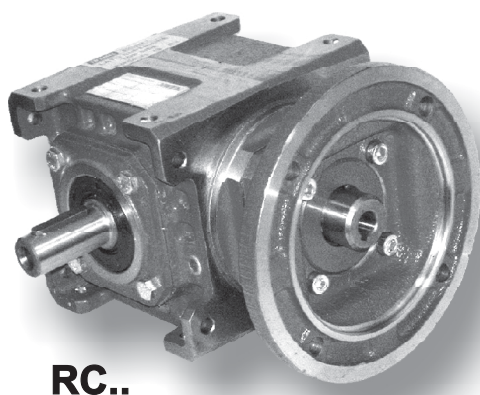
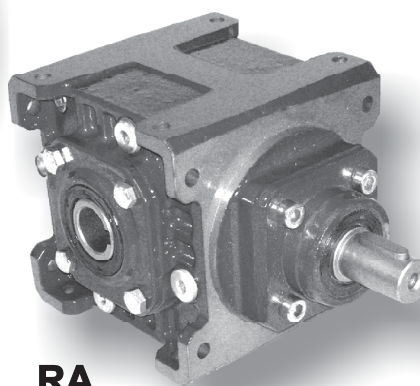


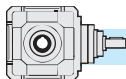
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|------|-------------------------------|-----------------------------|----------------------------------|----|
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**RC..**



**RA..**



## 5.1 Caratteristiche

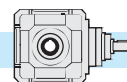
- Costruiti in 5 grandezze con tre tipi di albero uscita: cavo, sporgente, bisporgente. E' possibile inoltre disporre di un ulteriore albero di uscita opposto a quello di entrata.
- Sono previsti tre tipi di entrata: con albero sporgente, con predisposizione attacco motore (campana e giunto) e predisposizione attacco motore COMPATTA.
- Il corpo riduttore in ghisa meccanica EN GJL 200 UNI EN 1561 abbondantemente nervato all'interno e all'esterno per garantire la rigidità, è lavorato su tutti i piani per consentire un facile posizionamento; inoltre un'unica camera di lubrificazione garantisce una maggiore dissipazione termica e una migliore lubrificazione di tutti gli organi interni.
- Il cinematismo di questi rinvii è costituito da una coppia di ingranaggi conici a dentatura spiroidale GLEASON con profilo accuratamente rodato, in acciaio 16CrNi4 o 18NiCrMo5 UNI7846.
- L'utilizzo di cuscinetti a rulli conici di qualità su tutti gli assi (ad eccezione del manicotto in entrata nella predisposizione attacco motore compatta, il quale è sostituito da cuscinetti obliqui a sfere) consente al riduttore di ottenere delle durate molto elevate e di sopportare dei carichi radiali e assiali esterni molto elevati.
- Il corpo riduttore, le flange, le campane ed i coperchi vengono verniciati esternamente di colore BLU RAL 5010.

## 5.1 Characteristics

- *Built in five sizes with three types of output shaft : hollow, projecting or double-extended. Moreover, an additional output shaft can be installed opposite the input shaft.*
- *Three input types are available : with projecting input shaft, with pre-engineered motor coupling (bell and joint) and pre-engineered COMPACT motor coupling.*
- *Gear unit body in engineering cast iron, EN GJL 200 UNI EN 1561 ribbed internally and externally to guarantee rigidity and machined on all surfaces for easy positioning. The single lubrication chamber guarantees improved heat dissipation and better lubrication of all the internal components.*
- *The mechanism of these gearboxes consists of two GLEASON spiral bevel gears with precision ground profile, 16CrNi4 or 18NiCrMo5 UNI7846 steel.*
- *The use of high-quality tapered roller bearings on all shafts (except for the input sleeve on the compact motor coupling, which is supported by angular ball bearings) ensures long life, and enables very high external radial and axial loads.*
- *Gearbox housing, flanges, bells and covers are externally painted with BLUE RAL 5010.*

## 5.1 Merkmale

- Erhältlich in 5 Größen mit drei verschiedenen Abtriebswellen: Hohlwelle, vorstehend, zweifach vorstehend. Es kann außerdem eine weitere Abtriebswelle gegenüber der Antriebswelle montiert werden.
- Drei verschiedene Antriebsarten sind vorgesehen: mit vorstehender Antriebswelle, mit Auslegung für Motoranschluß (Anbauflansch und Kupplung), mit Kompaktauslegung für Motoranschluß.
- Das Getriebegehäuse aus Maschinenguß EN GJL 200 UNI EN 1561 ist sowohl innen als auch außen mit Rippen versehen, die die Starrheit gewährleisten; die Bearbeitung aller Flächen ermöglicht eine leichte Positionierung; eine einzige Schmirkammer gewährleistet eine höhere Wärmedissipation und eine bessere Schmierung aller inneren Elemente.
- Die Vorgelege bestehen aus einem spiralverzahnten GLEASON-Kegelradpaar mit sorgfältig geschliffenen Profil aus 16CrNi4- oder 18NiCrMo5-Stahl UNI7846.
- An allen Achsen wurden Qualitäts-Kegelrollenlager verwendet (Ausnahme: Muffe am Antrieb bei Kompaktauslegung, diese wird von Schrägkugellagern gehalten); diese gewährleisten eine hohe Lebensdauer und das Aushalten sehr hoher äußerer Quer- und Längsbelastungen.
- Getriebegehäuse Flansche, Glocken und Deckel werden mit BLAU RAL 5010 lackiert.

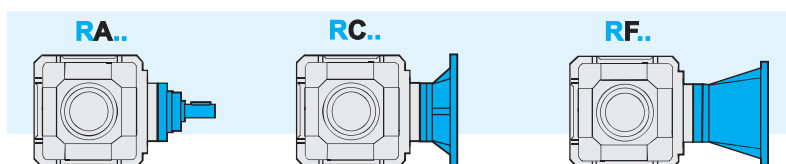


## 5.2 Designazione

## 5.2 Designation

## 5.2 Bezeichnung

| Macchina<br>Machine<br>Maschine                            | Tipo entrata<br>Input type<br>Antriebsart                                                                                                                                                                                                                                              | Grandezza<br>Size<br>Größe                                    | Rotismo<br>Gearing<br>Getriebe                                                             | Tipo uscita<br>Output type<br>Ausgang Typ                                                                                                                                                                                                                                              | Rapporto rid.<br>Ratio<br>Untersetzungsverhältnis                  | Predisposizione att. mot.<br>Motor coupling<br>Motorschluss | Rotazione alberi<br>Shafts rotation<br>Wellendrehrichtungen                                                          | Posizione di montaggio<br>Mounting position<br>Baulage                     | Flangia uscita<br>Output flange<br>Abtriebsflansch                                                                                                                                                                                                                                                 | Entrata supplementare<br>Additional input<br>Zusatzantrieb                                                                                                                                                                                                                                   |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>R</b>                                                   | <b>A</b>                                                                                                                                                                                                                                                                               | <b>28</b>                                                     | <b>A</b>                                                                                   | <b>S</b>                                                                                                                                                                                                                                                                               | <b>10/1</b>                                                        | <b>P.A.M.</b>                                               | <b>B</b>                                                                                                             | <b>B3</b>                                                                  | <b>FLD</b>                                                                                                                                                                                                                                                                                         | <b>S.e.A.</b>                                                                                                                                                                                                                                                                                |
| Rinvii angolari<br>Right angle gearboxes<br>Winkelgetriebe |  <b>A</b><br> <b>C</b><br> <b>F</b> | <b>19</b><br><b>24</b><br><b>28</b><br><b>38</b><br><b>48</b> |  <b>A</b> |  <b>S</b><br> <b>B</b><br> <b>C</b> | $i_n = \dots/1$<br><b>1</b><br><b>2.5</b><br><b>5</b><br><b>10</b> | <b>63 ÷ 200</b>                                             | <b>A</b><br><b>B</b><br><b>C</b><br><b>D</b><br><b>E</b><br><b>F</b><br><b>G</b><br><b>H</b><br><b>I</b><br><b>L</b> | <b>B3</b><br><b>B6</b><br><b>B7</b><br><b>B8</b><br><b>VA</b><br><b>VB</b> |  <b>FLS</b><br> <b>FLD</b><br> <b>2FL</b> |  <b>A</b><br> <b>C</b><br> <b>F</b> |



## 5.3 Velocità in entrata

Tutte le prestazioni dei riduttori sono calcolate in base ad una velocità in entrata di 1400 min<sup>-1</sup>.

La massima velocità ammessa in entrata è pari a 1400 min<sup>-1</sup>. Nel caso in cui tale limite debba essere superato contattare il servizio tecnico.

Nella tabella sottostante riportiamo i coefficienti correttivi della potenza in entrata P alle varie velocità riferita ad Fs =1

## 5.3 Input speed

All calculations of gear unit performance specifications are based on an input speed of 1400 min<sup>-1</sup>.

