

**MTM 345 - 0707**



**TECHNODRIVE**

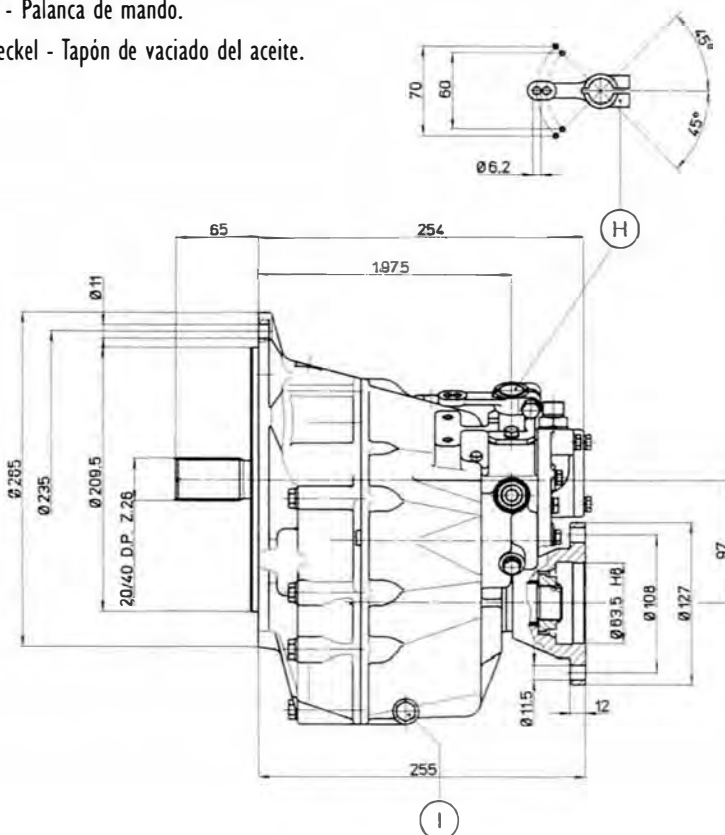
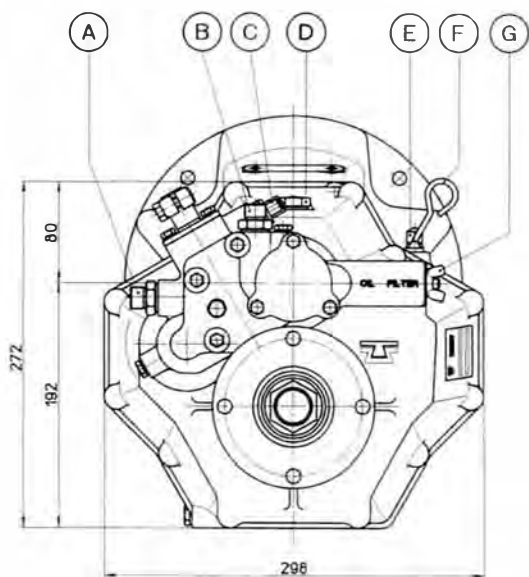
# TM345

**Service Manual**



# TM 345 - Dimensioni - Dimensions - Dimensions - Abmessungen - Medidas

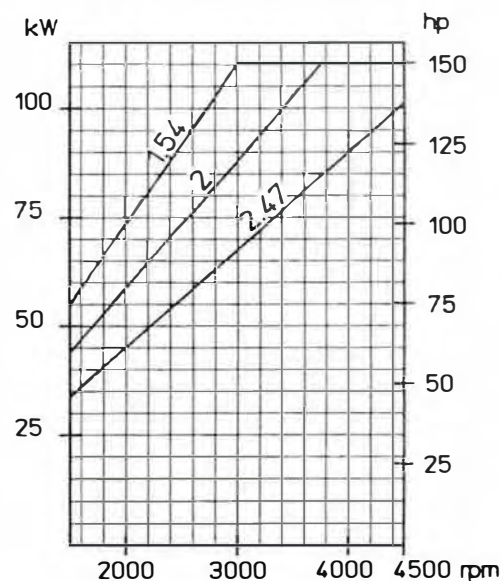
- A** - Ritorno olio da scambiatore - Oil from cooler - Retour huile de l'échangeur - Ölrücklauf vom Kühler - Regreso del aceite del intercambiador (3/8"Gas).
- B** - Mandata olio allo scambiatore - Oil to cooler - Refoulement huile ou échangeur - Ölzufluss zum Kühler - Impulsión del aceite al intercambiador (3/8"Gas).
- C** - Indicatore di folle - Neutral indicator - Indicateur point mort - Leerlauf Anzeiger - Neutral indicator.
- D** - Tappo carico olio - Filling plug - Bouchon de remplissage - Einfülldeckel Öl - Tapón de llenado del aceite.
- E** - Tappo di sfiato - Oil breather plug - Reniflard - Entlüftungsdeckel - Tapón de purga.
- F** - Asta livello olio - Oil dipstick - Bouchon de niveau - Ölmeßstab - Varilla del nivel del aceite.
- G** - Filtro olio - Oil filter - Filtre de l'huile - Ölfilter - Filtro del aceite.
- H** - Leva comando - Actuating lever - Levier de commande - Steuerhebel - Palanca de mando.
- I** - Tappo scarico olio - Oil drain plug - Bouchon de vidange - Ölablaßdeckel - Tapón de vaciado del aceite.



