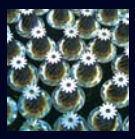






VARVEL®

MOTION CONTROL SINCE 1955

technology made in Italy

Working and Maintenance Instructions

ATEX Manual

GB

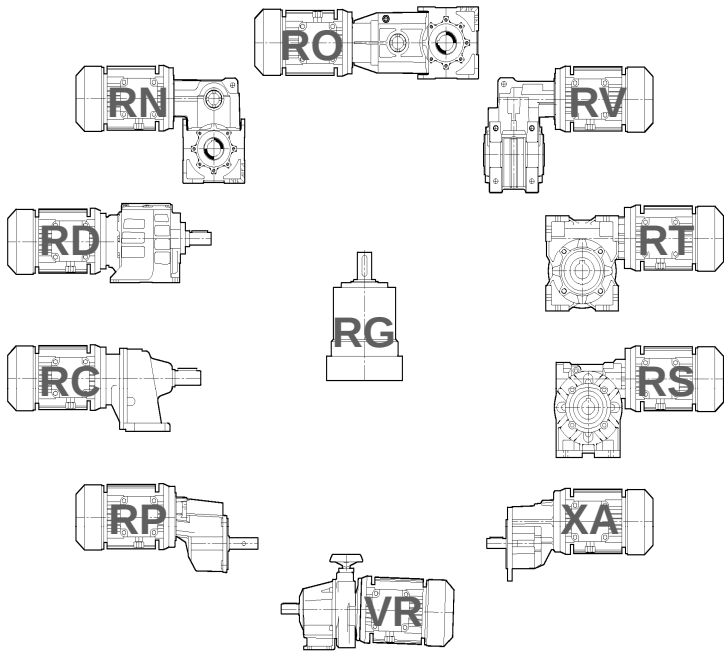
* VS made in China

Technology Made in Italy

Since 1955 Varvel has been making speed reducers and variators for light industry applications. Reliable partner in power transmission equipment offers also customized solutions always according to a socially responsible company values. Modularity and flexibility lead Varvel products by a unique kit form, common to all gearbox series. This feature allows distributors an easier job to set up required products in few minutes.

WORKING INSTRUCTIONS & MAINTENANCE

ATEX MANUAL



VARVEL
MOTION CONTROL SINCE 1955

Working Instructions & Maintenance

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GENERAL INFORMATION

Varvel speed reducers and variators are not in the field of application of the Machinery Directive 2006/42/CE as considered "**machinery components**".

Guide of Machinery Directive - § 35 - decrees:

"The Machinery Directive does not apply directly to machinery components, such as, for example, valves, hydraulic cylinders or **gearboxes**, that do not have a specific application as such but are intended to be incorporated into machinery, although the design and construction of such components must enable the complete machinery to comply with the relevant essential health and safety requirements."

Regular operation and the right to guarantee servicing request the observance of information contained in this manual that must be read before the gearbox is put into service.

SAFETY WARNINGS

2.1 Product Operation

During operation, outer surfaces of gearboxes and variators may warm up because of in motion parts and also by external environmental conditions.

Everything referred to transport, stocking, assembling, setting up, starting and maintenance must be performed by trained personnel and that follows this manual within specific national / regional regulations about safety and prevention of accidents.

2.2 Prevalent Use

Gearboxes and variators referred to in this manual are destined to operate industrial applications and they correspond to standards and regulations where applicable.

Performances and technical data are available in the unit's nameplate and from the related documentation.

2.3 Transport

Carefully check the state of the goods at their receipt and immediately notify the possible damages to the carrier.

2.4 Long-Term Storage

Stocked units must be kept in dry warehouse and dust free.

For storage longer than 3 months, apply anti-oxidants on the shafts and machined surfaces paying special attention to oil seal lips.

Storages longer than one year reduce bearing grease lifetime .

2.5 Environmental Management

In conformity with Environmental Certification ISO14001, we recommend the following to dispose of

- scrapped gearbox components: to deliver to authorised centres for metal object collection:
- drained oils and lubricants: to deliver to Exhausted Oil Centres;
- product accompanying packages (pallets, carton boxes, paper, plastic, etc.): to deliver into regeneration / recycling circuits as far as possible, by delivering separate waste classes to authorised companies.

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PRODUCT LAYOUT

The following layouts supply a generic help in finding out the most significant parts of the products.

Various design executions, assembling versions, number of stages actually origin a variety of solutions and therefore, we recommend to refer to the appropriate catalogue and/or Engineering Department.

Working Instructions & Maintenance

Product Layout

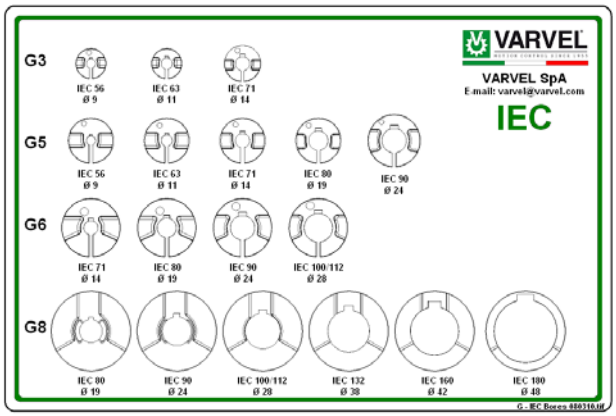
Elastic Coupling “G”

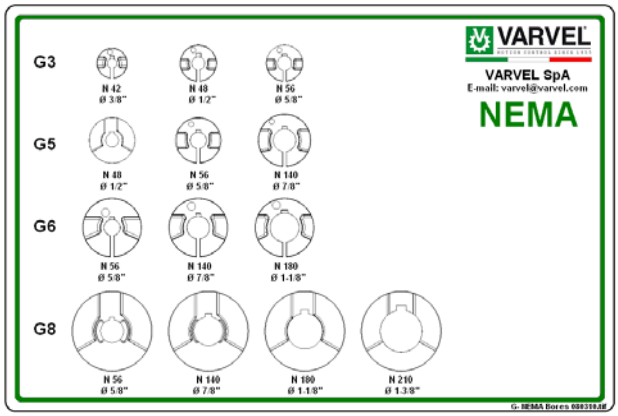
The elastic coupling “G” is supplied as standard fitting on the Series RD, RN, RO, RV, RP, RS, RT.

Reducer half-coupling
- Material: steel alloy
- One piece built-in input shaft
- Two bearing mounting
- Unchanged casing dimensions

Spider
- External tooth connection
- Material: Thermoplastic Elastomer
  - Elastollan ® TPU - Polyurethane
  - Hytrel ® TPE - Polyester
- Hardness
  - TPU 98 Shore A
  - TPE 72 Shore D
- Temperature
  - TPU -20/+75°C (-4 / +167°F)
  - TPE -30/+100°C (-22 / +212°F)

Motor half-coupling
- Material:
  - Aluminium die cast (G3, G5, G6)
  - Alloy steel (GS8)
- Dynamic balancing
- Fitting:
  - Clamp (G3, G5, G6)
  - Key (GS8)
- Bores:
  - IEC 72 / N42948
  - NEMA C y TC



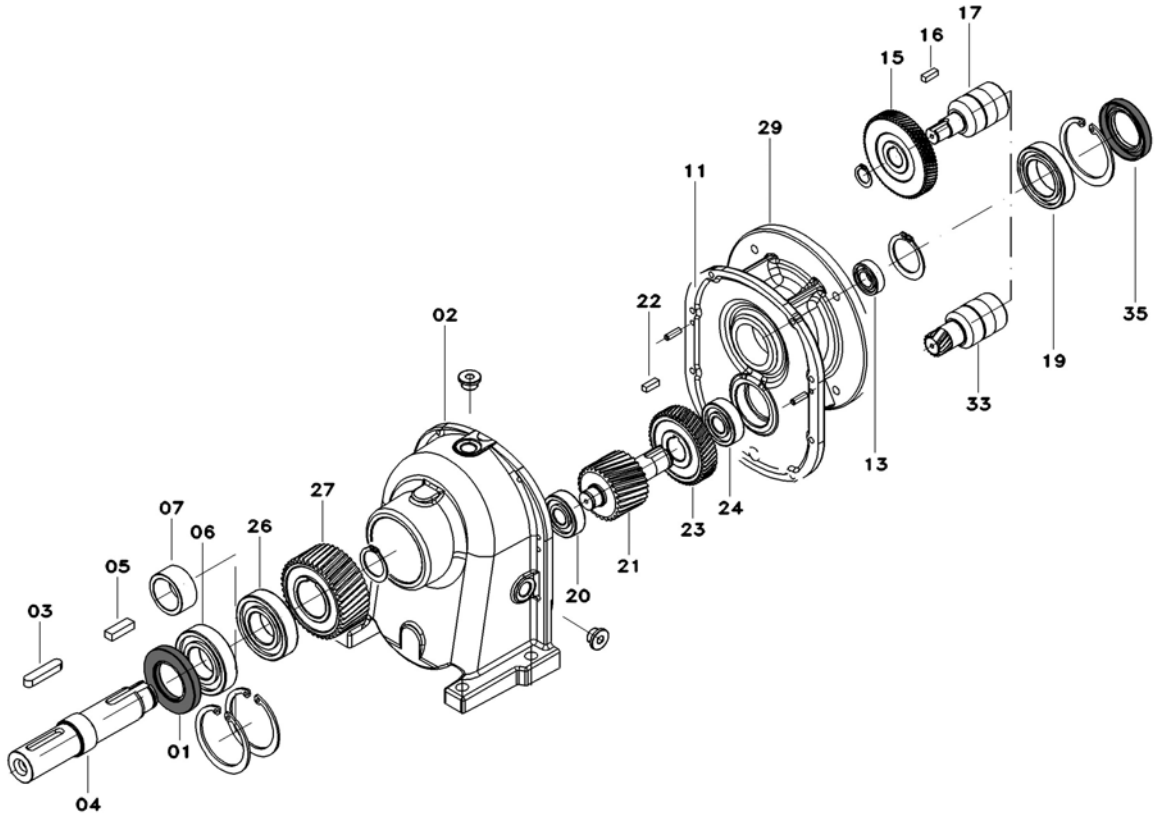


Advantages:
- One gearbox only for each reduction ratio
- Greater flexibility
- Increased stock rotation
- Fretting corrosion elimination between key and keyway
- Zero backlash in gearbox/motor connection
- Allowed angular misalignment 1° max
- Torsional rigidity
- High vibration damping

Input flanges:
- Material:
  - Aluminium up to IEC112 and NEMA TC180
  - Cast iron from IEC 132 and NEMA TC200

Series RC - 2 stages

The layout shows the general structure of a two-stage foot-mounted helical gearbox type FRC (sizes 05 to 30).



