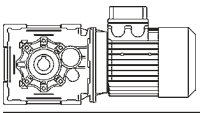


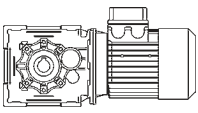


Maintenance and operational instructions for helical bevel geared motors and helical bevel gear reduction units

BA







## Warehouse storage

When moving the unit, care should be taken to protect external parts from breakage or damage due to accidental knocks or falls.

If the unit is to be stored in a hostile atmosphere or for a long period of time (2/4 months), it is important to apply protective and waterproofing products to avoid deterioration of shafts and rubber parts.

Before starting up the unit, carry out the following checks:

Check the data shown on the name plate of the reduction unit and/or the electric motor;

Check for any leaks of lubricant

If possible, remove any traces of dirt from the shaft and from the areas around the oil seal.

If the oil seal is not immersed in the lubricant inside the assembly during particularly long storage periods (4/6 months) it is recommended that it should be replaced as the rubber might stick to the shaft or even have lost the elasticity it needs to work.

## Installation

Particular care must be taken when installing drives, as this often the source of damage and of down time. Careful choice of the type of drive and mounting position can often avoid the need for protection of sensitive areas, particularly underneath the unit from oil leaks, however limited they may be.

- The machine must be firmly fastened in place in order to prevent any vibrations.
- Whenever possible, protect the reduction unit from direct sunlight and bad weather, especially when it is mounted on its vertical axis.
- Make sure the air intake on the fan side is unobstructed in order to ensure that the motor is correctly cooled.
- In the case of temperatures of  $< -5\text{ }^{\circ}\text{C}$  or  $> +40\text{ }^{\circ}\text{C}$  , contact Technical Assistance.
- If the motor is to be started up very often under load, the use of a heat probe inserted into the motor is recommended.
- The various machine members (pulleys, gear wheels, couplings, etc.) must be mounted on the shafts using special threaded holes or other systems that ensure correct operation without risk of causing damage to the bearings or the external parts of the assemblies (fig.1).
- Lubricate the surfaces that come into contact in order to prevent oxidation or seizure.

## Installation

Example of a pulley mounted correctly on the slow shaft of a reduction unit

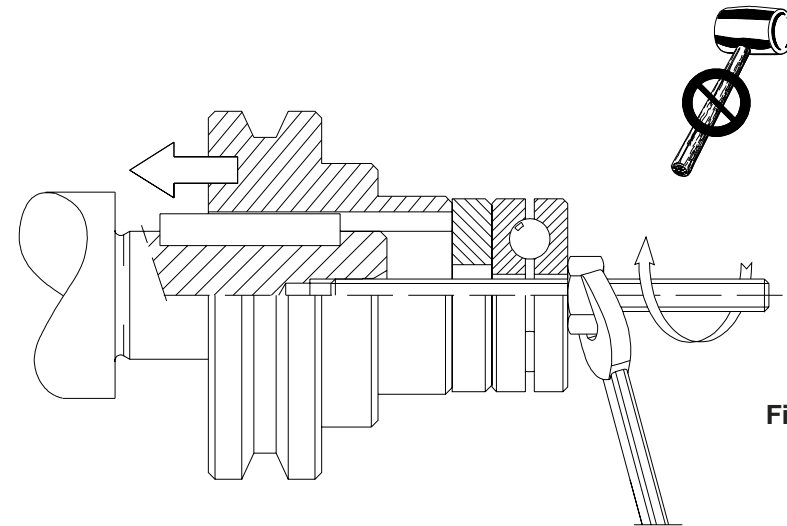


Fig.1

Correct and incorrect examples of pulleys mounted on the main shaft of a reduction unit.

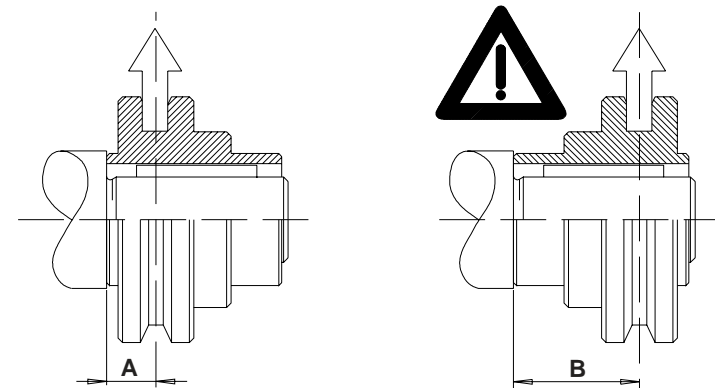
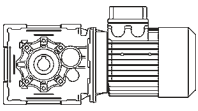


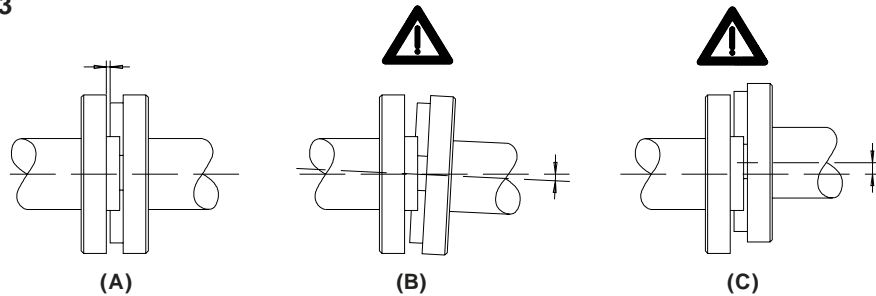
Fig.2



## Installation

### Correct and incorrect examples of coupling connections

Fig.3



The pulley must be mounted on the main shaft as close as possible to the shoulder so that it does not cause excessive radial load on the bearings (fig. 2). Great care must be taken when connecting the couplings to ensure that they are well aligned, so as not to cause excessive radial load on the bearings (fig.3). When it is applied, paint must never be used on rubber parts: oil seal, etc. It must never be applied to any breather holes in plugs if they are mounted on the unit. In the case of assemblies with oil plugs, remove the closed cap used for transport and fit it with the breather plug that is supplied with the reduction unit. When the assembly is supplied without a motor, the following precautions must be followed in order to ensure that connections are properly made

#### Mounting the motor on the pam B5/B14 flange

Check that the tolerance of the motor shaft and the motor flange comply with at least one 'normal' class of quality. Carefully clean off any trace of dirt or paint from the shaft, the spigot and the face of the flange. Carry out mounting operations making sure not to use force. If this is not possible, check the tolerance of the motor key and ensure that it is correctly fitted. Apply assembly grease to the shaft in order to prevent oxidation or seizure caused by contact. Good quality motors should be used in order to ensure that the unit works correctly, without vibrations or noise.

Before mounting the unit on the machine, check that the principal shaft of the reduction unit rotates in the right direction.

*Use the oil window, if present, to check that the lubricant reaches the correct level required for the mounting position used.*

## Starting up

The unit should be started up gradually: do not immediately apply the maximum load the machine is able to take; look for and correct any malfunction that may be caused by incorrect mounting.

Running-in is not essential for the reduction unit to run properly since modern construction techniques for the gears and castings, the extreme cleanliness of the internal parts, and the excellent qualities of the lubricants used, ensure that the internal parts receive a high degree of protection even during the first moments.

## Servicing

The high degree of finish of the internal parts ensures that the unit will work correctly with only a minimum amount of servicing

Generally speaking, the following rules should be followed: periodically check that the exterior of the assembly is clean, especially in the cooling areas; periodically check to see if there are any leaks, especially in the areas around the oil seals.

Assemblies that are lubricated for life and thus do not have any oil plugs do not require any special maintenance except as stated above.

For other assemblies, low maintenance is required with an oil change at 8/10,000 hours of use. The change of oil naturally depends on the type of environment and use to which the unit is put.

Apart from the normal maintenance rules given above, make sure the breather hole in the plug is clean and, using the oil window, periodically check that there is sufficient lubricant.

Should it be necessary to top up with lubricant, use the same type that is already in the reducer or one that is compatible with it.

In case of doubtful incompatibility between lubricants, we recommend you empty out the oil from the gearbox completely and, before refilling with new oil, wash out the unit to remove any residue.

When changing the oil, follow the previous instructions.

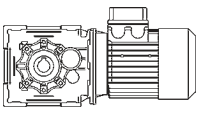
## Troubleshooting

If any problems should arise when starting up the unit or during its first few hours of operation, contact the after sales service unit of Motovario.

The table shows a series of problems with a description of possible remedies.

It should be borne in mind however that the information given is for reference only as all the drives manufactured by Motovario are thoroughly tested and checked before they leave the factory.

Please note that tampering with the assembly without prior authorization from Motovario immediately invalidates the warranty and often makes it impossible to ascertain the causes of a defect or malfunction.

