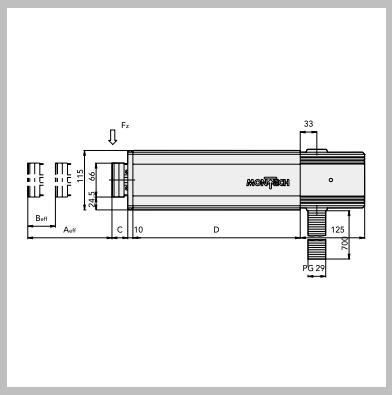
FLEXIBILITY FOR INNOVATORS ONLY

MONTECH®

COMPLETE
EXACT
COMPACT

LINEAR UNITS

LINEAR UNITS LEP CONTENTS

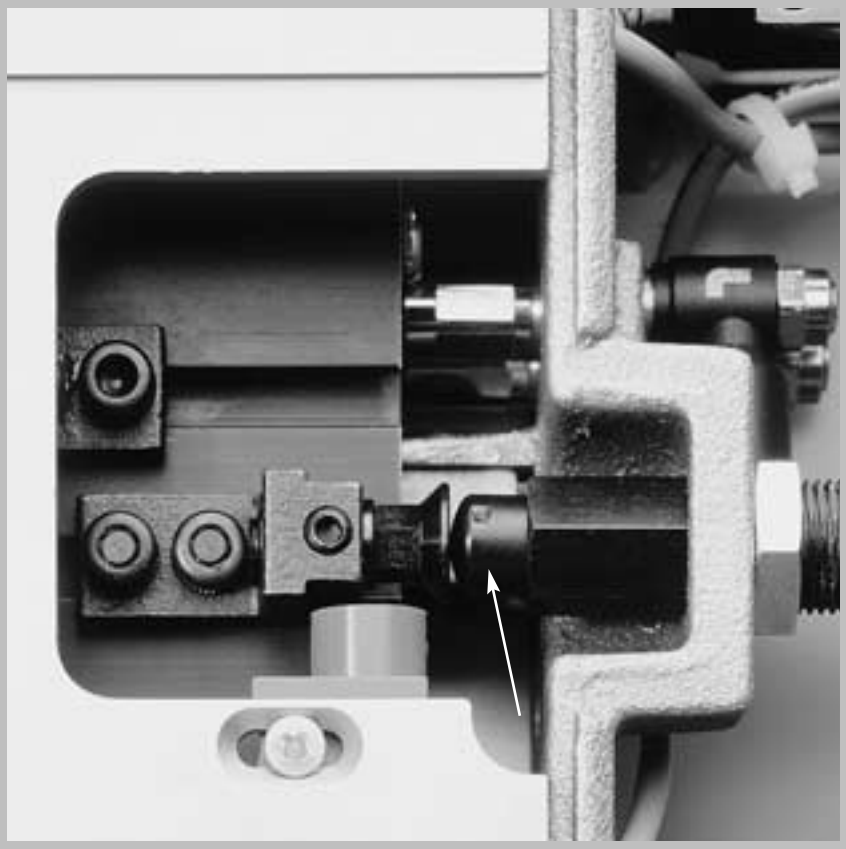


LINEAR UNITS LEP PRODUCT DESCRIPTION

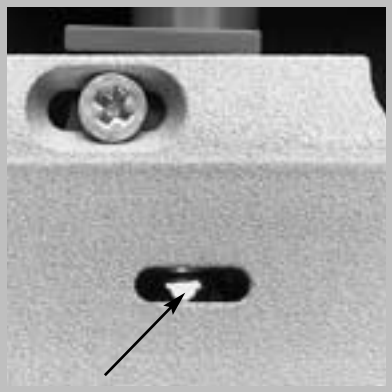
The **Linear Units LEP** are designed for horizontal and vertical mounting.

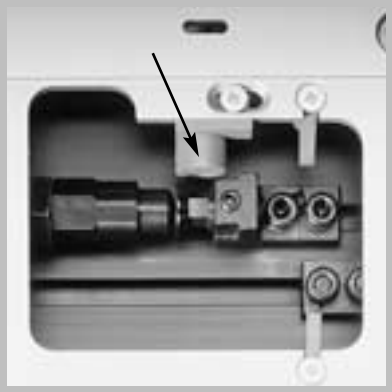
The drive is provided by a standard **ISO-CETOP pneumatic cylinder,** which can be exchanged with ease from the rear housing.

Together, the **hardened precision round bars** recessed in the enclosed section of the slide and the running rollers of the case body form the backlash-free, adjustable guide system.



behind



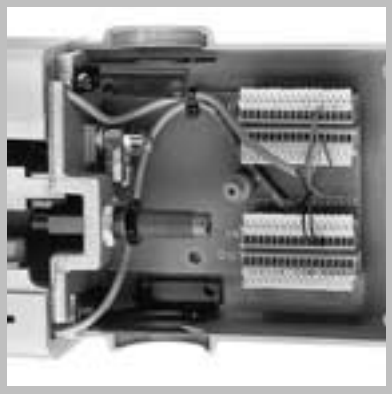


in front

The stroke is limited by stops, which contain a fine adjustment and **hydraulic shock absorbers.**

The switching status is indicated by **integral LEDs** that are visible from the outside through holes in the case.

The end positions are scanned by stationary, **inductive proximity switches** (included).



The cable and hose routing is enclosed using a standard **protective hose** (size 1) or a **power supply chain** (size 2).

All **cables** are combined on a terminal strip in the horizontal Linear Unit.

All Linear Units use **Quick-Set® dovetails** to allow fast mounting and simple adjustments (see Quick-Set® chapter from page 338). The dovetails are arranged on both sides of the case to allow the LEP to be used for transfer (confined fitting conditions).

version A

version B

return spring

The **encapsulated form of construction** eliminates danger points and ensures a quite process.

The Linear Units are available in **two versions. Version A** includes a retracted and adjustable extended position. With **version B** an **additional** (second) adjustable extended **position** can be obtained.

For weight compensation, LEPs intended for vertical mounting are provided with a **return spring.** In the event of an emergency stop or drop in compressed air pressure, the vertical slide is drawn automatically to the upper end position.

APPLICATIONS

Pick-and-Place application;
mounted on Quick-Set® underframe with horizontal and vertical Linear Unit LEP, Rotary Drive DAPI with internal air feed and Double-Acting Gripper GPDI.

Press charging;
attachment provided with vertically applied Stroke Unit HE, horizontal Linear Unit LEP and with Quick-Set®, as well as Angle Gripper GW-180.

Workpiece loading and unloading;
provided with Universal Slide US and Linear Units LEP for vertical and horizontal motion and attached revolver head. (Assembled with Quick-Set®, Rotary Drive DAP and Precision Parallel Gripper GPP).

Revolving head;
provided with Quick-Set® elements, a vertical Linear Unit LEP, a Rotary Drive DAP and two Precision Parallel Grippers GPP.

LINEAR UNITS LEP HORIZONTAL/VERTICAL

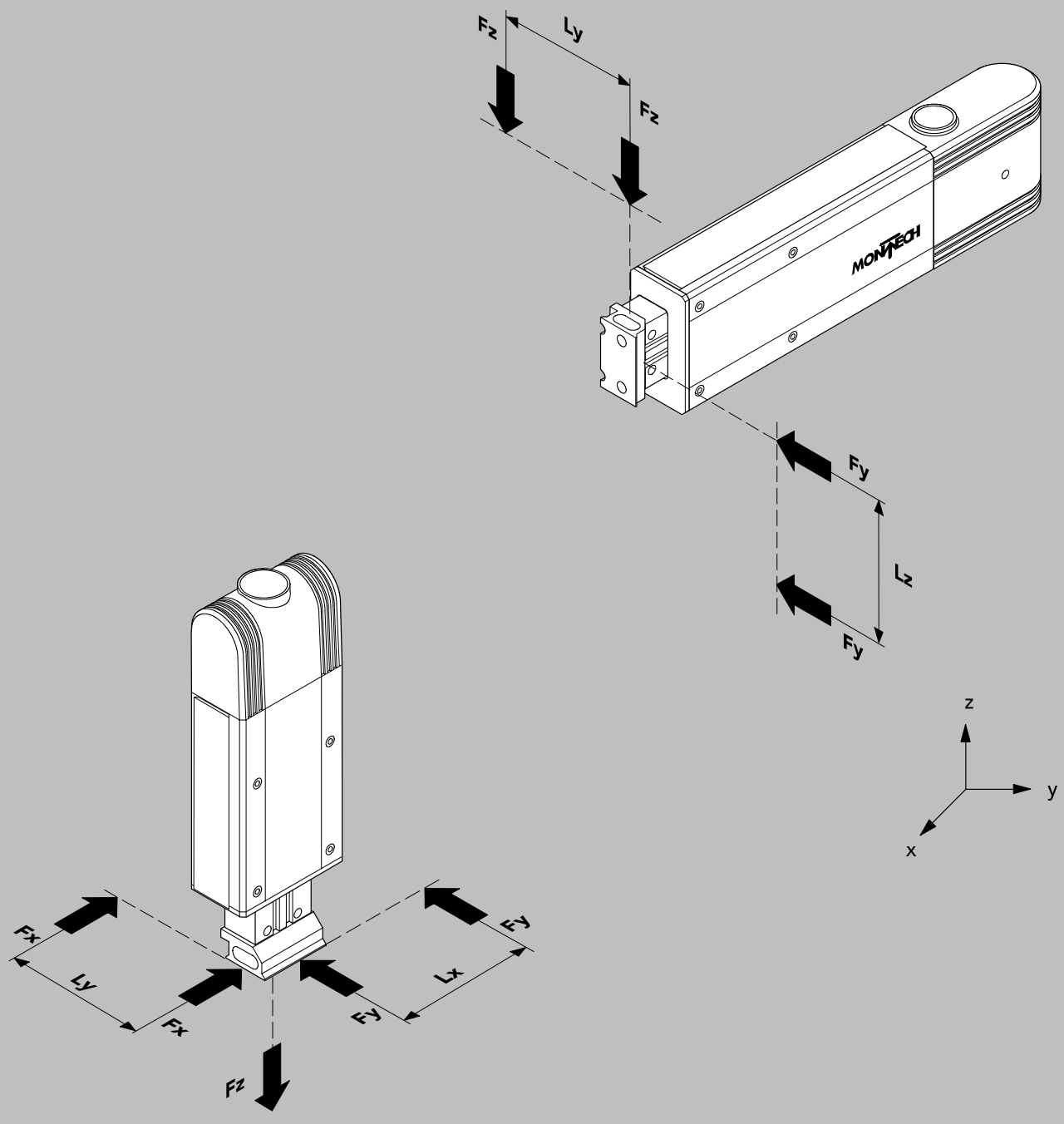
SCOPE OF DELIVERY
Linear Unit, including two shock-absorbers, two exhaust-air throttles, two proximity switches for A-version and five proximity switches for B-version, protective hose PG 29 or power supply chain and operating instructions.

