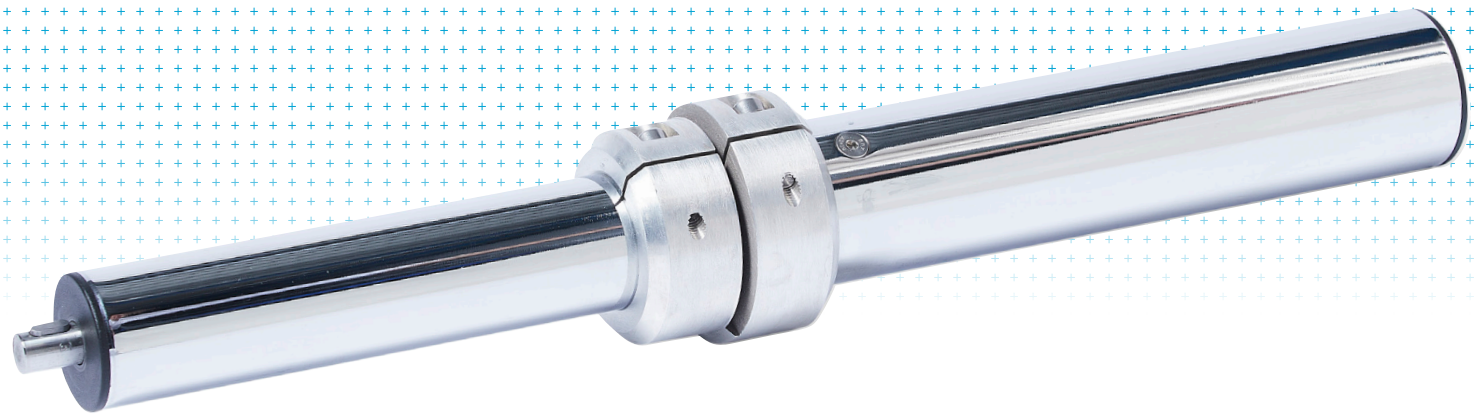
INOCON

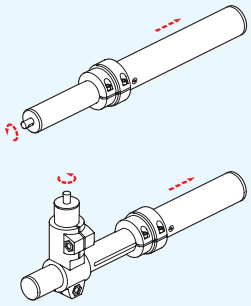


Configurable Telescopic Linear Actuators

Innovative assembly components inocon.de

Contents

Configure your linear actuator: Four steps to the right product



VT1S / VT1W

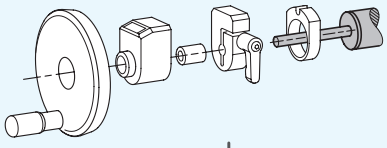
1

Select the linear actuator

In the first step, select the required linear actuator (with or without angular gear) with the correct size, material, stroke, thread direction and spindle pitch.

2

Choose accessories



The stud lengths on the linear actuator vary depending on the chosen accessories. The type overview on page 10 details the range of possible accessories.

3

Ordering the linear actuator

The linear actuator can now be ordered customized for the chosen accessories.

How to order
Standart section

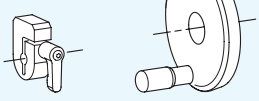
VT1S - 30 - ST - 250 - 100 - 130 - 100 - RH-4-B

1	Outer diameter d_1
2	Material
3	Stroke l_1

4

Ordering the accessories

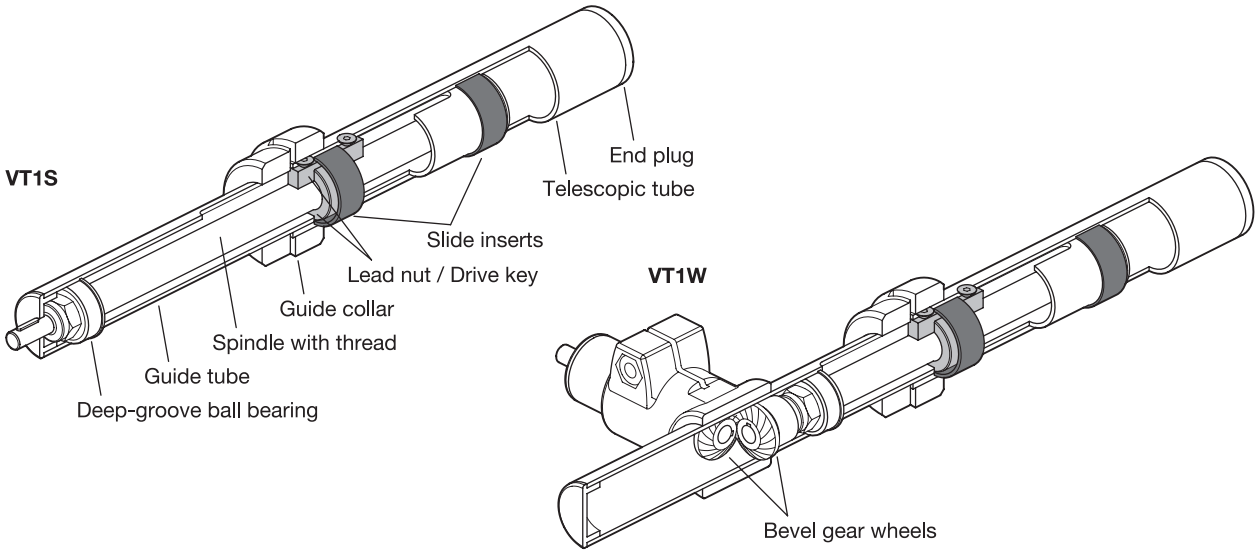
The accessories must be ordered separately using the corresponding standard.