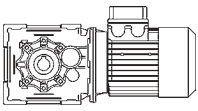


## Troubleshooting

PROBLEMS	CAUSES	ACTION (1)	ACTION (2)
<i>The motor does not start.</i>	Problems with power supply. Defective motor. Wrong size of motor.	Check power supply.	Replace electric motor.
<i>Current absorbed by the motor is greater than shown on the data plate.</i>	Wrong size of motor.	Check the application.	Replace the electric motor and, if necessary, the reduction unit.
<i>Temperature of the motor housing is very high.</i>	Defective motor. Wrong size of motor. Incorrect mounting of motor	Check the application.	Replace the electric motor and, if necessary, the reduction unit.
<i>Temperature of the reduction unit housing is very high.</i>	Wrong size of reduction unit. Mounting position does not comply with the order. Incorrect mounting of motor	Check the application.	Correct the working conditions: mounting position and/or lubricant level.
<i>Incorrect rotation speed of the main reducer unit shaft.</i>	Incorrect reduction ratio. Incorrect polarity of motor.	Check reduction ratio. Check polarity of motor.	Replace reduction unit and/or electric motor.
<i>Oil leak from oil seal.</i>	Defective oil seal. Oil seal damaged during shipment. Defective motor shaft.	Replace the oil seal. Repair motor shaft (if possible).	Replace the part or return the assembly to Motovario.
<i>Oil leak from joint.</i>	Flat gasket or O-ring damaged.	Replace damaged gasket or O-ring.	Return the assembly to Motovario.
<i>The main shaft rotates the wrong way.</i>	Incorrect connection of the electric motor.	Swap two phases of the motor supply.	
<i>Intermittent noise from the gears.</i>	Dents in the gear wheels.	No practical problem if the noise has no effect on the application.	Return the assembly to Motovario if there is significant noise when loaded.

## Troubleshooting

PROBLEMS	CAUSES	ACTION (1)	ACTION (2)
<i>No intermittent noise from the gears.</i>	Dirty inside the gearbox.	No practical problem if the noise has no effect on the application.	Return the assembly to Motovario if there is significant noise when loaded.
<i>Noise (whine) from the drive assembly.</i>	Bearings incorrectly adjusted. Gears with mesh errors. Insufficient lubricant.	Check correct quantity of lubricant.	Return the assembly to Motovario.
<i>Electric motor vibrates.</i>	Measurement of the assembly coupling.	Check geometric tolerance of flange on electric motor. Check tolerance and geometry of key on motor shaft.	Replace electric motor.



## Lubrication

- The reduction units 040-050-070 are supplied complete with lubricant for life and can be mounted in all the positions envisaged in the catalogue. The above sizes have no oil plugs.
- The remaining sizes are supplied complete with lubricant, mineral oil, AGIP BLASIA 220.
- V5 pos. For size 080, supplied with breather plug.
- For sizes 080-100-125-140 and 160 it is necessary to state the position, otherwise the reduction units are supplied with the q.ty of oil for pos. B3.
- Only reduction units 100-125-140-160 have filler/breather, level and oil drainage plugs. After installation, it is recommended to replace the closed plug used for transportation with the breather plug enclosed with the unit.

## Critical applications

The performance given in the catalogue correspond to mounting position B3 or similar, ie. when the first stage is not entirely immersed in oil. For other mounting positions and/or particular input speeds, refer to the above tables that highlight different critical situations for each size of reduction unit.

It is also necessary to take due consideration of and carefully assess the following applications by calling our Technical Service.

- As a speed increasing.
- Use in services that could be hazardous for people if the reduction unit fails.
- Applications with especially high inertia.
- Use as a lifting winch.
- Applications with high dynamic strain on the case of the reduction unit.
- In places with T° under -5C or over 40C.
- Use in chemically aggressive environments.
- Use in a salty environment.
- Mounting positions not envisaged in the catalogue.
- Use in radioactive environments.
- Use in environments pressures other than atmospheric pressure.
- Avoid applications where even partial immersion of the reduction unit is required.

Mineral oil		
TC ISO VG...	(-5) ÷ (+40) ISO VG220	(-15) ÷ (+25) ISO VG150
AGIP	BLASIA 220	BLASIA 150
SHELL	OMALA OIL220	OMALA OIL150
ESSO	SPARTAN EP220	SPARTAN EP150
MOBIL	MOBILGEAR 630	MOBILGEAR 629
CASTROL	ALPHA MAX 220	ALPHA MAX 150
BP	ENERGOL GR-XP220	ENERGOL GR-XP150

BA	040	050	070
2000 < n1 < 3000	-	-	-
V5 - V6	B	B	B
n1 > 3000	B	B	B
...L : B6 - B7	B	B	B

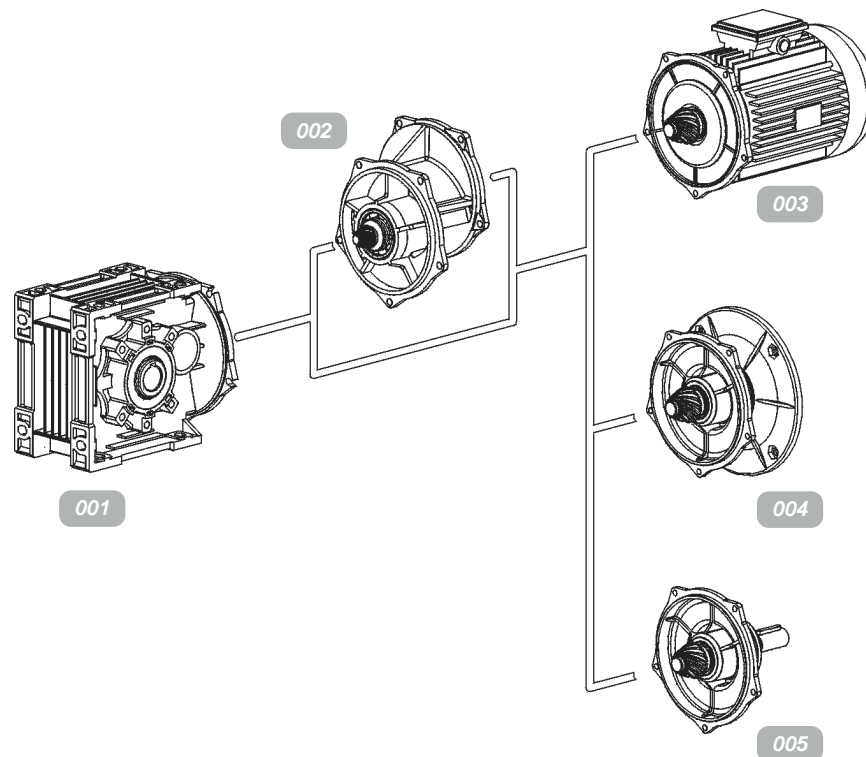
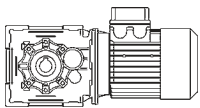
- A - Application not recommended  
 B - Check the application and/or call our technical service

	042		052		053		072		073	
	MRO	PRO	MRO	PRO	MRO	PRO	MRO	PRO	MRO	PRO
B3	0,2	0,3	0,3	0,45	0,3 + (0,13)	0,45 + (0,13)	0,8	1	0,8 + (0,13)	1 + (0,13)
B8										
B6-B7										
V5										
V6										

	082	083	102	103	122	123	142	143	162	163
B3	1,3	1,3	3	3,4	5,7	7	8,2	11,4	10,5	12,9
B8	1,7	1,7	4,4	5	9,5	10,7	10,9	13,1	13,3	16
B6-B7	1,3	1,3	2,9	3,9	7	7,8	8,5	10,2	10,6	12,7
V5	2,4	2,9	4,7	6,2	9,6	12,6	13,7	18,3	-	20
V6	1,3	1,3	3,1	4,5	-	7,8	10,9	13,1	-	13,6