SUITABLE ACCESSORIES

Special accessories	from page 38
Accessories	from page 302
Quick-Set®	from page 338

POINTS OF ACTION OF FORCES AND TORQUES

Horizontal units
$(F_z \cdot L_y)_{adm.} = (F_y \cdot L_z)_{adm.}$



Vertical units
$(F_x \cdot L_y)_{adm.} = (F_y \cdot L_x)_{adm.}$
The effective static sum of the forces occurring ($+F_z$ or $-F_z$) can be determined with due allowance for the attached mass, the operating pressure, the set stroke and the setting of the return spring from the force diagrams.

EXAMPLE CALCULATIONS

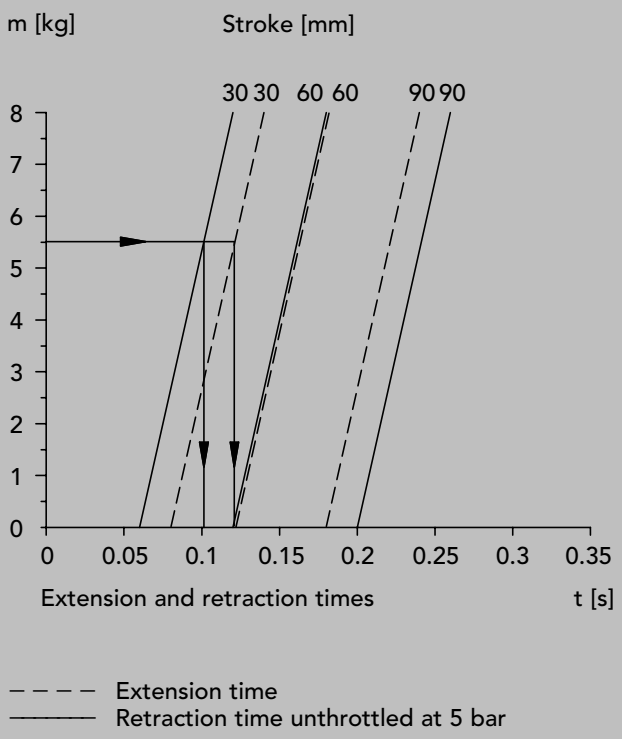
Travel time LEP-90-1 A/B horizontal

Extension time example: m = 5.5 kg
Stroke = 30 mm
Result: Extension time t = 0.12 s

Retraction time example: m = 5.5 kg
Stroke = 30 mm

Result: Retraction time t = 0.10 s

m = Attached mass [kg]
Stroke = Distance travelled [mm]
t = Travelling time [s]



– – – – Extension time
——— Retraction time unthrottled at 5 bar

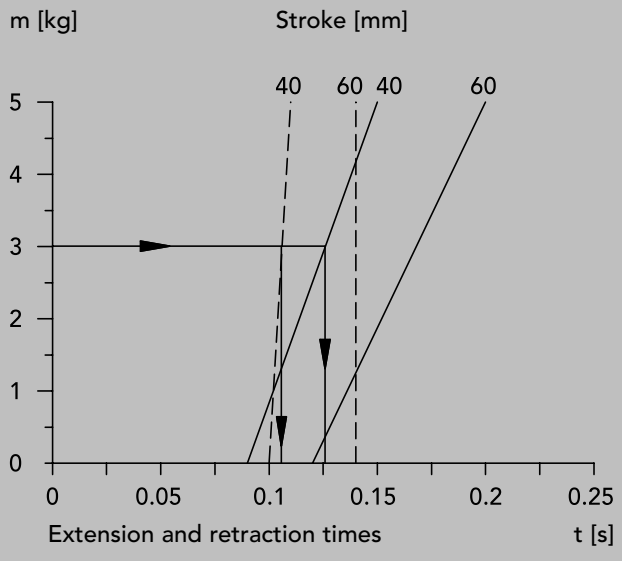
Travel time LEP-60-1 A/B vertical

Extension time example: m = 3 kg
Stroke = 40 mm
Result: Extension time t = 0.11 s

Retraction example: m = 3 kg
Stroke = 40 mm

Result: Retraction time t = 0.13 s

m = Attached masse [kg]
Stroke = Distance travelled [mm]
t = Travelling time [s]



– – – – Extension time
——— Retraction time unthrottled at 5 bar

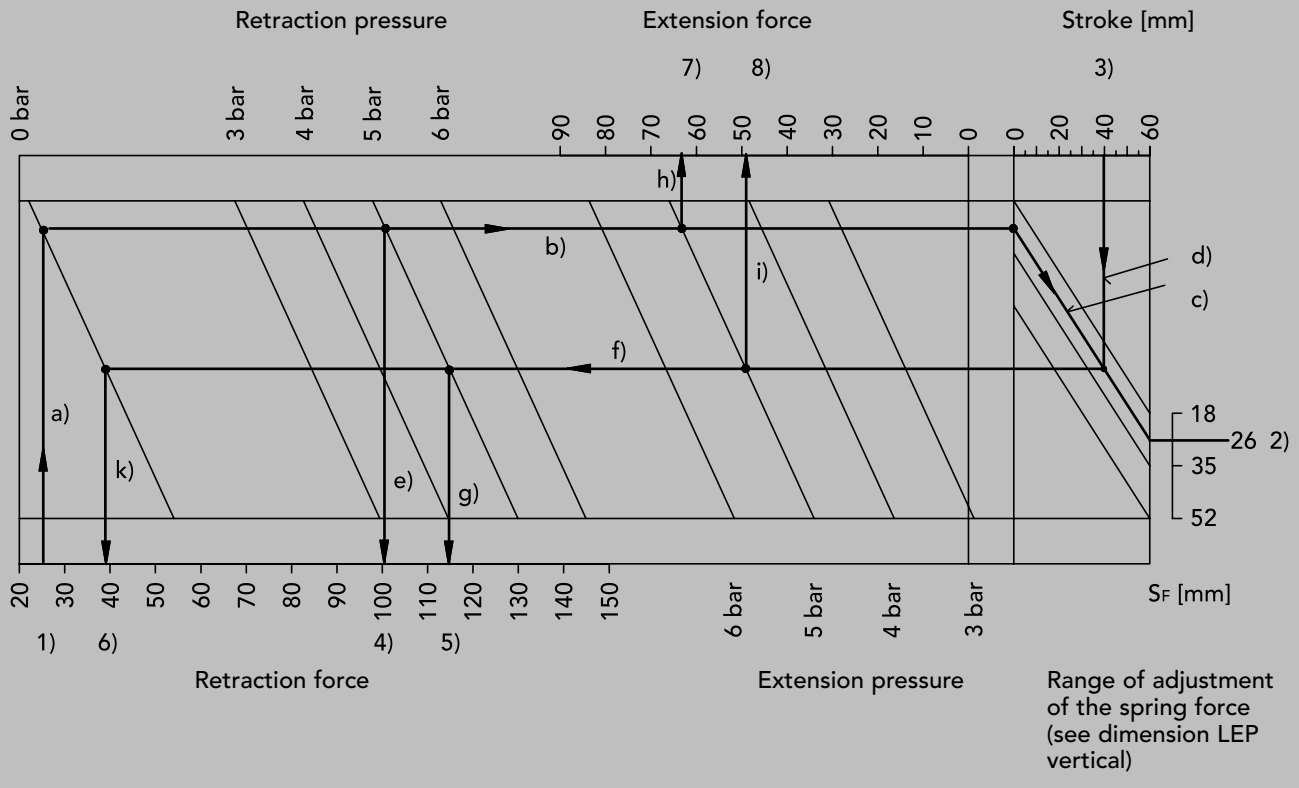
Linear Units LEP-60-1A/B vertical

Stroke	40 mm
Operating pressure	5 bar
Attached weight	(e.g. gripper + fingers + product): 2.5 kg
Stipulation	The attached weight (2.5 kg) will be moved to the «vp» position with pressure loss (0 bar).

1)	Inward force when retracted (stroke = 0, pressure = 0 bar) = (line a))	25 N–25 N ** = 0 N
2)	Lines a) – b) – c) lead to a spring setting S_F of 26 mm	
3)	Stroke 40 mm; line d)	
4)	Inward force when retracted (stroke = 0, pressure = 5 bar) = (line e))	101 N–25 N ** = 76 N
5)	Inward force when extended (stroke = 40 mm, pressure = 5 bar) = (line f) und g))	114 N–25 N ** = 89 N
6)	Inward force when extended (stroke = 40 mm, pressure = 0 bar) = (line k))	39 N–25 N ** = 14 N
7)	Outward force when retracted (stroke = 0 mm, pressure = 5 bar) = (line h))	63 N+25 N * = 88 N
8)	Outward force when extended (stroke = 40 mm, pressure = 5 bar) = (line i))	48 N+25 N * = 73 N

* Addition of the attached weight
** Subtraction of the attached weight

FORCE DIAGRAM LEP-60-1 A/B VERTICAL



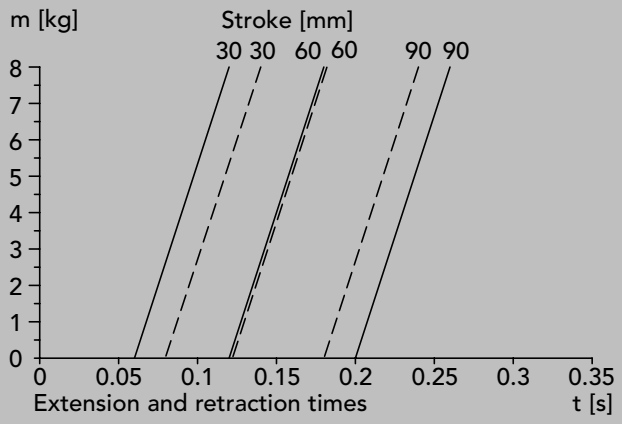
LINEAR UNITS LEP-90-1 A/B HORIZONTAL

			Typ 1A	Typ 1B
Stroke (min./max.)		[mm]	15/90	15/90
Stroke, step range	1)	[mm]	–	0–80
Piston diameter/Piston-rod diameter		[mm]	16/6	16/6
Outward/inward force at 5 bar		[N]	88/76	88/76
Max. permissible additional mass $m_{adm.}$		[kg]	8	8
$F_{z\ adm.}$	2)	[N]	130	190
$F_{y\ adm.}$	2)	[N]	70	100
$(F_z \cdot L_y)_{adm.}$	2)	[Ncm]	1200	1200
Weight		[kg]	2.5	3.1
Operating pressure		[bar]	3–6	
Operating medium			air, oiled or unoiled, filtered to 5 µm, dew point < 6°C	
End stop absorption			hydraulic shock-absorbers with fine adjustment	
Repeatability	3)	[mm]	< 0.005	
Check of end positions	4)		inductive proximity switches	
Plug-in pneumatic connection			main cylinder: hose-Ø 4 mm variable stop: hose-Ø 4 mm	
Speed regulation	5)		adjustable exhaust throttles M5	
Noise level	6)	[dBA]	< 64	
Degree of protection			IP 42	
Lead between control system and LEP			max. 17-core incl. 0 V and 24 V, 0.14–0.5 mm^2	
Connection capacity of printed circuit board			for 15 proximity switches	
Ambient: Temperature		[°C]	10–50	
Rel. humidity			< 95% (without condensation)	
Air purity			normal workshop atmosphere	
Guaranty period			2 years from the date of delivery	
Maintenance			oiling the felt pads and rods	
Material			aluminum, steel, bronze, plastic	

