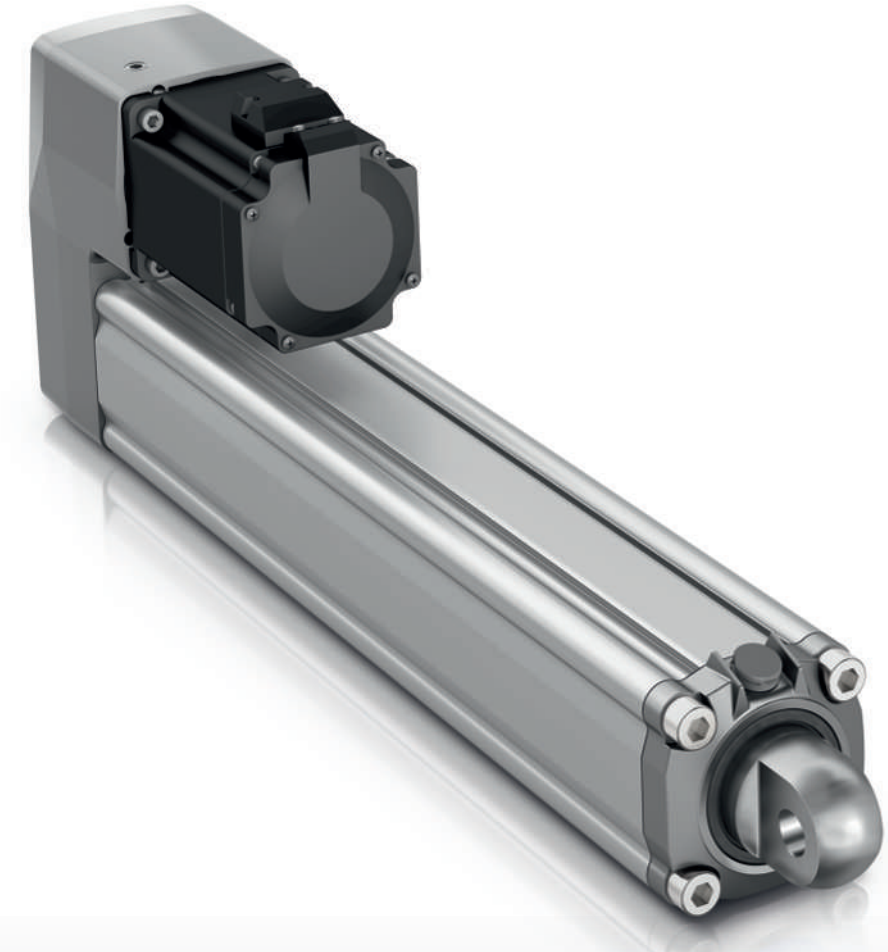


EWELLIX Linear Actuator EMA-80M

Medical

Technical Product Information

We pioneer motion

SCHAEFFLER

Contents

1 EWELLIX linear actuator EMA-80M

The EWELLIX linear actuator EMA-80M is a modular electromechanical linear actuator that has been specially developed for use in medical applications. It replaces hydraulic applications in medical imaging patient tables, offering a compact, energy-efficient, and maintenance-free alternative for demanding motion tasks.

Features

Each component is designed for use in patient tables and meets the medical standard according to IEC 60601-1 for medical electrical equipment.

The following features enable reliable and safe use in medical technology:

