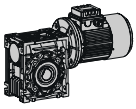


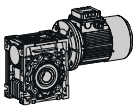


**MAINTENANCE AND OPERATING
INSTRUCTIONS FOR WORM GEAR
REDUCERS AND GEARMOTORS
SERIES:**

**NMRV - MCV - NRV
NMRV+NMRV
PC+NMRV**







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

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

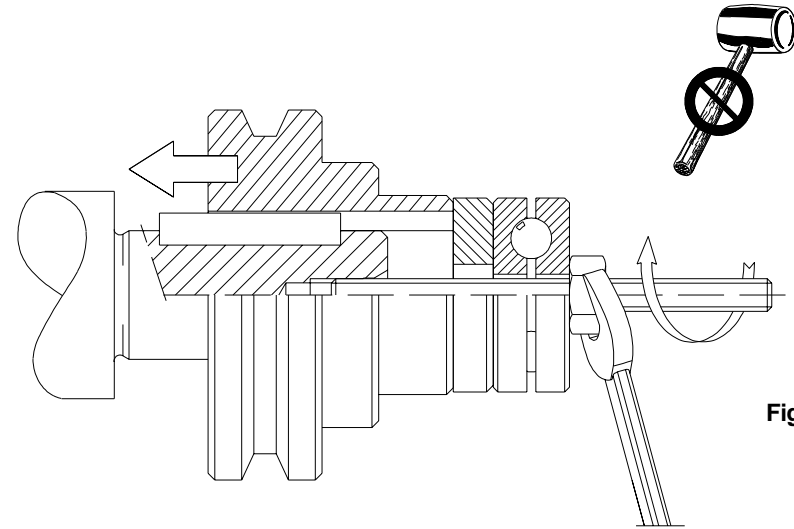


Fig. 1

Installation

Particular care must be taken when installing drives, as this is often the source of damage and 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 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.

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

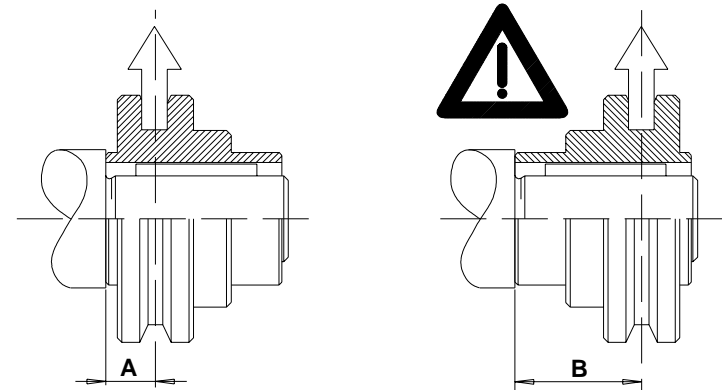
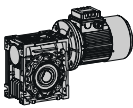


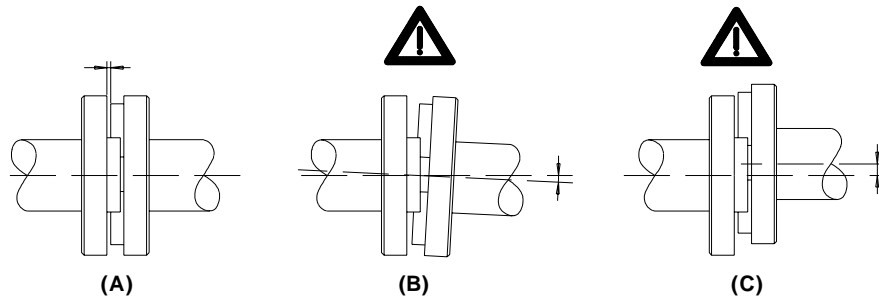
Fig. 2



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 centering diameter 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.

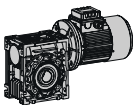
Troubleshooting

If any problems should arise when starting 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 kept 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.

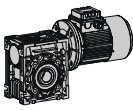


Troubleshooting

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>Intermittent noise from the gears.</i>	Dirt 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>	Misalignment of the assembly coupling.	Check geometric tolerance of flange on electric motor. Check tolerance and geometry of key on motor shaft.	Replace electric motor.



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 tables below that highlight different critical situations for each size of reduction unit.

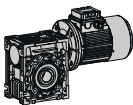
It is also necessary to take due consideration of and carefully assess the following applications by calling our Technical Service.

- 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 -5°C or over 40°C.
- Use in chemically aggressive environments.
- Use in a salty environment.
- Mounting positions not envisaged in the catalogue.
- Use in radioactive environment.
- Use in environments with pressures other than atmospheric pressure
- Avoid applications where even partial immersion of the reduction unit is required.

NMRV - MCV	025	030	040	050	063	075	090	105	110	130	150
V5: 1500 < n1 < 3000	-	-	-	-	-	B	B	B	B	B	B
n1 > 3000	B	B	B	B	B	A	A	A	A	A	A
V6	B	B	B	B	B	B	B	B	B	B	B

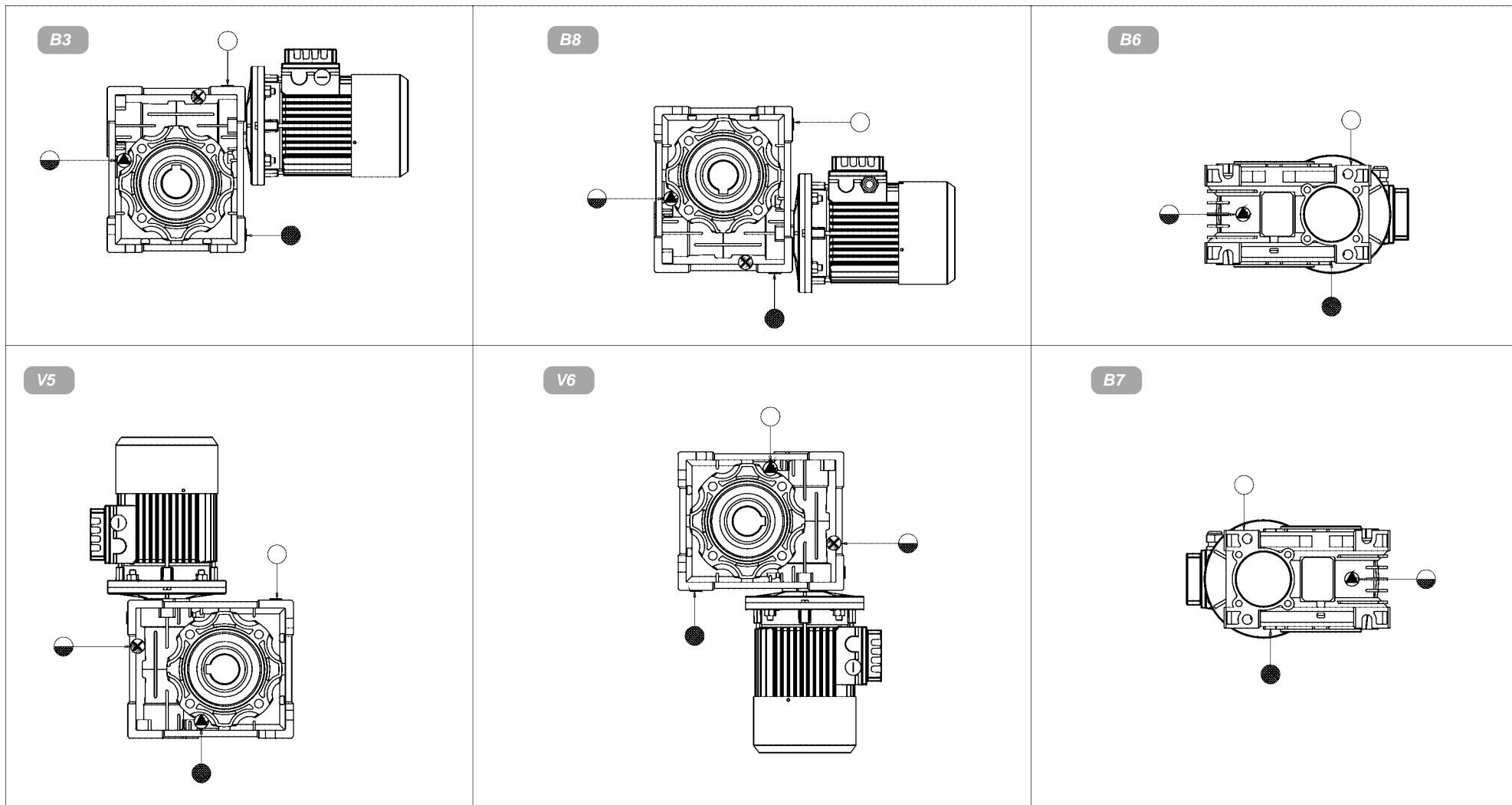
A - Application not recommended

B - Check the application and/or call our technical service

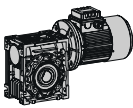


Mounting position

025 ÷ 150



- Oil fill / breather plug
- ◐ Oil level plug
- Oil drain plug



Lubrication

	NMRV 025 ÷ 105 PC 063 ÷ 090	NMRV 110 ÷ 150	
	Synthetic oil	Mineral oil	
T°C	(-25) ÷ (+50)	(-5) ÷ (+40)	(-15) ÷ (+25)
ISO VG...	ISO VG320	ISO VG460	ISO VG220
AGIP	TELIUM VSF320	BLASIA 460	BLASIA 220
SHELL	TIVELA OIL SC320	OMALA OIL460	OMALA OIL220
ESSO	S220	SPARTAN EP460	SPARTAN EP220
MOBIL	GLYGOYLE 30	MOBILGEAR 634	MOBILGEAR 630
CASTROL	ALPHASYN PG320	ALPHA MAX 460	ALPHA MAX 220
BP	ENERGOL SG-XP320	ENERGOL GR-XP460	ENERGOL GR-XP220

Lubrication (PC)

- The pre-stage helical modules are supplied complete with life-long lubricant, synthetic oil, AGIP TELIUM VSF, and can therefore be mounted in all of the positions.
- Lubrication is separate from that of the worm reduction unit.
- The synthetic lubricant adopted by Motovario can be used in places with temperatures from -25°C to + 50°C.

PC	063	071	080	090
B3 - B8 B6 - B7 V5 - V6	0,05	0,07	0,15	0,16

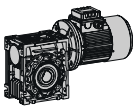
Quantity of oil in litres.

Lubrication (NMRV - MCV - NRV)

- Size 025 - 030 - 040 - 050 - 063 - 075 - 090 - 105 gear reducers come pre-filled with IP TELIUM VSF, a synthetic gear oil suitable for permanent lubrication. They can be mounted in any position. Only sizes 075 and 090 should not be installed in mounting positions V5 and V6 without prior consultation with our Technical Advise Service to determine optimal lubrication conditions.
- Size 110 and 130 gear reducers come pre-filled with IP MELLANA OIL 220, a mineral based gear oil.
- Always specify mounting position if different from B3 when ordering size 110 and 130 gear reducers.
- Size 110 and 130 gear reducers have oil filler, drain, and level plugs. After installation, replace the closed cap fitted for transport with the breather plug prior to operating the unit.
- The synthetic oil used by MOTOVARIO can operate in all ambient temperatures between - 25°C and +50°C.

NMRV	025	030	040	050	063	075	090	105	110	130	150
B3									3	4,5	7
B8									2,2	3,3	5,1
B6-B7	0,02	0,04	0,08	0,15	0,3	0,55	1	1,6	2,5	3,5	5,4
V5									3	4,5	7
V6									2,2	3,3	5,1

Quantity of oil in litres.

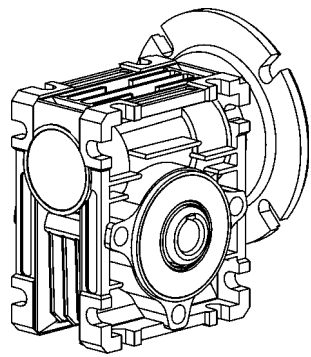


Spare parts tables

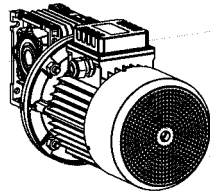
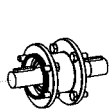
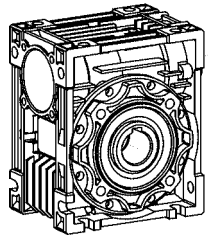
025÷150

Spare parts tables

025÷150

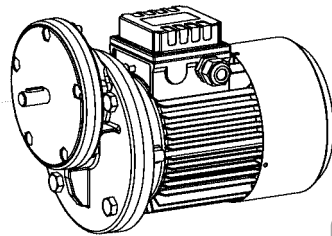
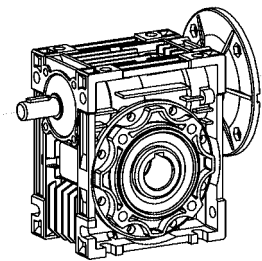


