

Electric cylinders DNCE-LAS, with linear motor



Electric cylinders DNCE-LAS, with linear motor

Key features

FESTO

At a glance

Characteristics

- Linear motor axis with piston rod
- The electric cylinder consists of a freely positionable linear motor, integrated displacement encoder with magnetic strip, reference switch and plain bearings
- Enables positioning with very high dynamic response. Accelerations of up to 125 m/s^2 are possible without load
- Mechanical interfaces are largely compatible with the standard cylinder DNC
- Together with the motor controller SFC-LACI and the associated cables, it is a quickly commissioned positioning system for small loads

Range of applications

- Positioning of small loads such as:
 - placing small parts into and removing small parts from magazines
 - sorting parts quickly
 - for equipping and assembly processes

Everything from a single source

Electric cylinder
DNCE-LAS

→ 3



Motor controller
SFC-LACI

→ Internet: sfc-laci

The electric cylinder DNCE-LAS and motor controller SFC-LACI form one unit.

- Thanks to protection class IP54, the SFC can be mounted close to the DNCE, either:
 - via central supports or
 - via H-rail
 - Just two cables are required between the electric cylinder DNCE and motor controller SFC (motor and encoder cable)
 - The motor controller SFC is available with or without control panel
 - Up to 31 positioning records
- Parameterisation via:
- Control panel:
 - suitable for simple position sequences

Parameterisation via:

- FCT (Festo Configuration Tool) configuration package:
 - via RS 232 interface
 - Windows-based PC user interface, Festo Configuration Tool
- Easy actuation via:
 - I/O interface
 - Profibus
 - CANopen, incl. “interpolated position mode”
 - DeviceNet



CANopen

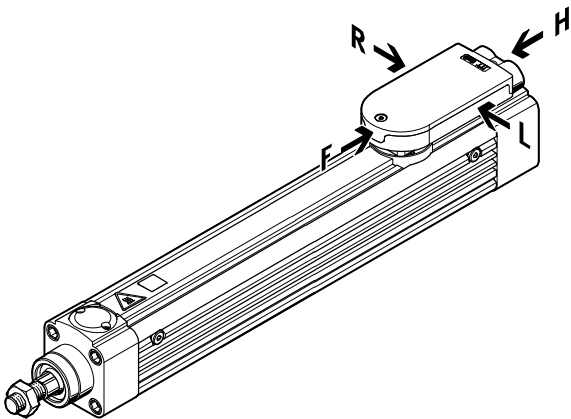
DeviceNet

Electric cylinders DNCE-LAS, with linear motor

Type codes

	DNCE	32	100	LAS	F	S1
Type						
DNCE	Electric cylinder					
Size						
Stroke [mm]						
Drive type/motor technology						
LAS	Linear motor, AC synchronous					
Cable outlet direction						
H	To the rear					
F	To the front					
L	To the left					
R	To the right					
Protection class for electrics						
S1	IP65					

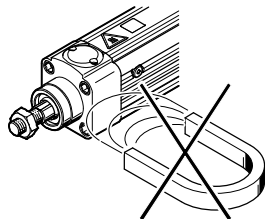
Cable outlet direction



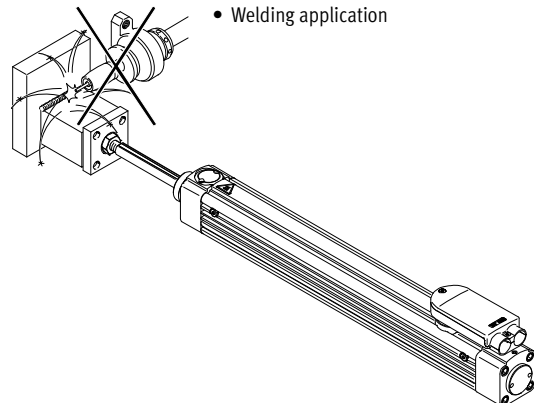
Instructions for use

The electric cylinder with linear motor is not designed for the following sample applications:

