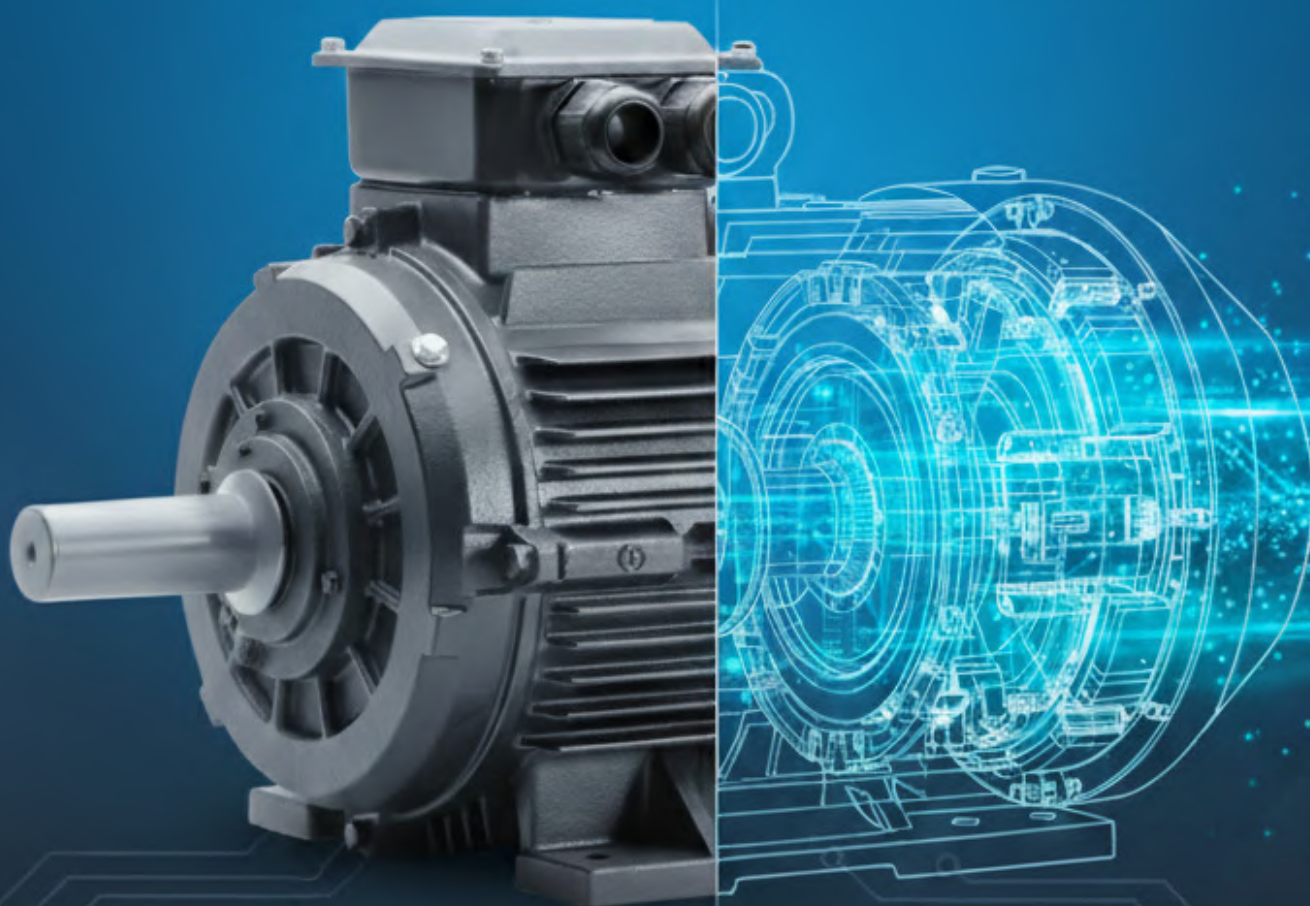




# ELECTRIC MOTORS

*FRAME SIZES, DESIGNS  
AND MOUNTING*



**IE1 IE2 IE3 IE4**

## FRAME SIZES AND DIMENSIONS (IEC 60072-1)

The dimensional and mechanical characteristics of electric motors are defined and standardized internationally by the International Electrotechnical Commission (IEC).

