Bonfiglioli Trasmital

TRACK DRIVE

Installation and maintenance manual

700C series Mobile Solutions

Customer Application Engineering

Prepared by:

Approved by:

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1.0 GENERAL INFORMATION

The standard products must be used at the following conditions:

- Not be used in environments with vapors, fumes or dust corrosive and/or abrasive.
- Not be used in environments where potentially explosive atmospheres are present.
- The environment temperature limit conditions permitted in which products can be used ranging from **-15°C to +45°C**.

The product is designed and constructed so as not to injure the operator in case of malfunction or breakage.

1.1 Manual aim

Information **This document is drawn up with the "Original instructions" in Italian and translated as "Translation of the original" in English.**

This manual has been devised by the **Bonfiglioli Trasmital** to give necessary information to those authorised to work on this product for example the design engineers, installers, repair and maintenance technicians.

Besides helping one understand the rules of good manufacturing techniques used, the information given must be carefully read and strictly applied.

Failure to observe this information may lead to health and safety risks to persons as well as economic loss.

Information **A strict and consistent compliance with the specifications of this technical manual ensure the minimum operating costs and a longer unit life.**

Photographic documentation and drawings are supplied for educational purposes, so as to safely and properly carry out maintenance operations.

Minor deviations from pictures of this manual may appear on the actual gearbox. However, these discrepancies are not relevant to the main parameters, or maintenance functions.

1.2 Information on safety

Carefully read the instructions given in this instruction manual as well as the ones attached to the product and make sure to follow the information concerning safety.

Information **Personnel, which perform any type of work on the product during its life span, must possess precise technical qualifications as well as recognised skills and experience gained in the specific sector. Failure to do so may lead to health and safety risks to persons.**

It is recommended that when handling the product attention is paid to the information given in this manual or simply follow the instructions given on the packaging (if present).

Utilise the product only for the use specified by the manufacturer. Improper use of the product could lead to health and safety risks to persons as well as economic loss and furthermore will invalidate the guarantee given **Bonfiglioli Trasmital**.

Keep the product in perfect working order by following the scheduled maintenance procedure set out by **Bonfiglioli Trasmital**. Good maintenance will ensure the best performances, a longer period of operation and a constant safeguard towards security requirements.

Caution **To undertake maintenance procedures in areas which are hard to reach or otherwise dangerous it is important to follow adequate safety conditions for one self and for others in compliance with the rules and regulations that govern safety in the workplace.**

When replacing worn parts, use original spare parts. Use oils and greases recommended by **Bonfiglioli Trasmital**. Doing this, will ensure that the product works properly and that the safety level is “acceptable”.

Danger - Warning **If the surfaces of the product have reached temperatures above 65°C, is necessary to wait for it to cool before running any action, and if necessary the operator should wear anti heat gloves.**

For actions in which you can get in contact with fluids, lubricants and greases should be followed all the warnings contained in safety data sheets of the respective manufacturers and should be used any personal protective equipment provided therein.

1.3 Personal protective equipment (PPE)

Information **The required properties of the safety gloves depend on the conditions existing in practice. Wear resistant safety gloves according to the relevant classification (for example, depending on the operating step, e.g., heat resistant, oil resistant, cut resistant).**

Wear personal protective equipment as required in the respective product and material safety data sheets when handling lubricating oils, preservation agents, solvents, detergents, and hydraulic fluids.

All components of the personal protective equipment must be intact. The personal protective equipment for the gearbox user consists of:


Safety gloves


Helmet, if necessary


Anti-noise headset


Safety footwear


Protective goggles

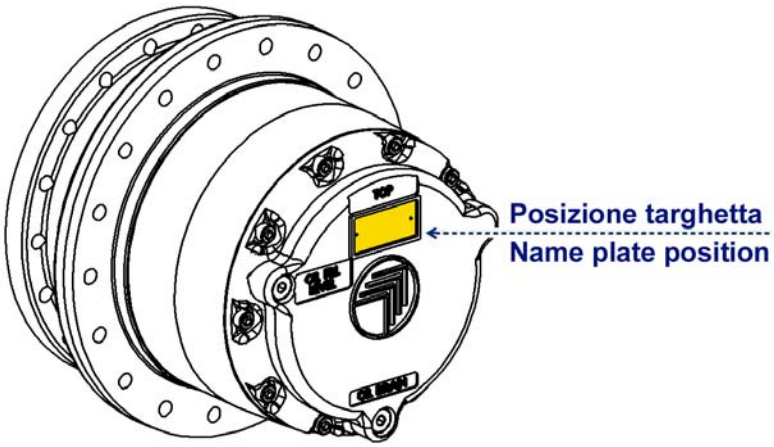

Protective clothing

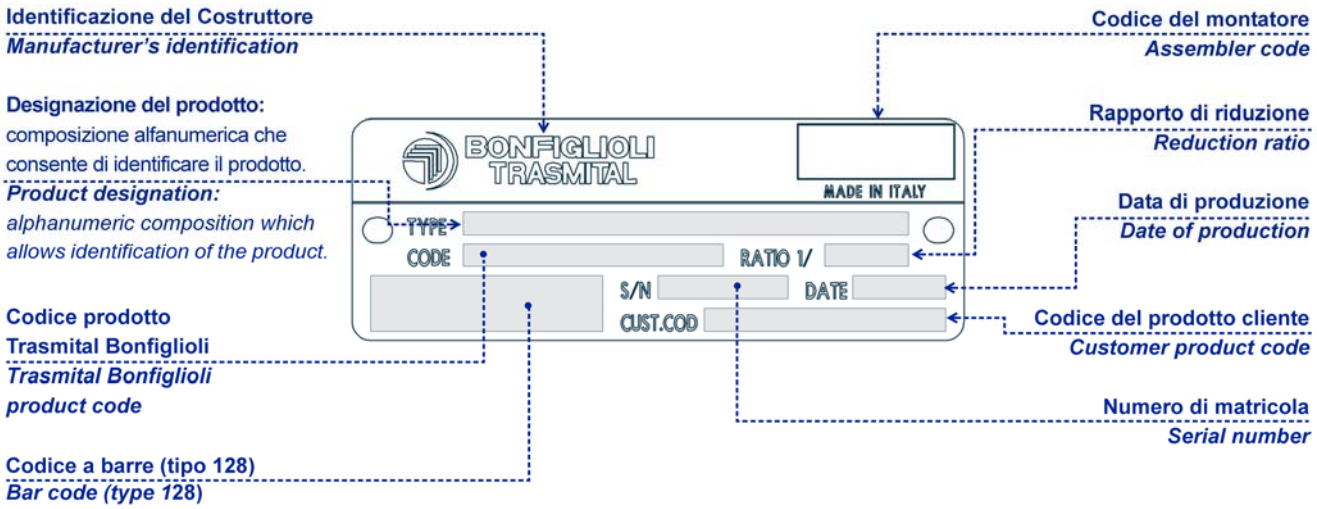
2.0 PRODUCT IDENTIFICATION

The identification data of the unit are shown on a name plates applied on it.

Information **For all enquiries regarding general information on the product, spare parts, assitance, always give the identification data stamped on the ID plate.**

The plate must not be removed or damaged during the life of the product. The following illustration shows how the data is set out on standard name plate.





For all requests for assistance please contact the **Bonfiglioli Trasmital** sales network, directly.

3.0 NOTES

3.1 Delivery conditions

Gearboxes are supplied by **BONFIGLIOLI TRASMITAL** at the following standard conditions:

- Ready for installation in the mounting position specified when ordering.
- To guarantee their reliability, the internal parts are properly lubricated with a layer of oil, the same as the one used in the final test of the gearbox and compatible with the recommended in section **"Gearbox lubrication".**
- **Without oil (as shows on the appropriate card), however with filling, draining and level plugs.**
- Mating surfaces are not painted and appropiately treated by antioxidants.
- External surfaces are protected with an antioxidant water based grey coloured paint suitable for finish painting. Finish coat to be applied by the customer.
- The breather plug must not be painted, if available.
- Tested to in-house specifications.
- Appropriately packaged to facilitate handling, transport and storage.

Information **When the product arrives, ensure that it meets the information contained in the purchase agreement and that there are no damages or irregularities. If there are any problems contact the Bonfiglioli Trasmital manufacturers' sales network directly.**

In addition to the above delivery conditions, the gearboxes can be supplied by Bonfiglioli Trasmital at the following conditions as specified when ordering:

- Factory filled with lubricant oil at level (as shown on the appropriate adhesive label applied on the product).
- Final painted.

The oil type and painting data are shown on the installation drawing.

3.2 Transport

We recommend that the box containing gearboxes is handled carefully in order to avoid damages during transport. When removing gearboxes from their packaging, extra caution should be taken to avoid impacts, which may damage sensitive parts.

The illustrations show the more common types of packaging.

3.3 Storage

Observe the following instructions to ensure correct storage of delivered products:

1. Do not store outdoors, in areas exposed to weather or with excessive humidity.
2. The products must be stored indoor or under cover, in a dry and clean ambient, at a temperature between -15°C e +50°C.
3. The conditions of temperature and humidity must be constant in ventilated ambient without aggressive vapors and no vibrations.
4. Always place boards of wood or other material between floor and products, to avoid direct contact with the floor.
5. Place the unit on a stable base and make sure that it is not subject to accidental displacement.