- Magnetic field

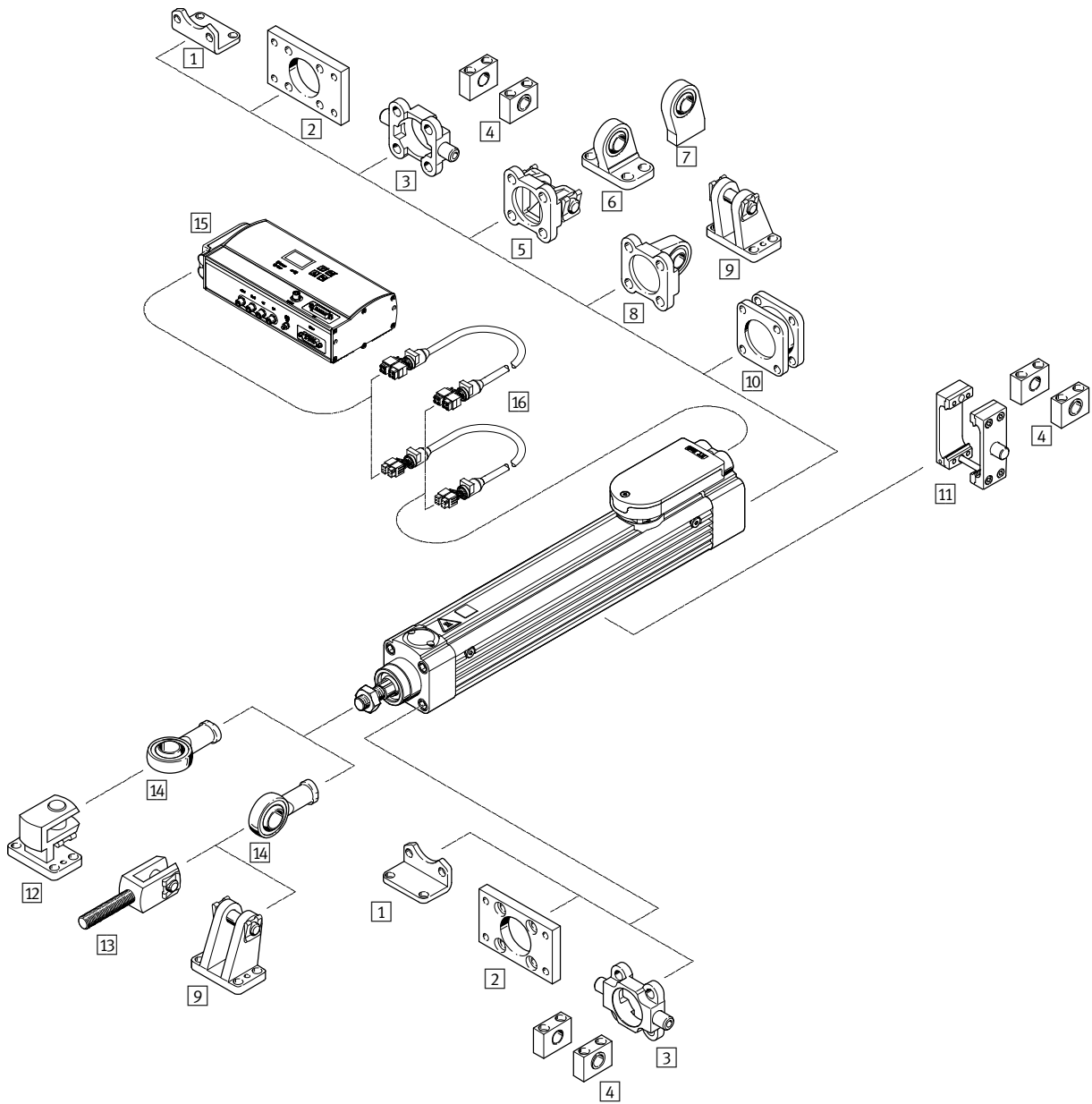


- Welding application



Electric cylinders DNCE-LAS, with linear motor

Peripherals overview



Electric cylinders DNCE-LAS, with linear motor

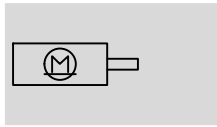
Peripherals overview

Mounting attachments and accessories		
	Description	→ Page/Internet
1	Foot mounting HNC/CRHNC	For bearing or end caps 16
2	Flange mounting FNC/CRFNG	For bearing or end caps 17
3	Trunnion flange ZNC/CRZNG	For bearing or end caps 18
4	Trunnion support LNZG/CRLNZG	For cylinders with trunnion mounting 19
5	Swivel flange SNC	For end caps 20
6	Clevis foot LSNG	With spherical bearing 21
7	Clevis foot LSNSG	Weld-on, with spherical bearing 21
8	Swivel flange SNCS	For end caps, with spherical bearing 20
9	Clevis foot LBG	With non-rotating pivot pin 21
10	Multi-position kit DPNC	For connecting two cylinders of the same size to form a multi-position cylinder 18
11	Trunnion mounting kit DAMT	For mounting anywhere along the cylinder profile barrel 21
12	Right-angle clevis foot LQG	For rod eye SGS 21
13	Rod clevis SGA	For swivel attachment of cylinders 21
14	Rod eye SGS	With spherical bearing 21
15	Motor controller SFC-LACI	For parameterising and positioning the electric cylinder sfc-laci
16	Motor/encoder cable NEBM	For connecting the motor and controller sfc-laci

Electric cylinders DNCE-LAS, with linear motor

Technical data

Function



- - Size
32, 40

- - Stroke length
100 ... 400 mm

- - Note

All values are based on a standard temperature of 23 °C. Dynamic response and accuracy are dependent on the mounting (rigidity) and temperature stresses (heat concentration).

- - www.festo.com



General technical data								
Size		32			40			
Stroke	[mm]	100	200	320	100	200	320	400
Mechanical								
Design		Electric linear direct drive						
Drive unit operating mode		Piston rod						
Type of mounting		Via female thread						
		Via accessories						
Mounting position		Any						
Continuous feed force ¹⁾	[N]	33.7	29.4	33.8	55.3	33.8	42.1	47.9
Peak feed force ¹⁾	[N]	93.7	141	141	183	202	202	202
Max. effective load without external guide (horizontal operation)	[kg]	1.5	1	0.5	2.5	2.5	1.5	1.4
Max. effective load with external guide (horizontal operation)	[kg]	2.8	6	4	3.4	6	6	6
Max. effective load without external guide (vertical operation)	[kg]	3	3	2	3	3	3	3
Max. speed	[m/s]	2	3	3	2	3	3	3
Repetition accuracy	[mm]	±0.02						
Electric								
Type of motor		Linear AC servo motor						
Displacement encoder		Relative measurement, magnetic, incremental, contactless						
Peak motor current	[A]	5.9	16.2	16.2	7.65	22.5	22.5	22.5
Nominal motor current	[A]	2.1	3.3	3.9	2.25	3.7	4.6	5.2
Rated motor output	[W]	101	88	101	166	101	126	144
Homing		Integrated reference sensor						

1) Disregarding friction

Electric cylinders DNCE-LAS, with linear motor

Technical data

Operating and environmental conditions		
Ambient temperature	[°C]	0 ... +40
Max. motor temperature	[°C]	70 (warning at 70 °C, shut-off at 75 °C)
Standard temperature ¹⁾	[°C]	23
Temperature monitoring		Shuts off if motor overheats
Protection class (mechanical system)		IP40
Protection class (electrical connection)		IP40 (with DNCE-...-S1: IP65)
CE marking (see declaration of conformity)		To EU EMC Directive
Corrosion resistance class CRC ²⁾		1

1) Unless otherwise stated, all values are based on standard temperature

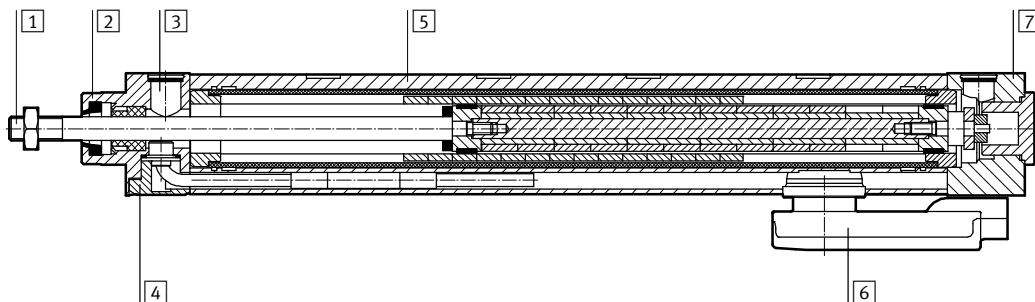
2) Corrosion resistance class CRC 1 to Festo standard FN 940070

Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Weight [g]								
Size	32			40				
Stroke	[mm]	100	200	320	100	200	320	400
Product weight		2570	3170	3750	4560	5420	6420	7000
Moving load		530	610	710	1340	1470	1630	1750

Materials

Sectional view



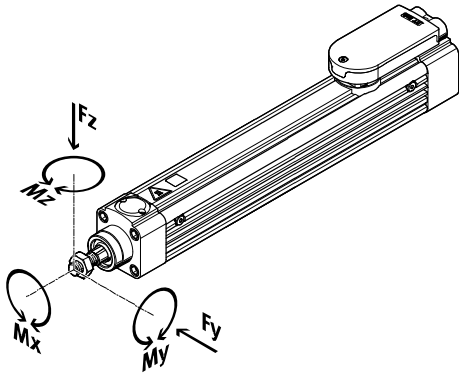
Electric cylinder		
1	Piston rod	High-alloy stainless steel
2	Bearing cap	Anodised wrought aluminium alloy
3	Filter disc	Sintered bronze
4	Distance piece	Anodised wrought aluminium alloy
5	Cylinder barrel	Anodised wrought aluminium alloy
6	Terminal strip	Die-cast zinc
7	End cap	Anodised wrought aluminium alloy
-	Screws	Galvanised steel
	Note on materials	Contains PWIS (paint-wetting impairment substances)
		RoHS-compliant

Electric cylinders DNCE-LAS, with linear motor

Technical data



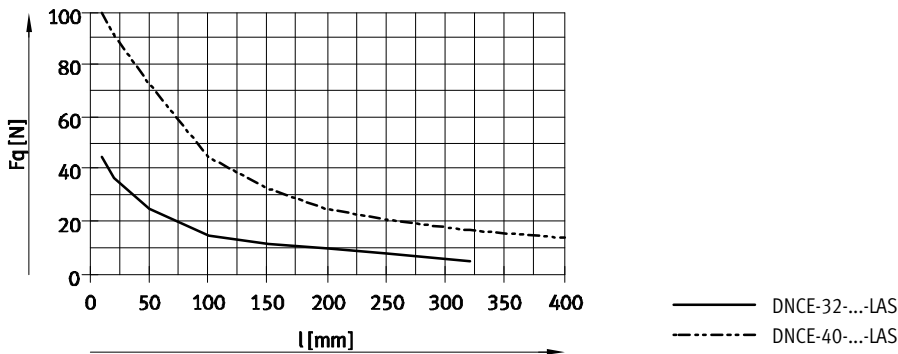
Maximum permissible loads on the piston rod