1) Difference between the two extended strokes
2) The values quoted for F_z, F_y and $F_z \cdot L_y$ apply to the entire stroke range
3) Scatter of the end setting during 100 successive strokes, conditions as 6)
4) With LED visible from outside
5) The pneumatically actuated variable stop has fixed throttles
6) Measured at 5 bar, maximum stroke, with attached mass m = 6.5 kg and fully open throttles

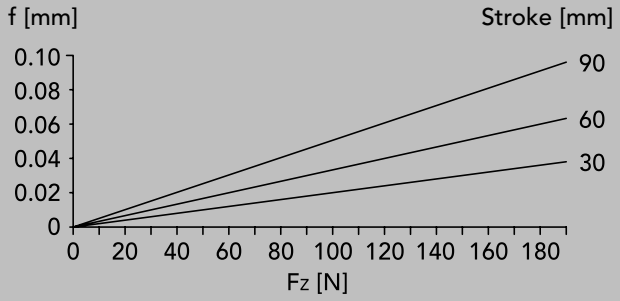
TRAVEL TIME DIAGRAM

(Example see page 20)

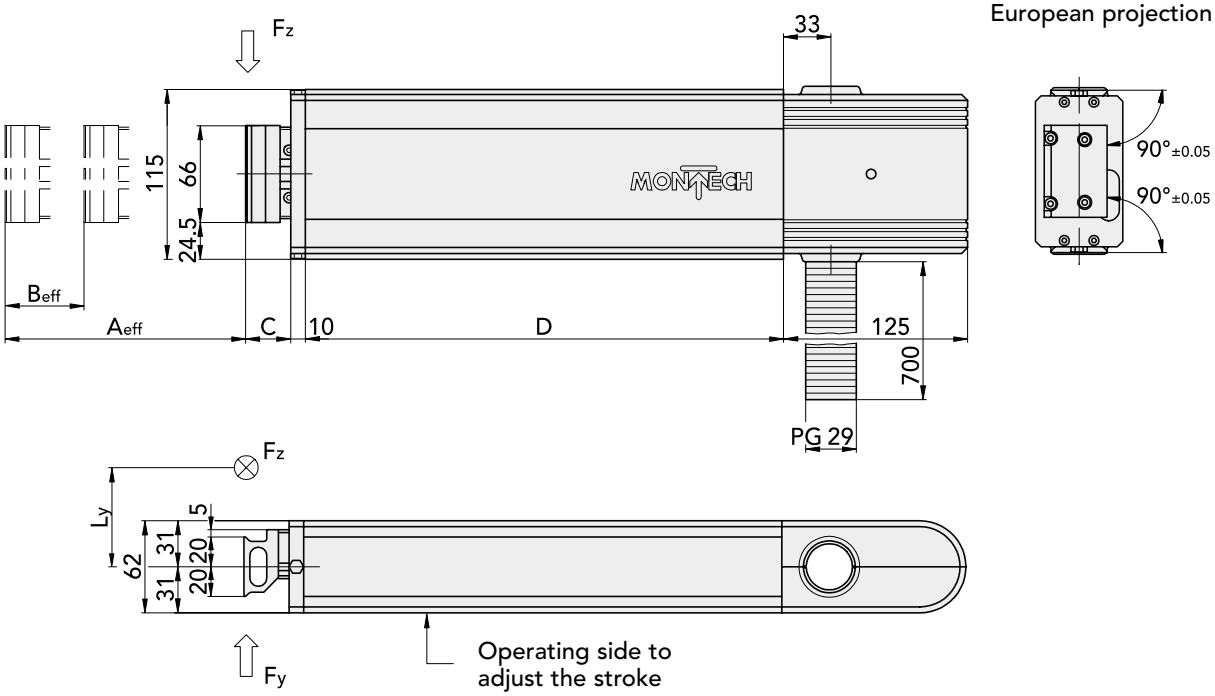


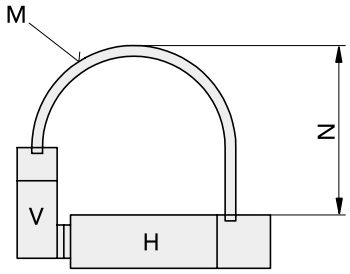
– – – – Extension time
———— Retraction time unthrottled at 5 bar

DEFORMATION DIAGRAM



f = Deflection (measured at the clamping plate)
Fz = Sum of all vertical forces





Standard with protective hose

	Amax	Bmax	C	D	M	N
LEP-90-1A/H	90	--	30-120	208	770	450
LEP-90-1B/H	90	80	30-120	265	820	460

Aeff Setting range of the first position ($A_{max} \geq A_{eff} \geq 15$)
Beff Set difference in stroke between 1st and 2nd positions ($B_{eff} \leq B_{max}$ and $B_{eff} \leq A_{eff} - 10$)*)
C Distance from body to end face of clamping plate (dovetail)
D Mounting range (dovetail)
E Maximum height of the power supply chain above the body
L Maximum projection of the power supply chain
M Necessary extended length of protective hose from a vertical axis to the horizontal axis
N Maximum height of protective hose above the body
*) Both conditions must be fulfilled

Ref. No.

LEP-90-1A/H	**42425**
LEP-90-1B/H	**42426**

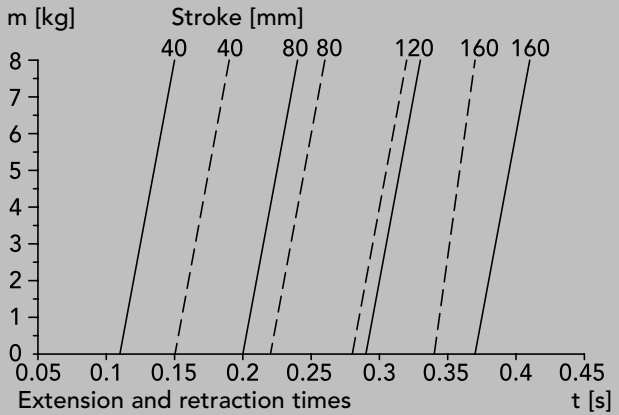
LINEAR UNITS LEP-160-1 A/B HORIZONTAL

			Typ 1A	Typ 1B
Stroke (min./max.)		[mm]	15/160	15/160
Stroke, step range	1)	[mm]	–	0–100
Piston diameter/Piston-rod diameter		[mm]	16/6	16/6
Outward/inward force at 5 bar		[N]	88/76	88/76
Max. permissible additional mass $m_{adm.}$		[kg]	8	8
$F_{z\ adm.}$	2)	[N]	95	155
$F_{y\ adm.}$	2)	[N]	50	85
$(F_z \cdot L_y)_{adm.}$	2)	[Ncm]	1200	1200
Weight		[kg]	3.2	3.8
Operating pressure		[bar]	3–6	
Operating medium			air, oiled or unoiled, filtered to 5 µm, dew point < 6°C	
End stop absorption			hydraulic shock-absorbers with fine adjustment	
Repeatability	3)	[mm]	< 0.005	
Check of end positions	4)		inductive proximity switches	
Plug-in pneumatic connection			main cylinder: hose-Ø 4 mm variable stop: hose-Ø 4 mm	
Speed regulation	5)		adjustable exhaust throttles M5	
Noise level	6)	[dBA]	< 64	
Degree of protection			IP 42	
Lead between control system and LEP			max. 17-core incl. 0 V and 24 V, 0.14–0.5 mm^2	
Connection capacity of printed circuit board			for 15 proximity switches	
Ambient: Temperature		[°C]	10–50	
Rel. humidity			< 95% (without condensation)	
Air purity			normal workshop atmosphere	
Guaranty period			2 years from the date of delivery	
Maintenance			oiling the felt pads and rods	
Material			aluminum, steel, bronze, plastic	

1) Difference between the two extended strokes
2) The values quoted for Fz, Fy and Fz · Ly apply to the entire stroke range
3) Scatter of the end setting during 100 successive strokes, conditions as 6)
4) With LED visible from outside
5) The pneumatically actuated variable stop has fixed throttles
6) Measured at 5 bar, maximum stroke, with attached mass m = 3 kg and fully open throttles

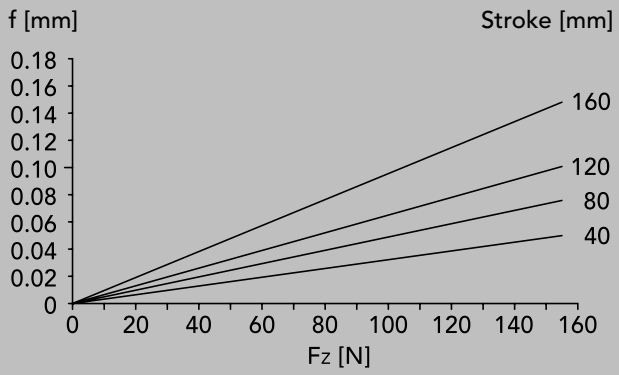
TRAVEL TIME DIAGRAM

(Example see page 20)

