



## 2 INTRODUCTION

This catalogue presents BONFIGLIOLI RIDOTTORI's range of Series 300M modular planetary gearboxes.

The range has been expanded and integrated with new sizes, technical improvements and enhanced modularity right through to the larger sizes. This feature signifies greater flexibility in internal production to ensure quick availability of products in the sizes and types requested either directly from the company or from the many affiliates belonging to the BONFIGLIOLI sales network in various countries around the world.


The gearboxes are tested in conformity with the following standards:

ISO 6336 : 2006 - method B for gears


ISO 281 for bearings

DIN 743 : 2012 for shafts

Symbols	Description / Condition	Value (*)	
		Synthetic Oil	Mineral Oil
$t_a$	Ambient temperature		
$t_{au \text{ min}}$	Minimum operating ambient temperature	<b>-30°C</b>	<b>-10°C</b>
$t_{au \text{ Max}}$	Maximum operating ambient temperature	<b>+50°C</b>	<b>+40°C</b>
$t_{as \text{ min}}$	Minimum storage ambient temperature	<b>-40°C</b>	<b>-10°C</b>
$t_{as \text{ Max}}$	Maximum storage ambient temperature	<b>+50°C</b>	<b>+50°C</b>
$t_s$	Surface temperature		
$t_{s \text{ min}}$	Minimum gearbox surface temperature starting with partial load (#)	<b>-25°C</b>	<b>-10°C</b>
$t_{sc \text{ min}}$	Minimum gearbox surface temperature starting with full load	<b>-10°C</b>	<b>-5°C</b>
$t_{s \text{ Max}}$	Maximum casing surface temperature during continuous operation (measured next to the gearbox input)	<b>+100°C</b>	<b>+100°C (@)</b>
$t_o$	Oil temperature		
$t_{o \text{ Max}}$	Maximum oil temperature during continuous operation	<b>+95°C</b>	<b>+95°C (@)</b>

(\*) = Refer to the table "Selection of the optimal oil viscosity" for further information about minimum and maximum values of different oil viscosity and for using hydraulic circuits. For values of  $t_a < -20^\circ\text{C}$  and  $t_s, t_o > 80^\circ\text{C}$ , choose (as permitted in the product configuration stage) the sealing type of the most suitable material to the type of application. If needed contact Bonfiglioli Technical Service. 

(@) = Continuous operation it is not advised if  $t_s$  and  $t_o$  range is  $80^\circ\text{C}$  to  $95^\circ\text{C}$ .

(#) = For full load start-up it is recommended to ramp-up and provide for greater absorption of the motor. If needed, contact Bonfiglioli Technical Service. 



### 3 ALLOWED TEMPERATURE LIMITS

### 4 SPECIFICATIONS





The 300M series consist of a range of multi-purpose planetary gearboxes that can be operated by either hydraulic or electric motors. Basic features are:

- 20 frame sizes of modular design
- output torque up to 1.286.700 Nm
- transmissible power up to 1050 kW
- ratios from 3,4:1 to 5234:1
- versions:
  - in-line with 1 to 4 reductions
  - right angle (spiral bevel gear set into first stage) with 2 to 4 reductions
- combinations with:
  - worm gear units
  - bevel-helical gear units
- flange, foot and shaft mounting arrangements
- slow output shafts: keyed, splined male, splined hollow, shrink disk mounted
- input adaptors for:
  - IEC-normalised electric motors
  - integral motor for in-line units up to size 307 and for units combined with bevel helical and worm gears
  - hydraulic motors by major manufacturers and according to SAE J744C
- parallel input shafts
- gearmotors with:
  - electric motors IEC
  - hydraulic orbital motors by BONFIGLIOLI TRASMITAL MG
- negative hydraulic parking brakes for operation by hydraulic motors
- output shaft accessories:
  - flanges
  - pinions
  - splined bars
  - shrink discs

#### More design features:

- high ratio of transmissible torque to overall dimensions
- high overhung and axial load capacity due to heavy duty tapered roller bearings featured on H and P versions
- high efficiency
- inner parts are coupled through splined connections rather than keys
- planetary gears mounted onto self-centering carriers to ensure the most even load distribution among planetary gears
- housing made of spheroidal cast iron.

(A 1)

Configuration	Power	Torque	Ratios	Efficiency	Noise level
	$0.25 \leq P_n \text{ [kW]} \leq 55$	$M_{2REF} \leq 1286700 \text{ Nm}$	$3.4 \leq i \leq 2916$	High	Medium
	$0.25 \leq P_n \text{ [kW]} \leq 55$	$M_{2REF} \leq 656000 \text{ Nm}$	$7 \leq i \leq 953$	High	Medium
	$0.12 \leq P_n \text{ [kW]} \leq 22$	$M_{2REF} \leq 656000 \text{ Nm}$	$370 \leq i \leq 5234$	Medium	Low
	$0.12 \leq P_n \text{ [kW]} \leq 22$	$M_{2REF} \leq 15680 \text{ Nm}$	$18.7 \leq i \leq 731$	High	Low



## Configurations

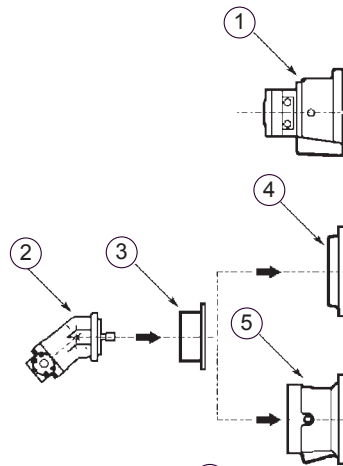
### 5 VERSIONS

#### A INPUT

#### B REDUCTIONS

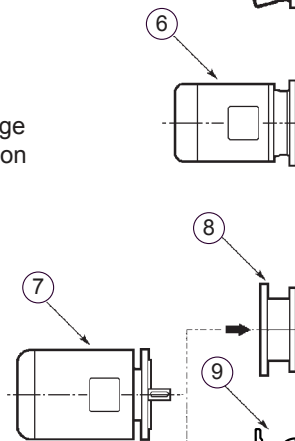
#### A

- 1 Orbital hydraulic motor  
MG with/without brake
- 2 Hydraulic motor
- 3 Hydraulic motor setting
- 4 Cover
- 5 Negative brake
- 6 Compact electric motor
- 7 IEC electric motor
- 8 Electric motor setting
- 9 Electric motor connection  
with integrated fan
- 10 Input shaft
- 11 Solid input shaft  
with fan



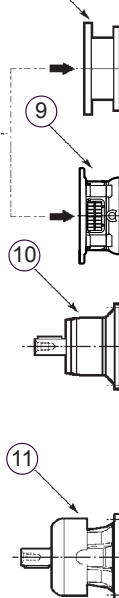
#### B

- 12 Right-angle reduction stage
- 13 Single planetary reduction stage
- 14 Two or more planetary reduction stages
- 15 Planetary reduction combined  
with wormgear unit
- 16 Planetary reduction stage  
combined with helical bevel  
gear unit