If there are two or more forces and torques simultaneously acting upon the piston rod, the following equations must be satisfied:

$$\frac{|F_{y1}|}{F_{y_{max}}} + \frac{|F_{z1}|}{F_{z_{max}}} + \frac{|M_{y1}|}{M_{y_{max}}} + \frac{|M_{z1}|}{M_{z_{max}}} \leq 1$$

Maximum permissible lateral forces $F_{y_{max}}$ and $F_{z_{max}}$ as a function of stroke l (limited by the plain bearing)



Maximum permissible forces and torques

Size	32	40
$M_{x_{max}}$ [Nm]	No torques are permitted	
$M_{y_{max}}, M_{z_{max}}$ [Nm]	2	5

- Note
PositioningDrives
sizing software
→ www.festo.com

Stroke reserve and cushioning length

1 Working stroke:

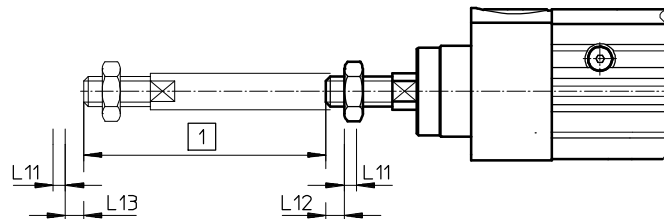
The recommended, available operating range

L12, L13 Stroke reserve:

The distance from the end positions of the working stroke to the buffers

L11 Cushioning length:

The distance from the buffer surface to the mechanical end position

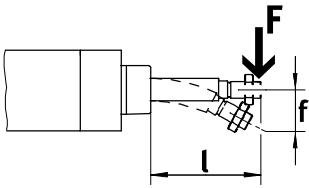


Size	Retracted		Advanced	
	L12	L11	L13	L11
32 [mm]	3.3	2	5.9	2
40 [mm]	3.1	2	3.7	2

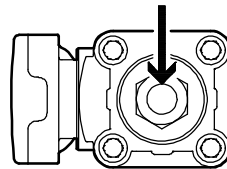
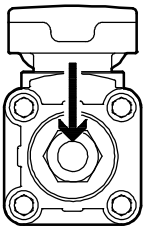
Electric cylinders DNCE-LAS, with linear motor

Technical data

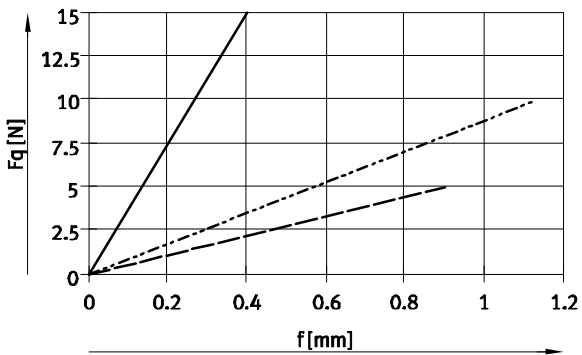
Piston rod displacement f , with fully advanced piston rod, as a function of lateral force F_q



Mounting position

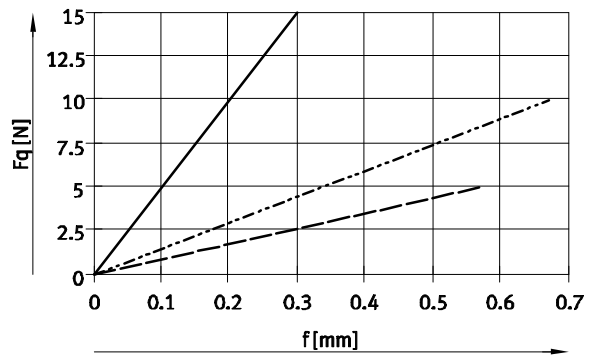


DNCE-32



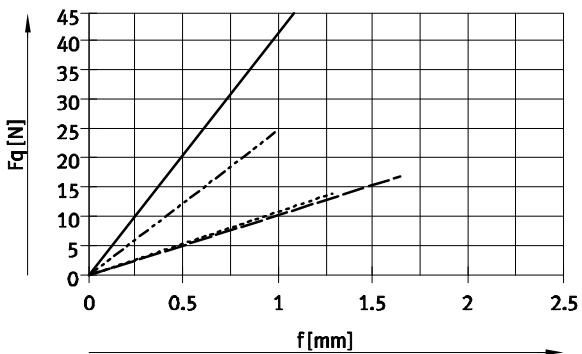
- DNCE-32-100-LAS
- - - DNCE-32-200-LAS
- · - DNCE-32-320-LAS

DNCE-32



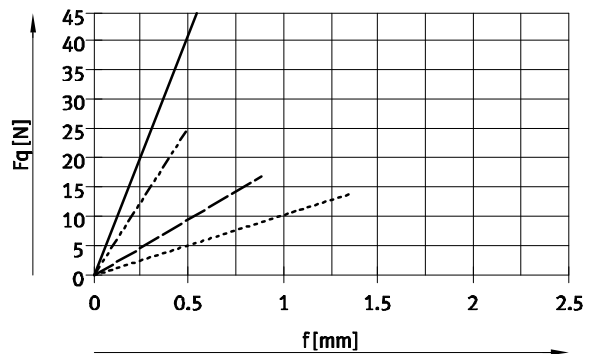
- DNCE-32-100-LAS
- - - DNCE-32-200-LAS
- · - DNCE-32-320-LAS

DNCE-40



- DNCE-40-100-LAS
- - - DNCE-40-200-LAS
- · - DNCE-40-320-LAS
- DNCE-40-400-LAS

DNCE-40



- DNCE-40-100-LAS
- - - DNCE-40-200-LAS
- · - DNCE-40-320-LAS
- DNCE-40-400-LAS

Electric cylinders DNCE-LAS, with linear motor

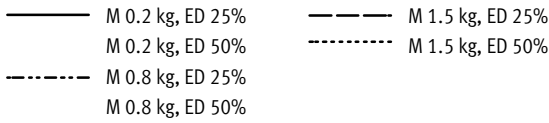
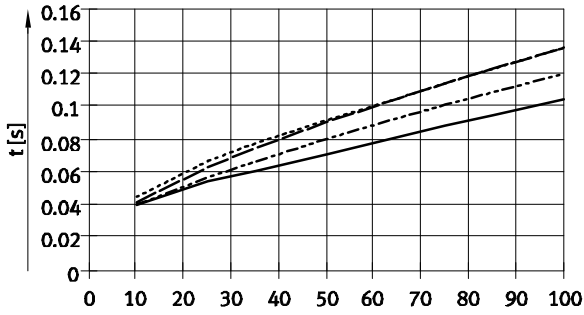
Technical data



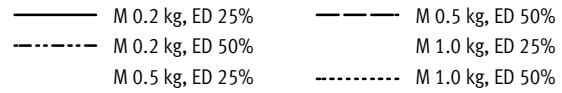
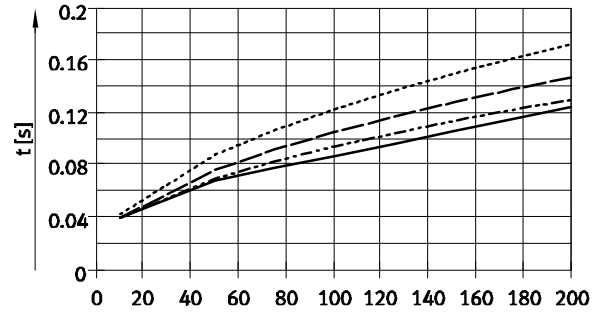
Positioning time t as a function of stroke l , effective load M and duty cycle ED