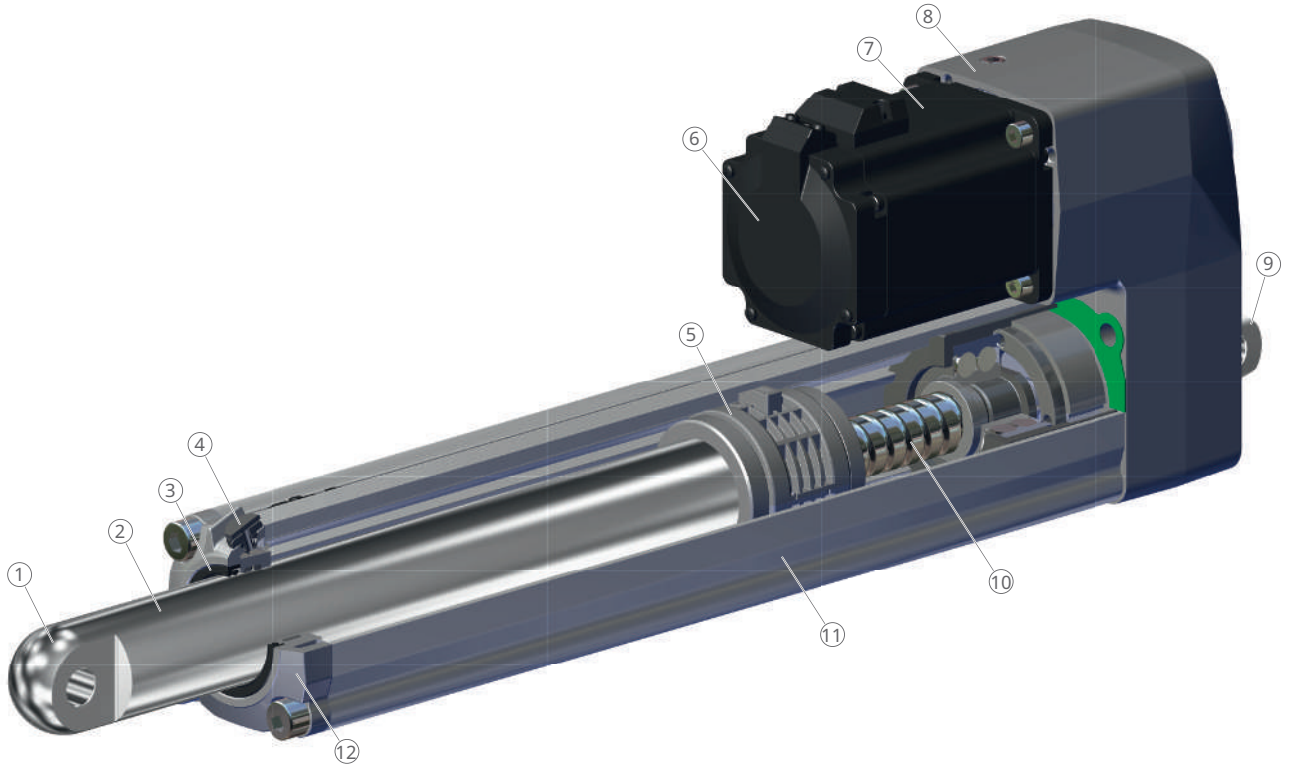
- Linear unit
  - push tube with front attachment
  - ball screw drive with back-up nut
  - precise positioning thanks to encoder
  - sealing system conforms to degree of protection IP65M
- Gearbox
  - three-stage helical gearbox with gear ratio i = 15:1
  - manual override for emergency adjustment in the event of a power failure
- Motor
  - either with DC-motor or AC-motor
  - magnetic, optical or mechanical encoder

Benefits

- optimal lifetime even in the presence of high forces
- precise positioning and repeat accuracy
- compact design with short installation length when retracted
- high static load safety factor and self-locking brake
- high speed and long duty cycle for increased productivity
- smooth, quiet movements

Product assembly

1 Assembly of the linear actuator



1	Front attachment	2	Push tube
3	Sealing	4	Vent plug
5	Threaded nut with back-up nut and magnet	6	Encoder
7	Motor	8	Gearbox
9	Rear attachment	10	Ball screw drive
11	Protection tube	12	Front cover

The interfaces and assemblies have the following functions:

- Front attachment:
  - mechanical connection between the push tube of the drive and the moving part of the application
  - Standard attachment with rod end
- Rear attachment:
  - mechanical connection between the gearbox of the linear actuator and the moving part of the application
  - Standard attachment with rod end
- Encoder:
  - precise motion control and operation monitoring

Screw drive

The linear actuator is equipped with a ball screw drive.

The screw drive converts the rotary motion of the motor into precise and efficient linear motion, ensuring a high load carrying capacity and long lifetime.

Back-up nut

The back-up nut is additionally integrated into the main nut as standard. During normal operation, the back-up nut is not in contact with the ball screw drive. The back-up nut prevents the linear actuator from collapsing if the threaded nut fails. If the back-up nut engages, the linear actuator can no longer be moved.

Once the back-up nut is engaged, the linear actuator must be replaced.

The function of the back-up nut is designed for both load directions.

