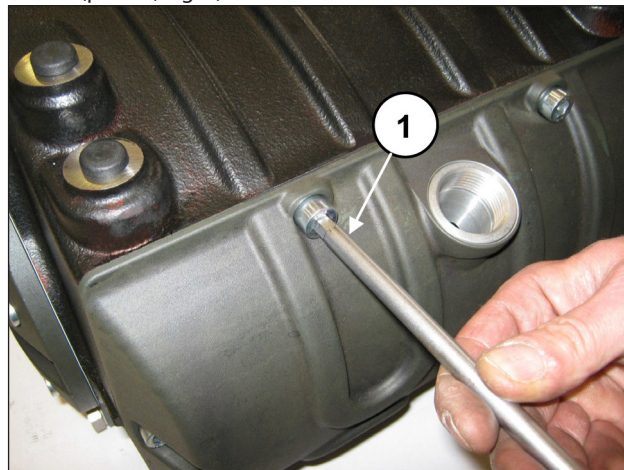


Fig. 2

Remove the tab from the PTO shaft (pos. ①, Fig. 3).

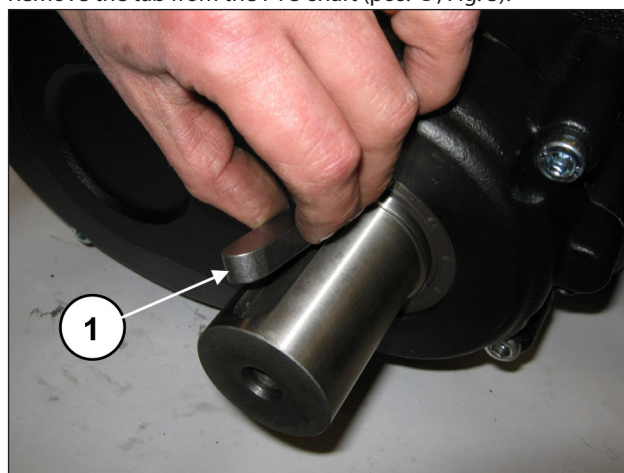


Fig. 3

Unscrew the reduction gear cover fixing screws (pos. ①, Fig. 4).

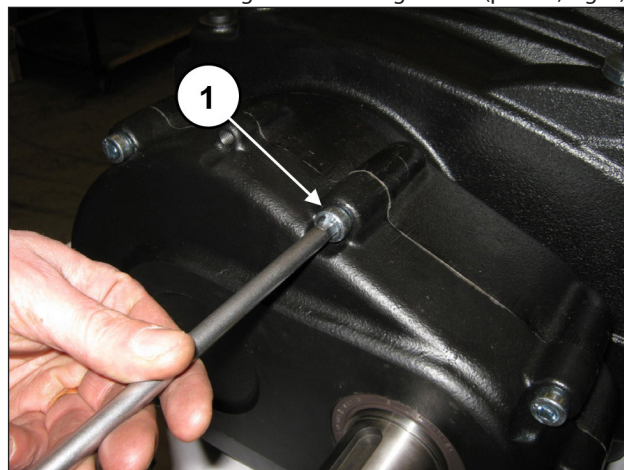


Fig. 4

Position the 3 grub screws or M8 threaded screws (pos. ①, Fig. 5) with the function of extractors in the holes and two sufficiently long M10 screws with the function of supporting the cover (pos. ②, Fig. 5).

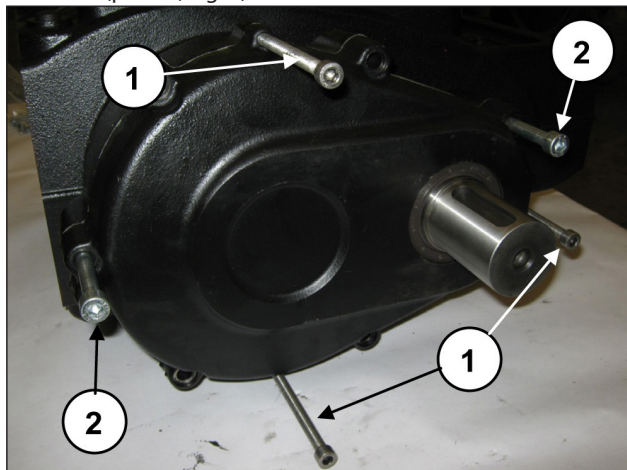


Fig. 5

Slowly screw in the 3 M8 screws (pos. ①, Fig. 6) with the function of extractors to fully remove the cover unit and pinion

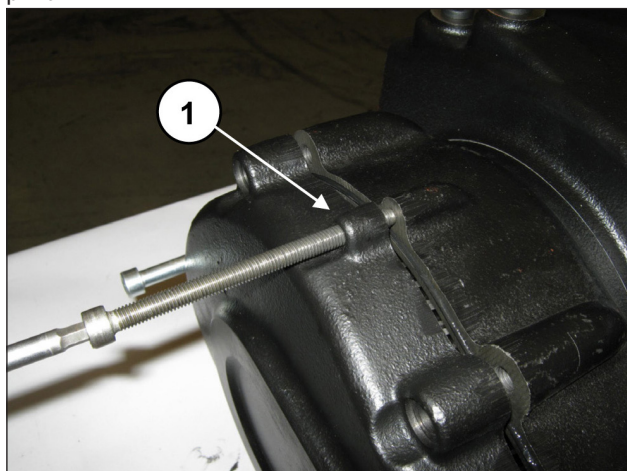


Fig. 6

Complete disassembly of the reduction gear cover from the pinion is possible following these steps:

Remove the Seeger ring Ø120 (pos. ①, Fig. 7).

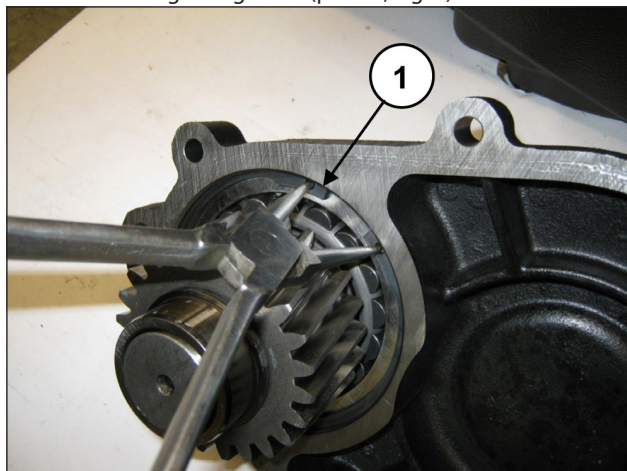


Fig. 7

Separate the pinion from the cover, working with an extractor hammer on the pinion itself (pos. ①, Fig. 8).

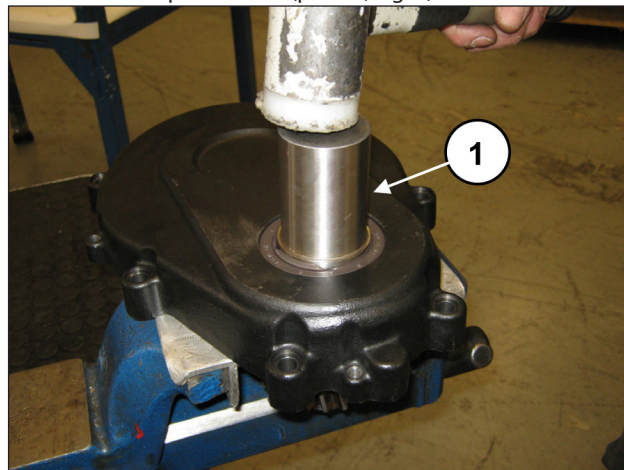


Fig. 8

Remove the Seeger ring Ø55 (pos. ①, Fig. 9) and the bearing support ring (pos. ①, Fig. 10) from the pinion

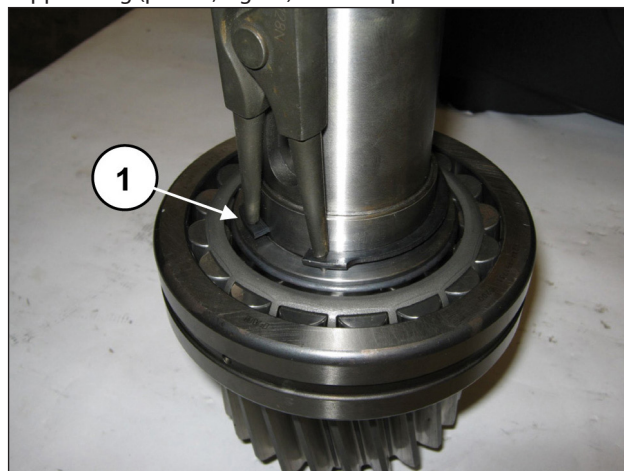


Fig. 9

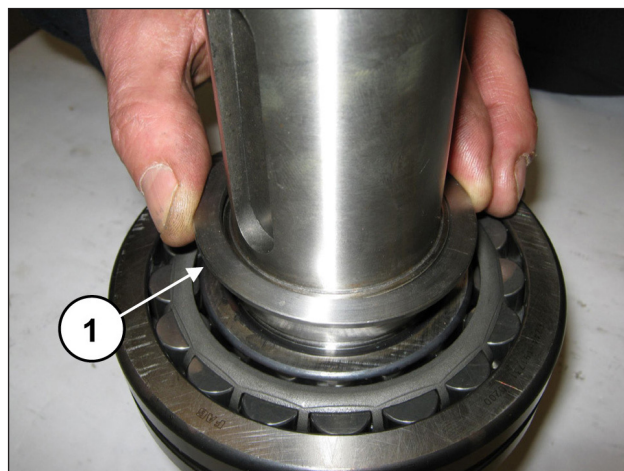


Fig. 10



Extract the seal ring from the reduction gear cover, working from the inner side of the cover (pos. ①, Fig. 11).

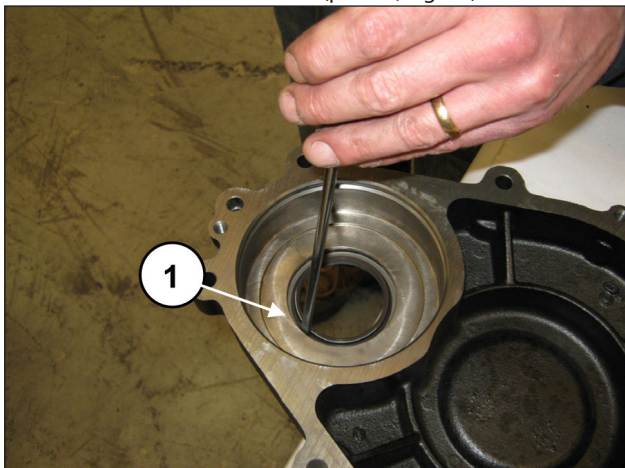


Fig. 11

Unscrew the screws holding in the ring gear (pos. ①, Fig. 12) and remove it (pos. ①, Fig. 13).

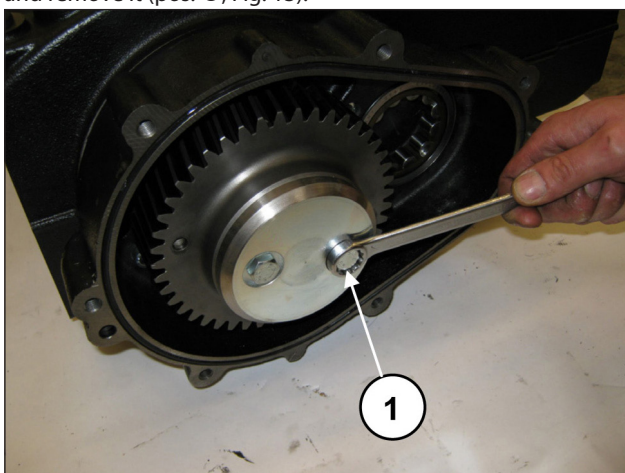


Fig. 12

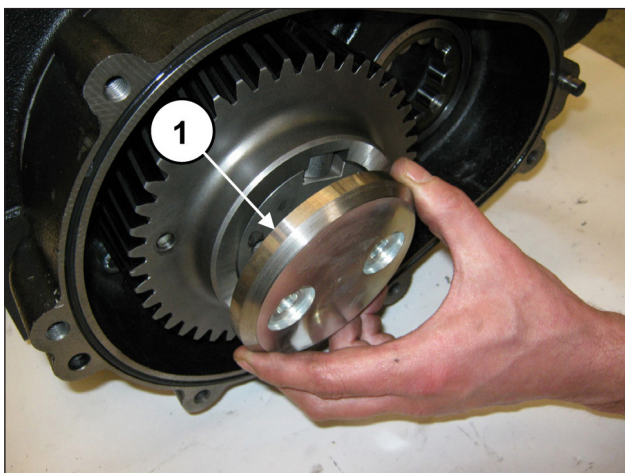


Fig. 13

Remove the ring gear (pos. ①, Fig. 14). If necessary, it is possible to use an extractor hammer to be applied on the 2 M8 holes (pos. ②, Fig. 14).

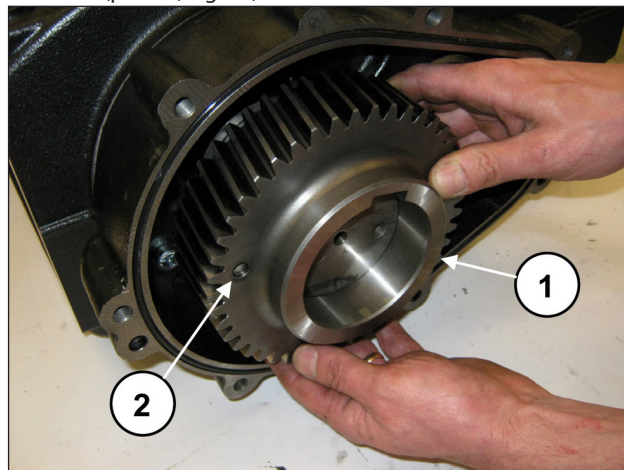


Fig. 14

Remove the tab from the shaft (pos. ①, Fig. 15).

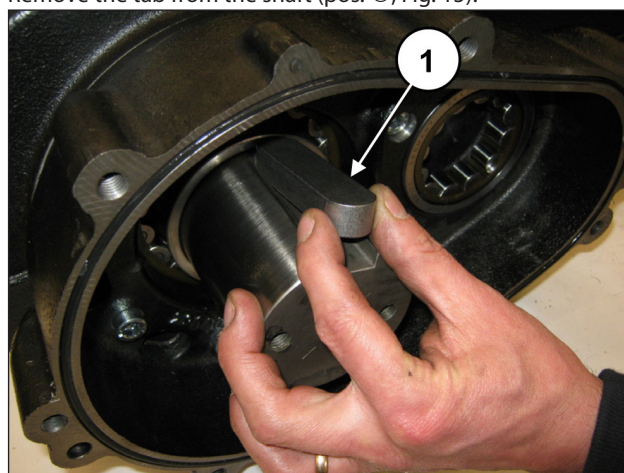


Fig. 15

Remove the ring gear support ring (pos. ①, Fig. 16).

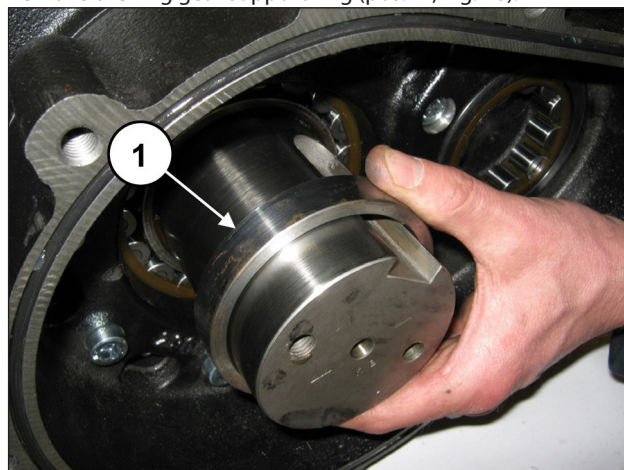


Fig. 16

Unscrew the con-rod screws (pos. ①, Fig. 17).

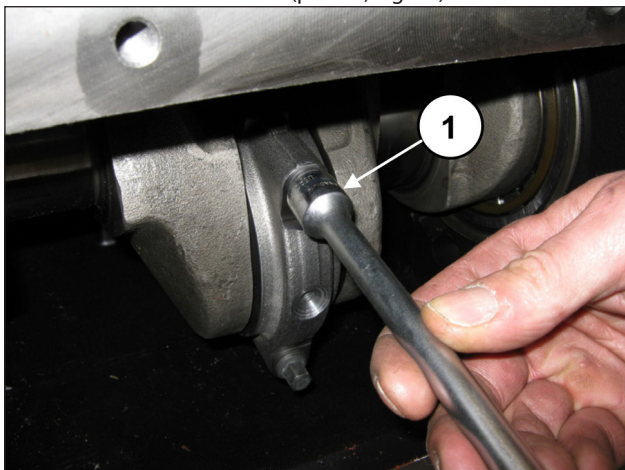


Fig. 17

Remove the con-rod caps with the lower semi-bearings, taking special care of the disassembly sequence during disassembly.



**The con-rod caps and their relative half supports must be reassembled in exactly the same order and coupling with which they were disassembled.**

To avoid possible errors, caps and half supports have been numbered on one side (pos. ①, Fig. 18).

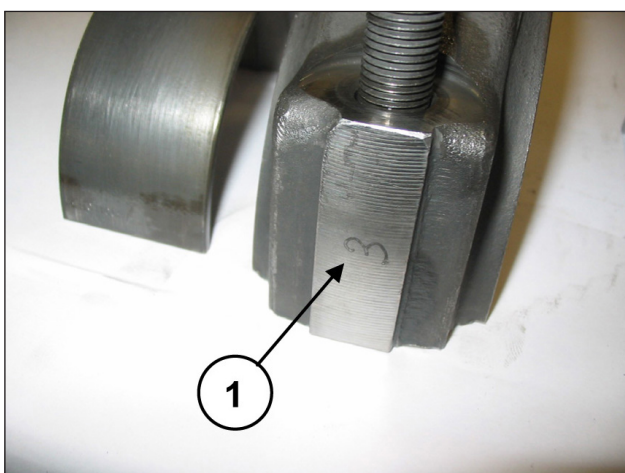


Fig. 18

Advance the half supports completely in the direction of the hydraulic part to allow the bend shaft to come out. To facilitate this operation, use special tool (code 27566200), (pos. ①, Fig. 19).

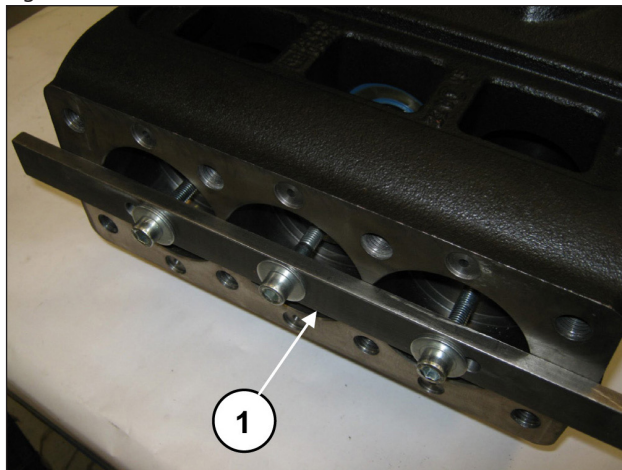


Fig. 19

Remove the three upper half-bearings of the half supports (pos. ①, Fig. 20).

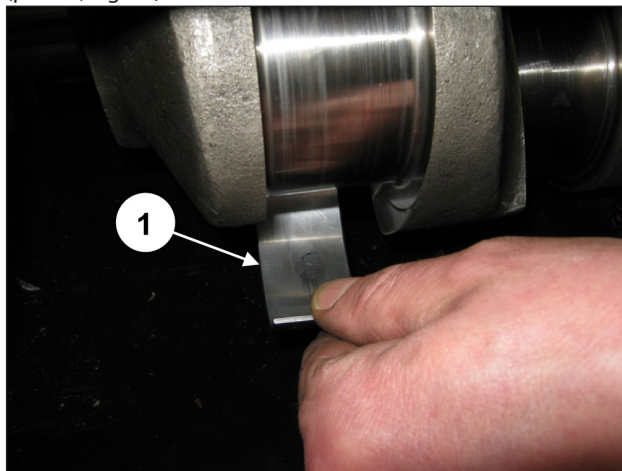


Fig. 20

Unscrew the reduction gear box fixing screws (pos. ①, Fig. 21 and Fig. 22).

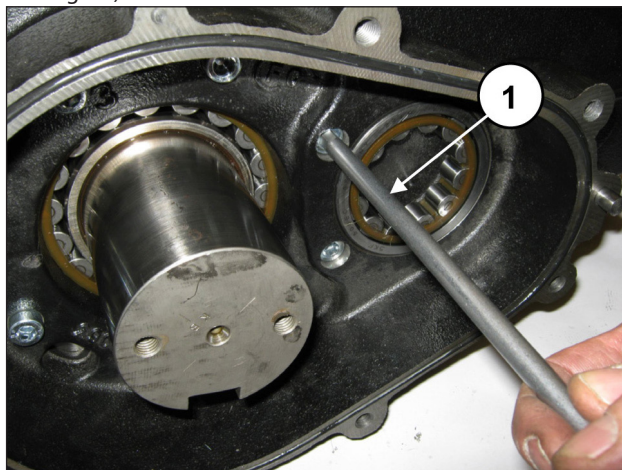


Fig. 21

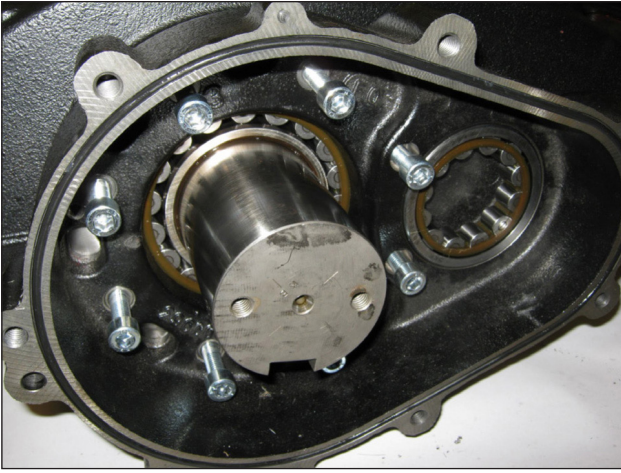


Fig. 22

Position the 3 grub screws or M8 threaded screws (pos. ①, Fig. 23) with the function of extractors in the holes and two sufficiently long M10 screws with the function of supporting the reduction gear box (pos. ②, Fig. 23).

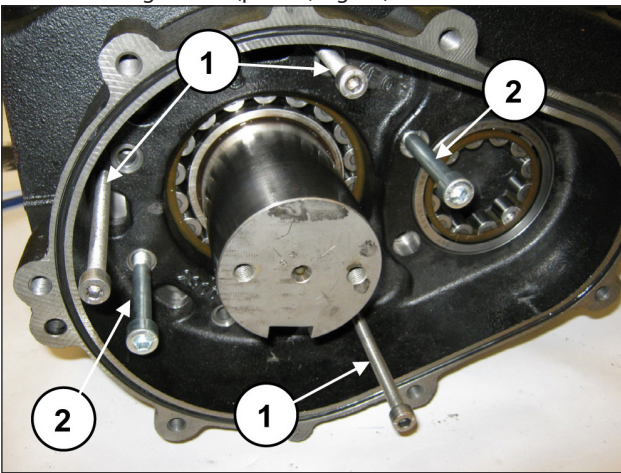


Fig. 23

Slowly screw in the 3 M8 screws (pos. ①, Fig. 24) to prevent that the box can tilt too far and get locked in the housing. Remove the box while supporting the shaft to prevent damage (pos. ①, Fig. 25).

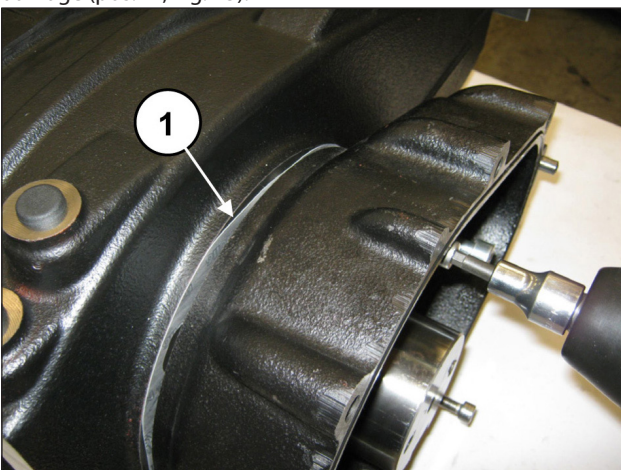


Fig. 24

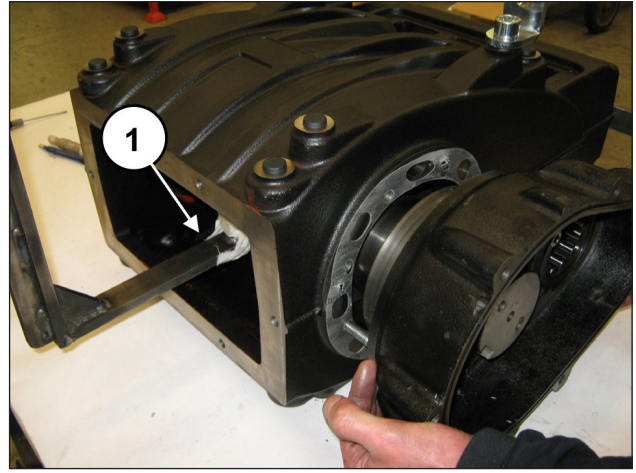


Fig. 25

Unscrew the bearing cover fixing screws from the opposite side (pos. ①, Fig. 26 and Fig. 27).

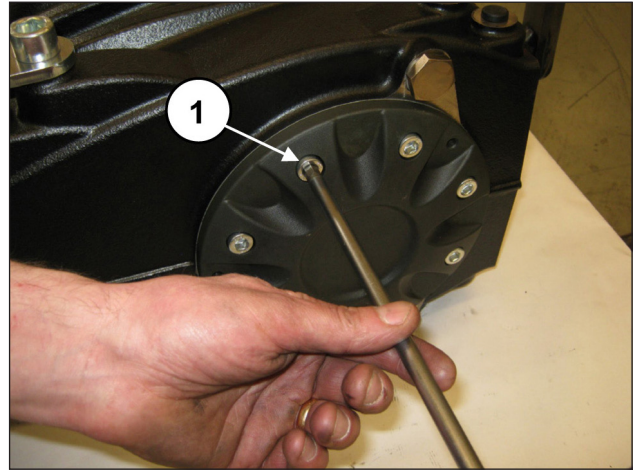


Fig. 26

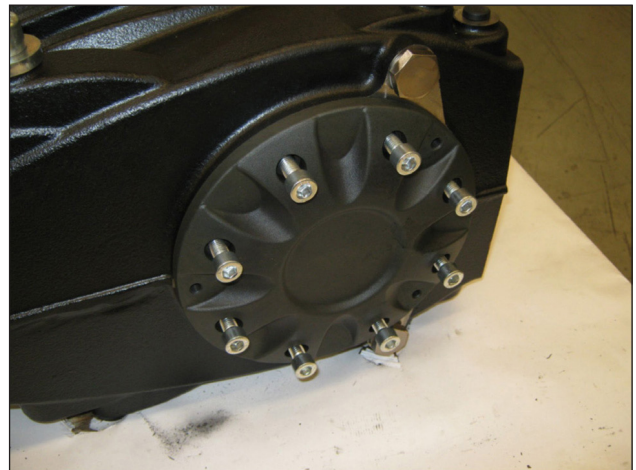


Fig. 27

Position the 3 grub screws or M8 threaded screws (pos. ①, Fig. 28) with the function of extractors in the holes

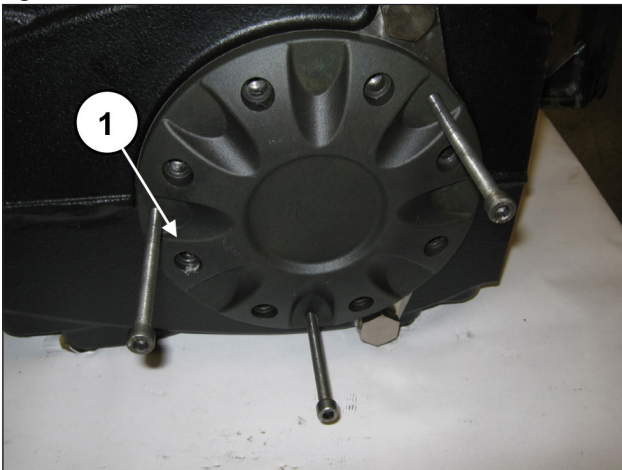


Fig. 28

Slowly screw in the 3 M8 screws (pos. ①, Fig. 29) to prevent that the cover can tilt too far and get locked in the housing. Remove the bearing cover while supporting the shaft to prevent damage (pos. ①, Fig. 30).

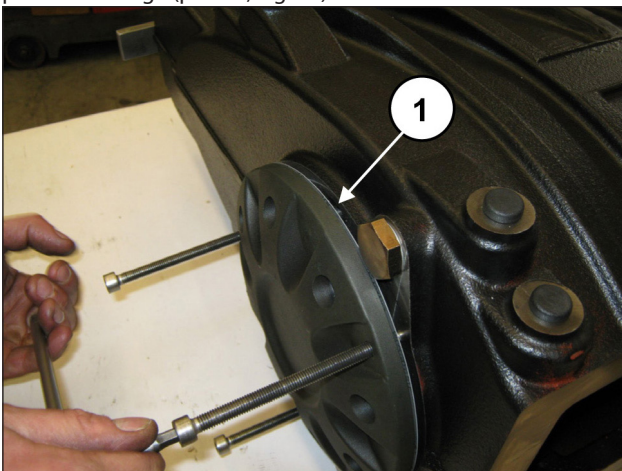


Fig. 29

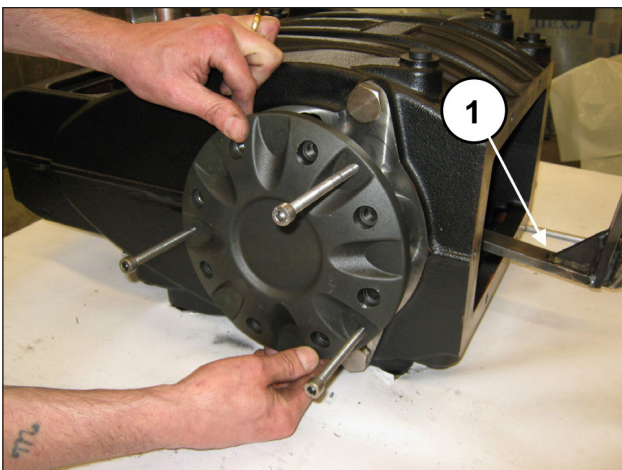


Fig. 30

Remove the bend shaft casing from the PTO side (pos. ①, Fig. 31).

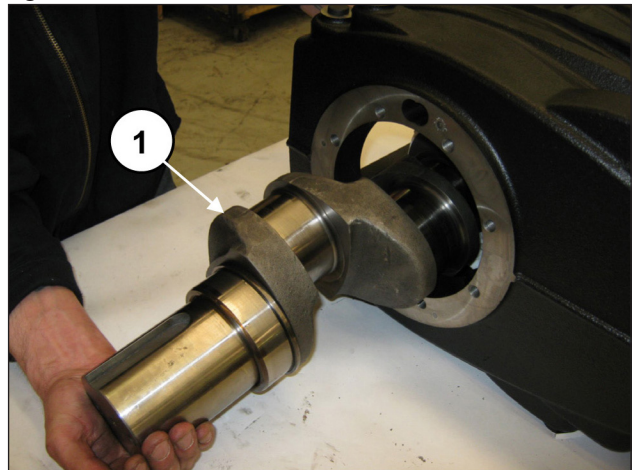


Fig. 31

In the event that it is necessary to replace one or more con-rods or piston guides, operate as follows: Unscrew the screws with tool code 27566200 to unlock the con-rods (pos. ①, Fig. 32) and then extract the con-rod-piston guide units from the back casing opening (pos. ①, Fig. 33).

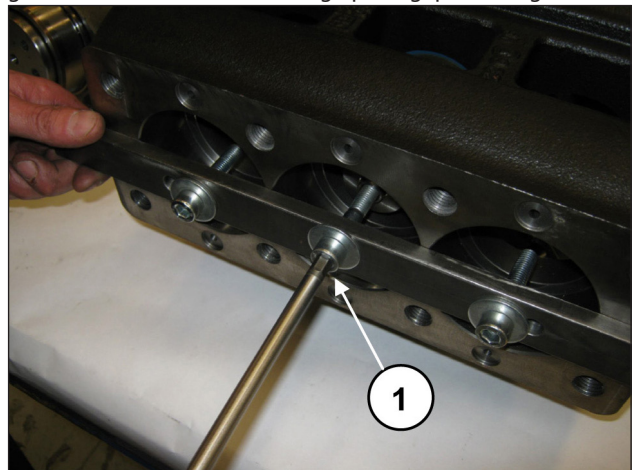


Fig. 32

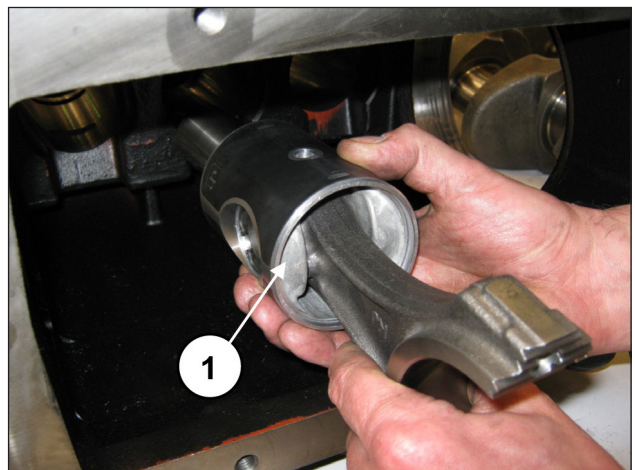


Fig. 33

It is now possible to disassemble the piston guide seal rings, taking care to not damage the piston guide sliding rod.



**Whenever it becomes necessary to replace the piston guide seal rings without dismantling the entire mechanical part, it is possible to extract the seal rings with the use of tool code 27918500 operating as follows:**

Insert the tool between the rod and the seal ring (pos. ①, Fig. 34) and, with the extractor hammer, complete insertion of the tapered section inside the seal ring (pos. ①, Fig. 35).

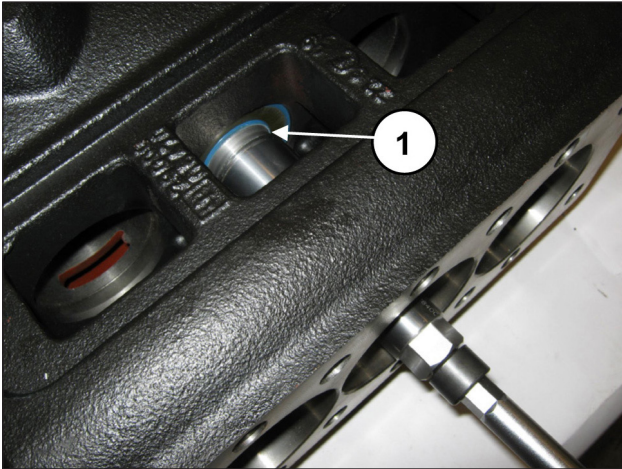


Fig. 34

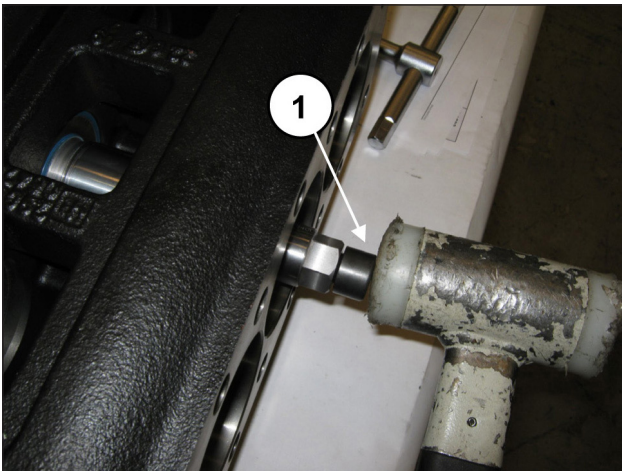


Fig. 35

Extract the seal ring using the tool extractor hammer (pos. ①, Fig. 36).

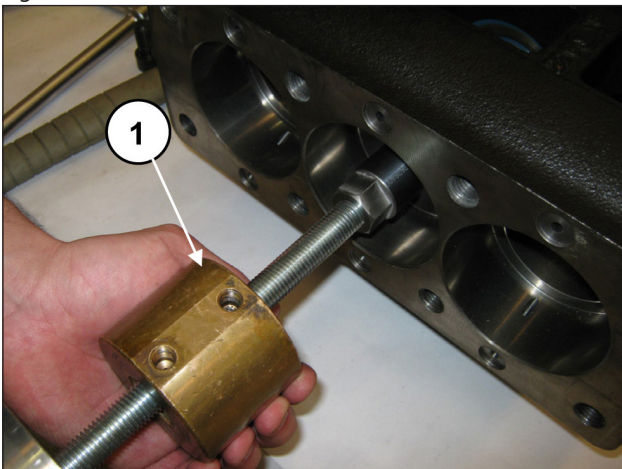


Fig. 36

Remove the two spindle locking Seeger rings (pos. ①, Fig. 37).

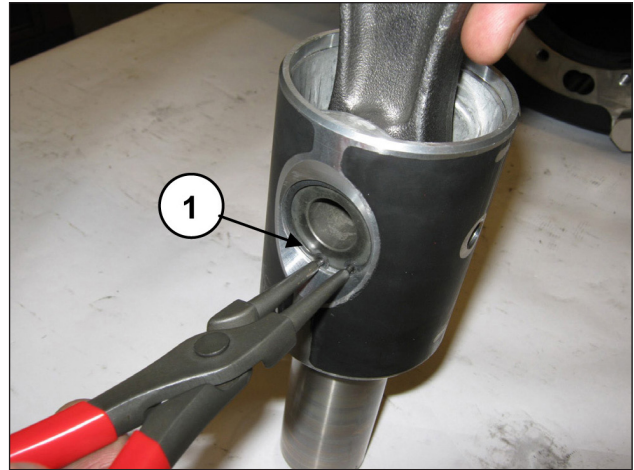


Fig. 37

Remove the spindle (pos. ①, Fig. 38) and extract the con-rod (pos. ①, Fig. 39).

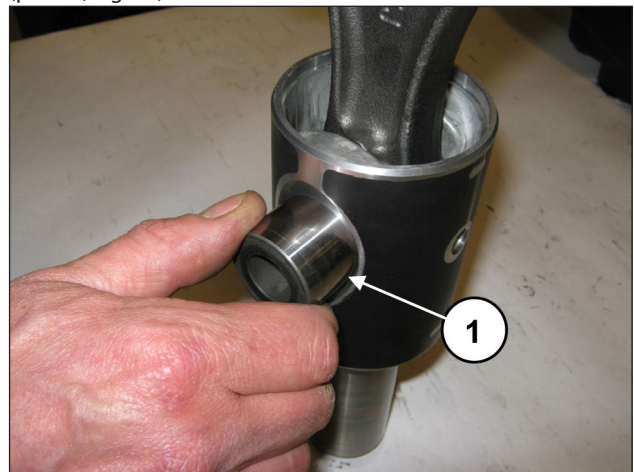


Fig. 38

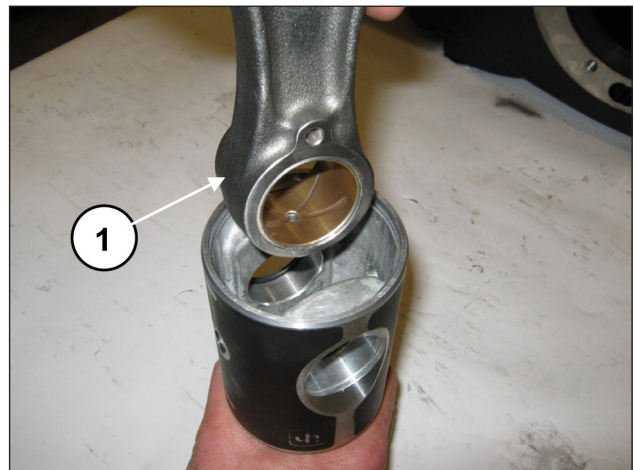


Fig. 39

Couple the half supports to the previously disassembled caps, referring to the numbering (pos. ①, Fig. 40).

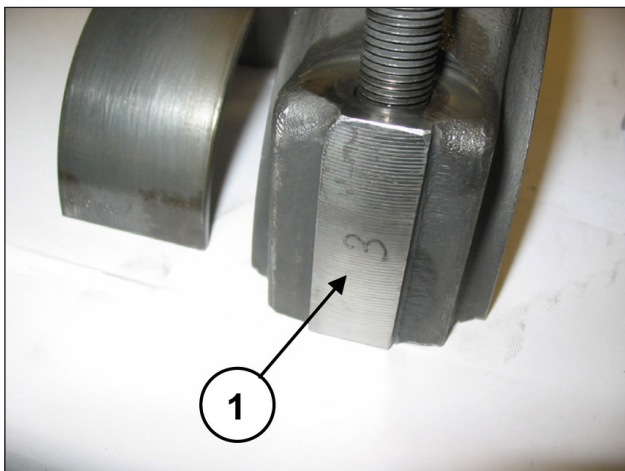


Fig. 40

To separate the rod from the piston guide, unscrew the hexagonal head M6 screws with a special wrench (pos. ①, Fig. 41).

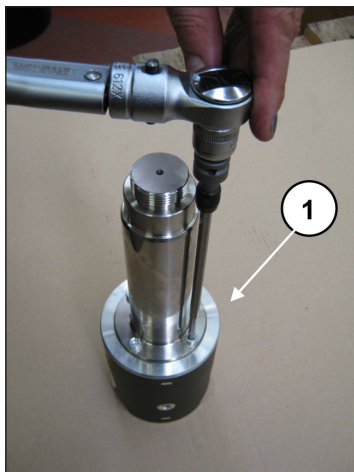


Fig. 41

**2.1.2 Assembly of mechanical parts**

Proceed with assembly following the reverse order indicated in par. 2.1.1.

The correct sequence is as follows:

Assemble the red to the piston guide.

Insert the piston guide rod into its seat on the piston guide (pos. ①, Fig. 42) and join the rod to the piston guide by means of the 4 M6x20 screws (pos. ①, Fig. 43).



Fig. 42



Fig. 43

Lock the piston guide in a vice with the aid of a special tool and calibrate the screws with a torque wrench (pos. ①, Fig. 44) as indicated in chapter 3.

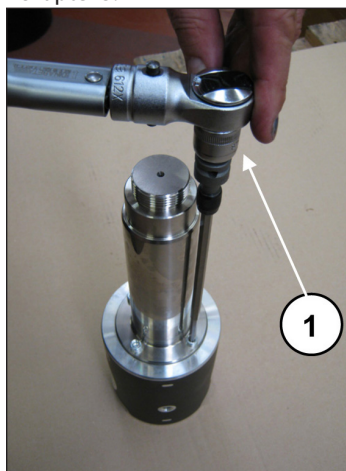


Fig. 44

Insert the con-rod in the piston guide (pos. ①, Fig. 39) and then insert the spindle (pos. ①, Fig. 38). Apply the two shoulder Seeger rings (pos. ①, Fig. 37).



**Assembly has been carried out properly if the con-rod foot, piston guide and spindle rotate freely.**

Separate the caps from the half supports. Proper coupling can be verified by the numbering on the side (pos. ①, Fig. 40). After having checked casing cleaning, proceed with assembly of half support-piston guide unit inside casing rods (pos. ①, Fig. 33).



**Insertion of the half support-piston guide unit in the casing must be made with the half bearings set in the direction in which numbers are visible from above.**

Block the three units with the use of special tool code 27566200 (pos. ①, Fig. 32).

Pre-assemble the ring inside the bend shaft bearings (on both sides of the shaft as far as possible) using special tool code 27604700 (pos. ①, Fig. 45) (pos. ①, Fig. 46).



**The inner and outer rings of the bearings must be reassembled keeping the same coupling with which they were disassembled.**



Fig. 45



Fig. 46

Insert the shaft from the PTO side, taking care not to hit the previously assembled con-rod shanks (pos. ①, Fig. 47) and (pos. ①, Fig. 48).

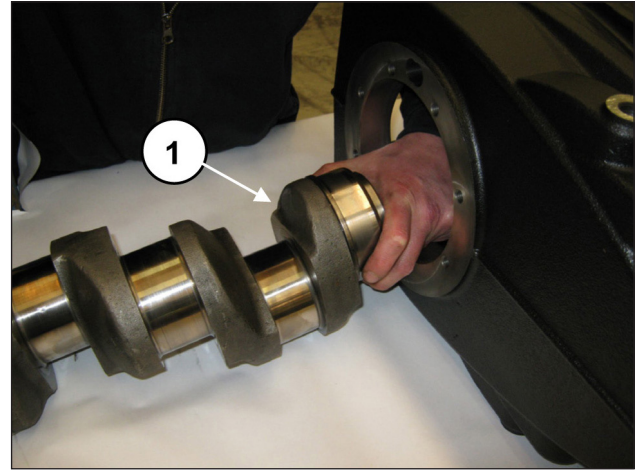


Fig. 47

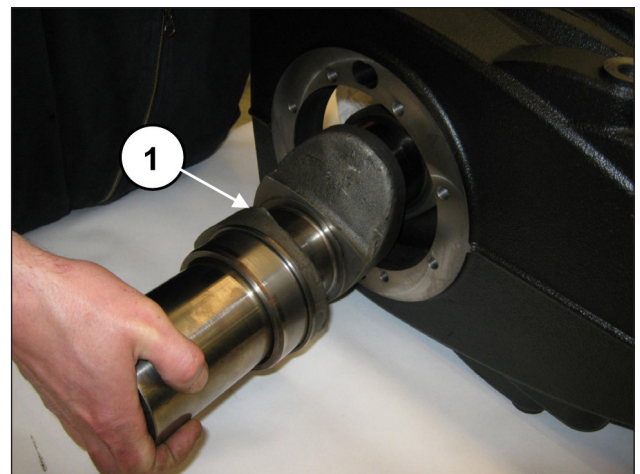


Fig. 48



**The bend shaft must always be assembled with the PTO on the opposite side with respect to the G1/2" holes for the oil discharge plugs on the pump casing (pos. ②, Fig. 50).**

Fully insert the shaft in the casing (pos. ①, Fig. 49 and Fig. 50).

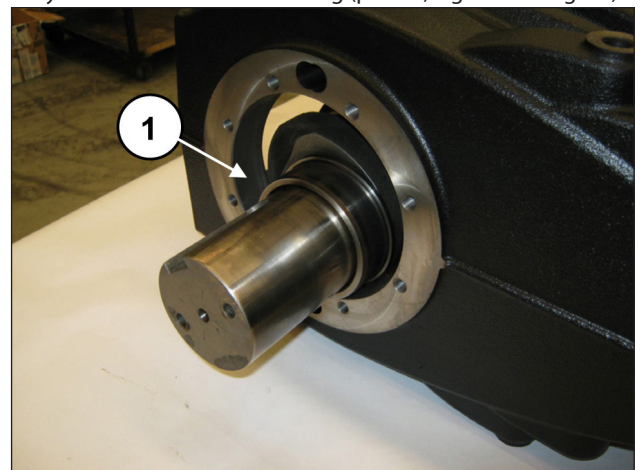


Fig. 49

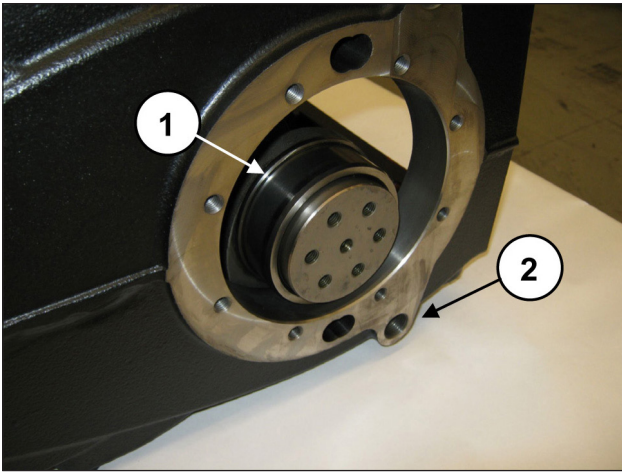


Fig. 50

Pre-assemble the outer ring of the pinion bearing on the reduction gear with the aid of special tool code 27604900 (pos. ①, Fig. 51) inserting fully down to end stroke (pos. ①, Fig. 52).

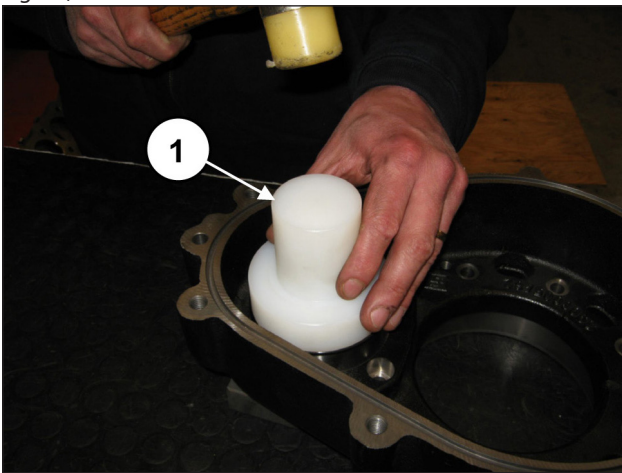


Fig. 51

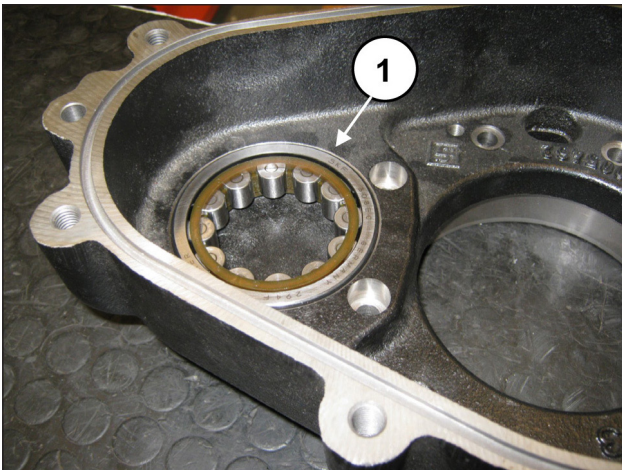


Fig. 52

From the opposite side of the reduction gear box, pre-assemble the external ring of the bend shaft bearing using the tool code 27605000 (pos. ①, Fig. 53) inserting fully down to end stroke (pos. ①, Fig. 54).

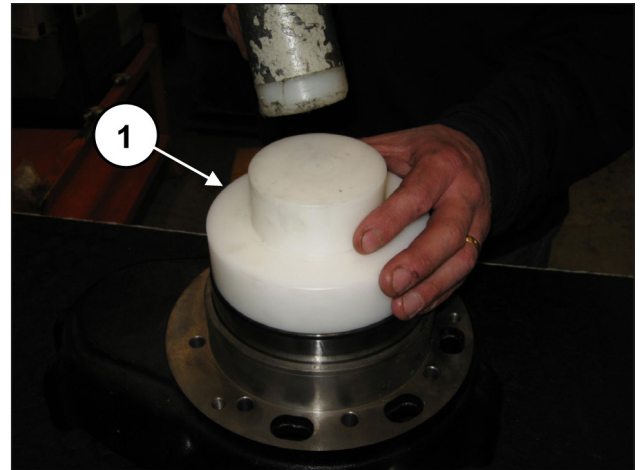


Fig. 53

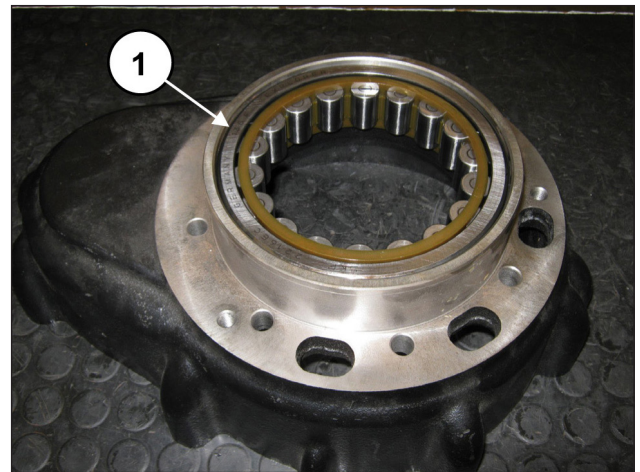


Fig. 54

Repeat this operation on the bearing cover, pre-assembling the external bend shaft bearing ring with the help of the tool code 27605000 (pos. ①, Fig. 55) inserting fully down to end stroke (pos. ①, Fig. 56).

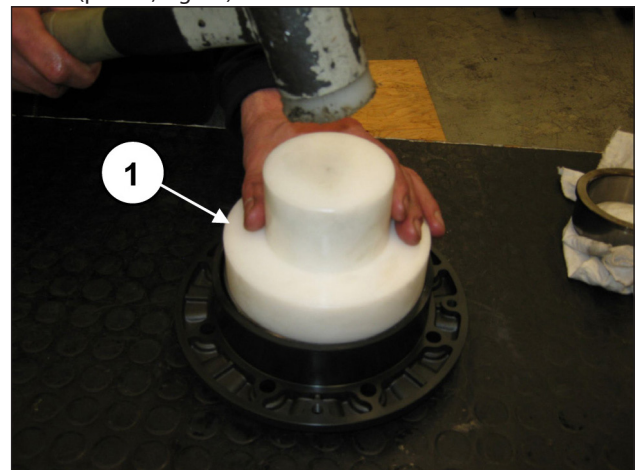


Fig. 55



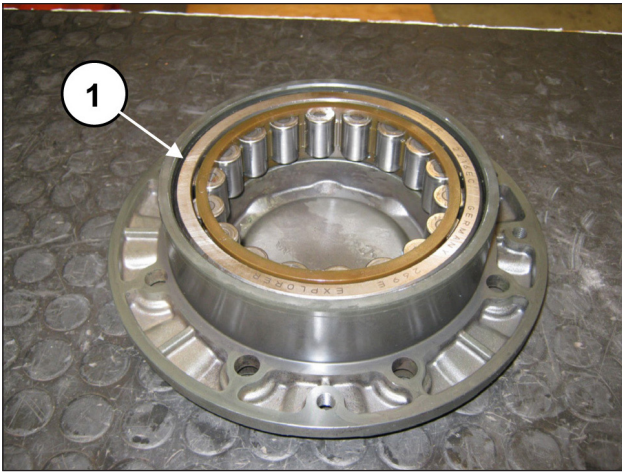


Fig. 56

Insert the side seal on the bearing cover (pos. ①, Fig. 57) and lift the bend shaft to favour cover insertion (pos. ①, Fig. 58).

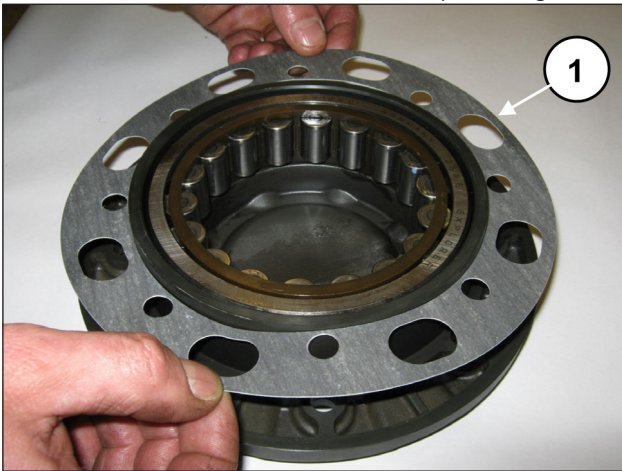


Fig. 57

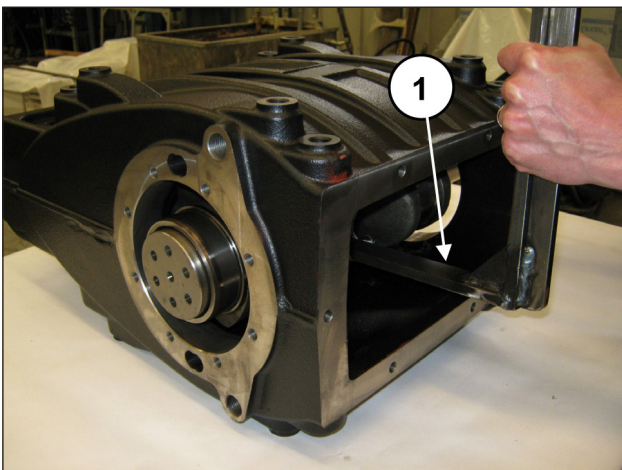


Fig. 58

Assemble the bearing cover (and relative seal) using an extractor hammer (pos. ①, Fig. 59)



**Position the bearing cover in such a way that the "Pratissoli" logo is perfectly horizontal.**

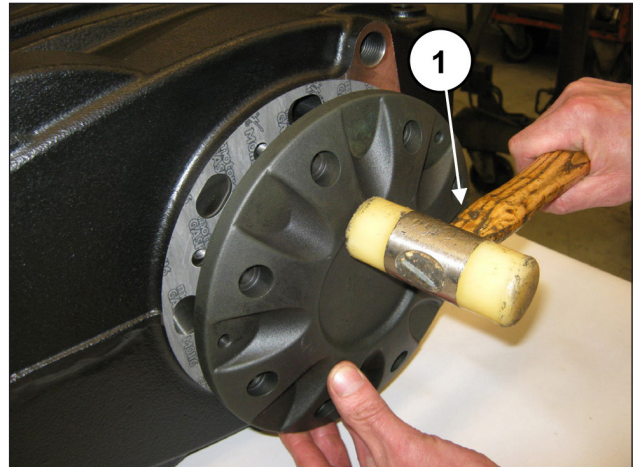


Fig. 59

Tighten the 8 M10x30 screws (pos. ①, Fig. 60). Calibrate the screws with a torque wrench as indicated in chapter 3.

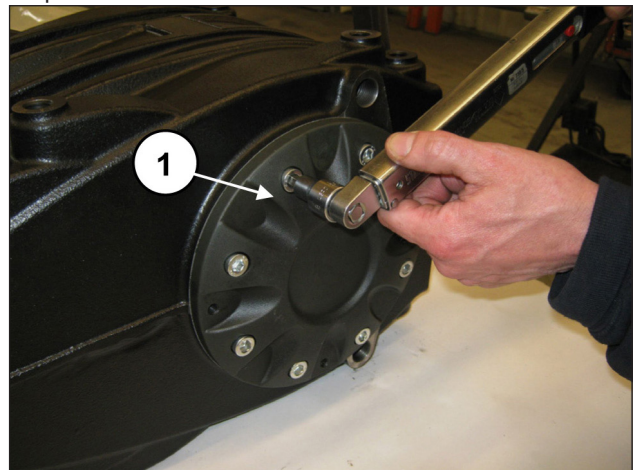


Fig. 60

From the opposite side, insert the side seal on the reduction gear box (pos. ①, Fig. 61) and lift the bend shaft to favour cover insertion (pos. ①, Fig. 62).

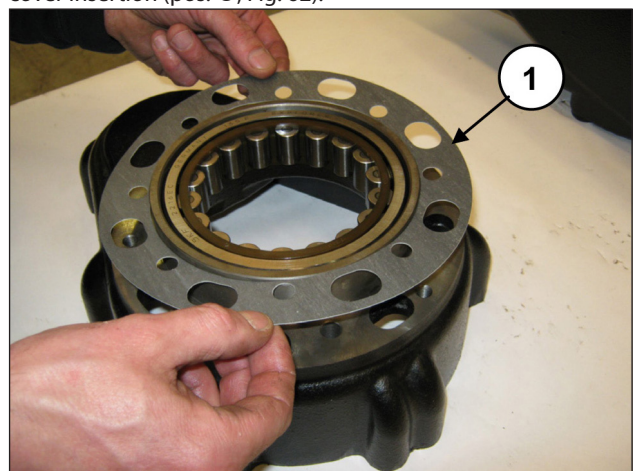


Fig. 61

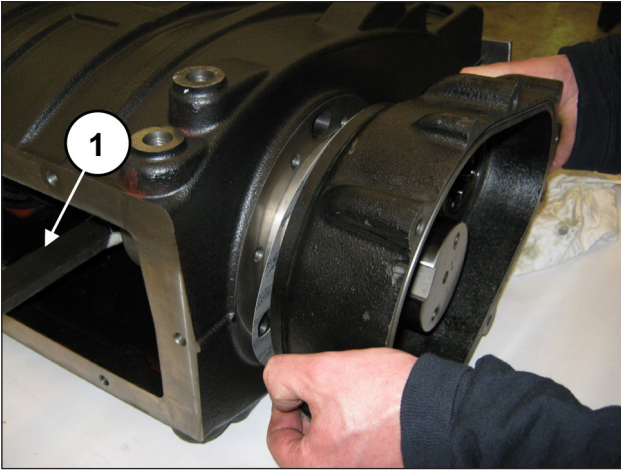


Fig. 62

Assemble the reduction gear box (and relative seal) using an extractor hammer (pos. ①, Fig. 63).

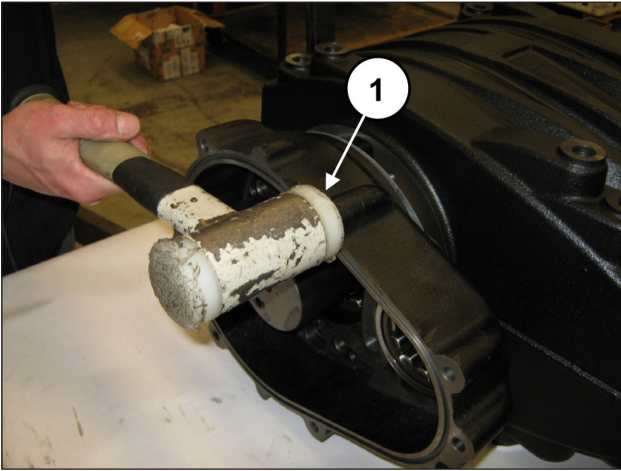


Fig. 63

Tighten the 8 M10x40 screws (pos. ①, Fig. 64). Calibrate the screws with a torque wrench as indicated in chapter 3 SCREW TIGHTENING CALIBRATION.

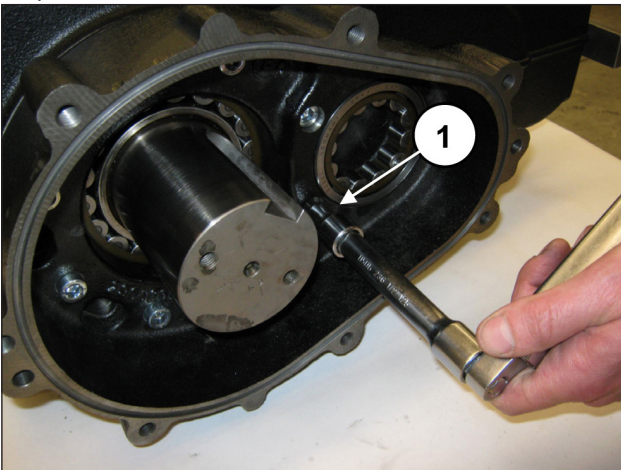


Fig. 64

Remove the tool for blocking the con-rods code 27566200 (pos. ①, Fig. 32).

Insert the upper half-bearings between the con-rods and the shaft (pos. ①, Fig. 65).



**For proper assembly of the half-bearings, ensure that the reference tab on the half-bearings are positioned in their housing on the half support (pos. ①, Fig. 66).**

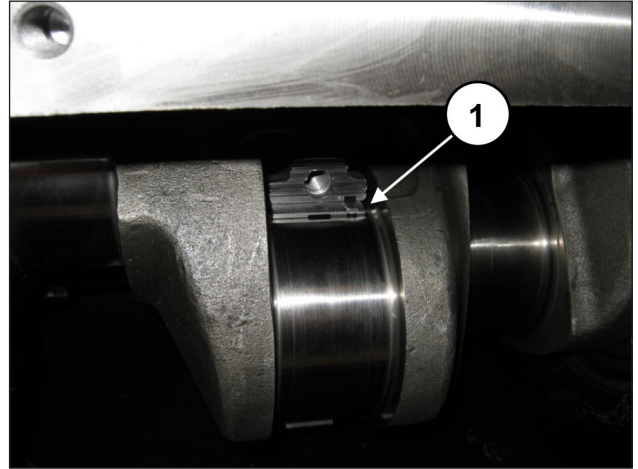


Fig. 65

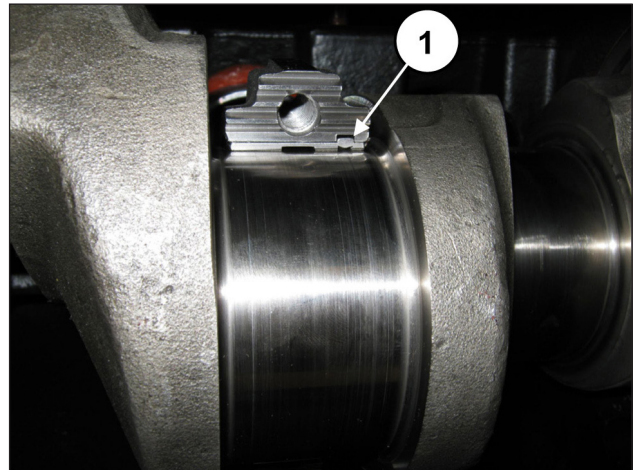


Fig. 66

Apply the lower half-bearings to the caps (pos. ①, Fig. 67) ensuring that the half-bearing reference notches are positioned in their housing on the cap (pos. ②, Fig. 67). Fasten the caps to the half supports by means of M10x1.5x80 screws (pos. ①, Fig. 68).



**Note the correct assembly direction of the caps. Numbering must be turned upward.**

Calibrate the screws with a torque wrench as indicated in chapter 3 SCREW TIGHTENING CALIBRATION, bringing the screws to tightening torque at the same time.

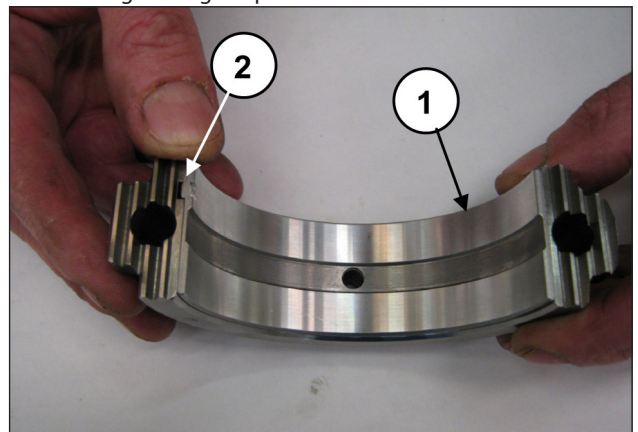


Fig. 67

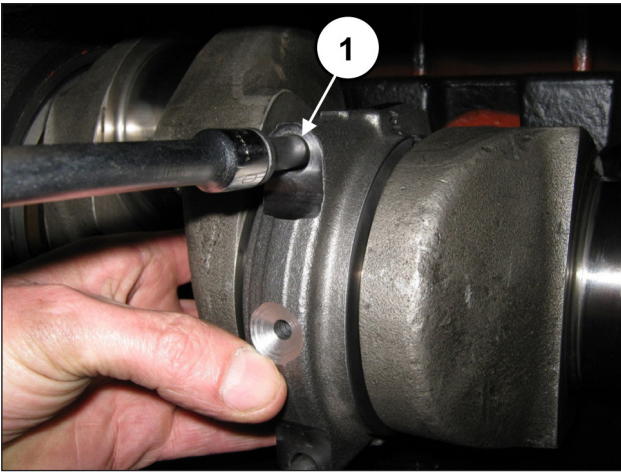


Fig. 68

**⚠ After finishing this operation, verify that the con-rods have axial clearance in both directions.**

Insert the piston guide seal rings in their casing housing by means of a special tool code 27605300. Position the component on the rod (pos. ①, Fig. 69/a) and strike on the tool until the seal ring is fully inserted in the housing (pos. ①, Fig. 69/b)

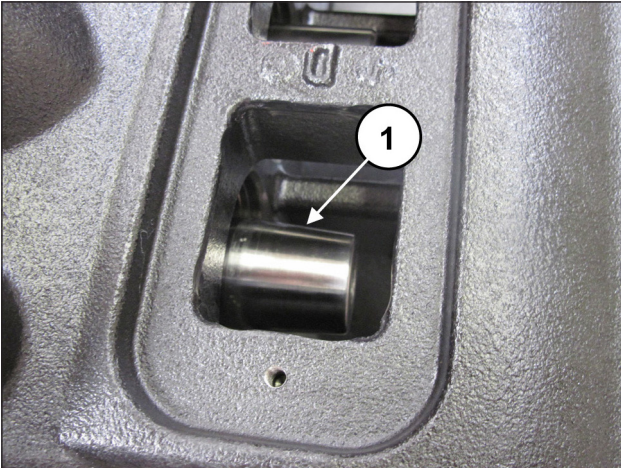


Fig. 69/a

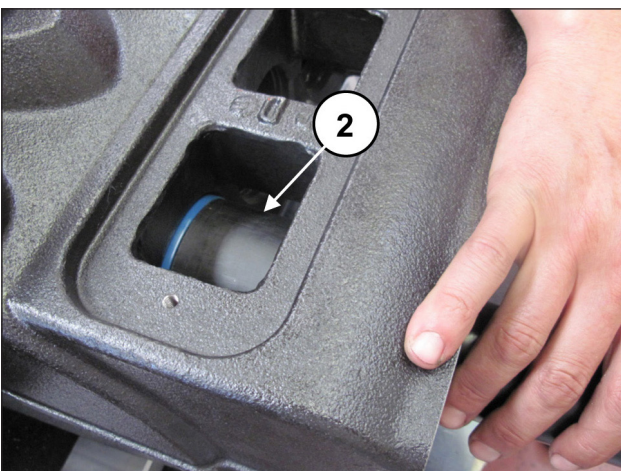


Fig. 69/b

Insert the O-ring on the rear cover (pos. ①, Fig. 70) and assemble the cover on the casing with the aid of 6 M10x30 screws (pos. ①, Fig. 71).

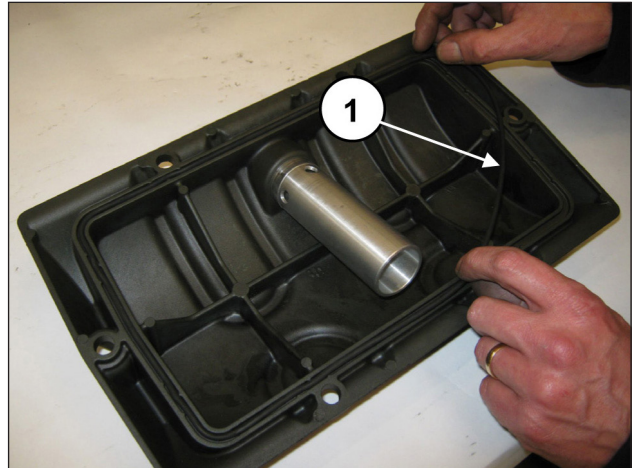


Fig. 70

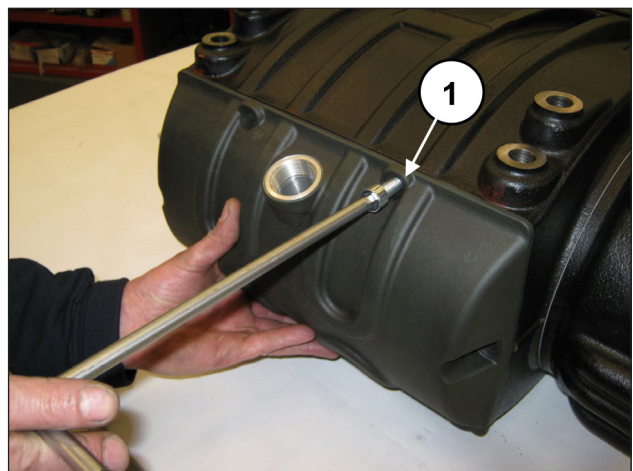


Fig. 71

**⚠ Take care to fully and properly insert the O-ring in its housing on the cover to prevent these can become damaged during screw tightening.**

Calibrate the screws with a torque wrench as indicated in chapter 3 SCREW TIGHTENING CALIBRATION.

Insert the ring gear support ring in the bend shaft shank (pos. ①, Fig. 72) to end stroke (pos. ①, Fig. 73).

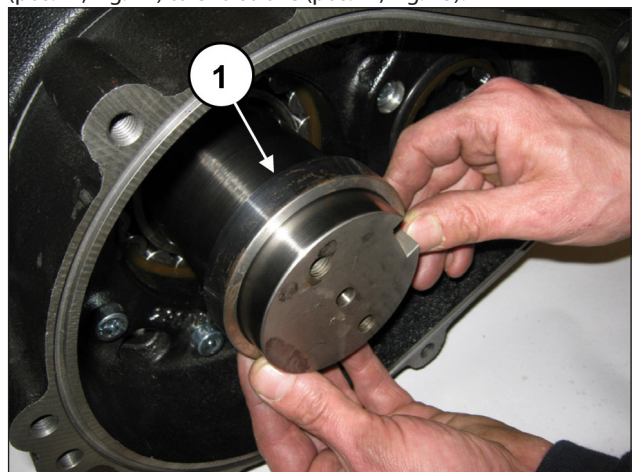


Fig. 72

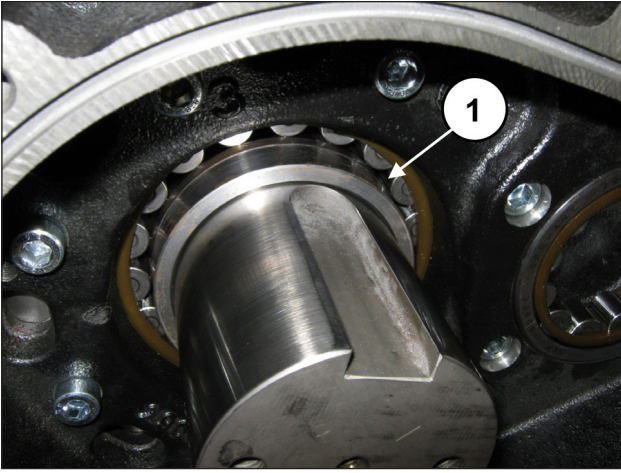


Fig. 73

Apply tab 22x14x80 in the shaft housing (pos. ①, Fig. 74) and insert the ring gear on the shaft (pos. ①, Fig. 75).



**The ring gear must be assembled making sure that the two M8 holes (to be used for extraction) be turned outward of the pump (pos. ②, Fig. 75).**

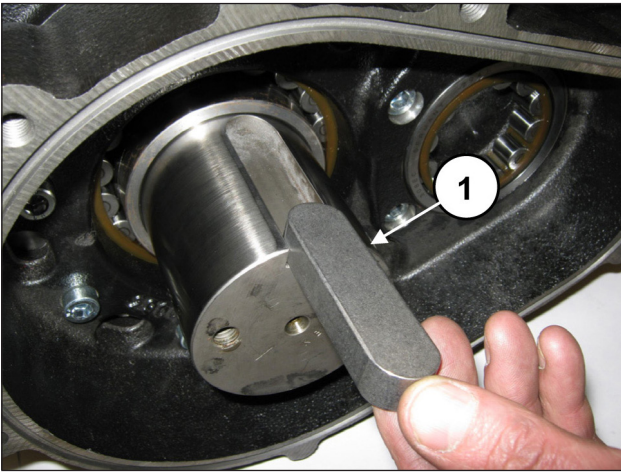


Fig. 74

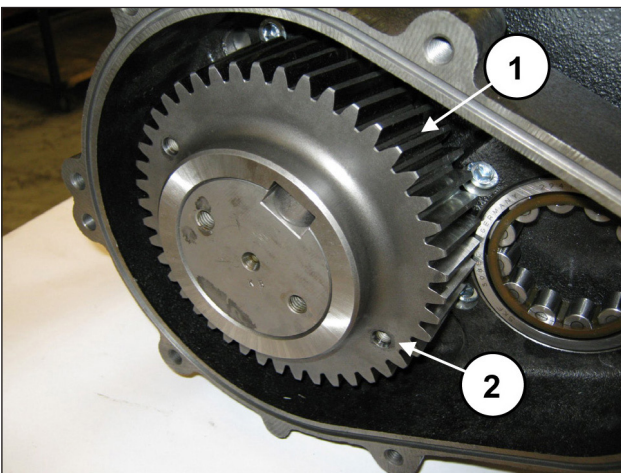


Fig. 75

Fasten the ring gear stop (pos. ①, Fig. 76) using 2 M10x25 screws.

Calibrate the screws with a torque wrench as indicated in chapter 3 (pos. ①, Fig. 77).

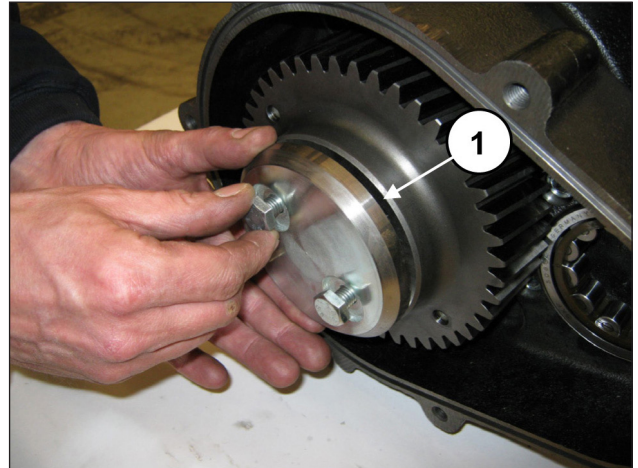


Fig. 76

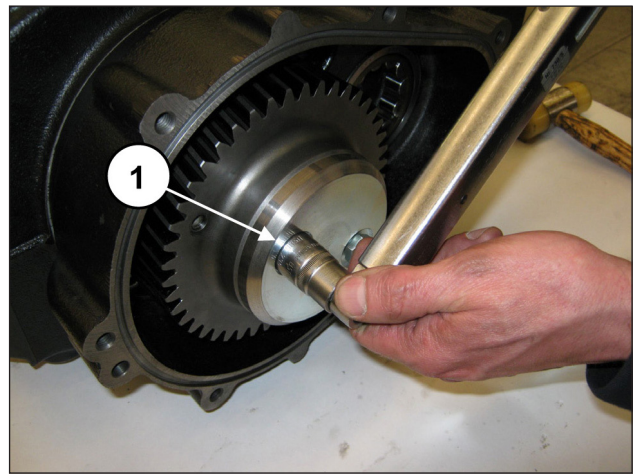


Fig. 77

Apply the 2 Ø10x24 pins on the reduction gear box (pos. ①, Fig. 78) and insert the O-ring (pos. ①, Fig. 79).

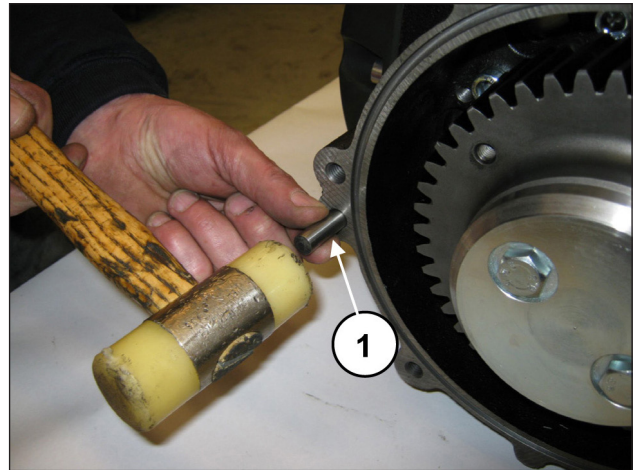


Fig. 78

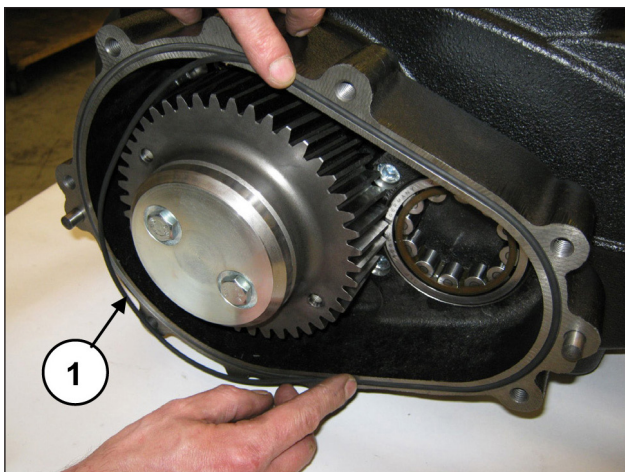


Fig. 79

Complete assembly of the pinion on the reduction gear cover, proceeding as follows:  
Pre-assemble the inner bearing ring 40x90x23 on the pinion (pos. ①, Fig. 80) positioning it to end stroke.

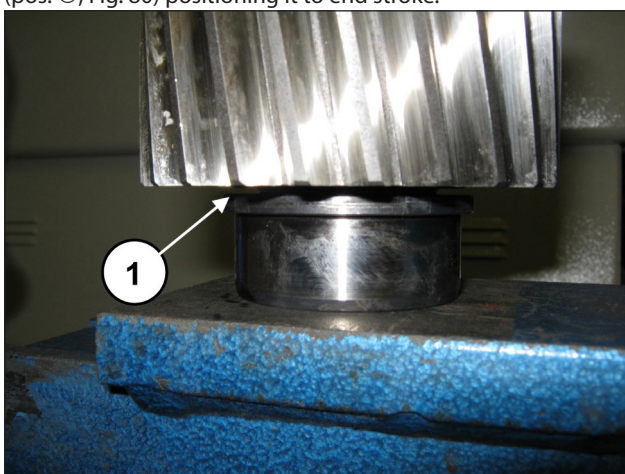


Fig. 80

From the other side of the pinion, pre-assemble the bearing 55x120x29 (pos. ①, Fig. 81) positioning it to end stroke using tool code 27604800 (pos. ①, Fig. 82).

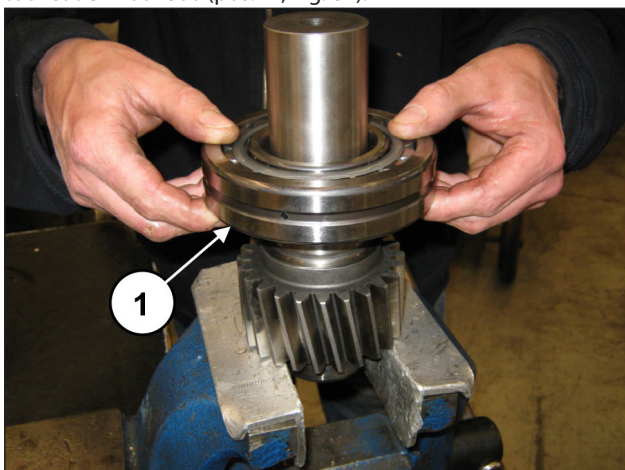


Fig. 81

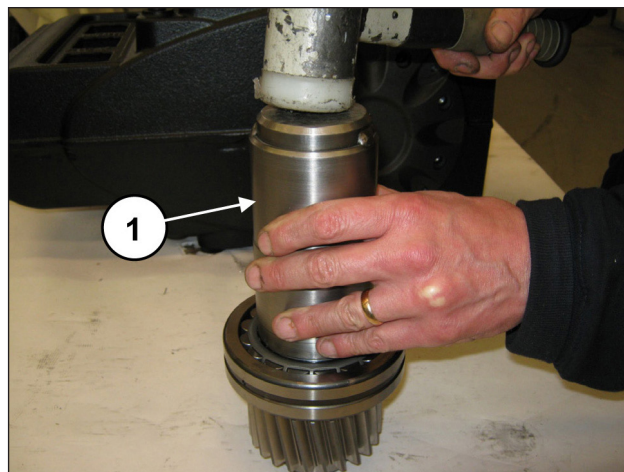


Fig. 82

Insert the bearing support ring (pos. ①, Fig. 83) and position the Seeger ring Ø55 (pos. ①, Fig. 84).

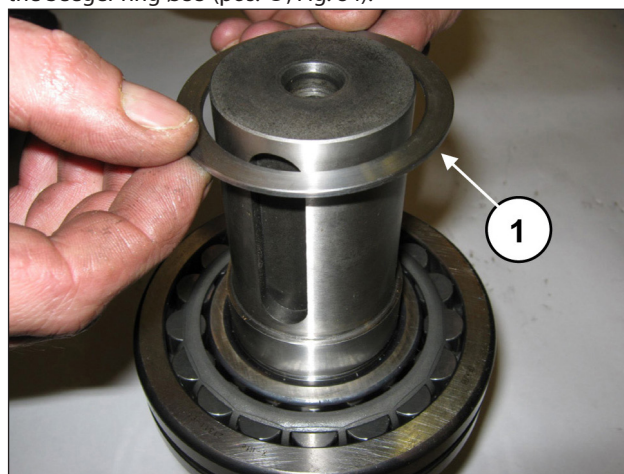


Fig. 83

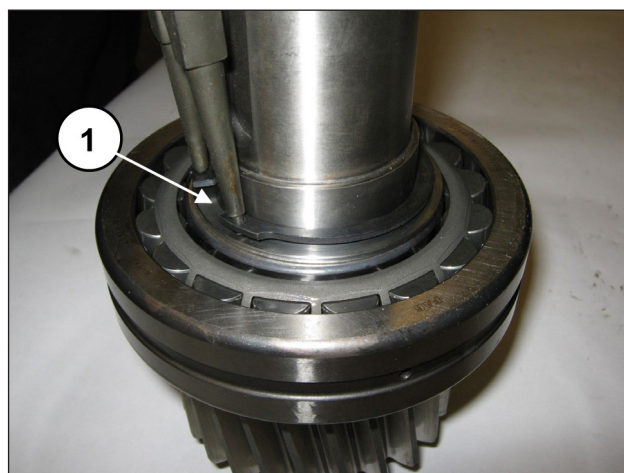


Fig. 84

Insert the pinion pre-assembled inside its housing in the reduction gear cover, with the aid of an extractor hammer (pos. ①, Fig. 85).

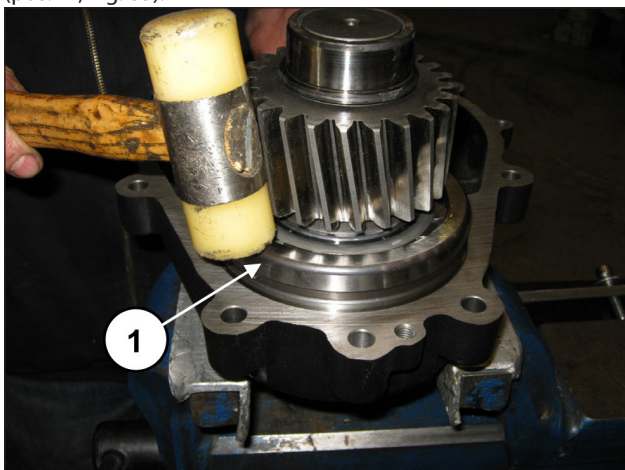


Fig. 85

Insert the Seeger ring Ø120 in the housing (pos. ①, Fig. 86).

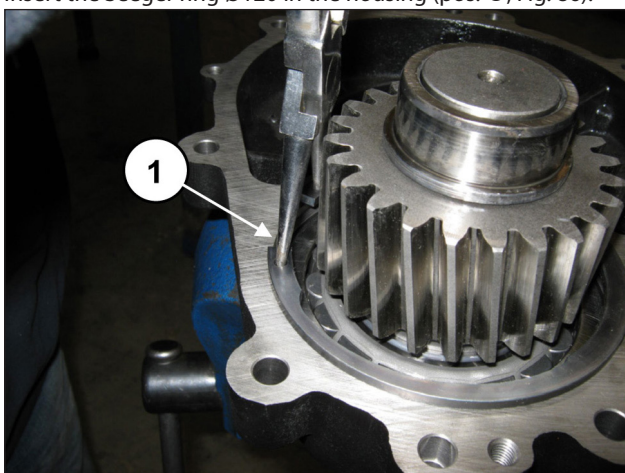


Fig. 86

Assemble the reduction gear cover with the aid of an extractor hammer (pos. ①, Fig. 87) and fasten it with 7 M10x40 screws (pos. ①, Fig. 88).

Take care to properly couple the two components on the bearing 40x90x23.

Calibrate the screws with a torque wrench as indicated in chapter 3.

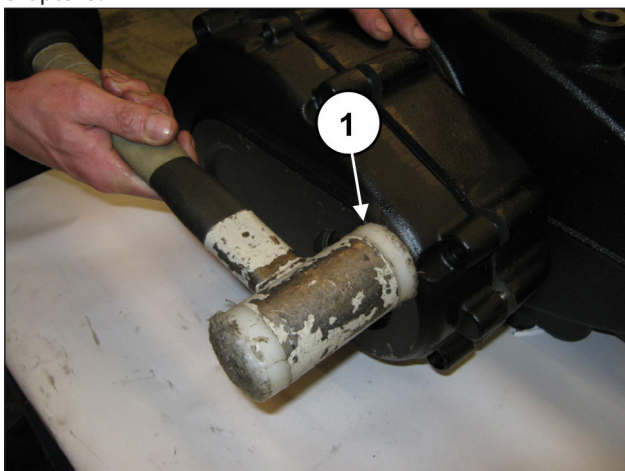


Fig. 87

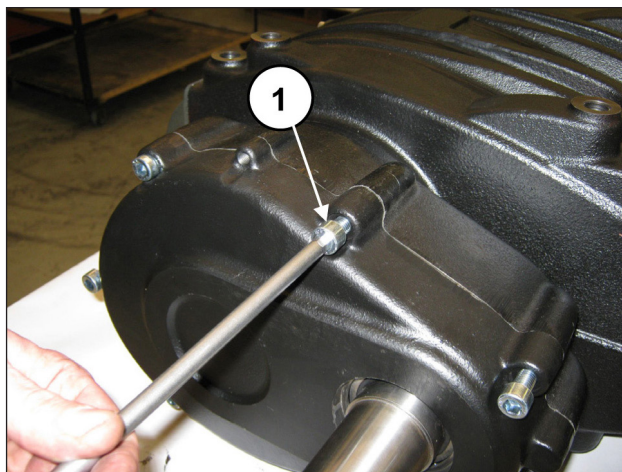


Fig. 88

Insert the seal ring inside the reduction gear cover with the use of special tool code 27605200 (pos. ①, Fig. 89). Before proceeding with seal ring assembly, check lip seal conditions. If replacement is necessary, position the new ring on the bottom of the groove as indicated in Fig. 90.



**If the shaft should present a diameter wear corresponding to the lip seal, to prevent grinding, position the ring in the second stroke as indicated in Fig. 90.**



Fig. 89

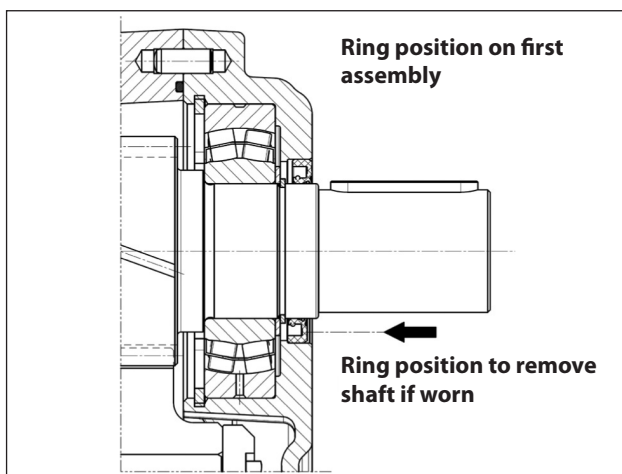


Fig. 90



**To prevent damage to the seal ring, take special care when inserting the seal ring on the pinion.**

Apply O-rings on the inspection covers (pos. ①, Fig. 91) and tighten with 2+2 M6x14 screws (pos. ①, Fig. 92). Calibrate the screws with a torque wrench as indicated in chapter 3 SCREW TIGHTENING CALIBRATION.