## Caratteristiche tecniche Technical data Caractéristiques techniques Technische Daten Características Técnicas

Rapporto-Ratio-Rapport- Untersetzung-Relacion		1,54	2,00	2,47
Coppia max - Diporto Max torque - Pleasure Couple maxi - Plaisance Max Drehmoment - Vergnügungsboot Par max - Recreo	Nm	345	280	210
Coppia max - Lavoro Max torque - Continuous Couple maxi - Continu Max Drehmoment - Arbeit Par max - Servicio	Nm	215	215	160
Velocità max entrata Max input speed Vitesse maxi à l'entrée Max Eingangsgeschwindigkeit Velocidad máx a la entrada		4500 RPM		
Peso a secco Weight without oil Poids sans huile Gewicht ohne Öl Peso sin aceite		25 Kg.		

## Diagramma di potenza (diporto) Power curve (pleasure) Diagramme de puissance (plaisance) Leistungskurve (Vergnügungsboot) Diagrama de potencia (recreo)





## OPERATING PROCEDURE

- In forward speed motion is transmitted by means of the clutch unit mounted on the input shaft.
- In forward speed, the rotating direction of the marine gear output flange is opposite to engine direction.
- In reverse speed, motion transmission is achieved by means of a clutch unit mounted on the intermediate shaft.
- Clutches are driven by the oil pressure raised by a pump controlled by the intermediate shaft and are able to transmit full power both in forward and in reverse speed.
- The reduction ratio is the same in forward as well as in reverse speed.

## INSTALLATION

- TM 345 - TM 345A marine gear can be connected to engine rotating counterclockwise (as seen from the flywheel side) only.
- Before connecting the marine gear output flange to the propeller axle, it is necessary to make sure that its misalignment does not exceed 0,05 mm.
- The remote control must be connected so that the control lever can rotate completely from the forward speed position to the reverse speed position and a correct neutral position can be ensured. From the neutral position, forward speed is achieved by rotating the control lever counterclockwise.
- The heat exchanger connection is achieved as shown in fig. I.
- The marine gear is supplied without oil; therefore, before starting it, fill it up to the maximum level marked on the dipstick; then start the engine to allow the piping system to fill up and check the oil level again.

 **Make sure that the control cable is easily movable.**


 **Make sure that the control cable is able to perform the complete lever stroke both in forward and in reverse and that it is well positioned in neutral.**

## USE

- The engagement of forward speed and reverse speed and the shifting to neutral position must be carried out while the engine is running at minimum speed.

 **The gearbox is supplied without oil. Before the first start-up it must be filled up to the maximum level marked on the dipstick.**

 **Before to start the engine make sure that the gearbox is in neutral position.**

 **The gearbox should only be shifted with the engine at idle speed so as to avoid that the gearbox or the coupling may be damaged.**

## MAINTENANCE

- Check oil level daily.
- Change the oil for the first time after 50 working hours: afterwards, replace the oil after 1000 working hours (or, at the longest, every 12 months).
- Whenever the oil is replaced, clean the filter (ref. 65).
- Clutches require no adjustment.

 **Disassembly and assembly of the gearbox or of its parts is to be made by specialized technicians only.**

## LUBRICATION

- Use class CD (API service classification) oil SAE 20 W 40.
- Oil quantity for the marine gear with standard cooler: 1,6 l.
- Max oil temperature: 90° C.
- Oil pressure measured at 1000 RPM engine speed, oil temperature 60° C, is to be between 13 and 15 bar. Pressure gauge connections M8x1 are placed, refer to fig. I, on L (forward) and M (reverse).

