

**MTM 170 - 0707**

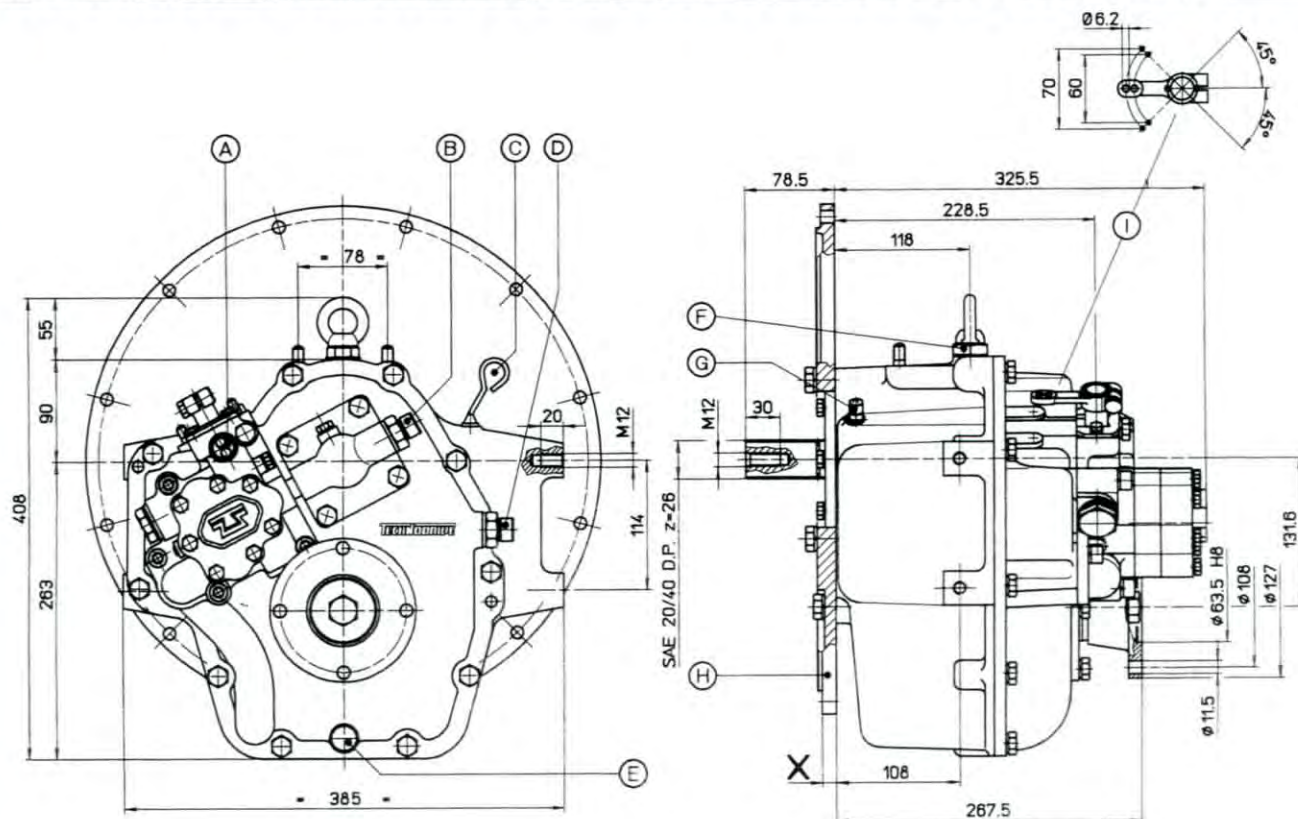


**TECHNODRIVE**

TM 170

**Manuale di Servizio  
Service Manual**



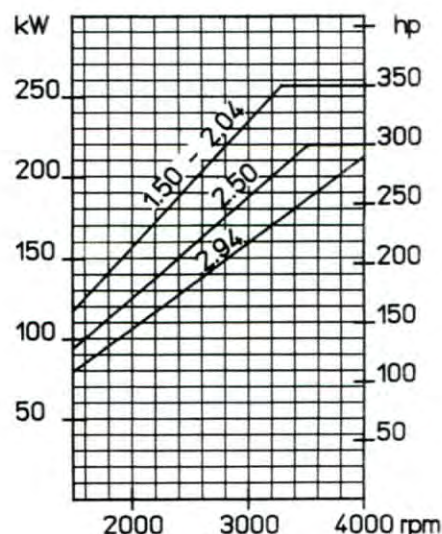


- A – Indicatore di folle – Neutral indicator – Indicateur point mort – Leerlauf Anzeiger – Neutral indicator
- B – Ritorno olio da scambiatore – Oil from cooler – Retour huile de l'échangeur – Ölrücklauf vom Kühler - Regreso del aceite del intercambiador (1/2" GAS)
- C – Asta livello olio – Oil dipstick – Bouchon de niveau – Ölmeßstab – Varilla del nivel del aceite
- D – Mandata olio allo scambiatore – Oil to cooler – Refoulement huile ou échangeur – Ölzulauf zum Kühler – Impulsion del aceite al intercambiador (1/2" GAS)
- E – Tappo scarico olio – Oil drain plug – Bouchon de vidange – Ölablaßdeckel – Tapòn de vaciado del aceite
- F – Tappo carico olio – Filling plug – Bouchon de remplissage – Einfülldeckel Öl – Tapòn de llenado del aceite
- G – Tappo di sfiato - Oil breather plug - Reniflard Entüftungsdeckel - Tapòn de purga
- H – Campana – Mounting flange – Cloche – Schwungradgehäuse – Campana: SAE 3, SAE 4 (X=12,5/33), BW (X=13,5)
- I – Leva comando – Actuating lever – Levier de commande – Steuerhebel – Palanca de mando