Period	Action
Up to 2 months	All machined surfaces such as flanges, shafts and couplings are protected by **Bonfiglioli Trasmital** with a suitable anti-oxidation product. Periodically check the condition of the product.
More than 2 months	All machined surfaces such as flanges, shafts and couplings must be protected with a suitable anti-oxidation product. Periodically check the condition of the product.
More than 6 months	Cover outer machined parts and mating parts with grease to avoid oxidation. Fill completely the gearboxes with oil to protect the internal components. In case of gearboxes complete with hydraulic motor, the motors too should be filled with oil **(ISO VG46**) to prevent oxidation, using metal plugs and washers to close the motor pilots and drain ports. If the holes are not sealed, dirt, water or other substances can get inside that would undermine correct operation of the gearbox. Before the starting up, drain the oil products used for the storage and fill them with the correct amount of lubricant oil suitable for use. Periodically check the condition of the product.

For storage lasting more than 24 months the rotating seals will no longer be efficient. It is recommended that they be checked periodically by turning all the internal kinematic motion. It is recommended that the gaskets be replaced when the machine is started.

Information **Before use, the gearboxes should be filled with the proper amount of lubricant of the recommended type.**

3.4 Lifting and handling

If the handling occurs when the product is still packaged, simply follow the instructions given on the packaging and/or use normal hoisting means.

Danger - Warning **Considering that the size and form of the product do not allow manual shifting, in particular handlings, (e.g. installation) it is necessary to use accessories that guarantee human safety and which also avoid damages to the product, such as eyebolts, hooks, brackets etc. or special tools supplied by Bonfiglioli Trasmital.**

To lift and handle the product, after having opened the packaging, follow the information given below:

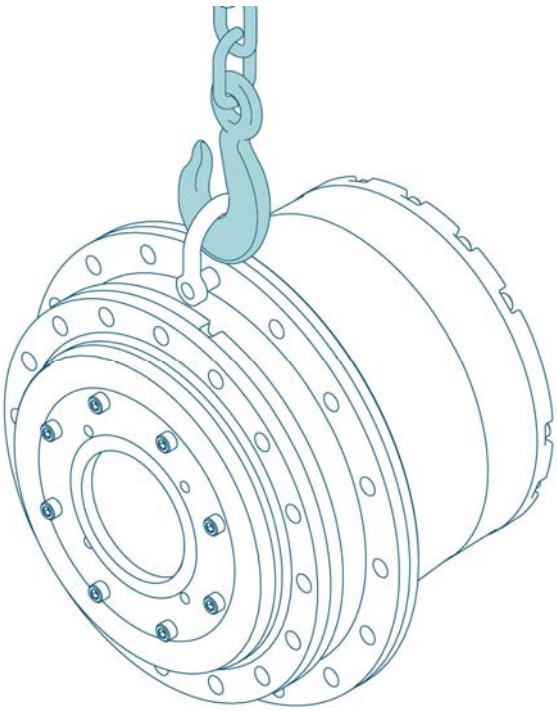
1. By using a tackle lift and handle with care avoiding impacts.

To turn gearboxes up side down it is necessary to use the hanging points provided for lifting operations, and in accordance with the rules which have been previously defined.

Wear ever gloves to provide appropriate mechanical protection to the hands.

The up side down operations must be carried out by keeping the gearbox as close as possible to a worktop; it is important to pay attention to its center of gravity so that its weight does not get unbalanced during this handling process.

Gearbox hookings must be made so that they do not come out of the hanging points or they cannot move and cause risks of falling loads; this is very important when the up side down turning operation is carried out by means of ropes or lifting bands which are more subject to displacement risks from loads hanging points.



3.5 Track drive weigh

The following table shows the weight values of every gearboxes sizes (The product weight can vary depending on the type of the hydraulic motor installed).

Size	Weight (Kg)	Size	Weight (Kg)
7 00 C	**20**	7 11 C	**270**
7 01 C	**25**	7 13 C	**310**
7 03 C	**42**	7 15 C	**350**
7 05 C	**60**	7 16 C	**400**
7 06 C	**95**	7 17 C	**630**
7 07 C	**135**	7 18 C	**750**
7 09 C	**180**	7 20 C	**820**
7 10 C	**200**	7 22 C	**1300**

4.0 TECHNICAL INFORMATION

The **Bonfiglioli Trasmital** gearboxes of the series decribed in this manual are designed and built for application as track drive for crawled machines.

The unit includes:

a Hydraulic motor (if included)

b Planetary gearbox

- One or more reduction stages planetary gearbox, with rotating housing
- connecting flange to the machine frame
- connecting flange to the sprocket.

An important piece of advice given is “to perfectly” design the main hydraulic system. The functional scheme is shown on the installation drawing.

Feed hydraulic circuits must be provided of pressure relief valves so that maximum admissible values cannot be exceeded.

Information **If the product is supplied with hydraulic motor, the data regarding pressure and flow rate to use are shown on the installation drawing.**

Danger - Warning **Make sure that there is no residual (back) pressure inside the brake pilot line when the machine has been stopped. A potential presence of residual pressure can reduce the efficiency of the emergency brake.**

Information **maximum admissible pressure value which allows proper brake function is shown on gearbox installation drawing.**

5.0 INSTALLATION

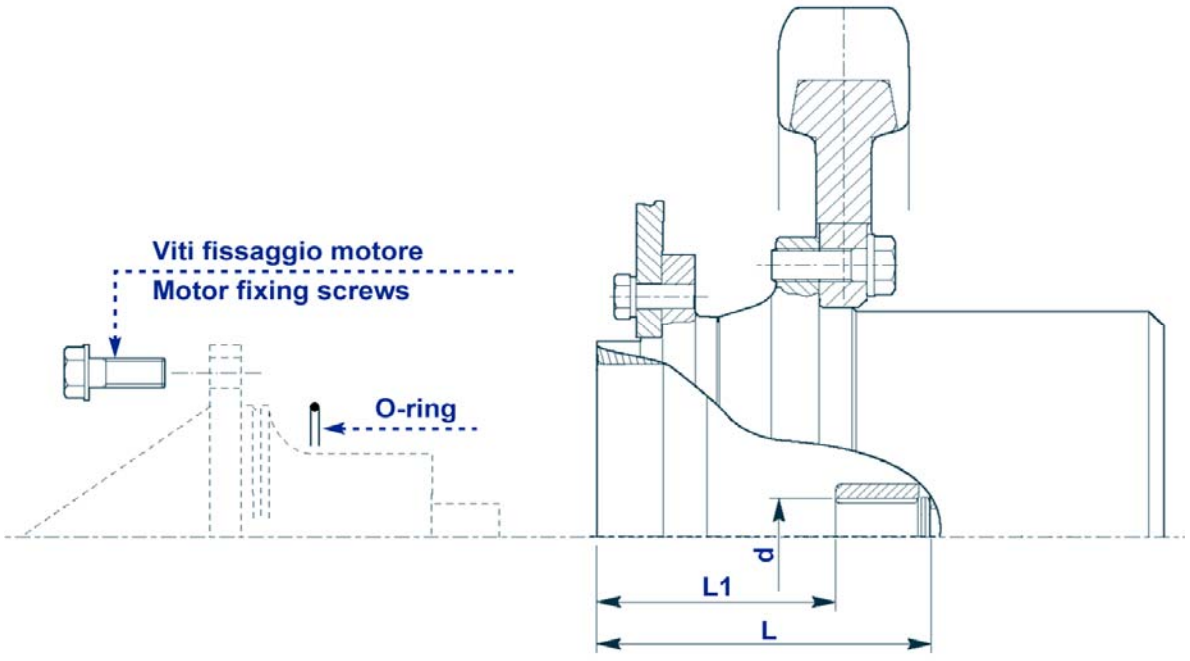
5.1 Hydraulic motor installation

In case of hydraulic motor installation, the following precautions must be observed

- Do not force the coupling and do not use inappropriate tools during assembly. Take cure not to damage the flat/cylindrical coupling surfaces.
- Do not force the rotary coupling mechanisms with heavy overhung or thrust loads.
- To facilitate assembly and avoid the rotary coupling mechanisms wear, use a lubricating synthetic oil paste such as **Klüberpaste 46 MR 401** or **Tecnolube WRL 115** or similar product.
- The mating areas and the pilot diameter of the gearbox where the motor is to be mounted must be clean and without burrs.

Information **Before assembling the hydraulic motor, verify by a depth slide gauge the correct assembly of the unit checking the axial distance as shown in the scheme below** (see installation drawing).

1. Fit the O-ring seal in its seat in the hydraulic motor and assemble it to the gearbox being careful not to damage the seal already fitted.
2. Assemble the Hydraulic motor to the gearbox tightening the screws by a torque wrench at a torque shown on the following table.



