TMC 260

manuale di servizio
service manual
manuel d'utilisation
bedienung – wartung
uso - manutencion

allpa
marine equipment

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TECHNODRIVE MARINE REVERSE-GEAR U IT TYPE TMC 260
I STRUCTIONS FOR INSTALLATION, USE AND MAINTENANCE – SPARE PARTS.

INTRODUCTIO

- Prior to starting read and follow the istruction provided in this manual. Failure to do so will make warranty void.
- Technodrive shall not be responsible for any demages caused by faulty installation, wrong handling or deficient maintenance.
- It is the responsibility of users to provide and install guards and safety devices wich may be required by recognized safety standards on the respective country.

GENERAL INFORMATION

- TMC 260 marine transmission is built with alloy steel, casehardened, and hardened gears; the clutch-unit is a bronze double cone and the coupling device is mechanically servo controlled.
- The marine transmission unit may be coupled only to engines which turn anti-clockwise (as seen from the flywheel side).
- In forward speed, the output flange rotating direction is reversed with regard to the engine rotating direction.
- In ratios 2,00 and 2,47 , the reverse-gear maintains the same ratio in both directions. In ratios 1,54 and 2,88 the reverse-gear unit does not have the same reduction ratio as the forward speed.

INSTALLATION

- The gearbox is supplied without oil. Therefore, prior to its starting, it must be filled up with ATF oil up to the maximum level marked by the dipstick
- The connection between the engine and the reverse-gear unit must be carried out by means of a proper flexible coupling. Before carrying out the connection, protect the splined shaft by putting a layer of water-repellent grease on it.
- Carefully carry out the fitting between the reverse-gear output shaft and the propeller shaft avoiding misalignments.
- The reverse-gear unit may be installed with a maximum inclination of 15° with respect to the horizontal surface.
- The reverse-gear unit must be shifted by means of a single-lever flexible cable. During the installation of the control cable make sure that the cable neutral position corresponds to that of the reverse-gear unit lever and that the cable allows the reverse-gear control lever to complete the stroke both in forward and in reverse speed. The stroke of the lever between forward speed and reverse speed, must not be less than 60 mm (lever lower hole), 70 mm (upper hole).
- Make sure that the lever forward speed position corresponds to the acual advencement of the hull.

⚠ **Make certain 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 AND MAINTENANCE

- Employ only ATF oil, perform the first replacement ofter 30 working hours then replace the oil every 500 working hours, at least once a year.
- Check the oil level weekly by means of the oil dipstick while the engine is off.
- When the reverse-gear unit is used continuously, oil temperature must not exceed 105° C.

- The shifting from one speed to the other must be performed by stopping shortly in the neutral position while the engine is running at idle speed. A direct shifting from the forward speed to the reverse speed without stopping in the neutral position is allowed only in case of emergency.
- When the boat is sailing (engine stopped), the gear lever must be in neutral position; never put the gear lever in the position corresponding to the direction of travel of the boat.
- The clutch-unit is self-adjusting and, therefore, needs no adjustment.
- If after using the reverse-gear unit for a long time, shifting (from forward speed to neutral or from reverse speed to neutral) becomes particularly difficult, it is advisable first to check the status of the control cable and of its relevant box and then, if necessary, unlock the nut ref. 35 (spanner 13) manteining the screw ref.36 in its position with an allen wrench (4 mm.); rotate clockwise the screw ref. 36 by a ¼ of turn and lock the nut ref. 35.
- If one or both clutches slip, it is necessary to check if the control cable runs the whole stroke needed to couple the reverse-gear unit (minimum 30 mm on each side in the lower hole and 35 mm on each side in the upper hole of the control lever) and if the neutral position of the reverse-gear unit corresponds to that of the control cable. If the problem persists, it is necessary to disassemble the reverse-gear unit in order to check the status of clutch ref. 22. If the clutch shows signs of wear or burns on its cone-shaped surfaces or on the groove, it must be replaced. The cone-shaped surface on gears ref. 17 and 24 must also be checked; such surface must show no marks of burning or seizure ond no material deposits coming from the clutch cone otherwise the gears must be replaced. In the case the clutch-unit alone is replaced, it is not cecessary to disassemble adjusting shims ref. 48 and, therefore, bearings need not to be adjusted during assembly.