1400 min<sup>-1</sup> is the max. allowed input speed. Should the required speed be higher, contact the technical service.

The table below shows the input power P corrective coefficients at the various speeds, with Fs =1.

## 5.3 Antriebsdrehzahl

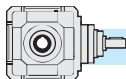
Bei der Berechnung der Getriebeleistungen wurde eine Antriebsdrehzahl von 1400 Min<sup>-1</sup> berücksichtigt.

1400 Min<sup>-1</sup> ist die max. zulässige Antriebsdrehzahl. Ist die verlangte Antriebsdrehzahl höher, ist das technische Büro zu befragen.

In der folgenden Tabelle finden Sie die Korrekturkoeffizienten für die Antriebsleistung P bei den verschiedenen Drehzahlen, bezogen auf Fs =1.

Tab. 1

| n <sub>1</sub> [min <sup>-1</sup> ] | 1400  | 900     | 700      | 500      |
|-------------------------------------|-------|---------|----------|----------|
| Pc (kW)                             | P x 1 | P x 0.7 | P x 0.56 | P x 0.42 |



#### 5.4 Rendimento

Il valore del rendimento dei riduttori può essere stimato con sufficiente approssimazione ( $R=0.97$ ), trascurando le variazioni non significative attribuibili ai vari rapporti (Tab.2).

#### 5.4 Efficiency

*The efficiency value of the gearbox can be estimated ( $R = 0.97$ ) ignoring non-significant variations which can be attributed to the various ratios (tab. 2).*

#### 5.4 Wirkungsgrad

Der Wirkungsgrad der Getriebe kann mit ausreichender Annäherung ermittelt werden ( $R = 0.97$ ), dabei können die unwesentlichen Veränderungen, die auf die verschiedenen Untersetzungsverhältnisse zurückzuführen sind, außer acht gelassen werden.

#### 5.5 Giochi angolari

Bloccando l'albero di entrata, il gioco viene misurato sull'albero uscita ruotandolo nelle due direzioni ad applicando la coppia strettamente necessaria a creare il contatto tra i denti degli ingranaggi al max pari al 2% della coppia massima garantita dal riduttore.

Nella tabella seguente sono riportati i valori del gioco angolare (in minuti di angolo) per quanto riguarda il montaggio normale ed i valori ottenibili con una registrazione più precisa. Quest'ultima esecuzione è da utilizzare solo in caso di reale necessità in quanto potrebbe comportare un leggero aumento della rumorosità e rendere meno efficace l'azione dell'olio lubrificante.

#### 5.5 Angular backlash

*After having blocked the input shaft, the angular backlash can be measured on the output shaft by rotating it in both directions and applying the torque which is strictly necessary to create a contact between the teeth of the gears. The applied torque should be at most 2% of the max. torque guaranteed by the gearbox.*

*The following table reports the approximate values of the angular backlash (in minutes of arc) referred to standard mounting and mounting with a more precise adjustment. The latter solution should be adopted only in case of necessity because it may raise the noise level and lessen the action of the lubricant.*

#### 5.5 Winkelspiel

Nachdem die Antriebswelle blockiert worden ist, darf das Winkelspiel auf die Abtriebswelle bemessen werden. Dabei soll die Abtriebswelle in beiden Richtungen gedreht werden und ein Drehmoment ausgeübt werden, das zur Entstehen eines Kontaktes zwischen den Zähnnengenügt. Das ausgeübte Drehmoment soll höchstens 2% des max. von Getrieben garantierten Drehmoments ( $T_{2M}$ ) sein.

Die folgende Tabelle weist die Näherungswerte des Winkelspiels (in Bogenminuten) für Standardmontage und Montage mit präziser Regulierung. Die präzisere Lösung darf nur im Notfall angewendet werden, weil infolgedessen das Geräuschpegel zunimmt und die Wirkung des Schmiermittels abnimmt.

| Gioco angolare / Backlash / Winkelspiel (1')             |                                                                                                      |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Montaggio normal<br>Standard mounting<br>Standardmontage | Montaggio con gioco ridotto<br>Mounting with reduced backlash<br>Montage mit reduziertem Winkelspiel |
| 12/20                                                    | 8                                                                                                    |

#### 5.6 Potenza termica

I valori delle potenze termiche,  $P_{t0}$  (kW), relative alle diverse grandezze di rinvii angolari sono riportati nella tabella seguente.

#### 5.6 Thermal power

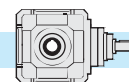
*The following table shows the values of thermal power  $P_{t0}$  (kW) for each gearbox size.*

#### 5.6 Thermische Leistung

Die folgende Tabelle enthält die Werte  $P_{t0}$  der thermischen Leistung (kW) je nach Getriebegröße.

Tab. 2

| $n_1$ [min <sup>-1</sup> ] | $P_{t0}$ [kW] - Potenza Termica / Thermal power / Thermische Leistung |     |      |      |      |
|----------------------------|-----------------------------------------------------------------------|-----|------|------|------|
|                            | R19                                                                   | R24 | R28  | R38  | R48  |
| 1400                       | 4.5                                                                   | 6.7 | 10.3 | 15.3 | 22.4 |



# 5.7 Dati tecnici

# 5.7 Technical data

# 5.7 Technische daten

| R  | n <sub>1</sub> = 1400 |      |                       | RC - RF              |                      |     | RA                    |         |
|----|-----------------------|------|-----------------------|----------------------|----------------------|-----|-----------------------|---------|
|    | in                    | ir   | n <sub>2</sub><br>rpm | T <sub>2</sub><br>Nm | P <sub>1</sub><br>kW | FS' | T <sub>2M</sub><br>Nm | P<br>kW |
| 19 | 1                     | 1    | 1400                  | 12                   | 1.8                  | 3   | 35                    | 5.5     |
|    | 2.5                   | 2.56 | 546                   | 30                   | 1.8                  | 1.6 | 50                    | 3       |
|    | 5                     | 4.90 | 285                   | 48                   | 1.5                  | 1   | 48                    | 1.5     |
|    | 10                    | 9.85 | 142                   | 48                   | 0.75                 | 1   | 48                    | 0.75    |
| 24 | 1                     | 1    | 1400                  | 26                   | 4                    | 2.7 | 73                    | 11      |
|    | 2.5                   | 2.56 | 546                   | 68                   | 4                    | 1.4 | 93                    | 5.5     |
|    | 5                     | 4.90 | 285                   | 97                   | 3                    | 1   | 97                    | 3       |
|    | 10                    | 9.85 | 142                   | 98                   | 1.5                  | 1   | 98                    | 1.5     |
| 28 | 1                     | 1    | 1400                  | 61                   | 9.2                  | 2.4 | 146                   | 22      |
|    | 2.5                   | 2.56 | 546                   | 156                  | 9.2                  | 1.2 | 187                   | 11      |
|    | 5                     | 4.90 | 285                   | 179                  | 5.5                  | 1   | 179                   | 5.5     |
|    | 10                    | 9.85 | 142                   | 196                  | 3                    | 1   | 196                   | 3       |

| R  | n <sub>1</sub> = 1400 |      |                       | RC - RF              |                      |     | RA                    |         |
|----|-----------------------|------|-----------------------|----------------------|----------------------|-----|-----------------------|---------|
|    | in                    | ir   | n <sub>2</sub><br>rpm | T <sub>2</sub><br>Nm | P <sub>1</sub><br>kW | FS' | T <sub>2M</sub><br>Nm | P<br>kW |
| 38 | 1                     | 1    | 1400                  | 146                  | 22                   | 2   | 291                   | 45      |
|    | 2.5                   | 2.56 | 546                   | 373                  | 22                   | 1   | 365                   | 22      |
|    | 5                     | 4.90 | 285                   | 357                  | 11                   | 1   | 350                   | 11      |
|    | 10                    | 9.85 | 142                   | 359                  | 5.5                  | 1   | 350                   | 5.5     |
| 48 | 1                     | 1    | 1400                  | 199                  | 30                   | 3   | 596                   | 90      |
|    | 2.5                   | 2.56 | 546                   | 509                  | 30                   | 1.5 | 763                   | 45      |
|    | 5                     | 4.90 | 285                   | 715                  | 22                   | 1   | 715                   | 22      |
|    | 10                    | 9.85 | 142                   | 717                  | 11                   | 1   | 717                   | 11      |