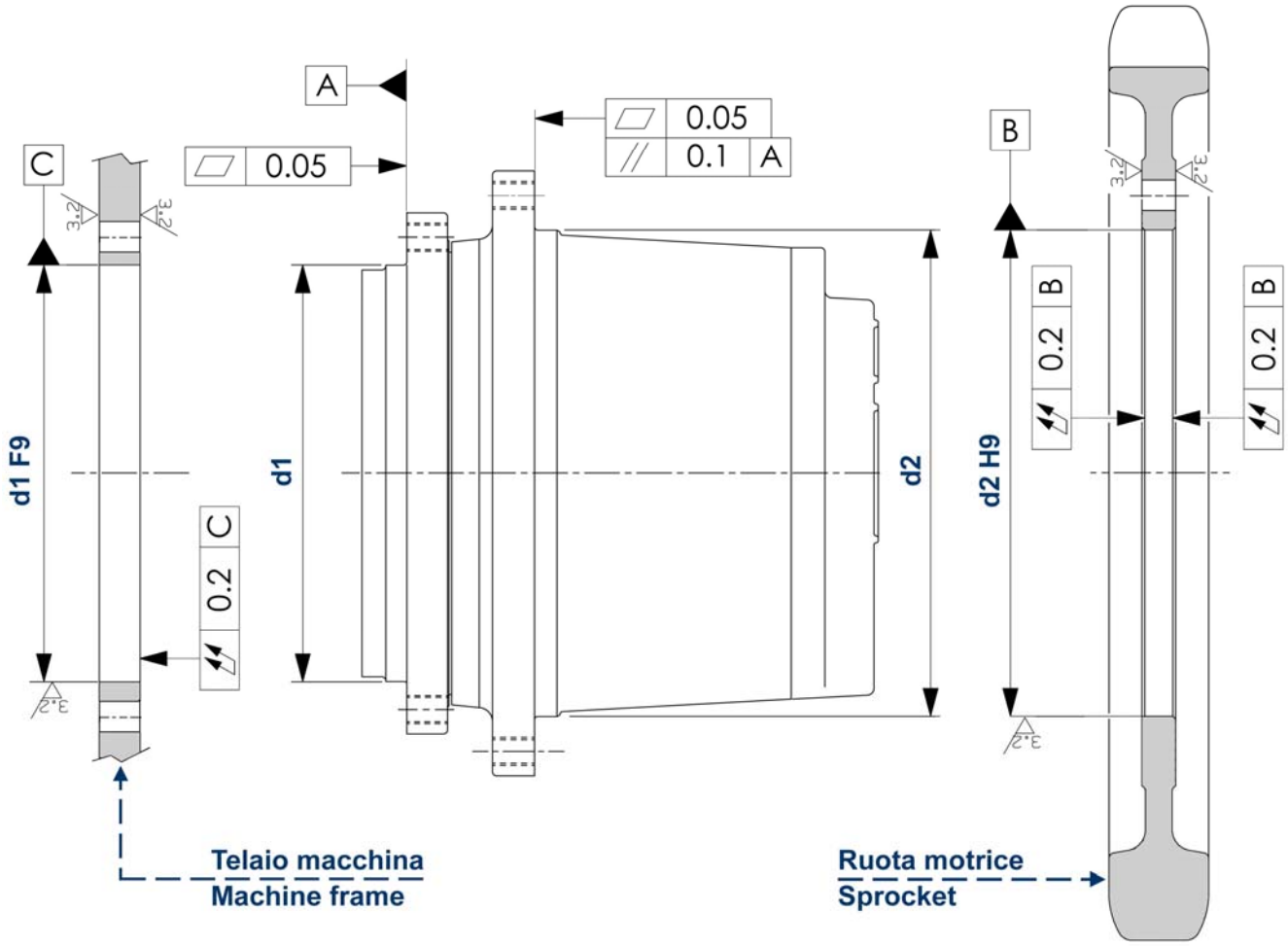
Information **Under no circumstance remove the plastic lid from the power supply ports of the hydraulic motor; this will help avoid the accidental introduction of foreign bodies into the motor, until the hoses are assembled.**

Input	Motor type	L	L1	d	Screw	N°	Nm
SAUER DANFOSS							
D0	OMR	55,5÷56,3		1" SAE 6B	M12x30-8.8	2	86
D2	OMS	67,1÷67,9		SAE 12/24 z14	M12x35-8.8	4	86
D4	OMSS	26,7÷27,3		SAE 12/24 z12	M10x30-8.8	4	50
D6	OMR	55,5÷56,3		ø25,4	M12x35-8.8	2	86
D8	OMSU (serie3)	45,7÷46,3		SAE 12/24 z12	M10-8.8	4	50
Y0	SAUER (51C080)	159÷159,8	111,4÷112,2	SAE 12/24 z14	M20x50-8.8	2	415
Y2	SAUER (90K075)-(90C055)	140,8÷141,6	93,0÷93,8	SAE 12/24 z14	M20x50-8.8	2	415
Y3	SAUER (90K055)	131,6÷132,4	83,8÷84,6	SAE 12/24 z14	M16x40-8.8	2	215
Y4	SAUER (90C075)	141÷141,8		SAE 12/24 z14	M20x55-8.8	2	415
Y5	SAUER M 46 MV (cartridge)	125,2÷126		SAE 16/32 z15	M16x40-8.8	2	215
EATON / CHAR-LYNN							
E2	BEARINGLESS 2000 std	41,6÷42,7		SAE 12/24 z12	M12x35-8.8	4	86
E3	SERIE 2000	56,8÷57,6		SAE 12/24 z14	M12-8.8	4	86
LINDE							
G0	HMF50÷HMV55	137,0÷137,8	88,7÷89,5	DIN 5480 30x1,25 z22	M12x40-8.8	4	86
G1	HMF÷HMV 70	132,0÷132,8	84,5÷85,3	DIN 5480 35x2 z16	M12x40-8.8	4	86
G2	HMR÷HMF÷HMV 90	158,5÷159,2	111,0÷111,8	DIN 5480 40x2 z18	M12x45-12.9	6	145
G3	HMV 105	174,2÷175	124,2÷125,0	SAE 16/32 z23	M12x55-8.8	6	86
G4	BMF 35	61,2÷62,0	23,0÷23,8	DIN 5482 25x22 z14	M10x30-8.8	4	50
G7	HMR 135	162,9÷163,7	102,9÷103,7	SAE 16/32 z27	M12x45-8.8	8	86
Y1	LINDE HMV 75	143,8÷144,6	111,4÷112,2	SAE 16/32 z21	M16x45-8.8	2	215
SAE STANDARD							
S3	SAE B (n°2 fori / holes)	42,2÷43,0		SAE 16/32 z13	M12-8.8	2	86
S4	SAE BB (n°2 fori / holes)	46,7÷47,5		SAE 16/32 z15	M12-8.8	2	86
S5	SAE C (n°4 fori / holes)	56,8÷57,6		SAE 12/24 z14	M14-8.8	4	140
S6	SAE D (n°4 fori / holes)	75,8÷76,6		SAE 8/16 z13	M20-8.8	4	415
X1	SAE C (n°4 fori / holes)	56,8÷57,6		SAE 16/32 z21	M12-8.8	4	86
X2	SAE C (n°4 fori / holes)	56,8÷57,6		SAE 16/32 z23	M12-8.8	4	86
X3	CHAR-LYNN Serie 2000	56,8÷57,6		SAE 12/24 z14	M12-8.8	2	86
X5	SAE C (n°2 fori / holes)	56,8÷57,6		SAE 16/32 z21	M16-8.8	2	215
X9	SAE D (n°4 fori / holes)	75,0÷76,0		SAE 8/16 z15	M20-8.8	4	415
X15	SAE BB (n°2 fori / holes)	46,0÷46,8		SAE 16/32 z15	M12-8.8	2	86

Input	Motor type	L	L1	d	Screw	N°	Nm
BOSCH REXROTH / PARKER VOAC / SAUER							
H0	A2FE 28÷32 (A) 6.1 A6VE 28 (A) 6.0 F12-030 (C-C)	125,0÷125,8	89,9÷90,7	DIN 5480 30x2 z14	M12x35-8.8	2	86
H1	A2FE 45÷63 (Z) 6.1 A6VE 55 (Z) 6.0/6.1 F12-040÷060 (C-C) V12-060 (C-C) SAUER 51C60	128,2÷129,0	93,2÷94,0	DIN 5480 30x2 z14	M16x40-8.8	2	215
H2	A2FE 80÷90 (A) 6.1 A6VE 80 (A) 6.0 SAUER 51C80	156,4÷157,2	111,4÷112,2	DIN 5480 40x2 z18	M20x50-8.8	2	415
H3	A2FM 23÷28 (Z) 6.1	68,8÷69,6	25.7÷26,5	DIN 5480 25x1,25 z18	M10x35-8.8	2	50
H4	A2FM 32 (A) 6.1	60,8÷61,6	25,7÷26,5	DIN 5480 30x2 z14	M10x35-8.8	2	50
H5	A6VM 55 (Z) 6.0	67,9÷68,7	32,7÷33,5	DIN 5480 30x2 z14	M12x35-8.8	4	86
H6	A2FE 107÷125 (Z) 6.1 A6VE 107 (Z) 6.3 F12-110 CHC 51C110 (SAUER)	168,7÷169,5	123,9÷124,7	DIN 5480 40x2 z18	M20x45-8.8	2	415
H7	A6VE 80 (H) 6.1	143,4÷144,2	111,4÷112,2	DIN 5480 40x2 z18	M20x50-8.8	2	415
H11	SAUER H1B060	128,2÷129,0	93,2÷94,0	DIN 5480 30x2 z14	M16x40-8.8	2	215
H13	SAUER H1B110	168,7÷169,5	123,9÷124,7	DIN 5480 40x2 z18	M20x45-8.8	2	415
I5	A2FM 63 (A) 6.1 V12-060 (I-D)	72,9÷73,7	32,7÷33,5	DIN 5480 35x2 z16	M12x35-8.8	4	86
J0	A6VE 28 (A) 6.1/6.3	125,0÷126,0	90,0÷91,0	DIN 5480 30x2 z14	M12x35-8.8	2	86
J1	A6VE 55 (A) 6.0	133,2÷134,0	93,2÷94,0	DIN 5480 35x2 z16	M16x40-8.8	2	215
J2	A6VE 107 (A) 6.0 A6VE 160 (Z) 6.1 A2FE 125 (A) 6.1	173,8÷174,6	123,9÷124,7	DIN 5480 45x2 z21	M20x50-8.8	2	415
J3	A16VE 80 (H) Serie 60	143,4÷144,2	111,4÷112,2	DIN 5480 40x2 z18	M20x50-8.8	2	415
J4	A6VE 160 (A) 6.1/6.3 A2FE 160	179,0÷180,0	123,9÷124,7	DIN 5480 50x2 z24	M20-8.8	2	415
J9	A6VM 200 (A) 6.3	95,8÷96,6	40,7÷41,5	DIN 5480 50x2 z24	M20x60-10.9	4	585
J14	A6VE 250	192,7÷193,5	134,5÷135,3	DIN 5480 50x2 z24	M20x60-12.9	4	705
R2	A10FE 45	127,6÷128,8		SAE 16/32 z15	M12x35-8.8	2	86
R5	A10VE 28	115,6÷116,4		SAE 16/32 z13	M12x35-8.8	2	86
R7	A10VE 63	140,2÷141		SAE 12/24 z14	M12x30-8.8	4	86

5.2 Construction of the flanges

Correct construction of the flanged hub and gearbox housing and relative coupling indications are shown here follow.