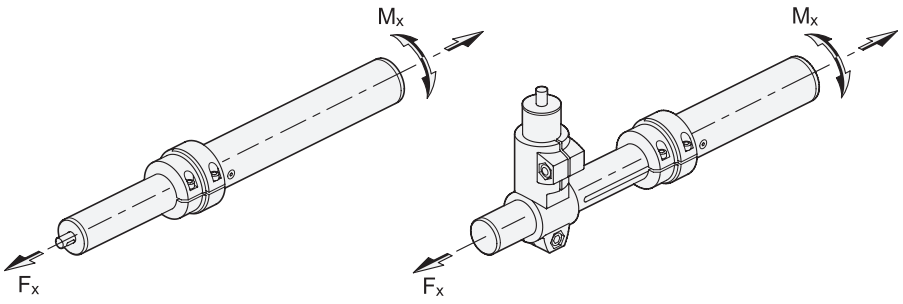
e.g. VZK e.g VZH

Technical Description

The linear actuators have a guide nut that is moved axially by means of the threaded spindle with ball barings.
The follower prevents twisting and forms the connection to the outer tube.
Tube clamps are available in a wide variety of different designs for fastening the linear actuators.



Load Data



Ø Linear actuator	Fx in N	Mx in Nm
18	400	1,5
30	850	6,5
40	1100	15
50	1750	29

Positioning Prescision

The positioning precision indicates the amount of deviation with which a specific position can be reached. The table indicates the maximum occurring deviation.

	Trapezoidal thread drive	Fine thread drive
max. deviation	±0,1 mm / 300 mm Stroke	±0,1 mm / 300 mm Stroke

Repeatability

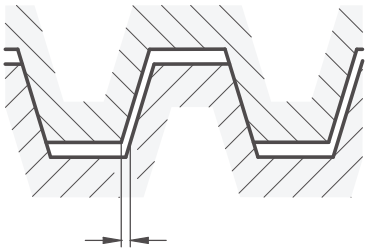
The repeatability indicates how precisely a position can be reached multiple times under identical conditions. In general, the repeatability is higher than the positioning precision because manufacturing tolerances have no influence on the repeatability. With the trapezoidal and fine thread drives used, the repeatability is ±0.05 mm.

Guidance Accuracy

The precision guide tubes of the linear actuators are made of steel as per DIN EN 10305-4 and are also chrome plated. The stainless steel design makes use of stainless steel precision tubes as per EN 10216-5.

Backlash on Reversal

The play between the thread flanks of the spindle and the spindle nut results in idling when the drive direction is changed. Before the connector moves in the opposite direction, this play must first be overcome. This backlash on reversal prevents the spindle nut and spindle from jamming up. For linear actuators with trapezoidal and fine thread spindles, the backlash on reversal is 0.2 mm.



Self-Braking

Because the pitch angle of trapezoidal and fine thread spindles is smaller than the angle of friction, these spindles are self-braking. It is not possible to push the linear actuator connector. The spindle can also be additionally secured with an external spindle lock by means of clamping plates.