001 For 025

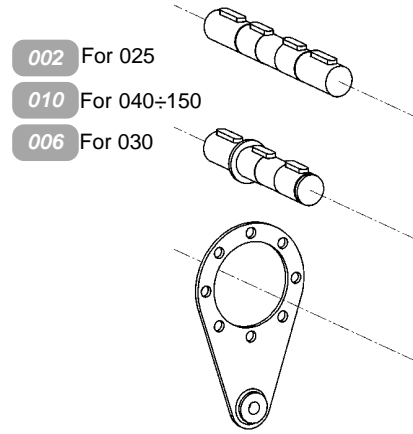


011 For 025

012 For 030÷063



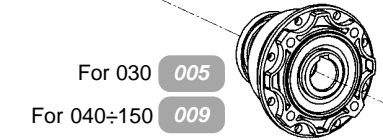
013 For 063÷090



002 For 025

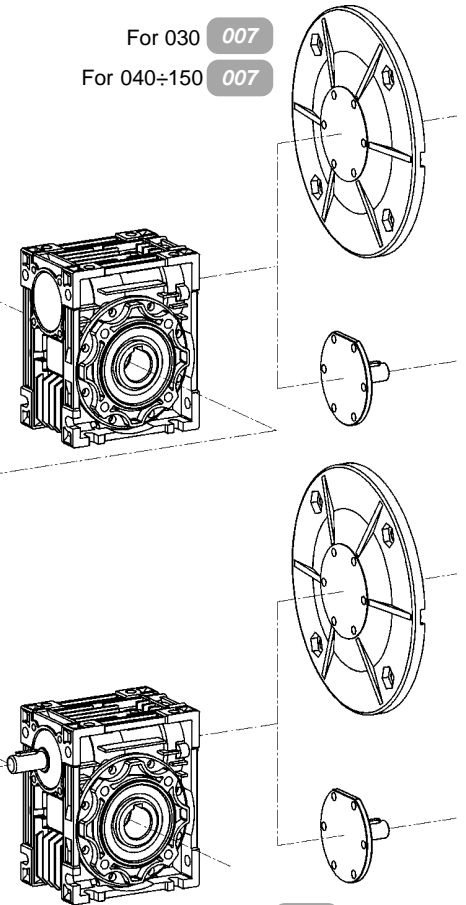
010 For 040÷150

006 For 030



For 030 005

For 040÷150 009



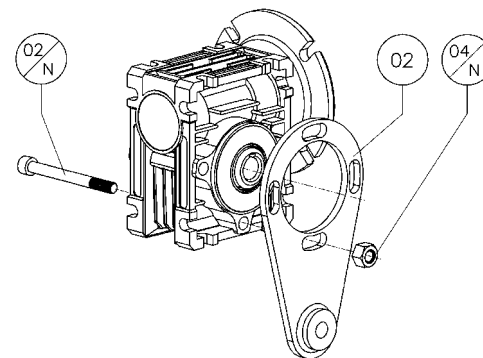
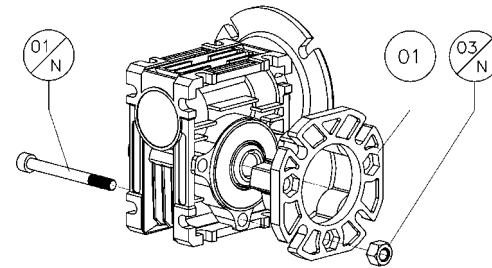
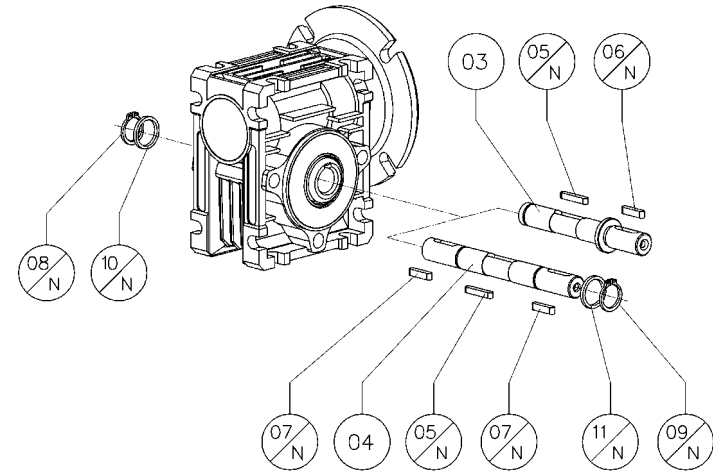
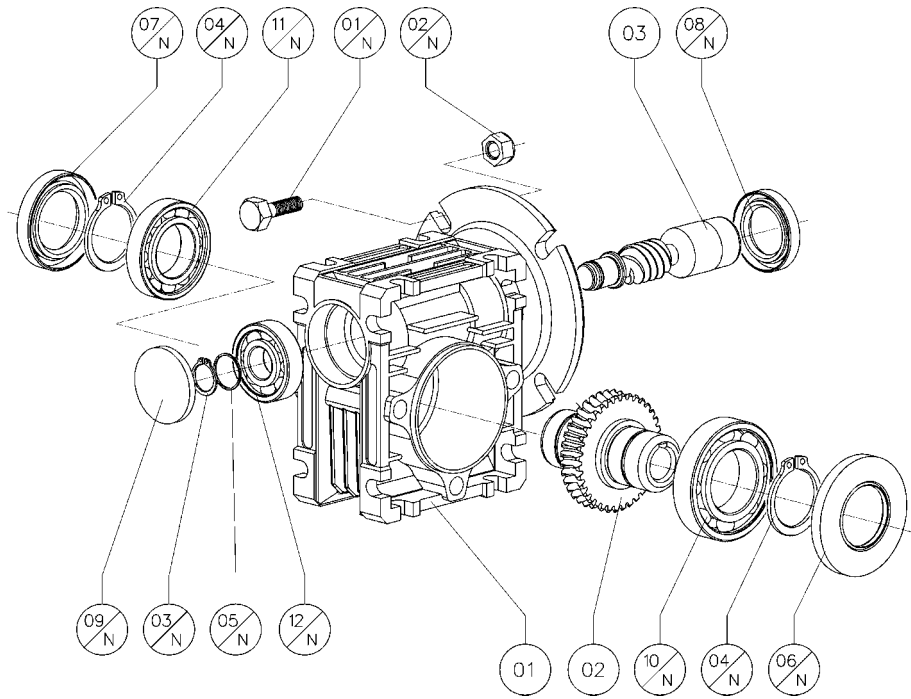
For 030 007

For 040÷150 007

004 For 030

008 For 040÷150

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



MOTOVARIO

TAV 001 1/1

025

P	T	C	Built	025
9	001	01	Casing	9.025.01
9	001	02	Worm Wheel	9.025.11
9	001	03	PAM worm	9.025.14

P	T	C	Commercial	025	
9	001	01 N	Screw DIN 931	M5x10	4
9	001	02 N	Nut DIN 934/6	M5	4
9	001	03 N	Circlip DIN 471	10	1
9	001	04 N	Circlip DIN 471	20	1
9	001	05 N	Spacer DIN 988	10x16x1,2	1
9	001	06 N	Oil Seal DIN 3760	A 20x42x7	1
9	001	07 N	Oil Seal DIN 3760	A 20x32x7	1
9	001	08 N	Oil Seal DIN 3760	A 17x30x7	1
9	001	09 N	Cap	RCA 28x4	1
9	001	10 N	Bearing	16004	1
9	001	11 N	Bearing	61904	1
9	001	12 N	Bearing	6000	1

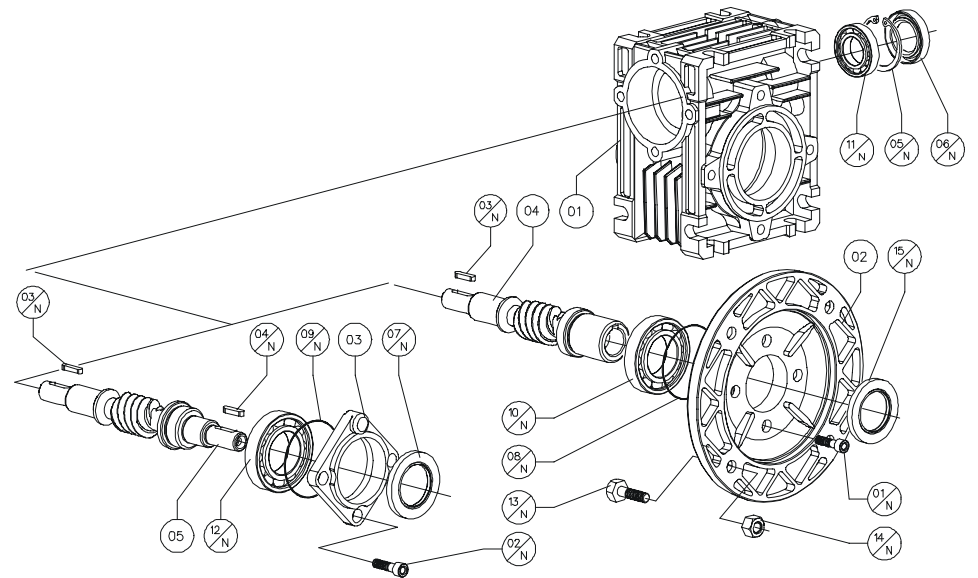
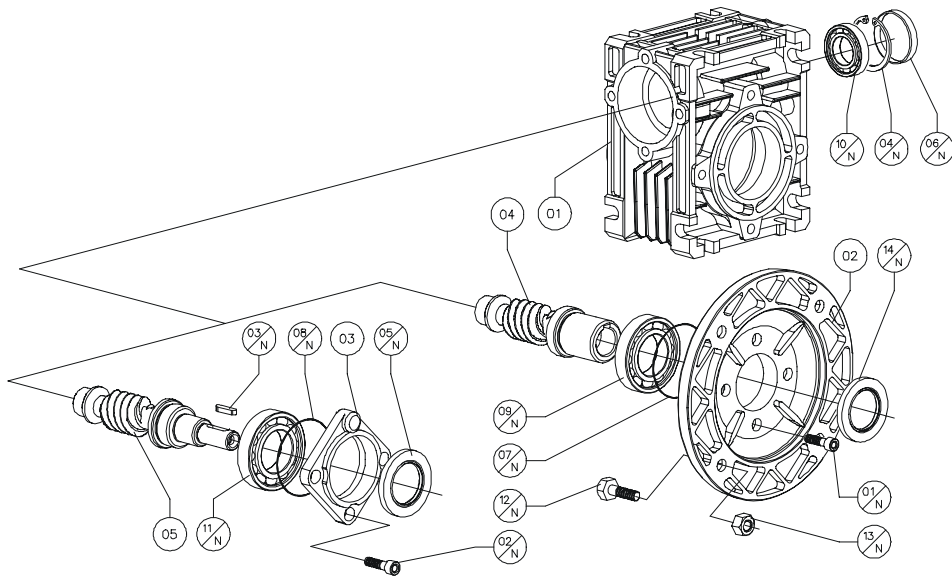
MOTOVARIO

TAV 002 1/1

025

P	T	C	Built	025
9	002	01	Output Flange F	9.025.04
9	002	02	Torque arm	9.025.05
9	002	03	Single output shaft	9.025.21
9	002	04	Double output shaft	9.025.22

P	T	C	Commercial	025	
9	002	01 N	Screw DIN 912	M6x65	3
9	002	02 N	Screw DIN 912	M6x55	3
9	002	03 N	Nut DIN 934/6	M6	3
9	002	04 N	Nut DIN 934/6	M6	3
9	002	05 N	Key DIN 6885	A 4x4x20	1
9	002	06 N	Key DIN 6885	A 4x4x15	1
9	002	07 N	Key DIN 6885	A 4x4x15	1
9	002	08 N	Circlip DIN 471	11	1
9	002	09 N	Circlip DIN 471	11	1
9	002	10 N	Spacer DIN 988	11x17x1,2	1
9	002	11 N	Spacer DIN 988	11x17x1,2	1



MOTOVARIO

TAV 003 1/1

030

P	T	C	Built	030
9	003	01	Casing	9.030.01
9	003	02	PAM flange	9.030.03
9	003	03	Gear unit cover	9.030.06
9	003	04	PAM worm	9.030.14
9	003	05	RV worm	9.030.16

pam	P	T	C	Commercial	030
	9	003	01 N	Shcs screw DIN 7984	M6x12 4
	9	003	02 N	Shcs screw DIN 7984	M6x12 3
	9	003	03 N	Key DIN 6885	A 3x3x15 1
	9	003	04 N	Circlip DIN 472	32 1
	9	003	05 N	Oil seal DIN 3760	AS 12x32x7 1
	9	003	06 N	Cap	RCA 32-5 1
	9	003	07 N	O-Ring	2131 1
	9	003	08 N	O-Ring	2131 1
	9	003	09 N	Bearing	61904 1
	9	003	10 N	Bearing	6201 1
	9	003	11 N	Bearing	6301 1
056 B5	9	003	12 N	Hex screw DIN 931	M6x20 4
	9	003	13 N	Nut DIN 934/6	M6 4
	9	003	14 N	Oil seal DIN 3760	A 20x30x7 1
063 B5	9	003	12 N	Hex screw DIN 931	M8x25 4
	9	003	13 N	Nut DIN 934/6	M8 4
	9	003	14 N	Oil seal DIN 3760	A 20x30x7 1
056 B14	9	003	12 N	Hex screw DIN 931	M5x12 4
	9	003	13 N	Nut DIN 934/6	M5 4
	9	003	14 N	Oil seal DIN 3760	A 20x30x7 1
063 B14	9	003	12 N	Hex screw DIN 931	M5x12 4
	9	003	13 N	Nut DIN 934/6	M5 4
	9	003	14 N	Oil seal DIN 3760	A 20x30x7 1

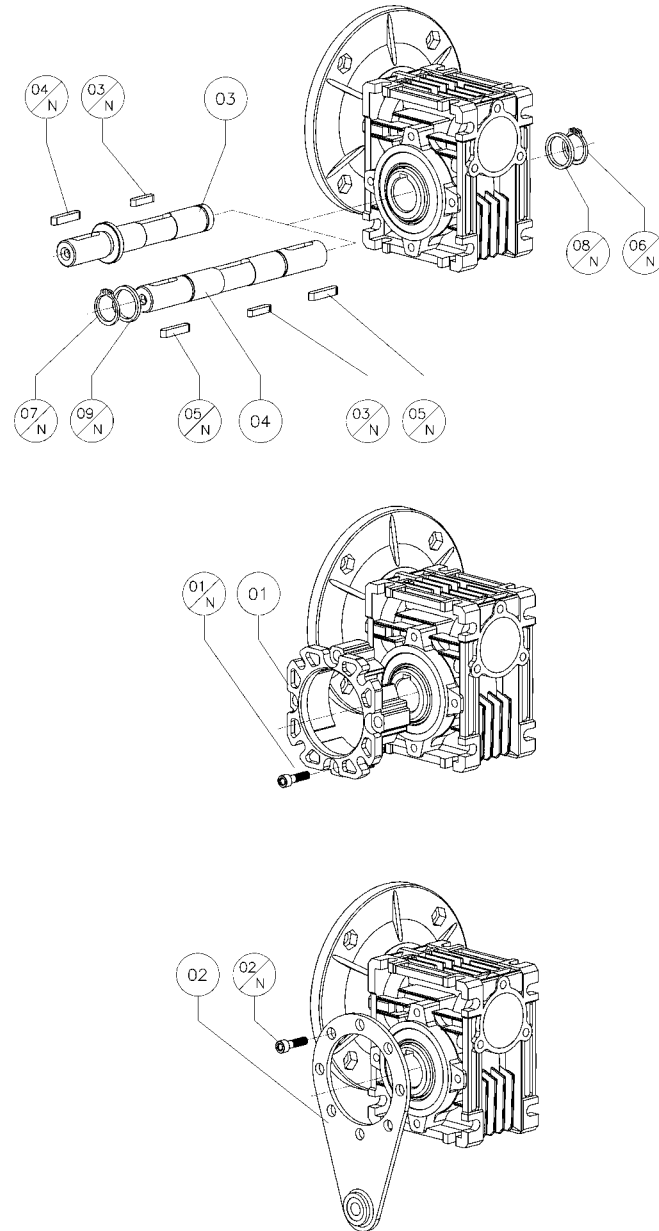
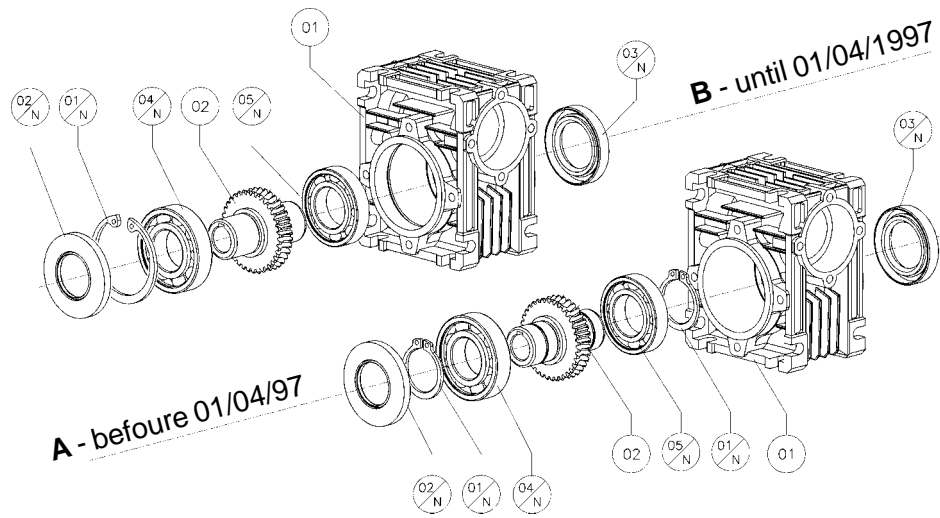
MOTOVARIO

