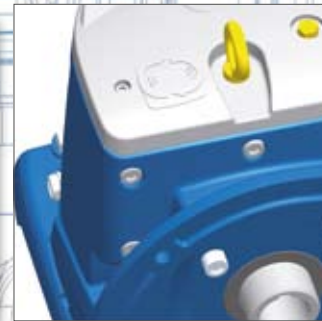


# ROBUS IN-LINE HELICAL GEARBOX





Technical characteristics pag. 2-3



List of components ROBUS-2 (2 reduction stages) pag. 4-5



List of components ROBUS-3 (3 reduction stages) pag. 6-7



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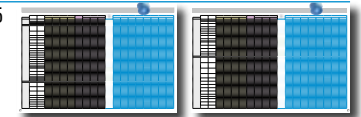
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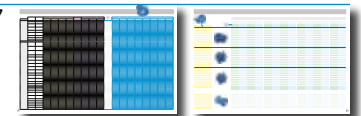
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## TECHNICAL CHARACTERISTICS



Uniquely contoured, rigid, precise, monobloc, cast iron Body, Base and Flange ensure extreme robustness.



Except Robus 20, all Robus sizes have a screw-on lifting eyebolt



ROBUST

A large top cover in light weight aluminium alloy facilitates the inspection

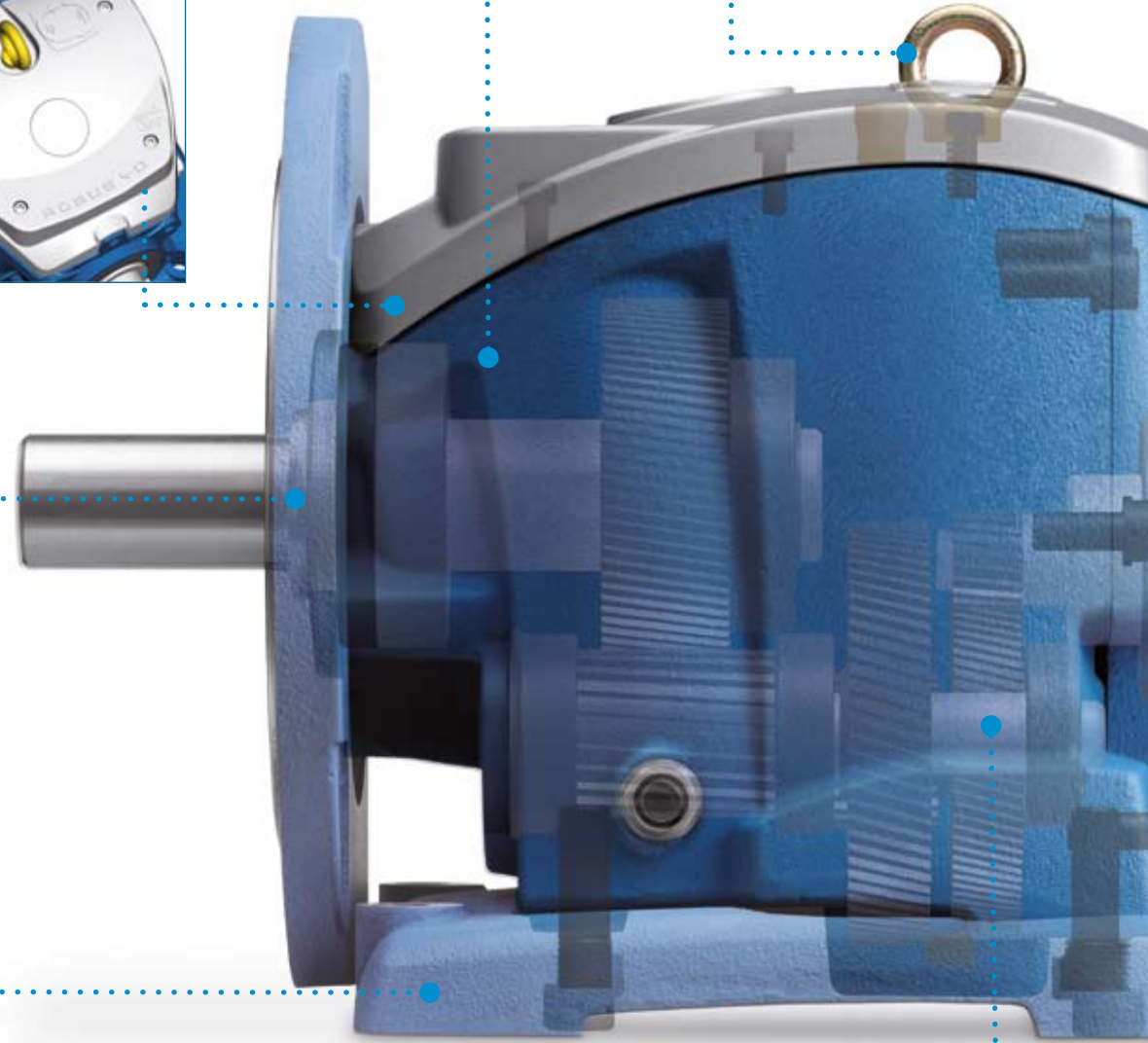
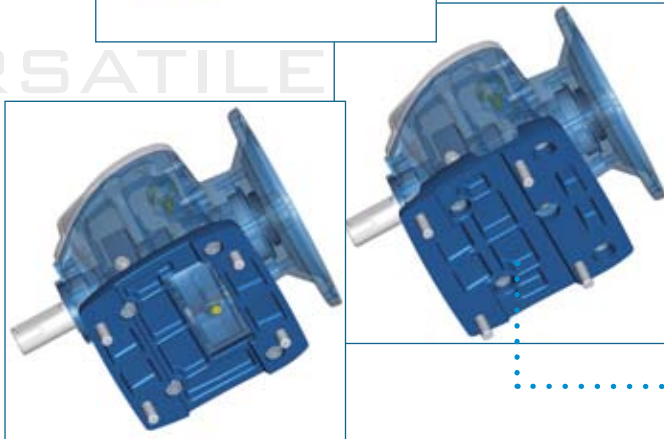


Modular design with detachable output flange and foot base allows easy and quick conversion between foot and flange mounting

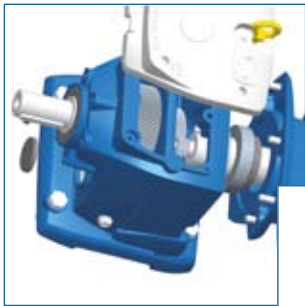


VERSATILE

Various detachable foot bases in solid cast iron make Robus interchangeable with any other gearbox brand



PATENTED



Easy to examine and maintain.  
 Minimum maintenance requirement.  
 All sizes are supplied with long-life synthetic oil.

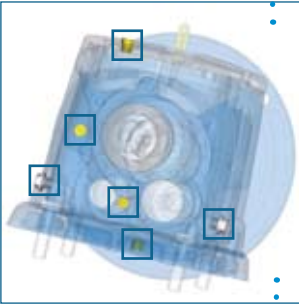


IEC flange and hollow shaft.  
 Choice of hollow input flanges permits direct mounting of any standard motor



Unique construction of Robus makes it possible to mount any size in any position.  
 This flexibility is achieved by:

+ ZZ autolubricating bearings on input and output shaft



+ 6 interchangeable plugs, including one breather plug and a level plug



+ mechanical parts locked in their positions by snap rings and spacers. This also ensures better absorption of axial thrust and prolongs the life of bearings

FLEXIBLE MOUNTING

ENGINEERED FOR HIGHER RELIABILITY



Use of high strength steels like 15CrMo4 and case hardening to 58 ±2 HRC reduce the wear rate in wheels. All wheels are profile ground to Din 3962 class 6 accuracy for low noise and high efficiency.



Shafts are made from 42CrMo4 steel and tempered to reach a hardness of 23-35 HRC, thus increasing their capacity to withstand shearing stresses.



If the mechanical robustness and the service factor of an helical gearbox are mainly influenced by the centres distance of the last stage, Robus confirms to be very robust (see "X2" at page 19)



Single stages ratios between 2 and 6, together with proper gears sizes, result mathematically in higher teeth number and size (module) of each wheel and a better fractioned load among the reduction stages. That influences both durability and torque transmission capability



Dual bearing support on the input shaft assures precise alignment of the first stage gears and reduces vibrations and consequent gear wear



Intermediate shaft is rigidly supported by 3 bearings, with no overhang wheel, thus imparting greater flexural strength and better meshing. This increases the overloading capacity and takes to lower noise