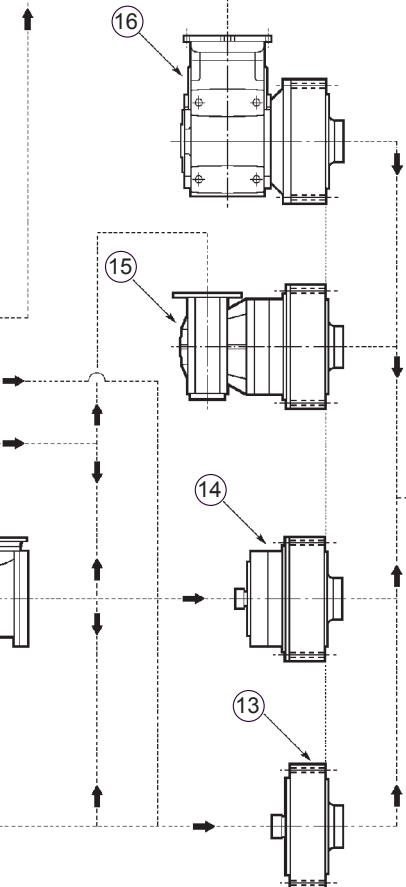
#### C

- 17 **MC/MZ** - Keyed or splined solid shaft  
output
- 18 **HC/HZ** - Keyed or splined heavy  
duty solid output shaft
- 19 **PC/PZ** - Output with support bracket  
and keyed or splined solid shaft
- 20 **FZ** - Splined hollow output shaft
- 21 **FP** - Hollow output shaft for  
shrink disc
- 22 **HC** - Parallel solid output shaft
- 23 **HZ** - Splined solid output shaft
- 24 **FZ** - Splined hollow output shaft
- 25 **FP** - Hollow output shaft  
for shrink disc
- 26 **PC** - Foot mount
- 27 **VK** - Reinforced output with parallel  
shaft for stirrers and mixers
- 28 **FDK** - Hollow shaft with double  
keyway
- 29 **FZP** - Hollow splined shaft with axial  
blockage device



#### D

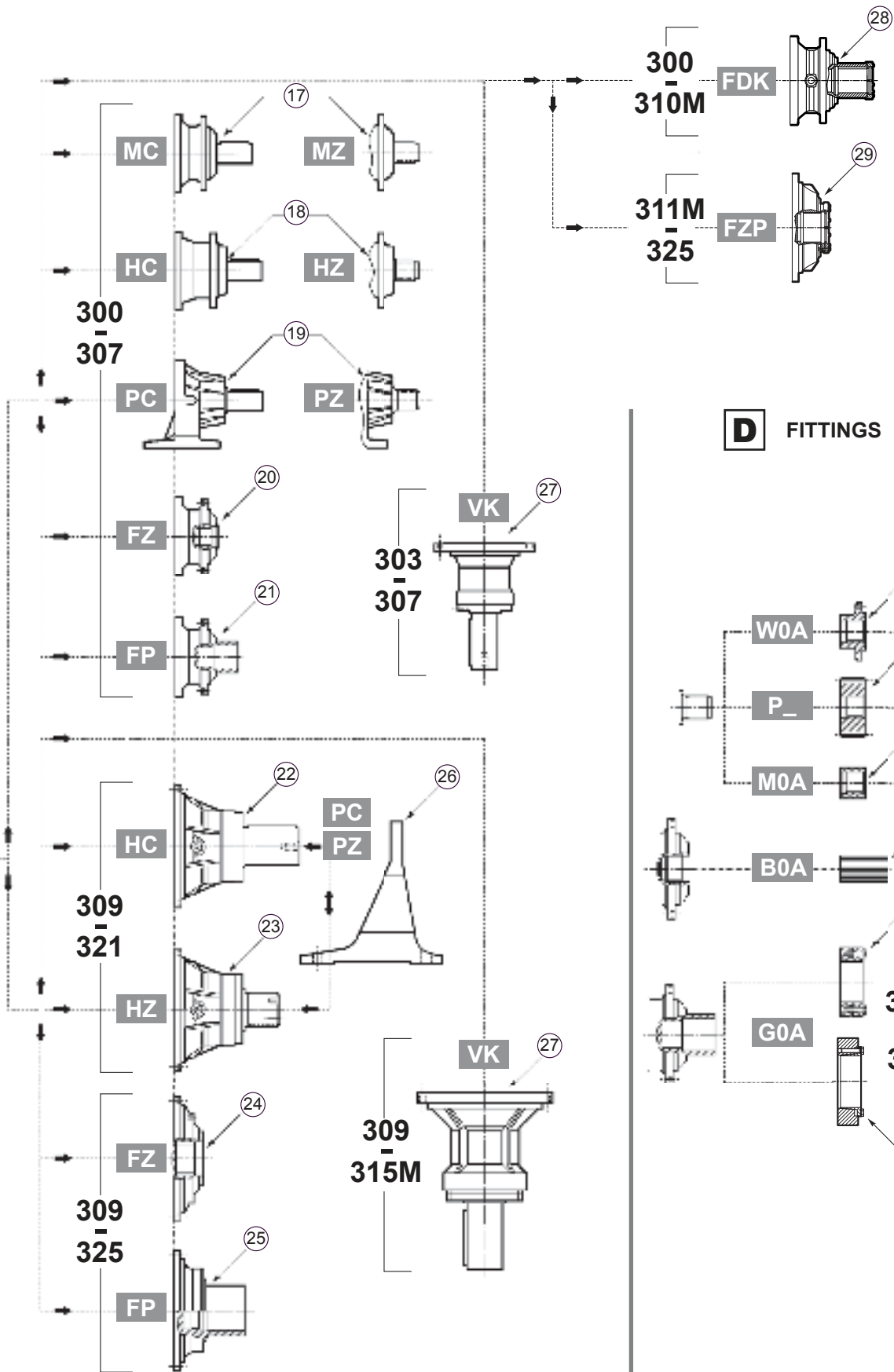
- 30 **W0A** - Flange
- 31 **P\_** - Pinion
- 32 **M0A** - Sleeve coupling