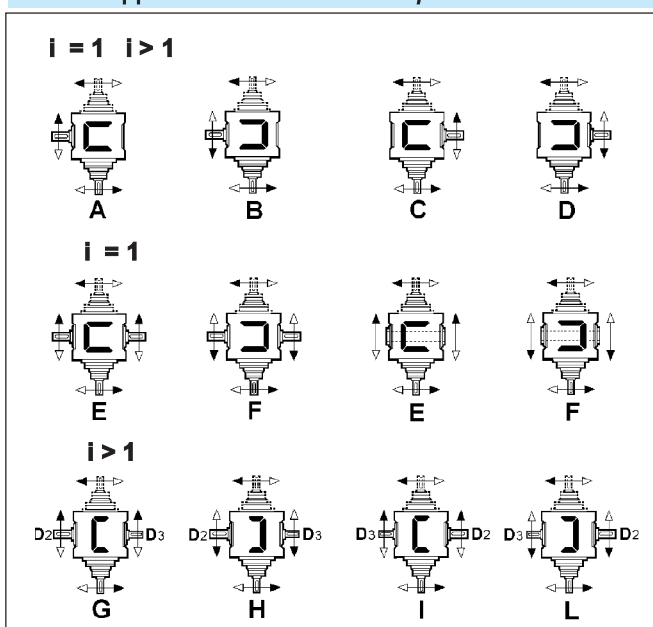
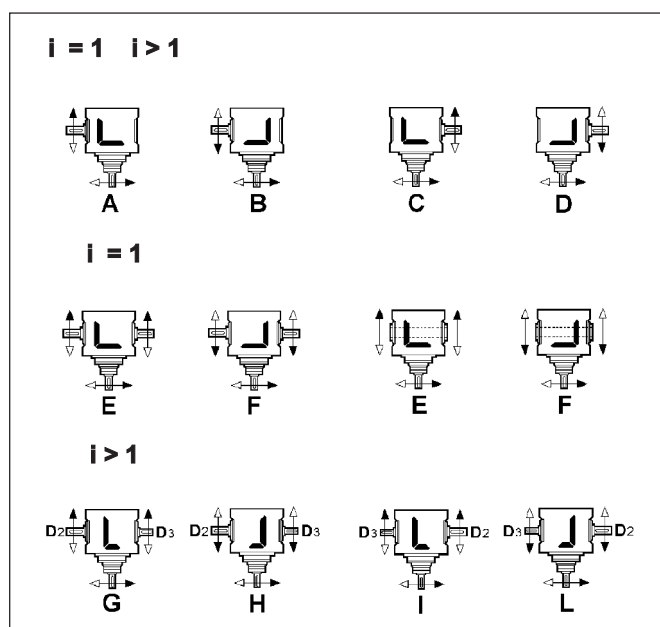
| R  | i        | IEC     |         |         |         |         |     |         |     |     |     |
|----|----------|---------|---------|---------|---------|---------|-----|---------|-----|-----|-----|
|    |          | 63      | 71      | 80      | 90      | 100     | 112 | 132     | 160 | 180 | 200 |
| 19 | 1        | RF      |         | RC - RF |         |         |     |         |     |     |     |
|    | 2.5-5-10 | RC - RF |         |         |         |         |     |         |     |     |     |
| 24 | 1        |         | RF      |         | RC - RF |         |     |         |     |     |     |
|    | 2.5-5-10 |         | RC - RF |         |         |         |     |         |     |     |     |
| 28 | 1        |         |         | RF      |         | RC - RF |     |         |     |     |     |
|    | 2.5-5-10 |         |         | RC - RF |         |         |     |         |     |     |     |
| 38 | 1        |         |         |         | RF      |         |     | RC - RF |     |     |     |
|    | 2.5-5-10 |         |         | RC - RF |         |         |     |         |     |     |     |
| 48 | 1        |         |         |         |         | RC - RF |     |         |     |     |     |
|    | 2.5-5-10 |         |         |         |         |         |     |         |     |     |     |

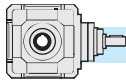
# 5.8 Senso di rotazione alberi

# 5.8 Shaft Rotation Direction

# 5.8 Wellendrehrichtungen

**S.e. =**  
Entrata supplementare / Additional input / Zusatzantrieb





## 5.9 Dimensioni

## 5.9 Dimensions

## 5.9 Abmessungen

|                        |                 | RA...- RC...- RF... |      |      |      |      |
|------------------------|-----------------|---------------------|------|------|------|------|
|                        |                 | 19                  | 24   | 28   | 38   | 48   |
| <b>A</b>               | <b>i = 1</b>    | 112                 | 142  | 180  | 224  | 280  |
| <b>a</b>               |                 | 80                  | 100  | 130  | 160  | 190  |
| <b>B</b>               |                 | 128                 | 146  | 175  | 204  | 230  |
| <b>b</b>               |                 | 110                 | 125  | 145  | 175  | 200  |
| <b>C2</b>              |                 | 130                 | 150  | 180  | 210  | 240  |
| <b>D2<sub>h6</sub></b> |                 | 19                  | 24   | 28   | 38   | 48   |
| <b>d2</b>              |                 | M8                  | M8   | M8   | M10  | M12  |
| <b>M2</b>              |                 | 21.5                | 27   | 31   | 41   | 51.5 |
| <b>N2</b>              |                 | 6                   | 8    | 8    | 10   | 14   |
| <b>F</b>               |                 | 7                   | 9    | 11   | 13   | 15   |
| <b>H</b>               | <b>i &gt; 1</b> | 56                  | 71   | 90   | 112  | 140  |
| <b>L2</b>              |                 | 40                  | 50   | 60   | 80   | 110  |
| <b>Z</b>               |                 | 7                   | 9    | 10   | 13   | 15   |
| <b>D3<sub>h6</sub></b> |                 | 19                  | 24   | 28   | 38   | 48   |
| <b>d3</b>              |                 | M8                  | M8   | M8   | M10  | M12  |
| <b>L3</b>              | <b>i = 1</b>    | 40                  | 50   | 60   | 80   | 110  |
| <b>M3</b>              |                 | 21.5                | 27   | 31   | 41   | 51.5 |
| <b>N3</b>              |                 | 6                   | 8    | 8    | 10   | 14   |
| <b>D4<sub>H7</sub></b> |                 | 20                  | 25   | 30   | 40   | 50   |
| <b>M4</b>              |                 | 22.8                | 28.3 | 33.3 | 43.3 | 53.8 |
| <b>N4</b>              |                 | 6                   | 8    | 8    | 12   | 14   |
| <b>D3<sub>h6</sub></b> |                 | 14                  | 19   | 24   | 28   | 38   |
| <b>d3</b>              |                 | M6                  | M8   | M8   | M10  | M10  |
| <b>L3</b>              |                 | 30                  | 40   | 50   | 60   | 80   |
| <b>M3</b>              |                 | 16                  | 21.5 | 27   | 31   | 41   |
| <b>N3</b>              |                 | 5                   | 6    | 8    | 8    | 10   |

|                        |                 | RA           |      |     |     |       |
|------------------------|-----------------|--------------|------|-----|-----|-------|
|                        |                 | 19           | 24   | 28  | 38  | 48    |
| <b>h</b>               | <b>i = 1</b>    | 101          | 120  | 147 | 170 | 207.5 |
| <b>D1<sub>h6</sub></b> |                 | 19           | 24   | 28  | 38  | 48    |
| <b>d1</b>              |                 | M8           | M8   | M8  | M10 | M12   |
| <b>M1</b>              |                 | 21.5         | 27   | 31  | 41  | 51.5  |
| <b>N1</b>              |                 | 6            | 8    | 8   | 10  | 14    |
| <b>h</b>               | <b>i &gt; 1</b> | 110          | 130  | 160 | 190 | 237.5 |
| <b>D1<sub>h6</sub></b> |                 | 14           | 19   | 24  | 28  | 38    |
| <b>d1</b>              |                 | M6           | M8   | M8  | M8  | M10   |
| <b>M1</b>              |                 | 16           | 21.5 | 27  | 31  | 41    |
| <b>N1</b>              |                 | 5            | 6    | 8   | 8   | 10    |
| <b>L1</b>              | <b>i = 1</b>    | 30           | 40   | 50  | 60  | 80    |
| <b>X</b>               | <b>i &gt; 1</b> | 90           | 110  | 130 | 150 | 175   |
| <b>kg</b>              |                 | 8.5          | 14   | 23  | 38  | 62    |
|                        |                 | RC...- RF... |      |     |     |       |
| <b>kg</b>              |                 | 11.5         | 19   | 33  | 55  | 82    |

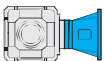


|            |                 | RC...    |          |             |           |          |          |          |            |
|------------|-----------------|----------|----------|-------------|-----------|----------|----------|----------|------------|
|            |                 | 19       |          |             |           | 24       |          |          |            |
| <b>IEC</b> |                 | 63<br>B5 | 71<br>B5 | 80/90<br>B5 | 80<br>B14 | 71<br>B5 | 80<br>B5 | 90<br>B5 | 90*<br>B14 |
| <b>Q</b>   |                 | —        | —        | —           | —         | —        | —        | —        | 120        |
| <b>Y</b>   |                 | 140      | 160      | 200         | 120       | 160      | 200      | 200      | 146        |
| <b>P</b>   | <b>i = 1</b>    | —        | —        | 131         | 131       | —        | —        | 148      | 148        |
| <b>P</b>   | <b>i &gt; 1</b> | 113      | 120      | 140         | 140       | 138      | 158      | 158      | 158        |