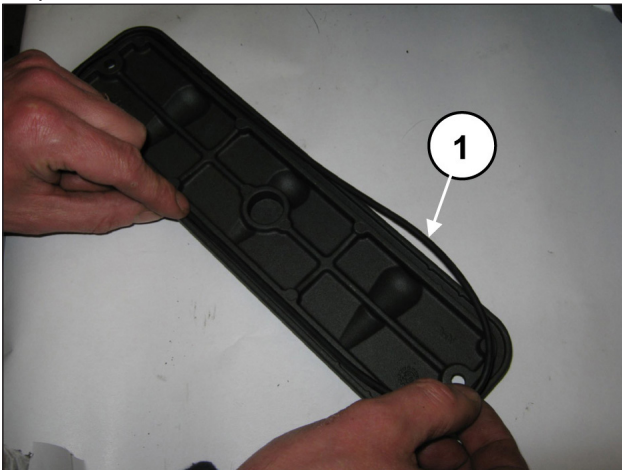


Fig. 91

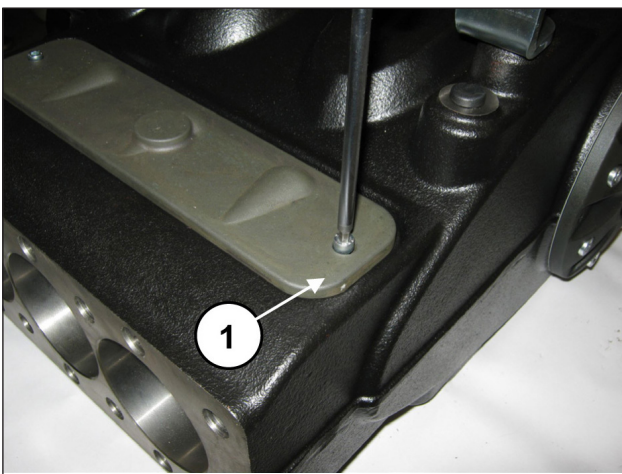


Fig. 92

Insert the tab 14x9x60 on the pinion. Apply plugs and lifting brackets with the use of M16x30 screws (pos. ①, Fig. 93). Calibrate the screws with a torque wrench as indicated in chapter 3 SCREW TIGHTENING CALIBRATION.

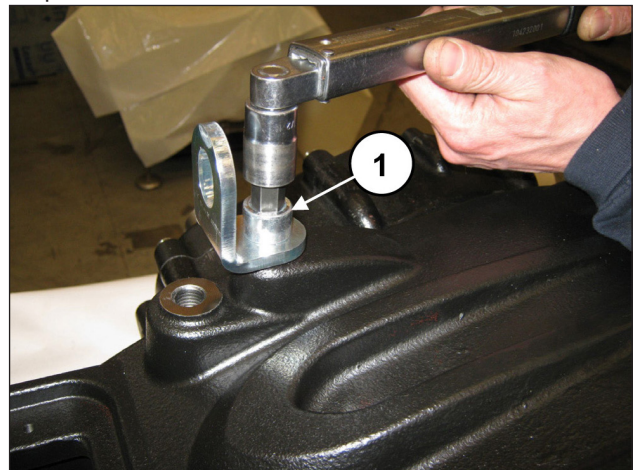


Fig. 93

Insert oil in the casing as indicated in the **Use and maintenance manual**, par. 7.4.

### 2.1.3 Increase and reduction classes

TABLE OF REDUCTIONS FOR BEND SHAFTS AND CON-ROD HALF-BEARINGS			
Recovery classes (mm)	Upper Half-Bearing Code	Lower Half-Bearing Code	Correction on the shaft pin diameter (mm)
0.25	90928100	90928400	Ø79.75 0/-0.02 Ra 0.4 Rt 3.5
0.50	90928200	90928500	Ø79.50 0/-0.02 Ra 0.4 Rt 3.5

INCREASE TABLE FOR PUMP CASING AND PISTON GUIDE		
Recovery classes (mm)	Piston Guide Code	Adjustments on the Pump Casing housing (mm)
1.00	73050543	Ø71 H6 +0.019/0 Ra 0.8 Rt 6

**2.2 REPAIRING HYDRAULIC PARTS**

**2.2.1 Dismantling the head – liners – valves**

The head does not require any routine maintenance. Operations are limited to inspection or replacement of valves, if necessary.

Proceed as follows to remove the valve units:

Unscrew the M10x140 head liner fixing screws without removing them (pos. ①, Fig. 94), in such a way as to free them.

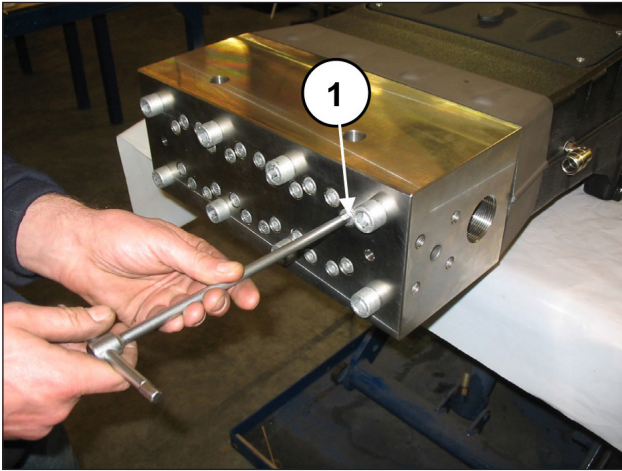


Fig. 94

Unscrew the two diametrically opposed M16x320 head fixing screws (pos. ① and ②, Fig. 95) and replace them with two screw-slave pins (code 27540200) (pos. ①, Fig. 96), then take out the remaining screws.

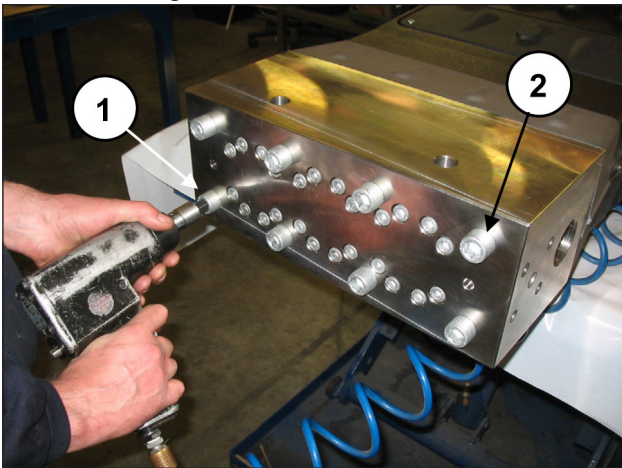


Fig. 95

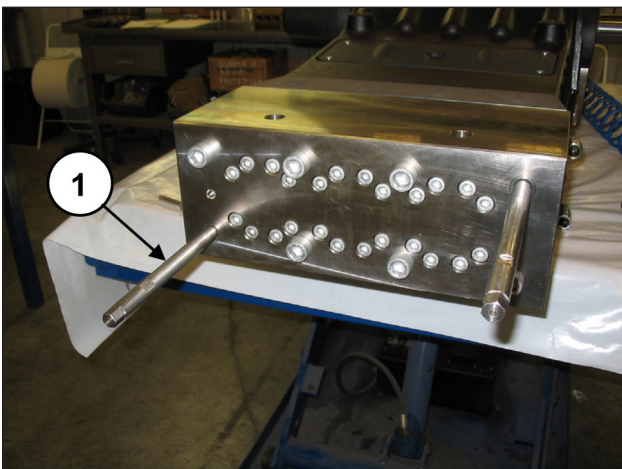


Fig. 96

Separate the head and the spacer for the liners from the pump casing (pos. ①, Fig. 97).

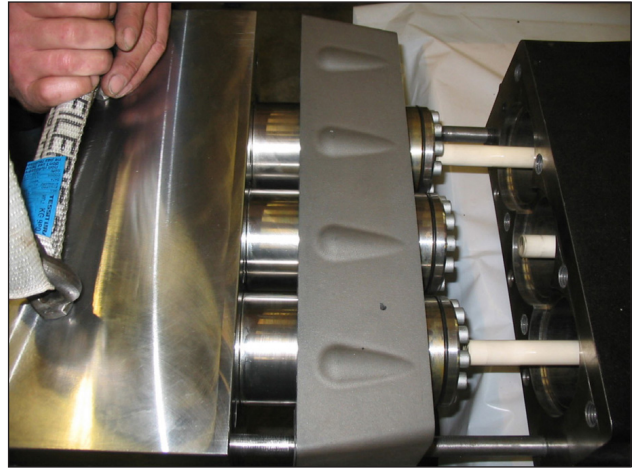


Fig. 97

Remove the liner spacer from the liner units (pos. ①, Fig. 98).

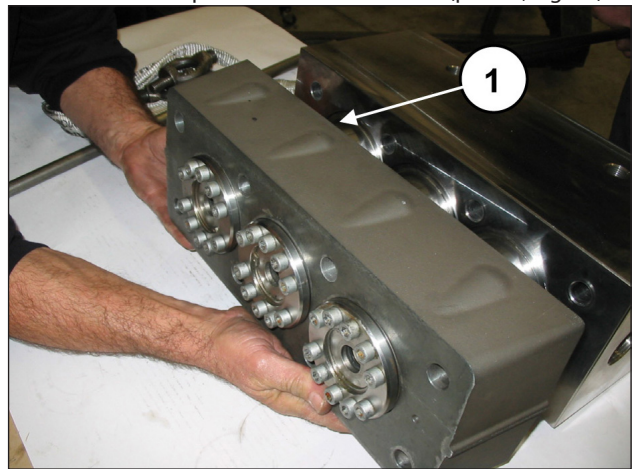


Fig. 98

Remove the M10x140 head liner fixing screws (pos. ①, Fig. 99) and remove the liner units (pos. ①, Fig. 100).

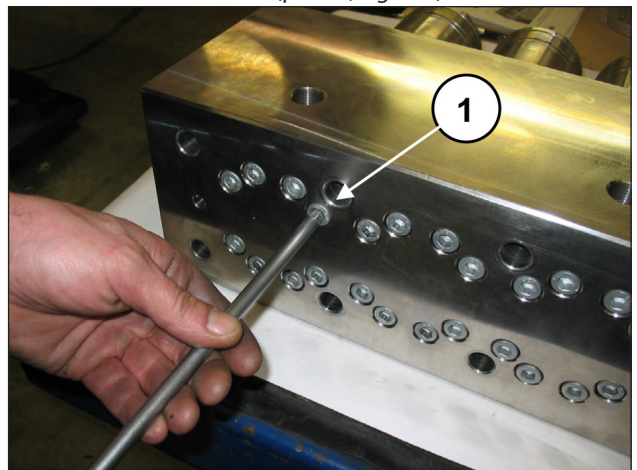


Fig. 99



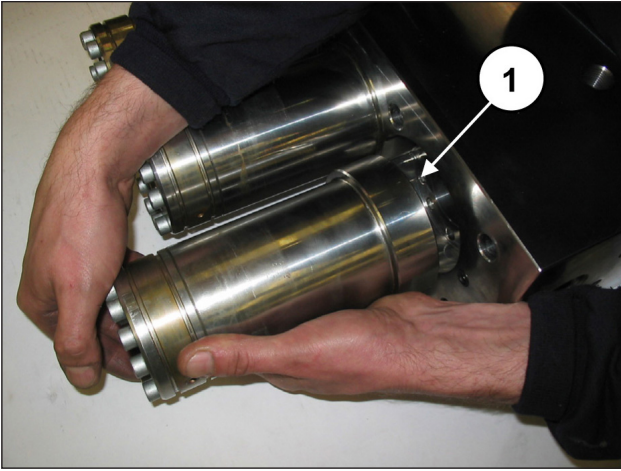


Fig. 100



During disassembly of the liners, take care not to disperse the valve springs and the flat valves (pos. ① and ②, Fig. 101) as, not being locked, they could fall.

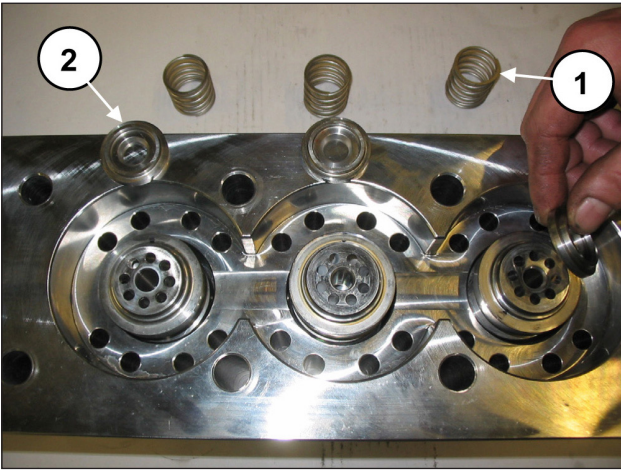


Fig. 101



If the valve seats are blocked on the head due to the formation of scale or oxide, they must be freed by inserting the tool (code 034300020) in the outlet hole (pos. ①, Fig. 102).

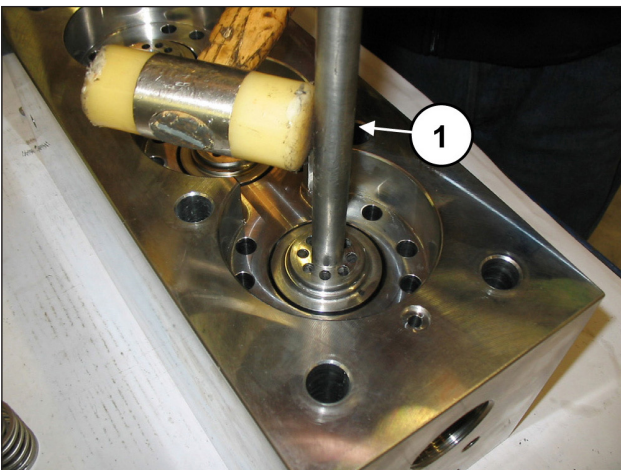


Fig. 102

Extract the valve housings and check the conditions of the various components.

If necessary, make any replacements (pos. ①, Fig. 103).

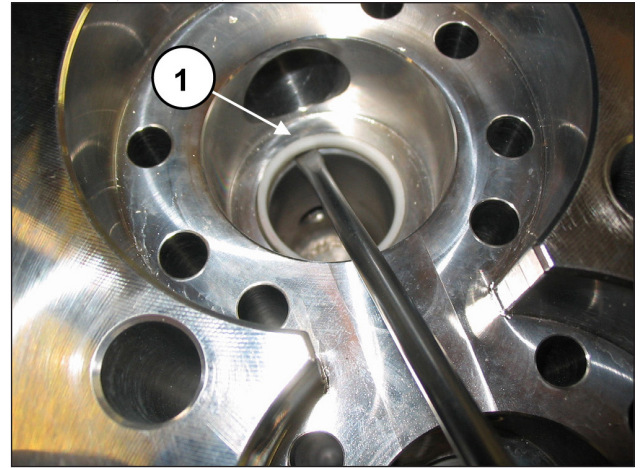


Fig. 103



At every valve inspection, replace the sealing rings and the O-rings between the liner and the head, between the head and the liner spacer in the area of the recirculation hole. Before reassembly, clean and dry off the components and all their seats inside the head.

Extract the outlet plates (pos. ①, Fig. 104), and their respective guides (pos. ①, Fig. 106), with their springs (pos. ①, Fig. 105). Check their conditions, replace if necessary and at the intervals necessary as indicated in chapter 11 in the *Use and maintenance manual*.

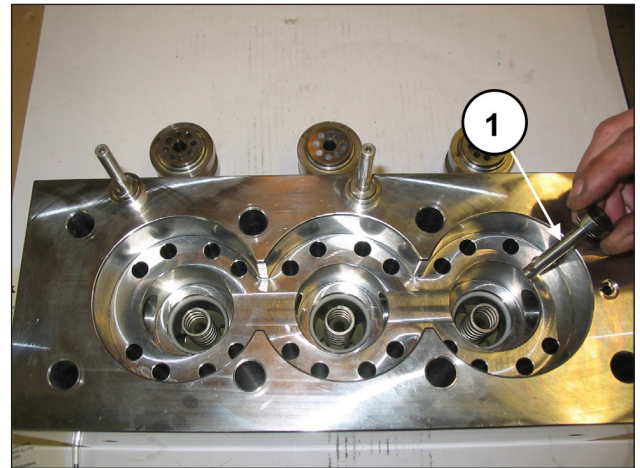


Fig. 104

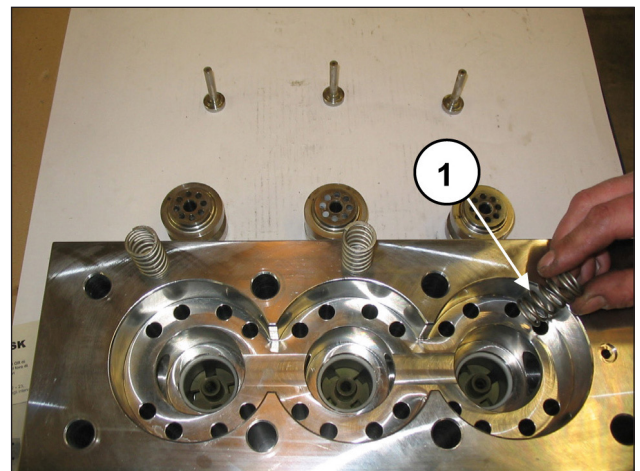


Fig. 105

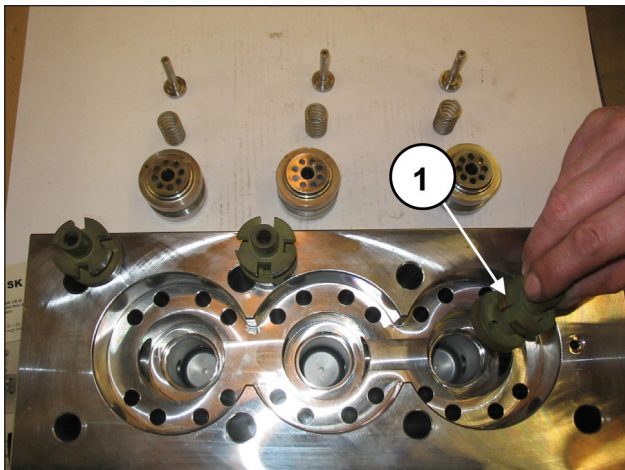


Fig. 106

### 2.2.2 Assembling the head - liners - valves

To reassemble the various components, follow the reverse operations listed above, taking particular care when assembling the liner spacer: the hole  $\varnothing 6$  (seal cooling circuit) must correspond to the same hole to the head (with O-ring).

**Heads - liners: proceed with assembly and head screw calibration, and then continue with the calibration of the liner fastening screws.**

For the values of the screw tightening torques and sequences, follow the instructions contained in chapter 3.

### 2.2.3 Disassembly of the piston unit – supports – seals

The piston unit does not require any routine maintenance. Service operations are limited to the visual inspection of the cooling circuit's draining. In case of anomalies / oscillations on the delivery pressure gauge, or pulsating of the cooling circuit's draining pipe (if flexible), seal packings must be inspected and replaced if necessary.

Proceed as follows to remove the piston units:

Separate the head and the spacer for the liners from the pump casing as shown in par. 2.2.1 (from Fig. 94 to Fig. 100).

Remove the upper inspection cover, unscrewing the 2 fixing screws (pos. ①, Fig. 107).

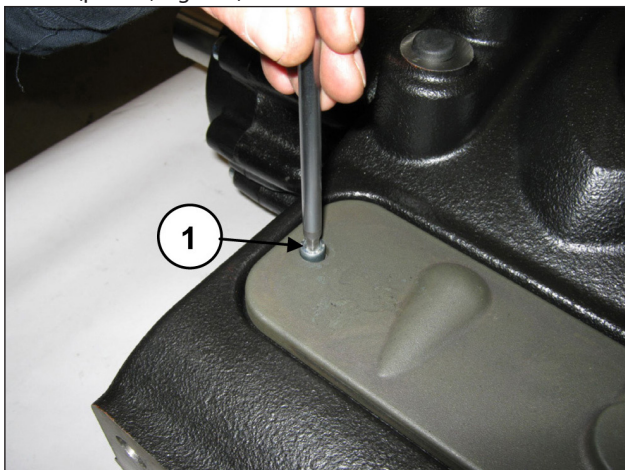


Fig. 107

Remove the pumping elements with a fork spanner (pos. ①, Fig. 108) and check their state of wear (pos. ①, Fig. 109). Replace them if necessary.

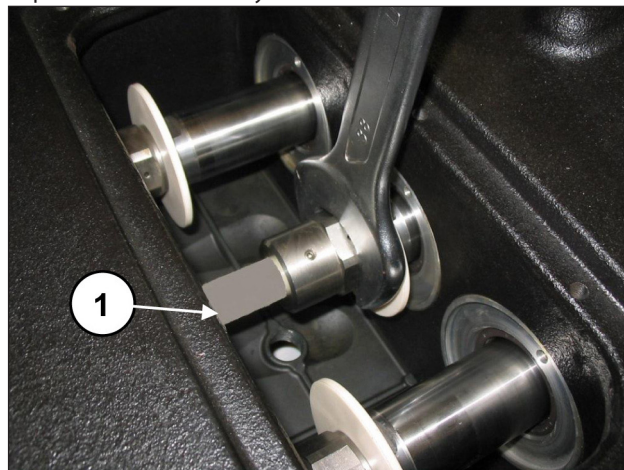


Fig. 108

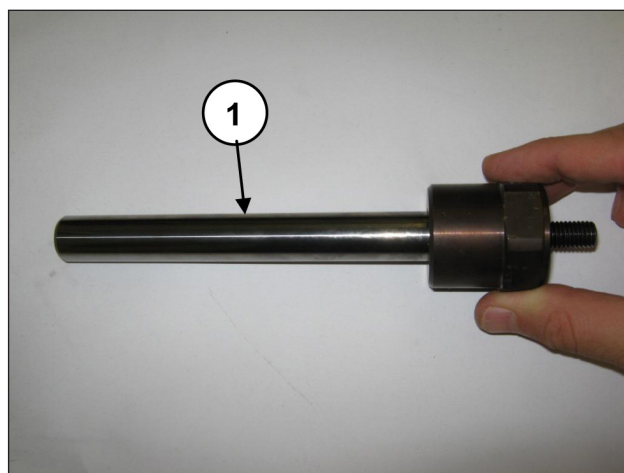


Fig. 109

Remove the M8x50 head liner fixing screws (pos. ①, Fig. 110) and separate the support from the liner (pos. ①, Fig. 111).

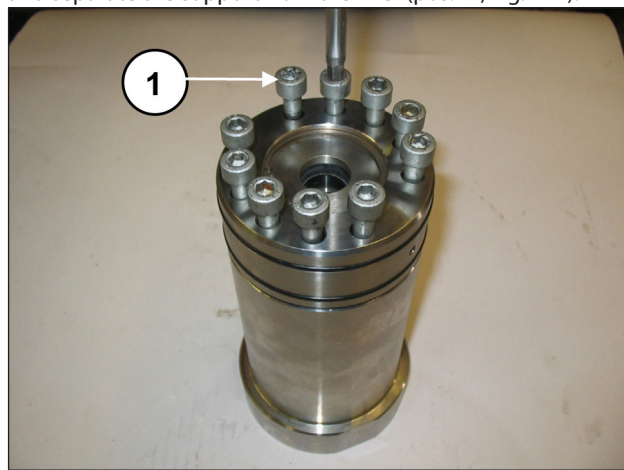


Fig. 110

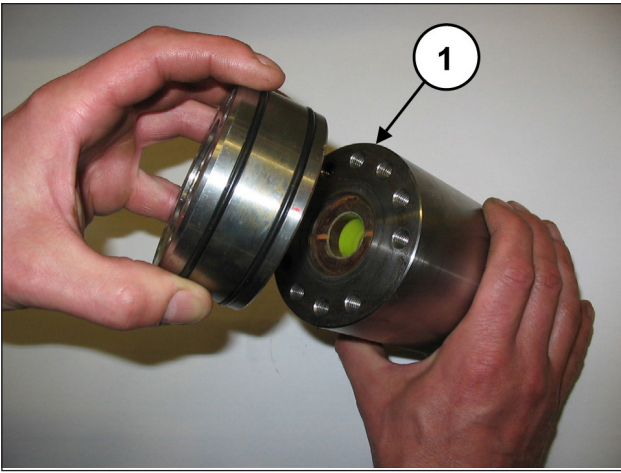


Fig. 111

Remove the Seeger ring and the seal ring (pos. ①, Fig. 112) and with a special plastic pin, remove the LP (low pressure) ring seal (pos. ①, Fig. 113).

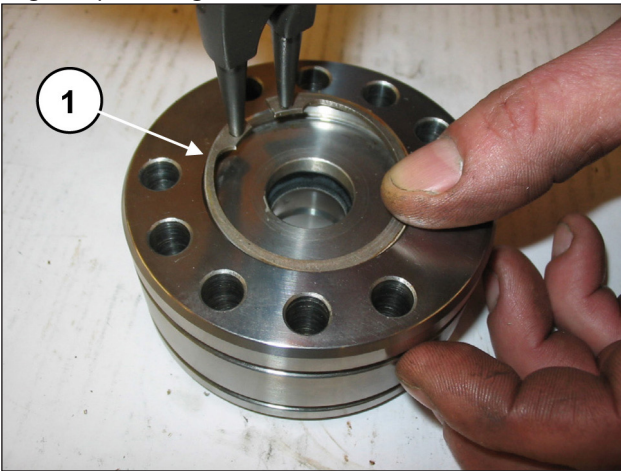


Fig. 112

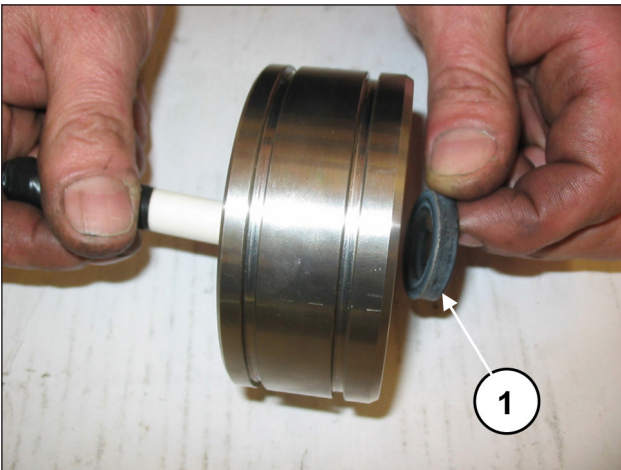



Fig. 113

 **The O-rings and the low pressure seals must be replaced at each disassembly.**

With the liner separate from the seal support and with the special plastic pin (pos. ①, Fig. 114) have the HP (high pressure) pack come out (pos. ①, Fig. 115).

 **At each disassembly, the HP packing (pos. ①, Fig. 115) must be replaced.**

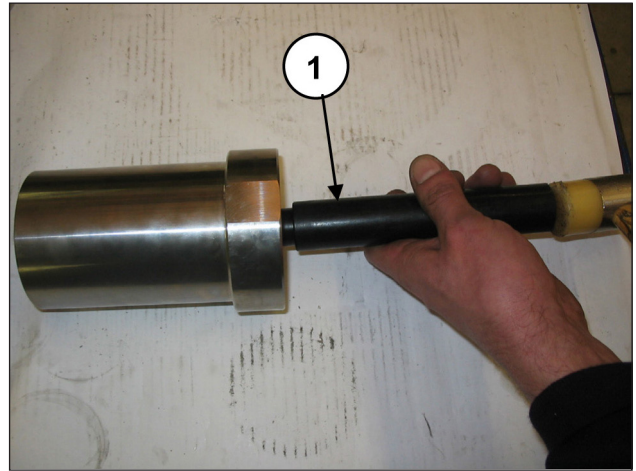


Fig. 114

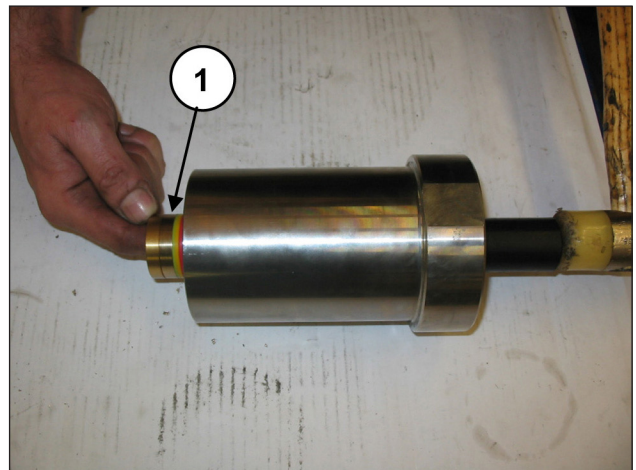


Fig. 115

**2.2.4 Assembling the piston unit – supports – seals**

To reassemble the various components, invert operations paying special attention to the sequences listed below. For tightening torque values and sequences, follow the instructions contained in chapter 3. Insert the upper bush into the liner.



**For the correct axial positioning of the bush, use the special tool (code 27921100 for SM14, code 27921200 for SM16, code 27921300 for SM18, code 27911200 for SM20, code 27911400 for SM22, code 27911500 for SM24) (pos. ①, Fig. 117 and Fig. 118).**

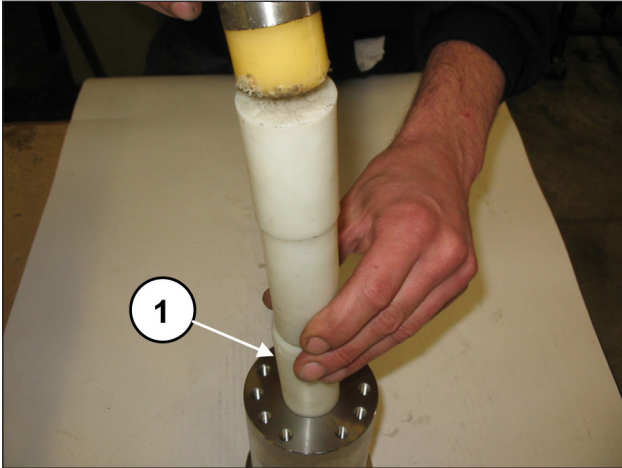


Fig. 116

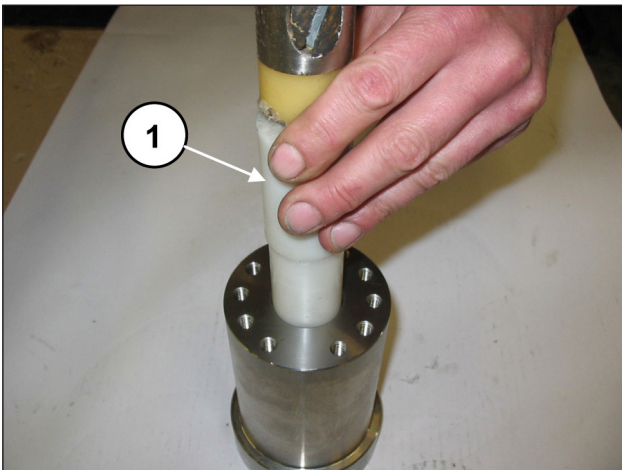


Fig. 117

Insert the H.P. pack (high pressure) (pos. ①, Fig. 118); considering the slight interference between the seal and the liner, to avoid damage we advise using the tool (code 27673200 for SM14, SM16 and SM18, code 27673300 for SM20, for SM22 and for SM24) (pos. ①, Fig. 119).

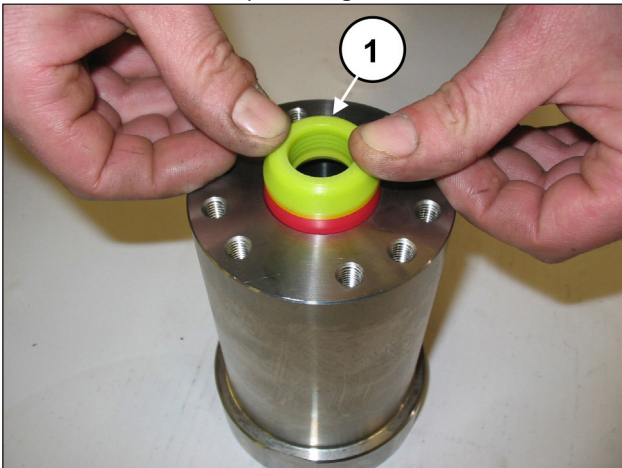


Fig. 118

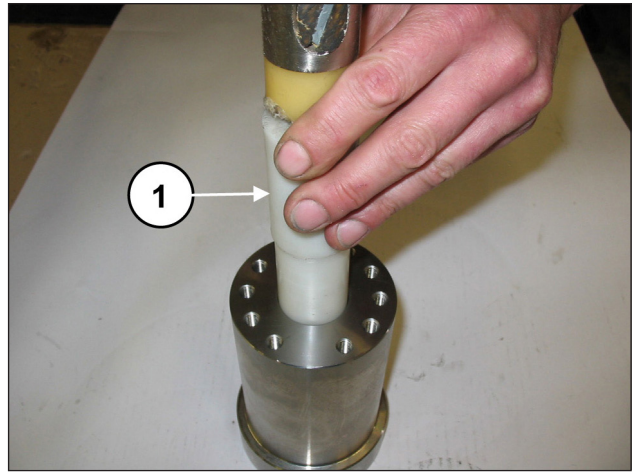


Fig. 119



**The H.P. seal must be placed in the liner as indicated in Fig. 121 and Fig. 122.**



**Before inserting them into their seats, the H.P. seals must be lubricated with silicone grease Type OKS 1110, following the operations listed below:**

**The external diameter must only be slightly greased;**

**On the internal diameter, grease must be applied paying great attention to filling all the pockets between the sealing lips as shown in Fig. 122.**

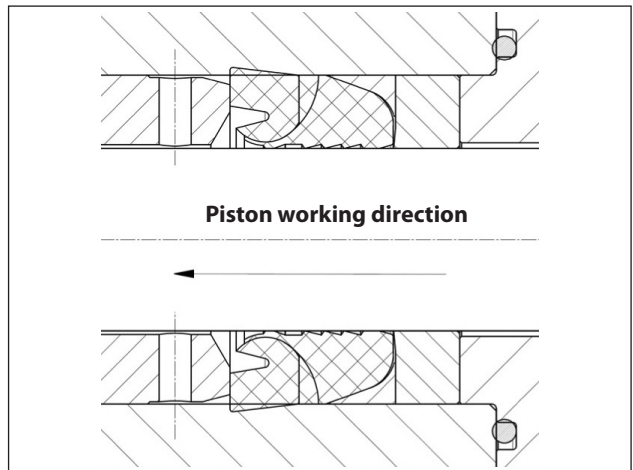


Fig. 120

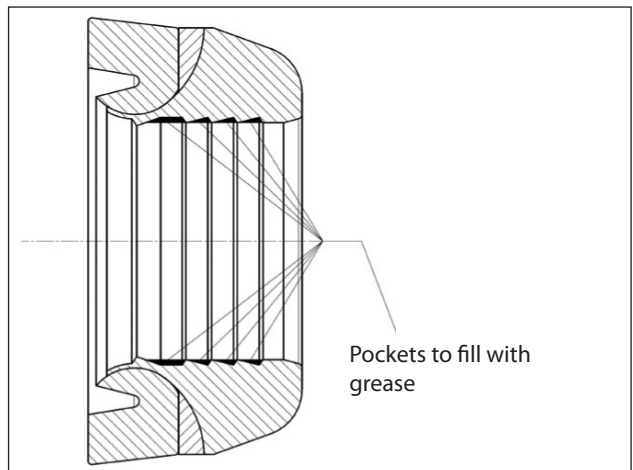


Fig. 121

Insert the anti-extrusion ring and the seals bush (pos. ① and ②, Fig. 122, Fig. 123 and Fig. 124).



The gasket bush ② must be introduced into the liner with the two outlets facing outwards (casing side) as shown in Fig. 123.

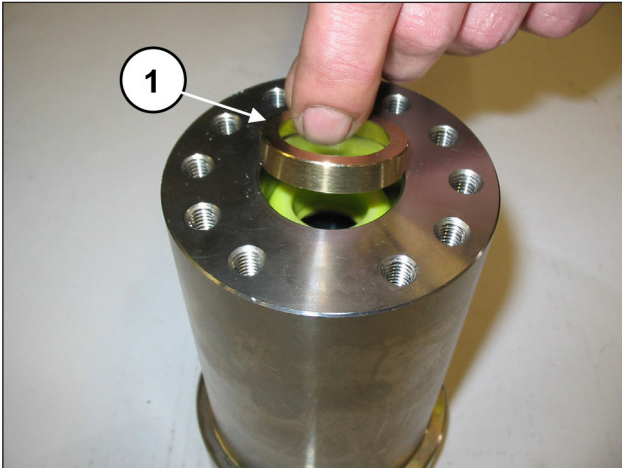


Fig. 122

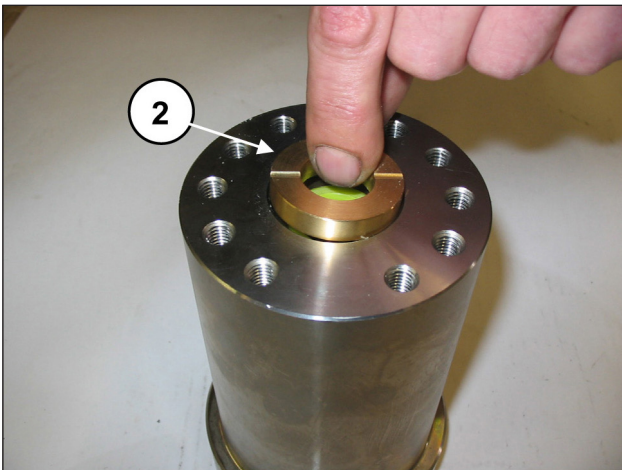


Fig. 123

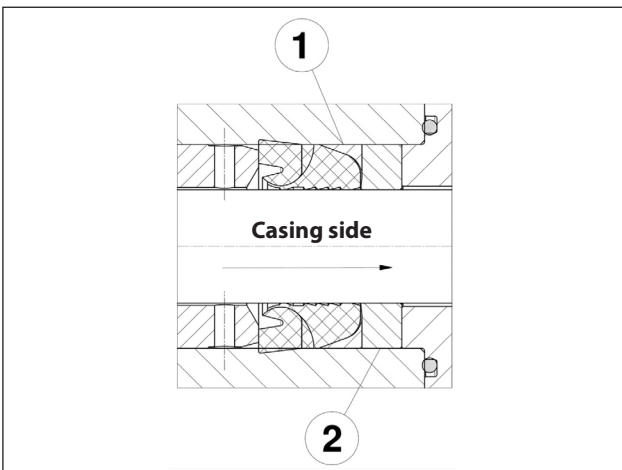


Fig. 124



The L.P. seal must be inserted in the liner with the lip seal in the direction of piston operation (pos. ①, Fig. 125 and Fig. 126), slightly lubricating the external diameter with OKS 1110 silicone grease. Replace the L.P. seal whenever wear is detected.

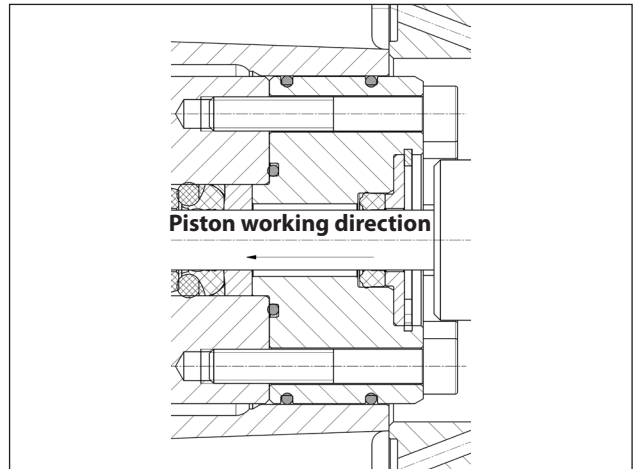


Fig. 125

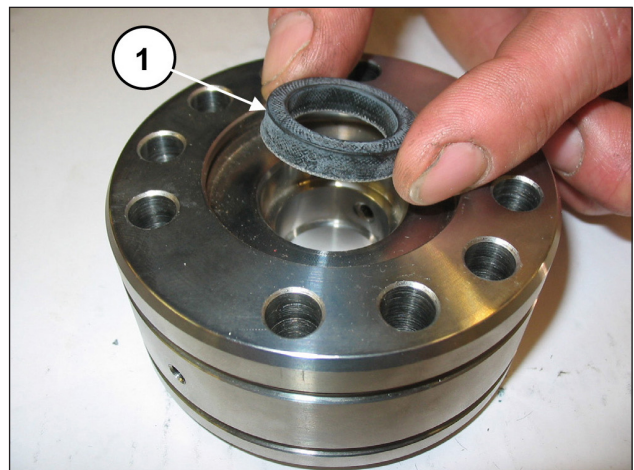


Fig. 126

Install the seal support unit (Fig. 127 and Fig. 128) replacing components ① and ②.

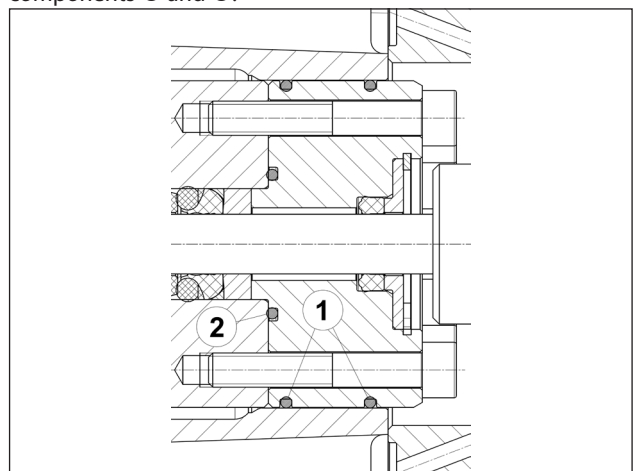


Fig. 127

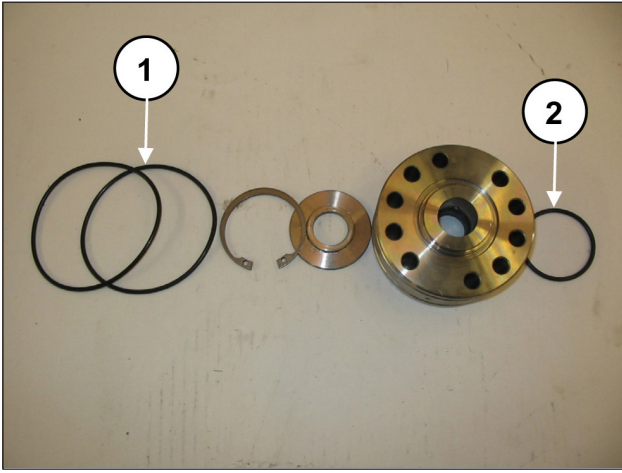


Fig. 128

Assemble the support - liner unit by manually screwing the M8x50 screws as shown in Fig. 129, then proceed with calibration using a torque wrench as indicated in chapter 3.

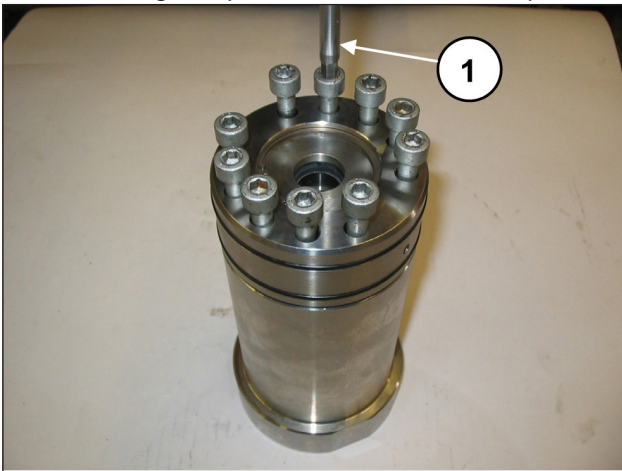


Fig. 129

### 3 SCREW TIGHTENING CALIBRATION

Screw tightening must only be performed with a torque wrench.

Description	Exploded Drawing Position	Tightening Torque Nm
Casing cover M10x30 screw	79	45
G1/2x13 casing plug	81	40
Lifting bracket M16x30 screw	41	200
Reduction gear cover M10x40 screw	71	45
Ring gear stop M10x25 screw	66	45
Reduction gear box M10x40 screw	71	45
Upper and lower cover M6x14 screw	50	10
Bearing cover M10x30 screw	79	45
Con-rod fixing M10x1.5x80 screw	43	65*
Piston guide M6x20 screw	37	10
Piston assembly	15	40
Choke fitting D.3 3/8M-3/8F	29	45
M8x50 screw supports	22	40**
Head M16x280 screw	1	280***
Liner M10x140 screw	26	83****

\* Achieve coupling torque tightening screws at the same time.



**The screws - pos. 1-22-26 must be tightened with a torque wrench, lubricating the threaded shank with Molybdenum Disulphide grease code 12001500.**

\*\* The support fixing screws must be tightened respecting the phases and order shown in the diagram in Fig. 130.

\*\*\* The head fixing screws must be tightened respecting the phases and order shown in the diagram in Fig. 131.

\*\*\*\* The liner fixing screws must be tightened respecting the phases and order shown in the diagram in Fig. 131.

#### Tightening gasket support screws pos. 22

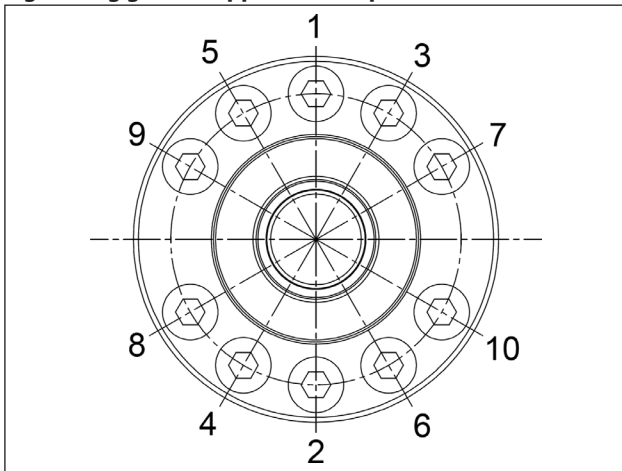


Fig. 130

Tightening M8x50 screws in the indicated sequence (1-2-3-4-5-6-7-8-9-10) performed in a single phase of the indicated torque

#### Tightening head and liner screws pos. 1 and pos. 26

**OPERATION 1:** Tightening M16x320 screws (pos. 1) in two phases observing the sequence indicated in figure: (A-B-C-D-E-F-G-H)

**Phase 1 = 200 Nm**  
**Phase 2 = 280 Nm**

**OPERATION 2:** Tightening M10x140 screws (pos. 26) in four phases observing the sequence indicated in figure: (1-2-3-4-5-6-7-8)

**Phase 1 = 40 Nm**  
**Phase 2 = 65 Nm**  
**Phase 3 = 83 Nm**  
**Phase 4 = 83 Nm**

Fig. 131

## 4 REPAIR TOOLS

Pump maintenance can be carried out with simple component disassembly and reassembly tools. The following tools are available:

### For assembly:

Shaft (con-rod interlocking)	code 27566200
Bearing on bend shaft	code 27604700
Pinion bearing on reduction gear box	code 27604900
Bend shaft bearing on the reduction gear box	code 27605000
Bend shaft bearing on the bearing cover	code 27605000
Piston guide oil seal	code 27605300
Bearing on pinion	code 27604800
Pinion oil seal	code 27605200
Bush for piston	code 27921100 (SM14)
	code 27921200 (SM16)
	code 27931300 (SM18)
	code 27911200 (SM20)
	code 27911400 (SM22)
	code 27911500 (SM24)
H.P. seal packing	code 27673200 (SM14 - SM16 - SM18)
	code 27673300 (SM20 - SM22 - SM24)
Head / liner spacer	code 27540200

### For disassembly:

Piston guide oil seal	code 27918500
Shaft (con-rod interlocking)	code 27566200
Valve seat	code 034300020
Head / liner spacer	code 27540200



### 5 REPLACING THE CON-ROD FOOT BUSH

Perform cold-driving of the bushing and the subsequent work bearing in mind the dimensions and tolerances shown in Fig. 132 below.

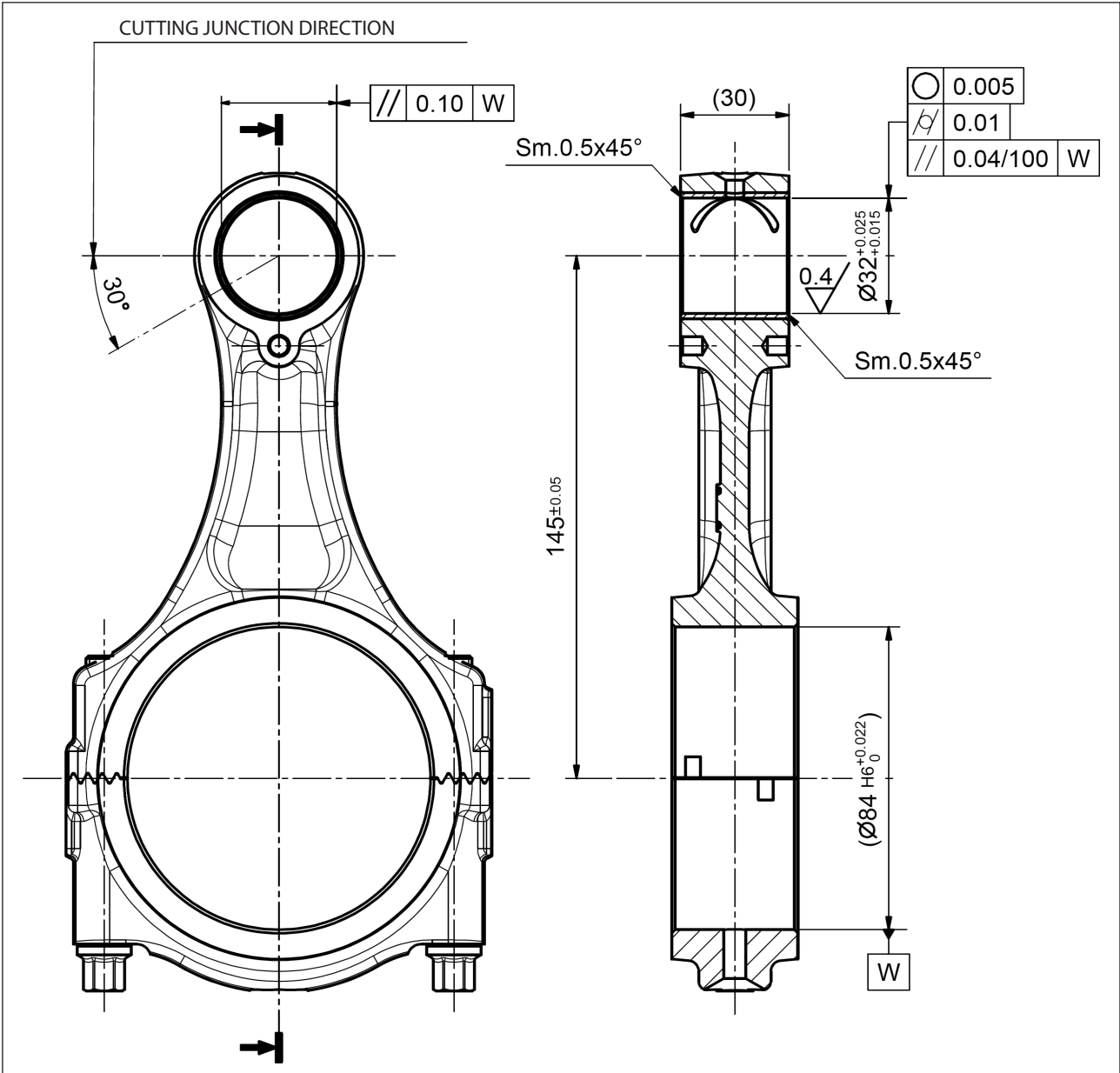


Fig. 132

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## 1 INTRODUCTION

Ce manuel décrit les instructions pour la réparation des pompes de la série SM et doit être attentivement lu et compris avant d'effectuer et de réaliser toute intervention sur la pompe.

Le bon fonctionnement et la durée de la pompe dépendent de l'usage correct et de l'entretien approprié effectué sur celle-ci.

Interpump Group décline toute responsabilité concernant les dommages causés par négligence et inobservation des consignes décrites dans ce manuel.

### 1.1 DESCRIPTION DES SYMBOLES

Lire attentivement ce qui est indiqué dans ce manuel avant de commencer toute opération.



**Signal de Mise en garde**



Lire attentivement ce qui est indiqué dans ce manuel avant de commencer toute opération.



**Signal de Danger**

S'équiper de lunettes de protection.



**Signal de Danger**

S'équiper de gants de protection avant chaque opération.

## 2 CONSIGNES DE RÉPARATION



### 2.1 RÉPARATION DE LA PARTIE MÉCANIQUE

Les opérations de réparation de la partie mécanique doivent être effectuées après avoir éliminé l'huile du carter.

Pour vidanger l'huile, retirer le bouchon de remplissage rep. ①, Fig. 1 puis le bouchon de vidange rep. ②, Fig. 1.

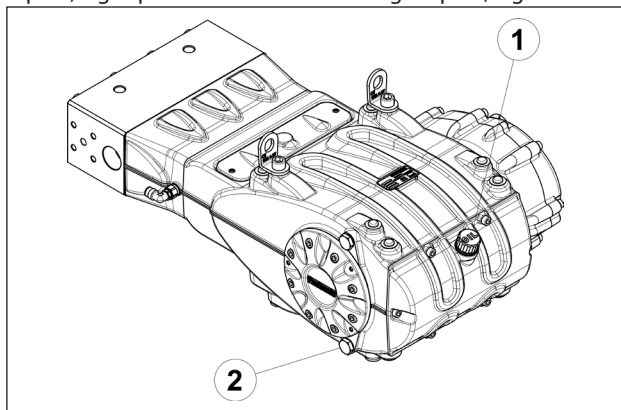


Fig. 1



**Verser l'huile usagée dans un récipient spécial et l'éliminer auprès des centres autorisés. Elle ne doit en aucun cas être déversée dans l'environnement.**

### 2.1.1 Démontage de la partie mécanique

La séquence correcte est la suivante :

Vidanger l'huile de la pompe puis démonter le couvercle du carter (avec ses joints toriques) en dévissant les 6 vis M10 (rep. ①, Fig. 2).

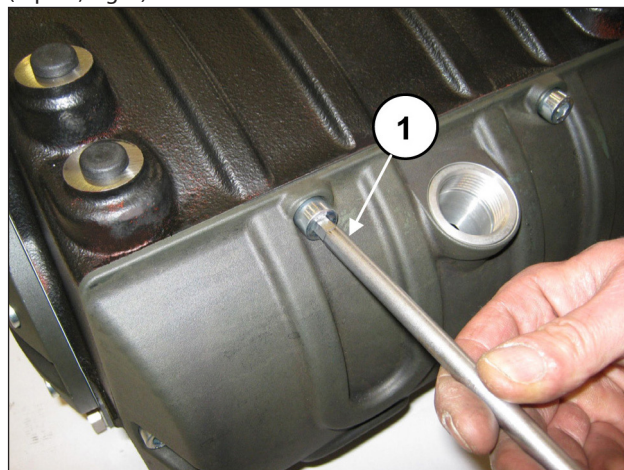


Fig. 2

Déposer la languette de l'arbre PTO (rep. ①, Fig. 3).

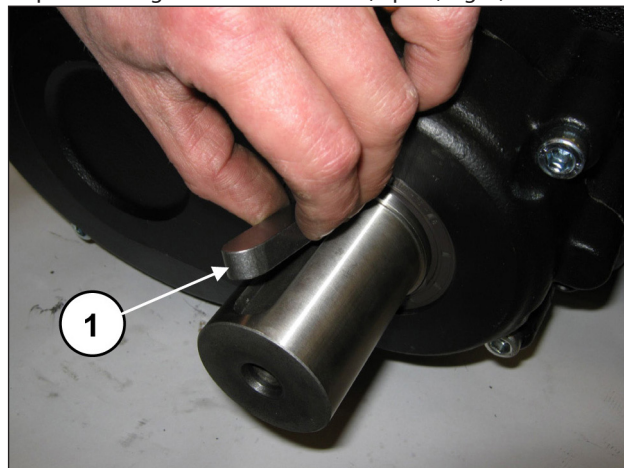


Fig. 3

Dévisser les vis de fixation du couvercle du réducteur (rep. ①, Fig. 4).

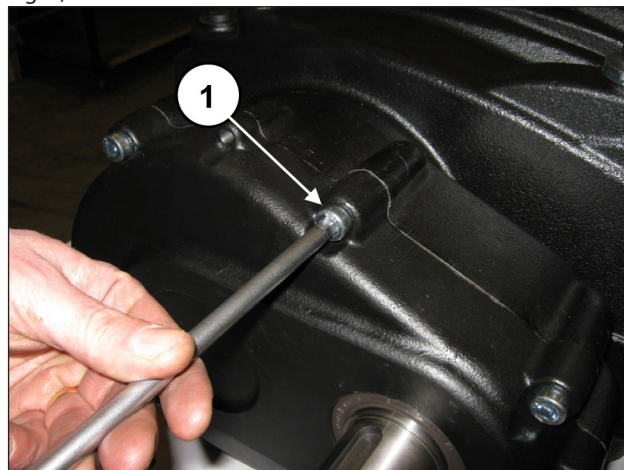


Fig. 4

Placer 3 goujons ou vis filetées M8 (rep. ①, Fig. 5) faisant office d'extracteurs, dans les orifices prévus à cet effet et deux vis M10 suffisamment longues servant à soutenir le couvercle (rep. ②, Fig. 5).

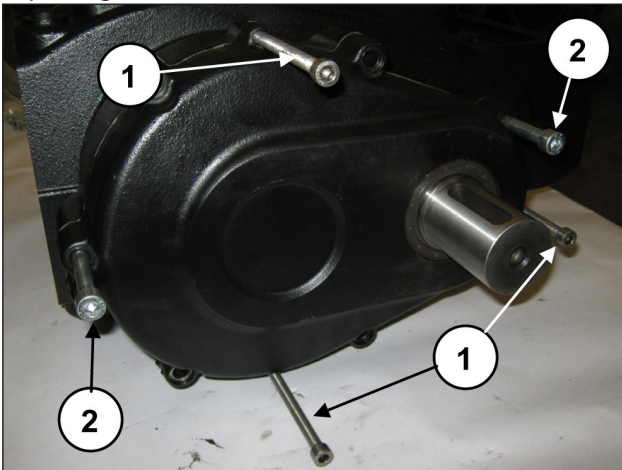


Fig. 5

Visser progressivement les 3 vis M8 (rep. ①, Fig. 6) faisant office d'extracteurs jusqu'à ce que le groupe complet couvercle/pignon soit détaché

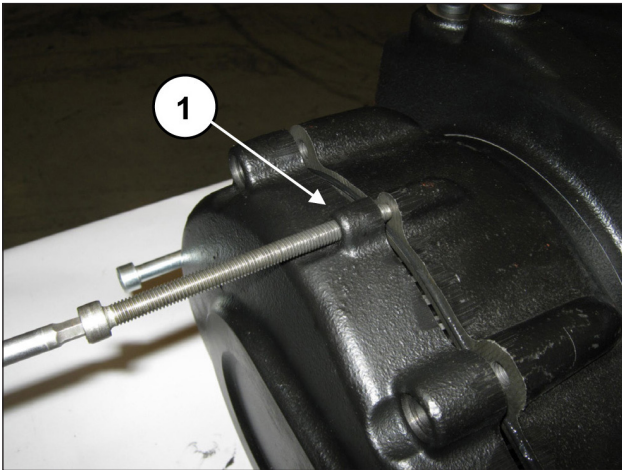


Fig. 6

Il est possible de démonter complètement le couvercle du réducteur du pignon en procédant de la façon suivante : Déposer l'anneau Seeger Ø120 (rep. ①, Fig. 7).

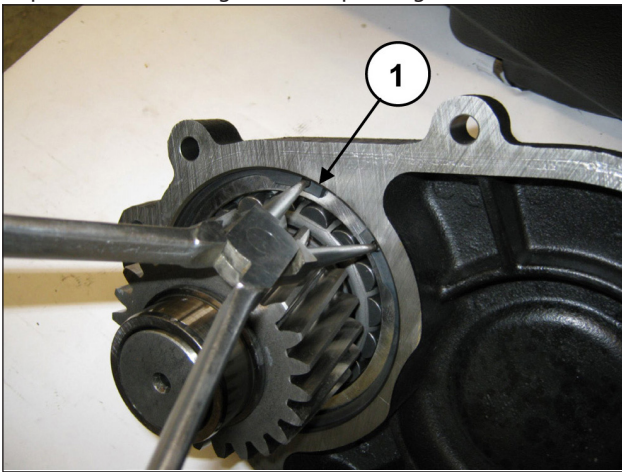


Fig. 7

Désassembler le pignon du couvercle en frappant le pignon à l'aide d'un outil à inertie (rep. ①, Fig. 8).

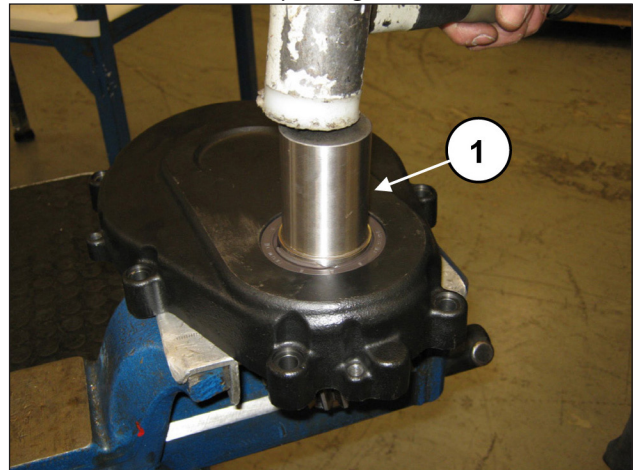


Fig. 8

Déposer l'anneau Seeger Ø55 (rep. ①, Fig. 9) et l'anneau d'appui du coussinet (rep. ①, Fig. 10) du pignon

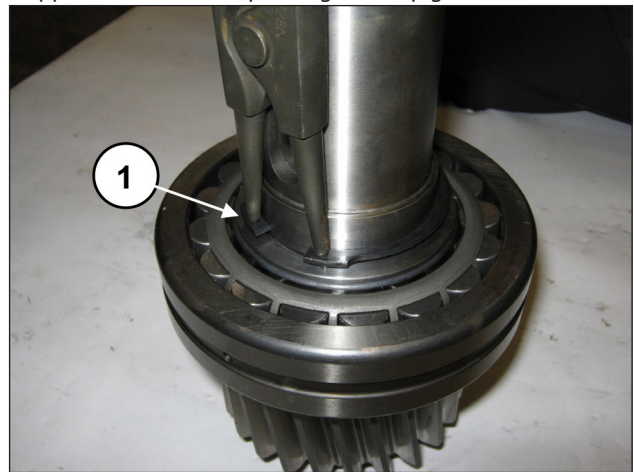


Fig. 9

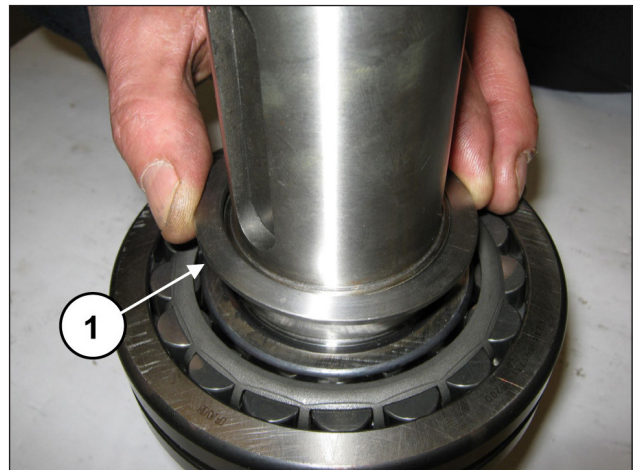


Fig. 10

Dégager le joint d'huile du couvercle du réducteur en passant par l'intérieur du couvercle (rep. ①, Fig. 11).

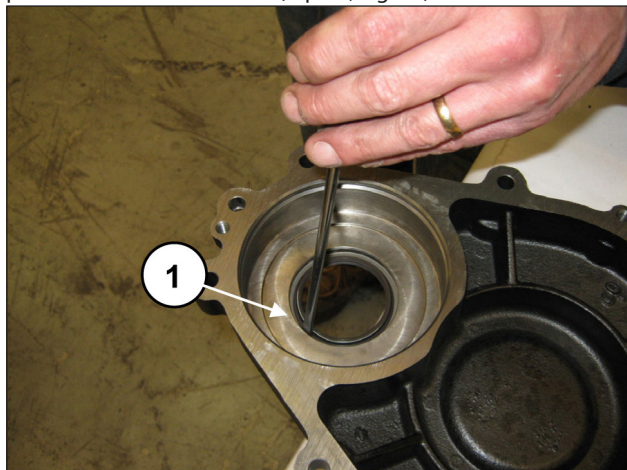


Fig. 11

Dévisser les vis de fixation du dispositif de retenue de la couronne (rep. ①, Fig. 12) et le déposer (rep. ①, Fig. 13).

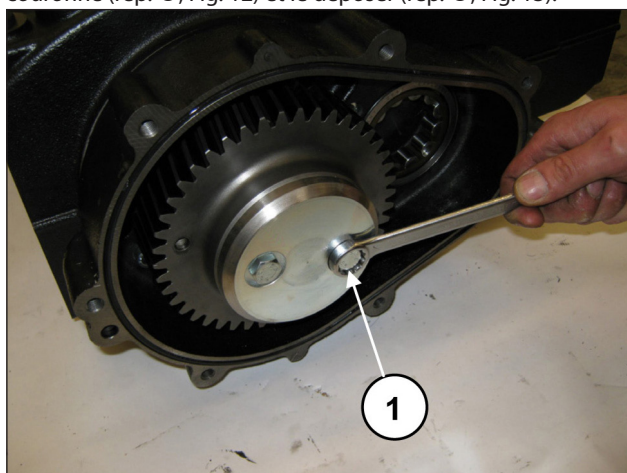


Fig. 12

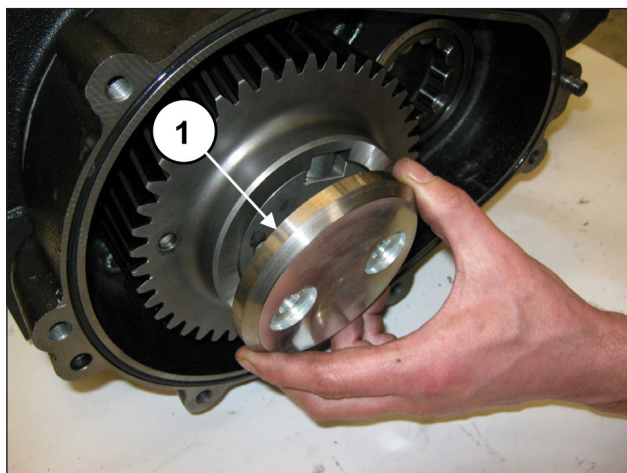


Fig. 13

Dégager la couronne (rep. ①, Fig. 14). Si nécessaire, il est possible d'utiliser un chasoir à inertie à appliquer aux 2 orifices M8 (rep. ②, Fig. 14).

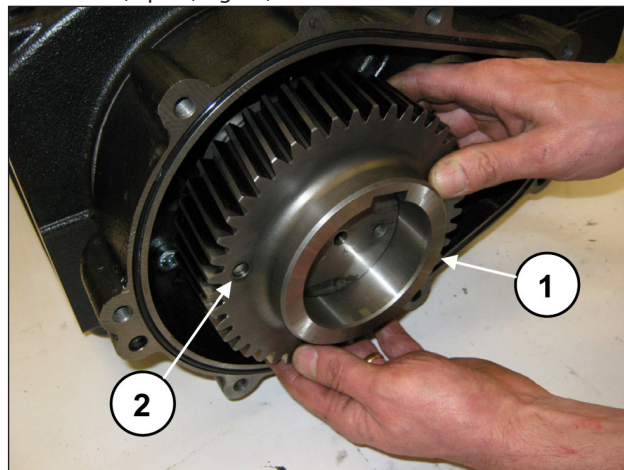


Fig. 14

Déposer la languette de l'arbre (rep. ①, Fig. 15).

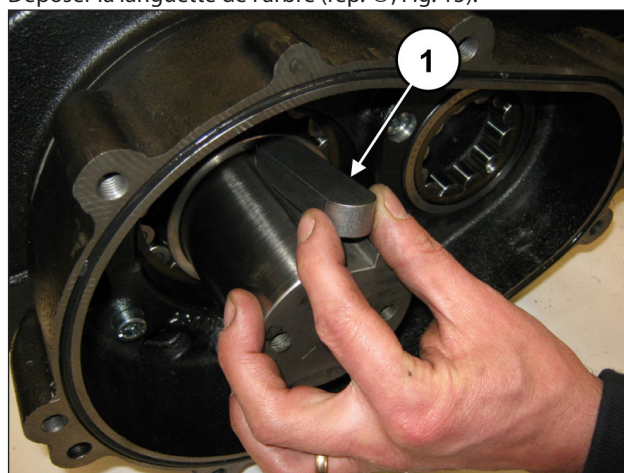


Fig. 15

Dégager la bague d'appui de la couronne (rep. ①, Fig. 16).

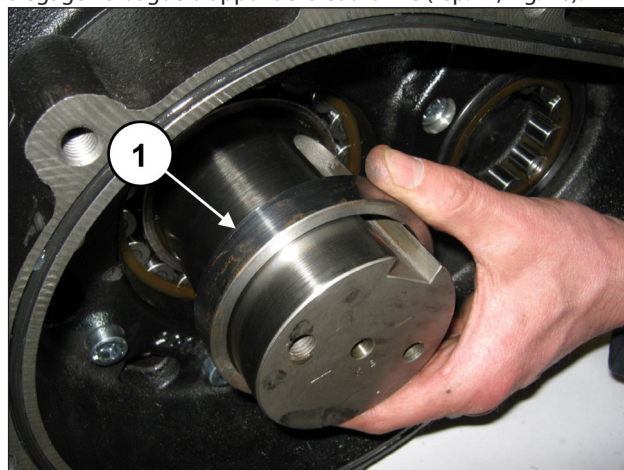


Fig. 16

Dévisser les vis de la bielle (rep. ①, Fig. 17).

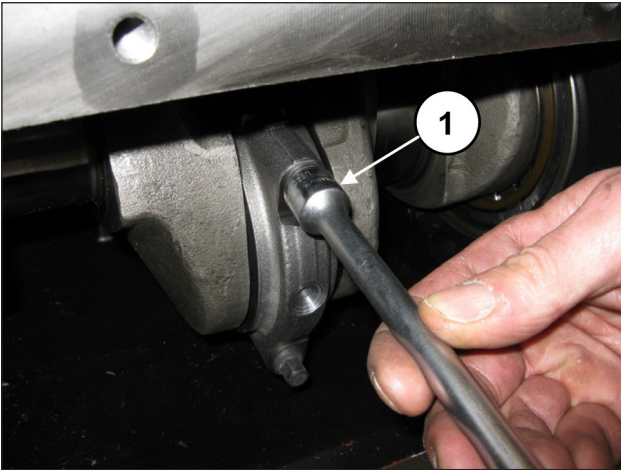


Fig. 17

Démonter les chapeaux de bielle avec les demi-coussinets inférieurs en prenant note de l'ordre de démontage.



**Remonter et accoupler les chapeaux de bielle et leurs demi-bielles dans l'ordre selon lequel ils ont été démontés.**

Pour éviter toute erreur possible, les chapeaux et les demi-bielles ont été numérotés sur un côté (rep. ①, Fig. 18).

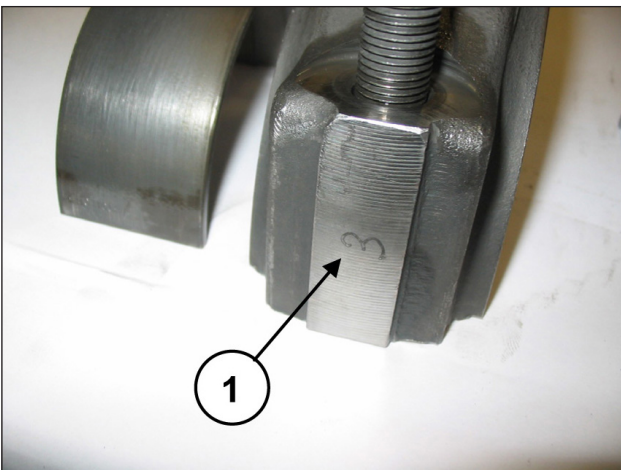


Fig. 18

Pousser à fond les demi-bielles dans la direction de la partie hydraulique pour faire ressortir le vilebrequin. Pour faciliter l'opération, utiliser l'outil (réf. 27566200 (rep. ①, Fig. 19).

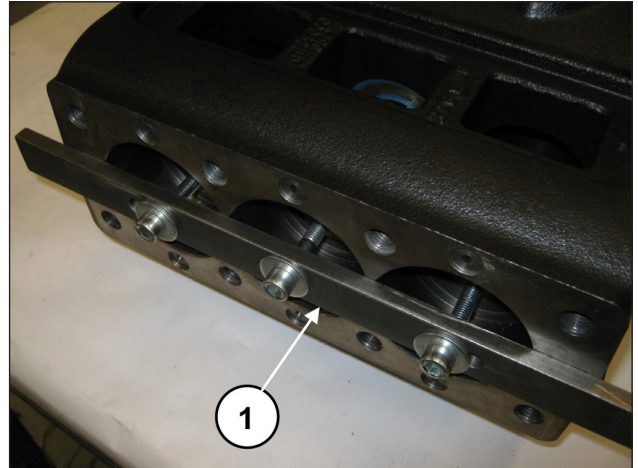


Fig. 19

Dégager les trois demi-coussinets supérieurs des demi-bielles (rep. ①, Fig. 20).

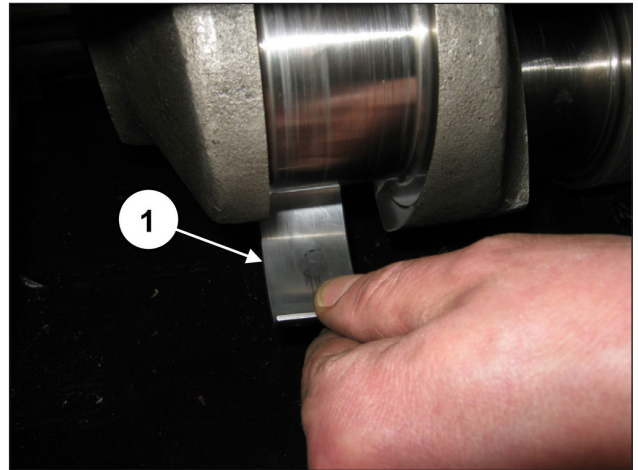


Fig. 20

Dévisser les vis de fixation du boîtier du réducteur (rep. ①, Fig. 21 et Fig. 22).

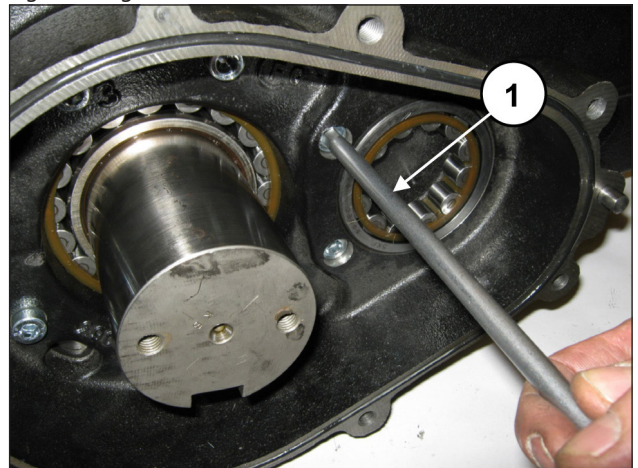


Fig. 21

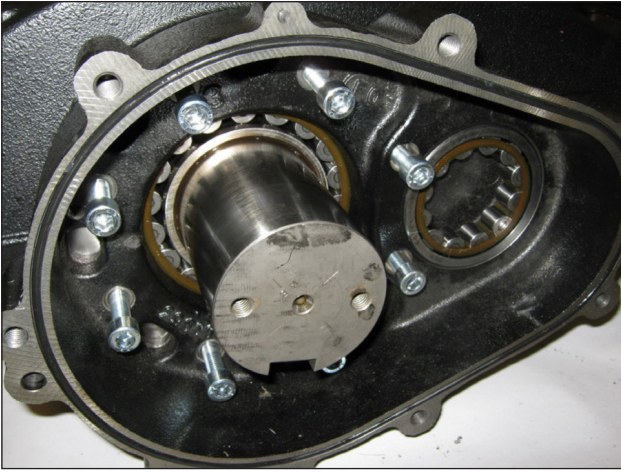


Fig. 22

Placer 3 goujons ou vis filetés M8 (rep. ①, Fig. 23) faisant office d'extracteurs, dans les orifices prévus à cet effet et deux vis M10 suffisamment longues servant à soutenir le boîtier du réducteur (rep. ②, Fig. 23).

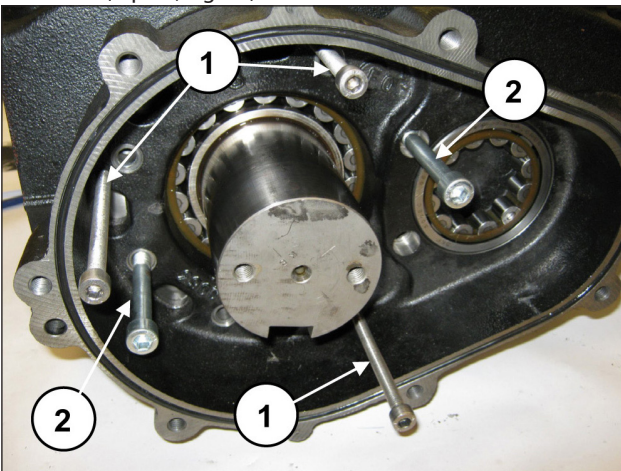


Fig. 23

Visser progressivement les 3 vis M8 (rep. ①, Fig. 24) pour éviter que le boîtier ne s'incline trop et ne se bloque dans son logement.

Déposer le boîtier en soutenant l'arbre pour éviter tout dommage (rep. ①, Fig. 25).

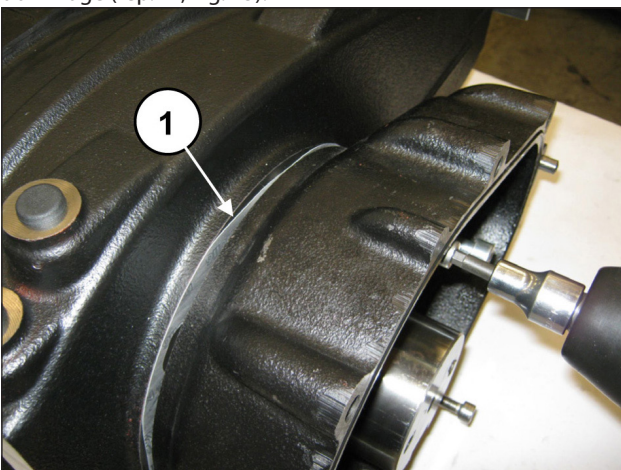


Fig. 24

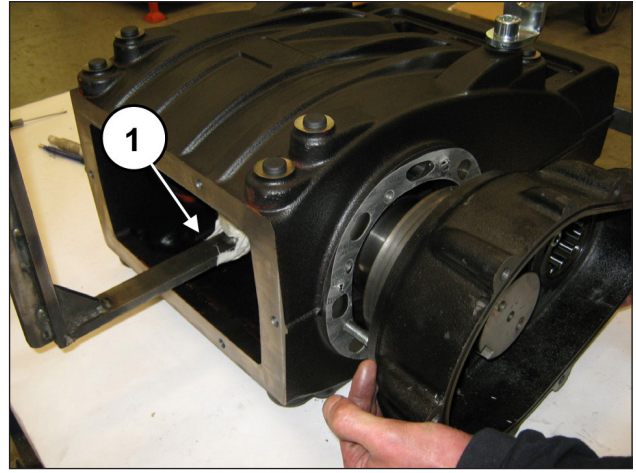


Fig. 25

De l'autre côté, dévisser les vis de fixation du couvercle du coussinet (rep. ①, Fig. 26 et Fig. 27).

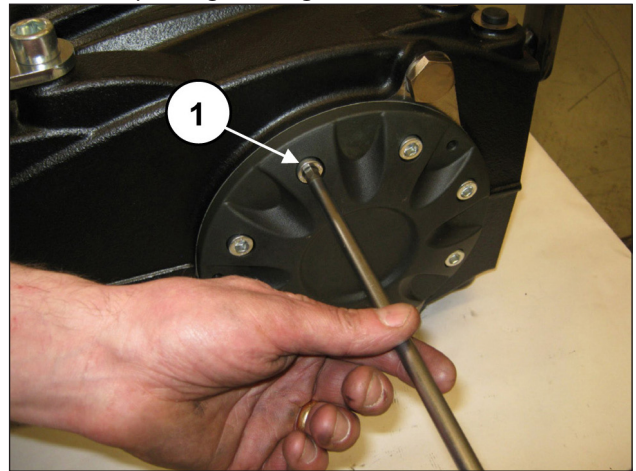


Fig. 26

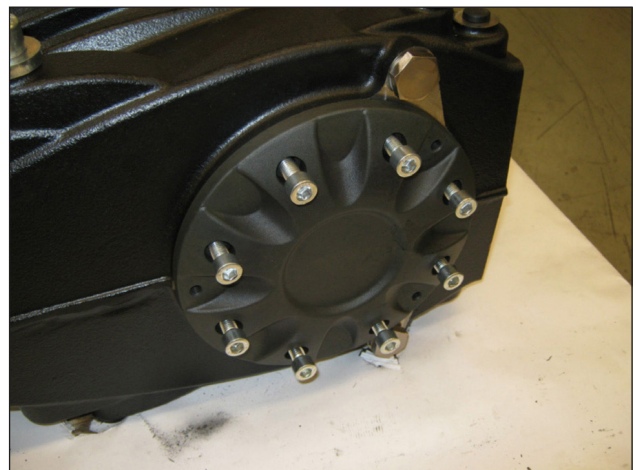


Fig. 27

Placer 3 goujons ou vis filetées M8 (rep. ①, Fig. 28) faisant office d'extracteurs, dans les orifices prévus à cet effet

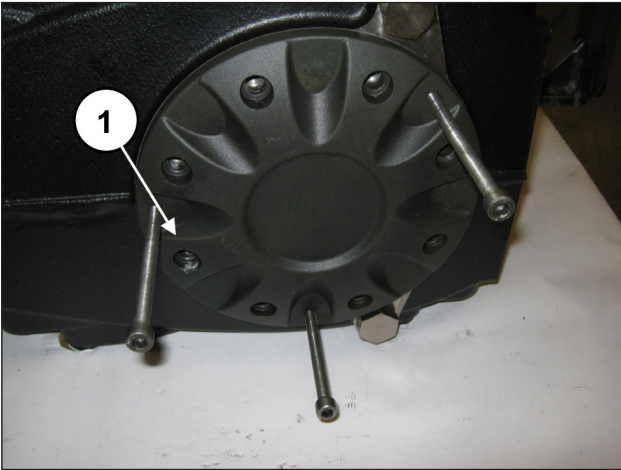


Fig. 28

Visser progressivement les 3 vis M8 (rep. ①, Fig. 29) pour éviter que le couvercle ne s'incline trop et ne se bloque dans son logement.

Déposer le couvercle du coussinet en soutenant l'arbre pour éviter tout dommage (rep. ①, Fig. 30).

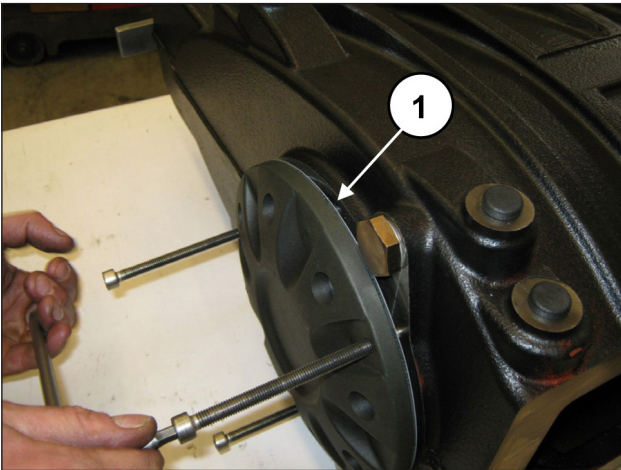


Fig. 29

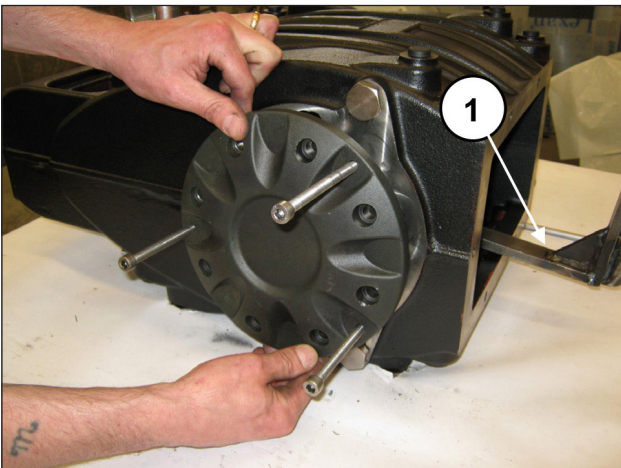


Fig. 30

Dégager le vilebrequin du carter, côté PTO (rep. ①, Fig. 31).

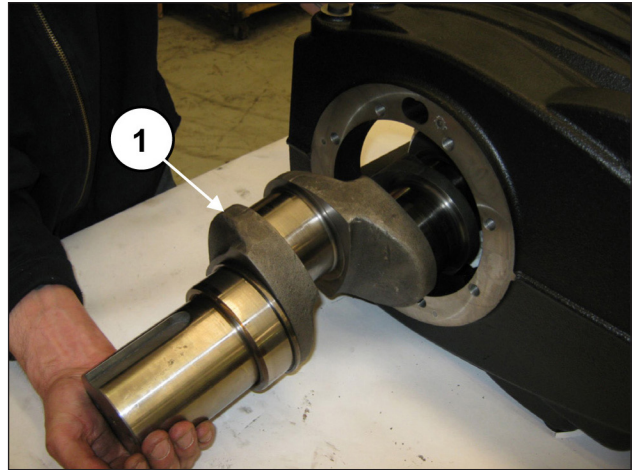


Fig. 31

S'il s'avère nécessaire de remplacer une ou plusieurs bielles ou guides de piston, procéder de la façon suivante : Dévisser les vis de l'outil réf. 27566200 pour débloquer les bielles (rep. ①, Fig. 32) puis dégager les ensembles bielle-guide de piston par l'ouverture arrière du carter (rep. ①, Fig. 33).

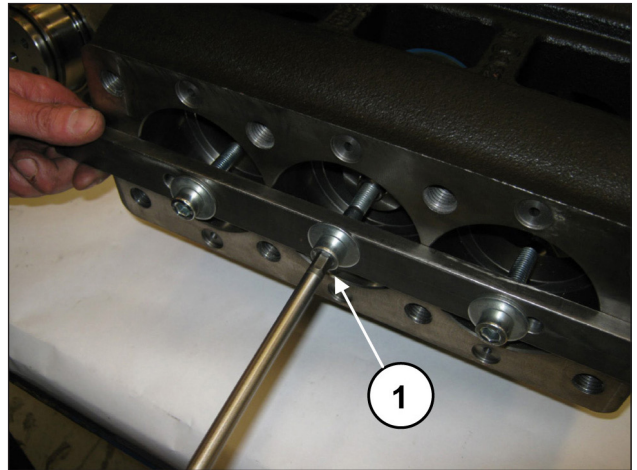


Fig. 32

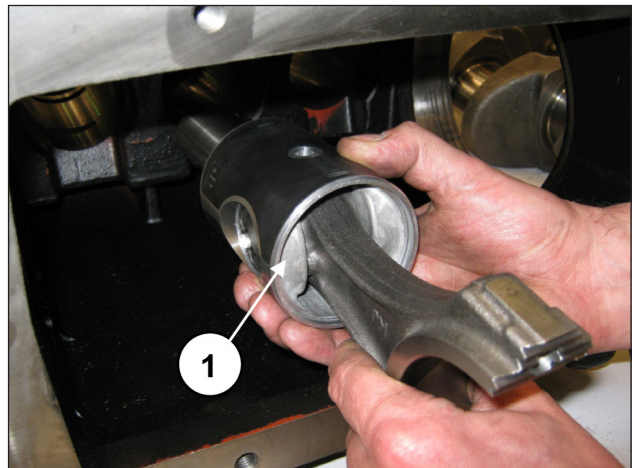


Fig. 33

Il est désormais possible de démonter les joints d'huile du guide de piston en ayant soin de ne pas endommager la tige de coulissement du guide de piston.



**S'il s'avère nécessaire de remplacer les joints d'huile du guide de piston sans devoir démonter toute la partie mécanique, il est possible de les dégager à l'aide de l'outil réf. 27918500 en procédant de la façon suivante :**



Insérer l'outil entre la tige et la lèvre du joint d'huile (rep. ①, Fig. 34) et enfoncer la partie conique dans le joint d'huile à l'aide d'un outil à inertie (rep. ①, Fig. 35).

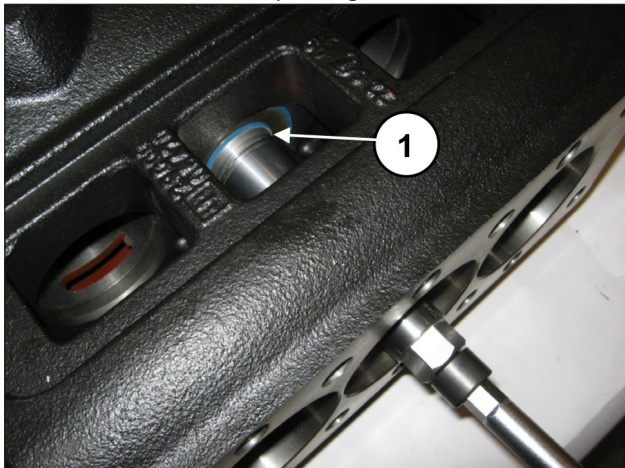


Fig. 34

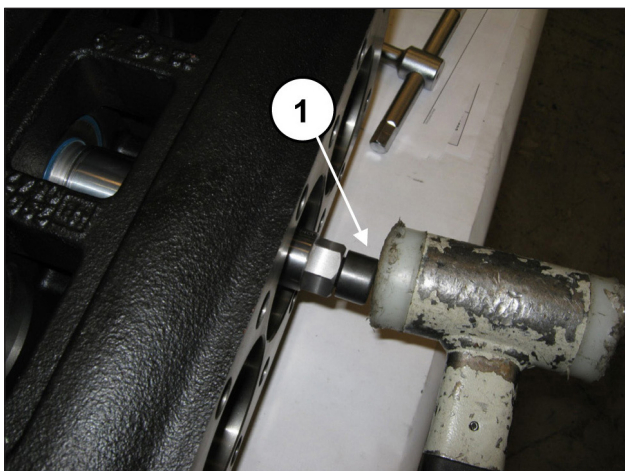


Fig. 35

Dégager le joint d'huile à l'aide de l'outil à inertie (rep. ①, Fig. 36).

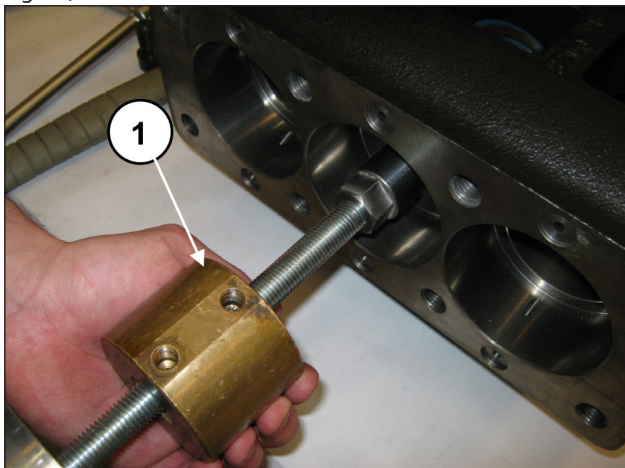


Fig. 36

Déposer les deux anneaux Seeger de retenue de la goupille (rep. ①, Fig. 37).

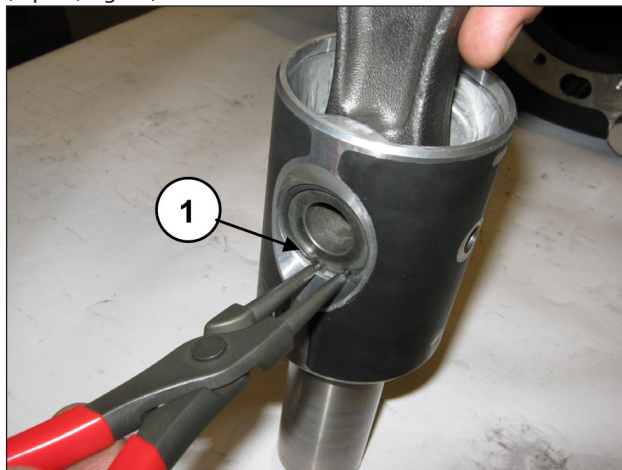


Fig. 37

Dégager la goupille (rep. ①, Fig. 38) et extraire la bielle (rep. ①, Fig. 39).