For horizontal mounting position

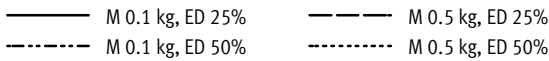
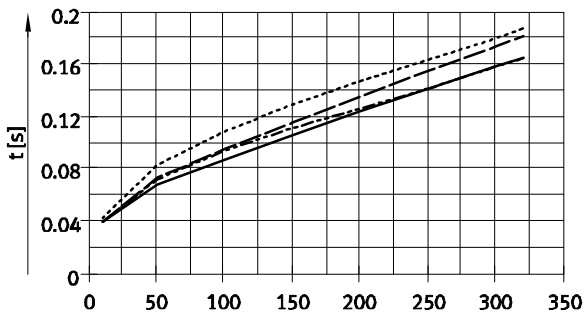
DNCE-32-100



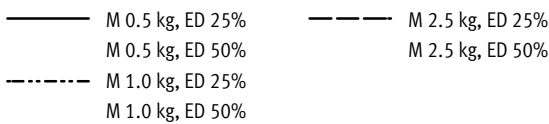
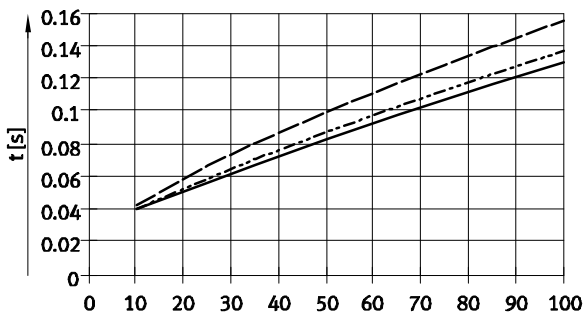
DNCE-32-200



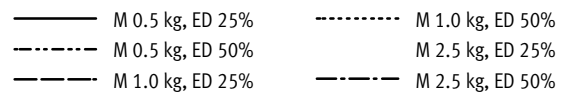
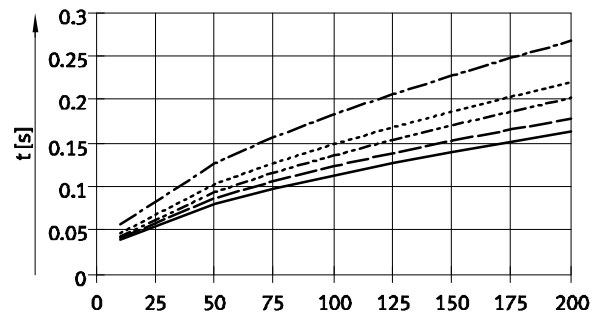
DNCE-32-320



DNCE-40-100



DNCE-40-200

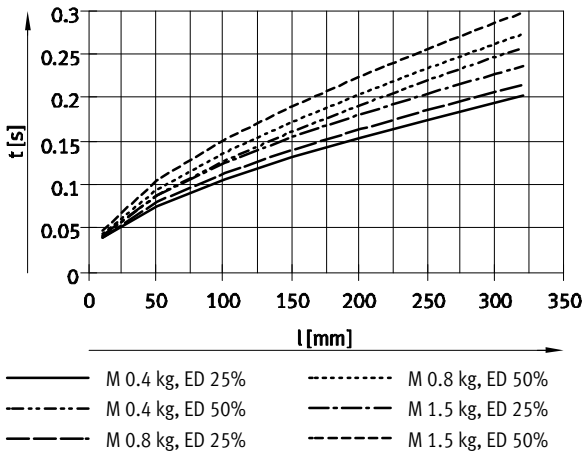


Electric cylinders DNCE-LAS, with linear motor

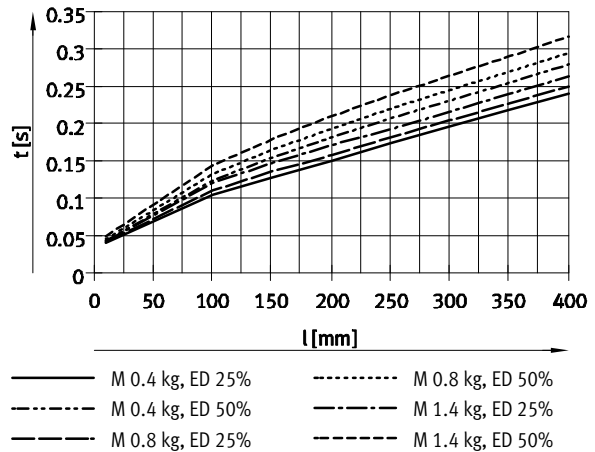
Technical data

Positioning time t as a function of stroke l , effective load M and duty cycle ED For horizontal mounting position

DNCE-40-320



DNCE-40-400



Feed force F as a function of stroke l

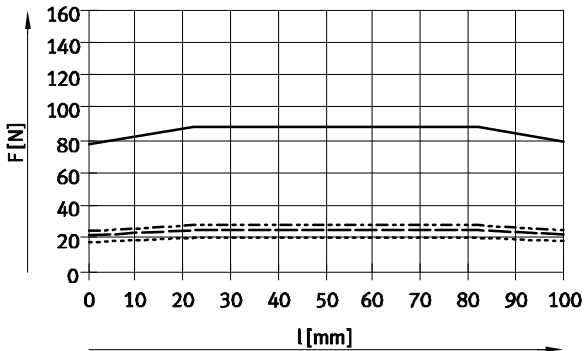
The graphs are based on practical values with friction taken into account.

Peak feed force

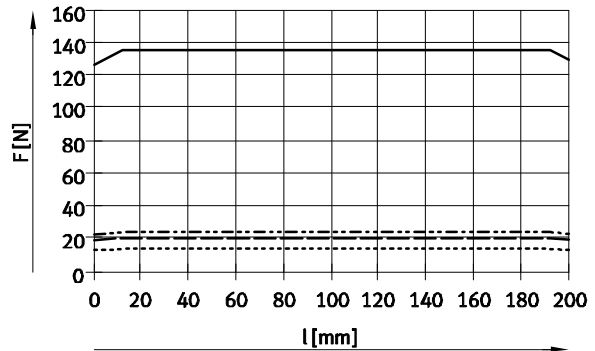
Continuous feed force at ambient temperature:

- from 23 °C
- from 30 °C
- from 40 °C

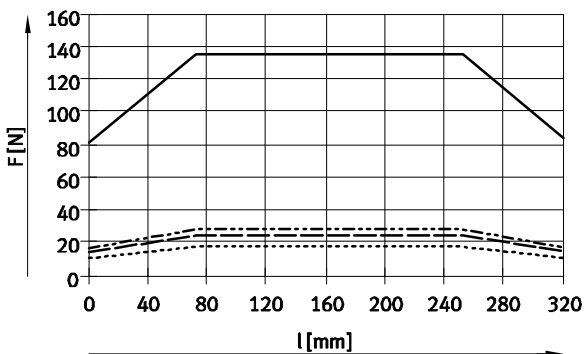
DNCE-32-100



DNCE-32-200



DNCE-32-320



Electric cylinders DNCE-LAS, with linear motor

Technical data



Feed force F as a function of stroke l

The graphs are based on practical values with friction taken into account.