1.1 Performance overview

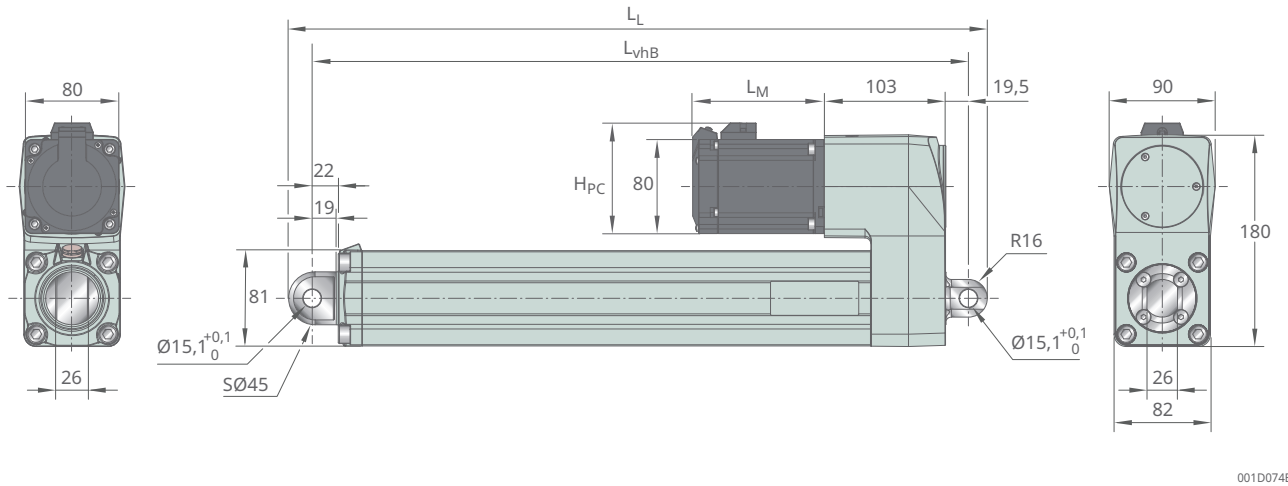
The following table shows the performance data and the mechanical characteristic values of the linear actuator.

1 Performance overview of the EWELLIX linear actuator EMA-80M

Characteristic	Symbol	Unit	Variant DC	Variant AC
Performance data				
max. linear speed	v_{max}	mm/s	25	25
Duty cycle	ED_L	%	20	20
Voltage	–	V	48	220
Power consumption	–	W	750	750
Current consumption	–	A	18.7	5.5
Mechanical data				
Rated push force	–	kN	20	20
Rated pull force	–	kN	20	20
Stroke	S	mm	50 ... 700	50 ... 700
Mass	m	kg	13.2	13.2
Ambient data				
Ambient temperature	–	°C	+10 ... +40	+10 ... +40
Load capacity safety factor	–	–	4	4
Protection code (IP)	–	–	IP65M	IP65M
Medical standard	–	–	IEC 60601-1 ed 3.2	IEC 60601-1 ed 3.2

1.2 Geometric data

2 Linear actuator dimensions



2 Dimensions of linear actuator

Characteristic	Variant DC	Variant AC
H_{PC}	93	89
L_M	90.9 ±1	90.9 ±1
L_{vhB}	H_0 + 258	H_0 + 258
L_L	L_{vhB} + 36	L_{vhB} + 36

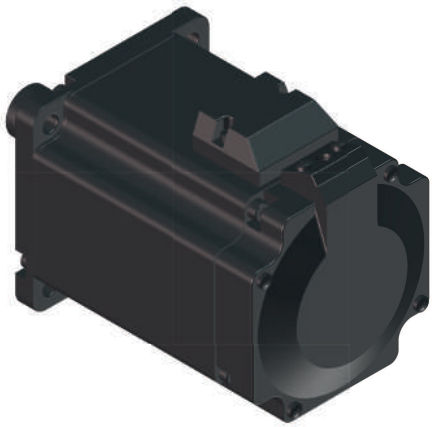
H_0	mm	nominal stroke
H_{PC}	mm	Height of connector
L_L	mm	Length from front attachment to rear attachment
L_M	mm	Length of motor
L_{vhB}	mm	Retracted length

2 Motor

The electric motor is the primary drive element of the linear actuator and converts electrical energy into rotary motion. For the EWELLIX linear actuator EMA-80M, a motor in 2 configuration variants with direct current DC 48 V or alternating current AC 220 V is available.

The alignment relative to the gearbox must be observed when ordering motors.