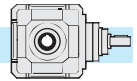
|            |                 | RC... |         |     |       |         |     |         |                               |                 |            |
|------------|-----------------|-------|---------|-----|-------|---------|-----|---------|-------------------------------|-----------------|------------|
|            |                 | 28    |         |     | 38    |         |     |         | 48                            |                 |            |
| <b>IEC</b> |                 | 80/90 | 100/112 | 132 | 80/90 | 100/112 | 132 | 160/180 | 100/112                       | 132             | 160        |
| <b>Y</b>   |                 | 200   | 250     | 300 | 200   | 250     | 300 | 350     | 250                           | 300             | 350        |
| <b>P</b>   | <b>i = 1</b>    | —     | 181     | 203 | —     | —       | 216 | 246     | 220                           | 270             | 270        |
| <b>P</b>   | <b>i &gt; 1</b> | 184   | 194     | 216 | 204   | 214     | 236 | 266     | 250 (i=2.5 - 5)<br>260 (i=10) | 300 (i=2.5 - 5) | 310 (i=10) |

\* Flange quadrata / Square flanges / Viereckige Flansche



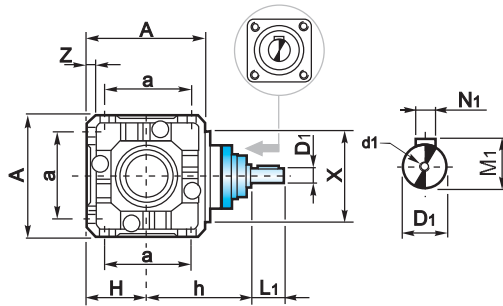


|     |       | RF... |     |       |     |       |            |       |            |     |     |     |            |     |            |            |     |            |     |
|-----|-------|-------|-----|-------|-----|-------|------------|-------|------------|-----|-----|-----|------------|-----|------------|------------|-----|------------|-----|
|     |       | 19    |     |       | 24  |       |            | 28    |            |     | 38  |     |            |     | 48         |            |     |            |     |
| IEC |       | 63    | 71  | 80/90 | 71  | 80/90 | 100<br>112 | 80/90 | 100<br>112 | 132 | 80  | 90  | 100<br>112 | 132 | 160<br>180 | 100<br>112 | 132 | 160<br>180 | 200 |
| Y   |       | 140   | 160 | 200   | 160 | 200   | 250        | 200   | 250        | 300 | 200 | 200 | 250        | 300 | 350        | 250        | 300 | 350        | 400 |
| P   | i = 1 | 158   | 165 | 186   | 194 | 215   | 225        | 252   | 262        | 283 | —   | 285 | 295        | 316 | 346        | 354        | 373 | 405        | 405 |
| P   | i > 1 | 167   | 174 | 195   | 204 | 225   | 235        | 265   | 275        | 296 | 305 | 305 | 315        | 336 | 366        | 384        | 403 | 435        | 435 |

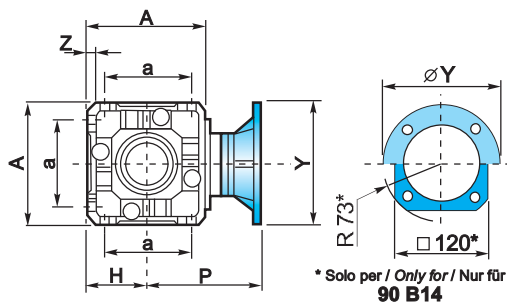


Tipo entrata / Input type / Antriebsart

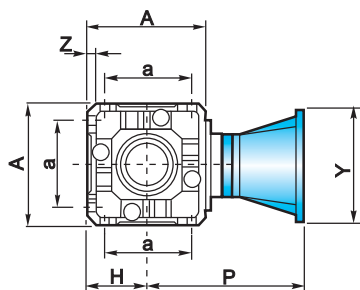
**RA**



**RC**

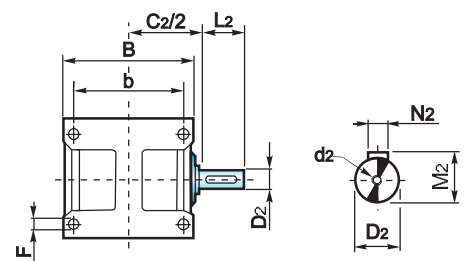


**RF**

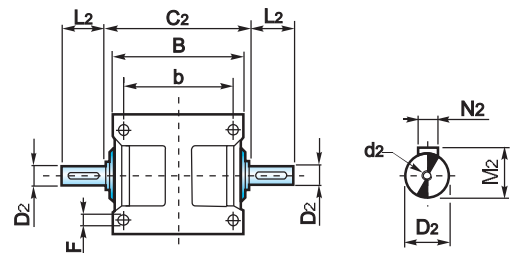


Tipo uscita / Output type / Ausgang Typ

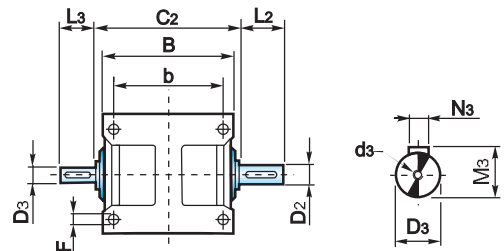
**S**



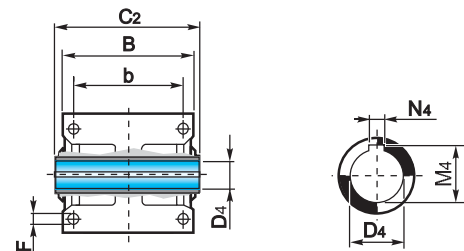
**B**  
**i = 1**



**B**  
**i > 1**

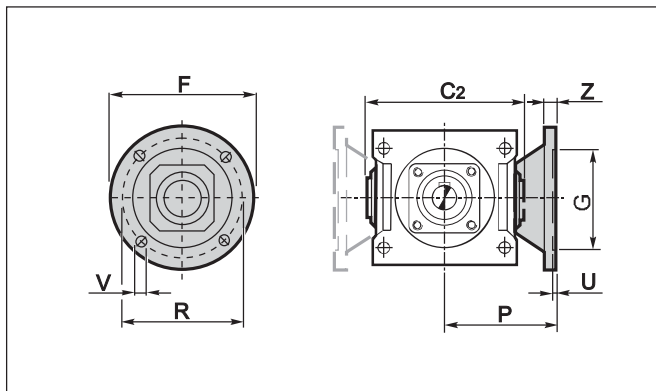


**C**  
**i = 1**



## 5.10 Accessori

### Flangia uscita



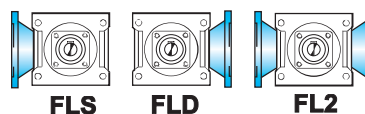
## 5.10 Accessoires

### Output flange

## 5.10 Zubehör

### Abtriebsflansch

|            | R   |      |     |     |     |
|------------|-----|------|-----|-----|-----|
|            | 19  | 24   | 28  | 38  | 48  |
| <b>C2</b>  | 130 | 150  | 180 | 210 | 240 |
| <b>F</b>   | 140 | 160  | 200 | 250 | 250 |
| <b>GF7</b> | 95  | 110  | 130 | 180 | 180 |
| <b>P</b>   | 85  | 100  | 120 | 145 | 175 |
| <b>R</b>   | 115 | 130  | 165 | 215 | 215 |
| <b>U</b>   | 3.5 | 4    | 4.5 | 5   | 5   |
| <b>V</b>   | 10  | 12   | 14  | 16  | 16  |
| <b>Z</b>   | 10  | 12.5 | 16  | 20  | 20  |



## 5.11 Lubrificazione

I rinvii angolari sono forniti predisposti per lubrificazione a olio e muniti dei tappi di carico, livello e scarico olio.

Si raccomanda di precisare sempre la posizione di montaggio desiderata in fase di ordine.

Il rinvio grandezza 19 viene fornito lubrificato a vita.

## 5.11 Lubrication

Right angle gearboxes require oil lubrication and are equipped with filler, level and drain plugs.

The mounting position should always be specified when ordering the gearbox.

The right angle gearbox size 19 is lubricated for life.

## 5.11 Schmierung

Die Winkelgetriebe sind für die Ölschmierung mit Einfüll-, Ölstand- und Ablassstopfen versehen.

Bei der Bestellung ist immer die gewünschte Montageposition anzugeben.