Peak feed force



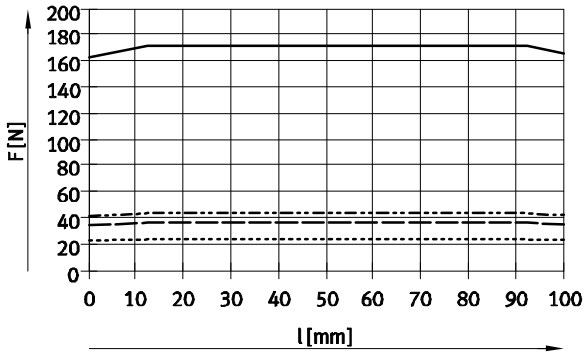
Continuous feed force at ambient temperature:

----- from 23 °C

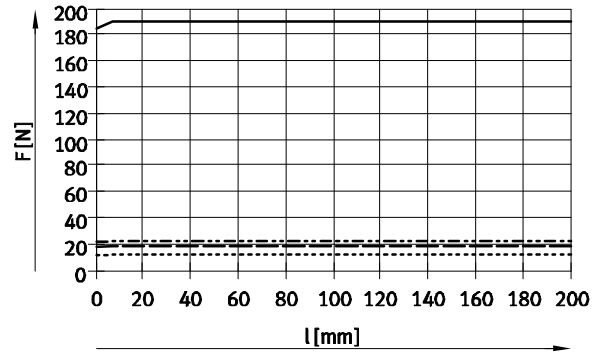
----- from 30 °C

..... from 40 °C

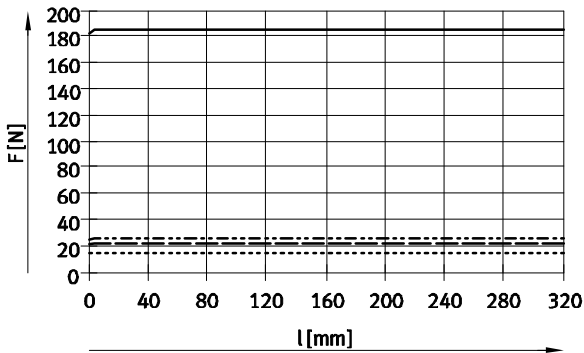
DNCE-40-100



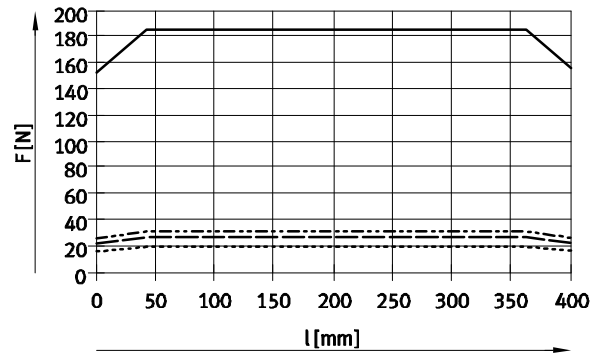
DNCE-40-200



DNCE-40-320



DNCE-40-400



Electric cylinders DNCE-LAS, with linear motor

Technical data

Feed force F as a function of speed v

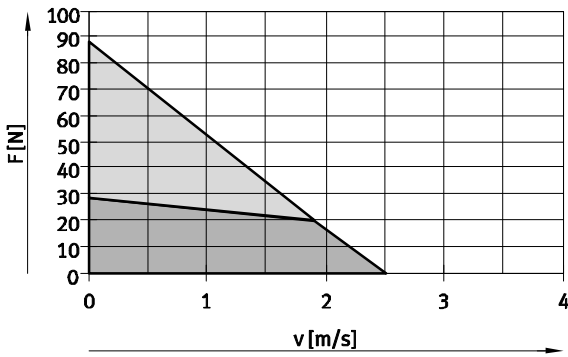
The graphs are based on practical values under the following conditions:

- Stroke centre of the electric cylinder
- Friction taken into account
- Standard temperature of 23 °C
- Max. motor temperature of 70 °C

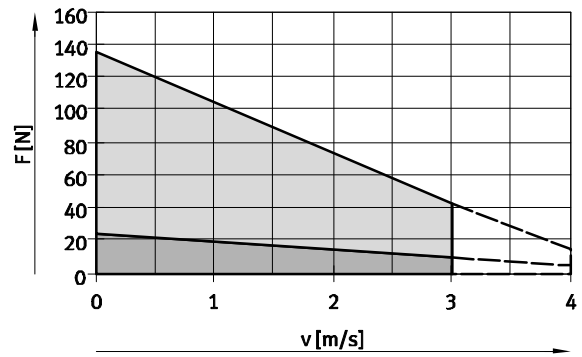
Legend:

- Peak feed force (light grey shaded area)
- Continuous feed force (dark grey shaded area)
- Non-permissible range (dashed line)