CARATTERISTICHE TECNICHE  
 TECHNICAL DATA  
 CARACTERISTIQUES TECHNIQUES  
 TECHNISCHE DATEN  
 CARACTERISTICAS TÉCNICAS

Rapporto-Ratio-Rapport- Untersetzung-Relacion	1,50	2,04	2,50	2,94	
Coppia max – Diporto Max torque – Pleasure Couple maxi – Plaisance Max Drehmoment-Vergnügungsboot Par max – Recreo	Nm	750	750	600	510
Coppia max – Lavoro Max torque – Continuous Couple maxi – Continu Max Drehmoment- Arbeit Par max – Servicio	Nm	550	550	440	380
Velocità max entrata Max input speed Vitesse maxi à l'entrée Max Eingangsgeschwindigkeit Velocidad màx a la entrada		4000 RPM			
Peso a secco Weight without oil Poids sans huile Gewicht ohne öl Peso sin aceite		75 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

- TM170-TM170A 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. 1.
- 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.123).
  - 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: 2,8 l.
- Max oil temperature: 90°C.
- Oil pressure measured at 1000 RPM engine speed, oil temperature 60°C, is to be between 20 and 22 bar. Pressure gauge connections M8x1 are placed, refer to fig. 1, on A (forward) and C (reverse).