TAV 004 1/1

030

P	T	C	Built	030
9	004	01	Casing	9.030.01
9	004	02	PAM flange	9.030.03
9	004	03	Gear unit cover	9.030.06
9	004	04	Double ext. PAM worm	9.030.15
9	004	05	Double ext. RV worm	9.030.17

pam	P	T	C	Commercial	030
	9	004	01 N	Shcs screw DIN 7984	M6x12 4
	9	004	02 N	Shcs screw DIN 7984	M6x12 3
	9	004	03 N	Key DIN 6885	A 3x3x15 1
	9	004	04 N	Key DIN 6885	A 3x3x15 1
	9	004	05 N	Circlip DIN 472	32 1
	9	004	06 N	Oil Seal DIN 3760	AS 12x32x7 1
	9	004	07 N	Oil Seal DIN 3760	AS 12x32x7 1
	9	004	08 N	O-Ring	2131 1
	9	004	09 N	O-Ring	2131 1
	9	004	10 N	Bearing	61904 1
	9	004	11 N	Bearing	6201 1
056 B5	9	004	12 N	Bearing	6301 1
	9	004	13 N	Hex screw DIN 931	M6x20 4
	9	004	14 N	Nut DIN 934/6	M6 4
063 B5	9	004	15 N	Oil Seal DIN 3760	A 20x30x7 1
	9	004	13 N	Hex screw DIN 931	M8x25 4
	9	004	14 N	Nut DIN 934/6	M8 4
063 B14	9	004	13 N	Hex screw DIN 931	M5x12 4
	9	004	14 N	Nut DIN 934/6	M5 4
	9	004	15 N	Oil Seal DIN 3760	A 20x30x7 1
056 B14	9	004	13 N	Hex screw DIN 931	M5x12 4
	9	004	14 N	Nut DIN 934/6	M5 4
	9	004	15 N	Oil Seal DIN 3760	A 20x30x7 1
063 B14	9	004	13 N	Hex screw DIN 931	M5x12 4
	9	004	14 N	Nut DIN 934/6	M5 4
	9	004	15 N	Oil Seal DIN 3760	A 20x30x7 1

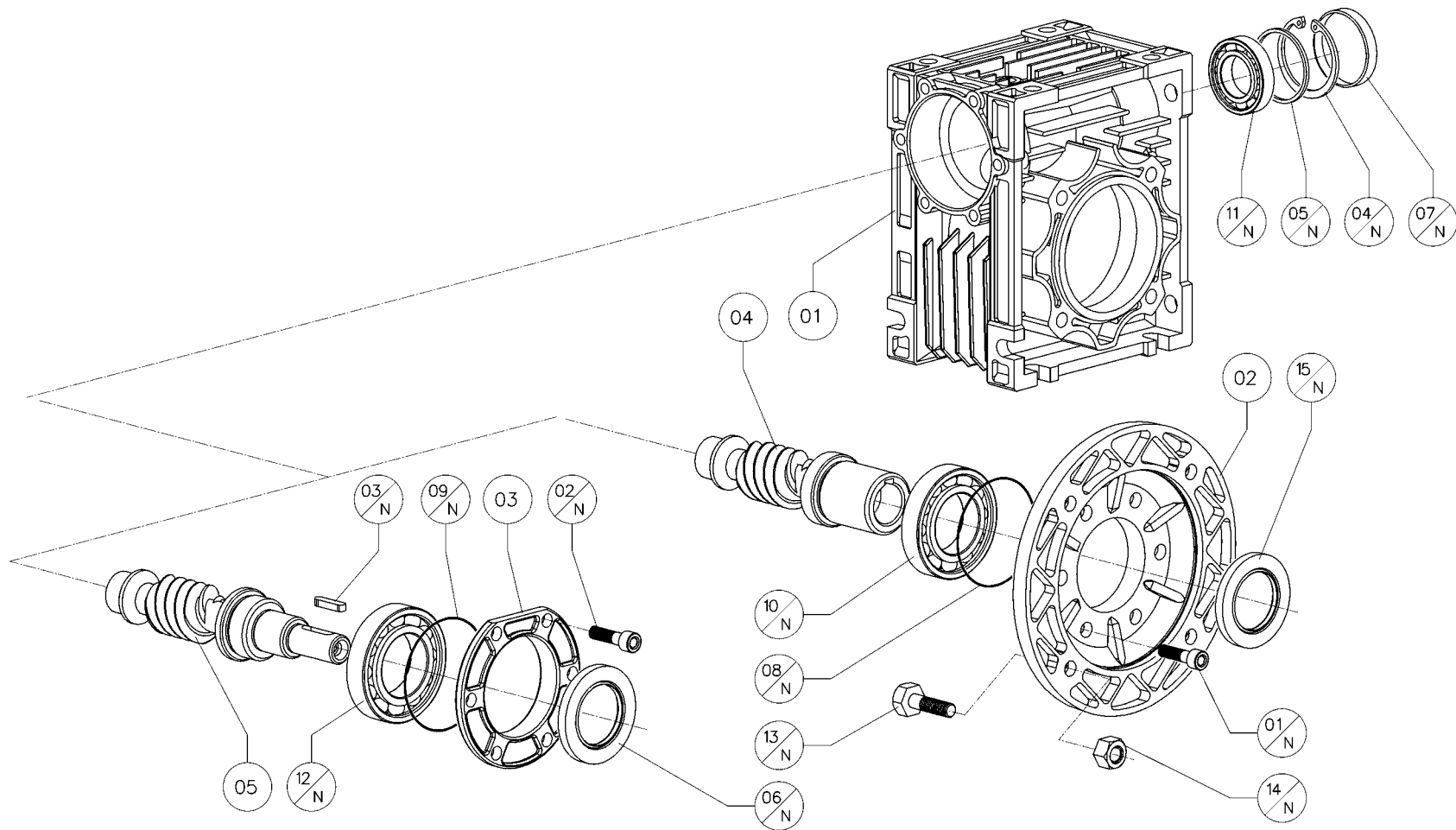


<i>P</i>	<i>T</i>	<i>C</i>	Built	030 A	030 B
9	005	01	Casing	9.030.01	9.030.01
9	005	02	Worm Wheel	9.030.11	9.030.11

<i>P</i>	<i>T</i>	<i>C</i>	Commercial	030 A		030 B	
9	005	01 N	Circlip	25 DIN 471	2	47 DIN 472	1
9	005	02 N	Oil seal DIN 3760	AS 25x47x7	1	AS 25x47x7	1
9	005	03 N	Oil seal DIN 3760	AS 25x35x7	1	AS 25x47x7	1
9	005	04 N	Bearing	16005	1	16005	1
9	005	05 N	Bearing	61905	1	16005	1

<i>P</i>	<i>T</i>	<i>C</i>	Built	030
9	006	01	Output flange F	9.030.04
9	006	02	Torque arm	9.030.05
9	006	03	Single output Shaft	9.030.21
9	006	04	Double output Shaft	9.030.22

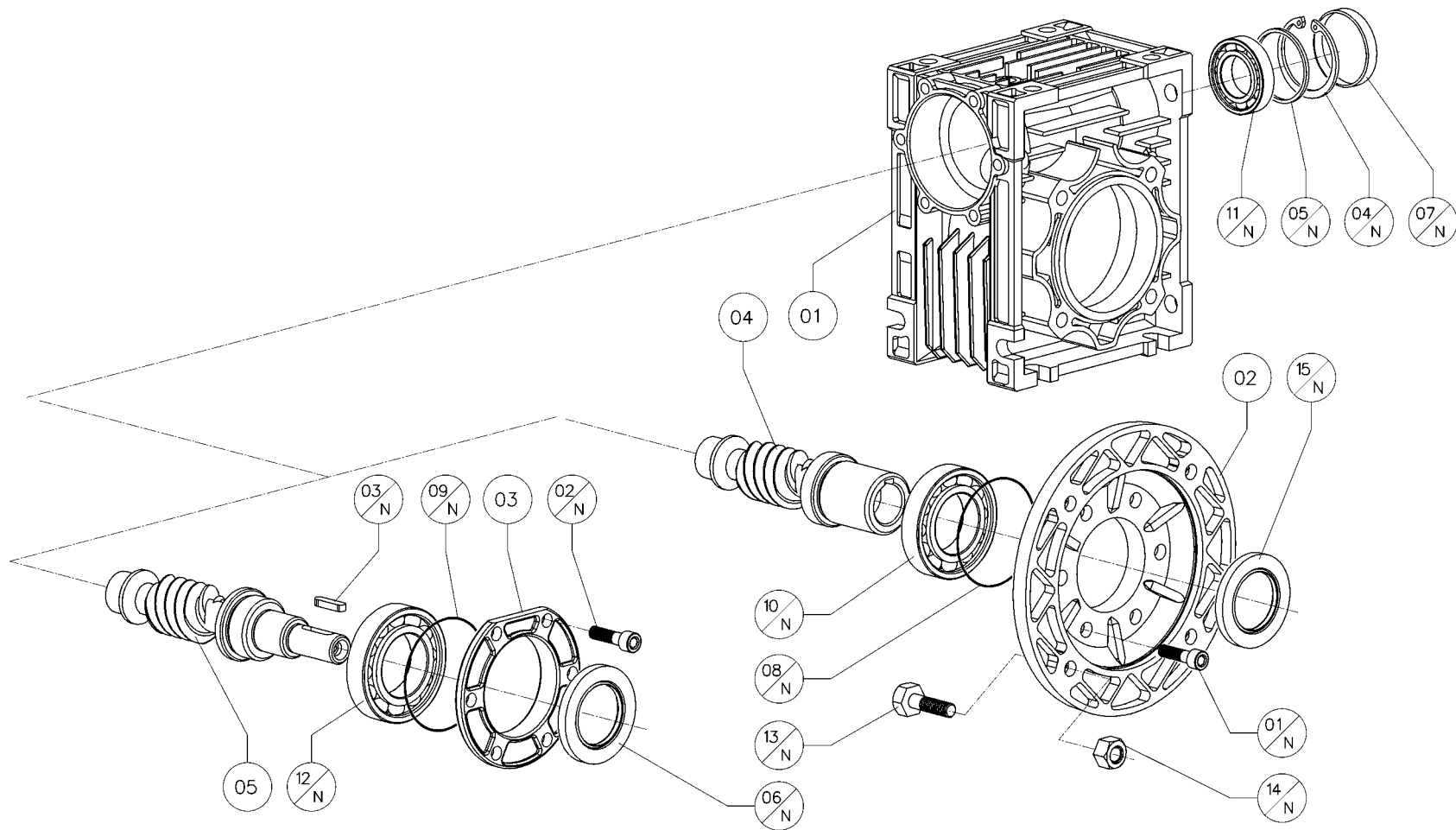
<i>P</i>	<i>T</i>	<i>C</i>	Commercial	030	
9	006	01 N	Shcs screw DIN 7984	M6x12	4
9	006	02 N	Shcs screw DIN 7984	M6x12	4
9	006	03 N	Key DIN 6885	A 5x5x25	1
9	006	04 N	Key DIN 6885	A 5x5x20	1
9	006	05 N	Key DIN 6885	A 5x5x20	1
9	006	06 N	Circlip DIN 471	14	1
9	006	07 N	Circlip DIN 471	14	1
9	006	08 N	Spacer DIN 988	14x20x1,5	1
9	006	09 N	Spacer DIN 988	14x20x1,5	1



P	T	C	Built	040	050	063	075	090	105	110	130
9	007	01	Casing	9.040.01	9.050.01	9.063.01	9.075.01	9.090.01	9.105.01	9.110.01	9.130.01
9	007	02	PAM flange	9.040.03	9.050.03	9.063.03	9.075.03	9.075.03	9.110.03	9.110.03	9.110.03
9	007	03	Gear unit cover	9.040.06	9.050.06	9.063.06	9.075.06	9.075.06	9.110.06	9.110.06	9.130.06
9	007	04	PAM worm	9.040.14	9.050.14	9.063.14	9.075.14	9.090.14	9.110.14	9.110.14	9.130.14
9	007	05	RV worm	9.040.16	9.050.16	9.063.16	9.075.16	9.090.16	9.110.16	9.110.16	9.130.16

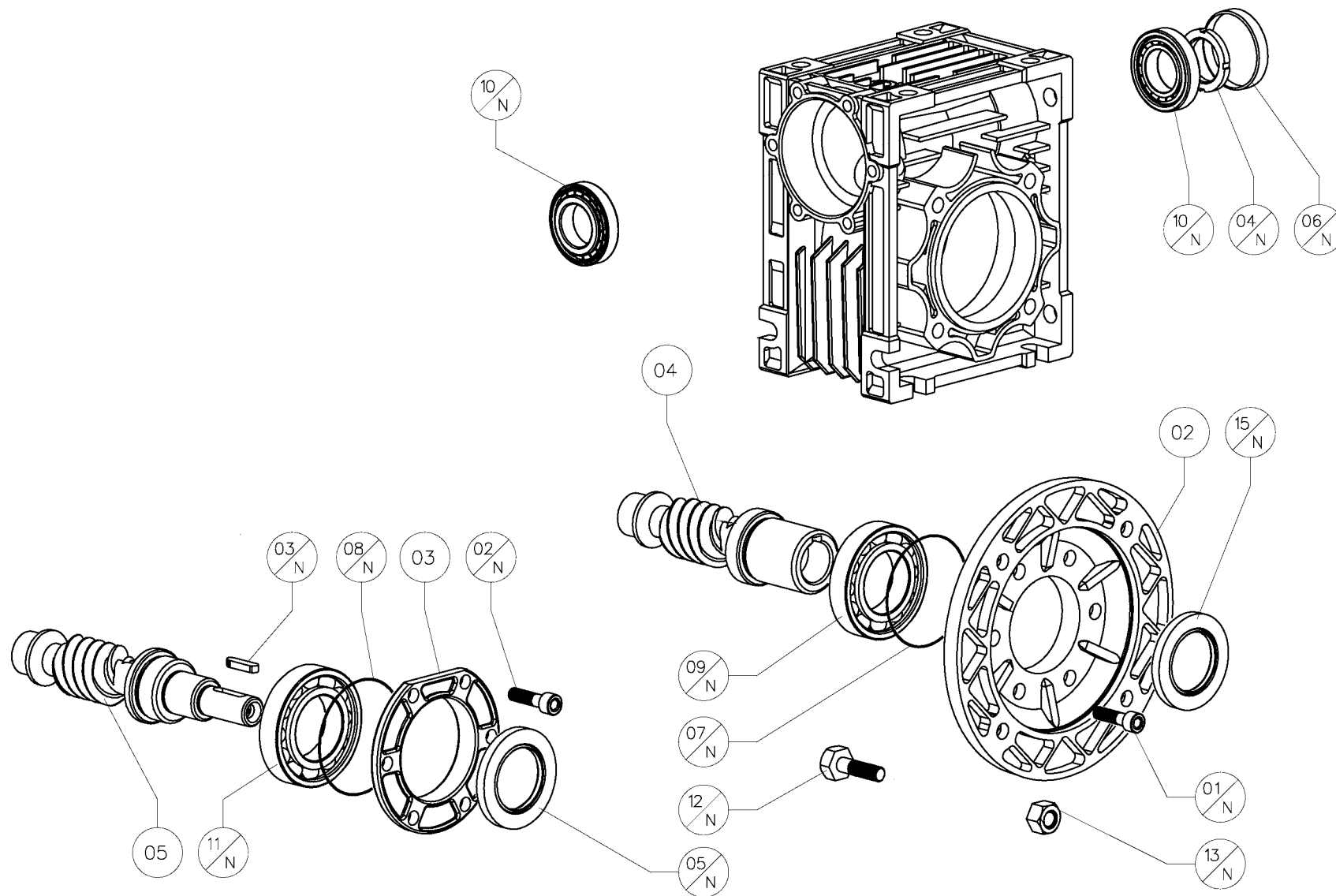
pam	P	T	C	Commercial	040		050		063		075		090		105		110		130			
	9	007	01 N	Screw DIN 912	M6x12***	6	M6x14	6	M8x18	6	M8x20	6	M8x20	6	M8x20*	6	M8x20	6	M8x20	6	M8x20	6
	9	007	02 N	Screw DIN 912	M6x12***	6	M6x14	6	M8x18	6	M8x20	6	M8x20	6	M8x20*	6	M8x20	6	M8x20	6	M8x20	6
	9	007	03 N	Key DIN 6885	A 4x4x15	1	A 5x5x20	1	A 6x6x30	1	A 8x7x35	1	A 8x7x35	1	A 8x7x45	1	A 8x7x45	1	A 8x7x45	1	A 8x7x45	1
	9	007	04 N	Circlip DIN 472	40	1	47	1	52	1	62	1	62	1	72	1	72	1	72	1	72	1
	9	007	05 N	Spacer DIN 988	-	-	37x47x2,5	1	42x52x2,5	1	50x62x3	1	50x62x3	1	56x72x3	1	56x72x3	1	56x72x3	1	56x72x3	1
	9	007	06 N	Oil seal DIN 3760	AS 17x40x7	1	AS 20x47x7	1	AS 25x52x7	1	AS 30x62x7	1	AS 30x62x7	1	AS 35x72x10	1	AS 35x72x10	1	AS 35x72x10	1	AS 35x72x10	1
	9	007	07 N	Cap	RCA 40x7	1	RCA 47x7	1	RCA 52x7	1	RCA 62x7	1	RCA 62x7	1	RCA 72x10	1	RCA 72x10	1	RCA 72x10	1	RCA 72x10	1
	9	007	08 N	O-Ring	2162	1	2200	1	3225	1	2250	1	2250	1	2300	1	2300	1	2300	1	2300	1
	9	007	09 N	O-Ring	2162	1	2200	1	3225	1	2250	1	2250	1	2300	1	2300	1	2300	1	2300	1
	9	007	10 N	Bearing	6005	1	6006	1	6007	1	6008	1	32008	1	32010	1	32010	1	32010	1	32010	1
	9	007	11 N	Bearing NMRV	6203	1	6204	1	6205	1	6206	1	32206	1	32207	1	32207	1	32207	1	33207	1
	9	007	11 N	Bearing NRV	6203	1	6204	1	30205	1	30206	1	32206	1	32207	1	32207	1	32207	1	33207	1
9	007	12 N	Bearing	6303	1	6006	1	30305	1	32008	1	32008	1	30307	1	30307	1	30307	1	30307	1	
056 B5	9	007	13 N	Hex screw DIN 931	M6x20	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	9	007	14 N	Nut DIN 934/6	M6	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	9	007	15 N	Oil seal DIN 3760	AS 25x35x7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
063 B5	9	007	13 N	Hex screw DIN 931	M8x25	4	M8x25	4	-	-	-	-	-	-	-	-	-	-	-	-	-	
	9	007	14 N	Nut DIN 934/6	M8	4	M6	4	-	-	-	-	-	-	-	-	-	-	-	-	-	
	9	007	15 N	Oil seal DIN 3760	AS 25x35x7	1	A 30x47x7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	
071 B5	9	007	13 N	Hex screw DIN 931	M8x25	4	M8x25	4	M8x25	4	M8x25	4	-	-	-	-	-	-	-	-	-	
	9	007	14 N	Nut DIN 934/6	M8	4	M8	4	M8	4	M8	4	-	-	-	-	-	-	-	-	-	
	9	007	15 N	Oil seal DIN 3760	AS 25x35x7	1	A 30x47x7	1	A 35x52x7	1	A 40x60x10	1	-	-	-	-	-	-	-	-	-	
080 B5	9	007	13 N	Hex screw DIN 931	-	-	M10x30	4	M10x30	4	M10x30	4	M10x30	4	M10x30	4	M10x30	4	M10x30	4	-	-
	9	007	14 N	Nut DIN 934/6	-	-	M10	4	M10	4	M10	4	M10	4	M10	4	M10	4	M10	4	-	-
	9	007	15 N	Oil seal DIN 3760	-	-	A 30x47x7	1	A 35x52x7	1	A 40x60x10	1	A 40x60x10	1	A 50x68x8	1	A 50x68x8	1	A 50x68x8	1	-	-
090 B5	9	007	13 N	Hex screw DIN 931	-	-	-	-	M10x30	4	M10x30	4	M10x30	4	M10x30	4	M10x30	4	M10x30	4	M10x30	4
	9	007	14 N	Nut DIN 934/6	-	-	-	-	M10	4	M10	4	M10	4	M10	4	M10	4	M10	4	M10	4
	9	007	15 N	Oil seal DIN 3760	-	-	-	-	A 35x52x7	1	A 40x60x10	1	A 40x60x10	1	A 50x68x8	1	A 50x68x8	1	A 50x68x8	1	A 50x68x8	1
100-112 B5	9	007	13 N	Hex screw DIN 931	-	-	-	-	-	-	M12x35	4	M12x35	4	M12x35	4	M12x35	4	M12x35	4	M12x35	4
	9	007	14 N	Nut DIN 934/6	-	-	-	-	-	-	M12	4	M12	4	M12	4	M12	4	M12	4	M12	4
	9	007	15 N	Oil seal DIN 3760	-	-	-	-	-	-	A 40x60x10	1	A 40x60x10	1	A 50x68x8	1	A 50x68x8	1	A 50x68x8	1	A 50x68x8	1