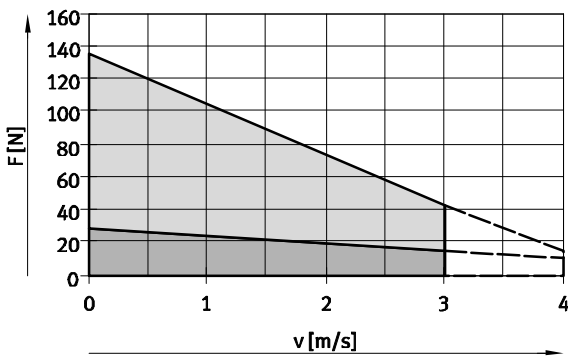
DNCE-32-100



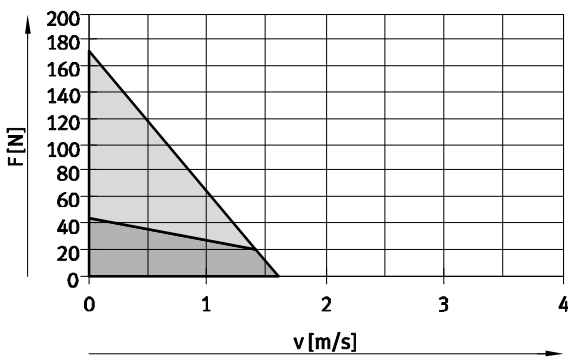
DNCE-32-200



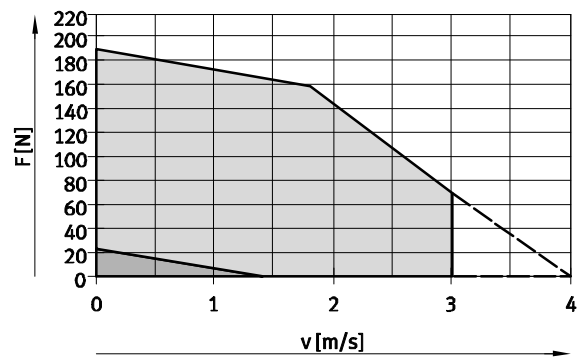
DNCE-32-320



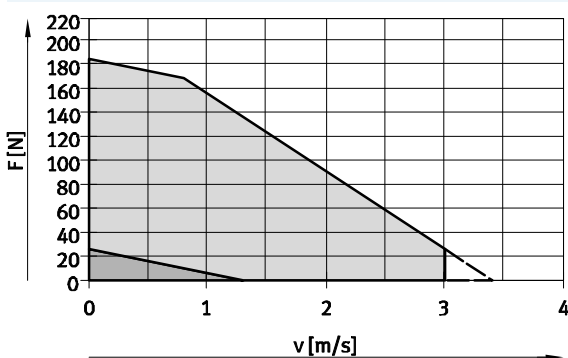
DNCE-40-100



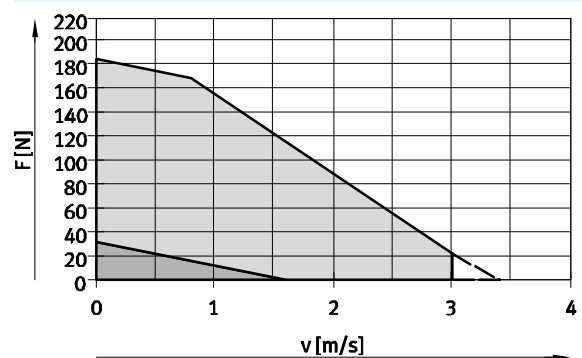
DNCE-40-200



DNCE-40-320



DNCE-40-400



Electric cylinders DNCE-LAS, with linear motor

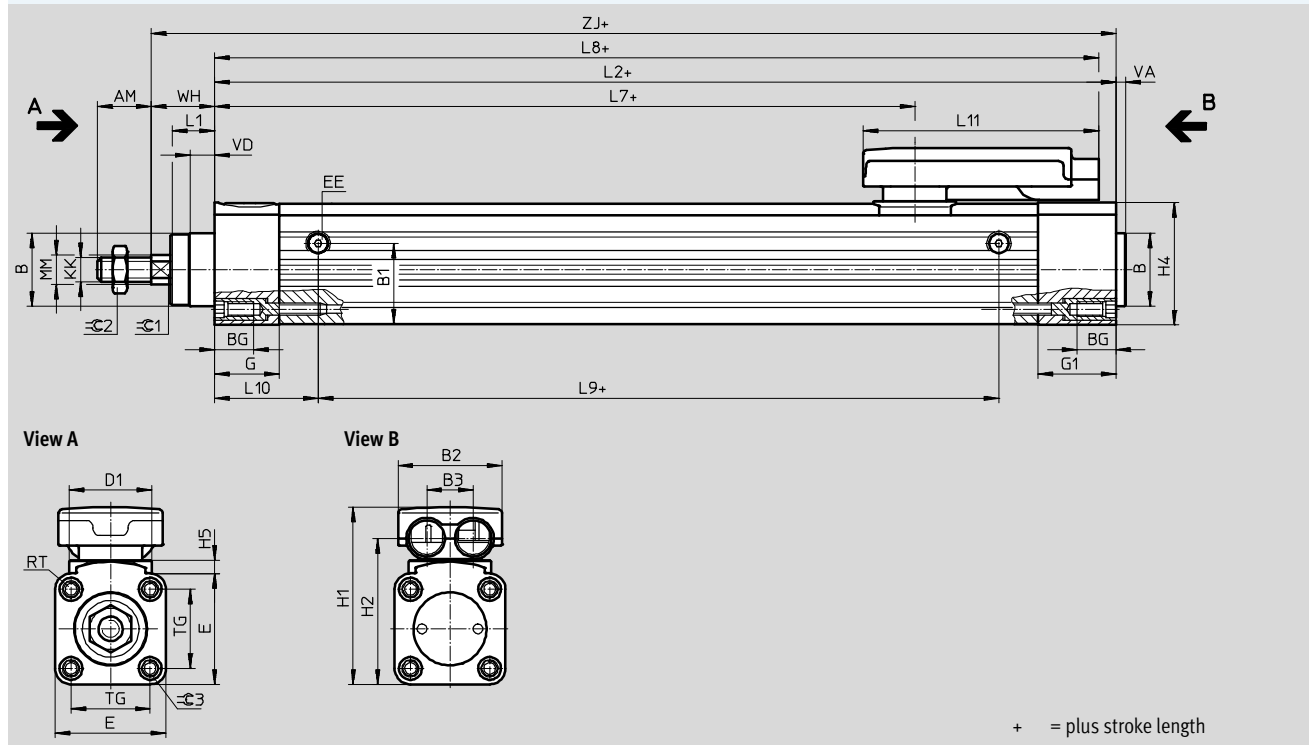


Technical data

Dimensions

Download CAD data → www.festo.com

DNCE-...



Size	AM	B \varnothing d11	B1	B2	B3	BG	D1 \varnothing	E	EE	G	G1
32	22	30	33	42.6	19	16	34	45.5	M5	26.5	32
40	24	35	38	42.6	19	16	34	54	M5	26.5	32

Size	H1	H2	H4	H5	KK	L1	L2	L7	L8	L9	L10
32	72.8	59.8	50.3	5.5	M10X1.25	18	270	187.5	263	179.5	42.5
40	81.3	68.3	58.7	5.5	M12X1.25	21.3	341	258.5	334	240.5	47.5

Size	L11	MM \varnothing	RT	TG	VA	VD	WH	ZJ	$\varnothing 1$	$\varnothing 2$	$\varnothing 3$
32	96.8	12	M6	32.5	4	10	26 _{-3,3}	296 _{-3,3}	10	17	6
40	96.8	16	M6	38	4	10.3	30 _{-3,1}	371 _{-3,1}	13	19	6

Electric cylinders DNCE-LAS, with linear motor

Ordering data – Modular products

Ordering table					
Size	32	40	Condi- tions	Code	Enter code
M Module No.	562830	562831			
Function	Electric cylinder			DNCE	DNCE
Size	32	40		-...	
Stroke [mm]	100	100		-...	
	200	200			
	320	320			
	-	400			
Drive type	Linear motor			-L	-L
Motor technology	AC synchronous			AS	AS
Cable outlet direction	To the rear			-H	
	To the front			-F	
	To the left			-L	
	To the right			-R	
O Protection class for electrics	IP65			-S1	

Transfer order code

Electric cylinders DNCE-LAS, with linear motor



Accessories

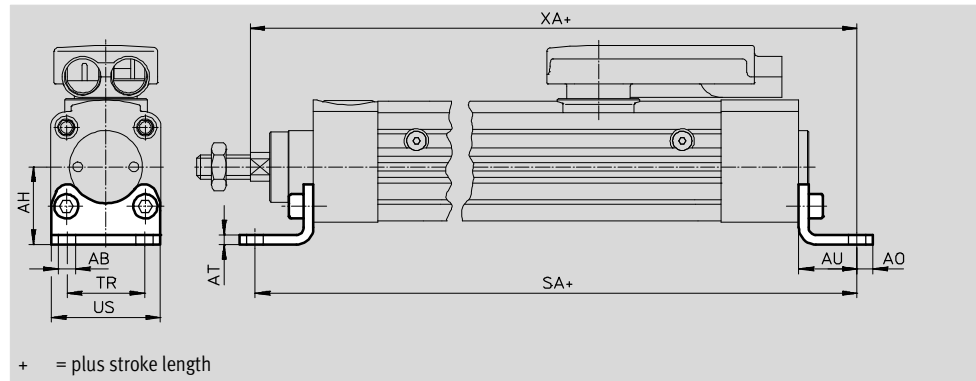
Foot mounting HNC/CRHNC

Material:

HNC: Galvanised steel

CRHNC: High-alloy steel

Free of copper and PTFE



Dimensions and ordering data

For size	AB ∅	AH	A0	AT	AU	SA	TR	US	XA
[mm]									
32	7	32	6.5	4	24	318	32	45	320
40	10	36	9	4	28	397	36	54	399

For size	Basic version				High corrosion protection			
	CRC ¹⁾	Weight [g]	Part No.	Type	CRC ¹⁾	Weight [g]	Part No.	Type
[mm]								
32	2	144	174369	HNC-32	4	139	176937	CRHNC-32
40	2	193	174370	HNC-40	4	188	176938	CRHNC-40

- 1) Corrosion resistance class CRC 2 to Festo standard FN 940070
 Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
- Corrosion resistance class CRC 4 to Festo standard FN 940070
 Particularly high corrosion stress. Outdoor exposure under extreme corrosive conditions. Parts exposed to aggressive media, for instance in the chemical or food industries. These applications may need to be supported by special tests (→ also FN 940082) using appropriate media.