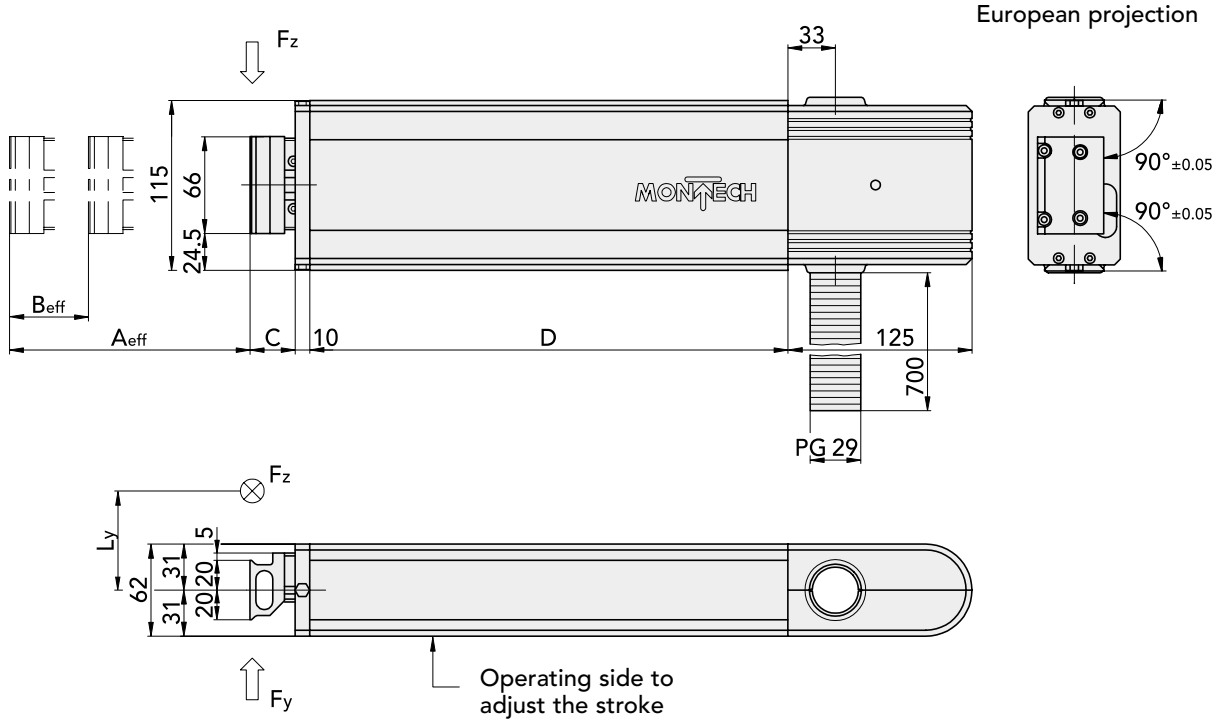


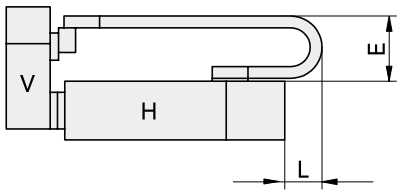
– – – – Extension time
———— Retraction time unthrottled at 5 bar

DEFORMATION DIAGRAM

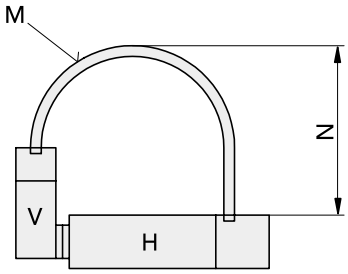


f = Deflection (measured at the clamping plate)
Fz = Sum of all vertical forces





Option with power supply chain



Standard with protective hose

	Amax	Bmax	C	D	E	L	M	N
LEP-160-1A/H	160	--	30-190	277	175	150	850	490
LEP-160-1B/H	160	100	30-190	345	175	150	900	500

Aeff Setting range of the first position ($A_{max} \geq A_{eff} \geq 15$)
Beff Set difference in stroke between 1st and 2nd positions ($B_{eff} \leq B_{max}$ and $B_{eff} \leq A_{eff} - 10$)*)
C Distance from body to end face of clamping plate (dovetail)
D Mounting range (dovetail)
E Maximum height of the power supply chain above the body
L Maximum projection of the power supply chain
M Necessary extended length of protective hose from a vertical axis to the horizontal axis
N Maximum height of protective hose above the body
*) Both conditions must be fulfilled

Ref. No.

LEP-160-1A/H	**40887**
LEP-160-1B/H	**40353**

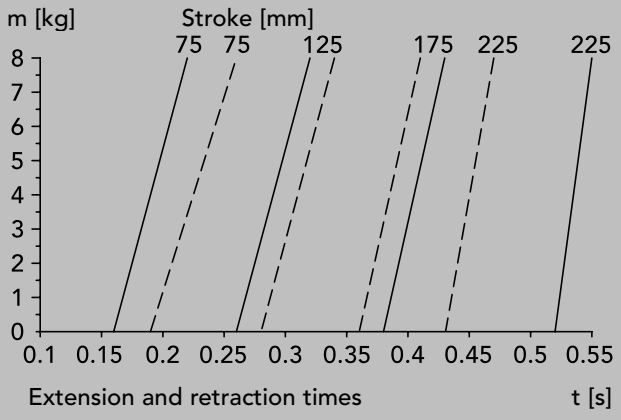
LINEAR UNITS LEP-225-1 A/B HORIZONTAL

			Typ 1A	Typ 1B
Stroke (min./max.)		[mm]	15/225	15/225
Stroke, step range	1)	[mm]	–	0–100
Piston diameter/Piston-rod diameter		[mm]	16/6	16/6
Outward/inward force at 5 bar		[N]	88/76	88/76
Max. permissible additional mass $m_{adm.}$		[kg]	8	8
$F_{z\ adm.}$	2)	[N]	160	160
$F_{y\ adm.}$	2)	[N]	85	85
$(F_z \cdot L_y)_{adm.}$	2)	[Ncm]	1200	1200
Weight		[kg]	4.5	4.6
Operating pressure		[bar]	3–6	
Operating medium			air, oiled or unoiled, filtered to 5 µm, dew point < 6°C	
End stop absorption			hydraulic shock-absorbers with fine adjustment	
Repeatability	3)	[mm]	< 0.005	
Check of end positions	4)		inductive proximity switches	
Plug-in pneumatic connection			main cylinder: hose-Ø 4 mm variable stop: hose-Ø 4 mm	
Speed regulation	5)		adjustable exhaust throttles M5	
Noise level	6)	[dBA]	< 64	
Degree of protection			IP 42	
Lead between control system and LEP			max. 17-core incl. 0 V and 24 V, 0.14–0.5 mm^2	
Connection capacity of printed circuit board			for 15 proximity switches	
Ambient: Temperature		[°C]	10–50	
Rel. humidity			< 95% (without condensation)	
Air purity			normal workshop atmosphere	
Guaranty period			2 years from the date of delivery	
Maintenance			oiling the felt pads and rods	
Material			aluminum, steel, bronze, plastic	

1) Difference between the two extended strokes
2) The values quoted for Fz, Fy and Fz · Ly apply to the entire stroke range
3) Scatter of the end setting during 100 successive strokes, conditions as 6)
4) With LED visible from outside
5) The pneumatically actuated variable stop has fixed throttles
6) Measured at 5 bar, maximum stroke, with attached mass m = 6.5 kg and fully open throttles

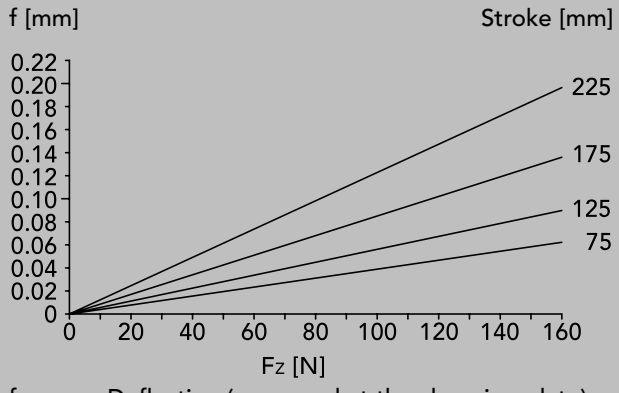
TRAVEL TIME DIAGRAM

(Example see page 20)

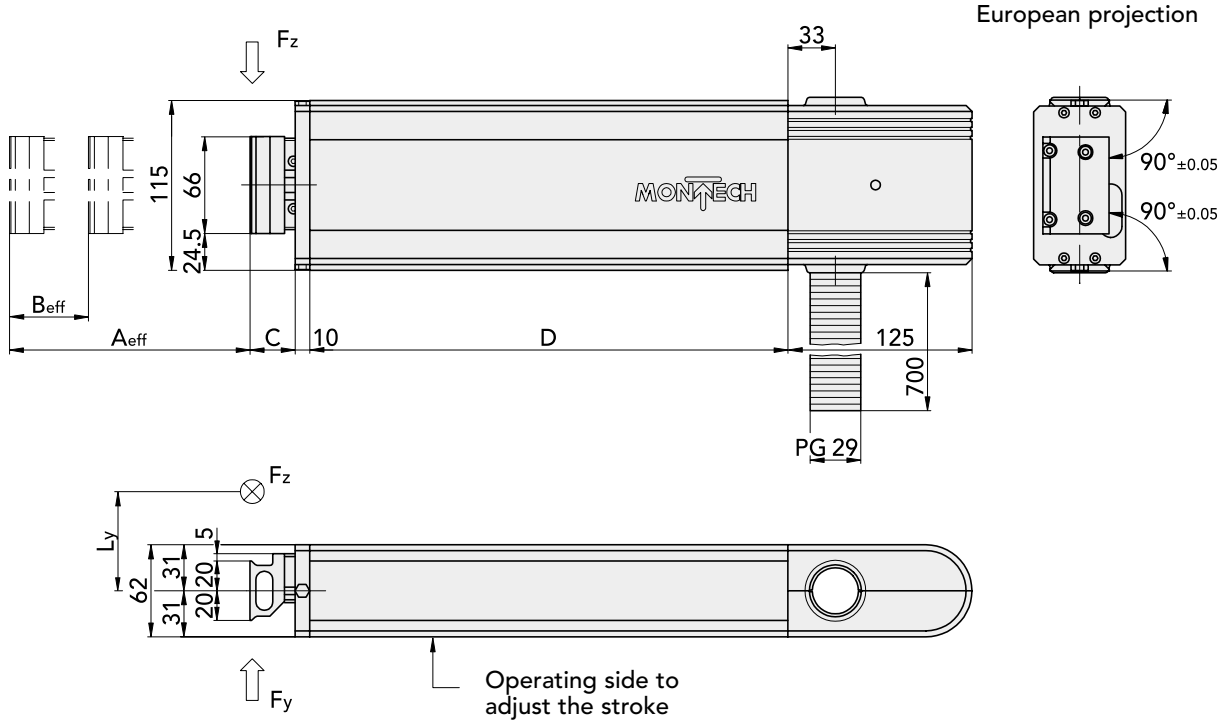


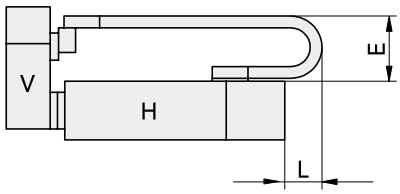
– – – – Extension time
———— Retraction time unthrottled at 5 bar

DEFORMATION DIAGRAM

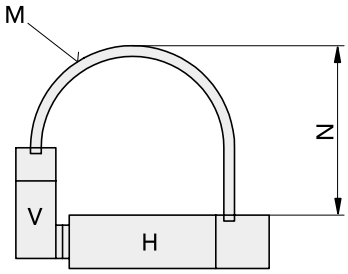


f = Deflection (measured at the clamping plate)
Fz = Sum of all vertical forces





Option with power supply chain



Standard with protective hose

	Amax	Bmax	C	D	E	L	M	N
LEP-225-1A/H	225	--	30-255	475	175	150	1170	590
LEP-225-1B/H	225	100	30-255	475	175	150	1170	590

Aeff Setting range of the first position ($A_{max} \geq A_{eff} \geq 15$)
Beff Set difference in stroke between 1st and 2nd positions ($B_{eff} \leq B_{max}$ and $B_{eff} \leq A_{eff} - 10$)*)
C Distance from body to end face of clamping plate (dovetail)
D Mounting range (dovetail)
E Maximum height of the power supply chain above the body
L Maximum projection of the power supply chain
M Necessary extended length of protective hose from a vertical axis to the horizontal axis
N Maximum height of protective hose above the body
*) Both conditions must be fulfilled

Ref. No.