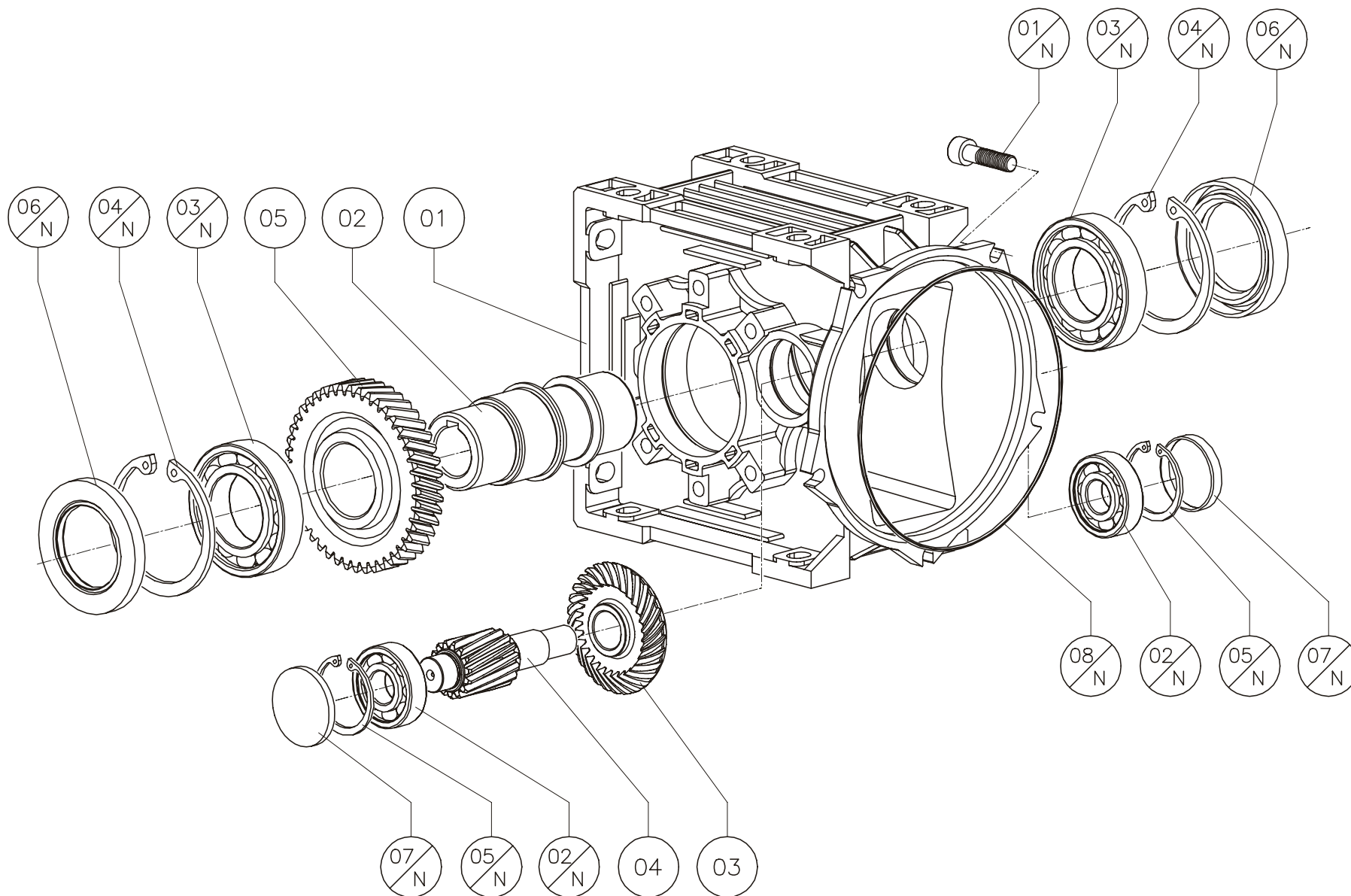
Quantity of oil in litres

(...) Separated lubrication



- 001 pag.10,11
- 002 pag.12,13
- 003 pag.14,15
- 004 pag.16÷25
- 005 pag. 26, 27
- 006 pag. 28, 29

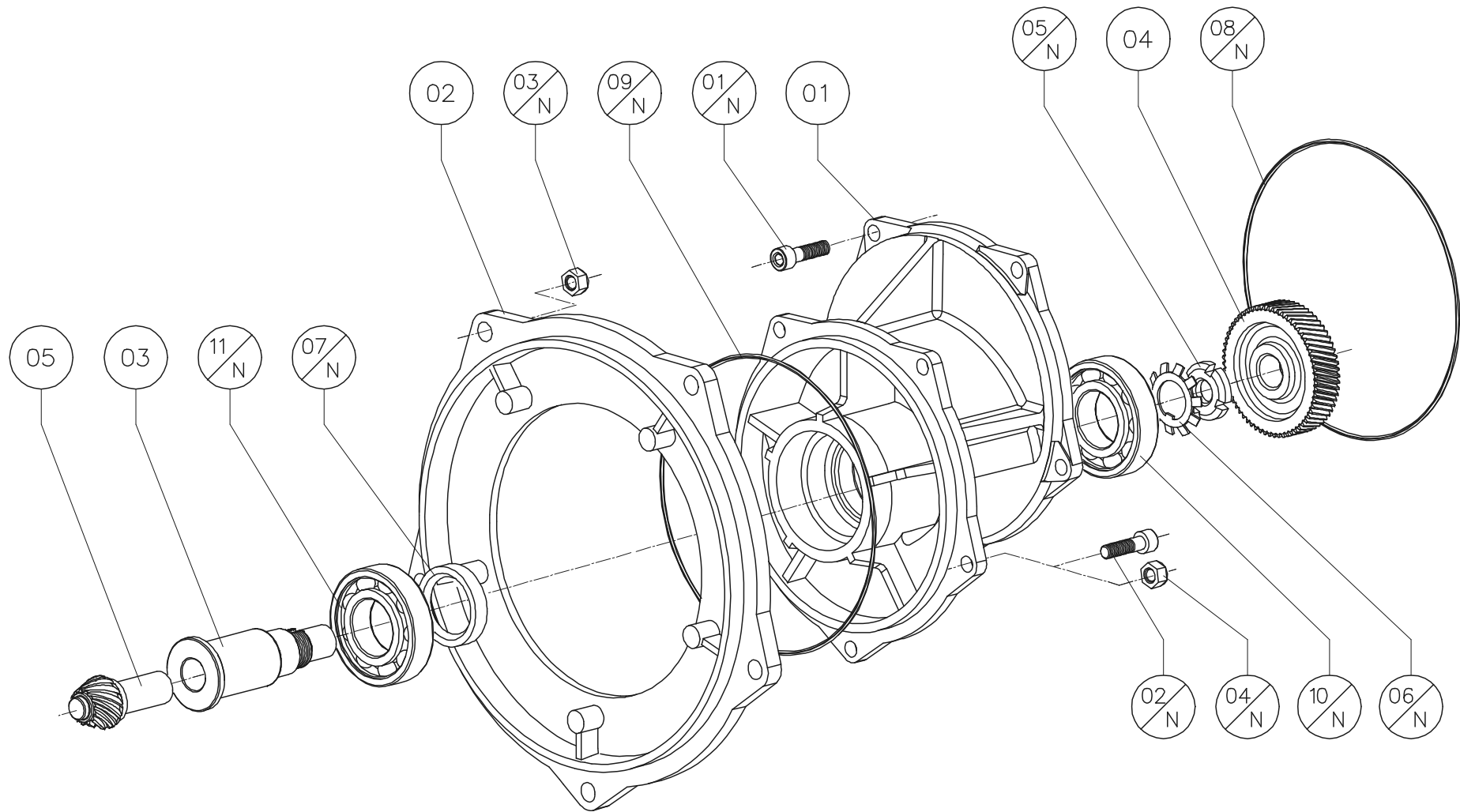
P = Project of pertinence  
T = Reference table  
C = Part number





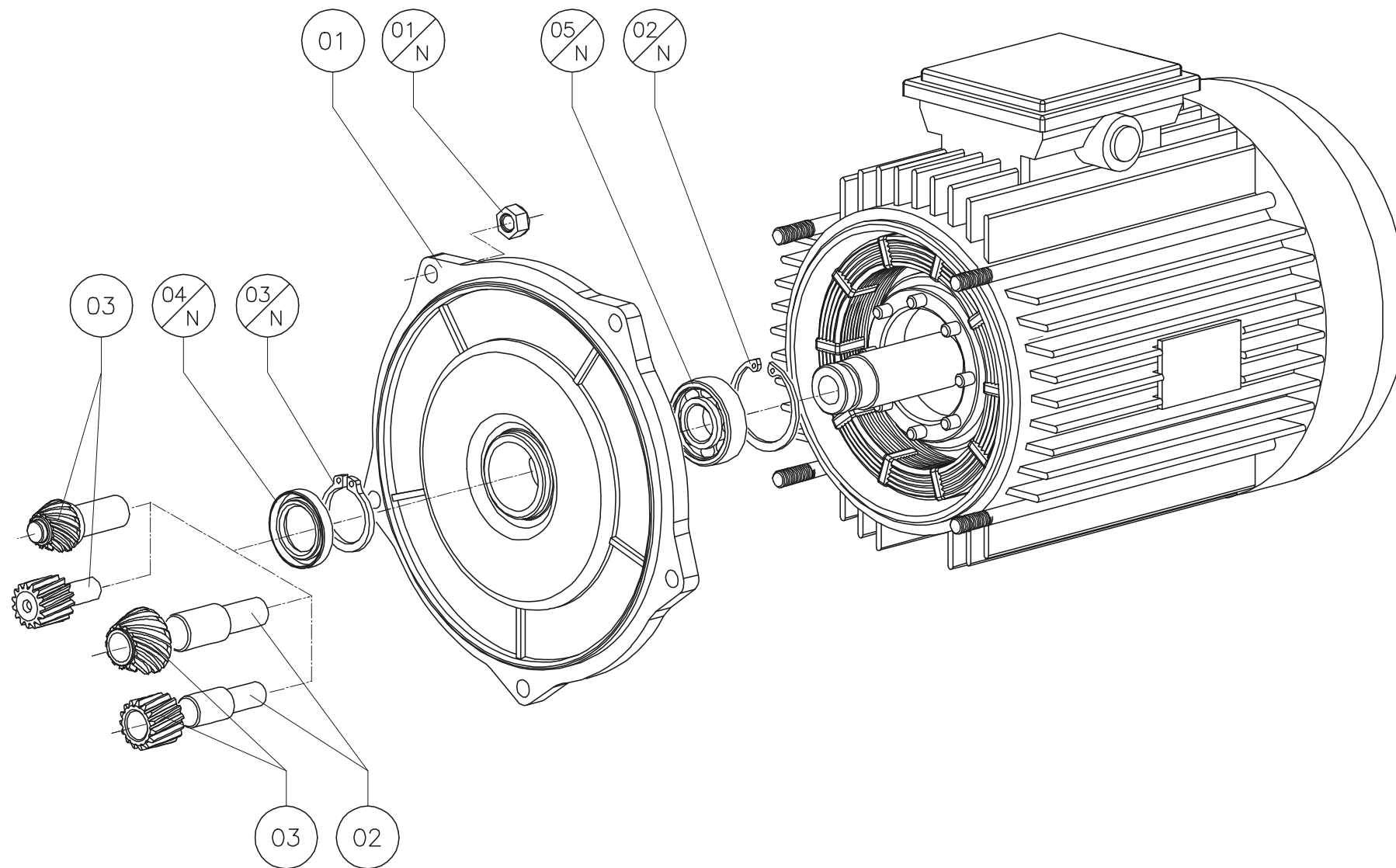
<i>P</i>	<i>T</i>	<i>C</i>	<i>Built</i>	<i>040</i>	<i>050</i>	<i>070</i>
8	001	01	Casing	8.040.01	8.050.01	8.070.01
8	001	02	Hollow output shaft	8.040.11	8.050.11	8.063.11
8	001	03	Bevel Gear	8.050.24	8.050.24	8.070.24
8	001	04	Pinion	8.040.25	8.050.25	8.070.25
8	001	05	Gear	8.040.26	8.050.26	8.070.26