Das Winkelgetriebe Größe 19 ist lebenslang geschmiert.

### Posizione di montaggio e quantità di lubrificante (litri)

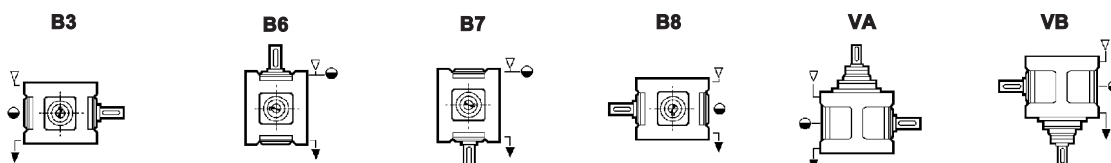
I quantitativi di olio riportati nelle varie tabelle sono indicativi e riferiti alle posizioni di lavoro indicate e considerando le condizioni di funzionamento a temperatura ambiente e velocità in ingresso di 1400 min<sup>-1</sup>. Per condizioni di lavoro diverse da quelle sopra riportate contattare il servizio tecnico.

### Mounting positions and lubricant quantity (litres)

The oil quantities stated in the tables are approximate values and refer to the indicated working positions, considering operating conditions at ambient temperature and an input speed of 1400 min<sup>-1</sup>. Should the operating conditions be different, please contact the technical service.

### Montageposition und Ölmenge (liter)

Die in der Tabellen angegebenen Daten sind Richtwerte. Die Ölmengen beziehen sich auf die angegebenen Betriebsposition. Dabei werden Betrieb bei Umgebungstemperatur und Antriebsdrehzahl von 1400 min<sup>-1</sup> berücksichtigt. Falls die Betriebsbedingungen anders sind, dann ist das technische Büro zu befragen.

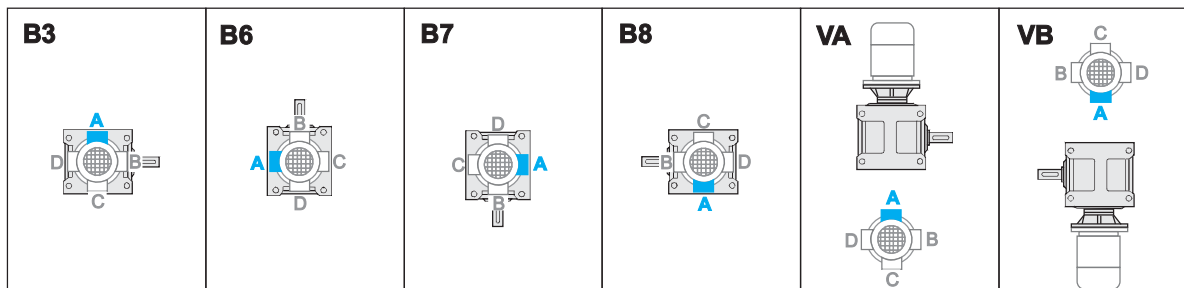


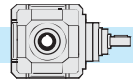
| R  | B3  | B6  | B7  | B8  | VA  | VB  |
|----|-----|-----|-----|-----|-----|-----|
| 19 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 24 | 0.4 | 0.8 | 0.8 | 0.4 | 0.6 | 0.5 |
| 28 | 0.9 | 0.8 | 0.8 | 0.8 | 0.9 | 0.8 |
| 38 | 1.6 | 3.0 | 3.0 | 2.0 | 2.7 | 2.7 |
| 48 | 4.0 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 |

### Posizione morsetti

### Terminal board position

### Lage der Klemmenkaste





## 5.12 Carichi radiali e assiali (N)

Le trasmissioni effettuate tramite pignoni per catena, ruote dentate o pulegge generano delle forze radiali ( $F_R$ ) sugli alberi dei riduttori. L'entità di tali forze può essere calcolata con la formula:

$$F_R = \frac{K_R \cdot T}{d} \quad [N]$$

dove:

T = Momento torcente (Nm)  
d = Diametro pignone o puleggia (mm)  
 $K_R$  = 2000 per pignone per catena  
= 2500 per ruote dentate  
= 3000 per puleggia con cinghie a V

I valori dei carichi radiali e assiali generati dall'applicazione debbono essere sempre minori o uguali a quelli ammissibili indicati nelle tabelle.

## 5.12 Radial and axial loads (N)

Transmissions implemented by means of chain pinions, wheels or pulleys generate radial forces ( $F_R$ ) on the gear unit shafts. The entity of these forces can be calculated using the following formula:

where :

T = torque (Nm)  
d = pinion or pulley diameter (mm)  
 $K_R$  = 2000 for chain pinion  
= 2500 for wheels  
= 3000 for V-belt pulleys

The values of the radial and axial loads generated by the application must always be lower than or equal to the admissible values reported in the tables.

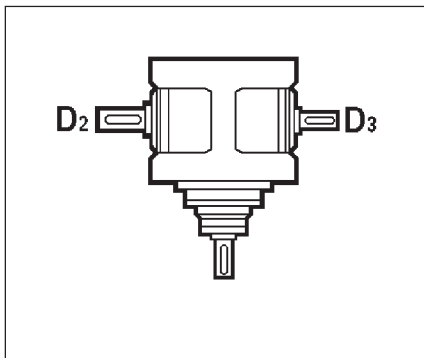
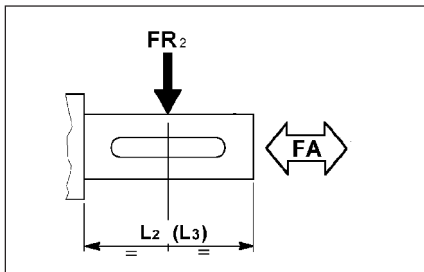
## 5.12 Radial-und Axialbelastungen (N)

Antriebe mit Kettenritzel, Zahnradern oder Riemenscheiben erzeugen radiale Kräfte ( $F_R$ ) an den Wellen der Untersetzungsgetriebe. Das Ausmaß dieser Kräfte kann nach folgender Formel berechnet werden:

dabei ist:

T = Drehmoment (Nm)  
d = Kettenritzel-bzw. Riemenscheibendurchmesser (mm)  
 $K_R$  = 2000 bei Kettenritzel  
= 2500 bei Zahnrad  
= 3000 bei Riemenscheibe mit Keilriemen

Die Werte der Radial- und Axialbelastungen, die durch die Anwendung hervorgerufen werden, dürfen nicht über den in den Tabellen angegebenen zulässigen Werten liegen.



| in                                                                                     | Albero<br>Shaft<br>Welle | R               |                 |                 |                 |                 |                 |                 |                 |                 |                 |
|----------------------------------------------------------------------------------------|--------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                                                                                        |                          | 19              |                 | 24              |                 | 28              |                 | 38              |                 | 48              |                 |
| ALBERO ENTRATA / INPUT SHAFT / ANTRIEBSWELLE (n <sub>1</sub> =1400 min <sup>-1</sup> ) |                          |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
|                                                                                        |                          | Fr <sub>1</sub> | Fa <sub>1</sub> | Fr <sub>1</sub> | Fa <sub>1</sub> | Fr <sub>1</sub> | Fa <sub>1</sub> | Fr <sub>1</sub> | Fa <sub>1</sub> | Fr <sub>1</sub> | Fa <sub>1</sub> |
| Tutti<br>All<br>Alle                                                                   | Tutti<br>All<br>Alle     | 400             | 80              | 630             | 125             | 1000            | 200             | 1600            | 320             | 2500            | 500             |
| ALBERO USCITA / OUTPUT SHAFT / ABTRIEBSWELLE (n <sub>1</sub> =1400 min <sup>-1</sup> ) |                          |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
|                                                                                        |                          | Fr <sub>2</sub> | Fa <sub>2</sub> | Fr <sub>2</sub> | Fa <sub>2</sub> | Fr <sub>2</sub> | Fa <sub>2</sub> | Fr <sub>2</sub> | Fa <sub>2</sub> | Fr <sub>2</sub> | Fa <sub>2</sub> |
| 1                                                                                      | Tutti / All<br>Alle      | 800             | 160             | 1250            | 250             | 2000            | 400             | 3150            | 630             | 5000            | 1000            |
| 2.5                                                                                    | D2                       | 1000            | 200             | 1600            | 320             | 2500            | 500             | 4000            | 800             | 6300            | 1260            |
|                                                                                        | D3                       | 630             | 130             | 1000            | 200             | 1600            | 320             | 2500            | 500             | 4000            | 800             |
| 5                                                                                      | D2                       | 1250            | 250             | 2000            | 400             | 3150            | 630             | 5000            | 1000            | 8000            | 1600            |
|                                                                                        | D3                       | 800             | 160             | 1250            | 250             | 2000            | 400             | 3150            | 630             | 5000            | 1000            |
| 10                                                                                     | D2                       | 1600            | 320             | 2500            | 500             | 4000            | 800             | 6300            | 1260            | 10000           | 2000            |
|                                                                                        | D3                       | 1000            | 200             | 1600            | 320             | 2500            | 500             | 4000            | 800             | 6300            | 1260            |

I carichi radiali indicati nelle tabelle si intendono applicati a metà della sporgenza dell'albero e sono riferiti ai riduttori operanti con fattore di servizio 1.