LEP-225-1A/H	**42594**
LEP-225-1B/H	**42595**

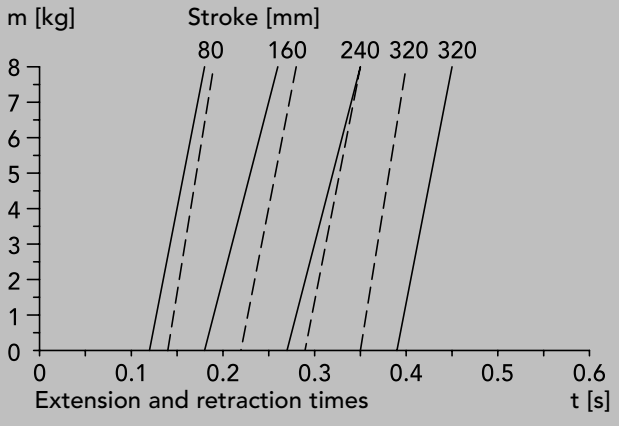
LINEAR UNITS LEP-320-2 A/B HORIZONTAL

			Typ 2A	Typ 2B
Stroke (min./max.)		[mm]	50/320	50/320
Stroke, step range	1)	[mm]	–	0–150
Piston diameter/Piston-rod diameter		[mm]	20/8	20/8
Outward/inward force at 5 bar		[N]	136/114	136/114
Max. permissible additional mass $m_{adm.}$		[kg]	8	8
$F_{z\ adm.}$	2)	[N]	120	190
$F_{y\ adm.}$	2)	[N]	100	160
$(F_z \cdot L_y)_{adm.}$	2)	[Ncm]	3850	3850
Weight		[kg]	8	9.6
Operating pressure		[bar]	3–6	
Operating medium			air, oiled or unoiled, filtered to 5 µm, dew point < 6°C	
End stop absorption			hydraulic shock-absorbers with fine adjustment	
Repeatability	3)	[mm]	< 0.005	
Check of end positions	4)		inductive proximity switches	
Plug-in pneumatic connection			main cylinder: hose-Ø 6 mm variable stop: hose-Ø 6 mm	
Speed regulation	5)		adjustable exhaust throttles G1/8"	
Noise level	6)	[dBA]	< 64	
Degree of protection			IP 42	
Lead between control system and LEP			max. 17-core incl. 0 V and 24 V, 0.14–0.5 mm^2	
Connection capacity of printed circuit board			for 15 proximity switches	
Ambient: Temperature		[°C]	10–50	
Rel. humidity			< 95% (without condensation)	
Air purity			normal workshop atmosphere	
Guaranty period			2 years from the date of delivery	
Maintenance			oiling the felt pads and rods	
Material			aluminum, steel, bronze, plastic	

1) Difference between the two extended strokes
2) The values quoted for Fz, Fy and Fz · Ly apply to the entire stroke range
3) Scatter of the end setting during 100 successive strokes, conditions as 6)
4) With LED visible from outside
5) The pneumatically actuated variable stop has fixed throttles
6) Measured at 5 bar, maximum stroke, with attached mass m = 6 kg and fully open throttles

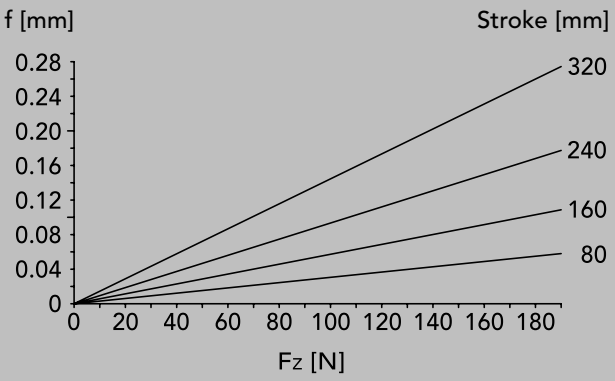
TRAVEL TIME DIAGRAM

(Example see page 20)



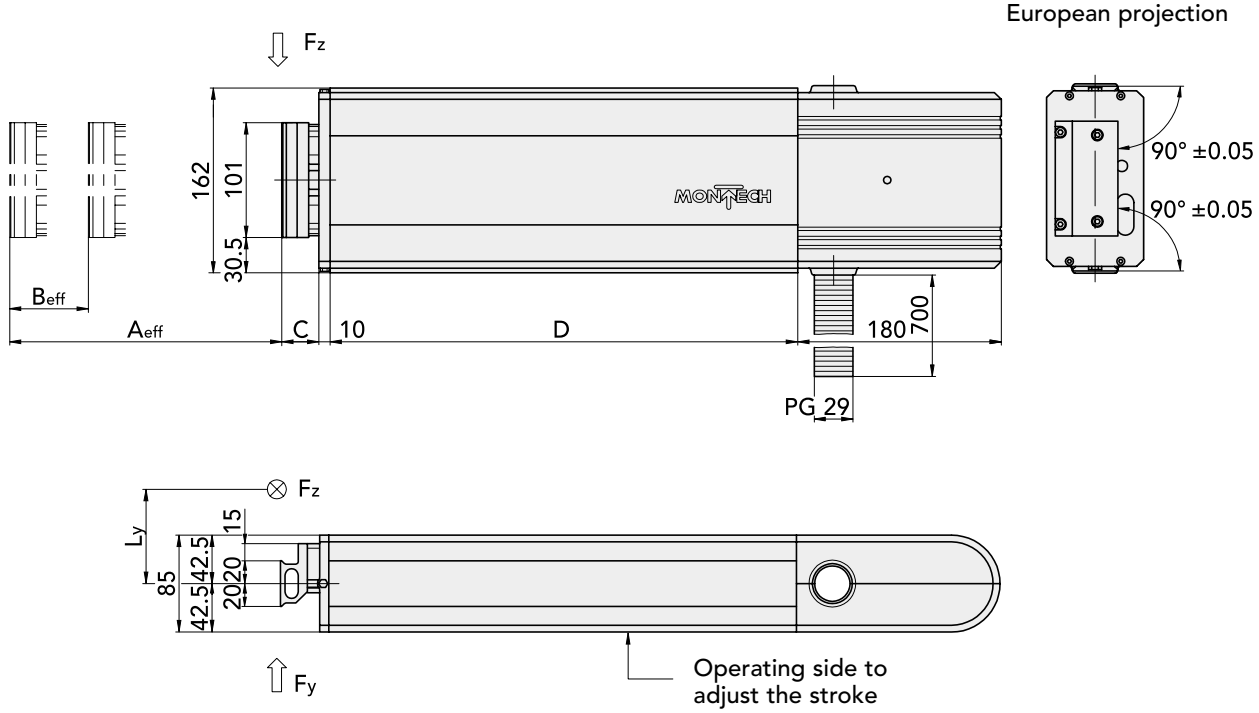
– – – – Extension time
———— Retraction time unthrottled at 5 bar

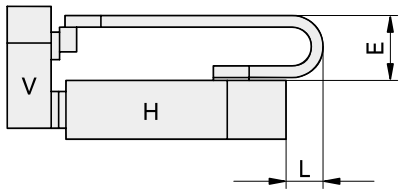
DEFORMATION DIAGRAM



f = Deflection (measured at the clamping plate)
Fz = Sum of all vertical forces

European projection





Standard with power supply chain

	Amax	Bmax	C	D	E	L
LEP-320-2A/H	320	--	32-352	500	175	150
LEP-320-2B/H	320	150	32-352	600	175	150

Aeff Setting range of the first position ($A_{max} \geq A_{eff} \geq 50$)
Beff Set difference in stroke between 1st and 2nd positions ($B_{eff} \leq B_{max}$ and $B_{eff} \leq A_{eff} - 15$)*)
C Distance from body to end face of clamping plate (dovetail)
D Mounting range (dovetail)
E Maximum height of the power supply chain above the body
L Maximum projection of the power supply chain
*) Both conditions must be fulfilled

Ref. No.

LEP-320-2A/H	**40860**
LEP-320-2B/H	**40870**

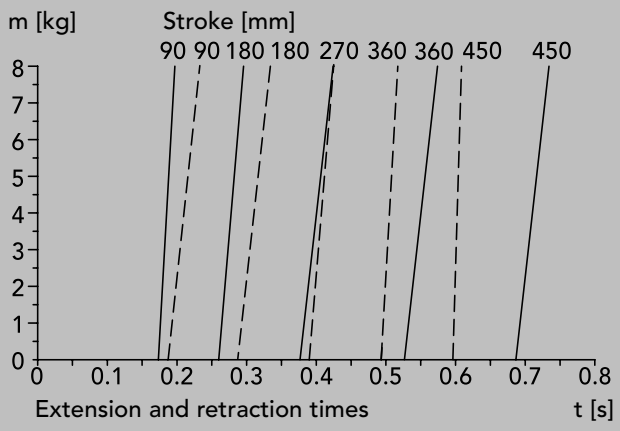
LINEAR UNITS LEP-450-2 A/B HORIZONTAL

			Typ 2A	Typ 2B
Stroke (min./max.)		[mm]	50/450	50/450
Stroke, step range	1)	[mm]	–	0–150
Piston diameter/Piston-rod diameter		[mm]	25/10	25/10
Outward/inward force at 5 bar		[N]	211/177	211/177
Max. permissible additional mass $m_{adm.}$		[kg]	8	8
$F_{z\ adm.}$	2)	[N]	145	145
$F_{y\ adm.}$	2)	[N]	120	120
$(F_z \cdot L_y)_{adm.}$	2)	[Ncm]	3850	3850
Weight		[kg]	10.5	11
Operating pressure		[bar]	3–6	
Operating medium			air, oiled or unoiled, filtered to 5 µm, dew point < 6°C	
End stop absorption			hydraulic shock-absorbers with fine adjustment	
Repeatability	3)	[mm]	< 0.005	
Check of end positions	4)		inductive proximity switches	
Plug-in pneumatic connection			main cylinder: hose-Ø 6 mm variable stop: hose-Ø 6 mm	
Speed regulation	5)		adjustable exhaust throttles G1/8"	
Noise level	6)	[dBA]	< 64	
Degree of protection			IP 42	
Lead between control system and LEP			max. 17-core incl. 0 V and 24 V, 0.14–0.5 mm^2	
Connection capacity of printed circuit board			for 15 proximity switches	
Ambient: Temperature		[°C]	10–50	
Rel. humidity			< 95% (without condensation)	
Air purity			normal workshop atmosphere	
Guaranty period			2 years from the date of delivery	
Maintenance			oiling the felt pads and rods	
Material			aluminum, steel, bronze, plastic	