<i>P</i>	<i>T</i>	<i>C</i>	<i>Commercial</i>	<i>040</i>		<i>050</i>		<i>070</i>	
8	001	01 N	Screw DIN 912	M6x20	5	M6x20	5	M8x30	5
8	001	02 N	Bearing	6201	1	6301	1	6304	1
8	001	03 N	Bearing	6007	1	61908	1	6010	1
8	001	04 N	Circlip DIN 472	62	1	62	1	80	1
8	001	05 N	Circlip DIN 472	32	1	37	1	52	1
8	001	06 N	Oil seal DIN 3760	AS 35x62x7	1	AS 40x62x8	1	AS 50x80x10	1
8	001	07 N	Cap	RCA 32x7	1	RCA 37x7	1	RCA 52x7	1
8	001	08 N	O-Ring	2500	1	2500	1	3725	1



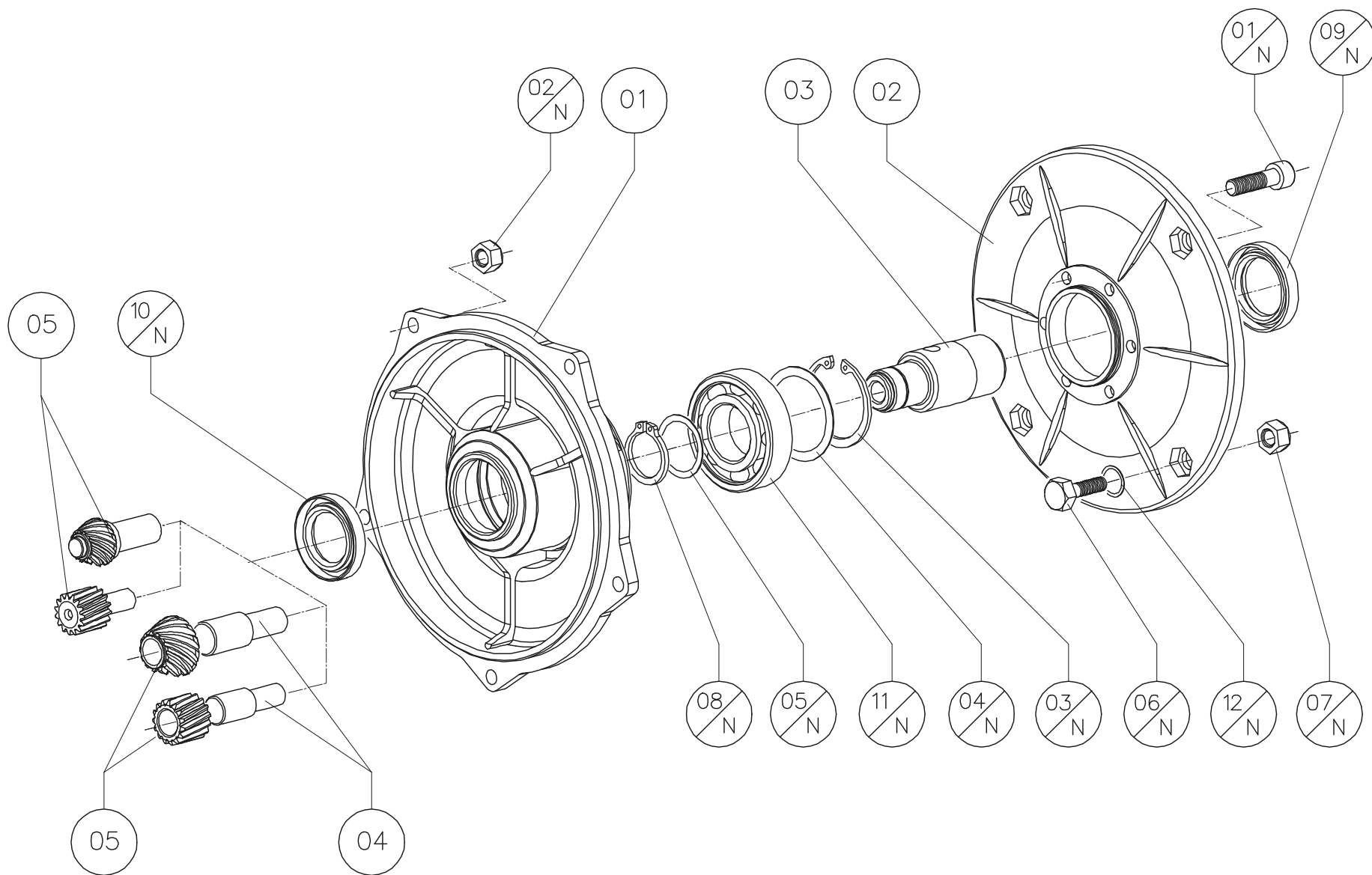
<b>P</b>	<b>T</b>	<b>C</b>	<b>Built</b>	<b>053</b>		<b>073</b>	
8	002	01	Cover	8.050.03		8.070.03	
8	002	02	Cover	-		0.050.07	
8	002	03	Middle shaft	8.050.17		8.070.17	
8	002	04	Gear	0.030.24		0.030.24	
8	002	05	Pinion	8.050.23		8.050.23	

<b>P</b>	<b>T</b>	<b>C</b>	<b>Commercial</b>	<b>053</b>		<b>073</b>	
8	002	01 N	Screw DIN 912	M6x20	5	M6x20	5
8	002	02 N	Screw DIN 912	M6x20	5	M6x18	5
8	002	03 N	Nut DIN 934/6	-	-	M8	5
8	002	04 N	Nut DIN 934/6	M6	5	M6	5
8	002	05 N	Lock nut	KM3 M17x1	1	KM3 M17x1	1
8	002	06 N	Gared ring	MB3	1	MB3	1
8	002	07 N	Oil seal DIN 3760	AS 25x35x7	1	AS 25x35x7	1
8	002	08 N	O-Ring	2500	1	2500	1
8	002	09 N	O-Ring	2500	1	2500	1
8	002	10 N	Bearing	6204	1	6204	1
8	002	11 N	Bearing	6205-2RS1	1	6205-2RS1	1