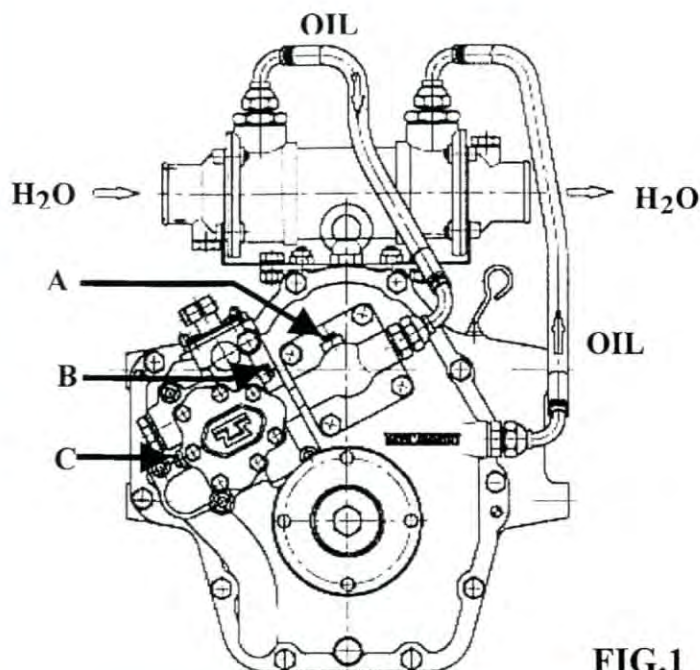


FIG.1

### Schema applicazione scambiatore - Attacchi manometri

### Exchanger application diagram - Pressure gauge connections

### Schema d'application de l'échangeur - Fixations des manometres

#### Prese per manometri: M8x1

- A Press. Marcia Avanti
- B Press. Pompa
- C Press. Marcia Indietro

#### Pressure gauge intakes: M8x1

- A Forward speed pressure
- B Pump pressure
- C Reverse speed pressure

#### Prises pour manometres: M8x1

- A Press. Marche-avant
- B Press. Pompe
- C Press. Marche-arrière

GUASTO-FAILURE-DEFAULT	CAUSA-CAUSE-CAUSE	RIMEDIO-SOLUTION-REMEDE
- Pressione olio troppo bassa	- Valvola regolatrice sporca (89) - Livello olio troppo basso - Pompa olio guasta - Anelli di tenuta sugli alberi frizione rotti(11),(34)	- Smontare valvola e pulire - Ripristinare livello - Sostituire pompa - Smontare e sostituire
- Pressione olio troppo alta	- Valvola regolatrice sporca (89)	- Smontare valvola e pulire
- Surriscaldamento	- Livello olio eccessivo - Portata acqua di raffreddamento insufficiente - Scambiatore sporco o intasato - La frizione slitta  - Eccessivo carico sull'invertitore - Precarico sui cuscinetti non corretto - Cuscinetto danneggiato	- Portare olio a livello prescritto - Portare al giusto valore - Smontare e pulire - 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. - Ridurre la potenza del propulsore - Ripristinare precarico alberi(max 0,02-min 0,05) - Sostituire il cuscinetto
- Too low oil pressure	- Dirty bypass valve (89) - Too low oil level - Failure in oil pump - Broken O rings on clutch shaft (11),(34)	- Remove valve and clean - Restore oil level - Replace pump - Remove and replace them
- Too high oil pressure	- Dirty bypass valve (89)	- Remove valve and clean it
- Overheating	- Excessive oil level - Insufficient cooling water intake - Dirty or clogged exchanger - Clutch slipping  - Exchanger overload - Incorrect bearing preloading - Damaged bearing	- Bring oil down to required level - Bring up to correct quantity - Remove and clean - 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. - Reduce propulsor power - Reset shaft preloading(max 0,02-min 0,05) - Replace bearing
- Pression d'huile trop basse	- Vanne de réglage sale (89) - Niveau d'huile insuffisant - Pompe à huile en panne - Cassure des bagues d'étanchéité sur axes embrayage (11),(34)	- Démontez la vanne et nettoyer - Rétablir le niveau - Remplacer la pompe - Démontez et remplacer
- Pression d'huile trop haute	- Vanne de régulation sale (89)	- Démontez la vanne et nettoyer
- Surchauffe	- Niveau d'huile excessif - Débit d'eau de refroidissement insuffisant - Echangeur sale ou bouché - L'embrayage glisse  - Charge excessive sur l'inverseur - Mauvaise pré-charge sur roulements	- Amener l'huile au niveau indiqué - Amener à la bonne valeur - Démontez et nettoyer - 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. - Réduire la puissance du propulseur. - Rétablir la pré-charge des axes (max 0,02-min 0,05)



**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 DÉTACHÉES** Pour la commande de pièces détachées, veuillez spécifier le type de 'inverseur, le numéro de série, le rapport, le numéro de rep. du 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.