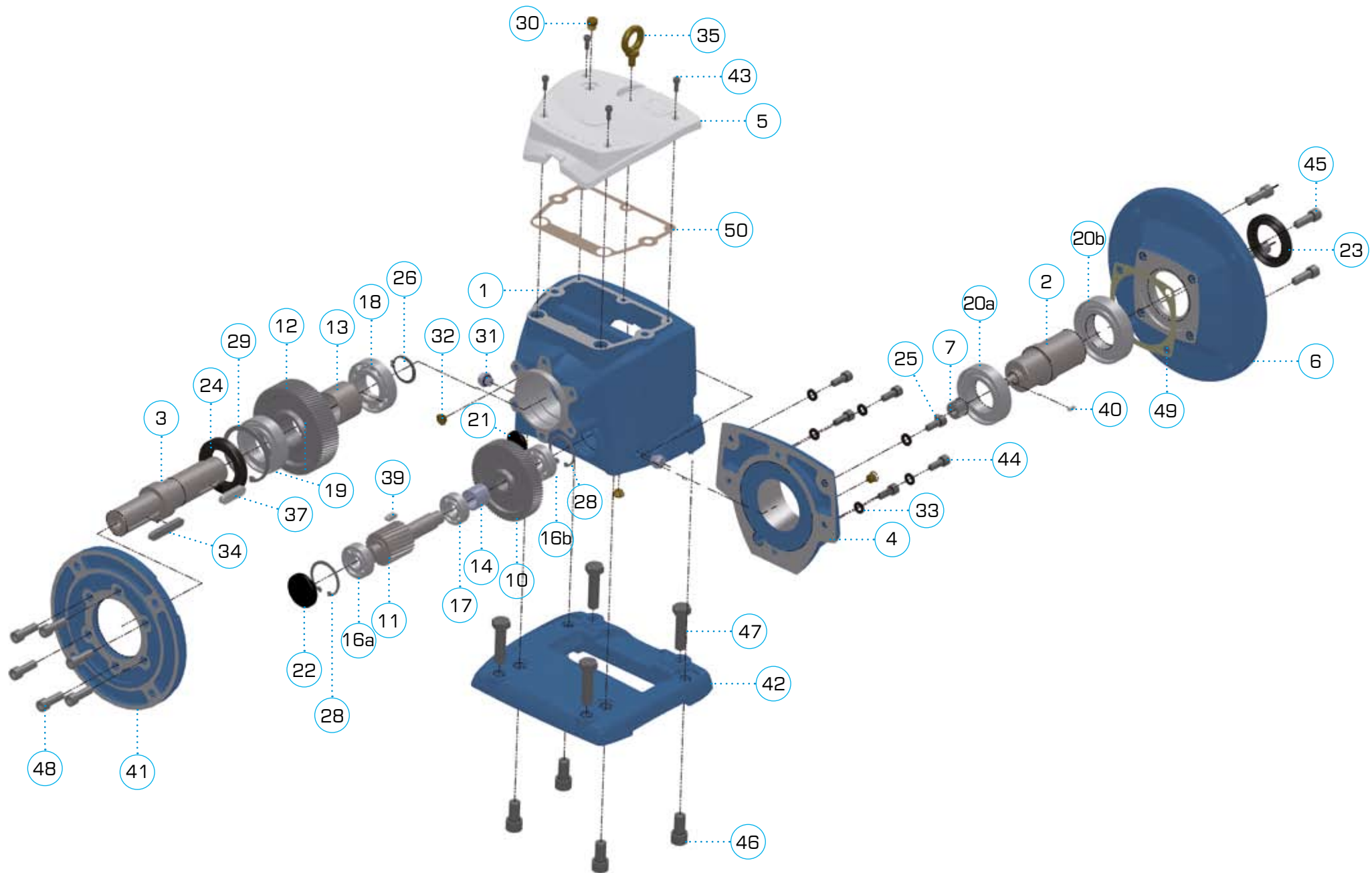


Smaller overhang distance of output shaft from supporting bearing in order to withstand higher radial loads



Abounding bearings size (pages 5 and 7), in order to withstand higher loads

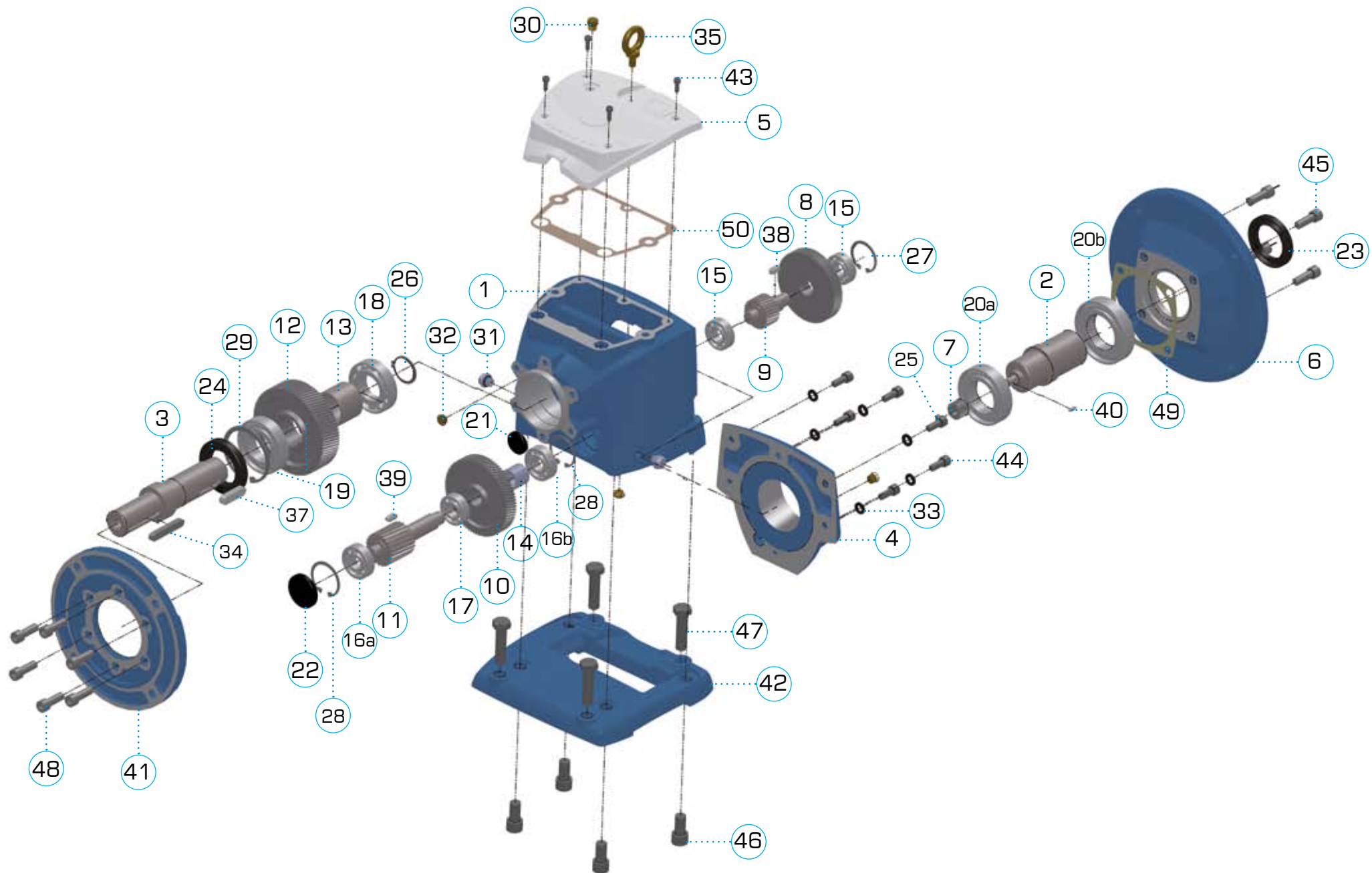
# LIST OF COMPONENTS ROBUS-2 (2 REDUCTION STAGES)