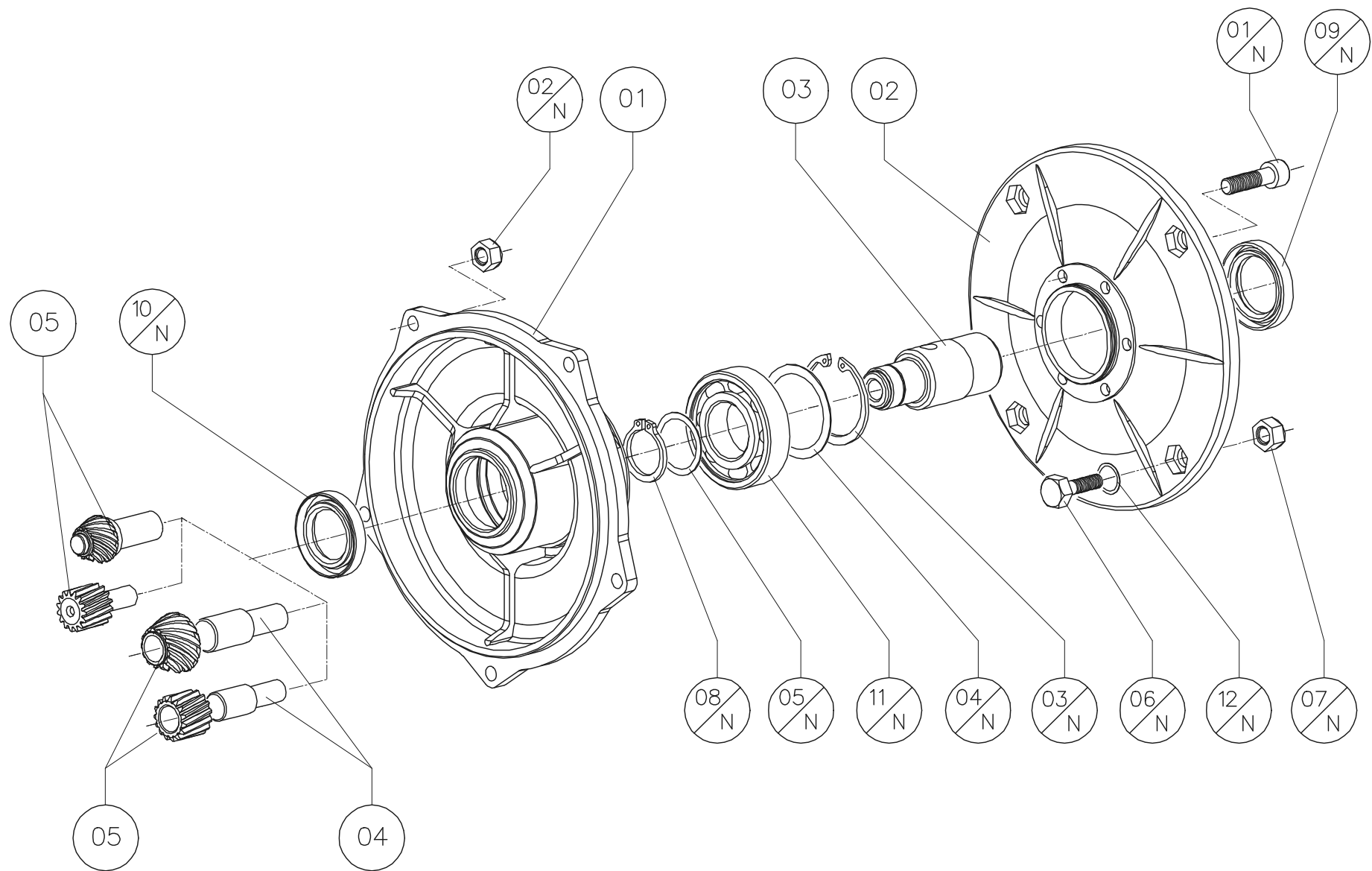
P	T	C	Built	042	052	053	072	073
8	003	01	Motor Shield	0.030.55	0.030.55 / 0.040.55	0.030.55 / 0.040.55	0.050.55	0.030.55 / 0.040.55
8	003	02	Pinion Hub	0.030.22	0.030.22	0.030.22	0.050.22	0.030.22
8	003	03	Pinion	-	-	0.030.23	-	0.030.23
8	003	03	Pinion	8.050.23	8.050.23	-	8.070.23	-

pam	P	T	C	Commercial	042		052		053		072		073	
063 B5 140x11	8	003	01 N	Nut DIN 934/6	M6	5	M6	5	M6	5	M8	5	M6	5
	8	003	02 N	Circlip DIN 472	35	1	35	1	35	1	-	-	35	1
	8	003	03 N	Circlip DIN 471	15	1	15	1	15	1	-	-	15	1
	8	003	04 N	Oil seal DIN 3760	A 15x27x7	1	A 15x27x7	1	A 15x27x7	1	-	-	A 15x27x7	1
	8	003	05 N	Bearing	6202-2Z	1	6202-2Z	1	6202-2Z	1	-	-	6202-2Z	1
071 B5 160x14	8	003	02 N	Circlip DIN 472	40	1	40	1	40	1	-	-	40	1
	8	003	03 N	Circlip DIN 471	17	1	17	1	17	1	-	-	17	1
	8	003	04 N	Oil seal DIN 3760	A 17x30x7	1	A 17x30x7	1	A 17x30x7	1	-	-	A 17x30x7	1
	8	003	05 N	Bearing	6203-2Z	1	6203-2Z	1	6203-2Z	1	-	-	6203-2Z	1
080 B5 200x19	8	003	02 N	Circlip DIN 472	47	1	47	1	47	1	47	1	47	1
	8	003	03 N	Circlip DIN 471	20	1	20	1	20	1	20	1	20	1
	8	003	04 N	Oil seal DIN 3760	A 20x35x7	1	A 20x35x7	1	A 20x35x7	1	A 20x35x7	1	A 20x35x7	1
	8	003	05 N	Bearing	6204-2Z	1	6204-2Z	1	6204-2Z	1	6204-2Z	1	6204-2Z	1
090 B5 200x24	8	003	02 N	Circlip DIN 472	-	-	62	1	62	1	62	1	62	1
	8	003	03 N	Circlip DIN 471	-	-	30	1	30	1	30	1	30	1
	8	003	04 N	Oil seal DIN 3760	-	-	A 30x47x7	1	A 30x47x7	1	A 30x47x7	1	A 30x47x7	1
	8	003	05 N	Bearing	-	-	6205-2Z	1	6205-2Z	1	6205-2Z	1	6205-2Z	1
100-112 B5 250x28	8	003	02 N	Circlip DIN 472	-	-	-	-	-	-	62	-	-	-
	8	003	03 N	Circlip DIN 471	-	-	-	-	-	-	30	-	-	-
	8	003	04 N	Oil seal DIN 3760	-	-	-	-	-	-	A 30x47x7	-	-	-
	8	003	05 N	Bearing	-	-	-	-	-	-	6206-2Z	-	-	-



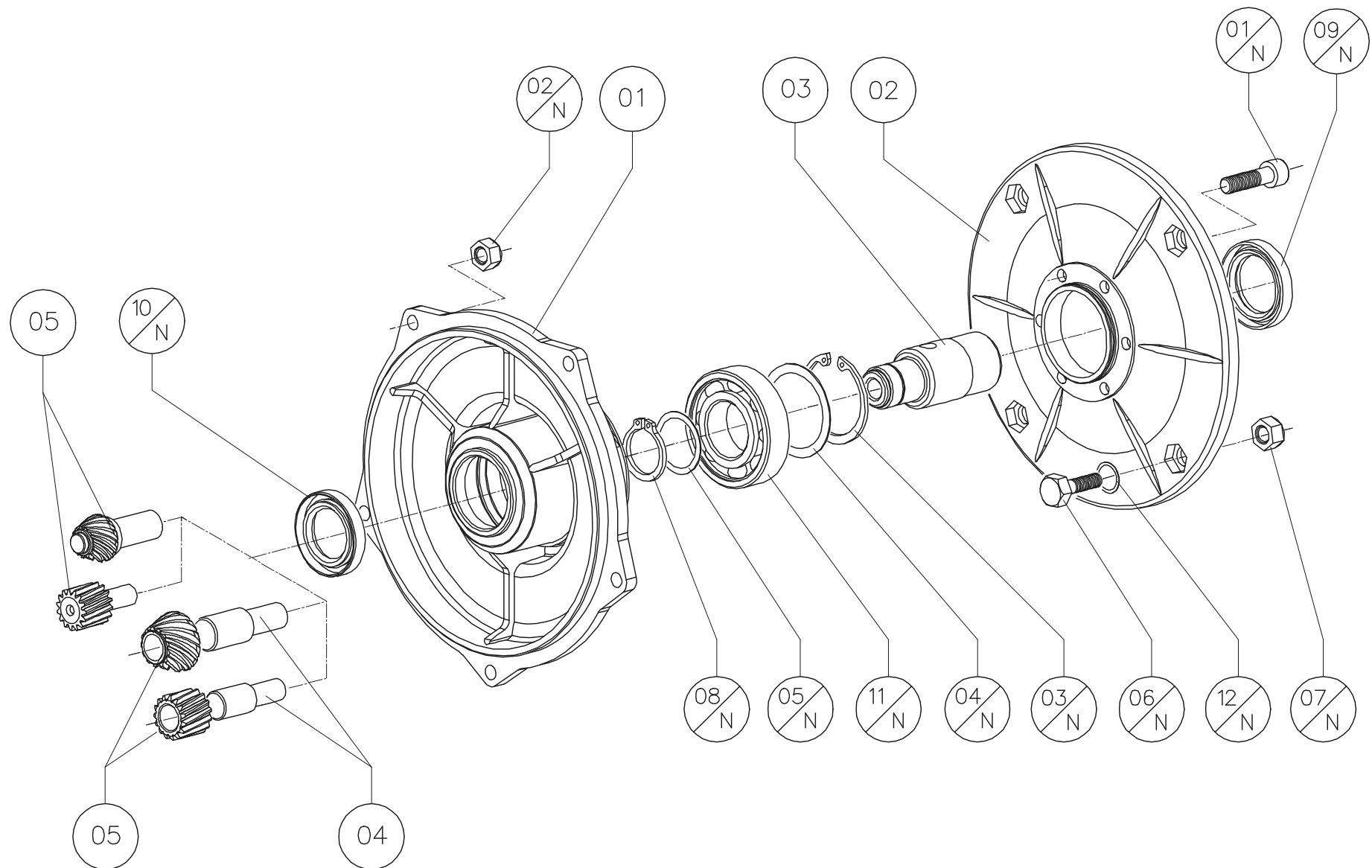
P	T	C	Built	042	052	072
8	004	01	Cover	0.030.04	0.030.04	0.050.04
8	004	02	PAM Flange	9.063.03	9.063.03	9.075.03
8	004	03	PAM Sleeve	0.030.16 (11-14-19)	0.030.16 (11-14-19)	0.030.16 (19) 0.040.16 (24) 0.050.16 (28)
8	004	04	Pinion Hub	0.030.22	0.030.22	0.050.22
8	004	05	Pinion	-	-	-
8	004	05	Pinion	8.050.23	8.050.23	8.070.23