- 33 End plate
- 34 **B0A** - Splined bar
- 35 **G0A** - Shrink disc



### C OUTPUT

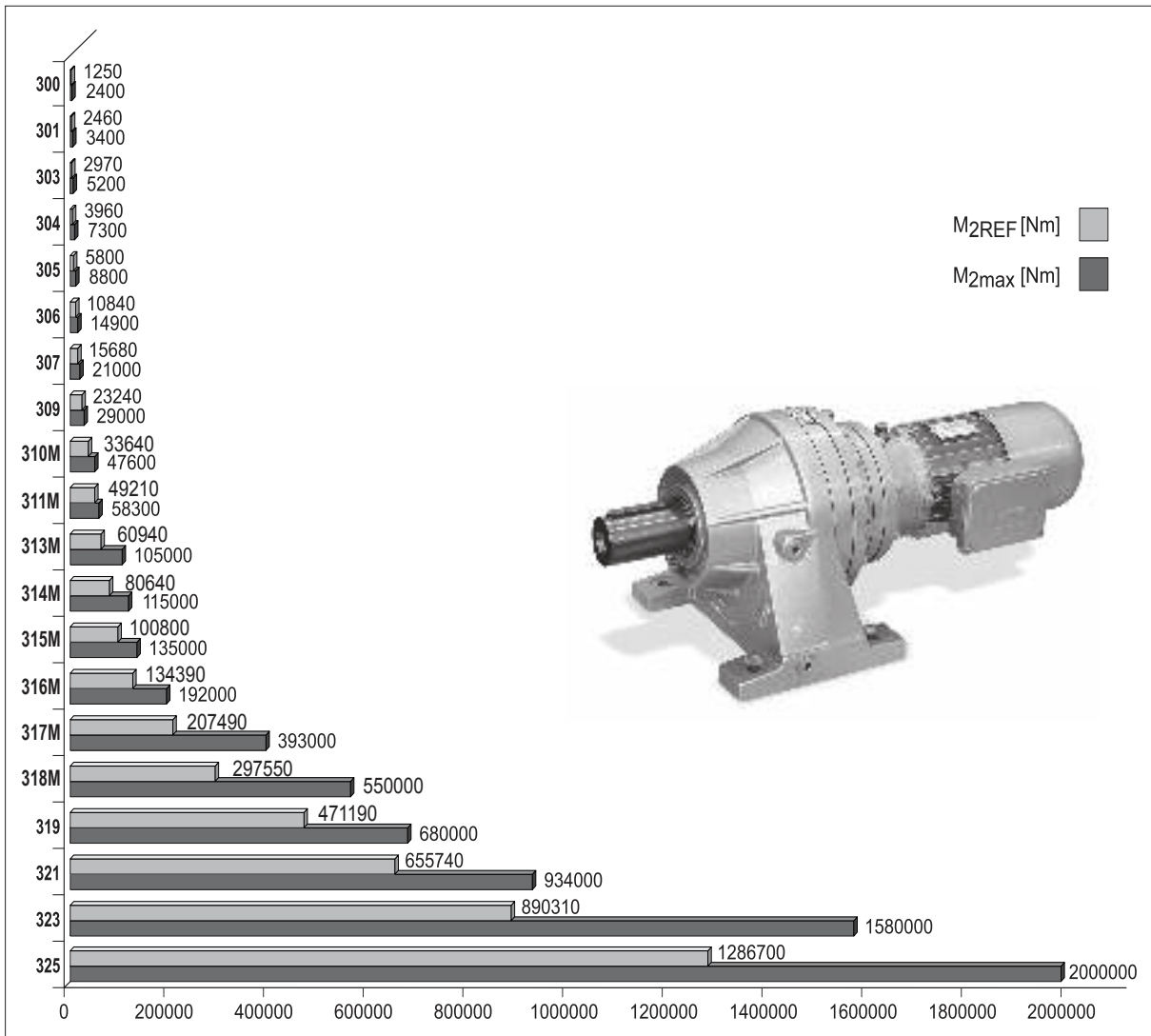




## GENERAL INFORMATION

The following paragraphs contain information on essential elements for selection and correct use of gearmotors.

(A 2)



## 6 OUTPUT TORQUE

### 6.1 Reference torque $M_{2REF}$ [Nm]

It is the significant value for the size. It is equivalent to the maximum value of nominal torque  $M_{n2}$  for a life factor  $n_2 \times h = 10000$  (referred to single stage configuration L1).

### 6.2 Rated output torque $M_{n2}$ [Nm]



It is the output torque which the gearbox can transmit with steady load under working condition specified in the calculation method.

### 6.3 Maximum torque $M_{2max}$ [Nm]

It is the output torque that the gearbox can withstand under static or almost static conditions. It is generally meant as a momentary peak load or starting-up torque under load.

The values in the tables are valid only in versions with output splined shaft (accessories excluded).

### 6.4 Required torque $M_{r2}$ [Nm]

The torque drawn by the application. It must always be equal to or less than rated output torque  $M_{n2}$  for the gearbox under study.

## 7 POWER

### 7.1 Input rated power $P_{n1}$ [kW]

$P_{n1}$  is the maximum power that can be safely applied to the gearbox when the same is operated:

- at a  $n_1$  drive speed
- yielding a theoretical lifetime of 10000 hours
- service factor  $f_s=1$

$$P_1' \times f_s \leq P_1 \quad (1)$$

Check that the formula here below is always satisfied:

### 7.2 Output power $P_2$ [kW]

This value is the net power delivered to the output shaft.

It can be calculated through the following formulas:

$$P_2 = P_1 \times \eta_d \quad (2)$$

$$P_2 = \frac{M_{r2} \times n_2}{9550} \quad (3)$$

Efficiency values are listed in table (A3).

### 7.3 Thermal power $P_T$ [kW]



This parameter is linked to the gearbox thermal limit (see par. 14.5).

## 8 EFFICIENCY

### 8.1 Dynamic efficiency $\eta_d$

$$\eta_d = \frac{P_2}{P_1} \quad (4)$$

The parameter is defined as the relationship of the net power delivered to the output shaft  $P_2$  to the power applied to the input shaft  $P_1$ :

(A 3)

No. of reductions	Configuration		
	Planetary	Combined with worm gear unit	Combined with right-angle unit
1	0.97	—	—
2	0.94	0.73	—
3	0.91	0.70	0.91
4	0.88	—	—

Indicative values for the efficiency are listed in the chart here after.

## 9 REDUCTION RATIO $i$

$$i = \frac{n_1}{n_2} \quad (5)$$

It is defined as the relationship of the speed the input shaft is driven at and the speed delivered at the output shaft of a gearbox.

## 10 ANGULAR SPEED

### 10.1 Input speed $n_1$ [min<sup>-1</sup>]

The speed the gearbox is driven at.

The value is coincident with the motor speed if this is directly connected to the gearbox.

Input speed should never exceed the  $n_{1max}$  value listed in the gearbox rating chart.

$$n_2 = \frac{n_1}{i} \quad (6)$$

### 10.2 Output speed $n_2$ [min<sup>-1</sup>]

It is calculated from drive speed  $n_1$  and gear ratio  $i$ , as per the following equation:

## 11 SERVICE FACTOR $f_s$

$$f_s = \frac{P_{n1}}{P_1} \quad (7)$$



This is the relationship of the gear unit rated power to the power of the electric motor actually driving the unit.

## 12 SERVICE FACTOR REQUESTED BY APPLICATION $f_s'$

(A 4)

Service factor $f_s'$ required depending on the application						
Type of load	Number of starts/hour <b>z</b>	Total operating hours (h)				
		≤ 5000	10000	15000	25000	50000
		Daily operating hours (h)				
		h < 4	4 < h < 8	8 < h < 12	12 < h < 16	16 < h < 24
Uniform load	Z < 10	0.90	1.00	1.15	1.30	1.60
	10 < Z < 30	0.95	1.15	1.30	1.50	1.80
	30 < Z < 100	1.00	1.25	1.45	1.60	2.00
Moderate shock load	Z < 10	1.00	1.25	1.45	1.60	2.00
	10 < Z < 30	1.10	1.40	1.60	1.80	2.20
	30 < Z < 100	1.20	1.50	1.70	2.00	2.40
Heavy shock load	Z < 10	1.20	1.50	1.70	2.00	2.40
	10 < Z < 30	1.30	1.60	1.80	2.10	2.60
	30 < Z < 100	1.40	1.75	2.00	2.30	2.80

It's a coefficient that represents the severity of the application. This factor takes into account, although approximately, the type of load the gearbox operates with, the specific duty cycle as well as the operating daily hours.