* Torx Screw TC DIN 7984



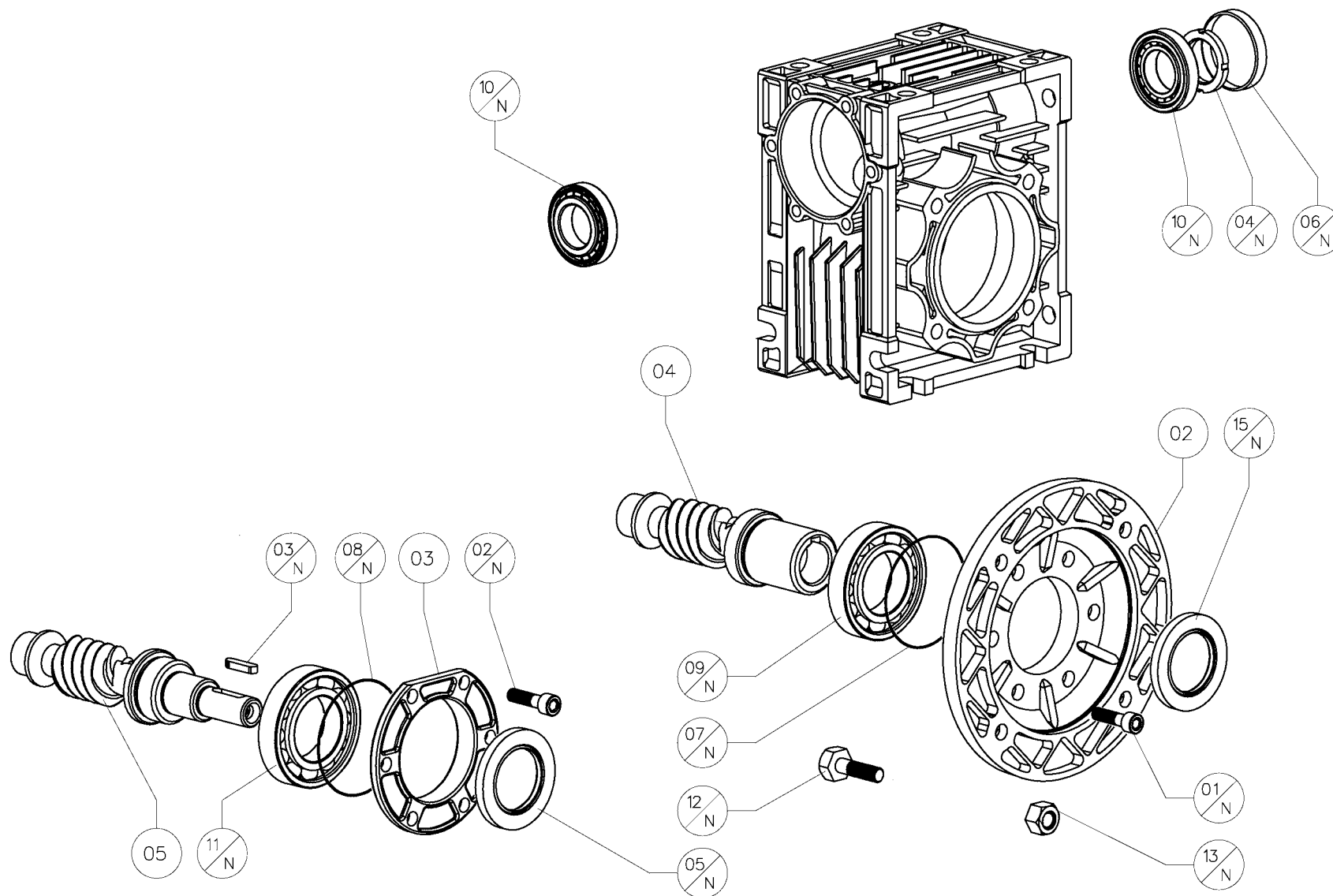
<i>pam</i>	P	T	C	Commercial	040		050		063		075		090		105		110		130	
132 B5	9	007	13 N	Hex screw DIN 931	-	-	-	-	-	-	-	-	-	-	M12x45	4	M12x45	4	M12x45	4
	9	007	14 N	Nut DIN 934/6	-	-	-	-	-	-	-	-	-	-	M12	4	M12	4	M12	4
	9	007	15 N	Oil seal DIN 3760	-	-	-	-	-	-	-	-	-	-	A 50x72x10	1	A 50x72x10	1	A 50x72x10	1
063 B14	9	007	13 N	Hex screw DIN 931	M5x20	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	9	007	14 N	Nut DIN 934/6	M5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	9	007	15 N	Oil seal DIN 3760	AS 25x35x7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
071 B14	9	007	13 N	Hex screw DIN 931	M6x16	4	M6x16	4	M6x25	4	-	-	-	-	-	-	-	-	-	-
	9	007	14 N	Nut DIN 934/6	M6	4	M6	4	M6	4	-	-	-	-	-	-	-	-	-	-
	9	007	15 N	Oil seal DIN 3760	AS 25x35x7	1	A 30x47x7	1	A 35x52x7	1	-	-	-	-	-	-	-	-	-	-
080 B14	9	007	13 N	Hex screw DIN 931	-	-	M6x20	4	M6x25	4	M6x25	4	M6x25	4	-	-	-	-	-	-
	9	007	14 N	Nut DIN 934/6	-	-	M6	4	M6	4	M6	4	M6	4	-	-	-	-	-	-
	9	007	15 N	Oil seal DIN 3760	-	-	A 30x47x7	1	A 35x52x7	1	A 40x60x10	1	A 40x60x10	1	-	-	-	-	-	-
090 B14	9	007	13 N	Hex screw DIN 931	-	-	-	-	M8x25	4	M8x25	4	M8x25	4	-	-	-	-	-	-
	9	007	14 N	Nut DIN 934/6	-	-	-	-	M8	4	M8	4	M8	4	-	-	-	-	-	-
	9	007	15 N	Oil seal DIN 3760	-	-	-	-	A 35x52x7	1	A 40x60x10	1	A 40x60x10	1	-	-	-	-	-	-
100-112 B14	9	007	13 N	Hex screw DIN 931	-	-	-	-	-	-	M8x25	4	M8x25	4	-	-	-	-	-	-
	9	007	14 N	Nut DIN 934/6	-	-	-	-	-	-	M8	4	M8	4	-	-	-	-	-	-
	9	007	15 N	Oil seal DIN 3760	-	-	-	-	-	-	A 40x60x10	1	A 40x60x10	1	-	-	-	-	-	-

* Torx Screw TC DIN 7984

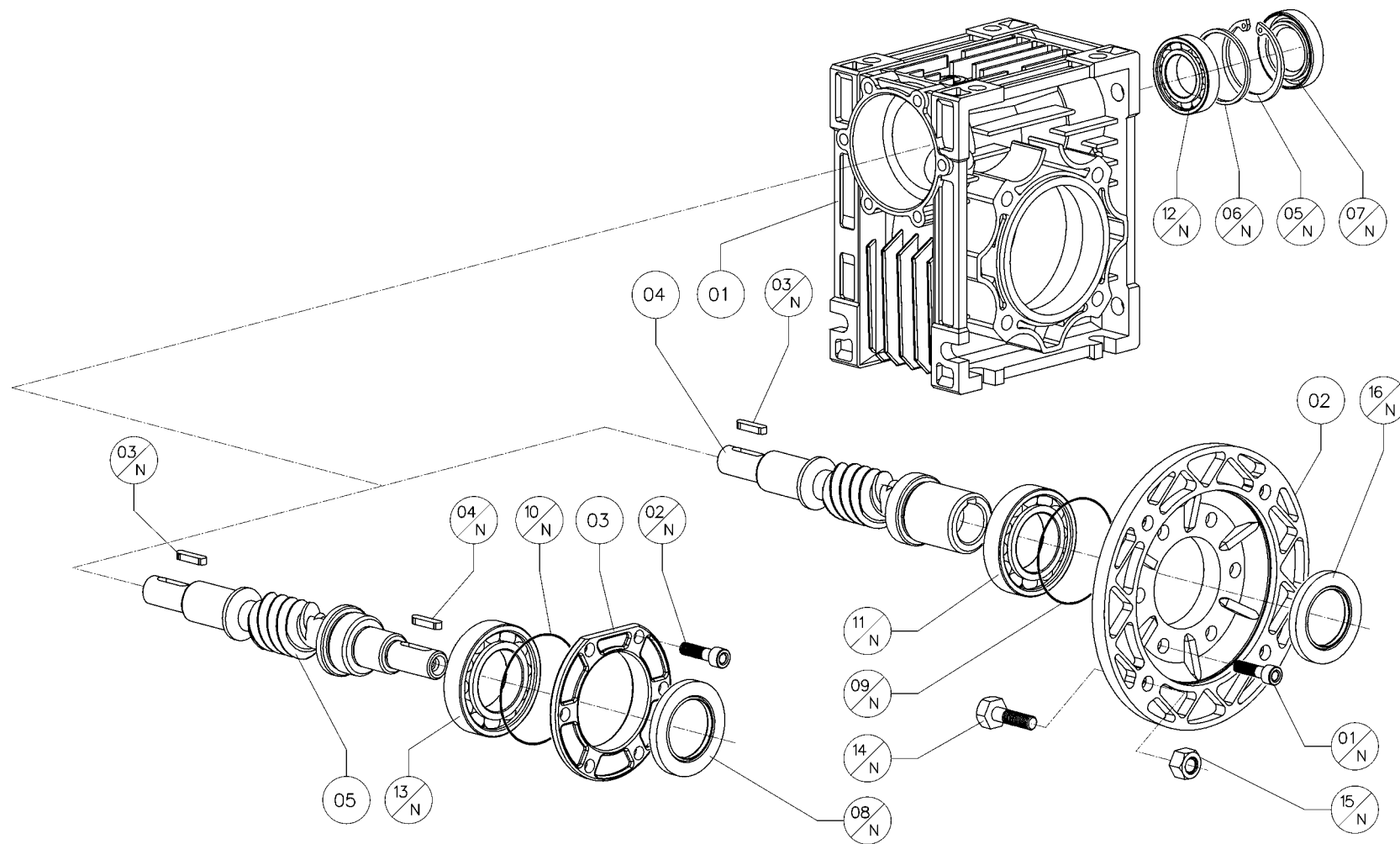


<i>P</i>	<i>T</i>	<i>C</i>	Built	150
9	007	01	Casing	9.150.01
9	007	02	PAM flange	4.080.05
9	007	03	Gear unit cover	8.100.08
9	007	04	PAM worm	9.150.14
9	007	05	RV worm	9.150.16