pam	P	T	C	Commercial	042		052		072	
	8	004	01 N	Screw DIN 912	M8x18	6	M8x18	6	M8x20	6
	8	004	02 N	Nut DIN 934/6	M6	5	M6	5	M8	5
	8	004	03 N	Circlip DIN 472	52	1	52	1	62	1
	8	004	05 N	Spacer DIN 988	25x35x2	1	25x35x2	1	-	-
063 B5 140x11	8	004	06 N	Screw DIN 931	M8x25	4	M8x25	4	-	-
	8	004	07 N	Nut DIN 934/6	M8	4	M8	4	-	-
	8	004	08 N	Circlip DIN 471	25	1	25	1	-	-
	8	004	09 N	Oil seal DIN 3760	AS 35x52x7	1	AS 35x52x7	1	-	-
	8	004	10 N	Oil seal DIN 3760	A 25x42x7	1	A 25x42x7	1	-	-
	8	004	11 N	Bearing	6205-2RS1	1	6205-2RS1	1	-	-
071 B5 160x14	8	004	06 N	Screw DIN 931	M8x25	4	M8x25	4	-	-
	8	004	07 N	Nut DIN 934/6	M8	4	M8	4	-	-
	8	004	08 N	Circlip DIN 471	25	1	25	1	-	-
	8	004	09 N	Oil seal DIN 3760	AS 35x52x7	1	AS 35x52x7	1	-	-
	8	004	10 N	Oil seal DIN 3760	A 25x42x7	1	A 25x42x7	1	-	-
	8	004	11 N	Bearing	6205-2RS1	1	6205-2RS1	1	-	-
071 B14 105x14	8	004	06 N	Screw DIN 931	M8x25	4	M8x25	4	-	-
	8	004	07 N	Nut DIN 934/6	M8	4	M8	4	-	-
	8	004	08 N	Circlip DIN 471	25	1	25	1	-	-
	8	004	09 N	Oil seal DIN 3760	AS 35x52x7	1	AS 35x52x7	1	-	-
	8	004	10 N	Oil seal DIN 3760	A 25x42x7	1	A 25x42x7	1	-	-
	8	004	11 N	Bearing	6205-2RS1	1	6205-2RS1	1	-	-
080 B5 200x19	8	004	06 N	Screw DIN 931	M10x30	4	M10x30	4	M10x30	4
	8	004	07 N	Nut DIN 934/6	M10	4	M10	4	M10	4
	8	004	08 N	Circlip DIN 471	25	1	25	1	25	1
	8	004	09 N	Oil seal DIN 3760	AS 35x52x7	1	AS 35x52x7	1	AS 35x60x10	1
	8	004	10 N	Oil seal DIN 3760	A 25x42x7	1	A 25x42x7	1	A 25x42x7	1
	8	004	11 N	Bearing	6205-2RS1	1	6205-2RS1	1	6305-2RS1	1





pam	P	T	C	Commercial	042		052		072	
080 B14 120x19	8	004	06 N	Screw DIN 931	M10x30	4	M10x30	4	M10x30	4
	8	004	07 N	Nut DIN 934/6	M10	4	M10	4	M10	4
	8	004	08 N	Circlip DIN 471	25	1	25	1	25	1
	8	004	09 N	Oil seal DIN 3760	AS 35x52x7	1	AS 35x52x7	1	AS 35x60x10	1
	8	004	10 N	Oil seal DIN 3760	A 25x42x7	1	A 25x42x7	1	A 25x42x7	1
	8	004	11 N	Bearing	6205-2RS1	1	6205-2RS1	1	6305-2RS1	1
090 B5 200x24	8	004	06 N	Screw DIN 931	-	-	M10x30	4	M10x30	4
	8	004	07 N	Nut DIN 934/6	-	-	M10	4	M10	4
	8	004	08 N	Circlip DIN 471	-	-	25	1	25	1
	8	004	09 N	Oil seal DIN 3760	-	-	AS 35x52x7	1	AS 35x60x10	1
	8	004	10 N	Oil seal DIN 3760	-	-	A 25x42x7	1	A 25x42x7	1
	8	004	11 N	Bearing	-	-	6205-2RS1	1	6305-2RS1	1
090 B14 140x24	8	004	06 N	Screw DIN 931	-	-	M10x30	4	M8x25	4
	8	004	07 N	Nut DIN 934/6	-	-	M10	4	M8	4
	8	004	08 N	Circlip DIN 471	-	-	25	1	25	1
	8	004	09 N	Oil seal DIN 3760	-	-	AS 35x52x7	1	AS 35x60x10	1
	8	004	10 N	Oil seal DIN 3760	-	-	A 25x42x7	1	A 25x42x7	1
	8	004	11 N	Bearing	-	-	6205-2RS1	1	6305-2RS1	1
	8	004	12 N	Rondella DIN 125/A	-	-	M10	4	-	-
100 B5 250x28	8	004	06 N	Screw DIN 931	-	-	-	-	M12x35	4
	8	004	07 N	Nut DIN 934/6	-	-	-	-	M12	4
	8	004	08 N	Circlip DIN 471	-	-	-	-	30	1
	8	004	04 N	Spacer DIN 988	-	-	-	-	50x62x1	1
	8	004	09 N	Oil seal DIN 3760	-	-	-	-	AS 40x60x10	1
	8	004	10 N	Oil seal DIN 3760	-	-	-	-	AS 30x42x7	1
	8	004	11 N	Bearing	-	-	-	-	6206-2RS1	1
	8	004	12 N	Rondella DIN 125/A	-	-	-	-	50x62x1	1
100 B14 160x28	8	004	06 N	Screw DIN 931	-	-	-	-	M8x25	4
	8	004	07 N	Nut DIN 934/6	-	-	-	-	M8	4
	8	004	08 N	Circlip DIN 471	-	-	-	-	30	1
	8	004	04 N	Spacer DIN 988	-	-	-	-	50x62x1	1
	8	004	09 N	Oil seal DIN 3760	-	-	-	-	AS 40x60x10	1
	8	004	10 N	Oil seal DIN 3760	-	-	-	-	AS 30x42x7	1
	8	004	11 N	Bearing	-	-	-	-	6206-2RS1	1
	8	004	12 N	Rondella DIN 125/A	-	-	-	-	M8	1