Fig. 38

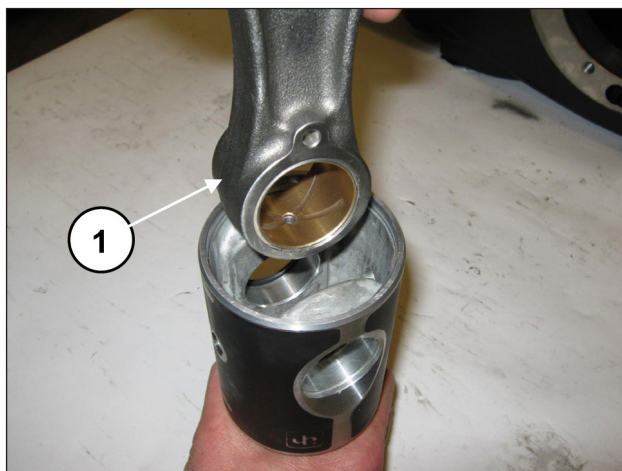


Fig. 39

Accoupler les demi-bielles avec les chapeaux préalablement démontés en suivant la numérotation (rep. ①, Fig. 40).

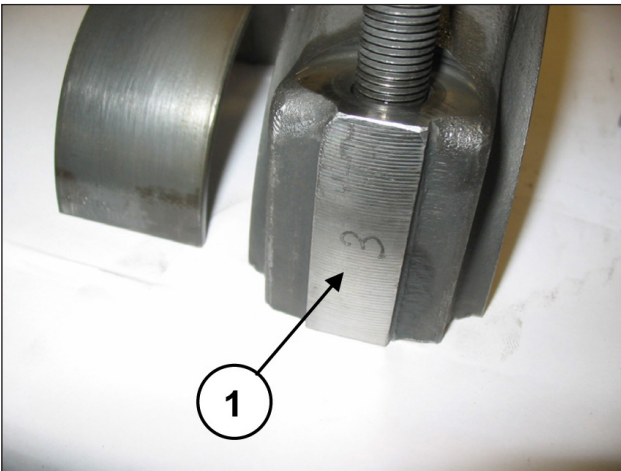


Fig. 40

Pour désassembler la tige du guide de piston, dévisser les vis à tête cylindrique M6 à l'aide d'une clé spéciale (rep. ①, Fig. 41).

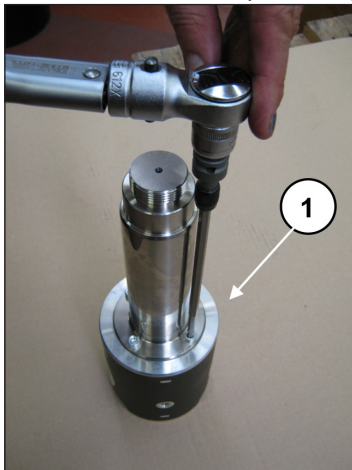


Fig. 41

## 2.1.2 Montage de la partie mécanique

Procéder au montage en inversant les opérations du parag. 2.1.1.

La séquence correcte est la suivante :

Assembler la tige au guide de piston.

Insérer la tige du guide de piston dans le logement prévu à cet effet sur le guide de piston (rep. ①, Fig. 42) et le fixer sur ce dernier à l'aide des 4 vis à tête cylindrique M6x20 (rep. ①, Fig. 43).



Fig. 42



Fig. 43

Bloquer le guide de piston dans un étau à l'aide d'un outil spécial et serrer les vis à l'aide d'une clé dynamométrique (rep. ①, Fig. 44) selon les explications figurant au chapitre 3.

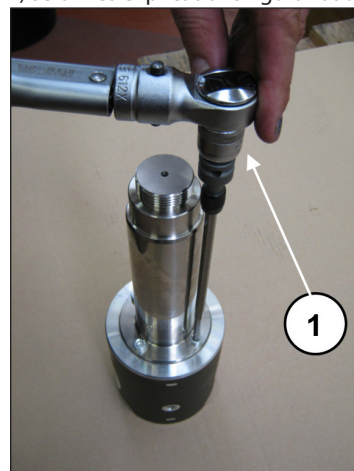


Fig. 44

Insérer la bielle dans le guide de piston (rep. ①, Fig. 39) puis insérer la goupille (rep. ①, Fig. 38). Appliquer les deux Seeger d'appui (rep. ①, Fig. 37).



**Le montage est correct lorsque le pied de bielle, le guide de piston et la goupille tournent sans problèmes.**

Désassembler les chapeaux des demi-bielles ; pour les accoupler correctement, suivre la numérotation présente sur un côté (rep. ①, Fig. 40).

Après s'être assuré que le carter est propre, insérer l'ensemble demi-bielle/guide de piston dans les tiges du carter (rep. ①, Fig. 33).



**Insérer l'ensemble demi-bielle/guide de piston dans le carter en tournant les demi-bielles de sorte que la numérotation soit visible sur le dessus.**

Bloquer les trois groupes à l'aide de l'outil réf. 27566200 (rep. ①, Fig. 32).

Prémonter l'anneau interne des coussinets du vilebrequin (à fond, des deux côtés de l'arbre) à l'aide de l'outil réf. 27604700 (rep. ①, Fig. 45) (rep. ①, Fig. 46).



**Remonter les bagues internes et externes des coussinets en les accouplant comme ils l'étaient au démontage.**



Fig. 45



Fig. 46

Insérer l'arbre côté PTO en ayant soin de ne pas heurter les corps de bielles préalablement montés (rep. ①, Fig. 47) et (rep. ①, Fig. 48).

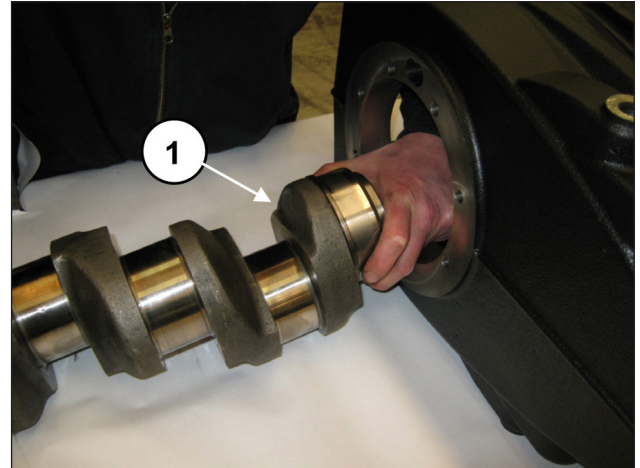


Fig. 47

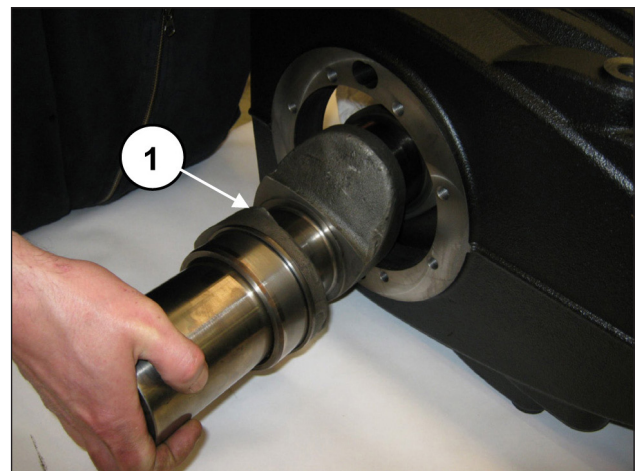


Fig. 48



**Monter impérativement le vilebrequin avec le côté PTO à l'opposé des orifices G1/2" pour les bouchons d'évacuation de l'huile du carter de pompe (rep. ②, Fig. 50).**

S'assurer que l'arbre est enfoncé dans le carter (rep. ①, Fig. 49 et Fig. 50).

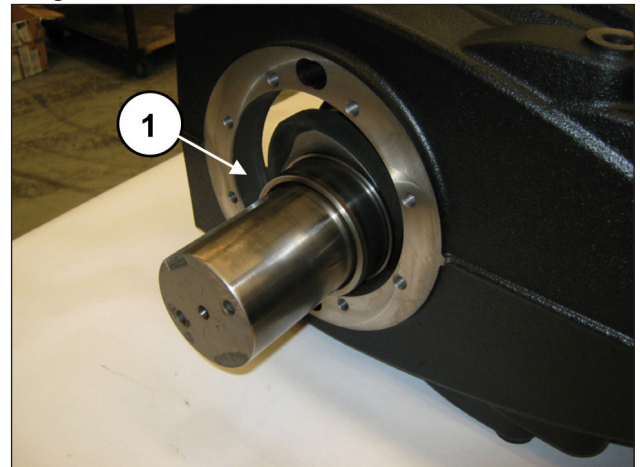


Fig. 49

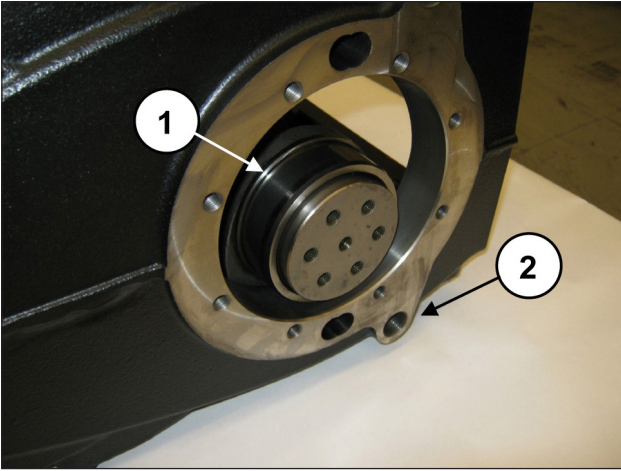


Fig. 50

Prémonter la bague externe du coussinet du pignon sur le boîtier du réducteur à l'aide de l'outil réf. 27604900 (rep. ①, Fig. 51) et le pousser à fond (rep. ①, Fig. 52).

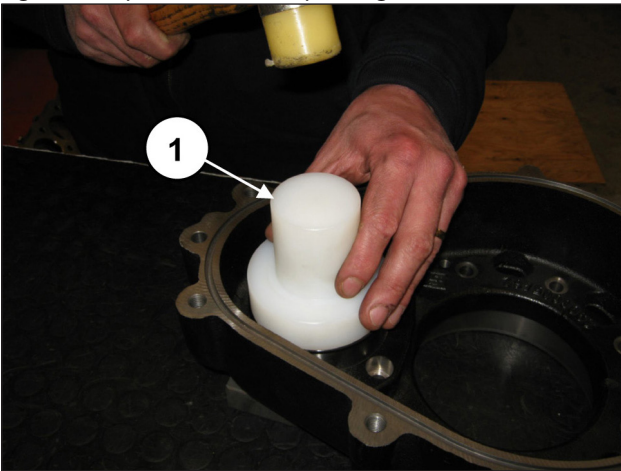


Fig. 51

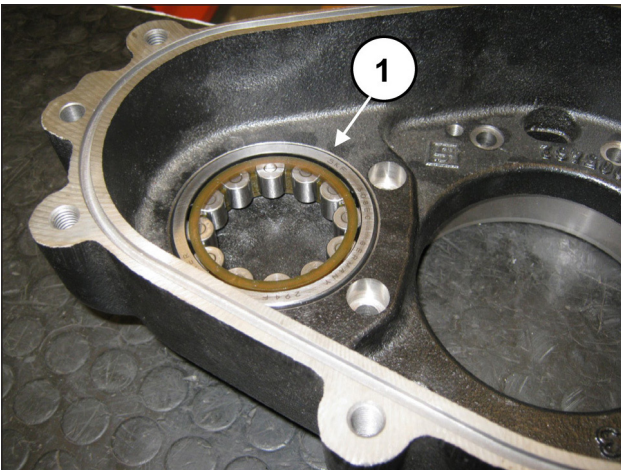


Fig. 52

Prémonter la bague externe du coussinet du vilebrequin de l'autre côté du boîtier du réducteur à l'aide de l'outil réf. 27605000 (rep. ①, Fig. 53) et le pousser à fond (rep. ①, Fig. 54).

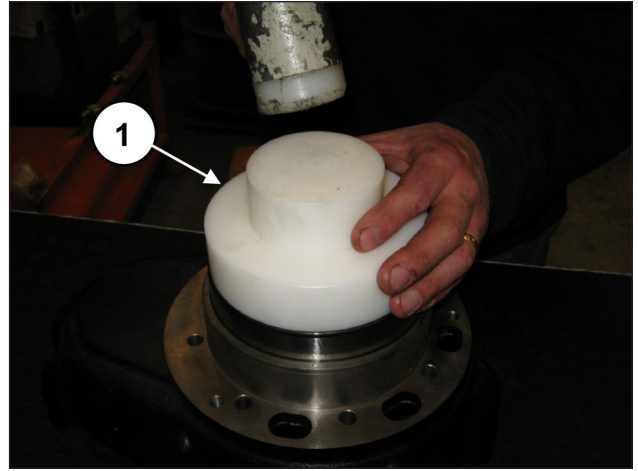


Fig. 53

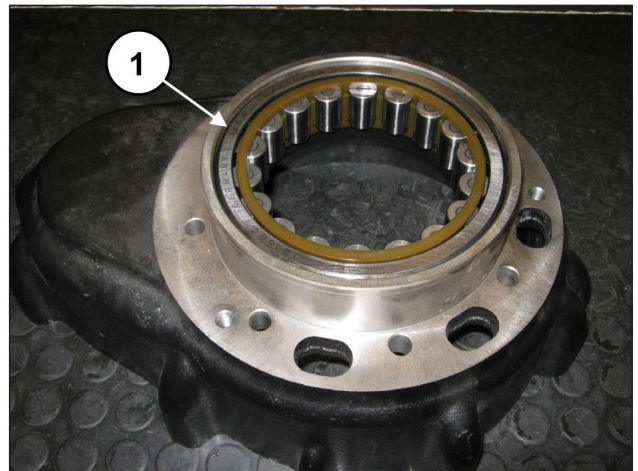


Fig. 54

Répéter l'opération sur le couvercle du coussinet en prémontant la bague externe du coussinet du vilebrequin à l'aide de l'outil réf. 27605000 (rep. ①, Fig. 55) et le pousser à fond (rep. ①, Fig. 56).

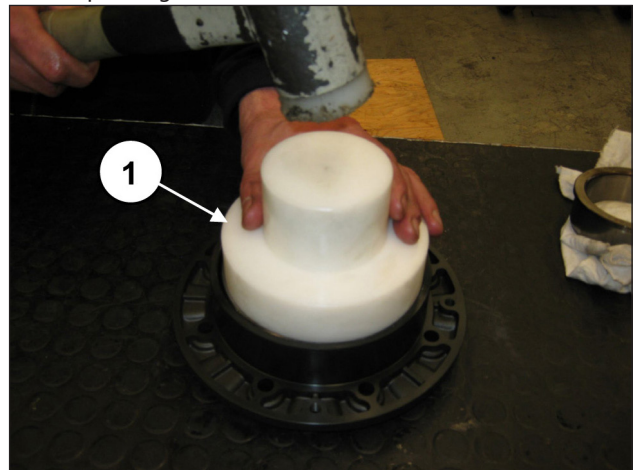


Fig. 55

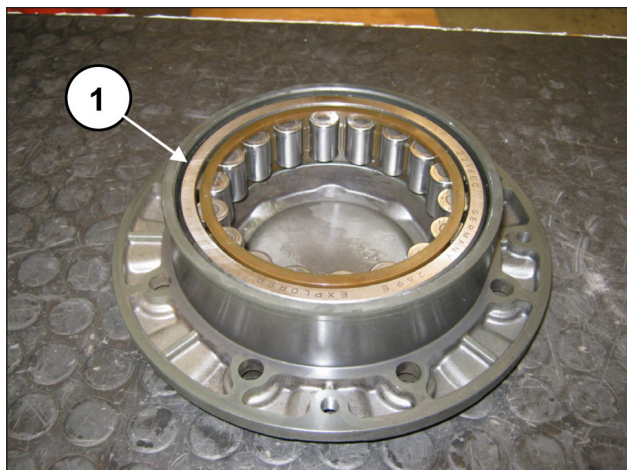


Fig. 56

Insérer le joint latéral sur le couvercle du coussinet (rep. ①, Fig. 57) et soulever le vilebrequin pour faciliter le passage du couvercle (rep. ①, Fig. 58).

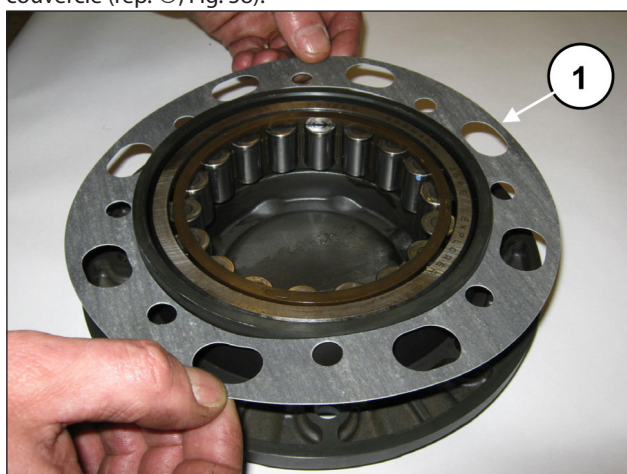


Fig. 57

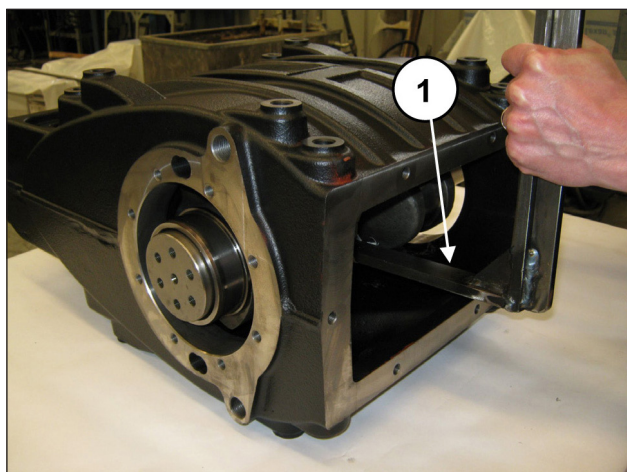


Fig. 58

Monter le couvercle du coussinet (et son joint) à l'aide d'un outil à inertie (rep. ①, Fig. 59).



**Tourner le couvercle du coussinet de sorte que le logo « Pratisoli » soit parfaitement horizontal.**

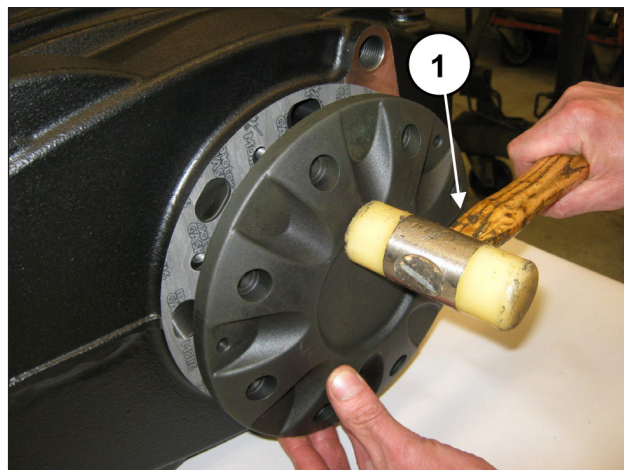


Fig. 59

Serrer les 8 vis M10x30 (rep. ①, Fig. 60).

Serrer les vis à l'aide d'une clé dynamométrique, en suivant les explications du chapitre 3.

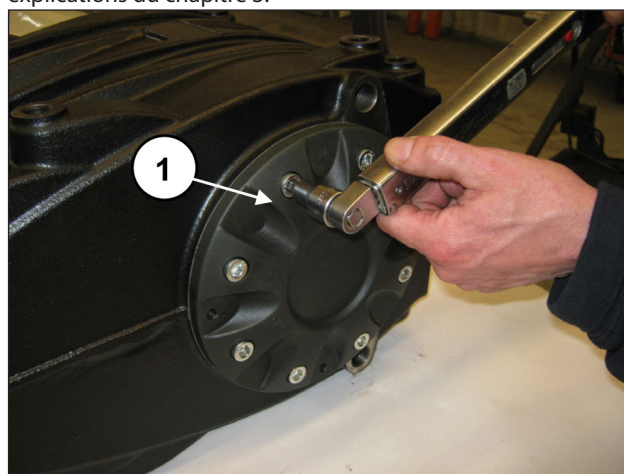


Fig. 60

De l'autre côté, insérer le joint latéral sur le boîtier du réducteur (rep. ①, Fig. 61) et soulever le vilebrequin pour faciliter le passage du couvercle (rep. ①, Fig. 62).

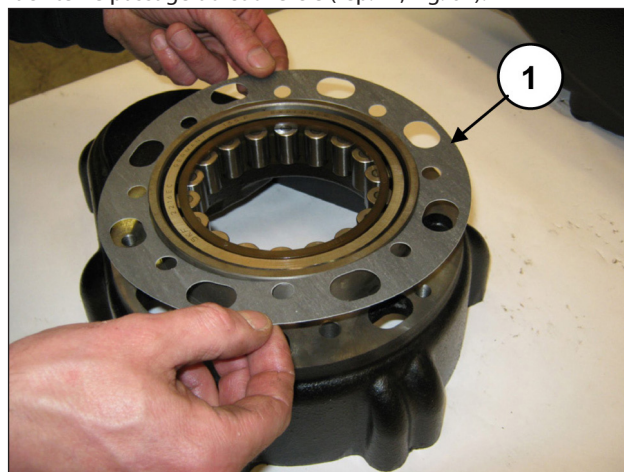


Fig. 61

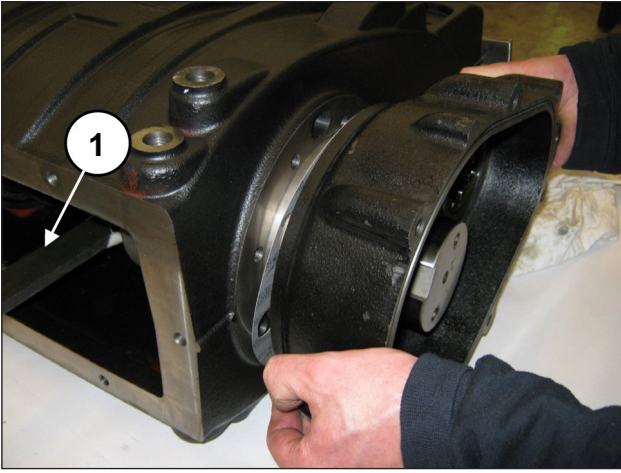


Fig. 62

Monter le boîtier du réducteur (et son joint) à l'aide d'un outil à inertie (rep. ①, Fig. 63).

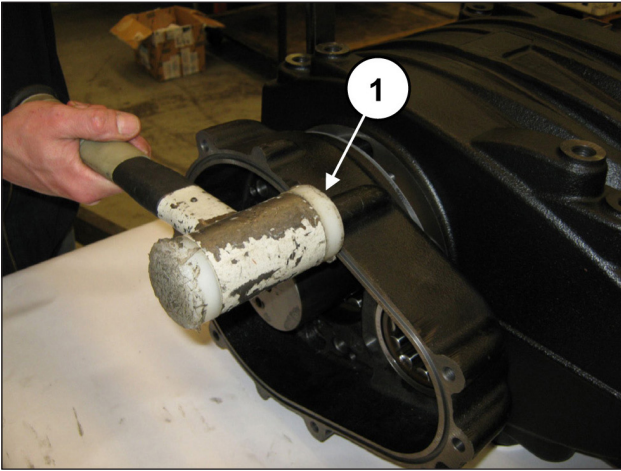


Fig. 63

Serrer les 8 vis M10x40 (rep. ①, Fig. 64).  
Serrer les vis à l'aide d'une clé dynamométrique, en suivant les explications du chapitre 3 FORCES DE SERRAGE DES VIS.

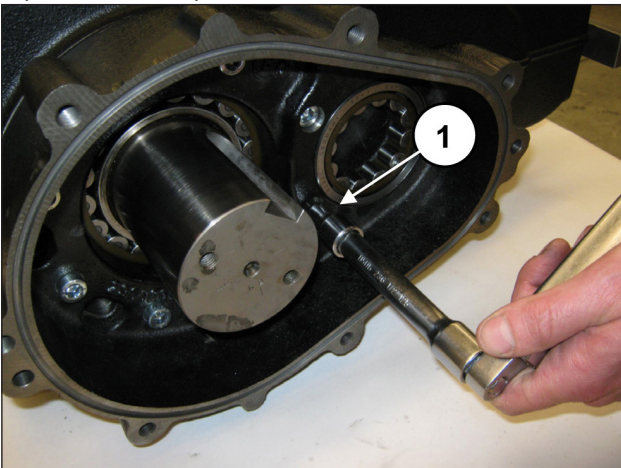


Fig. 64

Déposer l'outil de blocage des bielles réf. 27566200 (rep. ①, Fig. 32).

Insérer les demi-coussinets supérieurs entre les bielles et l'arbre (rep. ①, Fig. 65).



**Pour monter correctement les demi-coussinets, s'assurer que la languette de repère des demi-coussinets se trouve dans son logement sur la demi-bielle (rep. ①, Fig. 66).**

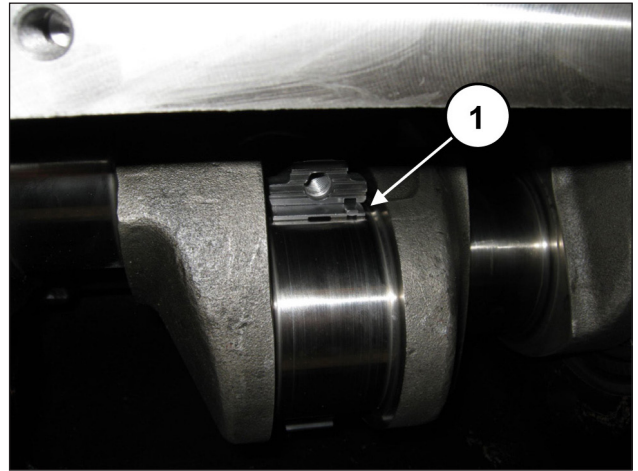


Fig. 65

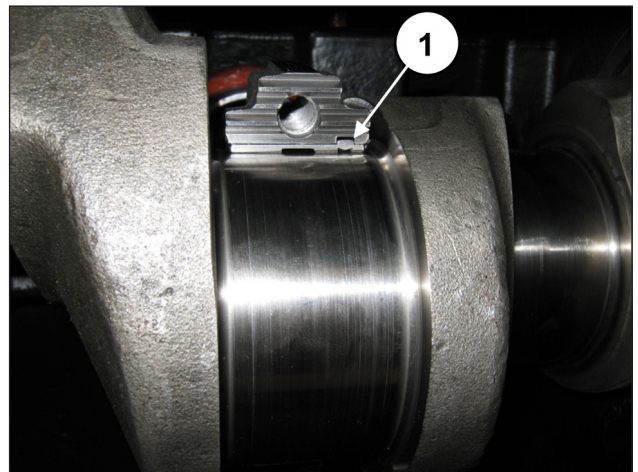


Fig. 66

Assembler les demi-coussinets inférieurs aux chapeaux (rep. ①, Fig. 67) en s'assurant que la languette de repère des demi-coussinets se trouve dans son logement sur le chapeau (rep. ②, Fig. 67).  
Fixer les chapeaux sur les demi-bielles à l'aide des vis M10x1,5x80 (rep. ①, Fig. 68).



**Faire attention au sens de montage des chapeaux. La numérotation doit être tournée vers le haut.**

Serrer les vis à l'aide d'une clé dynamométrique, en suivant les explications du chapitre 3 FORCES DE SERRAGE DES VIS et en serrant les vis au couple préconisé simultanément.

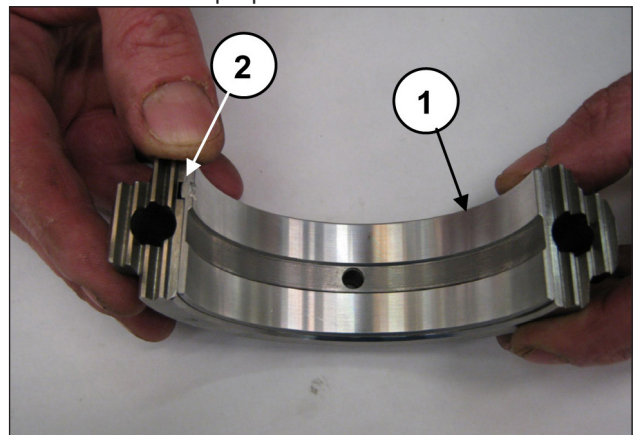


Fig. 67

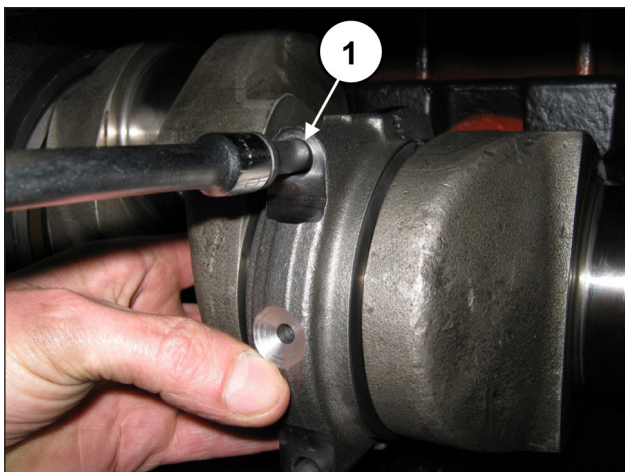


Fig. 68



**Une fois l'opération terminée, s'assurer que les bielles présentent un jeu axial dans les deux directions.**

Insérer les joints d'huile du guide de piston dans le logement sur le carter à l'aide de l'outil réf. 27605300. Placer la pièce sur la tige (rep. ①, Fig. 69/a) et frapper l'outil jusqu'à ce que le joint d'huile soit enfoncé (rep. ①, Fig. 69/b).

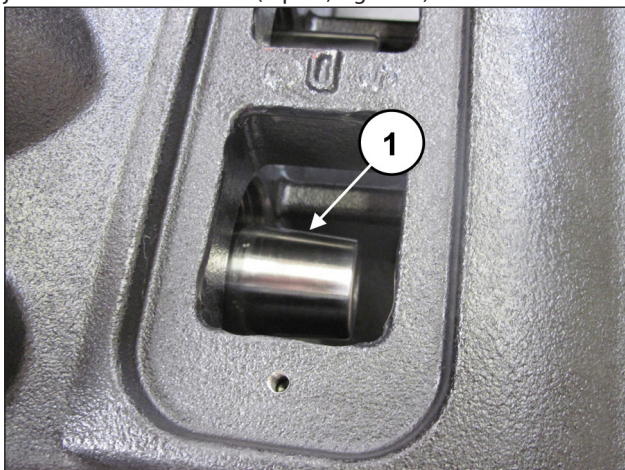


Fig. 69/a

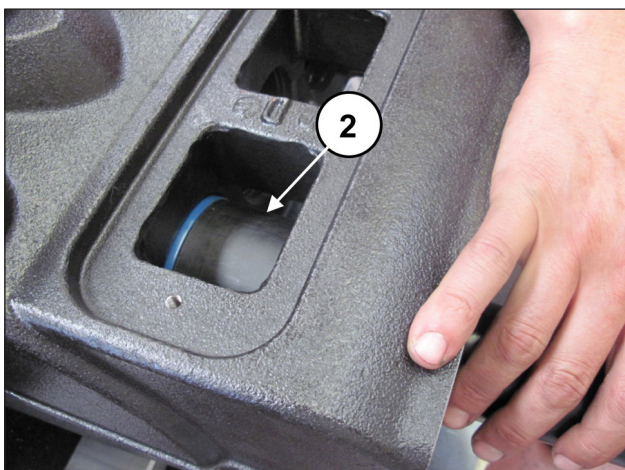


Fig. 69/b

Insérer le joint torique dans le couvercle arrière (rep. ①, Fig. 70) et monter le couvercle sur le carter à l'aide de 6 vis M10x30 (rep. ①, Fig. 71).

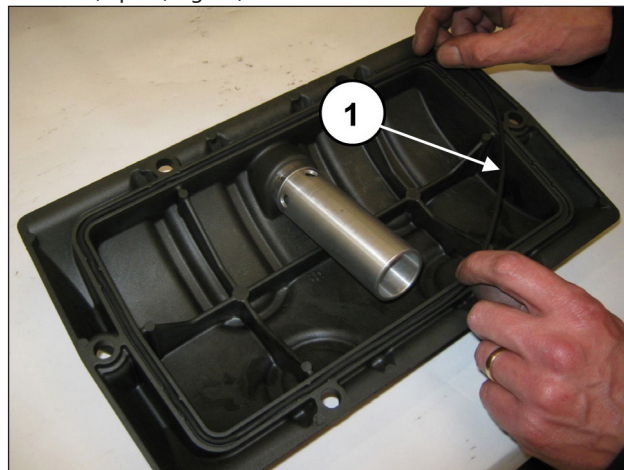


Fig. 70

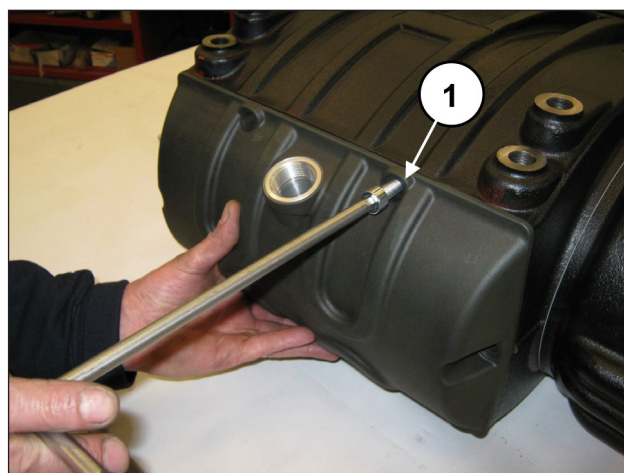


Fig. 71



**S'assurer que le joint torique est entré correctement et à fond dans son logement sur le couvercle pour éviter qu'il ne soit endommagé durant le serrage des vis.**

Serrer les vis à l'aide d'une clé dynamométrique, en suivant les explications du chapitre 3 FORCES DE SERRAGE DES VIS. Insérer la bague d'appui de la couronne dans la queue du vilebrequin (rep. ①, Fig. 72) et la pousser à fond (rep. ①, Fig. 73).

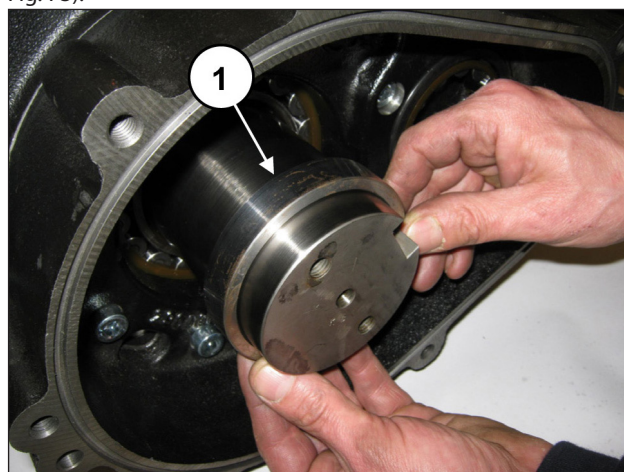


Fig. 72

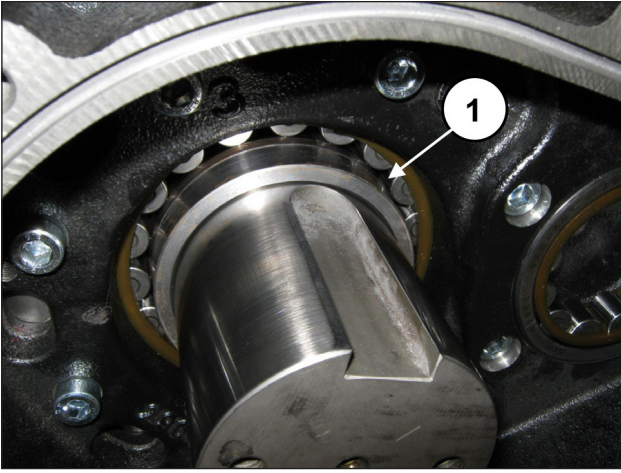


Fig. 73

Appliquer la languette 22x14x80 dans le logement de l'arbre (rep. ①, Fig. 74) et insérer la couronne sur l'arbre (rep. ①, Fig. 75).



**Monter la couronne en s'assurant que les deux orifices M8 (à utiliser pour l'extraction) sont tournés vers l'extérieur de la pompe (rep. ②, Fig. 75).**

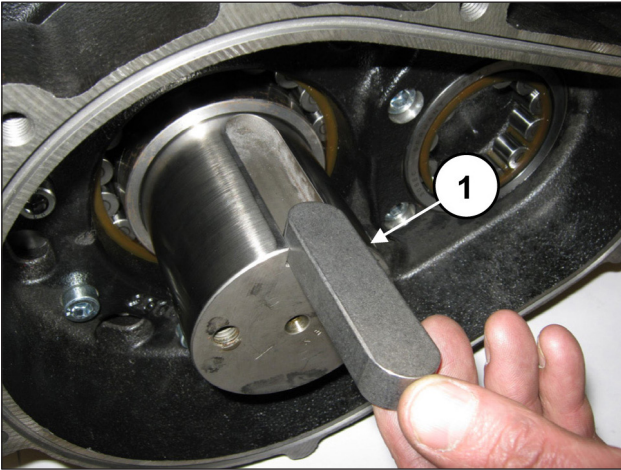


Fig. 74

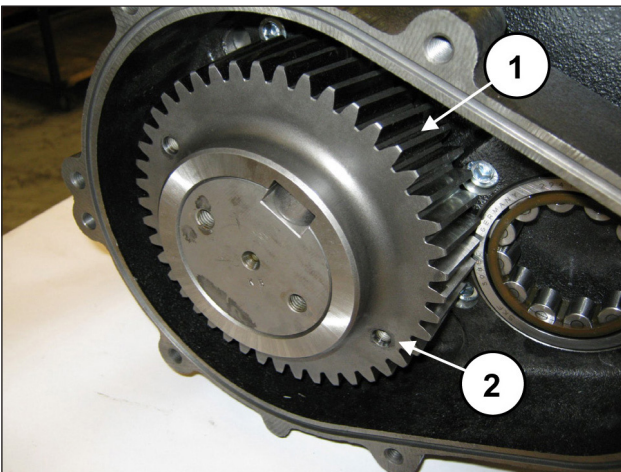


Fig. 75

Fixer le dispositif d'arrêt de la couronne (rep. ①, Fig. 76) à l'aide de 2 vis M10x25.

Serrer les vis à l'aide d'une clé dynamométrique, en suivant les explications du chapitre 3 (rep. ①, Fig. 77).

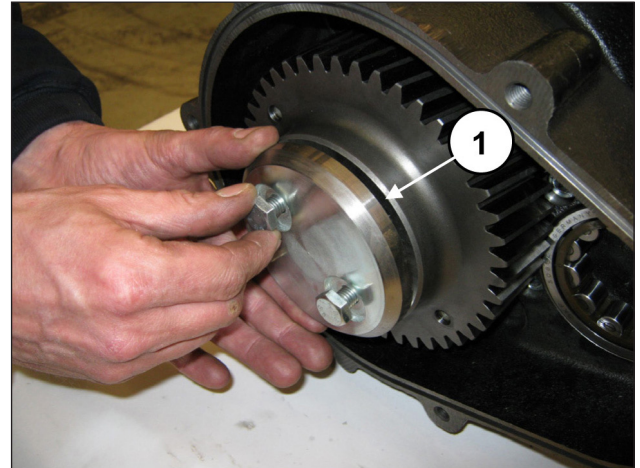


Fig. 76

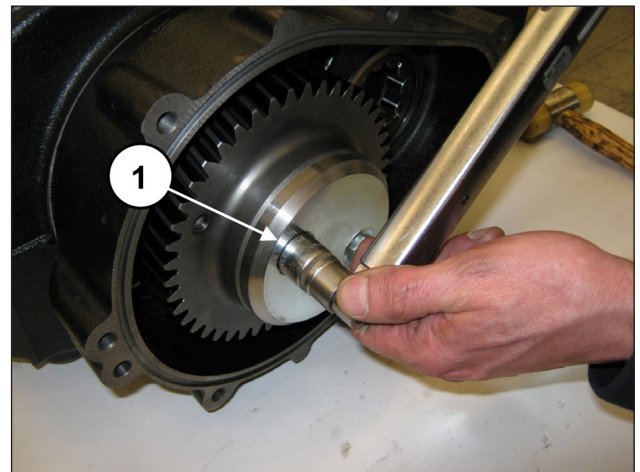


Fig. 77

Appliquer les 2 goupilles Ø10x24 au boîtier du réducteur (rep. ①, Fig. 78) et insérer le joint torique (rep. ①, Fig. 79).

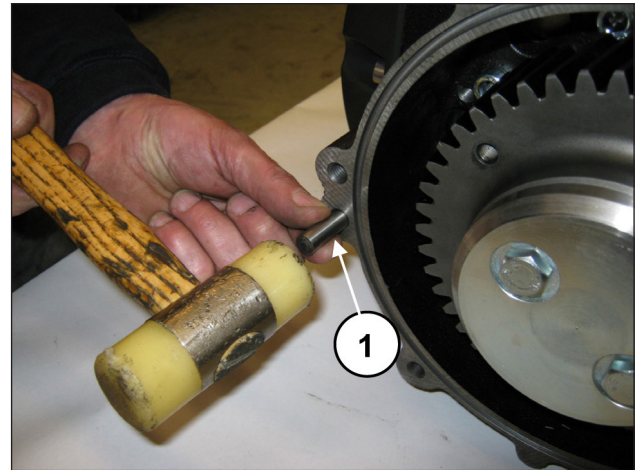


Fig. 78



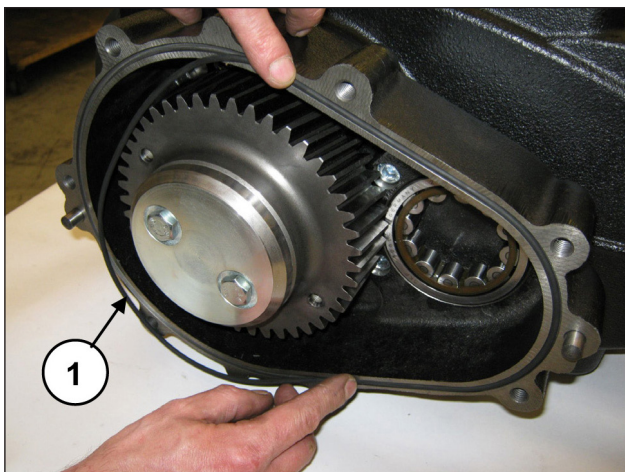


Fig. 79

Assembler le pignon sur le couvercle du réducteur en procédant de la façon suivante :  
Prémonter la bague interne du coussinet 40x90x23 sur le pignon (rep. ①, Fig. 80) et la pousser à fond.

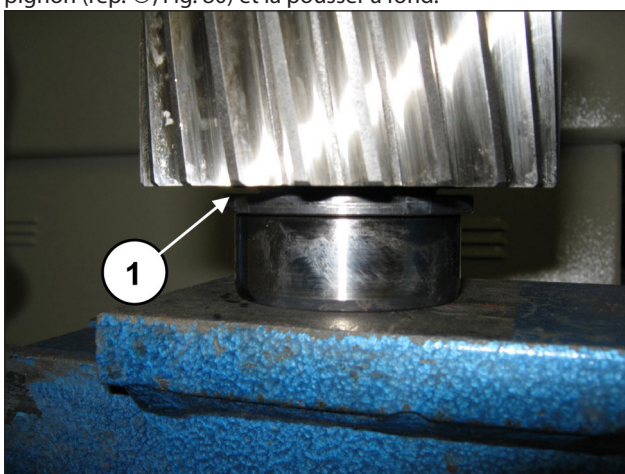


Fig. 80

De l'autre côté du pignon, prémonter le coussinet 55x120x29 (rep. ①, Fig. 81) et le pousser à fond à l'aide de l'outil réf. 27604800 (rep. ①, Fig. 82).

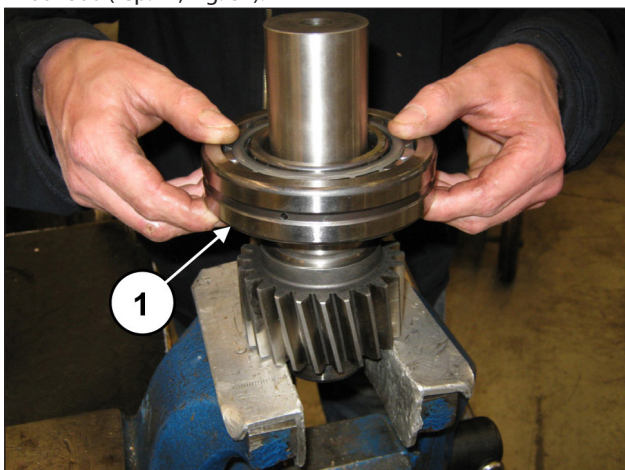


Fig. 81

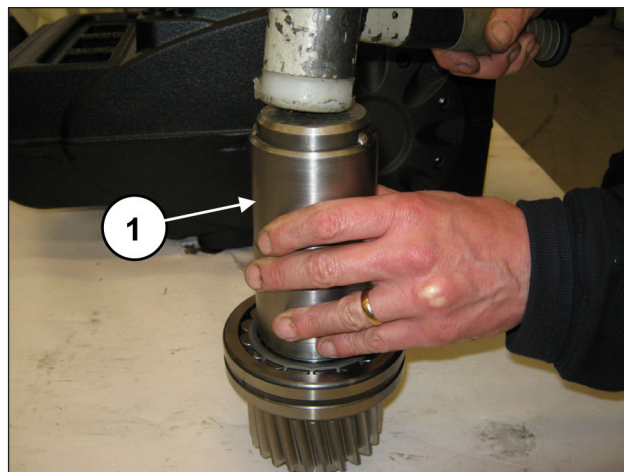


Fig. 82

Insérer l'anneau d'appui du coussinet (rep. ①, Fig. 83) et installer l'anneau Seeger Ø55 (rep. ①, Fig. 84).

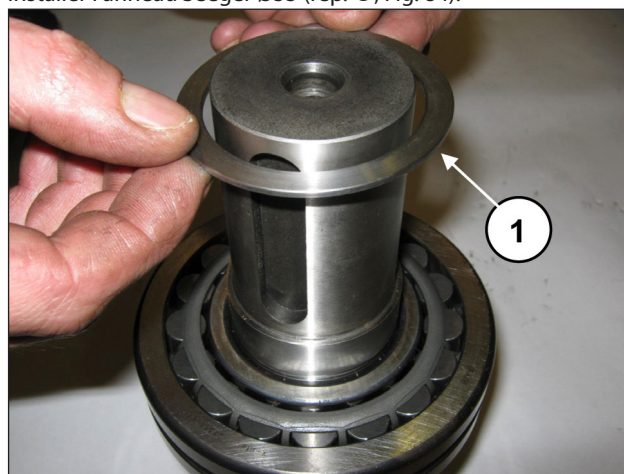


Fig. 83

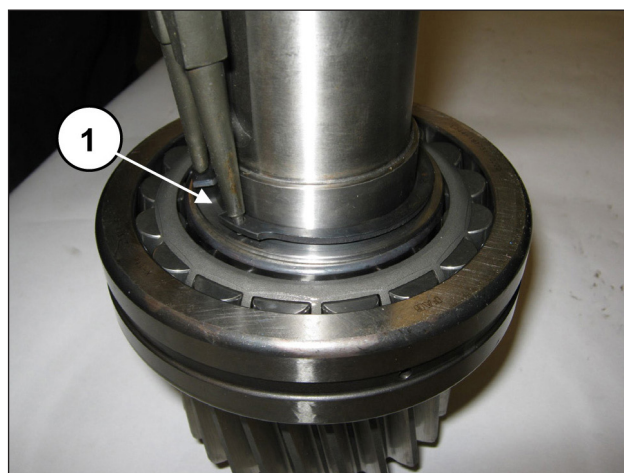


Fig. 84

Insérer le pignon prémonté dans son logement sur le couvercle du réducteur à l'aide d'un outil à inertie (rep. ①, Fig. 85).

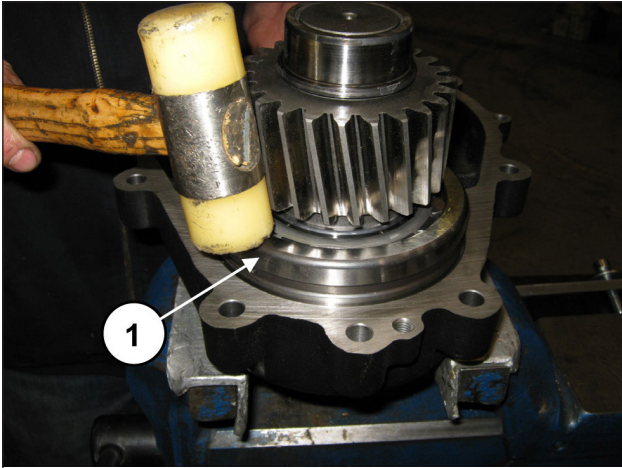


Fig. 85

Insérer dans le logement l'anneau Seeger Ø120 (rep. ①, Fig. 86).

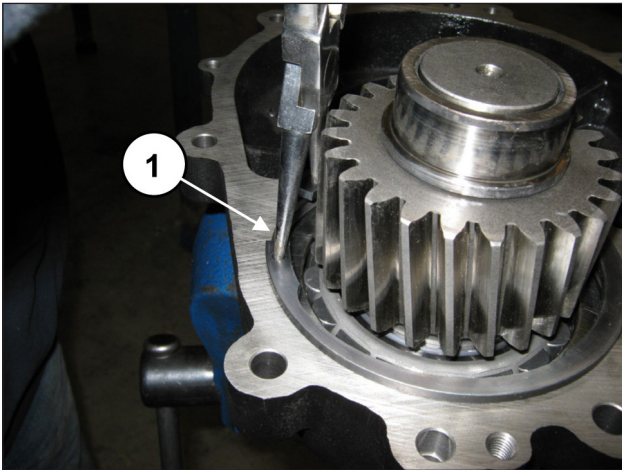


Fig. 86

Monter le couvercle du réducteur à l'aide d'un outil à inertie (rep. ①, Fig. 87) et le fixer à l'aide de 7 vis M10x40 (rep. ①, Fig. 88).

S'assurer d'accoupler correctement les deux éléments du coussinet 40x90x23.

Serrer les vis à l'aide d'une clé dynamométrique, en suivant les explications du chapitre 3.

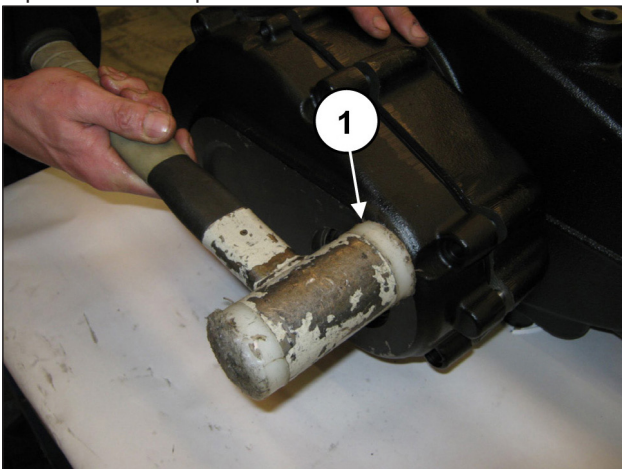


Fig. 87

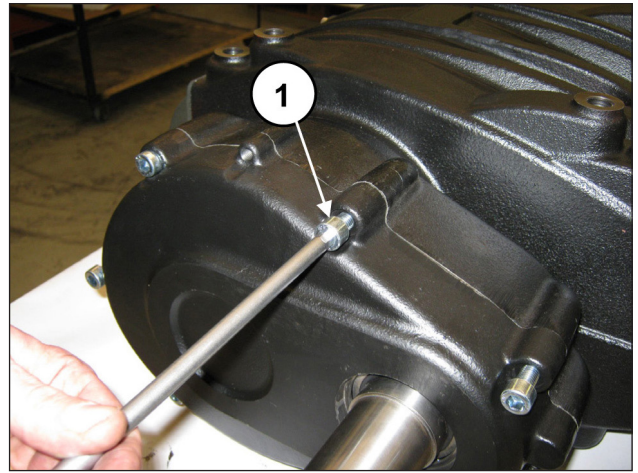


Fig. 88

Insérer le joint d'huile dans le couvercle du réducteur à l'aide de l'outil réf. 27605200 (rep. ①, Fig. 89).

Avant de procéder au montage du joint d'huile, vérifier les conditions de la lèvre d'étanchéité. S'il s'avère nécessaire de remplacer le joint, placer le nouveau joint sur le fond de la gorge comme le montre la Fig. 90



**Si l'arbre présente une usure diamétrale correspondant à la lèvre d'étanchéité, pour éviter la rectification, placer le joint en deuxième position, comme le montre la Fig. 90.**



Fig. 89

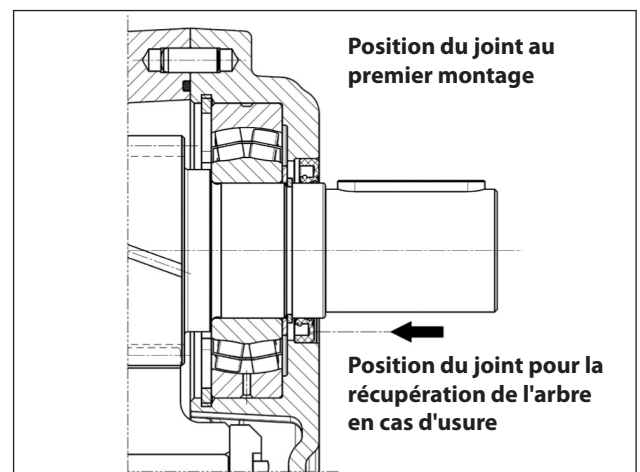


Fig. 90



**Pour éviter d'endommager le joint d'huile, l'introduire délicatement sur le pignon.**

Appliquer les couvercles d'inspection avec les joints toriques (rep. ①, Fig. 91) et serrer à l'aide de 2+2 vis M6x14 (rep. ①, Fig. 92).

Serrer les vis à l'aide d'une clé dynamométrique, en suivant les explications du chapitre 3 FORCES DE SERRAGE DES VIS.

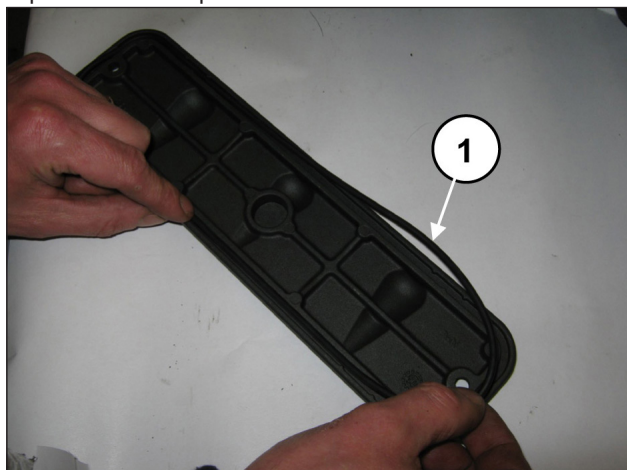


Fig. 91

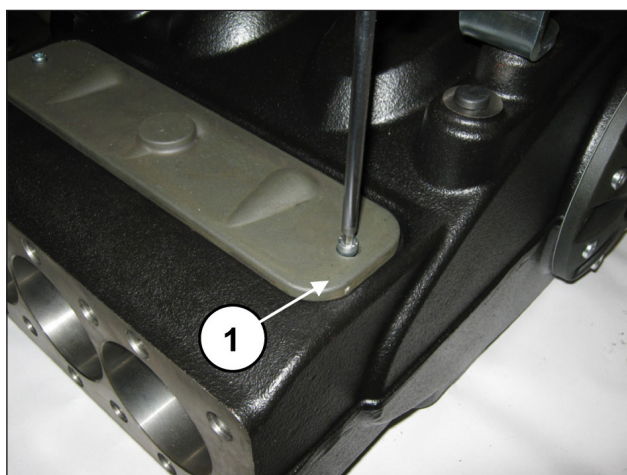


Fig. 92

Insérer la languette 14x9x60 dans le pignon.

Appliquer les bouchons et les étriers de levage à l'aide des vis M16x30 (rep. ①, Fig. 93).

Serrer les vis à l'aide d'une clé dynamométrique, en suivant les explications du chapitre 3 FORCES DE SERRAGE DES VIS.

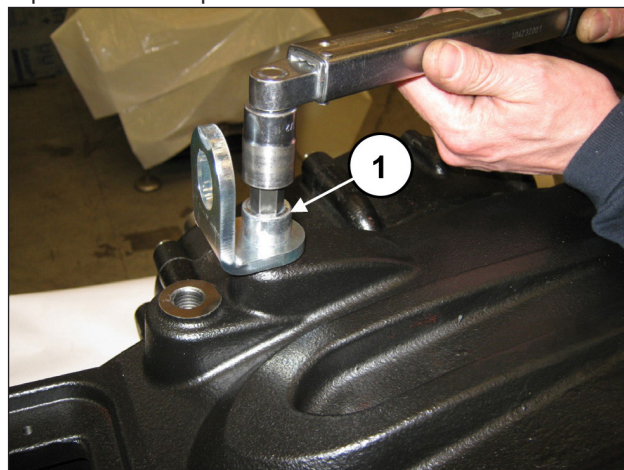


Fig. 93

Verser l'huile dans le carter en suivant les explications dans le *Manuel d'utilisation et d'entretien*, parag. 7.4.

### 2.1.3 Classes de majorations et de minorations prévues

**TABLEAU DE MINORATIONS POUR VILEBREQUIN ET DEMI-COUSSINET DE BIELLE**

Classes de rattrapage (mm)	Code Demi-coussinet Supérieur	Code Demi-coussinet Inférieur	Rectification sur le diamètre du goujon de l'arbre (mm)
0.25	90928100	90928400	Ø79.75 0/-0.02 Ra 0.4 Rt 3.5
0.50	90928200	90928500	Ø79.50 0/-0.02 Ra 0.4 Rt 3.5

**TABLEAU DES MAJORATIONS POUR CARTER DE POMPE ET GUIDE DE PISTON**

Classes de rattrapage (mm)	Référence Guide de piston	Rectification sur le siège du carter de pompe (mm)
1.00	73050543	Ø71 H6 +0.019/0 Ra 0.8 Rt 6

## 2.2 RÉPARATION DE LA PARTIE HYDRAULIQUE

### 2.2.1 Démontage de la tête - chemises - soupapes

La tête ne nécessite aucun entretien régulier.

Les interventions se limitent à l'inspection ou au remplacement des soupapes, en cas de besoin.

Pour l'extraction des groupes de la soupape, procéder de la façon suivante :

Desserrer, sans les déposer, les vis M10x140 de fixation des chemises sur la tête (rep. ①, Fig. 94) de sorte qu'elles résultent libres.

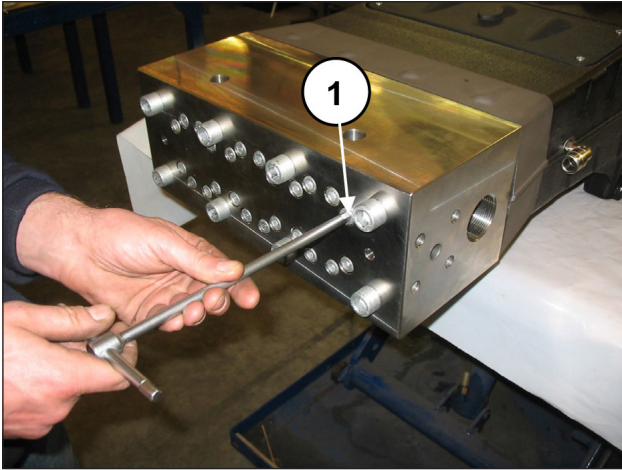


Fig. 94

Dévisser deux vis de fixation de la tête M16x320 diamétralement opposées (rep. ① et ②, Fig. 95) et les remplacer par deux goujons de service (réf. 27540200) (rep. ①, Fig. 96) puis enlever les autres vis.

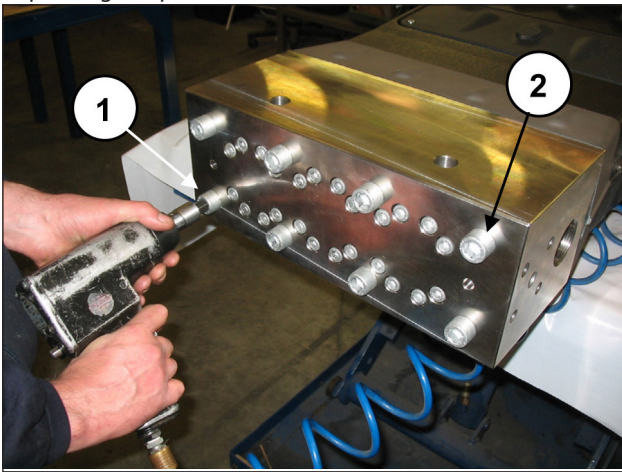


Fig. 95

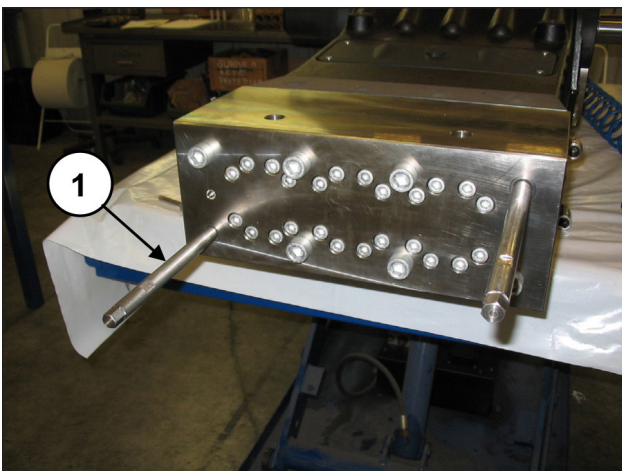


Fig. 96

Désassembler la tête et l'entretoise des chemises du carter de pompe (rep. ①, Fig. 97).

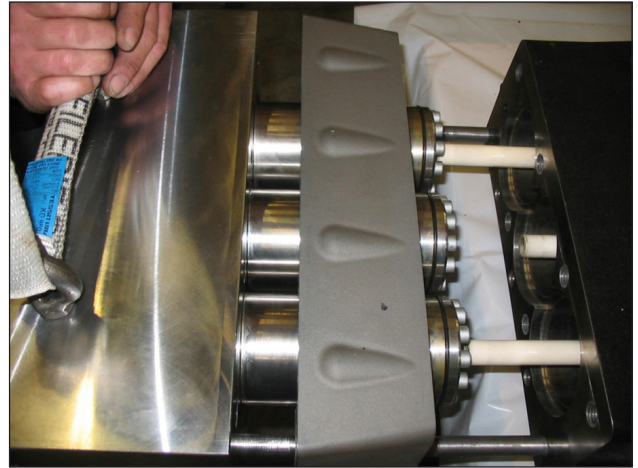


Fig. 97

Dégager l'entretoise des chemises des groupes chemises (rep. ①, Fig. 98).

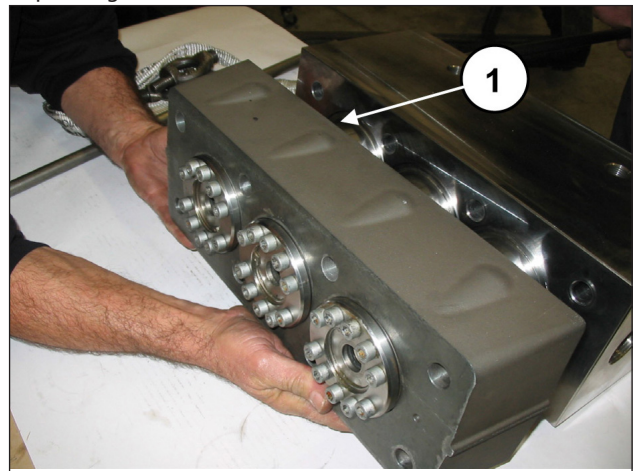


Fig. 98

Déposer les vis M10x140 de fixation des chemises sur la tête (rep. ①, Fig. 99) et dégager les groupes chemises (rep. ①, Fig. 100).

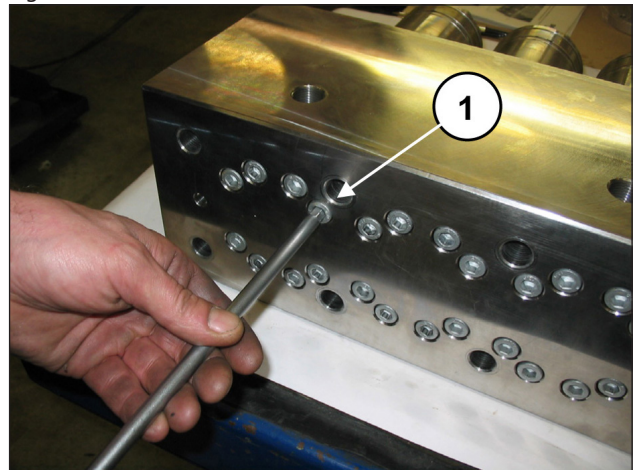


Fig. 99

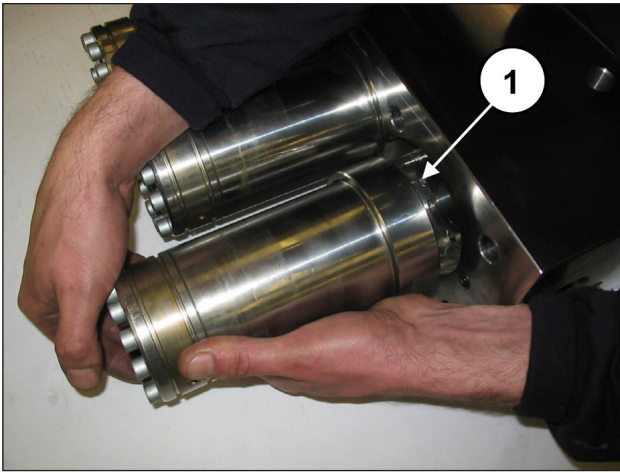


Fig. 100



**Durant le démontage des chemises, ne pas perdre les ressorts de soupape ni les soupapes plates (rep. ① et ②, Fig. 101) car ils risquent de tomber du fait qu'ils ne sont pas bloqués.**

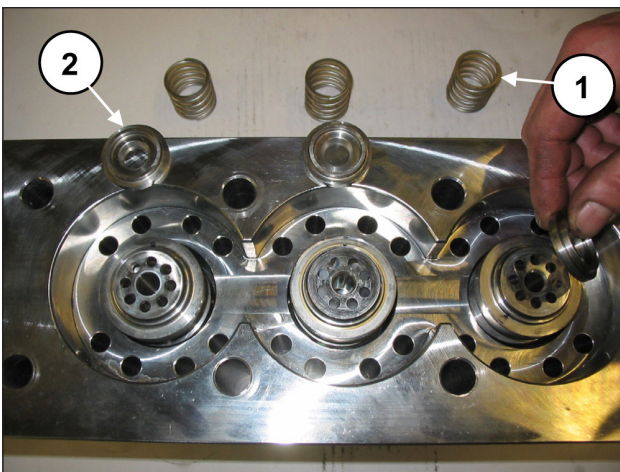


Fig. 101



**Si les sièges de soupape résultent bloqués sur la tête à cause de la présence de calcaire ou s'ils sont oxydés, les débloquer en faisant passer l'outil (réf. 034300020) dans l'orifice de refoulement (rep. ①, Fig. 102).**

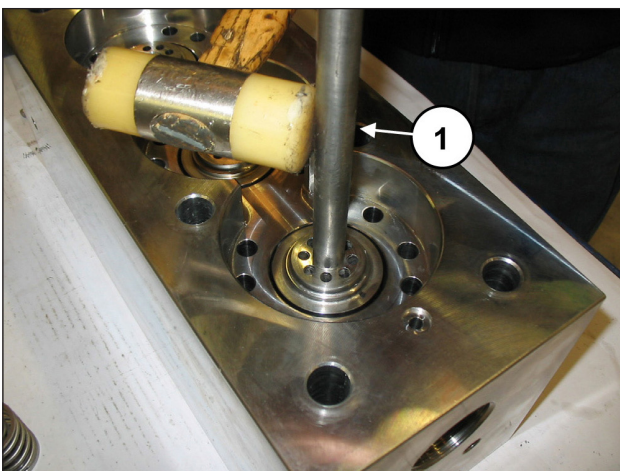


Fig. 102

Dégager les sièges de soupape et vérifier si les joints sont usés. Si nécessaire, procéder au remplacement (rep. ①, Fig. 103).

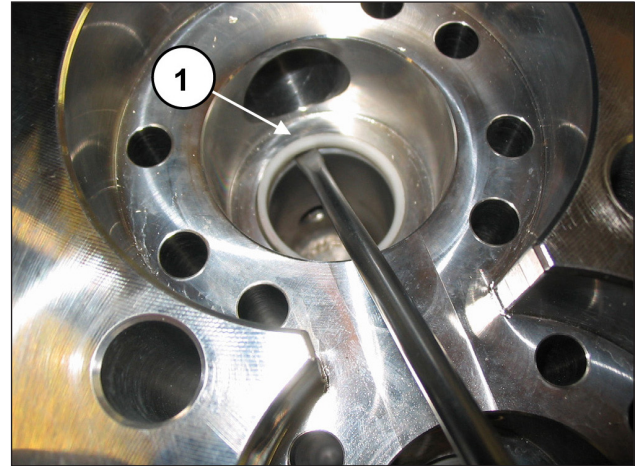


Fig. 103



**Remplacer les joints d'étanchéité et les joints toriques correspondants à l'avant, entre la chemise et la tête, entre la tête et l'entretoise des chemises à proximité de l'orifice de recyclage, chaque fois que l'on procède au contrôle des soupapes. Avant de procéder au remontage, nettoyer et essuyer les différents composants et tous leurs logements à l'intérieur de la tête.**

Extraire les plateaux de refoulement (rep. ①, Fig. 104) ainsi que leurs guides (rep. ①, Fig. 106), avec leurs ressorts (rep. ①, Fig. 105), vérifier s'ils sont usés et procéder au remplacement si nécessaire ; toujours les remplacer aux intervalles indiqués au chapitre 11 du *Manuel d'utilisation et d'entretien*.

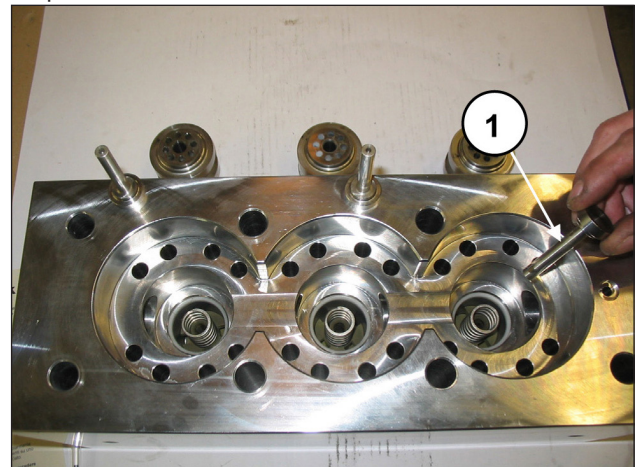


Fig. 104

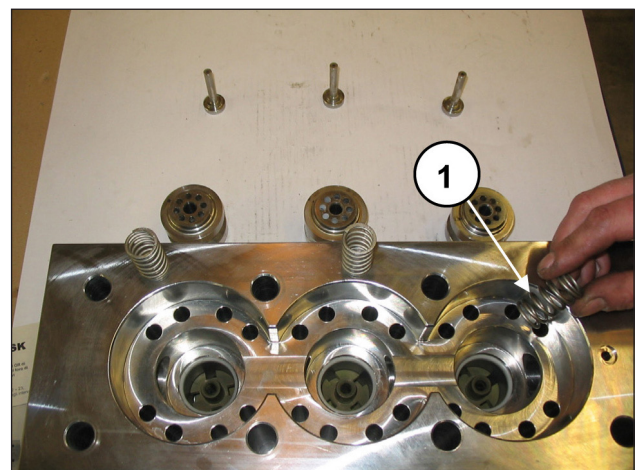


Fig. 105

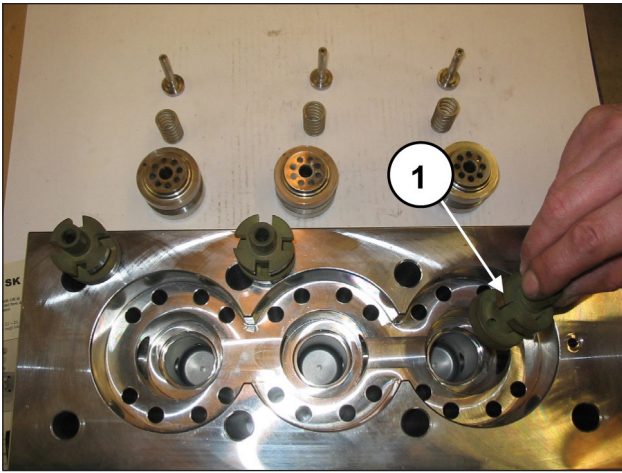


Fig. 106

### 2.2.2 Montage de la tête - chemises - soupapes

Pour remonter les différents composants, inverser les opérations précédentes en ayant soin de monter correctement l'entretoise des chemises : l'orifice  $\varnothing 6$  (circuit de refroidissement des joints d'étanchéité) doit se trouver face à son orifice analogue sur la tête (avec joint torique).

**Têtes - chemises : procéder au remontage et au réglage des vis de fixation de la tête puis au réglage des vis de fixation des chemises.**

Pour les valeurs des couples et les séquences de serrage, respecter les indications qui figurent au chapitre 3.

### 2.2.3 Démontage du groupe piston - supports - joints d'étanchéité

Le groupe du piston ne nécessite aucun entretien régulier. Les interventions se limitent au simple contrôle visuel du drainage du circuit de refroidissement. En cas d'anomalies / oscillations sur le manomètre de refoulement ou de pulsations sur le tuyau de drainage du circuit de refroidissement (s'il est élastique), procéder à un contrôle et remplacer éventuellement le lot de joints.

Pour l'extraction des groupes du piston, procéder de la façon suivante :

Désassembler la tête et l'entretoise de chemises du carter de pompe en suivant les explications au parag. 2.2.1 (de Fig. 94 à Fig. 100).

Déposer le couvercle d'inspection supérieur en desserrant les 2 vis de fixation (rep. ①, Fig. 107).

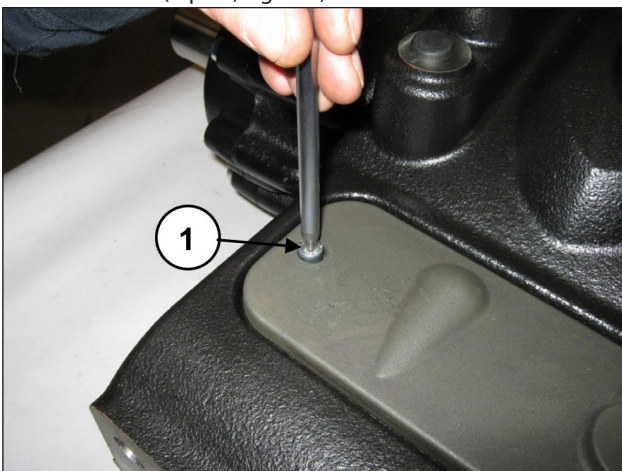


Fig. 107

Déposer les éléments de pompage à l'aide d'une clé à fourchette (rep. ①, Fig. 108) et vérifier s'ils sont usés (rep. ①, Fig. 109). Les remplacer si nécessaire.

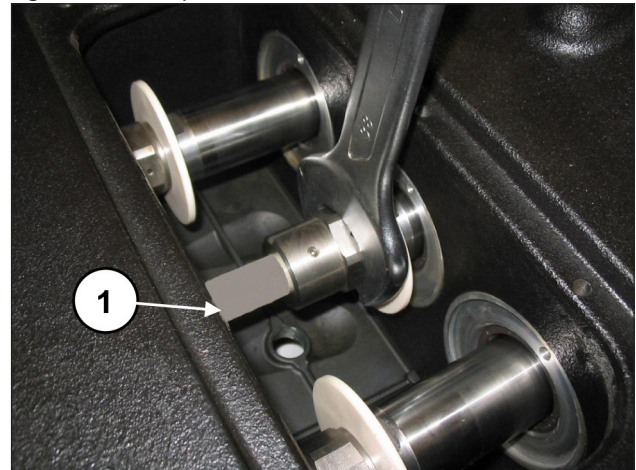


Fig. 108

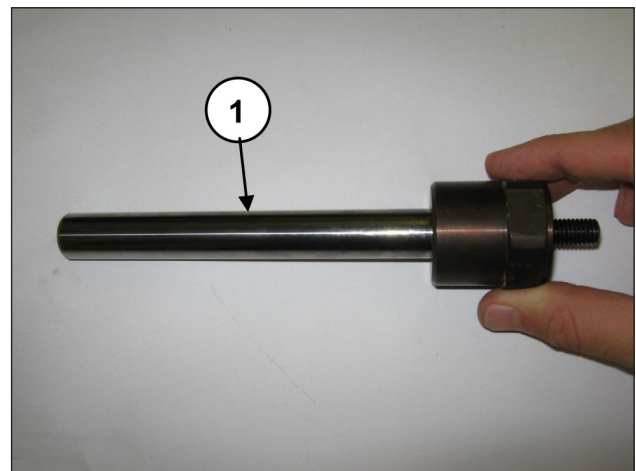


Fig. 109

Déposer les vis M8x50 de fixation du support de la chemise (rep. ①, Fig. 110) et désassembler le support de la chemise (rep. ①, Fig. 111).

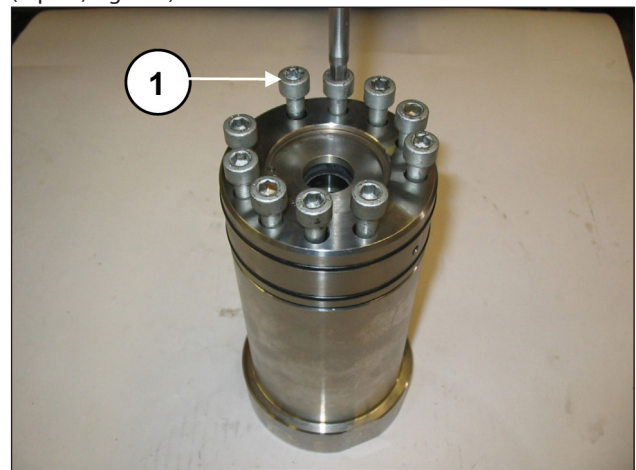


Fig. 110

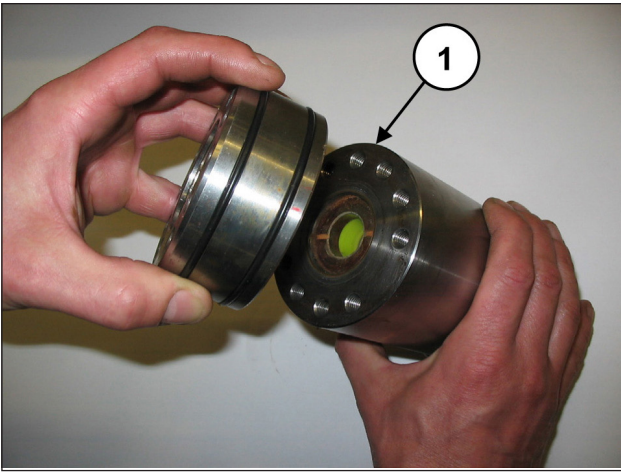


Fig. 111

Déposer l'anneau Seeger et l'anneau de retenue des joints d'étanchéité (rep. ①, Fig. 112) puis utiliser une goupille en plastique pour dégager le joint d'étanchéité LP (basse pression) (rep. ①, Fig. 113).

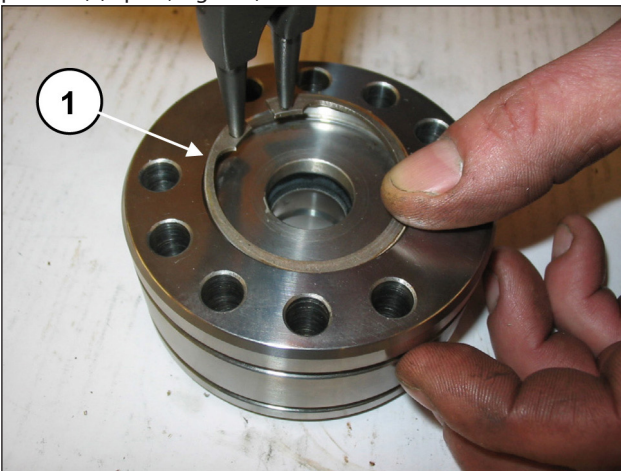


Fig. 112

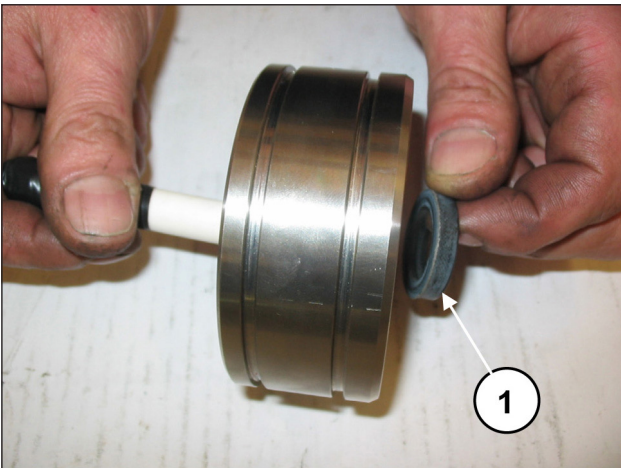


Fig. 113

 Remplacer les joints de basse pression et les joints toriques à chaque opération de démontage.

Une fois la chemise désassemblée du support des joints, utiliser une goupille en plastique (rep. ①, Fig. 114) pour chasser le lot HP (haute pression) (rep. ①, Fig. 115).



Remplacer le lot HP (rep. ①, Fig. 115) chaque fois que l'on procède au démontage.

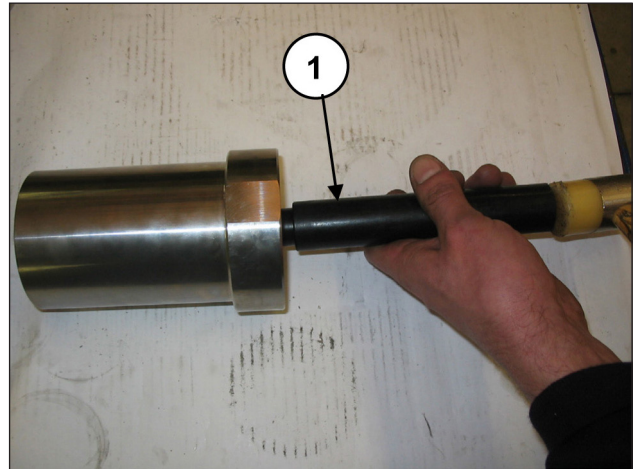


Fig. 114

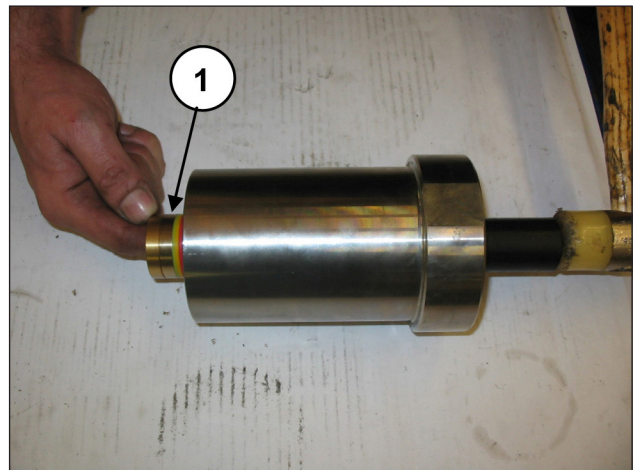


Fig. 115

### 2.2.4 Montage du groupe piston - supports - joints d'étanchéité

Pour le remontage des différents composants, inverser les opérations et faire particulièrement attention aux séquences décrites ci-après ; pour les valeurs des couples de serrage et la séquence de serrage, respecter les indications figurant au chapitre 3 ; Insérer la douille supérieure dans la chemise.



**Pour installer correctement la douille en position axiale, utiliser l'outil (réf. 27921100 pour SM14, réf. 27921200 pour SM16, réf. 27921300 pour SM18, réf. 27911200 pour SM20, réf. 27911400 pour SM22, réf. 27911500 pour SM24) (rep. ①, Fig. 117 et Fig. 118).**

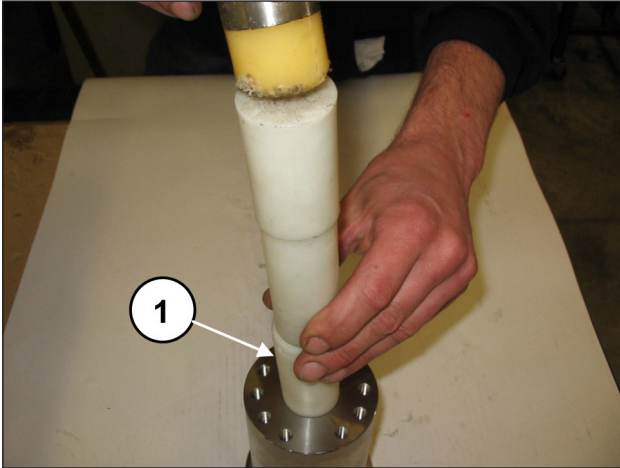


Fig. 116

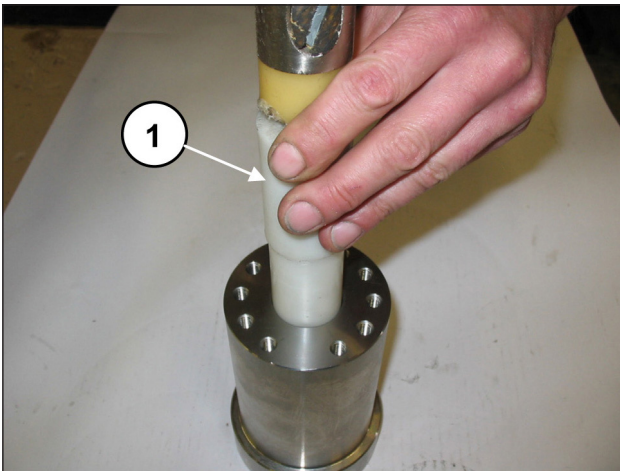


Fig. 117

Introduire le lot H.P. (haute pression) (rep. ①, Fig. 118 vu la légère interférence entre le joint et la chemise, pour éviter tout dommage, il est conseillé d'utiliser l'outil (réf. 27673200 pour SM14, SM16 et SM18, réf. 27673300 pour SM20, pour SM22 et pour SM24) (rep. ①, Fig. 119).

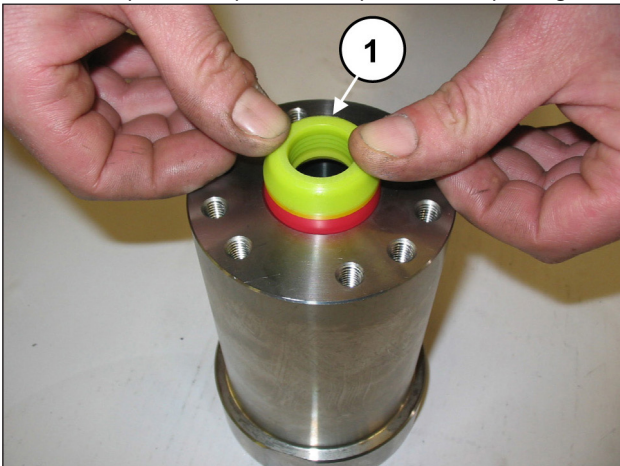


Fig. 118

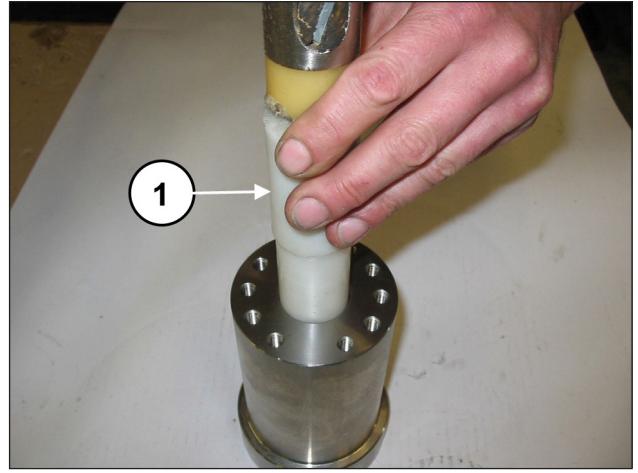


Fig. 119



**Installer le joint H.P. dans la chemise comme le montrent les Fig. 121 et Fig. 122.**



**Avant de les remonter dans leur siège, lubrifier les joints H.P. avec de la graisse à base de silicone type OKS 1110, en respectant les opérations ci-après :**

**Ne lubrifier que très légèrement le diamètre extérieur ;**

**En enduisant le diamètre intérieur, s'assurer de bien remplir les gorges comprises entre les lèvres d'étanchéité comme le montre la Fig. 122.**

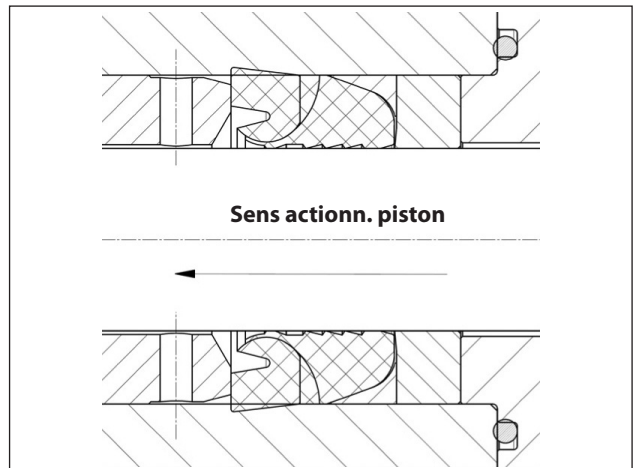


Fig. 120

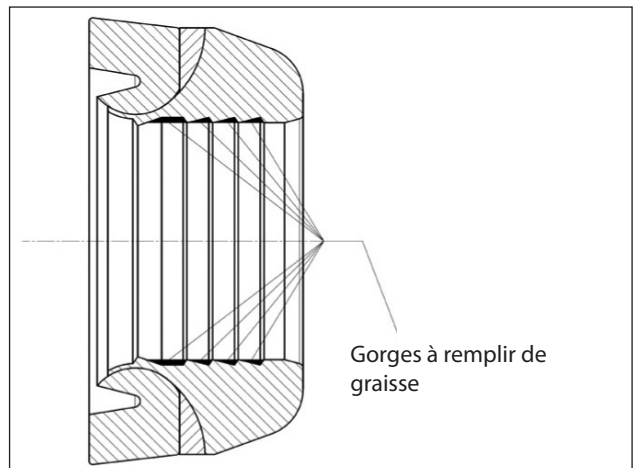


Fig. 121



Introduire la bague anti-extrusion et la douille des joints (rep. ① et ②, Fig. 122, Fig. 123 et Fig. 124).