<i>pam</i>	<i>P</i>	<i>T</i>	<i>C</i>	Commercial	150	
	9	007	01 N	Screw DIN 912	M12x25	6
	9	007	02 N	Screw DIN 912	M12x25	6
	9	007	03 N	Key DIN 6885	A 10x8x60	1
	9	007	04 N	Lock nut	Km9	1
	9	007	05 N	Oil seal DIN 3760	TC 60-80-10	1
	9	007	06 N	Cap	RCA 85x10	1
	9	007	07 N	O-Ring	540	1
	9	007	08 N	O-Ring	540	1
	9	007	09 N	Bearing	6013	1
	9	007	10 N	Bearing NMRV	30209	1
	9	007	10 N	Bearing NRV	30209	1
056 B5	9	007	12 N	Hex screw DIN 931	-	-
	9	007	13 N	Nut DIN 934/6	-	-
	9	007	14 N	Oil seal DIN 3760	-	-
063 B5	9	007	12 N	Hex screw DIN 931	-	-
	9	007	13 N	Nut DIN 934/6	-	-
	9	007	14 N	Oil seal DIN 3760	-	-
071 B5	9	007	12 N	Hex screw DIN 931	-	-
	9	007	13 N	Nut DIN 934/6	-	-
	9	007	14 N	Oil seal DIN 3760	-	-
080 B5	9	007	12 N	Hex screw DIN 931	-	-
	9	007	13 N	Nut DIN 934/6	-	-
	9	007	14 N	Oil seal DIN 3760	-	-
090 B5	9	007	12 N	Hex screw DIN 931	-	-
	9	007	13 N	Nut DIN 934/6	-	-
	9	007	14 N	Oil seal DIN 3760	-	-
100-112 B5	9	007	12 N	Hex screw DIN 931	M12x45	4
	9	007	13 N	Nut DIN 934/6	M12	4
	9	007	14 N	Oil seal DIN 3760	TC 60-80-10	1



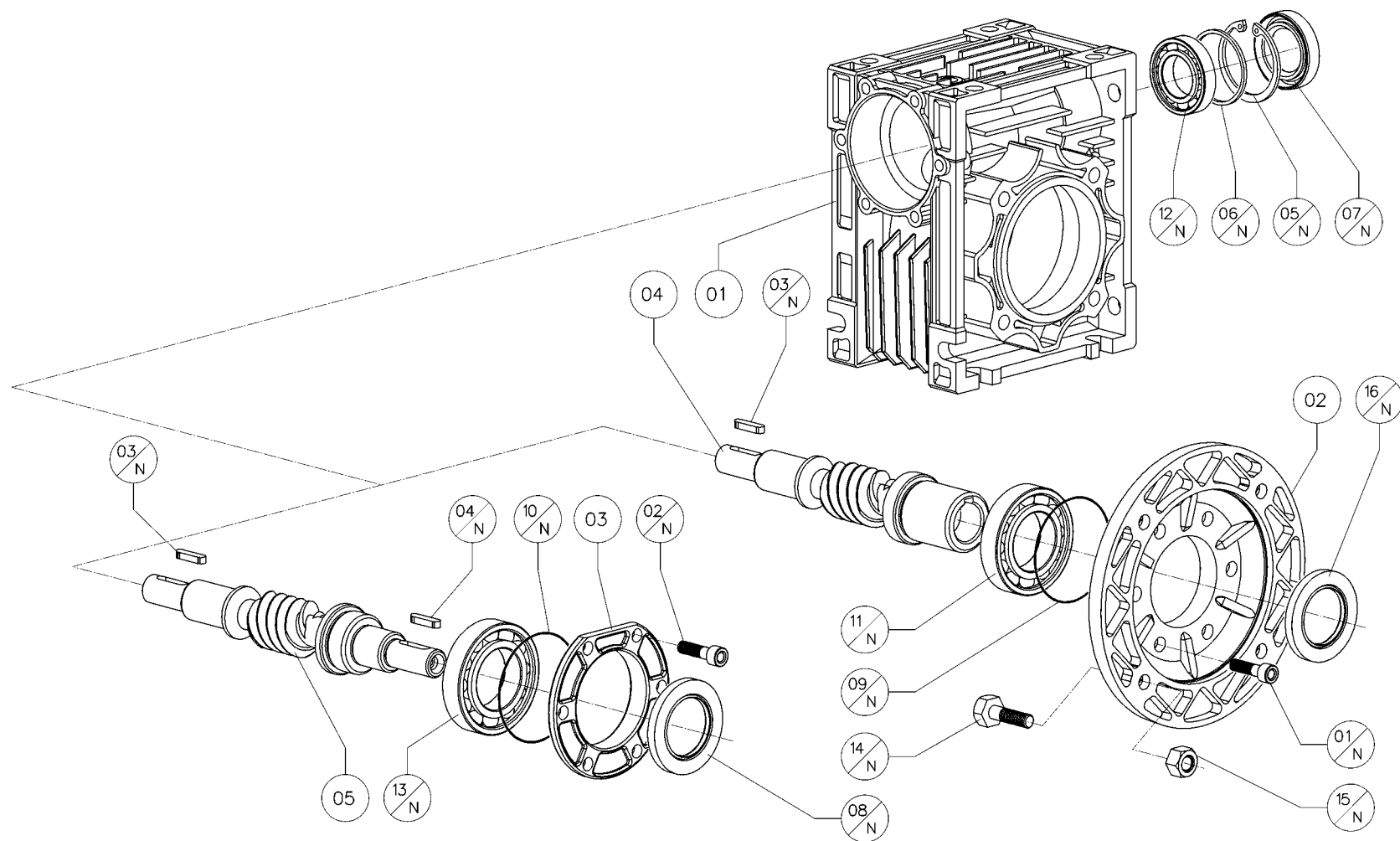
<i>pam</i>	P	T	C	Commercial	150	
132 B5	9	007	12 N	Hex screw DIN 931	M12x45	4
	9	007	13 N	Nut DIN 934/6	M12	4
	9	007	14 N	Oil seal DIN 3760	TC 60-80-10	1
063 B14	9	007	12 N	Hex screw DIN 931	-	-
	9	007	13 N	Nut DIN 934/6	-	-
	9	007	14 N	Oil seal DIN 3760	-	-
071 B14	9	007	12 N	Hex screw DIN 931	-	-
	9	007	13 N	Nut DIN 934/6	-	-
	9	007	14 N	Oil seal DIN 3760	-	-
080 B14	9	007	12 N	Hex screw DIN 931	-	-
	9	007	13 N	Nut DIN 934/6	-	-
	9	007	14 N	Oil seal DIN 3760	-	-
090 B14	9	007	12 N	Hex screw DIN 931	-	-
	9	007	13 N	Nut DIN 934/6	-	-
	9	007	14 N	Oil seal DIN 3760	-	-
100-112 B14	9	007	12 N	Hex screw DIN 931	-	-
	9	007	13 N	Nut DIN 934/6	-	-
	9	007	14 N	Oil seal DIN 3760	-	-



P	T	C	Built	040	050	063	075	090	105	110	130
9	008	01	Casing	9.040.01	9.050.01	9.063.01	9.075.01	9.090.01	9.105.01	9.110.01	9.130.01
9	008	02	PAM flange	9.040.03	9.050.03	9.063.03	9.075.03	9.075.03	9.110.03	9.110.03	9.110.03
9	008	03	Gear unit cover	9.040.06	9.050.06	9.063.06	9.075.06	9.075.06	9.110.06	9.110.06	9.130.06
9	008	04	Double ext. PAM worm	9.040.15	9.050.15	9.063.15	9.075.15	9.090.15	9.110.15	9.110.15	9.130.15
9	008	05	Double ext. RV worm	9.040.17	9.050.17	9.063.17	9.075.17	9.090.17	9.110.17	9.110.17	9.130.17

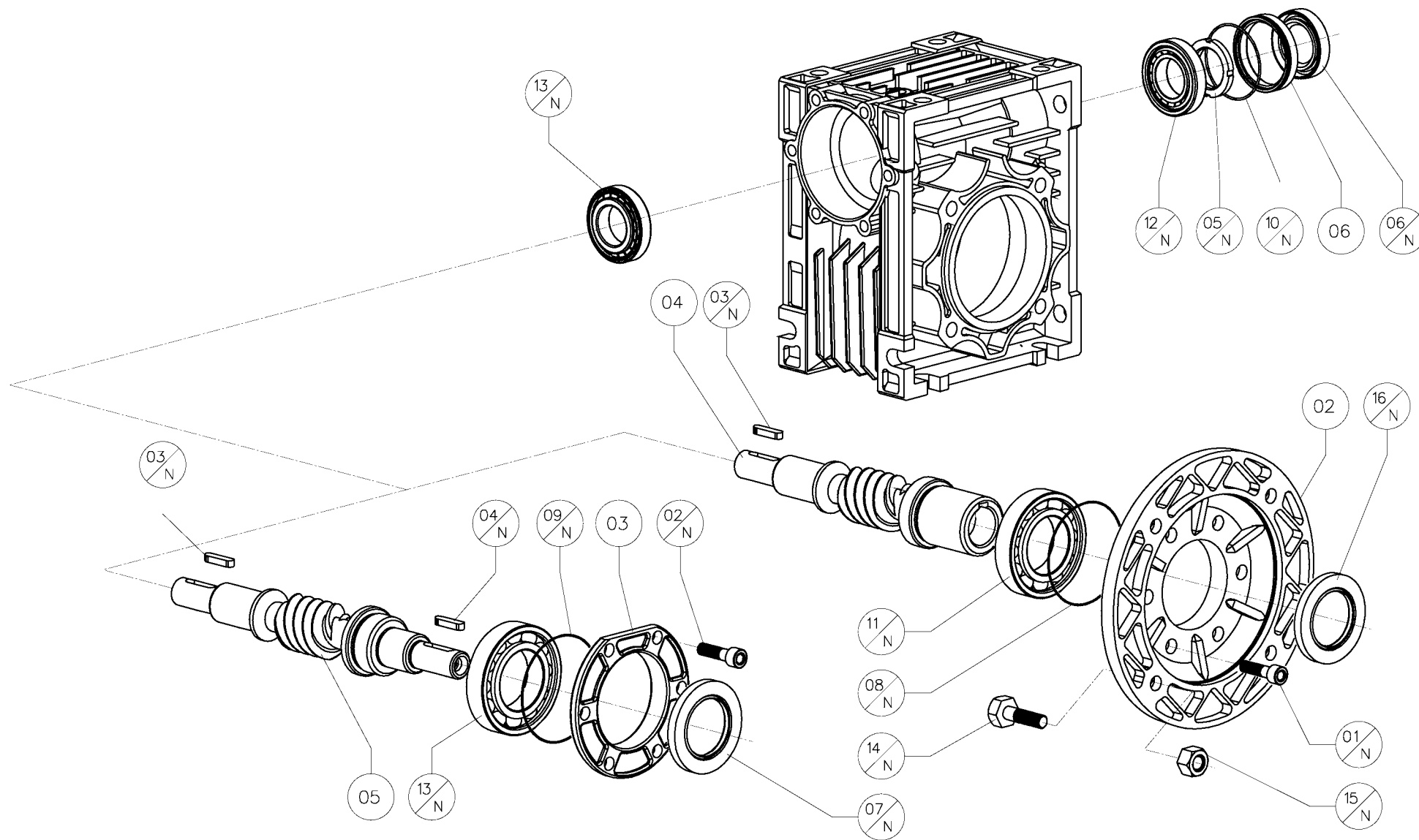
pam	P	T	C	Commercial	040		050		063		075		090		105		110		130	
	9	008	01 N	Screw DIN 912	M6x12***	6	M6x14	6	M8x18	6	M8x20	6	M8x20	6	M8x20*	6	M8x20	6	M8x20	6
	9	008	02 N	Screw DIN 912	M6x12***	6	M6x14	6	M8x18	6	M8x20	6	M8x20	6	M8x20*	6	M8x20	6	M8x20	6
	9	008	03 N	Key DIN 6885	A 4x4x15	1	A 5x5x20	1	A 6x6x30	1	A 8x7x35	1	A 8x7x35	1	A 8x7x45	1	A 8x7x45	1	A 8x7x45	1
	9	008	04 N	Key DIN 6885	A 4x4x15	1	A 5x5x20	1	A 6x6x30	1	A 8x7x35	1	A 8x7x35	1	A 8x7x45	1	A 8x7x45	1	A 8x7x45	1
	9	008	05 N	Circlip DIN 472	40	1	47	1	52	1	62	1	62	1	72	1	72	1	72	1
	9	008	06 N	Spacer DIN 988	-	-	37x47x2,5	1	42x52x2,5	1	50x62x3	1	50x62x3	1	56x72x3	1	56x72x3	1	56x72x3	1
	9	008	07 N	Oil seal DIN 3760	AS 17x40x7	1	AS 20x47x7	1	AS 25x52x7	1	AS 30x62x7	1	AS 30x62x7	1	AS 35x72x10	1	AS 35x72x10	1	AS 35x72x10	1
	9	008	08 N	Oil seal DIN 3760	AS 17x40x7	1	AS 20x47x7	1	AS 25x52x7	1	AS 30x62x7	1	AS 30x62x7	1	AS 35x72x10	1	AS 35x72x10	1	AS 35x72x10	1
	9	008	09 N	O-Ring	2162	1	2200	1	3225	1	2250	1	2250	1	2300	1	2300	1	2300	1
	9	008	10 N	O-Ring	2162	1	2200	1	3225	1	2250	1	2250	1	2300	1	2300	1	2300	1
	9	008	11 N	Bearing	6005	1	6006	1	6007	1	32008	1	32008	1	32010	1	32010	1	32010	1
	9	008	12 N	Bearing NMRV	6203	1	6204	1	6205	1	30206	1	32206	1	32207	1	32207	1	33207	1
	9	008	12 N	Bearing NRV	6203	1	6204	1	30205	1	30206	1	32206	1	32207	1	32207	1	33207	1
9	008	13 N	Bearing	6303	1	6006	1	30305	1	32008	1	32008	1	30307	1	30307	1	30307	1	
056 B5	9	008	14 N	Hex screw DIN 931	M6x20	4	-	-	-	-	-	-	-	-	-	-	-	-	-	
	9	008	15 N	Nut DIN 934/6	M6	4	-	-	-	-	-	-	-	-	-	-	-	-	-	
	9	008	16 N	Oil seal DIN 3760	AS 25x35x7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	
063 B5	9	008	14 N	Hex screw DIN 931	M8x25	4	M8x25	4	-	-	-	-	-	-	-	-	-	-	-	
	9	008	15 N	Nut DIN 934/6	M8	4	M6	4	-	-	-	-	-	-	-	-	-	-	-	
	9	008	16 N	Oil seal DIN 3760	AS 25x35x7	1	A 30x47x7	1	-	-	-	-	-	-	-	-	-	-	-	
071 B5	9	008	14 N	Hex screw DIN 931	M8x25	4	M8x25	4	M8x25	4	M8x25	4	-	-	-	-	-	-	-	
	9	008	15 N	Nut DIN 934/6	M8	4	M8	4	M8	4	M8	4	-	-	-	-	-	-	-	
	9	008	16 N	Oil seal DIN 3760	AS 25x35x7	1	A 30x47x7	1	A 35x52x7	1	A 40x60x10	1	-	-	-	-	-	-	-	
080 B5	9	008	14 N	Hex screw DIN 931	-	-	M10x30	4	M10x30	4	M10x30	4	M10x30	4	M10x30	4	M10x30	4	-	-
	9	008	15 N	Nut DIN 934/6	-	-	M10	4	M10	4	M10	4	M10	4	M10	4	M10	4	-	-
	9	008	16 N	Oil seal DIN 3760	-	-	A 30x47x7	1	A 35x52x7	1	A 40x60x10	1	A 40x60x10	1	A 50x68x8	1	A 50x68x8	1	-	-
090 B5	9	008	14 N	Hex screw DIN 931	-	-	-	-	M10x30	4	M10x30	4	M10x30	4	M10x30	4	M10x30	4	M10x30	4
	9	008	15 N	Nut DIN 934/6	-	-	-	-	M10	4	M10	4	M10	4	M10	4	M10	4	M10	4
	9	008	16 N	Oil seal DIN 3760	-	-	-	-	A 35x52x7	1	A 40x60x10	1	A 40x60x10	1	A 50x68x8	1	A 50x68x8	1	A 50x68x8	1
100-112 B5	9	008	14 N	Hex screw DIN 931	-	-	-	-	-	-	M12x35	4	M12x35	4	M12x35	4	M12x35	4	M12x35	4
	9	008	15 N	Nut DIN 934/6	-	-	-	-	-	-	M12	4	M12	4	M12	4	M12	4	M12	4
	9	008	16 N	Oil seal DIN 3760	-	-	-	-	-	-	A 40x60x10	1	A 40x60x10	1	A 50x68x8	1	A 50x68x8	1	A 50x68x8	1