1) Difference between the two extended strokes
2) The values quoted for Fz, Fy and Fz · Ly apply to the entire stroke range
3) Scatter of the end setting during 100 successive strokes, conditions as 6)
4) With LED visible from outside
5) The pneumatically actuated variable stop has fixed throttles
6) Measured at 5 bar, maximum stroke, with attached mass m = 7.25 kg and fully open throttles

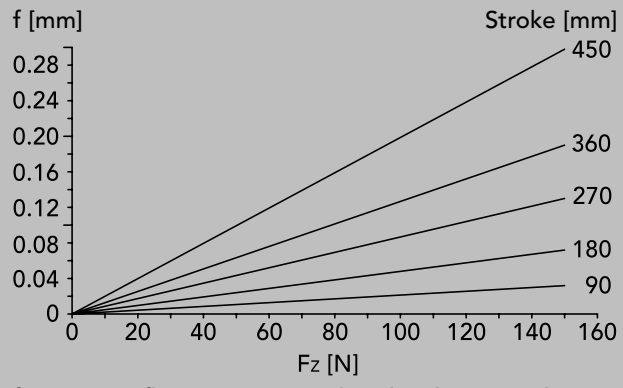
TRAVEL TIME DIAGRAM

(Example see page 20)



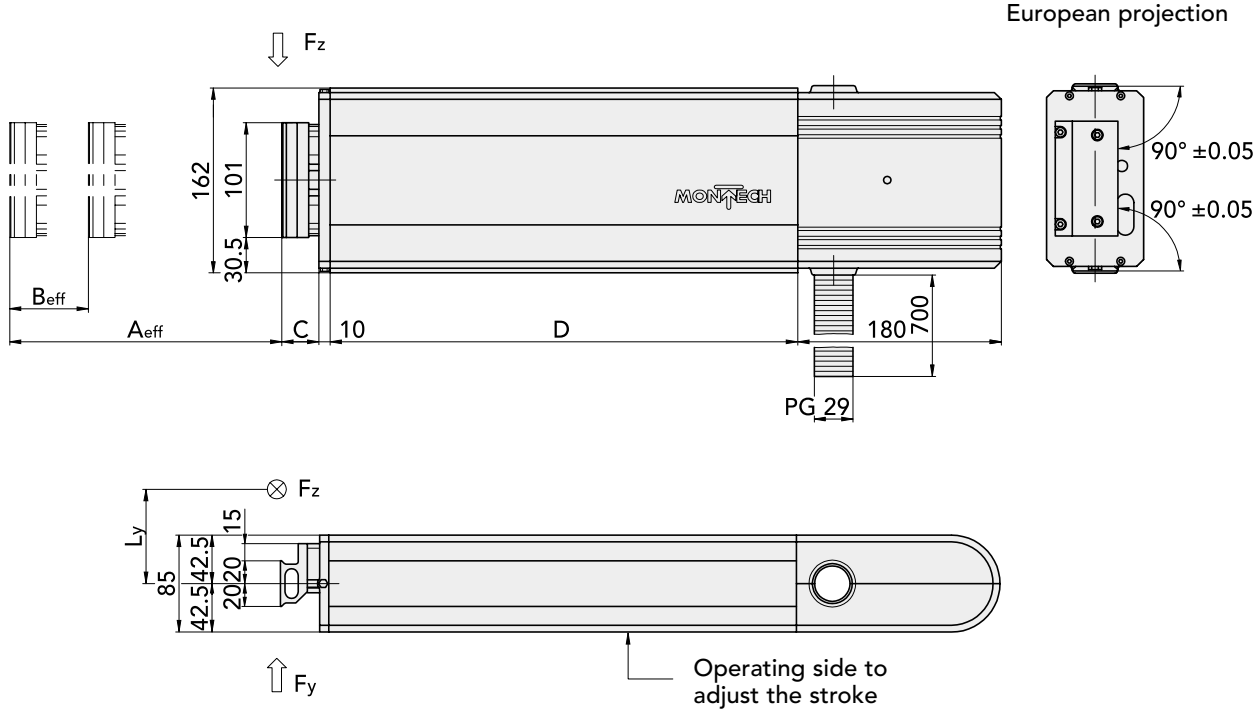
– – – – Extension time
———— Retraction time unthrottled at 5 bar

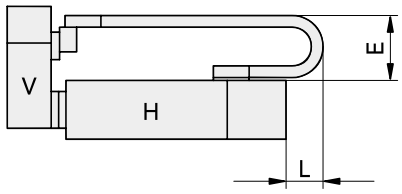
DEFORMATION DIAGRAM



f = Deflection (measured at the clamping plate)
Fz = Sum of all vertical forces

European projection





Standard with power supply chain

	Amax	Bmax	C	D	E	L
LEP-450-2A/H	450	--	32-482	725	175	150
LEP-450-2B/H	450	150	32-482	725	175	150

Aeff Setting range of the first position (Amax ≥ Aeff ≥ 50)
Beff Set difference in stroke between 1st and 2nd positions (Beff ≤ Bmax and Beff ≤ Aeff –15)*)
C Distance from body to end face of clamping plate (dovetail)
D Mounting range (dovetail)
E Maximum height of the power supply chain above the body
L Maximum projection of the power supply chain
*) Both conditions must be fulfilled

Ref. No.

LEP-450-2A/H	**42445**
LEP-450-2B/H	**42550**

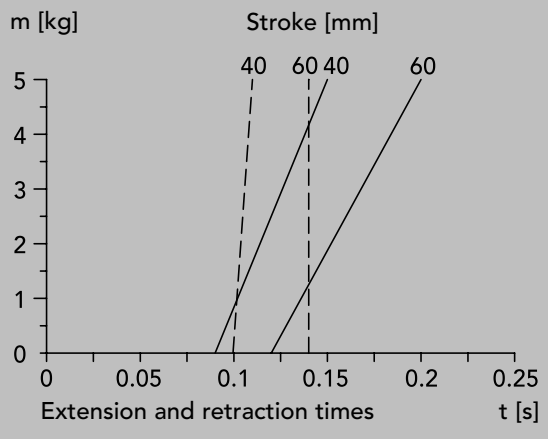
LINEAR UNITS LEP-60-1 A/B VERTICAL

			Typ 1A	Typ 1B
Stroke (min./max.)		[mm]	15/60	15/60
Stroke, step range	1)	[mm]	–	0–50
Piston diameter/Piston-rod diameter		[mm]	16/6	16/6
Max. permissible additional mass $m_{adm.}$		[kg]	5	5
$F_{x\ adm.}$	2)	[N]	150	190
$F_{y\ adm.}$	2)	[N]	80	100
$(F_x \cdot L_y)_{adm.}$	2)	[Ncm]	1200	1200
Weight		[kg]	2.15	2.5
Operating pressure		[bar]	3–6	
Operating medium			air, oiled or unoiled, filtered to 5 µm, dew point < 6°C	
End stop absorption			hydraulic shock-absorbers with fine adjustment	
Repeatability	3)	[mm]	< 0.005	
Check of end positions	4)		inductive proximity switches	
Plug-in pneumatic connection			main cylinder: hose-Ø 4 mm variable stop: hose-Ø 4 mm	
Speed regulation	5)		adjustable exhaust throttles M5	
Noise level	6)	[dBA]	< 64	
Degree of protection			IP 42	
Ambient: Temperature		[°C]	10–50	
Rel. humidity			< 95% (without condensation)	
Air purity			normal workshop atmosphere	
Guaranty period			2 years from the date of delivery	
Maintenance			oiling the felt pads and rods	
Material			aluminum, steel, bronze, plastic	

1) Difference between the two extended strokes
2) The values quoted for F_x, F_y and $F_x \cdot L_y$ apply to the entire stroke range
3) Scatter of the end setting during 100 successive strokes, conditions as 6)
4) With LED visible from outside
5) The pneumatically actuated variable stop has fixed throttles
6) Measured at 5 bar, maximum stroke, with attached mass m = 3 kg and fully open throttles

TRAVEL TIME DIAGRAM

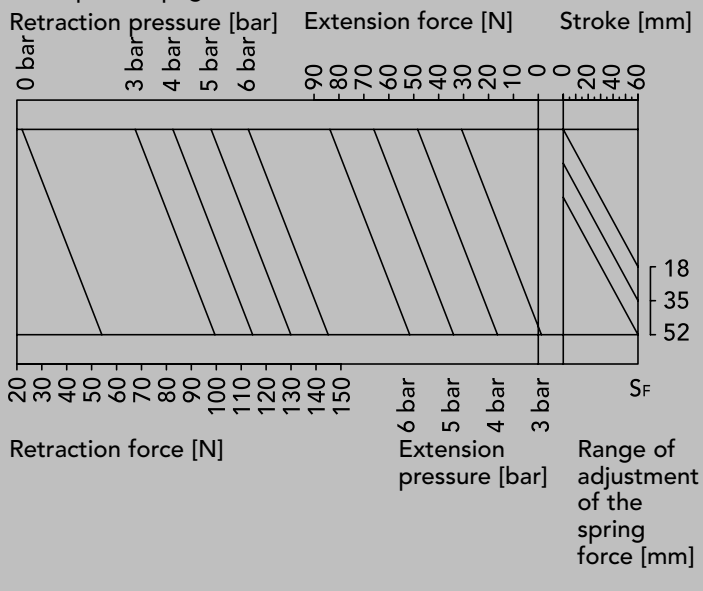
(Example see page 20)