## LIST OF COMPONENTS ROBUS-2 (2 REDUCTION STAGES)

|      |      | ROBUS25-2         |      | ROBUS30-2         |      | ROBUS35-2         |      | ROBUS40-2         |      | ROBUS50-2          |      | ROBUS60-2          |      |
|------|------|-------------------|------|-------------------|------|-------------------|------|-------------------|------|--------------------|------|--------------------|------|
| item | code | description       | q.ty | description       | q.ty | description       | q.ty | description       | q.ty | description        | q.ty | description        | q.ty |
| 1    | HOU  | housing           | 1    | housing           | 1    | housing           | 1    | housing           | 1    | housing            | 1    | housing            | 1    |
| 2    | ISH  | input shaft       | 1    | input shaft       | 1    | input shaft       | 1    | input shaft       | 1    | input shaft        | 1    | input shaft        | 1    |
| 3    | OSH  | output shaft      | 1    | output shaft      | 1    | output shaft      | 1    | output shaft      | 1    | output shaft       | 1    | output shaft       | 1    |
| 4    | ICV  | input cover       | 1    | input cover       | 1    | input cover       | 1    | input cover       | 1    | input cover        | 1    | input cover        | 1    |
| 5    | TCV  | top cover         | 1    | top cover         | 1    | top cover         | 1    | top cover         | 1    | top cover          | 1    | top cover          | 1    |
| 6    | IFL  | input flange      | 1    | input flange      | 1    | input flange      | 1    | input flange      | 1    | input flange       | 1    | input flange       | 1    |
|      |      | 63B5              |      | 63                |      | 63                |      | 80                |      | 90                 |      | 100/112            |      |
|      |      | 71B5              |      | 71                |      | 71                |      | 90                |      | 100/112            |      | 132                |      |
|      |      | 80B5              |      | 80                |      | 80                |      | 100/112           |      | 132                |      | 160                |      |
|      |      | 90B5              |      | 90                |      | 90                |      | 132               |      | 160                |      | 180                |      |
|      |      |                   |      | 100/112           |      | 100/112           |      |                   |      |                    |      |                    |      |
| 7    | P1   | pinion 1          | 1    | pinion 1          | 1    | pinion 1          | 1    | pinion 1          | 1    | pinion 1           | 1    | pinion 1           | 1    |
| 10   | G2   | gear 2            | 1    | gear 2            | 1    | gear 2            | 1    | gear 2            | 1    | gear 2             | 1    | gear 2             | 1    |
| 11   | P3   | pinion 3          | 1    | pinion 3          | 1    | pinion 3          | 1    | pinion 3          | 1    | pinion 3           | 1    | pinion 3           | 1    |
| 12   | G3   | gear 3            | 1    | gear 3            | 1    | gear 3            | 1    | gear 3            | 1    | gear 3             | 1    | gear 3             | 1    |
| 13   | SP   | spacer            | 1    | spacer            | 1    | spacer            | 1    | spacer            | 1    | spacer             | 1    | spacer             | 1    |
| 14   | SP   | spacer            | 1    | spacer            | 1    | spacer            | 1    | spacer            | 1    | spacer             | 1    | spacer             | 1    |
| 16a  | BEA  | bearing 6202      | 1    | bearing 6302      | 1    | bearing 6304      | 1    | bearing 6304      | 1    | bearing 6306       | 1    | Bearing 6307       | 1    |
| 16b  | BEA  | bearing 6202      | 1    | bearing 6203      | 1    | bearing 6204      | 1    | bearing 6304      | 1    | bearing 6306       | 1    | Bearing 6307       | 1    |
| 17   | BEA  | bearing 6003      | 1    | bearing 6004      | 1    | bearing 6205      | 1    | bearing 6205      | 1    | bearing 6207       | 1    | Bearing 6208       | 1    |
| 18   | BEA  | bearing 6205      | 1    | bearing 7206      | 1    | bearing 7207      | 1    | bearing 7208      | 1    | bearing 6210       | 1    | Bearing 6212       | 1    |
| 19   | BEA  | bearing 6206ZZ    | 1    | bearing 7207ZZ    | 1    | bearing 7208ZZ    | 1    | bearing 7209ZZ    | 1    | bearing 6311ZZ     | 1    | Bearing 6313-zz    | 1    |
| 20a  | BEA  |                   |      |                   |      |                   |      | bearing 6210ZZ    | 1    | bearing 6212ZZ     | 1    | bearing 6215-zz    | 1    |
| 20b  | BEA  |                   |      |                   |      |                   |      | bearing 6211ZZ    | 1    | bearing 6213ZZ     | 1    | bearing 6216-zz    | 1    |
| 20   | BEA  | bearing 6008ZZ    | 2    | bearing 6009ZZ    | 2    | bearing 6009ZZ    | 2    |                   |      | bearing 6009ZZ     | 2    |                    |      |
| 21   | COV  | plug seal D25     | 1    | plug seal D30     | 1    | plug seal D35     | 1    | plug seal D35     | 1    | plug seal D42      | 1    | plug seal D52      | 1    |
| 22   | COV  | plug seal D35     | 1    | plug seal D42     | 1    | plug seal D52     | 1    | plug seal D52     | 1    | plug seal D72      | 1    | plug seal D80      | 1    |
| 23   | OS   | oil seal 40x55x8  | 1    | oil seal 45x60x9  | 1    | oil seal 60x45x9  | 1    | oil seal 55x80x10 | 1    | oil seal 65x90x12  | 1    | oil seal 80x105x13 | 1    |
| 24   | OS   | oil seal 62x35x11 | 1    | oil seal 40x72x10 | 1    | oil seal 50x80x10 | 1    | oil seal 55x85x12 | 1    | oil seal 65x120x15 | 1    | oil seal 72x140x12 | 1    |
| 25   | SNR  | snap ring         | 1    | snap ring         | 1    | snap ring         | 1    | snap ring         | 1    | snap ring          | 1    | snap ring          | 1    |
| 26   | SNR  | snap ring         | 1    | snap ring         | 1    | snap ring         | 1    | snap ring         | 1    | snap ring          | 1    | snap ring          | 1    |
| 27   | SNR  | snap ring         | 2    | snap ring         | 2    | snap ring         | 2    | snap ring         | 2    | snap ring          | 2    | snap ring          | 1    |
| 28   | SNR  | snap ring         | 2    | snap ring         | 2    | snap ring         | 2    | snap ring         | 2    | snap ring          | 2    | snap ring          | 2    |
| 29   | SNR  | snap ring         | 1    | snap ring         | 1    | snap ring         | 1    | snap ring         | 1    | snap ring          | 1    | snap ring          | 1    |
| 30   | BPL  | breather plug     | 1    | breather plug     | 1    | breather plug     | 1    | breather plug     | 1    | breather plug      | 1    | breather plug      | 1    |
| 31   | FPL  | filler plug       | 6    | filler plug       | 6    | filler plug       | 6    | filler plug       | 6    | filler plug        | 6    | filler plug        | 6    |
| 32   | LPL  | level plug        | 1    | level plug        | 1    | level plug        | 1    | level plug        | 1    | level plug         | 1    | level plug         | 1    |
| 33   | WSH  | washer            | 4    | washer            | 4    | washer            | 4    | washer            | 4    | washer             | 4    | washer             | 4    |
| 34   | KEY  | key               | 1    | key               | 1    | key               | 1    | key               | 1    | key                | 1    | key                | 1    |
| 35   | KEY  | eye-bolt          | 1    | eye-bolt          | 1    | eye-bolt          | 1    | eye-bolt          | 1    | eye-bolt           | 1    | eye-bolt           | 1    |
| 37   | KEY  | key               | 1    | key               | 1    | key               | 1    | key               | 1    | key                | 1    | key                | 1    |
| 39   | KEY  | key               | 1    | key               | 1    | key               | 1    | key               | 1    | key                | 1    | key                | 1    |
| 40   | KEY  | key               | 1    | key               | 1    | key               | 1    | key               | 1    | key                | 1    | key                | 1    |
| 41   | OFL  | output flange     | 1    | output flange     | 1    | output flange     | 1    | output flange     | 1    | output flange      | 1    | output flange      | 1    |
|      |      | 200               |      | 200               |      | 250               |      | 300               |      | 350                |      | 450                |      |
|      |      | 160               |      | 160               |      | 200               |      | 250               |      | 300                |      | 350                |      |
| 42   | FSW  | base              | 1    | base              | 1    | base              | 1    | base              | 1    | base               | 1    | base               | 1    |
|      | FBF  | SW                |      | SW                |      | SW                |      | SW                |      | SW                 |      | SW                 |      |
|      |      | BF                |      | BF                |      | BF                |      | BF                |      | BF                 |      | BF                 |      |
| 43   | SCR  | screw             | 6    | screw             | 6    | screw             | 6    | screw             | 6    | screw              | 6    | screw              | 6    |
| 44   | SCR  | screw             | 6    | screw             | 6    | screw             | 6    | screw             | 6    | screw              | 6    | screw              | 6    |
| 45   | SCR  | screw             | 4    | screw             | 4    | screw             | 4    | screw             | 4    | screw              | 4    | screw              | 4    |
| 46   | SCR  | screw             | 4    | screw             | 4    | screw             | 4    | screw             | 4    | screw              | 4    | screw              | 4    |
| 47   | SCR  | screw             | 4    | screw             | 4    | screw             | 4    | screw             | 4    | screw              | 4    | screw              | 4    |
| 48   | SCR  | screw             | 6    | screw             | 6    | screw             | 6    | screw             | 6    | screw              | 6    | screw              | 6    |
| 49   | GK49 | gasket            | 1    | gasket            | 1    | gasket            | 1    | gasket            | 1    | gasket             | 1    | gasket             | 1    |
| 50   | GK50 | gasket            | 1    | gasket            | 1    | gasket            | 1    | gasket            | 1    | gasket             | 1    | gasket             | 1    |

LIST OF COMPONENTS ROBUS-3 (3 REDUCTION STAGES)