# Schema applicazione scambiatore - Attacchi manometri Exchanger application diagram - Pressure gauge connections Schema d'application de l'échangeur - Fixations des manomètres

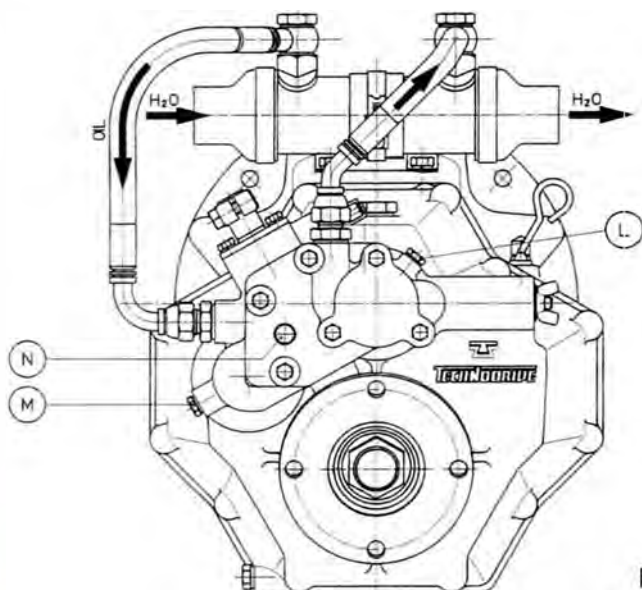


FIG. 1

- L** - Pressione marcia avanti (M8x1)  
Forward pressure (M8x1)  
Pression marche-avant (M8x1)
- M** - Pressione marcia indietro (M8x1)  
Reverse pressure (M8x1)  
Pression marche-arrière (M8x1)
- N** - Pressione lubrificazione (M8x1)  
Lubrication pressure (M8x1)  
Pression lubrification (M8x1)

GUASTO - FAILURE - DEFAULT	CAUSA - CAUSE - CAUSE	RIMEDIO - SOLUTION - REMEDE
<ul style="list-style-type: none"> <li>- Pressione olio troppo bassa</li> <li>- Pressione olio troppo alta</li> <li>- Surriscaldamento</li> </ul>	<ul style="list-style-type: none"> <li>- Valvola regolatrice sporca (74)</li> <li>- Livello olio troppo basso</li> <li>- Pompa olio guasta</li> <li>- Anelli di tenuta sugli alberi frizione rotti (21)</li> <li>- Valvola regolatrice sporca (74)</li> <li>- Livello olio eccessivo</li> <li>- Portata acqua di raffreddamento insufficiente</li> <li>- Scambiatore sporco o intasato</li> <li>- La frizione slitta.</li> <li>- Eccessivo carico sull'invertitore</li> <li>- Precarico sui cuscinetti non corretto</li> <li>- Cuscinetto danneggiato</li> </ul>	<ul style="list-style-type: none"> <li>- Smontare valvola e pulire</li> <li>- Ripristinare livello</li> <li>- Sostituire pompa</li> <li>- Smontare e sostituire</li> <li>- Smontare valvola e pulire</li> <li>- Portare olio al livello prescritto</li> <li>- Portare al giusto valore</li> <li>- Smontare e pulire</li> <li>- Verificare la pressione dell'olio nel circuito di comando. Se la pressione è troppo bassa regolarsi come detto. Se la pressione è normale occorre smontare e sostituire i dischi frizione.</li> <li>- Ridurre la potenza del propulsore</li> <li>- Ripristinare precarico alberi (max 0,07 - min. 0,10)</li> <li>- Sostituire il cuscinetto</li> </ul>
<ul style="list-style-type: none"> <li>- Too low oil pressure</li> <li>- Too high oil pressure</li> <li>- Overheating</li> </ul>	<ul style="list-style-type: none"> <li>- Dirty bypass valve (74)</li> <li>- Too low oil level</li> <li>- Failure in oil pump</li> <li>- Broken O rings on clutch shaft (21)</li> <li>- Dirty bypass valve (74)</li> <li>- Excessive oil level</li> <li>- Insufficient cooling water intake</li> <li>- Dirty or clogged exchanger</li> <li>- Clutch slipping</li> <li>- Exchanger overload</li> <li>- Incorrect bearing preloading</li> <li>- Damaged bearing</li> </ul>	<ul style="list-style-type: none"> <li>- Remove valve and clean it</li> <li>- Restore oil level</li> <li>- Replace pump</li> <li>- Remove and replace them</li> <li>- Remove valve and clean it</li> <li>- Bring oil down to required level</li> <li>- Bring up to correct quantity</li> <li>- Remove and clean</li> <li>- Check oil pressure in the transmission circuit. If the pressure is too low, proceed as indicated above. If pressure is normal, remove and replace clutch plates.</li> <li>- Reduce propulsor power</li> <li>- Reset shaft preloading (max 0,07 - min 0,10)</li> <li>- Replace bearing</li> </ul>
<ul style="list-style-type: none"> <li>- Pression d'huile trop basse</li> <li>- Pression d'huile trop haute</li> <li>- Surchauffe</li> </ul>	<ul style="list-style-type: none"> <li>- Vanne de réglage sale (74)</li> <li>- Niveau d'huile insuffisant</li> <li>- Pompe à huile en panne</li> <li>- Cassure des bagues d'étanchéité sur axes embrayage (21)</li> <li>- Vanne de régulation sale (74)</li> <li>- Niveau d'huile excessif</li> <li>- Débit d'eau de refroidissement insuffisant</li> <li>- Exchangeur sale ou bouché</li> <li>- L'embrayage glisse</li> <li>- Charge excessive sur l'inverseur</li> <li>- Mauvaise pré-charge sur roulements</li> <li>- Roulement endommagé</li> </ul>	<ul style="list-style-type: none"> <li>- Démonter la vanne et nettoyer</li> <li>- Rétablir le niveau</li> <li>- Remplacer la pompe</li> <li>- Démonter et remplacer</li> <li>- Démonter la vanne et nettoyer</li> <li>- Amener l'huile au niveau indiqué</li> <li>- Amener à la bonne valeur</li> <li>- Démonter et nettoyer</li> <li>- Vérifier la pression de l'huile dans le circuit de commande. Si la pression est trop basse, procéder de la façon indiquée. Si la pression est normale, il faut démonter et remplacer les disques d'embrayage.</li> <li>- Réduire la puissance du propulseur.</li> <li>- Rétablir la pré-charge des axes (max. 0,07 - min. 0,10)</li> <li>- Remplacer le roulement.</li> </ul>