The table (A4) is of reference when determining the appropriate service factor for the application.

$$F_{h1} = (n_1 \times h) \quad (8)$$

$$F_{h2} = (n_2 \times h) \quad (9)$$

## 13 LIFE FACTOR $F_{h1}$ , $F_{h2}$

Factor resulting by multiplying angular speed at input ( $n_1$ ) or output ( $n_2$ ) by actual operating working hours h, break times excluded.

Life factor is directly proportional to gearbox rpms during the whole duty time



## 14 PRODUCT SELECTION

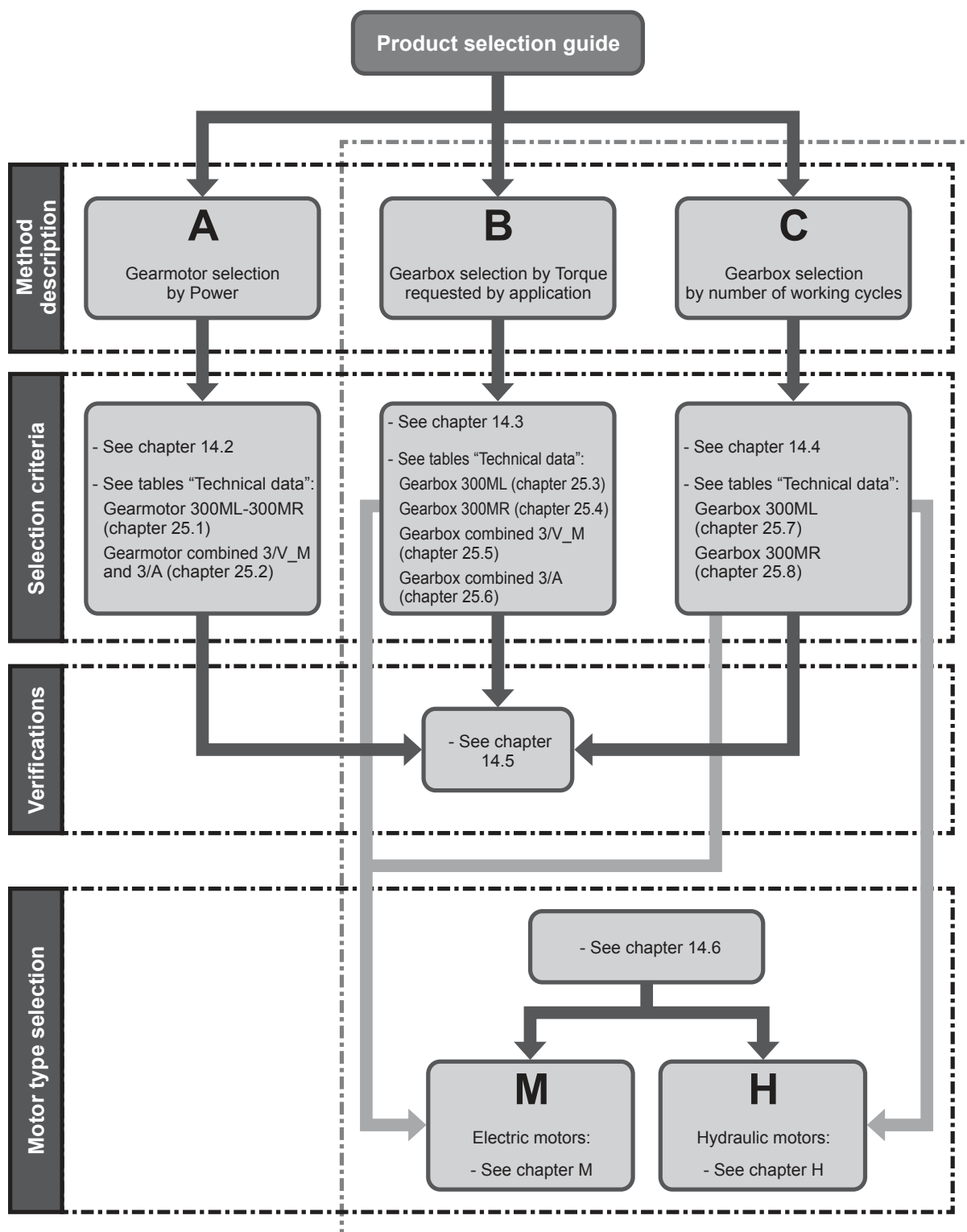
Bonfiglioli Forever Forward		TECHNICAL DATA REQUIRED FOR THE SELECTION OF 300M				Nr:	
						Date:	
						Rev_	
						Date:	
<b>A ) GENERAL DATA</b>							
#	1	Company / Customer					
#	2	Contact					
#	3	Branch / Distributor					
#	4	Order quantity					
#	5	Delivery time					
<b>B<sub>1</sub>) ELECTRIC MOTOR</b>			<b>B<sub>2</sub>) HYDRAULIC MOTOR</b>				
#	6	Motor Type					
#	7	P <sub>n1</sub>	Rated motor Power	[kW]	V	Displacement	[cm <sup>3</sup> ]
#	8	P <sub>r1</sub>	Motor power demand	[kW]	Δp	Max drop of pressure	[bar]
#	9	n <sub>1</sub>	Input speed	[min <sup>-1</sup> ]	Q	Max oil flow rate	[l/min]
#	10	Pole number					
#	11	Motor mounting: B3 - B5 - B14					
<b>C<sub>1</sub>) PLANETARY GEARBOX</b>			<b>C<sub>2</sub>) ATEX CONDITION [ GROUP II ] -2014/34/EU</b>				
#	12	Gearbox configuration					
#	13	i	Gear ratio	Category: [2=standard / 3=special]			
#	14	n <sub>2</sub>	Output speed	[min <sup>-1</sup> ]	Atmosphere: [G=gas / D=dust]		
#	15	M <sub>r2</sub>	Output torque demand	[Nm]	Zone: [1 - 21 / 2 - 22]		
#	16	M <sub>p2</sub>	Peak torque demand	[Nm]	Temperature Class [T4 / 135 °C]		
#	17	f <sub>s</sub>	Service factor demand				
#	18	Rotation of the output shaft [frontal view ]:		<b>CW</b>	<b>CCW</b>		
#	19	L <sub>10H</sub>	Bearings lifetime	[h]			
#	20	Gears lifetime		[h]			
#	21	SF <sub>min</sub>	Safety for tooth root stress	standard reference (ISO preferred)			
#	22	SH <sub>min</sub>	Safety for flank pressure	standard reference (ISO preferred)			
<b>D ) ADDITIONAL LOADS</b>							
#	23	R <sub>c2</sub>	Radial load on output shaft	[N]			
#	24	x <sub>2</sub>	Load application distance from shaft shoulder	[mm]			
#	26	R <sub>c1</sub>	Radial load on input shaft	[N]			
#	27	x <sub>1</sub>	Load application distance from shaft shoulder	[mm]			
#	29	A <sub>n2</sub>	Thrust load on output shaft (+ / -)	[N]			
#	30	A <sub>n1</sub>	Thrust load on input shaft (+ / -)	[N]			
<b>E ) APPLICATION</b>							
#	31	Type of application					
#	32	Duty cycle		Time phase %	Time phase hours	Gearbox output torque [Nm]	
						Gearbox output speed [min <sup>-1</sup> ]	
#	33	Notes about Duty Cycle:					
		Duty type		<b>S1</b>	<b>S2</b>	<b>S3</b>	
						<b>S4-S8</b>	
#	34	v <sub>A</sub>	Ambient air velocity	[m/s]	≤ 0.5	> 0.5 ≤ 1.4	
#	35	t <sub>a</sub>	Ambient temperature range	[°C]			
#	36	Altitude a.s.l.		[m]			
#	37	Rating according FEM class		T-	L-	M-	
<b>F ) OPTIONS OR ADDITIONAL REQUESTS</b>							
#	38	Lubrication					
#	39	Supplementary cooling systems					
#	40	Paint coating					
#	41	To specific requests for testing					
<b>G ) NOTES</b>							
#	42	Notes and additional Customer requirements:					
#	43	PRJ number if present for Special Gearbox					

# Mandatory for the selection

The form, duly filled in, can be forwarded to our Technical Service which will assist the Customer in selecting the most suitable drive for the specific application.