* Torx Screw TC DIN 7984



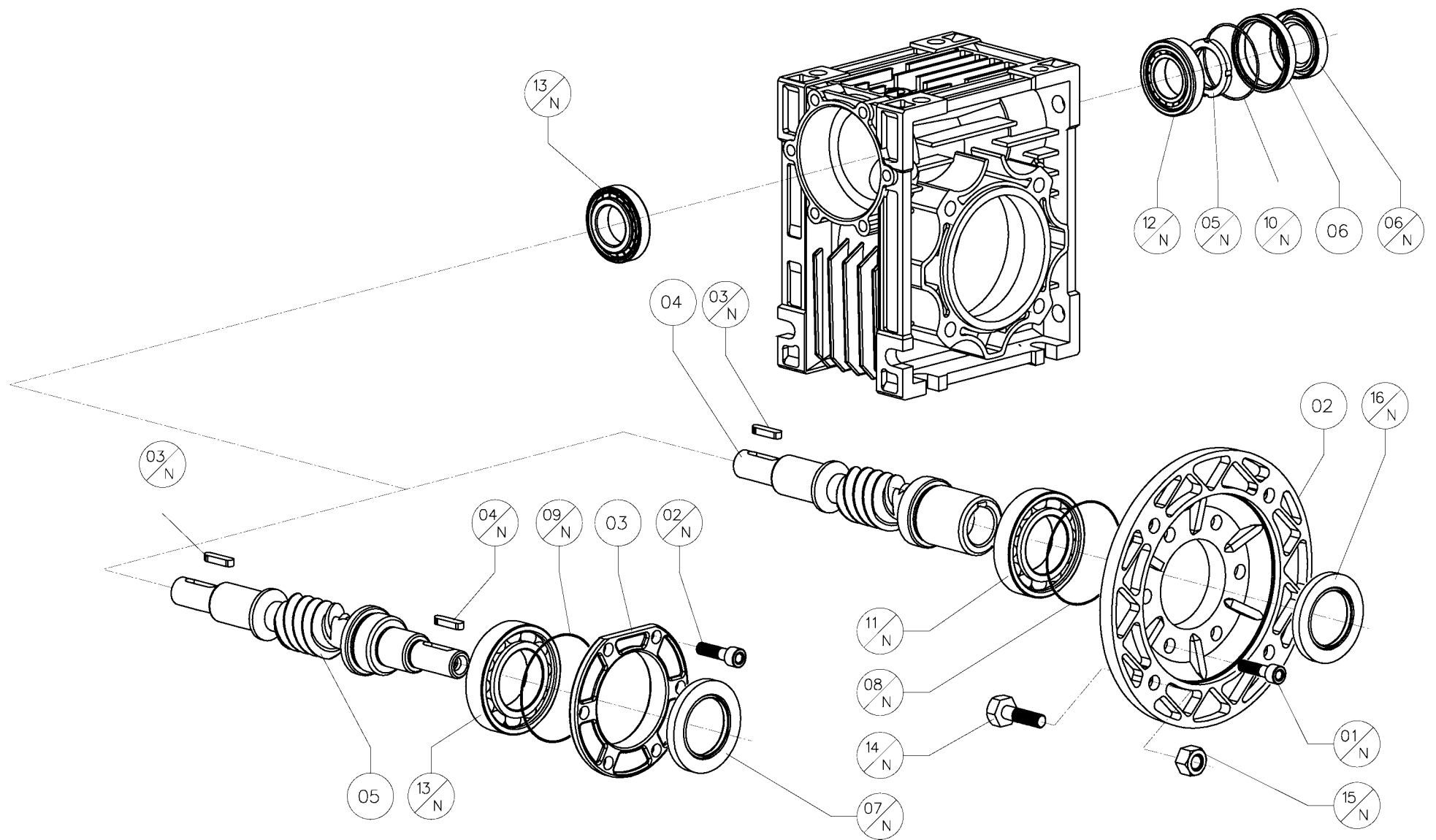
<i>pam</i>	P	T	C	Commercial	040		050		063		075		090		105		110		130	
132 B5	9	008	14 N	Hex screw DIN 931	-	-	-	-	-	-	-	-	-	-	M12x45	4	M12x45	4	M12x45	4
	9	008	15 N	Nut DIN 934/6	-	-	-	-	-	-	-	-	-	-	M12	4	M12	4	M12	4
	9	008	16 N	Oil seal DIN 3760	-	-	-	-	-	-	-	-	-	-	A 50x72x10	1	A 50x72x10	1	A 50x72x10	1
063 B14	9	008	14 N	Hex screw DIN 931	M5x20	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	9	008	15 N	Nut DIN 934/6	M5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	9	008	16 N	Oil seal DIN 3760	AS 25x35x7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
071 B14	9	008	14 N	Hex screw DIN 931	M6x16	4	M6x16	4	M6x25	4	-	-	-	-	-	-	-	-	-	-
	9	008	15 N	Nut DIN 934/6	M6	4	M6	4	M6	4	-	-	-	-	-	-	-	-	-	-
	9	008	16 N	Oil seal DIN 3760	AS 25x35x7	1	A 30x47x7	1	A 35x52x7	1	-	-	-	-	-	-	-	-	-	-
080 B14	9	008	14 N	Hex screw DIN 931	-	-	M6x20	4	M6x25	4	M6x25	4	M6x25	4	-	-	-	-	-	-
	9	008	15 N	Nut DIN 934/6	-	-	M6	4	M6	4	M6	4	M6	4	-	-	-	-	-	-
	9	008	16 N	Oil seal DIN 3760	-	-	A 30x47x7	1	A 35x52x7	1	A 40x60x10	1	A 40x60x10	1	-	-	-	-	-	-
090 B14	9	008	14 N	Hex screw DIN 931	-	-	-	-	M8x25	4	M8x25	4	M8x25	4	-	-	-	-	-	-
	9	008	15 N	Nut DIN 934/6	-	-	-	-	M8	4	M8	4	M8	4	-	-	-	-	-	-
	9	008	16 N	Oil seal DIN 3760	-	-	-	-	A 35x52x7	1	A 40x60x10	1	A 40x60x10	1	-	-	-	-	-	-
100-112 B14	9	008	14 N	Hex screw DIN 931	-	-	-	-	-	-	M8x25	4	M8x25	4	-	-	-	-	-	-
	9	008	15 N	Nut DIN 934/6	-	-	-	-	-	-	M8	4	M8	4	-	-	-	-	-	-
	9	008	16 N	Oil seal DIN 3760	-	-	-	-	-	-	A 40x60x10	1	A 40x60x10	1	-	-	-	-	-	-

* Torx Screw TC DIN 7984

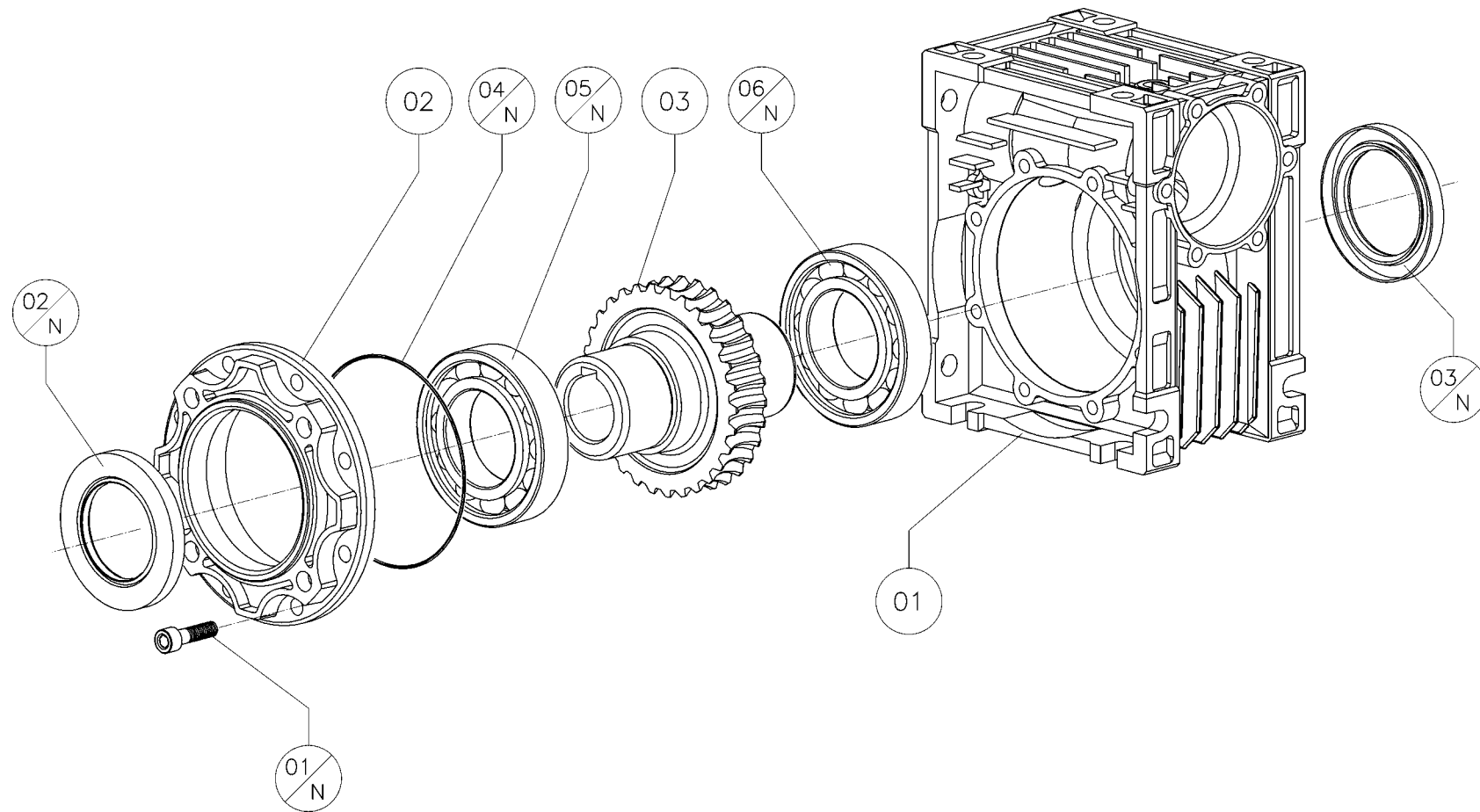


<i>P</i>	<i>T</i>	<i>C</i>	Built	150
9	008	01	Casing	9.150.01
9	008	02	PAM flange	8.100.08
9	008	03	Gear unit cover	4.080.05
9	008	04	Double ext. PAM worm	9.150.15
9	008	05	Double ext. RV worm	9.150.17
9	008	06	Oil seal ring	9.150.18

<i>pam</i>	<i>P</i>	<i>T</i>	<i>C</i>	Commercial	150
	9	008	01 N	Screw DIN 912	M12x25 6
	9	008	02 N	Screw DIN 912	M12x25 6
	9	008	03 N	Key DIN 6885	A 10x8x60 2
	9	008	04 N	Key DIN 6885	A 10x8x60 1
	9	008	05 N	Lock nut	Km9 1
	9	008	06 N	Oil seal DIN 3760	TC 40-72-10 1
	9	008	07 N	Oil seal DIN 3760	TC 40-100-25 1
	9	008	08 N	O-Ring	540 1
	9	008	09 N	O-Ring	540 1
	9	008	10 N	O-Ring	2325 1
	9	008	11 N	Bearing	6013 1
	9	008	12 N	Bearing NMRV	30209 1
	9	008	12 N	Bearing NRV	30209 1
9	008	13 N	Bearing	6309 1	
056 B5	9	008	14 N	Hex screw DIN 931	- -
	9	008	15 N	Nut DIN 934/6	- -
	9	008	16 N	Oil seal DIN 3760	- -
063 B5	9	008	14 N	Hex screw DIN 931	- -
	9	008	15 N	Nut DIN 934/6	- -
	9	008	16 N	Oil seal DIN 3760	- -
071 B5	9	008	14 N	Hex screw DIN 931	- -
	9	008	15 N	Nut DIN 934/6	- -
	9	008	16 N	Oil seal DIN 3760	- -
080 B5	9	008	14 N	Hex screw DIN 931	- -
	9	008	15 N	Nut DIN 934/6	- -
	9	008	16 N	Oil seal DIN 3760	- -
090 B5	9	008	14 N	Hex screw DIN 931	- -
	9	008	15 N	Nut DIN 934/6	- -
	9	008	16 N	Oil seal DIN 3760	- -
100-112 B5	9	008	14 N	Hex screw DIN 931	M12x45 4
	9	008	15 N	Nut DIN 934/6	M12 4
	9	008	16 N	Oil seal DIN 3760	TC 60-80-10 1



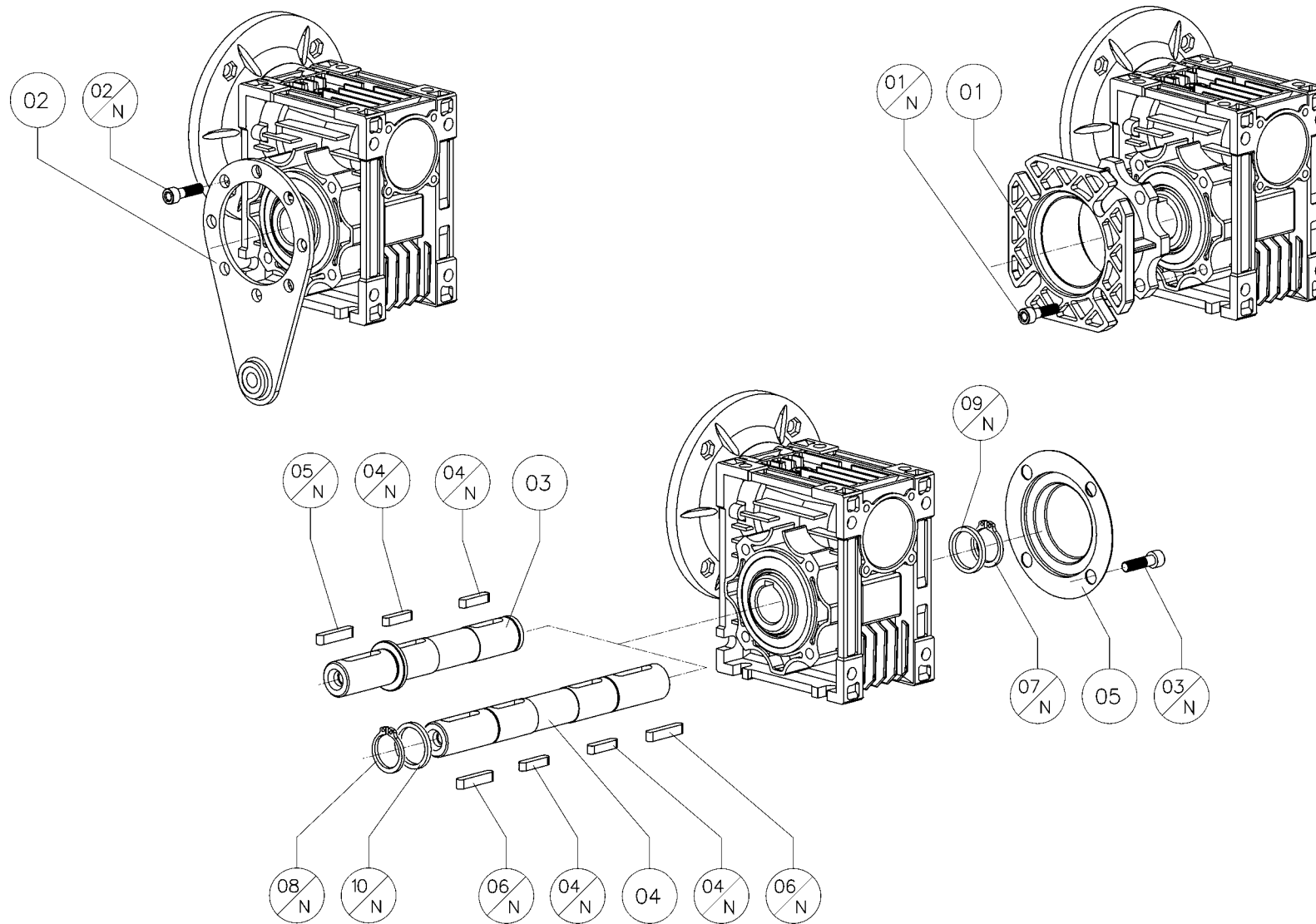
<i>pam</i>	P	T	C	Commercial	150	
132 B5	9	008	14 N	Hex screw DIN 931	M12x45	4
	9	008	15 N	Nut DIN 934/6	M12	4
	9	008	16 N	Oil seal DIN 3760	TC 60-80-10	1
063 B14	9	008	14 N	Hex screw DIN 931	-	-
	9	008	15 N	Nut DIN 934/6	-	-
	9	008	16 N	Oil seal DIN 3760	-	-
071 B14	9	008	14 N	Hex screw DIN 931	-	-
	9	008	15 N	Nut DIN 934/6	-	-
	9	008	16 N	Oil seal DIN 3760	-	-
080 B14	9	008	14 N	Hex screw DIN 931	-	-
	9	008	15 N	Nut DIN 934/6	-	-
	9	008	16 N	Oil seal DIN 3760	-	-
090 B14	9	008	14 N	Hex screw DIN 931	-	-
	9	008	15 N	Nut DIN 934/6	-	-
	9	008	16 N	Oil seal DIN 3760	-	-
100-112 B14	9	008	14 N	Hex screw DIN 931	-	-
	9	008	15 N	Nut DIN 934/6	-	-
	9	008	16 N	Oil seal DIN 3760	-	-