The main reference standards are:

- IEC 60034-7 = construction and mounting classification (IM codes)
- IEC 60072-1 = definition of mechanical dimensions and IEC frame sizes

These standards ensure design uniformity and full interchangeability between different manufacturers, allowing a motor to be replaced with an equivalent model without modifying the existing mechanical installation.

### Objectives of the standard:

- ✓ Interchangeability between manufacturers
- ✓ Motor-gearbox compatibility
- ✓ Technical standardization at global level

The IEC standard defines the motor's mechanical frame size and all key dimensions: shaft height, shaft extension, flanges, and mounting holes.

These parameters are standardized for each frame size and ensure interchangeability between manufacturers.

The IEC frame size is based on the "H" dimension, which is the shaft height from the mounting surface to the center of the shaft, expressed in millimeters.

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For each frame size, the following parameters are defined:

- H - Shaft height (the main reference parameter)
- D - Motor shaft diameter
- E - Shaft extension length (or usable shaft length)
- Dimensions and position of the coupling flanges
- Center-to-center distance and configuration of the mounting holes

For the same shaft height (H), the motor frame can be manufactured in different lengths, identified by the following suffixes:

- S (Short) - short frame, lower power rating
- M (Medium) - medium frame, standard power rating
- L (Long) - long frame, higher power rating

Example: IEC 90M indicates a shaft height of 90 mm and a medium frame; a longer frame allows for higher power output.

The following table shows the standardized dimensions for the most common IEC frame sizes.

IEC size	H (mm) Axle Height	D (mm) Ø Shaft	E (mm) Shaft Length
56	56	9	20
63	63	11	23
71	71	14	30
80	80	19	40
90S	90	24	50
90L	90	24	50
100L	100	28	60
112M	112	28	60
132S	132	38	80
132M	132	38	80
160M	160	42	110
160L	160	42	110
180M	180	48	110
200L	200	55	110
225M	225	60	140

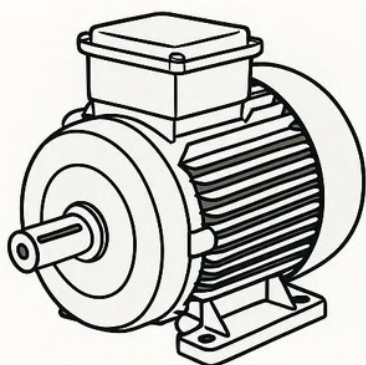
## MOUNTING CONFIGURATIONS AND DESIGNS (IEC 60034-7)

The **mounting configurations** define the method by which the motor is installed and secured to the driven machine or gear unit.

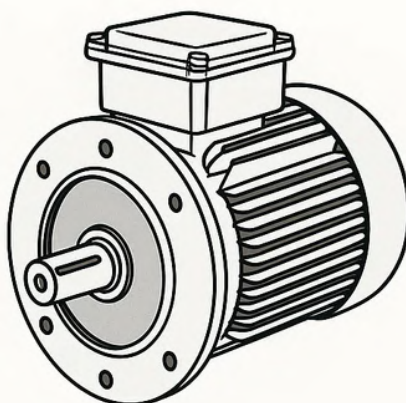
These are identified by the **IM (International Mounting)** code, followed by an alphanumeric string that describes the mechanical configuration.

The most common versions are **B3**, **B5** e **B14**.