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

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

⚠ **The gearbox could only be shifted with the engine at idle speed. Avoiding that the gearbox or the coupling may be demaged.**

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

GEARBOX DISASSEMBLY

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

In order to completely disassemble the reverse-gear unit, operate as follows:

- Remove the reverse-gear control unit by unscrewing M8 two nuts ref. 34 and extracting the whole unit (control lever ref. 43, cover ref. 42, shaft ref. 40, guide shoe ref. 30, screw ref. 36) carefully avoiding to drop guide shoe ref. 30 into the reverse-gear unit as it has no axial lock.
- Remove output flange ref. 49 from the reverse-gear unit by unscrewing nut ref. 51 and by extracting the flange from the shaft spline.
- Loosen fastening screws ref. 18 located between the box and the cover and, while holding the reverse-gear unit in a vertical position, gently, beat the head of output shaft ref. 13 with a copper hammer in order to separate the box from the cover.
- While the reverse-gear unit is open, remove input shaft ref. 9 together with bearing cones ref. 8, 11 and the whole output shaft. Loosen screw ref. 33 which fastens the intermediate shaft to the reverse-gear cover and remove the whole intermediate shaft.
- In order to disassemble the clutch cone from the output shaft, extract all parts according to the following sequence: bearing ref. 11 located on the flange side, spacer ref. 14, gear ref. 24, pin housing cage ref. 15, bush ref. 25 spacer ref. 16 and clutch cone ref. 22.
- In order to complete the disassembly of the output shaft remove nut ref. 12 and extract, in the following order, bearing ref. 11, spacer ref. 14, gear ref. 17, pin housing cage ref. 16, bush ref. 25 and spacer ref. 16.
- Spacers ref. 48 are located between cover ref. 53, 46 and bearing ref. 11.
- Disassembly of intermediate gear rif. 21: unscrew ring nut ref. 23, extract gear ref. 21 towards the splined side of shaft ref. 56. Together with the gear also one of bearings ref. 57, distance ring ref. 58 and stop ring