## 14,1 PRODUCT SELECTION GUIDE



### NOTE:

The selection criteria and specifications reported in this catalogue are not valid for every and each application, including those where the gearbox operates as a safety device preventing injury to persons or damage to objects, as is the case with hoisting equipment.

For these applications, the gearbox should be selected according to specific criteria and in compliance with the applicable safety regulations. Should this be the case we recommend that you seek advice from BONFIGLIOLI Technical Service.



For the selection of gear units in ATEX configuration, see also the specific chapter on page 486.

## 14.2 METHOD A (Gearbox selection by power)

Based on application type, it should be defined :

a) Required service factor  $f_S'$  (see tab A4);

b) Required drive power:

$$P_{r1} = \frac{M_{r2} \times n_2}{9550 \times \eta_d} \quad (10)$$

Table (A3) lists the indicative values of efficiency  $\eta_d$  for the different types of gearboxes.

c) After required power  $P_{r1}$  and output speed  $n_2$  are known, locate the gearmotor rating charts and select the one relevant to normalized power  $P_n$  equal to or greater than  $P_{r1}$ :

$$P_n \geq P_{r1} \quad (11)$$

Unless otherwise specified, power  $P_n$  listed in the motor rating chart refers to continuous duty S1. For motors operating in conditions other than S1, determine type of duty according to CEI 2-3/IEC 60034-1 standards.

Note that for duty cycles from S2 to S8 and motor frame sizes up to 132 included, power may be upgraded over that specified for continuous duty. In this event, the condition to be verified is the following:

$$P_n = \frac{P_{r1}}{f_m} \quad (12)$$

The adjusting factor  $f_m$  can be obtained from table (A5).

	DUTY						Please contact us
	S2			S3*			
	Cycle duration			Cyclic duration factor			
	10	30	60	25%	40%	60%	
$f_m$	1.35	1.15	1.05	1.25	1.15	1.1	

\* Cycle time must be equal to or less than 10 minutes. Should this not be the case contact our Technical Service for assistance.

Cyclic duration rate is the relationship of operating time under load  $t_r$  to total cycle time ( $t_f + t_r$ ) where  $t_f$  is time at rest, expressed as a percentage.

Cyclic duration rate:

$$I = \frac{t_r}{t_f + t_r} \times 100 \quad (13)$$



For the output speed  $n_2$ , or closest to, select the gearmotor that yields a service factor  $f_S$  meeting the following condition:

$$f_S \geq f_S' \quad (14)$$



In case of **FP** configuration, please see Verification paragraph (chapter 14.5 - item g) .

### 14,3 METHOD B (Gearbox selection by Torque requested by application)

Based on application type, it should be defined :

a) Required service factor  $f_S'$  (see tab A4);

b) Determine calculated torque according to required output torque  $M_{r2}$  as follows:

$$M_{c2} = M_{r2} \times f_S' \quad (15)$$

c) Determine gear ratio from required output speed  $n_2$  and drive speed  $n_1$ :

$$i = \frac{n_1}{n_2} \quad (16)$$

d) Once  $M_{c2}$  and  $i$  are determined, locate the gearbox rating chart for the drive speed  $n_1$  and select a gearbox featuring the ratio  $i$  nearest to calculated ratio that also satisfies the condition:

$$M_{n2} \geq M_{c2} \quad (17)$$

If a IEC-normalised motor is to be fitted onto the gearbox, check availability of the applicable adapter.



In case of **FP** configuration, please see Verification paragraph (chapter 14.5 - item g) .

### 14,4 METHOD C (Gearbox selection by number of working cycles)

a) Determine the following according to the required application:

- Required service factor  $f_S'$  (see tab. A4)
- required gearbox working life  $h$
- required drive unit (hydraulic, electric or others).

b) Define the calculated torque with the required output torque  $M_{r2}$ :

$$M_{c2} = M_{r2} \times f_S' \quad (18)$$

c) Calculate the life factor with required working life  $h$  and output speed  $n_2$ :

$$Fh_2 = (n_2 \times h) \quad (19)$$



d) Calculate the required reduction ratio:

$$i = \frac{n_1}{n_2} \quad (20)$$

e) Select gearbox size which, having a reduction ratio close to the calculated value, which satisfies the following

$$M_{c2} \leq M_{n2} \quad (21)$$

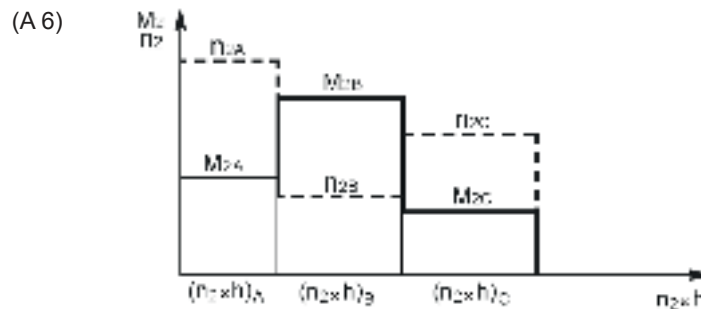
$$Fh_2 \leq (n_2 \times h) \quad (22)$$

where  $M_{n2}$  and  $Fh_2$  are indicated in the tables on technical features for each gearbox size.

In case of applications in which the required torque  $M_{r2}$  and speed  $n_2$  vary within a wide range, best selection could be an equivalent required torque given by:

$$M_{r2} = \sqrt[4]{\frac{(n_2 \times h)_A \times M_A^4 + (n_2 \times h)_B \times M_B^4 + (n_2 \times h)_C \times M_C^4 + \dots}{(n_2 \times h)_A + (n_2 \times h)_B + (n_2 \times h)_C + \dots}} \quad (23)$$

referred to:



and calculating the life factor  $Fh$  with:

$$Fh_{calc} = (n_2 \times h)_A + (n_2 \times h)_B + (n_2 \times h)_C + \dots \quad (24)$$

Then follow the same procedure as specified in d) and e).



In case of **FP** configuration, please see Verification paragraph (chapter 14.5 - item g) .



## 14,5 VERIFICATION

After selecting the drive units, please check the following:

### a) Thermal power

The thermal power  $P_T$  is the maximum power that the gearbox can transmit mechanically, under continuous operation, without the internal temperature rising to a value that could damage the gearbox components.