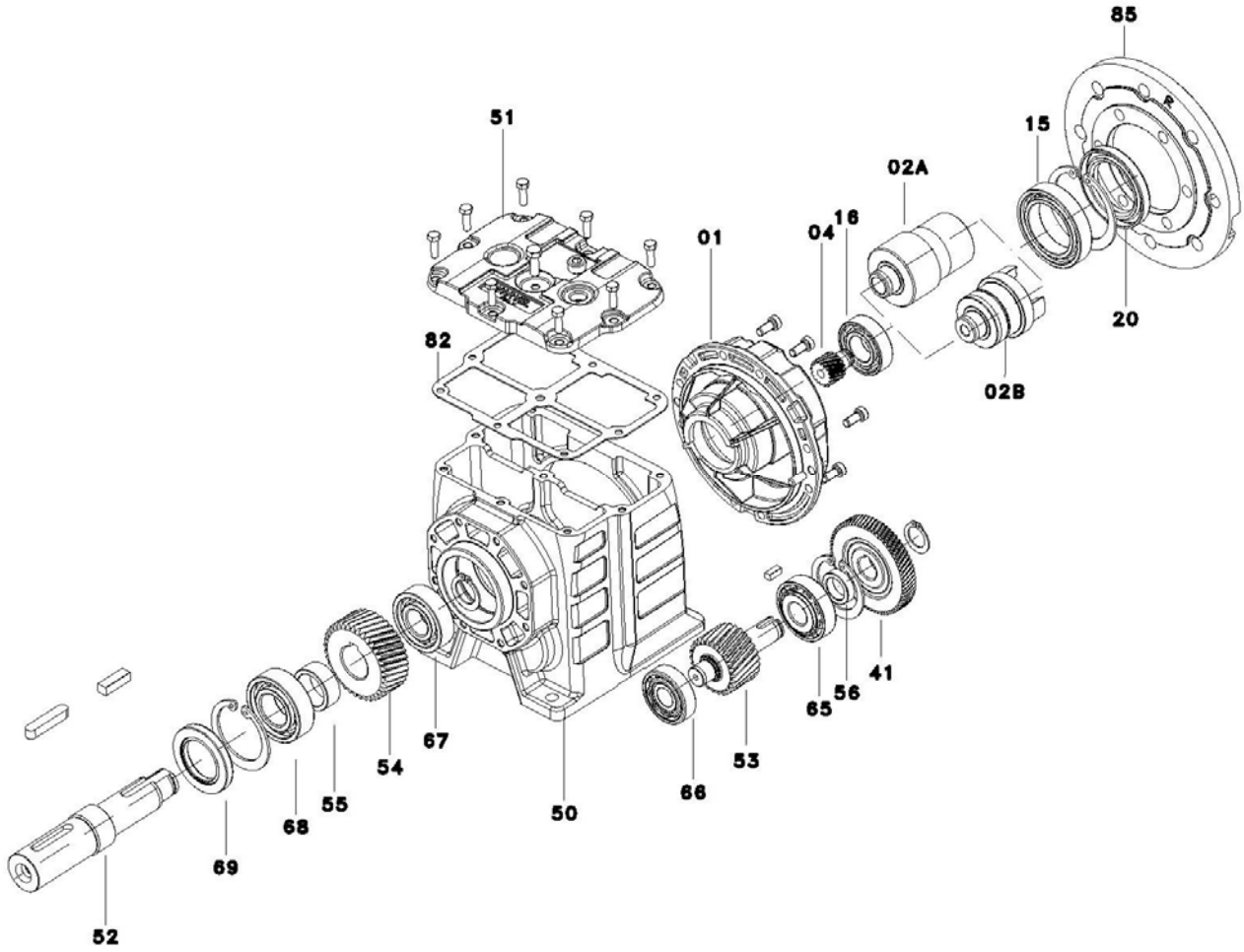
01	Oil seal	19	Bearing		
02	Housing	20	Bearing		
03	Key	21	Pinion		
04	Output shaft	22	Key		
05	Key	23	Gear		
06	Bearing	24	Bearing		
07	Spacer	26	Bearing		
11	Gasket	27	Gear		
13	Bearing	29	IEC input cover		
15	Pinion	33	Hollow input		
16	Key	35	Oil seal		
17	Hollow input				

Working Instructions & Maintenance RD

Product Layout

Series RD - 2 stages

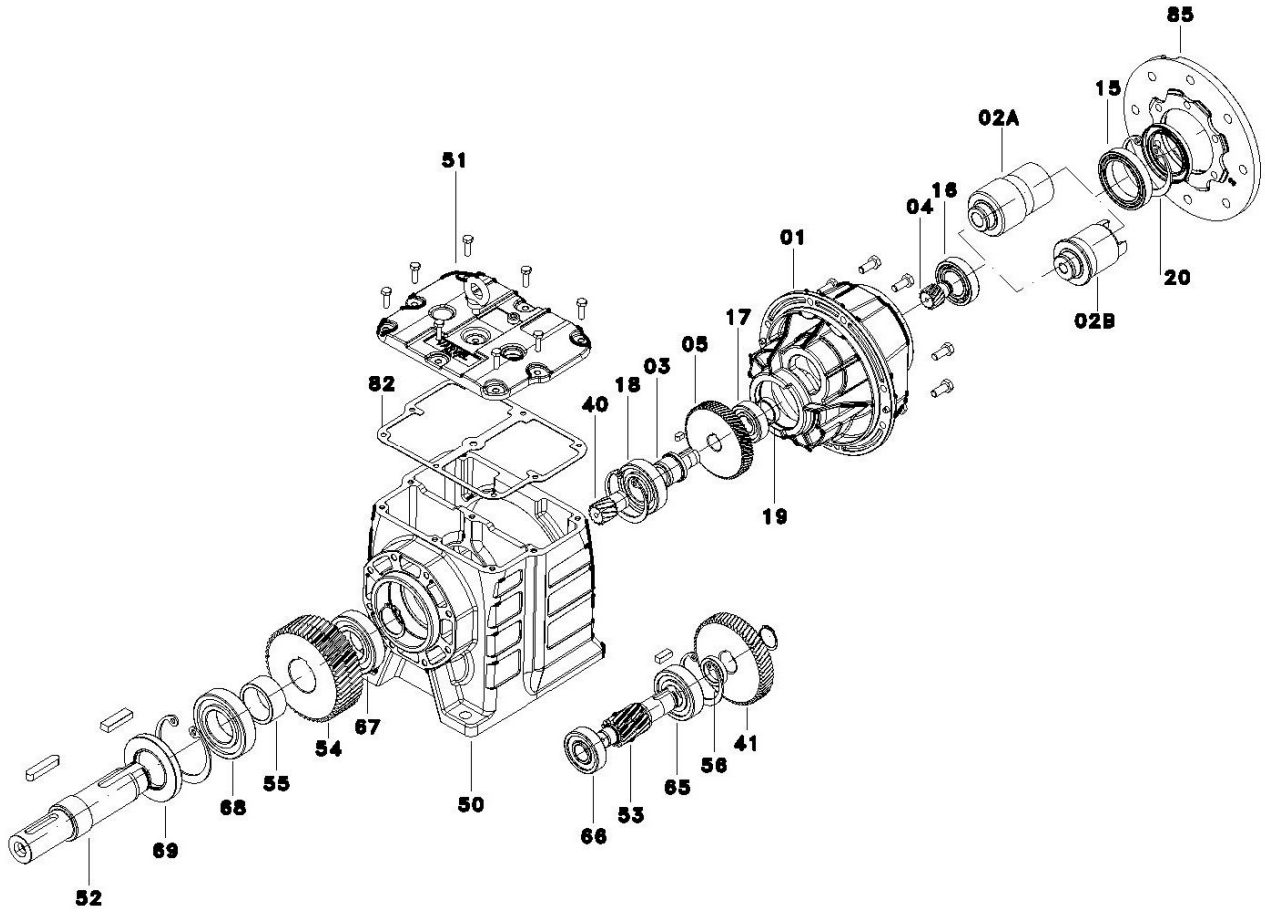
The layout shows the general structure of a two-stage foot-mounted helical gearbox type FRD.



01	Input cover	54	Gear		
02A	Hollow input IEC	55	Spacer		
02B	Hollow input “G”	65	Bearing		
04	Pinion	66	Bearing		
15	Bearing	67	Bearing		
16	Bearing	68	Bearing		
20	Oil seal	69	Oil seal		
41	Gear	82	Gasket		
50	Housing	85	Motor Flange		
51	Upper cover				
52	Output shaft				
53	Pinion				

Series RD - 3 stages

The layout shows the general structure of a three-stage foot-mounted helical gearbox type FRD.



01	Input cover	40	Pinion	68	Bearing
02A	Hollow input IEC	41	Gear	69	Oil seal
02B	Hollow input “G”	50	Housing	82	Gasket
03	3rd stage shaft	51	Upper cover	85	Motor flange
04	Pinion	52	Output shaft		
05	Gear	53	Pinion		
15	Bearing	54	Gear		
16	Bearing	55	Spacer		
17	Bearing	56	Spacer		
18	Bearing	65	Bearing		
19	Spacer	66	Bearing		
20	Oil seal	67	Bearing		