**RICAMBI**

Per ordinare i ricambi specificare il tipo di invertitore, il numero di serie, il rapporto, il numero di riferimento del disegno, la quantità.

**SPARE PARTS**

When ordering spare parts specify the gearbox model, the serial number, ratio, reference number indicated on the drawing and desired quantity.

**PIÈCES D'ETACHÉES**

Pour la commande de pièces d'etachées, veuillez spécifier le type de l'inverseur, le numéro de série, le rapport, le numero de rep. de la plan ainsi que la quantité.

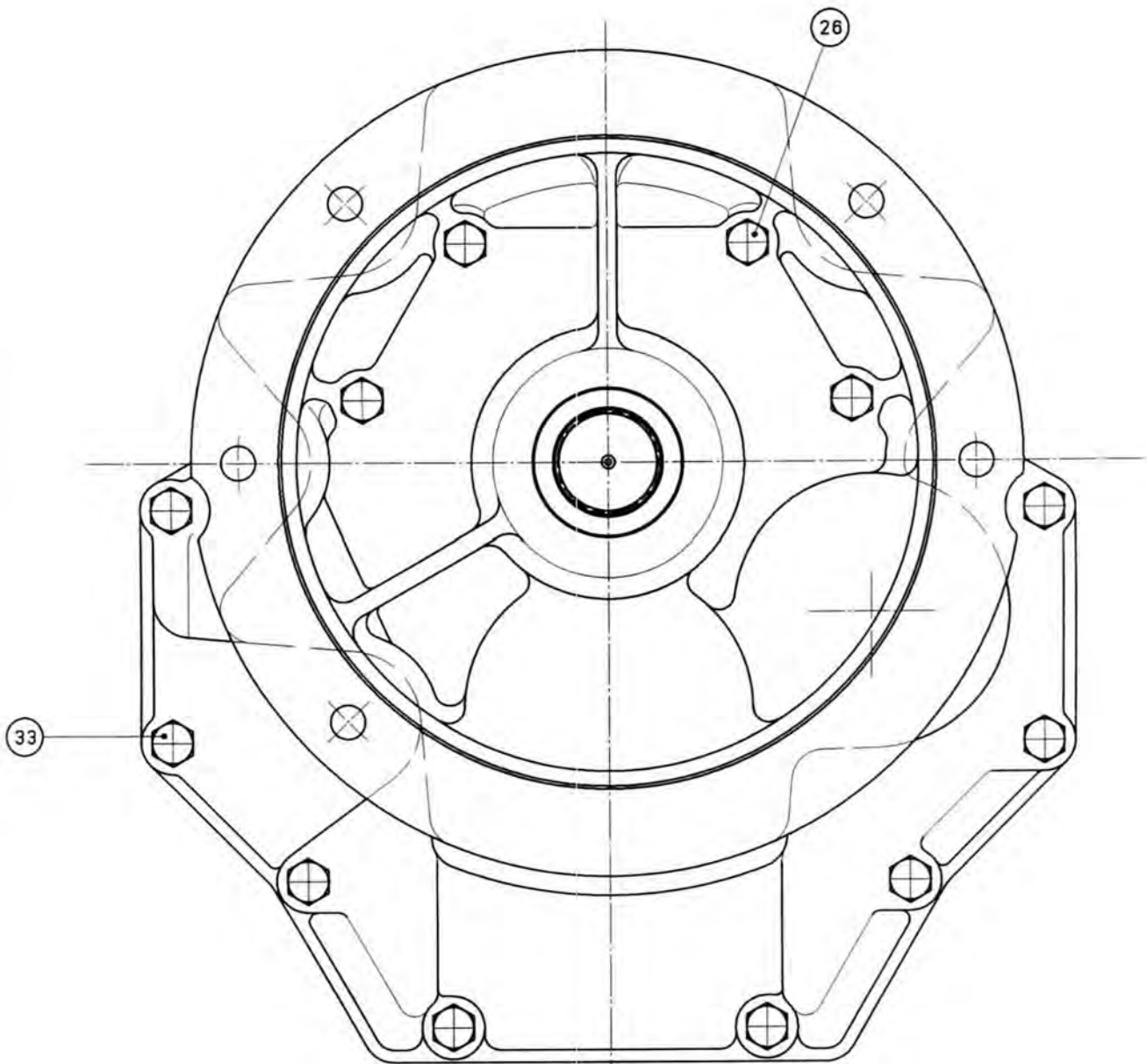
**ERSATZTEILE**

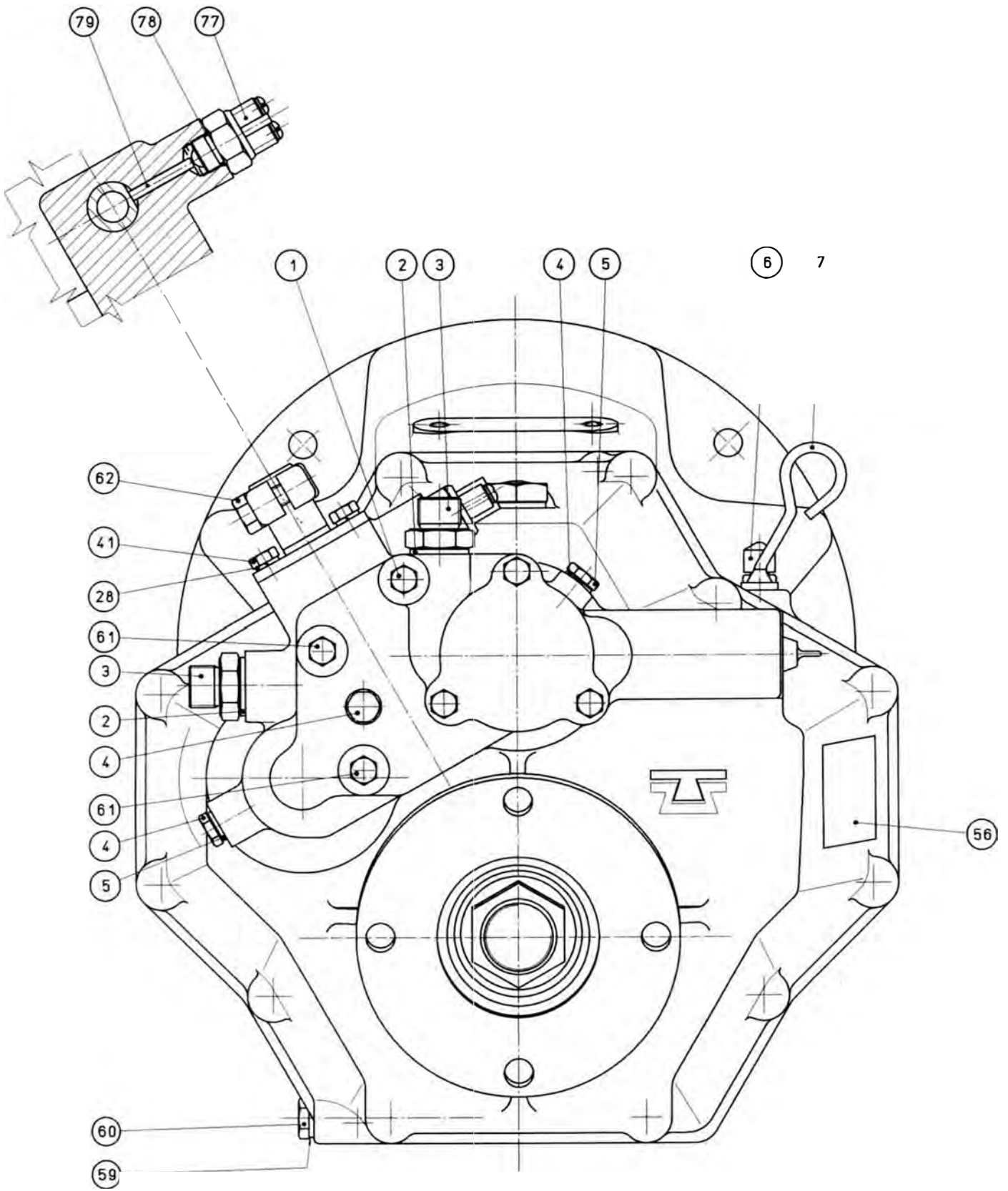
Zum Bestellen von Ersatzteilen den Typ des Wendegetriebes, die Fabriknummer, die Untersetzung, die Bezugsnummer der Zeichnung und die Menge angeben.