**Introduire la douille pour joints ② dans la chemise avec les deux orifices d'évacuation tournés vers l'extérieur (côté carter) comme le montre la Fig. 123.**

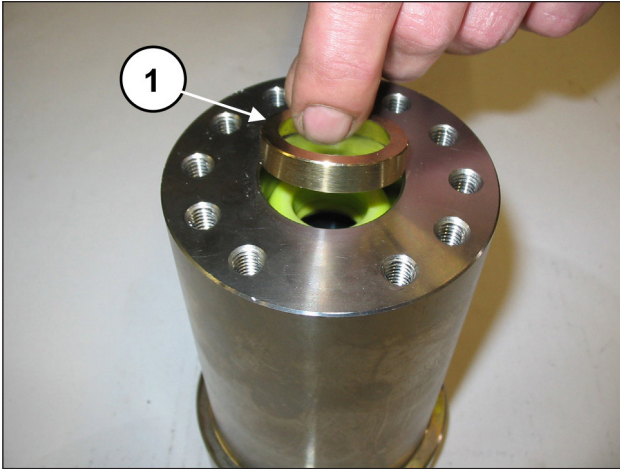


Fig. 122

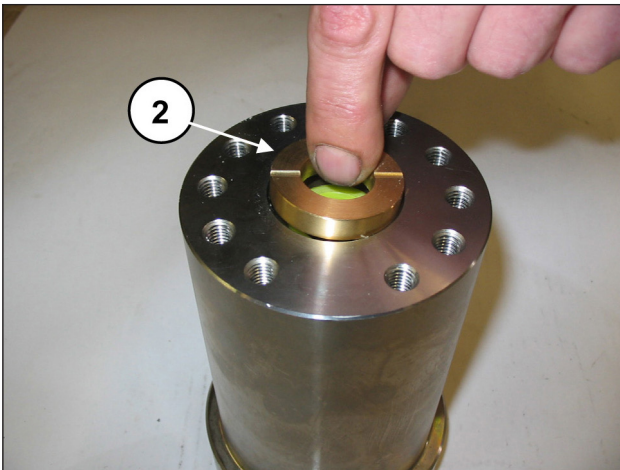


Fig. 123

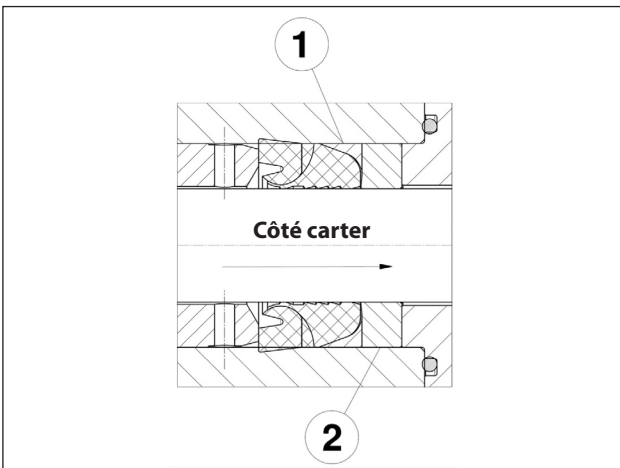


Fig. 124



**Introduire le joint L.P. dans la chemise avec la lèvres d'étanchéité dans le sens d'actionnement du piston (rep. ①, Fig. 125 et Fig. 126) et lubrifier légèrement le diamètre extérieur avec de la graisse à base de silicone type OKS 1110. Remplacer le joint L.P. s'il s'avère usé.**

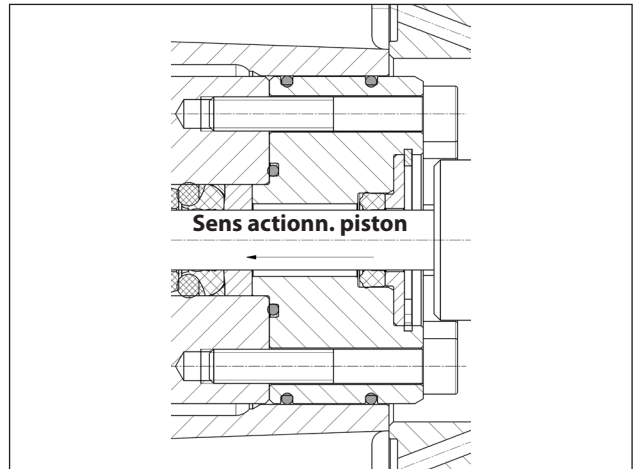


Fig. 125

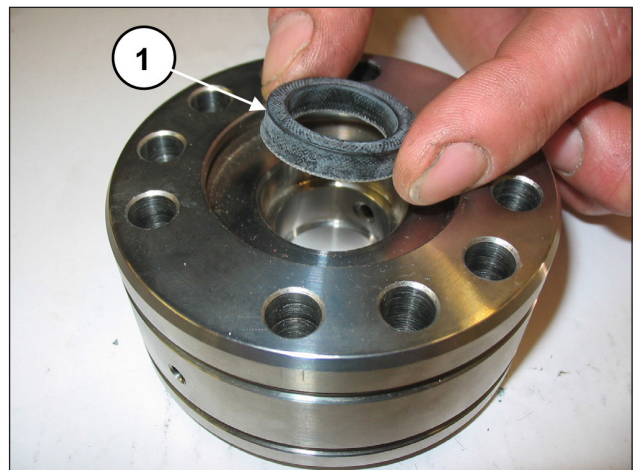


Fig. 126

Remonter le groupe de support des joints (Fig. 127 et Fig. 128) en remplaçant les composants ① et ②.

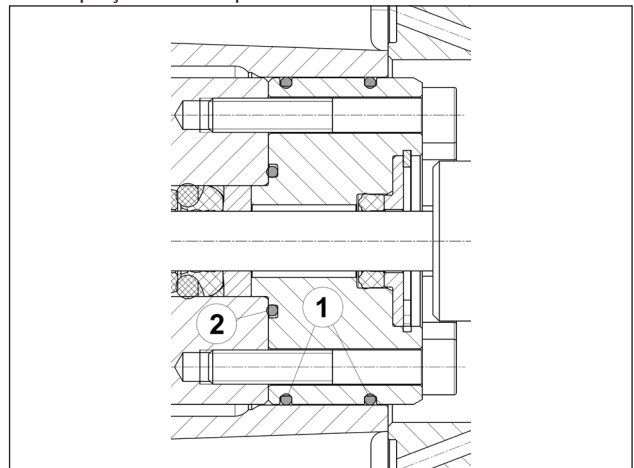


Fig. 127

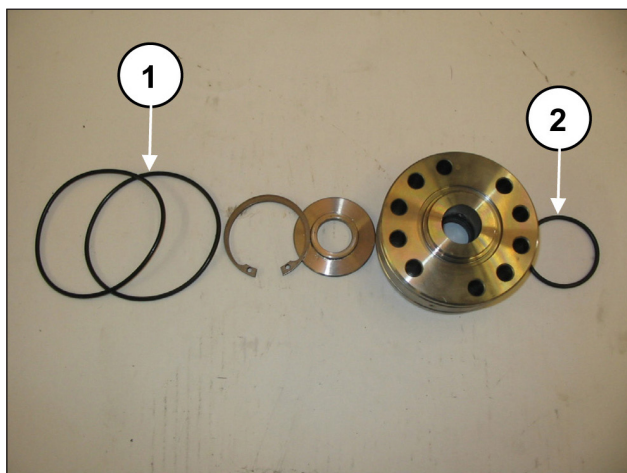


Fig. 128

Assembler le groupe support - chemise en vissant manuellement les vis M8x50 comme le montre la Fig. 129 puis serrer les vis avec une clé dynamométrique en suivant les explications figurant au chapitre 3.

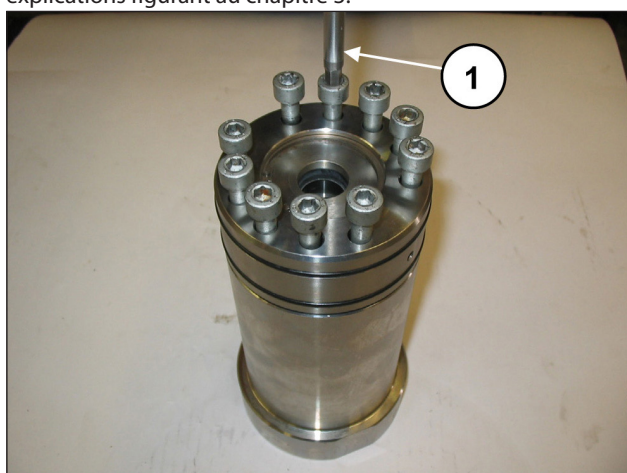


Fig. 129

### 3 FORCES DE SERRAGE DES VIS

Pour serrer les vis, utiliser exclusivement une clé dynamométrique.

Description	Repère vue éclatée	Couple de serrage Nm
Vis M10x30 couvercle carter	79	45
Bouchon G1/2x13 carter	81	40
Vis M16x30 étrier de levage	41	200
Vis M10x40 couvercle réducteur	71	45
Vis M10x25 arrêt couronne	66	45
Vis M10x40 boîtier réducteur	71	45
Vis M6x14 couvercles sup. et inf.	50	10
Vis M10x30 couvercle coussinet	79	45
Vis M10x1,5x80 serrage bielle	43	65*
Vis M6x20 guide piston	37	10
Piston complet	15	40
Raccord étrangl. D.3 3/8M-3/8F	29	45
Vis M8x50 supports	22	40**
Vis M16x280 tête	1	280***
Vis M10x140 chemises	26	83****

\* Obtenir le couple de serrage en serrant les vis simultanément.



**Les vis - rep. 1-22-26 doivent être serrées avec la clé dynamométrique en lubrifiant la tige filetée avec de la graisse au bisulfure de molybdène réf. 12001500.**

\*\* Les vis de fixation des supports doivent être serrées en respectant les phases et l'ordre indiqué sur le schéma Fig. 130.

\*\*\* Les vis de fixation de la tête doivent être serrées en respectant les phases et l'ordre indiqué sur le schéma Fig. 131.

\*\*\*\* Les vis de fixation des chemises doivent être serrées en respectant les phases et l'ordre indiqué sur le schéma Fig. 131.

#### Serrage des vis du support des joints rep. 22

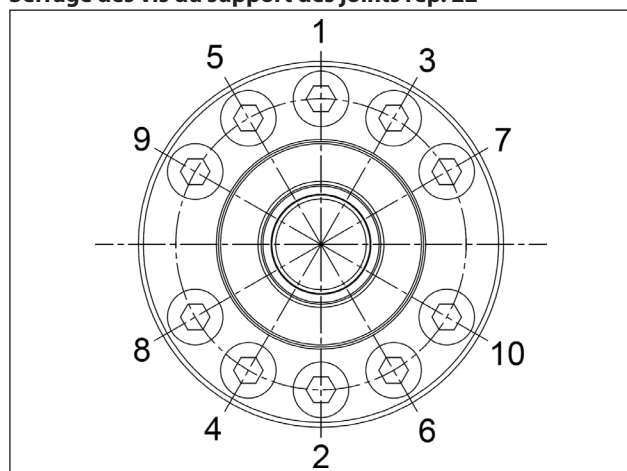


Fig. 130

Serrage des vis M8x50 selon la séquence indiquée (1-2-3-4-5-6-7-8-9-10) effectuée en une seule phase au couple indiqué

#### Serrage des vis de la tête et des chemises rep. 1 et rep. 26

**OPÉRATION 1 :** Serrage des vis M16x320 (rep. 1) en deux phases, en respectant la séquence indiquée sur la figure : (A-B-C-D-E-F-G-H)  
**Phase 1 = 200 Nm**  
**Phase 2 = 280 Nm**

**OPÉRATION 2 :** Serrage des vis M10x140 (rep. 26) en quatre phases, en respectant la séquence indiquée sur la figure : (1-2-3-4-5-6-7-8)  
**Phase 1 = 40 Nm**  
**Phase 2 = 65 Nm**  
**Phase 3 = 83 Nm**  
**Phase 4 = 83 Nm**

Fig. 131

## 4 OUTILS POUR LA RÉPARATION

Pour l'entretien de la pompe, il est possible d'utiliser des outils traditionnels pour le démontage et le remontage des composants. Les outils suivants sont disponibles :

### Pour le montage :

Arbre (blocage des bielles)	réf. 27566200
Coussinet sur vilebrequin	réf. 27604700
Coussinet pignon sur boîtier de réducteur	réf. 27604900
Coussinet vilebrequin sur boîtier de réducteur	réf. 27605000
Coussinet vilebrequin sur couvercle coussinet	réf. 27605000
Joint d'huile guide piston	réf. 27605300
Coussinet sur pignon	réf. 27604800
Joint d'huile pignon	réf. 27605200
Douille pour piston	réf. 27921100 (SM14)
	réf. 27921200 (SM16)
	réf. 27931300 (SM18)
	réf. 27911200 (SM20)
	réf. 27911400 (SM22)
	réf. 27911500 (SM24)
Lot de joints HP	réf. 27673200 (SM14 - SM16 - SM18)
	réf. 27673300 (SM20 - SM22 - SM24)
Tête / Entretoise chemises	réf. 27540200

### Pour le démontage :

Joint d'huile guide piston	réf. 27918500
Arbre (blocage des bielles)	réf. 27566200
Siège de soupape	réf. 034300020
Tête / Entretoise chemises	réf. 27540200

## 5 REMPLACEMENT DE LA DOUILLE PIED DE LA BIELLE

Procéder au calage du coussinet à froid et aux usinages suivants en respectant les dimensions et les tolérances de la Fig. 132 ci-dessous.

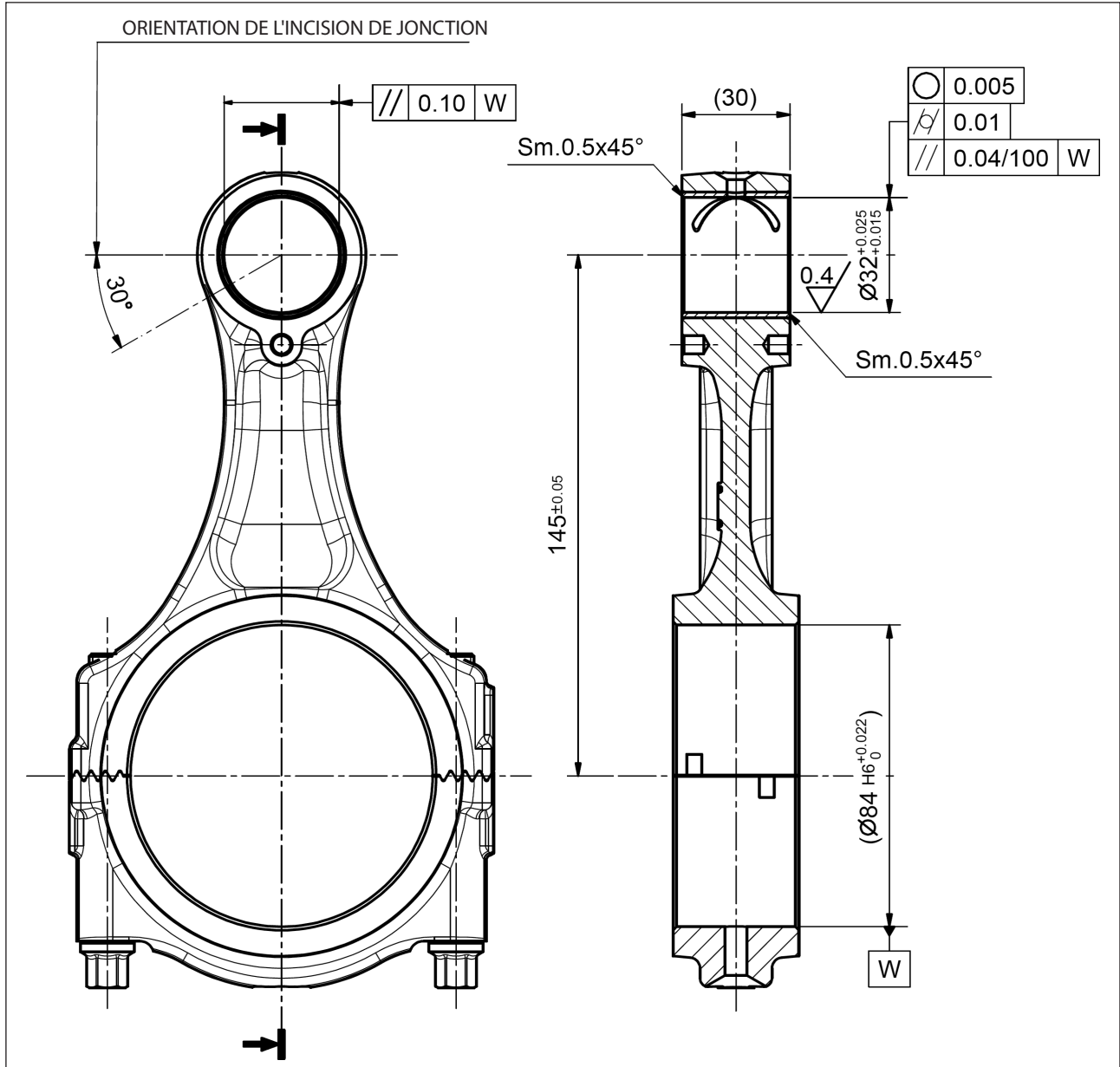


Fig. 132

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## 1 EINLEITUNG

Diese Anleitung enthält die Anweisungen für die Reparatur der Pumpen der Baureihe SM und muss vor jeglichen Arbeiten an der Pumpe sorgfältig gelesen und verstanden werden. Der einwandfreie Betrieb und die lange Lebensdauer der Pumpe sind von der korrekten Verwendung und angemessenen Wartung abhängig. Interpump Group haftet nicht für Schäden durch Nachlässigkeit oder Nichtbeachtung der in dieser Anleitung beschriebenen Vorschriften.

### 1.1 BESCHREIBUNG DER SYMBOLE

Lesen Sie vor jeder Arbeit stets aufmerksam die Anweisungen in dieser Anleitung.



**Warnzeichen**



Lesen Sie vor jeder Arbeit stets aufmerksam die Anweisungen in dieser Anleitung.



**Gefahrenzeichen**  
Schutzbrille tragen.



**Gefahrenzeichen**  
Vor jeder Arbeit Schutzhandschuhe anziehen.

## 2 REPARATURVORSCHRIFTEN



### 2.1 REPARATUR DER MECHANIK

Vor den Reparaturarbeiten an der Mechanik muss zunächst das Öl aus dem Kurbelgehäuse abgelassen werden. Zum Ablassen des Öls den Öleinfüllverschluss Pos. ①, Abb. 1 und anschließend den Ölablassverschluss abnehmen, Pos. ②, Abb. 1.

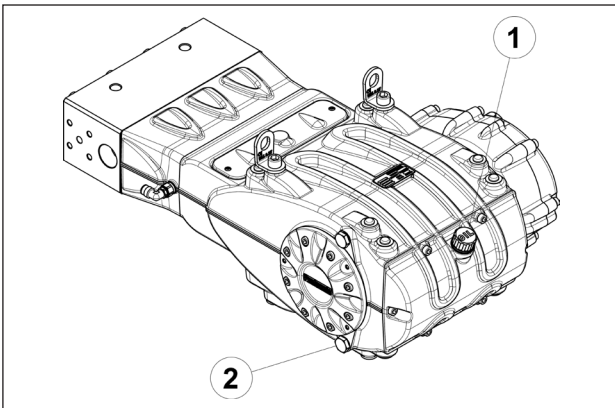


Abb. 1



**Altöl muss in einem geeigneten Behälter gesammelt und den entsprechenden Wertstoffstellen zugeführt werden. Es darf auf keinen Fall in die Umwelt abgeleitet werden.**

### 2.1.1 Ausbau der Mechanik

Die vorgeschriebene Arbeitsabfolge lautet. Lassen Sie die Ölfüllung der Pumpe vollständig ab und demontieren Sie dann den Gehäusedeckel (samt O-Ring) durch Abdrehen der 6 Schrauben IM10 (Pos. ①, Abb. 2).

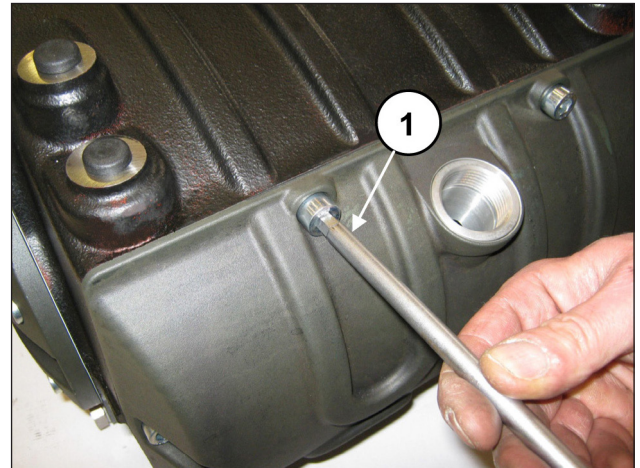


Abb. 2

Nehmen Sie die Passfeder von der Zapfwelle ab (Pos. ①, Abb. 3).

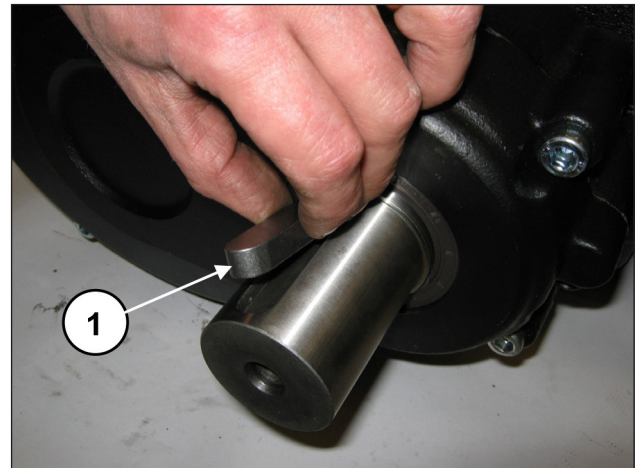


Abb. 3

Lösen Sie die Befestigungsschrauben des Getriebedeckels (Pos. ①, Abb. 4).

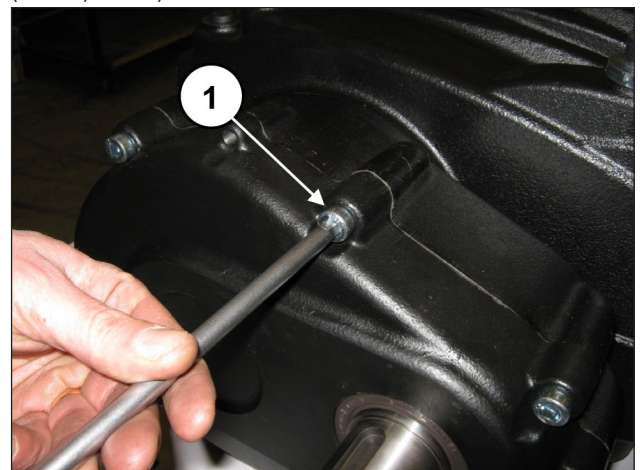


Abb. 4

Drehen Sie 3 Stiftschrauben oder Gewindeschrauben M8 (Pos. ①, Abb. 5) als Abzieher in die entsprechenden Bohrungen ein und zwei ausreichend lange Schrauben M10 für die Halterung des Deckels ein (Pos. ②, Abb. 5).

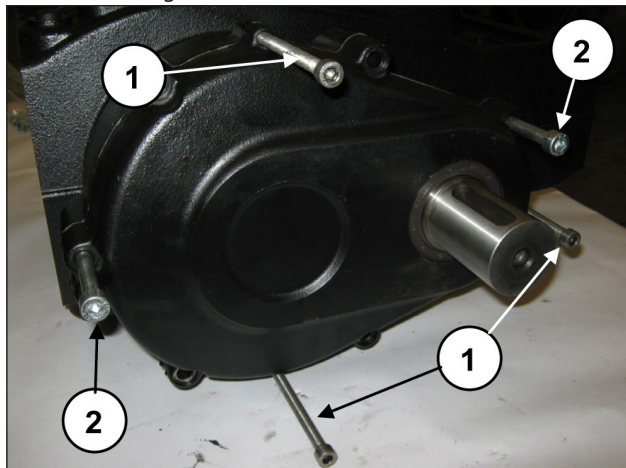


Abb. 5

Drehen Sie schrittweise die 3 Schrauben M8 (Pos. ①, Abb. 6) als Abzieher soweit ein, bis die Gruppe Deckel-Ritzel komplett abgezogen werden kann

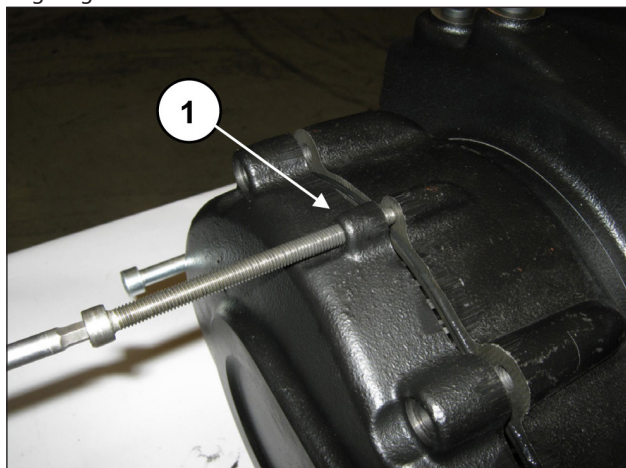


Abb. 6

Zur Demontage des Getriebedeckels vom Ritzel gehen Sie folgendermaßen vor:

Entfernen Sie den Seegerring Ø120 (Pos. ①, Abb. 7).

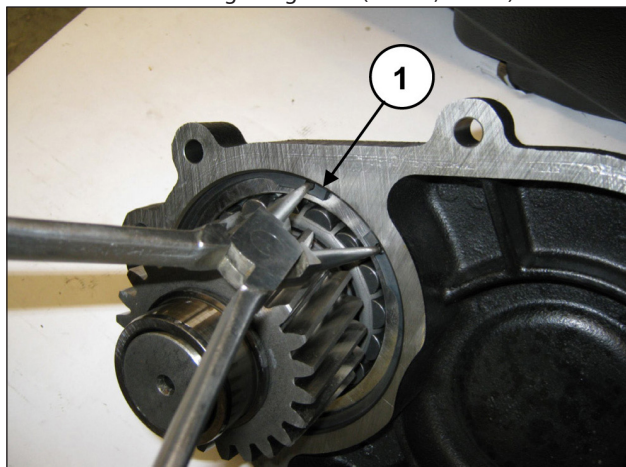


Abb. 7

Trennen Sie das Ritzel vom Deckel mit einem am Ritzel angesetzten Schlagwerk (Pos. ①, Abb. 8).

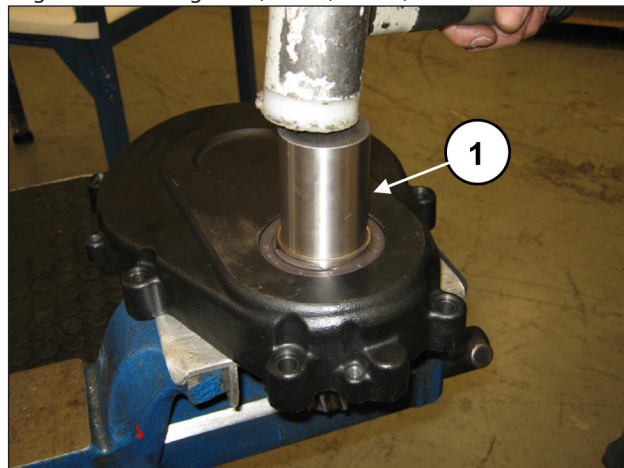


Abb. 8

Entfernen Sie den Seegerring Ø55 (Pos. ①, Abb. 9) und den Stützring des Lagers (Pos. ①, Abb. 10) vom Ritzel

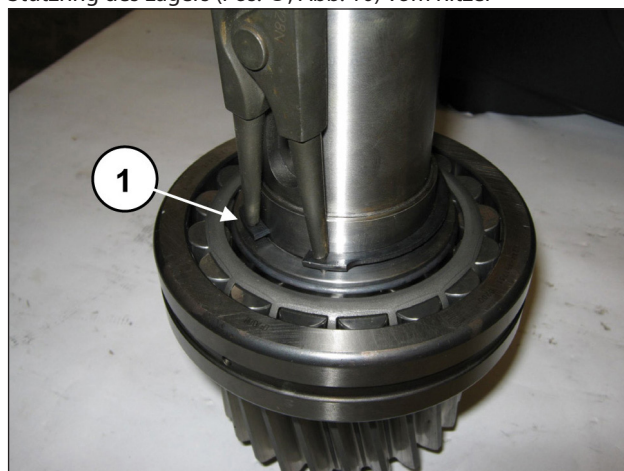


Abb. 9

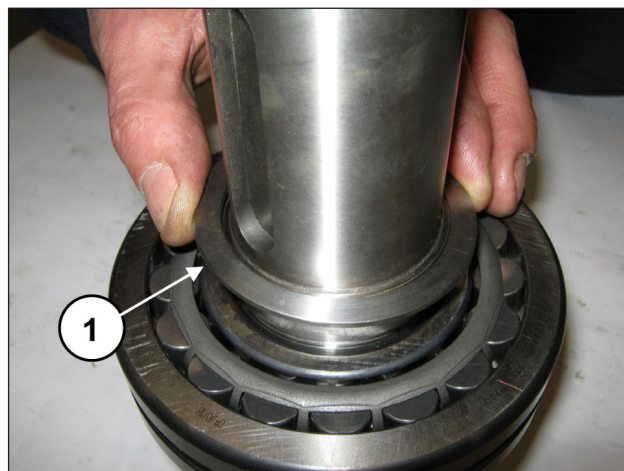


Abb. 10



Ziehen Sie den Ölabstreifring von der Innenseite des Deckels aus dem Getriebedeckel heraus (Pos. ①, Abb. 11).

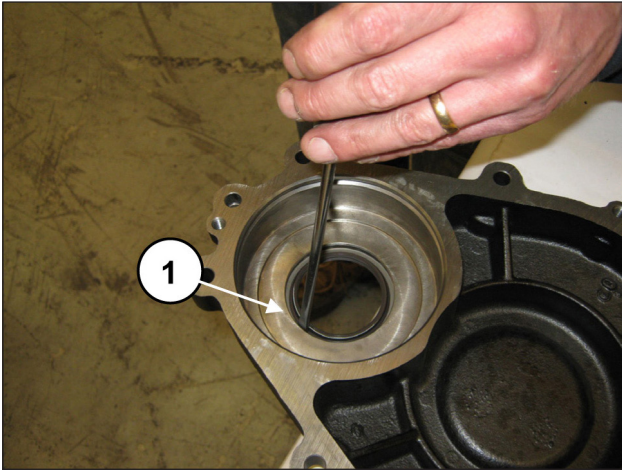


Abb. 11

Lösen Sie die Befestigungsschrauben des Zahnkranzhalters (Pos. ①, Abb. 12) und entfernen Sie den Halter (Pos. ①, Abb. 13).

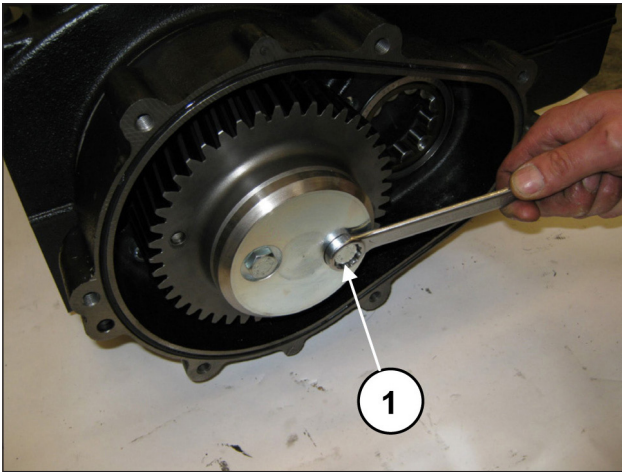


Abb. 12

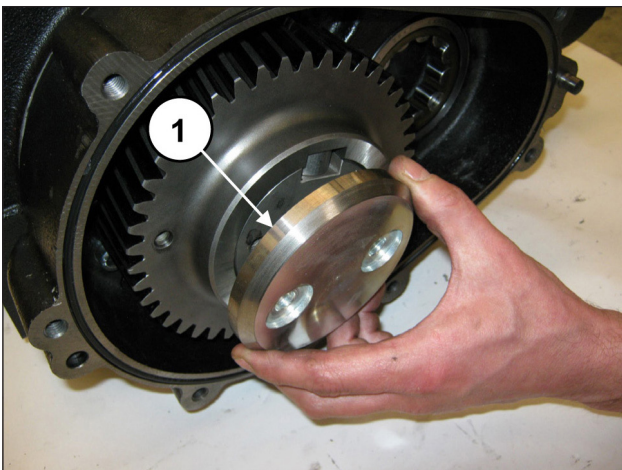


Abb. 13

Entfernen Sie den Zahnkranz (Pos. ①, Abb. 14). Bei Bedarf können Sie einen Abzieher mit Schlagwerk an den 2 Bohrungen M8 ansetzen (Pos. ②, Abb. 14).

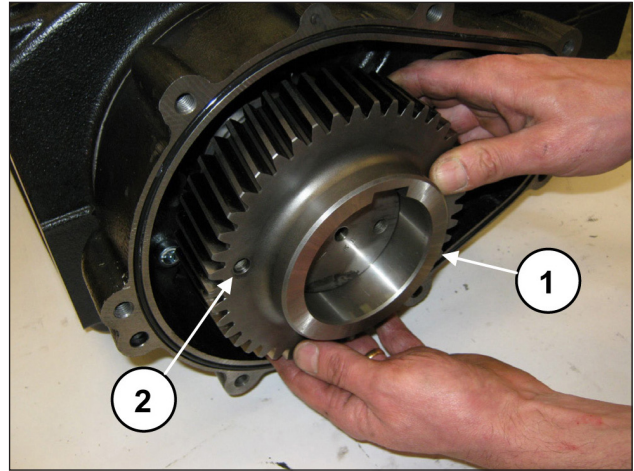


Abb. 14

Nehmen Sie die Passfeder von der Welle ab (Pos. ①, Abb. 15).

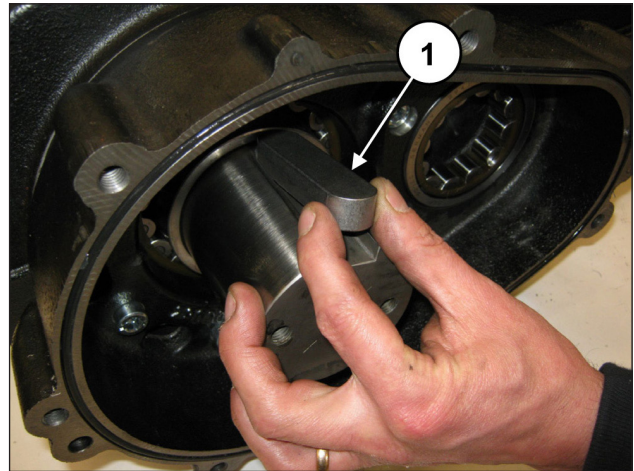


Abb. 15

Entfernen Sie den Stützring des Zahnkranzes (Pos. ①, Abb. 16).

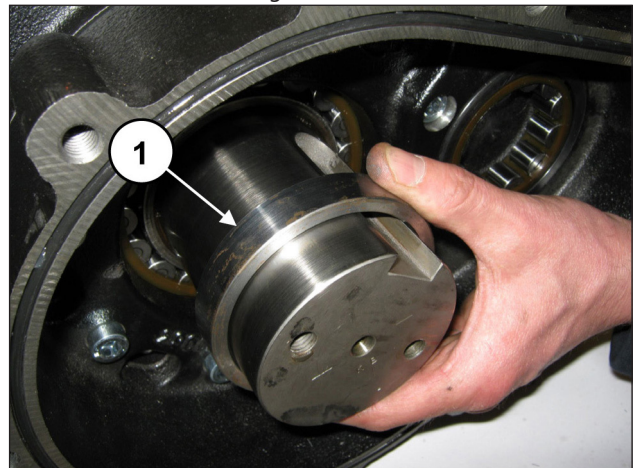


Abb. 16

Lösen Sie die Schrauben der Pleuelstange (Pos. ①, Abb. 17).

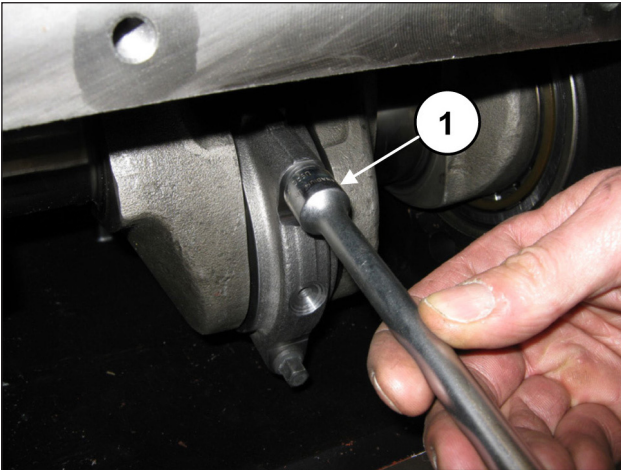


Abb. 17

Demontieren Sie die Pleueldeckel samt unteren Lagerschalen und achten Sie dabei genau auf die Ausbaureihenfolge.



**Pleueldeckel und Pleuelhälften müssen in der gleichen Paarungs- und Ausbaureihenfolge wieder eingebaut werden.**

Um Fehler zu vermeiden, sind Pleueldeckel und Pleuelhälften auf einer Seite nummeriert (Pos. ①, Abb. 18).

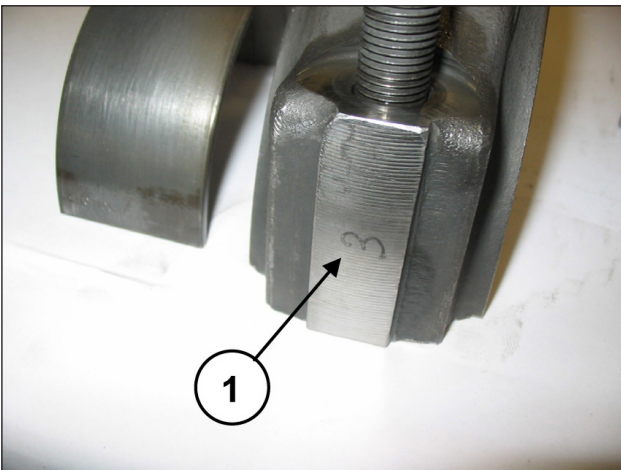


Abb. 18

Schieben Sie die Pleuelhälften in Richtung Hydraulik ganz vor, damit die Kurbelwelle heraustritt. Verwenden Sie als Arbeitshilfe das entsprechende Werkzeug (Art. 27566200), (Pos. ①, Abb. 19).

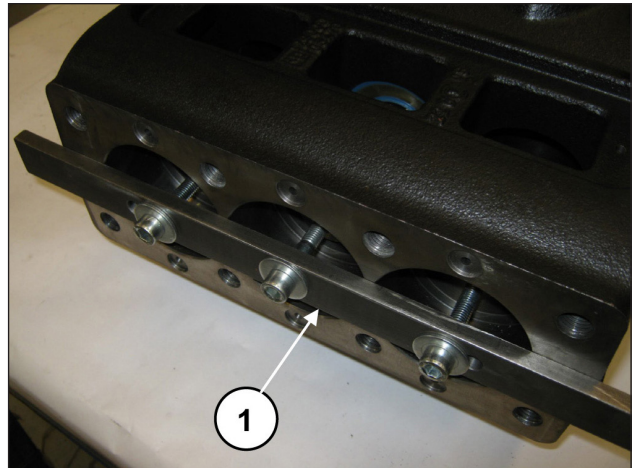


Abb. 19

Ziehen Sie die drei Lagerschalen der Pleuelhälften ab (Pos. ①, Abb. 20).

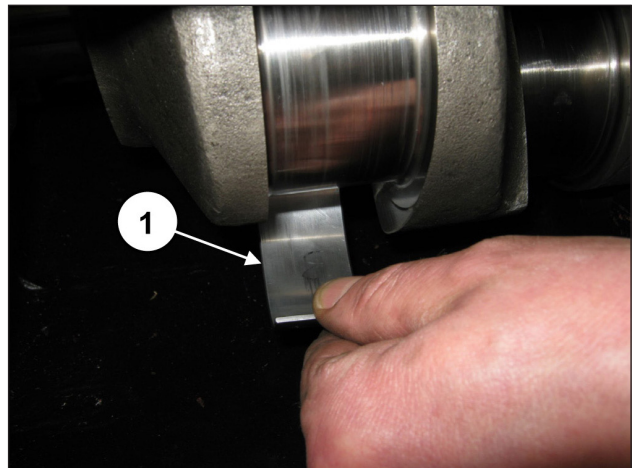


Abb. 20

Lösen Sie die Befestigungsschrauben des Getriebegehäuses (Pos. ①, Abb. 21 und Abb. 22).

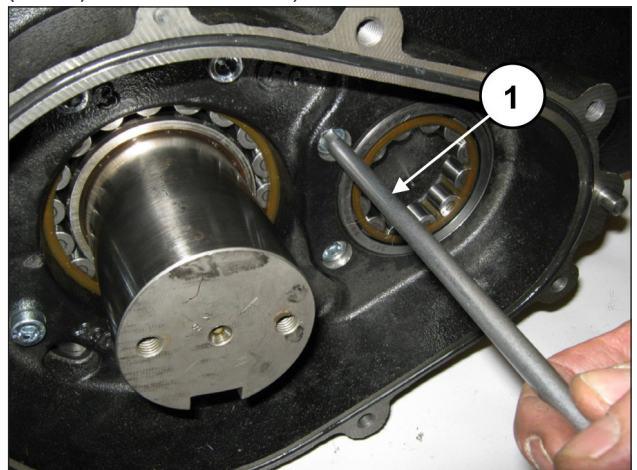


Abb. 21

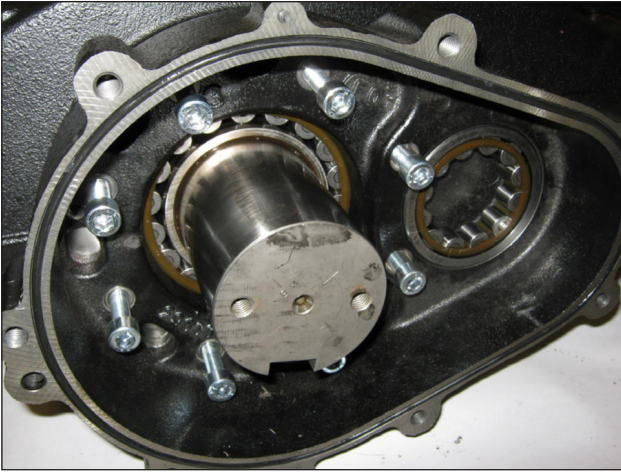


Abb. 22

Drehen Sie 3 Stiftschrauben oder Gewindeschrauben M8 (Pos. ①, Abb. 23) als Abzieher in die entsprechenden Bohrungen ein und zwei ausreichend lange Schrauben M10 für die Halterung des Getriebegehäuses ein (Pos. ②, Abb. 23).

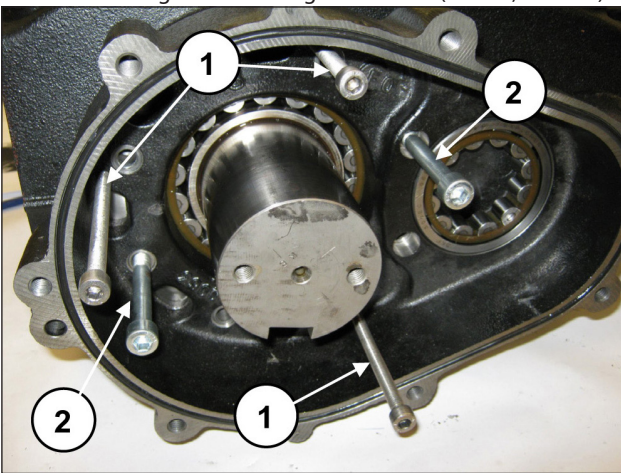


Abb. 23

Drehen Sie schrittweise die 3 Schrauben M8 fest (Pos. ①, Abb. 24) um ein übermäßiges Anwinkeln und das Festsitzen des Gehäuses zu vermeiden. Entfernen Sie das Gehäuse und stützen Sie dabei die Welle ab (Pos. ①, Abb. 25).

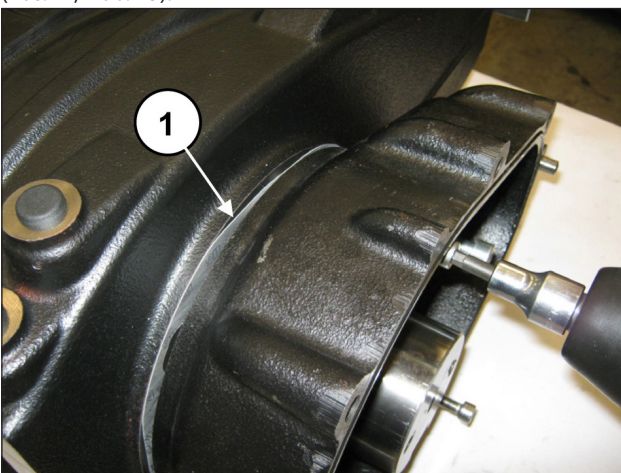


Abb. 24

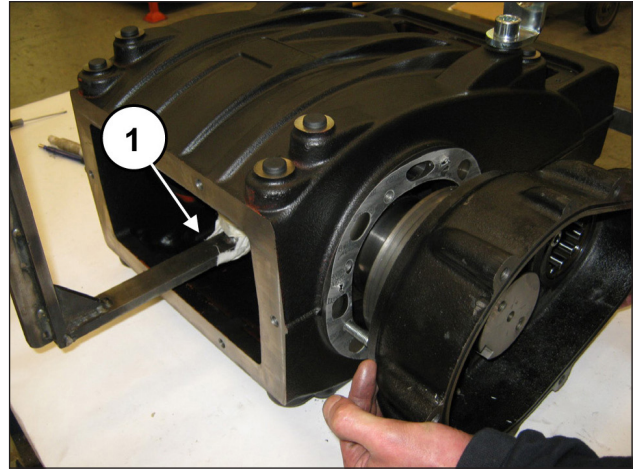


Abb. 25

Lösen Sie auf der gegenüberliegenden Seite die Befestigungsschrauben des Lagerdeckels (Pos. ①, Abb. 26 und Abb. 27).

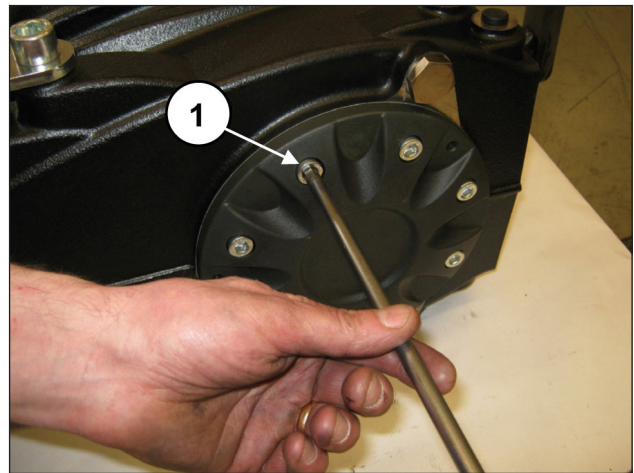


Abb. 26

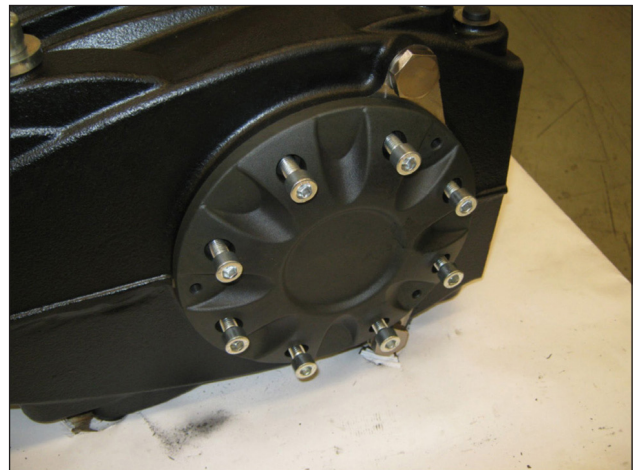


Abb. 27

Drehen Sie 3 Stiftschrauben oder Gewindeschrauben M8 (Pos. ①, Abb. 28) als Abzieher in die entsprechenden Bohrungen ein

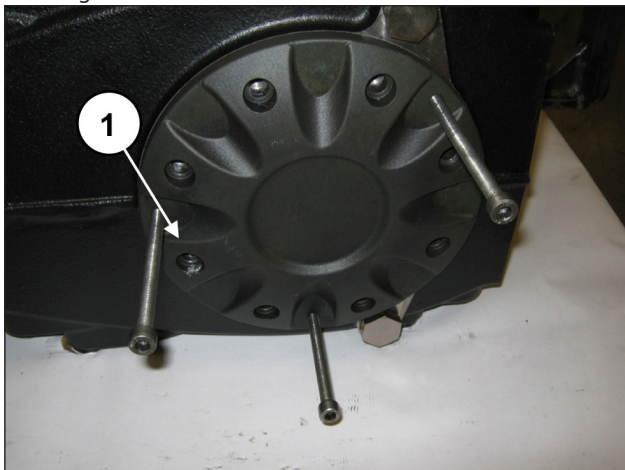


Abb. 28

Drehen Sie schrittweise die 3 Schrauben M8 fest (Pos. ①, Abb. 29) um ein übermäßiges Anwinkeln und das Festsitzen des Deckels zu vermeiden.

Entfernen Sie den Lagerdeckel und stützen Sie dabei die Welle ab (Pos. ①, Abb. 30).

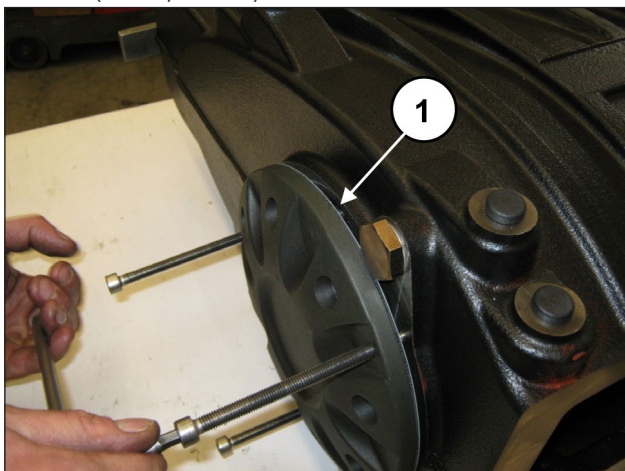


Abb. 29

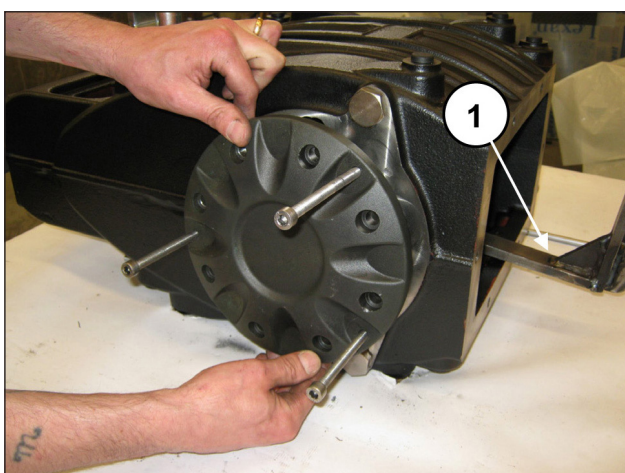


Abb. 30

Ziehen Sie von Zapfwellenseite die Kurbelwelle aus dem Gehäuse (Pos. ①, Abb. 31).

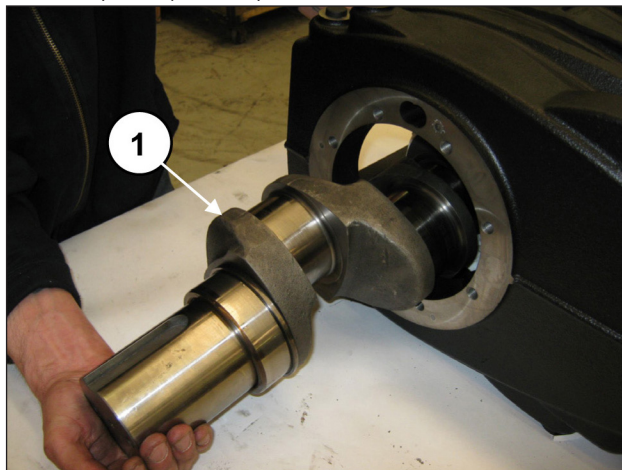


Abb. 31

Gehen Sie für den etwaigen Austausch einer oder mehrerer Pleuelstangen oder Kolbenführungen folgendermaßen vor: Drehen Sie die Schrauben des Werkzeugs Art. 27566200 zum Lösen der Pleuelstangen ab (Pos. ①, Abb. 32) und ziehen Sie anschließend die Baugruppe Pleuelstange-Kolbenführung von der hinteren Gehäuseöffnung heraus (Pos. ①, Abb. 33).

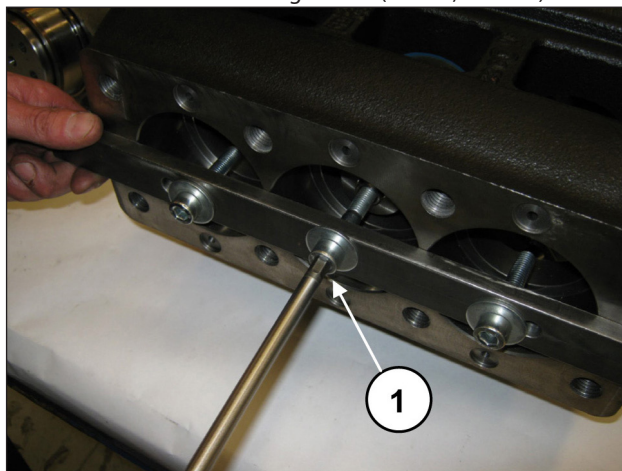


Abb. 32

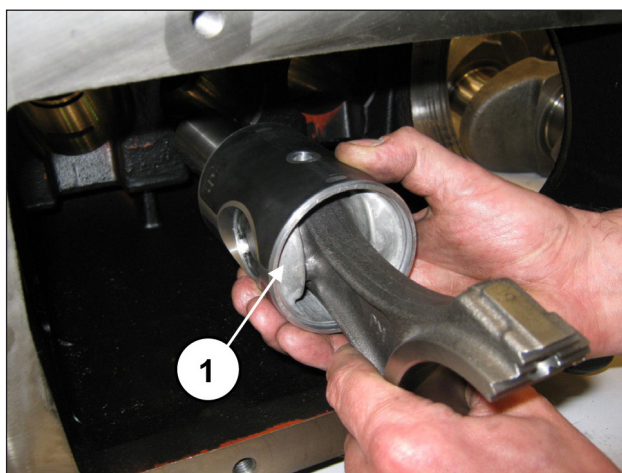


Abb. 33

Sie können nun die Ölabbreifer der Kolbenführung ausbauen. Achten Sie darauf, die Laufbuche der Kolbenführung nicht zu beschädigen.



**Sollte der Austausch der Ölabbreifer der Kolbenführung ohne Ausbau der Mechanik erforderlich sein, können Sie die Ölabbreifer mithilfe des Werkzeugs Art. 27918500 folgendermaßen herausziehen:**

Setzen Sie das Werkzeug zwischen Schaft und Lippe des Ölabbstreifings ein (Pos. ①, Abb. 34) und treiben Sie mit dem Schlagwerk den konischen Teil in den Ölabbstreifring (Pos. ①, Abb. 35).

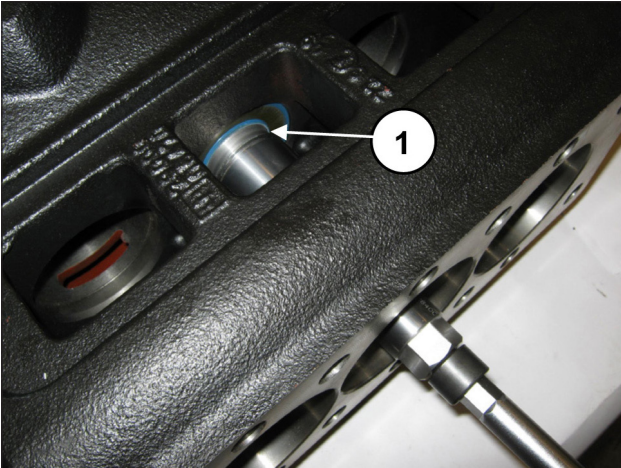


Abb. 34

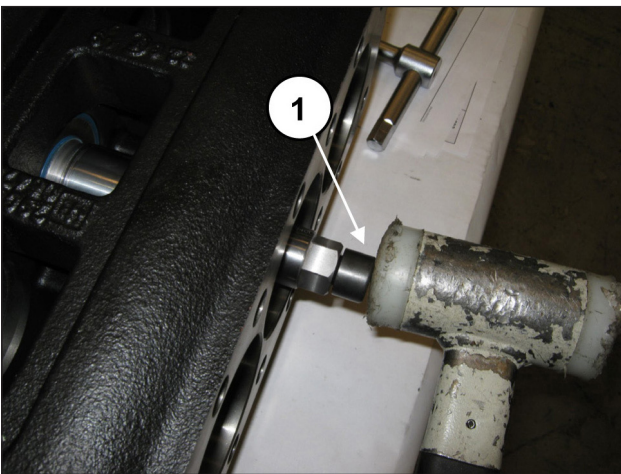


Abb. 35

Ziehen Sie den Ölabbstreifring mit dem Schlagwerk des Werkzeugs ab (Pos. ①, Abb. 36).

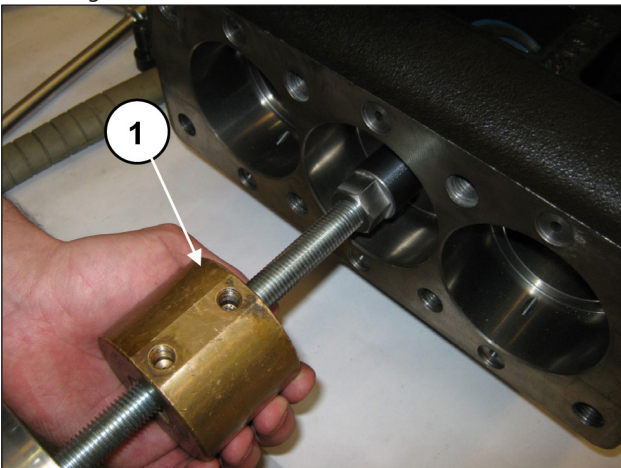


Abb. 36

Entfernen Sie die zwei Seegerringe zur Sicherung des Bolzens (Pos. ①, Abb. 37).

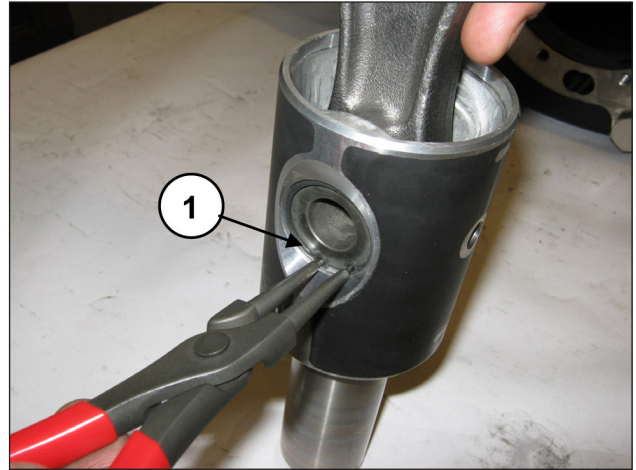


Abb. 37

Streifen Sie den Bolzen ab (Pos. ①, Abb. 38) und ziehen Sie die Pleuelstange heraus (Pos. ①, Abb. 39).

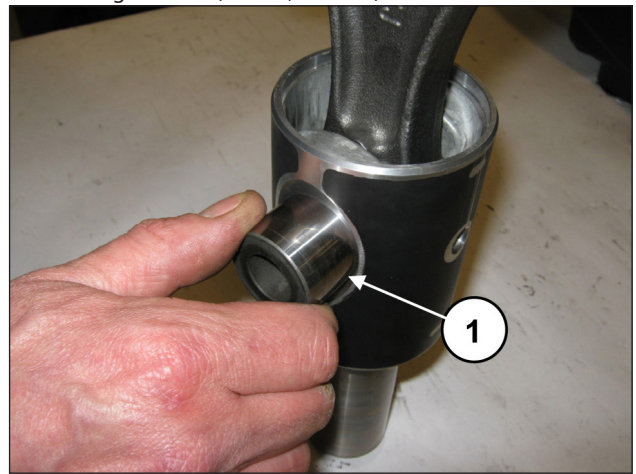


Abb. 38

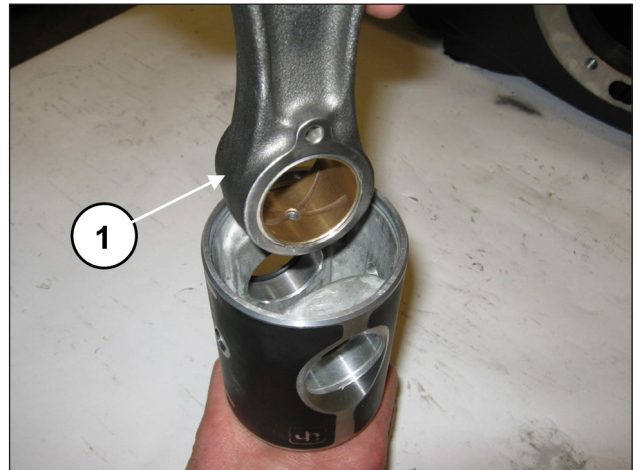


Abb. 39

Paaren Sie die Pleuelhälften mit dem vorab ausgebauten Pleueldeckeln unter Berücksichtigung der Nummerierung (Pos. ①, Abb. 40).

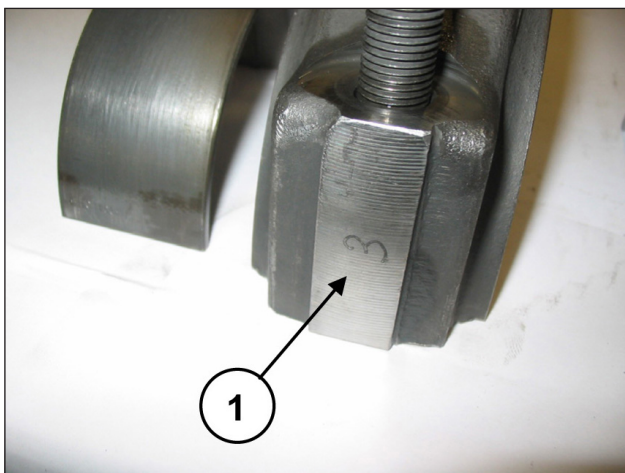


Abb. 40

Drehen Sie zum Trennen der Stange von der Kolbenführung die Zylinderkopfschrauben M6 mit dem entsprechenden Schlüssel ab (Pos. ①, Abb. 41).

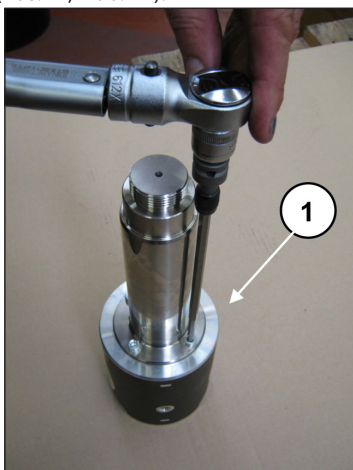


Abb. 41

### 2.1.2 Einbau der Mechanik

Verfahren Sie für den Einbau in umgekehrter Reihenfolge zu den Angaben in Abschn. 2.1.1.

Die vorgeschriebene Arbeitsabfolge lautet:

Montieren Sie die Stange an die Kolbenführung.

Setzen Sie die Kolbenführungsstange in die entsprechende Aufnahme an der Kolbenführung ein (Pos. ①, Abb. 42) und befestigen Sie die Stange mit den 4 Zylinderkopfschrauben M6x20 (Pos. ①, Abb. 43).



Abb. 42



Abb. 43

Spannen Sie die Kolbenführung mithilfe des speziellen Werkzeugs in einen Schraubstock und eichen Sie die Schrauben mit einem Drehmomentschlüssel (Pos. ①, Abb. 44) gemäß Angaben in Kapitel 3.

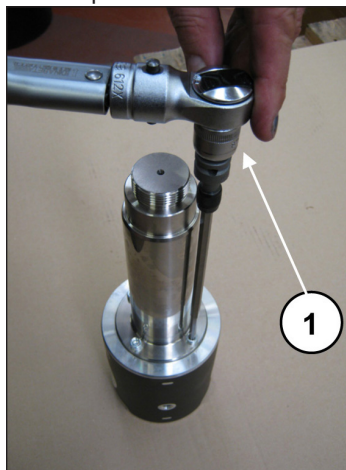


Abb. 44

Setzen Sie die Pleuelstange in die Kolbenführung ein (Pos. ①, Abb. 39) und anschließend den Bolzen (Pos. ①, Abb. 38). Montieren Sie die zwei Seegeringe zur Sicherung (Pos. ①, Abb. 37).



**Der Einbau ist korrekt, wenn Pleuelauge, Kolbenführung und Bolzen freigängig drehen.**

Trennen Sie Pleuedeckel und Pleuehälften; die vorschriftsmäßige Paarung wird durch die seitliche Nummerierung garantiert (Pos. ①, Abb. 40). Nachdem Sie das Gehäuse auf perfekte Sauberkeit überprüft haben, setzen Sie die Baugruppe Pleuehälfte-Kolbenführung in die Buchsen des Gehäuses ein (Pos. ①, Abb. 33).



**Beim Einsetzen der Baugruppe Pleuehälfte-Kolbenführung in das Gehäuse müssen die Pleuehälften mit nach oben sichtbarer Nummerierung ausgerichtet werden.**

Arretieren Sie die drei Baugruppen mit dem entsprechenden Werkzeug Art. 27566200 (Pos. ①, Abb. 32).

Montieren Sie vorläufig den Innenring der Kurbelwellenlager (bis auf Anschlag an beiden Seiten der Welle) mithilfe des geeigneten Werkzeugs Art. 27604700 (Pos. ①, Abb. 45) (Pos. ①, Abb. 46).



**Die Innen- und Außenringe der Lager müssen unter Beibehaltung der Ausbaupaarung wieder eingebaut werden.**



Abb. 45



Abb. 46

Achten Sie beim Einführen der Welle auf Zapfwellenseite darauf, nicht gegen die Schäfte der vorab eingebauten Pleuelstangen zu stoßen (Pos. ①, Abb. 47) und (Pos. ①, Abb. 48).

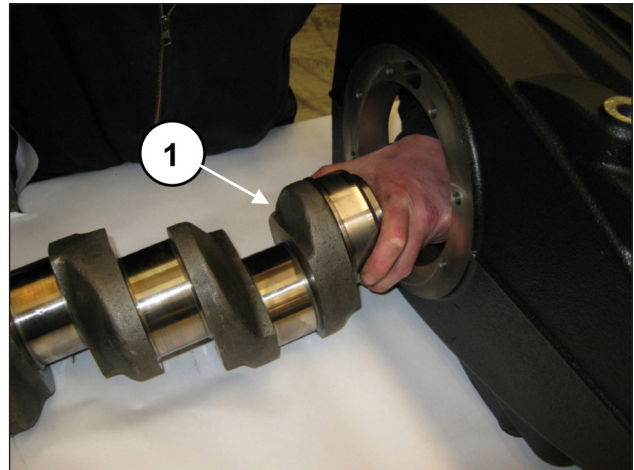


Abb. 47

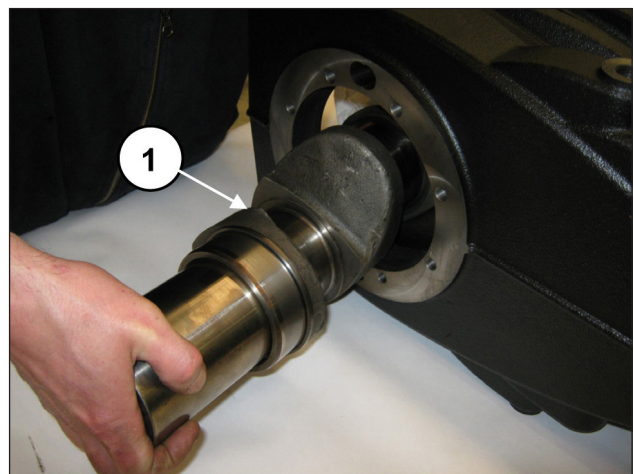


Abb. 48



**Bauen Sie die Kurbelwelle unbedingt mit der Zapfwellenseite entgegengesetzt zu den Bohrungen G1/2" für die Ölablassverschlüsse des Pumpengehäuses ein (Pos. ②, Abb. 50).**

Führen Sie die Welle vollständig in das Gehäuse ein (Pos. ①, Abb. 49 und Abb. 50).

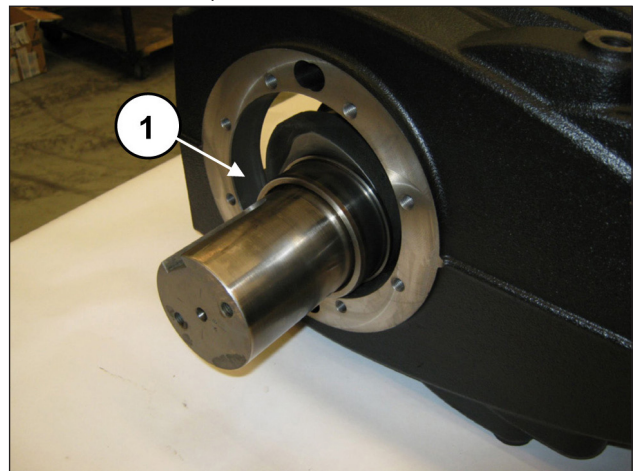


Abb. 49

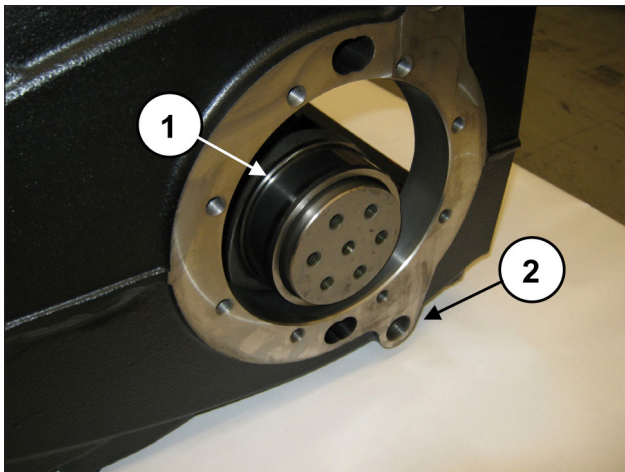


Abb. 50

Montieren Sie vorläufig am Getriebegehäuse den Außenring des Ritzlagers mithilfe des Werkzeugs Art. 27604900 (Pos. ①, Abb. 51) bis auf Anschlag (Pos. ①, Abb. 52).

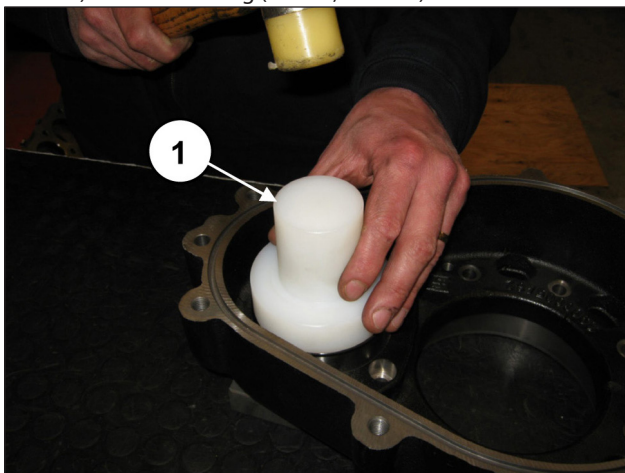


Abb. 51

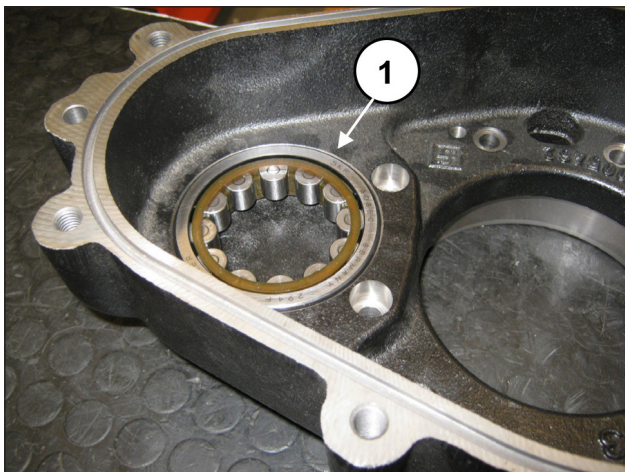


Abb. 52

Montieren Sie vorläufig auf der entgegengesetzten Seite des Getriebegehäuses den Außenring des Kurbelwellenlagers mithilfe des Werkzeugs Art. 27605000 (Pos. ①, Abb. 53) bis auf Anschlag (Pos. ①, Abb. 54).

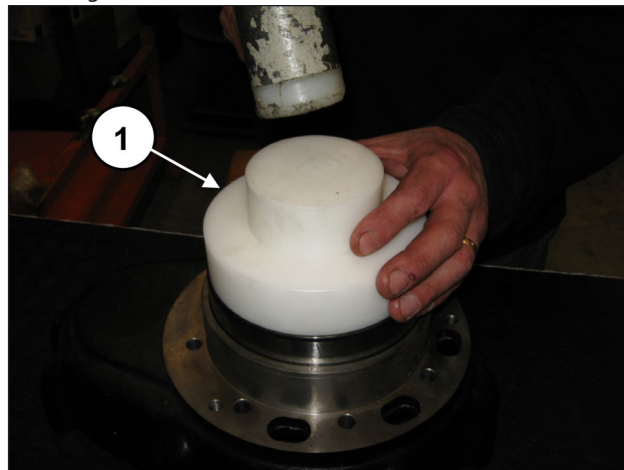


Abb. 53

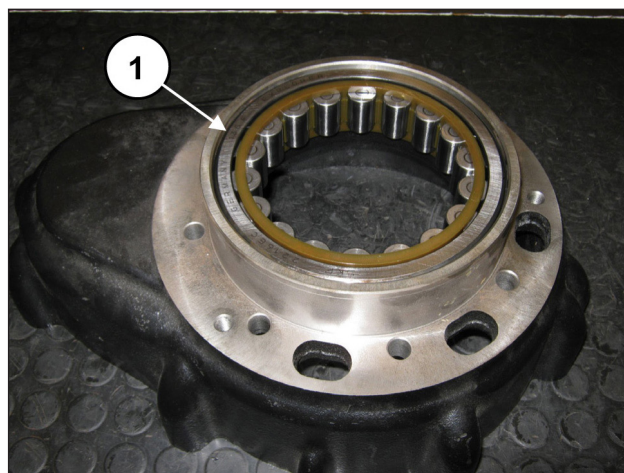


Abb. 54

Wiederholen Sie den Vorgang am Lagerdeckel, und montieren Sie vorläufig den Außenring des Kurbelwellenlagers mithilfe des Werkzeugs Art. 27605000 (Pos. ①, Abb. 55) bis auf Anschlag (Pos. ①, Abb. 56).

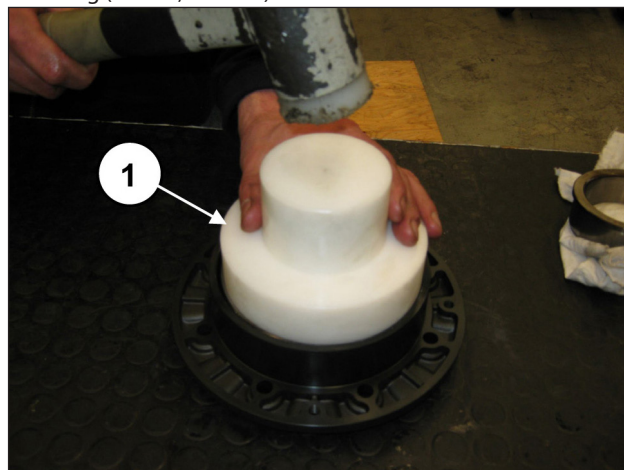


Abb. 55



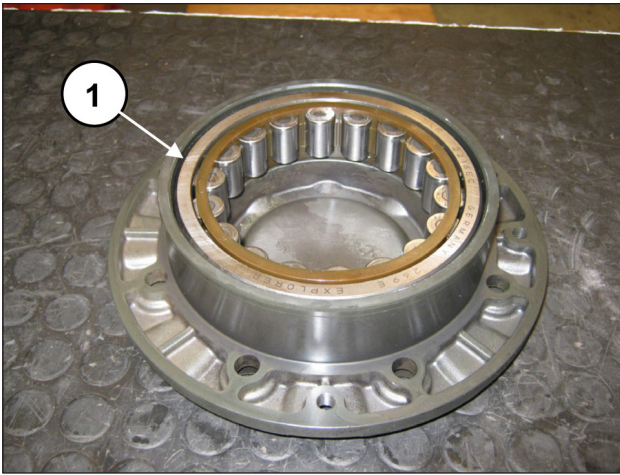


Abb. 56

Setzen Sie die seitliche Dichtung am Lagerdeckel ein (Pos. ①, Abb. 57) und heben Sie die Kurbelwelle zum leichteren Anbringen des Deckels (Pos. ①, Abb. 58).



Abb. 57

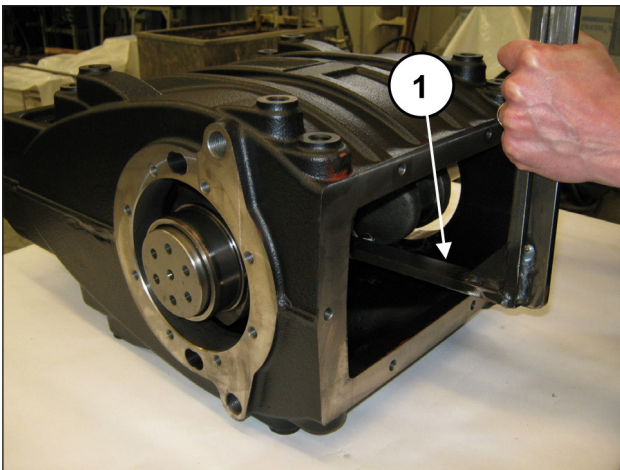


Abb. 58

Montieren Sie den Lagerdeckel (samt Dichtung) mithilfe des Schlagwerks (Pos. ①, Abb. 59)



**Richten Sie den Lagerdeckel so aus, dass das Logo "Pratissoli" horizontal liegt.**

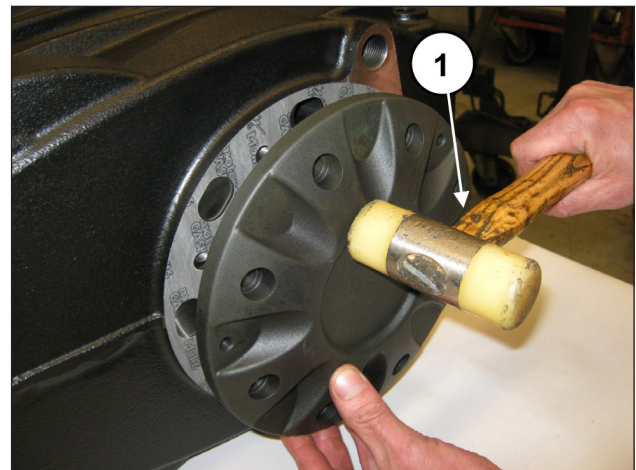


Abb. 59

Drehen Sie die 8 Schrauben M10x30 fest (Pos. ①, Abb. 60). Eichen Sie die Schrauben mit einem Drehmomentschlüssel, wie in Kapitel 3 gezeigt.

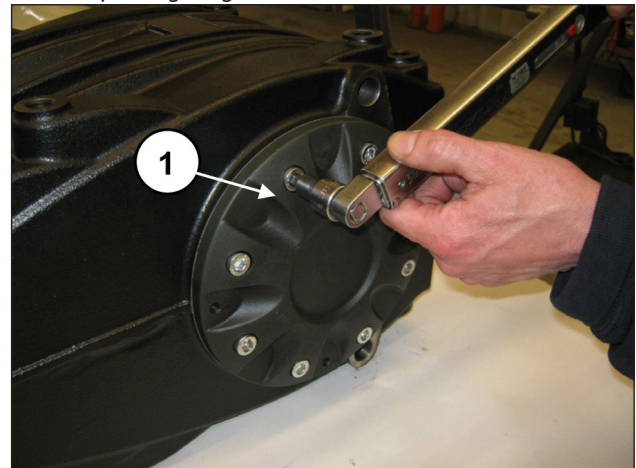


Abb. 60

Setzen Sie auf der gegenüberliegenden Seite die seitliche Dichtung am Getriebegehäuse ein (Pos. ①, Abb. 61) und heben Sie die Kurbelwelle zum leichteren Anbringen des Deckels (Pos. ①, Abb. 62).

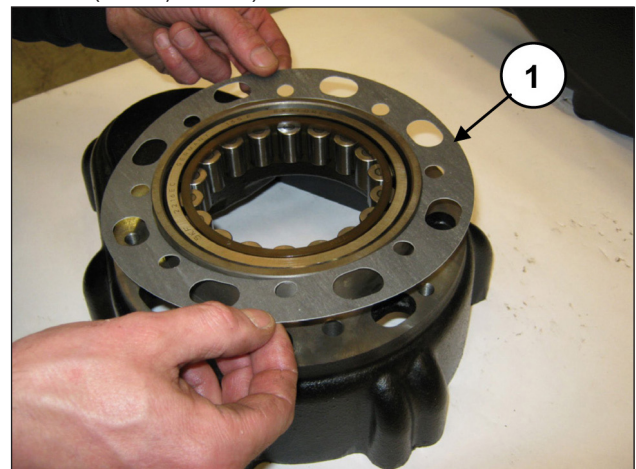


Abb. 61

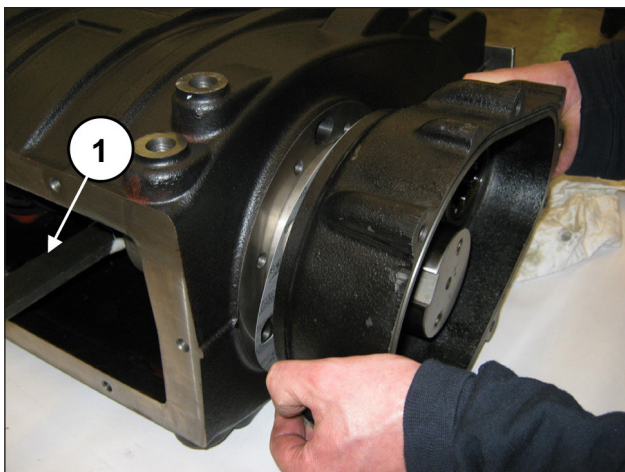


Abb. 62

Montieren Sie das Getriebegehäuse (samt Dichtung) mithilfe des Schlagwerks (Pos. ①, Abb. 63).

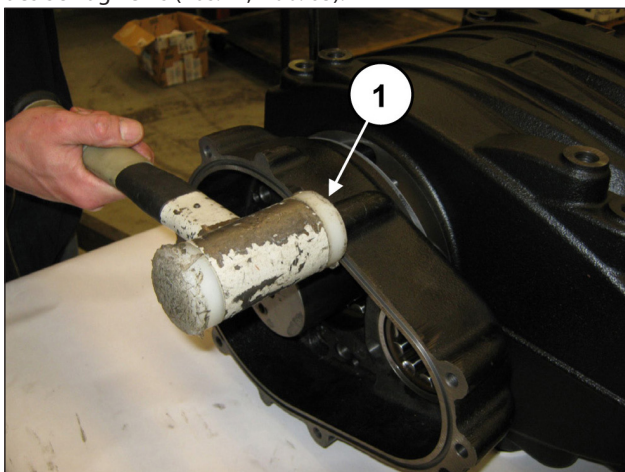


Abb. 63

Drehen Sie die 8 Schrauben M10x40 fest (Pos. ①, Abb. 64). Eichen Sie die Schrauben mit einem Drehmomentschlüssel, wie in Kapitel 3 EICHWERTE FÜR DEN SCHRAUBENANZUG gezeigt.

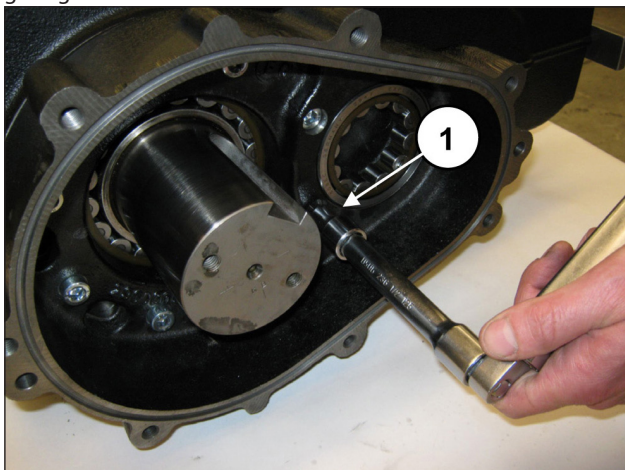


Abb. 64

Entfernen Sie das Werkzeug zur Sicherung der Pleuelstangen Art. 27566200 (Pos. ①, Abb. 32).

Setzen Sie die oberen Lagerschalen zwischen Pleuelstange und Welle ein (Pos. ①, Abb. 65).



**Stellen Sie für einen vorschriftsmäßigen Einbau der Lagerschalen sicher, dass die Bezugsmarkierung der Lagerschalen in der entsprechenden Aufnahme an der Pleuelhälfte zu liegen kommt (Pos. ①, Abb. 66).**

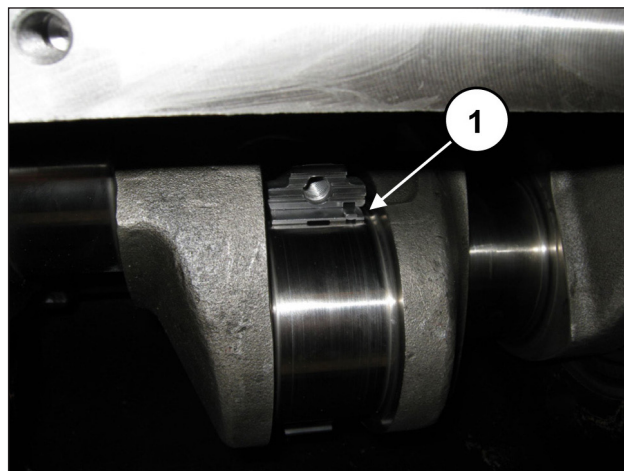


Abb. 65

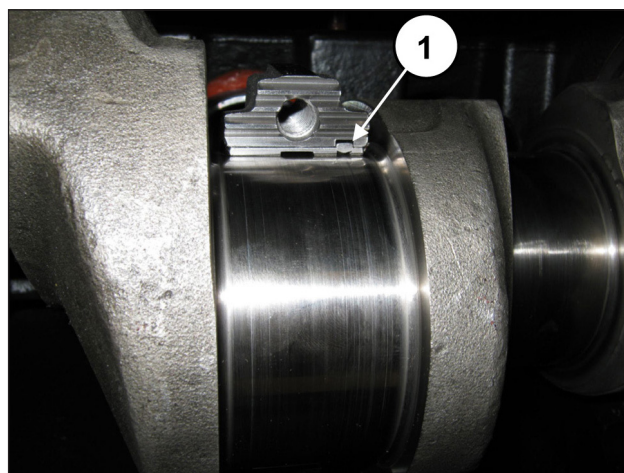


Abb. 66

Montieren Sie die unteren Lagerschalen an die Pleueldeckel (Pos. ①, Abb. 67) und vergewissern Sie sich dabei, dass die Bezugsmarkierung der Lagerschalen in der entsprechenden Aufnahme am Deckel zu liegen kommt (Pos. ②, Abb. 67). Befestigen Sie die Pleueldeckel mit Pleuelhälften anhand der Schrauben M10x1.5x80 (Pos. ①, Abb. 68).



**Achten Sie auf den richtigen Einbausinn der Lagerdeckel. Die Nummerierung muss nach oben gerichtet sein.**

Eichen Sie die Schrauben mit einem Drehmomentschlüssel, wie in Kapitel 3 EICHWERTE FÜR DEN SCHRAUBENANZUG gezeigt, und ziehen Sie gleichzeitig die Schrauben auf Anzugsmoment fest.

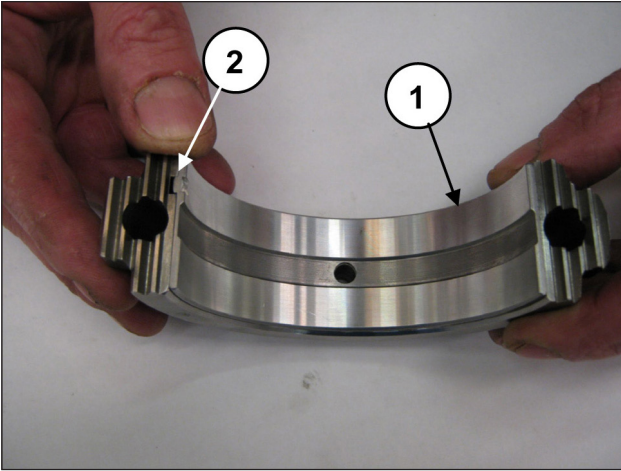


Abb. 67

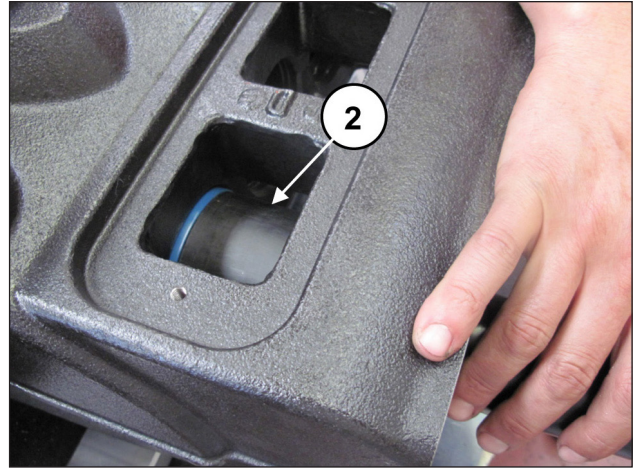


Abb. 69/b

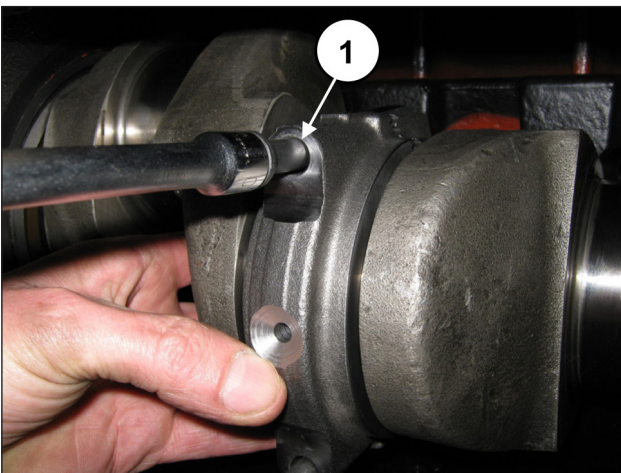


Abb. 68



**Überprüfen Sie nach abgeschlossenem Vorgang, ob die Pleuelstangen in beiden Richtungen Axialspiel aufweisen.**

Montieren Sie die Ölabbstreifringe der Pleuelstange in den Gehäusesitz mithilfe des geeigneten Werkzeugs Art.27605300. Setzen Sie das Teil auf die Stange (Pos. ①, Abb. 69/a) und treiben Sie mit dem Werkzeug den Ölabbstreifring in seinen Sitz ein (Pos. ①, Abb. 69/b)

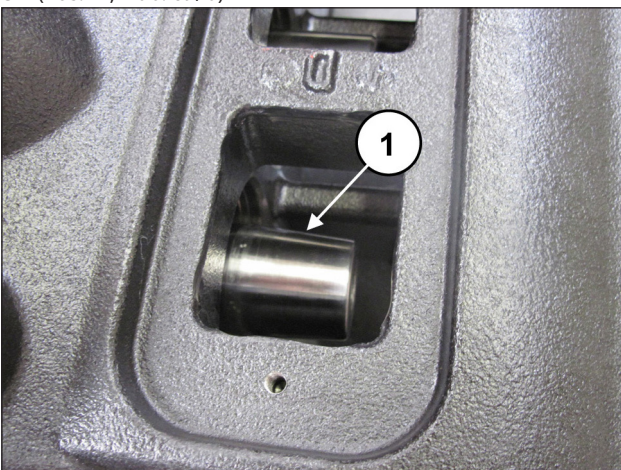


Abb. 69/a

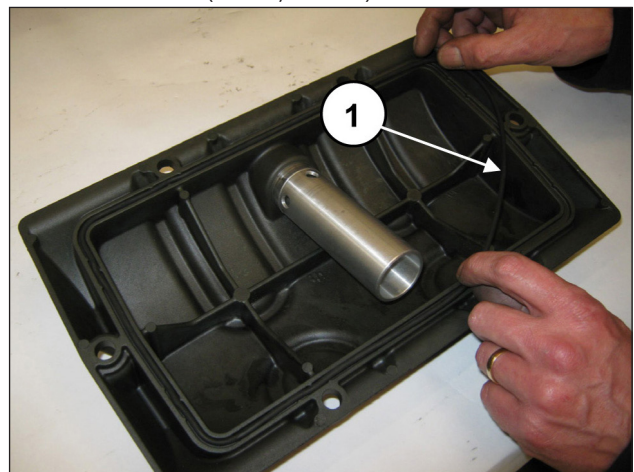


Abb. 70

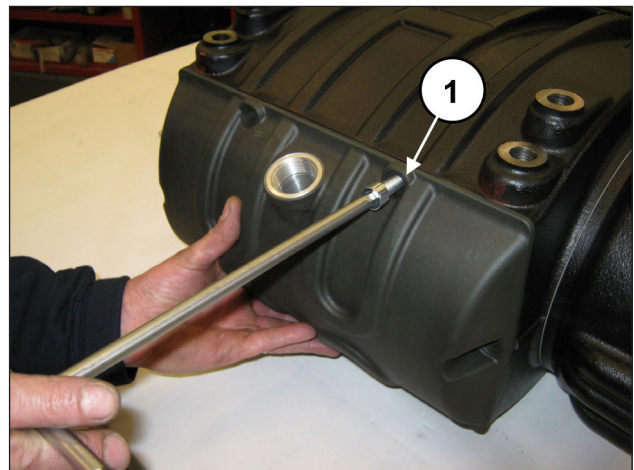


Abb. 71



**Achten Sie dabei, den O-Ring bündig in seinen Sitz am Deckel einzusetzen, damit der während des Schraubens nicht beschädigt wird.**

Eichen Sie die Schrauben mit einem Drehmomentschlüssel, wie in Kapitel 3 EICHWERTE FÜR DEN SCHRAUBENANZUG gezeigt.