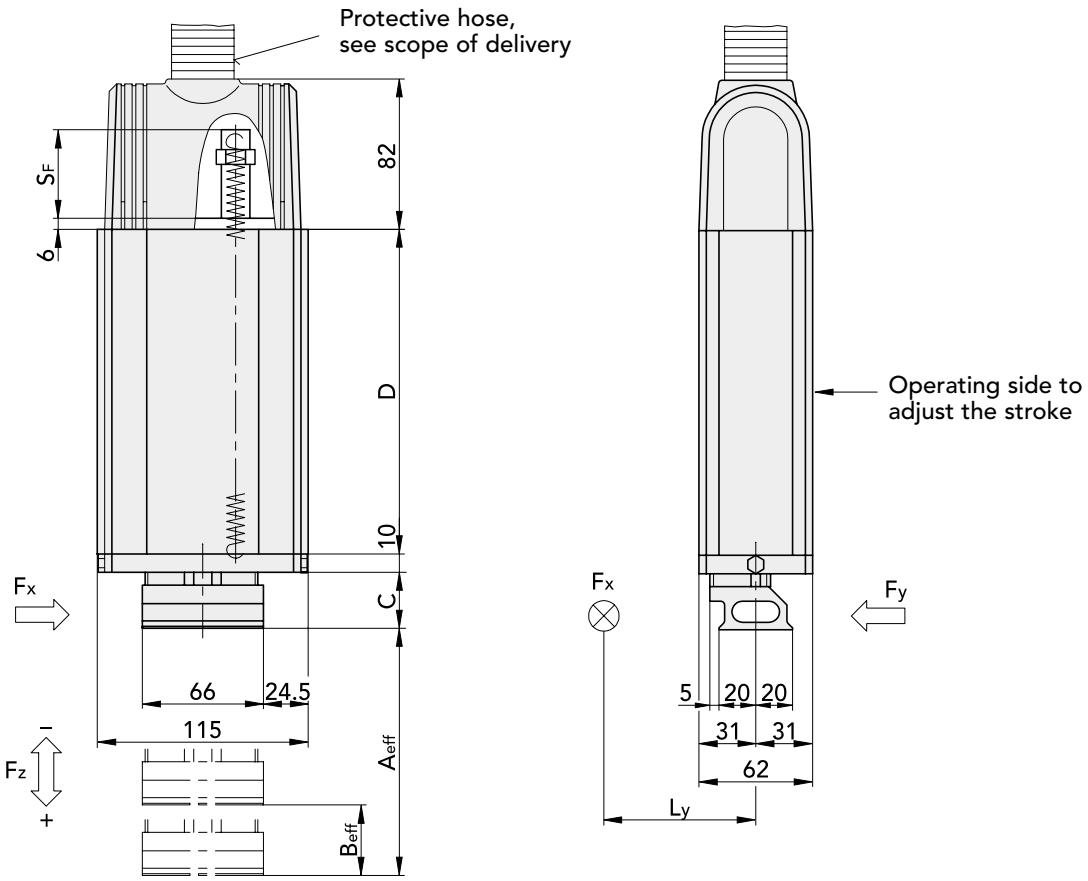
– – – – Extension time
———— Retraction time unthrottled at 5 bar

FORCE DIAGRAM

(Example see page 21)



European projection



	Amax	Bmax	C	D
LEP-60-1A/V	60	--	30-90	177
LEP-60-1B/V	60	50	30-90	208

Aeff Setting range of the first position (Amax ≥ Aeff ≥ 15)
Beff Set difference in stroke between 1st and 2nd positions
(Beff ≤ Bmax and Beff ≤ Aeff –10)*)
C Distance from body to end face of clamping plate (dovetail)
D Mounting range (dovetail)
*) Both conditions must be fulfilled

Ref. No.

LEP-60-1A/V	**40885**
LEP-60-1B/V	**40425**

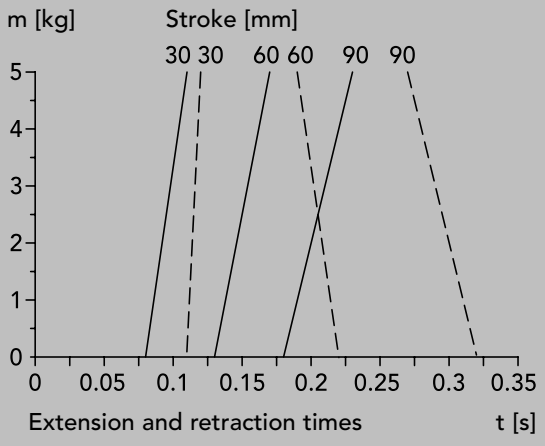
LINEAR UNITS LEP-90-1 A/B VERTICAL

			Typ 1A	Typ 1B
Stroke (min./max.)		[mm]	15/90	15/90
Stroke, step range	1)	[mm]	–	0–80
Piston diameter/Piston-rod diameter		[mm]	16/6	16/6
Max. permissible additional mass $m_{adm.}$		[kg]	5	5
$F_{x\ adm.}$	2)	[N]	130	190
$F_{y\ adm.}$	2)	[N]	70	100
$(F_x \cdot L_y)_{adm.}$	2)	[Ncm]	1200	1200
Weight		[kg]	2.35	3.0
Operating pressure		[bar]	3–6	
Operating medium			air, oiled or unoiled, filtered to 5 µm, dew point < 6°C	
End stop absorption			hydraulic shock-absorbers with fine adjustment	
Repeatability	3)	[mm]	< 0.005	
Check of end positions	4)		inductive proximity switches	
Plug-in pneumatic connection			main cylinder: hose-Ø 4 mm variable stop: hose-Ø 4 mm	
Speed regulation	5)		adjustable exhaust throttles M5	
Noise level	6)	[dBA]	< 64	
Degree of protection			IP 42	
Ambient: Temperature		[°C]	10–50	
Rel. humidity			< 95% (without condensation)	
Air purity			normal workshop atmosphere	
Guaranty period			2 years from the date of delivery	
Maintenance			oiling the felt pads and rods	
Material			aluminum, steel, bronze, plastic	

1) Difference between the two extended strokes
2) The values quoted for F_x, F_y and $F_x \cdot L_y$ apply to the entire stroke range
3) Scatter of the end setting during 100 successive strokes, conditions as 6)
4) With LED visible from outside
5) The pneumatically actuated variable stop has fixed throttles
6) Measured at 5 bar, maximum stroke, with attached mass m = 3 kg and fully open throttles

TRAVEL TIME DIAGRAM

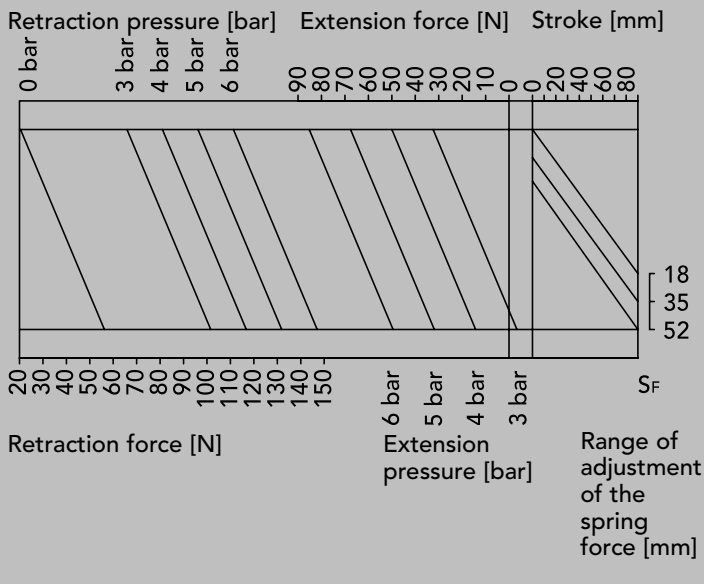
(Example see page 20)



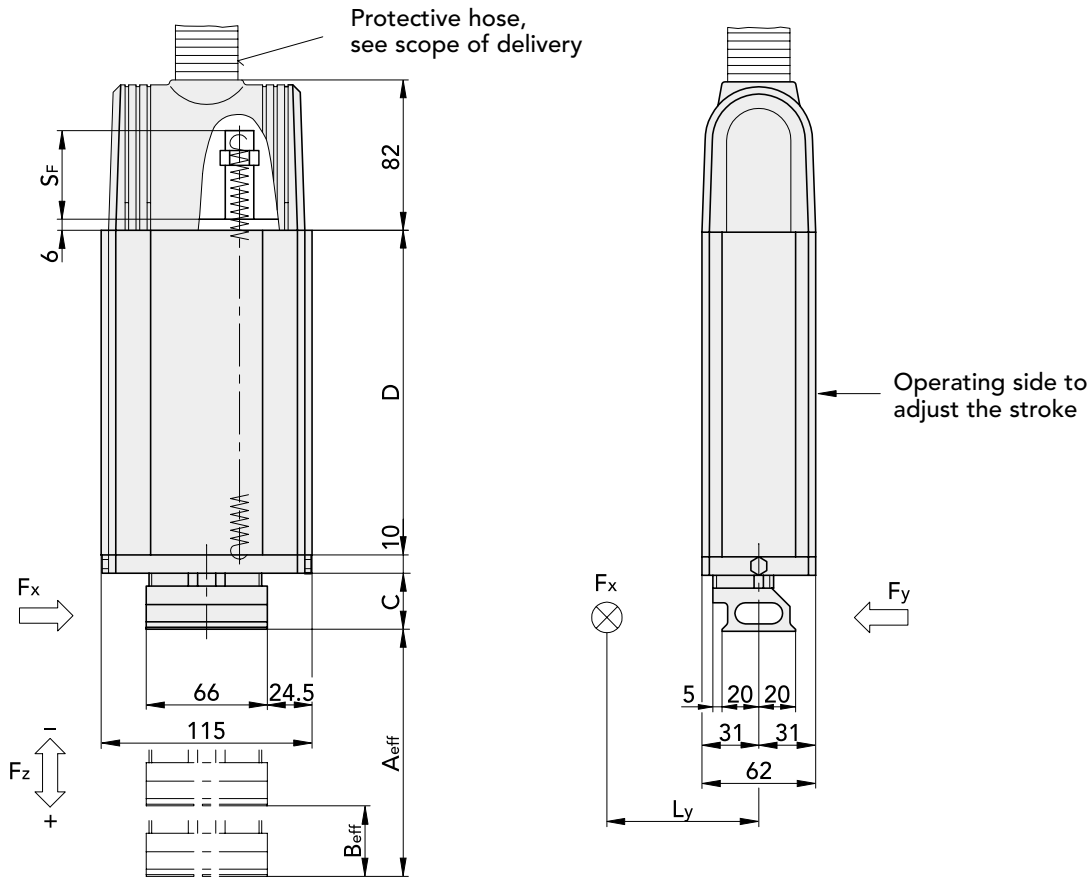
– – – – Extension time
———— Retraction time unthrottled at 5 bar

FORCE DIAGRAM

(Example see page 21)



European projection



	Amax	Bmax	C	D
LEP-90-1A/V	90	--	30-120	208
LEP-90-1B/V	90	80	30-120	265

A_{eff} Setting range of the first position ($A_{max} \geq A_{eff} \geq 15$)
B_{eff} Set difference in stroke between 1st and 2nd positions
($B_{eff} \leq B_{max}$ and $B_{eff} \leq A_{eff} - 10$)*)
C Distance from body to end face of clamping plate (dovetail)
D Mounting range (dovetail)
*) Both conditions must be fulfilled

Ref. No.