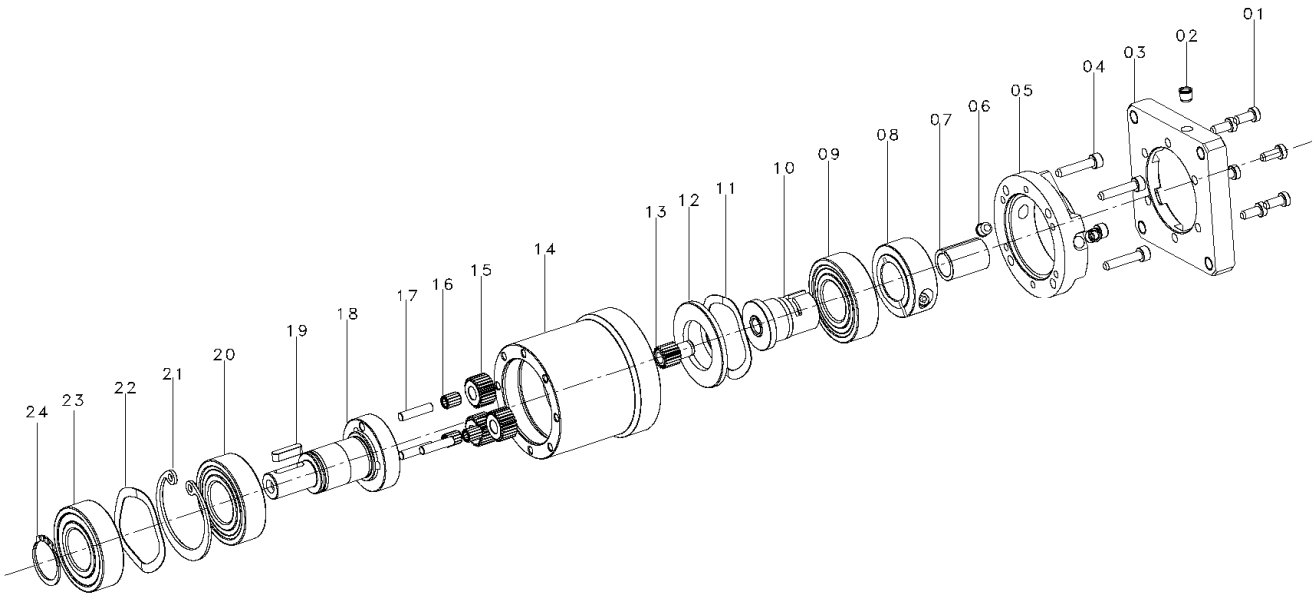
Working Instructions & Maintenance

RG

Product Layout

Series RG - 1 stage

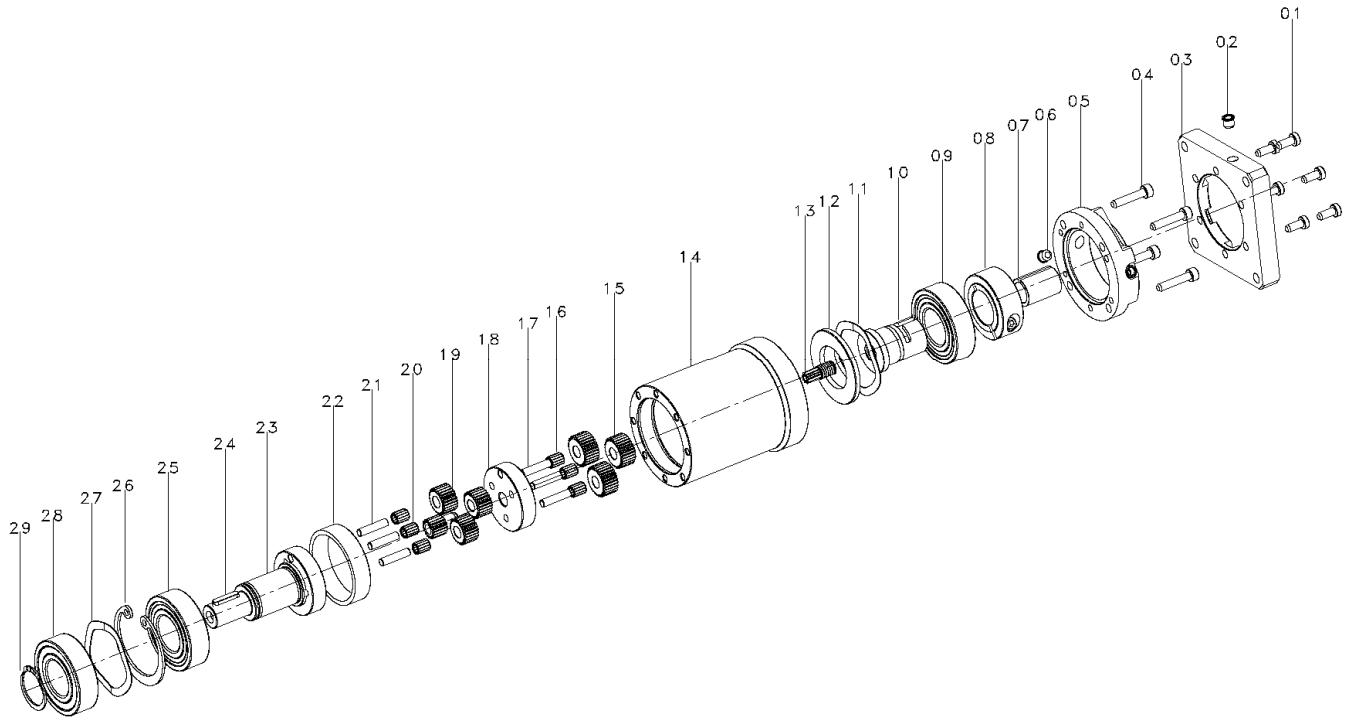
The layout shows the general structure of a one-stage reduced backlash planetary gearbox type FRG.



01	Screw	13	Sun gear		
02	Plug	14	Ring gear body		
03	Motor flange	15	Planet gear		
04	Screw	16	Needle bearing		
05	Input flange	17	Planet shaft		
06	Plug	18	Planet carrier		
07	Adapter	19	Key		
08	Clamp coupling	20	Bearing		
09	Bearing	21	Snap ring		
10	Input shaft	22	Shim		
11	Shim	23	Bearing		
12	Spacer	24	Snap ring		

Series RG - 2 stages

The layout shows the general structure of a two-stage reduced backlash planetary gearbox type FRG.



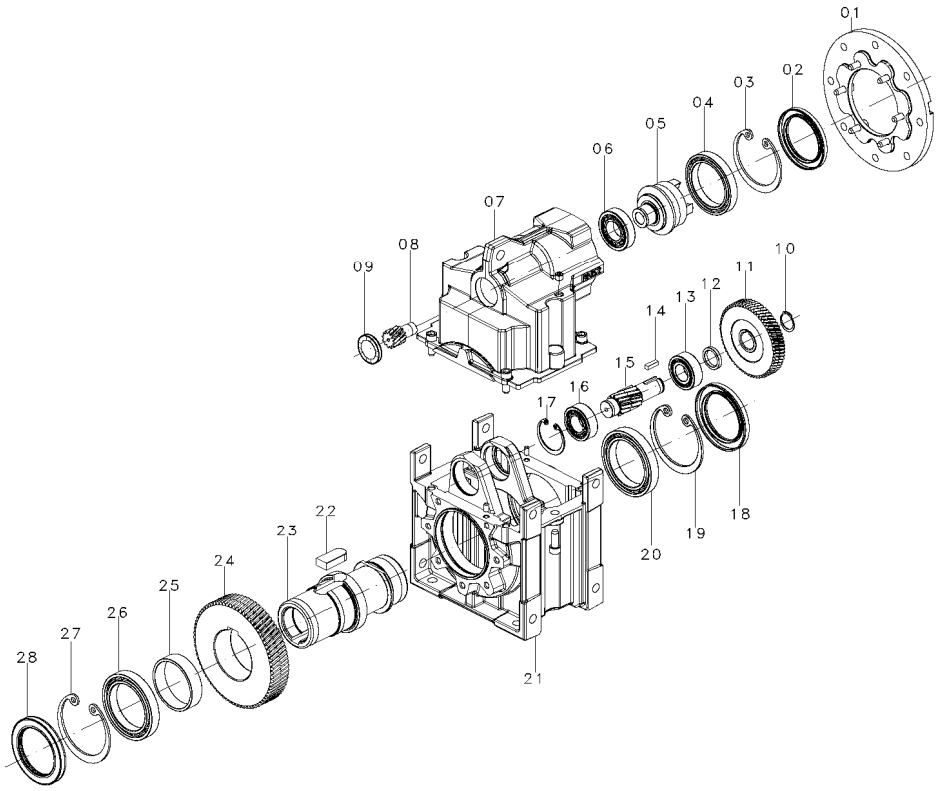
01	Screw	13	Sun gear	25	Bearing
02	Plug	14	Ring gear body	26	Snap ring
03	Motor flange	15	Planet gear	27	Shim
04	Screw	16	Needle bearing	28	Bearing
05	Input flange	17	Planet shaft	29	Snap ring
06	Plug	18	Planet carrier		
07	Adapter	19	Planet gear		
08	Clamp coupling	20	Needle bearing		
09	Bearing	21	Planet shaft		
10	Input shaft	22	Spacer		
11	Shim	23	Planet carrier		
12	Spacer	24	Key		

Working Instructions & Maintenance RN

Product Layout

Series RN - 2 stages

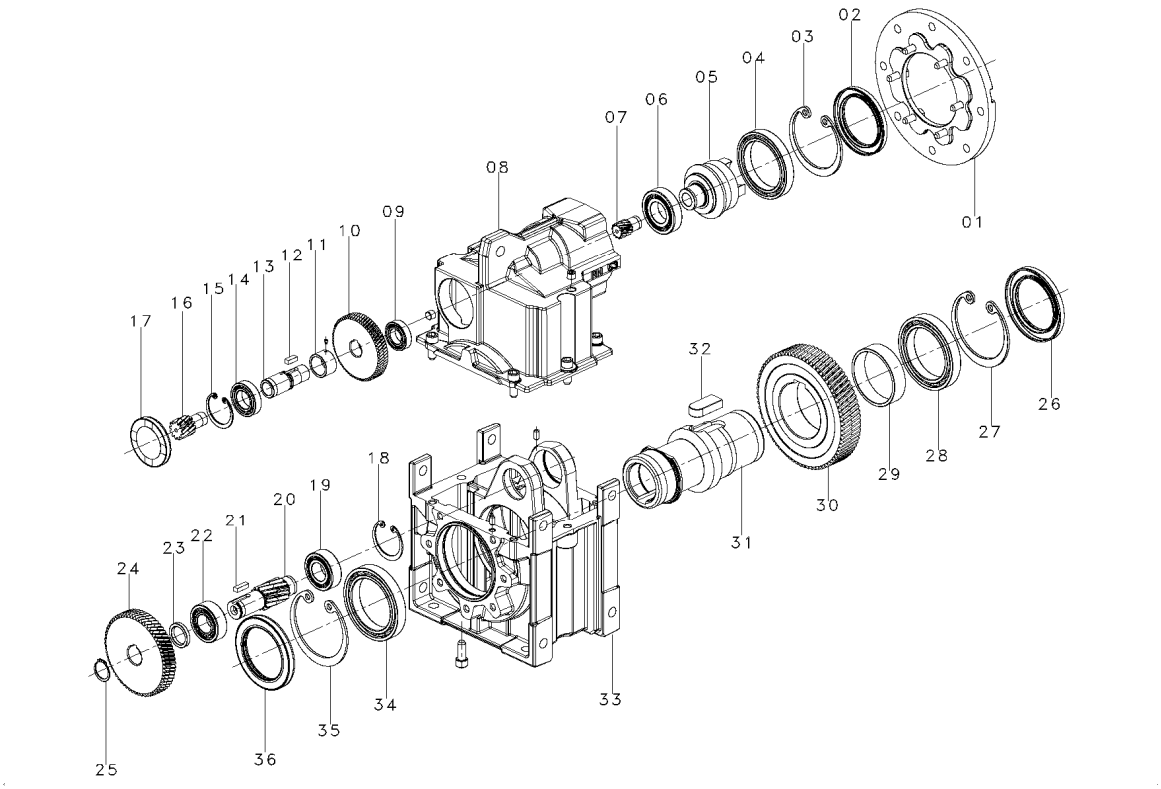
The layout shows the general structure of a two-stage parallel shaft gearbox type FRN with through hollow output shaft.



01	Input flange	13	Bearing	25	Spacer
02	Oil seal	14	Key	26	Bearing
03	Snap ring	15	Pinion	27	Snap ring
04	Bearing	16	Bearing	28	Oil seal
05	Input shaft	17	Snap ring		
06	Bearing	18	Oil seal		
07	Cover	19	Snap ring		
08	Pinion	20	Bearing		
09	Oil seal RCA	21	Body		
10	Snap ring	22	Key		
11	Gear	23	Output shaft		
12	Spacer	24	Gear		

Series RN - 3 stages

The layout shows the general structure of a three-stage parallel shaft gearbox type FRN with through hollow output shaft.