Base thermal capacities values  $P_{TB}$  are listed in section C and calculated under the following operating conditions:

- Input speed 1500 min<sup>-1</sup> (some exceptions)
- Ambient temperature 20°C
- Foot base with splined or solid keyed shaft
- Horizontal mounting position (A, B, E, F, G, I, J, M)
- Installation in large area (air speed > 1.4 m/s)
- Continuous duty
- Max. installation altitude 1000 m
- Oil ISO VG 320

They are valid for a specific size and gearbox ratio.

Please refer to Bonfiglioli Technical Service:

- For L1 gearbox configuration
- For R2 gearbox configuration, size > 307

Otherwise, for a specific configuration, the total thermal power  $P_T$  can be calculated using the following formula:

$$P_T = P_{TB} \times f_{out} \times f_{Tamb} \times f_{speed} \times f_{pos} \times f_{input V} \times f_{air} \times f_{id} \times f_{nb} \quad (25)$$

Where:

$P_T$  = overall thermal power

$P_{TB}$  = Base thermal power

$f_{out}$  = factor depends on output version

$f_{Tamb}$  = factor for ambient temperature 40°C

$f_{speed}$  = factor for specific input speed (1800, 1200, 1000 min<sup>-1</sup>)

$f_{pos}$  = factor for vertical mounting position (T, O, Q, V)

$f_{input V}$  = factor for solid input shaft if present (apply only for size  $\geq 309$ )

$f_{air}$  = factor for installation in confined space (air speed  $\leq 1.4$  m/s)

$f_{id}$  = factor for intermittent duty

$f_{nb}$  = factor for negative multidisc brake (if present)

The specific factors are listed in the tables below.

The total thermal power obtained from this calculation must be greater than the  $P_{r1}$  (required input power).

$$P_T \geq P_{r1} \quad (26)$$

For specific configuration or application data different from the standard, please refer to Bonfiglioli Technical Service.



## 17 STORAGE

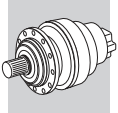
Observe the following instructions to ensure correct storage of delivered products:

- a) Do not store outdoors, in areas exposed to weather or with excessive humidity.
- b) Always place boards, wood, or other material between the products and the floor. The gearbox should not have direct contact with the floor.
- c) For storage periods of over 60 days, all machined surfaces such as flanges, shafts and couplings must be protected with a suitable anti-oxidation product.
- d) In the cases of long-term storage defined in the order phase with the optional choice of SLM or SLP (see specific chapter for cases and times), the appropriate technical requirements are given in the User Manual available on [www.bonfiglioli.com](http://www.bonfiglioli.com). To guarantee times, conditions and extensions, contact the Bonfiglioli Assistance Center available on the company website.

## 18 SUPPLY CONDITIONS

Gearboxes are supplied as follows:

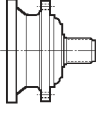
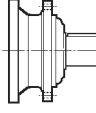
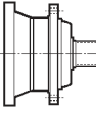
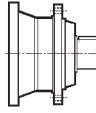
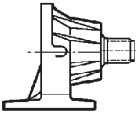
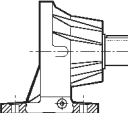


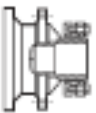
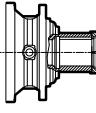
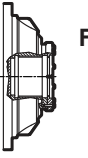
- a) arranged for installation in the mounting position specified in the purchase order;
- b) Unlubricated. Inner parts are protected by a film of the oil used for testing purpose;
- c) when no specific protection class is requested, the surfaces of gearboxes are protected to at least corrosivity class C2 (UNI EN ISO 12944-2), realized with a grey antioxidant water-based primer Ral 7042. Mating surface are not coated .
- d) tested to factory specifications;
- e) suitably packed;
- f) complete with mounting hardware for IEC electric or hydraulic motors;
- g) gearboxes lubricated “for life” are factory filled with oil.



**19 300M GEARBOX DESIGNATION**

**3 11M L 2 16.7 HZ**

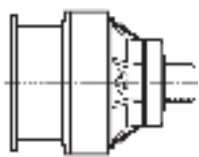
**OUTPUT VERSION**

	<b>MZ:</b> Splined male shaft		<b>MC:</b> Solid keyed shaft
	<b>HZ:</b> Heavy duty splined male shaft		<b>HC:</b> Heavy duty solid keyed shaft
	<b>PZ:</b> Foot base with splined shaft		<b>PC:</b> Foot base with solid keyed shaft
	<b>FZ / FZB:</b> Hollow splined shaft		<b>VK:</b> Reinforced output with heavy duty keyed shaft for stirrers and mixer
	<b>FP:</b> Hollow shaft for shrink disc		
	<b>FDK:</b> Hollow shaft with double keyway		<b>FZP:</b> Hollow splined shaft with axial blockage device (recommended for shaft mounted installation)

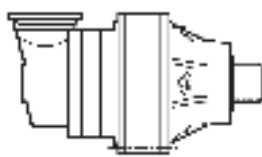
Reduction ratio  
 Fill in the value of the transm. ratio (including point and decimals) reported in the selection charts  
 Es. : 1/5.33 = 5.33    1/44.6 = 44.6    1/131 = 131

**No. OF REDUCTIONS**  
**1, 2, 3, 4**

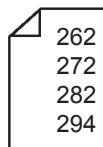
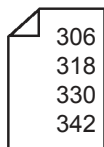
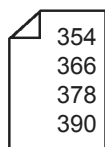
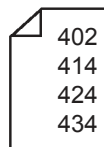

**DESIGN**  
**L = Linear**



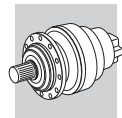
**R = Right angle**



**GEARBOX SIZE**

<b>00</b> = 300	 262	<b>05</b> = 305	 306	<b>10M</b> = 310M	 354	<b>15M</b> = 315M	 402	<b>19</b> = 319	 444
<b>01</b> = 301	272	<b>06</b> = 306	318	<b>11M</b> = 311M	366	<b>16M</b> = 316M	414	<b>21</b> = 321	454
<b>03</b> = 303	282	<b>07</b> = 307	330	<b>13M</b> = 313M	378	<b>17M</b> = 317M	424	<b>23</b> = 323	464
<b>04</b> = 304	294	<b>09</b> = 309	342	<b>14M</b> = 314M	390	<b>18M</b> = 318M	434	<b>25</b> = 325	468

**SERIES**



# 6A S5EC A A W0A ... ..

## OPTIONS

GASKET  
STANDARD = NBR  
PV = Fluoro elastomer  
(☉ hydraulic inputs )

ONLY FOR RIGHT ANGLE DESIGN  
preferential input direction of rotation

RA = left   
RO = right 32

LUBRICATION  
LM (SHELL OMALA S4 WE 320)  
LH (SHELL OMALA S4 WE 150)  
(☉ Hydraulic inputs )

SURFACE PROTECTION 43  
C2 (default), C3, C4

PAINTING 43  
RAL7042 (default), RAL5010,  
RAL9005, RAL9006, RAL9010

CERTIFICATES 45  
AC, CC

SUPPLEMENTARY COOLING SYSTEM 26  
CR1, CR2, CR3

## OUTPUT FITTINGS

P... = Pinions B0A = Splined bar M0A = Sleeve coupling G0A = Shrink disc W0A = Flange disc