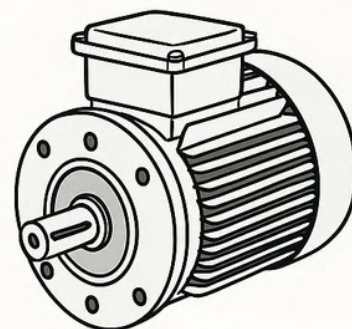
**B3**



**B5**



**B14**





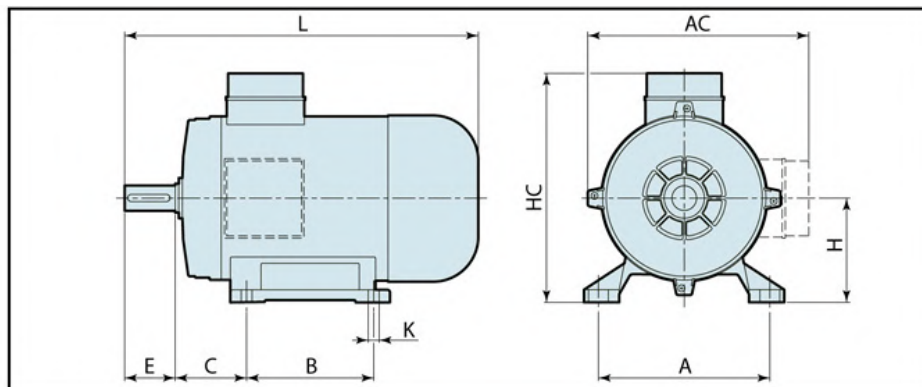
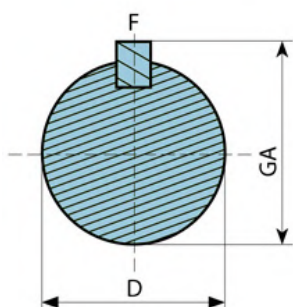
## B3 – FOOT MOUNTING

Traditional configuration with feet integrated into the frame base. The motor is secured to a baseplate using bolts passing through the holes in the feet.

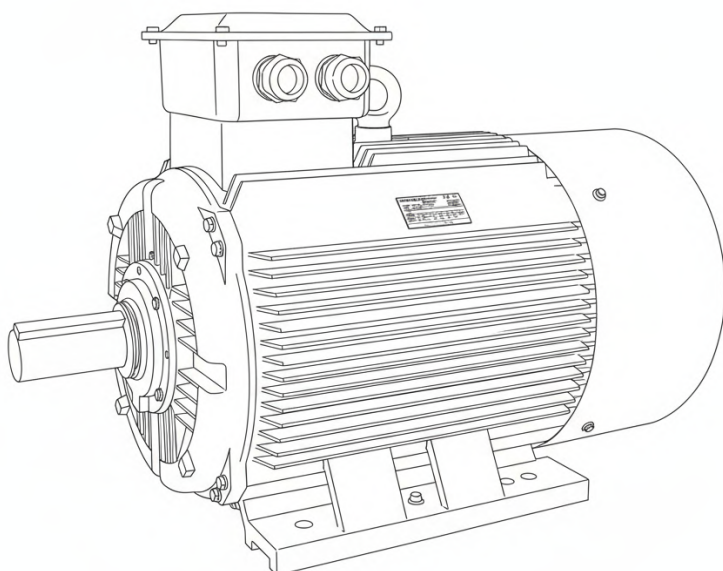
### Key features:

- Base mounting via integrated feet
- Standard horizontal mounting
- Critical dimensions: foot hole centers and shaft height
- Typical applications: pumps, fans, conveyor belts, transmissions with couplings or pulleys

### B3



TIPO	ALBERO - SHAFT				FLANGIA - FLANGE						GENERALI - FRAME									
FRAME	D	E	F	GA	M	N	P	S	T	LA	A	AC	AD	B	C	H	HC	L	K	
63	11	23	4	12,5							100	158		80	40	63	163	202	7	
71	14	30	5	16							112	176		90	45	71	180	245	7	
80	19	40	6	21,5							125	217		100	50	80	205	278	9,5	
90S	24	50	8	27							140	238		100	56	90	220	305	9,5	
90L	24	50	8	27							140	238		125	56	90	220	330	9,5	
100L	28	60	8	31							160	255		140	63	100	240	368	12	
112M	28	60	8	31							190	266		140	70	112	265	388	12	
132S	38	80	10	41							216	326		140	89	132	320	448	12	
132M	38	80	10	41							216	326		178	89	132	320	486	12	
160M	42	110	12	45							254	360		210	108	160	410	600	14,5	