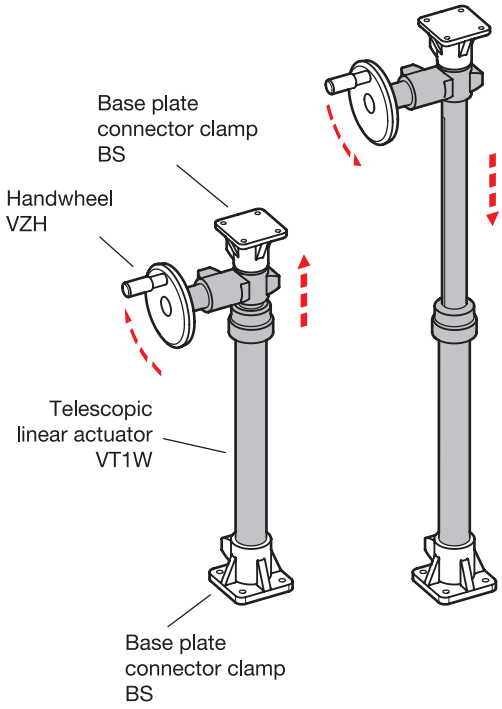
Lifespan

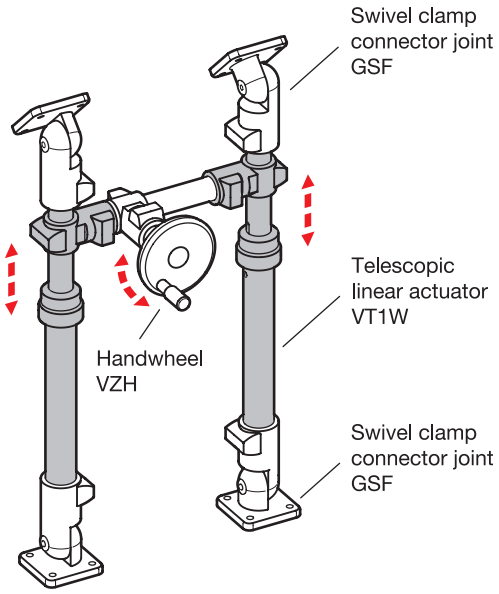
The lifespan of linear actuators in a given application depends on the expected environmental conditions.

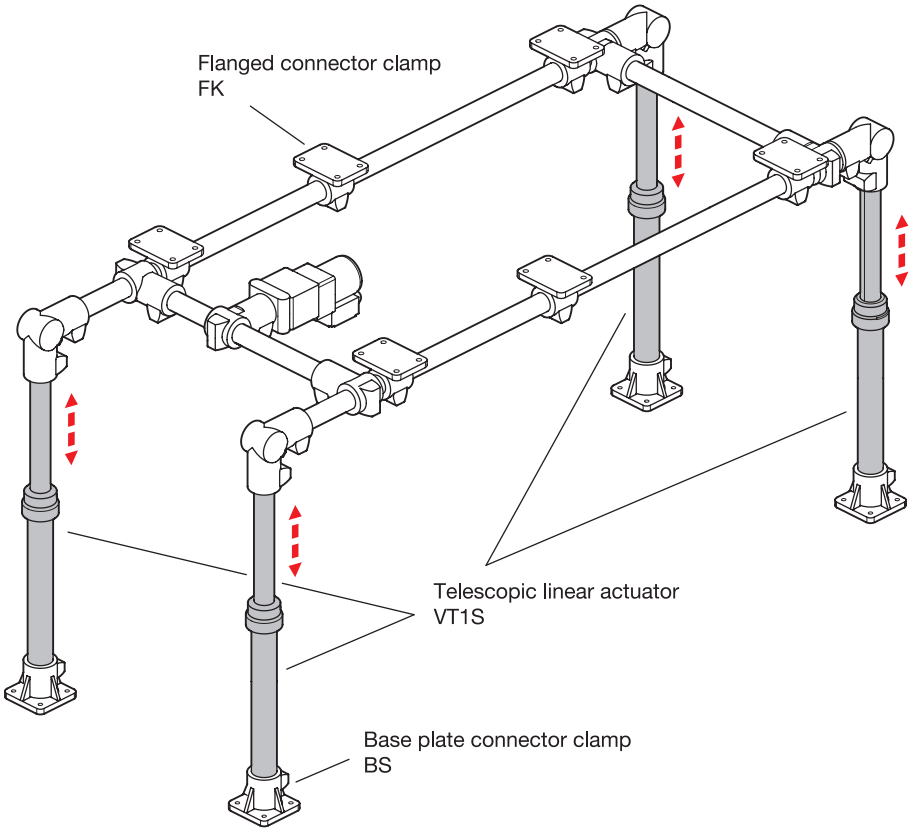
The following factors come into play:
- Installation position
- Load moved
- Movement speed
- Movement frequency
- Ambient temperature
- Compliance with maintenance intervals