MOTOR FLANGE ORIENTATION 477

MOUNTING POSITION 45

## INPUT

Without motor adaptor

V9AA	V9AC	V9AE	V9AG	V9AL
V9AB	V9AD	V9AF	V9AH	

Input keyed shaft

V01A	V01B	V05B	V06B	V07A	V07B	V10B	V11B	V15B
diam.	Ø24	Ø38	Ø48	Ø60	Ø60	Ø80	Ø80	Ø120

Solid input shaft with fan

FV05B	FV06B	FV07A	FV07B	FV10B	FV11B
diam.	Ø48	Ø60	Ø60	Ø80	Ø80

Electric motor connection  
P+IEC (P71...P250)

PF160	PF180	PF200	PF225	PF250
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\* For version R and for mounting positions T and V

Integrated gearmotor with in-built compact electric motor (available up to size 307) **S2, S3, S4**

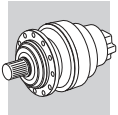
Hydraulic motor adapter with European standard flange **S5AP, COAA, HOBA, ...** 478  
For motors with U.S.-type flange  
(☉ PV-LM-LH option )

Hydraulic motor MG 487  
(☉ PV option )

## ONLY WITH HYDRAULIC MOTOR ADAPTOR

Standard negative multidisc brake 477  
6 = Type : 4, 5, 6  
A = Braking torque : A, B, C, ...

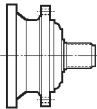
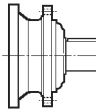
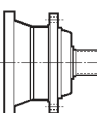
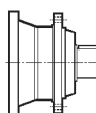
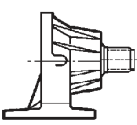
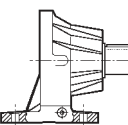

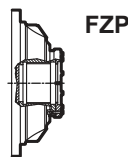

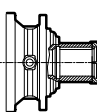
Negative multidisc brake for MG hydraulic motor 493  
SF = Without brake



20 3/V\_M GEARBOX DESIGNATION

**3/V 10M L 3 1617 PC**

OUTPUT VERSION

	<b>MZ:</b> Splined male shaft		<b>MC:</b> Solid keyed shaft
	<b>HZ:</b> Heavy duty splined male shaft		<b>HC:</b> Heavy duty solid keyed shaft
	<b>PZ:</b> Foot base with splined shaft		<b>PC:</b> Foot base with solid keyed shaft
	<b>FZ / FZB:</b> Hollow splined shaft		<b>FZP:</b> Hollow splined shaft with axial blockage device (recommended for shaft mounted installation)
	<b>FP:</b> Hollow shaft for shrink disc		
	<b>FDK:</b> Hollow shaft with double keyway		

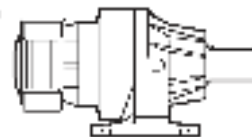
REDUCTION RATIO

Fill in the value of the transm. ratio reported in the selection charts  
Es. : 1/773 = 773

No. OF REDUCTIONS  
**3, 4**

DESIGN

**L** = Combined 300M unit,  
2 or 3 planetary stages + worm gear units

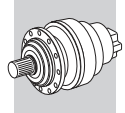


GEARBOX SIZE

<b>00</b> = 3/V 00	266	<b>05</b> = 3/V 05	310	<b>10M</b> = 3/V 10M	358	<b>15M</b> = 3/V 15M	406	<b>19</b> = 3/V 19	448
<b>01</b> = 3/V 01	276	<b>06</b> = 3/V 06	322	<b>11M</b> = 3/V 11M	370	<b>16M</b> = 3/V 16M	418	<b>21</b> = 3/V 21	458
<b>03</b> = 3/V 03	286	<b>07</b> = 3/V 07	334	<b>13M</b> = 3/V 13M	382	<b>17M</b> = 3/V 17M	428		
<b>04</b> = 3/V 04	298	<b>09</b> = 3/V 09	346	<b>14M</b> = 3/V 14M	394	<b>18M</b> = 3/V 18M	438		

SERIES


Combined 300M gearboxes / Worm gear units





# P80 B5 AF W0A ...

## OPTIONS

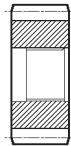
GASKET  
STANDARD = NBR  
**PV** = Fluoro elastomer

SURFACE PROTECTION  
**C2** (default), **C3**, **C4** 

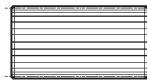
PAINTING  
**RAL7042** (default), **RAL5010**,  
**RAL9005**, **RAL9006**, **RAL9010** 

CERTIFICATES  
**AC**, **CC** 

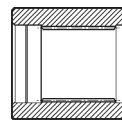
## OUTPUT FITTINGS



**P...** = Pinions



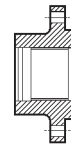
**B0A** = Splined bar




**M0A** = Sleeve coupling



**G0A** = Shrink disc

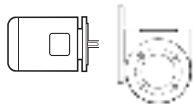


**W0A** = Flange

MOUNTING POSITION 

DESIGN  
**B5**, **B14**

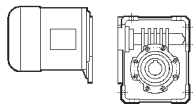
## ENTRATA



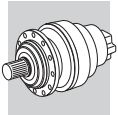
Electric motor connection **P+IEC** (P63...P180)



Input keyed shaft **HS**

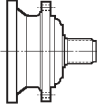
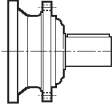
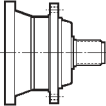
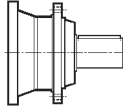
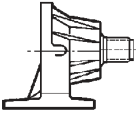
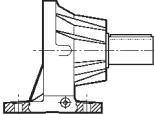

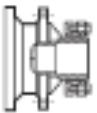
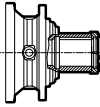


Integrated gearmotor with in-built compact electric motor **S1**, **S2**, **S3**



**3/A 06 L 2 69.9 PC**

OUTPUT VERSION

	<b>MZ:</b> Splined male shaft		<b>MC:</b> Solid keyed shaft
	<b>HZ:</b> Heavy duty splined male shaft		<b>HC:</b> Heavy duty solid keyed shaft
	<b>PZ:</b> Foot base with splined shaft		<b>PC:</b> Foot base with solid keyed shaft
	<b>FZ / FZB:</b> Hollow splined shaft		
	<b>FP:</b> Hollow shaft for shrink disc		
	<b>FDK:</b> Hollow shaft with double keyway		

REDUCTION RATIO

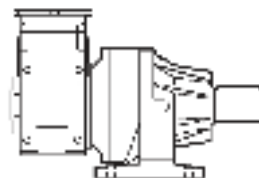
Fill in the value of the transm. ratio reported in the selection charts  
 Es. : 1/19.4 = 19.4    1/175 = 175

No. OF REDUCTIONS

**2**

DESIGN

**L** = Combined 300 unit,  
 1 planetary stages + A helical bevel units



GEARBOX SIZE

- 00** = 3/A 00 (300+A10)
- 01** = 3/A 01 (301+A20)
- 03** = 3/A 03 (303+A30)
- 04** = 3/A 04 (304+A41)

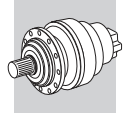
267
277
287
299

- 05** = 3/A 05 (305+A41)
- 06** = 3/A 06 (306+A50)
- 07** = 3/A 07 (307+A60)