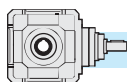
The radial loads indicated in the table are considered to be applied at the half-way point of the shaft projection and refer to gear units operating with service factor 1.

Die in den Tabellen angegebenen Radialbelastungen gelten für Ansatzpunkte in der Mitte des herausragenden Wellenteils und für Untersetzungsgetriebe mit Betriebsfaktor 1.

Nel caso di alberi bisporgenti il valore del carico applicabile a ciascuna estremità è uguale ai 2/3 del valore di tabella, purchè i carichi applicati siano uguali di intensità e direzione ed agiscano nello stesso senso. Diversamente contattare il servizio tecnico.

With regard to double-projecting shafts, the load applicable at each end is 2/3 of the value given in the table, on condition that the applied loads feature same intensity and direction and that they act in the same direction. Otherwise please contact the technical department.

Bei zweifach vorstehenden Wellen ist die Belastung, die an jede Ende anwendbar ist, 2/3 des in der Tabelle angegebenen Wertes unter der Bedingung, dass die Belastungen die selbe Stärke und Richtung aufweisen und dass sie in der selben Richtung wirken. Andernfalls ist das technische Büro zu befragen.

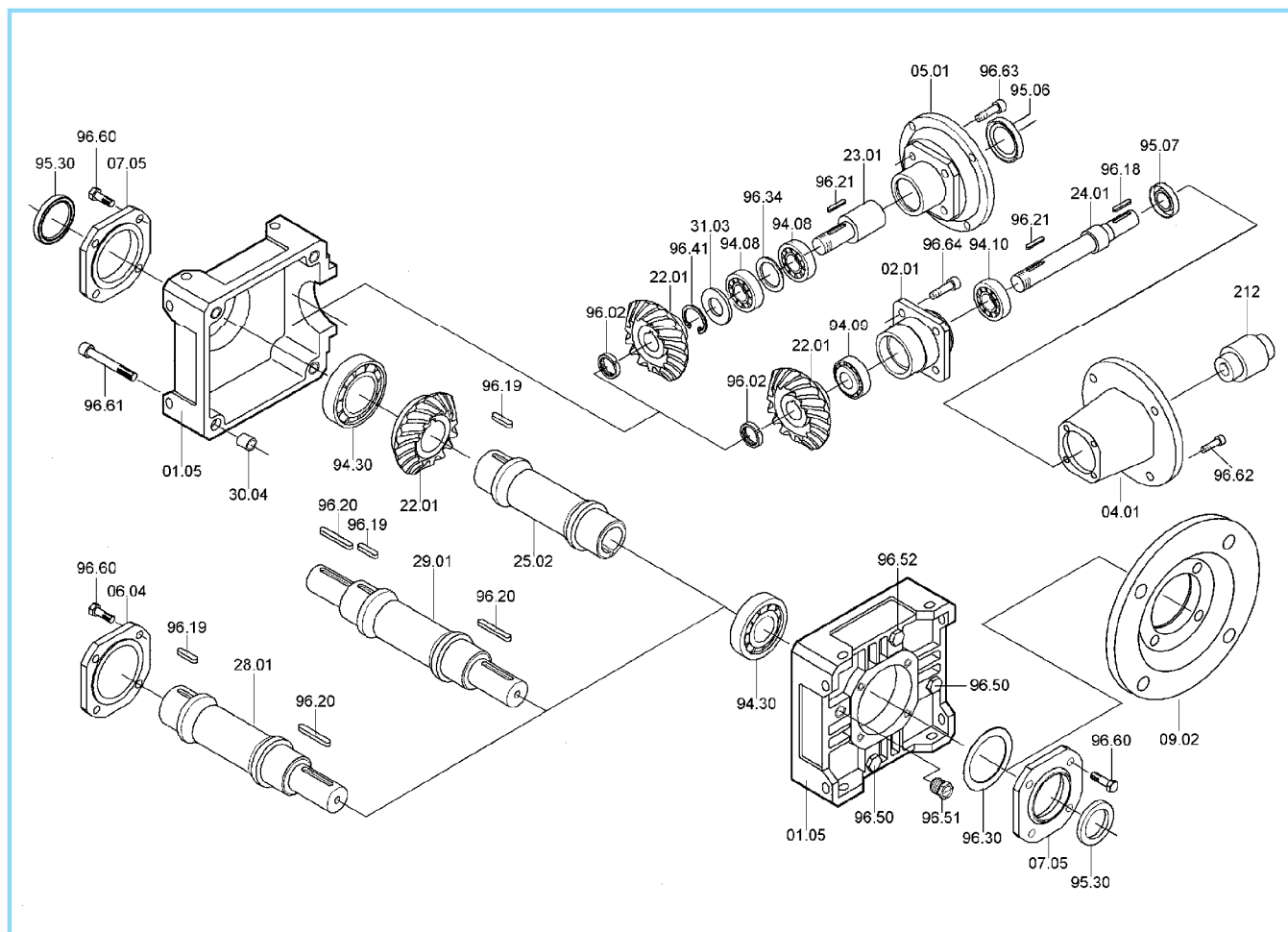


## 5.13 Lista parti di ricambio

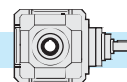
## 5.13 Spare parts list

## 5.13 Ersatzteilliste

### RA - RC - RF (in = 1)



| RA - RC - RF<br>in = 1:1 | Cuscinetti / Bearings / Lager |                             |                         | Anelli di tenuta / Oilseals / Öldichtungen |                                           |                                                                                           |                 |
|--------------------------|-------------------------------|-----------------------------|-------------------------|--------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------------|-----------------|
|                          | RA - RC - RF                  | RA - RF                     | RC                      | RA - RC - RF                               | RC                                        | RA - RF                                                                                   |                 |
|                          | 94.30                         | 94.10 - 94.09               | 94.08                   | 95.30                                      | IEC                                       | 95.06                                                                                     | 95.07           |
| <b>19</b>                | <b>6206</b><br>30/62/16       | <b>30203</b><br>17/40/13.25 | <b>7203</b><br>17/40/12 | 30/47/7                                    | 63<br>71<br>80<br>90                      | <b>25/52/7</b><br><b>30/52/7</b><br><b>35/52/7</b><br><b>37/52/8</b>                      | <b>20/40/7</b>  |
| <b>24</b>                | <b>6207</b><br>35/72/17       | <b>32005</b><br>25/47/15    | <b>7205</b><br>25/52/15 | 35/52/7                                    | 71 - 80<br>90<br>100 - 112                | <b>35/62/7</b><br><b>40/62/7</b><br><b>45/62/8</b>                                        | <b>30/47/7</b>  |
| <b>28</b>                | <b>6208</b><br>40/80/18       | <b>32006</b><br>30/55/17    | <b>7206</b><br>30/62/16 | 40/62/8                                    | 80 - 90<br>100 - 112<br>132               | <b>40/72/7</b><br><b>45/72/8</b><br><b>55/72/10</b>                                       | <b>35/58/10</b> |
| <b>38</b>                | <b>6211</b><br>55/100/21      | <b>32007</b><br>35/62/18    | <b>7207</b><br>35/72/17 | 55/72/10                                   | 80 - 90<br>100 - 112<br>132<br>160<br>180 | <b>45/80/10</b><br><b>45/80/10</b><br><b>55/80/10</b><br><b>60/80/8</b><br><b>65/80/8</b> | <b>40/62/7</b>  |
| <b>48</b>                | <b>6213</b><br>65/120/23      | <b>32009</b><br>45/75/20    | <b>7209</b><br>45/85/19 | 65/90/10                                   | 100 - 112<br>132 - 160<br>180<br>200      | <b>55/100/13</b><br><b>60/100/10</b><br><b>65/100/10</b><br><b>75/100/10</b>              | <b>55/80/8</b>  |