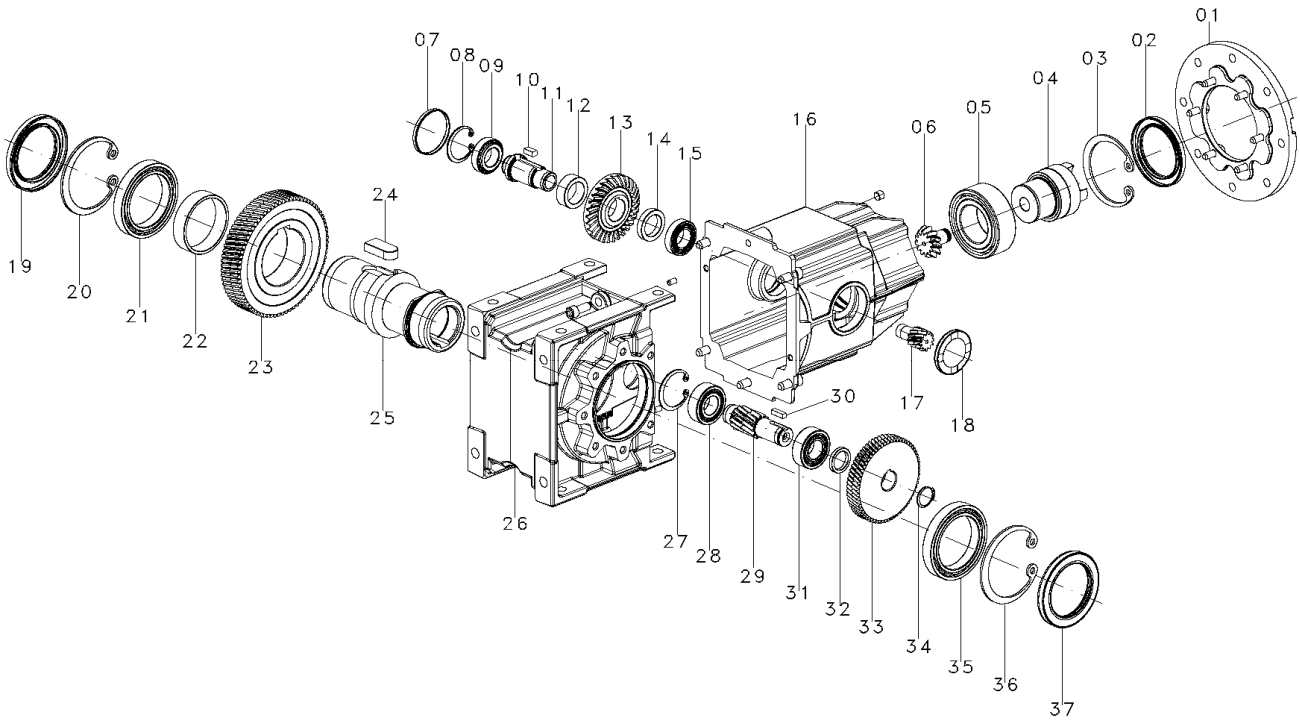
01	Motor flange	13	Shaft	25	Snap ring
02	Oil seal	14	Bearing	26	Oil seal
03	Snap ring	15	Snap ring	27	Snap ring
04	Bearing	16	Pinion	28	Bearing
05	Input shaft	17	Oil seal RCA	29	Spacer
06	Bearing	18	Snap ring	30	Gear
07	Pinion	19	Bearing	31	Output shaft
08	Cover	20	Pinion	32	Key
09	Bearing	21	Key	33	Body
10	Gear	22	Bearing	34	Bearing
11	Spacer	23	Spacer	35	Snap ring
12	Key	24	Gear	36	Oil seal

Working Instructions & Maintenance RO

Product Layout

Series RO

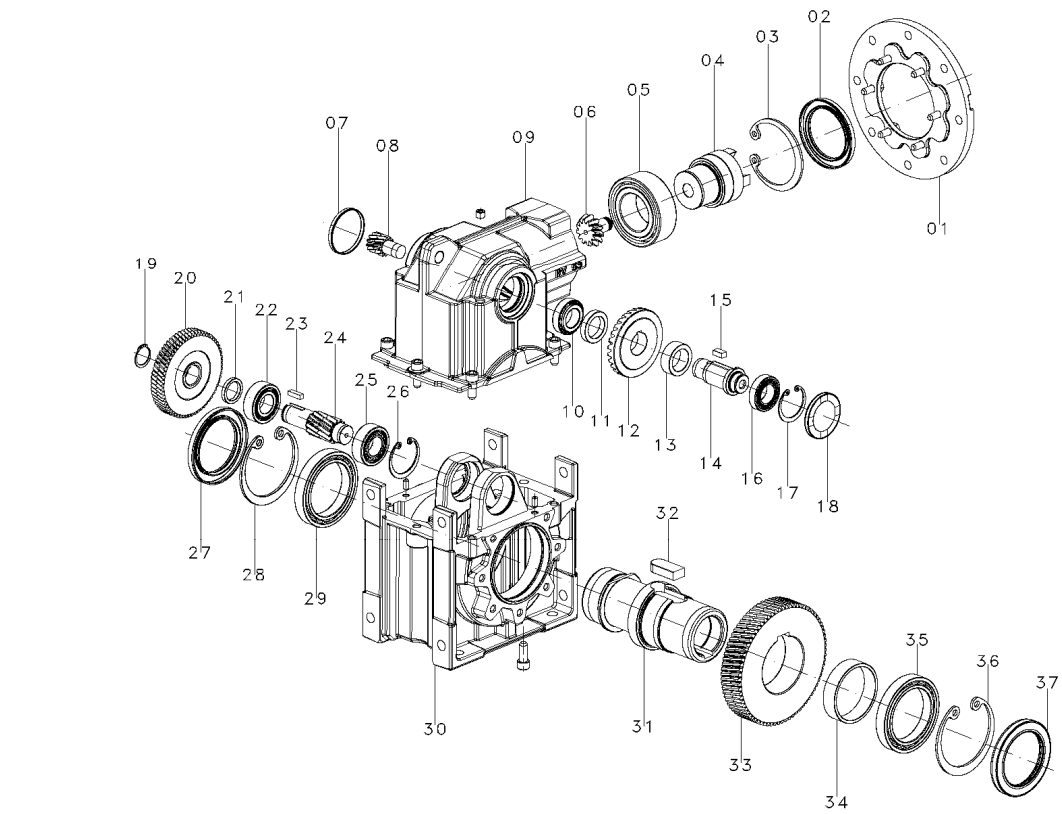
The layout shows the general structure of a three-stage bevel/helical gearbox type FRO with through hollow output shaft.



01	Motor flange	13	Gear	25	Output shaft
02	Oil seal	14	Spacer	26	Body
03	Snap ring	15	Bearing	27	Snap ring
04	Input shaft	16	Cover	28	Bearing
05	Bearing	17	Pinion	29	Pinion
06	Pinion	18	Oil seal RCA	31	Bearing
07	Oil seal RCA	19	Oil seal	32	Spacer
08	Snap ring	20	Snap ring	33	Gear
09	Bearing	21	Bearing	34	Snap ring
10	Key	22	Spacer	35	Bearing
11	Shaft	23	Gear	36	Snap ring
12	Spacer	24	Key	37	Oil seal

Series RV

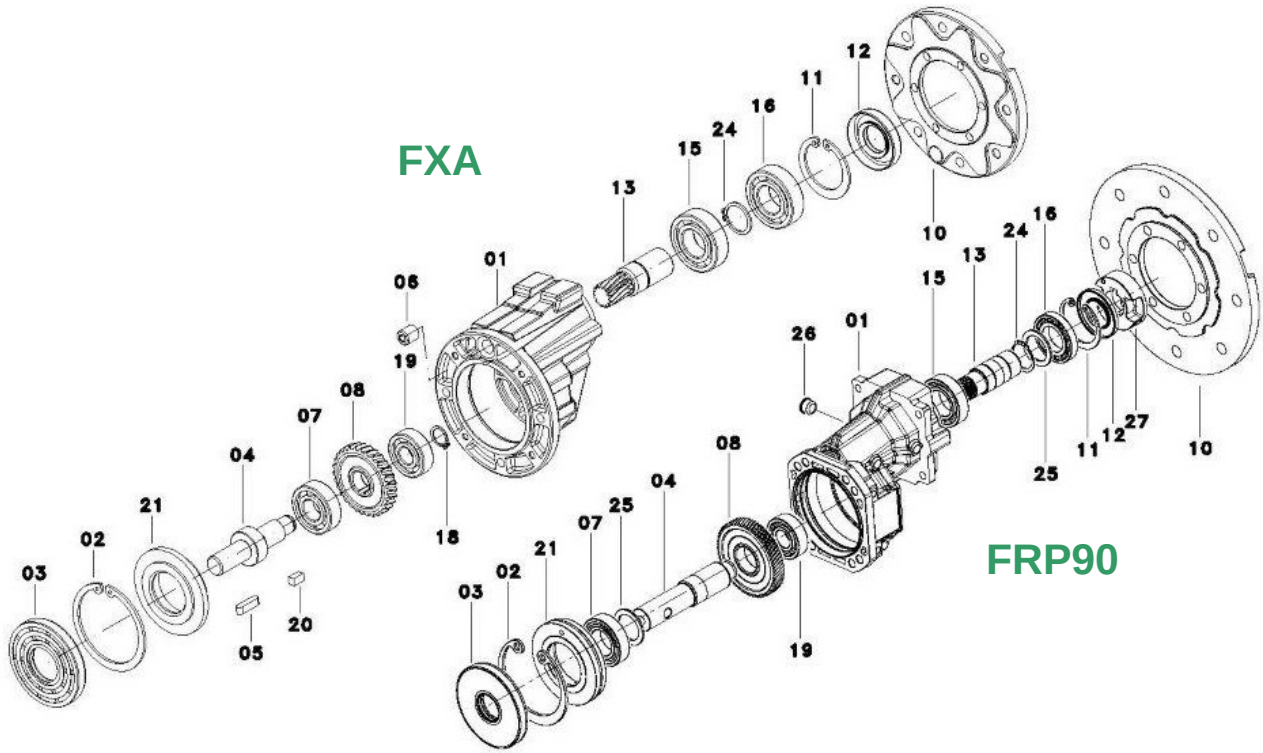
The layout shows the general structure of a three-stage bevel/helical gearbox type FRV with through hollow output shaft.



01	Motor flange	13	Bearing	25	Bearing
02	Oil seal	14	Shaft	26	Snap ring
03	Snap ring	15	Key	27	Oil seal
04	Input shaft	16	Bearing	28	Snap ring
05	Bearing	17	Snap ring	29	Bearing
06	Pinion	18	Oil seal RCA	30	Body
07	Oil seal RCA	19	Snap ring	31	Output shaft
08	Pinion	20	Gear	33	Gear
09	Cover	21	Spacer	34	Spacer
10	Bearing	22	Bearing	35	Bearing
11	Spacer	23	Key	36	Snap ring
12	Gear	24	Pinion	37	Oil seal

Series RP and XA

The layout shows the general structure of a one-stage helical gearbox type FRP and FXA, flange mounting.