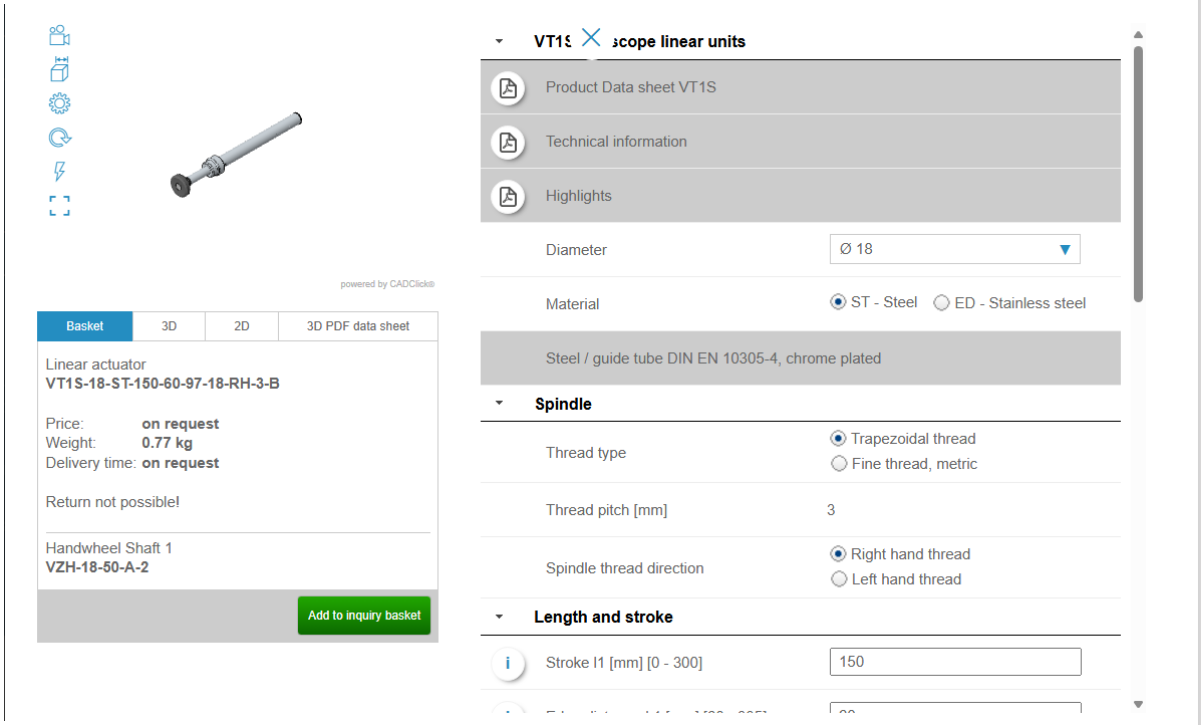
Environmental Conditions

The linear actuators are designed for ambient temperatures from -20 °C to +100 °C. In general, large temperature fluctuations and condensing humidity should be avoided.


Base plate
connector clamp
BS
Handwheel
VZH
Telescopic
linear actuator
VT1W
Base plate
connector clamp
BS


Swivel clamp
connector joint
GSF
Telescopic
linear actuator
VT1W
Handwheel
VZH
Swivel clamp
connector joint
GSF


Flanged connector clamp
FK
Telescopic linear actuator
VT1S
Base plate connector clamp
BS



Simple online configuration and ordering at inocon.com

The new online configurator makes configuring your individual linear actuator incredibly easy while providing a complete overview of the various designs and possible accessories. When finished, you can even place an order directly from the configurator.

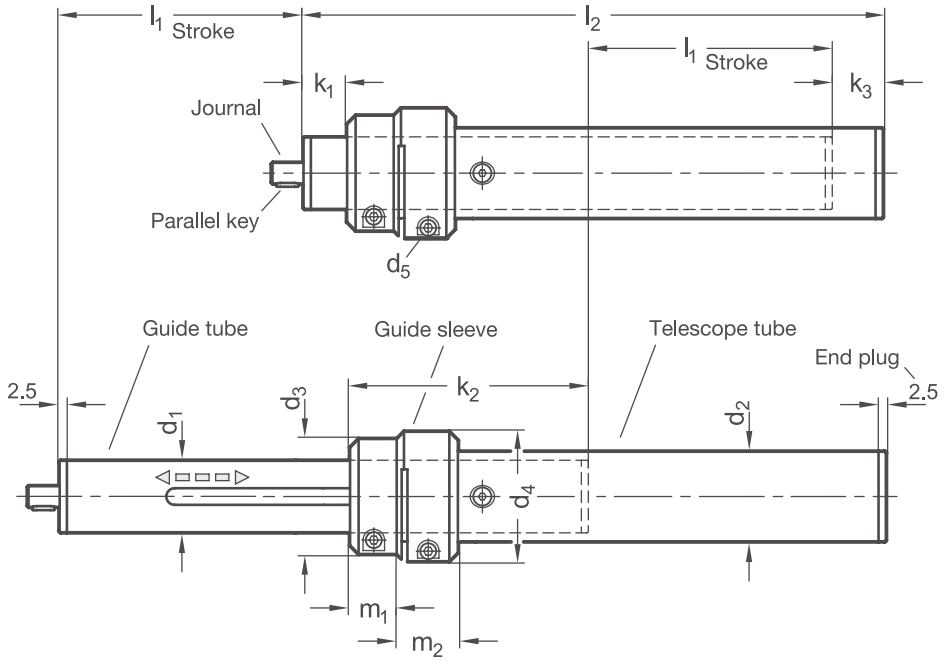
PRODUCT INFO

The tubes of **telescope linear units VT1S** are made of chrome-plated steel or bright, seamless stainless steel precision tubes. A continuous spindle with ball bearings on each side is installed in the guide tube. The attached spindle nut transmits the linear movements to the telescope tube, initiating an adjustment of the telescope linear unit travel distance.