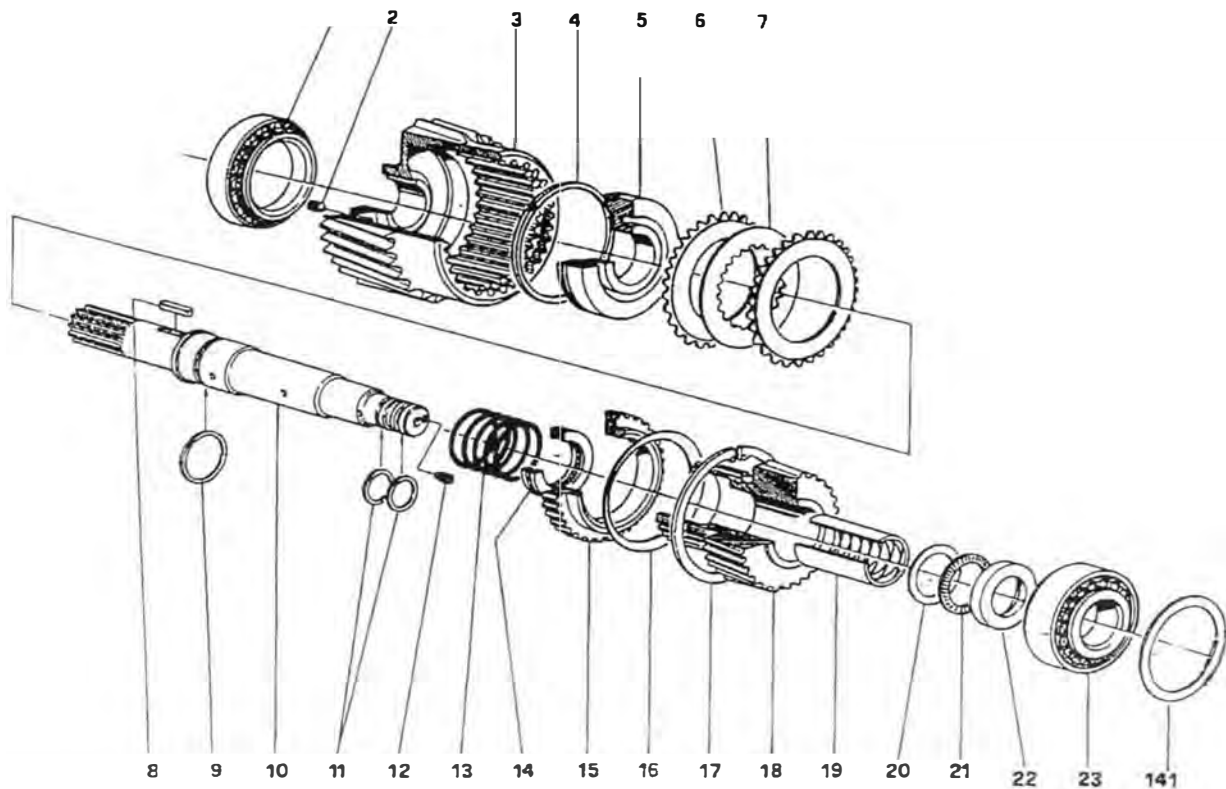
**REPUESTOS** Para pedir los repuestos hay que especificar el tipo de inversor, el número de serie, la relación (ratio), el número de referencia del dibujo y la cantidad.