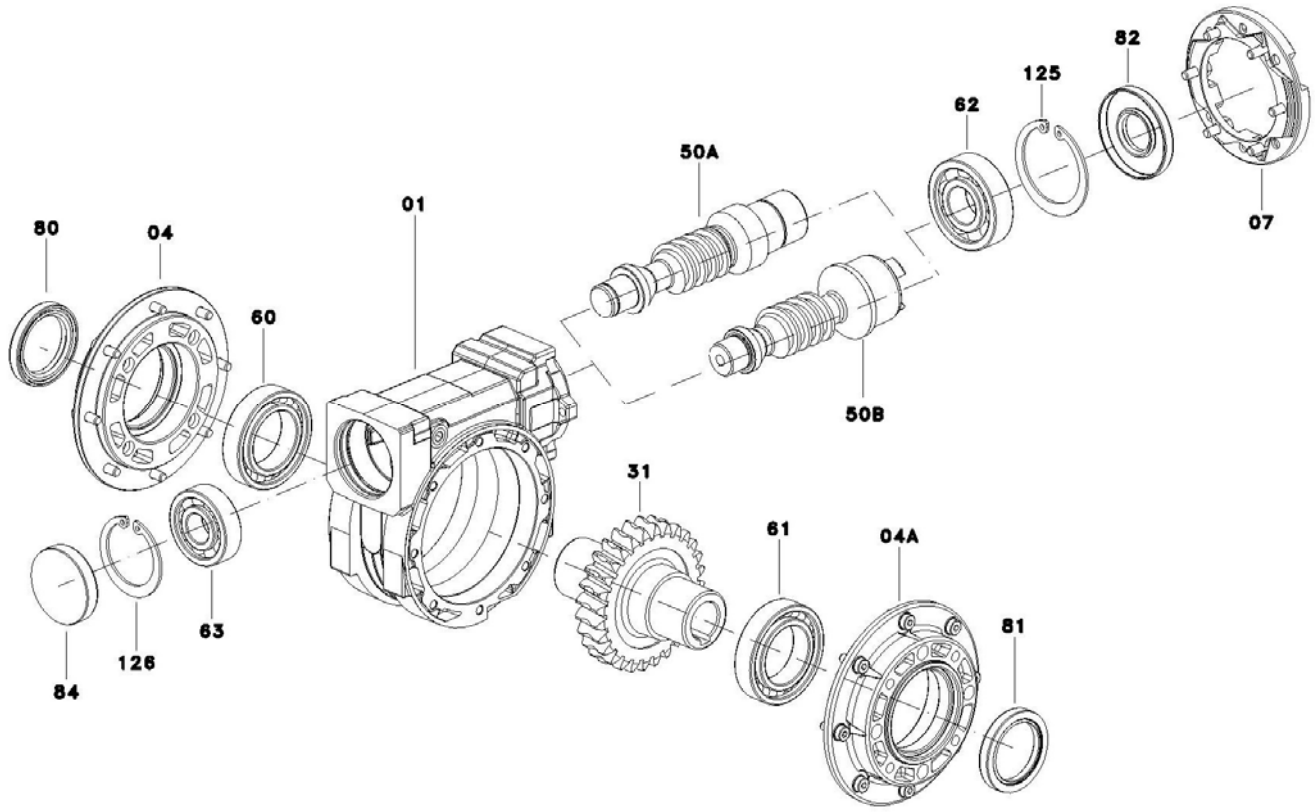


01	Body	15	Bearing		
02	Snap ring	16	Bearing		
03	Oil seal	18	Snap ring		
04	Output shaft	19	Bearing		
05	Key	20	Key		
06	Screw	21	Adapter		
07	Bearing	24	Snap ring		
08	Gear	25	Spacer		
10	Motor flange	26	Plug		
11	Snap ring	27	Flexible coupling		
12	Oil seal				
13	Pinion				

Series RS

The layout shows the general structure of a worm gearbox type FRS with through hollow output shaft and shaft mounting.

The Series TA (helical / worm) are made of a helical one-stage gearbox XA mounted as input stage onto a standard worm box RS and the Series RS/RS (two stage worm) of two standard worm boxes RS and an appropriate combination kit.



01	Body	84	Oil seal RCA		
04	Side cover	125	Snap ring		
07	Motor flange	126	Snap ring		
31	Worm wheel				
50	Worm shaft				
60	Bearing				
61	Bearing				
62	Bearing				
63	Bearing				
80	Oil seal				
81	Oil seal				
82	Oil seal				

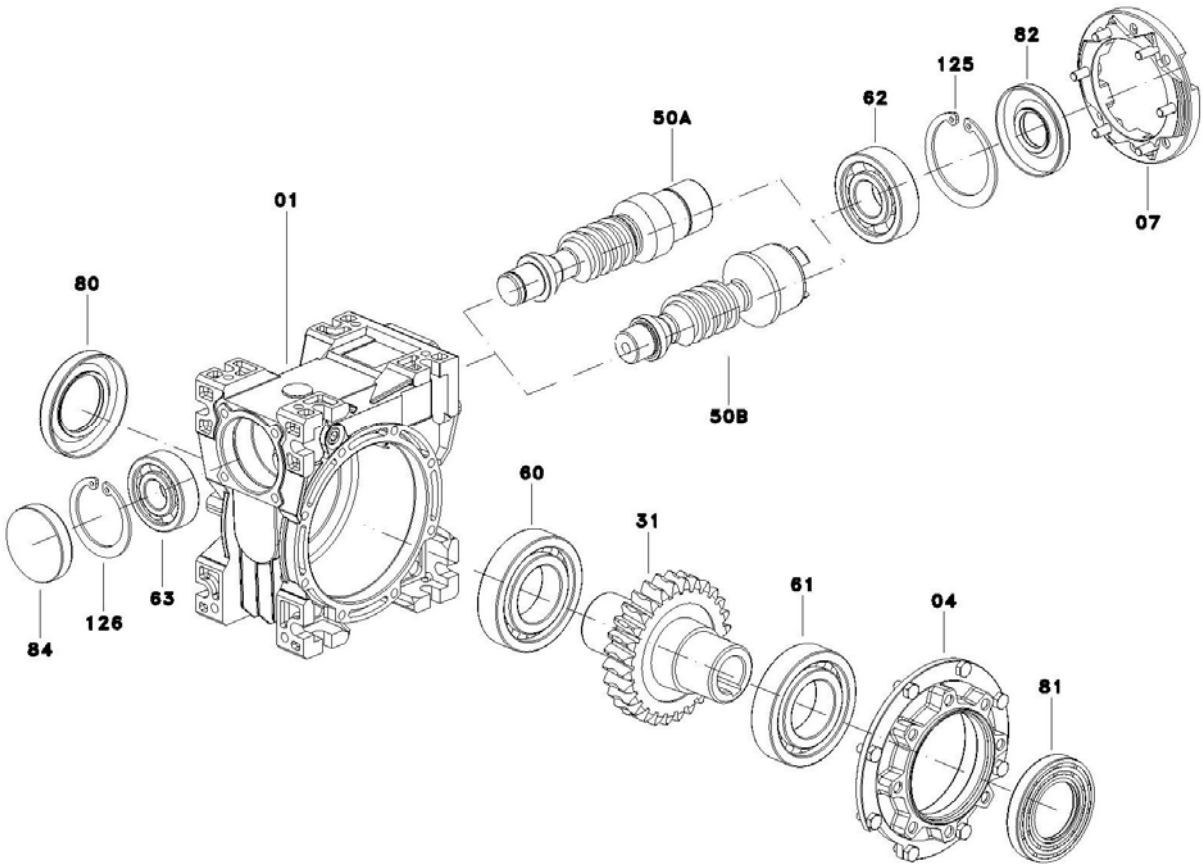
Working Instructions & Maintenance

Product Layout

Series RT

The layout shows the general structure of a foot-mounted worm gearbox type FRT.

The Series TA (helical / worm) are made of a helical one-stage gearbox XA mounted as input stage onto a standard worm box RT and the Series RT/RT (two stage worm) of two standard worm boxes RT and an appropriate combination kit.

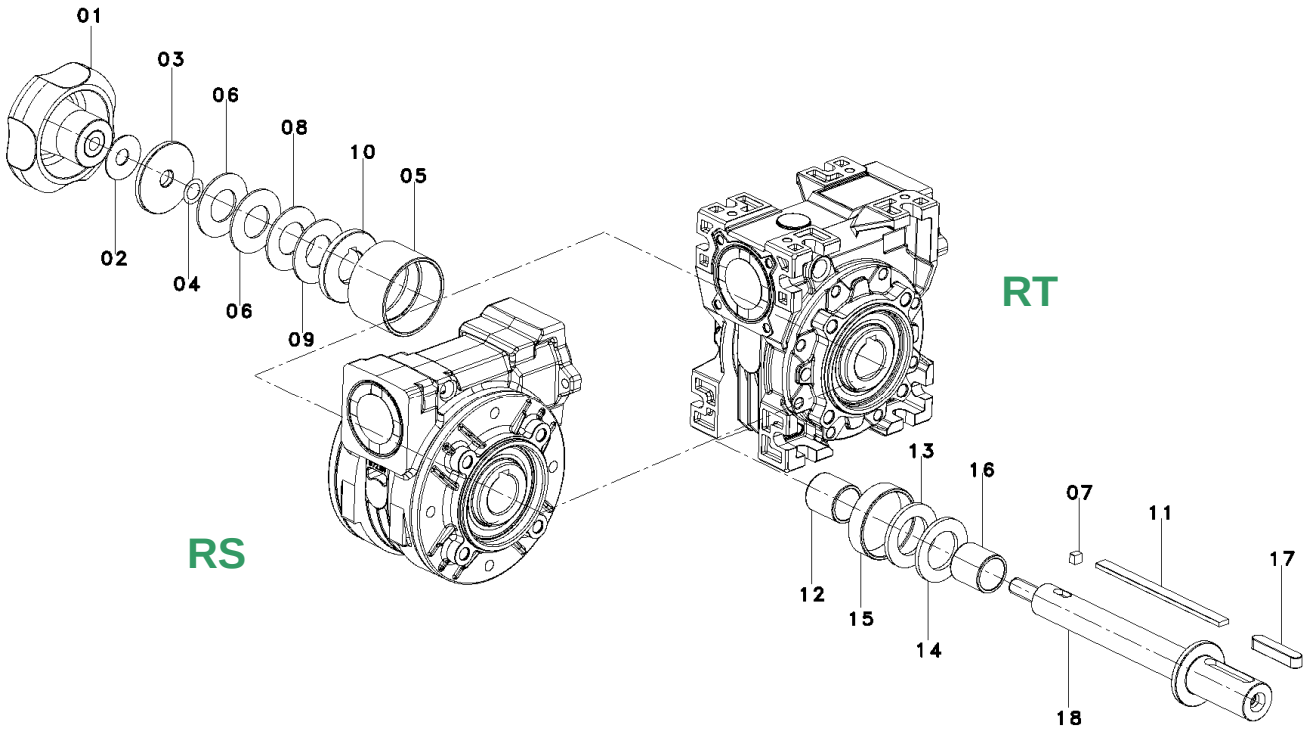


01	Housing	82	Oil seal		
04	Side cover	84	Oil seal RCA		
07	Motor flange	125	Seeger ring		
31	Worm wheel	126	Seeger ring		
50A	Worm shaft IEC				
50B	Worm shaft “G”				
60	Bearing				
61	Bearing				
62	Bearing				
63	Bearing				
80	Oil seal				
81	Oil seal				

TLE - Torque Limiter Option

The layout shows the general structure of a torque limiter type TLE to fit inside a worm gearbox Series RS or RT.