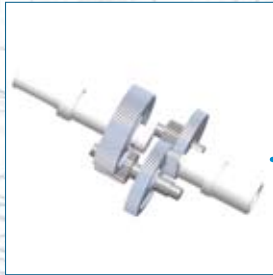


## LIST OF COMPONENTS ROBUS-3 (3 REDUCTION STAGES)

|      |      | ROBUS25-3         |      | ROBUS30-3          |      | ROBUS35-3          |      | ROBUS40-3         |      | ROBUS50-3          |      | ROBUS60-3          |      |
|------|------|-------------------|------|--------------------|------|--------------------|------|-------------------|------|--------------------|------|--------------------|------|
| item | code | description       | q.ty | description        | q.ty | description        | q.ty | description       | q.ty | description        | q.ty | description        | q.ty |
| 1    | HOU  | housing           | 1    | housing            | 1    | housing            | 1    | housing           | 1    | housing            | 1    | housing            | 1    |
| 2    | ISH  | input shaft       | 1    | input shaft        | 1    | input shaft        | 1    | input shaft       | 1    | input shaft        | 1    | input shaft        | 1    |
| 3    | OSH  | output shaft      | 1    | output shaft       | 1    | output shaft       | 1    | output shaft      | 1    | output shaft       | 1    | output shaft       | 1    |
| 4    | ICV  | input cover       | 1    | input cover        | 1    | input cover        | 1    | input cover       | 1    | input cover        | 1    | input cover        | 1    |
| 5    | TCV  | top cover         | 1    | top cover          | 1    | top cover          | 1    | top cover         | 1    | top cover          | 1    | top cover          | 1    |
| 6    | IFL  | input flange      | 1    | input flange       | 1    | input flange       | 1    | input flange      | 1    | input flange       | 1    | input flange       | 1    |
|      |      | 63B5              |      | 63                 |      | 63                 |      | 63                |      | 63                 |      | 63                 |      |
|      |      | 71B5              |      | 71                 |      | 71                 |      | 71                |      | 71                 |      | 71                 |      |
|      |      | 80B5              |      | 80                 |      | 80                 |      | 80                |      | 80                 |      | 80                 |      |
|      |      | 90B5              |      | 90                 |      | 90                 |      | 90                |      | 90                 |      | 90                 |      |
|      |      |                   |      | 100/112            |      | 100/112            |      | 100/112           |      | 100/112            |      | 100/112            |      |
| 7    | P1   | pinion 1          | 1    | pinion 1           | 1    | pinion 1           | 1    | pinion 1          | 1    | pinion 1           | 1    | pinion 1           | 1    |
| 8    | G1   | gear 1            | 1    | gear 1             | 1    | gear 1             | 1    | gear 1            | 1    | gear 1             | 1    | gear 1             | 1    |
| 9    | P2   | pinion 2          | 1    | pinion 2           | 1    | pinion 2           | 1    | pinion 2          | 1    | pinion 2           | 1    | pinion 2           | 1    |
| 10   | G2   | gear 2            | 1    | gear 2             | 1    | gear 2             | 1    | gear 2            | 1    | gear 2             | 1    | gear 2             | 1    |
| 11   | P3   | pinion 3          | 1    | pinion 3           | 1    | pinion 3           | 1    | pinion 3          | 1    | pinion 3           | 1    | pinion 3           | 1    |
| 12   | G3   | gear 3            | 1    | gear 3             | 1    | gear 3             | 1    | gear 3            | 1    | gear 3             | 1    | gear 3             | 1    |
| 13   | SP   | spacer D30.5xL24  | 1    | spacer D35.5xL32.5 | 1    | spacer D40.5xL36.6 | 1    | spacer            | 1    | spacer D55.5xL45   | 1    | spacer D65.5xL50   | 1    |
| 14   | SP   | spacer D20xL22    | 1    | spacer D20.5xL23.5 | 1    | spacer D21.5xL24.5 | 1    | spacer            | 1    | spacer D35xL32     | 1    | spacer D40.5xL38   | 1    |
| 15   | BEA  | bearing 6002      | 2    | bearing 6003       | 2    | bearing 6203       | 2    | bearing 6204      | 2    | bearing 6206       | 2    | bearing 6207       | 2    |
| 16a  | BEA  | bearing 6202      | 1    | bearing 6302       | 1    | bearing 6304       | 1    | bearing 6304      | 1    | bearing 6306       | 1    | Bearing 6307       | 1    |
| 16b  | BEA  | bearing 6202      | 1    | bearing 6203       | 1    | bearing 6204       | 1    | bearing 6304      | 1    | bearing 6306       | 1    | Bearing 6307       | 1    |
| 17   | BEA  | bearing 6003      | 1    | bearing 6004       | 1    | bearing 6205       | 1    | bearing 6205      | 1    | bearing 6207       | 1    | Bearing 6208       | 1    |
| 18   | BEA  | bearing 6205      | 1    | bearing 7206       | 1    | bearing 7207       | 1    | bearing 7208      | 1    | bearing 6210       | 1    | Bearing 6212       | 1    |
| 19   | BEA  | bearing 6206      | 1    | bearing 7207ZZ     | 1    | bearing 7208ZZ     | 1    | bearing 7209ZZ    | 1    | bearing 6311ZZ     | 1    | Bearing 6313ZZ     | 1    |
| 20a  | BEA  |                   |      |                    |      |                    |      | bearing 6210ZZ    | 1    | bearing 6212ZZ     | 1    | bearing 6215ZZ     | 1    |
| 20b  | BEA  |                   |      |                    |      |                    |      | bearing 6211ZZ    | 1    | bearing 6213ZZ     | 1    | bearing 6216ZZ     | 1    |
| 20   | BEA  | bearing 6008      | 2    | bearing 6009ZZ     | 2    | bearing 6009ZZ     | 2    | bearing 6009ZZ    | 2    | bearing 6009ZZ     | 2    | bearing 6009ZZ     | 2    |
| 21   | COV  | plug seal D25     | 1    | plug seal D30      | 1    | plug seal D35      | 1    | plug seal D35     | 1    | plug seal D42      | 1    | plug seal D52      | 1    |
| 22   | COV  | plug seal D35     | 1    | plug seal D42      | 1    | plug seal D52      | 1    | plug seal D52     | 1    | plug seal D72      | 1    | plug seal D80      | 1    |
| 23   | OS   | oil seal 40x55x8  | 1    | oil seal 45x60x9   | 1    | oil seal 60x45x9   | 1    | oil seal 55x80x10 | 1    | oil seal 65x90x12  | 1    | oil seal 80x105x13 | 1    |
| 24   | OS   | oil seal 35x62x11 | 1    | oil seal 40x72x10  | 1    | oil seal 50x80x10  | 1    | oil seal 55x85x12 | 1    | oil seal 65x120x15 | 1    | oil seal 72x140x12 | 1    |
| 25   | SNR  | snap ring         | 1    | snap ring          | 1    | snap ring          | 1    | snap ring         | 1    | snap ring          | 1    | snap ring          | 1    |
| 26   | SNR  | snap ring         | 1    | snap ring          | 1    | snap ring          | 1    | snap ring         | 1    | snap ring          | 1    | snap ring          | 1    |
| 27   | SNR  | snap ring         | 2    | snap ring          | 2    | snap ring          | 2    | snap ring         | 2    | snap ring          | 2    | snap ring          | 1    |
| 28   | SNR  | snap ring         | 2    | snap ring          | 2    | snap ring          | 2    | snap ring         | 2    | snap ring          | 2    | snap ring          | 2    |
| 29   | SNR  | snap ring         | 1    | snap ring          | 1    | snap ring          | 1    | snap ring         | 1    | snap ring          | 1    | snap ring          | 1    |
| 30   | BPL  | breather plug     | 1    | breather plug      | 1    | breather plug      | 1    | breather plug     | 1    | breather plug      | 1    | breather plug      | 1    |
| 31   | FPL  | filler plug       | 6    | filler plug        | 6    | filler plug        | 6    | filler plug       | 6    | filler plug        | 6    | filler plug        | 6    |
| 32   | LPL  | level plug        | 1    | level plug         | 1    | level plug         | 1    | level plug        | 1    | level plug         | 1    | level plug         | 1    |
| 33   | WSH  |                   |      |                    |      |                    |      |                   |      |                    |      |                    |      |
| 34   | KEY  | key               | 1    | key                | 1    | key                | 1    | key               | 1    | key                | 1    | key                | 1    |
| 35   | KEY  | eye-bolt          | 1    | eye-bolt           | 1    | eye-bolt           | 1    | eye-bolt          | 1    | eye-bolt           | 1    | eye-bolt           | 1    |
| 37   | KEY  | key               | 1    | key                | 1    | key                | 1    | key               | 1    | key                | 1    | key                | 1    |
| 38   | KEY  | key               | 1    | key                | 1    | key                | 1    | key               | 1    | key                | 1    | key                | 1    |
| 39   | KEY  | key               | 1    | key                | 1    | key                | 1    | key               | 1    | key                | 1    | key                | 1    |
| 40   | KEY  | Key               | 1    | Key                | 1    | Key                | 1    | Key               | 1    | Key                | 1    | Key                | 1    |
| 41   | OFL  | output flange     | 1    | output flange      | 1    | output flange      | 1    | output flange     | 1    | output flange      | 1    | output flange      | 1    |
|      |      | 200               |      | 200                |      | 250                |      | 300               |      | 350                |      | 450                |      |
|      |      | 160               |      | 160                |      | 200                |      | 250               |      | 300                |      | 350                |      |
| 42   |      | base              | 1    | base               | 1    | base               | 1    | base              | 1    | base               | 1    | base               | 1    |
|      | FSW  | SW                |      | SW                 |      | SW                 |      | SW                |      | SW                 |      | SW                 |      |
|      | FBF  | BF                |      | BF                 |      | BF                 |      | BF                |      | BF                 |      | BF                 |      |
| 43   | SCR  | screw             | 6    | screw              | 6    | screw              | 6    | screw             | 6    | screw              | 6    | screw              | 6    |
| 44   | SCR  | screw             | 6    | screw              | 6    | screw              | 6    | screw             | 6    | screw              | 6    | screw              | 6    |
| 45   | SCR  | screw             | 4    | screw              | 4    | screw              | 4    | screw             | 4    | screw              | 4    | screw              | 4    |
| 46   | SCR  | screw             | 4    | screw              | 4    | screw              | 4    | screw             | 4    | screw              | 4    | screw              | 4    |
| 47   | SCR  | screw             | 4    | screw              | 4    | screw              | 4    | screw             | 4    | screw              | 4    | screw              | 4    |
| 48   | SCR  | screw             | 6    | screw              | 6    | screw              | 6    | screw             | 6    | screw              | 6    | screw              | 6    |
| 49   | GK49 | gasket            | 1    | gasket             | 1    | gasket             | 1    | gasket            | 1    | gasket             | 1    | gasket             | 1    |
| 50   | GK50 | gasket            | 1    | gasket             | 1    | gasket             | 1    | gasket            | 1    | gasket             | 1    | gasket             | 1    |

# CODE SYSTEM

1 first 4 digits describe the ROBUS size  
**RB40** =ROBUS 40  
**RB50** =ROBUS 50  
 etc



2 then 1 digit tell the nr of stages  
**2** =2 stages  
**3** =3 stages

3 then 3 digits are the rated ratio  
**020** =i:20  
**120** =i:120  
 etc

4 then 3 digits for the mounting type

**FSW** =base type SW (page19)  
**FBF** =base type BF (page19)  
**FMS** =base type MS

**140** =output flange 63B5 KP=140  
**160** =output flange 71B5 KP=160  
**200** =output flange 80/90B5 KP=200  
**250** =output flange 100/112B5 KP=250  
**300** =output flange 132B5 KP=300  
**350** =output flange 160/180 KP=350  
**450** =output flange 200 KP=450

**UNV** =without foot or output flange

5 than 3 digits for the input flange (that determines the input hole diameter too)

**714** =71B14 (page18)  
**805** =80B5 (page18)  
**905** =90B5 (page18)  
**125** =100-112B5 (page18)  
**135** =132B5 (page18)  
 etc ...

For instance:

**RB603070FSW135**

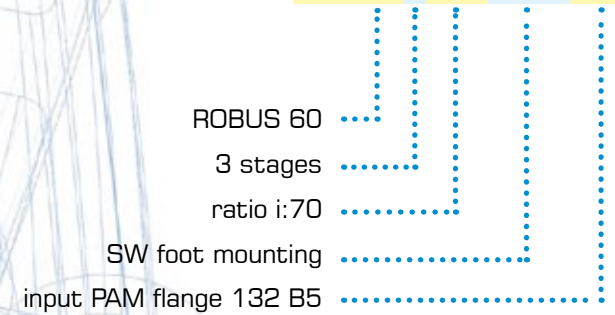
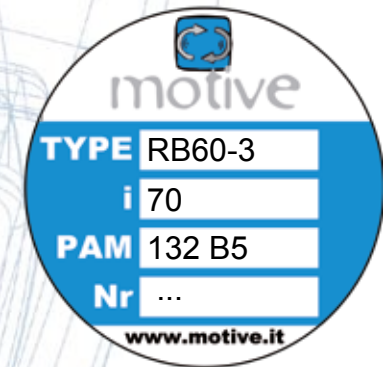


Plate:

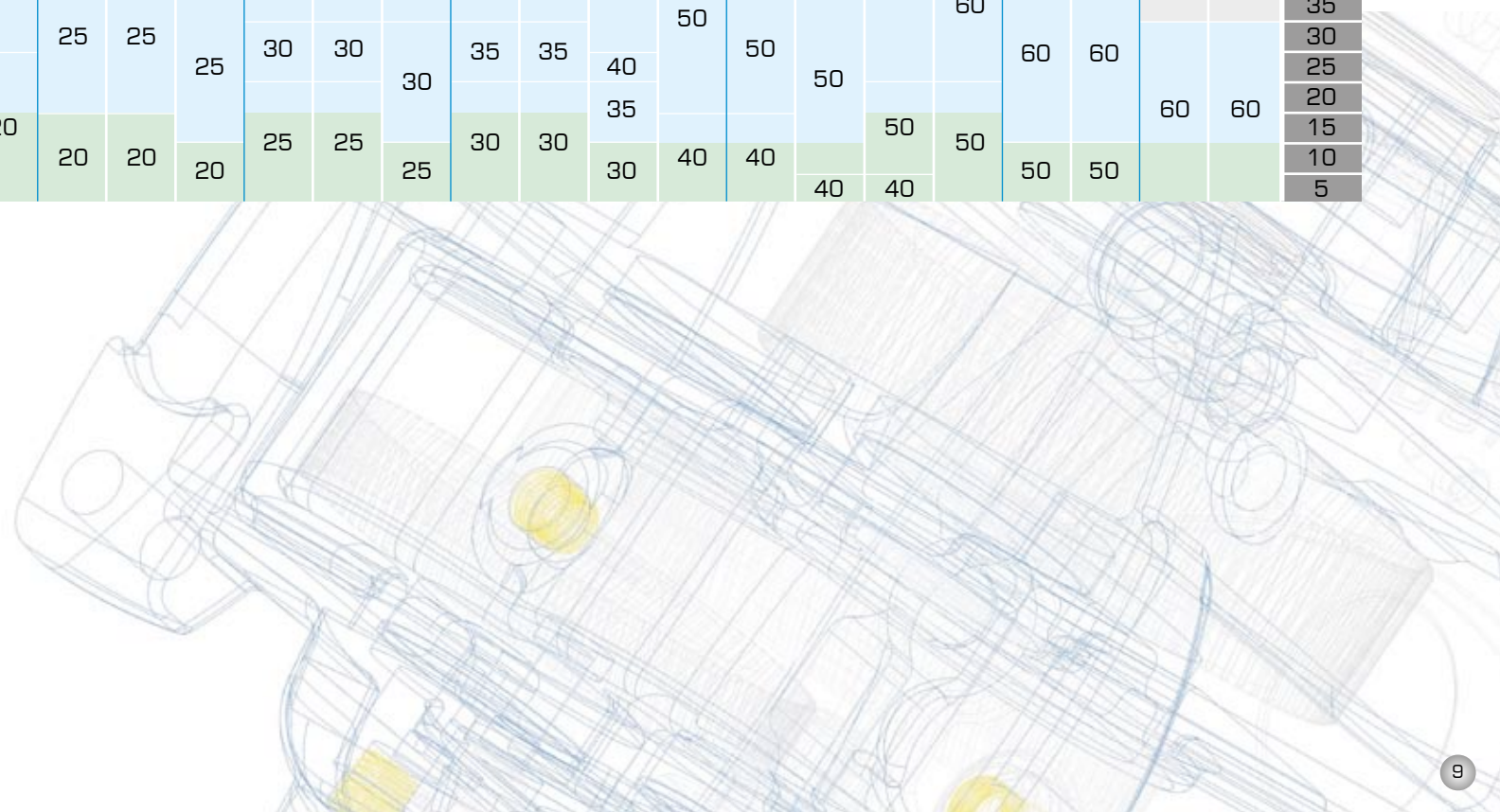


# KW / SIZE / RATIO

service factor  $f_s \geq 1.5$

| input PAM | 63          |             |    | 71    |    |    | 80     |    |    | 90    |    |    | 100/112 |    |    | 132   |    |  | 160   |  | 180   |    |
|-----------|-------------|-------------|----|-------|----|----|--------|----|----|-------|----|----|---------|----|----|-------|----|--|-------|--|-------|----|
|           | 11 mm       |             |    | 14 mm |    |    | 190 mm |    |    | 24 mm |    |    | 28 mm   |    |    | 38 mm |    |  | 42 mm |  | 48 mm |    |
|           | $P_{n1}$ kW | $P_{n1}$ Hp |    |       |    |    |        |    |    |       |    |    |         |    |    |       |    |  |       |  |       |    |
| 120       |             |             |    |       |    |    |        |    |    |       |    |    |         |    |    |       |    |  |       |  |       |    |
| 110       |             |             |    |       | 30 | 35 |        |    |    |       |    |    |         |    |    |       |    |  |       |  |       |    |
| 100       |             |             | 25 | 25    |    |    | 40     | 40 |    |       |    |    |         |    | 60 |       |    |  |       |  |       |    |
| 90        |             |             |    |       |    | 30 |        |    |    | 50    | 50 |    |         |    |    |       |    |  |       |  |       |    |
| 80        |             |             |    |       |    |    | 35     | 35 | 40 |       |    | 50 | 50      |    |    |       |    |  |       |  |       |    |
| 70        |             |             |    |       |    |    |        |    |    |       |    |    |         |    |    |       |    |  |       |  |       |    |
| 60        |             |             |    |       | 25 |    |        |    |    | 40    | 40 |    |         |    | 60 |       |    |  |       |  |       |    |
| 55        |             |             |    |       |    |    | 30     | 30 | 35 |       |    |    |         |    | 60 |       |    |  |       |  |       |    |
| 50        |             |             |    |       |    | 25 |        |    |    |       |    | 40 |         |    |    |       |    |  |       |  |       |    |
| 45        |             |             |    |       |    |    |        |    |    |       |    |    |         |    |    |       |    |  |       |  |       |    |
| 40        | 20          | 20          | 20 | 20    |    |    |        |    |    | 35    | 35 | 35 | 40      | 40 |    |       |    |  |       |  |       |    |
| 35        |             |             |    |       |    |    |        |    |    |       |    |    |         |    | 50 |       |    |  |       |  |       |    |
| 30        |             |             |    |       |    |    | 25     | 25 |    |       |    |    |         |    |    |       |    |  |       |  |       |    |
| 25        |             |             |    |       |    |    |        |    |    | 30    | 30 | 30 | 35      | 35 |    |       |    |  |       |  | 60    | 60 |
| 20        |             |             |    |       | 20 |    |        |    |    |       |    | 30 |         |    |    |       |    |  |       |  |       |    |
| 15        |             |             |    |       |    | 20 |        |    |    | 25    | 25 |    | 30      | 30 |    |       |    |  |       |  | 60    | 60 |
| 10        |             |             |    |       |    |    | 20     | 20 | 20 |       |    |    |         |    | 40 | 40    |    |  |       |  |       |    |
| 5         |             |             |    |       |    |    |        |    |    |       |    | 25 |         |    | 30 | 40    | 40 |  |       |  |       |    |

= 3 stages  
 = 2 stages



# LUBRICATION

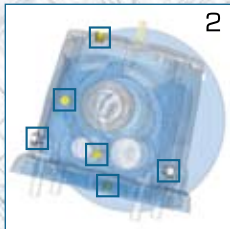
Each Robus is supplied with long-life synthetic oil and do not require any maintenance.  
The oil quantity is suitable for B3 mounting position

| ROBUS | oil (lt) |      |      |      |      |      | ISO       | temp.        | oil type                |                         |
|-------|----------|------|------|------|------|------|-----------|--------------|-------------------------|-------------------------|
|       | B3       | B6   | B7   | B8   | V5   | V6   |           |              |                         |                         |
| 20    | 0,25     | 0,4  | 0,35 | 0,55 | 0,55 | 0,35 | VG<br>220 | -25<br>+80°C | Mobil<br>Glygoyle<br>30 | Shell<br>Tivela<br>S220 |
| 25    | 0,3      | 0,75 | 0,95 | 0,95 | 1,05 | 0,85 |           |              |                         |                         |
| 30    | 0,7      | 1,5  | 1,5  | 1,5  | 1,65 | 1,6  |           |              |                         |                         |
| 35    | 1,1      | 1,8  | 2    | 2    | 3,5  | 1,6  |           |              |                         |                         |
| 40    | 1,2      | 2,5  | 3,4  | 3,4  | 4,1  | 3,8  |           |              |                         |                         |
| 50    | 2,3      | 6,3  | 6,5  | 6,5  | 7,7  | 6,7  |           |              |                         |                         |
| 60    | 4,6      | 11,3 | 11,7 | 11,7 | 13,4 | 11,7 |           |              |                         |                         |

After adapting the oil quantity, each Robus can be mounted in ANY position, thus giving big advantages in the stock management and lead time, thanks to the following 3 characteristics:



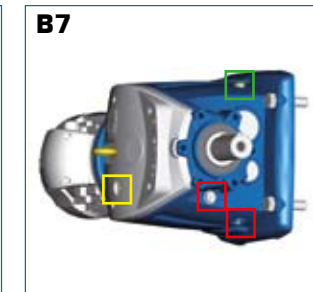
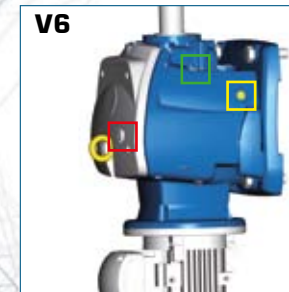
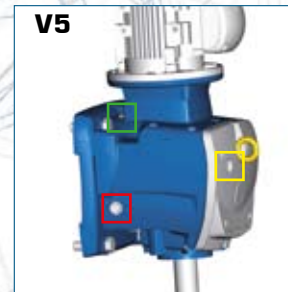
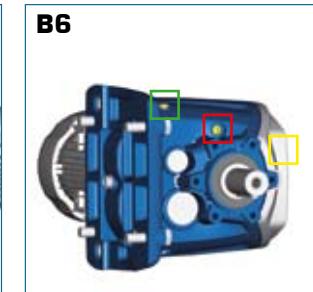
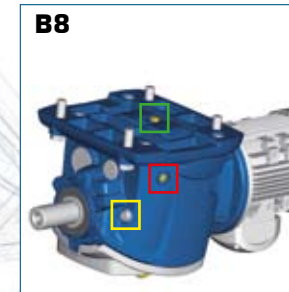
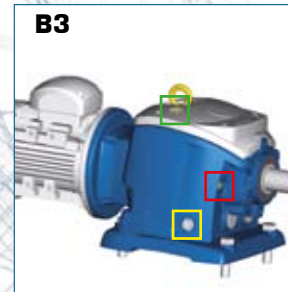
ZZ autolubricating bearings on input and output shaft



6 interchangeable plugs, including one breather plug and a level plug. Level and breather plug must be positioned according to this chart



mechanical parts locked in their positions by circlips and spacers. This also ensures better absorption of axial thrust and prolongs the life of bearings



breather plug



level plug



filler plug

**Rated output torque  $M_{n2}$  [Nm]**

Torque output transmissible under uniform loading and referred to the input speed  $n_1$  and the corresponding output speed  $n_2$ .

The output torque can be calculated with the following formula:

$$M_{n2} = \frac{P_{n1} \text{ [kW]} \cdot 9550}{n_2} \cdot \eta$$

**Torque demand  $M_{r2}$  [Nm]**

Torque calculated based on application requirements. It must be  $\leq M_{n2}$  of the chosen BOX unit.

**Input power  $P_{n1}$  [kW]**

This is the power value of the motor applied to the input shaft and corresponding to a certain input speed  $n_1$ , a service factor  $f_s = 1$  and a duty service  $S_1$ .

It is even possible to calculate the motor-size necessary by using the formula:

$$P_{n1} \text{ [kW]} = \frac{M_{r2} \cdot n_2}{9550 \cdot \eta}$$

Since the value calculated in this way could not really correspond to an input power actually available in the IEC standardised motors, it will be necessary to choose, among the input powers available, the one which is immediately higher, checking this in the Motive catalogue of the motors.

**Efficiency  $\eta$  [%]**

An inherent factor in the selection worm-gear boxes is the efficiency  $\eta$ , defined as the ratio between the mechanical power coming out from the output shaft, and the power in the input shaft:

$$\eta = \frac{P_{n2}}{P_{n1}}$$

The efficiency in helical gearboxes is mainly determined by the gearing and

bearing friction.

The efficiency of ROBUS varies with the nr of stages: it's 94% when the reduction stages are 3, 96% when the stages are 2.

The starting efficiency is always less than the efficiency at rated speed

**Gear ratio  $i$**

It is the relationship of the input speed  $n_1$  and the output speed  $n_2$

$$i = \frac{n_1}{n_2}$$

In the combined, the total ratio is the result of the product of the ratio of the two single boxes.

**Input speed  $n_1$  [rpm]**

It is the speed the BOX unit is driven at.