The guide tube is fitted with sliding inserts and forms a solid linear round guide together with the telescope tube. The linear unit can be adjusted for low backlash or clamped in place via the slitted guide sleeve. The drive is situated on the end, allowing the telescope linear unit to be fastened from the side. Depending on the type of fastening, the drive of the linear unit remains at the fastening point or is carried along by the travel movement.

Accessory parts are listed in the tables and are already taken into account when selecting the linear units. This ensures that the length of the shaft journal z is correct for attaching the accessories, for example. The accessories are not included with the linear units and must be ordered separately.

RoHS-compliant product



d_1	Stroke max. l_1	Edge distance 1 min. k_1	Guide length min. k_2	Edge distance 2 min. k_3	d_2	d_3	d_4	d_5	Total length max. ($k_1 + k_2 + l_1 + k_3$) l_2	m_1	m_2
18	300	60	72	18	25	34	40	M 4	600	13	19
30	400	80	80	20	35	49	54	M 5	1000	15,5	20,5
40	600	110	115	20	50	64	82	M 6	1200	26	34
50	700	110	130	30	60	75	85	M 6	1300	25	35

Material
w

ST	Steel • Guide tube, DIN EN 10305-4: Steel, chrome-plated • Trapezoidal / fine thread spindle: Steel, with ball bearing • Spindle nut: Red brass / end plug: Plastic / Guide sleeve: Aluminum
ED	Stainless steel • Guide tubes, EN 10216-5: Stainless steel AISI 304 • Trapezoidal / fine thread spindle: Stainless steel AISI 303, with ball bearing • Spindle nut: Red brass / end plug: Plastic / Guide sleeve: Aluminum

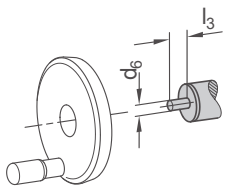
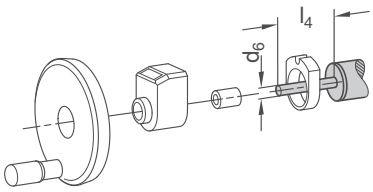
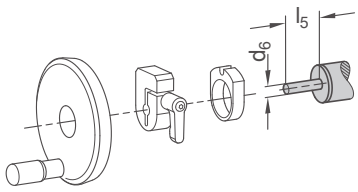
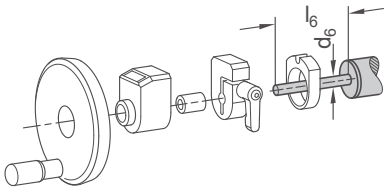
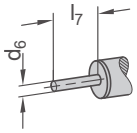
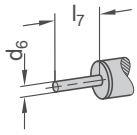
Spindle thread direction
r

RH	Right-hand thread
LH	Left-hand thread

d_1	Spindle pitch **p**		Journal diameter d_6	Journal length B l_3	Journal length D l_4	Journal length E l_5	Journal length F l_6	individual pin length l_7
	Trapezoidal thread	Fine thread, metric						
18	3	1	6	16	44	-	-	16...65
30	4	1	8	16	52	31	67	16...67
40	4	1	12	17	59	32	74	17...74
50	4	1	12	18	60	33	75	18...75

d_1	**Accessories:**				
	Torque support	Clamping plate	Position indicator		Handwheel
30	VZDR	VZK	VZPM	VZPE	VZH
40	VZDR	VZK	VZPM	VZPE	VZH

Journal
z

B	Journal for handwheel	D	Journal for position indicator and handwheel	E	Journal for spacer plate and handwheel
 Journal length l_3		 Journal length l_4		 Journal length l_5	
F	Journal for spacer plate, position indicator and handwheel	Gxx	Individual length with keyway (for xx enter value from column l_7)	Hxx	Individual length without keyway (for xx enter value from column l_7)
 Journal length l_6		 Journal length l_7		 Journal length l_7	