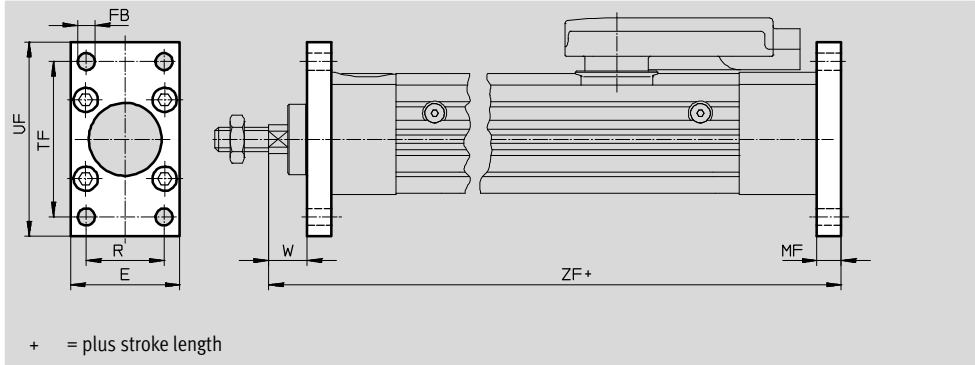
Electric cylinders DNCE-LAS, with linear motor

Accessories

Flange mounting FNC/CRFNG

Material:
 FNC: Galvanised steel
 CRFNG: High-alloy steel

Free of copper and PTFE
 RoHS-compliant



Dimensions and ordering data								
For size	E	FB	MF	R	TF	UF	W	ZF
[mm]		∅ H13						
32	45	7	10	32	64	80	16	306
40	54	9	10	36	72	90	20	381

For size [mm]	Basic version				High corrosion protection			
	CRC ¹⁾	Weight [g]	Part No.	Type	CRC ¹⁾	Weight [g]	Part No.	Type
32	1	221	174376	FNC-32	4	220	161846	CRFNG-32
40	1	291	174377	FNC-40	4	291	161847	CRFNG-40

1) Corrosion resistance class CRC 1 to Festo standard FN 940070
 Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).
 Corrosion resistance class CRC 4 to Festo standard FN 940070
 Particularly high corrosion stress. Outdoor exposure under extreme corrosive conditions. Parts exposed to aggressive media, for instance in the chemical or food industries. These applications may need to be supported by special tests (→ also FN 940082) using appropriate media.

Electric cylinders DNCE-LAS, with linear motor

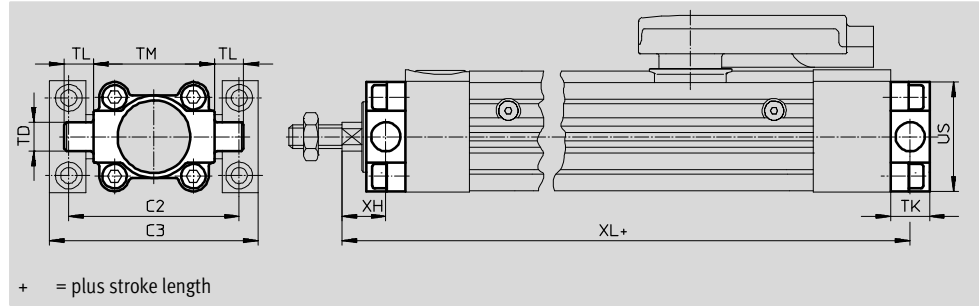
Accessories



Trunnion flange ZNCF/CRZNG

Material:
 ZNCF: Stainless steel casting
 CRZNG: Electropolished special steel casting

Free of copper and PTFE
 RoHS-compliant



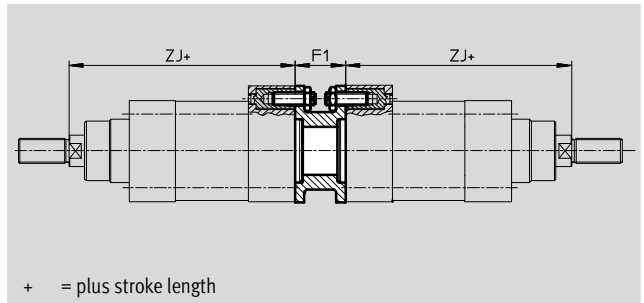
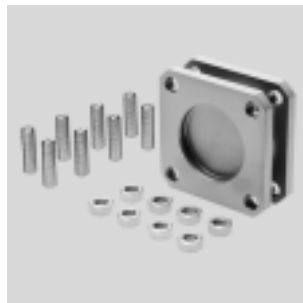
Dimensions and ordering data									
For size	C2	C3	TD	TK	TL	TM	US	XH	XL
[mm]			∅ e9						
32	71	86	12	16	12	50	45	18	304
40	87	105	16	20	16	63	54	20	381

For size	Basic version				High corrosion protection			
	CRC ¹⁾	Weight [g]	Part No.	Type	CRC ¹⁾	Weight [g]	Part No.	Type
32	2	150	174411	ZNCF-32	4	150	161852	CRZNG-32
40	2	285	174412	ZNCF-40	4	285	161853	CRZNG-40

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
 Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
 Corrosion resistance class CRC 4 to Festo standard FN 940070
 Particularly high corrosion stress. Outdoor exposure under extreme corrosive conditions. Parts exposed to aggressive media, for instance in the chemical or food industries. These applications may need to be supported by special tests (➔ also FN 940082) using appropriate media.

Multi-position kit DPNC

Material:
 Flange: Wrought aluminium alloy
 Threaded studs, hex nuts:
 Galvanised steel
 Free of copper and PTFE
 RoHS-compliant



Dimensions and ordering data					
For size	F1	ZJ	Weight [g]	Part No.	Type
32	27	296	292	174418	DPNC-32
40	27	371	410	174419	DPNC-40

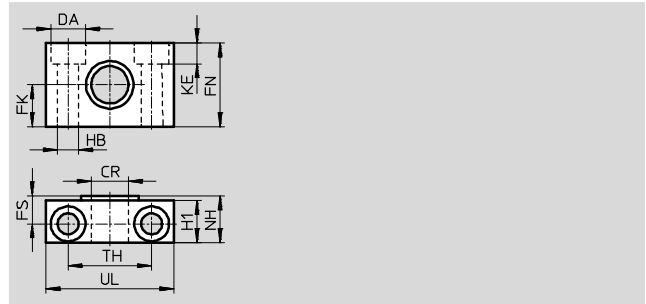
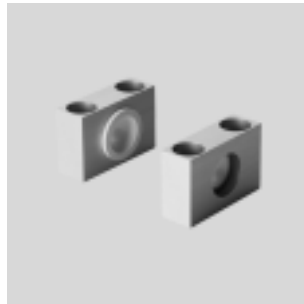
dpnc

Electric cylinders DNCE-LAS, with linear motor

Accessories

Trunnion support LNZG

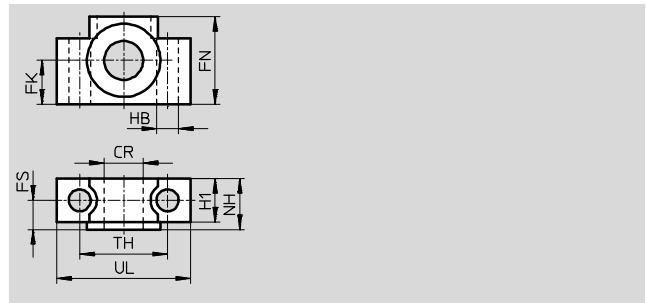
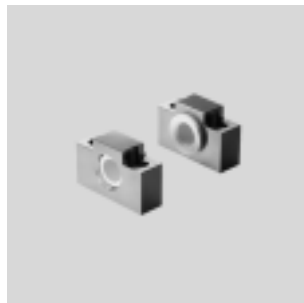
Material:
 Trunnion support:
 Anodised aluminium
 Plain bearing: Plastic
 Free of copper and PTFE
 RoHS-compliant