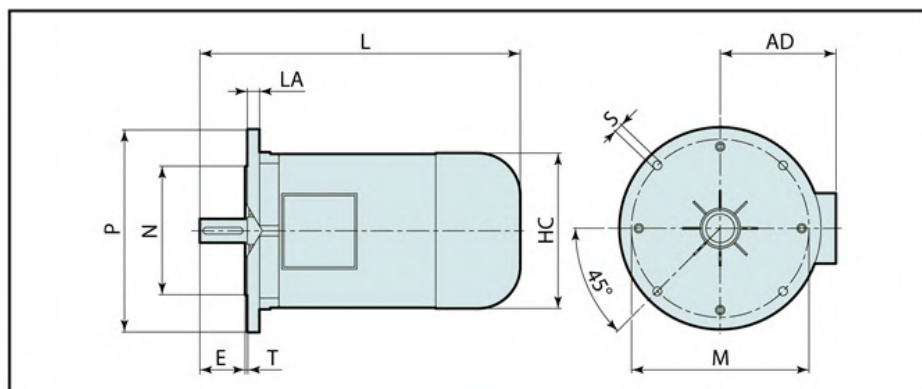
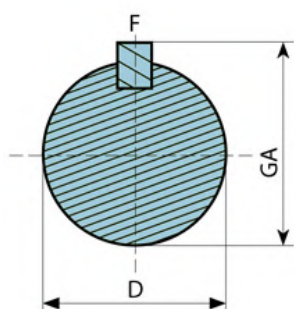
## B5 – LARGE FLANGE

Motor equipped with a front flange featuring through holes for mounting. The flange diameter is larger than the motor frame, ensuring high robustness and rigidity.

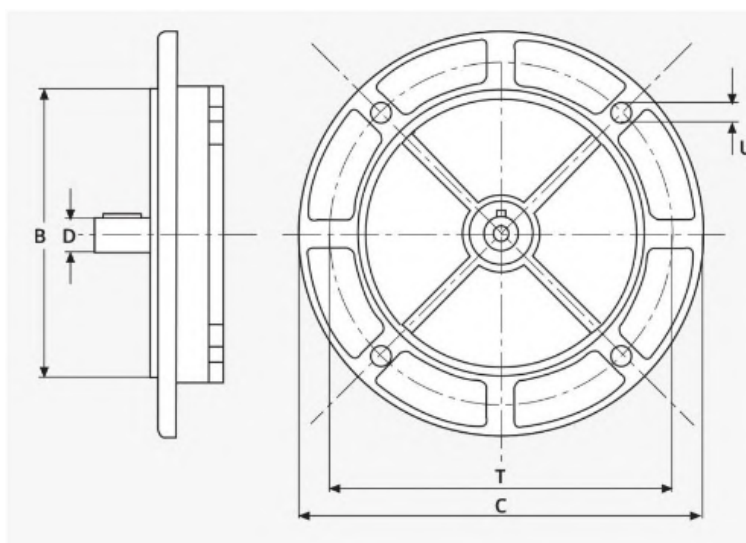
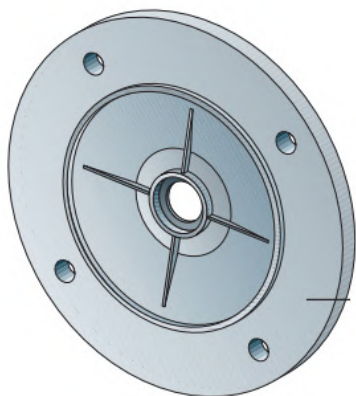
### Key features:

- Flange with through holes
- Flange diameter larger than the frame diameter
- High structural rigidity
- Typical use: direct coupling to medium and large-sized gear units

## B5



TIPO	ALBERO - SHAFT				FLANGIA - FLANGE						GENERALI - FRAME								
FRAME	D	E	F	GA	M	N	P	S	T	LA	A	AC	AD	B	C	H	HC	L	K
63	11	23	4	12,5	115	95	140	9	3	9			97				124	202	
71	14	30	5	16	130	110	160	9	3,5	9			107				140	245	
80	19	40	6	21,5	165	130	200	11	3,5	13			140				158	278	
90S	24	50	8	27	165	130	200	11	3,5	13			150				173	305	
90L	24	50	8	27	165	130	200	11	3,5	13			150				173	330	
100L	28	60	8	31	215	180	250	13	4	13			159				196	368	
112M	28	60	8	31	215	180	250	13	4	13			170				222	388	
132S	38	80	10	41	265	230	300	13	4	20			196				260	448	
132M	38	80	10	41	265	230	300	13	4	20			196				260	486	
160M	42	110	12	45	300	250	350	18	5	20			245				310	600	



