Morskate®

EXTREME

LA Linear Actuator

For Applications in Ultra-High-Vacuum and Cryogenic Environment

RoHS compliant

CE

Motors for use in vacuum should not only withstand the vacuum (no bursting of air inclusions), they must not contaminate the vacuum either. Through many years of experience with special materials for use in Space, we have put a focus on materials with minimal molecular outgassing and high heat resistance. This is the prerequisite for a high vacuum quality and genuine measurement results in scientific and medical applications.

For exact positioning in vacuum, stepper motors are therefore particularly suitable because they can precisely position even without sensitive feedback providers. Therefore Phytron linear actuators can be used in particularly challenging environmental conditions (radiation, cryo-temperatures).

Since stepper motors do not generate jitter effects while holding a position, this technology is ideal for precisely aligning optical instruments, mirrors, antennas or samples e.g. in high-resolution microscopes, particle accelerators or molecular analysis devices.

Phytron LA linear actuators for cryo (UHVC1;UHVC2) and UHV (UHVS) are completely dry lubricated.

In Focus

high temperature

vacuum

radiation resistance

low temperature

- 2-phase stepper motor
- Diameter 25 mm
- Linear speed 1.5 mm/s
- Linear stroke 13 mm
- Screw pitch 1 mm
- Positioning accuracy <0,01 mm
- Operating temperature
  - Cryo version:
    UHVC1: -196 to -50 °C
    UHVC2: down to -269 °C (on demand)
  - UHV version (UHVS): -40 to +150 °C
- Rotatory encoder with switching cam
- Linear limit switches for stroke limitation
- Temperature evaluation with K-type
- Mounting position: any
- Lifetime (worst case)
  100 000 strokes min.

Options

- VGPL precision planetary gear

Highlight

Cleanliness

Phytron motors for use in ultra high vacuum (UHV) contain only materials that also meet the requirements of the ECSS (European Space regulations). Thus, each material has a maximum TML (Total Mass Loss) value < 1% and a maximum CVCM (Volatile Mass Losses) value < 0.1 %. You will receive your UHV motor, double-wrapped and vacuum sealed..

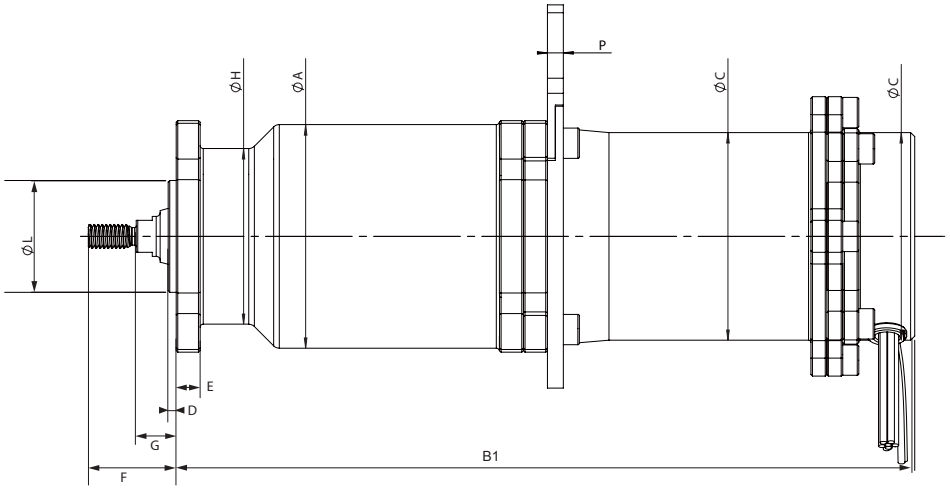
Extreme

Vacuum Classes

	Winding temperature [°C]	Vacum class [hPa]	Thermocouple	Radiation-resistant up to [J/kg]	Conditioning of the components	First outgas-sing at phytron	TML [%]	CVCM [%]
UHVS solid lubrication	-40...+150	10^{-11}	K type	10^6	yes	yes	<1	<0.1
UHVC1 [1) 2)] Cryo 1 solid lubrication	-196...-50[1)]	10^{-11}	K type	10^6	yes	– [2)]	–	–
UHVC2 [1)2)] Cryo 2 solid lubrication	-269...-50[1)]	10^{-11}	K type	10^6	yes	– [2)]	–	–