The Torque Limiter TLE is directly fitted into the hollow shaft of already assembled standard gearboxes without any special tooling.



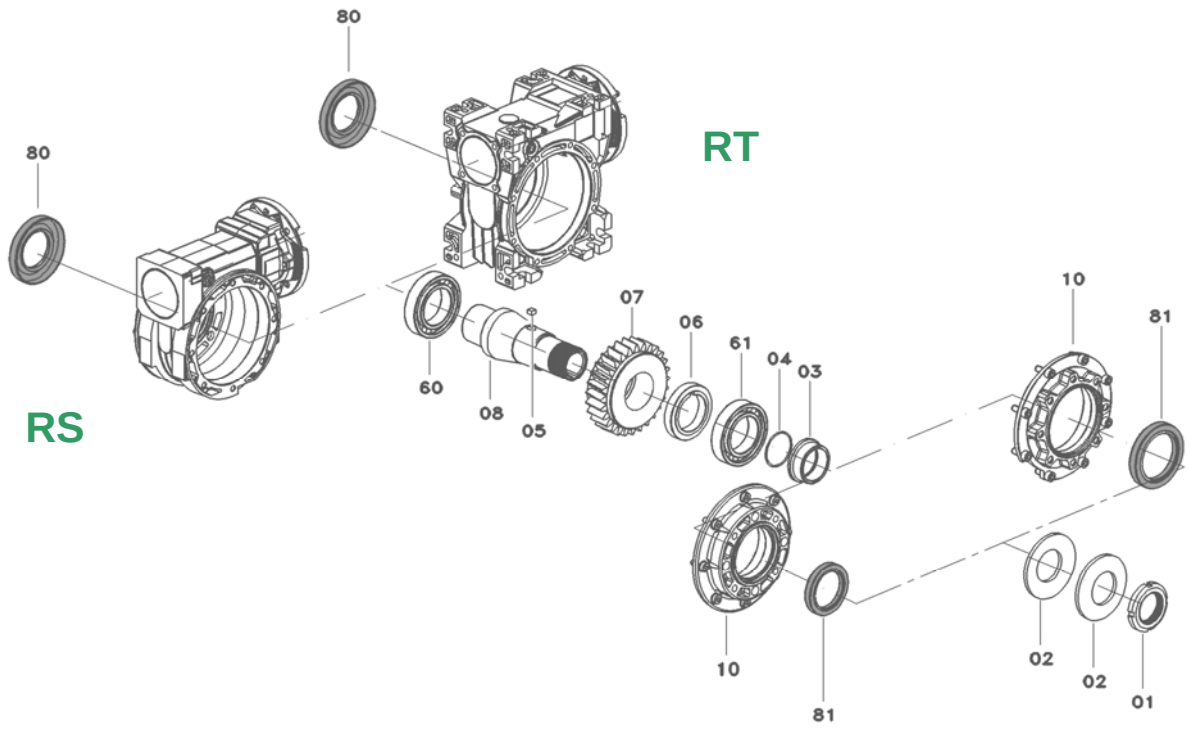
01	Setting torque hand wheel	13	Front washer		
02	Belville washer	14	Front friction		
03	Spacer	15	Front protection		
04	Spacer	16	Front bush		
05	Rear protection	17	Key		
06	Belville washer	18	Low speed shaft		
07	Key				
08	Thrust washer				
09	Rear friction				
10	Rear washer				
11	Key				
12	Rear bush				

Working Instructions & Maintenance TLI

Product Layout

TLI - Torque Limiter Option

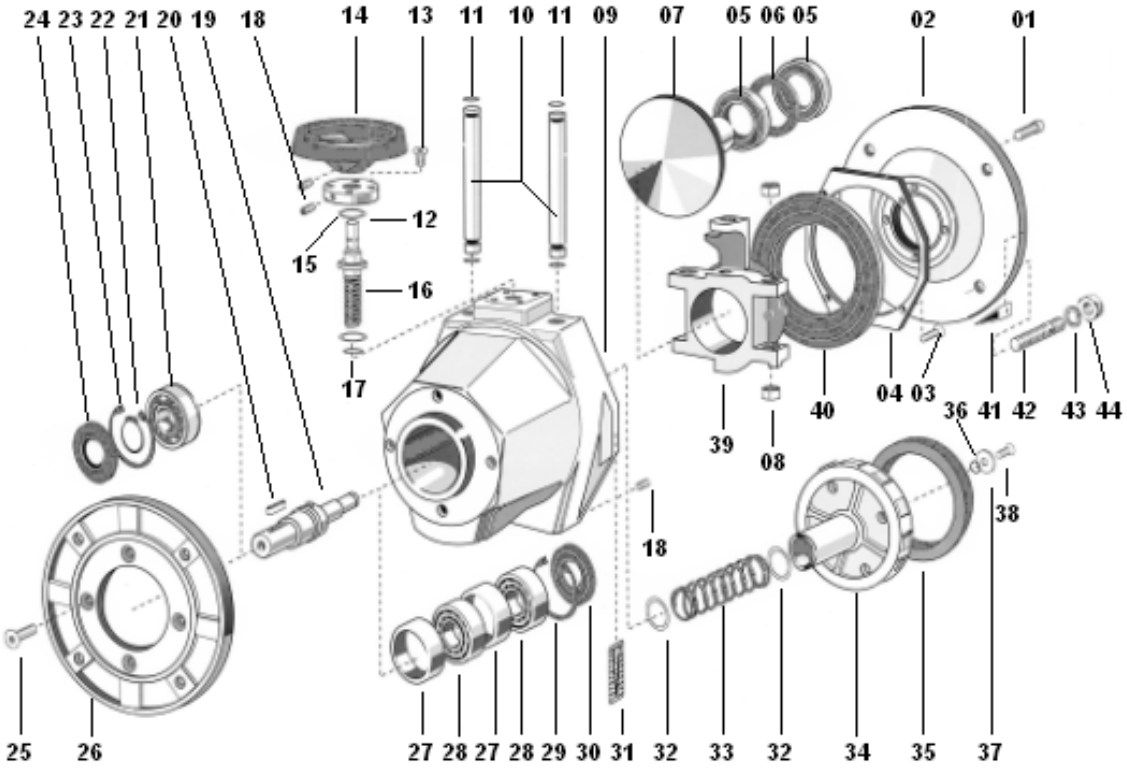
The layout shows the general structure of a built-in torque limiter type TLI incorporated inside a worm gearbox Series RS or RT.



01	Lock nut	81	Oil seal		
02	Bellville washer				
03	Bush				
04	Oil seal				
05	Key				
06	Spacer				
07	Worm wheel				
08	Hollow output shaft				
10	Cover				
60	Bearing				
61	Bearing				
80	Oil seal				

Series VR

The layout shows the general structure of a flange-mounted variator without gearbox type.



01	Screw	14	Control hand wheel	27	Spacer
02	IEC motor flange	15	Control shaft lock	28	Bearing
03	Screw	16	Control shaft	29	Snap ring
04	Seal plate	17	Oil seal OR	30	Oil seal
05	Bearing	18	Screw	31	Index scale
06	Spacer	19	Output shaft	32	Snap ring
07	Cone	20	Key	33	Spring
09	Body	21	Bearing	34	Friction ring carrier
10	Cylindrical slide	22	Snap ring	35	Friction ring
11	Oil seal OR	23	Snap ring	39	Cone holder
12	Oil seal OR	24	Oil seal	40	Bellows seal
13	Screw	26	Output flange	41	Index

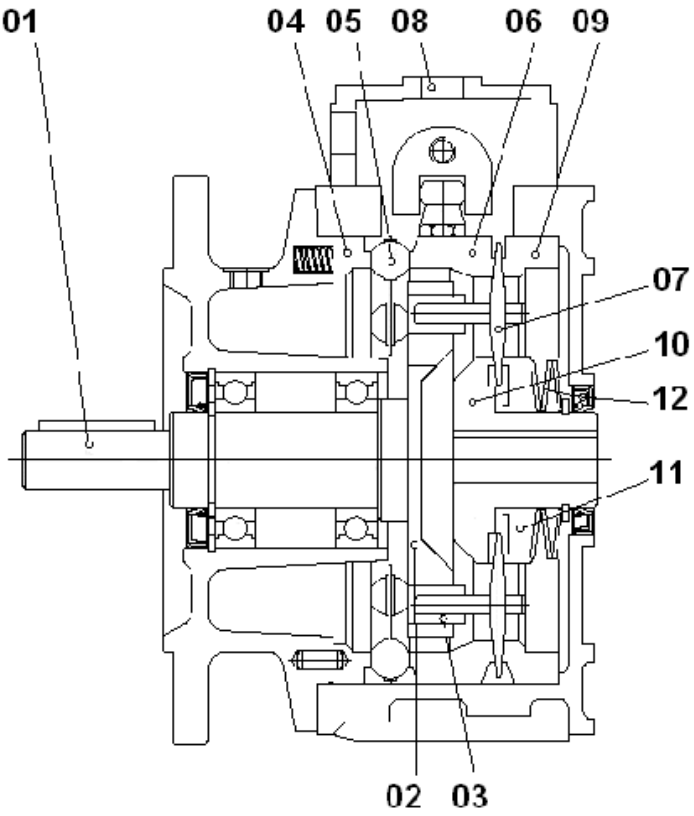
Working Instructions & Maintenance

VS

Product Layout

Series VS

The layout shows the general structure of a flange-mounted variator without gearbox type.



01	Output shaft				
02	Planet carrier				
03	Sliding bush				
04	Adjusting track				
05	Ball carrier				
06	External mobile track				
07	Planet				
08	Adjusting box				
09	External fixed track				
10	Internal fixed track				
11	Internal mobile track				
12	Belville washer				

INSTALLATION

4.1 Tolerances

Tolerances are recommended according to DIN 748 as follows

- Shafts: solid input or output ISO h6
  hollow input ISO E8
  hollow output ISO EH7
  centre hole DIN 332, DR
- Flanges: spigot ISO h7

4.2 Precautions

Check that the unit to be put into service is rightly sized to perform the required function and that its mounting position complies with the order. Such data are shown in the nameplate fitted on the unit.

Check mounting stability so that the unit operates without vibrations or overloads, or insert damping couplings or torque limiters.

Care must be taken to ensure exact positioning and steadiness when handling the units to not origin damages to normal operation of the unit.

When hoisting, use relevant locations of the housing or eyebolts if provided, or foot or flange holes.

Never hoist on any moving part (input or out-put shafts).

4.3 Groundwork

Clean carefully all the surfaces of shafts and flanges paying attention that the used product for cleaning does not came in contact with sealing lips of oil seals to avoid any damage and lubricant leakages.

4.4 Set up

The unit may be connected for clockwise or counter-clockwise rotation.

Stop immediately the unit when unexpected running or noise occurs: if the part originating the anomaly is not identified, other parts may be damaged with consequent difficulty in going back to the cause.