Gearbox [mm]		Sprocket [mm]
d2	≤300	d2 H9 [mm]
	>300	(d2+0.2) H9 [mm]

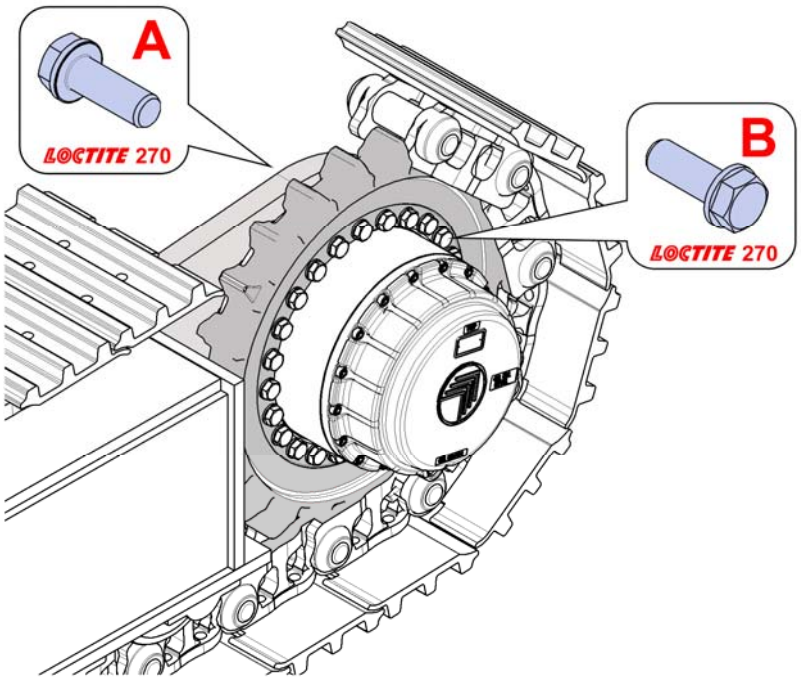
5.3 Installation of the track drive on the machine

Information **The entire installation process must be planned as early as the general design phase of the machine. The person authorised to do the work must, if necessary, set out a safety plan to protect the health and safety of all persons directly involved and apply all applicable legislation.**

1. Ensure that the structure to wich the gear unit is to be mounted is sufficiently robust and rigid to support its weight and operating stresses.
2. Check that the machine to which the gear unit is to be installed is switched and cannot be accidentally switched on again.
3. Make sure all mating surfaces are flat.
4. Make sure the shaft/shaft or shaft/bore are perfectly aligned for coupling.
5. Fit suitable guards to protect against the gear unit's external moving parts.
6. We recommend applying a protective paste to all gear/motor mating surfaces and other parts such as **Klüberpaste 46 MR 401** or **Tecnolube WRL 115** or similar product, to ensure optimal coupling and protection against fretting corrosion.
7. Move the track drive in the mounting area applying lifting methods shown in section "**Lifting and handling**".
8. Clean the mating surfaces from oils or paint and fit the track drive on the machine frame (for the correct orientation refer to the installation drawing).
9. Apply **LOCTITE 270** or similar product on the thread screws **(A)**. Fix the gearbox to the machine frame tightening all the screws foreseen **(A)** by a torque wrench at a torque shown on the following table.

5.4 Sprocket fixing

1. Clean the mating surfaces from oils or paint and assemble the sprocket to the gearbox.
2. Apply **LOCTITE 270** or similar product on the thread screws **(B)**. Fix the sprocket to the gearbox tightening all the screws foreseen **(B)** by a torque wrench at a torque shown on the following table.

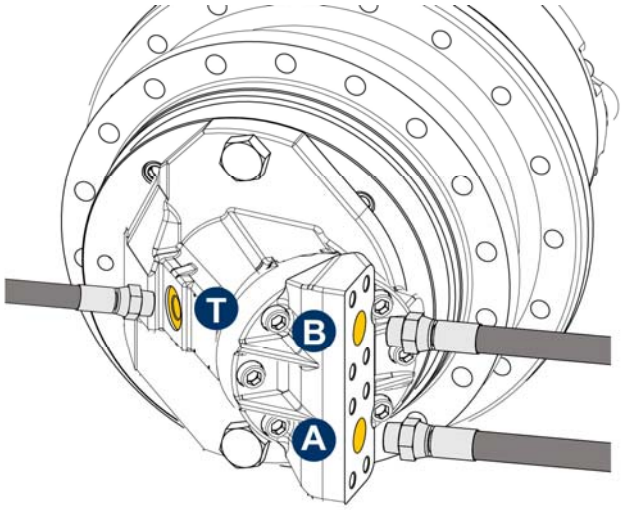


		Machine frame			Sprocket		
Gearbox	Max torque (Nm)	A	Nos.	(Nm)	B	Nos.	(Nm)
7 00 C	1.000	M10-8.8	8	50	M10-8.8	8	50
7 01 C	2.200	M10-8.8	8	50	M10-8.8	8	50
7 03 C	4.000	M16-8.8	8	215	M20x1,5-8.8	8	430
7 05 C	10.000	M16-10.9	12	300	M16-8.8	16	215
7 06 C	18.000	M16-8.8	18	215	M16-8.8	18	215
7 07 C	26.000	M20-8.8	20	415	M16-10.9	20	300
7 09 C	30.000	M20-10.9	16	585	M16-8.8	30	215
7 10 C	36.000	M20-10.9	16	585	M20-10.9	16	585
7 11 C	45.000	M20-10.9	24	585	M20-8.8	24	415
7 13 C	60.000	M20-10.9	24	585	M20-10.9	24	585
7 15 C	85.000	M20-12.9	24	705	M20-10.9	24	585
7 16 C	100.000	M24-10.9	24	1000	M18x1,5-12.9	36	550
7 17 C	130.000	M30-10.9	20	2020	M24-10.9	24	1000
7 18 C	180.000	M24-12.9	30	1220	M24-12.9	20	1220
7 20 C	220.000	M30-10.9	30	2020	M30-10.9	20	2020
7 22 C	330.000	M30-10.9	30	2020	M30-10.9	30	2020

5.5 Connection of the hydraulic system

1. **Information** **Clean hoses thoroughly prior to connection and remove any internal obstructions.**

   Prevent any foreign particles from getting into the hoses by removing the plastic caps only at the time of the assembly.
2. Clean the surface to be connected on the hydraulic motor.
3. Connect the hoses to the hydraulic motor ports (for hoses sizes and dimensions refer to the installation drawing).
   - Service ports: **A-B**
   - Drain port: **T**

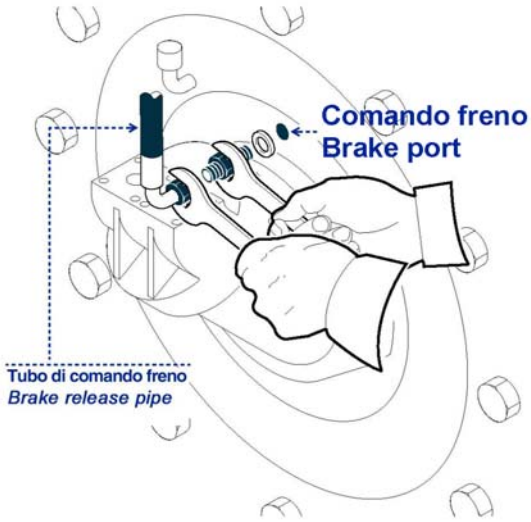


5.6 Connection of the brake

The gearbox drive can be supplied with a safety negative multidisc brake hydraulically driven (parking brake).

For further information see the installation drawing.

1. To operate the brake, connect the brake pilot pipe to the brake port.



6.0 LUBRICATION

6.1 Gearbox lubrication

The motor and the gearbox have separate lubrication. The gearbox is lubricated by oil splashing.
The recommended oil type has to be **EP** characteristics according to **MIL-L-2105 C & API GL5.**

For standard working conditions, the recommended oil is:

Oil type	Viscosity
Mineral	**SAE 80W/90**
synthetic	**SAE 75W/90**

For heavy duty working conditions (high loads, high duty cycles or high ambient temperatures), the recommended oil is:

Olio tipo / Oil type	Viscosità / Viscosity
Minerale / Mineral	**SAE 85W/140**
Sintetico / Synthetic	**SAE 80W/140 - SAE 75W/140**

In the following table the most common brands of lubricant and the types recommended are shown.