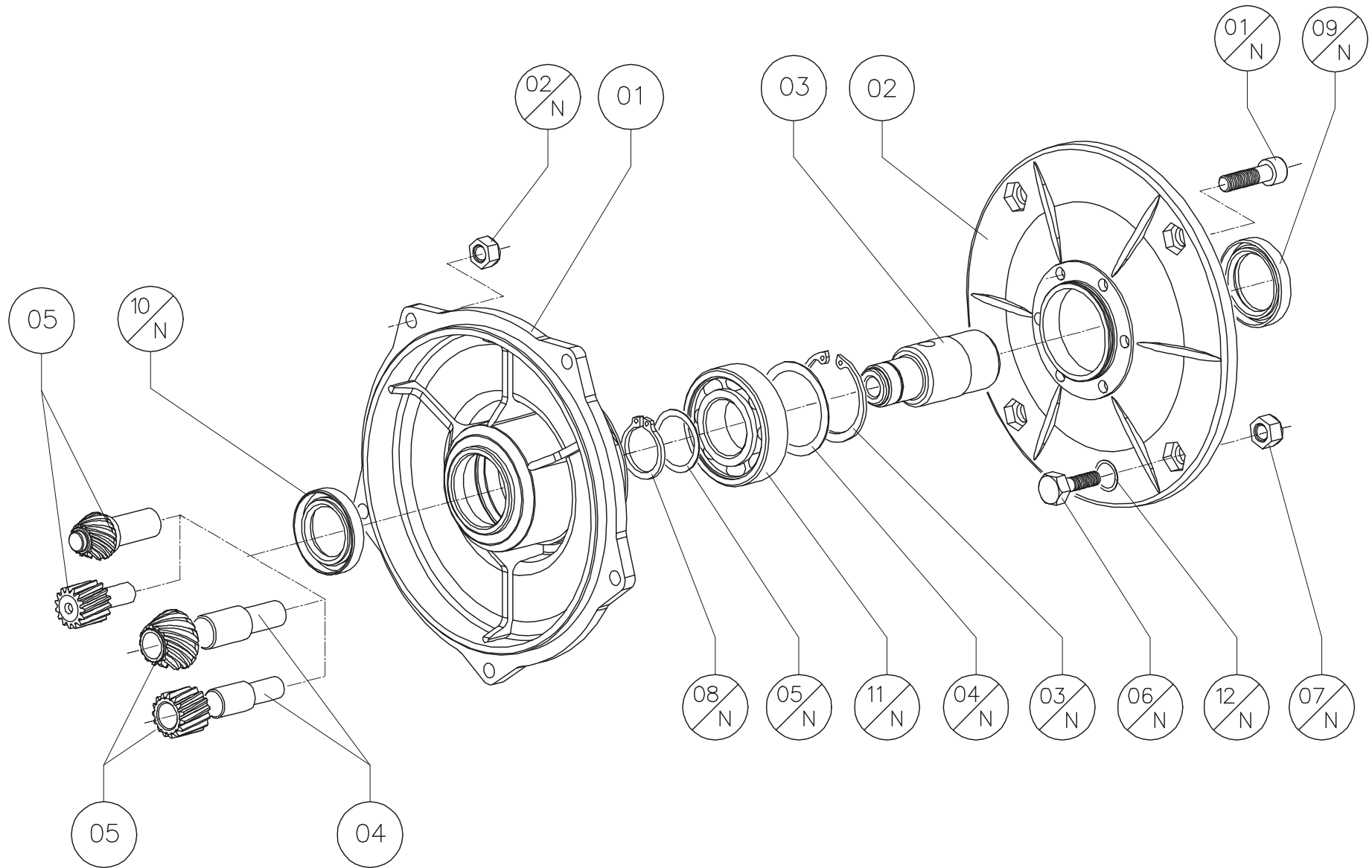


<i>pam</i>	<b>P</b>	<b>T</b>	<b>C</b>	<b>Commercial</b>	<b>042</b>		<b>052</b>		<b>072</b>	
112 B5 250x28	8	004	06 N	Screw DIN 931	-	-	-	-	M12x35	4
	8	004	07 N	Nut DIN 934/6	-	-	-	-	M12	4
	8	004	08 N	Circlip DIN 471	-	-	-	-	30	1
	8	004	04 N	Spacer DIN 988	-	-	-	-	50x62x1	1
	8	004	09 N	Oil seal DIN 3760	-	-	-	-	AS 40x60x10	1
	8	004	10 N	Oil seal DIN 3760	-	-	-	-	AS 30x42x7	1
	8	004	11 N	Bearing	-	-	-	-	6206-2RS1	1
112 B14 160x28	8	004	06 N	Screw DIN 931	-	-	-	-	M8x25	4
	8	004	07 N	Nut DIN 934/6	-	-	-	-	M8	4
	8	004	08 N	Circlip DIN 471	-	-	-	-	30	1
	8	004	04 N	Spacer DIN 988	-	-	-	-	50x62x1	1
	8	004	09 N	Oil seal DIN 3760	-	-	-	-	AS 40x60x10	1
	8	004	10 N	Oil seal DIN 3760	-	-	-	-	AS 30x42x7	1
	8	004	11 N	Bearing	-	-	-	-	6206-2RS1	1
8	004	12 N	Rondella DIN 125/A	-	-	-	-	M8	1	

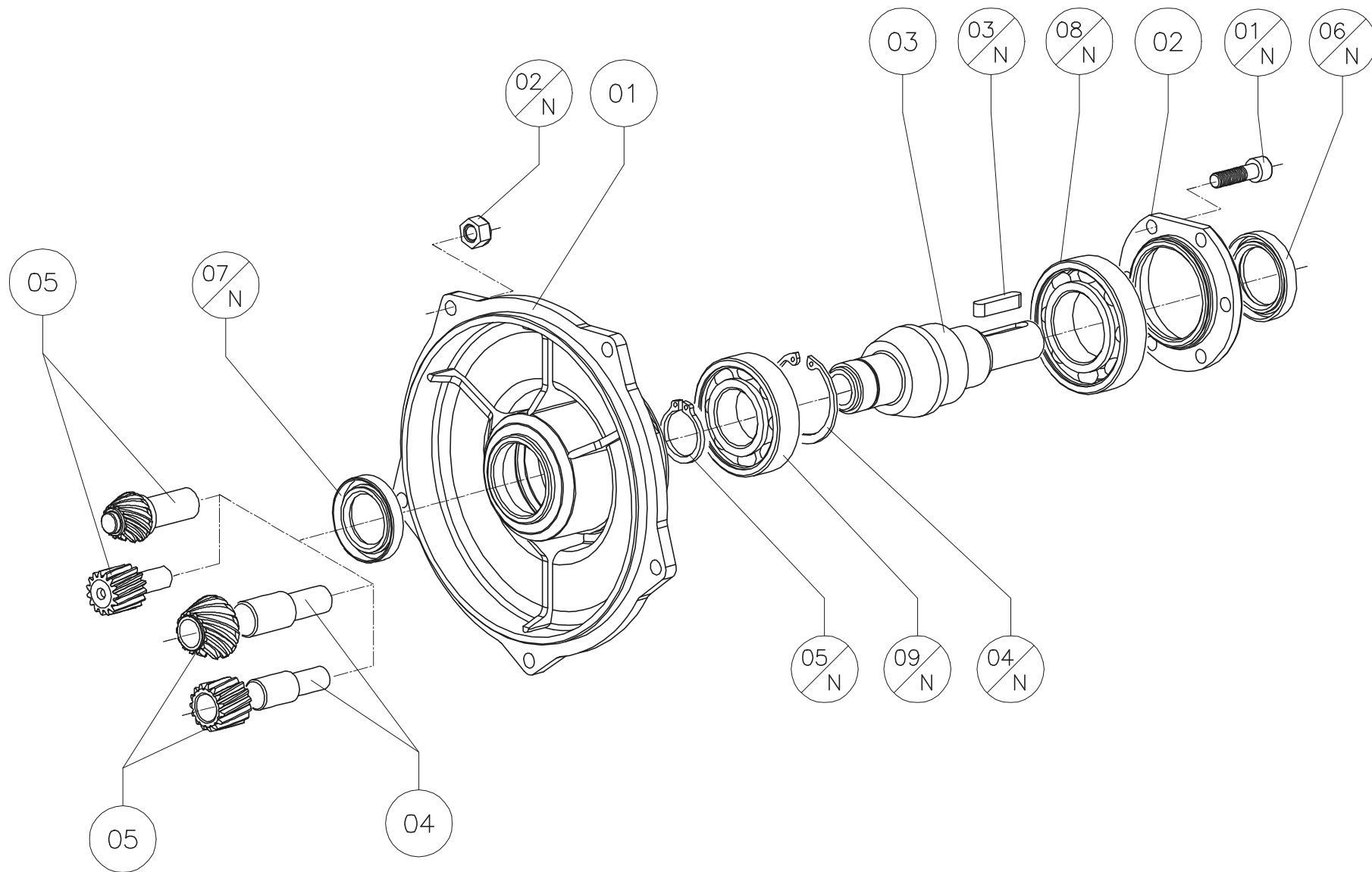


<i>P</i>	<i>T</i>	<i>C</i>	<b>Built</b>	<b>053</b>	<b>073</b>
8	004	01	Cover	0.030.04	0.030.04
8	004	02	PAM Flange	9.063.03	9.063.03
8	004	03	PAM Sleeve	0.030.16 (11-14-19)	0.030.16 (11-14-19) 0.040.16 (24)
8	004	04	Pinion Hub	0.030.22	0.030.22
8	004	05	Pinion	0.030.23	0.030.23
8	004	05	Pinion	-	-

<i>pam</i>	<i>P</i>	<i>T</i>	<i>C</i>	<b>Commercial</b>	<b>053</b>		<b>073</b>	
	8	004	01 N	Screw DIN 912	M8x18	6	M8x18	6
	8	004	02 N	Nut DIN 934/6	M6	5	M6	5
	8	004	03 N	Circlip DIN 472	52	1	52	1
	8	004	05 N	Spacer DIN 988	25x35x2	1	25x35x2	1
063 B5 140x11	8	004	06 N	Screw DIN 931	M8x25	4	M8x25	4
	8	004	07 N	Nut DIN 934/6	M8	4	M8	4
	8	004	08 N	Circlip DIN 471	25	1	25	1
	8	004	09 N	Oil seal DIN 3760	AS 25x42x7	1	AS 25x42x7	1
	8	004	10 N	Oil seal DIN 3760	AS 35x52x7	1	AS 35x52x7	1
071 B5 160x14	8	004	11 N	Bearing	6205-2RS1	1	6205-2RS1	1
	8	004	06 N	Screw DIN 931	M8x25	4	M8x25	4
	8	004	07 N	Nut DIN 934/6	M8	4	M8	4
	8	004	08 N	Circlip DIN 471	25	1	25	1
	8	004	09 N	Oil seal DIN 3760	AS 25x42x7	1	AS 25x42x7	1
	8	004	10 N	Oil seal DIN 3760	AS 35x52x7	1	AS 35x52x7	1
071 B14 105x14	8	004	11 N	Bearing	6205-2RS1	1	6205-2RS1	1
	8	004	06 N	Screw DIN 931	M6x25	4	M6x25	4
	8	004	07 N	Nut DIN 934/6	M6	4	M6	4
	8	004	08 N	Circlip DIN 471	25	1	25	1
	8	004	09 N	Oil seal DIN 3760	AS 25x42x7	1	AS 25x42x7	1
	8	004	10 N	Oil seal DIN 3760	AS 35x52x7	1	AS 35x52x7	1
080 B5 200x19	8	004	11 N	Bearing	6205-2RS1	1	6205-2RS1	1
	8	004	06 N	Screw DIN 931	M10x30	4	M10x30	4
	8	004	07 N	Nut DIN 934/6	M10	4	M10	4
	8	004	08 N	Circlip DIN 471	25	1	25	1
	8	004	09 N	Oil seal DIN 3760	AS 25x42x7	1	AS 25x42x7	1
	8	004	10 N	Oil seal DIN 3760	AS 35x52x7	1	AS 35x52x7	1