311
323
335

SERIES

Combined 300 gearboxes / A series helical bevel gear units



# S4 EF WOA ...

## OPTIONS

GASKET  
STANDARD = NBR  
**PV** = Fluoro elastomer

SURFACE  
PROTECTION  
**C2** (default), **C3**, **C4**



PAINTING  
**RAL7042** (default), **RAL5010**,  
**RAL9005**, **RAL9006**, **RAL9010**



CERTIFICATES  
**AC**, **CC**



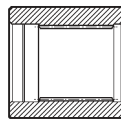
## OUTPUT FITTINGS



**P...** = Pinions



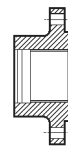
**B0A** = Splined  
bar



**M0A** = Sleeve  
coupling



**G0A** = Shrink  
disc



**W0A** = Flange

## MOUNTING POSITION

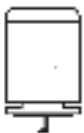


## INPUT



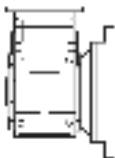
Integrated gearmotor with in-built  
compact electric motor

**S2, S3, S4**



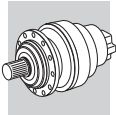
Electric motor connection

**P+IEC** (P63...P180)

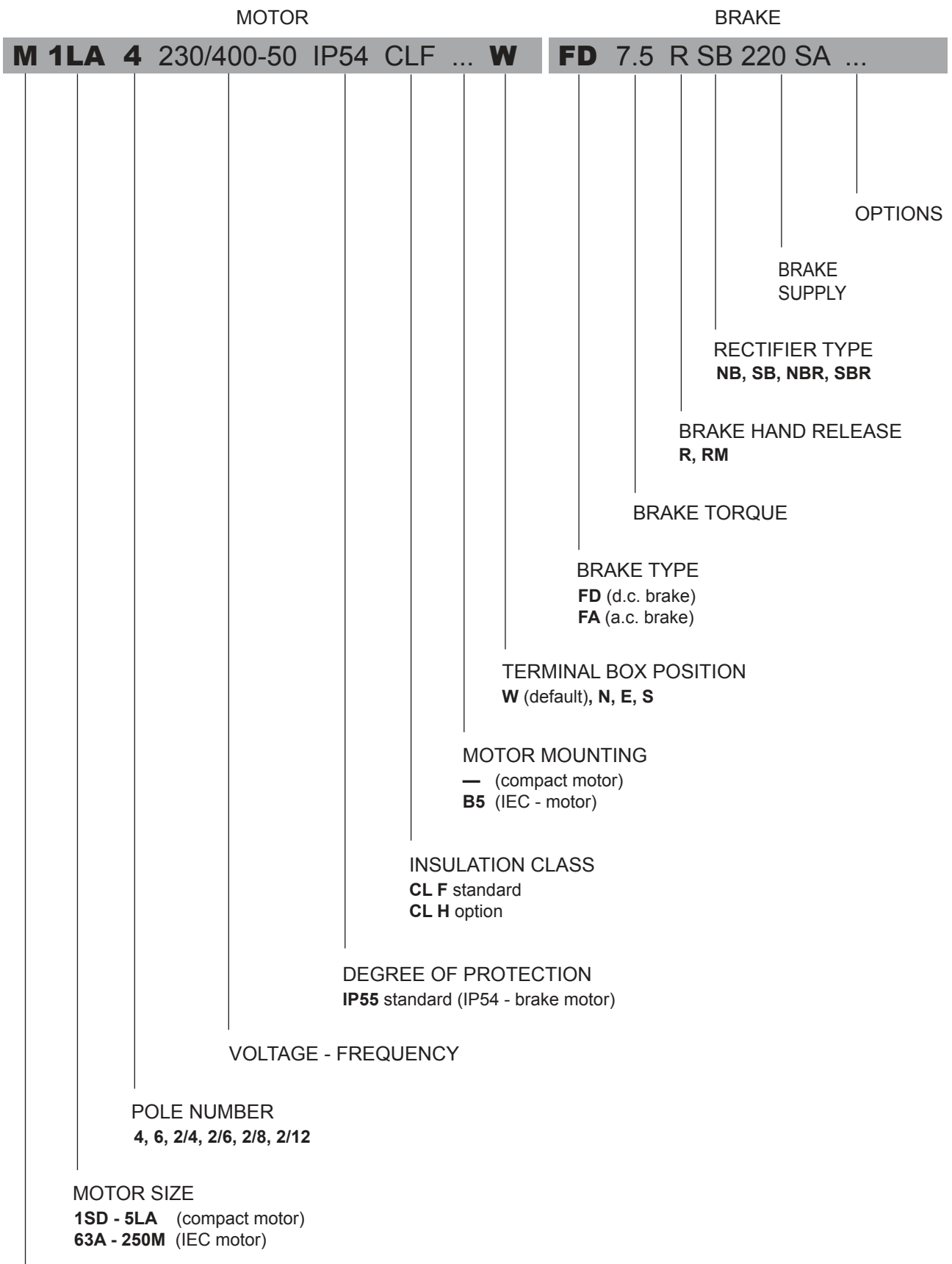


Input keyed shaft

**HS**



## 22 MOTOR DESIGNATION

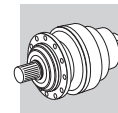


### MOTOR TYPE

**MX-MXN** = compact 3-phase, class IE3  
**BX-BXN** = IEC 3-phase, class IE3

**ME** = compact 3-phase, class IE2  
**BE** = IEC 3-phase, class IE2

**M** = compact 3-phase, class IE1  
**BN** = IEC 3-phase, class IE1



## 23 ADDITIONAL OPTIONS

### 23.1 SURFACE PROTECTION

When no specific protection class is requested, the surfaces of gearboxes are protected to at least corrosivity class C2 (UNI EN ISO 12944-2). For improved resistance to atmospheric corrosion, gearboxes can be delivered with C3 and C4 surface protection, obtained by painting the complete gearbox.

<b>SURFACE PROTECTION</b>	Typical environments	Maximum surface temperature	Corrosivity class according to UNI EN ISO 12944-2
<b>C3</b>	Urban and industrial environments with up to 100% relative humidity (medium air pollution)	120°C	C3
<b>C4</b>	Industrial areas, coastal areas, chemical plant, with up to 100% relative humidity (high air pollution)	120°C	C4

Gearboxes with optional protection to class C3 or C4 are available in a choice of colours. If no specific colour is requested (see the “PAINTING” option) gearboxes are finished in RAL 7042. Gearboxes can also be supplied with surface protection for corrosivity class C5 according to UNI EN ISO 12944-2. Contact our Technical Service for further details.

### 23.2 PAINTING

Gearboxes with optional protection to class C3 or C4 are available in the colours listed in the following table.

<b>PAINTING</b>	Farbe	RAL number
<b>RAL7042*</b>	Traffik Grey A	7042
<b>RAL5010</b>	Gentian Blue	5010
<b>RAL9005</b>	Jet Black	9005
<b>RAL9006</b>	White Aluminium	9006
<b>RAL9010</b>	Pure White	9010
<b>RAL7035</b>	Light Grey	7035
<b>RAL7001</b>	Silver Grey	7001
<b>RAL5015</b>	Sky Blue	5015
<b>RAL7037</b>	Dusty Grey	7037
<b>RAL5024</b>	Pastel Blue	5024

\* Gearboxes are supplied in this standard colour if no other colour is specified.

NOTE – “PAINTING” options can only be specified in conjunction with “SURFACE PROTECTION” options.