Information **During the operation the oil temperature must not exceed 85-90°C intermittent, if not otherwise indicated on installation drawing.**

Caution **In case of lubrication with syntetic oils, is recommended to use only oils with PAO base if not otherwise specified when ordering.**

Do not mix together oils of different brands or characteristics.

Use oils listed in the table or similar products with equivalent characteristics in order to not modify the brake performances (if present).

For information about characteristics of lubricating oils and their proper use, please consult the lubricant suppliers directly.

		Minerali/Minerals		Sintetici/Synthetics	
		-20°C / +30°C (SAE 80W/90)	+10°C / +45°C (SAE 85W/140)	-20°C / +30°C (SAE 75W90)	+10°C / +45°C (SAE 80W140)
SHELL	**SPIRAX S2 A 80W-90** (SPIRAX A 80W90)	●			
	SPIRAX S2 A 85W-140 (SPIRAX A 85W140)		●		
	SPIRAX S5 ATE 75W-90 (TRANSAXLE 75W90)			●	
	SPIRAX S6 AXME 75W-90 (SPIRAX ASX 75W90)			●	
	SPIRAX S 75W140				●
	SPIRAX S 80W140				●
AGIP	ROTRA MP 80W90	●			
	ROTRA MP 85W140		●		
	GEAR SYNTH 75W90			●	
API	EP SAE 80W90	●			
	EP SAE 85W140		●		
	EP SINT 75W90			●	
ARAL	EP PLUS 80W90	●			
	HYP 85W140		●		
	HYP SYNTH 75W90			●	
BP	ENERGEAR HYPO 80W/90	●			
	ENERGEAR HYPO 85W140		●		
	ENERGEAR SHX-M 75W90			●	
	ENERGEAR SHX-S 75W140				●
CASTROL	EPX 80W/90	●			
	EPX 85W/140		●		
	SAF-XO			●	
	MTX FULL SYNTHETIC				●
	SAF-X 75W140				●
CEPSA	TRANSMISSIONES EP 80W90	●			
	TRANSMISSIONES EP 85W140		●		
	TRANSMISSIONES EP FE+LD 75W90			●	
	TRANSMISSIONES EP FE+LD 75W140				●
CHEVRON TEXACO	DELO GEAR LUBRICANT EDI 80W90	●			
	DELO GEAR LUBRICANT EDI 85W140		●		
	TEGRA SYNTHETIC GEAR LUBRICANT 75W90			●	
	TEGRA SYNTHETIC GEAR LUBRICANT 80W140				●
ELF	TRANSELF TYPE B 80W/90	●			
	TRANSELF TYPE B 85W/140		●		
	TRANSELF SYNTH ESE FE 75W90			●	
	TRANSELF SYNTH ESE FE 75W140				●
ERG	GEAR EP 80W/90	●			
	GEAR EP 85W/140		●		
	GEAR EPS 75W90			●	
FUCHS	TITAN SUPER GEAR 80W90	●			
	TITAN SUPER GEAR 85W140		●		
	TITAN CYTRAC HSY 75W90			●	
	TITAN SINTOPOID 80W140				●
I.P.	PONTIAX HD 80W90	●			
	PONTIAX HD 85W140		●		
	PONTIAX HDS 75W90			●	
MOBIL	MOBILUBE HD 80W90	●			
	MOBILUBE HD 85W140		●		
	MOBILUBE 1 SHC 75W90			●	
PAKELO	GLOBAL GEAR SA 80W90	●			
	GEAR OIL EP GL-5 80W90	●			
	GLOBAL GEAR SA 85W140		●		
	GEAR OIL EP GL-5 85W140		●		
	GLOBAL MULTIGEAR TS 75W90			●	
	GLOBAL TRANSMISSION TS 80W140				●
Q8	GEAR OIL XG 80W90	●			
	T 55 85W 90	●			
	T 55 85W140		●		
	T 65			●	
TAMOIL	TAMGEAR MP LUBRICANT 80W90	●			
	TAMGEAR MP LUBRICANT 85W140		●		
	TAMGEAR PERFORMANCE 75W90			●	
TEXACO	GEARTEX EP-C 80W90	●			
	MULTIGEAR 80W90	●			
	GEARTEX EP-C 85W140		●		
	GEARTEX S5 75W90			●	
	MULTIGEAR S 75W90			●	
TOTAL	EP-B 80W90	●			
	TRANSMISSION TM 80W90	●			
	TRANSMISSION TM 85W140		●		
	TRANSMISSION SYN FE 75W90			●	
	TRANSMISSION SYN FE 75W140				●

6.2 Oil filling

Caution **The gearbox is supplied without oil; anyway it has filling, draining and oil level plugs. Before putting the gearbox into operation, it is necessary to fill it with oil.**

Proceed according to the following instructions:

1. Check that the gearbox axis is horizontal. Rotate the gearbox housing until the filling oil plug is positioned as shown in the sketch below.
2. Unscrew the fill and level oil plugs.
3. Add the lubricating oil with the features listed in section "**Gearbox lubrication**" untill it flows out from the level hole.
4. Screw the oil plugs.
5. Run the gearbox, after a few minutes, stop and check the oil level.
6. If necessary, refill with lubricant oil.

For further information see the installation drawing.

Tighten the plugs by a torque wrench at a torque shown on the table in the end of this manual.

6.3 Gearbox factory filled with oil

Caution **Before the starting up, check the level of lubricating oil. If necessary, refill with lubricant oil.**

In case the gearbox is factory filled with lubricant oil at level (as specified when ordering) ,follow the procedures given in detail at sections "**Oil filling**" and "**Oil draining and replacement**" only for the oil replacements following the start up and running in.

The lubricant oil type is shown on the product installation drawing.

6.4 Oil draining and replacement

1. Check that the gearbox axis is horizontal. Rotate the gearbox housing until the drain plug **(2)** is on the bottom of the vertical axis of the end cover.

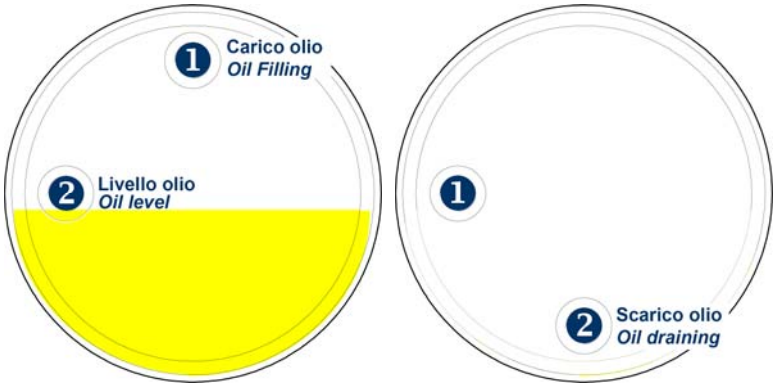
Danger - Warning **Remove the oil plugs with extreme caution because an overpressure inside the unit could strongly expel them.**

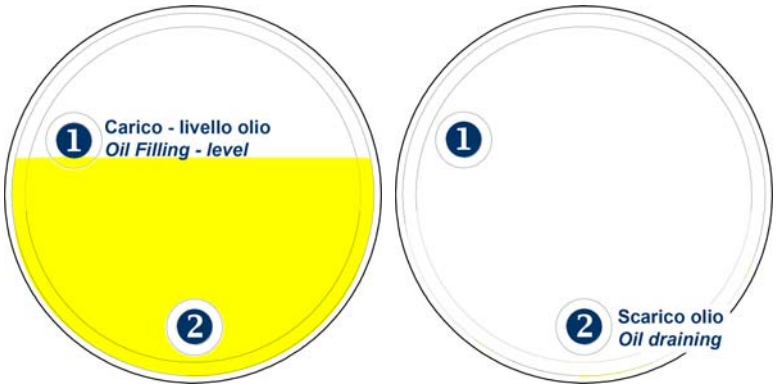
2. Unscrew the **plugs (1-2)** and let the oil flow in a large enough container; in order to facilitate the draining must be oil still warm.
3. Wait a few minutes until all the oil is drained and then proceed to screw on the plugs **(1-2)**.
4. Proceed with the oil fill-up according to the following procedures listed in Section "**Oil filling**".

Danger - Warning **Do not dispose oil in natural environment but be careful to eliminate it in compliance with the relative rules and regulations that govern locally.**

Information **Check the correct oil level after filling through the appropriate plug.**
Oil quantity to fill the gearbox is indicated on the following table or on the product installation drawing (Indicative values).

Belove are reported the standard gearbox oil filling-draining sketches.





Size	Oil qt.(l ± 10%)	Size	Oil qt.(l ± 10%)
7 00 C	**0,5**	7 13 C	**8÷9**
7 01 C	**0,7**	7 15 C	**7,5÷8,5**
7 03 C	**0,8**	7 16 C	**13÷15**
7 05 C	**1,3÷1,5**	7 17 C	**12÷14**
7 06 C	**2÷2,6**	7 18 C	**15÷18**
7 07 C	**2,5÷3**	7 20 C	**22÷26**
7 09 C	**3,5÷4,5**	7 22 C	**28÷32**
7 10 C	**3,5÷4,5**		
7 11 C	**6÷7**		

Informazioni **Fill, level and drain oil plug dimensions are indicated on the product installation drawing.**

For gearboxes with filling and draining oil hub side, refer to the installation drawing.