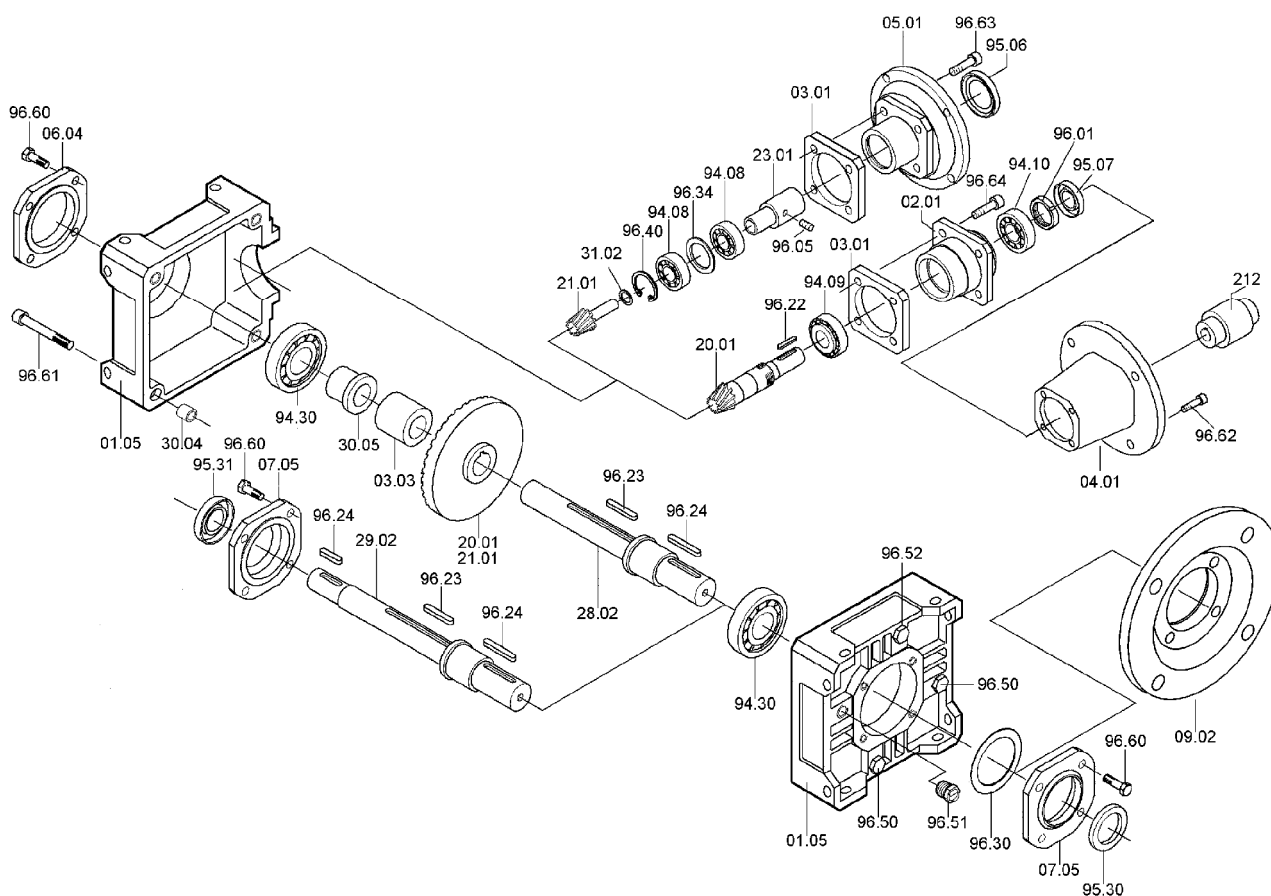


## 5.13 Lista parti di ricambio

## 5.13 Spare parts list

## 5.13 Ersatzteilliste

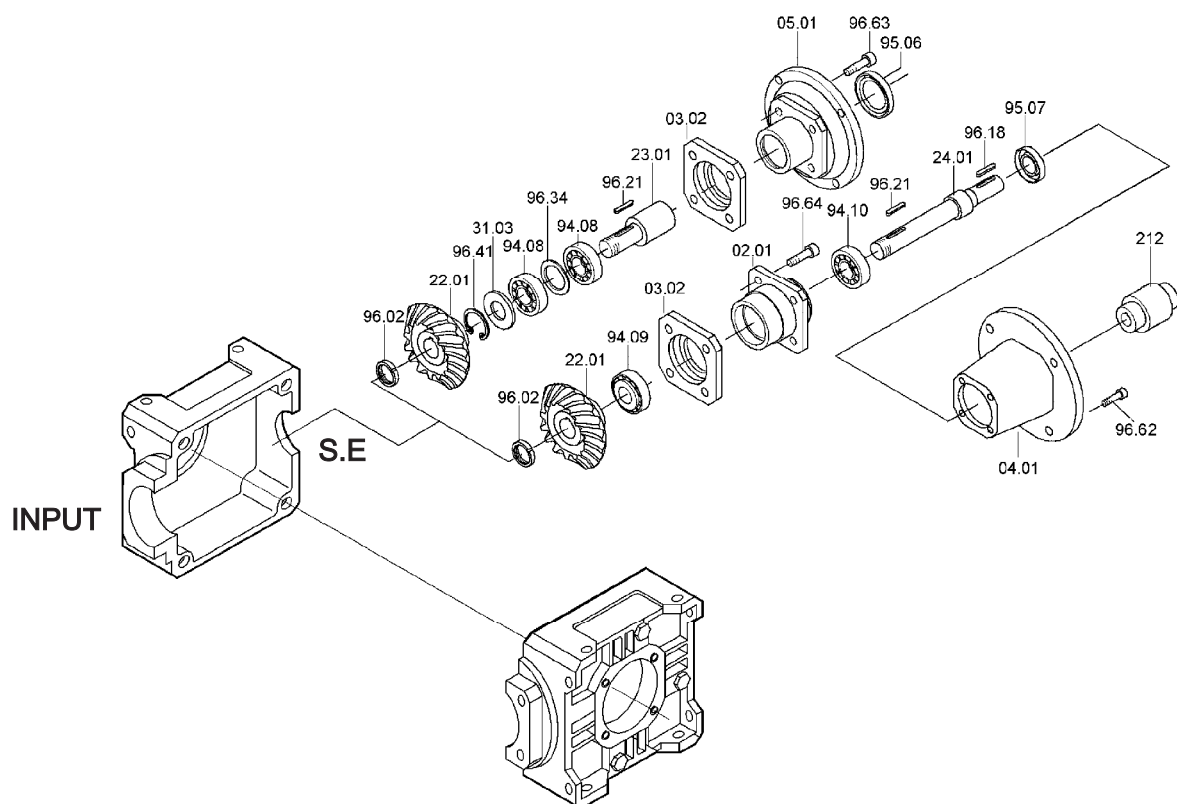
## RA - RC - RF (in > 1)



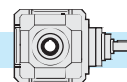
| RA - RC - RF<br>in > 1 | Cuscinetti / Bearings / Lager |                             |       |                         | Anelli di tenuta / Oilseals / Öldichtungen |          |           |                  |                 |
|------------------------|-------------------------------|-----------------------------|-------|-------------------------|--------------------------------------------|----------|-----------|------------------|-----------------|
|                        | RA - RC - RF                  | RA - RF                     |       | RC                      | RA - RC - RF                               |          | RC        |                  | RA - RF         |
|                        | 94.30                         | 94.09                       | 94.10 | 94.08                   | 95.30                                      | 95.31    | IEC       | 95.06            | 95.07           |
| <b>19</b>              | <b>6305</b><br>25/62/17       | <b>30203</b><br>17/40/13.25 |       | <b>7203</b><br>17/40/12 | 25/47/7                                    | 17/47/7  | 63        | <b>25/52/7</b>   | <b>15/40/10</b> |
|                        |                               |                             |       |                         |                                            |          | 71        | <b>30/52/7</b>   |                 |
|                        |                               |                             |       |                         |                                            |          | 80        | <b>35/52/7</b>   |                 |
|                        |                               |                             |       |                         |                                            |          | 90        | <b>37/52/8</b>   |                 |
| <b>24</b>              | <b>6306</b><br>30/72/19       | <b>32005</b><br>25/47/15    |       | <b>7205</b><br>25/52/15 | 30/52/7                                    | 20/52/7  | 71 - 80   | <b>35/62/7</b>   | <b>20/47/7</b>  |
|                        |                               |                             |       |                         |                                            |          | 90        | <b>40/62/7</b>   |                 |
|                        |                               |                             |       |                         |                                            |          | 100 - 112 | <b>45/62/8</b>   |                 |
|                        |                               |                             |       |                         |                                            |          | 80 - 90   | <b>40/72/7</b>   |                 |
| <b>28</b>              | <b>6307</b><br>35/80/21       | <b>32006</b><br>30/55/17    |       | <b>7206</b><br>30/62/16 | 35/62/7                                    | 25/62/10 | 100 - 112 | <b>45/72/8</b>   | <b>25/58/10</b> |
|                        |                               |                             |       |                         |                                            |          | 132       | <b>55/72/10</b>  |                 |
|                        |                               |                             |       |                         |                                            |          | 80 - 90   | <b>45/80/10</b>  |                 |
|                        |                               |                             |       |                         |                                            |          | 100 - 112 | <b>45/80/10</b>  |                 |
| <b>38</b>              | <b>6309</b><br>45/100/25      | <b>32007</b><br>35/62/18    |       | <b>7207</b><br>35/72/17 | 45/72/8                                    | 30/72/10 | 132       | <b>55/80/10</b>  | <b>30/62/7</b>  |
|                        |                               |                             |       |                         |                                            |          | 160       | <b>60/80/8</b>   |                 |
|                        |                               |                             |       |                         |                                            |          | 180       | <b>65/80/8</b>   |                 |
|                        |                               |                             |       |                         |                                            |          | 100 - 112 | <b>55/100/13</b> |                 |
| <b>48</b>              | <b>6311</b><br>55/120/29      | <b>32009</b><br>45/75/20    |       | <b>7209</b><br>45/85/19 | 55/90/10                                   | 40/90/8  | 132 - 160 | <b>60/100/10</b> | <b>40/80/10</b> |
|                        |                               |                             |       |                         |                                            |          | 180       | <b>65/100/10</b> |                 |
|                        |                               |                             |       |                         |                                            |          | 200       | <b>75/100/10</b> |                 |
|                        |                               |                             |       |                         |                                            |          |           |                  |                 |