Setzen Sie den Zahnkranz-Stützring in den Stummel der Kurbelwelle (Pos. ①, Abb. 72) bis auf Anschlag ein (Pos. ①, Abb. 73).

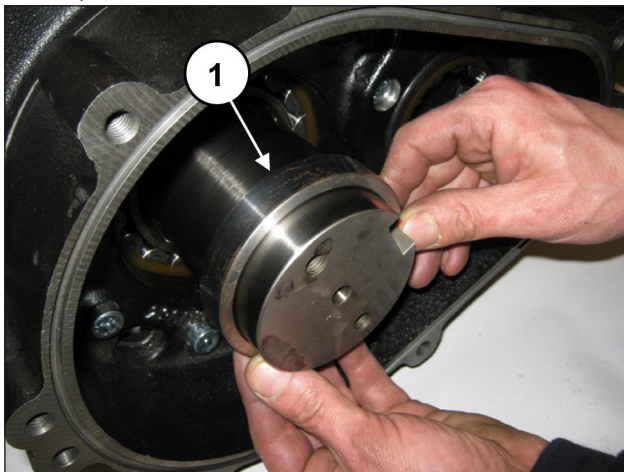


Abb. 72

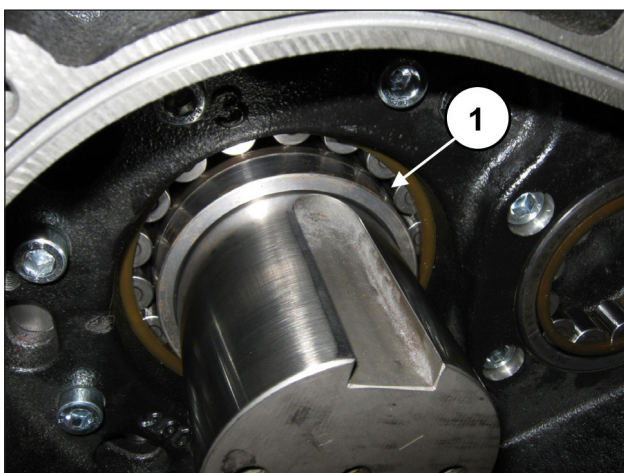


Abb. 73

Montieren Sie die Passfeder 22x14x80 in den Wellensitz (Pos. ①, Abb. 74) und schieben Sie den Zahnkranz auf die Welle (Pos. ①, Abb. 75).



**Stellen Sie beim Einbau des Zahnkranzes sicher, dass die beiden Bohrungen M8 (zum Abziehen verwendet) zur Außenseite der Pumpe gerichtet sind (Pos. ②, Abb. 75).**

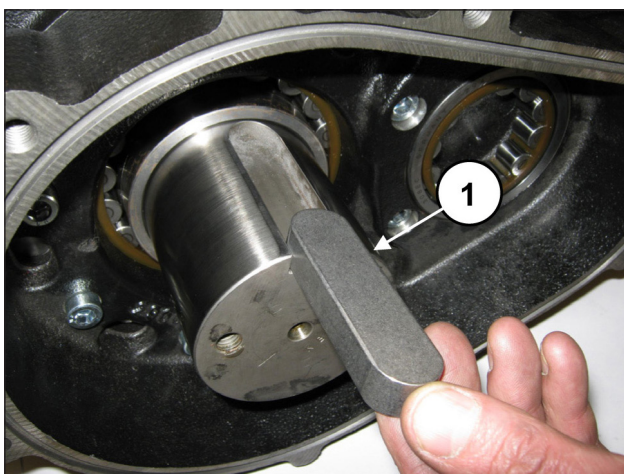


Abb. 74

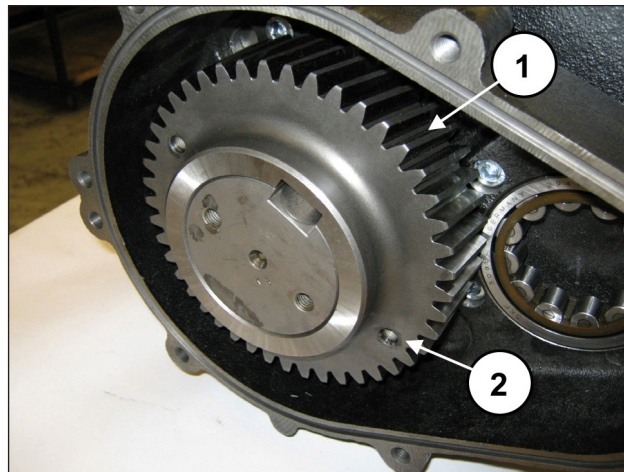


Abb. 75

Befestigen Sie die Zahnkranzarretierung (Pos. ①, Abb. 76) mit den 2 Schrauben M10x25.

Eichen Sie die Schrauben mit einem Drehmomentschlüssel gemäß Angaben in Kapitel 3 (Pos. ①, Abb. 77).

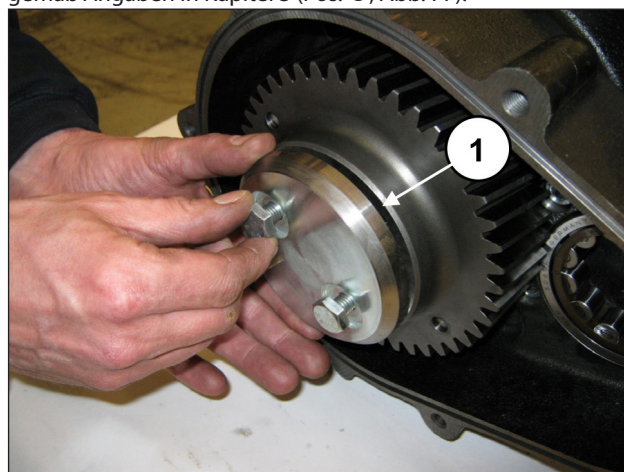


Abb. 76

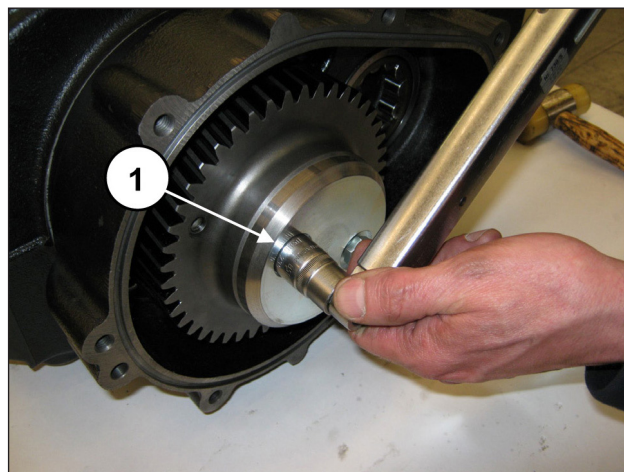


Abb. 77

Bringen Sie die 2 Stifte  $\text{\O}10 \times 24$  am Getriebegehäuse an (Pos. ①, Abb. 78) und setzen Sie den O-Ring ein (Pos. ①, Abb. 79).

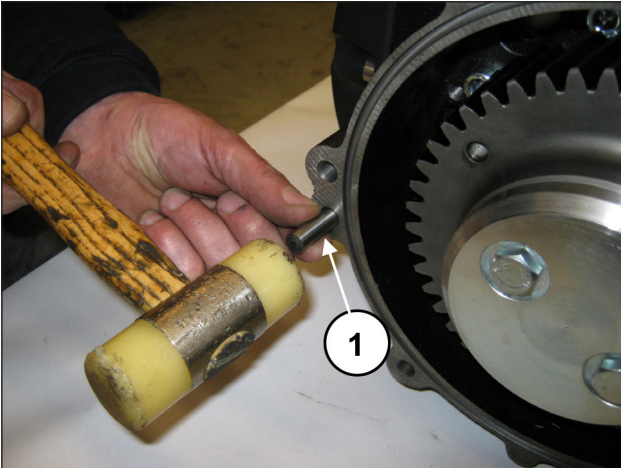


Abb. 78

Montieren Sie auf der anderen Seite vorläufig das Lager  $55 \times 120 \times 29$  (Pos. ①, Abb. 81) bis auf Anschlag. Verwenden Sie hierzu das Werkzeug Art. 27604800 (Pos. ①, Abb. 82).

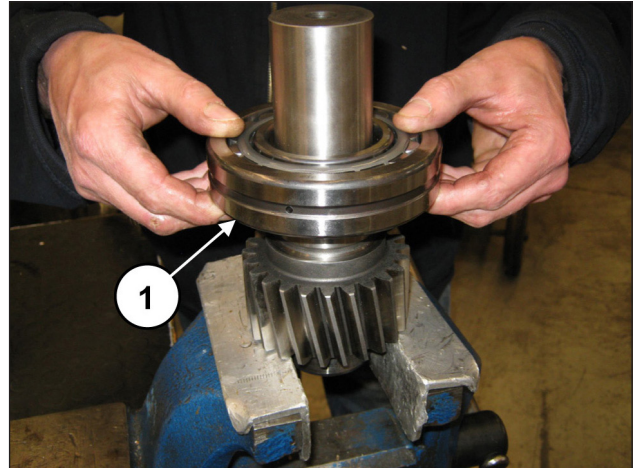


Abb. 81

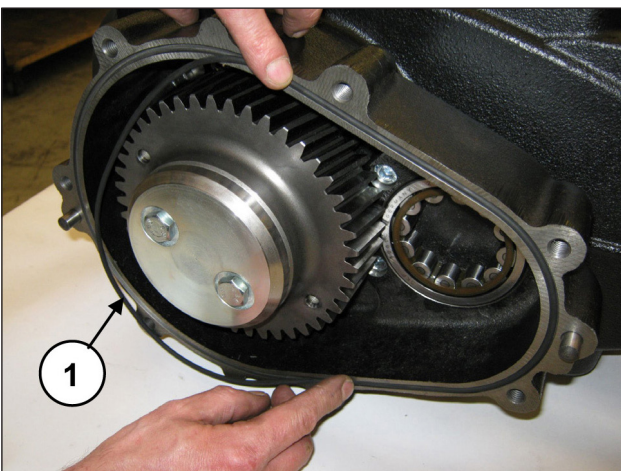


Abb. 79

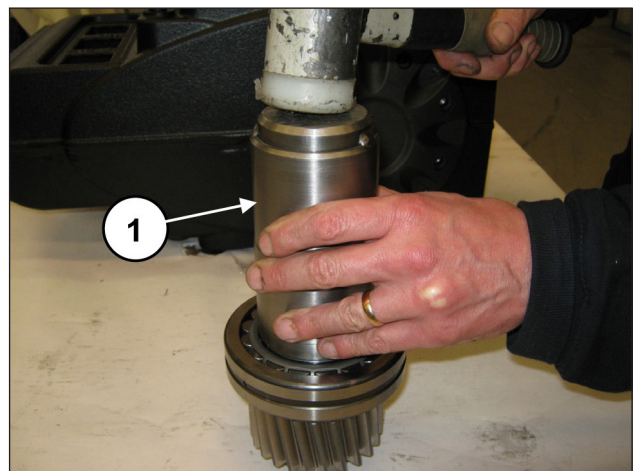


Abb. 82

Bauen Sie nun das Ritzel folgendermaßen auf den Gehäusedeckel ein:

Montieren Sie vorläufig auf das Ritzel den Innenring des Lagers  $40 \times 90 \times 23$  (Pos. ①, Abb. 80) bis auf Anschlag.

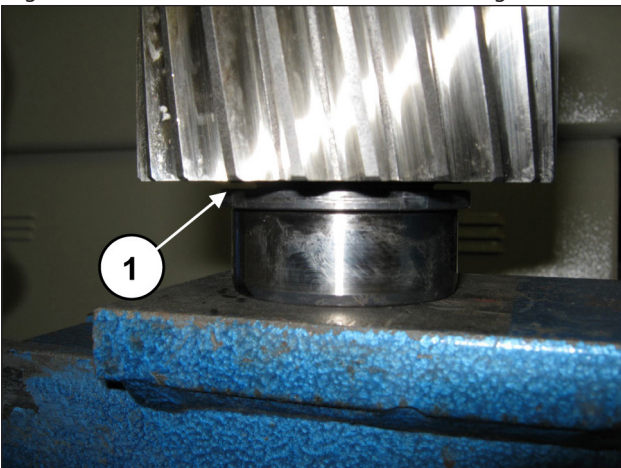


Abb. 80

Setzen Sie den Stützring des Lagers (Pos. ①, Abb. 83) und den Seegerring  $\text{\O}55$  ein (Pos. ①, Abb. 84).

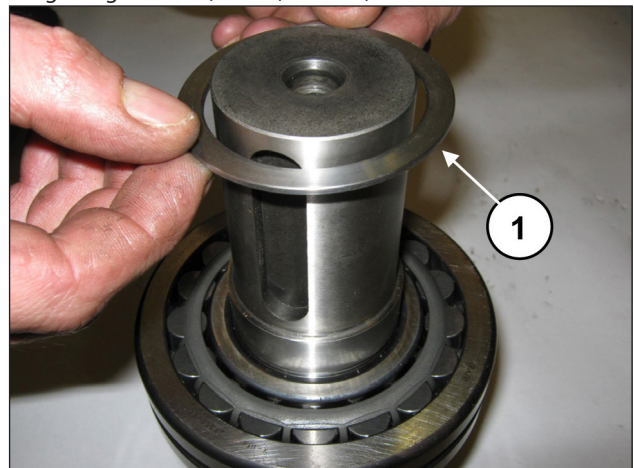


Abb. 83

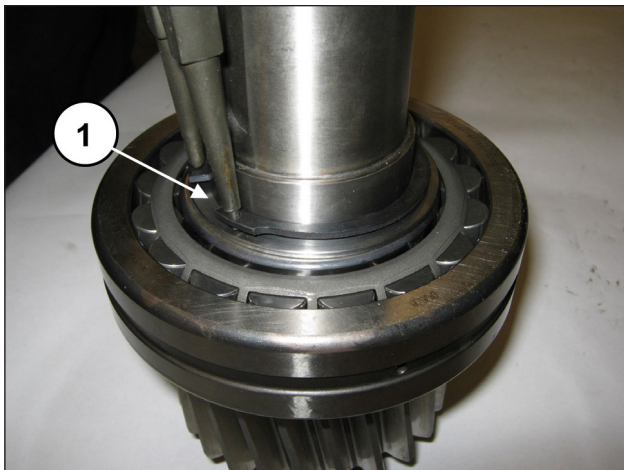


Abb. 84

Treiben Sie das vormontierte Ritzel in den entsprechenden Sitz am Getriebedeckel mithilfe des Schlagwerks ein (Pos. ①, Abb. 85).

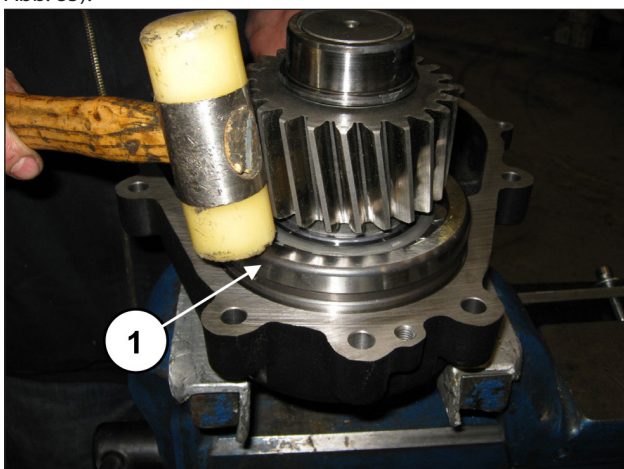


Abb. 85

Setzen Sie den Seegerring Ø120 ein (Pos. ①, Abb. 86).

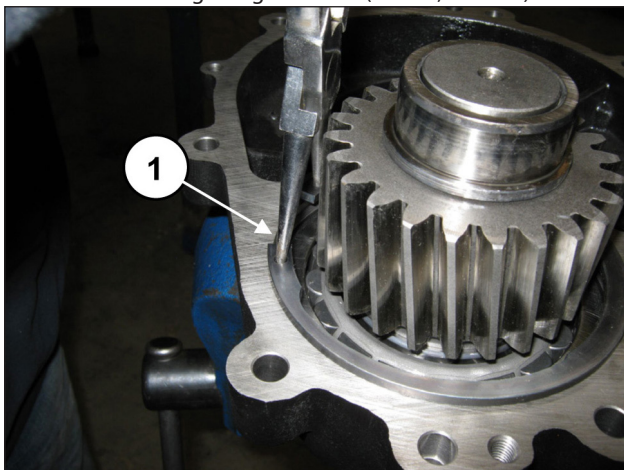


Abb. 86

Montieren Sie den Getriebedeckel mit dem Schlagwerk (Pos. ①, Abb. 87) und befestigen Sie den Deckel anhand von 7 Schrauben M10x40 (Pos. ①, Abb. 88).

Achten Sie hierbei besonders auf die vorschriftsmäßige Paarung der beiden Lagerelemente 40x90x23.

Eichen Sie die Schrauben mit einem Drehmomentschlüssel, wie in Kapitel 3 gezeigt.

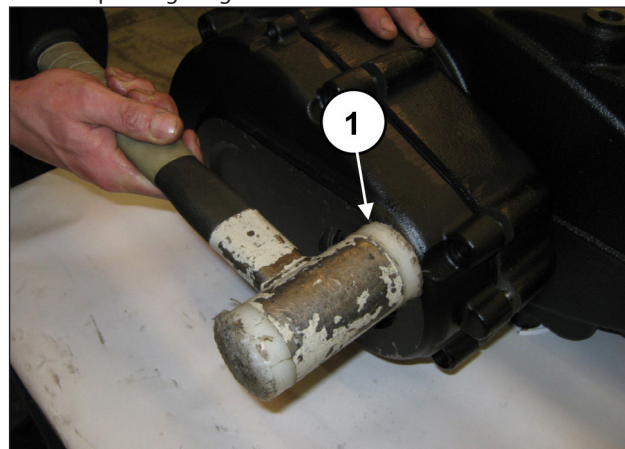


Abb. 87

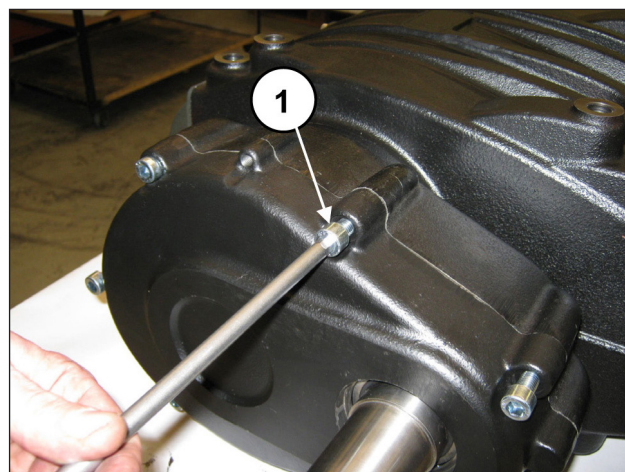


Abb. 88

Setzen Sie den Ölabstreifring in den Getriebedeckel ein. Verwenden Sie hierfür das Werkzeug Art. 27605200 (Pos. ①, Abb. 89). Überprüfen Sie vor Einbau des Ölabstreifrings den Zustand der Dichtlippe. Im Fall eines Austauschs setzen Sie den neuen Ring bündig in die Nut ein, siehe Abb. 90.



**Sollte die Welle im Bereich mit der Dichtlippe einen Verschleiß am Durchmesser aufweisen, können Sie zur Vermeidung der Schleifbearbeitung den Ring auf Anschlag mit dem Deckel neu ausrichten, siehe hierzu Abb. 90.**



Abb. 89

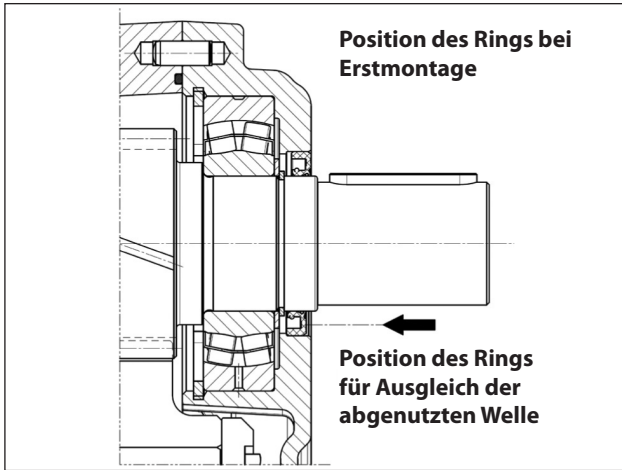


Abb. 90

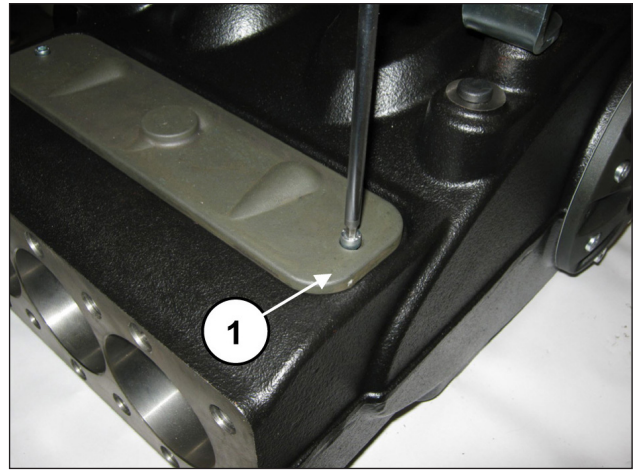


Abb. 92



**Geben Sie besonders beim Einsetzen des Ölabbstreifings auf das Ritzel acht, um den Ring nicht zu beschädigen.**

Montieren Sie Inspektionsdeckel mit dem O-Ring (Pos. ①, Abb. 91) und ziehen Sie die Deckel anhand von 2+2 Schrauben M6x14 fest (Pos. ①, Abb. 92).

Eichen Sie die Schrauben mit einem Drehmomentschlüssel, wie in Kapitel 3 EICHWERTE FÜR DEN SCHRAUBENANZUG gezeigt.

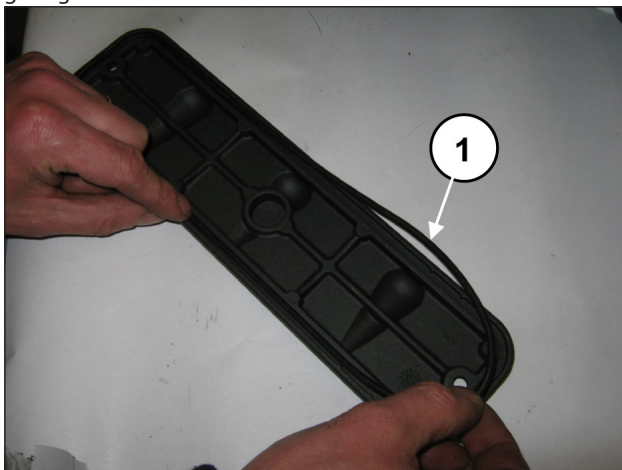


Abb. 91

Setzen Sie die Passfeder 14x9x60 in das Ritzel ein. Bringen Sie die Verschlüsse und Hehebügel mit den entsprechenden Schrauben M16x30 an (Pos. ①, Abb. 93). Eichen Sie die Schrauben mit einem Drehmomentschlüssel, wie in Kapitel 3 EICHWERTE FÜR DEN SCHRAUBENANZUG gezeigt.

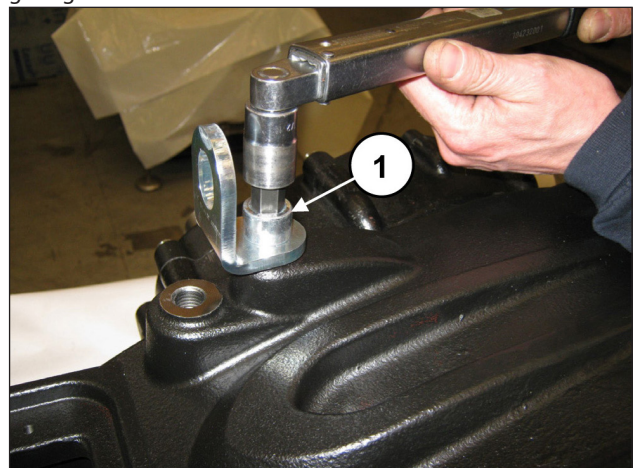


Abb. 93

Füllen Sie Öl in das Gehäuse gemäß Angaben in der **Betriebs- und Wartungsanleitung**, Abschn. 7.4.

### 2.1.3 Vorgesehene Über- und Untermaßklassen

UNTERMASSTABELLE FÜR KURBELWELLE UND PLEUEL-LAGERSCHALEN			
Ausgleichklassen (mm)	Art. obere Lagerschale	Art. untere Lagerschale	Schliff am Durchmesser des Wellenzapfens (mm)
0.25	90928100	90928400	Ø79.75 0/-0.02 Ra 0.4 Rt 3.5
0.50	90928200	90928500	Ø79.50 0/-0.02 Ra 0.4 Rt 3.5

ÜBERMASSTABELLE FÜR PUMPENGEHÄUSE UND KOLBENFÜHRUNG		
Ausgleichklassen (mm)	Artikel Kolbenführung	Schliff am Sitz des Pumpengehäuses (mm)
1.00	73050543	Ø71 H6 +0.019/0 Ra 0.8 Rt 6

## 2.2 REPARATUR DER HYDRAULIK

### 2.2.1 Ausbau des Kopfs - Buchsen - Ventile

Der Kopf bedarf keiner regelmäßigen Wartung. Die Arbeiten beschränken sich auf die Inspektion oder den Austausch der Ventile im Bedarfsfall.

Verfahren Sie zur Abnahme der Ventilgruppen wie folgt: Lockern Sie die Befestigungsschrauben M10x140 von Buchsen und Kopf (Pos. ①, Abb. 94), um sie freizulegen.

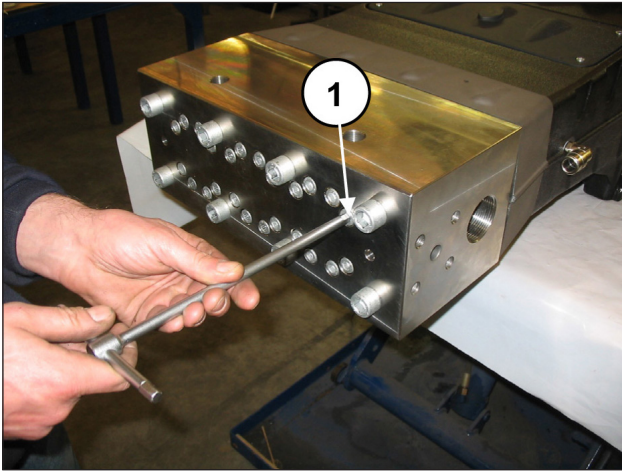


Abb. 94

Lösen Sie zwei diametral entgegengesetzte Befestigungsschrauben des Kopfs M16x320 (Pos. ① und ②, Abb. 95), ersetzen Sie diese durch zwei Wartungsschrauben - Stifte (Art.27540200) (Pos. ①, Abb. 96), nehmen Sie dann die übrigen Schrauben ab.

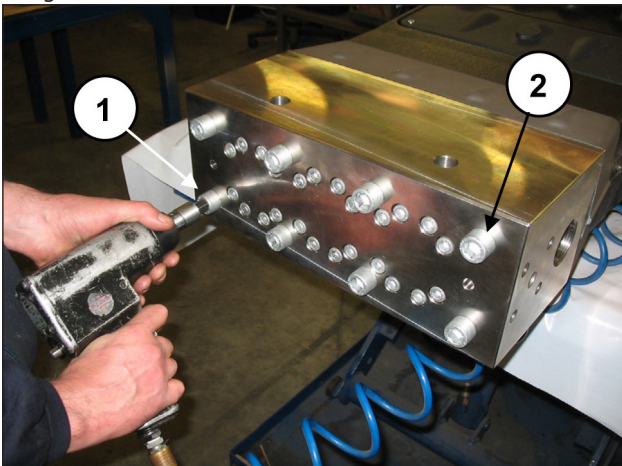


Abb. 95

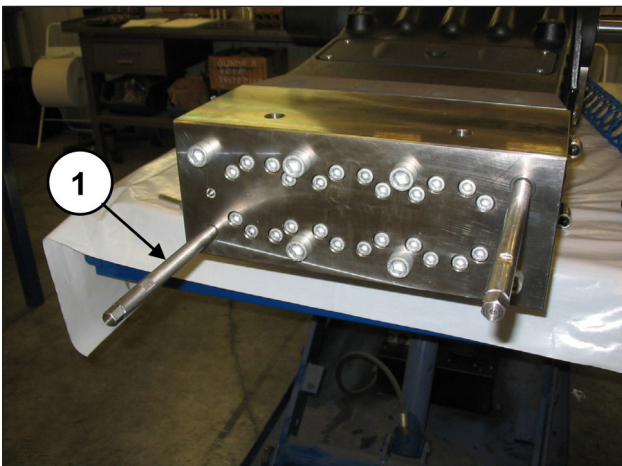


Abb. 96

Trennen Sie den Kopf und das Distanzstück der Buchsen vom Pumpengehäuse (Pos. ①, Abb. 97).

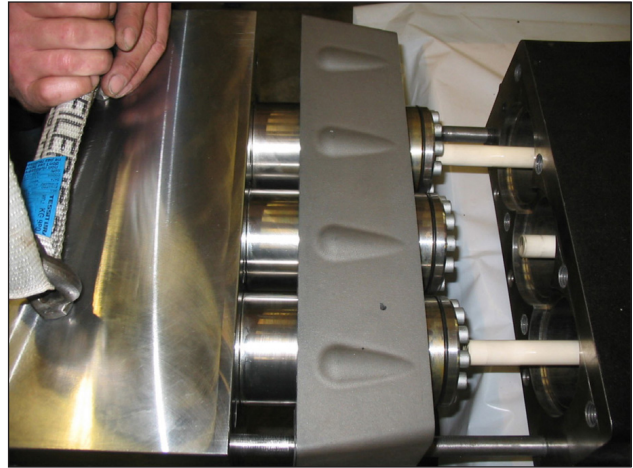


Abb. 97

Entfernen Sie das Distanzstück der Buchsen von den Buchsengruppen ab (Pos. ①, Abb. 98).

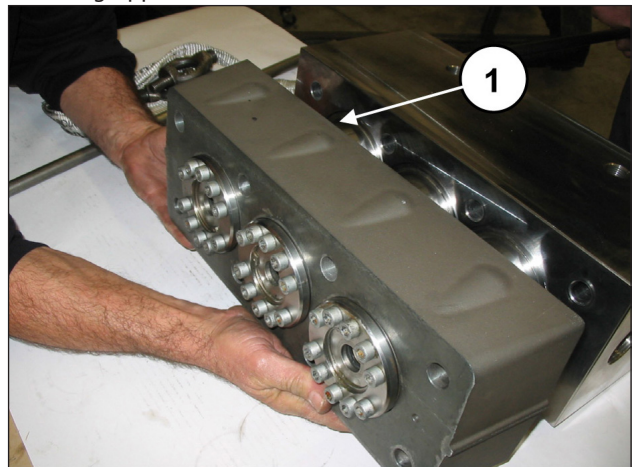


Abb. 98

Lösen Sie die Befestigungsschrauben M10x140 von Buchsen und Kopf (Pos. ①, Abb. 99) und ziehen Sie Buchsengruppen heraus (Pos. ①, Abb. 100).

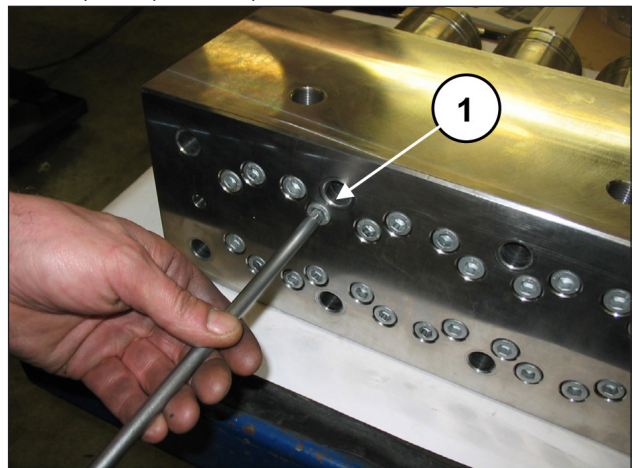


Abb. 99



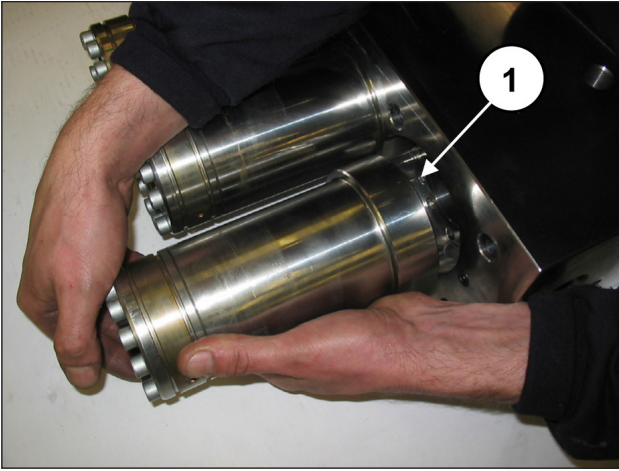


Abb. 100



Achten Sie beim Ausbau der Buchsen darauf, nicht die Ventilsfeder und die Flachventile zu verlieren (Pos. ① und ②, Abb. 101), da diese nicht eingepresst sind und herausfallen können.

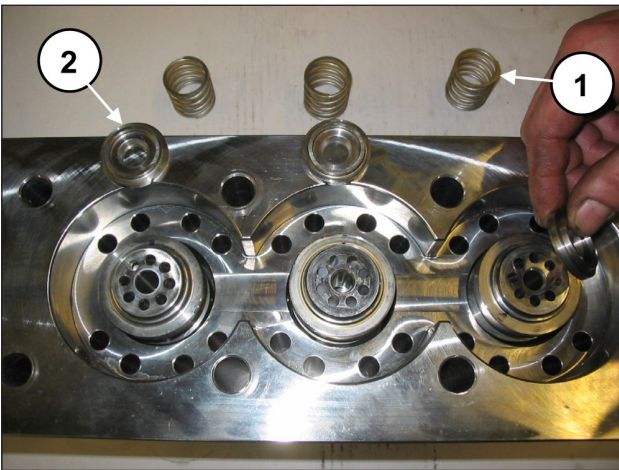


Abb. 101



Lösen Sie die ggf. durch Kalk oder Oxid am Kopf verklemmten Ventilsitze, indem Sie das entsprechende Werkzeug (Art. 034300020) in die Druckbohrung einsetzen (Pos. ①, Abb. 102).

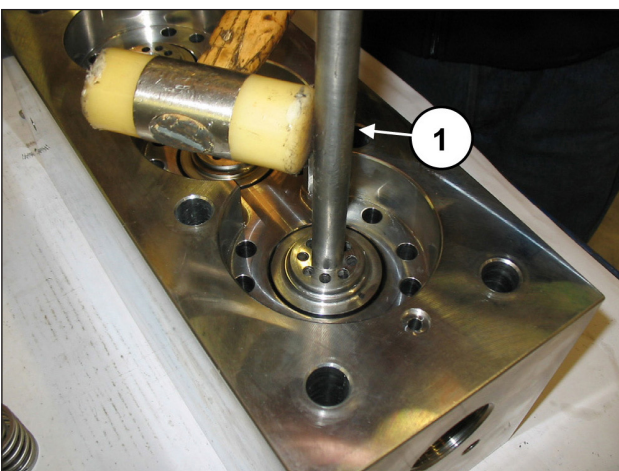


Abb. 102

Entfernen Sie die Ventilsitze und überprüfen Sie den Zustand der Dichtungen.

Ersetzen Sie bei Bedarf die abgenutzten Teile (Pos. ①, Abb. 103).

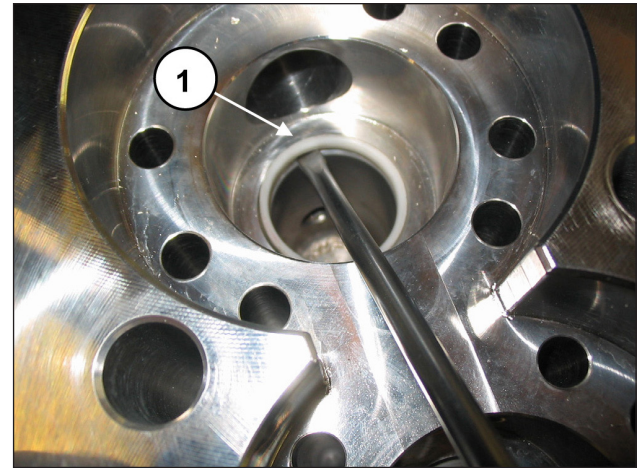


Abb. 103



Ersetzen Sie bei jeder Ventilinspektion stets die Dichtringe und die zugehörigen O-Ringe für die stirnseitige Abdichtung zwischen Buchse und Kopf und zwischen Kopf und Distanzstück im Bereich der Umlaufbohrung. Reinigen und trocknen Sie vor dem Wiedereinbau die einzelnen Bauteile und sämtliche Aufnahmen im Kopf.

Entfernen Sie die Druckteller (Pos. ①, Abb. 104), und die entsprechenden Führungen (Pos. ①, Abb. 106) samt Federn (Pos. ①, Abb. 105), überprüfen Sie den Verschleißzustand und ersetzen Sie die abgenutzten Teile bei Bedarf und auf jeden Fall in den Intervallen lt. Kapitel 11 der **Betriebs- und Wartungsanleitung**.

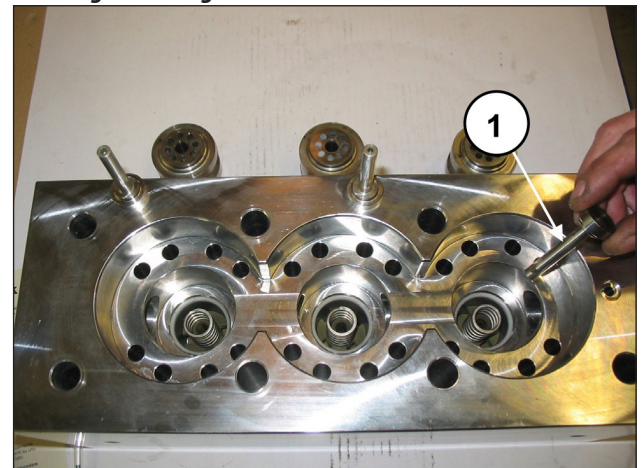


Abb. 104

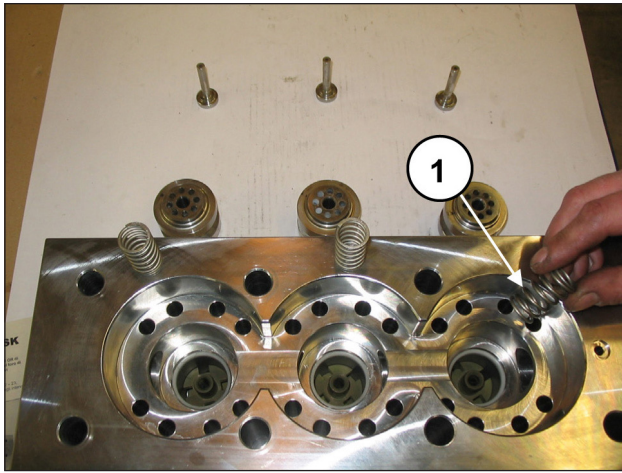


Abb. 105

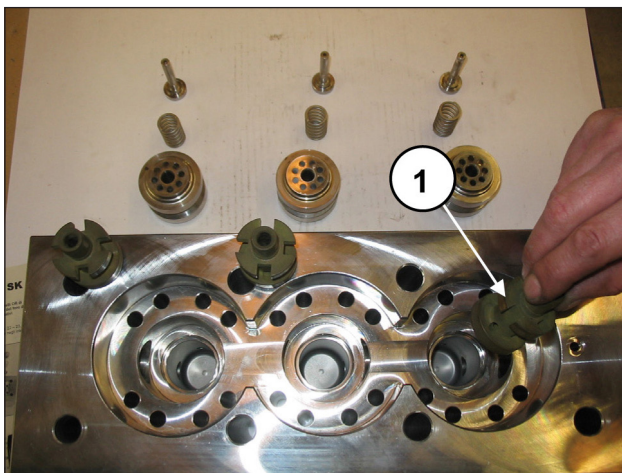


Abb. 106

### 2.2.2 Einbau des Kopfs - Buchsen - Ventile

Führen Sie zum Wiedereinbau der einzelnen Bauteile die vorgenannten Arbeiten in umgekehrter Reihenfolge aus und achten Sie auf den vorschriftsmäßigen Einbau des Distanzstücks für Buchsen: die Bohrung  $\varnothing 6$  (Kühlkreis der Dichtungen) muss zur zugehörigen Bohrung am Kopf (mit O-Ring) ausgerichtet sein.

**Köpfe - Buchsen: Montieren und eichen Sie die Befestigungsschrauben des Kopfs und eichen Sie dann die Befestigungsschrauben der Buchsen.**

Für die Anzugsmomente und die Anzugsreihenfolge der Schrauben beachten Sie die Angaben in Kapitel 3.

### 2.2.3 Ausbau der Kolbengruppe - Lager - Dichtungen

Die Kolbenbaugruppe bedarf keiner regelmäßigen Wartung. Die Eingriffe beschränken sich lediglich auf die Sichtinspektion des Kühlkreis-Ablasses. Sollten Störungen / Schwingungen am Druckmanometer oder Pulsationen in der Ablassleitung (Schlauch) des Kühlkreises auftreten, muss das Dichtungspaket überprüft und ggf. ausgetauscht werden.

Verfahren Sie zur Abnahme der Kolbenbaugruppen wie folgt: Trennen Sie den Kopf und das Distanzstück der Buchsen vom Pumpengehäuse gemäß den Hinweisen in Abschn. 2.2.1 (von Abb. 94 bis Abb. 100).

Demontieren Sie den oberen Inspektionsdeckel durch Abdrehen der 2 Befestigungsschrauben (Pos. ①, Abb. 107).

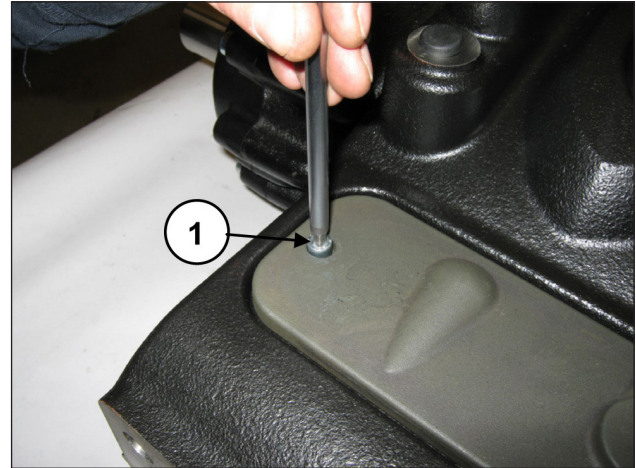


Abb. 107

Demontieren Sie die Pumpenelemente mit einem Gabelschlüssel (Pos. ①, Abb. 108) und überprüfen Sie ihren Verschleißzustand (Pos. ①, Abb. 109). Tauschen Sie diese bei Bedarf aus.

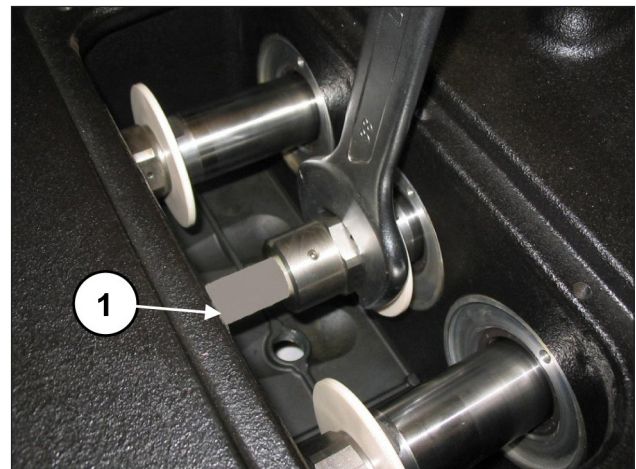


Abb. 108

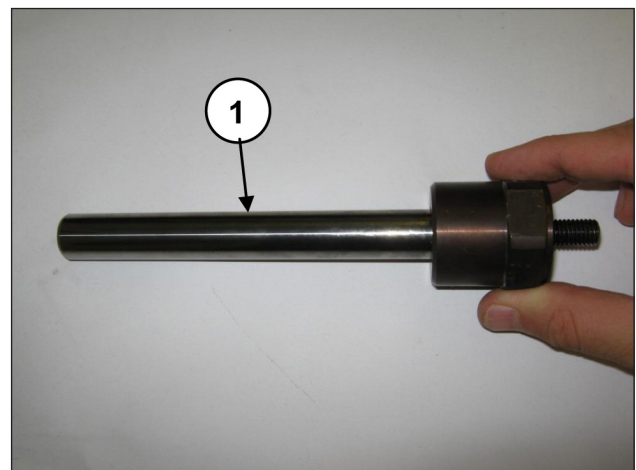


Abb. 109

Lösen Sie die Befestigungsschrauben M8x50 des Halters an der Buchse (Pos. ①, Abb. 110) und trennen Sie dann den Halter von der Buchse (Pos. ①, Abb. 111).

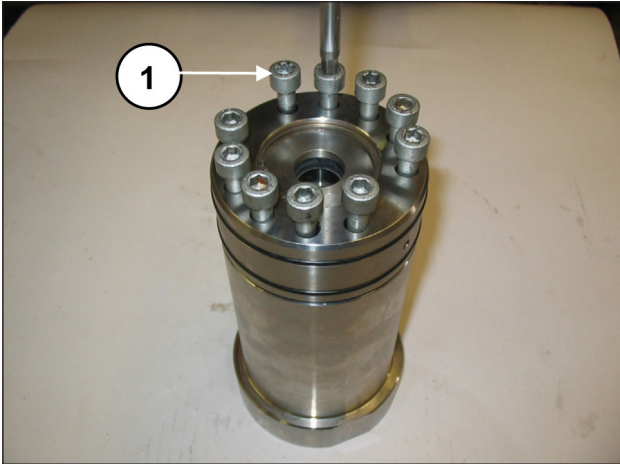


Abb. 110

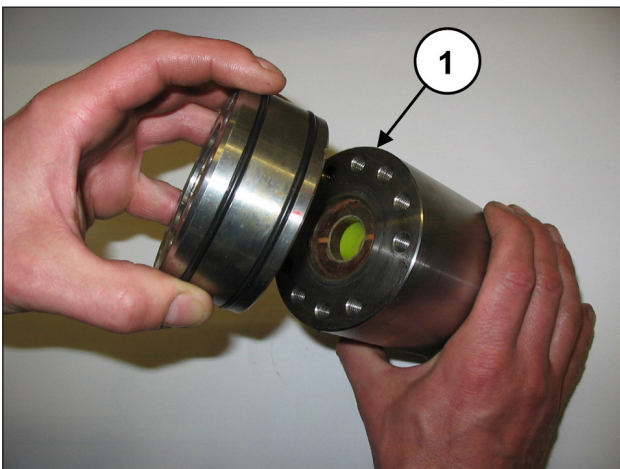


Abb. 111

Entfernen Sie den Seegerring und den Stützring der Dichtungen (Pos. ①, Abb. 112) und ziehen Sie mit einem speziellen Kunststoffdorn die ND (Niederdruck) Dichtung heraus (Pos. ①, Abb. 113).

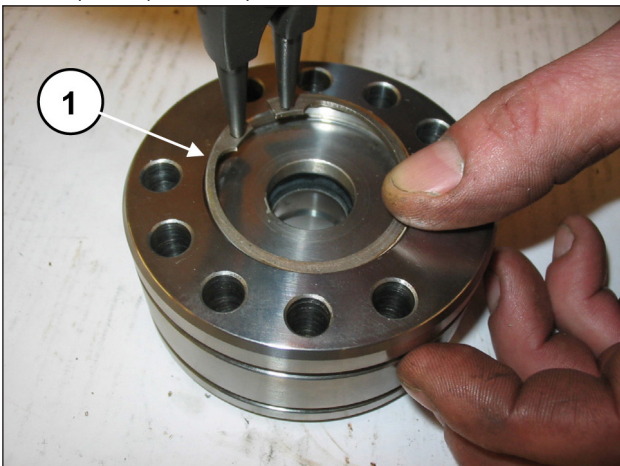


Abb. 112

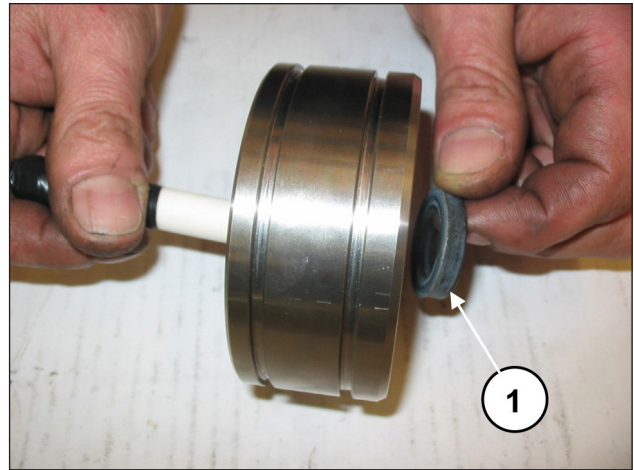


Abb. 113



**Bei jedem Ausbau müssen die ND-Dichtungen und die O-Ringe ersetzt werden.**

Entnehmen Sie nach Trennung der Buchse vom Dichtungshalter mit einem speziellen Kunststoffdorn (Pos. ①, Abb. 114) den HD (Hochdruck) Dichtungssatz (Pos. ①, Abb. 115).



**Bei jedem Ausbau muss der HD-Dichtungssatz (Pos. ①, Abb. 115) ausgetauscht werden.**

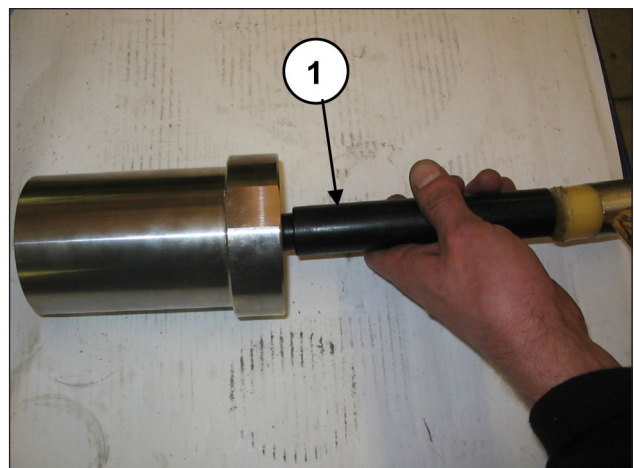


Abb. 114

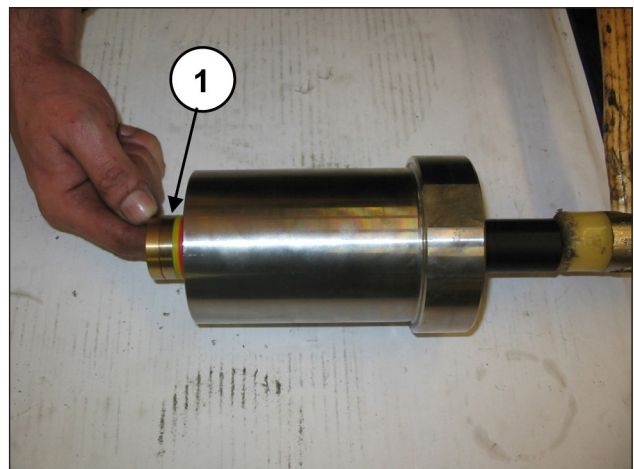


Abb. 115

### 2.2.4 Einbau der Kolbengruppe - Lager - Dichtungen

Führen Sie zum Wiedereinbau der einzelnen Bauteile die Schritte in umgekehrter Reihenfolge aus und achten Sie dabei auf die einzelnen Abfolgen, wie im Nachhinein geschildert. Für die Anzugsmomente und die Anzugsreihenfolge beachten Sie die Angaben in Kapitel 3.

Führen Sie die obere Hülse in die Buchse ein.



**Verwenden Sie für die korrekte axiale Ausrichtung das entsprechende Werkzeug (Art. 27921100 für SM14, Art. 27921200 für SM16, Art. 27921300 für SM18, Art. 27911200 für SM20, Art. 27911400 für SM22 und Art. 27911500 für SM24 (Pos. ①, Abb. 117 und Abb. 118).**

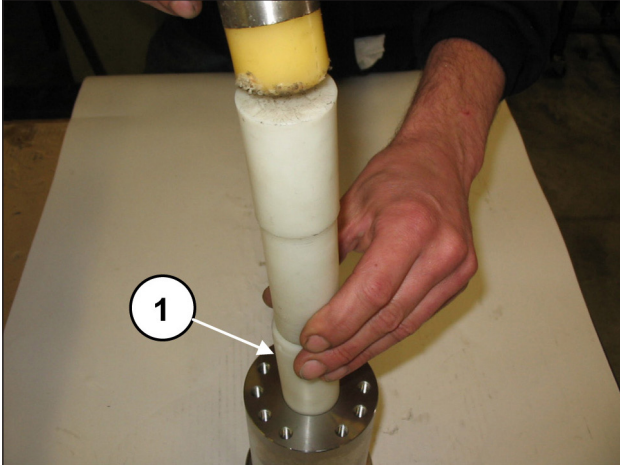


Abb. 116

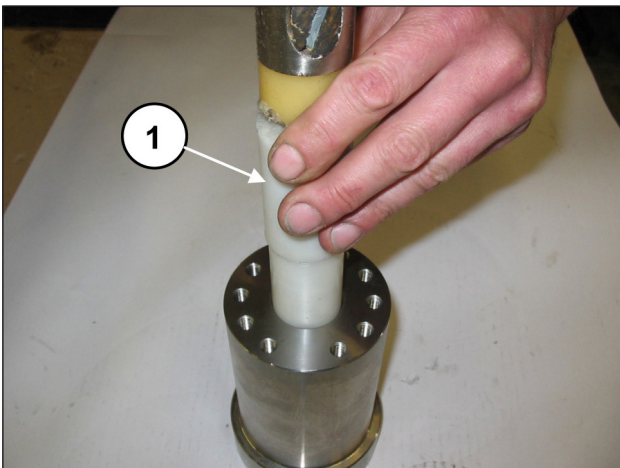


Abb. 117

Setzen Sie das HD-Dichtungspaket (Hochdruck) (Pos. ①, Abb. 118) ein; verwenden Sie aufgrund des leichten Übermaßes zwischen Dichtung und Buchse zur Vermeidung von Schäden das entsprechende Werkzeug (Art. 27673200 für SM14, SM16 und SM18, Art. 27673300 für SM20, SM22 und SM24) (Pos. ①, Abb. 119).

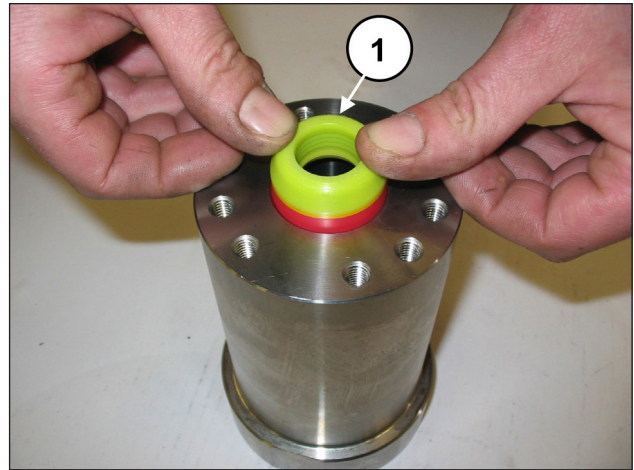


Abb. 118

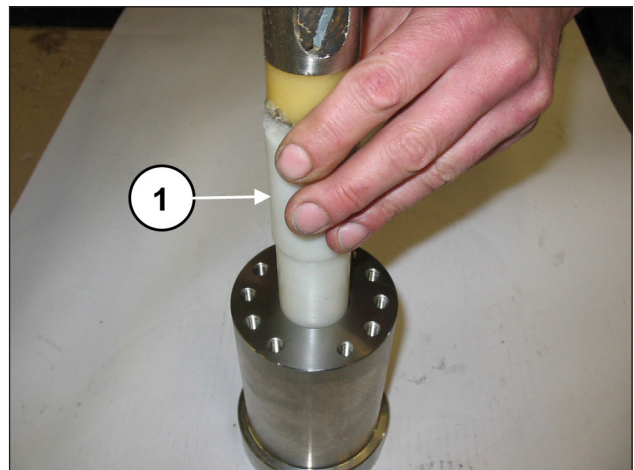


Abb. 119



Die HD-Dichtung muss lt. Abb. 121 und Abb. 122 eingesetzt werden.



Vor dem Einsetzen müssen die HD-Dichtungen mit Silikonfett der Sorte OKS 1110 wie folgt geschmiert werden:

Schmieren Sie den Außendurchmesser nur leicht ein;

Tragen Sie das Fett so auf den Innendurchmesser auf, dass sämtliche Sicken zwischen den Dichtlippen einwandfrei gefüllt werden, siehe Abb. 122.

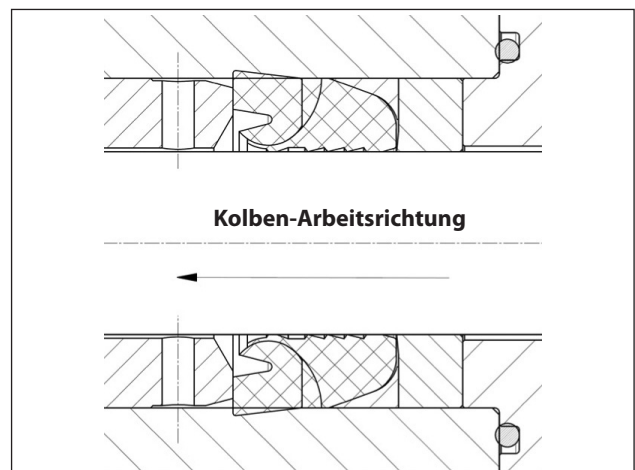


Abb. 120

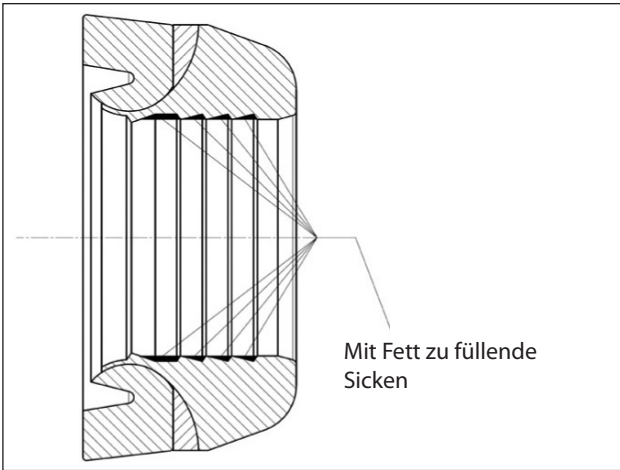


Abb. 121

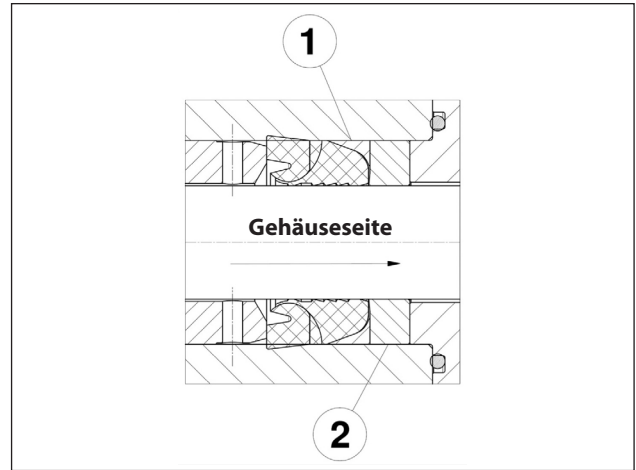


Abb. 124

Setzen Sie den Stützring und die Dichtungshülse ein (Pos. ① und ②, Abb. 122, Abb. 123 und Abb. 124).



**Führen Sie die Dichtungshülse ② mit den zwei nach außen gerichteten Aussparungen (zur Gehäuseseite) gemäß Abb. 123 ein.**



**Die HD-Dichtung muss mit Dichtlippe in Arbeitsrichtung des Kolbens in die Buchse eingesetzt werden (Pos. ①, Abb. 125 und Abb. 126), wobei der Außendurchmesser leicht mit Silikonfett der Sorte OKS 1110 zu schmieren ist. Tauschen Sie abgenutzte ND-Dichtungen aus.**

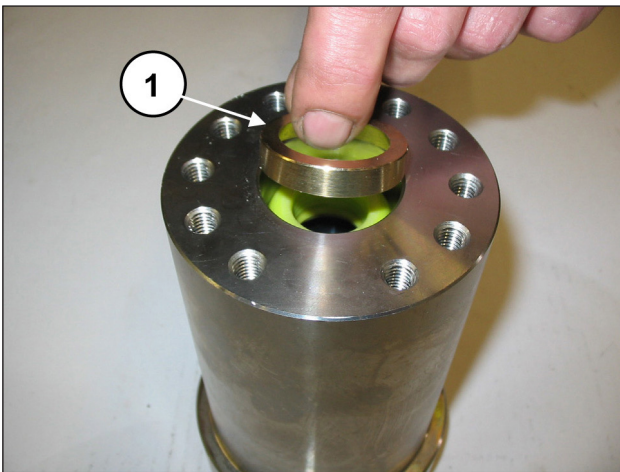


Abb. 122

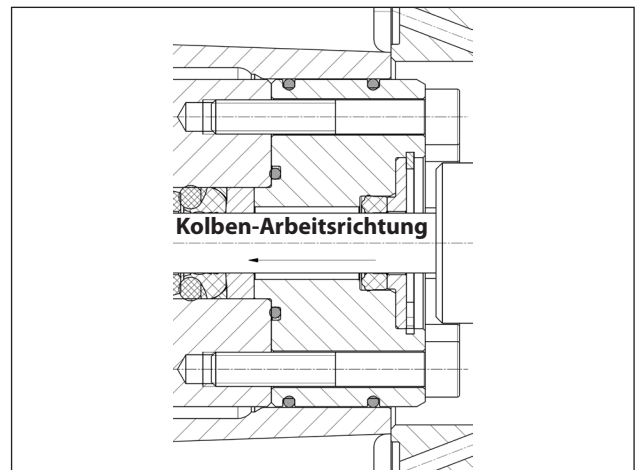


Abb. 125

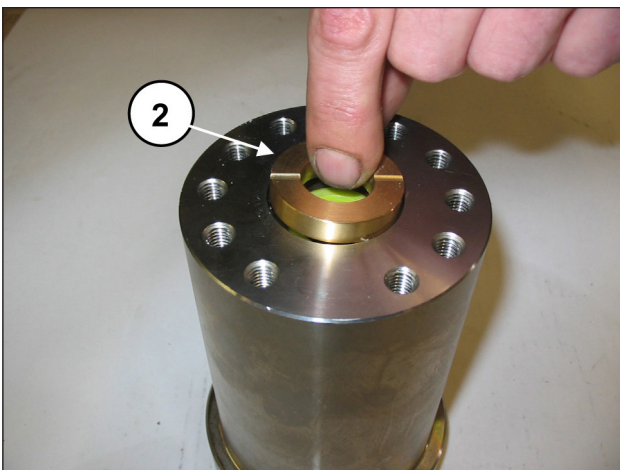


Abb. 123

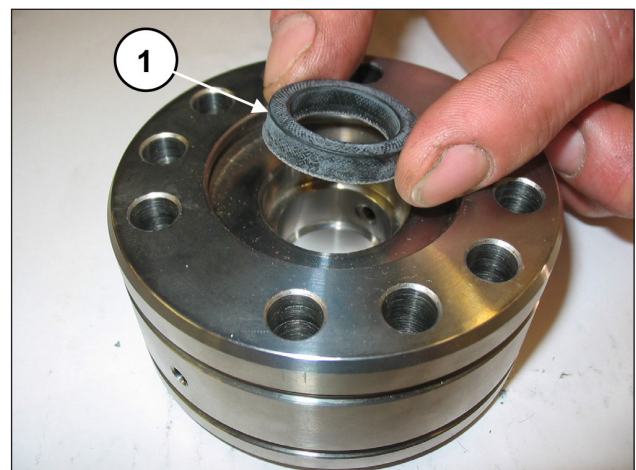


Abb. 126

Bauen Sie den Dichtungshalter (Abb. 127 und Abb. 128) ein und tauschen Sie die Bauteile ① und ② aus.

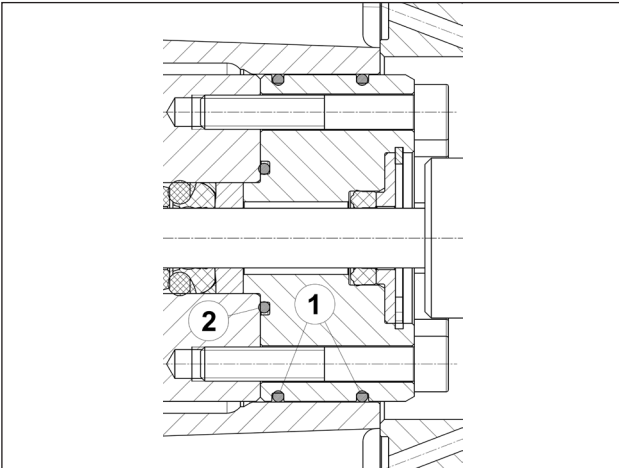


Abb. 127

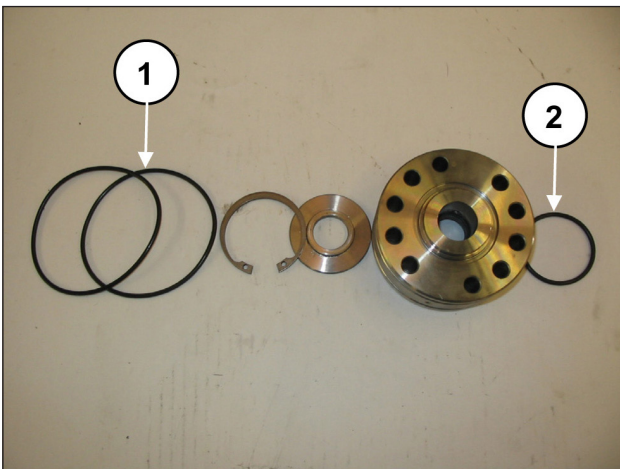


Abb. 128

Montieren Sie die Baugruppe Halter - Buchse durch Andrehen der Schrauben M8x50 von Hand gemäß Abb. 129, führen Sie dann die Eichtung mit einem Drehmomentschlüssel aus, siehe hierzu die Angaben in Kapitel 3.

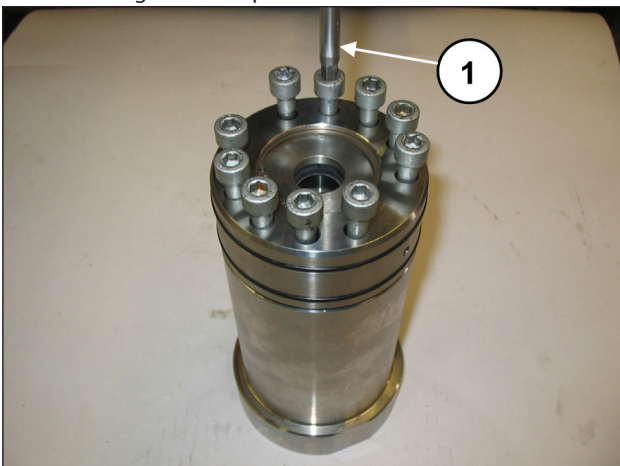


Abb. 129

### 3 EICHWERTE FÜR DEN SCHRAUBENANZUG

Ziehen Sie die Schrauben ausschließlich mit einem Drehmomentschlüssel fest.

Beschreibung	Position Explosionszeichnung	Anzugsmoment Nm
Schraube M10x30 Gehäusedeckel	79	45
Verschluss G1/2x13 Gehäuse	81	40
Schraube M16x30 Hebebügel	41	200
Schraube M10x40 Getriebedeckel	71	45
Schraube M10x25 Zahnkranzarretierung	66	45
Schraube M10x40 Getriebegehäuse	71	45
Schraube M6x14 oberer und unterer Deckel	50	10
Schraube M10x30 Lagerdeckel	79	45
Schraube M10x1.5x80 Pleuelbefestigung	43	65*
Schraube M6x20 Kolbenführung	37	10
Kompletter Kolben	15	40
Drosselanschluss D.3 3/8M-3/8F	29	45
Schraube M8x50 Halter	22	40**
Schraube M16x280 Kopf	1	280***
Schraube M10x140 Buchsen	26	83****

\* Ziehen Sie alle Schrauben gleichzeitig bis auf Anzugsmoment fest.



**Die Schrauben - Pos. 1-22-26 - müssen mit einem Drehmomentschlüssel bei Schmierung des Gewindeschäfts mit Fett auf Basis Molybdändisulfid Art.12001500 festgezogen werden.**

\*\* Die Befestigungsschrauben der Halter müssen in den Phasen und der Reihenfolge gemäß Schema in Abb. 130 festgezogen werden.

\*\*\* Die Befestigungsschrauben des Kopfs müssen in den Phasen und der Reihenfolge gemäß Schema in Abb. 131 festgezogen werden.

\*\*\*\* Die Befestigungsschrauben der Buchsen müssen in den Phasen und der Reihenfolge gemäß Schema in Abb. 131 festgezogen werden.

#### Schraubenanzug Dichtungshalter Pos. 22

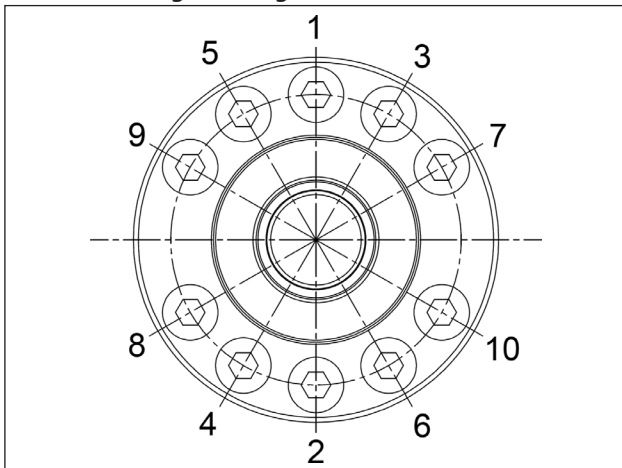


Abb. 130

Ziehen Sie die Schrauben M8x50 in der angegebenen Reihenfolge (1-2-3-4-5-6-7-8-9-10) in einer Phase auf das angegebene Anzugsmoment fest

#### Schraubenanzug Kopf und Buchsen Pos. 1 und Pos. 26

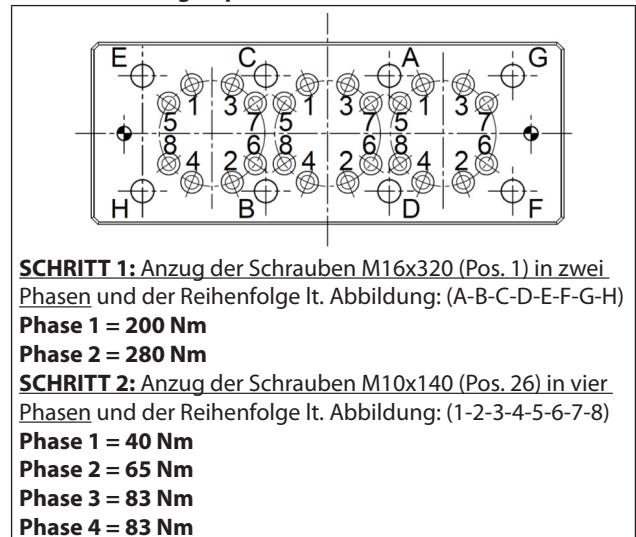


Abb. 131

## 4 REPARATURWERKZEUGE

Die Wartung der Pumpe kann durch einfache Aus- und Einbauwerkzeuge erfolgen. Folgende Werkzeuge sind verfügbar:

### Für den Einbau:

Welle (Pleuelbefestigung)	Art. 27566200
Lager auf Kurbelwelle	Art. 27604700
Ritzellager auf Getriebegehäuse	Art. 27604900
Kurbelwellenlager auf Getriebegehäuse	Art. 27605000
Kurbelwellenlager auf Lagerdeckel	Art. 27605000
Ölabstreifring Kolbenführung	Art. 27605300
Lager auf Ritzel	Art. 27604800
Ölabstreifring Ritzel	Art. 27605200
Kolbenhülse	Art. 27921100 (SM14)
	Art. 27921200 (SM16)
	Art. 27931300 (SM18)
	Art. 27911200 (SM20)
	Art. 27911400 (SM22)
HD-Dichtungspaket	Art. 27673200 (SM14 - SM16 - SM18)
	Art. 27673300 (SM20 - SM22 - SM24)
Kopf / Distanzstück Buchsen	Art. 27540200

### Für den Ausbau:

Ölabstreifring Kolbenführung	Art. 27918500
Welle (Pleuelbefestigung)	Art. 27566200
Ventilsitz	Art. 034300020
Kopf / Distanzstück Buchsen	Art. 27540200



## 5 AUSTAUSCH DER PLEUELAUGENBUCHSE

Führen Sie das Setzen der Buchse und die anschließenden Bearbeitungen im Kaltzustand aus und beachten Sie dabei die Maße und Toleranzen gemäß Abb. 132.

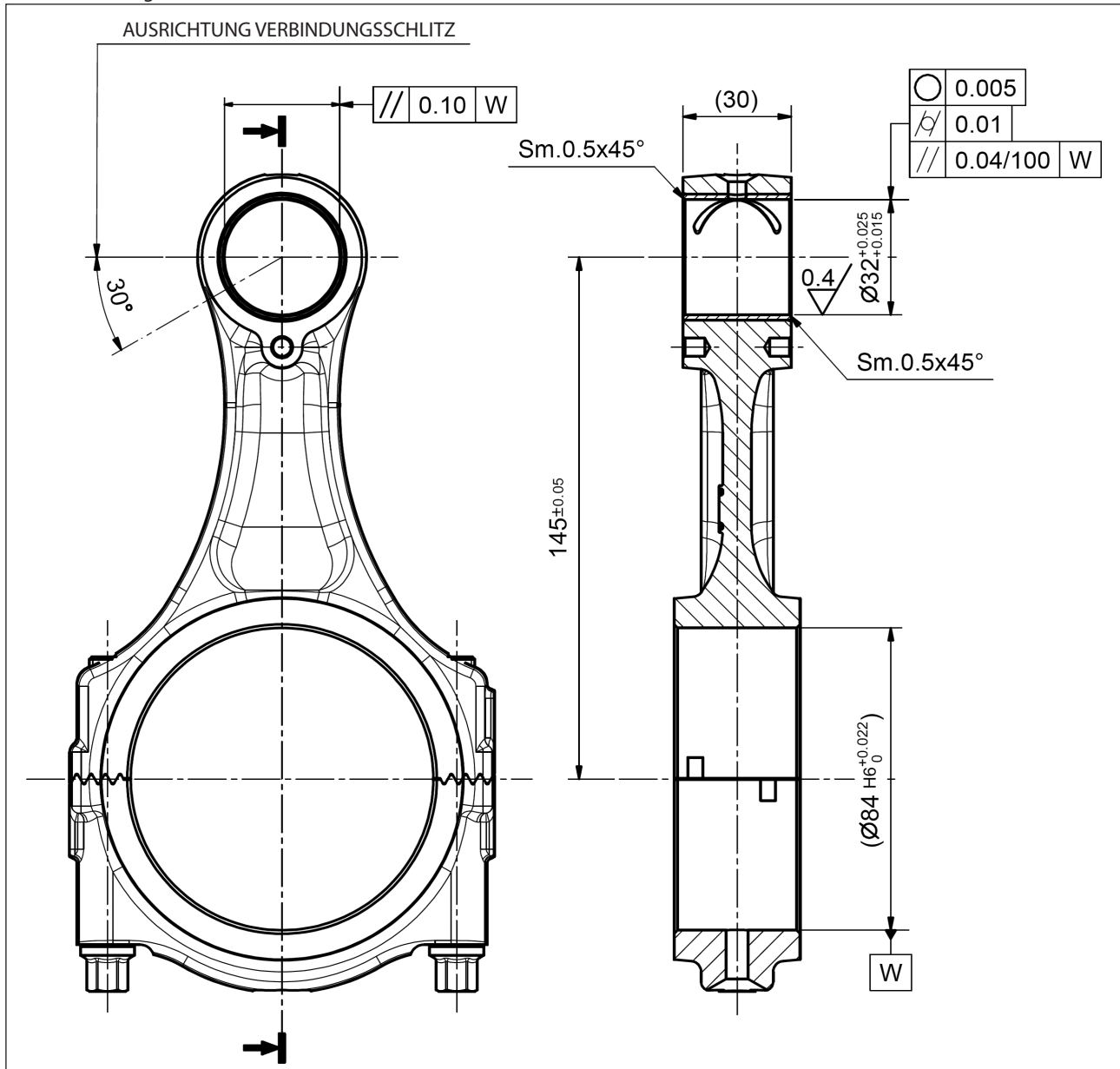


Abb. 132

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# 1 INTRODUCCIÓN

Este manual describe las instrucciones para la reparación de las bombas SM y debe ser atentamente leído y comprendido antes de utilizar la bomba.

De un correcto uso y un mantenimiento adecuado depende el funcionamiento regular y la duración de la bomba.

Interpump Group no se responsabiliza de los daños causados por negligencia o falta de observación de las normas descritas sobre el presente manual.

## 1.1 DESCRIPCIÓN DE LOS SÍMBOLOS

Leer atentamente lo indicado en el presente manual antes de realizar cada operación.



**Señal de advertencia**



Leer atentamente lo indicado en el presente manual antes de realizar cada operación.



**Señal de Peligro**

Utilizar gafas de protección



**Señal de Peligro**

Utilizar guantes de protección para realizar cualquier tipo de operación

# 2 DECLARACIÓN DE REPARACIÓN



## 2.1 REPARACIÓN DE LA PARTE MECÁNICA

Las operaciones de reparación de la parte mecánica deben ser realizadas después de haber retirado todo el aceite del cárter. Para eliminar el aceite es necesario quitar el tapón de llenado de aceite pos. ①, Fig. 1 y a continuación el tapón de descarga pos. ②, Fig. 1.

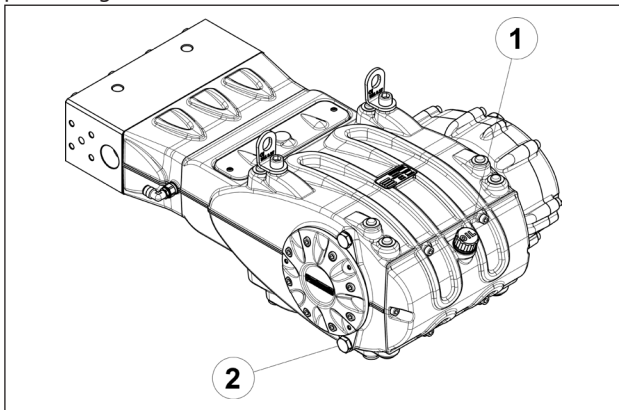


Fig. 1



**El aceite agotado debe ser colocado en un recipiente adecuado y eliminado en los correspondientes centros. No debe dispersarse en el ambiente.**

### 2.1.1 Desmontaje de la parte mecánica

La secuencia correcta es la siguiente:

Vaciar el aceite contenido en la bomba y desmontar la tapa del cárter (con la junta tórica) aflojando los 6 tornillos M10 (pos. ①, Fig. 2).

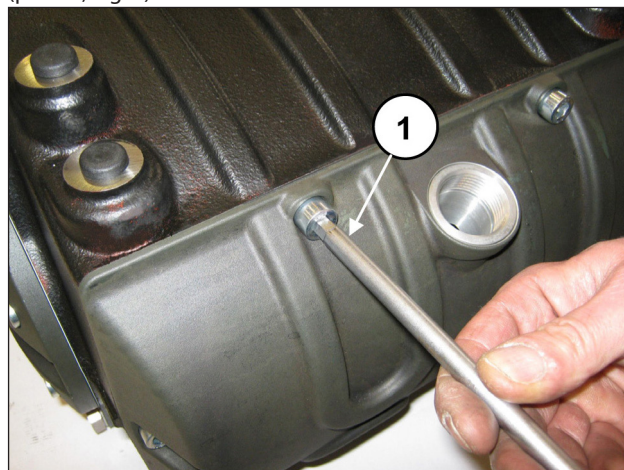


Fig. 2

Desmontar la lengüeta del eje PTO (pos. ①, Fig. 3).

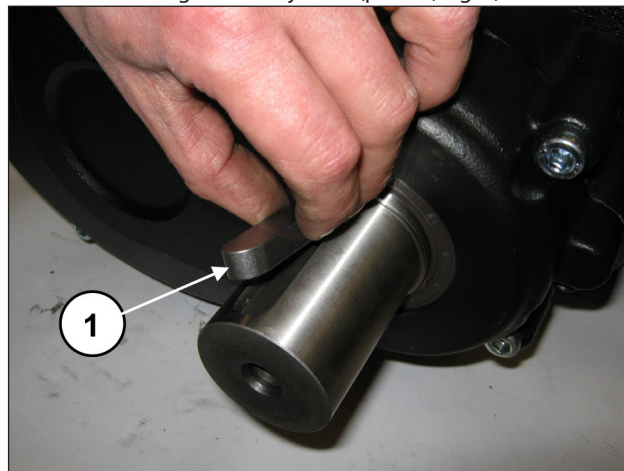


Fig. 3

Aflojar los tornillos de fijación de la tapa del reductor (pos. ①, Fig. 4).

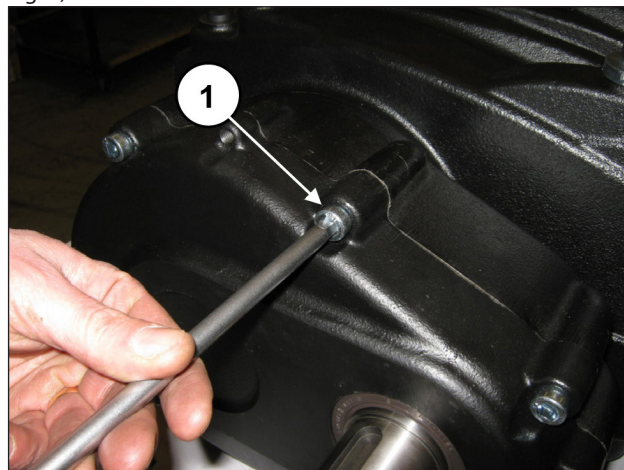


Fig. 4

Enroscar en los orificios específicos 3 tornillos prisioneros o tornillos roscados M8 (pos. ①, Fig. 5) para que actúen de extractores y 2 tornillos M10 lo suficientemente largos como para sujetar la tapa (pos. ②, Fig. 5).

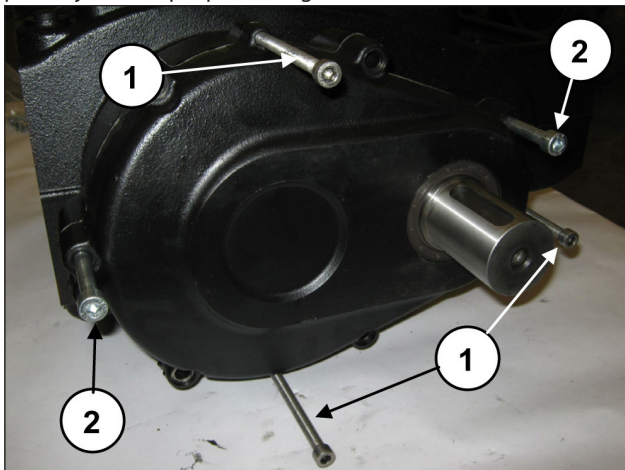


Fig. 5

Apretar de manera gradual los 3 tornillos M8 (pos. ①, Fig. 6) que actúan como extractores, hasta desmontar por completo el grupo de la tapa y el piñón.

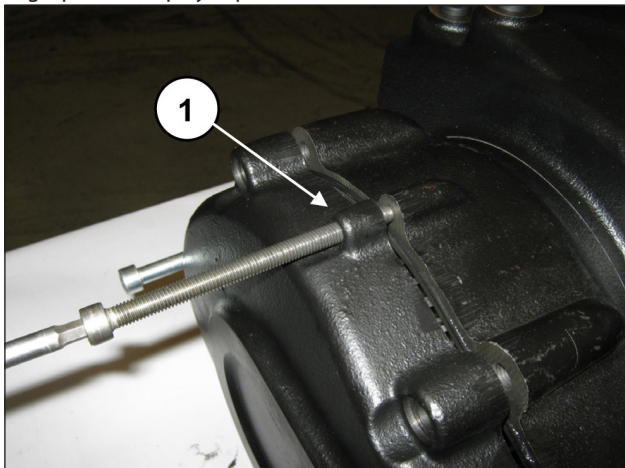


Fig. 6

La tapa del reductor se puede desmontar del piñón como se indica a continuación:  
Desmontar la anilla seeger Ø120 (pos. ①, Fig. 7).

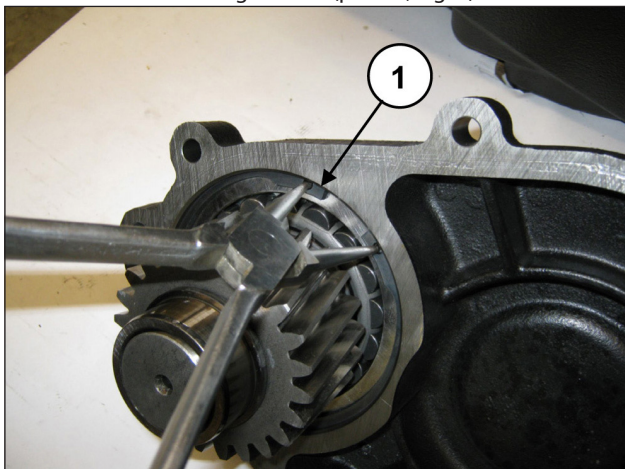


Fig. 7

Separar el piñón de la tapa presionando con una herramienta de percusión el piñón (pos. ①, Fig. 8).

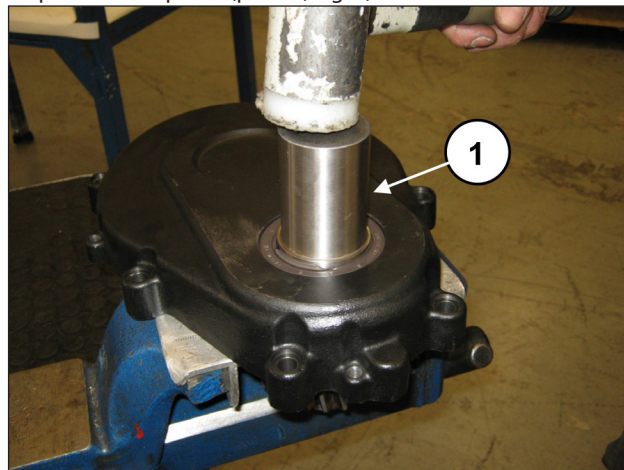


Fig. 8

Desmontar la anilla seeger Ø55 (pos. ①, Fig. 9) y la anilla de apoyo del cojinete (pos. ①, Fig. 10) del piñón.

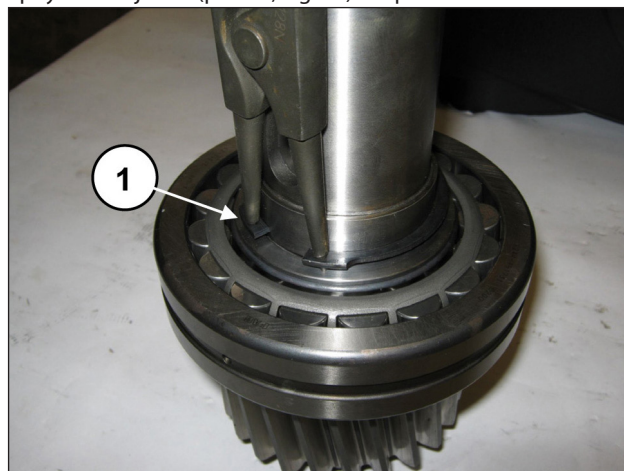


Fig. 9

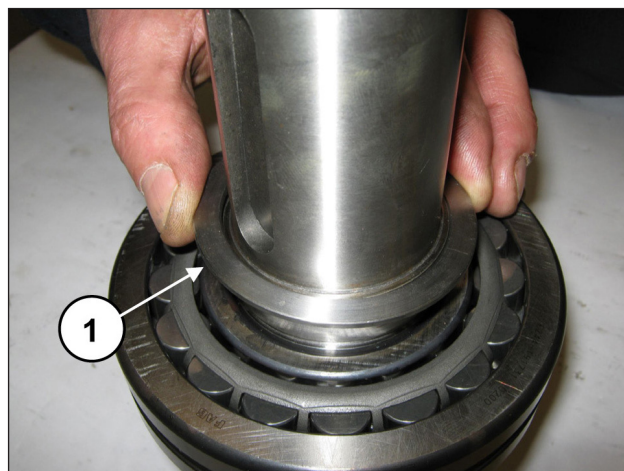


Fig. 10

Extraer el retén de la tapa del reductor desde el lado interno de la tapa (pos. ①, Fig. 11).

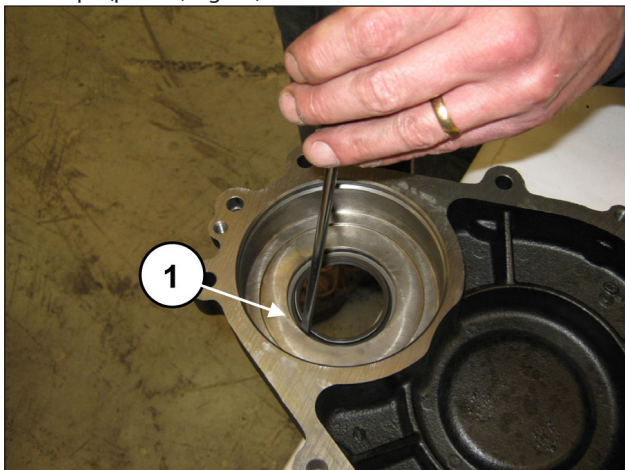


Fig. 11

Extraer la corona (pos. ①, Fig. 14). Si es necesario, aplicar un extractor de percusión en los 2 orificios M8 (, pos. ②, Fig. 14).

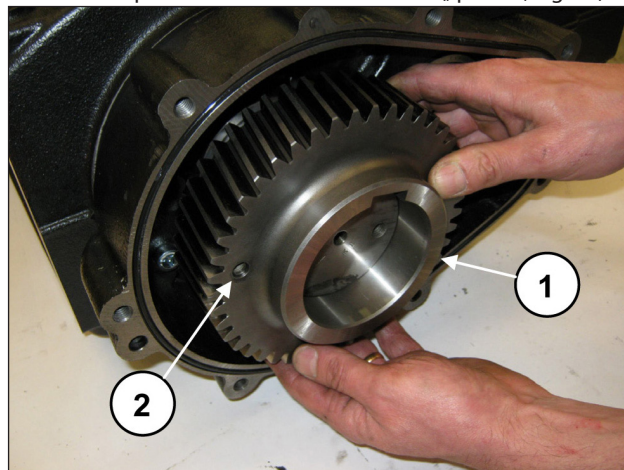


Fig. 14

Aflojar los tornillos que fijan el tope de la corona (pos. ①, Fig. 12) y desmontarlo (pos. ①, Fig. 13).