**Output speed  $n_2$  [rpm]**

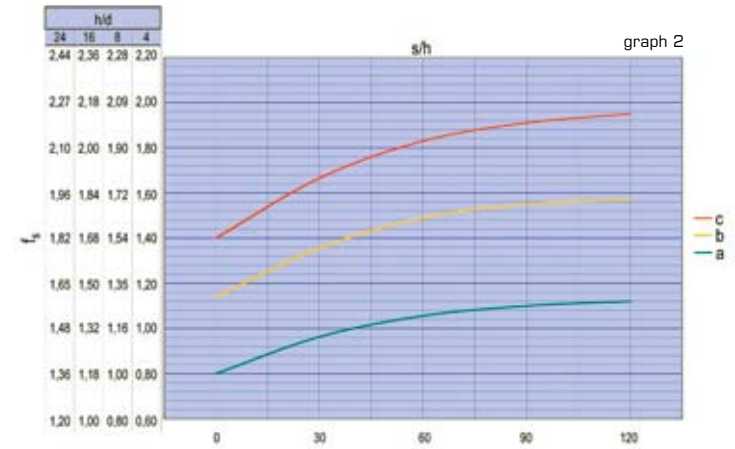
It is the rotation speed of the output shaft.

**Service factor  $f_s$**

It is a numeric value describing the BOX unit service duty. With unavoidable approximation, it takes into consideration:

- the daily working hours **h/d**
- the load classification (see table 2), and then the moment of inertia of the driven masses.
- The number of starts per hour **s/h**
- The presence of brake motors, for which it is necessary to multiply for 1.12 the service factor value deducted by the graph 2.
- The significance of the application in terms of safety, for example lifting of parts

In the graph 2, the service factor  $f_{sr}$  required by a certain application can be attained, after having selected the proper "daily working hours" (h/d) column, by intersecting the number of starts per hour (s/h) and one of the a, b or c curves. The curves a, b and c are linked with the load classification described in the table 2.



| load classification   | application  |
|---|--|
| <b>c</b><br>uneven operation, heavy loads, larger masses to be accelerated                                  | conveyors with violent jerks; compressors and alternate pumps with 1 or more cylinders; machinery for bricks, tiles and clay; kneaders; milling machines; lifting winches with buckets; rotting furnaces; heavy fans or mining purposes; mixers for heavy materials; machine-tools; planing kinds; alternating saws; shears; tumbling barrels; vibrators; shredders; turntables  |
| <b>b</b><br>starting with moderate loads, uneven operating conditions, medium size masses to be accelerated | belt conveyors with varied load with transfer of bridge trucks for light duty; levelling machines; shakers and mixed for liquid with variable density and viscosity; machines for the food industry (kneading troughs, mincing machines, slicing machines, etc.); sifting machines for sand gravel; textile industry machines; cranes, hoists, goodstifts; fertilizer scrapers; concrete mixers; folding machines; winches; crane mechanisms |
| <b>a</b><br>easy starting, smooth operation, small masses be accelerated                                    | belt conveyors for light material; centrifugal pumps; rotary gear pumps; screw feeders for light materials; lifts; bottling machines; auxiliary controls of tool machines; fans; power generators; fillers; small mixers   |

If, after the selection of the right  $M_{r2}$  and  $n_2$  in the following performance tables, you don't find a BOX unit whose service factor  $f_s$  is  $\geq$  of the requested one  $f_{sr}$ , you can choose a BOX unit in which  $M_{n2} > M_{r2}$ . In fact, in order to satisfy  $f_{sr}$ , you can choose another BOX unit whose output torque is  $\geq M_{c2}$  output torque, where:

$$M_{c2} = M_{r2} \cdot f_{sr}$$

Note: This rule is valid only if the new BOX unit that has been selected in this way has a service factor  $f_s \geq 1$  in the performance tables.

From another point of view, the value of  $f_s$  in the performance tables refers to a case in

which the effective torque requested by the application  $M_{r2}$  matches perfectly with the one appearing on the catalogue  $M_{n2}$ . Whenever the torque indicated in the performance table is higher than the requested one, the offered service factor of the performance table can be increased according to the formula:

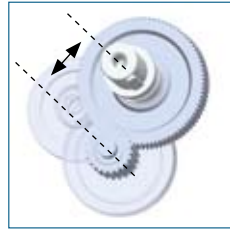
$$f_{s \text{ real}} = \frac{f_s \text{ on the table} \cdot M_{n2} \text{ on the table}}{M_{r2}}$$

The value of  $f_s$  calculated in this way must be  $\geq f_{sr}$ .

**Offered service factor**

Which features determine the service factor offered by an helical gearbox?

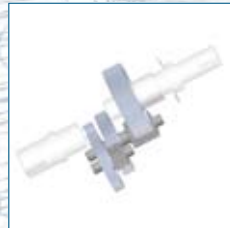
The service factor of a gearbox is its capacity to withstand operating load and overloads, a certain number of starts, the duration of operating time, and mechanical shocks and vibrations. Thus, higher the service factor, greater is the possibility of trouble-free operation and increased life. Without aiming to be completely exhaustive, we list here the main features that influence the service factor:



Amongst all parts, the last stage gears are subjected to highest mechanical stresses. Higher centre distance which in turn results in higher module considerably increases the service factor. ROBUS excels in the area (see measures at page 22)



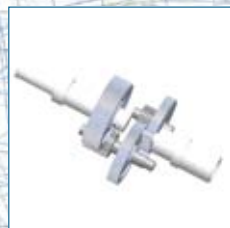
Compared to fractioned or Aluminium body, the monobloc cast-iron body of ROBUS provides higher rigidity and mechanical robustness.



Use of high strength steels like 15CrMo4 and case hardening to  $58 \pm 2$  HRC reduce the wear rate in wheels. All wheels are profile ground to Din 3962 class 6 accuracy



Shafts are made from 42CrMo4 steel and tempered to reach a hardness of 23-35 HRC, thus increasing their capacity to withstand shearing stresses and torsion effect.



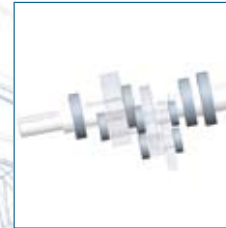
Optimal ratios (between 2 and 6) in the several stages, together with appropriate centre distances, result in higher number of teeth and size (module) of each wheel and better torque transmission fractioning through various stages. This improves the overall durability.



Dual bearing support on the input shaft ensures precise alignment of the first stage gears and reduces vibrations and consequent gear wear



An intermediate shaft rigidly supported by 3 bearings instead of 2, with no overhang wheel, imparts greater flexural strength and smoother meshing



Oversized bearings (see ROBUS bearings list at pages 5 and 7), allow the gearbox to withstand higher operating loads



Mechanical parts locked in their position by snap rings and spacers. This ensures better absorption of axial thrust and prolongs the life of bearings



Smaller overhang of output shaft from supporting bearing in order to withstand higher radial loads














# WEIGHTS



## Weights including oil in Kg

| input      |   | ROBUS20 |      | ROBUS25 |      | ROBUS30 |      | ROBUS35 |      | ROBUS40 |      | ROBUS50 |       | ROBUS60 |       |
|------------|---|---------|------|---------|------|---------|------|---------|------|---------|------|---------|-------|---------|-------|
|            |   | 2       | 3    | 2       | 3    | 2       | 3    | 2       | 3    | 2       | 3    | 2       | 3     | 2       | 3     |
| 63 B14     | UNV<br>  | 7,3     | 7,7  | -       | -    | -       | -    | -       | -    | -       | -    | -       | -     | -       | -     |
| 71 B14     |   | 7,5     | 7,9  | -       | -    | -       | -    | -       | -    | -       | -    | -       | -     | -       | -     |
| 80B14      |   | 8,8     | 9,0  | -       | -    | -       | -    | -       | -    | -       | -    | -       | -     | -       | -     |
| 63/71 B5   |   | -       | -    | 12,8    | 13,4 | 22,2    | 23,4 | 32,0    | 33,5 | -       | -    | -       | -     | -       | -     |
| 80/90 B5   |   | -       | -    | 13,7    | 14,3 | 23,4    | 24,2 | 32,5    | 34,2 | 39,4    | 41,7 | 74,0    | 78,6  | -       | -     |
| 100/112 B5 |   | -       | -    | -       | -    | 24,7    | 25,7 | 34,2    | 35,7 | 40,9    | 43,1 | 75,1    | 82,9  | 135,8   | 141,2 |
| 132 B5     |   | -       | -    | -       | -    | -       | -    | -       | -    | 47,3    | 49,6 | 87,5    | 92,0  | 136,9   | 142,3 |
| 160 B5     |   | -       | -    | -       | -    | -       | -    | -       | -    | -       | -    | 89,9    | -     | 139,3   | 144,3 |
| 180 B5     | -   | -       | -    | -       | -    | -       | -    | -       | -    | -       | -    | -       | 139,0 | 144,4   |       |
| 63 B14     | FSW<br>  | 8,8     | 9,2  | -       | -    | -       | -    | -       | -    | -       | -    | -       | -     | -       |       |
| 71 B14     |   | 9,0     | 9,4  | -       | -    | -       | -    | -       | -    | -       | -    | -       | -     | -       |       |
| 80 B14     |   | 10,3    | 10,5 | -       | -    | -       | -    | -       | -    | -       | -    | -       | -     | -       |       |
| 63/71 B5   |   | -       | -    | 14,7    | 15,3 | 25,8    | 27,0 | 37,2    | 38,7 | -       | -    | -       | -     | -       | -     |
| 80/90 B5   |   | -       | -    | 15,6    | 16,2 | 27,0    | 27,8 | 37,7    | 39,4 | 45,9    | 48,2 | 88,0    | 92,6  | -       | -     |
| 100/112 B5 |   | -       | -    | -       | -    | 28,3    | 29,3 | 39,4    | 40,9 | 47,4    | 49,6 | 89,1    | 96,9  | 164,8   | 170,2 |
| 132 B5     |   | -       | -    | -       | -    | -       | -    | -       | -    | 53,8    | 56,1 | 101,5   | 106,0 | 165,9   | 171,3 |
| 160 B5     |   | -       | -    | -       | -    | -       | -    | -       | -    | -       | -    | 103,9   | -     | 168,3   | 173,3 |
| 180 B5     | -   | -       | -    | -       | -    | -       | -    | -       | -    | -       | -    | -       | 168,0 | 173,4   |       |
| 63 B14     | FBF<br> | 8,9     | 9,3  | -       | -    | -       | -    | -       | -    | -       | -    | -       | -     | -       |       |
| 71B14      |   | 9,1     | 9,5  | -       | -    | -       | -    | -       | -    | -       | -    | -       | -     | -       |       |
| 80 B14     |   | 10,4    | 10,6 | -       | -    | -       | -    | -       | -    | -       | -    | -       | -     | -       |       |
| 63/71 B5   |   | -       | -    | 15,6    | 16,2 | 26,6    | 27,8 | 39,5    | 41,0 | -       | -    | -       | -     | -       | -     |
| 80/90 B5   |   | -       | -    | 16,4    | 17,1 | 27,8    | 28,6 | 40,0    | 41,7 | 49,7    | 52,0 | 95,7    | 100,3 | -       | -     |
| 100/112 B5 |   | -       | -    | -       | -    | 29,1    | 30,1 | 41,7    | 43,2 | 51,2    | 53,4 | 96,8    | 104,6 | 162,2   | 167,6 |
| 132 B5     |   | -       | -    | -       | -    | -       | -    | -       | -    | 57,6    | 59,9 | 109,2   | 113,7 | 163,3   | 168,7 |
| 160 B5     |   | -       | -    | -       | -    | -       | -    | -       | -    | -       | -    | 111,6   | -     | 165,7   | 170,7 |
| 180 B5     | -   | -       | -    | -       | -    | -       | -    | -       | -    | -       | -    | -       | 165,4 | 170,8   |       |