[1)] Short-term tests at room temperature are possible [2)] First outgassing is optional

Linear Actuator LA 25.200.x-y-z

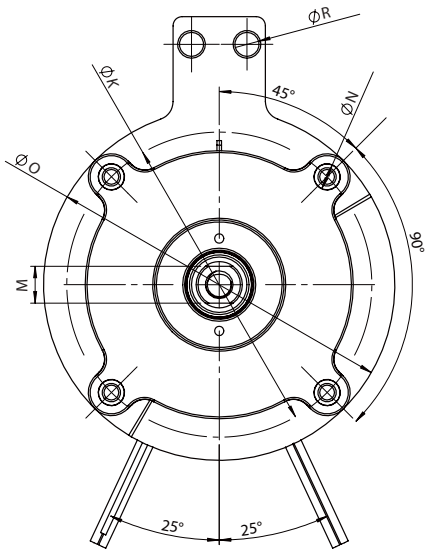


Dimensions / Electrical and Mechanical Characteristics

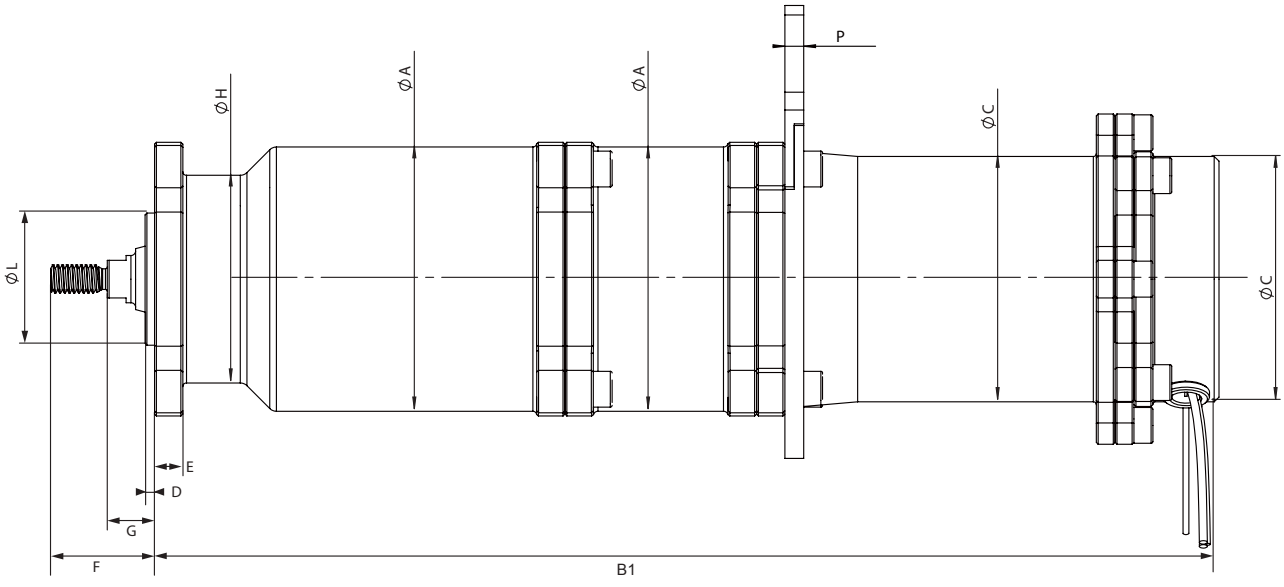
LA Standard 200-steps 4 lead parallel	Electrical Characteristics					Mechanical Characteristics				Dimensions in mm														
	Current/ Phase I_N [2)]	Rresistance/ Phase	Inductivity/ Phase	max. operating voltage	AWG	mass	force max.	max. spped	max. frequency (full step)															
	A	Ω	mH	V_{DC}		kg	N	mm/s	Hz	A	B1	C	D	E	F	G	H	K	L[1)]	M	N	O	P	R
25.200.1.2	1.2	1.1	0.475	24	26	0.23	10	1.5	300	28	92.5	26	1	3	11...24	5	22	33	14	4	2.8	38	2	2.6

[1)] Tolerance ±0.02 [2)]rated current: at UHVS: 1.2 A; at UHVC1 and UHVC2: 1.5 A
All values given above refer to room temperature and atmospheric pressure.