3 Motor DC 48 V



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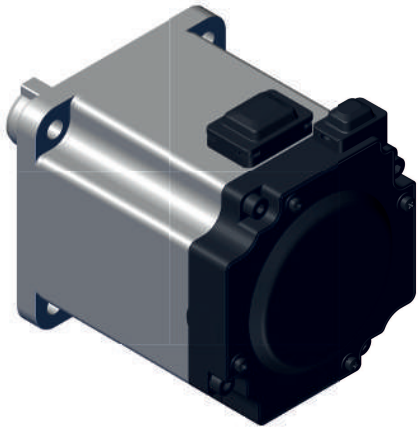
4 Motor AC 220 V



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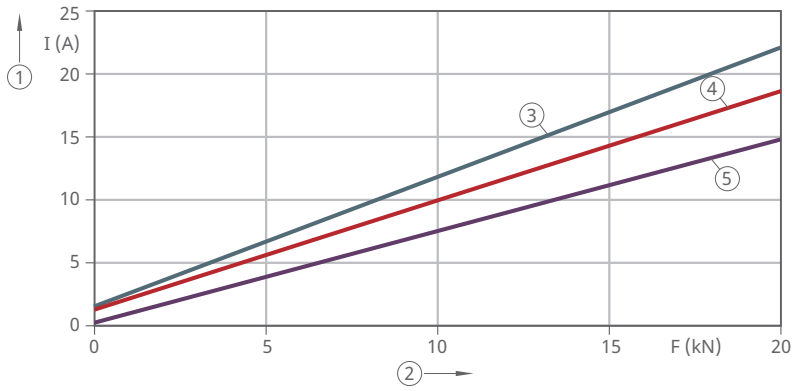
2.1 Diagrams force-current

5 Diagram force-current DC 48 V



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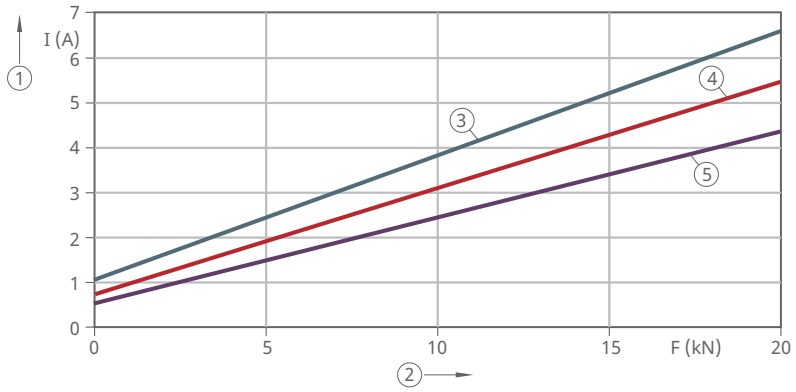
1	Current consumption I	2	Force F
3	I and F at 25 mm/s	4	I and F at 20 mm/s
5	I and F at 15 mm/s		

6 Diagram force-current AC 220 V



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1	Current consumption I	2	Force F
3	I and F at 25 mm/s	4	I and F at 20 mm/s
5	I and F at 15 mm/s		

2.2 Encoder

Depending on the application requirements, various encoders are used for position feedback and speed feedback of the electromagnetic linear actuator to ensure precise control and reliable operation monitoring.

Three different encoders are available for the linear actuator:

- Hall sensor
- Optical rotary encoder
- Mechanical absolute encoder

3 Structure of the ordering designation

3.1 Notes on orientation

Various orientations are available for the linear actuator:

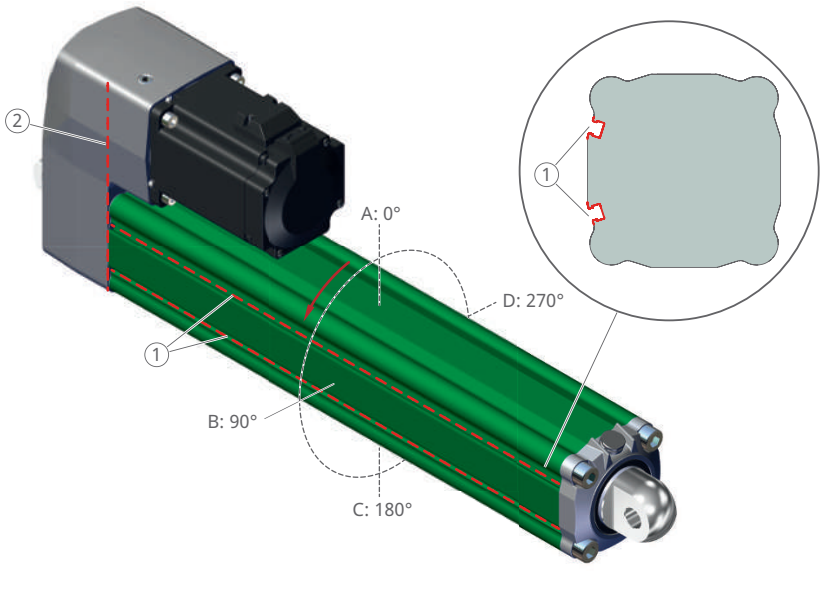
- entire linear unit relative to the gearbox (with vent plug)
- motor relative to the gearbox
- front cover with vent plug relative to the slot