**REPUESTOS**

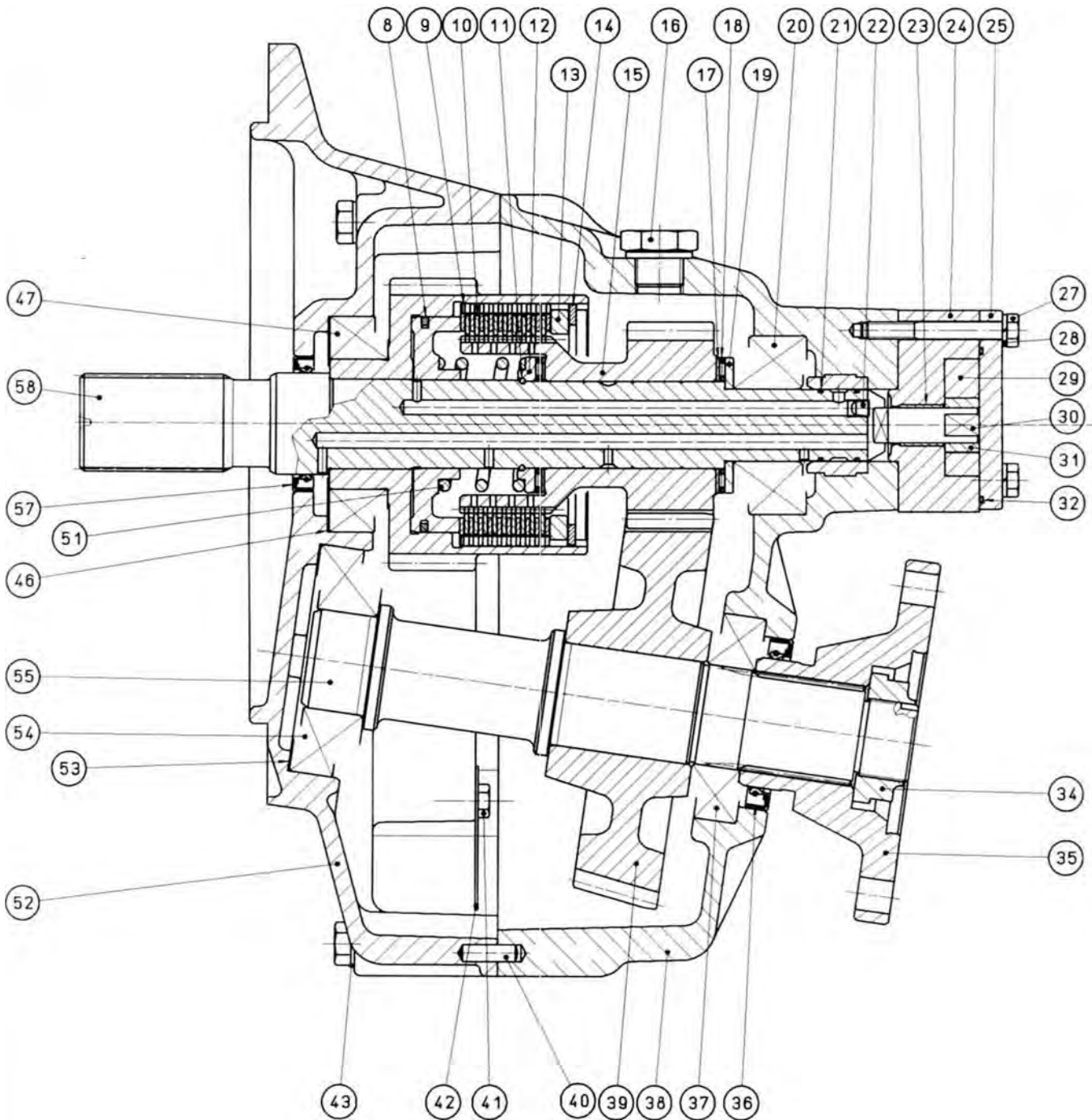
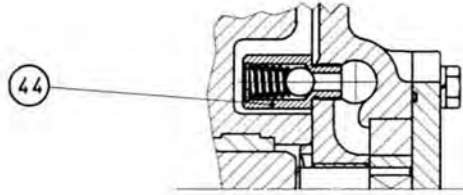
Para pedir los repuestos hay que especificar el tipo de inversor, el número de serie, la relación (ratio), el número de referencia del dibujo y la cantidad.