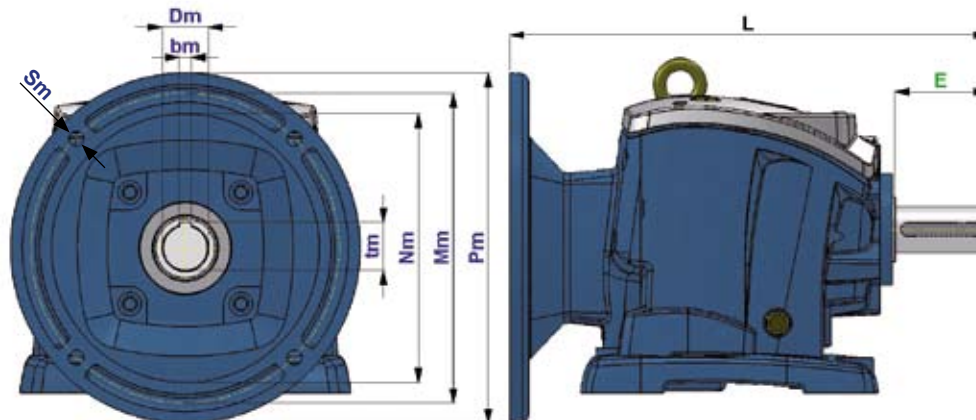
|     |           |
|-----|-----------|
| 120 | 56B5      |
| 160 | 71B5      |
| 200 | 80/90B5   |
| 250 | 100/112B5 |
| 300 | 132B5     |
| 350 | 160/180B5 |
| 450 | 200B5     |



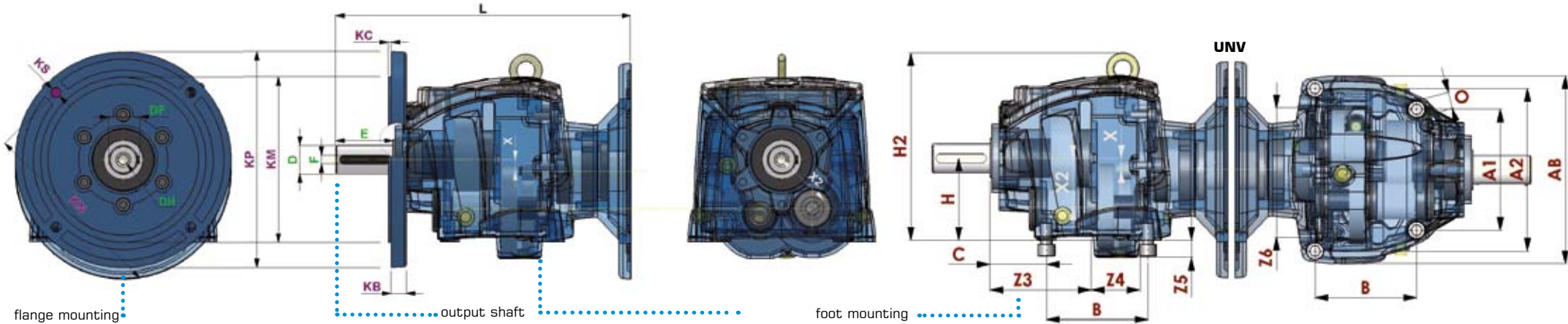
|          |          |          |  |          |  |  |          |  |          |  |          |  |           |  |  |
|----------|----------|----------|--|----------|--|--|----------|--|----------|--|----------|--|-----------|--|--|
| =UNV+0,4 |          |          |  |          |  |  |          |  |          |  |          |  |           |  |  |
|          | =UNV+0,9 |          |  |          |  |  |          |  |          |  |          |  |           |  |  |
|          | =UNV+1,7 | =UNV+0,9 |  | =UNV+0,9 |  |  |          |  |          |  |          |  |           |  |  |
|          |          | =UNV+1,7 |  | =UNV+1,7 |  |  | =UNV+1,8 |  |          |  |          |  |           |  |  |
|          |          |          |  |          |  |  | =UNV+3,8 |  |          |  |          |  |           |  |  |
|          |          |          |  |          |  |  |          |  | =UNV+4,1 |  |          |  |           |  |  |
|          |          |          |  |          |  |  |          |  | =UNV+7,2 |  |          |  |           |  |  |
|          |          |          |  |          |  |  |          |  |          |  | =UNV+5,8 |  |           |  |  |
|          |          |          |  |          |  |  |          |  |          |  | =UNV+9,8 |  |           |  |  |
|          |          |          |  |          |  |  |          |  |          |  |          |  | =UNV+8,9  |  |  |
|          |          |          |  |          |  |  |          |  |          |  |          |  | =UNV+19,9 |  |  |

## DIMENSIONS

| ROBUS | motor type |         | Nm  | Mm  | Pm  | Sm  | Dm  | tm   | bm   | L     |       |
|-------|------------|---------|-----|-----|-----|-----|-----|------|------|-------|-------|
| 20    | 63         | B14     | 60  | 75  | 90  | M6  | 11  | 12,8 | 4    | 212,5 |       |
|       | 71         | B14     | 70  | 85  | 105 | M7  | 14  | 16,3 | 5    | 212,5 |       |
|       | 80         | B14     | 80  | 100 | 120 |     | 19  | 21,8 | 6    | 227,0 |       |
| 25    | 63         | B5      | 95  | 115 | 140 | M8  | 11  | 12,8 | 4    | 273,0 |       |
|       | 71         | B5      | 110 | 130 | 160 |     | 14  | 16,3 | 5    |       |       |
|       | 80         | B5      | 130 | 165 | 200 | M10 | 19  | 21,8 | 6    | 274,0 |       |
|       | 90         | B5      | 130 | 165 | 200 |     | 24  | 27,3 | 8    |       |       |
| 30    | 63         | B5      | 95  | 115 | 140 | M8  | 11  | 12,8 | 4    | 317,6 |       |
|       | 71         | B5      | 110 | 130 | 160 |     | 14  | 16,3 | 5    |       |       |
|       | 80         | B5      | 130 | 165 | 200 | M10 | 19  | 21,8 | 6    | 326,6 |       |
|       | 90         | B5      | 130 | 165 | 200 |     | 24  | 27,3 | 8    |       |       |
|       | 100/112    | B5      | 180 | 215 | 250 | M12 | 28  | 31,3 | 8    | 327,6 |       |
| 35    | 63         | B5      | 95  | 115 | 140 | M8  | 11  | 12,8 | 4    | 357,0 |       |
|       | 71         | B5      | 110 | 130 | 160 |     | 14  | 16,3 | 5    |       |       |
|       | 80         | B5      | 130 | 165 | 200 | M10 | 19  | 21,8 | 6    | 366,0 |       |
|       | 90         | B5      | 130 | 165 | 200 |     | 24  | 27,3 | 8    |       |       |
|       |            | 100/112 | B5  | 180 | 215 | 250 | M12 | 28   | 31,3 | 8     | 367,0 |
| 40    | 80         | B5      | 130 | 165 | 200 | M10 | 19  | 21,8 | 6    | 396,5 |       |
|       | 90         | B5      | 130 | 165 | 200 |     | 24  | 27,3 | 8    |       |       |
|       |            | 100/112 | B5  | 180 | 215 | 250 | M12 | 28   | 31,3 | 8     | 398,5 |
|       |            | 132     | B5  | 230 | 265 | 300 |     | 38   | 41,3 | 12    |       |
| 50    | 90         | B5      | 130 | 165 | 200 | M10 | 24  | 27,3 | 8    | 447,0 |       |
|       |            | 100/112 | B5  | 180 | 215 |     | 250 | M12  | 28   |       | 31,3  |
|       |            | 132     | B5  | 230 | 265 | 300 | M16 |      | 38   | 41,3  | 12    |
|       |            | 160     | B5  | 250 | 300 | 350 |     | 42   | 45,3 | 12    |       |
| 60    |            | 100/112 | B5  | 180 | 215 | 250 | M12 | 28   | 31,3 | 8     | 567,4 |
|       |            | 132     | B5  | 230 | 265 | 300 |     | 38   | 41,3 | 12    |       |
|       |            | 160     | B5  | 250 | 300 | 350 | M16 | 42   | 45,3 | 12    | 585,6 |
|       |            | 180     | B5  | 250 | 300 | 350 |     | 48   | 51,8 | 14    |       |