3.1.1 0° reference for the linear unit

The 0° reference for the linear unit is the gearbox.

The linear unit can be rotated in 90° increments.

7 Possible orientation of the linear unit

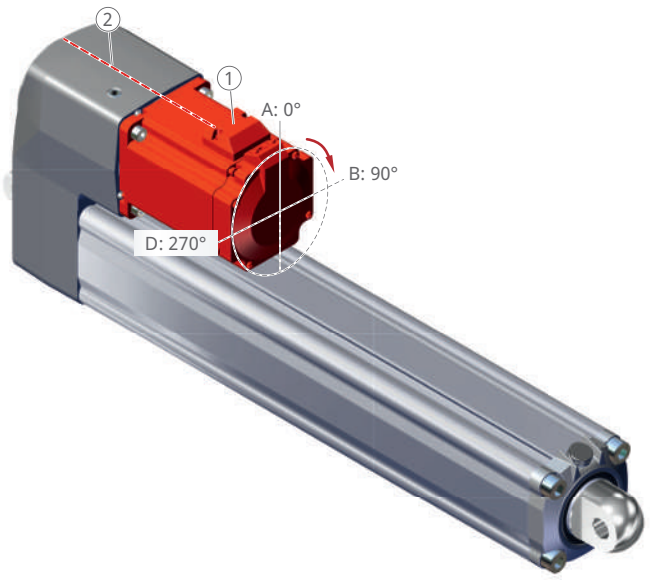


1	Position of the slot	2	Position of the gearbox

3.1.2 0° reference for the motor

The 0° reference for the motor is the gearbox position. The motor can be rotated to the 0° position, 90° position or 270° position. The motor cannot be positioned at 180° due to the location of the connectors.

8 Possible orientation of the motor



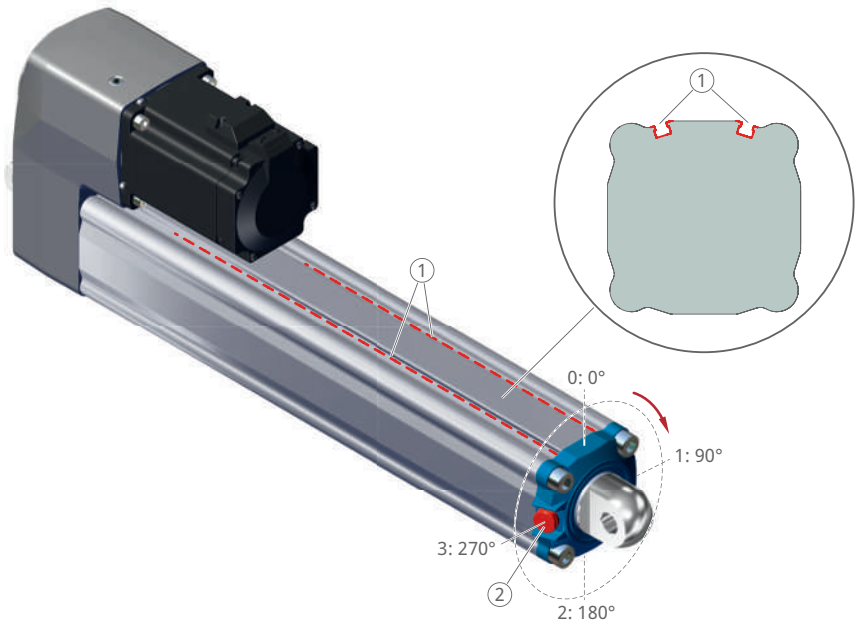
1	Position of the connectors	2	Position of the gearbox

3.1.3 0° reference for front cover with vent plug

The 0° reference for the front cover with vent plug is the slot. The front cover with vent plug can be rotated in 90° increments.