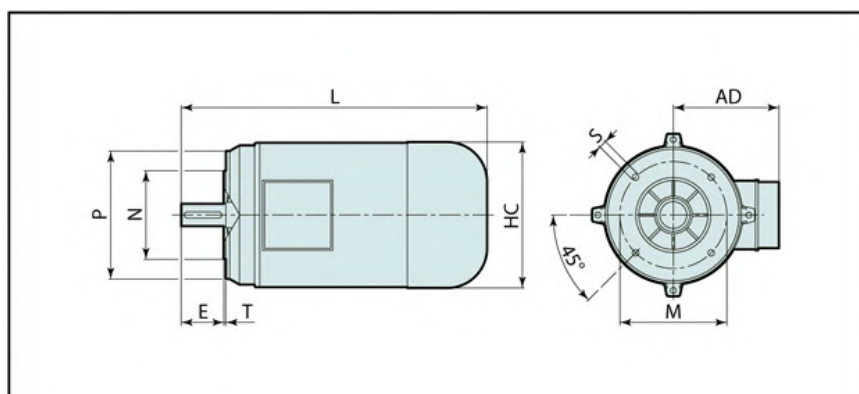
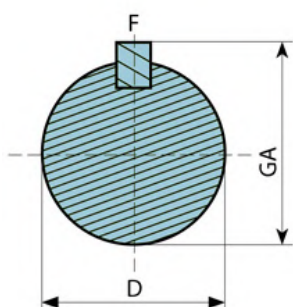
## B14 – SMALL FLANGE

Motor equipped with a compact front flange featuring tapped (threaded) holes. The flange is generally integrated into the frame or designed with a reduced diameter for compact applications.

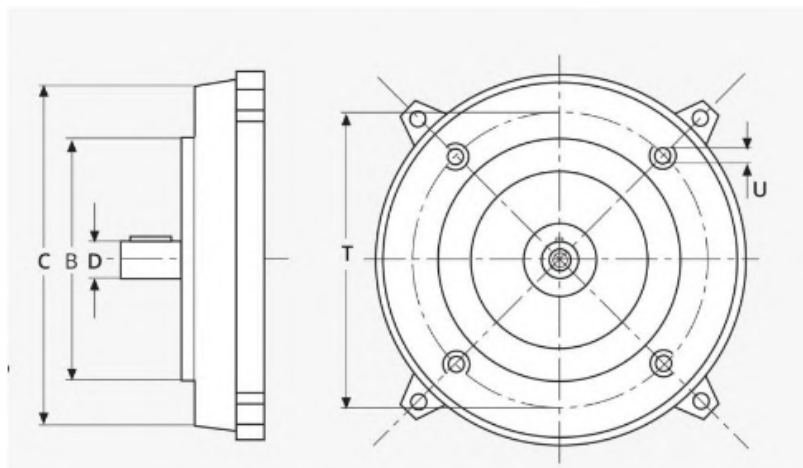
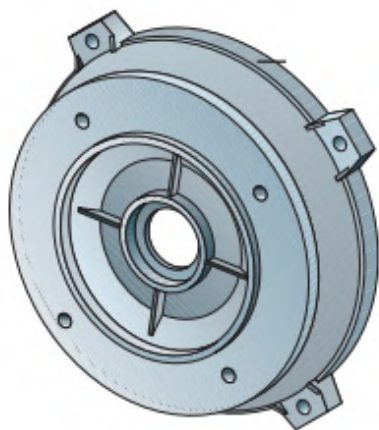
### Key features:

- Compact flange with tapped holes
- Reduced external diameter
- Compact overall dimensions (reduced footprint)
- Typical applications: compact gear units and installations with limited space

## B14



TIPO FRAME	ALBERO - SHAFT				FLANGIA - FLANGE						GENERALI - FRAME								
	D	E	F	GA	M	N	P	S	T	LA	A	AC	AD	B	C	H	HC	L	K
63	11	23	4	12,5	75	60	90	M5	2,5	11			97				124	202	
71	14	30	5	16	85	70	105	M6	2,5	11			107				140	245	
80	19	40	6	21,5	100	80	120	M6	3	12			140				158	278	
90S	24	50	8	27	115	95	140	M8	3	14			150				179	305	
90L	24	50	8	27	115	95	140	M8	3	14			150				179	330	
100L	28	60	8	31	130	110	160	M8	3,5	16			159				196	368	
112M	28	60	8	31	130	110	160	M8	3,5	16			170				222	384	
132S	38	80	10	41	165	130	200	M10	4	18			196				260	446	
132M	38	80	10	41	165	130	200	M10	4	18			196				260	486	
160MR	38	80	10	41	165	130	200	M10	4				245				310	570	
160M	42	110	12	45	215	180	250	M12	4				245				310	600	





PAM motor Interface frame refers to the standardized mechanical interface on the gear unit's input side, specifically designed for direct coupling with standard IEC electric motors.