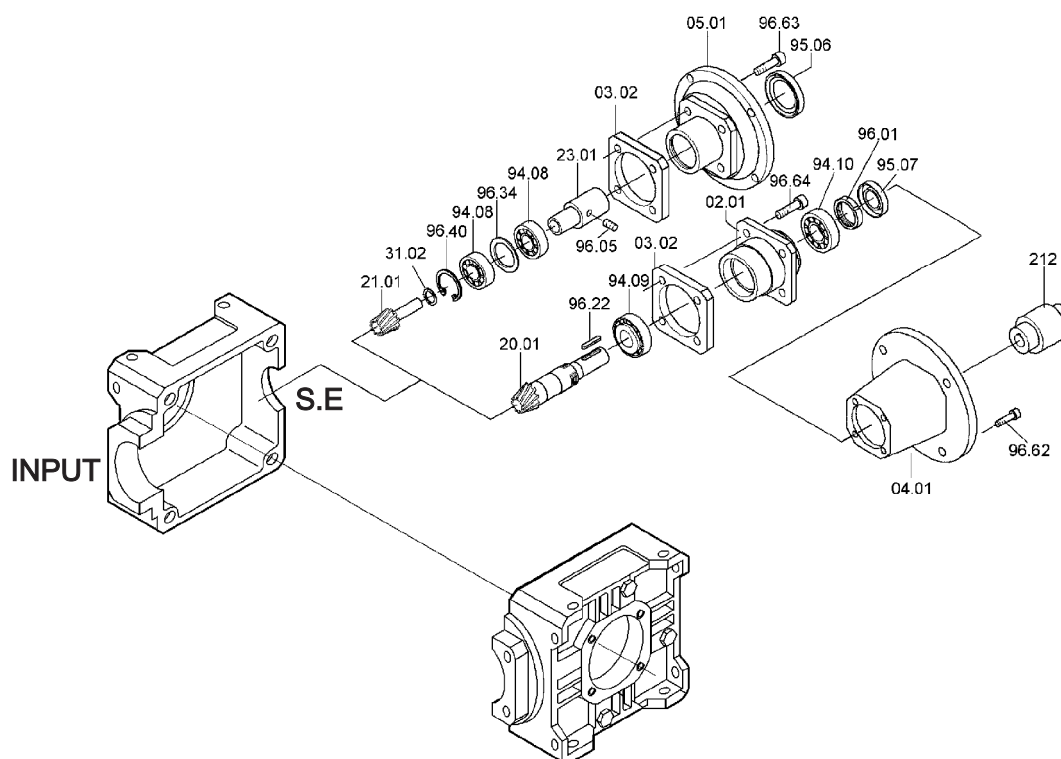
**RA - RC - RF (in = 1) s.e.**



| RA - RC - RF<br>in = 1:1<br>S.E | Cuscinetti / Bearings / Lager |                  | Anelli di tenuta / Oilseals / Öldichtungen |           |          |
|---------------------------------|-------------------------------|------------------|--------------------------------------------|-----------|----------|
|                                 | RA - RF                       | RC               | RC                                         |           | RA - RF  |
|                                 | 94.10 - 94.09                 | 94.08            | IEC                                        | 95.06     | 95.07    |
| 19                              | 30203<br>17/40/13.25          | 7203<br>17/40/12 | 63                                         | 25/52/7   | 20/40/7  |
|                                 |                               |                  | 71                                         | 30/52/7   |          |
|                                 |                               |                  | 80                                         | 35/52/7   |          |
|                                 |                               |                  | 90                                         | 37/52/8   |          |
| 24                              | 32005<br>25/47/15             | 7205<br>25/52/15 | 71 - 80                                    | 35/62/7   | 30/47/7  |
|                                 |                               |                  | 90                                         | 40/62/7   |          |
|                                 |                               |                  | 100 - 112                                  | 45/62/8   |          |
| 28                              | 32006<br>30/55/17             | 7206<br>30/62/16 | 80 - 90                                    | 40/72/7   | 35/58/10 |
|                                 |                               |                  | 100 - 112                                  | 45/72/8   |          |
|                                 |                               |                  | 132                                        | 55/72/10  |          |
| 38                              | 32007<br>35/62/18             | 7207<br>35/72/17 | 80 - 90                                    | 45/80/10  | 40/62/7  |
|                                 |                               |                  | 100 - 112                                  | 45/80/10  |          |
|                                 |                               |                  | 132                                        | 55/80/10  |          |
|                                 |                               |                  | 160                                        | 60/80/8   |          |
| 48                              | 32009<br>45/75/20             | 7209<br>45/85/19 | 180                                        | 65/80/8   | 55/80/8  |
|                                 |                               |                  | 100 - 112                                  | 55/100/13 |          |
|                                 |                               |                  | 132 - 160                                  | 60/100/10 |          |
|                                 |                               |                  | 200                                        | 75/100/10 |          |



## RA - RC - RF (in > 1) s.e.



| RA - RC - RF<br>in > 1<br>S.E | Cuscinetti / Bearings / Lager |                         | Anelli di tenuta / Oilseals / Öldichtungen |                  |                 |
|-------------------------------|-------------------------------|-------------------------|--------------------------------------------|------------------|-----------------|
|                               | RA - RF                       | RC                      | RC                                         |                  | RA - RF         |
|                               | 94.09 - 94.10                 | 94.08                   | IEC                                        | 95.06            | 95.07           |
| <b>19</b>                     | <b>32023</b><br>17/40/13.25   | <b>7203</b><br>17/40/12 | 63                                         | <b>25/52/7</b>   | <b>15/40/10</b> |
|                               |                               |                         | 71                                         | <b>30/52/7</b>   |                 |
|                               |                               |                         | 80                                         | <b>35/52/7</b>   |                 |
|                               |                               |                         | 90                                         | <b>37/52/8</b>   |                 |
| <b>24</b>                     | <b>32005</b><br>25/47/15      | <b>7205</b><br>25/52/15 | 71 - 80                                    | <b>35/62/7</b>   | <b>20/47/7</b>  |
|                               |                               |                         | 90                                         | <b>40/62/7</b>   |                 |
|                               |                               |                         | 100 - 112                                  | <b>45/62/8</b>   |                 |
|                               |                               |                         | 80 - 90                                    | <b>40/72/7</b>   |                 |
| <b>28</b>                     | <b>32006</b><br>30/55/17      | <b>7206</b><br>30/62/16 | 100 - 121                                  | <b>45/72/8</b>   | <b>25/58/10</b> |
|                               |                               |                         | 132                                        | <b>55/72/10</b>  |                 |
|                               |                               |                         | 80 - 90                                    | <b>45/80/10</b>  |                 |
|                               |                               |                         | 100 - 112                                  | <b>45/80/10</b>  |                 |
| <b>38</b>                     | <b>32007</b><br>35/62/18      | <b>7207</b><br>35/72/17 | 132                                        | <b>55/80/10</b>  | <b>30/62/7</b>  |
|                               |                               |                         | 160                                        | <b>60/80/8</b>   |                 |
|                               |                               |                         | 180                                        | <b>65/80/8</b>   |                 |
|                               |                               |                         | 100 - 112                                  | <b>55/100/13</b> |                 |
| <b>48</b>                     | <b>32009</b><br>45/75/20      | <b>7209</b><br>45/85/19 | 132 - 160                                  | <b>60/100/10</b> | <b>40/80/10</b> |
|                               |                               |                         | 180                                        | <b>65/100/10</b> |                 |
|                               |                               |                         | 200                                        | <b>75/100/10</b> |                 |
|                               |                               |                         |                                            |                  |                 |