LEP-90-1A/V	**40886**
LEP-90-1B/V	**40888**

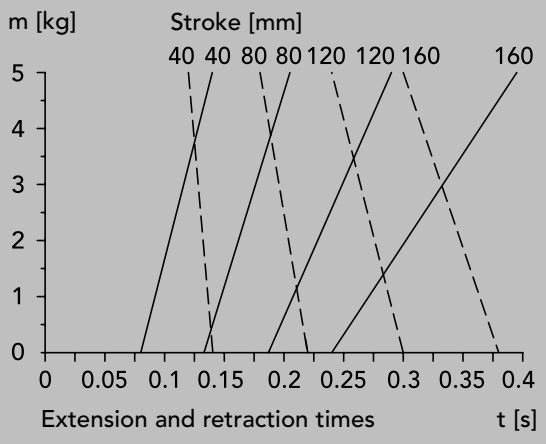
LINEAR UNITS LEP-160-1 A/B VERTICAL

			Typ 1A	Typ 1B
Stroke (min./max.)		[mm]	15/160	15/160
Stroke, step range	1)	[mm]	–	0–100
Piston diameter/Piston-rod diameter		[mm]	16/6	16/6
Max. permissible additional mass $m_{adm.}$		[kg]	5	5
$F_{x\ adm.}$	2)	[N]	95	155
$F_{y\ adm.}$	2)	[N]	50	85
$(F_x \cdot L_y)_{adm.}$	2)	[Ncm]	1200	1200
Weight		[kg]	3.1	3.7
Operating pressure		[bar]	3–6	
Operating medium			air, oiled or unoiled, filtered to 5 µm, dew point < 6°C	
End stop absorption			hydraulic shock-absorbers with fine adjustment	
Repeatability	3)	[mm]	< 0.005	
Check of end positions	4)		inductive proximity switches	
Plug-in pneumatic connection			main cylinder: hose-Ø 4 mm variable stop: hose-Ø 4 mm	
Speed regulation	5)		adjustable exhaust throttles M5	
Noise level	6)	[dBA]	< 64	
Degree of protection			IP 42	
Ambient: Temperature		[°C]	10–50	
Rel. humidity			< 95% (without condensation)	
Air purity			normal workshop atmosphere	
Guaranty period			2 years from the date of delivery	
Maintenance			oiling the felt pads and rods	
Material			aluminum, steel, bronze, plastic	

1) Difference between the two extended strokes
2) The values quoted for F_x, F_y and $F_x \cdot L_y$ apply to the entire stroke range
3) Scatter of the end setting during 100 successive strokes, conditions as 6)
4) With LED visible from outside
5) The pneumatically actuated variable stop has fixed throttles
6) Measured at 5 bar, maximum stroke, with attached mass m = 3 kg and fully open throttles

TRAVEL TIME DIAGRAM

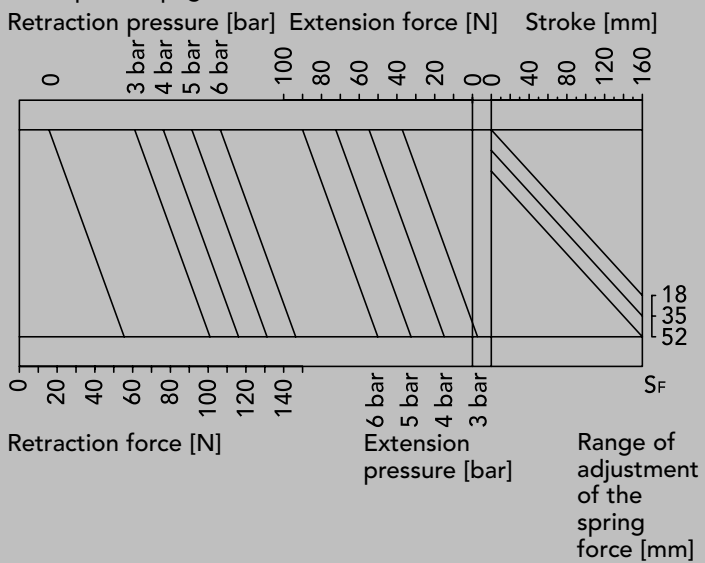
(Example see page 20)



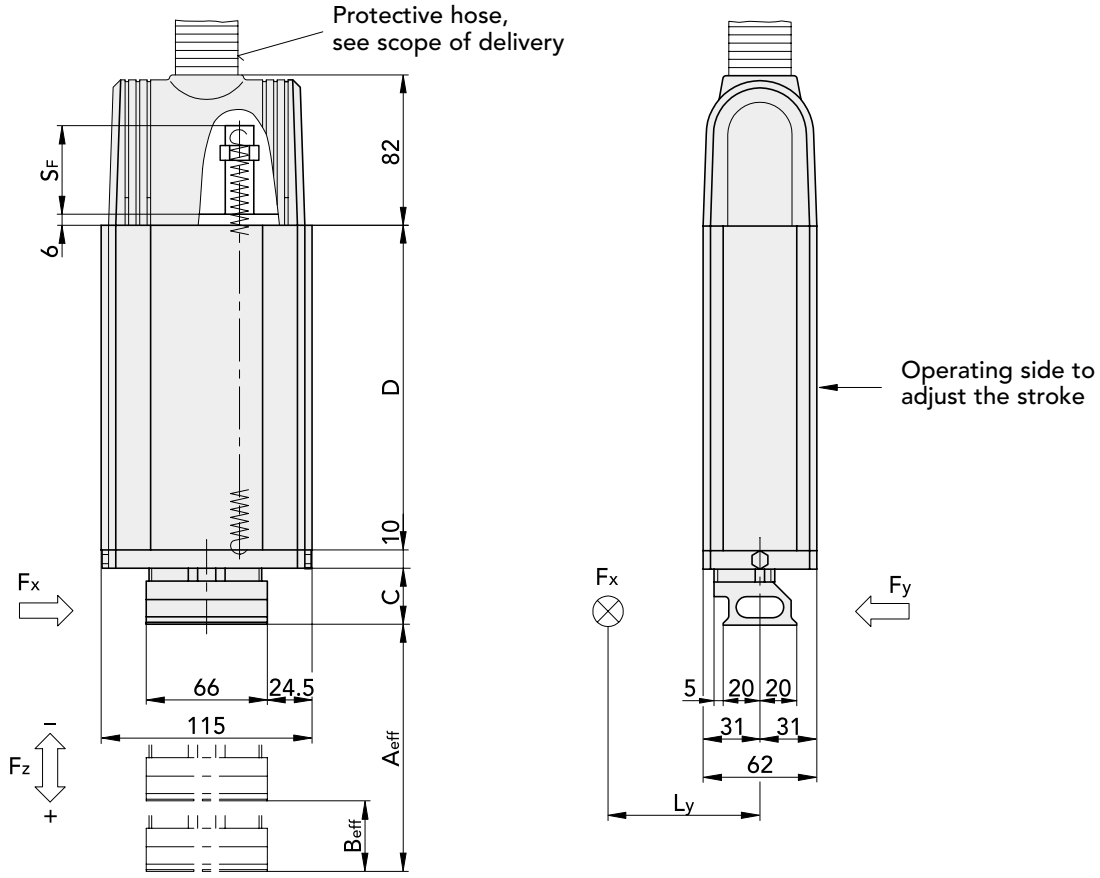
– – – – Extension time
———— Retraction time unthrottled at 5 bar

FORCE DIAGRAM

(Example see page 21)



European projection



	A_{max}	B_{max}	C	D
LEP-160-1A/V	160	--	30-190	277
LEP-160-1B/V	160	100	30-190	345

A_{eff} Setting range of the first position ($A_{max} \geq A_{eff} \geq 15$)
B_{eff} Set difference in stroke between 1st and 2nd positions
($B_{eff} \leq B_{max}$ and $B_{eff} \leq A_{eff} - 10$)*)
C Distance from body to end face of clamping plate (dovetail)
D Mounting range (dovetail)
*) Both conditions must be fulfilled

Ref. No.

LEP-160-1A/V	**42350**
LEP-160-1B/V	**42400**

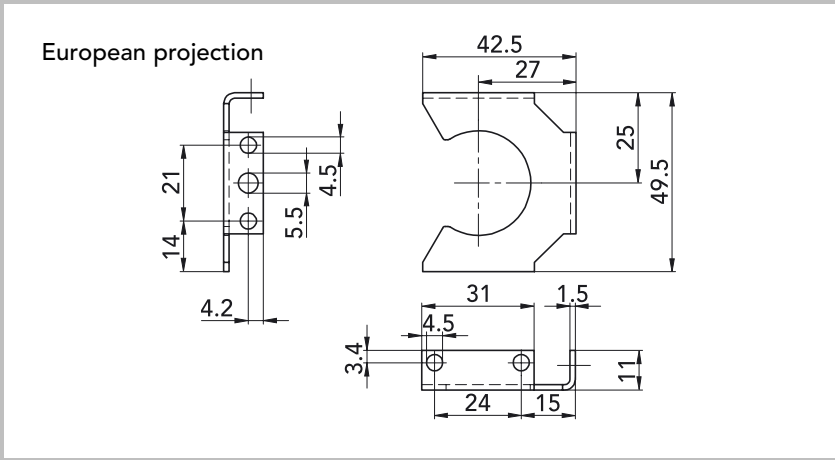
SPECIAL ACCESSORIES

HOSE HOLDER

Used when pneumatic hoses and/or electric cable must be taken from any unit to a point provided for hose connection PG-29. Mounted with an SP-32E-40 on the dovetail system.

Typ SH-29 **42334**

Example: Direct attachment of a slide to a horizontal Linear Unit.



ATTACHMENT SET FOR CABLE-CHAIN

This is necessary when a cable-chain is to be used instead of the standard protective hose. The scope of delivery includes the connection set for the cable-chain, all Quick-Set® fixing angles and sections necessary and a cover cap for the opening of the protective hose.

45543

CABLE-CHAIN

To supplement the attachment set, the stroke-dependent number of power supply chain links is also required.

to LEP-160	160/16	**505071**
to LEP-225	225/21	**505070**
to LEP-320	320/26	**505067**
to LEP-450	450/31	**505066**

SERVICE ACCESSORIES

RUSH-TYPE HAND GUN

for easy relubrication of LEPs, SHAs and SVAs via lubricating nipples. **504720**

OIL CONTAINER (filled), 100 ml

filled with oil Klüber Paraliq P460, suitable for all Montech automation components **504721**