The front cover with vent plug must be protected against water accumulation. The orientation must be selected accordingly.

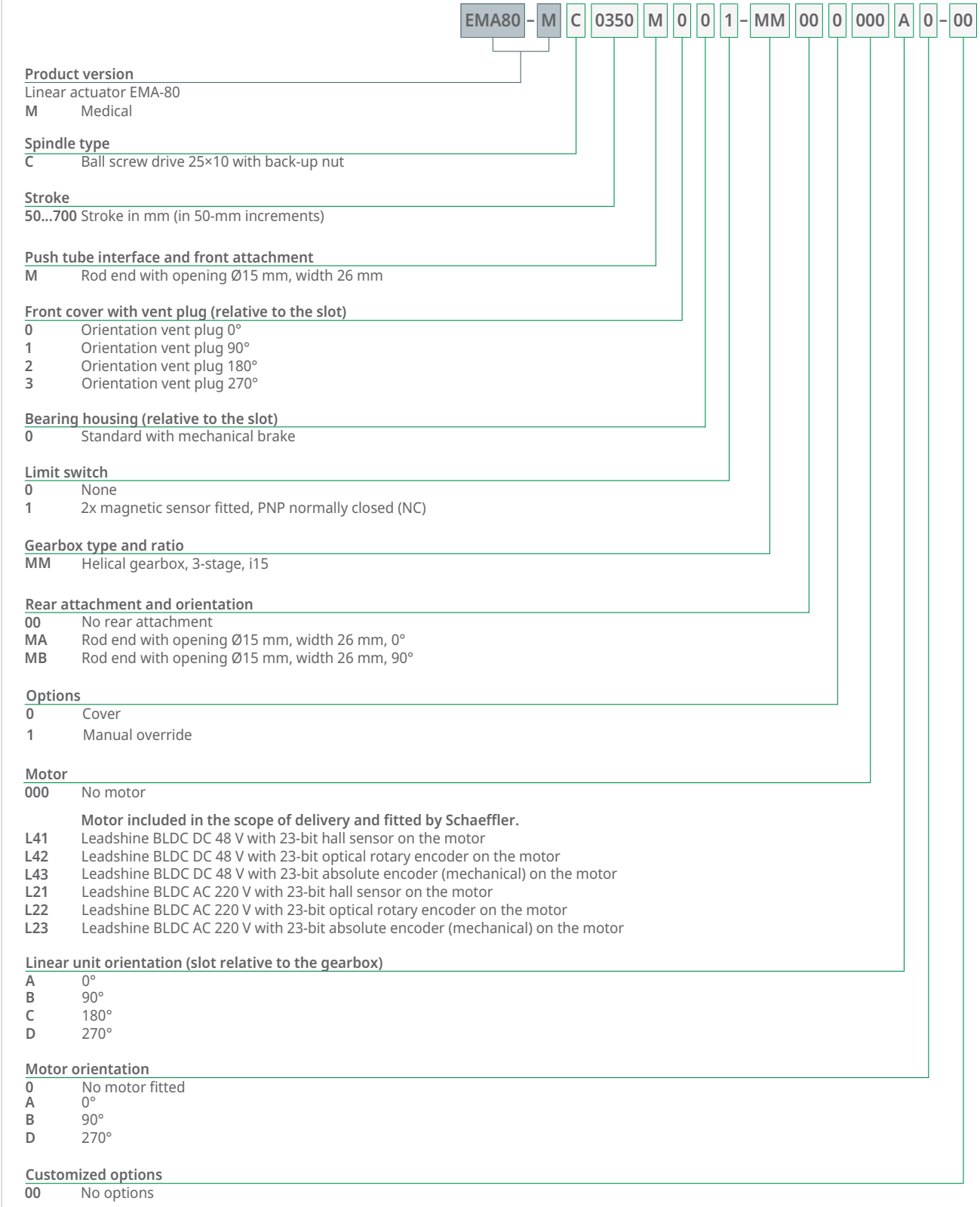
9 Possible orientation of the front cover with vent plug



1	Position of the slot	2	Position of the vent plug

3.2 Ordering designation

10 Ordering designation for linear actuator



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