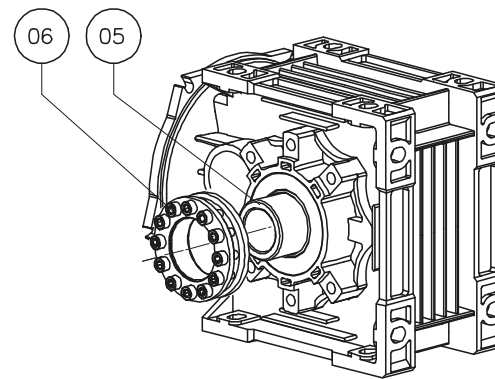
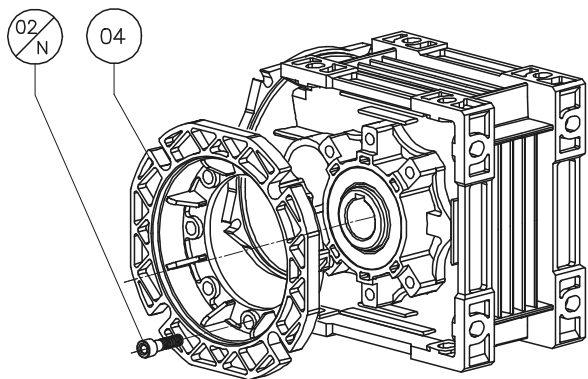
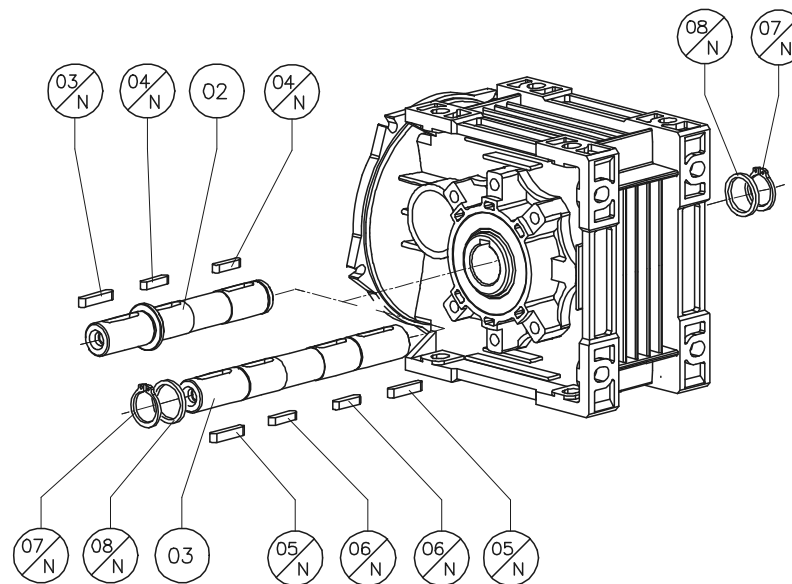
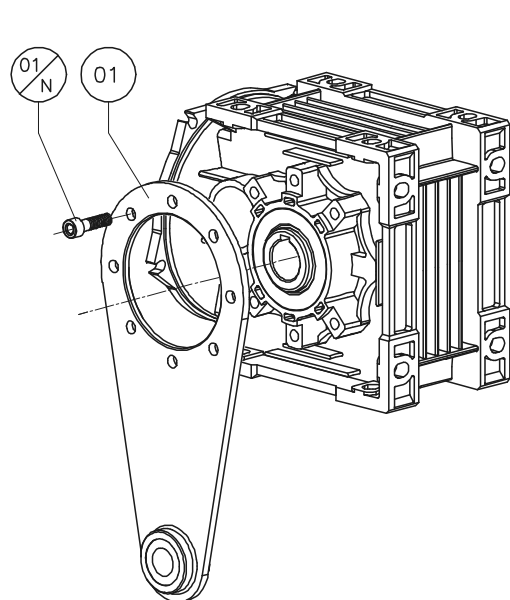
<i>pam</i>	<b>P</b>	<b>T</b>	<b>C</b>	<b>Commercial</b>	<b>053</b>		<b>073</b>	
<b>080 B14</b> 120x19	8	004	06 N	Screw DIN 931	M6x25	4	M6x25	4
	8	004	07 N	Nut DIN 934/6	M6	4	M6	4
	8	004	08 N	Circlip DIN 471	25	1	25	1
	8	004	09 N	Oil seal DIN 3760	AS 25x42x7	1	AS 25x42x7	1
	8	004	10 N	Oil seal DIN 3760	AS 35x52x7	1	AS 35x52x7	1
	8	004	11 N	Bearing	6205-2RS1	1	6205-2RS1	1
<b>090 B5</b> 200x24	8	004	06 N	Screw DIN 931	M10x30	4	M10x30	4
	8	004	07 N	Nut DIN 934/6	M10	4	M10	4
	8	004	08 N	Circlip DIN 471	25	1	25	1
	8	004	09 N	Oil seal DIN 3760	AS 25x42x7	1	AS 25x42x7	1
	8	004	10 N	Oil seal DIN 3760	AS 35x52x7	1	AS 35x52x7	1
	8	004	11 N	Bearing	6205-2RS1	1	6205-2RS1	1
<b>090 B14</b> 140x24	8	004	06 N	Screw DIN 931	M8x25	4	M8x25	4
	8	004	07 N	Nut DIN 934/6	M8	4	M8	4
	8	004	08 N	Circlip DIN 471	25	1	25	1
	8	004	09 N	Oil seal DIN 3760	AS 25x42x7	1	AS 25x42x7	1
	8	004	10 N	Oil seal DIN 3760	AS 35x52x7	1	AS 35x52x7	1
	8	004	11 N	Bearing	6205-2RS1	1	6205-2RS1	1
	8	004	12 N	Rondella DIN 125/A	M8	4	M8	4





<i>P</i>	<i>T</i>	<i>C</i>	<i>Built</i>	<i>042</i>	<i>052</i>	<i>053</i>	<i>072</i>	<i>073</i>
8	005	01	Cover	0.030.04	0.030.04	0.030.04	0.050.04	0.030.04
8	005	02	Cover	9.063.06	9.063.06	9.063.06	9.075.06	9.063.06
8	005	03	Input shaft	0.030.15	0.030.15	0.030.15	0.050.15	0.030.15
8	005	04	Pinion Hub	0.030.22	0.030.22	0.030.22	0.050.22	0.030.22
8	005	05	Pinion	8.050.23	8.050.23	0.030.23	8.070.23	8.050.23

<i>P</i>	<i>T</i>	<i>C</i>	<i>Commercial</i>	<i>042</i>		<i>052</i>		<i>053</i>		<i>072</i>		<i>070</i>	
8	005	01 N	Screw DIN 912	M8x18	6	M8x18	6	M8x18	6	M8x20	6	M8x18	6
8	005	02 N	Nut DIN 934/6	M6	5	M6	5	M6	5	M8	5	M6	5
8	005	03 N	Key DIN 6885	A 5x5x30	1	A 5x5x30	1	A 5x5x30	1	A 6x6x30	1	A 5x5x30	1
8	005	04 N	Circlip DIN 472	52	1	52	1	52	1	62	1	52	1
8	005	05 N	Circlip DIN 471	25	1	25	1	25	1	25	1	25	1
8	005	06 N	Oil seal DIN 3760	AS 25x52x7	1	AS 25x52x7	1	AS 25x52x7	1	AS 30x62x7	1	AS 25x52x7	1
8	005	07 N	Oil seal DIN 3760	A 25x42x7	1	A 25x42x7	1	A 25x42x7	1	AS 30x42x7	1	A 25x42x7	1
8	005	08 N	Bearing	6007-2RS1	1	6007-2RS1	1	6007-2RS1	1	6008-2RS1	1	6007-2RS1	1
8	005	09 N	Bearing	6205-2RS1	1	6205-2RS1	1	6205-2RS1	1	6305-2RS1	1	6205-2RS1	1



<b>P</b>	<b>T</b>	<b>C</b>	<b>Built</b>	<b>040</b>	<b>050</b>	<b>070</b>
8	006	01	Torque Arm	9.050.05	9.063.05	9.075.05
8	006	02	Output shaft	8.040.12	9.063.21	8.070.18
8	006	03	Double Output Shaft	8.040.13	9.063.22	8.070.19
8	006	04	Output flange	9.050.04	9.063.04	9.075.04
8	006	05	Shaft for Shrink Disc	8.040.20	8.050.20	8.063.20
8	006	06	Shrink Disc	8.040.54	8.050.54	8.063.54

<b>P</b>	<b>T</b>	<b>C</b>	<b>Commercial</b>	<b>040</b>		<b>050</b>		<b>070</b>	
8	006	01 N	Screw DIN 912	M8x18	4	M8x18	6	M8x25	7
8	006	02 N	Screw DIN 912	M8x18	4	M8x18	6	M8x25	7
8	006	03 N	Key DIN 6885	A 6x6x30	1	A 8x7x35	1	A 10x8x50	1
8	006	04 N	Key DIN 6885	A 6x6x25	1	A 8x7x30	1	-	-
8	006	05 N	Key DIN 6885	A 6x6x30	1	A 8x7x35	1	A 10x8x50	1
8	006	06 N	Key DIN 6885	A 6x6x25	1	A 8x7x30	1	-	-
8	006	07 N	Circlip DIN 471	20	1	25	1	-	-
8	006	08 N	Spacer DIN 988	20x28x2	1	25x35x2	1	-	-



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