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

- *Output shaft unit assembly*: orderly assemble, starting from the end opposite the output flange, spacer ref. 16, bush ref. 25, cage ref. 15, gear ref. 17, spacer ref. 14, bearing cone ref. 11, nut ref. 12 (torque wrench setting 155 Nm). Tighten the stop nut in the appropriate place on the shaft. Insert clutch unit ref. 36 and moving toward the output flange end, assemble, in sequence, the following parts: ref. 16, 25, 15, 24, 14, 11.
- *Intermediate shaft unit assembly*: upon positioning stop ring ref. 58 and distance ring ref. 57 assemble the cups of the two bearings ref. 57 on gear ref. 21. Assemble the bearing cone on shaft ref. 56 making it close on the shoulder. Insert the gear on the shaft and assemble the last cone. Assemble ring nut ref. 23 fastening the ring nut very tightly in order to move bearings ref. 57 to the correct position; loosen the ring nut until the gear can rotate smoothly, which corresponds to an adjustment leaving zero play of the bearing, and lock the ring nut into place by means of the lock washer.
- *Input shaft unit assembly*: the gears are enbloc with the shaft; therefore it is necessary only to assemble the cones of bearings ref. 8 and 11.
- *Shafts assembly on cover*: place cover ref. 7 on a horizontal surface with the bearing seat upward and an opening which allows the protuding part of sahft ref. 9 and the spigot 88 mm to go through.
  Place bearing cups ref. 8, 11 in the relevant cover seets. Insert both input and output shafts, which have been previously assembled, in the relevant positions. Insert pins ref. 30. Assemble the cups of bearings ref.11 on box ref. 4. Put sealing paste between the cover plate re. 4 and the shaft ref. 56, fasten the previously assembled intermediate shaft ref. 56 to cover ref. 4 by means of screw ref. 33 and of washer ref.54. Put sealing paste and close box ref. 4 using screws ref. 18.
  Bearings will have to be shimmed using as many shims ref. 48 as required in order to build a preloading of 0,03 ± 0,02 mm. Shims must be inserted between the bearing cone and the reverse-gear cover seat ref. 46 and 53. Put sealing paste between the box ref. 4 and the covers ref. 46 and 53 and fasten with screws ref.47.
  Assemble oil seals ref. 10 and 50. Insert flange ref. 49 on the output shaft spline, insert sealing paste and tighten the lock nut ref. 51 by a 155 Nm torque wrench setting and lock it.
- *Control unit assembly*: upon positioning spring ref. 32 on the stem of guide shoe ref. 16, insert it into the hole of drive shaft ref. 40. Guide shoe ref. 30 must be positioned with its beveled side upward (behind the v-shaped surface touching the clutch-unit). Insert the complete control unit (cover ref. 42, shaft ref. 40, spring ref. 32, guide shoe ref. 30) into the reverse-gear unit box making sure to maintain the guide shoe position described above and to avoid dropping the guide into the casing. Fasten both bolts ref. 34 and assemble control level ref. 43 fastening it by means of screw ref. 33.
- *Clutch control unit adjustment*: with the operating lever ref. 43 in neutral position, turn by hand the output flange ref. 49 and screw at the same time the adjusting screw ref. 36 with an allen wrench (4 mm) until the output flange rotation gets hard on a small arc only. Unscrew of ¾ of turn the adjusting screw ref. 36 and fix it by locking the nut ref. 35.