4.5 Pulleys, Pinions, Couplings

Bore tolerance F7 is recommended when fitting pulleys, pinions, couplings, etc. on the output shaft.

It is also recommended to not fit or extract with mallets or hammer hits to not damaging internal parts, but to use the shaft-head threaded bore as reaction to fitting or extraction.

- Belt drives: the force imposed on the shaft due to belt tension to not exceed the maximum permissible radial force of the unit.
- Chain drives: properly lubricate the chain drive and check that no pitch differences hinder its smooth running.

4.6 Torque arm

The torque arm Type BR (Series RS) or Type BT (Series RT) can rotate by 45° within the arc 45° to 315°.
The types BRV (Series RS) and Type BTV (Series RT) incorporate a Vulkollan® bush to allow vibration dumping.

4.7 Painting

Carefully protect oil seals, coupling faces and shafts when re-painting the units.

5 STARTING

5.1 Series RS, RT

The worm gearbox originates the following rotations of input and output shafts, with worm shaft upwards :

- inverse rotation
  one-stage gearboxes (RS, RT);
- original rotation
  helical/worm gearboxes (RA, TA);
- inverse rotation
  two-stage gearboxes (RS/RS, RT/RT).

Worm shaft downwards: opposite rotations.

5.2 Series RC, RD, RN, RO/RV, RP, XA, VR, VS

The helical or bevel/helical gearbox and the variator originate the following rotations of input and output shafts :

- inverse rotation
  odd-stage gearboxes (one, three, etc.)
  and variators with odd-stages ;
- original rotation
  even-stage gearboxes (two, four, etc.)
  and variators without stages or even-stages .

6 INSPECTIONS AND MAINTENANCE

6.1 Intervals

Although the units are no-load run tested in the factory before despatch, it is advisable not to run them at maximum load for the first 20-30 hours to allow proper running in.

For variators, run throughout the full speed range at reduced load before the full load is applied.

The units are delivered already filled with synthetic long-life oil: no servicing or refilling within the average lifetime of 15,000 hours for operation according to SF1.0.

Refer to the Catalogues as appropriate to the right definition of Service Factor.

Variators Series VR run dry and bearings are lifetime grease packed; therefore, there is no part needing periodical maintenance, the friction ring replacement excepted on normal wearing conditions. .

6.2 Maintenance Servicing

Units supplied without any oil plugs:

Series RC (sizes 05, 10, 20, 30)
Series RD (sizes 0, 1, 2, 3, 4)
Series RG (sizes 05, 07, 09, 12)
Series RN (sizes 1, 2, 3, 4, 5, 6)
Series RO (sizes 1, 2, 3, 4, 5, 6)
Series RV (sizes 1, 2, 3, 4, 5, 6)
Series RP (size 71)
Series RS (sizes 28, 40, 50, 60, 70, 85)
Series RT (sizes 28, 40, 50, 60, 70, 85, 110)
Series XA (sizes 63, 71, 80, 100)
Series VR (sizes 63, 71, 80, 90)

6 INSPECTIONS AND MAINTENANCE (contd)

6.2 Maintenance Servicing

Units supplied with oil plugs:

Series RC (sizes 40, 50, 60)

Series RS (sizes 110, 130, 150)

Series VS (sizes 63, 71, 80, 90, 100, 112)

Periodically check the seal condition and possible evidence of lubricant leakages.

If lubricant replacement or topping is required, do not mix synthetic lubricants with mineral based lubricants.

According to working conditions:

Eliminate by means of a vacuum cleaner any dust accumulation thicker than 5 mm.

- **GEARBOXES**
  - ➔ **Every 500 working hours or every month:**
    Oil seal visual check to monitoring any lubricant leakage.
  - ➔ **Every 3000 working hours or every 6 months:**
    Oil seal check and replacement if considerably used.
  - ➔ **Every 5 years:**
    Replace synthetic oil.

- **VARIATORS - Series VR only**

Series VR
Variation section, dry running and with lifetime grease-packed bearings, does not require any periodic servicing, excepted the friction ring replacement on normal wearing conditions.

- ➔ **According to working conditions**:
  Replace friction ring, if considerably used.
- ➔ **Every 3000 working hours or every 6 months:**
  Check output shaft angular play and oil seal and corrugated hood integrity.
- ➔ **Every 6000 working hours or every year:**
  Replace friction ring.

Series VS
Variation section, mineral oil lubricated, requires periodic servicing as follows:

- ➔ **Every 500 working hours or every month:**
  Oil seal visual check to monitoring any lubricant leakage.
- ➔ **Every 3000 working hours or every 6 months:**
  Oil seal check and replacement if considerably used.
- ➔ **Every 5 years:**
  Replace mineral oil .

7 MALFUNCTIONING

7.1 Major Events

- **Running noise, continuous**

  ➔ Grinding sound: damaged bearing .
  Replace bearing & check the oil

  ➔ Knocking sound: irregular gearing
  Contact Customer Service

- **Running noise, intermittent**

  ➔ Foreign particles in the oil
  Contact Customer Service

  ➔ Series VR - Damaged friction ring
  Rectify the cause and replace friction ring.
  See the next Section «Friction Ring Replacement»

- **Oil leakages**
  (see also next note)

  ➔ Damaged oil seal
  Replace the oil seal

  ➔ Loosen screws
  Tighten the screws

  ➔ Inner overpressure
  Contact Customer Service

  ➔ Oil seal fitting
  Defective fitting or fitting-lubricant melting

- **No rotation of output shaft**

  ➔ Internal connection cut off
  Contact Customer Service

  ➔ Series VR - Friction ring end of life
  Replace the friction ring
  See the next Section «Friction Ring Replacement»

  ➔ Series VR - Contaminated friction ring
  Clean carefully cone and ring working areas with solvent of similar product .
  See the next Section «Friction Ring Replacement»

7.2 Customer Service

We recommend to always provide the Customer Service with the following information:

- Full data of name plate and/or Serial No.
- Type of application
- Duty cycle
- Circumstances of malfunctioning
- Supposed causes.

8 LUBRICANTS

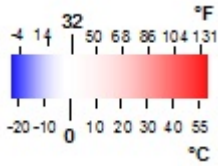
8.1 Recommended Types

All the units are delivered already filled with synthetic long-life oil.

The safe operation of the units with ISO VG 320 grade lubricant is recommended in the ambient temperature range

-20 to +55 °C (-4 to 131 °F)

Other temperatures require specific recommendations for low or high temperatures to ask the Customer Service.

Temperature range	ISO VG	ARAL	bp	Castrol	EXXON	Mobil	TEXACO	TOTAL	
	* 320	Degol GS 320	Enersyn SG-XP320	Alphasyn PG 320	Glycolube 320	Glygoyle HE 320	Synlube CLP 320	Carter SY 320	Tivela SC 320
	** 320	Eural Gear 320	---	Vitalube GS 320	Gear Oil FM 320	Mobil DTE FM 320	---	Nevas-tane EP 320	Cassida Fluid GL 320

* - Synthetic Oil

** - Food Industry Oil

8.2 Quantity [litres]

RC

1c	l_1	l_2	l_3	2c	l_1	l_2	l_3	3c	l_1	l_2	l_3
RC105	0.05	0.65	0.05	RC205	0.13	0.15	0.15	RC305	0.17	0.30	0.30
RC110	0.10	0.13	0.10	RC210	0.17	0.25	0.17	RC310	0.25	0.50	0.35
RC120	0.17	0.25	0.17	RC220	0.50	0.60	0.50	RC320	0.60	0.80	0.60
RC130	0.30	0.50	0.30	RC230	0.70	1.15	0.80	RC330	1.15	1.50	1.15
RC140	0.60	1.15	0.60	RC240	1.15	2.25	2.00	RC340	1.50	3.00	2.25
RC150	1.50	2.25	1.50	RC250	2.25	4.40	4.00	RC350	3.75	6.00	5.00
RC160	3.00	4.40	3.00	RC260	6.00	8.80	8.00	RC360	8.00	10.00	8.80

1c - One stage 2c - Two stages 3c - Three stages

l_1 - B3, B6, B7, B8, B5 l_2 - V1, V5 l_3 - V3, V6

RD

2c	H	V	3c	H	V
RD02	0.20	0.28	RD03	0.30	0.38
RD12	0.50	0.70	RD13	0.50	0.70
RD22	0.80	1.00	RD23	0.80	1.00
RD32	1.30	1.80	RD33	1.60	2.10
RD42	2.20	3.00	RD43	2.20	3.40
RD52	4.50	5.50	RD53	4.50	6,.50
RD62	7.00	9.00	RD63	7.00	11.00

2c - Two stages 3c - Three stages

H = H1, H2, H3, H4

V = V5, V6

Working Instructions & Maintenance

Lubricants

8.2 **Quantity** [litres] (contd)

RP

FRP	l
71	0.05

RS

RS	l
28	0.03
40	0.08
50	0.13
60	0.20
70	0.35
85	0.60
110	1.50
130	2.75
150	4.40

l - Litres FRS

RA	l_1 / l_2
63 / 40	0.04 / 0.08
63 / 50	0.04 / 0.13
63 / 60	0.04 / 0.20
71 / 50	0.06 / 0.13
71 / 60	0.06 / 0.20
71 / 70	0.06 / 0.35
71 / 85	0.06 / 0.60
80 / 60	0.10 / 0.20
80 / 70	0.10 / 0.35
80 / 85	0.10 / 0.60
80 / 110	0.10 / 1.50
100 / 110	0.20 / 1.50
100 / 130	0.20 / 2.75
100 / 150	0.20 / 4.40

l_1 / l_2 - Litres FXA / FRS

RS / RS	l_3 / l_4
28 / 28	0.03 / 0.03
28 / 40	0.03 / 0.10
28 / 50	0.03 / 0.15
28 / 60	0.03 / 0.25
40 / 70	0.10 / 0.35
40 / 85	0.10 / 0.63
50 / 110	0.15 / 1.50
60 / 130	0.25 / 2.75
70 / 150	0.35 / 4.40

l_3 / l_4 - Litres FRS / FRS

RT

RT	l
28	0.03
40	0.08
50	0.13
60	0.20
70	0.35
85	0.60
110	1.50

l - Litres FRT

TA	l_1 / l_2
63 / 40	0.04 / 0.08
63 / 50	0.04 / 0.13
63 / 60	0.04 / 0.20
71 / 50	0.06 / 0.13
71 / 60	0.06 / 0.20
71 / 70	0.06 / 0.35
71 / 85	0.06 / 0.60
80 / 60	0.10 / 0.20
80 / 70	0.10 / 0.35
80 / 85	0.10 / 0.60
80 / 110	0.10 / 1.50
100 / 110	0.20 / 1.50

l_1 / l_2- Litres FTA / FRT

RT / RT	l_3 / l_4
28 / 28	0.03 / 0.03
28 / 40	0.03 / 0.08
28 / 50	0.03 / 0.13
28 / 60	0.03 / 0.20
40 / 70	0.08 / 0.35
40 / 85	0.08 / 0.60
50 / 110	0.13 / 1.50

l_3 / l_4 - Litres FRT / FRT

XA

FXA	l
63	0.04
71	0.05
80	0.08
100	0.20

8.2 **Quantity** [litres] (contd)