# DIMENSIONS

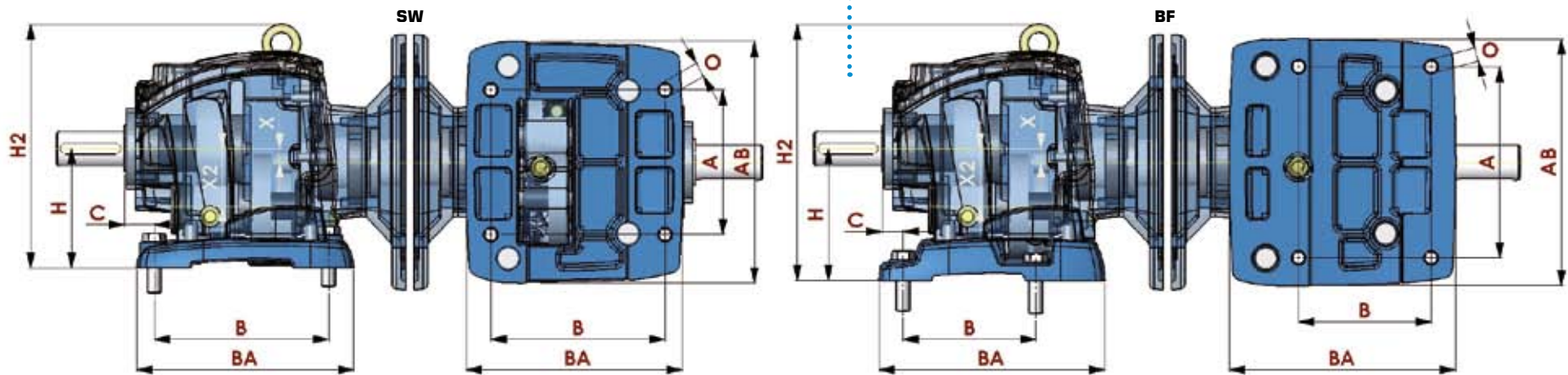


flange mounting

output shaft

foot mounting

| ROBUS | IEC       | KP  | KM  | KN  | KS   | KC  | KB | D       | E   | F  | DF   | DH      | X    | X2    | type  | B     | BA            | A             | AB    | O    | H     | H2    | C    | Z3  | Z4  | Z5  | Z6  |
|-------|-----------|-----|-----|-----|------|-----|----|---------|-----|----|------|---------|------|-------|-------|-------|---------------|---------------|-------|------|-------|-------|------|-----|-----|-----|-----|
| 20    | 56B5      | 120 | 80  | 100 | 7    | 3   | 8  | 20 (k6) | 40  | 6  | 23   | M5x12,5 | 6,5  | 39-40 | SW    | 110   | 143           | 110           | 153   | 9    | 75    | 170   | 18   | -   | -   | -   | -   |
|       |           |     |     |     |      |     |    |         |     |    |      |         |      |       | BF    | 87    | 143           | 110           | 153   | 9    | 85    | 180   | 18   | -   | -   | -   | -   |
| 25    | 80/90B5   | 200 | 130 | 165 | 11   | 3,5 | 12 | 25 (k6) | 50  | 8  | 28   | M10x20L | 11   | 52,5  | UNV   | 42    | -             | A1=116 A2=124 | 145   | M6   | 59    | 120   | 50   | 35  | 100 | 20  | 145 |
|       | 71B5      | 160 | 110 | 130 | 9    | 3,5 | 10 |         |     |    |      |         |      | SW    | 130   | 171,5 | 110           | 145           | 9     | 90   | 193,6 | 25    | -    | -   | -   | -   |     |
| 30    | 80/90B5   | 200 | 130 | 165 | 11   | 3,5 | 12 | 30 (k6) | 60  | 8  | 33   | M10x20L | 13,5 | 66    | BF    | 107,5 | 173,8         | 130           | 180,5 | 9    | 100   | 203,5 | 18   | -   | -   | -   | -   |
|       | 71B5      | 160 | 110 | 130 | 9    | 3,5 | 10 |         |     |    |      |         |      | UNV   | 90,6  | -     | A1=108 A2=145 | 170           | M10   | 73,5 | 180   | 54,5  | 95   | 84  | 17  | 128 |     |
| 35    | 100/112B5 | 250 | 180 | 215 | 13,5 | 4   | 15 | 35 (k6) | 70  | 10 | 38   | M12x24L | 17   | 72    | SW    | 165   | 209           | 135           | 233   | 14   | 115   | 238,6 | 30   | -   | -   | -   | -   |
|       | 80/90B5   | 200 | 130 | 165 | 11   | 4   | 12 |         |     |    |      |         |      | BF    | 130   | 213,5 | 160           | 229           | 14    | 120  | 243,5 | 18    | -    | -   | -   | -   |     |
| 40    | 132B5     | 300 | 230 | 265 | 14   | 4   | 21 | 40 (k6) | 80  | 12 | 43   | M16x32  | 16   | 80    | UNV   | 115,8 | -             | A1=130 A2=186 | 215   | M12  | 94    | 215   | 62,4 | 115 | 95  | 22  | 155 |
|       | 100/112B5 | 250 | 180 | 215 | 14   | 4   | 19 |         |     |    |      |         |      | SW    | 195   | 236,7 | 150           | 263,7         | 14    | 130  | 264   | 30    | -    | -   | -   | -   |     |
| 50    | 160/180B5 | 350 | 250 | 300 | 18   | 5   | 21 | 50 (k6) | 100 | 14 | 53,5 | M16x32  | 18   | 103   | BF    | 149,5 | 246,8         | 180           | 269   | 14   | 140   | 274,5 | 19,5 | -   | -   | -   | -   |
|       | 132B5     | 300 | 230 | 265 | 14   | 4   | 19 |         |     |    |      |         |      | UNV   | 131   | -     | A1=156 A2=210 | 243           | M12   | 106  | 235   | 74    | 135  | 105 | 20  | 168 |     |
| 60    | 200B5     | 450 | 350 | 400 | 18   | 5   | 25 | 60 (m6) | 120 | 18 | 64   | M20x40  | 20   | 120   | SW    | 205   | 255           | 170           | 283,7 | 18   | 140   | 287   | 35   | -   | -   | -   | -   |
|       | 160/180B5 | 350 | 250 | 300 | 18   | 5   | 21 |         |     |    |      |         |      | BF    | 156   | 266   | 225           | 290           | 18    | 155  | 302   | 25    | -    | -   | -   | -   |     |
|       |           |     |     |     |      |     |    |         |     |    |      |         |      | UNV   | 141   | -     | A1=168 A2=226 | 262           | M16   | 114  | 262   | 78,5  | 140  | 65  | 27  | 190 |     |
|       |           |     |     |     |      |     |    |         |     |    |      |         |      | SW    | 260   | 327,7 | 215           | 364,6         | 18    | 180  | 357   | 40    | -    | -   | -   | -   |     |
|       |           |     |     |     |      |     |    |         |     |    |      |         |      | BF    | 180   | 336   | 250           | 372,5         | 18    | 195  | 372   | 25    | -    | -   | -   | -   |     |
|       |           |     |     |     |      |     |    |         |     |    |      |         |      | UNV   | 181,3 | -     | A1=216 A2=291 | 336           | M16   | 148  | 313   | 92    | 170  | 98  | 32  | 250 |     |
|       |           |     |     |     |      |     |    |         |     |    |      |         |      | SW    | 310   | 393   | 250           | 438           | 22    | 225  | 428   | 40    | -    | -   | -   | -   |     |
|       |           |     |     |     |      |     |    |         |     |    |      |         |      | BF    | 165   | 394   | 300           | 437,5         | 22    | 217  | 421   | 25    | -    | -   | -   | -   |     |
|       |           |     |     |     |      |     |    |         |     |    |      |         |      | UNV   | 217,6 | -     | A1=259 A2=349 | 405           | M16   | 176  | 381   | 103   | 185  | 120 | 43  | 295 |     |



## TERMS OF SALE AND GUARANTEE

### ARTICLE 1 GUARANTEE

1.1 Barring written agreements, entered into between the parties hereto each time, Motive hereby guarantees compliance with specific agreements.

The guarantee for defects shall be restricted to product defects following design, materials or manufacturing defects leading back to Motive.

The guarantee shall not include:

- \* Faults or damages ensuing from transport. Faults or damages ensuing from installation defects; incompetent use of the product, or any other unsuitable use.
- \* Tampering or damages ensuing from use by non-authorized staff and/or use of non-original parts and/or spare parts;
- \* Defects and/or damages ensuing from chemical agents and/or atmospheric phenomena (e.g. burnt out material, etc.); routine maintenance and required action or checks;
- \* Products lacking a plate or having a tempered plate.

1.2 Returns to credit or replace will be accepted only in exceptional cases; however returns of goods already used to credit or replace won't be accepted in any case.

The guarantee shall be effective for all Motive products, with a term of validity of 12 months, starting from the date of shipment.

The guarantee shall be subject to specific written request for Motive to take action, according to statements, as described at

the paragraphs herein below. By virtue of aforesaid approval, and as regards the claim, Motive shall be bound at its discretion, and within a reasonable time-limit, to alternatively take the following actions:

a) To supply the Buyer with products of the same type and quality as those having proven defective and not complying with agreements, free ex-works; in aforesaid case, Motive shall have the right to request, at Buyer's charge, early return of defective goods, which shall become Motive's property;

b) To repair, at its charge, the defective product or to modify the product which does not comply with agreements, by performing aforesaid action at its facilities; in aforesaid cases, all costs regarding product transport shall be sustained by the Buyer.

c) To send spare parts free of charge: all costs regarding product transport shall be sustained by the Buyer.

1.3. The guarantee herein shall assimilate and replace legal guarantees for defects and discrepancies, and shall exclude any other eventual Motive liability, however caused by supplied products; in particular, the Buyer shall have no right to submit any further claims.

Motive shall not be liable for the enforcement of any further claims, as of the date the guarantee's term of validity expires.

### ARTICLE 2 CLAIMS

2.1. Claims, regarding quantity, weight, gross weight and colour, or claims regarding faults and defects in quality or compliance, and which the Buyer may discover on goods delivery, shall be submitted by a max. 7 days of aforesaid discovery, under penalty of nullity.

### ARTICLE 3 DELIVERY

3.1. Any liability for damages ensuing from total or partial delayed or failed delivery, shall be excluded.

3.2. Unless differently communicated by written to the Client, the transport terms have to be intended ex-works.

### ARTICLE 4 PAYMENT

4.1. Any delayed or irregular payments shall entitle Motive to cancel ongoing agreement, including agreements which do not regard the payments at issue, as well as entitling Motive to claim damages, if any. Motive shall, however, have the right, as of payment's due date and without placing in arrears, to claim interest for arrears, to the extent of the discount rate in force in Italy, increased by 12 points. Motive shall also have the right to withhold material under repair for replacement. In the case of failed payment, Motive shall have the right to cancel all guarantees of materials, as regards the insolvent Client.

4.2. The Buyer shall be bound to complete payment, including cases whereby claims or disputes are underway.

ALL DATA HAVE BEEN WRITTEN AND CHECKED WITH THE GREATEST CARE. WE DO NOT TAKE ANY RESPONSIBILITY FOR POSSIBLE ERRORS OR OMISSIONS. MOTIVE CAN CHANGE THE CHARACTERISTIC OF THE SOLD ITEMS ON HIS FIRM OPINION AND IN EVERY MOMENT.





**Motive s.r.l.**

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