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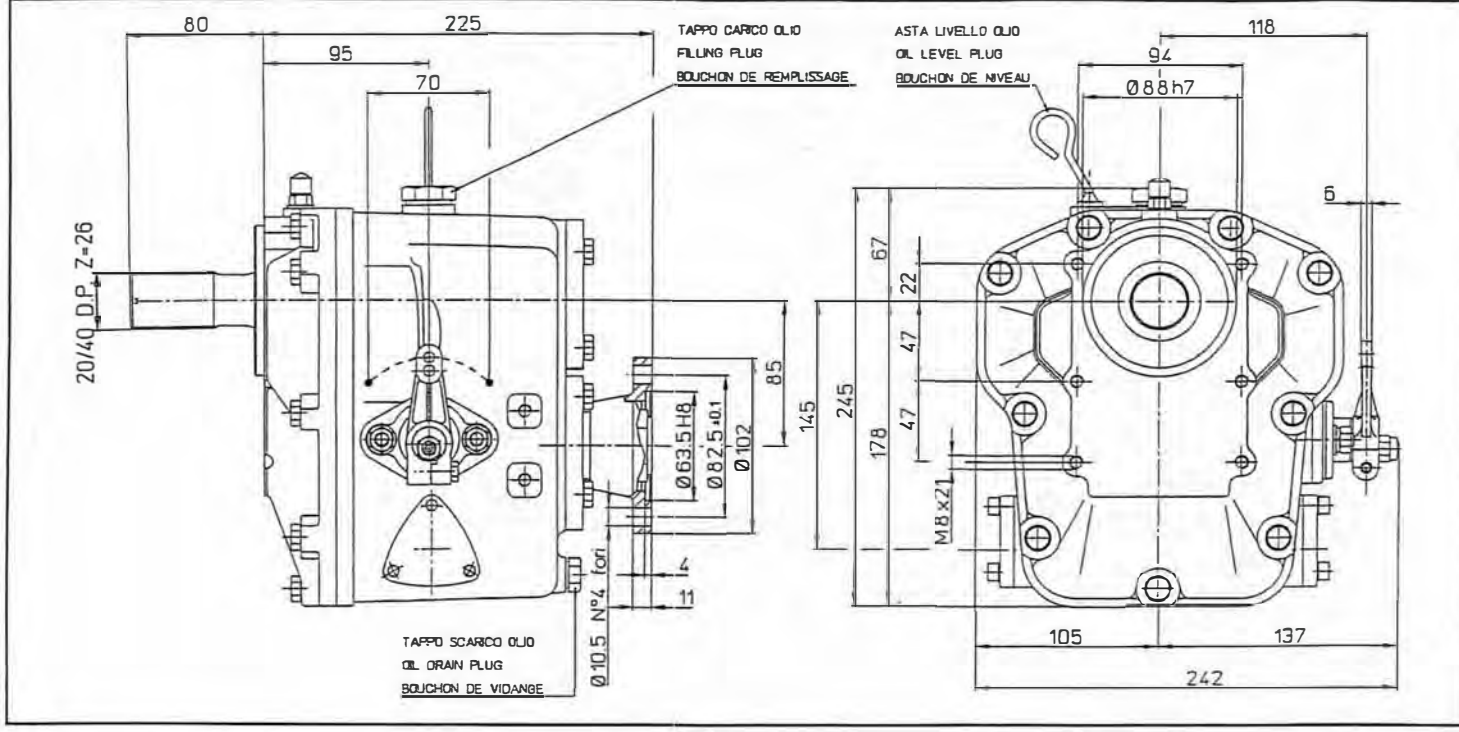
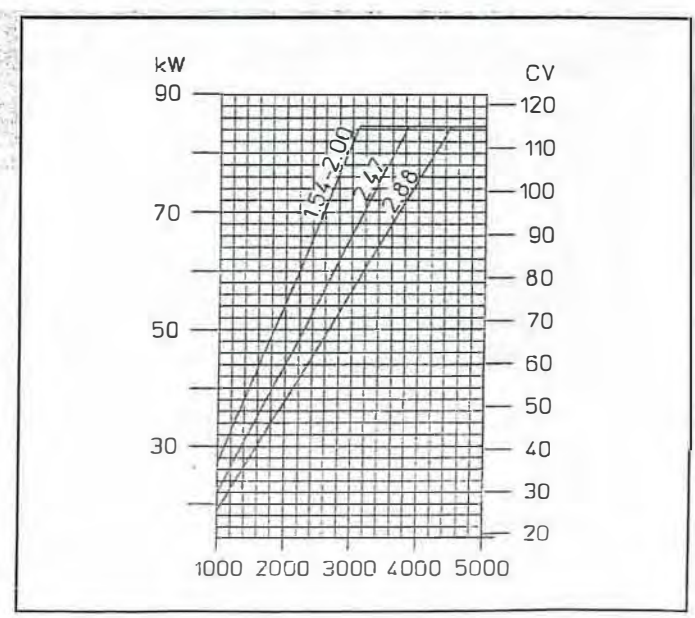


Caratteristiche tecniche
Technical data
Caractéristiques tecniques

Rapporto m. avanti - Forward ratio - Rapport m. avant			1.54	2.00	2.47	2.88
Rapporto retromarcia - Rev. ratio - Rapport m. arriere			2.00	2.00	2.47	2.47
Coppia max. entrata Max input torque Couple maxi	Diporto - Pleasure Plaisance	Nm	260	260	210	180
	Lavoro - Continuous Travail	Nm	190	190	140	110
Potenza/velocità Power/speed Puissance/vitesse	Diporto - Pleasure Plaisance	Kw/Rpm	0,0272	0,0272	0,0220	0,0188
	Lavoro - Continuous Travail	Kw/Rpm	0,0199	0,0199	0,0147	0,0115
Potenza max. entrata Max input power Puissance maxi à l'entrée	Diporto - Pleasure Plaisance	Kw	84			
	Lavoro - Continuous Travail	Kw	61			
Velocità max. entrata Max input speed Vitesse maxi à l'entrée		Rpm	5000			
Peso senza olio - Weight without oil - Poids sans huile		kg	18			
Quantità olio - Oil quantity - Quantité huile		l	1.2			
Olio tipo - Oil type - Type d'huile			ATF			