Rif. Ref.	Denominazione Denomination	Quantità Quantity	Codice Code	Rif. Ref.	Denominazione Denomination	Quantità Quantity	Codice Code
1	Cuscinetto – Bearing	1	4622084	39	Molla a tazza – Spring	1	2020049
2	Tappo – Plug	1	2055036	40	Anello Seeger – Seeger	1	4601105
3	Campana Frizione – Clutch Housing	1	2011227	41	Pignone TM170 r 1,50 – Gear TM170 r 1,50	1	2061426
4	Fascia Elastica – Seal ring	1	2024005	41	Pignone TM170 r 2,04 – Gear TM170 r 2,04	1	2061427
5	Pistone – Piston	1	2017006	41	Pignone TM170 r 2,50 – Gear TM170 r 2,50	1	2061428
6	Disco Frizione conduttore – Clutch plate	9	2022030	41	Pignone TM170 r 2,94 – Gear TM170 r 2,94	1	2061440
7	Disco Frizione condotto – Steel plate	8	2022050	41	Pignone TM170A r 1,53 – Gear TM170A r 1,53	1	2061429
8	Chiavetta – Key	1	4620068	41	Pignone TM170A r 2,08 – Gear TM170A r 2,08	1	2061430
9	Fascia elastica – Seal ring	1	2024006	41	Pignone TM170A r 2,60 – Gear TM170A r 2,60	1	2061431
10	Albero primario – Input shaft	1	2021344	42	Boccola – Bushing	1	2050014
11	Fascia elastica – Seal ring	2	2024007	43	Ralla – Thrust block	1	4603020
12	Tappo conico – Plug	1	4588006	44	Cuscinetto reggispinta – Thrust bearing	1	4607020
13	Molla – Spring	1	2020051	45	Rasamento – Ring	1	2016016
14	Cuscinetto – Bearing	1	2065001	46	Cuscinetto – Bearing	1	4622045
15	Disco di ritenuta – Spacer ring	1	2022051	47	Cuscinetto – Bearing	1	4622076
16	Molla a tazza – Spring	1	2020049	48	Chiavetta – Key	TM 170 r. 1,50	1 1012021
17	Anello Seeger – Seeger	1	4601105	49	Albero – shaft		
18	Pignone TM170 r 1,50 – Gear TM170 r 1,50	1	2061426	50	Corona – Gear		
18	Pignone TM170 r 2,04 – Gear TM170 r 2,04	1	2061427	51	Distanziale – Spacer	TM 170 r. 2,04	1 1012022
18	Pignone TM170 r 2,50 – Gear TM170 r 2,50	1	2061428	48	Chiavetta – Key		
18	Pignone TM170 r 2,94 – Gear TM170 r 2,94	1	2061440	49	Albero – shaft		
18	Pignone TM170A r 1,53 – Gear TM170A r 1,53	1	2061426	50	Corona – Gear	TM 170 r. 2,50	1 1012023
18	Pignone TM170A r 2,08 – Gear TM170A r 2,08	1	2061427	51	Distanziale – Spacer		
18	Pignone TM170A r 2,60 – Gear TM170A r 2,60	1	2061428	48	Chiavetta – Key		
19	Boccola – Bushing	1	2050014	49	Albero – shaft	TM 170 r. 2,94	1 1012024
20	Ralla – Thrust block	1	4603020	50	Corona – Gear		
21	Cuscinetto reggispinta – Thrust bearing	1	4607020	51	Distanziale – Spacer		
22	Rasamento – Ring	1	2016016	48	Chiavetta – Key	TM 170A r. 1,53	1 1012031
23	Cuscinetto – Bearing	1	4622045	49	Albero – shaft		
24	Cuscinetto – Bearing	1	4622084	50	Corona – Gear		
25	Tappo – Plug	1	2055036	51	Distanziale – Spacer	TM 170A r. 1,53	1 1012031
26	Campana Frizione – Clutch housing	1	2011228	48	Chiavetta – Key		
27	Fascia elastica – Seal ring	1	2024005	49	Albero – shaft		
28	Pistone – Piston	1	2017006	50	Corona – Gear	TM 170A r. 2,08	1 1012032
29	Disco Frizione Conduttore – Clutch plate	9	2022030	51	Distanziale – Spacer		
30	Disco Frizione Condotto – Steel plate	8	2022050	48	Chiavetta – Key		
31	Chiavetta – Key	1	4620068	49	Albero – shaft	TM 170A r. 2,60	1 1012033
32	Fascia elastica – Seal ring	1	2024006	50	Corona – Gear		
33	Albero di rinvio – Intermediate shaft	1	2021345	51	Distanziale – Spacer		
34	Fascia elastica – Seal ring	2	2024007	48	Chiavetta – Key	TM 170A r. 2,60	1 1012033
35	Tappo conico – Plug	1	4588006	49	Albero – shaft		
36	Molla – Spring	1	2020051	50	Corona – Gear		
37	Cuscinetto – Bearing	1	2065001	51	Distanziale – Spacer	TM 170A r. 2,60	1 1012033
38	Disco di ritenuta – Spacer ring	1	2022051	52	Cuscinetto – Bearing		