RN

RN-2	H1 [l]	H2 [l]	H3 [l]	H4 [l]	V1 [l]	V2 [l]	RN-3	H1 [l]	H2 [l]	H3 [l]	H4 [l]	V1 [l]	V2 [l]
12	0.5	0.6	0.4	0.6	0.6	0.6	13	0.5	0.4	0.3	0.4	0.6	0.4
22	0.6	0.7	0.5	0.7	0.7	0.7	23	0.6	0.5	0.4	0.5	0.7	0.5
32	1.1	1.3	0.8	1.3	1.2	1.2	33	1.2	1.0	0.6	1.0	1.2	1.0
42	2.8	1.8	1.2	1.8	2.7	2.7	43	2.5	1.5	0.9	1.5	2.2	1.9
52	5.1	3.2	2.1	3.2	4.9	4.9	53	5.0	2.8	1.6	2.8	4.0	3.4
62	9.2	5.8	3.8	5.8	8.8	8.8	63	9.0	5.0	2.9	5.0	7.2	6.1

RO
RV

RO	H1 [l]	H2 [l]	H3 [l]	H4 [l]	V1 [l]	V2 [l]	RV	H1 [l]	H2 [l]	H3 [l]	H4 [l]	V1 [l]	V2 [l]
13	0.6	0.6	0.6	0.6	0.7	0.7	13	0.6	0.5	0.4	0.5	0.6	0.6
23	0.9	0.7	0.9	0.7	1.0	1.0	23	0.9	0.6	0.5	0.6	0.7	0.7
33	1.5	1.2	1.4	1.2	1.7	1.7	33	1.5	1.0	0.8	1.0	1.2	1.2
43	2.8	2.0	1.6	2.0	2.5	2.5	43	2.9	1.9	1.2	1.8	2.6	2.6
53	5.1	3.6	2.9	3.6	5.0	5.0	53	5.2	3.4	2.1	3.2	4.7	4.7
63	9.2	6.5	5.2	6.5	9.0	9.0	63	9.4	6.1	3.8	5.8	8.5	8.5

RG

Low backlash planetary gearboxes are Kluber Synth GE 46 life-greased.

9 DIRECTIVE 94/9/CE - ATEX

9.1 General Information

Directive relates not only to electrical equipment, but also to all kind of machines and control components, separately or jointly, for use in potentially explosive atmospheres.

The following recommendations, issued to operations in potentially explosive environment, are meant as specific completion to the preceding «Working Instructions».

VARVEL-ATEX gearboxes are manufactured with housings and covers of metallic material, incorporating the transmission elements fitted on ball and roller bearings, with Viton oil seals on input and output shafts et with the adequate oil quantity to assure the design operation.

9.2 Prevalent Use

VARVEL-ATEX gearboxes are identified as « components », fundamental but without any autonomous function to operate units and protection systems for production, transport, storage, measurement, control and conversion of energy, or the processing of materials which are capable of causing an explosion through their own potential source of ignition.

9.3 References

VARVEL-ATEX gearboxes are designed and produced according to Directive 94/9/CE and the following standards

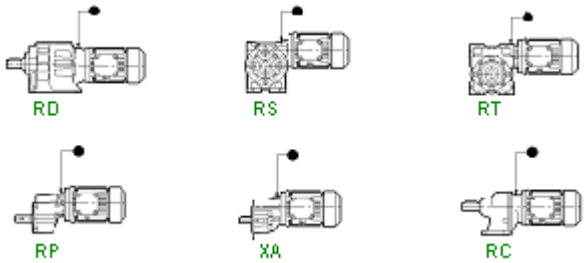
- EN 1127-1 - Explosion prevention and explosion protection**,** Fundamental notions and methodology.
- EN 13463-1 - Not electrical devices for potentially explosive atmospheres, Basic methods and required conditions.
- EN 13463-5 - Not electrical devices for potentially explosive atmospheres**,** Section 5: protection by construction safety « c ».
- EN 13463-6 - Not electrical devices for potentially explosive atmospheres, Section 6: protection by trigger source control « b ».
- EN 13463-8 - Not electrical devices for potentially explosive atmospheres, Section 8: protection by construction safety « k ».

9.4 Temperature

The units must be properly ventilated: check that ventilation temperature does not exceed 55 °C.

Measure housing temperature after 2 hours from start up and check that the difference between measured temperature (see sketch) and ambient temperature does not exceed the max. value of 80 °C.

In such a case, immediately stop the unit and call for Customer Service.



9.5 Safety Instructions

Electric motors and other elements to fit at the input or at the output of VARVEL-ATEX products, must be ATEX approved according the Directive 94/9/CE.

Expected temperature limits of the products must comply with temperature classes and max. temperature.

VARVEL gearboxes must be installed and serviced according to installation and servicing standards for classified environments against explosion hazard because of gas or dust presence (e.g. EN 60079-14, EN 60079-17, EN 50281-1-2 and any other acknowledged national standard).

In case of combustible dusts, it is mandatory the regular cleaning to avoid any accumulation of dust layers on product surfaces.

9.6 ATEX Marking

VARVEL Series RC, RD, RP, RS, RT, XA conform to design requirements required by Group II, Category 2 and to operate in areas with explosion danger of gas (Zone 1 and Zone 2) and combustive dust (Zone 21 and Zone 22).

- Dust accumulation: max. thickness on sur-face 5 mm maximum (EN50281-1-2)
- Casing: IP66 (Ingress Protection)

VARVEL-ATEX products are identified by the corresponding technical files, deposited at the Notified Body of Technical File Deposit, INERIS - France:

- Series RC **"ATEX 03RC"** - Series RD **"ATEX 03RD"** - Series RP **"ATEX 03RP"**
- Series RT **"ATEX 03RT"** - Series RS **"ATEX 03RS"** - Series XA **"ATEX 03XA"**

and marked

Ex **II 2 GD ck IP66**
T_{max}=120°C or
T_{max}=135°C T_{amb} -20/+55 °C-

where**:**

II	- Group II (Surface Industries)
2	- Category 2
G	- Explosive atmosphere with presence of gas, vapours or clouds Zone1 (2G) and Zone 2 (2G o 3G)
D	- Explosive atmosphere with presence of dust Zone 21 (2D) and Zone 22 (2D o 3D)
b	- Trigger Source Control « b »
c	- Construction Safety « c »
k	- Liquid Dipping « k »
IP66	- Protection Grade (Ingress Protection)
T_{max}	- Max. Surface Temperature
T_{amb}	- Ambient Temperature
ATEX 03XX	- Technical File Ref. No.

Working Instructions & Maintenance

Directive 94/9 CE (ATEX)

9.7 Maintenance Servicing

Strict observance of maintenance intervals is recommended to ensure appropriate working conditions and explosion-proof protection.

- ➔ **According to working conditions:**
  Elimination of any dust accumulation thicker than 5 mm by means of a vacuum cleaner.
- ➔ **Every 500 working hours or every month:**
  Visual inspection of oil seals to monitor any lubricant leakage.
- ➔ **Every 3000 working hours or every 6 months:**
  Inspection of oil seals and replacement if worn-out.
- ➔ **Every 5 years:**
  Replacement of synthetic oil.

9.8 Materials - Dangerous Zones - Categories

CORRESPONDENCE AMONG MATERIALS, DANGEROUS ZONES AND CATEGORIES
(ACCORDING TO DIRECTIVE 94/9/CE)

MATERIALS	DANGEROUS ZONES	CATEGORIES		
Gas Vapour Cloud	Zone 0	1G		
	Zone 1	1G	2G	
	Zone 2	1G	2G	3G
Dust	Zone 20	1D		
	Zone 21	1D	2D	
	Zone 22	1D	2D	3D

VARVEL-ATEX Products to not supply

9.9 Gas Temperature Class

GAS TEMPERATURE CLASS

GROUP	T1	T2	T3	T4	T5	T6
I	*Natural gas (Firedamp)					
II A	Ethyl acetate Methyl acetate Acetone Ammonia Benzene Benzol Chlorine methylene Chlorine ethylene Ethane Methane Methanol Carbon monoxide Naphtalene Propane Toluene Xylene	Butyl acetate Propyl acetate Amyl alcohol Ethyl alcohol Isobutyl alcohol Methyl alcohol n-butyl alcohol Acetic anhydride Ciclohexanone Liquefied petroleum gas Natural gas Iso-Propane Mono amyl acetate n-Butane	Cyclohexane Cyclohexanol Decane Heptane Hexane Gasoil Kerosene Naphtha Pentane Oil **	acetaldehyde Ethylic ether		
II B	Coke gas Water gas	1.3-butadiene Ethyl benzene Ethylene Ethylene oxide	Sulphydric acid Isoprene Oil **	Ethylic ether		
II C	Hydrogen	Acetylene				Ethyl nitrate carbon sulphide

* - VARVEL-ATEX Products to not supply

** - According to chemical composition

Working Instructions & Maintenance

Conformity Certificate (specimen)

VARVEL Spa Via 2 Agosto 1980. 9 40056 Crespellano BO Italy	dichiara sotto la propria responsabilità che il prodotto *declares on his own responsibility that the product*	**Riduttori** *Gearboxes* **Serie/s RS** **Serie/s RT** **Serie/s RD** **Serie/s RC** **Serie/s RP** **Serie/s XA**
	al quale questa dichiarazione si riferisce, è conforme alla Direttiva *to which this declaration relates to, complies with the Directive*	**94/9/EC (ATEX).**
	La conformità è stata verificata sulla base dei requisiti delle norme o dei documenti normativi *The conformity is under observance of the standard documents*	**EN 1127-1** **EN 13463-1** **EN 13463-5** **EN 13463-8**
	Modo di protezione: *Type of protection:*	**II 2 GD ck IP66** Tmax = 120°C oppure/*or* Tmax = 135°C Tamb. -20/+55°C
	I File Tecnici *The Technical Files* sono stati depositati presso l'Organismo Notificato di deposito del fascicolo tecnico *were deposited at the Notified Body of Technical File Deposit*	**ATEX 03RS, ATEX 03RT, ATEX 03RC, ATEX 03RD, ATEX 03RP, ATEX 03XA** **0080 INERIS,** **F-60550 Verneuil en Halatte, France**
	Firma autorizzata (Funzione: Presidente) *Authorized Signature* *(Function: President)*	**VARVEL Spa**
	Luogo e data dell'emissione *Place and Date of Issue*	**Crespellano, ../../....**

C-IUM ed01-2013 rev01 GB 251113

A socially responsible company

To the scope of intensifying our commitment to society, Varvel since 2004 started an ongoing support programme with three non-profit institutions: UNICEF (United Nations Children's Fund), MSF (Médicins sans Frontères) and ANT (National Cancer Association). Environmental respect and protection are also part of Varvel's values and this is why Varvel certified in 2001 its Environmental System to standard UNI EN ISO 14001.

borderline


RN•RO•RV


RS•RT


RD


RG


VR•VS


ISM•BSM


VARfarm
by VARVEL





VARVEL®
MOTION CONTROL SINCE 1955

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