Diagramma di potenza (diporto)
Power curve (pleasure)
Diagramme de puissance (plaisance)



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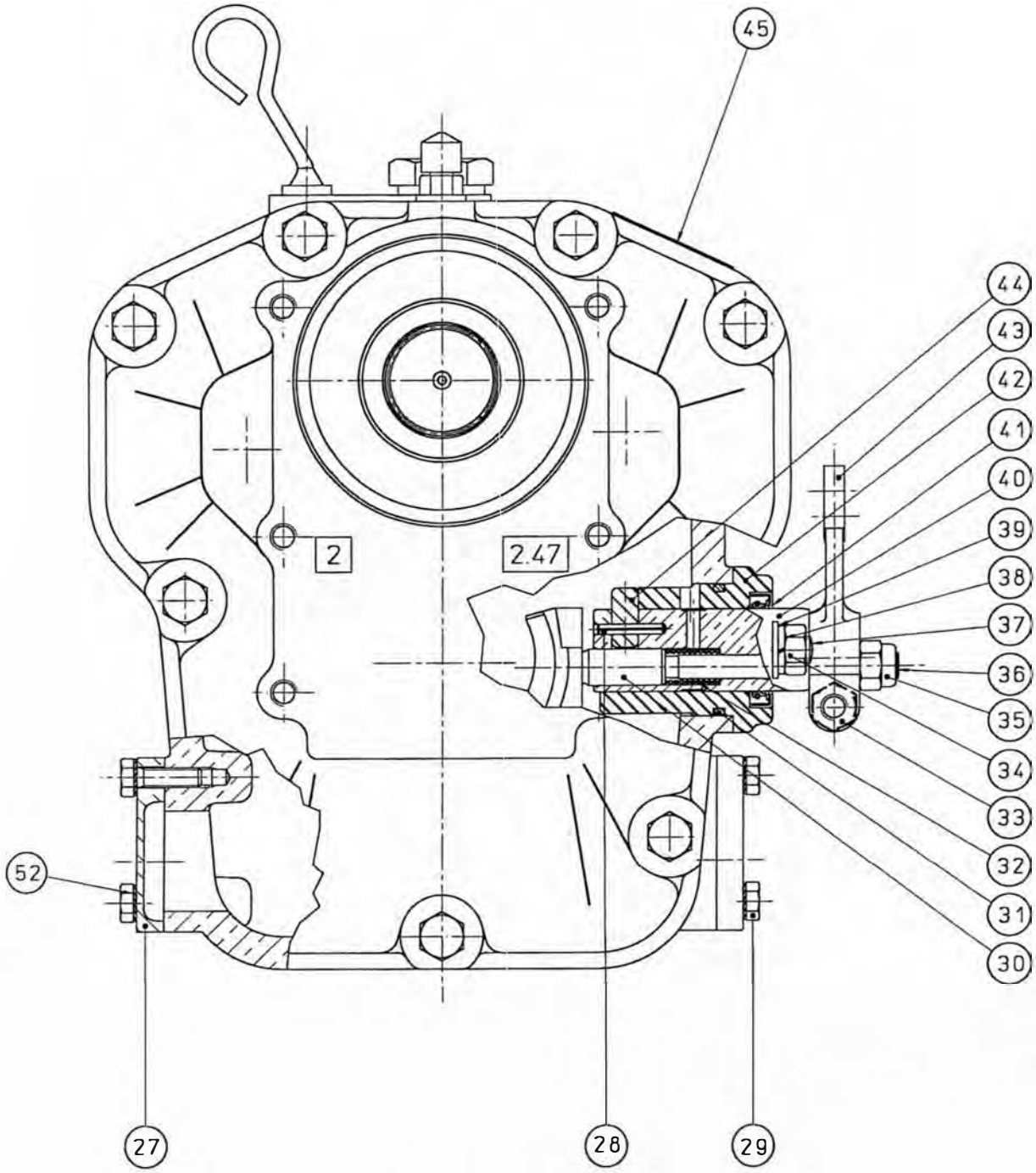
RICAMBI Per ordinare i ricambi specificare il tipo di invertitore,il numero di serie,il rapporto,il numero di riferimento del disegno, la quantità.