Linear Actuator LA 25.200.x-y-z Front View



Linear Actuator LA 25.200.x-y-z with Gear



Dimensions

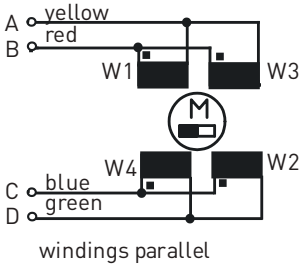
Gear	Stepper motor size	Gear stage	Force max. [N]	Speed max. [mm/s]	Frequency max. [Hz] (full step)	Dimensions in mm													Mass
						A	B1	C	D	E	F	G	H	K	L	M	N	O	P	(motor and gear) [kg]
VGPL 22	25	5:1	30	0.3	300	28	112.8	26	1	3	11...24	5	22	33	14	4	2.8	38	2	0.320

Extreme

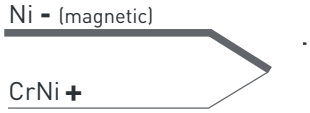
Motor Connection

4-lead

bipolar
control



Stepper motor connection



Thermocouple connection

Wire length: 500 mm

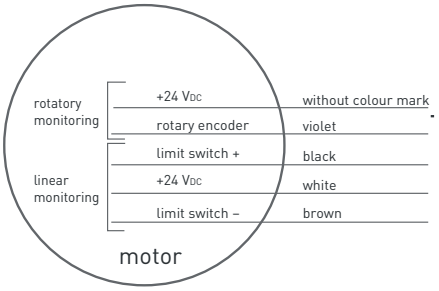
Control Electronics for Vacuum Application: *phy*MOTION™

Modular stepper motor controller for in-vacuum applications

EPICS

The *phy*MOTION™ controller is ideally equipped for the demands of in-vacuum projects. Beside the encoder evaluation (differential incremental encoder with quadrature signals, absolute encoder acc. to SSI standard, BiSS- and EnDat-encoder) a resolver and thermocouple evaluation of each axis is possible for monitoring of the driven motors. This functions can be integrated as optional submodules of each axis – in addition to the default limit switch evaluations of each axis. The better part of cabling effort is eliminated because the power stages are already integrated.

Limit Switch Connection

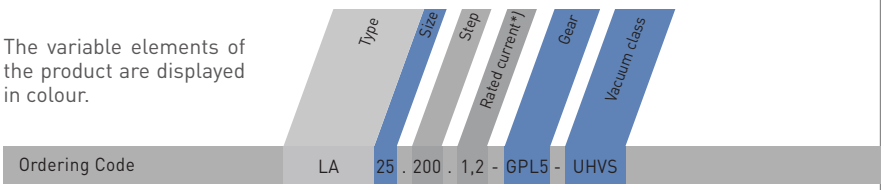


The limit switches are used to monitor the stroke limitation. The offset can be set with the switching cam as a rotatory encoder.

All illustrations, descriptions and technical specifications are subject to modifications; no responsibility is accepted for the accuracy of this information.

Ordering Code

The variable elements of the product are displayed in colour.



Options		
Size	25	Other sizes in progress
Gear	GPL5 –	VGPL22.1 precision planetary gear 5:1 no gear
Vacuum class	UHVS UHVC1 UHVC2	Ultra high vacuum dry coated bearing Ultra high vacuum cryo temperature down to liquid Nitrogen **On demand:** Ultra high vacuum cryo temperature down to liquid Helium

*) Rated current: at UHVS: 1.2 A
at UHVC1 and UHVC2: 1.5 A

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Any questions? Please contact us.

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