2A

ACCESSORIES

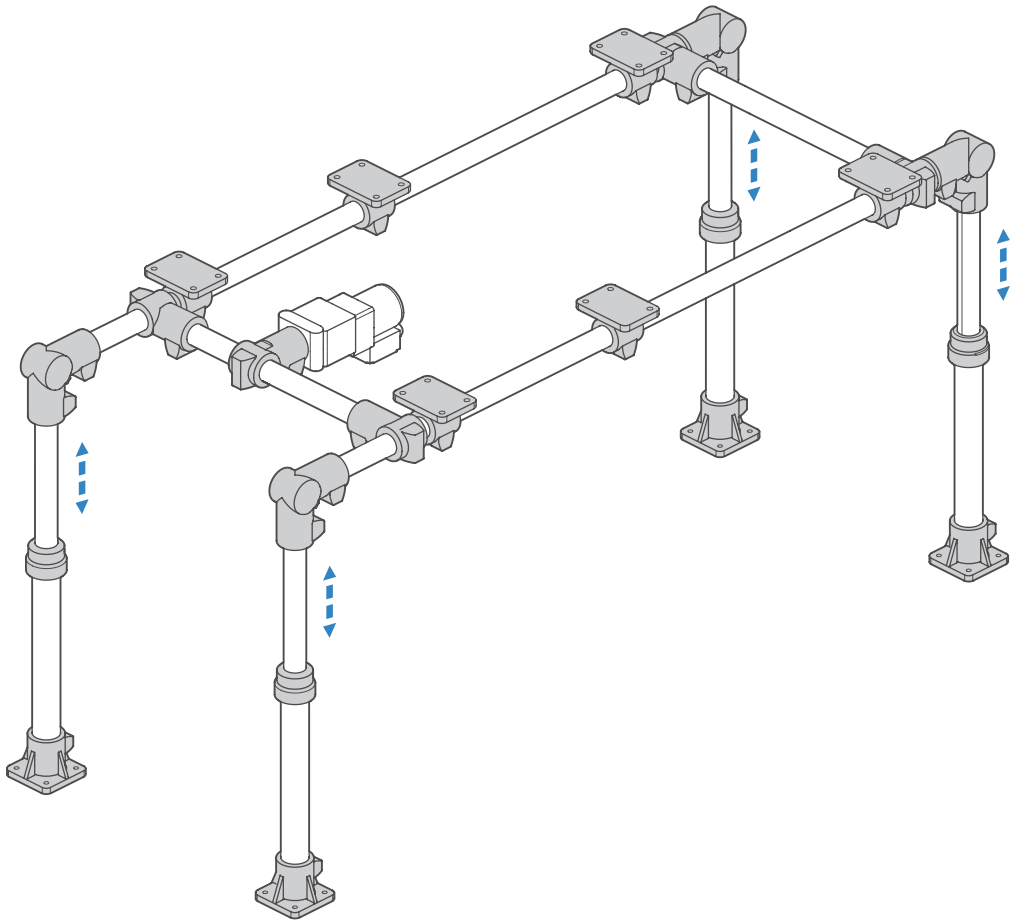
- Handwheels **VZH** → *see page 11*
- Position indicators **VZPM / VZPE** → *see page 13 / 14*
- Clamping plates **VZK** → *see page 12*
- Torque supports **VZDR** → *see page 15*

ORDER KEY

Name key | Supplemental key

VT1S - d_1 - w - l_1 - k_1 - k_2 - k_3 - r - p - z

- Telescope linear unit
- Outer diameter
- Material
- Stroke
- Edge distance 1
- Guide length
- Edge distance 2
- Spindle thread direction
- Spindle pitch
- Journal z