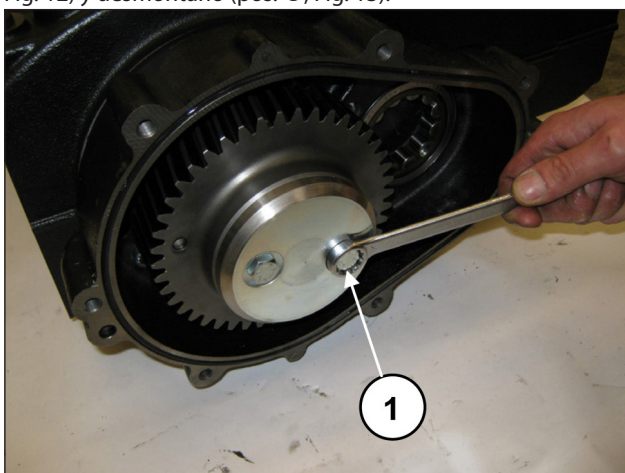


Fig. 12

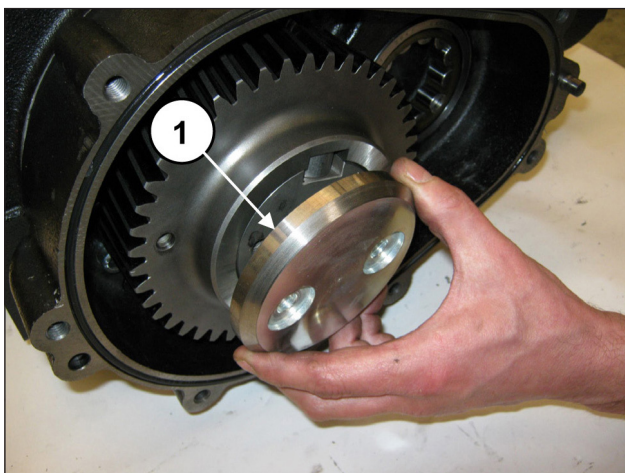


Fig. 13

Quitar la lengüeta del eje PTO (pos. ①, Fig. 15).

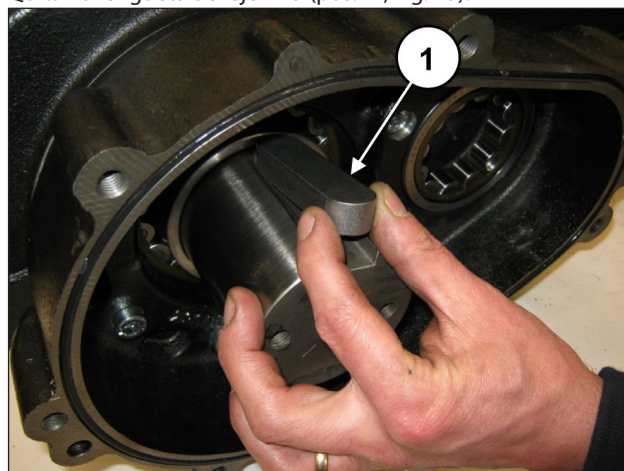


Fig. 15

Extraer la anilla de apoyo de la corona (pos. ①, Fig. 16).

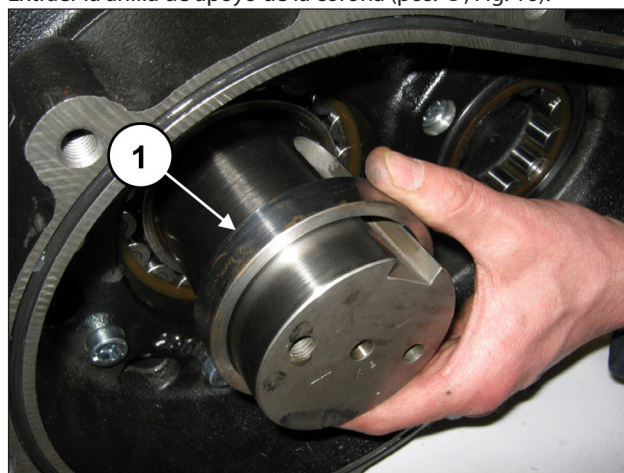


Fig. 16

Aflojar los tornillos de la biela (pos. ①, Fig. 17).

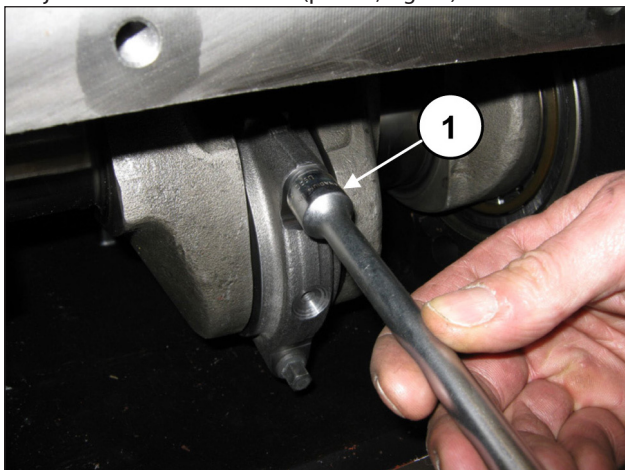


Fig. 17

Desmontar los sombreretes de la biela con los semicojinetes inferiores, controlando el orden de desmontaje.



**Al montar los sombreretes de la biela y sus semibielas se deben respetar el orden y el emparejamiento de desmontaje.**

Para evitar posibles errores, sombreretes y semibielas han sido enumerados en un lateral (pos. ①, Fig. 18).

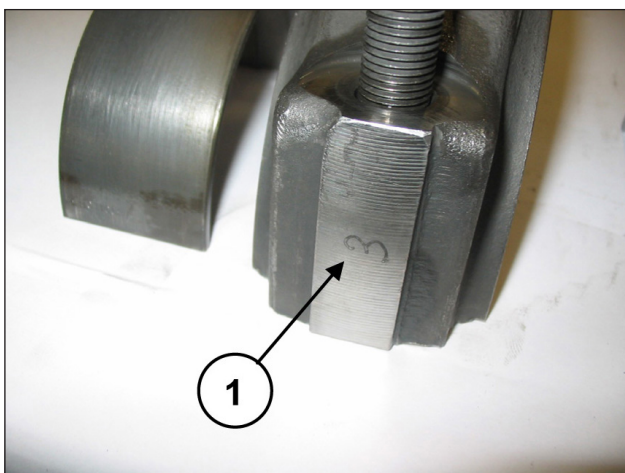


Fig. 18

Desplazar las semibielas hacia la parte hidráulica para extraer el eje acodado. Para facilitar la operación, utilizar la herramienta específica (cód. 27566200), (pos. ①, Fig. 19).

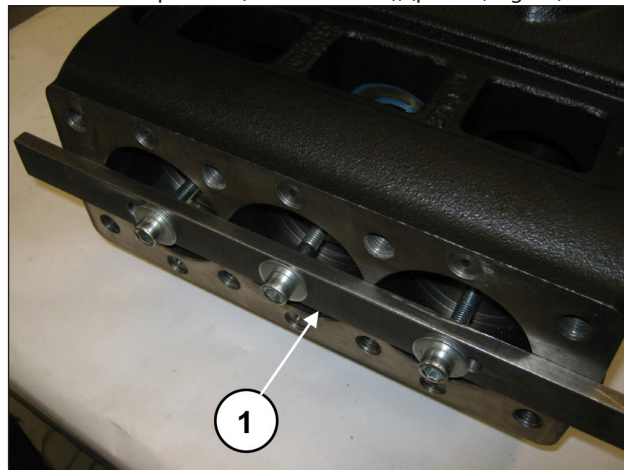


Fig. 19

Extraer los 3 semicojinetes superiores de las semibielas (pos. ①, Fig. 20).

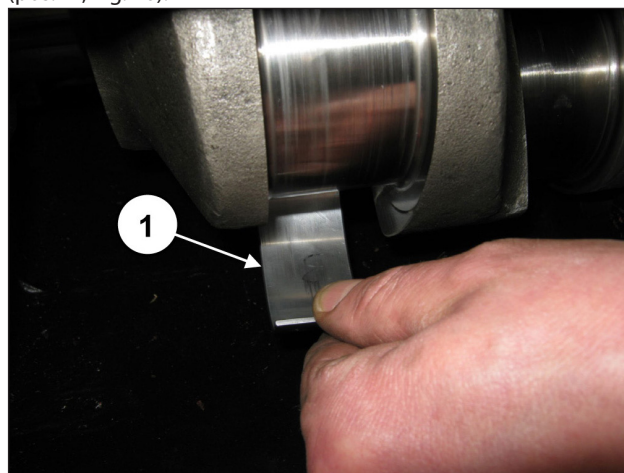


Fig. 20

Aflojar los tornillos de fijación de la caja del reductor (pos. ①, Fig. 21 y Fig. 22).

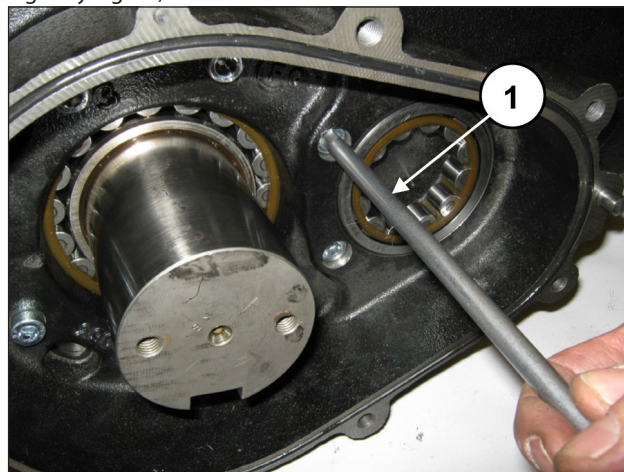


Fig. 21

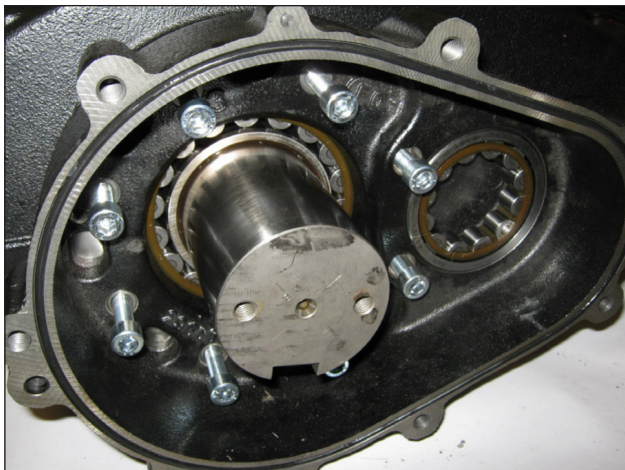


Fig. 22

Enroscar en los orificios específicos 3 tornillos prisioneros o tornillos roscados M8 (pos. ①, Fig. 23) para que actúen de extractores y 2 tornillos M10 lo suficientemente largos como para sujetar la caja del reductor (pos. ②, Fig. 23).

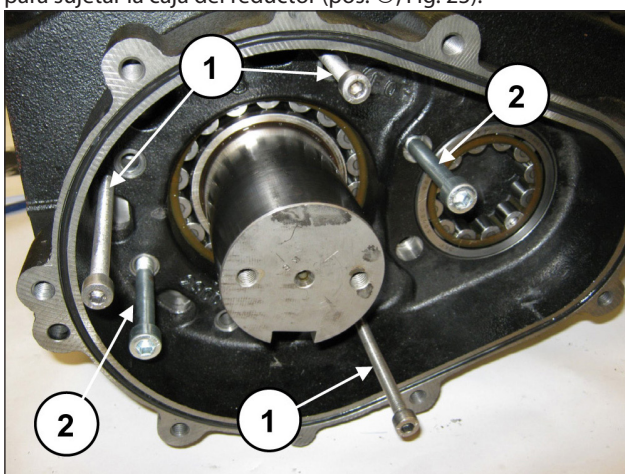


Fig. 23

Apretar de manera gradual los 3 tornillos M8 (pos. ①, Fig. 24) para evitar que la caja se incline demasiado y se bloquee en el alojamiento.

Extraer la caja sujetando el eje para evitar que se dañe (pos. ①, Fig. 25).

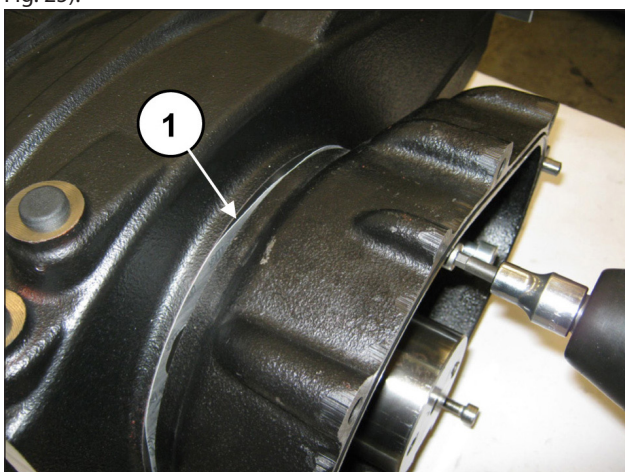


Fig. 24

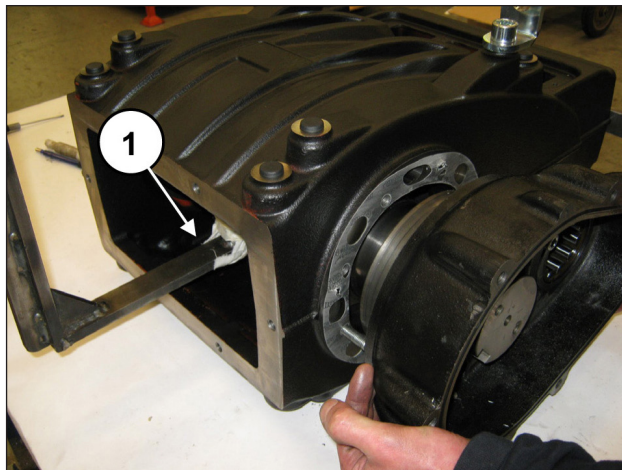


Fig. 25

En la parte opuesta, extraer los tornillos de fijación de la tapa del cojinete (pos. ①, Fig. 26 y Fig. 27).

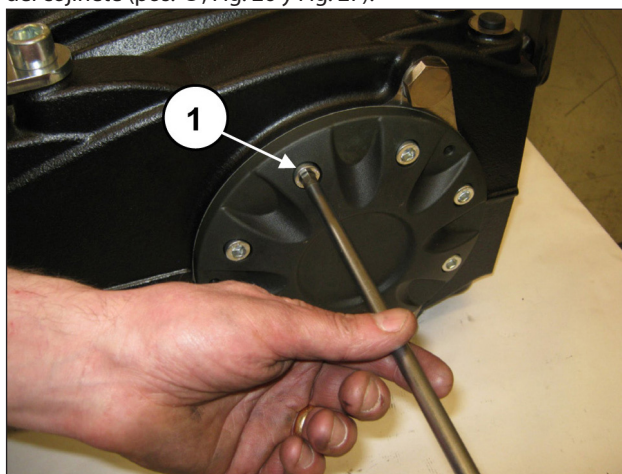


Fig. 26

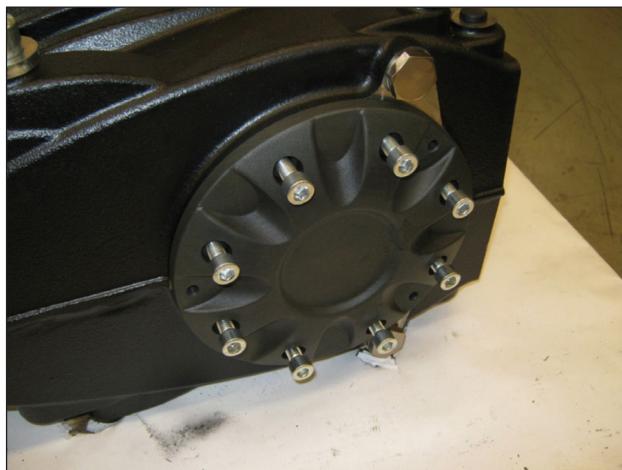


Fig. 27

Enroscar en los orificios específicos 3 tornillos prisioneros o tornillos roscados M8 (pos. ①, Fig. 28) que actúen como extractores.

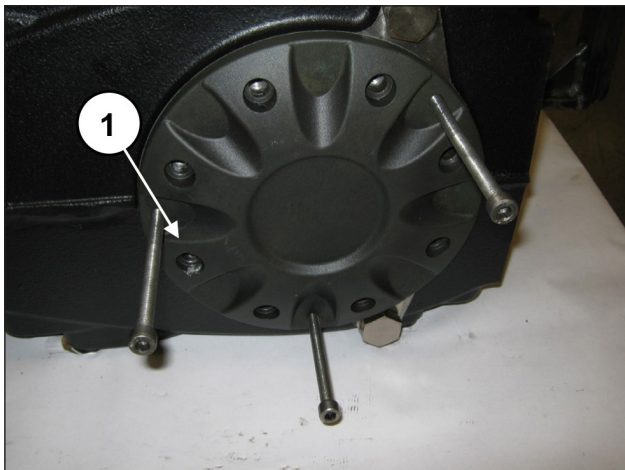


Fig. 28

Apretar de manera gradual los 3 tornillos M8 (pos. ①, Fig. 29) para evitar que la tapa se incline demasiado y se bloquee en el alojamiento.

Extraer la tapa del cojinete sujetando el eje para evitar que se dañe (pos. ①, Fig. 30).

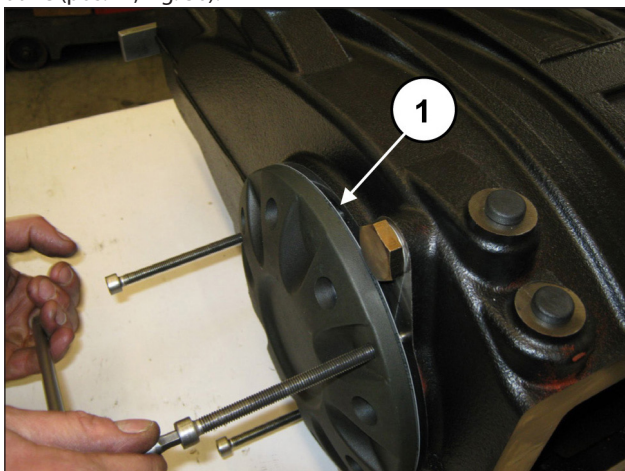


Fig. 29

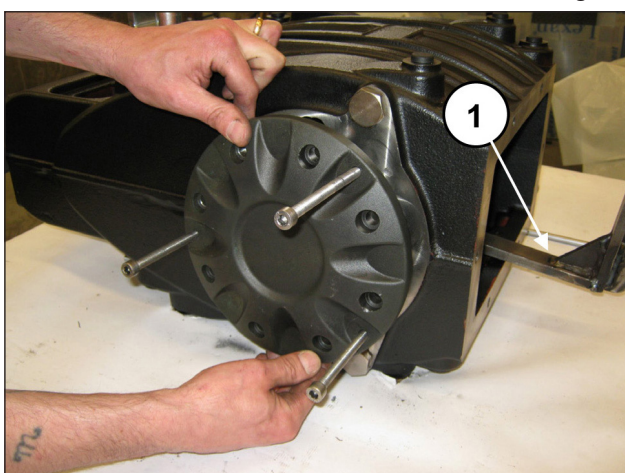


Fig. 30

Extraer el cárter del eje acodado desde el lado del PTO (pos. ①, Fig. 31).

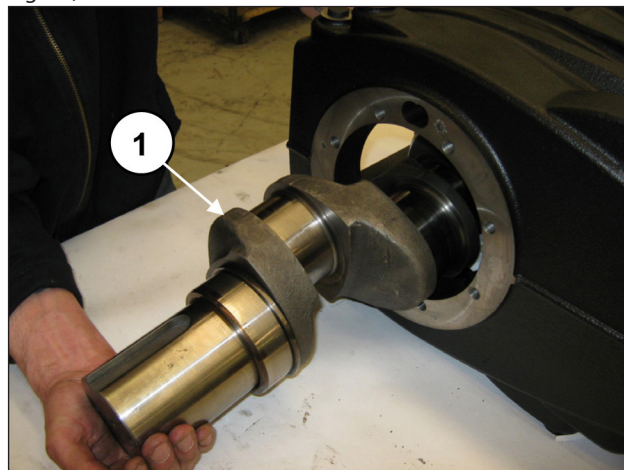


Fig. 31

En aquellos casos en los que sea necesario sustituir una o más bielas, o guías del pistón, actuar del siguiente modo: Aflojar los tornillos de la herramienta cód. 27566200 para desbloquear las bielas (pos. ①, Fig. 32) y, a continuación, extraer los grupos biela-guía del pistón por la abertura posterior del cárter (pos. ①, Fig. 33).

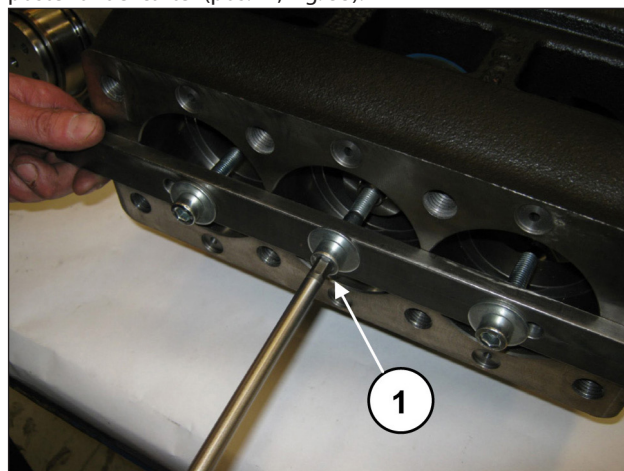


Fig. 32

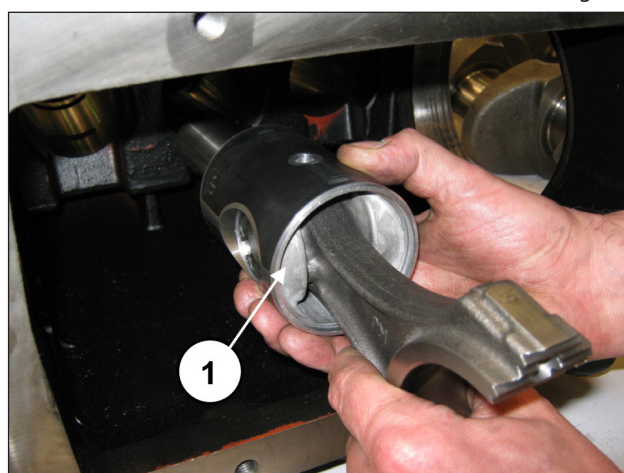


Fig. 33

Ahora es posible desmontar los retenes de la guía del pistón. Proceder con atención para no dañar la leva de deslizamiento de la guía.



**En caso de tener que sustituir los retenes de la guía del pistón sin desmontar la parte mecánica, es posible extraer los retenes utilizando la herramienta cód. 27918500 como se indica a continuación:**



Introducir la herramienta entre el vástago y el labio del retén (pos. ①, Fig. 34) e introducir a fondo la parte cónica en el retén con una herramienta de percusión (pos. ①, Fig. 35).

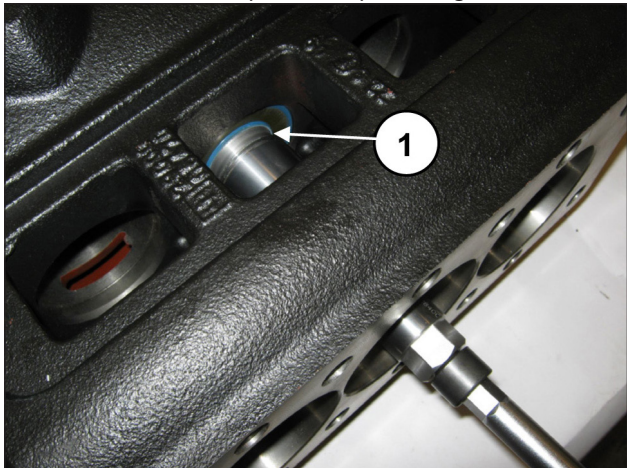


Fig. 34

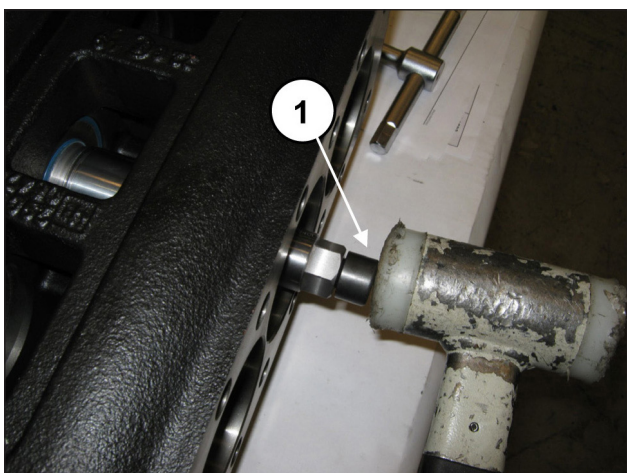


Fig. 35

Extraer el retén utilizando la pieza de percusión de la herramienta (pos. ①, Fig. 36).

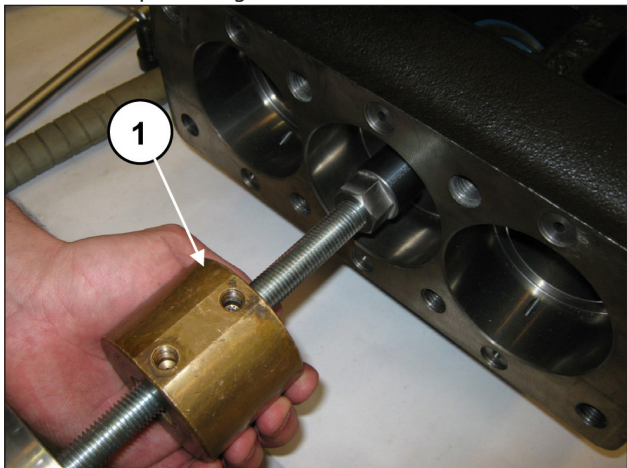


Fig. 36

Desmontar las 2 anillas seeger de bloqueo de la clavija (pos. ①, Fig. 37).



Fig. 37

Extraer la clavija (pos. ①, Fig. 38) y, a continuación, la biela (pos. ①, Fig. 39).

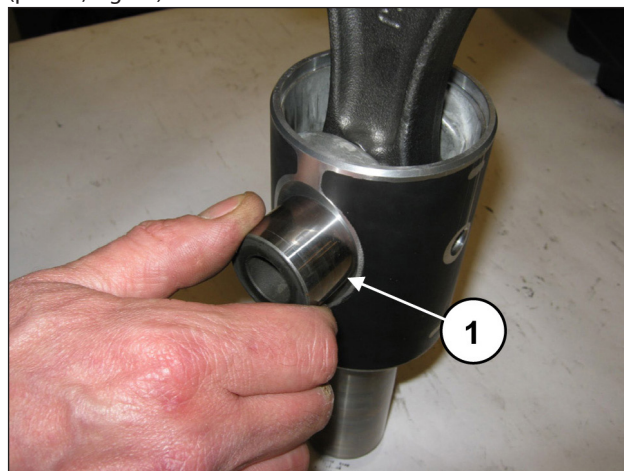


Fig. 38

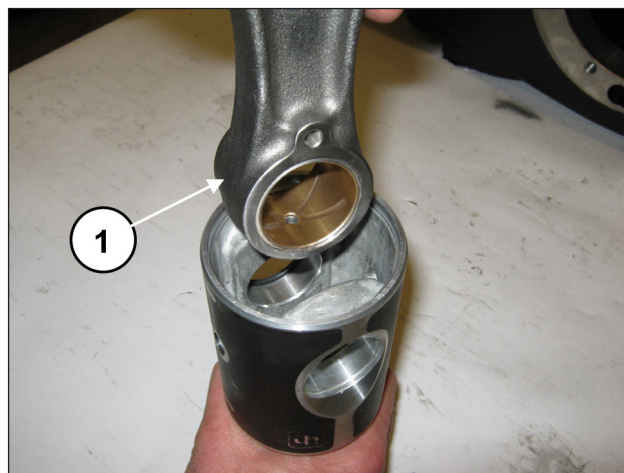


Fig. 39

Acoplar las semibielas en los sombreretes ya desmontados, controlando la numeración (pos. ①, Fig. 40).

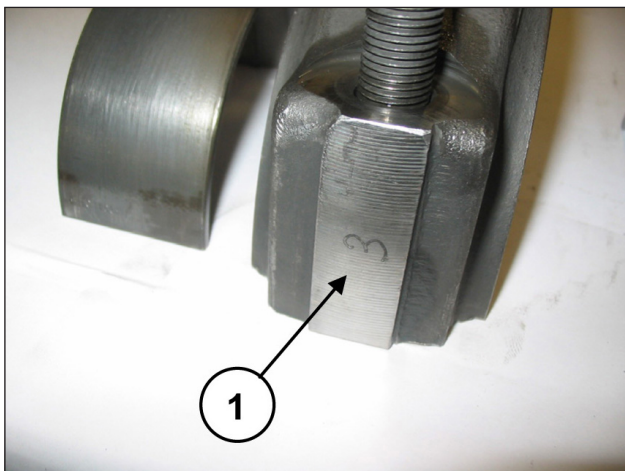


Fig. 40

Para separar el vástago de la guía del pistón, es necesario aflojar los tornillos de cabeza cilíndrica M6 con la llave específica (pos. ①, Fig. 41).

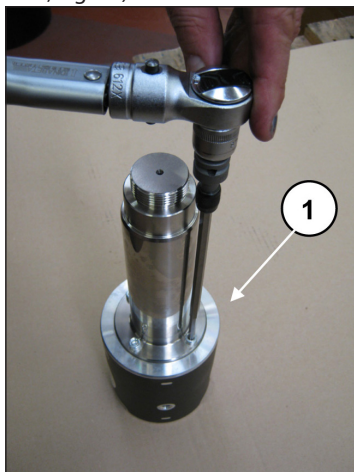


Fig. 41

### 2.1.2 Montaje de la parte mecánica

Seguir en orden contrario la secuencia de desmontaje descrita en el apart. 2.1.1.

La secuencia correcta es la siguiente:

Ensamblar el vástago en la guía del pistón.

Introducir el vástago de guía del pistón en el alojamiento de la guía del pistón (pos. ①, Fig. 42) y fijarlo con los 4 tornillos de cabeza cilíndrica M6x20 (pos. ①, Fig. 43).



Fig. 42



Fig. 43

Bloquear la guía del pistón con la herramienta específica y apretar los tornillos con la llave dinamométrica (pos. ①, Fig. 44) como se indica en el capítulo 3.

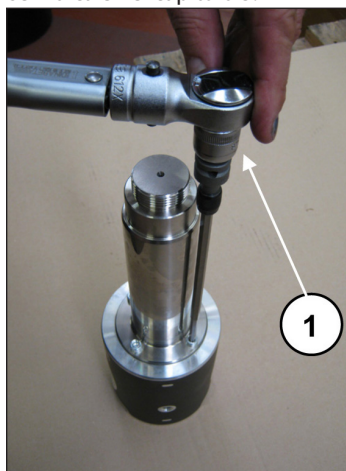


Fig. 44

Introducir la biela en la guía del pistón (pos. ①, Fig. 39) y, a continuación, la clavija (pos. ①, Fig. 38). Aplicar las dos anillas de tope (pos. ①, Fig. 37).



**Si los componentes están montados correctamente, el pie de biela, la guía del pistón y la clavija debe girar libremente.**

Separar los sombreretes de las semibielas; controlar los números laterales para emparejarlos de manera correcta (pos. ①, Fig. 40).

Comprobar que el cárter esté limpio e introducir el grupo semibiela-guía pistón dentro de las levas del cárter (pos. ①, Fig. 33).



**Introducir el grupo semibiela-guía del pistón en el cárter de manera que la numeración de las semibielas pueda verse desde arriba.**

Bloquear los tres grupos con la herramienta cód. 27566200, (pos. ①, Fig. 32).

Premontar la anilla interna de los cojinetes del eje acodado (en ambos lados del eje hasta el tope) utilizando la herramienta cód. 27604700, (pos. ①, Fig. 45) (pos. ①, Fig. 46).



**Las anillas internas y externas de los cojinetes se han de montar respetando el emparejamiento de desmontaje.**



Fig. 45



Fig. 46

Introducir el eje desde el lado del PTO sin golpear los cilindros de las bielas montados anteriormente (pos. ①, Fig. 47) y (pos. ①, Fig. 48).

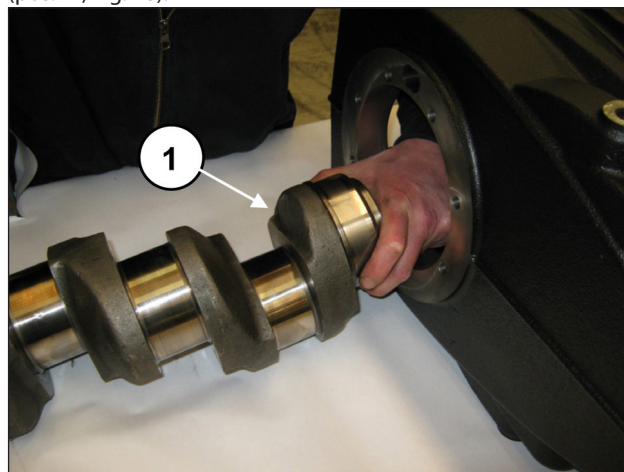


Fig. 47

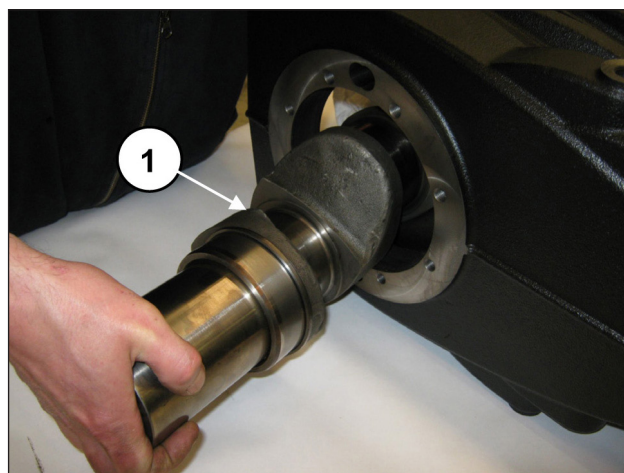


Fig. 48



**El eje acodado se ha de montar de manera que el lado PTO se encuentre en la parte opuesta a los orificios G1/2" para los tapones de descarga de aceite del cárter de la bomba (pos. ②, Fig. 50).**

Continuar hasta que el eje entre por completo en el cárter (pos. ①, Fig. 49 y Fig. 50).

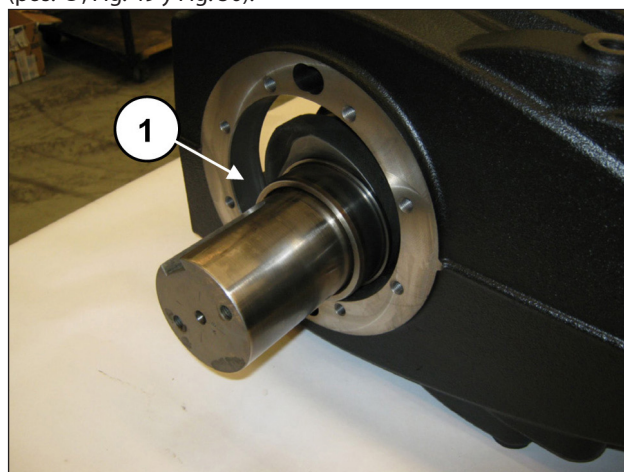


Fig. 49

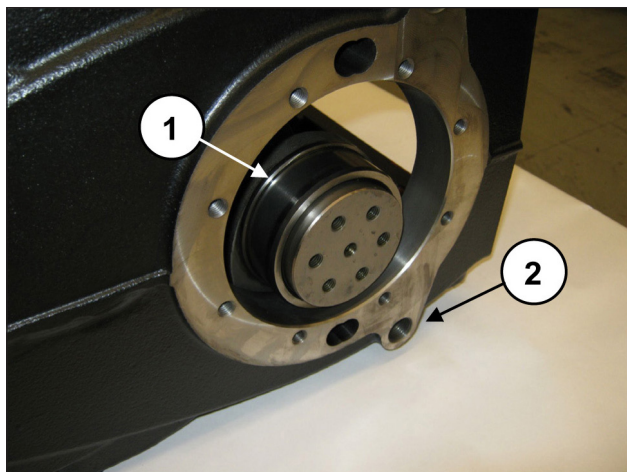


Fig. 50

Premontar la anilla externa del cojinete del piñón en la caja del reductor utilizando la herramienta cód. 27604900, (pos. ①, Fig. 51) para introducirla a fondo (pos. ①, Fig. 52).



Fig. 51

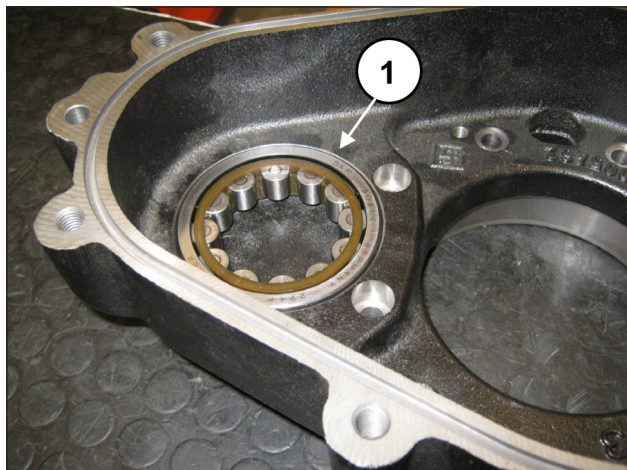


Fig. 52

Desde el lado opuesto de la caja del reductor, premontar la anilla externa del cojinete del eje acodado utilizando la herramienta cód. 27605000, (pos. ①, Fig. 53) para introducirla a fondo (pos. ①, Fig. 54).

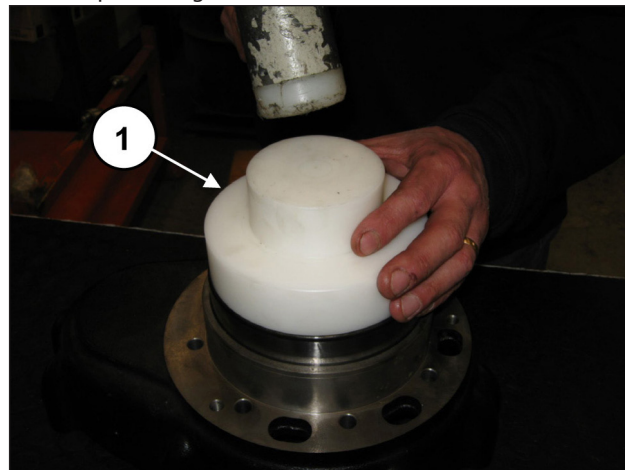


Fig. 53

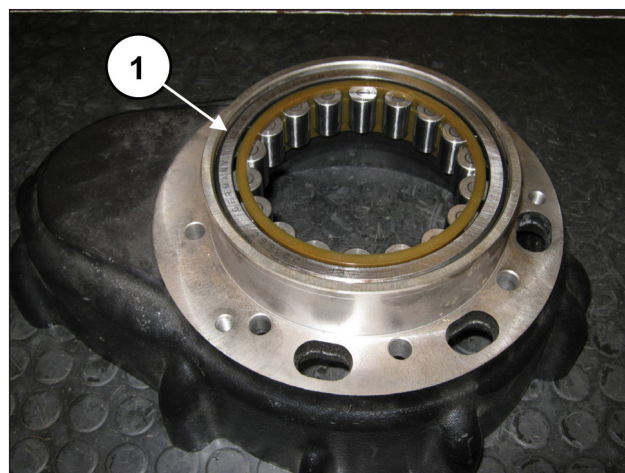


Fig. 54

Repetir la operación en la tapa del cojinete para premontar la anilla externa del cojinete del eje acodado utilizando la herramienta cód. 27605000, (pos. ①, Fig. 55) para introducirla a fondo (pos. ①, Fig. 56).

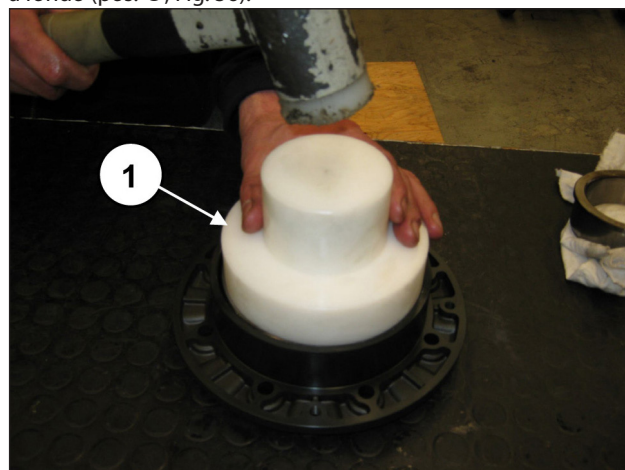


Fig. 55

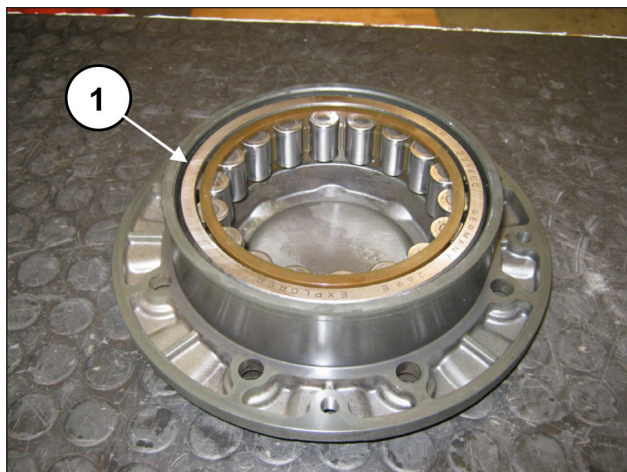


Fig. 56

Introducir la junta lateral en la tapa del cojinete (pos. ①, Fig. 57) y levantar el eje acodado para facilitar la introducción de la tapa (pos. ①, Fig. 58).

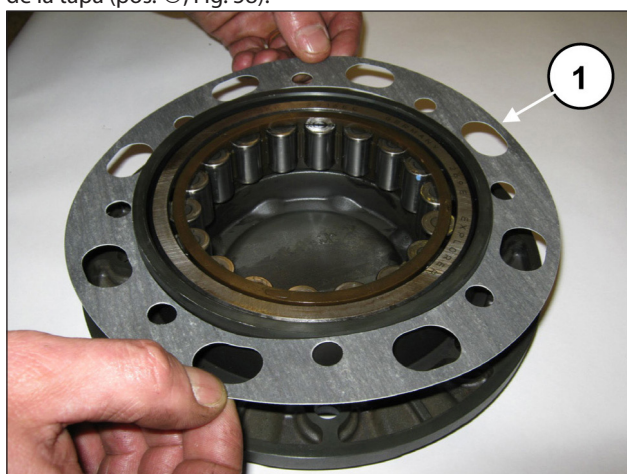


Fig. 57

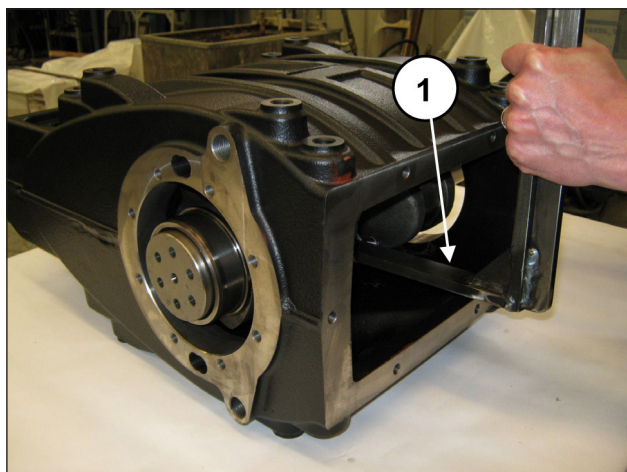


Fig. 58

Montar la tapa del cojinete (y la junta) utilizando una herramienta de percusión (pos. ①, Fig. 59)



Orientar la tapa del cojinete de manera que el logo "Pratissoli" esté en posición horizontal.

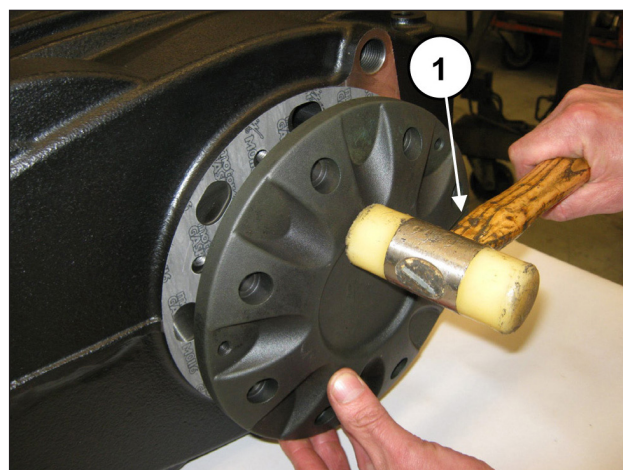


Fig. 59

Apretar los 8 tornillos M10x30 (pos. ①, Fig. 60). Ajustar los tornillos con la llave dinamométrica como se indica en el capítulo 3.

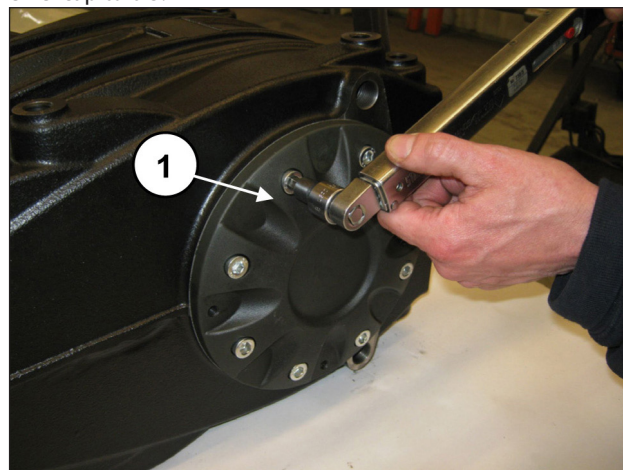


Fig. 60

Desde el lado opuesto, introducir la junta lateral en la caja del reductor (pos. ①, Fig. 61) y levantar el eje acodado para facilitar la introducción de la tapa (pos. ①, Fig. 62).

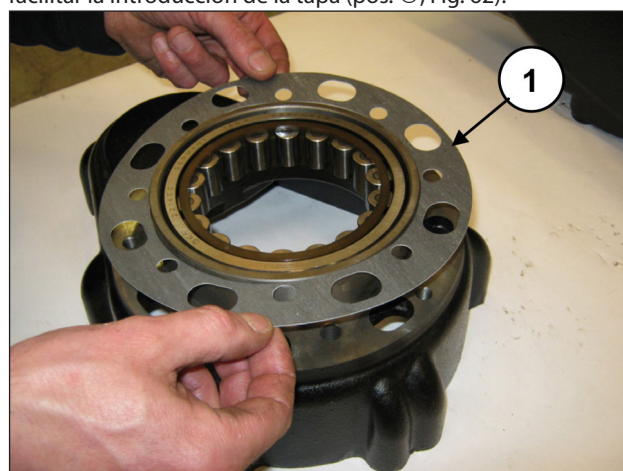


Fig. 61

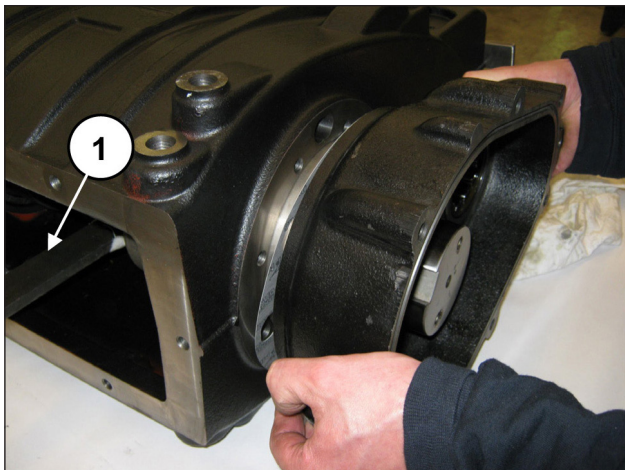


Fig. 62

Montar la caja del reductor (y la junta) utilizando una herramienta de percusión (pos. ①, Fig. 63).

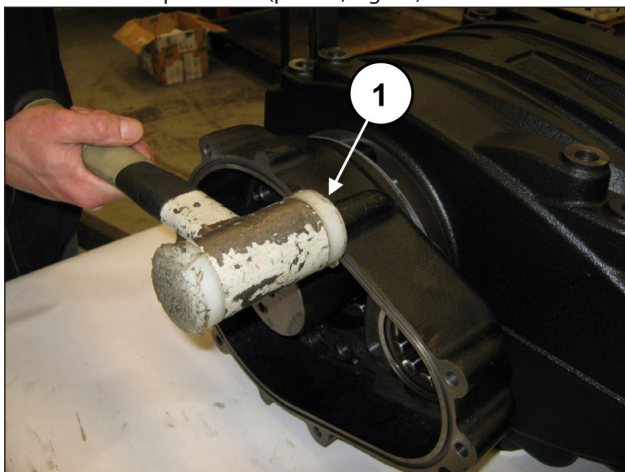


Fig. 63

Apretar los 8 tornillos M10x40 (pos. ①, Fig. 64).  
Ajustar los tornillos con la llave dinamométrica como se indica en el capítulo 3 CALIBRACIÓN DE AJUSTE DE LOS TORNILLOS.

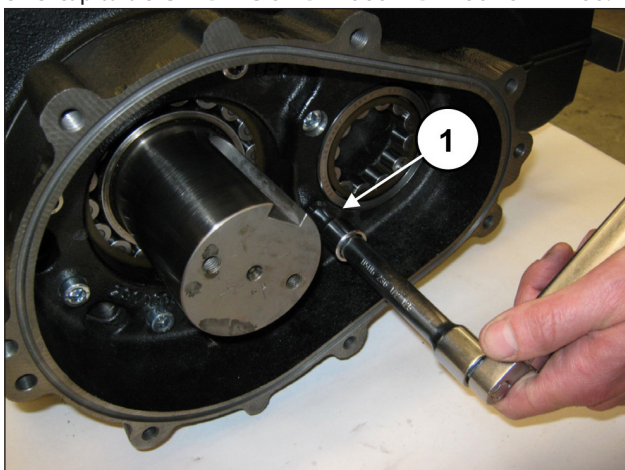


Fig. 64

Desmontar la herramienta que bloquea las bielas cód. 27566200, (pos. ①, Fig. 32).

Introducir los semicojinetes superiores entre las bielas y el eje (pos. ①, Fig. 65).



**Para montar correctamente los cojinetes, la lengüeta de referencia de los semicojinetes debe encajar en el alojamiento de la semibiela (pos. ①, Fig. 66).**

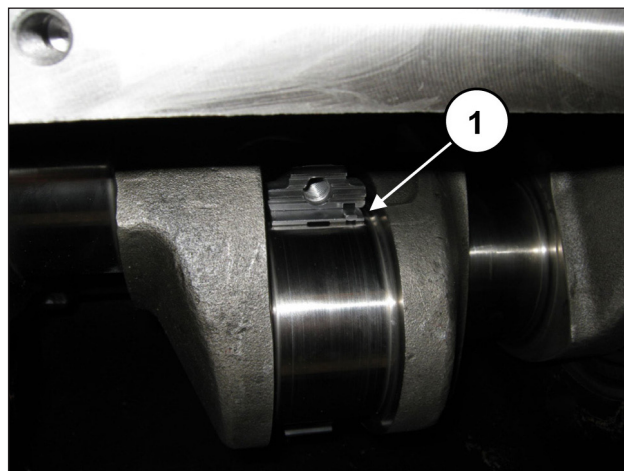


Fig. 65

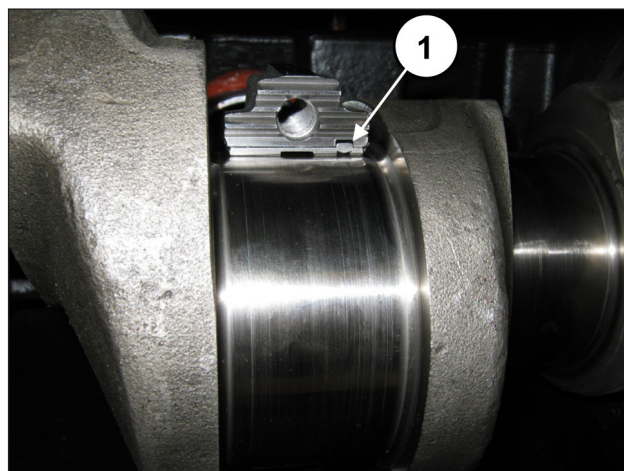


Fig. 66

Montar los semicojinetes inferiores en los sombreretes (pos. ①, Fig. 67). Comprobar que la lengüeta de referencia de los semicojinetes esté dentro del alojamiento del sombrerete (pos. ②, Fig. 67).

Fijar los sombreretes a las semibielas con los tornillos M10x1.5x80 (pos. ①, Fig. 68).



**Prestar atención al sentido correcto de montaje de los sombreretes. La numeración debe estar orientada hacia arriba.**

Ajustar los tornillos con la llave dinamométrica como se indica en el capítulo 3 CALIBRACIÓN DE AJUSTE DE LOS TORNILLOS, aplicando el parte de apriete a los tornillos de manera simultánea.

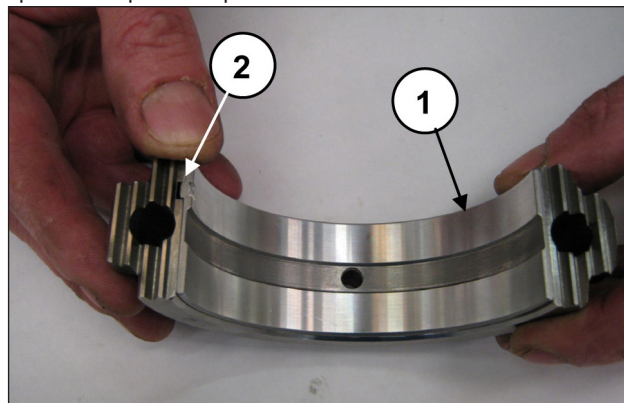


Fig. 67

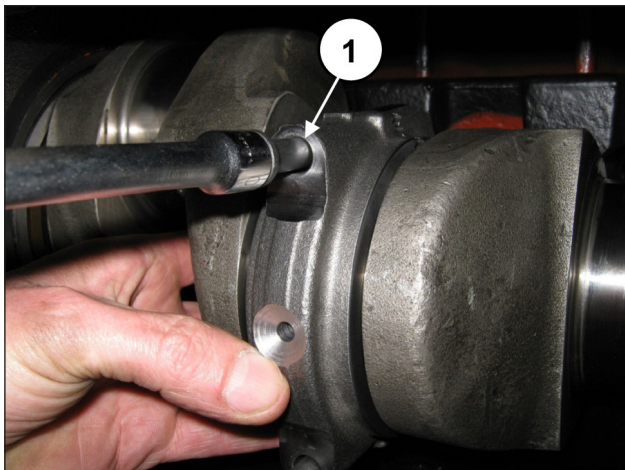


Fig. 68



**Ad terminar las operaciones, comprobar la holgura axial de las bielas en ambas direcciones.**

Introducir el retén de la guía del pistón en el alojamiento del cárter utilizando la herramienta cód. 27605300. Colocar la pieza en el vástago (pos. ①, Fig. 69/a) y golpear la herramienta hasta introducir a fondo el retén en el alojamiento (pos. ①, Fig. 69/b)

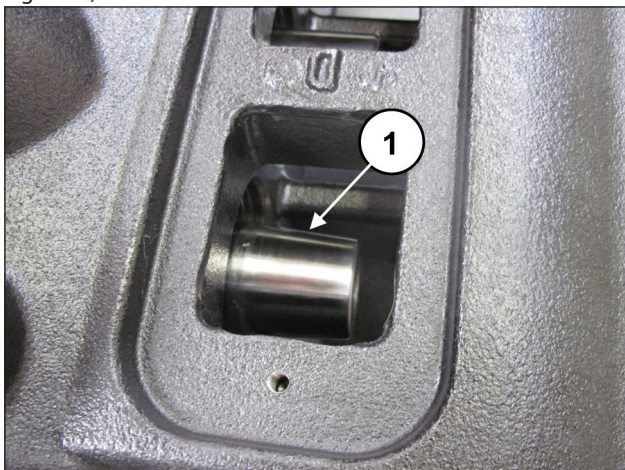


Fig. 69/a

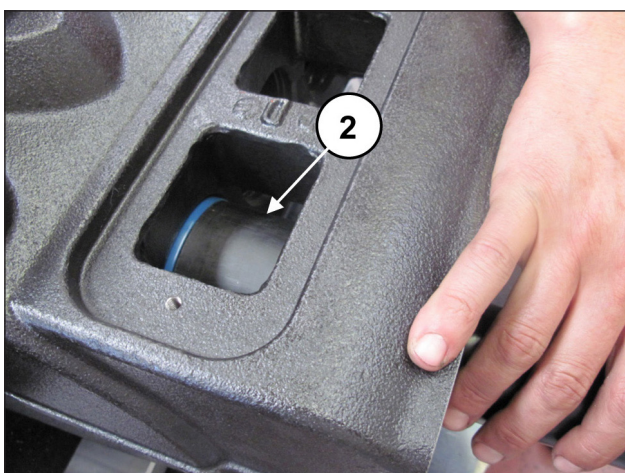


Fig. 69/b

Introducir la junta tórica en la tapa posterior (pos. ①, Fig. 70) y montar la tapa en el cárter con los 6 tornillos M10x30 (pos. ①, Fig. 71).

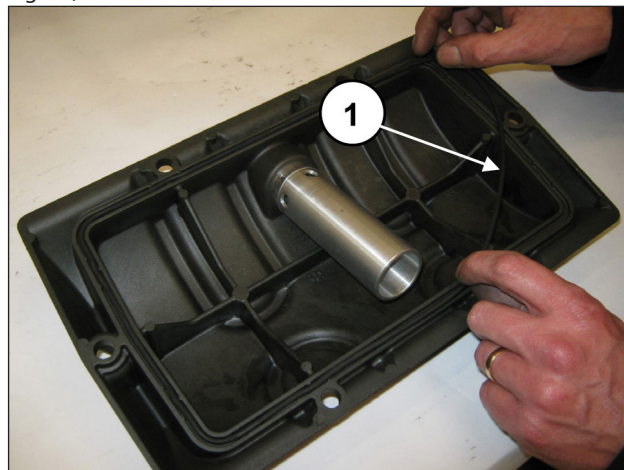


Fig. 70

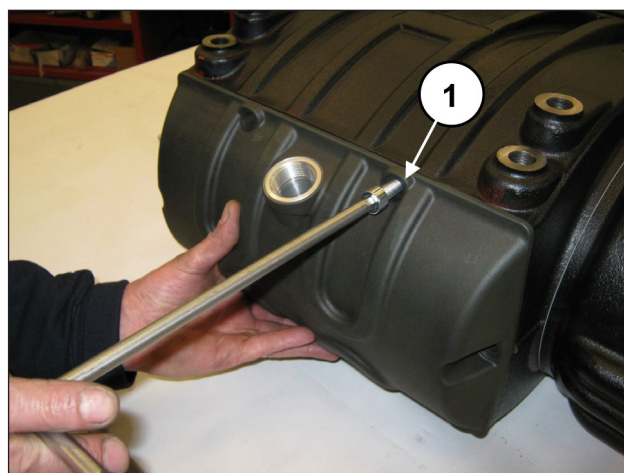


Fig. 71



**Comprobar que la junta tórica entre a fondo en el alojamiento de la tapa para evitar que se dañe al apretar los tornillos.**

Ajustar los tornillos con la llave dinamométrica como se indica en el capítulo 3 CALIBRACIÓN DE AJUSTE DE LOS TORNILLOS. Introducir la anilla de apoyo de la corona en el codo del eje acodado (pos. ①, Fig. 72) hasta el tope (pos. ①, Fig. 73).

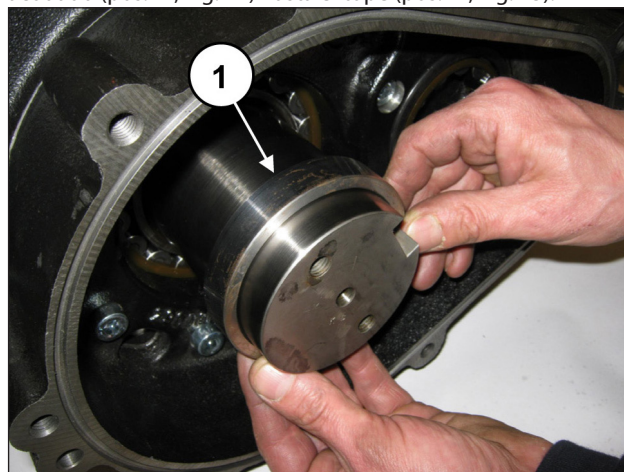


Fig. 72

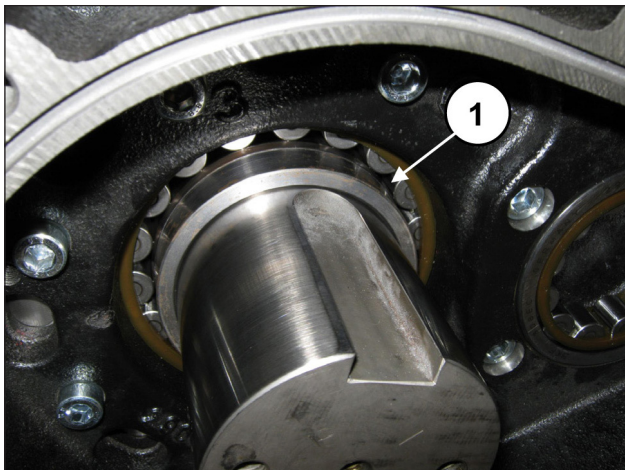


Fig. 73

Introducir la lengüeta 22x14x80 en el alojamiento del eje (pos. ①, Fig. 74) e introducir la corona en el eje (pos. ①, Fig. 75).



**Montar la corona de modo que los dos orificios M8 utilizados para la extracción estén orientados hacia la parte externa de la bomba (pos. ②, Fig. 75).**

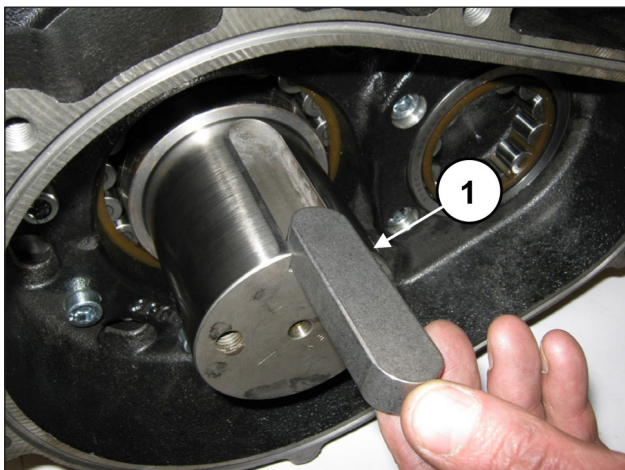


Fig. 74

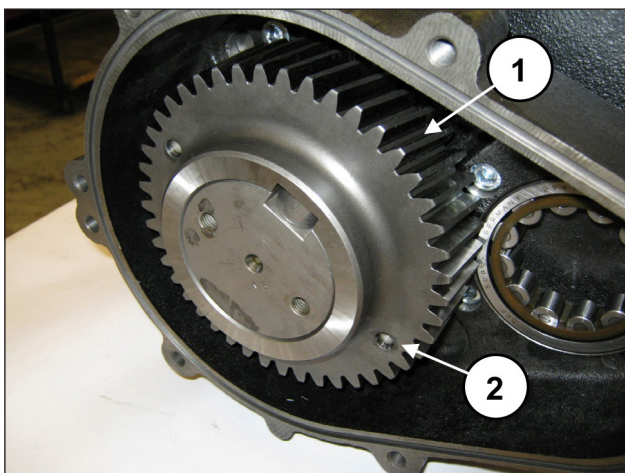


Fig. 75

Fijar el tope de la corona (pos. ①, Fig. 76) con los 2 tornillos M10x25. Ajustar los tornillos con la llave dinamométrica como se indica en el capítulo 3 (pos. ①, Fig. 77).

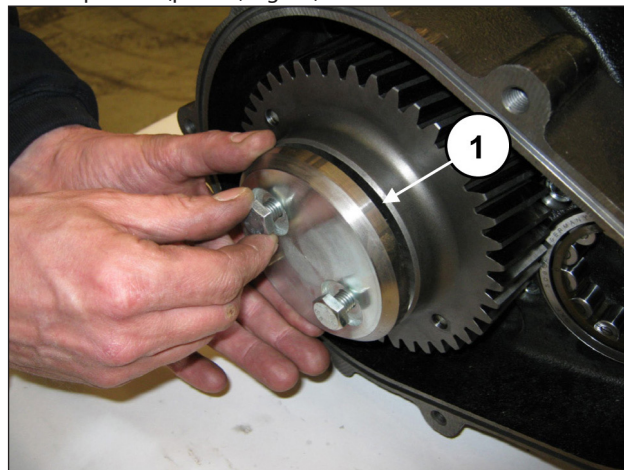


Fig. 76

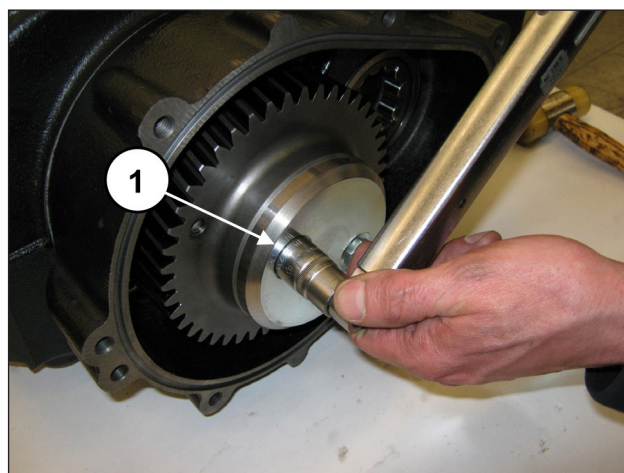


Fig. 77

Colocar las 2 clavijas Ø10x24 en la caja del reductor (pos. ①, Fig. 78) e introducir la junta tórica (pos. ①, Fig. 79).

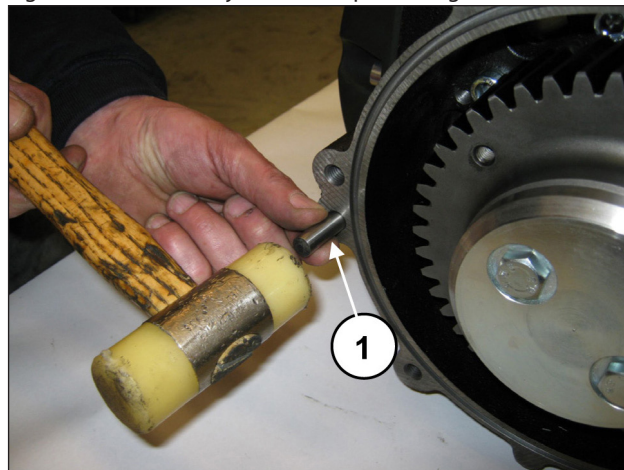


Fig. 78



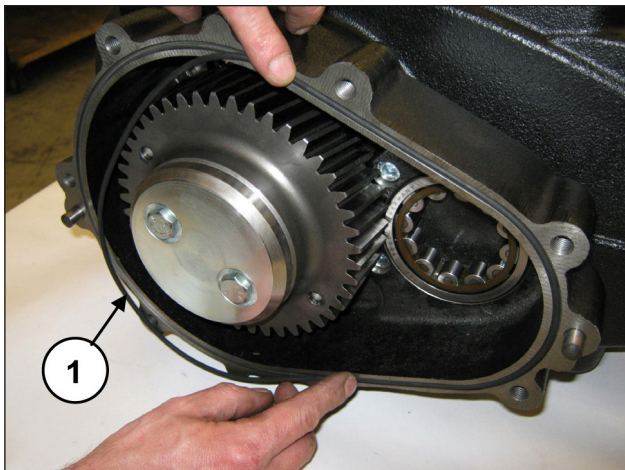


Fig. 79

Ensamblar el piñón en la tapa del reductor como se indica a continuación:

Premontar en el piñón la anilla interna del cojinete 40x90x23 (pos. ①, Fig. 80) introduciéndola a fondo.

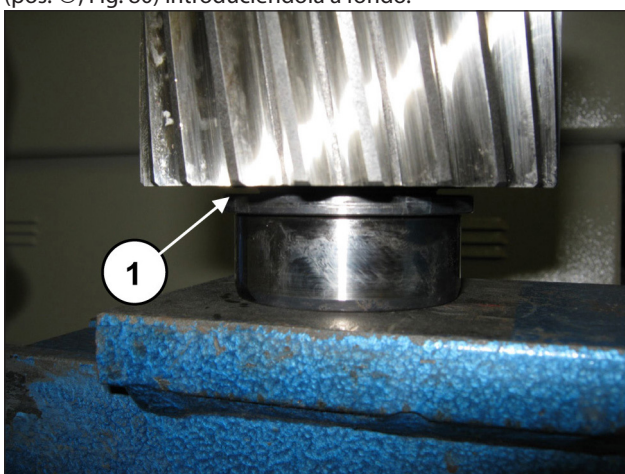


Fig. 80

Desde el lado opuesto del piñón, premontar el cojinete 55x120x29 (pos. ①, Fig. 81) introduciéndolo a fondo con la herramienta cód. 27604800, (pos. ①, Fig. 82).

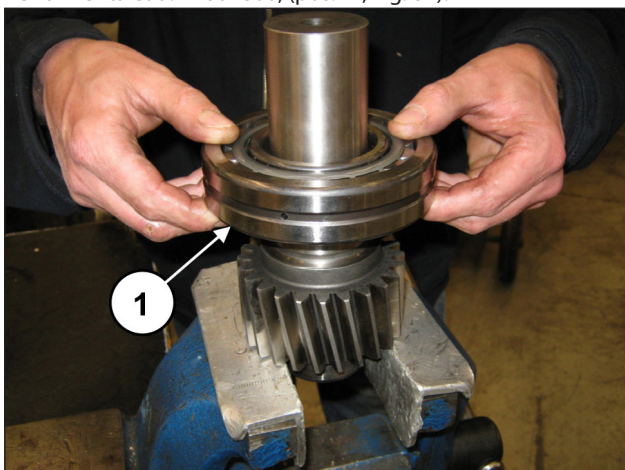


Fig. 81

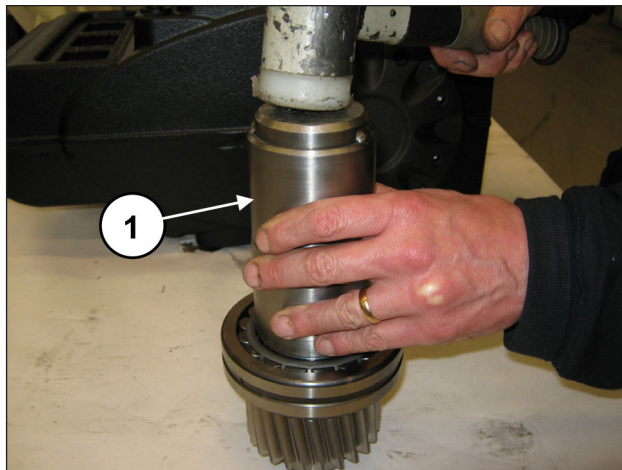


Fig. 82

Introducir la anilla de apoyo del cojinete (pos. ①, Fig. 83) y colocar la anilla seeger Ø55 (pos. ①, Fig. 84).

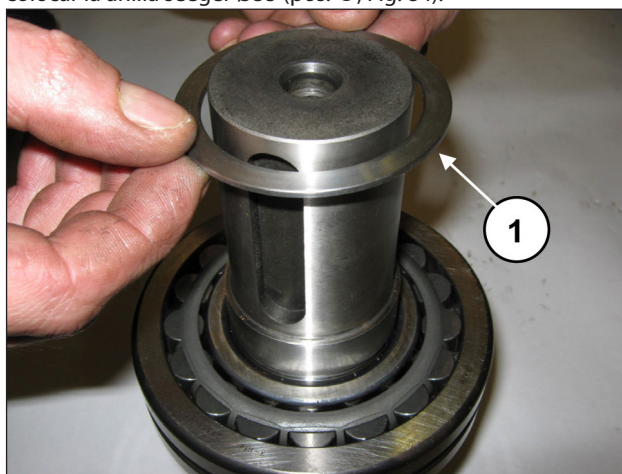


Fig. 83

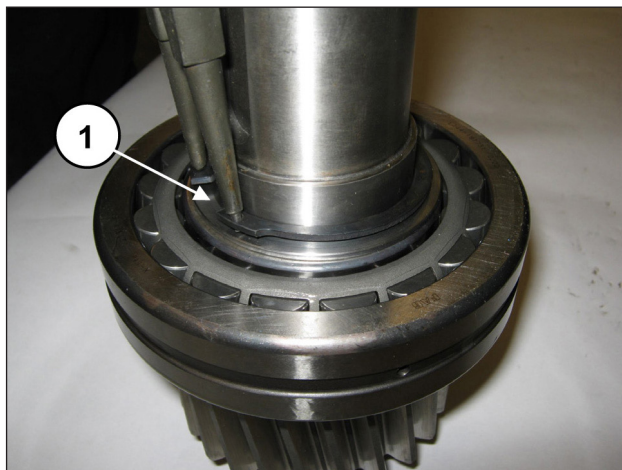


Fig. 84

Introducir el piñón premontado en el alojamiento de la tapa del reductor utilizando una herramienta de percusión (pos. ①, Fig. 85).

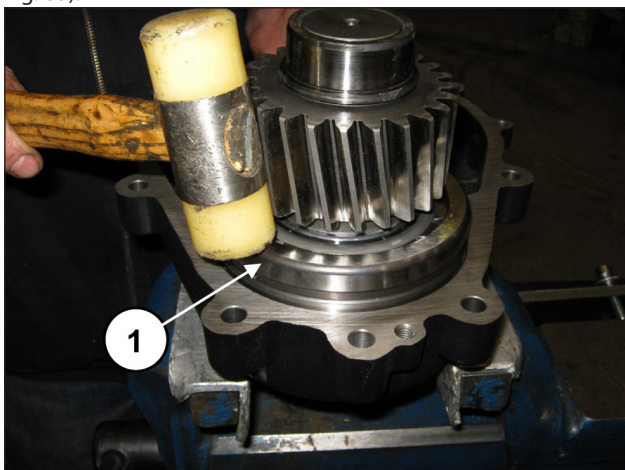


Fig. 85

Introducir en el alojamiento la anilla seeger Ø120 (pos. ①, Fig. 86).

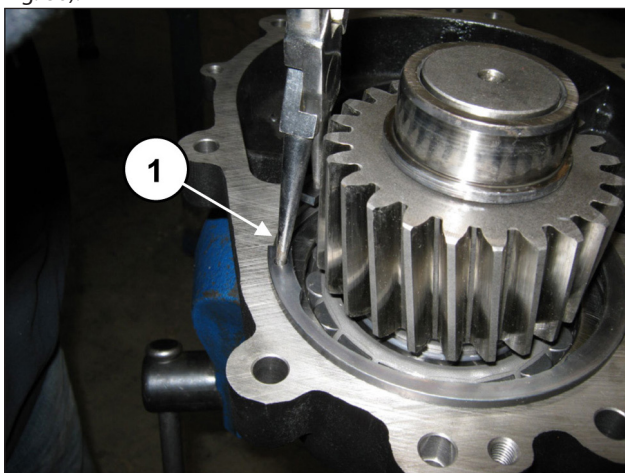


Fig. 86

Montar la tapa del reductor con la herramienta de percusión (pos. ①, Fig. 87) y fijarla con los 7 tornillos M10x40 (pos. ①, Fig. 88).

Controlar el ensamblaje de los dos elementos del cojinete 40x90x23.

Ajustar los tornillos con la llave dinamométrica como se indica en el capítulo 3.

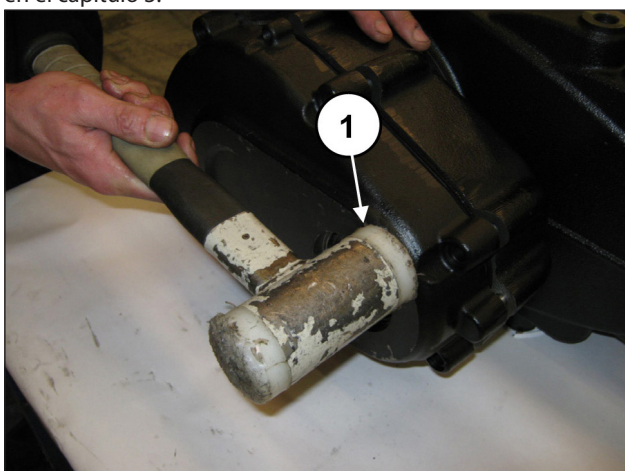


Fig. 87

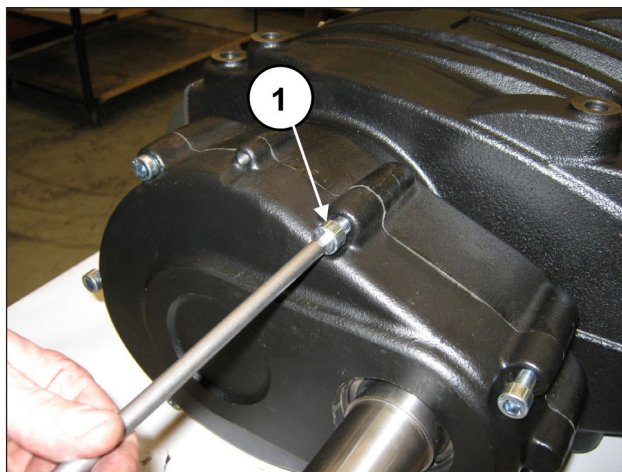


Fig. 88

Introducir el retén en la tapa del reductor utilizando la herramienta cód. 27605200, (pos. ①, Fig. 89).

Antes de montar el retén, comprobar las condiciones del labio de estanqueidad. Si se ha de sustituir, colocar una anilla nueva en el fondo del alojamiento como se indica en la Fig. 90.



**En el caso que el eje presente un desgaste diametral en correspondencia con el labio de retención, con el fin de evitar tener que realizar la operación de rectificación, es posible volver a colocar la anilla en el segundo tope como se indica en la Fig. 90.**



Fig. 89

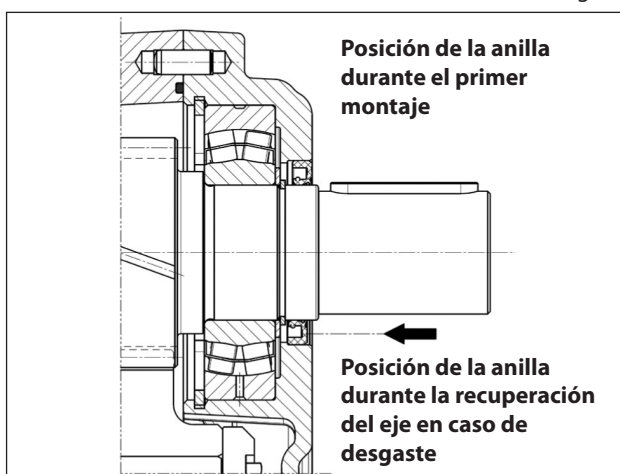


Fig. 90



**Introducir el retén en el piñón con cuidado para no dañarlo.**

Aplicar las tapas de inspección con la junta tórica (pos. ①, Fig. 91) y fijarlas con 2+2 tornillos M6x14 (pos. ①, Fig. 92). Ajustar los tornillos con la llave dinamométrica como se indica en el capítulo 3 CALIBRACIÓN DE AJUSTE DE LOS TORNILLOS.

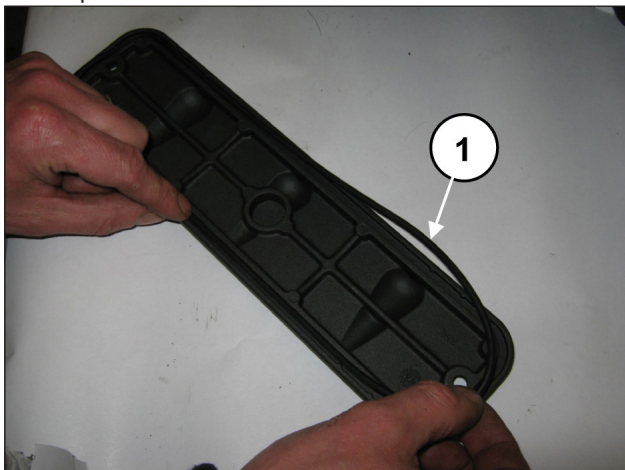


Fig. 91

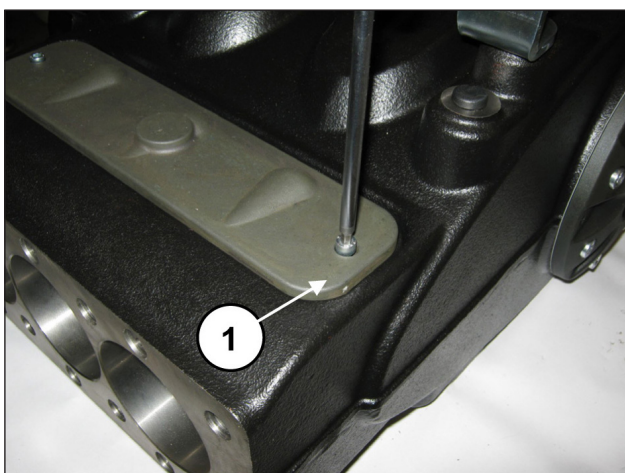


Fig. 92

Introducir la lengüeta 14x9x60 en el piñón. Aplicar los tapones y las bridas de elevación con los tornillos M16x30 (pos. ①, Fig. 93).

Ajustar los tornillos con la llave dinamométrica como se indica en el capítulo 3 CALIBRACIÓN DE AJUSTE DE LOS TORNILLOS.

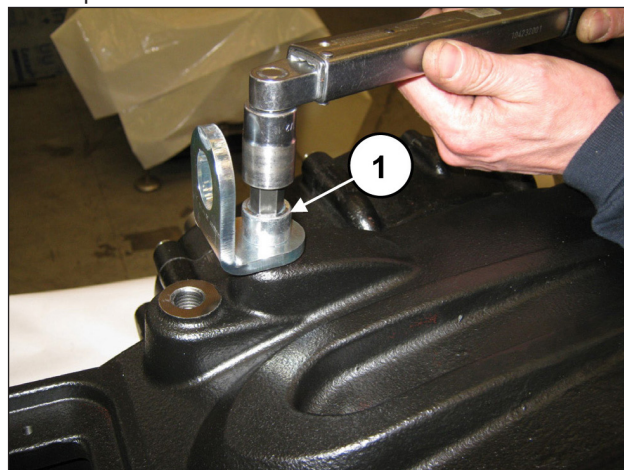


Fig. 93

Introducir el aceite en el cárter tal y como se indica en el *Manual de uso y mantenimiento*, punto 7.4.

### 2.1.3 Clases de mayoraciones y minoraciones previstas

TABLA DE MINORACIONES PARA EJE ACODADO Y SEMICOJINETES DE LA BIELA			
Clases de recuperación (mm)	Código semicojinete superior	Código semicojinete inferior	Rectificación sobre el diámetro del perno del eje (mm)
0.25	90928100	90928400	Ø79.75 0/-0.02 Ra 0.4 Rt 3.5
0.50	90928200	90928500	Ø79.50 0/-0.02 Ra 0.4 Rt 3.5

TABLA DE MAYORACIONES PARA CÁRTER DE LA BOMBA Y GUÍA DEL PISTÓN		
Clases de recuperación (mm)	Código de la guía pistón	Rectificación en alojamiento del cárter de la bomba (mm)
1.00	73050543	Ø71 H6 +0.019/0 Ra 0.8 Rt 6

## 2.2 REPARACIÓN DE LA PARTE HIDRÁULICA

### 2.2.1 Desmontaje de cabeza – camisas - válvulas

La cabeza no requiere un mantenimiento periódico. Las intervenciones se limitan a la inspección o sustitución de las válvulas, en el caso que sea necesario: Para extraer los grupos de válvula operar del siguiente modo: Aflojar, sin extraerlos, los tornillos M10x140 que fijan las camisas a la cabeza (pos. ①, Fig. 94) para liberarlas.

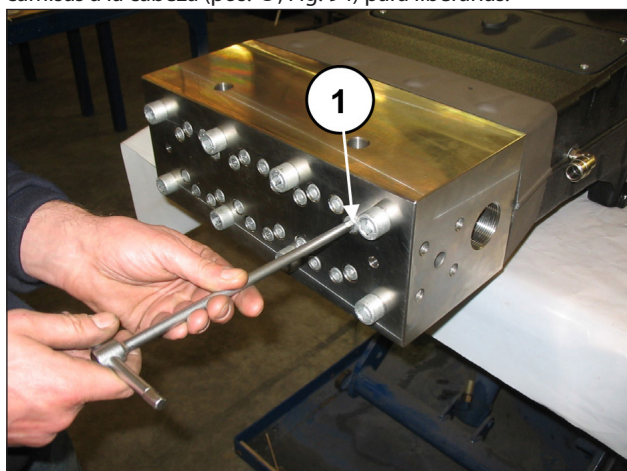


Fig. 94

Aflojar los dos tornillos diametralmente opuestos de fijación de la cabeza M16x320 (pos. ① y ②, Fig. 95) sustituyéndolos con dos tornillos - clavija de servicio (cód. 27540200) (pos. ①, Fig. 96). A continuación, extraer los tornillos restantes.

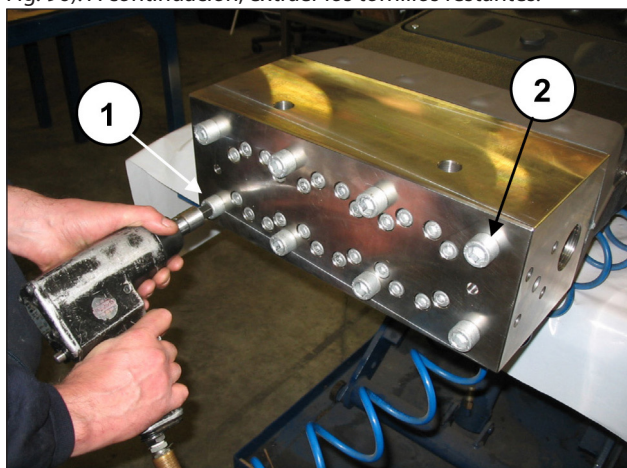


Fig. 95

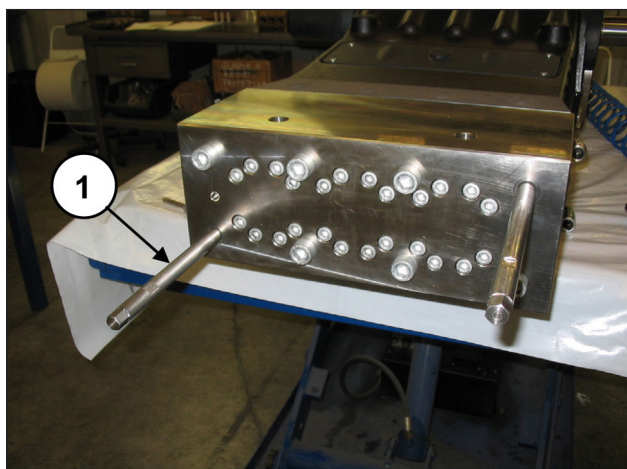


Fig. 96

Desmontar la cabeza y el distanciador de las camisas del cárter de la bomba (pos. ①, Fig. 97).

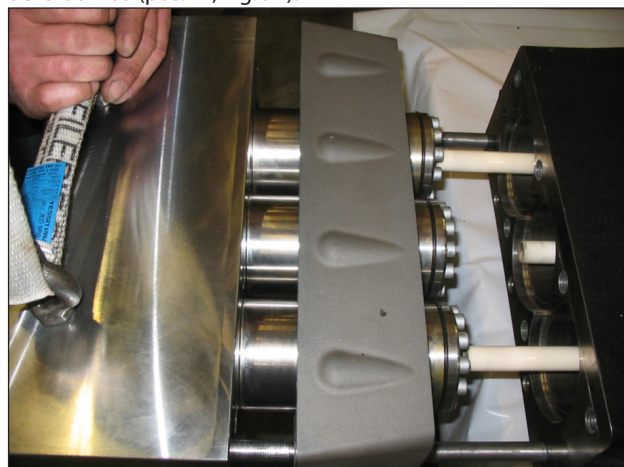


Fig. 97

Extraer el distanciador de las camisas de los grupos de camisas (pos. ①, Fig. 98).

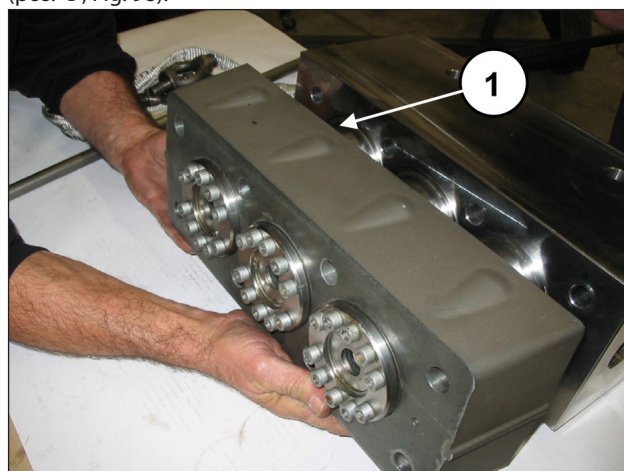


Fig. 98

Extraer los tornillos M10x140 que fijan las camisas a la cabeza (pos. ①, Fig. 99) y extraer los grupos de camisas (pos. ①, Fig. 100).

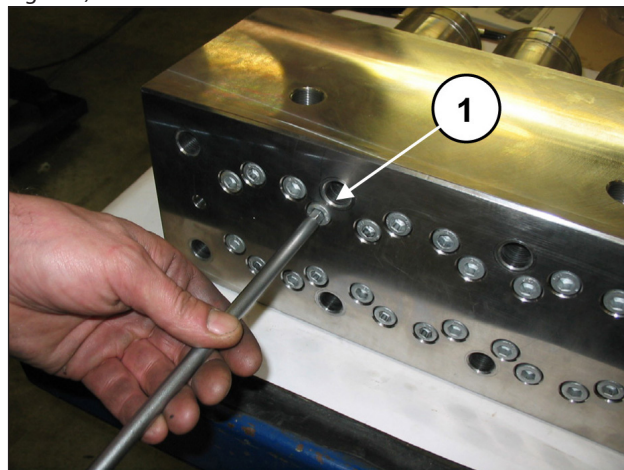


Fig. 99

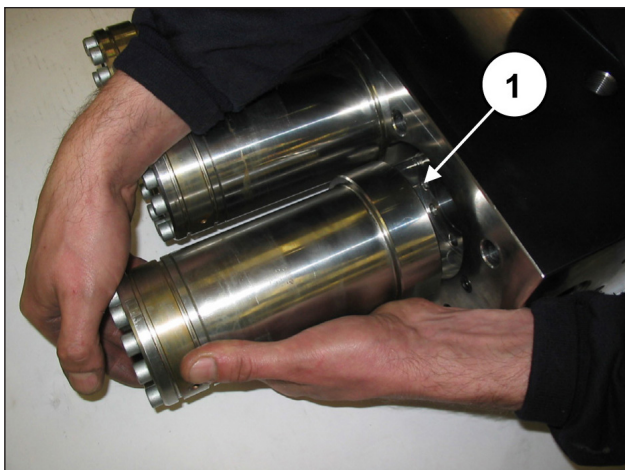


Fig. 100



**Durante el desmontaje de las camisas es importante no perder los muelles de la válvula ni las válvulas planas (pos. ① y ②, Fig. 101), ya que al no estar bloqueadas podrían caerse.**

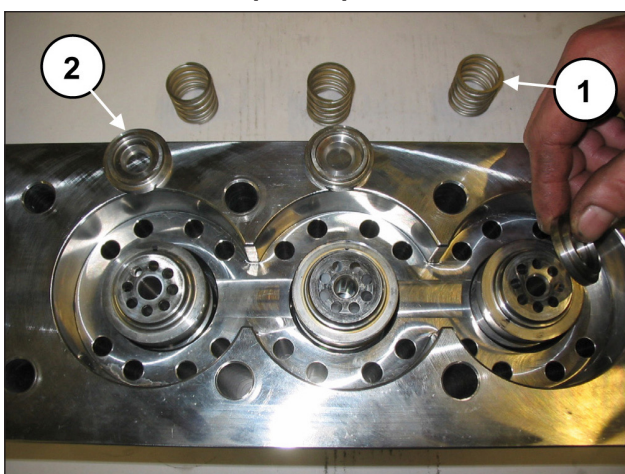


Fig. 101



**Si las sedes de la válvula están bloqueadas en la cabeza debido a los depósitos de cal o al óxido, desbloquearlas introduciendo la herramienta adecuada (cód. 034300020) en el orificio de envío (pos. ①, Fig. 102).**

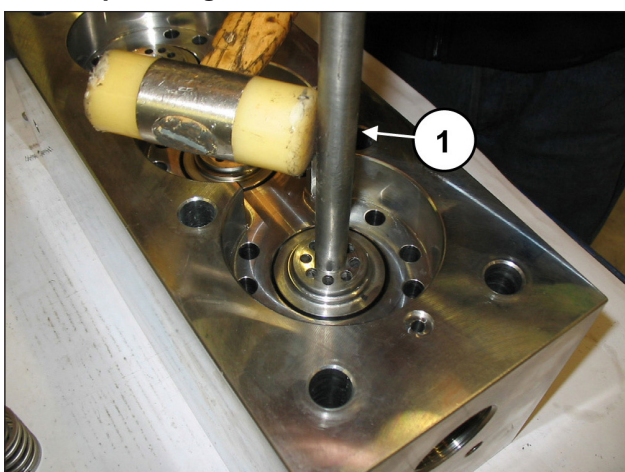


Fig. 102

Extraer los alojamientos de la válvula y controlar el desgaste de las juntas.