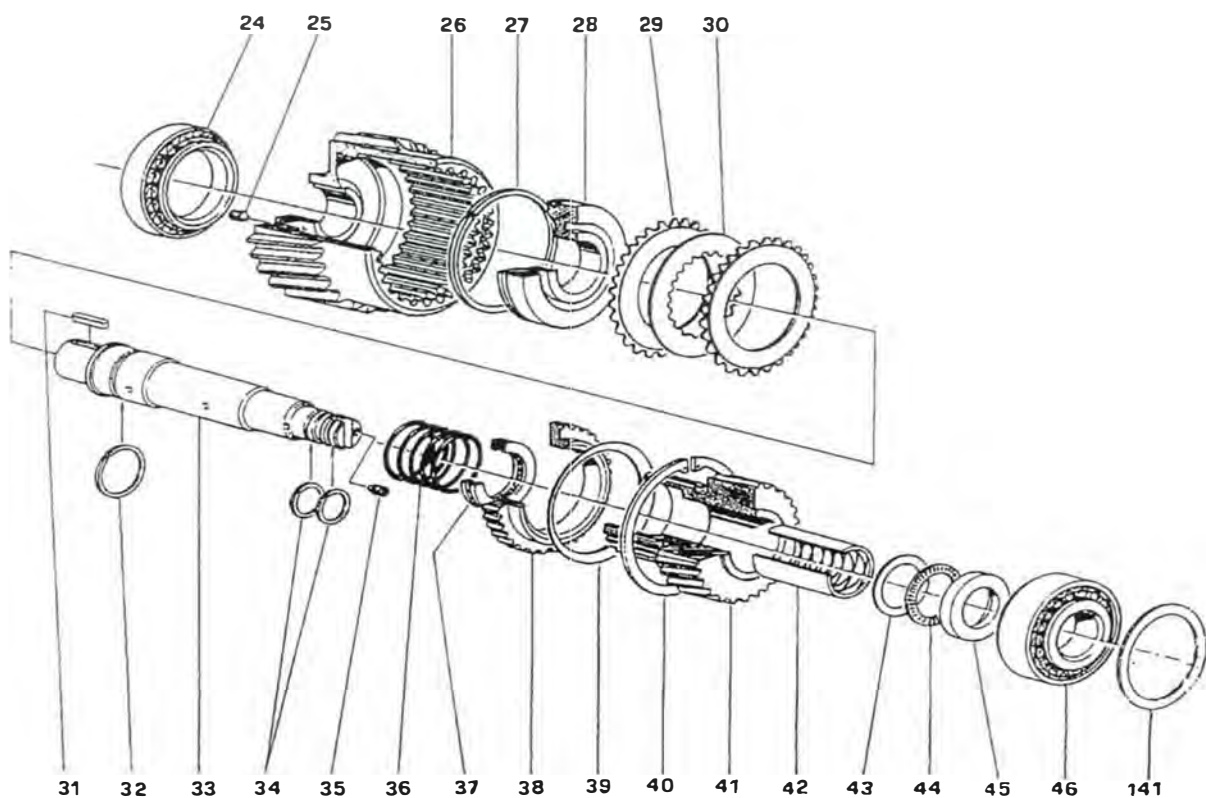


Rif. Ref.	Denominazione Denomination	Quantità Quantity	Codice Code	Rif. Ref.	Denominazione Denomination	Quantità Quantity	Codice Code
53	Flangia uscita – Output flange	1	2062231	97	Tappo – Plug	1	4588009
54	Guarnizione OR – "O" Ring	1	4598029	98	Tubo di raccordo - Pipe	1	2042016
55	Rosetta – Washer	1	2014064	99	Guarnizioni OR – "O" Ring	2	4598067
56	Spina elastica - Pin	1	4613005	100	Tubo di raccordo - Pipe	1	2042017
57	Rondella elastica - Washer	1	4611116	101	Guarnizioni OR – "O" Ring	2	4598 024
58	Vite – Screw	1	4615479	102	Rondella elastica - Washer	2	4611110
59	Vite – Screw	6	4615214	103	Vite - Screw	2	4615302
60	Rondella elastica - Washer	6	4611108	104	Coperchio pompa lato motore - Cover	1	2010292
61	Coperchietto - Cover	1	2010210	105	Ingranaggio condotto pompa – Pump gear	1	2061456
62	Paraolio – Oil seal	1	4595129	108	Vite - Screw	4	4615238
63	Tappo di sfiato - Breather	1	2055032	109	Rondella elastica - Washer	4	4611108
64	Targhetta – Name plate	1	2028004	110	Corpo pompa – Oil pump body	1	2010291
65	Prigioniero – Stud	2	4617081	111	Vite - Screw	3	4615144
66	Rondella – Washer	1	4609021	112	Boccola - Bushing	4	4584002
67	Golfare – Eyebolt	1	4642010	113	Ingranaggio conduttore pompa – Pump gear	1	2061446
68	Rondella – Washer	1	4609011	114	Spina – Dowel pin	2	4614013
69	Tappo – Plug	1	2055033	115	Corpo distributore – Valve body	1	2056090
70	Asta livello olio – Oil gauge	1	2070050	116	Tappo a espansione - Plug	1	4587022
71	Prigioniero – Stud	2	4617063	117	Molla – Spring	1	2020056
72	Coperchio TM170 – Cover TM170	1	2010215	118	Molla – Spring	1	2020055
72	Coperchio TM170A-Cover TM170A	1	2010203	119	Vite – Screw	2	4615317
73	Rondella – Washer	1	4609030	120	Rondella elastica - Washer	2	4611110
74	Raccordo - Nipple	1	4624002	121	Rondella - Washer	1	4609009