VT1W Telescope linear units with side drive

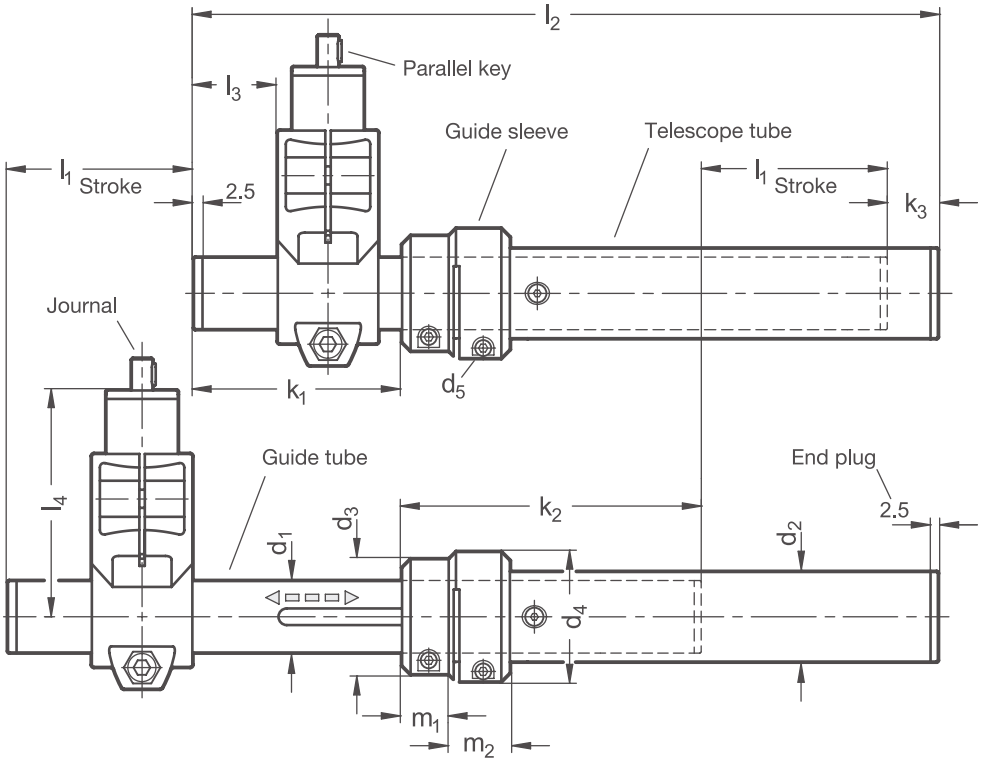
PRODUCT INFO

The tubes of the **telescope linear units VT1W** are made of chrome-plated steel or bright, seamless stainless steel precision tubes. A continuous spindle with ball bearings on each side is installed in the guide tube. The attached spindle nut transmits the linear movements to the telescope tube, initiating an adjustment of the telescope linear unit travel distance.

The guide tube is fitted with sliding inserts and forms a solid linear round guide together with the telescope tube. The linear unit can be adjusted for low backlash or clamped in place via the slitted guide sleeve. The drive is offset by 90 degrees by means of an angle gear, allowing the telescope linear unit to be fastened at the end. Depending on the type of fastening, the drive of the linear unit remains at the fastening point or is carried along by the travel movement.

Accessory parts are listed in the tables and are already taken into account when selecting the linear units. This ensures that the length of the shaft journal z is correct for attachment of the accessories, for example. The accessories are not included with the linear units and must be ordered separately.

RoHS-compliant product



d_1	Stroke max. l_1	Edge distance 1 min. k_1	Guide length min. k_2	Edge distance 2 min. k_3	d_2	d_3	d_4	d_5	Total length max. (retracted) ($k_1 + k_2 + l_1 + k_3$) l_2	l_3	l_4	m_1	m_2
18	300	80	72	18	25	34	40	M 4	600	45	67	13	19
30	400	125	80	20	35	49	54	M 5	1000	70	86	15,5	20,5
40	600	165	115	20	50	64	72	M 6	1200	100	125	26	34
50	700	170	130	30	60	75	85	M 6	1300	100	125	25	35

Material
w

ST	Steel • Guide tube, DIN EN 10305-4: Steel, chrome-plated • Trapezoidal / fine thread spindle: Steel, with ball bearing • Spindle nut: Red brass / end plug: Plastic / Guide sleeve: Aluminum
ED	Stainless steel • Guide tubes, EN 10216-5: Stainless steel AISI 304 • Trapezoidal / fine thread spindle: Stainless steel AISI 303, with ball bearing • Spindle nut: Red brass / end plug: Plastic / Guide sleeve: Aluminum

Spindle thread direction
r

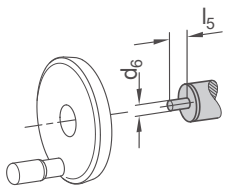
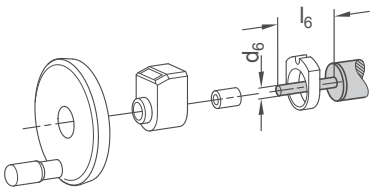
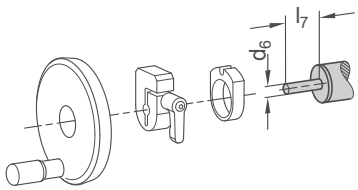
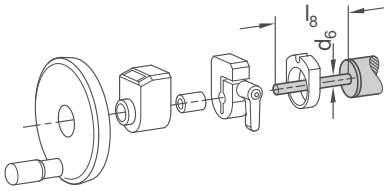
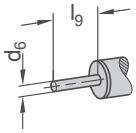
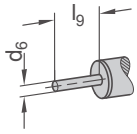
RH	Right-hand thread
LH	Left-hand thread

d_1	Spindle pitch **p**		Journal diameter d_6	Journal length B l_5	Journal length D l_6	Journal length E l_7	Journal length F l_8	individual journal length l_9
	Trapezoidal thread	Fine thread, metric						
18	3	1	6	16	44	-	-	16...65
30	4	1	8	16	52	31	67	16...67
40	4	1	12	17	59	32	74	17...74
50	4	1	12	18	60	33	75	18...75