Si es necesario, sustituir las (pos. ①, Fig. 103).

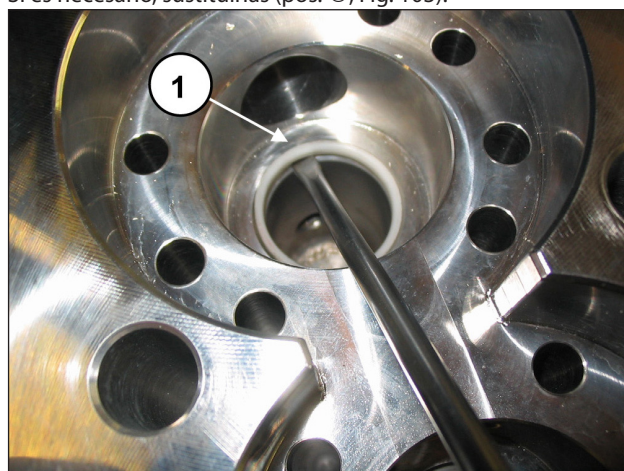


Fig. 103



**Cada vez que se inspeccionan las válvulas, se deben sustituir todas las anillas de retención y las juntas tóricas de retención frontal situadas entre la camisa y la cabeza, y entre la cabeza y el espaciador de las camisas de la zona del orificio de recirculación. Antes de volver a montar los componentes, limpiar y secar tanto los componentes como los alojamientos internos de la cabeza.**

Extraer los platillos de envío (pos. ①, Fig. 104), y sus guías (pos. ①, Fig. 106), con los muelles (pos. ①, Fig. 105). Controlar el desgaste y, si es necesario, sustituirlos respetando, en cualquier caso, los intervalos indicados en el capítulo 11 del *Manual de uso y mantenimiento*.

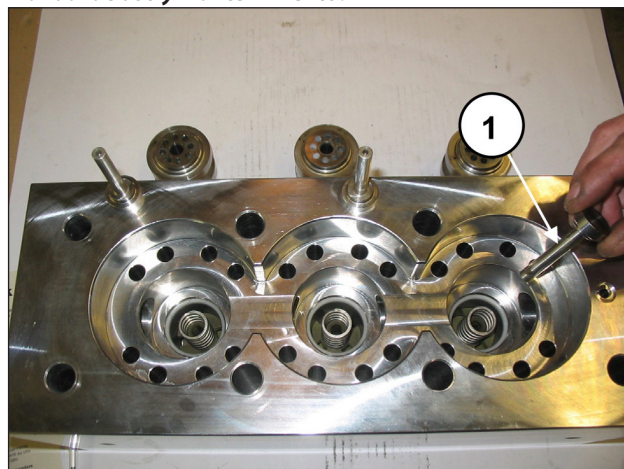


Fig. 104

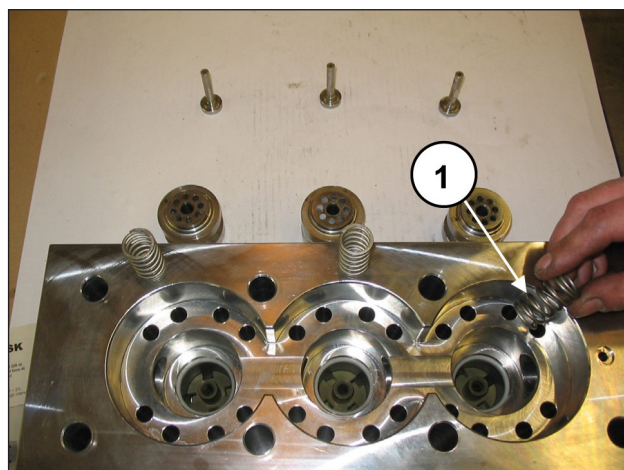


Fig. 105

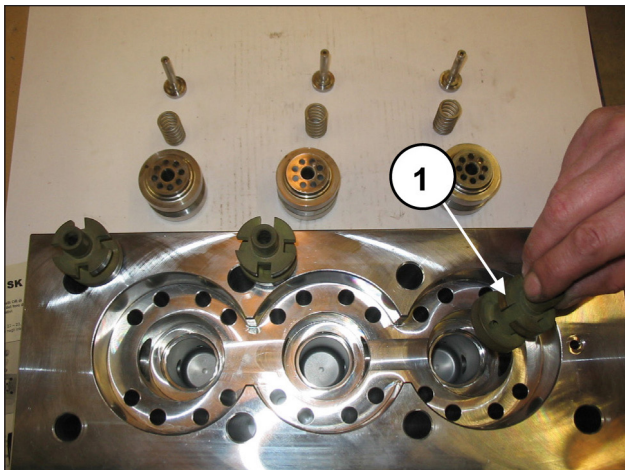


Fig. 106

### 2.2.2 Montaje de cabeza – camisas - válvulas

Para volver a montar los diferentes componentes invertir la secuencia de operaciones descrita anteriormente con cuidado de montar correctamente el distanciador de las camisas: el orificio  $\varnothing 6$  (circuito de refrigeración de las juntas) debe coincidir con el orificio análogo del cabezal (con junta tórica).

#### **Cabezas - camisas: montar y ajustar los tornillos de fijación de la cabeza y ajustar los tornillos de fijación de las camisas.**

Para los valores de los pares de apriete y las secuencias de ajuste de los tornillos respetar las indicaciones contenidas en el capítulo 3.

### 2.2.3 Desmontaje del grupo pistón - soportes - juntas

El grupo pistón no requiere un mantenimiento periódico. Sólo es necesario inspeccionar el drenaje del circuito de refrigeración. Si se detectan anomalías y oscilaciones en el manómetro de envío o pulsaciones en el tubo de drenaje del circuito de refrigeración (si es elástico), controlar y sustituir el paquete de juntas.

Para extraer los grupos de pistón operar del siguiente modo: Desmontar la cabeza y el distanciador de las camisas del cárter de la bomba como se indica en el apart. 2.2.1 (de Fig. 94 a Fig. 100).

Quitar la tapa de inspección superior aflojando los 2 tornillos de fijación (pos. ①, Fig. 107).



Fig. 107

Desmontar las bombas con una llave de horquilla (pos. ①, Fig. 108) y controlar su desgaste (pos. ①, Fig. 109). Sustituirlos si es necesario.

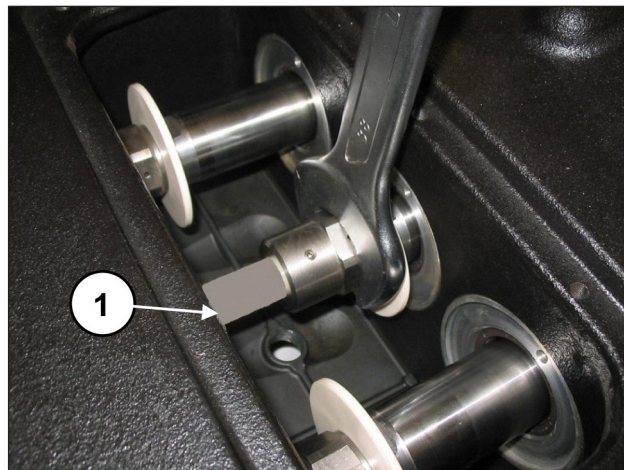


Fig. 108

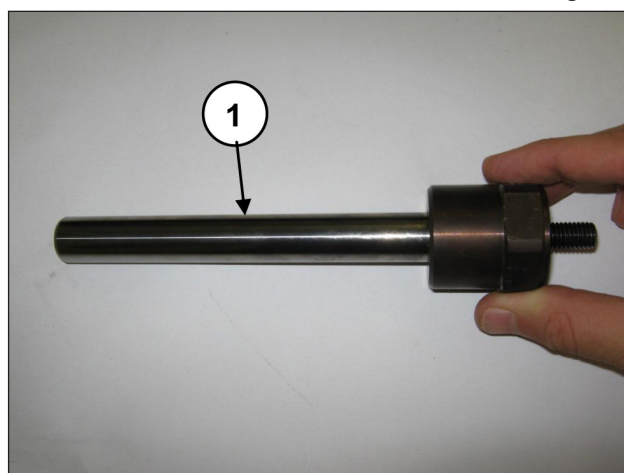


Fig. 109

Extraer los tornillos M8x50 que fijan el soporte a la camisa (pos. ①, Fig. 110) y separar el soporte de la camisa (pos. ①, Fig. 111).

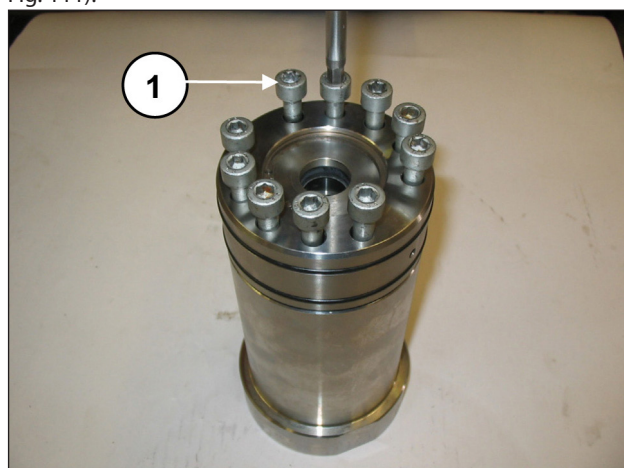


Fig. 110

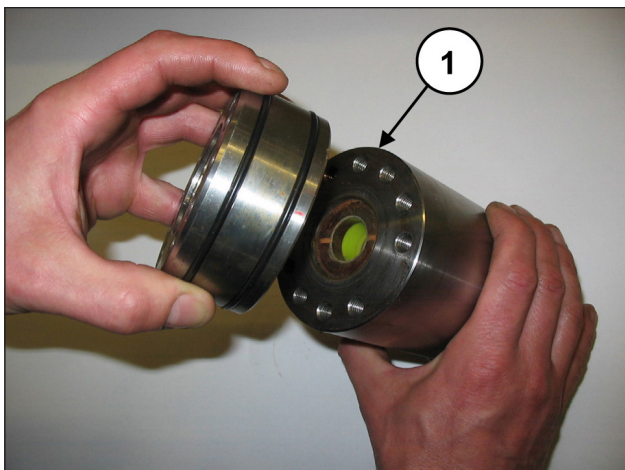


Fig. 111

Desmontar la anilla seeger y la anilla de retén de las juntas (pos. ①, Fig. 112) y extraer con una clavija de plástico la junta de retén LP (baja presión) (pos. ①, Fig. 113).



Fig. 112

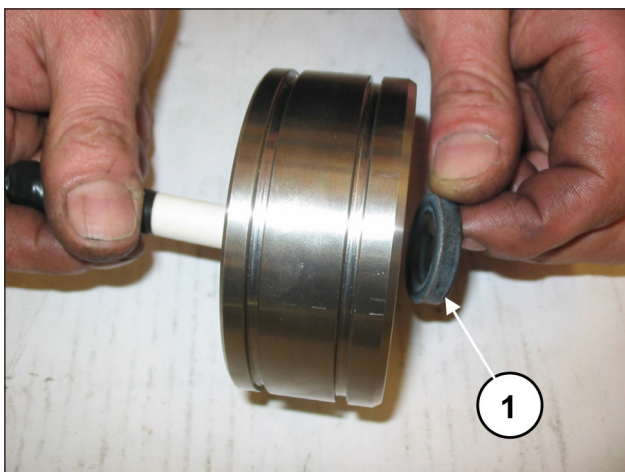


Fig. 113



Sustituir las juntas de baja presión y las juntas tóricas cada vez que se realicen operaciones de desmontaje.

Con la camisa separada del soporte de juntas y utilizando una clavija de plástico (pos. ①, Fig. 114) extraer el paquete HP (alta presión) (pos. ①, Fig. 115).



Sustituir el paquete HP (pos. ①, Fig. 115) cada vez que se realicen operaciones de desmontaje.

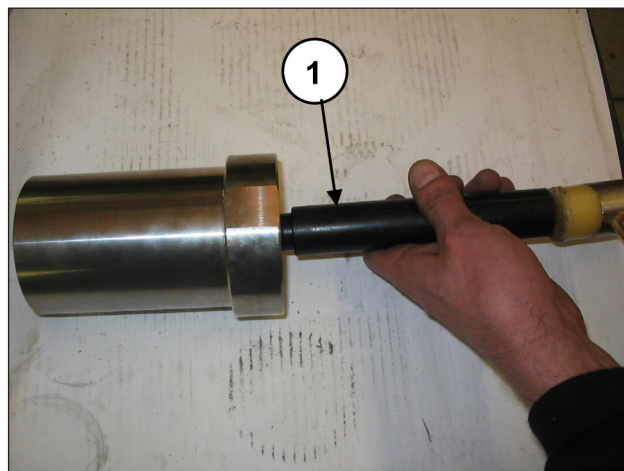


Fig. 114

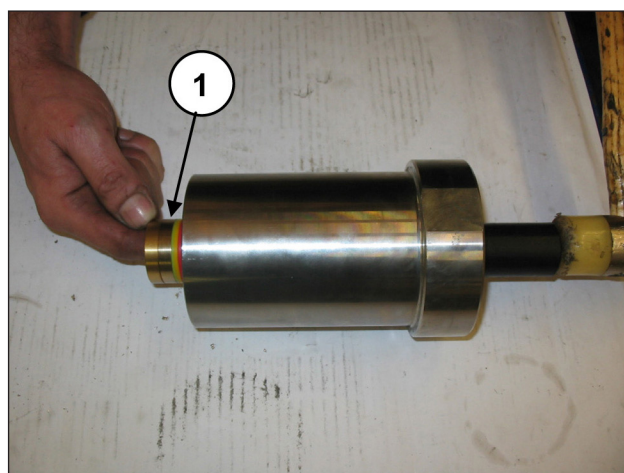


Fig. 115

**2.2.4 Montaje del grupo pistón - soportes - juntas**

Para montar los componentes realizar las operaciones arriba descritas en orden contrario respetando las secuencias indicadas a continuación; para los valores de los pares de apriete y las secuencias de ajuste, respetar las indicaciones contenidas en el capítulo 3.

Introducir el casquillo superior en la camisa.



**Para garantizar una correcta posición axial del casquillo utilizar la herramienta (cód. 27921100 para SM14, cód. 27921200 para SM16, cód. 27921300 para SM18, cód. 27911200 para SM20, cód. 27911400 para SM22 y cód. 27911500 para SM24) (pos. ①, Fig. 117 y Fig. 118).**

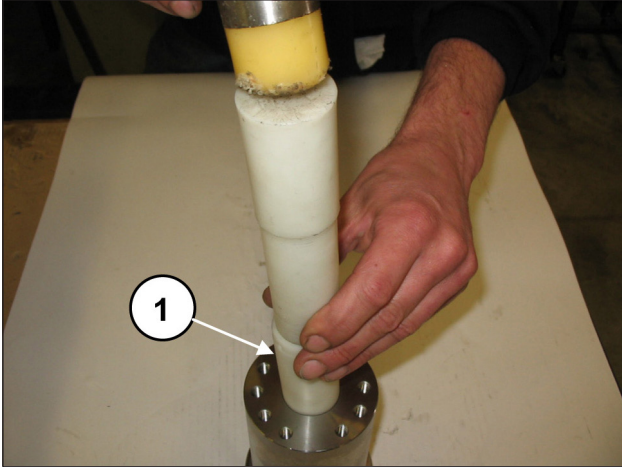


Fig. 116

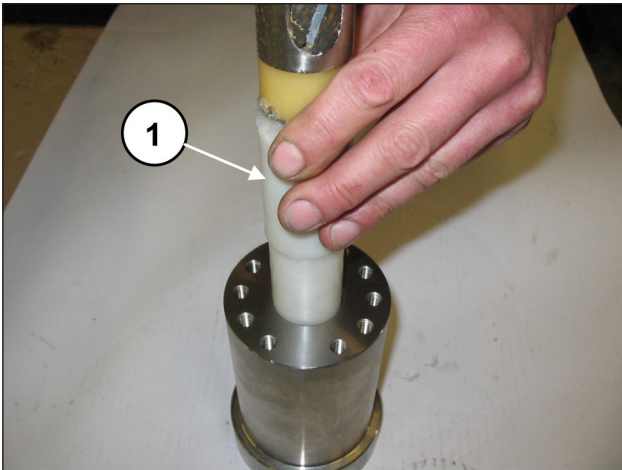


Fig. 117

Introducir el paquete H.P. (alta presión) (pos. ①, Fig. 118); para evitar daños debido a la ligera interferencia entre la junta y la camisa, se recomienda utilizar la herramienta (cód. 27673200 para SM14, SM16 y SM18, y cód. 27673300 para SM20, SM22 y SM24) (pos. ①, Fig. 119).

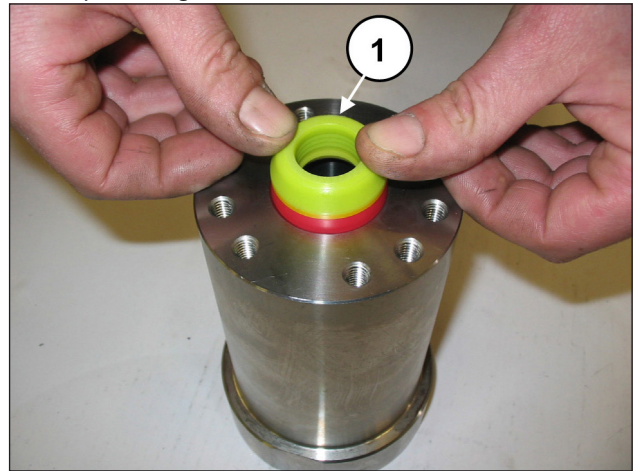


Fig. 118

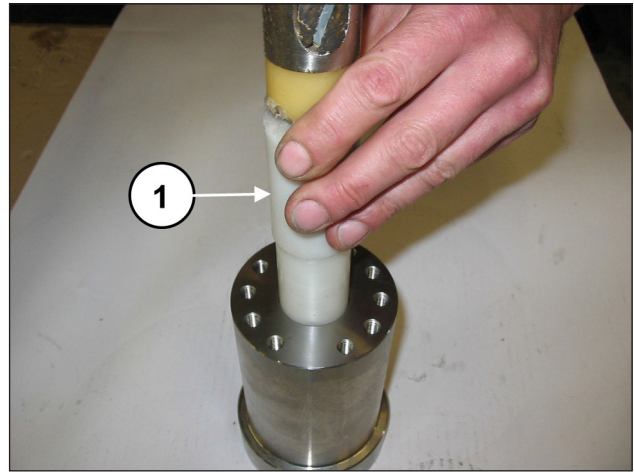


Fig. 119



**La junta H.P. se ha de introducir en la camisa como se indica en la Fig. 121 y Fig. 122.**



**Antes de montarlas en la sede, las juntas de H.P. se deben lubricar con grasa de silicona de tipo OKS 1110 como se indica a continuación: Lubricar el diámetro externo ligeramente. Aplicar la grasa en el diámetro interno rellenando con cuidado todos los intersticios comprendidos entre los labios de retención, como se indica en la Fig. 122.**

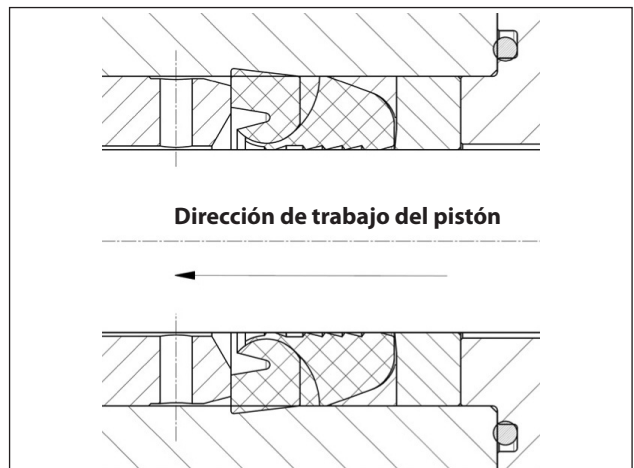


Fig. 120



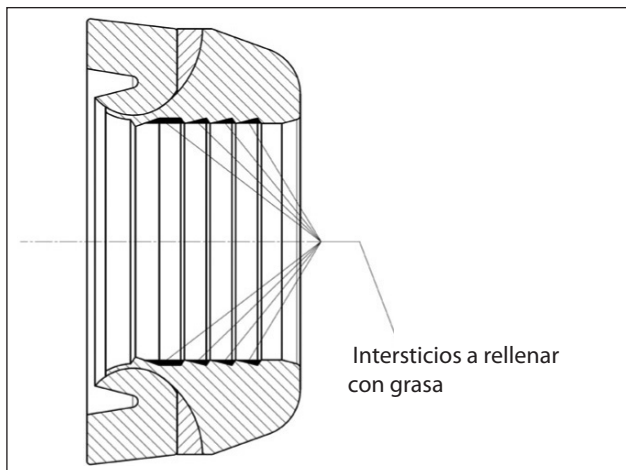


Fig. 121

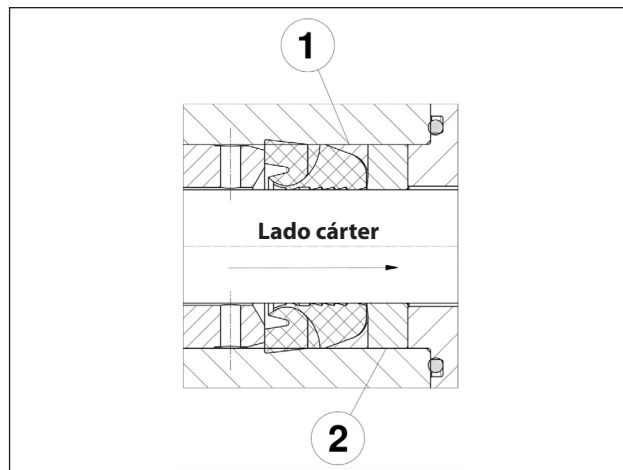


Fig. 124

Introducir la anilla anti extrusora y el casquillo de juntas (pos. ① y ②, Fig. 122, Fig. 123 y Fig. 124).



**El casquillo de las juntas ② se ha de introducir en la camisa con las dos descargas orientadas hacia el exterior (lado cárter) como se indica en la Fig. 123.**



**La junta L.P. se ha de introducir en la camisa con el labio de retención orientado hacia la dirección de trabajo del pistón (pos. ①, Fig. 125 y Fig. 126), lubricando ligeramente el diámetro externo con grasas de silicona de tipo OKS 1110. Sustituir la junta L.P. si está desgastada.**

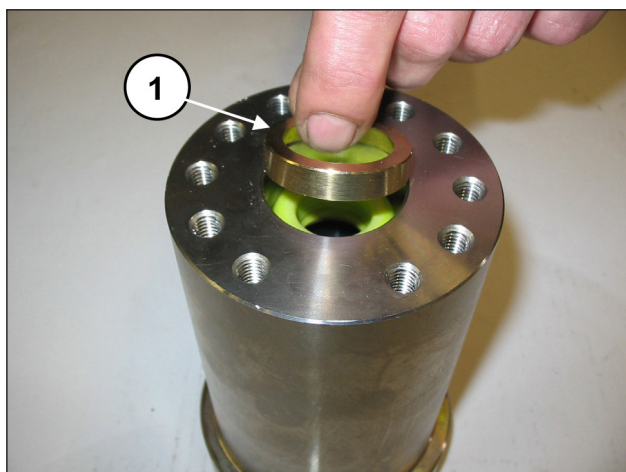


Fig. 122

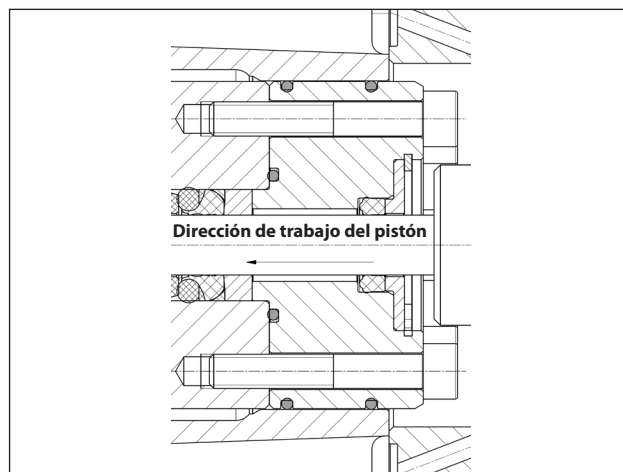


Fig. 125

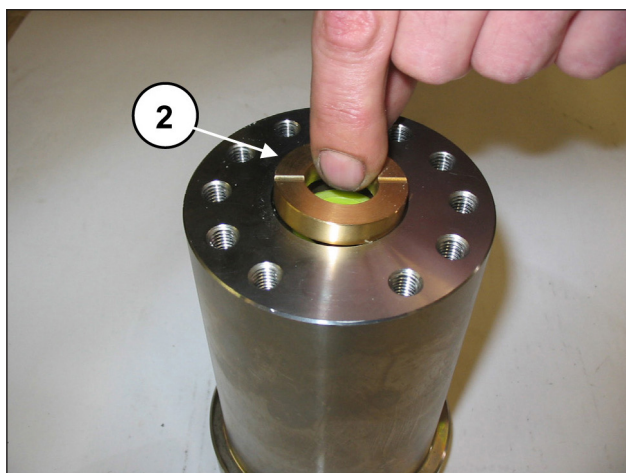


Fig. 123

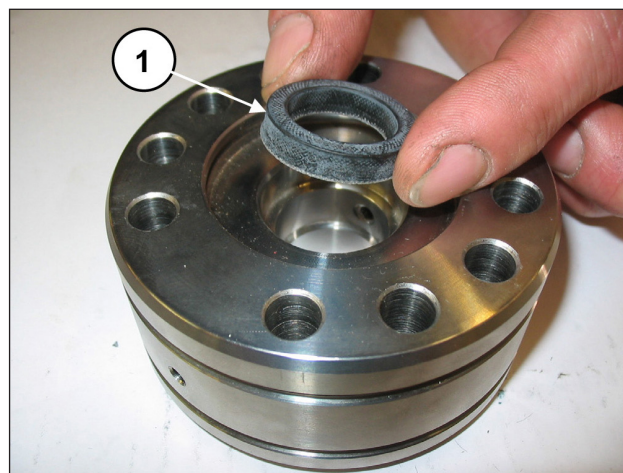


Fig. 126

Montar el grupo de soporte de las juntas (Fig. 127 y Fig. 128) y sustituir los componentes ① y ②.

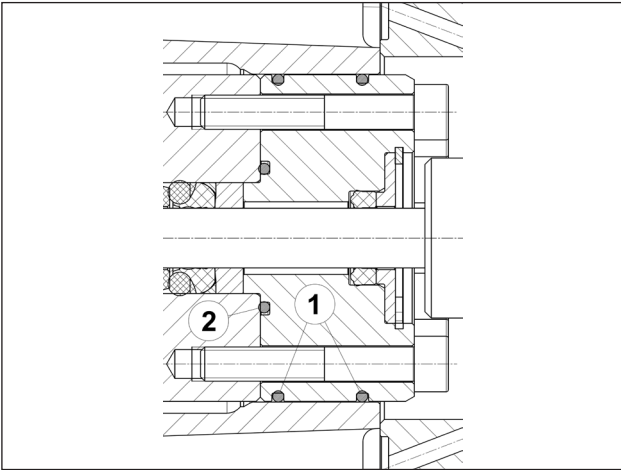


Fig. 127

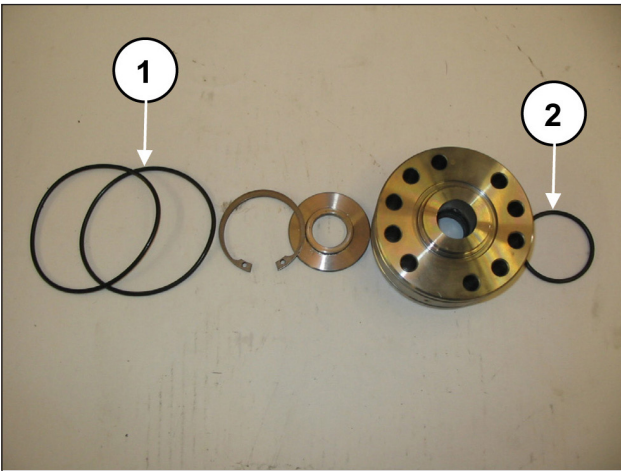


Fig. 128

Ensamblar el grupo soporte - camisa y apretar a mano los tornillos M8x50 como se indica en la Fig. 129. A continuación, apretar con la llave dinamométrica como se indica en el capítulo 3.

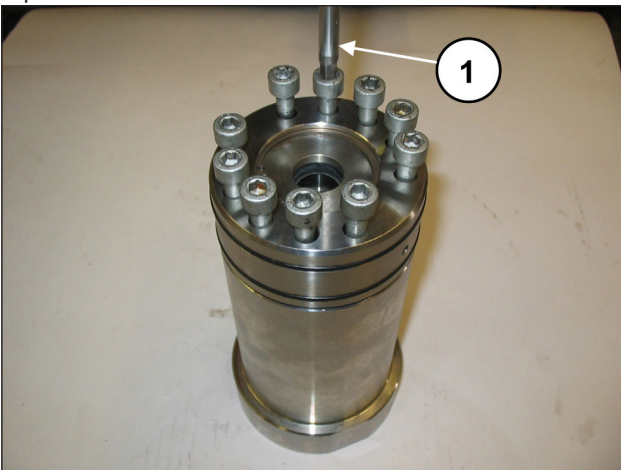


Fig. 129

### 3 CALIBRACIÓN DE AJUSTE DE LOS TORNILLOS

El ajuste de los tornillos debe realizarse exclusivamente con una llave dinamométrica.

Descripción	Posición dibujo desglosado	Par de apriete Nm
Tornillo M10x30 de la tapa del cárter	79	45
Tapón G1/2x13 del cárter	81	40
Tornillo M16x30 del soporte de elevación	41	200
Tornillo M10x40 de la tapa del reductor	71	45
Tornillo M10x25 de tope de la corona	66	45
Tornillo M10x40 de la caja del reductor	71	45
Tornillo M6x14 de las tapas superior e inferior	50	10
Tornillo M10x30 de la tapa del cojinete	79	45
Tornillo M10x1.5x80 de apriete de la biela	43	65*
Tornillo M6x20 de la guía del pistón	37	10
Pistón completo	15	40
Racor estrang. D.3 3/8M-3/8F	29	45
Tornillo M8x50 de los soportes	22	40**
Tornillo M16x280 de la cabeza	1	280***
Tornillo M10x140 de las camisas	26	83****

\* Ajustar el par de apriete atornillando los tornillos de modo simultáneo.



**Los tornillos - pos. 1-22-26 se deben apretar con la llave dinamométrica lubricando el pie roscado con grasa de disulfuro de molibdeno cód. 12001500.**

\*\* Los tornillos de fijación de los soportes deben ser ajustados respetando las secuencias y el orden indicado en el esquema de la Fig. 130.

\*\*\* Los tornillos de fijación del cabezal deben ser ajustados respetando las secuencias y el orden indicado en el esquema de la Fig. 131.

\*\*\*\* Los tornillos de fijación de las camisas deben ser ajustados respetando las secuencias y el orden indicado en el esquema de la Fig. 131.

#### Apriete de los tornillos de soporte de las juntas pos. 22

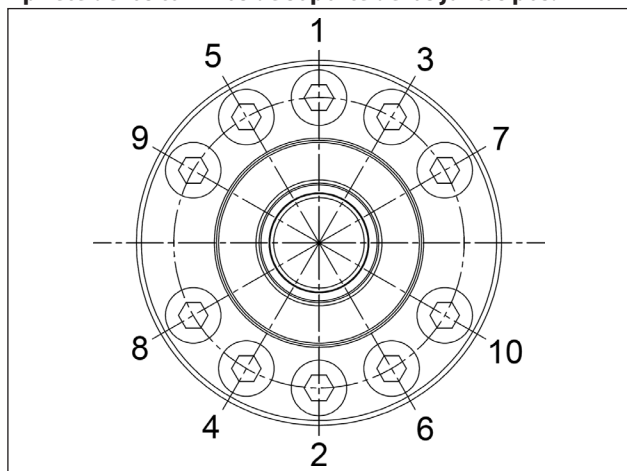


Fig. 130

Apretar los tornillos M8x50 respetando la secuencia indicada (1-2-3-4-5-6-7-8-9-10) efectuando en una única fase el par indicado.

#### Apriete de los tornillos de la cabeza y las camisas pos. 1 y pos. 26

**OPERACIÓN 1:** Apriete tornillos M16x320 (pos. 1) en dos fases respetando la secuencia indicada en la figura: (A-B-C-D-E-F-G-H)  
**Fase 1 = 200 Nm**  
**Fase 2 = 280 Nm**

**OPERACIÓN 2:** Apriete tornillos M10x140 (pos. 26) en cuatro fases respetando la secuencia indicada en la figura: (1-2-3-4-5-6-7-8)  
**Fase 1 = 40 Nm**  
**Fase 2 = 65 Nm**  
**Fase 3 = 83 Nm**  
**Fase 4 = 83 Nm**

Fig. 131

## 4 HERRAMIENTAS DE REPARACIÓN

El mantenimiento de la bomba se puede llevar a cabo utilizando herramientas estándar para el montaje y el desmontaje de los componentes. Están disponibles las siguientes herramientas:

### Para el montaje:

Eje (bloqueo de las bielas)	cód. 27566200
Cojinete del eje acodado	cód. 27604700
Cojinete del piñón de la caja del reductor	cód. 27604900
Cojinete del eje acodado de la caja del reductor	cód. 27605000
Cojinete del eje acodado de la tapa del cojinete	cód. 27605000
Retención guía pistón	cód. 27605300
Cojinete del piñón	cód. 27604800
Retén del piñón	cód. 27605200
Casquillo para pistón	cód. 27921100 (SM14)
	cód. 27921200 (SM16)
	cód. 27931300 (SM18)
	cód. 27911200 (SM20)
	cód. 27911400 (SM22)
	cód. 27911500 (SM24)
Paquete de juntas HP	cód. 27673200 (SM14 - SM16 - SM18)
	cód. 27673300 (SM20 - SM22 - SM24)
Cabeza / distanciador camisas	cód. 27540200

### Para el desmontaje:

Retención guía pistón	cód. 27918500
Eje (bloqueo de las bielas)	cód. 27566200
Sedes de la válvula	cód. 034300020
Cabeza / distanciador camisas	cód. 27540200

### 5 SUSTITUCIÓN DEL CASQUILLO PIE DE LA BIELA

Realizar la conexión en frío del buje y los trabajos necesarios respetando las dimensiones y las tolerancias indicadas en la Fig. 132.

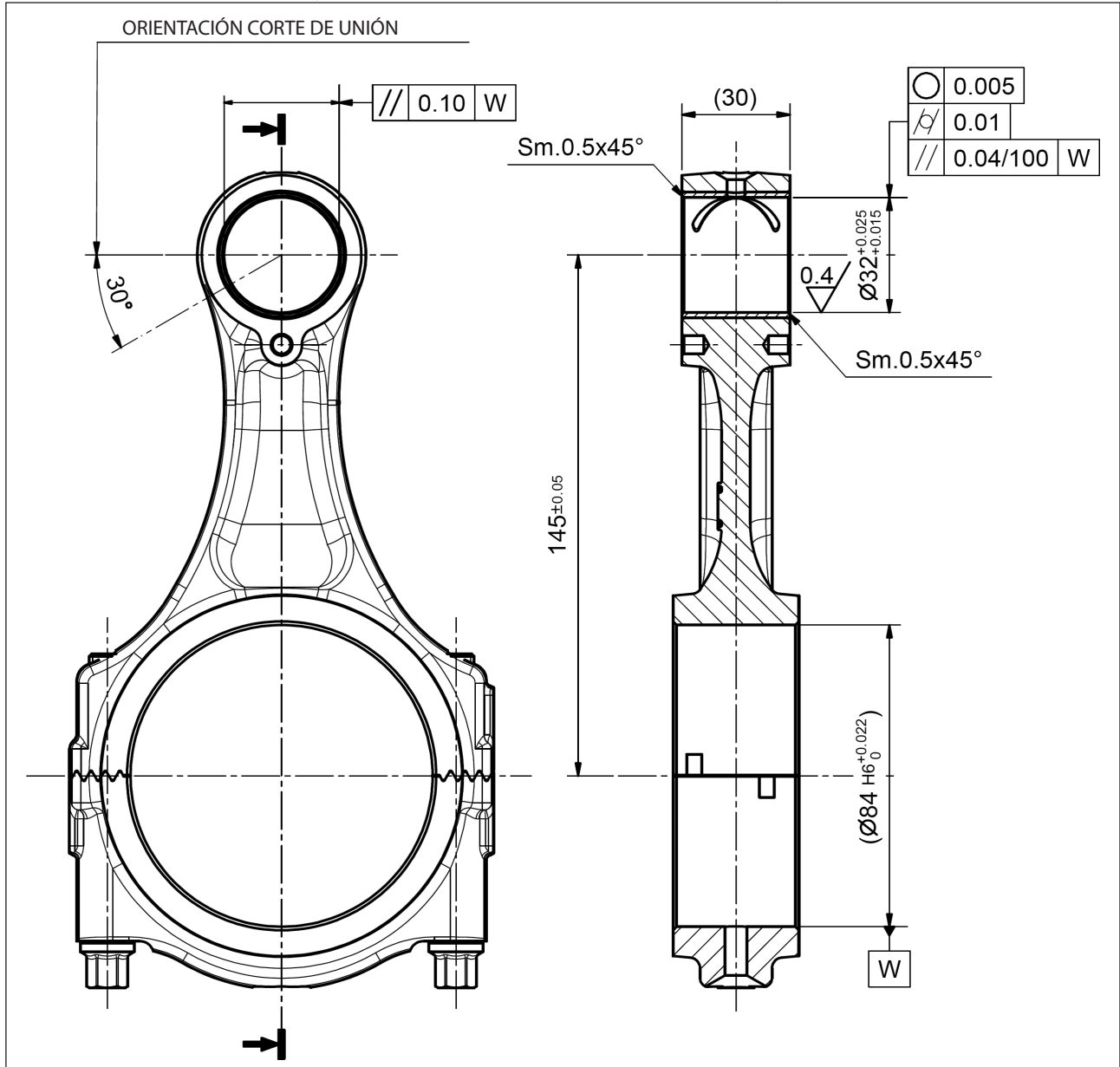


Fig. 132

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## 1 INTRODUÇÃO

Este manual descreve as instruções para a reparação da bomba da família SM e deve ser atentamente lido e compreendido antes de realizar qualquer intervenção na bomba.

O uso correto e a manutenção adequada depende do bom funcionamento e duração da bomba.

A Interpump Group não se responsabiliza por qualquer dano causado por negligência ou pelo não cumprimento das regras descritas neste manual.

### 1.1 DESCRIÇÕES DOS SÍMBOLOS

Leia atentamente as instruções contidas neste manual antes de qualquer operação.



**Sinal de Advertência**



Leia atentamente as instruções contidas neste manual antes de qualquer operação.



**Sinal de Perigo**

Use óculos de proteção.



**Sinal de Perigo**

Use luvas de proteção antes de cada operação.

## 2 NORMAS DE REPARAÇÃO



### 2.1 REPARAÇÃO DA PARTE MECÂNICA

As operações de reparação da parte mecânica devem ser realizadas depois de ter removido o óleo do carter.

Para retirar o óleo, é preciso remover a tampa de carga do óleo pos. ①, Fig. 1 e em seguida, a tampa de descarga pos. ②, Fig. 1.

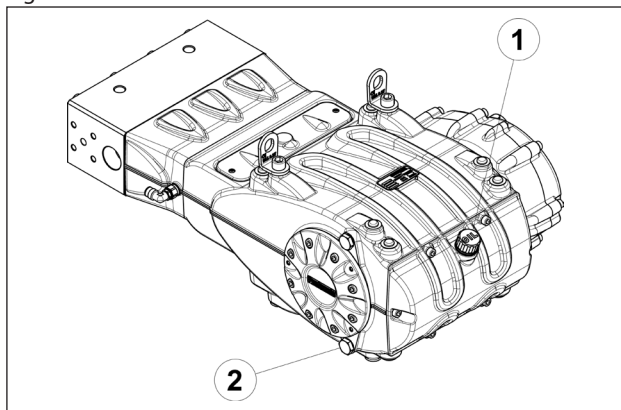


Fig. 1



**O óleo esgotado deve ser colocado em um recipiente adequado e disposto em centrais adequadas.**

**Não deve ser, de forma nenhuma, disposto no meio ambiente.**

#### 2.1.1 Desmontagem da parte mecânica

A sequência correta é a seguinte.

Esvazie completamente a bomba do óleo, em seguida, organize a desmontagem da cobertura do carter (e relativo anel circular), soltando os seis parafusos M10 (pos. ①, Fig. 2).

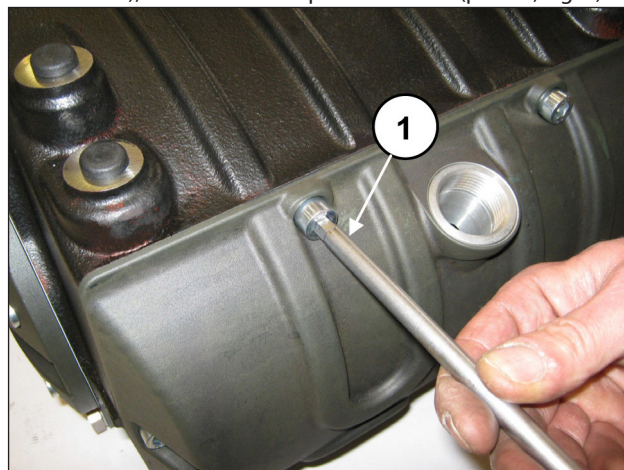


Fig. 2

Remova a linguetta o eixo PTO (pos. ①, Fig. 3).

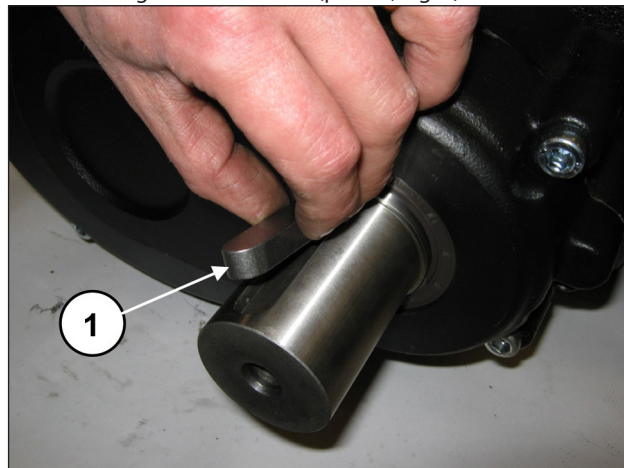


Fig. 3

Solte os parafusos de fixação da cobertura do redutor (pos. ①, Fig. 4).

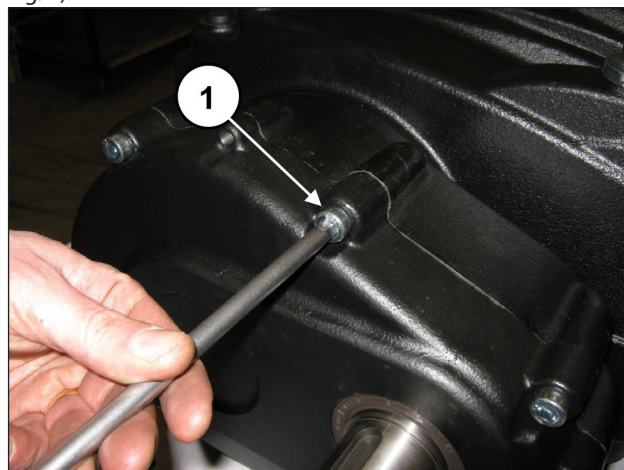


Fig. 4

Posicione três grãos ou parafusos rosqueados M8 (pos. ①, Fig. 5) com a função de extrator nos furos especiais e dois parafusos M10, suficientemente longos, com a função de sustentar a cobertura (pos. ②, Fig. 5).

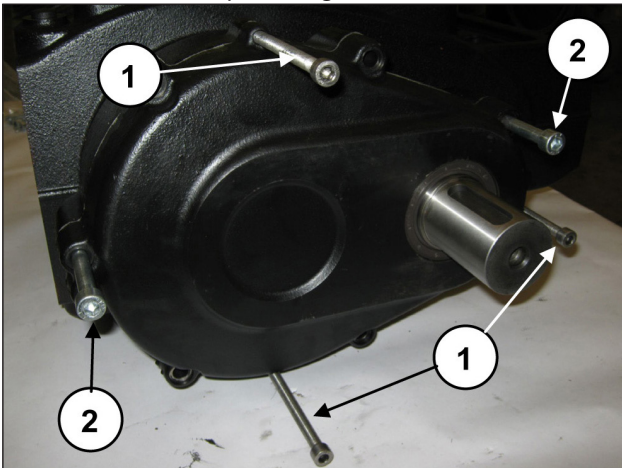


Fig. 5

Aperte gradualmente os três parafusos M8 (pos. ①, Fig. 6) com a função de extrator até remover completamente o grupo da cobertura e do pinhão

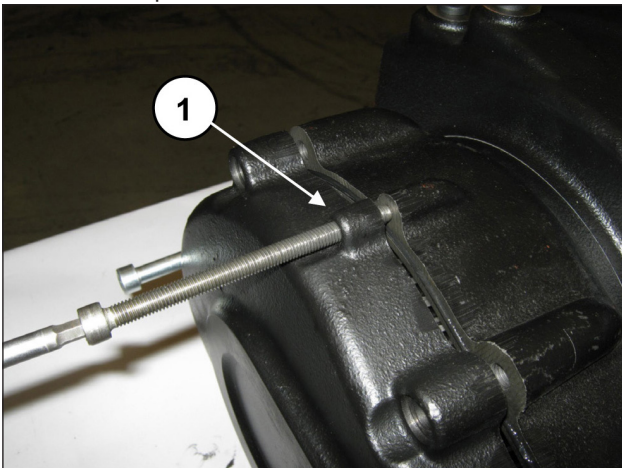


Fig. 6

É possível realizar a desmontagem completa da cobertura do redutor do pinhão, procedendo conforme a seguir:  
Remova o anel elástico Ø120 (pos. ①, Fig. 7).

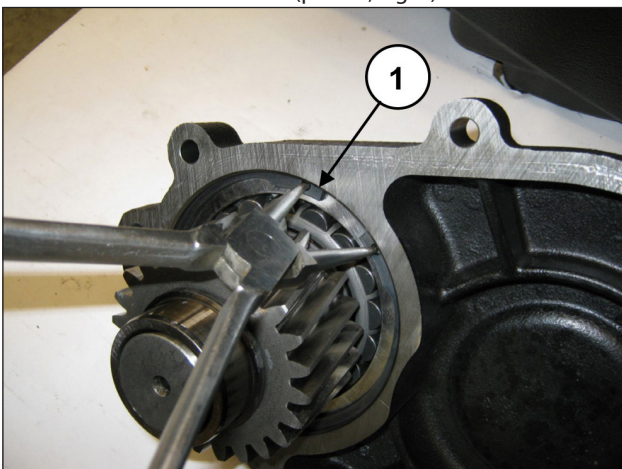


Fig. 7

Separe o pinhão da cobertura, agindo mediante o mecanismo de percussão no mesmo pinhão (pos. ①, Fig. 8).

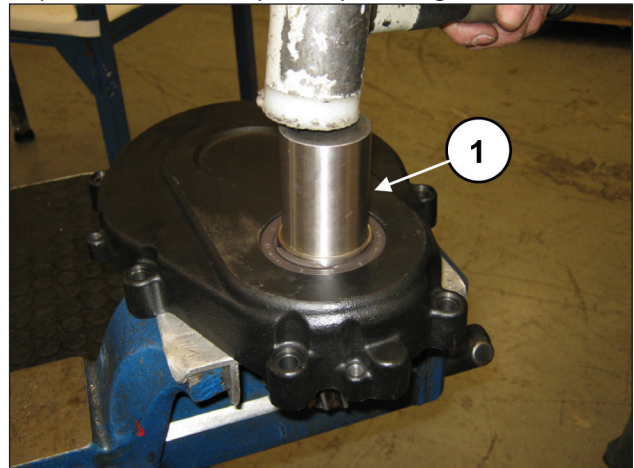


Fig. 8

Remova o anel elástico Ø55 (pos. ①, Fig. 9) e o anel de apoio do rolamento (pos. ①, Fig. 10) do pinhão

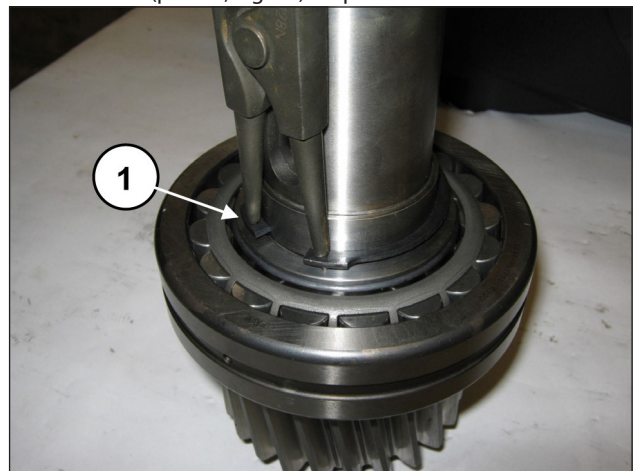


Fig. 9

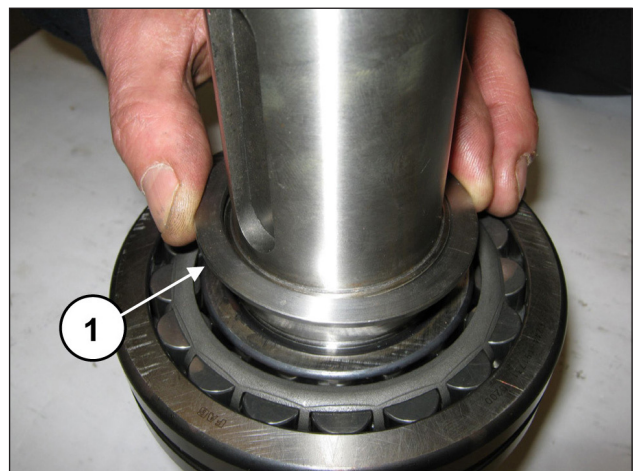


Fig. 10



Extraia as vedações do óleo da cobertura do redutor, agindo do lado interno da cobertura (pos. ①, Fig. 11).

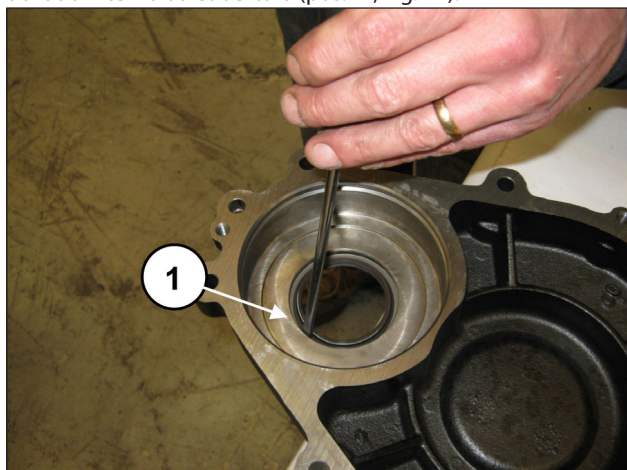


Fig. 11

Solte os parafusos que fixam a retenção da coroa (pos. ①, Fig. 12) e remova-os (pos. ①, Fig. 13).

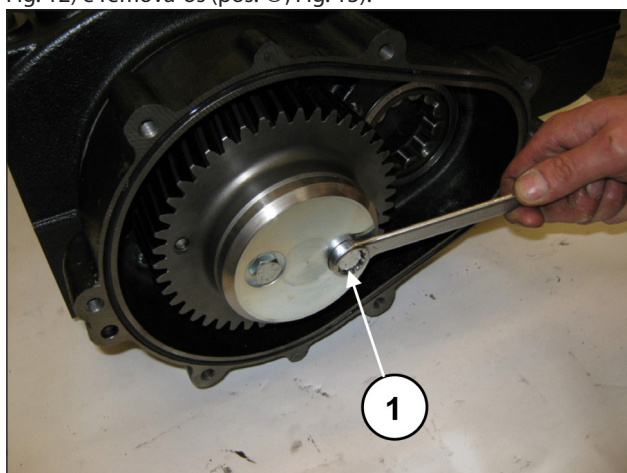


Fig. 12

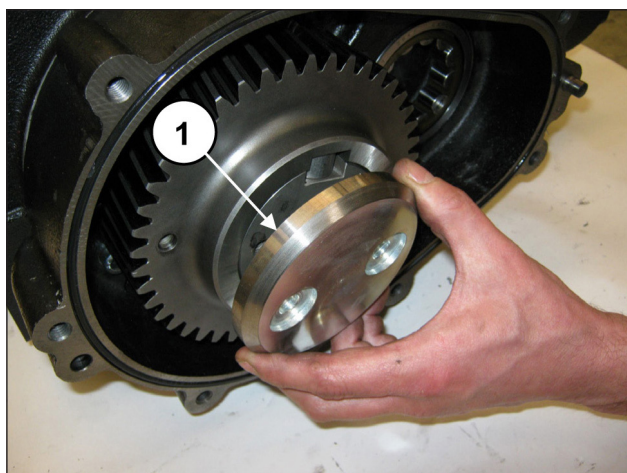


Fig. 13

Retire a coroa (pos. ①, Fig. 14). Se necessário, é possível usar um extrator de mecanismo de percussão para aplicar os dois furos M8 (pos. ②, Fig. 14).

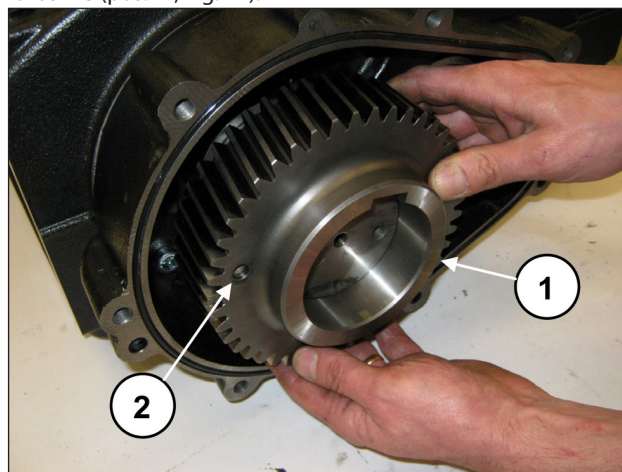


Fig. 14

Retire a lingueta do eixo (pos. ①, Fig. 15).

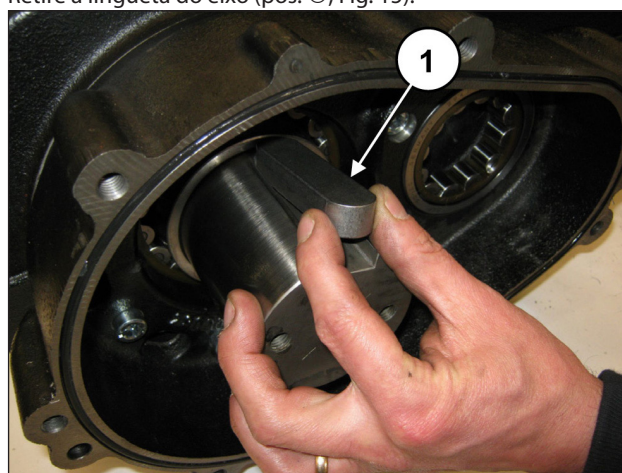


Fig. 15

Retire o anel de apoio da coroa (pos. ①, Fig. 16).

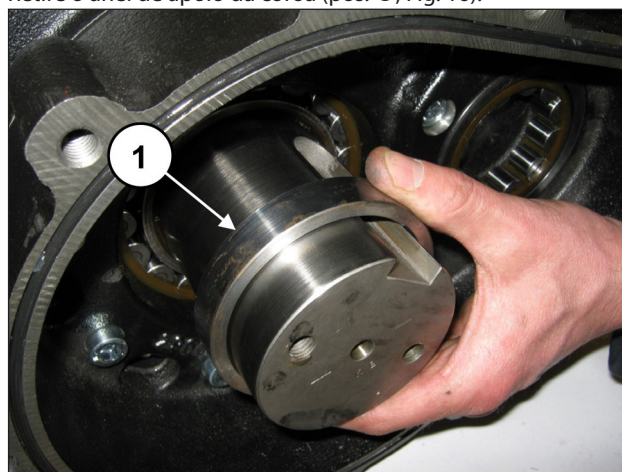


Fig. 16

Solte os parafusos da haste (pos. ①, Fig. 17).

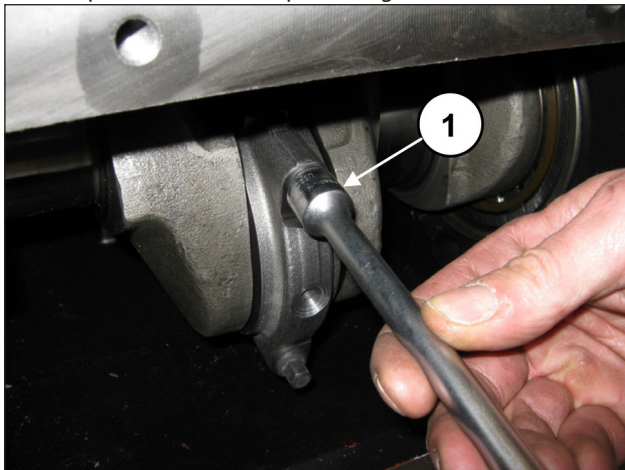


Fig. 17

Desmonte os chapéus da haste com os semi-rolamentos inferiores, tendo cuidado especial durante a desmontagem, na ordem em que são desmontados.



**Os chapéus da haste e as semi-hastes relativas devem ser remontados exatamente na mesma ordem e acoplamento em que foram desmontados.**

Para evitar possíveis erros do chapéu e semi-hastes, foram numerados em um lado (pos. ①, Fig. 18).

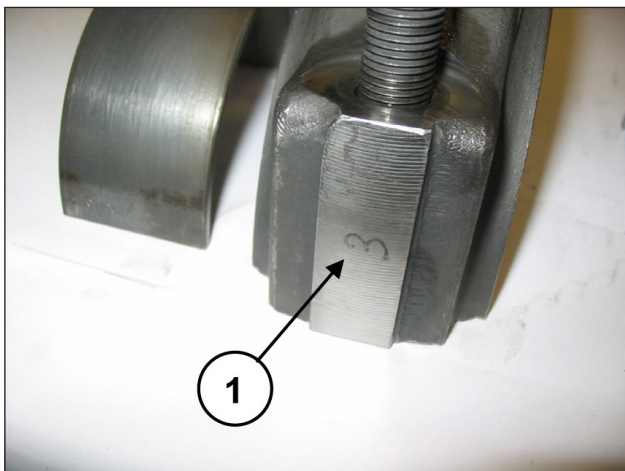


Fig. 18

Avance as semi-hastes completamente na direção da parte hidráulica para permitir o escape do eixo de manivela. Para facilitar a operação, use a ferramenta adequada (cód. 27566200), (pos. ①, Fig. 19).

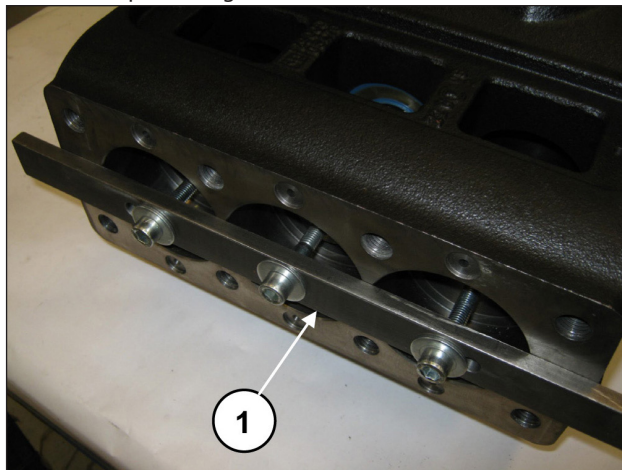


Fig. 19

Solte os três semi-rolamentos superiores das semi-hastes (pos. ①, Fig. 20).

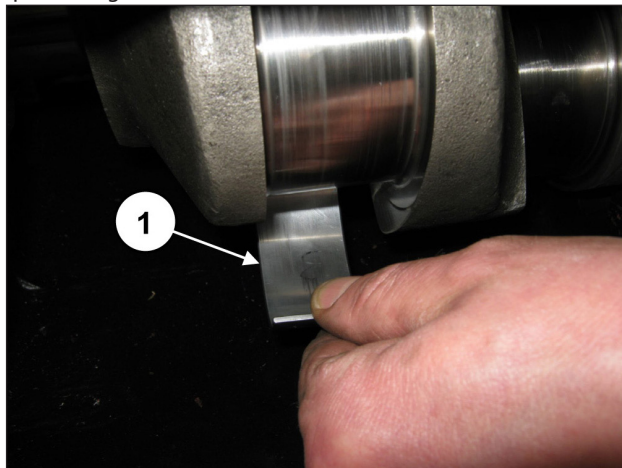


Fig. 20

Solte os parafusos de fixação da caixa do redutor (pos. ①, Fig. 21 e Fig. 22).

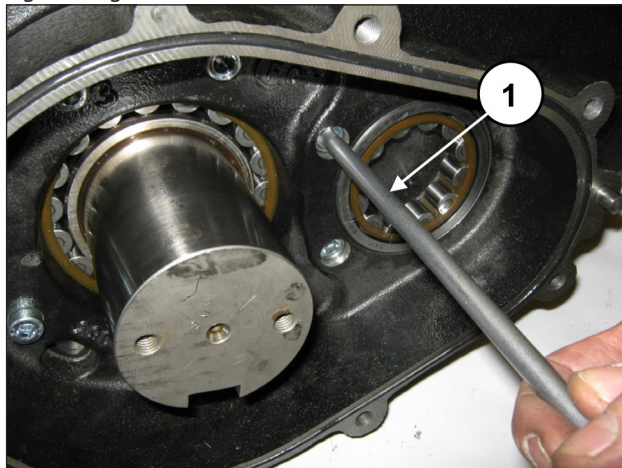


Fig. 21

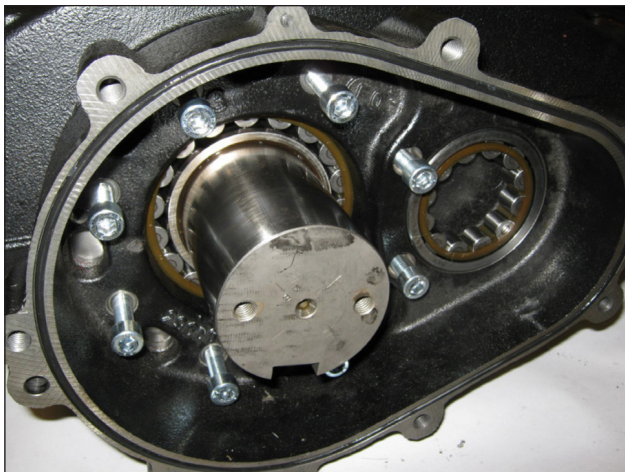


Fig. 22

Posicione três grãos ou parafusos rosqueados M8 (pos. ①, Fig. 23) com a função de extrator nos furos adequados e dois parafusos M10 suficientemente longos, com a função de sustentar a caixa do redutor (pos. ②, Fig. 23).

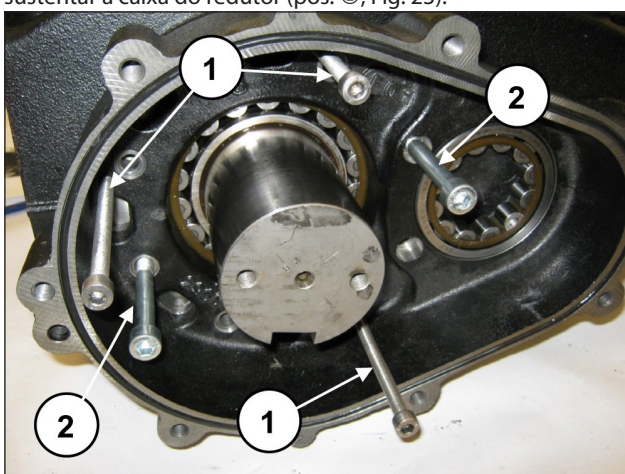


Fig. 23

Solte os três parafusos M8 gradualmente (pos. ①, Fig. 24), para evitar que a caixa possa se inclinar demais e bloquear o local. Forneça a remoção da caixa de sustentação do eixo, para evitar danos (pos. ①, Fig. 25).

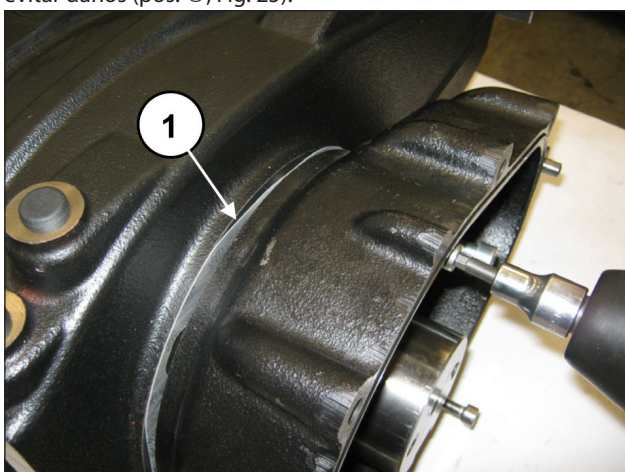


Fig. 24

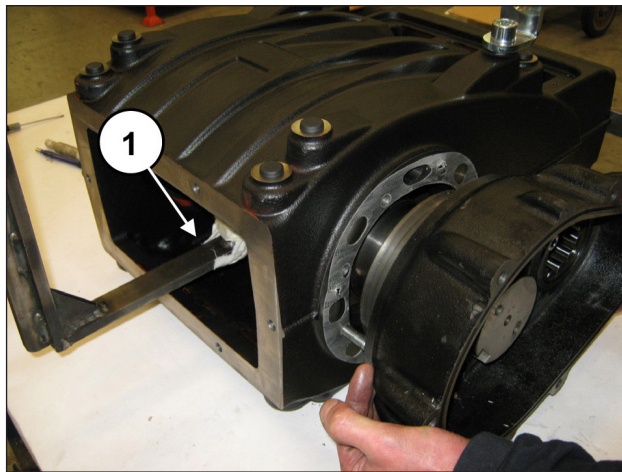


Fig. 25

No lado oposto, solte os parafusos de fixação da cobertura do rolamento (pos. ①, Fig. 26 e Fig. 27).

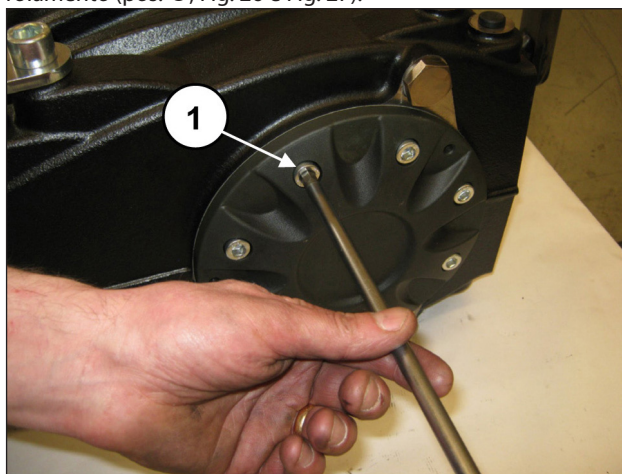


Fig. 26



Fig. 27

Posicione três grãos ou parafusos rosqueados M8 (pos. ①, Fig. 28), com a função de extrator nos furos especiais

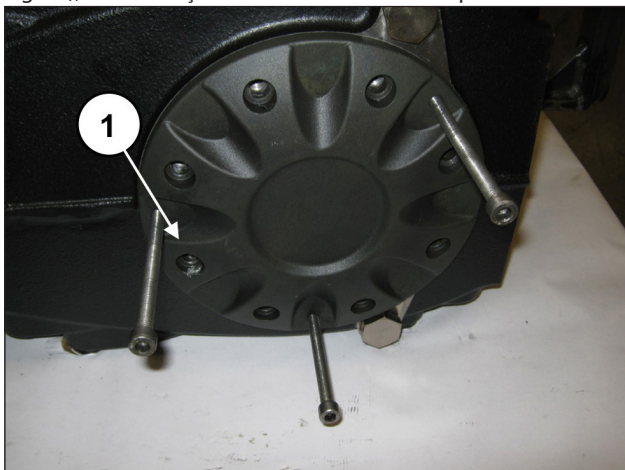


Fig. 28

Solte os três parafusos M8 gradualmente (pos. ①, Fig. 29) para evitar que a cobertura possa se inclinar demais e bloquear o local.

Forneça a remoção da cobertura do rolamento, sustentando o eixo para evitar danos (pos. ①, Fig. 30).

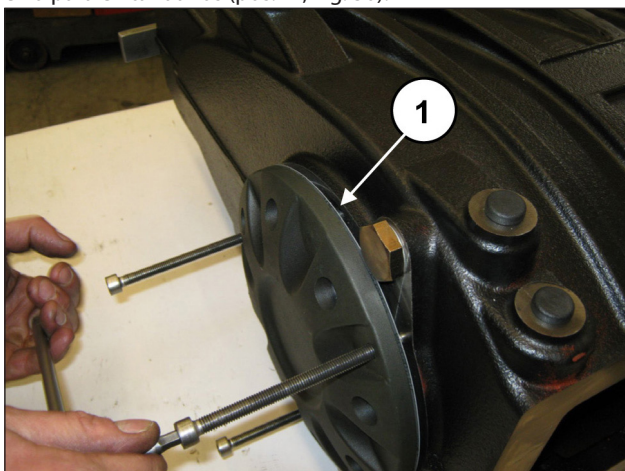


Fig. 29

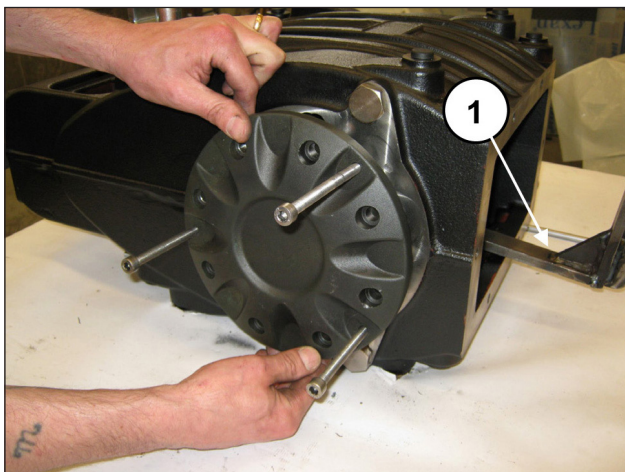


Fig. 30

Retire o eixo de manivela do carter do lado PTO (pos. ①, Fig. 31).

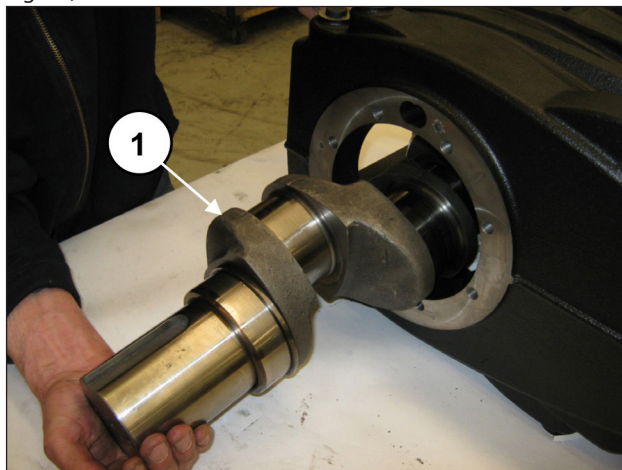


Fig. 31

No caso de ser necessário, substitua uma ou mais hastes ou guias do pistão, procedendo conforme a seguir: Prossiga com o desapertar dos parafusos da ferramenta, cód. 27566200, para desbloquear as hastes (pos. ①, Fig. 32) e, em seguida, extraia os grupos da haste-guia do pistão da abertura posterior do carter (pos. ①, Fig. 33).

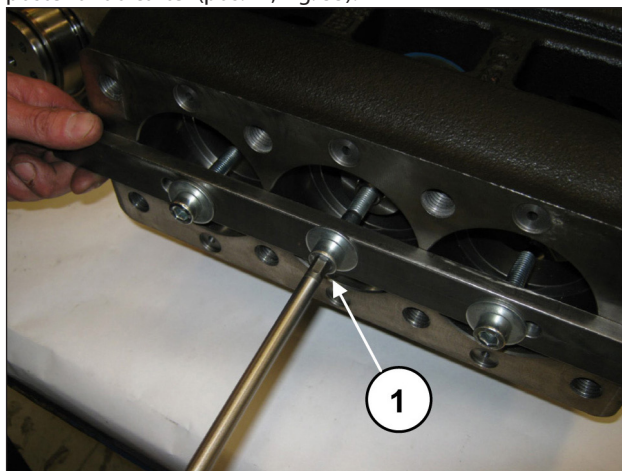


Fig. 32

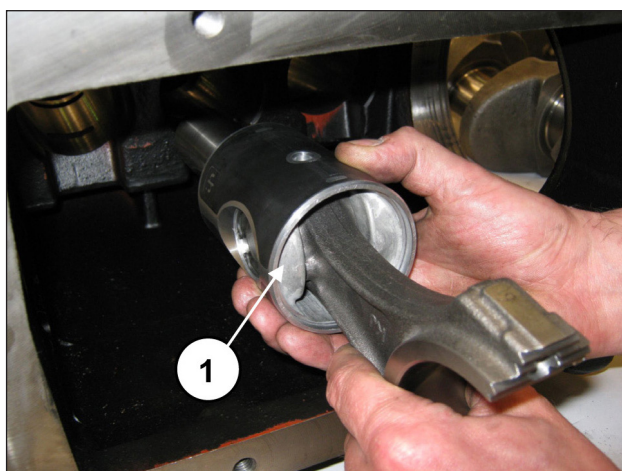


Fig. 33

Agora é possível proporcionar a desmontagem das vedações do óleo da guia do pistão, prestando atenção para não danificar a haste deslizante da guia do pistão.



**Caso seja necessária a substituição das vedações do óleo da guia do pistão sem desmontar toda a parte mecânica, é possível extrair as vedações do óleo usando a ferramenta especial, cód. 27918500, operando conforme o seguinte:**

Insira a ferramenta entre a haste e a borda das vedações do óleo (pos. ①, Fig. 34) e, mediante o mecanismo de percussão, forneça a inserção completa da zona cônica no interior da vedação do óleo (pos. ①, Fig. 35).

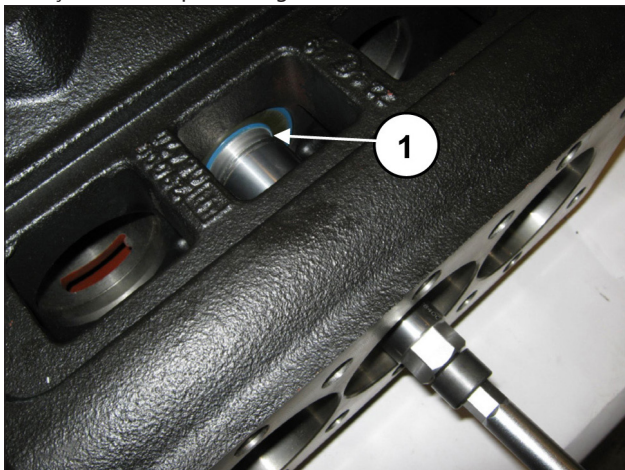


Fig. 34

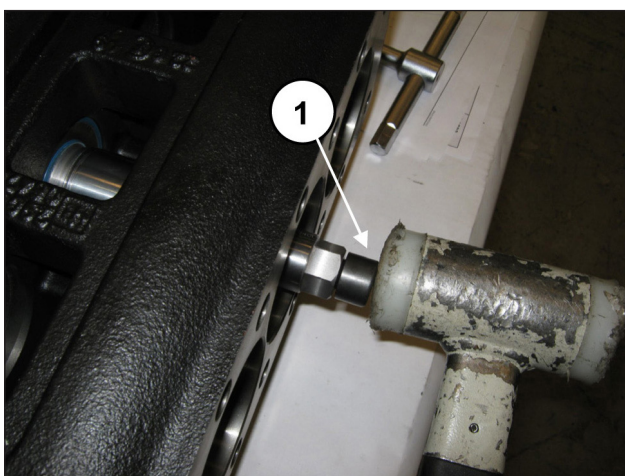


Fig. 35

Extraia as vedações do óleo usando o mecanismo de percussão da ferramenta (pos. ①, Fig. 36).

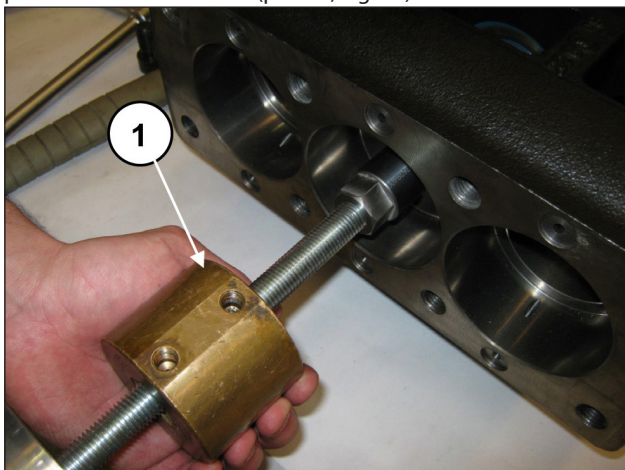


Fig. 36

Remova os dois anéis elásticos de bloqueio do pino (pos. ①, Fig. 37).

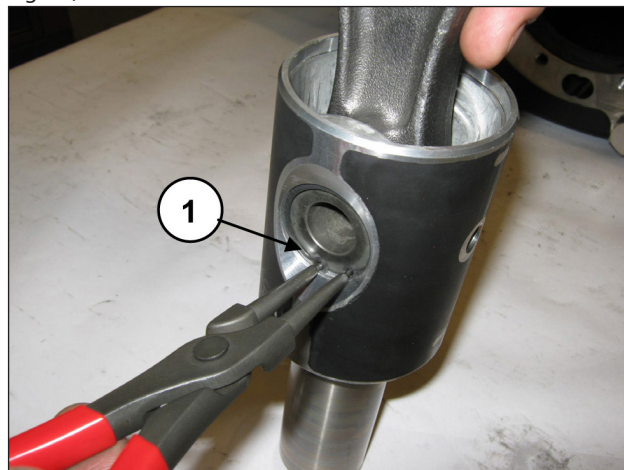


Fig. 37

Solte o pino (pos. ①, Fig. 38) e forneça a extração da haste (pos. ①, Fig. 39).



Fig. 38

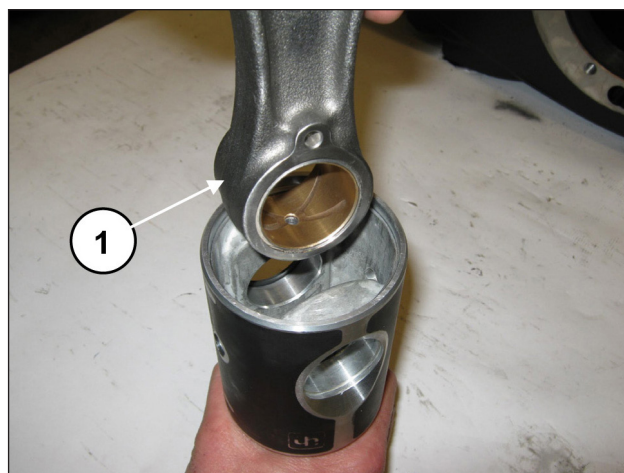


Fig. 39

Acople as semi-hastes aos chapéus anteriormente desmontados, fazendo referência à numeração (pos. ①, Fig. 40).

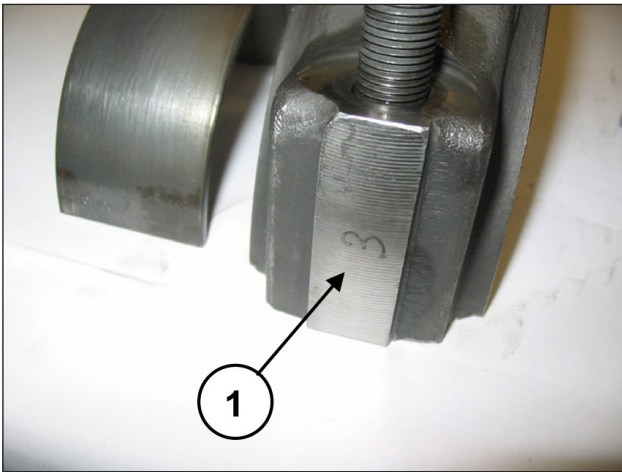


Fig. 40

Para separar a haste da guia do pistão, solte os parafusos do cabeçote cilíndrico M6, mediante a chave especial (pos. ①, Fig. 41).

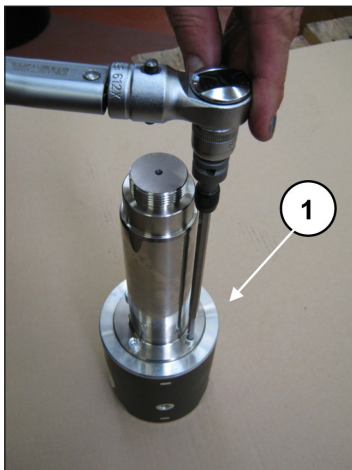


Fig. 41

### 2.1.2 Montagem da parte mecânica

Proceda com a montagem, seguindo o procedimento inverso ao indicado no parág. 2.1.1.

A sequência correta é a seguinte:

Monte o mesmo na guia do pistão.

Insira a mesma guia do pistão no local especial da guia do pistão (pos. ①, Fig. 42) e fixe-a a este último com os quatro parafusos do cabeçote cilíndrico M6x20 (pos. ①, Fig. 43).



Fig. 42



Fig. 43

Bloqueie a guia do pistão no gancho com ajuda de ferramenta adequada e proceda com a calibragem dos parafusos com chave dinamométrica (pos. ①, Fig. 44), conforme indicado no capítulo 3.

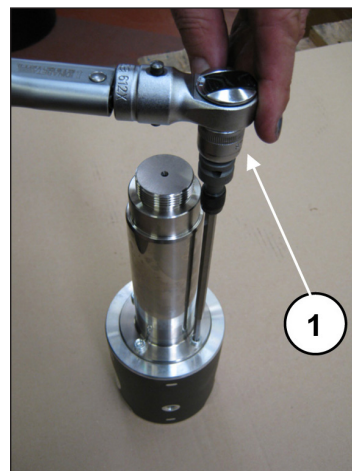


Fig. 44

Insira a haste na guia do pistão (pos. ①, Fig. 39) e, em seguida, insira o pino (pos. ①, Fig. 38). Aplique os dois elásticos perfilados (pos. ①, Fig. 37).



**A montagem correta é garantida se o pé da haste, a guia do pistão e o pino giram livremente.**

Separe os chapéus das semi-hastes. O acoplamento correto será garantido pela numeração colocada em um lado (pos. ①, Fig. 40).

Depois de ter verificado a limpeza correta do carter, insira o grupo da semi-haste-guia do pistão no interior das varas do carter (pos. ①, Fig. 33).



**A inserção do grupo da semi-haste-guia do pistão no carter deve ser feita orientando as semi-hastes com a numeração visível para cima.**

Bloqueie os três grupos da ferramenta adequada, cód. 27566200 (pos. ①, Fig. 32).

Pré-monte o anel interno dos rolamentos do eixo de manivela (em ambos os lados do eixo até a passagem), usando a ferramenta adequada, cód. 27604700 (pos. ①, Fig. 45) (pos. ①, Fig. 46).



**Os anéis internos e externos dos rolamentos devem ser remontados, mantendo o mesmo acoplamento com o qual foram montados.**



Fig. 45



Fig. 46

Insira o eixo do lado PTO, prestando atenção para não bater os eixos das hastes montadas anteriormente (pos. ①, Fig. 47) e (pos. ①, Fig. 48).

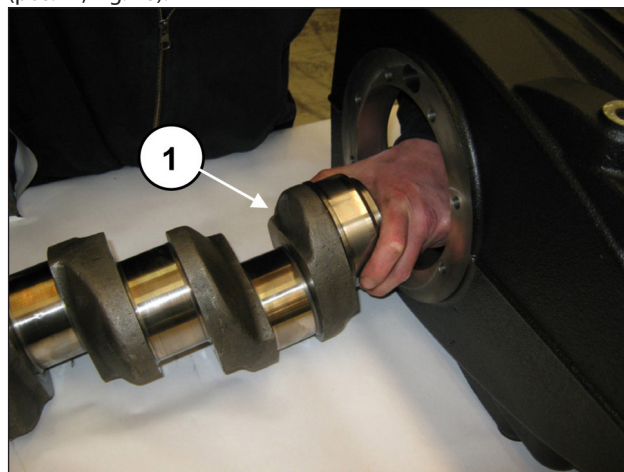


Fig. 47

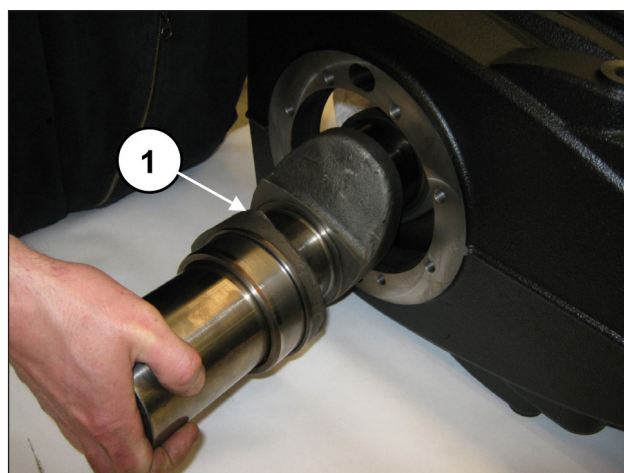


Fig. 48



**O eixo de manivela deve ser sempre montado com o lado PTO da parte oposta, em relação aos furos G1/2" para as tampas de descarga de óleo do carter da bomba (pos. ②, Fig. 50).**

Chegue até a inserção completa do eixo no carter (pos. ①, Fig. 49 e Fig. 50).

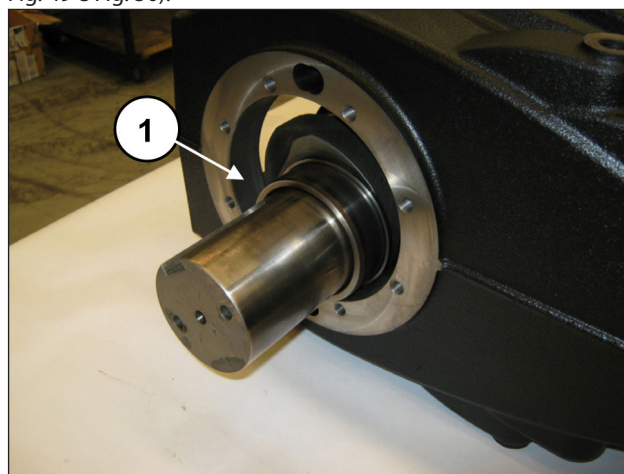


Fig. 49

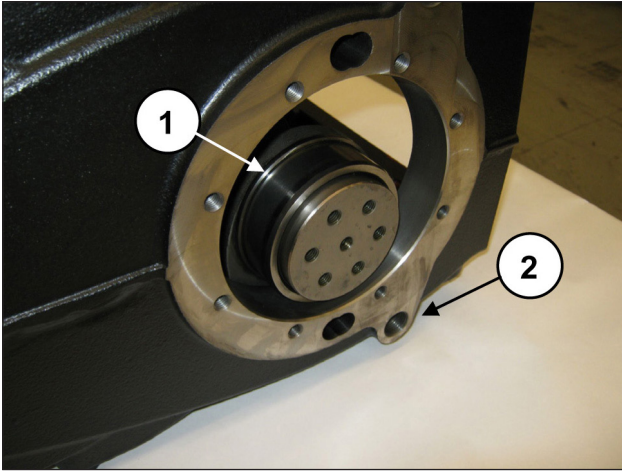


Fig. 50

Na caixa do redutor, pré-monte o anel externo do rolamento do pinhão, usando a ferramenta cód. 27604900 (pos. ①, Fig. 51), até a sua inserção completa na passagem (pos. ②, Fig. 52).

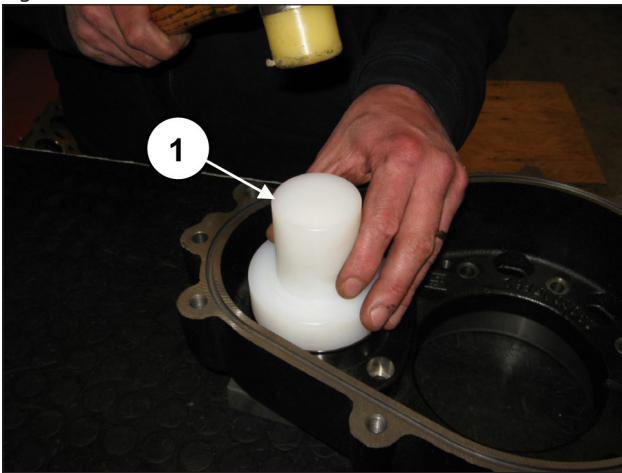


Fig. 51

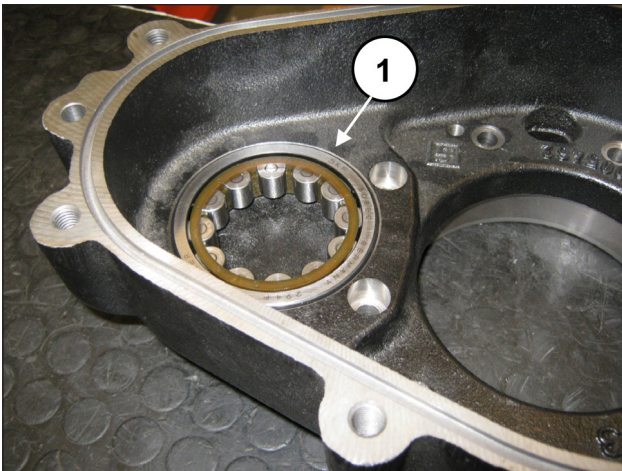


Fig. 52

Do lado oposto da caixa do redutor, pré-monte o anel externo do rolamento do eixo de manivela, usando a ferramenta cód. 27605000 (pos. ①, Fig. 53), até a sua inserção completa na passagem (pos. ②, Fig. 54).

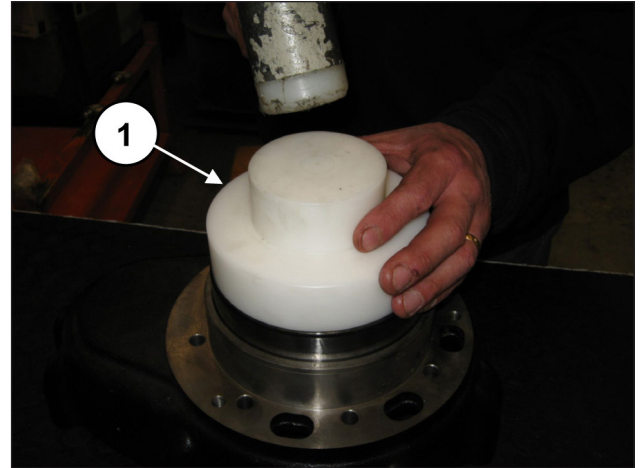


Fig. 53

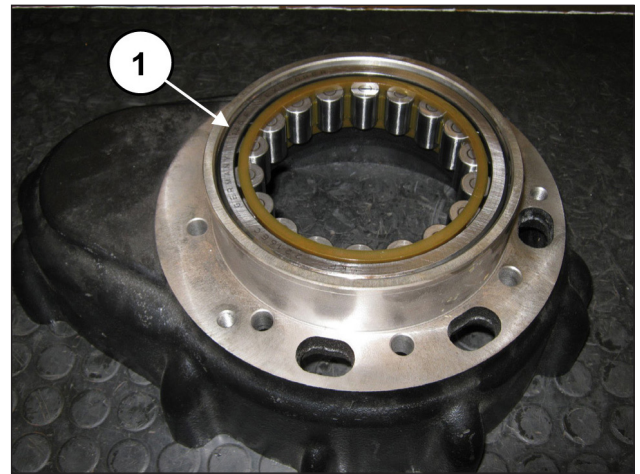


Fig. 54

Repita a operação na cobertura do rolamento pré-montando o anel externo do rolamento do eixo de manivela, mediante a ferramenta, cód. 27605000 (pos. ①, Fig. 55), até a sua inserção completa na passagem (pos. ②, Fig. 56).