6.5 Characteristics of the Hydraulic System

The hydraulic motor lubrication must reflect the ISO VG 46 characteristics. It must be filtered with a maximum grade of **10 µm** and with a contamination level equal to or inferior to **class 9 according to NAS 1638** or **22/18/15 according ISO/DIS 4406** (unless otherwise indicated on the product installation drawing). Hydraulic fluids with different properties should not be mixed.

Use filter with a visual indicator which can detect clogging from the outside, and with a reliefvalve which by-passes the oil when the filter element is clogged.
Should the machine operate at very low temperature (artic climates) it is essential to use specific guidelines (contact the manufacturer).

As the temperature of the hydraulic oil may be a critical factor we recommend that it be checked. High operational temperatures will causea corruption of the oxidation resistance level and will accelerate the deterioration process of the hydraulic oil.

The following precautions should be taken:

1. The temperature ranges of the hydraulic oil during operation have to be within **25°C÷90°C.**
2. The temperature of oil should reach **-20°C** prior to start operation.
3. During operation the oil temperature can rise to **90°C** but this temperature is acceptable only for very short periods of time.

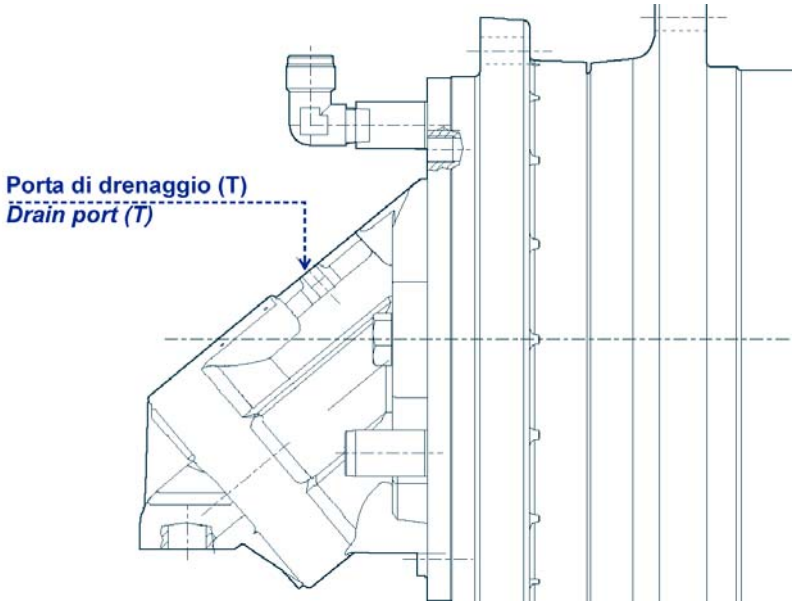
These temperatues have been set to take into consideration general degrading in viscosity as well as the wear resisting additives used in the oil. The lifetime of motor will be reduced significantly if it should continuously above **90°C**.

7.0 START UP AND RUNNING IN

In this first stage it is advised to follow the measures given below:

1. Check the correct lubrication of the unit.

2. Fill the motor housing with hydraulic oil from the **drain port (T)** (see the following picture).



3. Bleed air from every part of the hyraulic circuit and add oil in the tank if necessary.

Information **The presence of residual air in the hydraulic circuit will manifest itself with the presence of foam in the tank and will lead to a jerking of the motor as well as excessive noise coming from the motor and the valves.**

4. Start the gearbox at a low speed and gradually increase it after having verified that it functions correctly without any noises or vibrations.

Information **Do not reach maximum pressure unless the entire system has been filtered to eliminate any particles of dirt that may be present.**

During the running-in stage follow the steps given below.

5. Check the correct revolution and direction of rotation.

6. Make sure that the functioning is regular and with-out any excessive noises and vibrations.

7. Make sure that the oil temperature does not exceed 85-90°C.

After having terminated this first running-in follow the steps given below.

8. Check that there are no oil leakages. If present, proceed to remove them.

9. Check the level of lubricating oil in the gearbox.

10. It could happen that due to the presence of air, during the first start up, the opening action of the brake could be slowed down. It is advised to repeat the opening and closing function of the brake.

11. Check that there are no other problems in general.

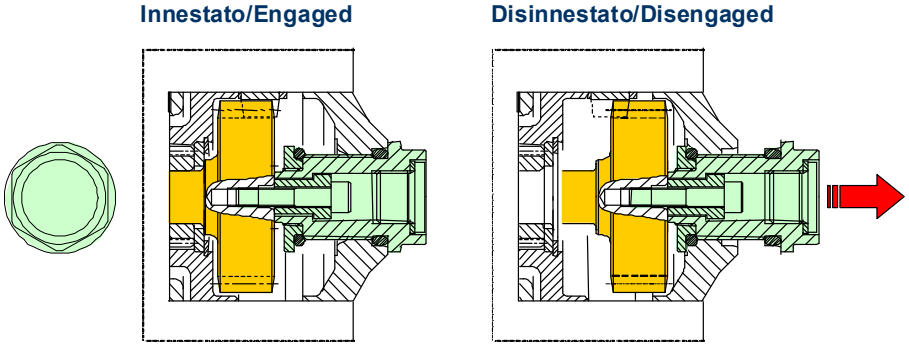
7.1 Mechanical disengagement

The gearbox can be supplied with mechanical disengagement getting it suitable to be driven both with stad still hydraulic motor and with closed static brake.

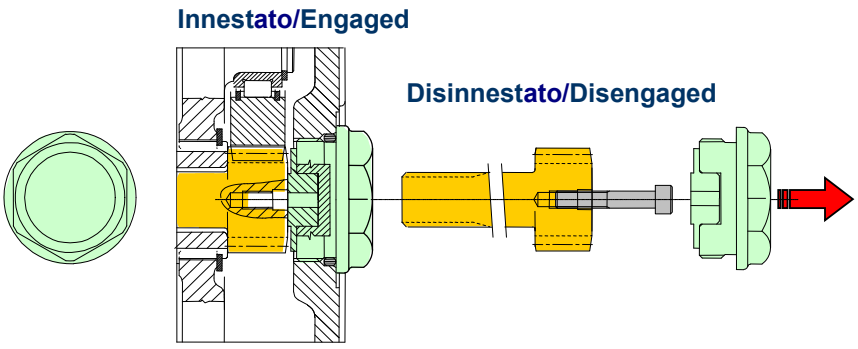
Information **The max wheel speed with disengaged gearbox must not overcome the rpm shown in the following table for max continuative period of 1 hr.**

Danger - Warning **The disengagement must be connected or disconnected only when the gearbox is stopped on flat ground.**

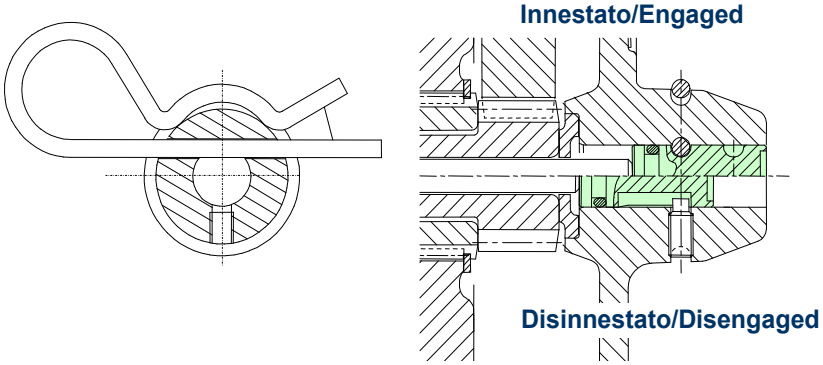
Belove are reported the standard sketches of gearbox disengagement:



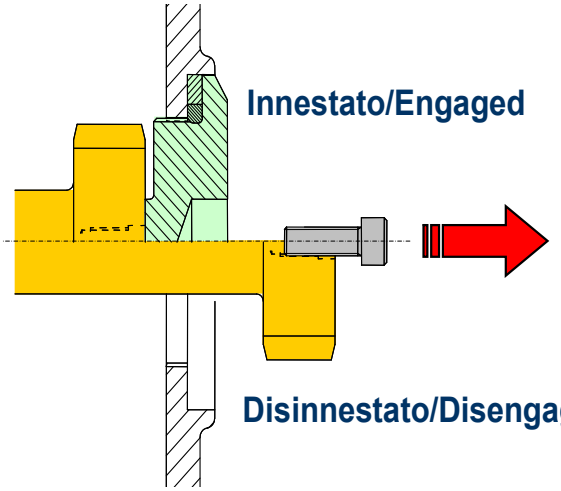
Size	Disengag.	Wheel (max rpm)
7 03 C	D	**100**



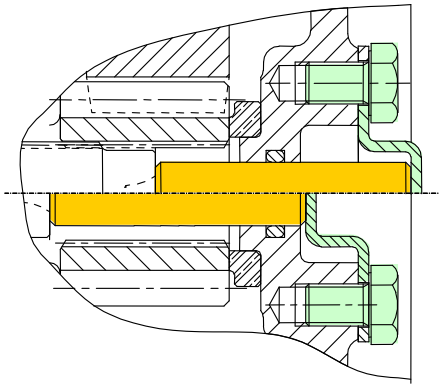
Size	Disengag.	Wheel (max rpm)
7 05 C	D	**100**



Size	Disengag.	Wheel (max rpm)
7 05 C	DS2	**100**



Size	Disengag.	Wheel (max rpm)
7 06 C	D	**60**
7 07 C	D	**40**
7 09 C	D	**40**
7 13 C	D	**20**
7 15 C	D	**20**
7 17 C	D	**20**



Size	Disengag.	Wheel (max rpm)
7 13 C	DS1	**20**
7 17 C	DS1	**20**

Operation:

1. Engaged gearbox:

At this condition the motion is trasmitted from the hydraulic motor to the gearbox.