Rif. Ref	Denominazione Denomination	Quantità Quantity	Codice Code	Rif. Ref	Denominazione Denomination	Quantità Quantity	Codice Code	
1	Vite T.E. - Screw hex.	1	4615149	39	Corona - Gear r. 1,54	TM 345A	1	2061596
2	Rosetta di rame - Washer	3	4609029	39	Corona - Gear r. 2,00		1	2061597
3	Nipple 3-8 - Nipple	2	4624007	39	Corona - Gear r. 2,47		1	2061598
4	Tappo - Plug	3	4588028	40	Spina - Dowel pin		2	4614007
5	Rosetta di rame - Washer	3	4609009	41	Vite T.E. - Screw hex.		5	4615134
6	Tappo di sfiato - Breather	1	2055032	42	Paratia - Bulkhead		1	2026009
7	Asta livello olio - Gauge	1	2070167	43	Rosetta ondulata - Washer		12	4611208
8	Fascia elastica - Seal ring	2	2024016	44	Valvola by pass - By pass valve		1	1036002
9	Disco frizione conduttore-Clutch plate	20	2022058	45	Pignone - Gear r. 1,54	TM 345	1	2061613
10	Disco frizione condotto - Steel plate	18	2022052	45	Pignone - Gear r. 2,00		1	2061614
11	Anello di fermo - Ring	2	2054028	45	Pignone - Gear r. 2,47		1	2061615
12	Rasamento - Ring	2	2016030	45	Pignone - Gear r. 1,54	TM 345A	1	2061593
13	Distanziale - Spacer	2	2013637	45	Pignone - Gear r. 2,00		1	2061594
14	Seeger- Seeger	2	4601080	45	Pignone - Gear r. 2,47		1	2061595
15	Pignone - Gear r. 1,54	TM 345	1	2061613	46	Spessore di registro - Shim	6	2013624
15	Pignone - Gear r. 2,00		1	2061614	47	Cuscinetto - Bearing	2	4622060
15	Pignone - Gear r. 2,47		1	2061615	48	Pistone - Piston	2	2017015
15	Pignone - Gear r. 1,54	TM 345A	1	2061590	49	Albero di rinvio - Intermediate shaft	1	2021476
15	Pignone - Gear r. 2,00		1	2061591	50	Campana frizione - Clutch housing	1	2061589
15	Pignone - Gear r. 2,47		1	2061592	51	Molla - Spring	2	2020082
16	Tappo 3-8 Gas - Plug	1	4588108	52	Coperchio - Cover	TM 345	1	2010295
17	Ralla - Thrust block	4	4603025	52	Coperchio - Cover	TM 345A	1	2010278
18	Gabbia a rullini - Needle bearing	4	4607016	53	Spessore - Shim		3	2013189
19	Rasamento - Shim	2	2016029	54	Cuscinetto - Bearing		1	4622047
20	Cuscinetto - Bearing	2	4622025	55	Albero secondario - Output shaft		1	2021478
21	Fascia elastica - Seal ring	4	2024015	56	Targhetta - Plate		1	2028008
22	Tappo conico - Plug	2	4588006	57	Anello di tenuta - Oil seal		1	4596111
23	Kit pompa olio Oil pump kit	1	1009034	58	Albero primario - Input shaft		1	2021559
24				59	Rosetta di rame - Washer		1	4609011
25				60	Tappo scarico olio - Drain plug		1	4588030
26				61	Vite T.E. - Screw hex		1	4615141
27				62	Vite T.E. - Screw hex		1	4615214
28				63	Guarnizione OR - "O" ring		1	4598016
29				64	Tubo di aspirazione - Tube		1	2042077
30				65	Filtro olio - Oil filter		1	2056039
31				66	Perno di chiusura - Pin		1	2035062
32				67	Guarnizione OR - "O" ring		1	4598148
33				68	Distanziale - Spacer		1	2014099
34				69	Dado - Nut		1	4633025
35	70	Molla - Spring		1	2020084			
36	71	Leva di comando - Lever		1	2037036			
37	72	Piastrina di fermo - Plate		1	2054024			
38	73	Stelo distributore - Selector valve		1	2056115			
39	74	Valvola - Valve		1	2069002			
39	75	Molla - Spring		1	2020083			
39	76	Grano - Dowel		1	4583004			
39	77	Interruttore - Switch		1	4639001			
39	78	Guarnizione or - O ring		1	4598070			
39	79	Rullino cilindrico - Needle		1	4627007			
39	Corona - Gear r. 2,47		2061618	/	/	/	/	