Dimensions and ordering data														Weight	Part No.	Type
For size	CR	DA	FK	FN	FS	H1	HB	KE	NH	TH	UL	CRC ¹⁾	Weight	Part No.	Type	
[mm]	∅	∅	∅				∅			±0.2			[g]			
32	12	11	15	30	10.5	15	6.6	6.8	18	32	46	2	83	32959	LNZG-32	
40	16	15	18	36	12	18	9	9	21	36	55	2	129	32960	LNZG-40/50	

Trunnion support CRLNZG

Material:
 High-alloy steel
 Free of copper and PTFE
 RoHS-compliant



Dimensions and ordering data														Weight	Part No.	Type
For size	CR	FK	FN	FS	H1	HB	NH	TH	UL	CRC ¹⁾	Weight	Part No.	Type			
[mm]	∅	∅				∅		±0.2			[g]					
32	12	15	30	10.5	15	6.6	18	32	46	4	205	161874	CRLNZG-32			
40	16	18	36	12	18	9	21	36	55	4	323	161875	CRLNZG-40/50			

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
 Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
 Corrosion resistance class CRC 4 to Festo standard FN 940070
 Particularly high corrosion stress. Outdoor exposure under extreme corrosive conditions. Parts exposed to aggressive media, for instance in the chemical or food industries. These applications may need to be supported by special tests (➔ also FN 940082) using appropriate media.

Electric cylinders DNCE-LAS, with linear motor

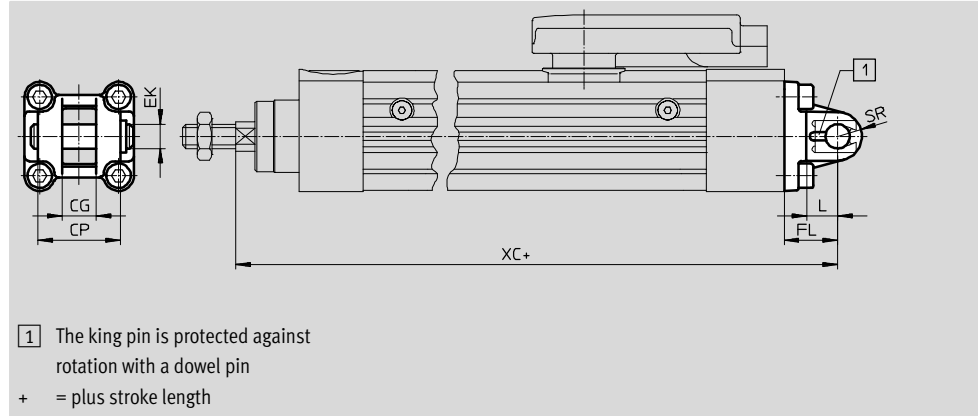
Accessories



Swivel flange SNC

Material:
Die-cast aluminium

Free of copper and PTFE
RoHS-compliant

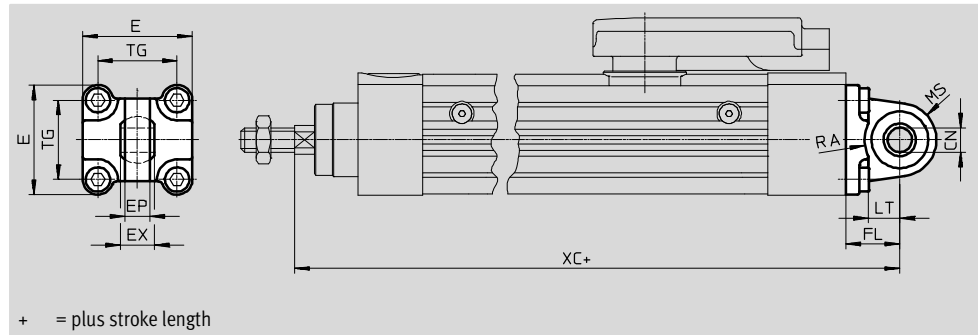


Dimensions and ordering data												
For size	CG	CP	EK	FL	L	SR	XC	CRC ¹⁾	Weight	Part No.	Type	
[mm]	H14	h14	∅	±0.2					[g]			
32	14	34	10	22	13	10	318	2	93	174383	SNC-32	
40	16	40	12	25	16	12	396	2	140	174384	SNC-40	

Swivel flange SNCS

Material:
Die-cast aluminium

Free of copper and PTFE
RoHS-compliant



Dimensions and ordering data														
For size	CN	E	EP	EX	FL	LT	MS	RA	TG	XC	CRC ¹⁾	Weight	Part No.	Type
[mm]	∅		+0.2		±0.2			+1				[g]		
32	10 ^{+0.013}	45 ^{+0.2/-0.5}	10.5	14	22	13	15 ^{+0.5}	14.5	32.5	318	2	86	174397	SNCS-32
40	12 ^{+0.015}	54 ^{-0.5}	12	16	25	16	17 ^{+0.5}	17.5	38	396	2	122	174398	SNCS-40

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

Electric cylinders DNCE-LAS, with linear motor

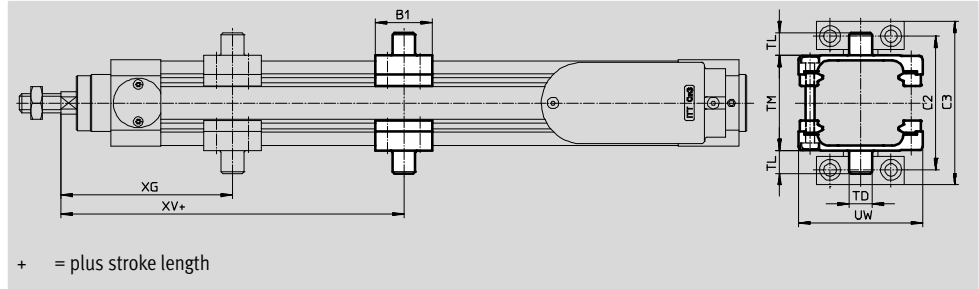
Accessories



Trunnion mounting kit DAMT

Material:
Galvanised steel

Free of copper and PTFE
RoHS-compliant



+ = plus stroke length

- Note
The kit can be mounted axially anywhere on the cylinder barrel between the positions XG and XV+stroke.
The kit can only be mounted as shown in the drawing and not turned by 90°. The bolt on the top side must be removed for attachment.

Dimensions and ordering data									
For size	B1	C2	C3	TD	TL	TM	UW	XG	XV
[mm]				∅ e9					
32	30	71	86	12	12	50	65	90	80
40	32	87	105	16	16	63	75	100	150

For size	Max. tightening torque	CRC ¹⁾	Weight	Part No.	Type
[mm]	[Nm]		[g]		
32	4+1	2	213	2213233	DAMT-V1-32-A
40	8+1	2	388	2214899	DAMT-V1-40-A

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

Ordering data – Mounting attachments				Technical data → Internet: clevis foot			
Designation	For size	Part No.	Type	Designation	For size	Part No.	Type
Clevis foot LSNG				Clevis foot LSNSG			
	32	31740	LSNG-32		32	31747	LSNSG-32
	40	31741	LSNG-40		40	31748	LSNSG-40
Clevis foot LBG				Right-angle clevis foot LQG			
	32	31761	LBG-32		32	31768	LQG-32
	40	31762	LBG-40		40	31769	LQG-40

Ordering data – Piston rod attachments				Technical data → Internet: piston rod attachments			
Designation	For size	Part No.	Type	Designation	For size	Part No.	Type
Rod eye SGS				Rod clevis SGA			
	32	9261	SGS-M10x1,25		32	32954	SGA-M10x1,25
	40	9262	SGS-M12x1,25		40	10767	SGA-M12x1,25