2. Disengaged gearbox:

Danger - Warning **At this condition the hydraulic motor and static brake are disconnected to the gearbox: the wheel is idle so the machine can move freely.**

Information **Following disengagement, always engage the gearbox when the machine is used normally.**

7.2 Speed shift and hydraulic disengagement

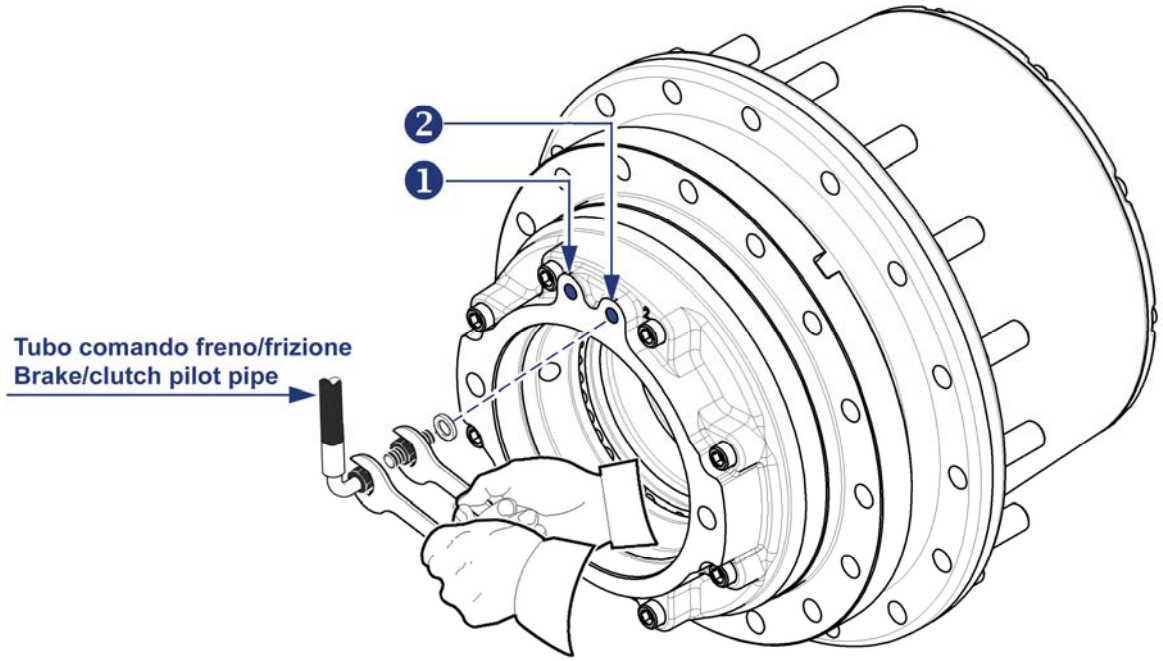
In the "**710C2/3**" size the gearbox has a negative multidiscs brake/clutches for low/high speed hydraulically driven (speed shift). The selected driving speed is transmitted from the hydraulic motor to the gearbox in accordance with the pressurized hydraulic clutch.

For information regarding the characteristics of the brake/clutch, port types and dimensions, refer to the installation drawing.

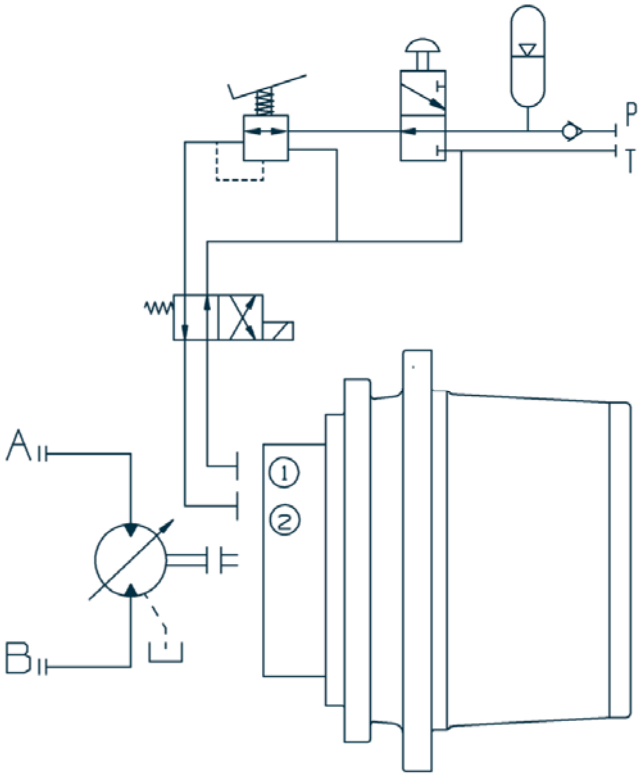
Information **The max wheel speed with disengaged gearbox (pressurized hydraulic clutch) must not overcome the rpm shown in section "Mechanical disengagement" for max continuative period of 1 hr.**

Pericolo - Attenzione **The disengagement must be connected or disconnected only when the gearbox is stopped on flat ground.**

1. To operate the brake/clutch, connect the pilot pipes to the followings ports:
   a. Low speed clutch port: **"1"**
   b. High speed clutch port: **"2"**



Belove is shown the standard sketch hydraulic disengagement and speed shift of the gearbox.



Presurized port	Pressure (bar)	Function
1-2	**0**	Parking brake engaged (gearbox locked)
		Brake technical data Braking torque at gearbox output (see installation drawing)
1 2	**Min / Max** **0**	**Low speed** (ratio and Min/Max pressure data are shown on the installation drawing)
1 2	**0** **Min / Max**	**High speed** (ratio and Min/Max pressure data are shown on the installation drawing).
1 2	**Min / Max** **Min / Max**	At this condition the hydraulic motor and brake are disconnected to the gearbox: the wheel is idle (Min/Max pressure data are shown on the installation drawing).

Operation:

1. Engaged gearbox:

At this condition the motion is trasmitted from the hydraulic motor to the gearbox.

2. Disengaged gearbox:

The clutches are pressurized at the same time, the hydraulic motor will be disengaged from the gearbox: free wheel.

Danger - Warning **In this last gearbox status, the machine can freely move. It is responsibility of the machine manufacturer to adopt one supplementary braking system in order to avoid loosing the machine control.**

Information **Following disengagement, always engage the gearbox when the machine is used normally.**

8.0 VARIANTS

If requested the gearboxes can be supplied with variants previously specified when ordering after agreement with the customer.

1. **Lubrication:** The gearboxes can be supplied with different types of lubricant oil at level.
2. **Painting:** External surfaces of the unit can be painted with different finish paint coats.
3. **Identification labels:** Identify visually different product configurations.

Variants are described on the product installation drawing attached.

9.0 MAINTENANCE

Under normal operating circumstances, no routine maintenance is required, except routine oil checks and oil changes. As recommended in this manual, unusual operating characteristics, such as noise or overheat, should indicate further investigation. Always follow instructions set out in paragraph **"Information on safety"**

For a proper maintenance of the gearbox, the following checks and operations have to be done.

Inspection	Frequency	Action
Tightening screws	After the first **50** operating hours of the gearbox	Screws tightening torque check
Oil level	Every **150** operating hours of the gearbox	Refill oil if necessary
1st oil change	At **150** operating hours of the gearbox	Oil replacement
Oil plugs with washers or seals	Every oil change	Oil plugs with washers or seals replacement

Next oil change (mineral oil)

Standard conditions	Every **1000** operating hours or **12** months	Oil replacement
Heavy duty conditions	Every **500** operating hours or **12** months	Oil replacement

Next oil change (sinthetyc oil)

Standard conditions	Every **2000** operating hours or **24** months	Oil replacement
Heavy duty conditions	Every **1000** operating hours or **24** months	Oil replacement

The values listed on the table above refer to general working conditions values of the gearbox. In case of maintenance with different schedules, they are subject to technical choices made during the product definition.

Information **In case of important and complex maintenance operations, make reference to the Spare Part Lists Exploded View which can be supplied under request and the instructions contained in this technical manual.**

If you need further instructions or if you encounter any particular problems, please feel free to contact the gearbox distributor or our technical service: website **"www.bonfiglioli.com".**

9.1 Trouble shootings

The following table is realized to localize troubles in track drive gearboxes

Anomalies	Causes	Remedies
External oil leakage:		
From the lifetime seal	Lifetime damaged	Replace lifetime seal
From the end cover	O-ring seal damaged	Replace O-ring seals
From the oil plugs	Plug seal damaged	Replace plug seal
	Plugs or screws loose	Tighten the plugs/screws
	Oil exceeding max. level	Check the oil level
	Breather plug clogged	Clean or replace the plug
From the hydraulic motor	O-Ring seals damaged	Replace O-Ring seals
	Plugs or screws loose	Tighten the plugs/screws
	Internal motor parts damaged	Check hydraulic motor
Too much noise:		
Inside the hydraulic motor (Mechanical noise)	Internal motor damaged	Contact Bonfiglioli Service Dpt.
Hydraulic noise (during the slowing down of the motor speed)	Hydraulic circuit malfunctioning	Verify hydraulic circuit
Inside the gearbox (reductions)	Internal damage	Contact Bonfiglioli Service Dpt.
Other:		
Overheating	Insufficient oil level	Check the oil level and refill if necessary
	Hydraulic oil too warm	Check the hydraulic circuit
	Brake not fully released	Check brake release pressure
Insufficient power	Internal motor parts damaged	Contact Bonfiglioli Service Dpt.
Insufficient braking torque	Parking brake malfunctioning	
	-Brake discs worm	Replace brake discs pack
	-Damaged parts	Check brake components
Sprocket locked	Hydraulic motor locked	Contact Bonfiglioli Service Dpt.
	Parking brake locked	Check the complete brake release
	Mechanical components damaged	Contact Bonfiglioli Service Dpt.