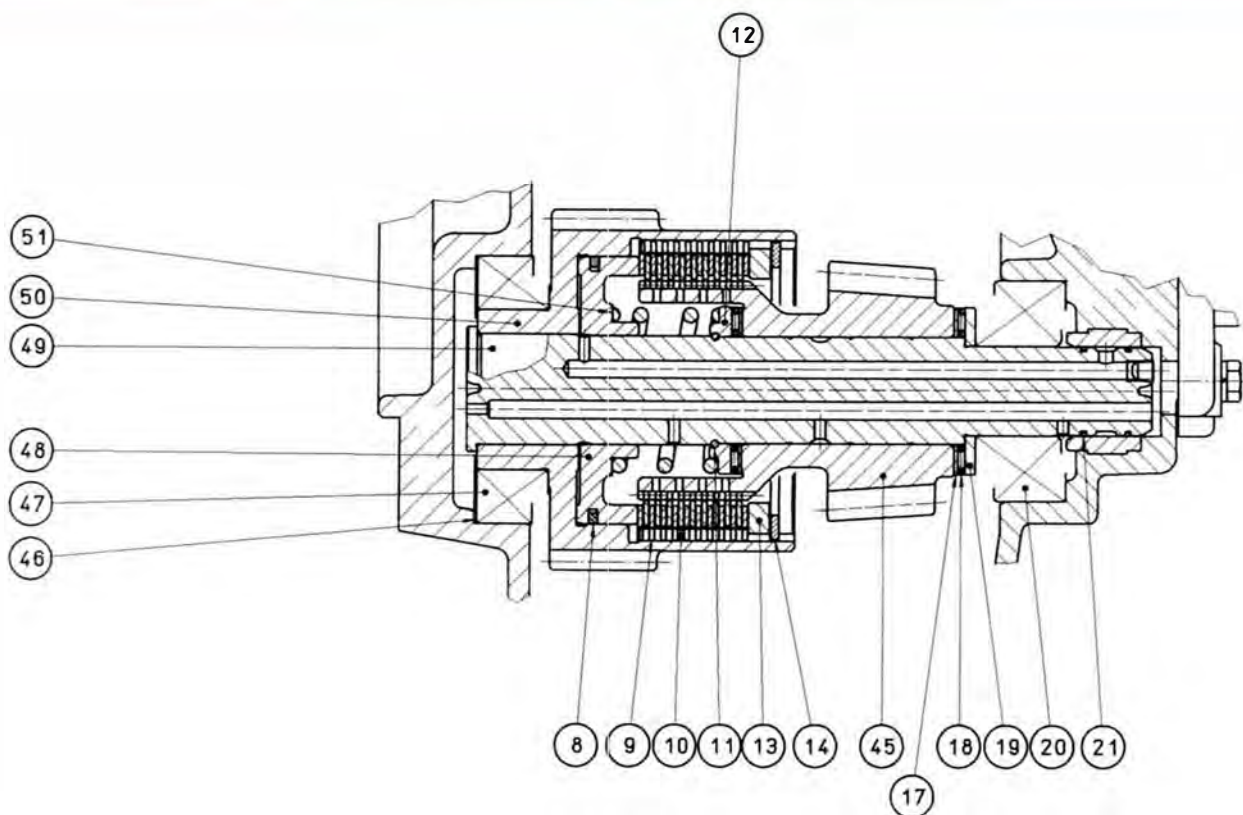




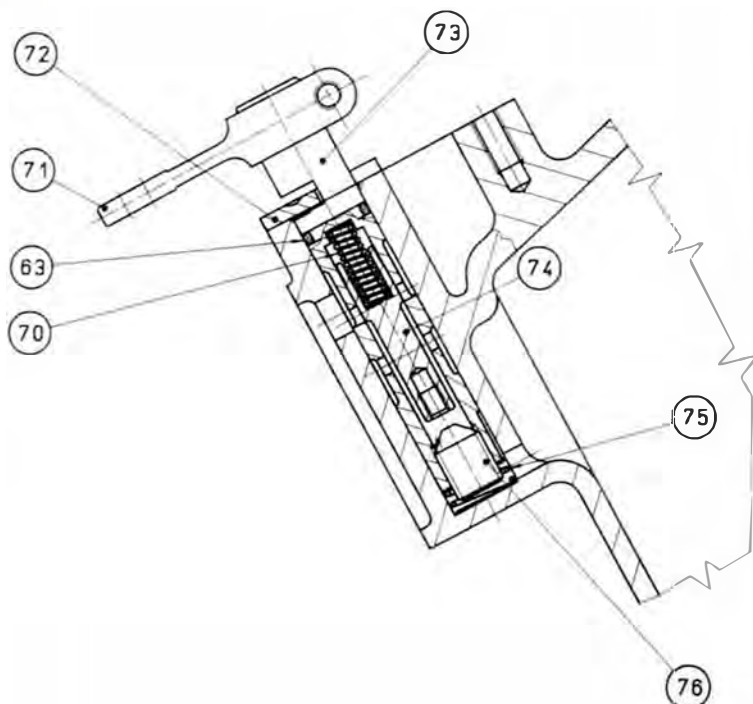




**ALBERO DI RINVIO - INTERMEDIATE SHAFT - ARBRE DE RENVOI -  
VORGELEGEWELLE - CONTRAEJE**



**SELETORE - SELECTOR VALVE - SÉLECTEUR -  
VORWAHL - SELECTOR**



**FILTRO OLIO - OIL FILTER - FILTRE -  
ÖLFILTER - FILTRO DE ACEITE**