The PAM acts as the "geometric mate" for the motor flange and shaft. It serves as a precision-fit housing for the motor, ensuring:

- Direct coupling without external joints
- Perfect coaxiality between motor and gear unit
- Maximum torsional rigidity
- Plug-and-play installation

To ensure a correct and functional assembly, the gear unit's PAM **MUST EXACTLY** match the electric motor's configuration.

- ✓ IEC MOTOR FRAME SIZE = PAM GEARBOX SIZE
- ✓ MATCHING FLANGE TYPE (B5 WITH B5, B14 WITH B14)



### Examples of correct coupling:

- IEC 90 B5 Motor = PAM 90 B5 Gear Unit
- IEC 80 B14 Motor = PAM 80 B14 Gear Unit
- IEC 112 B5 Motor = PAM 112 B5 Gear Unit

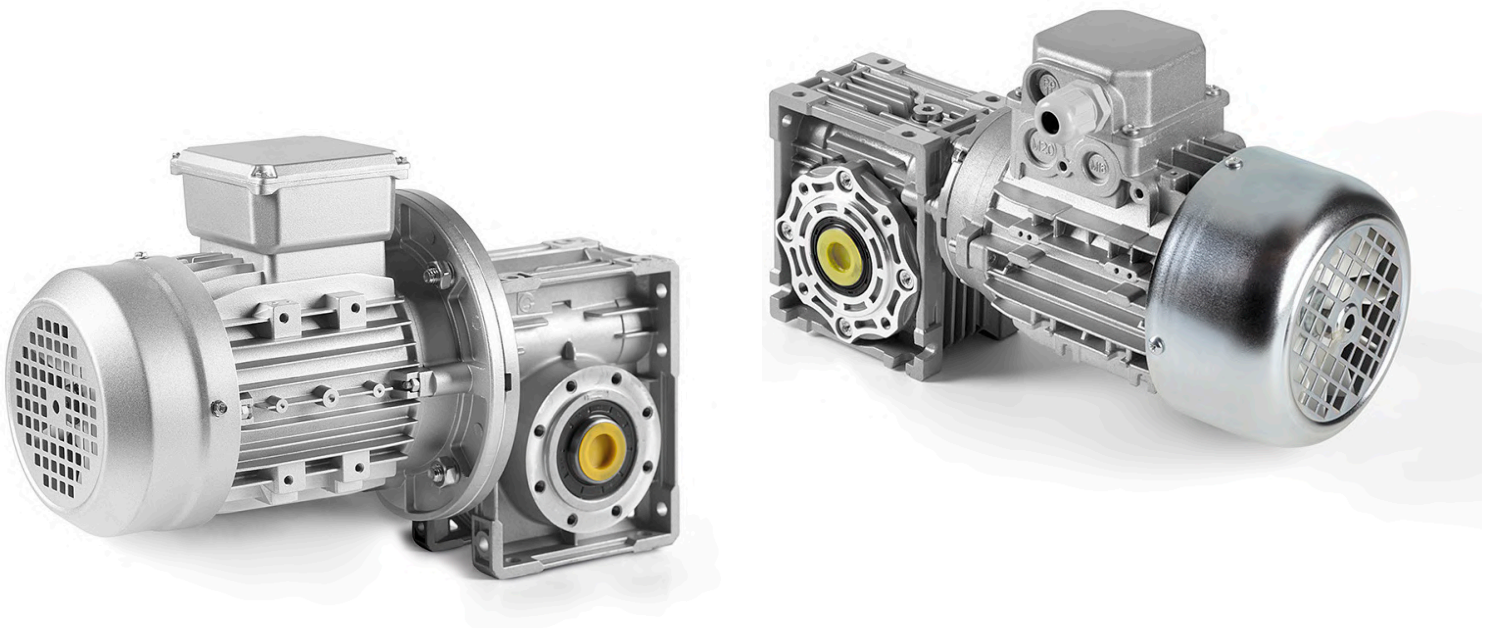
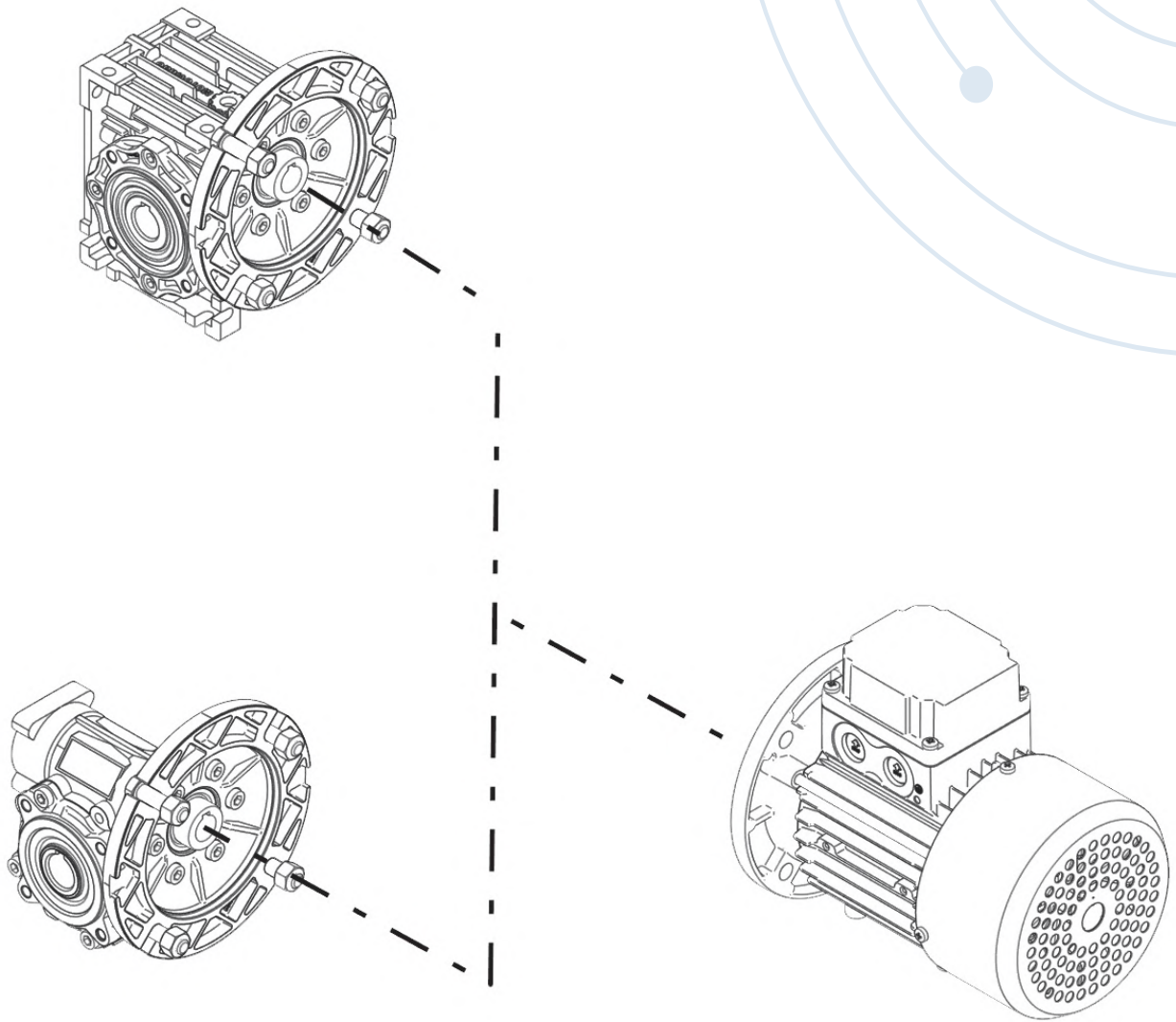


**IMPORTANT: B5 and B14 flanges are NOT interchangeable. Always verify that the motor flange type matches the gear unit interface.**

To ensure a correct and secure coupling between the motor and the gear unit, it is necessary to verify the compatibility of three fundamental parameters:

- 1 MECHANICAL FRAME SIZE (Shaft Height H)**  
The motor's IEC frame size must match the gear unit's PAM to ensure the compatibility of mechanical dimensions (shaft height, flange, holes).  
Example: IEC 90 = PAM 90 (H = 90 mm)
- 2 SHAFT DIAMETER (D)**  
The motor shaft diameter must match the gear unit's input bore, typically with j6 or k6 tolerances for a controlled fit.  
Verification via micrometer and comparison with PAM data.
- 3 FLANGE GEOMETRY (B5 or B14)**  
The flange type must be identical: B5 and B14 are not compatible, even within the same IEC frame size, as they differ in: flange diameter, hole type, number of holes, and centering ring diameter (spigot diameter).