9.2 Dismantling and destroying the product

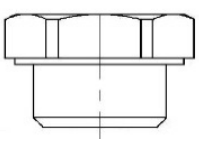
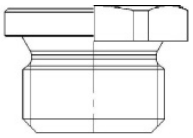
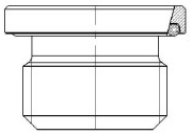
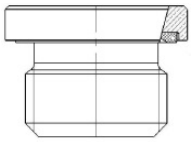
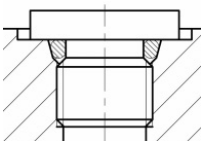
When dismantling the track drive follow the indications given below.

1. Remove the track drive from the machine frame and let the lubricant oil flow.
2. Completely dismount the track drive and remove all oil and grease from its parts.
3. Send all dangerous and/or polluted parts to the authorised demolishing centres whilst keeping in line with respective local rules and regulations.

9.3 Screw tightening torque values

	8.8		10.9		12.9	
Thread	(Nm)	(ft*lbs)	(Nm)	(ft*lbs)	(Nm)	(ft*lbs)
M8	**25**	18,4	**35**	25,8	**42**	31
M10	**50**	36,9	**70**	51,6	**85**	62,7
M12	**86**	63,4	**120**	88,5	**145**	106,9
M14	**140**	103,2	**195**	143,8	**235**	173,3
M16	**215**	158,6	**300**	221,2	**350**	258,1
M18	**295**	217,6	**415**	306	**495**	365
M20	**415**	306	**585**	431,4	**705**	519,9
M22	**565**	416,7	**800**	590	**960**	708
M24	**720**	531	**1000**	737,5	**1220**	899,7
M27	**1050**	774,3	**1500**	1106,2	**1800**	1327,4
M30	**1440**	1061,9	**2020**	1489,7	**2430**	1792

9.4 Oil plugs tightening torque values

A	B	C	D	E
Al - Brass	Fe	Fe (DIN 908)	Fe (DIN 908)	Fe (JIS B2351 - SAE J475)
				
Washer KLINGER	Washer Aluminium/Copper	Rubber seal type OR	Rubber seal type TR	Oring Boss type
				

Thread	A	B	C	D	E
	(Nm ± 5%)				
1/8"	8÷10	12÷18	12÷18	12÷18	15,3
1/4”	8÷10	12÷18	12÷18	12÷18	36,8
3/8"	8÷10	20÷30	20÷30	20÷30	53,9
1/2"	8÷10	20÷30	20÷30	20÷30	118
3/4"	10÷15	30÷40	30÷40	30÷40	157
1"	10÷15	30÷40	30÷40	30÷40	
5/16” -24UNF	8÷10	20÷30			5
9/16” -18UNF	8÷10	20÷30			36,8
7/8”-14UNF	8÷10	20÷30			118
M8	8÷10	8÷12	8÷12	8÷12	
M10x1	8÷10	8÷12	8÷12	8÷12	
M12x1,5	8÷10	8÷12	8÷12	8÷12	
M14x1,5	8÷10	8÷12	8÷12	8÷12	
M18x1,5	8÷10	20÷30	20÷30	20÷30	
M20x1,5	8÷10	20÷30	20÷30	20÷30	
M22x1,5	8÷10	30÷40	30÷40	30÷40	
M24x1,5	8÷10	30÷40	30÷40	30÷40	
M26x1,5		60÷80			
M30x2	10÷15	60÷80	60÷80	60÷80	
M30x1,5	10÷15	60÷80	60÷80	60÷80	
M42x3	10÷15	60÷80	60÷80	60÷80	

REVISION INDEX

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Bonfiglioli Worldwide Locations

Australia
www.bonfiglioli.com.au
2, Cox Place Glendenning NSW 2761
Locked Bag 1000 Plumpton NSW 2761
Tel. + 61 2 8811 8000

Brazil
www.bonfigliolidobrasil.com.br
Travessa Cláudio Armando 171
Bloco 3 - CEP 09861-730 - Bairro Assunção
São Bernardo do Campo - São Paulo
Tel. +55 11 4344 2322

China
www.bonfiglioli.cn
Bonfiglioli Drives (Shanghai) Co., Ltd.
#68, Hui-Lian Road, QingPu District,
201707 Shanghai
Tel. +86 21 6700 2000

France
www.bonfiglioli.fr
14 Rue Eugène Pottier
Zone Industrielle de Moimont II - 95670 Marly la Ville
Tel. +33 1 34474510

Germany
www.bonfiglioli.de
Sperberweg 12 - 41468 Neuss
Tel. +49 0 2131 2988 0
Industrial
Europark Fichtenhain B6 - 47807 Krefeld
Tel. +49 0 2151 8396 0

O&K Antriebstechnik
Ruhrallee 8-12 - 45525 Hattingen
Tel. +49 0 2324 2050 1

India
www.bonfiglioli.in
Mobile, Wind
Bonfiglioli Transmissions Pvt. Ltd.
Plot No. AC7-AC11, SIDCO Industrial Estate,
Thirumudivakkam - 600 044 Chennai
Tel. +91 44 2478 1035
Industrial
Survey No. 528, Porambakkam High Road,
Mannur Village, Sriperambudur Taluk - 602 105
Chennai
Tel. +91 44 6710 3800
Plot No. A-95, Phase IV, MIDC Chakan, Village
Nighoje
Pune, Maharashtra - 410 501

Italy
www.bonfiglioli.it
Headquarters
Bonfiglioli Riduttori S.p.A.
Via Giovanni XXIII, 7/A
Lippo di Calderara di Reno - 40012 Bologna
Tel. +39 051 647 3111
Mobile, Wind
Via Enrico Mattei, 12 Z.I. Villa Selva - 47100 Forlì
Tel. +39 0543 789111
Industrial
Via Bazzane, 33/A - 40012 Calderara di Reno
Tel. +39 051 6473111
Via Trinità, 1 - 41058 Vignola
Tel. +39 059 768511
Via Sandro Pertini lotto 7b - 20080 Carpiano
Tel. +39 02 985081

Bonfiglioli Mechatronic Research
Via F. Zeni 8 - 38068 Rovereto
Tel. +39 0464 443435/36

New Zealand
www.bonfiglioli.co.nz
88 Hastie Avenue, Mangere Bridge, 2022 Auckland
PO Box 11795, Ellerslie
Tel. +64 09 634 6441

Singapore
www.bonfiglioli.com
24 Pioneer Crescent #02-08
West Park Bizcentral - Singapore, 628557
Tel. +65 6268 9869

Slovakia
www.bonfiglioli.com
Robotnícka 2129
Považská Bystrica, 01701 Slovakia
Tel. +421 42 430 75 64

South Africa
www.bonfiglioli.co.za
55 Galaxy Avenue, Linbro Business Park - Sandton
Tel. +27 11 608 2030

Spain
www.tecnotrans.bonfiglioli.com
Tecnotrans Bonfiglioli S.A.
Pol. Ind. Zona Franca, Sector C, Calle F, nº 6
08040 Barcelona
Tel. +34 93 447 84 00

Turkey
www.bonfiglioli.com.tr
Atatürk Organize Sanayi Bölgesi, 10007 Sk. No. 30
Atatürk Organize Sanayi Bölgesi, 35620 Çigli - Izmir
Tel. +90 0 232 328 22 77

United Kingdom
www.bonfiglioli.co.uk
Industrial
Unit 7, Colemeadow Road
North Moons Moat - Redditch, Worcestershire B98
9PB
Tel. +44 1527 65022
Mobile, Wind
3 - 7 Grosvenor Grange, Woolston
Warrington - Cheshire WA1 4SF
Tel. +44 1925 852667

USA
www.bonfiglioliusa.com
3541 Hargrave Drive
Hebron, Kentucky 41048
Tel. +1 859 334 3333

Vietnam
www.bonfiglioli.vn
Lot C-9D-CN My Phuoc Industrial Park 3
Ben Cat - Binh Duong Province
Tel. +84 650 3577411

Headquarters
Bonfiglioli Riduttori
Via Giovanni XXIII, 7/A
40012 Lippo di Calderara di Reno - Bologna (Italy)
Tel. (+39) 051 6473111 - Fax (+39) 051 6473126
www.bonfiglioli.com - bonfiglioli@bonfiglioli.com

Mobility & Wind Industries Business Unit
Bonfiglioli Riduttori
Via Enrico Mattei,12 - Z.I.
Villa Selva - 47100 Forlì (Italy)
Tel. (+39) 0543 789111
Fax (+39) 0543 789242 - 0543 789245
trasmital@bonfiglioli.com

Spare Parts Bonfiglioli
B.R.T.
Via Castagnini, 2-4 - Z.I. Bargellino
40012 Calderara di Reno - Bologna (Italy)
Tel. (+39) 051 6460611- Fax (+39) 051 6460600
www.brtbonfiglioliricambi.it - brt@bonfiglioli.com