P	T	C	Built	040	050	063	075	090	105	110	130	150
9	009	01	Casing	9.040.01	9.050.01	9.063.01	9.075.01	9.090.01	9.105.01	9.110.01	9.130.01	9.150.01
9	009	02	Bearing support cover	9.040.02	9.050.02	9.063.02	9.075.02	9.090.02	9.105.02	9.110.02	9.130.02	9.150.02
9	009	03	Worm Wheel	9.040.11	9.050.11	9.063.11	9.075.11	9.090.11	9.110.11	9.110.11	9.130.11	9.150.11

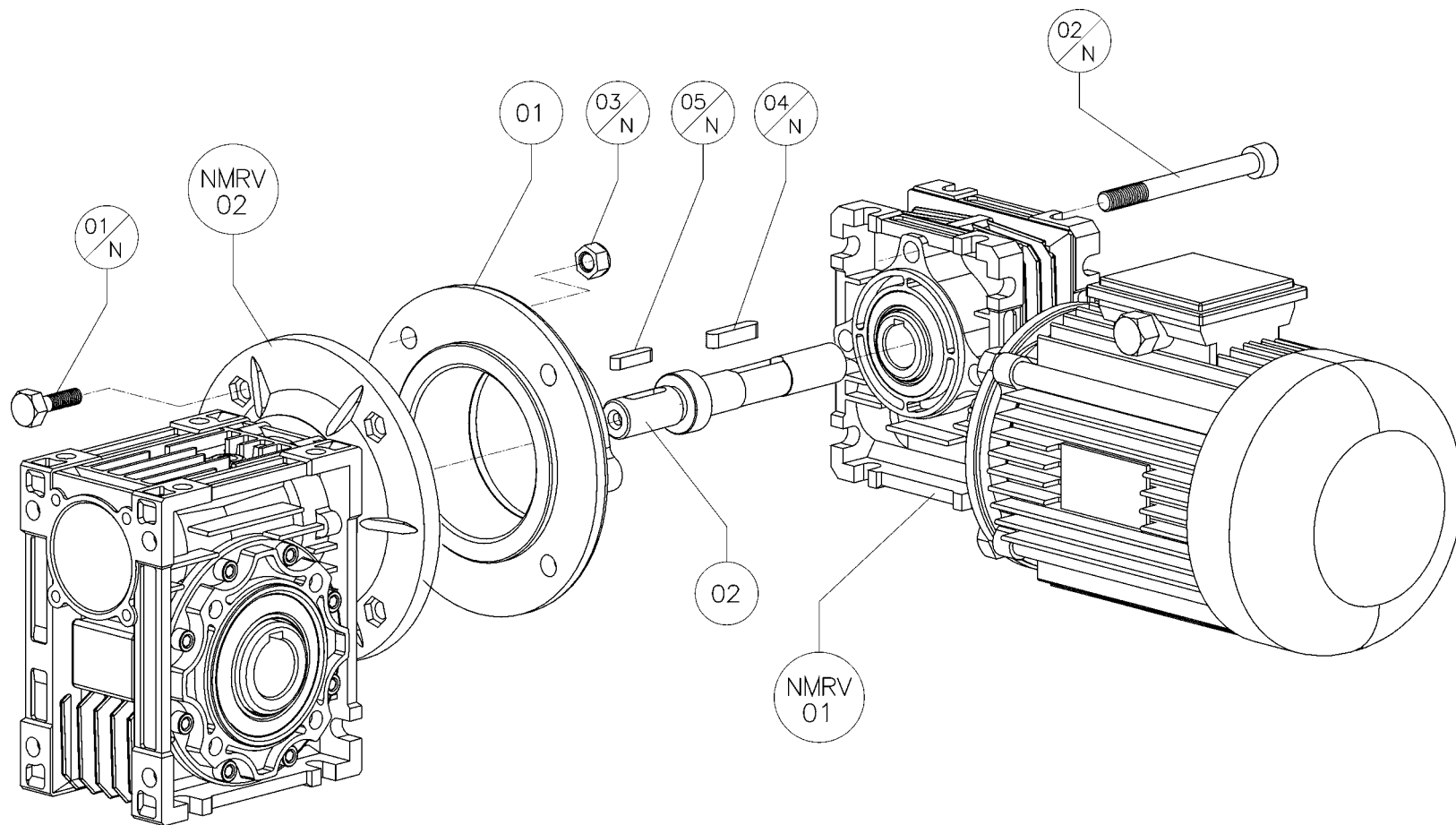
P	T	C	Commercial	040		050		063		075		090		105		110		130		150	
9	009	01 N	Screw DIN 912	M6x12***	8	M6x14	8	M8x18	8	M8x20	8	M8x20	8	M8x20*	8	M8x20	8	M8x20	8	M10x25	8
9	009	02 N	Oil seal DIN 3760	AS 30x40x7	1	AS 40x62x8	1	AS 45x65x10	1	AS 50x72x10	1	AS 60x85x8	1	AS 65x85x10	1	AS 65x85x10	1	AS 70x90x10	1	TC 90x120x12	1
9	009	03 N	Oil seal DIN 3760	AS 30x40x7	1	AS 40x62x8	1	AS 45x65x10	1	AS 50x72x10	1	AS 60x85x8	1	AS 65x85x10	1	AS 65x85x10	1	AS 70x90x10	1	TC 90x120x12	1
9	009	04 N	O-Ring	2250	1	2300	1	540	1	3500	1	3625	1	3750	1	3750	1	3925	1	41000	1
9	009	05 N	Bearing	6006	1	6008	1	6009	1	6010	1	6012	1	6013	1	6013	1	6014	1	6018	1
9	009	06 N	Bearing	6006	1	6008	1	6009	1	6010	1	6012	1	6013	1	6013	1	6014	1	6018	1

* Torx Screw TC DIN 7984



P	T	C	Built	040	050	063	075	090	105	110	130	150
9	010	01	Output flange	9.040.04	9.050.04	9.063.04	9.075.04	9.090.04	9.110.04	9.110.04	9.130.04	9.150.04
9	010	02	Torque arm	9.040.05	9.050.05	9.063.05	9.075.05	9.090.05	9.110.05	9.110.05	9.130.05	9.150.05
9	010	03	Single output Shaft	9.040.21	9.050.21	9.063.21	9.075.21	9.090.21	9.110.21	9.110.21	9.130.21	9.150.21
9	010	04	Double output Shaft	9.040.22	9.050.22	9.063.22	9.075.22	9.090.22	9.110.22	9.110.22	9.130.22	9.150.22
9	010	05	Protection cap	9.040.94	9.050.94	9.063.94	9.075.94	9.090.94	9.110.94	9.110.94	9.130.94	-

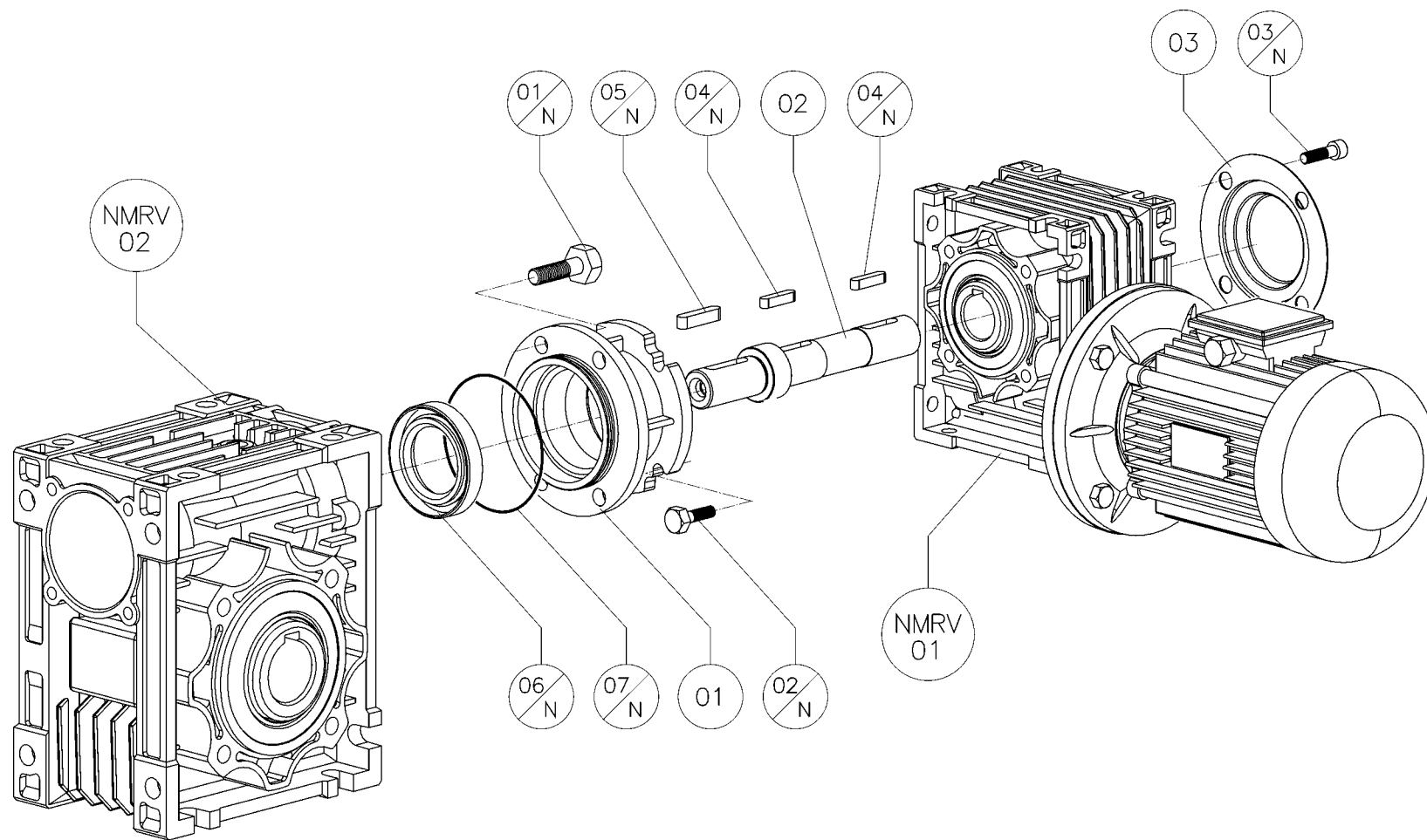
P	T	C	Commercial	040		050		063		075		090		105		110		130		150	
9	010	01 N	Srew DIN 912	M6x14	4	M8x16	4	M8x18	8	M8x20	8	M10x25	8	M10x25	8	M10x25	8	M12x30	8	M12x30	8
9	010	02 N	Srew DIN 912	M6x14	4	M8x12	4	M8x18	8	M8x18	8	M10x20	8	M10x20	8	M10x20	8	M12x25	8	M12x25	8
9	010	03 N	Screw DIN (see notes)	M6x12*	4	M8x14***	4	M8x16**	4	M8x18**	4	M10x16**	4	M10x16**	4	M10x16**	4	M12x20**	4	-	-
9	010	04 N	Key DIN 6885	A 6x6x20	1	A 8x7x30	1	A 8x7x30	1	A 8x7x30	1	A10x8x35	1	A 12x8x40	1	A 12x8x40	1	A 14x9x50	1	A 14x9x70	1
9	010	05 N	Key DIN 6885	A 6x6x30	1	A 8x7x35	1	A 8x7x35	1	A 8x7x45	1	A10x8x60	1	A 12x8x60	1	A 12x8x60	1	A 14x9x60	1	A 14x9x70	1
9	010	06 N	Key DIN 6885	A 6x6x30	1	A 8x7x35	1	A 8x7x35	1	A 8x7x45	1	A10x8x60	1	A 12x8x60	1	A 12x8x60	1	A 14x9x60	1	A 14x9x70	1
9	010	07 N	Circlip DIN 471	18	1	25	1	25	1	28	1	35	1	42	1	42	1	45	1	50	1
9	010	08 N	Circlip DIN 471	18	1	25	1	25	1	28	1	35	1	42	1	42	1	45	1	50	1
9	010	09 N	Spacer DIN 988	18x25x1,5	1	25x35x2	1	25x35x2	1	28x40x2	1	35x45x2,5	1	42x52x2,5	1	42x52x2,5	1	45x55x3	1	50x62x3	1
9	010	10 N	Spacer DIN 988	18x25x1,5	1	25x35x2	1	25x35x2	1	28x40x2	1	35x45x2,5	1	42x52x2,5	1	42x52x2,5	1	45x55x3	1	50x62x3	1



<i>P</i>	<i>T</i>	<i>C</i>	<i>Built</i>	<i>025+030*</i>	<i>025+040</i>
9	011	01	Combination flange	9.025.07.030	9.025.07.030
9	011	02	Connection shaft	9.025.23.11	9.025.23.11