75	Valvola BY Pass – BY Pass valve	1	1036001	122	Tappo – Plug	1	4588009
76	Rondella – Washer	1	4609009	123	Filtro olio – Oil filter	1	2056039
77	Tappo – Plug	1	4588009	124	Anello Seeger - Seeger	1	4601017
78	Coperchio – Cover	1	2010202	125	Molla – Spring	1	2020045
79	Rondella – Washer	1	4609030	126	Sfera – Ball	1	4630020
80	Raccordo – Nipple	1	4624002	127	Rondella - Washer	1	4609028
81	Guarnizione OR – "O" Ring	1	4598016	128	Tappo – Plug	1	2055037
82	Leva di comando - Lever	1	2037036	129	Coperchio albero secondario - Cover	1	2010209
83	Rondella elastica - Washer	1	4611108	130	Paraolio – Oil seal	1	4596183
84	Vite – Screw	1	4615214	131	Tappo – Plug	1	4588034
85	Vite – Screw	2	4615134	132	Rondella - Washer	1	4609015
86	Rondella elastica - Washer	2	4611106	133	Vite – Screw	10	4615301
87	Piastrina – Plate	1	2054024	134	Rondella elastica - Washer	10	4611110
88	Stelo distributore – Selector valve	1	2056072	135	Tubo di aspiraz. TM170 – Tube for TM170	1	2042033
89	Valvola – Valve	1	2056073	135	Tubo di aspiraz. TM170A–Tube for TM170A	1	2042034
90	Rondella elastica - Washer	4	4611110	136	Spina – Dowel	2	4614010
91	Vite – Screw	4	4615301	137	Paratia – Bulkhead	1	2026005
92	Rondella elastica - Washer	4	4611110	138	Vite – Screw	2	4615202
93	Vite – Screw	4	4615301	139	Scatola TM170 – Housing TM170	1	2009066
94	Rondella elastica - Washer	1	4611110	139	Scatola TM170A – Housing TM170A	1	2009064
95	Vite – Screw	1	4615334	140	Spessori di registro - Shim	x	2013184
96	Rondella – Washer	1	4609009	141	Spessori di registro - Shim	x	2013189

**ALBERO DI ENTRATA - INPUT SHAFT - ARBRE D'ENTREE  
EINGANGSWELLE - EJE DE ENTRADA**



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





**ALBERO DI USCITA - OUTPUT SHAFT - ARBRE DE SORTIE  
AUSGANGSWELLE - EJE DE SAIDA**