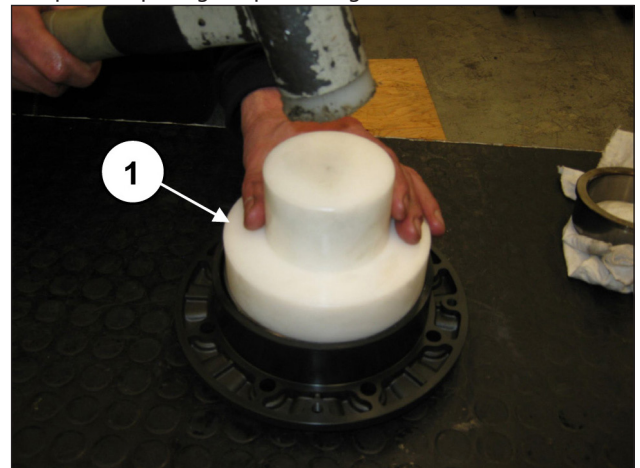


Fig. 55



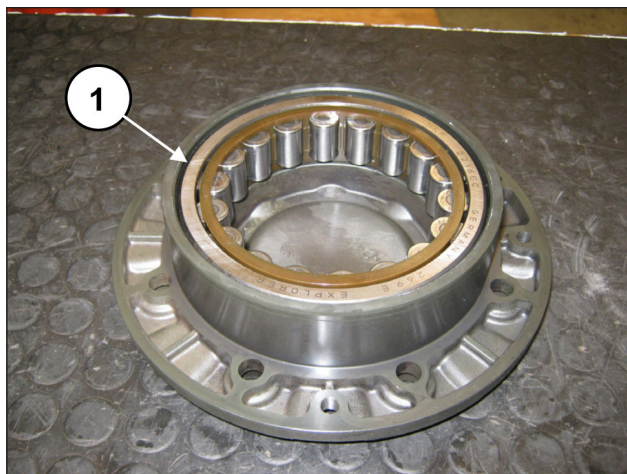


Fig. 56

Insira o forro lateral na cobertura do rolamento (pos. ①, Fig. 57) e eleve o eixo de manivela para favorecer a inserção da cobertura (pos. ①, Fig. 58).



Fig. 57

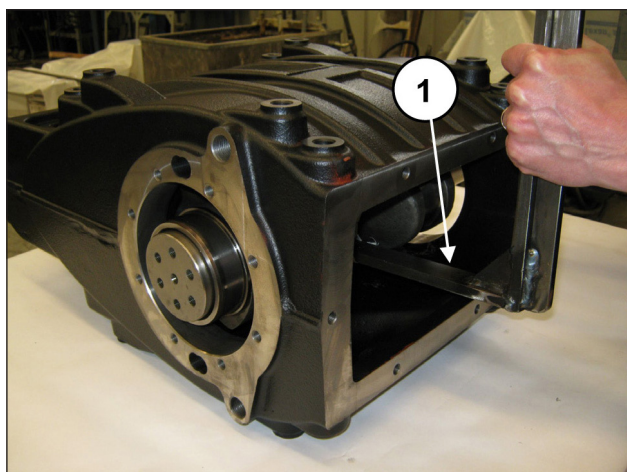


Fig. 58

Monte a cobertura do rolamento (e relativos forros), usando um mecanismo de percussão (pos. ①, Fig. 59)



**Oriente a cobertura do rolamento, de modo que o logotipo "Pratissoli" fique perfeitamente horizontal.**

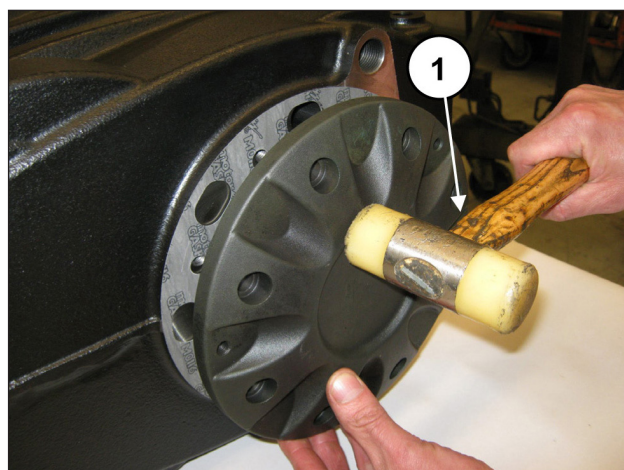


Fig. 59

Aperte os oito parafusos M10x30 (pos. ①, Fig. 60). calibre os parafusos com chave dinamométrica, conforme indicado no capítulo 3.

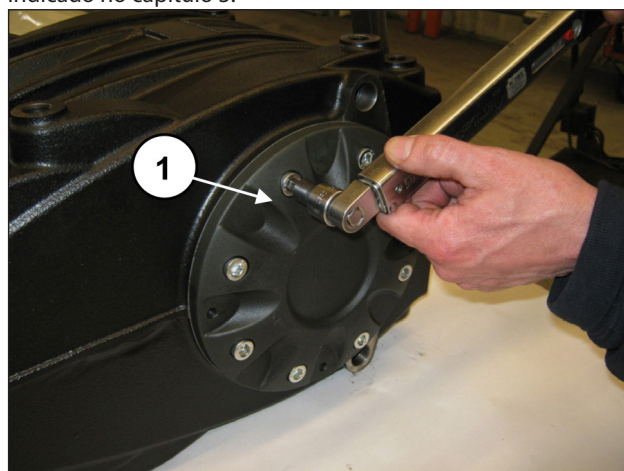


Fig. 60

Do lado oposto, insira o forro lateral na caixa do redutor (pos. ①, Fig. 61) e eleve o eixo de manivela para favorecer a inserção da cobertura (pos. ①, Fig. 62).

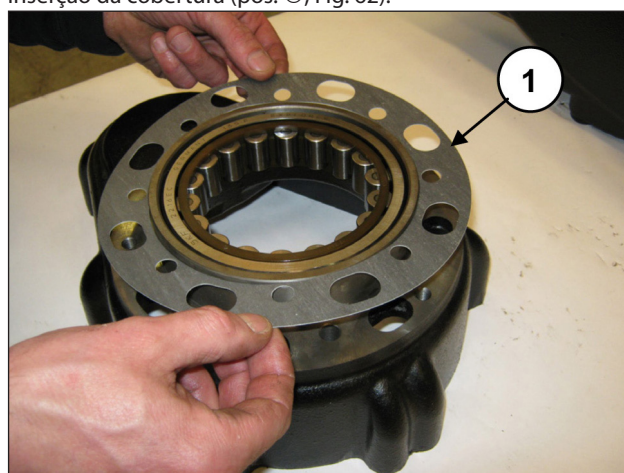


Fig. 61

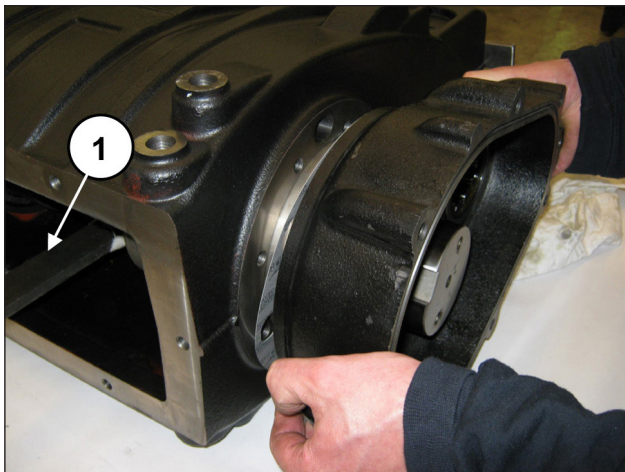


Fig. 62

Monte a caixa do redutor (e relativo forro), usando um mecanismo de percussão (pos. ①, Fig. 63).

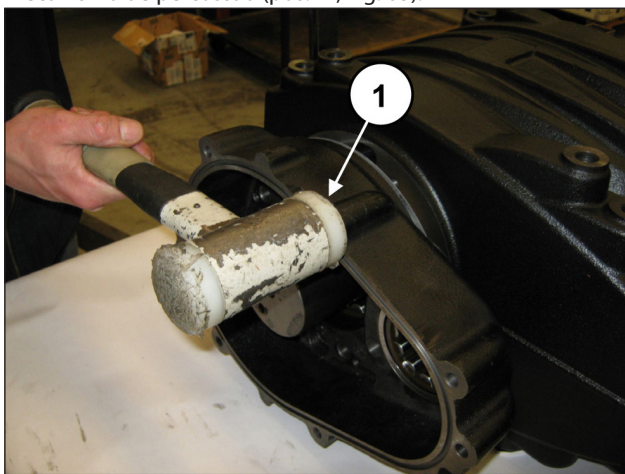


Fig. 63

Aperte os oito parafusos M10x40 (pos. ①, Fig. 64). calibre os parafusos com chave dinamométrica, conforme indicado no capítulo 3 CALIBRAGEM DO APERTO DOS PARAFUSOS.

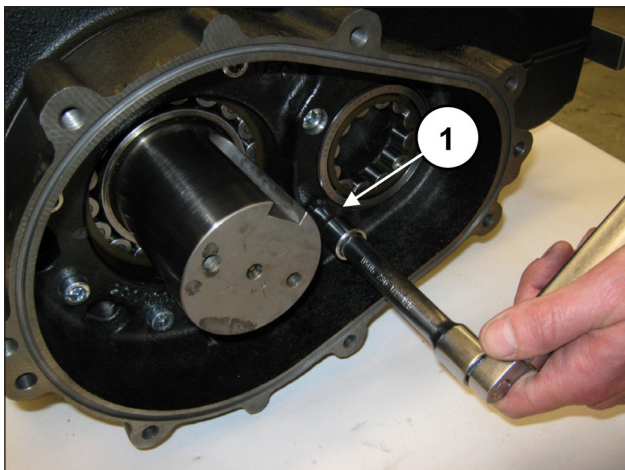


Fig. 64

Remova a ferramenta para o bloqueio da haste, cód. 27566200 (pos. ①, Fig. 32). Insira os semi-rolamentos superiores entre a haste e o eixo (pos. ①, Fig. 65).



**Para uma montagem correta dos semi-rolamentos, certifique-se de que a lingueta de referência dos semi-rolamentos esteja posicionada na caixa adequada sobre a semi-haste (pos. ①, Fig. 66).**

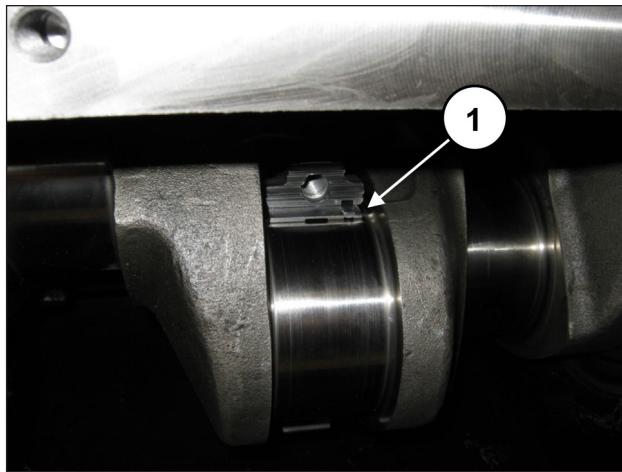


Fig. 65

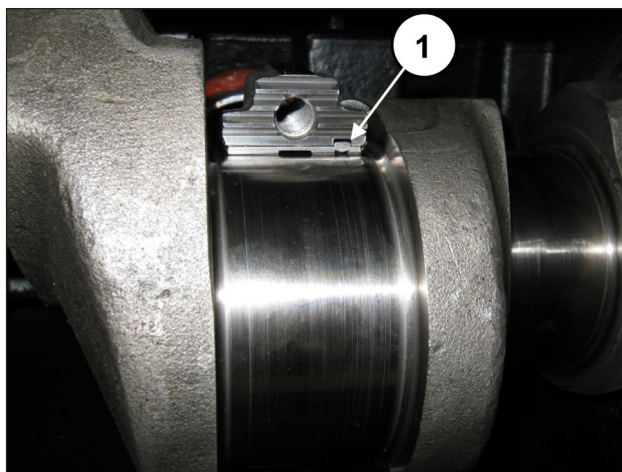


Fig. 66

Aplique os semi-rolamentos inferiores aos chapéus (pos. ①, Fig. 67), certificando-se que a lingueta de referência dos semi-rolamentos esteja posicionada na caixa sobre o chapéu (pos. ②, Fig. 67).

Fixe os chapéus nas semi-hastes, mediante os parafusos M10x1.5x80 (pos. ①, Fig. 68).



**Preste atenção na direção correta da montagem dos chapéus. A numeração deve ser virada para cima.**

Calibre os parafusos com chave dinamométrica, conforme indicado no capítulo 3 CALIBRAGEM DE APERTO DOS PARAFUSOS, trazendo os parafusos com o aperto simultaneamente.

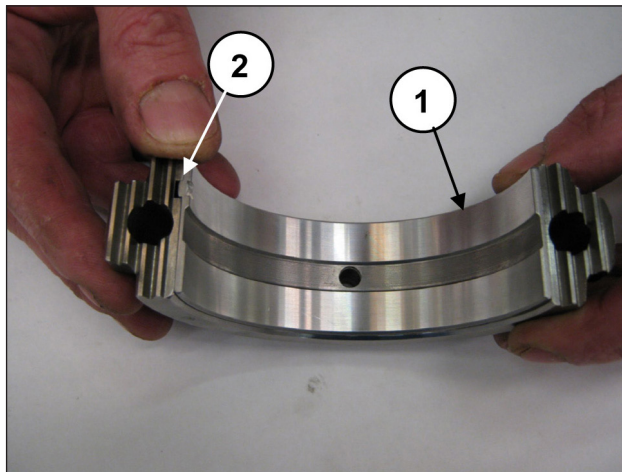


Fig. 67

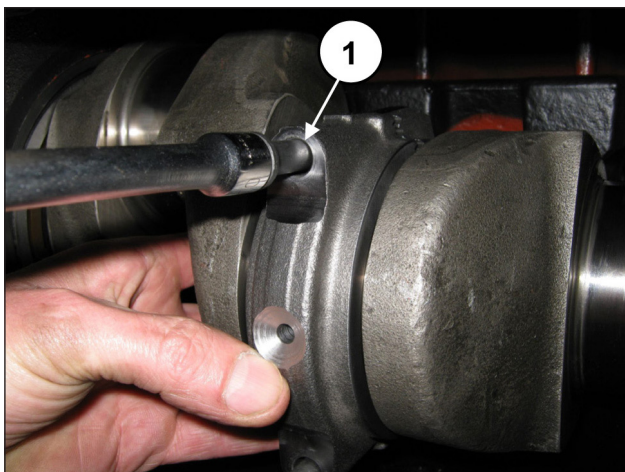


Fig. 68



**Com a operação concluída, verifique se as hastes tenham uma folga axial em todas as direções.**

Insira as vedações do óleo da guia do pistão no local do carter, mediante o uso da ferramenta adequada, cód. 27605300. Posicione o particular na haste (pos. ①, Fig. 69/a) e bata na ferramenta até a completa inserção da vedação do óleo no local (pos. ①, Fig. 69/b)

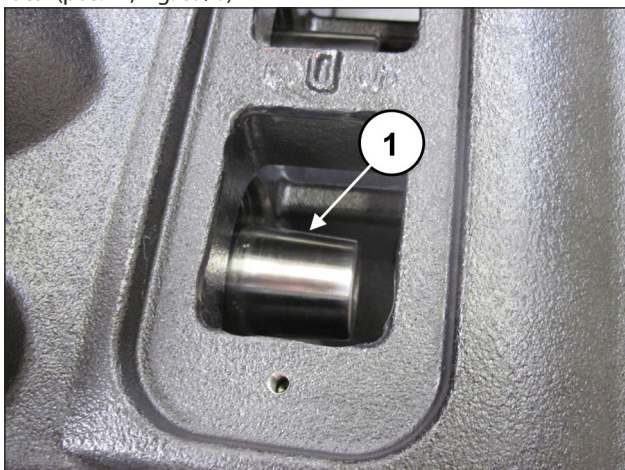


Fig. 69/a

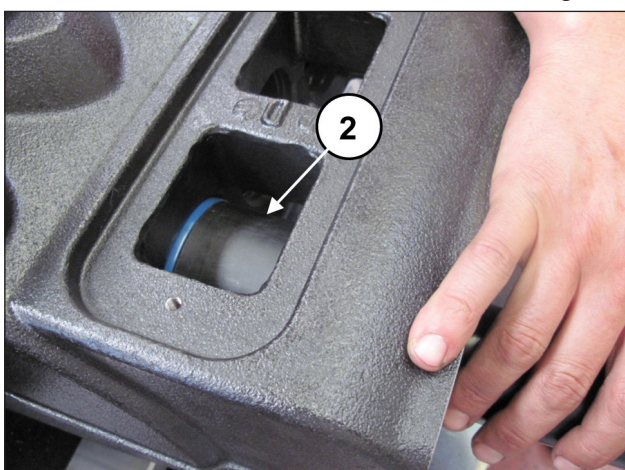


Fig. 69/b

Insira o anel circular na cobertura posterior (pos. ①, Fig. 70) e monte a cobertura no carter, mediante seis parafusos M10x30 (pos. ①, Fig. 71).

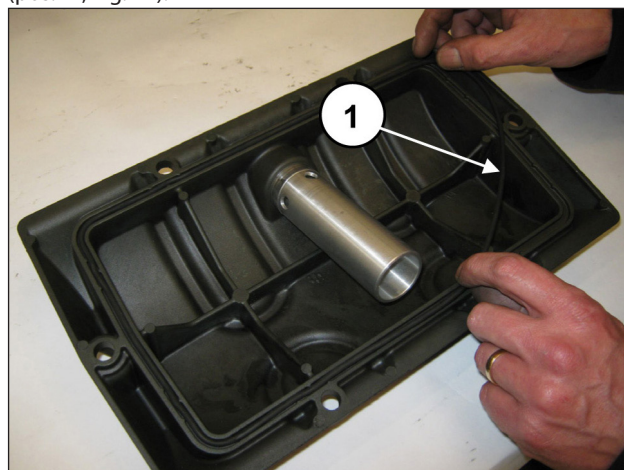


Fig. 70

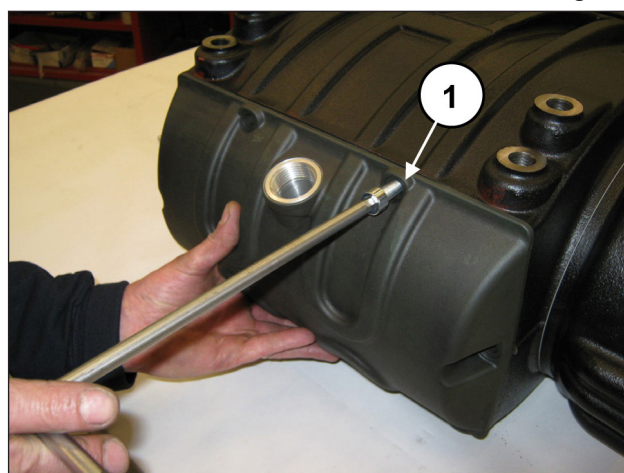


Fig. 71



**Preste atenção à correta e completa inserção do anel circular no local adequado na cobertura, para evitar que possa se danificar durante o aperto dos parafusos.**

Calibre os parafusos com chave dinamométrica, conforme indicado no capítulo 3 CALIBRAGEM DO APERTO DOS PARAFUSOS.

Insira o anel de suporte da coroa no suporte do eixo de manivelas (pos. ①, Fig. 72) até a parada (pos. ①, Fig. 73).

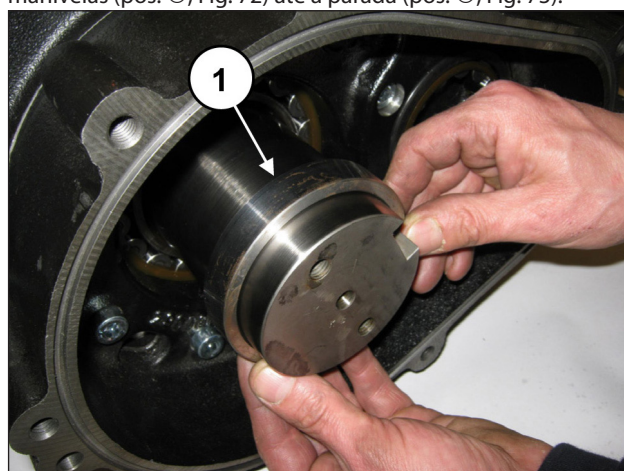


Fig. 72

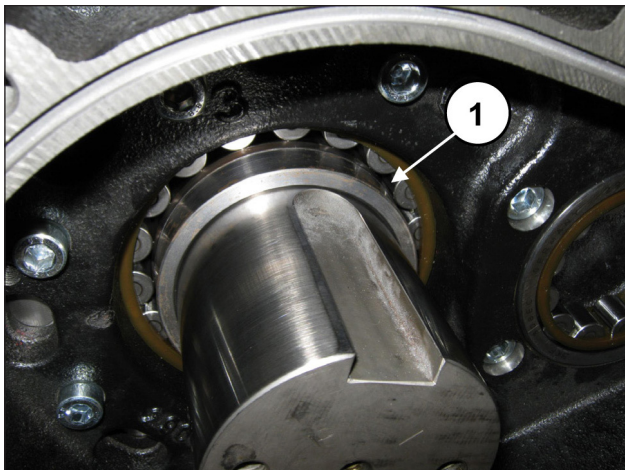


Fig. 73

Aplique a lingueta 22x14x80 no local do eixo (pos. ①, Fig. 74) e insira a coroa no eixo (pos. ①, Fig. 75).



**A coroa deve ser montada, certificando-se de que os dois furos M8 (a serem usados para a extração), resultem virados para o exterior da bomba (pos. ②, Fig. 75).**

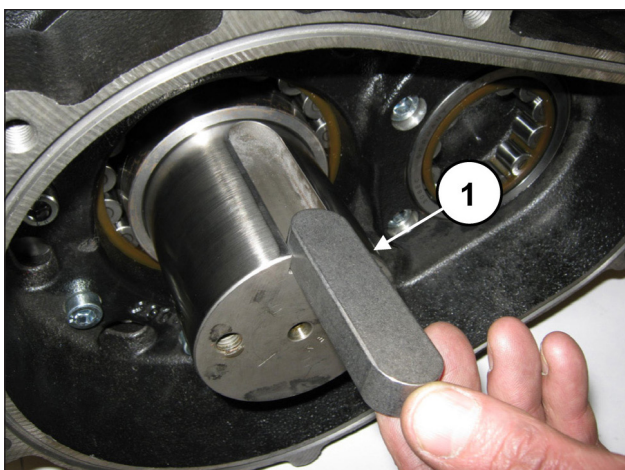


Fig. 74

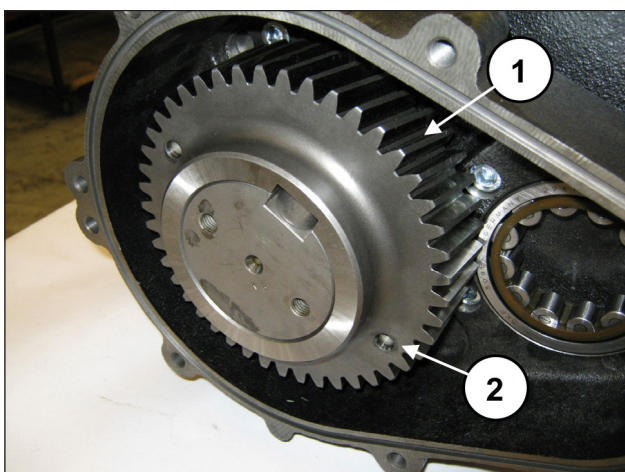


Fig. 75

Fixe a fixação da coroa (pos. ①, Fig. 76) usando os dois parafusos M10x25.  
Calibre os parafusos com chave dinamométrica, conforme indicado no capítulo 3 (pos. ①, Fig. 77).

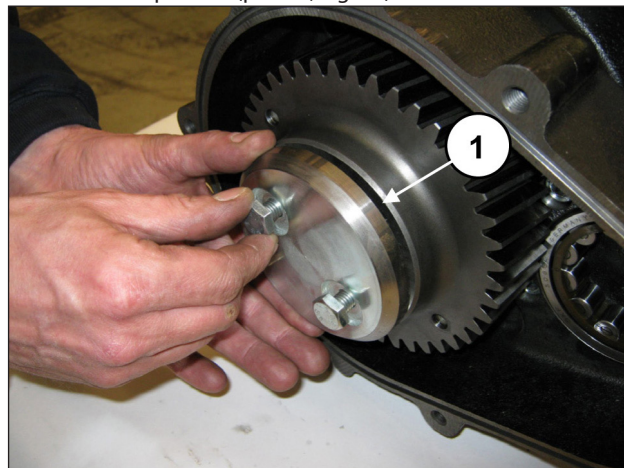


Fig. 76

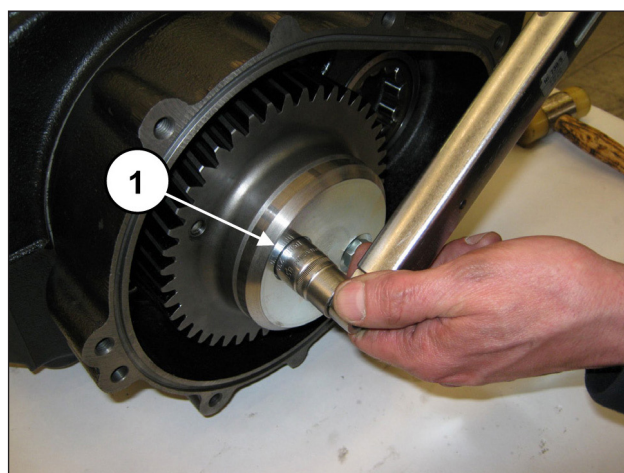


Fig. 77

Aplique os dois pinos Ø10x24 à caixa do redutor (pos. ①, Fig. 78) e insira o anel circular (pos. ①, Fig. 79).

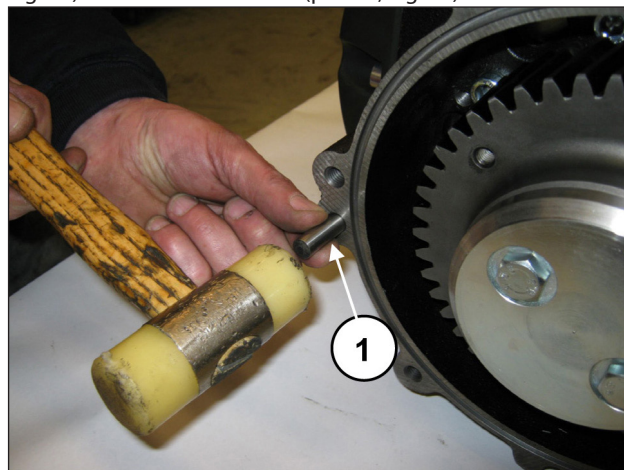


Fig. 78

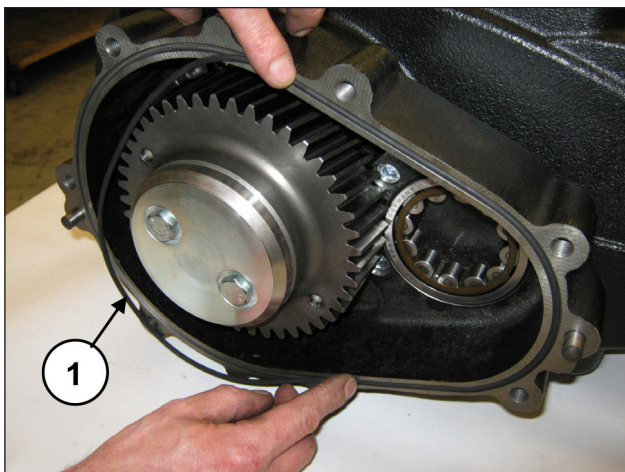


Fig. 79

Prossiga com a montagem do pinhão na cobertura do redutor, procedendo conforme a seguir:  
Pré-monte o anel interno do rolamento 40x90x23 no pinhão (pos. ①, Fig. 80) posicionando-o até a parada.

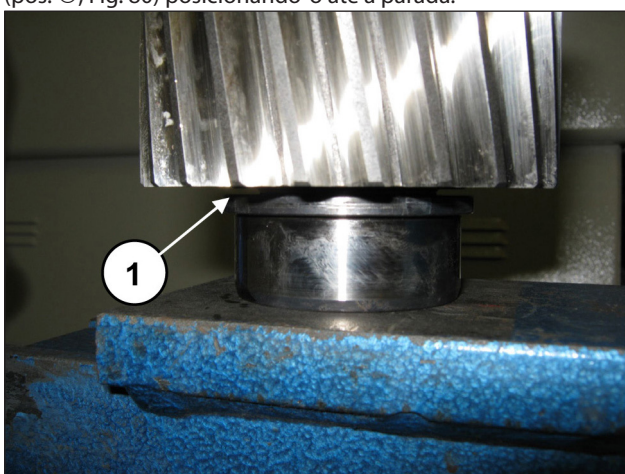


Fig. 80

Do outro lado do pinhão, pré-monte o rolamento 55x120x29 (pos. ①, Fig. 81) posicionando-o até a parada, usando a ferramenta, cód. 27604800 (pos. ①, Fig. 82).

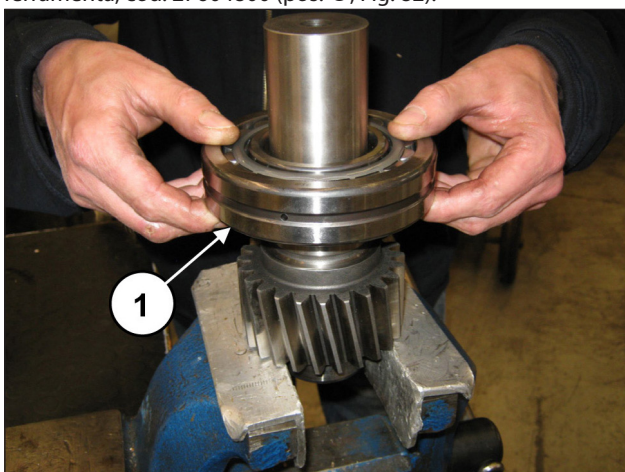


Fig. 81

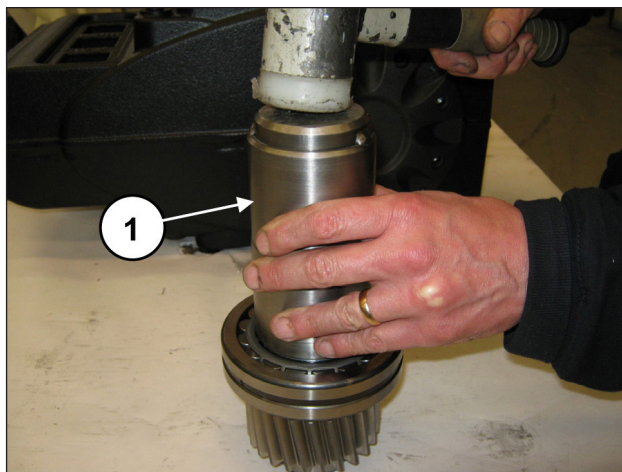


Fig. 82

Insira o anel de apoio do rolamento (pos. ①, Fig. 83) e posicione o anel elástico Ø55 (pos. ①, Fig. 84).

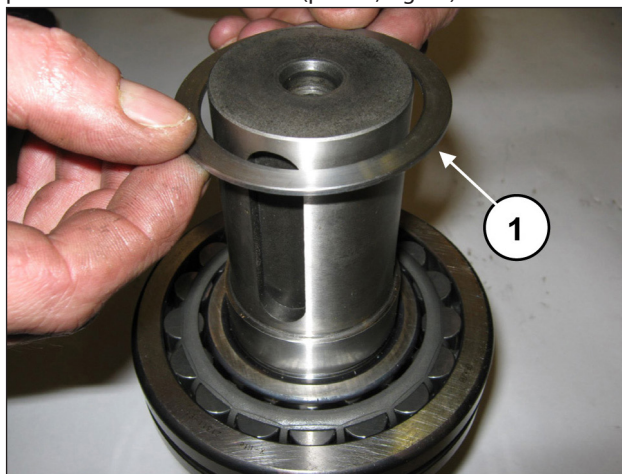


Fig. 83

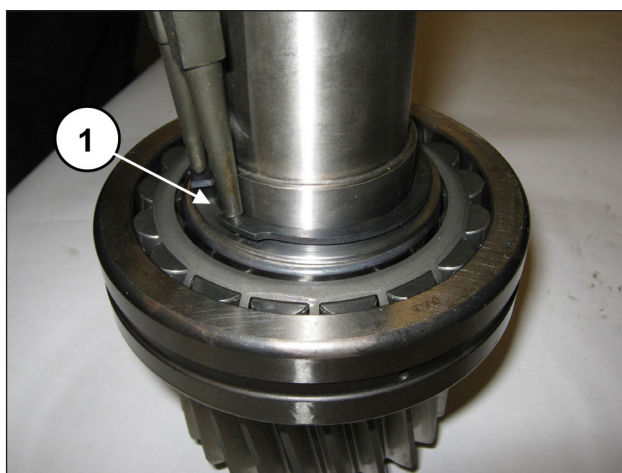


Fig. 84

Insira o pinhão pré-montado no interior do local especial na cobertura do redutor, mediante o uso de um mecanismo de percussão (pos. ①, Fig. 85).

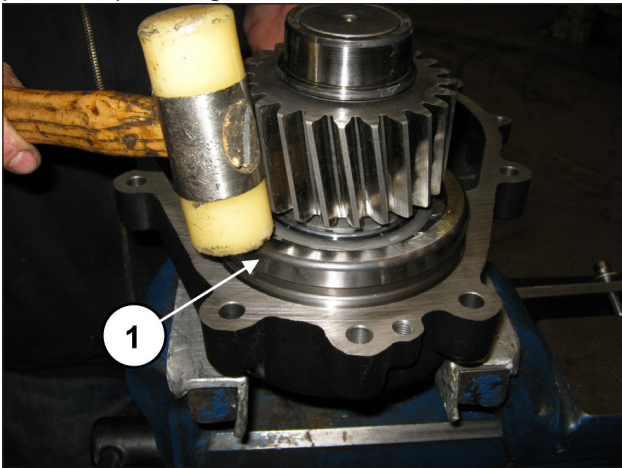


Fig. 85

Insira no local do anel elástico Ø120 (pos. ①, Fig. 86).

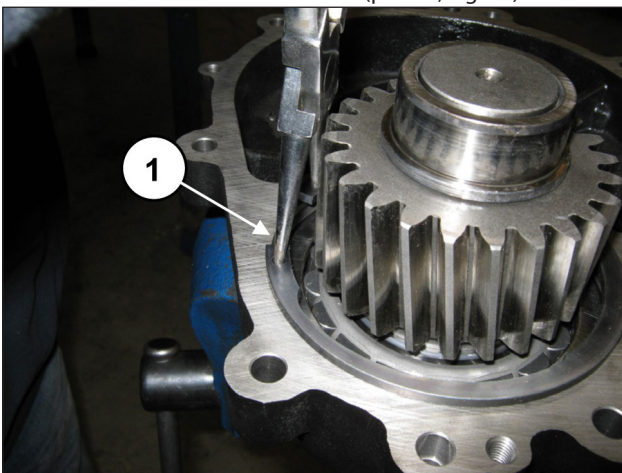


Fig. 86

Monte a cobertura do redutor, mediante o mecanismo de percussão (pos. ①, Fig. 87) e fixe-o, mediante sete parafusos M10x40 (pos. ①, Fig. 88).

Preste atenção para o correto acoplamento dos dois elementos do rolamento 40x90x23.

Calibre os parafusos com chave dinamométrica, conforme indicado no capítulo 3.

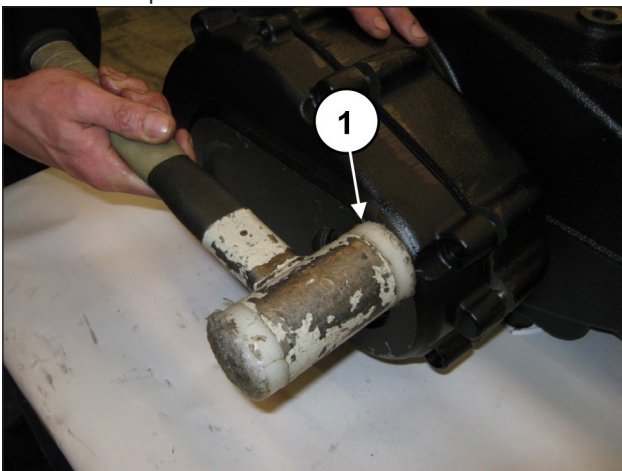


Fig. 87

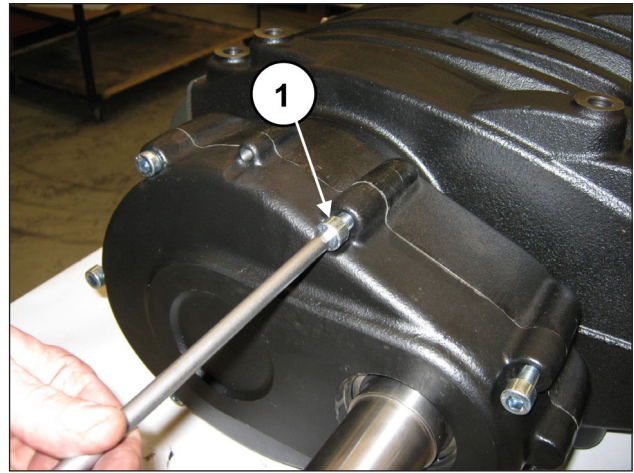


Fig. 88

Insira as vedações do óleo no interior da cobertura do redutor, mediante o uso da ferramenta, cod. 27605200 (pos. ①, Fig. 89). Antes de realizar a montagem das vedações do óleo, verifique as condições das bordas de vedação. Se a substituição for necessária, posicione o novo anel no fundo do buraco, conforme indicado na Fig. 90.



**Se o eixo apresentar um desgaste do diâmetro correspondente à borda da vedação para evitar a operação de retificação, pode-se posicionar o anel na segunda paragem, conforme indicado na Fig. 90.**



Fig. 89

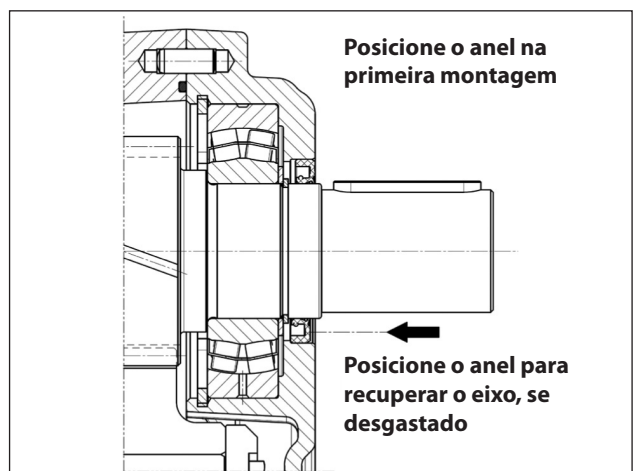


Fig. 90



**Para evitar danificar as vedações de óleo, preste particular atenção na inserção das vedações de óleo no pinhão.**

Aplique as coberturas de inspeção com o anel circular (pos. ①, Fig. 91) e aperte mediante 2+2 parafusos M6x14 (pos. ①, Fig. 92).

Calibre os parafusos com chave dinamométrica, conforme indicado no capítulo 3 CALIBRAGEM DO APERTO DOS PARAFUSOS.

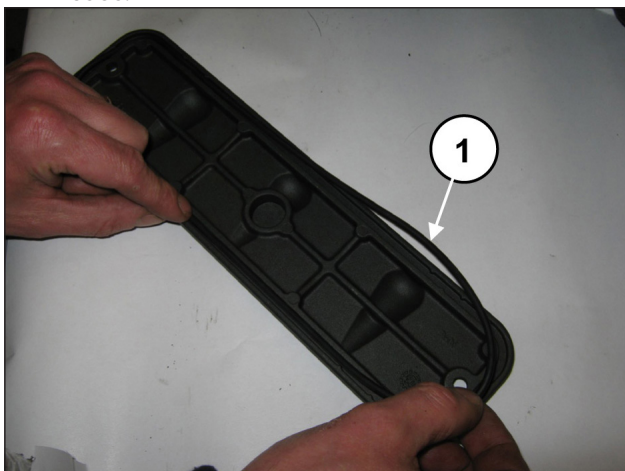


Fig. 91

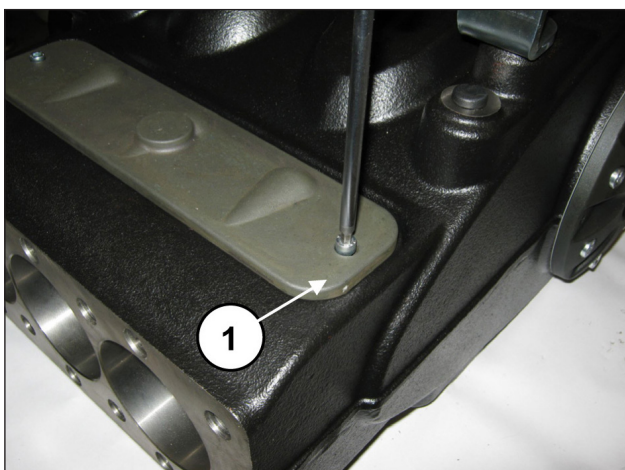


Fig. 92

Insira a lingueta 14x9x60 no pistão.

Aplique as tampas e os suportes de elevação mediante os parafusos especiais M16x30 (pos. ①, Fig. 93).

Calibre os parafusos com chave dinamométrica, conforme indicado no capítulo 3 CALIBRAGEM DO APERTO DOS PARAFUSOS.

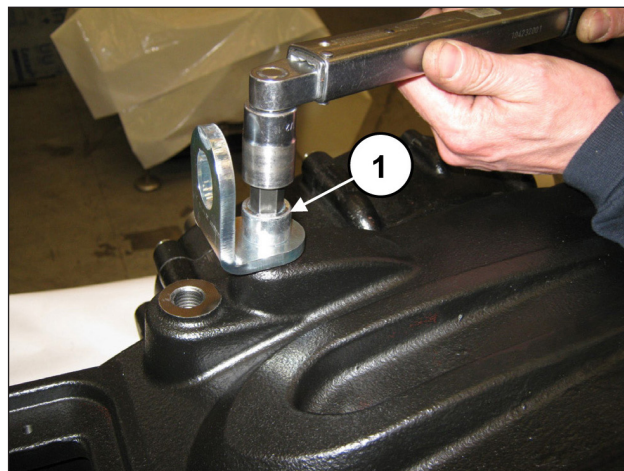


Fig. 93

Insira o óleo no carter, conforme indicado no *Manual de uso e manutenção*, parág. 7.4.

### 2.1.3 Classes de aumento e diminuição previstos

**TABELA DE DIMINUIÇÃO PARA O EIXO DE MANIVELA E SEMI-ROLAMENTOS DA HASTE**

Classe de recuperação (mm)	Código do semi-rolamento superior	Código do semi-rolamento inferior	Correção do diâmetro do pino do eixo (mm)
0.25	90928100	90928400	Ø79.75 0/-0.02 Ra 0.4 Rt 3.5
0.50	90928200	90928500	Ø79.50 0/-0.02 Ra 0.4 Rt 3.5

**TABELA DE AUMENTO PARA O CARTER DA BOMBA E GUIA DO PISTÃO**

Classe de recuperação (mm)	Código da guia do pistão	Correção do local do carter da bomba (mm)
1.00	73050543	Ø71 H6 +0.019/0 Ra 0.8 Rt 6

## 2.2 REPARAÇÃO DA PARTE HIDRÁULICA

### 2.2.1 Desmontagem do cabeçote - camisas - válvulas

O cabeçote não precisa de manutenção periódica.

As intervenções são limitadas à inspeção ou substituição da válvula, quando necessário.

Para a extração dos grupos da válvula, opere como mostra a seguir:

Solte, sem remover, os parafusos M10x140 de fixação das camisas do cabeçote (pos. ①, Fig. 94), de modo a ficarem livres.

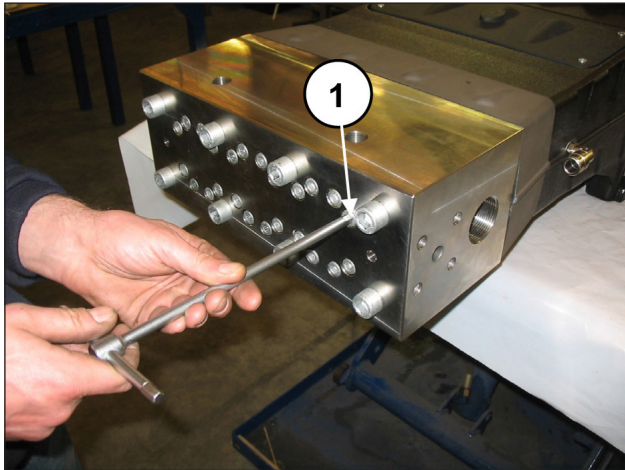


Fig. 94

Solte dois parafusos de fixação do cabeçote M16x320, diametralmente opostos (pos. ① e ②, Fig. 95), substituindo-os com dois parafusos-pino de serviço (cód.27540200) (pos. ①, Fig. 96), e assim, proceda com a remoção dos parafusos restantes.

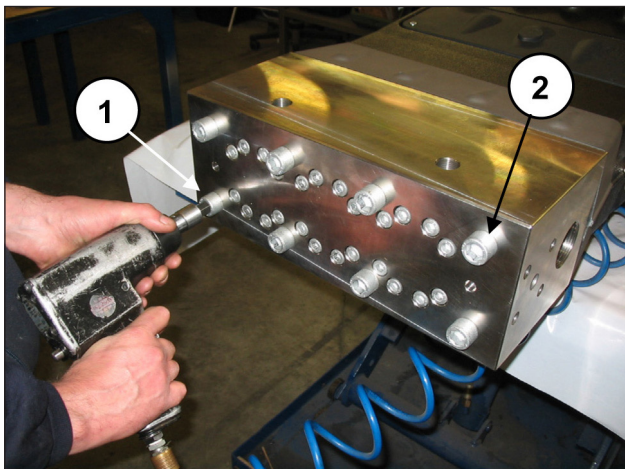


Fig. 95

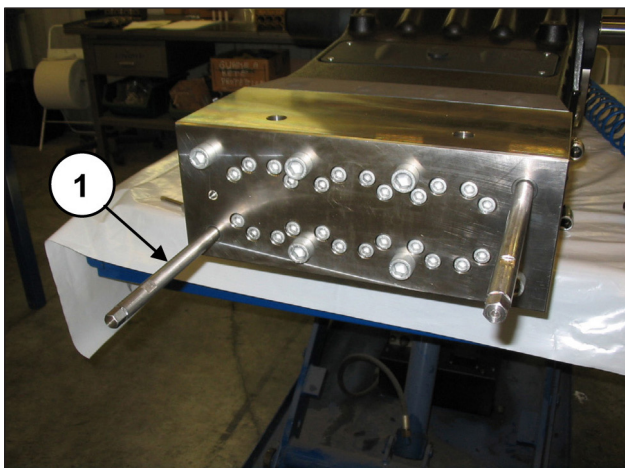


Fig. 96

Separe o cabeçote e o espaçador para camisas do carter da bomba (pos. ①, Fig. 97).

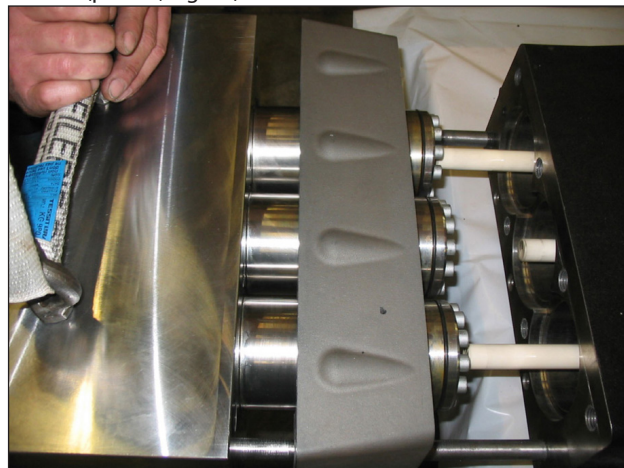


Fig. 97

Separe o espaçador para camisas dos grupos de camisas (pos. ①, Fig. 98).

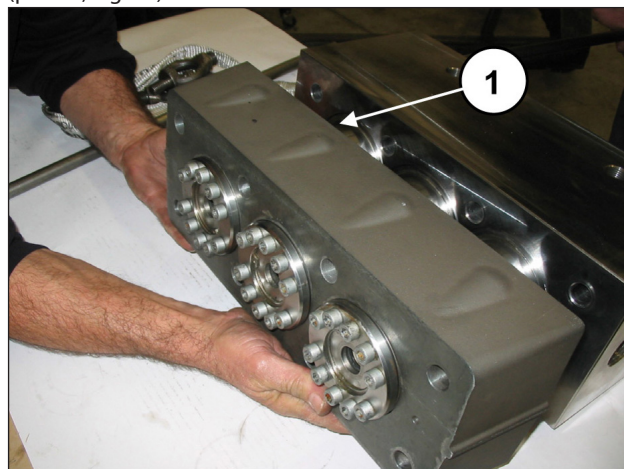


Fig. 98

Remova os parafusos M10x140 de fixação das camisas do cabeçote (pos. ①, Fig. 99) e extraia os grupos das camisas (pos. ①, Fig. 100).

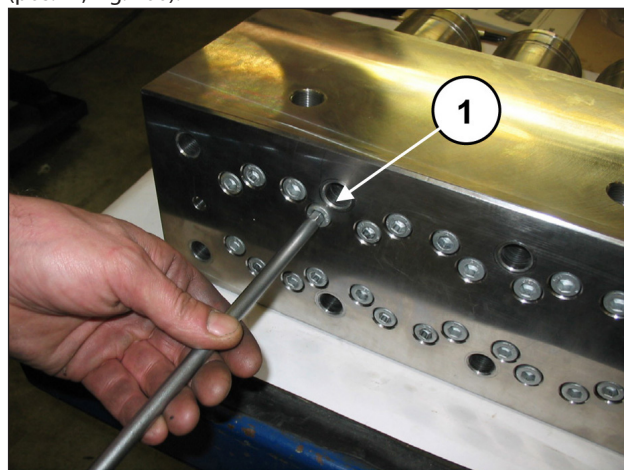


Fig. 99



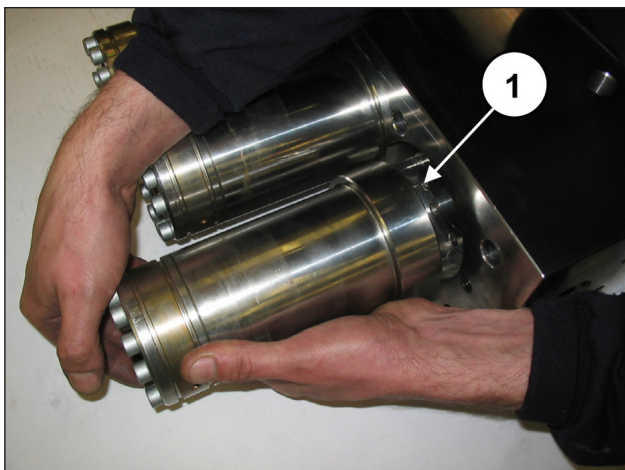


Fig. 100



**Durante a desmontagem das camisas, preste atenção para não soltar as molas da válvula e a válvula plana (pos. ① e ②, Fig. 101) pois não estando bloqueada, poderão cair.**

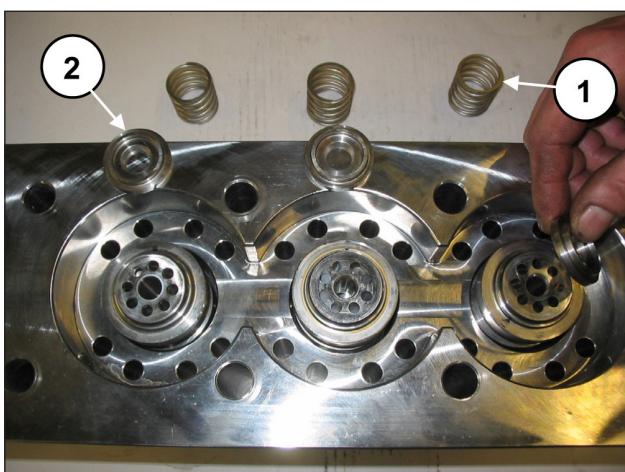


Fig. 101



**Se os locais da válvula estiverem bloqueados no cabeçote, a causa da formação de calcário ou de óxido deve ser retirada, inserindo a ferramenta adequada (cód. 034300020) no furo de fluxo (pos. ①, Fig. 102).**

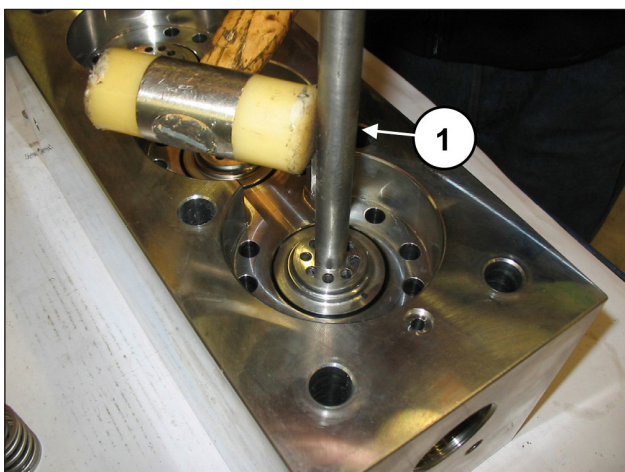


Fig. 102

Extraia os locais da válvula e verifique o estado de desgaste das vedações.

Se necessário, realize eventuais substituições (pos. ①, Fig. 103).

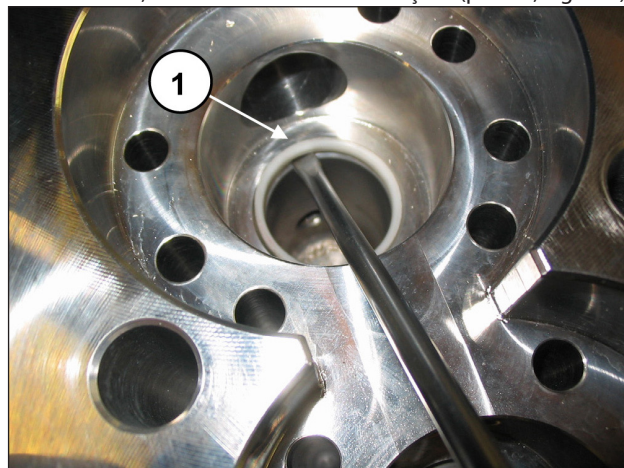


Fig. 103



**A cada inspeção da válvula, substitua os anéis de vedação e os relativos anéis circulares de vedação frontal entre a camisa e o cabeçote, e entre o cabeçote e o espaçador da camisa na zona do furo de recirculação. Antes de remontar, limpe e enxugue os vários componentes e todas as relativas ranhuras no interior do cabeçote.**

Extraia as placas de fluxo (pos. ①, Fig. 104), e as respectivas guias (pos. ①, Fig. 106), com as respectivas molas (pos. ①, Fig. 105), verifique o seu estado de desgaste e execute, se necessário, eventuais substituições, e se necessário, nos intervalos indicados no capítulo 11 do *Manual de uso e manutenção*.

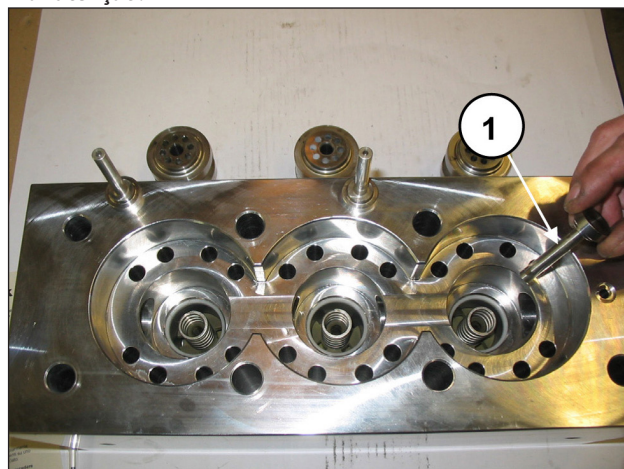


Fig. 104

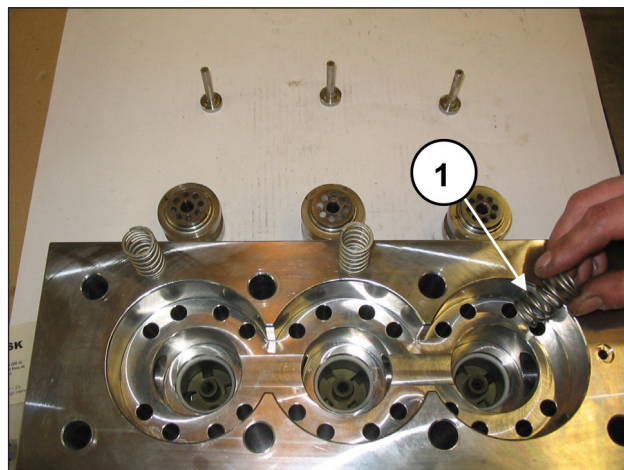


Fig. 105

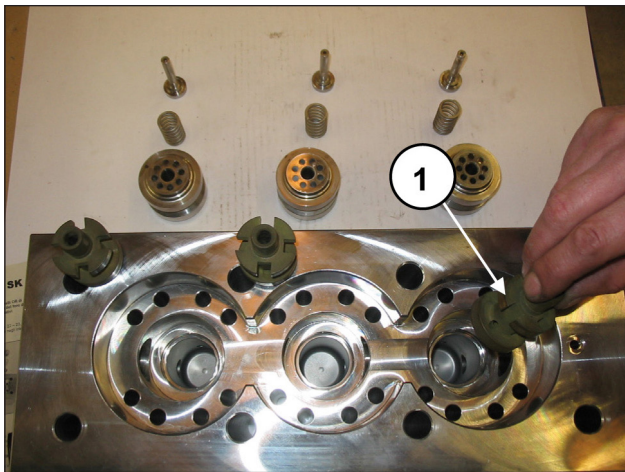


Fig. 106

**2.2.2 Montagem do cabeçote - camisas - válvulas**

Para remontar os vários componentes, inverta as operações anteriormente listadas, prestando atenção particular na montagem correta do espaçador para camisas: o furo Ø6 (circuito de refrigeração da vedação) deve resultar em correspondência ao furo análogo do cabeçote (com o anel circular).

**Cabeçote - camisa: proceda com a montagem e a calibragem dos parafusos de fixação do cabeçote e depois, proceda com a calibragem dos parafusos de fixação das camisas.**

para os valores do torque de aperto e para a sequência de aperto dos parafusos, respeite as indicações relacionadas no capítulo 3.

**2.2.3 Desmontagem do grupo do pistão - suportes - vedação**

O grupo de pistão não precisa de manutenção periódica. As intervenções são limitadas somente ao controle visual de drenagem do circuito de resfriamento. Se for apresentado falhas/oscilações no manômetro de fluxo ou pulsações do tubo de drenagem do circuito de resfriamento (se elástico), será necessário proceder com o controle e com eventual substituição do pacote de vedação.

Para a extração dos grupos de pistão, opere como a seguir: Separe o cabeçote e o espaçador para camisas do carter da bomba, conforme indicado no parág. 2.2.1 (da Fig. 94 a Fig. 100).

Remova a cobertura de inspeção superior, soltando os dois parafusos de fixação (pos. ①, Fig. 107).



Fig. 107

Remova os pistões c om uma chave fixa (pos. ①, Fig. 108) e controle o seu estado de desgaste (pos. ①, Fig. 109). Substituí-los, se necessário.

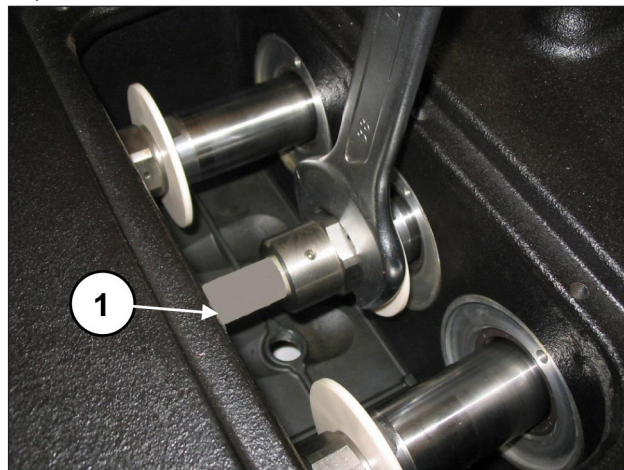


Fig. 108

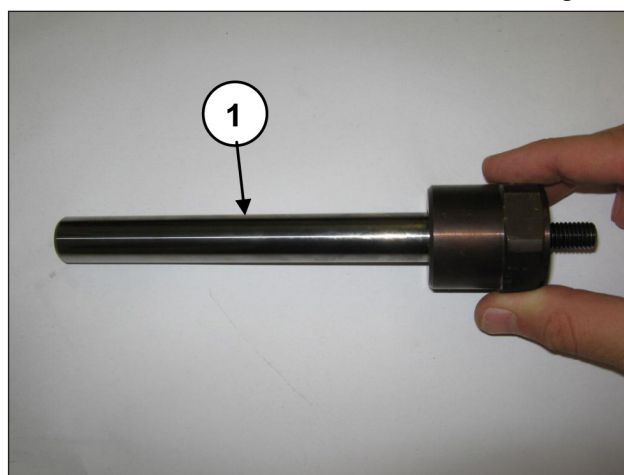


Fig. 109

Remova os parafusos M8x50 de fixação do suporte da camisa (pos. ①, Fig. 110) e proceda com a separação do suporte da camisa (pos. ①, Fig. 111).

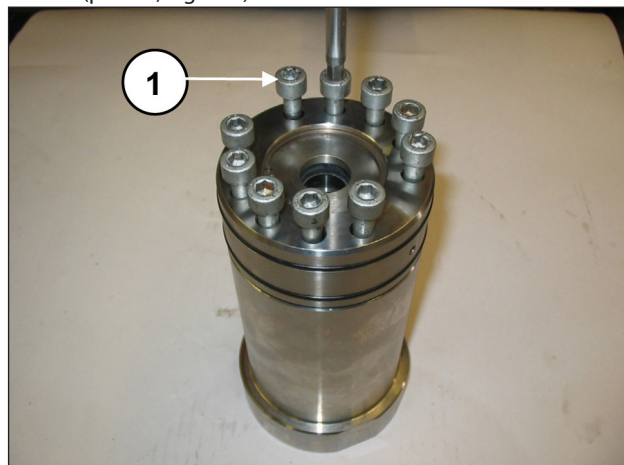


Fig. 110

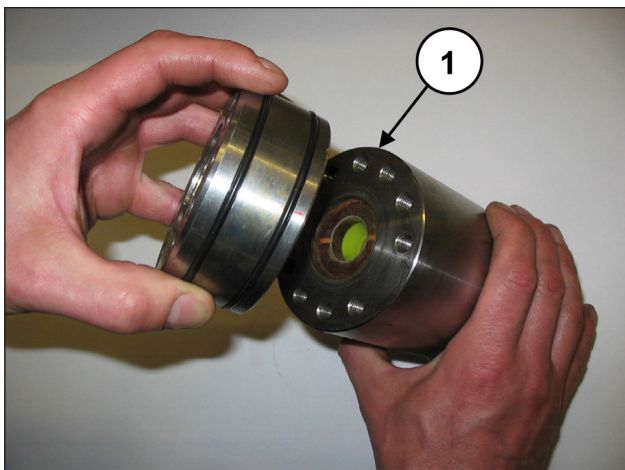


Fig. 111

Remova o anel elástico e o anel de retenção da vedação (pos. ①, Fig. 112) e com um pino especial, em material plástico, extraia a guarnição da vedação LP (baixa pressão) (pos. ①, Fig. 113).



Fig. 112

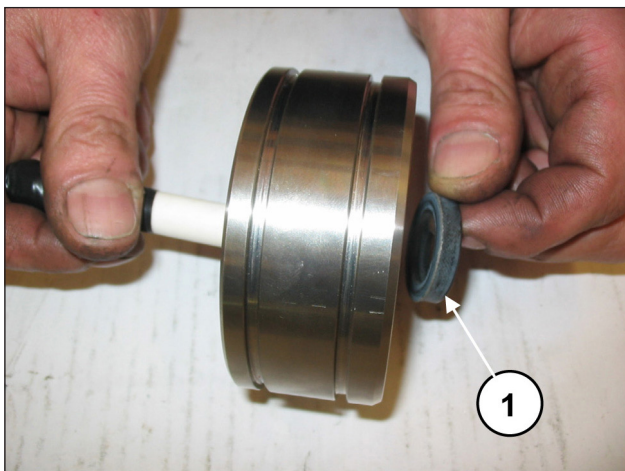


Fig. 113



A cada desmontagem, a vedação de baixa pressão e os anéis circulares devem ser substituídos.

Com a camisa separada do suporte de vedação e com um pino especial em material plástico (pos. ①, Fig. 114) faça sair o pacote HP (alta pressão) (pos. ①, Fig. 115).



A cada desmontagem, o pacote HP (pos. ①, Fig. 115) deverá ser substituído.

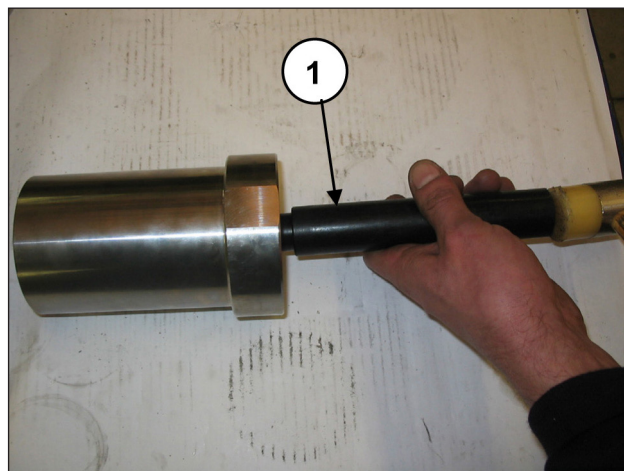


Fig. 114

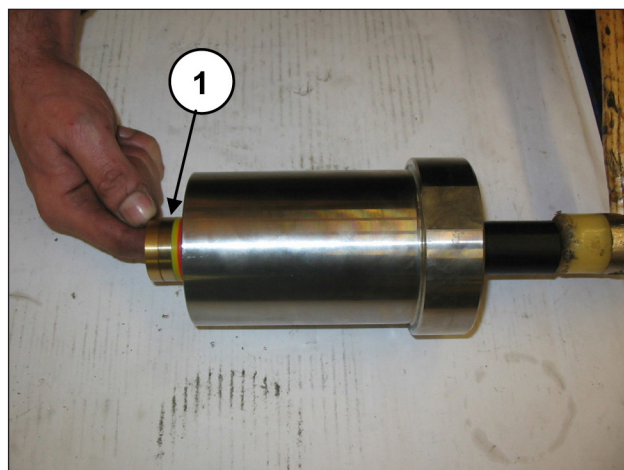


Fig. 115

### 2.2.4 Montagem do grupo do pistão - suportes - vedação

Para a remontagem dos vários componentes, inverta as operações, prestando atenção particular à sequência abaixo listadas. Para os valores do torque de aperto e para a sequência de aperto, respeite as indicações relacionadas no capítulo 3. Insira a bússola superior na camisa.



Para um posicionamento axial correto da bússola, use a ferramenta especial (cód. 27921100 para SM14, cód. 27921200 para SM16, cód. 27921300 para SM18, cód. 27911200 para SM20, cód. 27911400 para SM22 e cód. 27911500 para SM24) (pos. ①, Fig. 117 e Fig. 118).

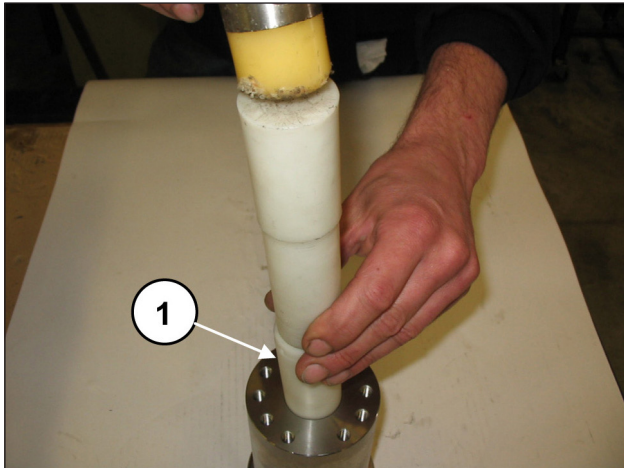


Fig. 116

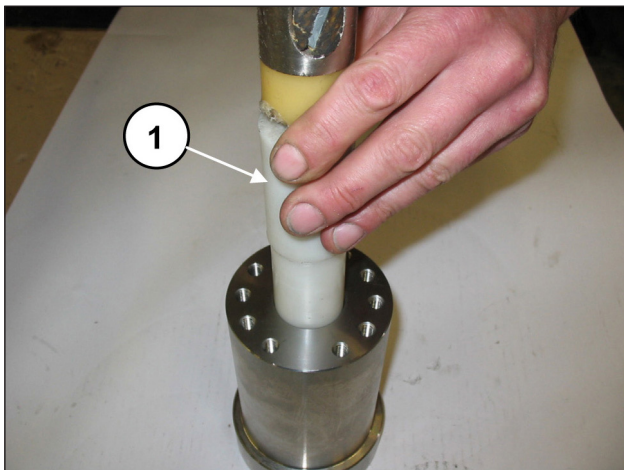


Fig. 117

introduza o pacote H.P. (alta pressão) (pos. ①, Fig. 118); dada a leve interferência entre a vedação e a camisa para evitar eventuais danos, aconselha-se o uso da ferramenta especial (cód. 27673200 para SM14, SM16 e SM18, cód. 27673300 para SM20, para SM22 e para SM24) (pos. ①, Fig. 119).

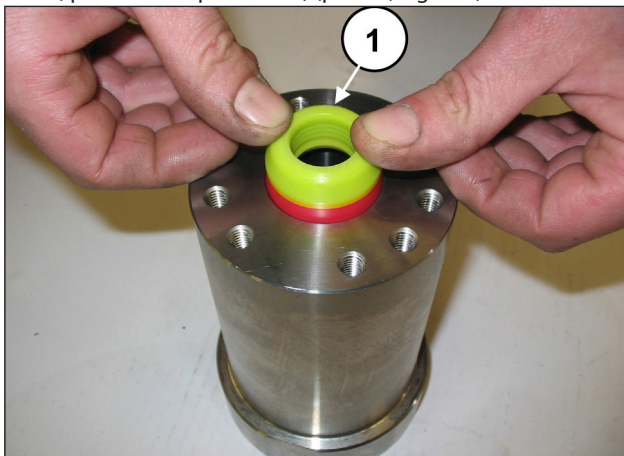


Fig. 118

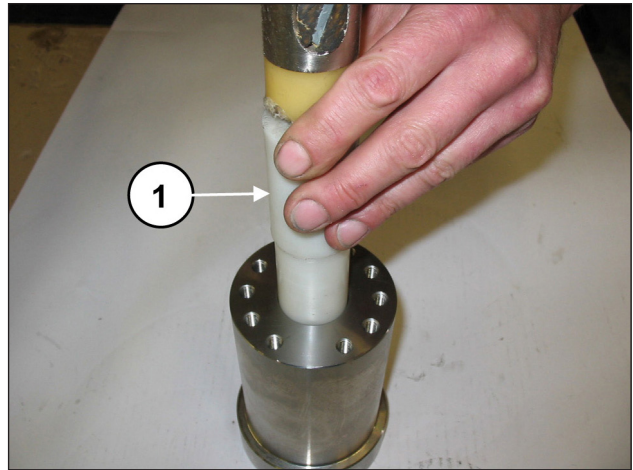


Fig. 119



A vedação H.P. deve ser introduzida na camisa, conforme indicado na Fig. 121 e Fig. 122.



Antes da montagem no local da vedação do H.P., deve ser lubrificado com lubrificante de silicone do tipo OKS 1110, seguindo as operações listadas abaixo:

O diâmetro externo deve ser ligeiramente lubrificado;

No diâmetro interno, o lubrificante deve ser aplicado prestando cuidado especial para o preenchimento de todas as bolsas entre as bordas de vedação, conforme indicado na Fig. 122.

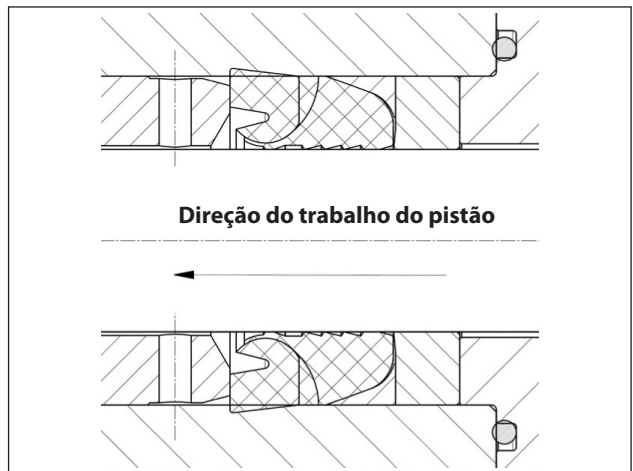


Fig. 120

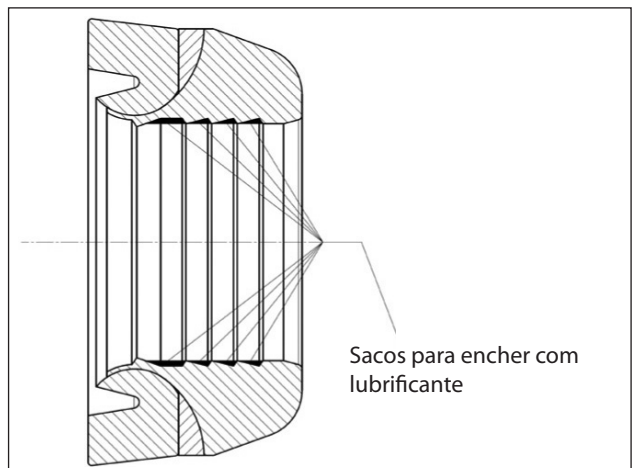


Fig. 121

Introduza o anel anti-extrusão e a bússola de vedação (pos. ① e ②, Fig. 122, Fig. 123 e Fig. 124).



A bússola das vedações ② deve ser introduzida na camisa com as duas descargas de frente para a parte exterior (lateral do carter), conforme indicado na Fig. 123.

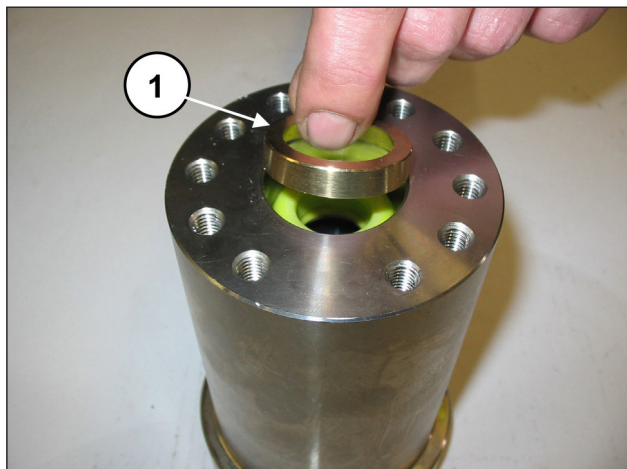


Fig. 122

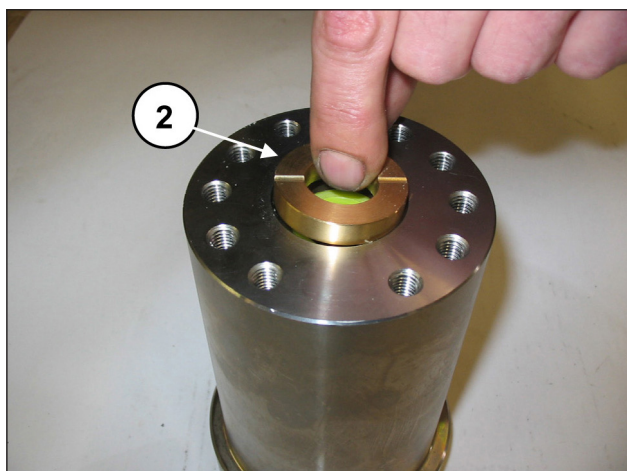


Fig. 123

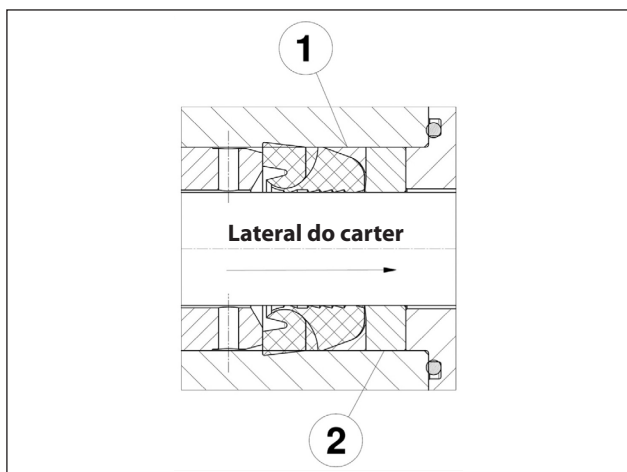


Fig. 124



A vedação L.P. deve ser introduzida na camisa com a borda de vedação na direção do trabalho do pistão (pos. ①, Fig. 125 e Fig. 126), lubrificando ligeiramente o diâmetro externo com lubrificante de silicone tipo OKS 1110. Substitua a vedação L.P. quando se apresentar desgastada.

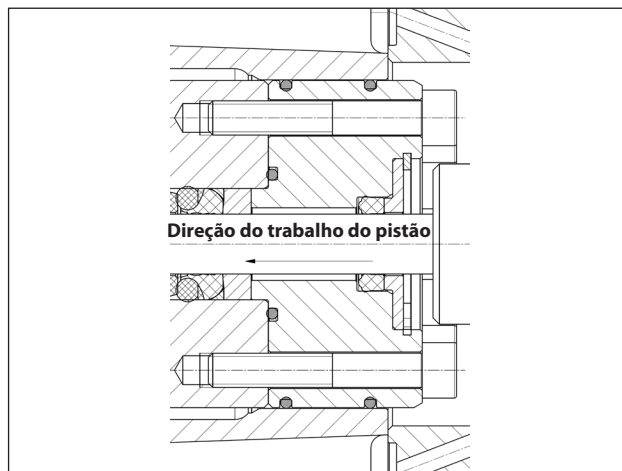


Fig. 125

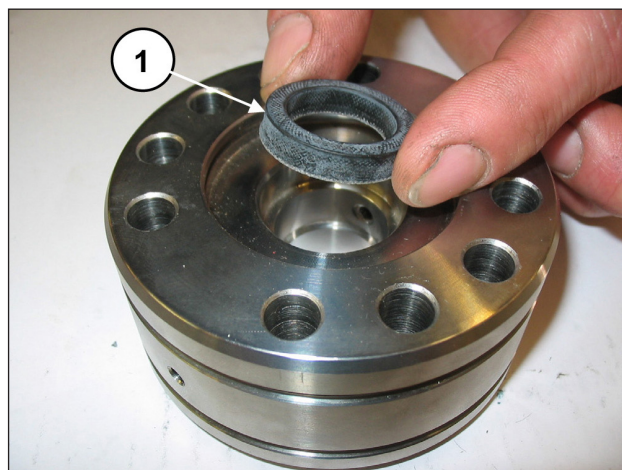


Fig. 126

Remonte o grupo de suporte de vedação (Fig. 127 e Fig. 128), substituindo os componentes ① e ②.

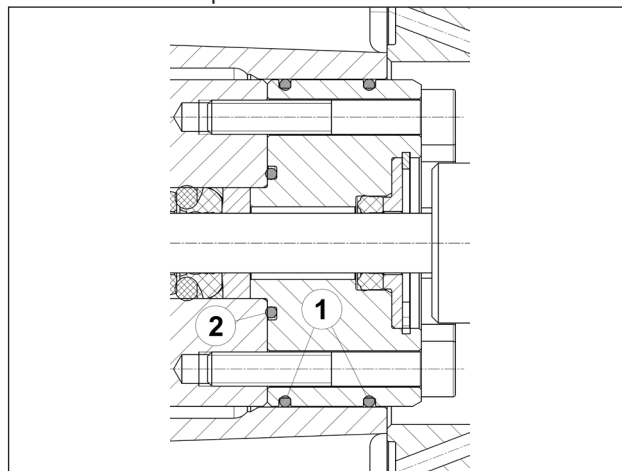


Fig. 127

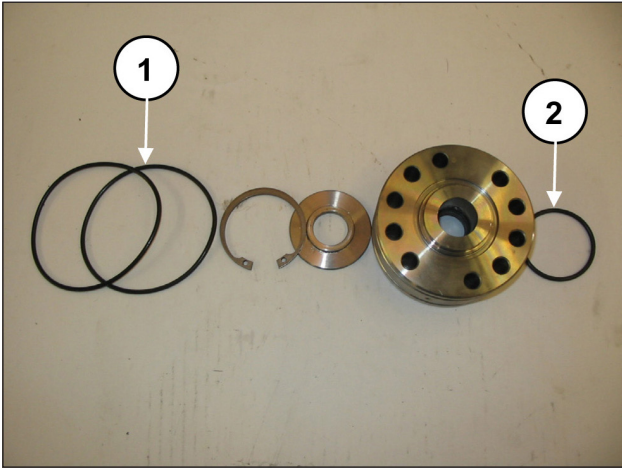


Fig. 128

Monte o grupo do suporte - camisa soltando manualmente os parafusos M8x50, conforme indicado na Fig. 129, em seguida, proceda com a calibragem com chave dinamométrica, conforme indicado no capítulo 3.

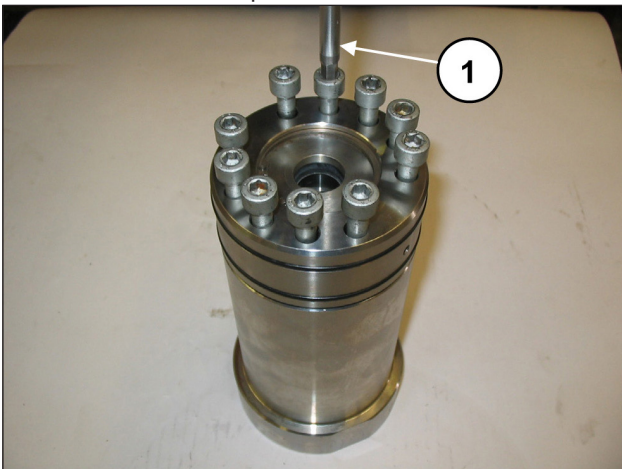


Fig. 129

### 3 CALIBRAGEM DO APERTO DOS PARAFUSOS

O aperto dos parafusos é para ser executado exclusivamente com chave dinamométrica.

Descrição	Posição de explosão	Torque de aperto Nm
Parafuso M10x30 da cobertura do carter	79	45
Tampa G1/2x13 do carter	81	40
Parafuso M16x30 do suporte de elevação	41	200
Parafuso M10x40 da cobertura do redutor	71	45
Parafuso M10x25 de fixação da coroa	66	45
Parafuso M10x40 da caixa do redutor	71	45
Parafuso M6x14 das coberturas superior e inferior	50	10
Parafuso M10x30 da cobertura do rolamento	79	45
Parafuso M10x1.5x80 do aperto da haste	43	65*
Parafuso M6x20 da guia do pistão	37	10
Pistão completo	15	40
Montagem das bobinas D.3 3/8M-3/8F	29	45
Parafuso M8x50 dos suportes	22	40**
Parafuso M16x280 do cabeçote	1	280***
Parafuso M10x140 da camisa	26	83****

\* Alance o torque de aperto, apertando os parafusos simultaneamente.



**Os parafusos - posic. 1-22-26 devem ser apertados com chave dinamométrica, lubrificando a haste rosqueada com lubrificante de bissulfureto de molibdeno, cód.12001500.**

\*\* Os parafusos de fixação dos suportes devem ser apertados, respeitando as fases e a ordem relacionada no esquema da Fig. 130.

\*\*\* Os parafusos de fixação do cabeçote devem ser apertados, respeitando as fases e a ordem relacionados no esquema da Fig. 131.

\*\*\*\* Os parafusos de fixação da camisa devem ser apertados as fases e a ordem relacionada no esquema da Fig. 131.

#### Aperto dos parafusos de suporte das vedações, pos. 22

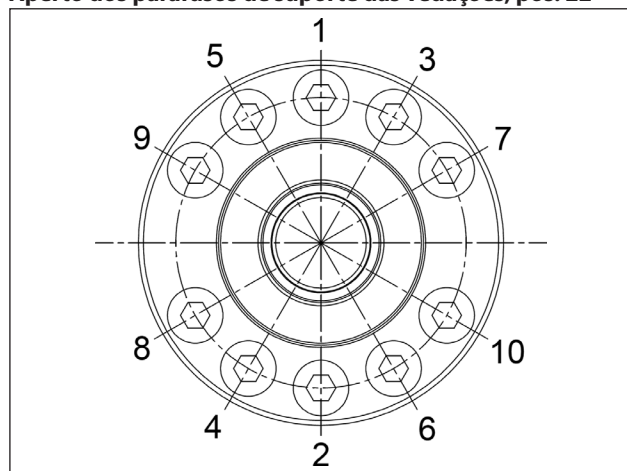


Fig. 130

Aperto dos parafusos M8x50, segundo a sequência indicada (1-2-3-4-5-6-7-8-9-10), realizada em uma única fase do torque indicado

#### Aperto dos parafusos do cabeçote e camisas, pos. 1 e pos. 26

**OPERAÇÃO 1:** Aperto dos parafusos M16x320 (pos. 1) em duas fases respeitando a sequência indicada na figura: (A-B-C-D-E-F-G-H)

**Fase 1 = 200 Nm**  
**Fase 2 = 280 Nm**

**OPERAÇÃO 2:** Aperto dos parafusos M10x140 (pos. 26) em quatro fases, respeitando a sequência indicada na figura: (1-2-3-4-5-6-7-8)

**Fase 1 = 40 Nm**  
**Fase 2 = 65 Nm**  
**Fase 3 = 83 Nm**  
**Fase 4 = 83 Nm**

Fig. 131

## 4 FERRAMENTAS PARA A REPARAÇÃO

A manutenção da bomba pode ser realizada através de ferramentas simples para a desmontagem e remontagem dos componentes. As seguintes ferramentas estão disponíveis:

### Para a montagem:

Eixo (bloqueio da haste)	cód. 27566200
Rolamento no eixo de manivela	cód. 27604700
Rolamento do pinhão na caixa do redutor	cód. 27604900
Rolamento do eixo de manivela na caixa do redutor	cód. 27605000
Rolamento do eixo de manivela na cobertura do rolamento	cód. 27605000
Vedações do óleo da guia do pistão	cód. 27605300
Rolamento no pinhão	cód. 27604800
Vedações do óleo do pinhão	cód. 27605200
Bússola para pistão	cód. 27921100 (SM14)
	cód. 27921200 (SM16)
	cód. 27931300 (SM18)
	cód. 27911200 (SM20)
	cód. 27911400 (SM22)
	cód. 27911500 (SM24)
Pacote de vedação HP	cód. 27673200 (SM14 - SM16 - SM18)
	cód. 27673300 (SM20 - SM22 - SM24)
Cabeçote/espaçador da camisa	cód. 27540200

### Para a desmontagem:

Vedações do óleo da guia do pistão	cód. 27918500
Eixo (bloqueio da haste)	cód. 27566200
Local da válvula	cód. 034300020
Cabeçote/espaçador da camisa	cód. 27540200



### 5 SUBSTITUIÇÃO DA BUCHA DO PÉ DA HASTE

Realize a perfuração a frio da bucha e o processamento sucessivo, prestando atenção às dimensões e tolerâncias dos elementos subjacentes Fig. 132.

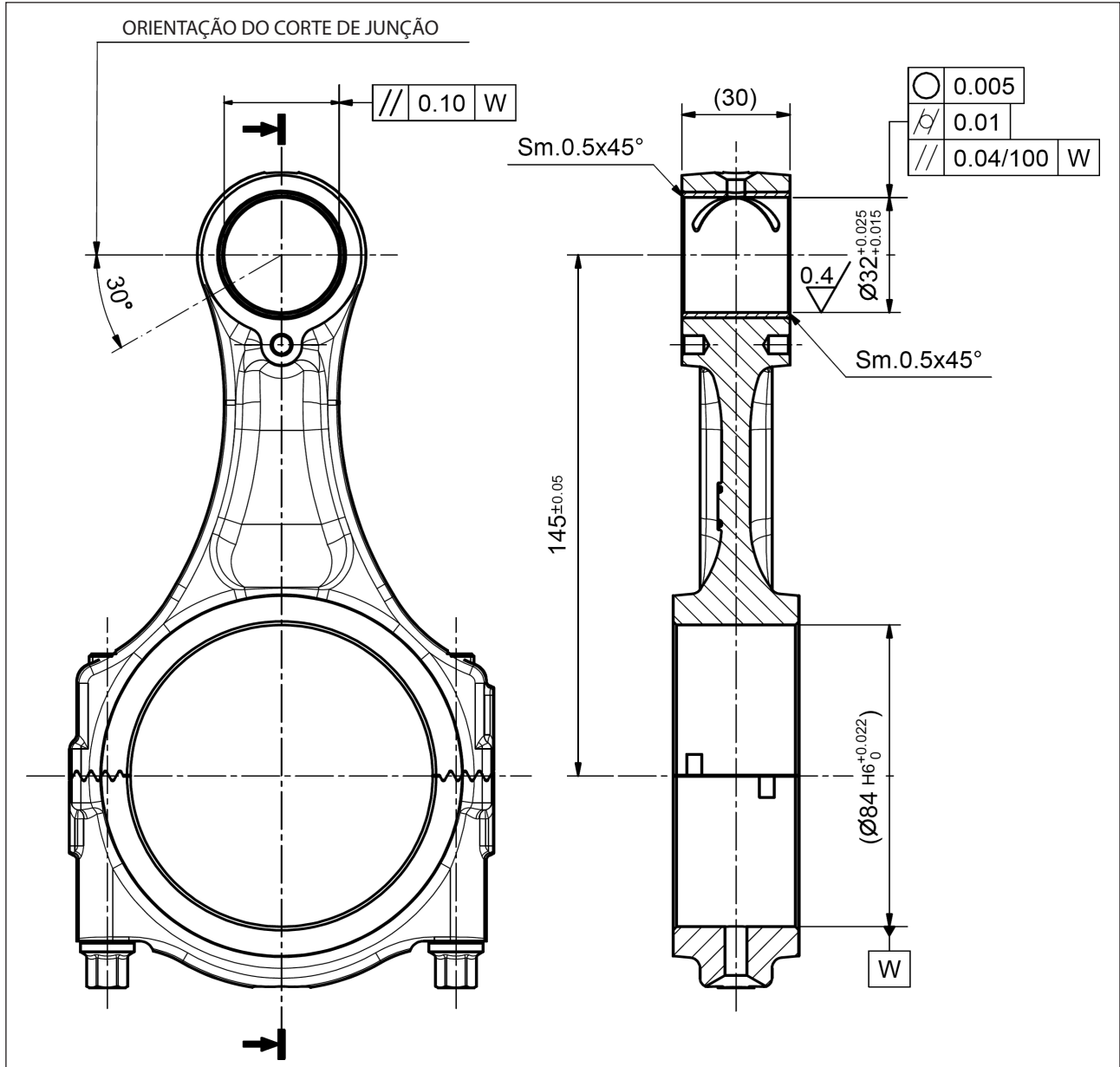
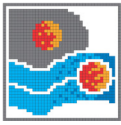


Fig. 132



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