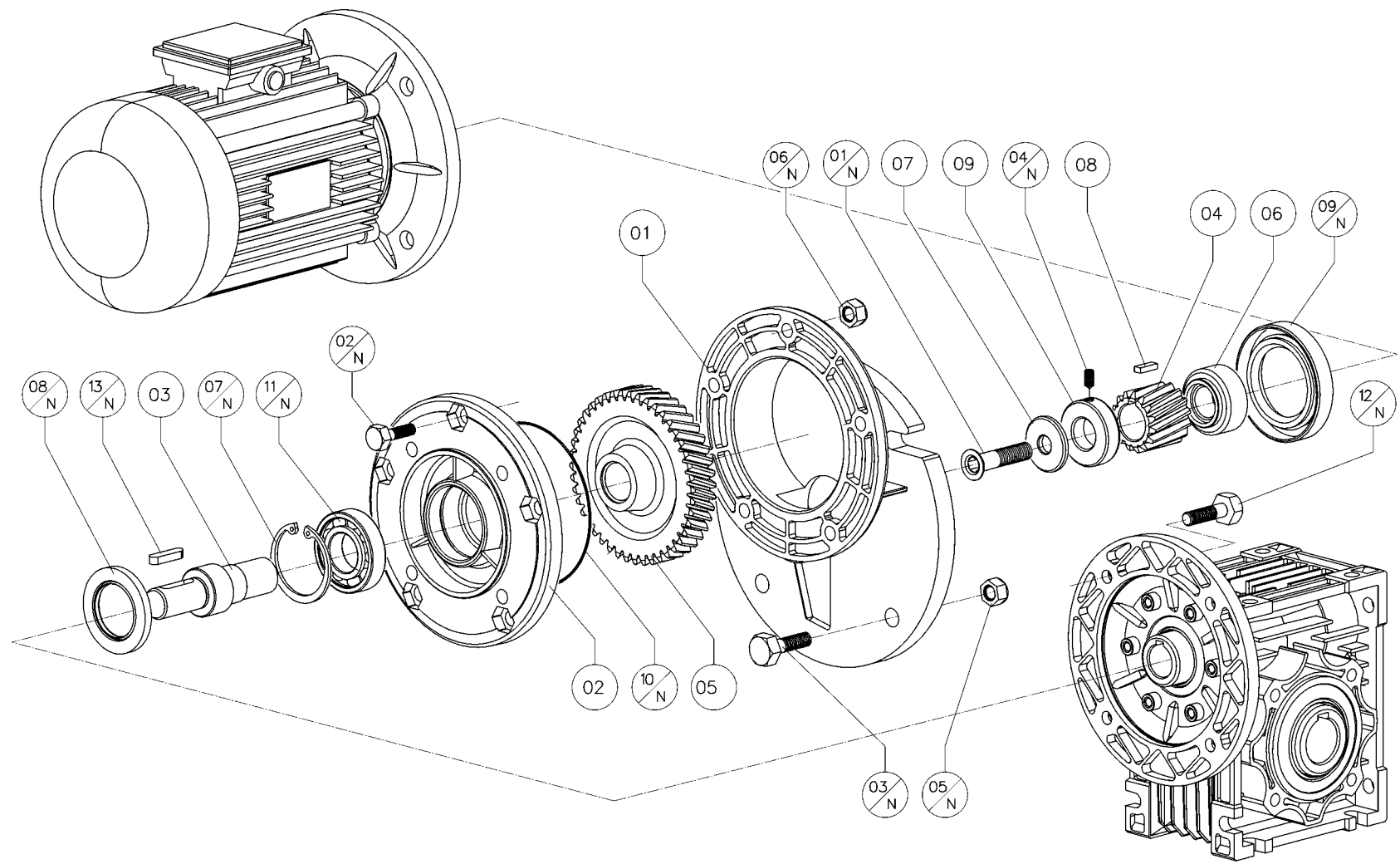
<i>P</i>	<i>T</i>	<i>C</i>	<i>Commercial</i>	<i>025+030*</i>		<i>025+040</i>	
9	011	01 N	Hex screw DIN 931	M5x16	4	M5x15	4
9	011	02 N	Screw DIN 912	M6x55	3	M6x55	3
9	011	03 N	Nut DIN 934/6	M5	4	M5	4
9	011	04 N	KeyDIN 6885	A 4x4x20	1	A 4x4x20	1
9	011	05 N	KeyDIN 6885	A 4x4x15	1	A 4x4x15	1

* NMRV - 030/040 pam 063B14 ø90xø11



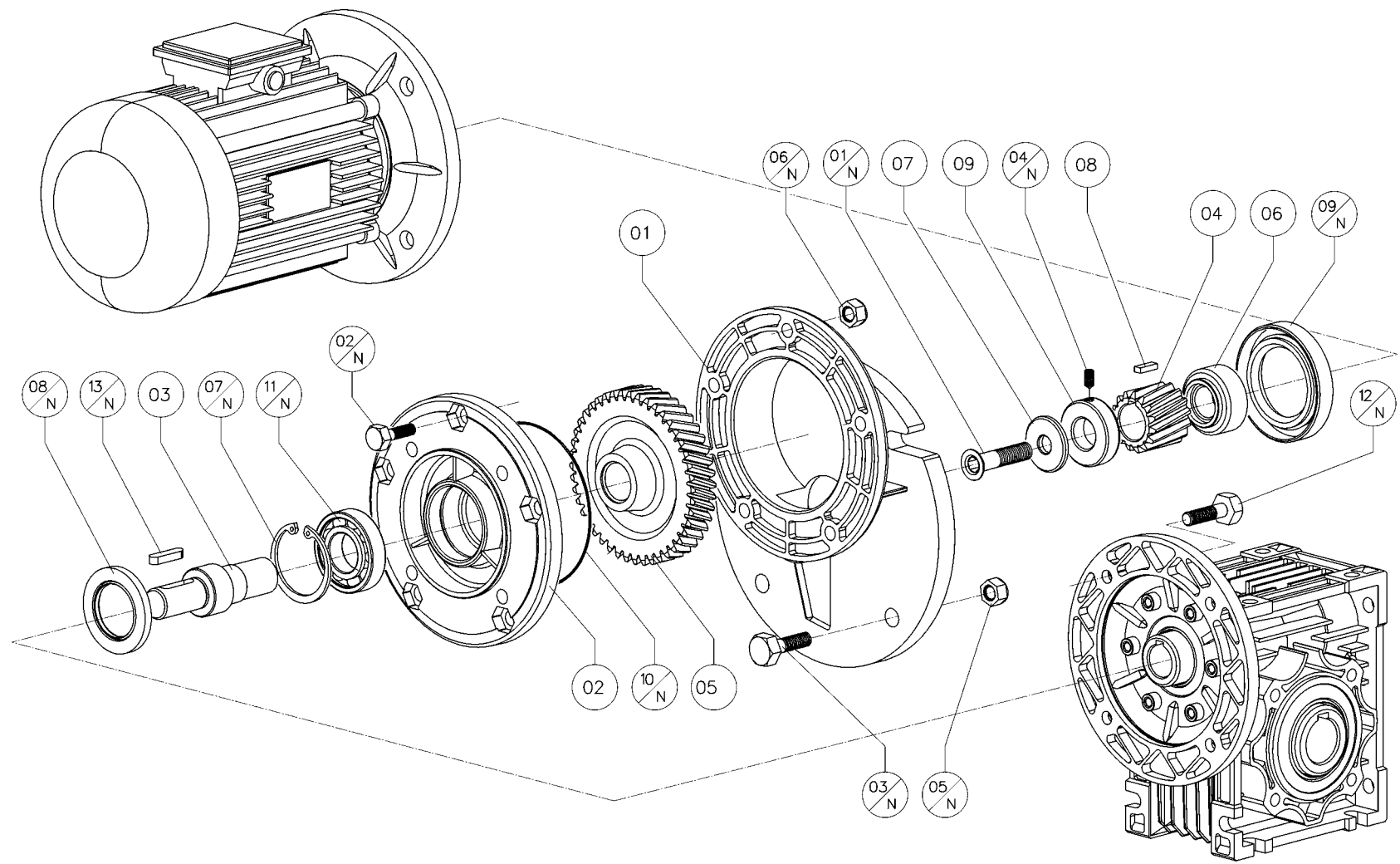
P	T	C	Built	030+040	030+050	030+063	040+075	040+090	050+105	050+110	063+130	063+150
9	012	01	Combination flange	9.030.07.040	9.030.07.050	9.030.07.063	9.040.07.075	9.040.07.075	9.050.07.110	9.050.07.110	9.063.07.130	9.063.07.150
9	012	02	Connection shaft	9.030.23.14	9.030.23.14	9.030.23.14	9.040.23.19	9.040.23.19	9.050.23.24/28	9.050.23.24/28	9.063.23.24/28	9.063.23.28/38
9	012	03	Protection cap				9.040.94	9.040.94	9.050.94	9.050.94	9.063.94	9.063.94

P	T	C	Commercial	030+040		030+050		030+063		040+075		040+090		050+105		050+110		063+130		063+150	
9	012	01 N	Hex screw DIN 931	M6x16	6	M6x16	6	M8x20	6	M8x20	6	M8x20	6	M8x20	6	M8x20	6	M8x20	6	M12x25	4
9	012	02 N	Hex screw DIN 931	M6x16	4	M6x16	4	M6x16	4	M6x16	4	M6x16	4	M8x16	4	M8x16	4	M8x20	4	M8x20	4
9	012	03 N	Screw DIN (see notes)	-	-	-	-	-	-	M6x12*	4	M6x12*	4	M8x14***	4	M8x14***	4	M8x16**	4	M8x16	1
9	012	04 N	Key DIN 6885	A 5x5x25	1	A 5x5x25	1	A 5x5x25	1	A 6x6x20	1	A 6x6x20	1	A 8x7x30	1	A 8x7x30	1	A 8x7x30	1	A 8x7x30	1
9	012	05 N	Key DIN 6885	A 5x5x20	1	A 5x5x20	1	A 5x5x20	1	A 6x6x30	1	A 6x6x30	1	A 8x7x35	1	A 8x7x35	1	A 8x7x35	1	A 8x7x45	1
9	012	05 N	Key DIN 6885	-	-	-	-	-	-	-	-	-	-	A 8x7x45	1	A 8x7x45	1	A 8x7x45	1	A 10x8x60	1
9	012	06 N	Oil seal DIN 3760	AS 25x35x7	1	AS 30x47x7	1	AS 35x52x7	1	A 40x60x10	1	A 40x60x10	1	A 50x72x10	1	A 50x72x10	1	A 50x72x10	1	TC 60x80x10	1
9	012	07 N	O-Ring	2162	1	2200	1	3225	1	2250	1	2250	1	2300	1	2300	1	2300	1	540	1



P	T	C	Built	063	071	080	090
9	013	01	Pre-stage unit casing	2.063.21	2.071.21	2.080.21	2.080.21
9	013	02	Cover	2.063.22	2.071.22	2.080.22	2.080.22
9	013	03	Low speed shaft	2.063.23	2.071.23	2.080.23	2.080.23
9	013	04	Hollow pinion	2.063.24	2.071.24	2.080.24	2.080.24
9	013	05	Gear	2.063.25	2.071.25	2.080.25	2.080.25
9	013	06	Bush	2.063.26	2.071.26	2.080.26	2.080.26
9	013	07	Washer	2.063.27	2.071.27	2.080.27	2.080.27
9	013	08	Special key	2.063.28	2.071.28	2.080.28	2.080.28
9	013	09	Stop ring	-	-	-	2.080.30

<i>nrv</i>	P	T	C	Commercial	063		071		080		090	
	9	013	01 N	Screw DIN 7991	M4x12	1	M5x12	1	M6x12	1	M6x12	1
	9	013	02 N	Hex screw DIN 931	M6x20	5	M6x20	5	M8x25	5	M8x25	5
	9	013	03 N	Hex screw DIN 931	M8x30	4	M8x30	4	M10x35	4	M10x35	4
	9	013	04 N	Screw DIN 916	-	-	-	-	-	-	M4x5	1
	9	013	05 N	Nut DIN 934/6	M8	4	M8	4	M10	4	M10	4
	9	013	06 N	Nut DIN 934/6	M6	5	M6	5	M8	5	M8	5
	9	013	07 N	Circlip DIN 472	35	1	40	1	52	1	52	1
	9	013	08 N	Oil seal DIN 3760	AS 20x35x7	1	A 22x40x7	1	AS 30x52x7	1	AS 30x52x7	1
	9	013	09 N	Oil seal DIN 3760	AS 25x40x7	1	AS 30x47x7	1	A 42x62x8	1	A 42x62x8	1
	9	013	10 N	O-ring	2262	1	2325	1	2400	1	2400	1
040	9	013	11 N	Bearing	6202	1	6203	1	6205	1	6205	1
	9	013	12 N	Hex screw DIN 931	M6x16	4	-	-	-	-	-	-
	9	013	13 N	Key DIN 6885	(Ø11) A 4x4x15	1	-	-	-	-	-	-
050	9	013	13 N	Key DIN 6885	(Ø14) A 5x5x20	1	-	-	-	-	-	-
	9	013	12 N	Hex screw DIN 931	M6x16	4	M6x25	4	-	-	-	-
	9	013	13 N	Key DIN 6885	(Ø11) A 4x4x15	1	(Ø14) A 5x5x20	1	-	-	-	-
063	9	013	13 N	Key DIN 6885	(Ø14) A 5x5x20	1	(Ø19) A 6x6x30	1	-	-	-	-
	9	013	12 N	Hex screw DIN 931	M6x16	4	M6x25	4	-	-	-	-
	9	013	13 N	Key DIN 6885	(Ø11) A 4x4x15	1	(Ø14) A 5x5x20	1	-	-	-	-
075	9	013	13 N	Key DIN 6885	(Ø14) A 5x5x20	1	(Ø19) A 6x6x30	1	-	-	-	-
	9	013	12 N	Hex screw DIN 931	-	-	M6x25	4	M8x25	4	M8x25	4
	9	013	13 N	Key DIN 6885	-	-	(Ø14) A 5x5x20	1	(Ø19) A 6x6x30	1	(Ø24) A 8x7x35	1
	9	013	13 N	Key DIN 6885	-	-	(Ø19) A 6x6x30	1	(Ø24) A 8x7x35	1	(Ø19) A 6x6x30	1
9	013	13 N	Key DIN 6885	-	-	-	-	(Ø28) A 8x7x45	1	(Ø28) A 8x7x45	1	



<i>n</i> <i>m</i> <i>r</i> <i>v</i>	<i>P</i>	<i>T</i>	<i>C</i>	Commercial	063		071		080		090	
090	9	013	12 N	Hex screw DIN 931	-	-	M6x25	4	M8x25	4	M8x25	4
	9	013	13 N	Key DIN 6885	-	-	(Ø14) A 5x5x20	1	(Ø19) A 6x6x30	1	(Ø24) A 8x7x35	1
	9	013	13 N	Key DIN 6885	-	-	(Ø19) A 6x6x30	1	(Ø24) A 8x7x35	1	(Ø19) A 6x6x30	1
	9	013	13 N	Key DIN 6885	-	-	-	-	(Ø28) A 8x7x45	1	(Ø28) A 8x7x45	1
105	9	013	12 N	Vis DIN 931	-	-	-	-	M8x25	4	M8x25	4
	9	013	13 N	Clavette DIN 6885	-	-	-	-	(Ø19) A 6x6x30	1	(Ø24) A 8x7x35	1
	9	013	13 N	Clavette DIN 6885	-	-	-	-	(Ø24) A 8x7x35	1	(Ø19) A 6x6x30	1
	9	013	13 N	Clavette DIN 6885	-	-	-	-	(Ø28) A 8x7x45	1	(Ø28) A 8x7x45	1
110	9	013	12 N	Hex screw DIN 931	-	-	-	-	M8x25	4	M8x25	4
	9	013	13 N	Key DIN 6885	-	-	-	-	(Ø19) A 6x6x30	1	(Ø24) A 8x7x35	1
	9	013	13 N	Key DIN 6885	-	-	-	-	(Ø24) A 8x7x35	1	(Ø19) A 6x6x30	1
	9	013	13 N	Key DIN 6885	-	-	-	-	(Ø28) A 8x7x45	1	(Ø28) A 8x7x45	1
130	9	013	12 N	Hex screw DIN 931	-	-	-	-	M8x25	4	M8x25	4
	9	013	13 N	Key DIN 6885	-	-	-	-	(Ø19) A 6x6x30	1	(Ø24) A 8x7x35	1
	9	013	13 N	Key DIN 6885	-	-	-	-	(Ø24) A 8x7x35	1	(Ø19) A 6x6x30	1
	9	013	13 N	Key DIN 6885	-	-	-	-	(Ø28) A 8x7x45	1	(Ø28) A 8x7x45	1



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