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

PIÉCES 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.

Rif. Ref	Denominazione Denomination	Quantità Quantity	Codice Code	Rif Ref	Denominazione Denomination	Quantità Quantity	Codice Code
59	Seeger – Seeger	1	4601052	25	Anello - Cage	2	4584023
58	Rosetta - Washer	2	4573032	24	Ingranaggio r 1,54 Gear r 1,54	1	2061632
57	Cuscinetto - Bearing	2	4622020	24	Ingranaggio r 2,00 Gear r 2,00	1	2061634
56	Albero di rinvio - Intermediate shaft	1	2015534	24	Ingranaggio r 2,47 Gear r 2,47	1	2061635
55	Tappo - Plug	1	2055063	24	Ingranaggio r 2,88 Gear r 2,88	1	2061636
54	Rosetta - Washer	1	2014024	23	Ghiera - Nut	1	4580004
53	Coperchio - Cover	1	2010311	22	Corpo frizione - Clutch	1	2056127
52	Rosetta - Washer	6	4618006	21	Ingranaggio di Rinvio - Gear	1	2061637
51	Dado – Nut	1	2038024	20	Spina – Dowel Pin	2	4614006
50	Anello di tenuta – Oil seal	1	4595133	19	Rosetta – Washer	17	4611208
49	Flangia – Output flange	1	2062191	18	Vite – Screw	9	4615227
48	Spessore - Shim	6	2013192	17	Ingranaggio r 1,54 Gear r 1,54	1	2061632
47	Vite – Screw	8	4615218	17	Ingranaggio r 2,00 Gear r 2,00	1	2061632
46	Coperchio - Cover	1	2010310	17	Ingranaggio r 2,47 Gear r 2,47	1	2061633
45	Targhetta – Name Plate	1	2028008	17	Ingranaggio r 2,88 Gear r 2,88	1	6061633
44	Perno – Dowel Pin	1	2035054	16	Distanziale - Spacer	2	2013285
43	Leva di Comando - Lever	1	2037036	15	Gabbia a rullini - Bearing	2	4604015
42	Coperchio - Cover	1	2010251	14	Distanziale - Spacer	2	2013509
41	Anello di tenuta – Oil seal	1	4595083	13	Albero secondario – Output Shaft	1	2021473
40	Albero - Shaft	1	2021390	12	Dado – Nut	1	2038025
39	Rosetta - Washer	2	4610008	11	Cuscinetto - Bearing	3	4622036
38	Rosetta - Washer	2	4611108	10	Anello di tenuta – Oil seal	1	4595111
37	Prigioniero - Screw	2	4617067	9	Albero primario r 1,54 Input shaft r 1,54	1	2021530
36	Vite – Screw	1	4581013	9	Albero primario r 2,00 Input Shaft r 2,00	1	2021531
35	Dado – Nut	1	4634008	9	Albero primario r 2,47 Input Shaft r 2,47	1	2021532
34	Dado – Nut	2	4632008	9	Albero primario r 2,88 Input Shaft r 2,88	1	2021533
33	Vite – Screw	2	4615214	8	Cuscinetto - Bearing	1	4622041
32	Molla - Spring	1	2020068	7	Coperchio - Cover	1	2010309
31	OR – "O"Ring	1	4598135	6	Rosetta - Washer	2	4609011
30	Pattino di comando – Pad	1	2056091	5	Tappo di sfiato - Breather	1	2055032
29	Vite – Screw	6	4615137	4	Scatola - Box	1	2009114
28	Spina – Dowel Pin	1	4613034	3	Rosetta - Washer	1	4609021
27	Coperchio - Cover	2	2010317	2	Asta livello - Gauge	1	2070169
26	Tappo - Plug	1	4588030	1	Tappo - Plut	1	4588040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