## PAM MOTOR INTERFACE FRAME





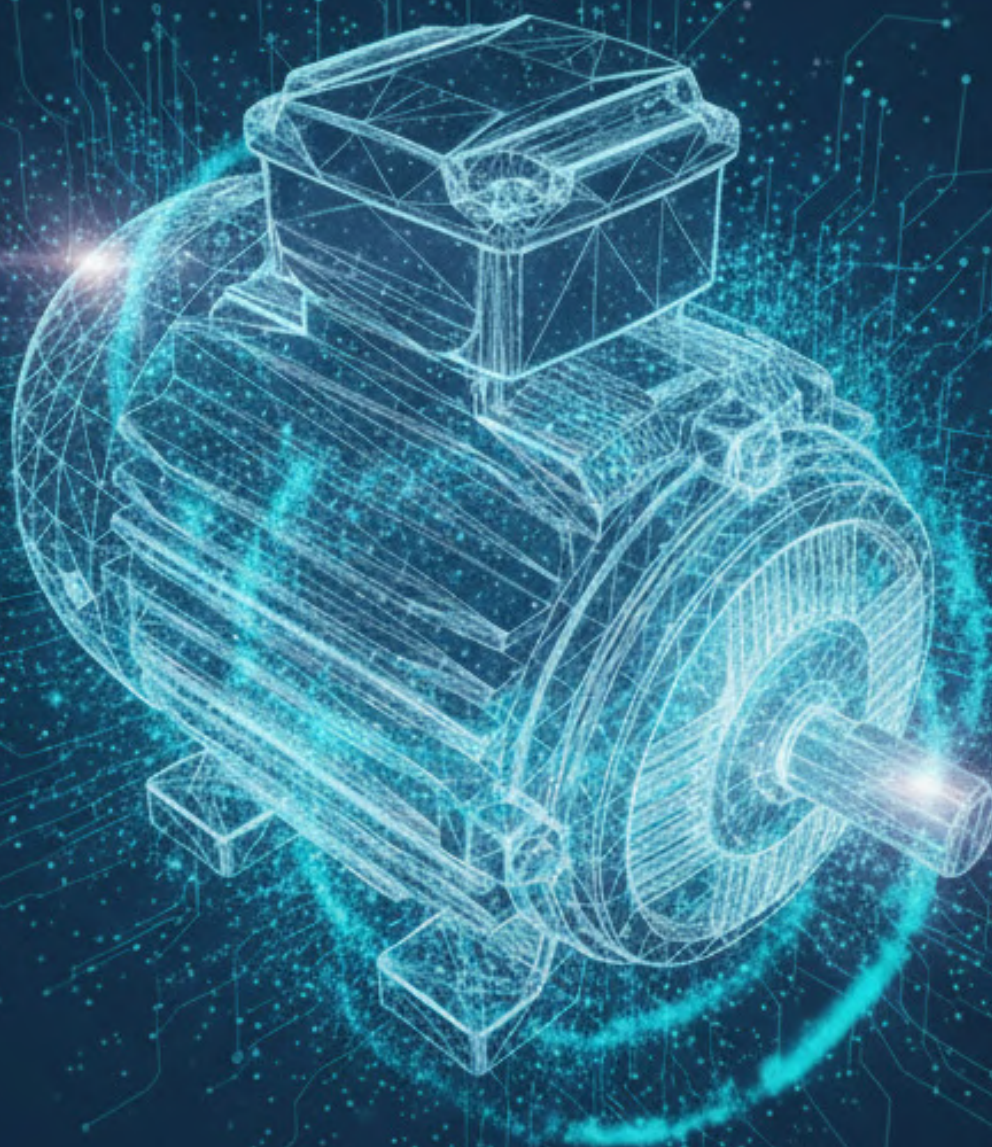


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