Accessories:

d_1	Torque support	Clamping plate	Position indicator		Handwheel
30	VZDR	VZK	VZPM	VZPE	VZH
40	VZDR	VZK	VZPM	VZPE	VZH

Journal
z

B	Journal for handwheel	D	Journal for position indicator and handwheel	E	Journal for spacer plate and handwheel
 Journal length l_5		 Journal length l_6		 Journal length l_7	
F	Journal for spacer plate, position indicator and handwheel	Gxx	Individual length with keyway (for xx enter value from column l_9)	Hxx	Individual length without keyway (for xx enter value from column l_9)
 Journal length l_8		 Journal length l_9		 Journal length l_9	

ACCESSORIES

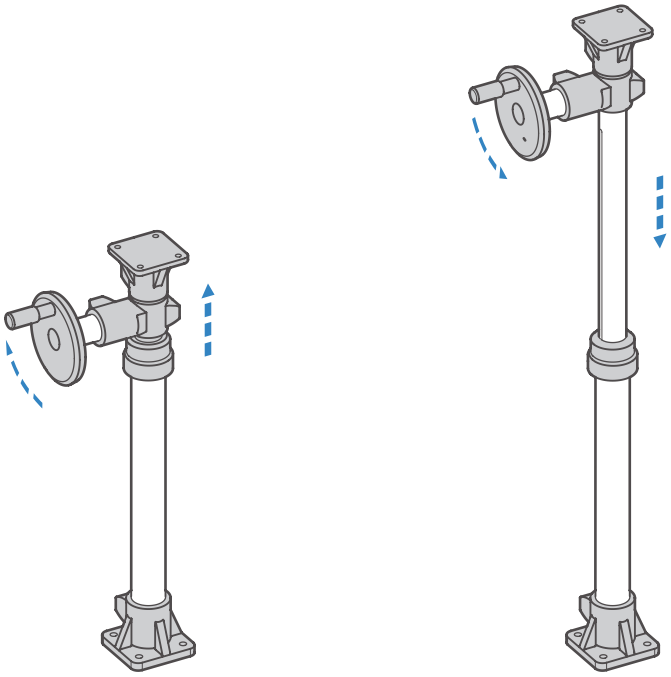
- Handwheels **VZH** → *see page 11*
- Position indicators **VZPM / VZPE** → *see page 13 / 14*
- Clamping plates **VZK** → *see page 12*
- Torque supports **VZDR** → *see page 15*

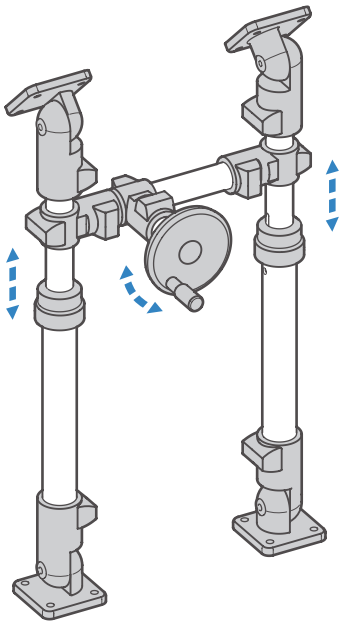
ORDER KEY

Name key | Supplemental key

VT1W - d_1 - w - l_1 - k_1 - k_2 - k_3 - r - p - z

- Telescope linear unit
- Outer diameter
- Material
- Stroke
- Edge distance 1
- Guide length
- Edge distance 2
- Spindle thread direction
- Spindle pitch
- Journal z





Accessories for Configurable Telescopic Linear Actuators

Overview of Types

The accessories include parts that supplement the linear actuators or improve their usability. For example, handwheels can be used for operating the linear actuators, position indicators for monitoring the position and clamping plates for locking the spindle in place. The torque supports provide protection against twisting when installing a position indicator and clamping plate. The matching accessories can be selected on the various standard sheets based on the diameter of the chosen linear actuator.

Norm		Eigenschaften
VZH page 11		Handwheels VZH are used for manually operating linear actuators and are available with a variety of handle designs.
VZK page 12		Clamping plates VZK are used to lock the threaded spindle to prevent unintended movement out of the current position.
VZPM page 13		Position indicators VZPM indicate the current position of the linear actuator connector using a mechanical counter. The supplied adapter bushing serves as the connection between the stud of the linear actuator connector and the hollow shaft of the position indicator.
VZPE page 14		Position indicators VZPE indicate the current position of the linear actuator connector using a mechanical counter. The supplied adapter bushing serves as the connection between the stud of the linear actuator connector and the hollow shaft of the position indicator.
VZDR Seite 15		Torque supports VZDR are needed for installing clamping plates and position indicators on round linear actuators.

PRODUCT INFO

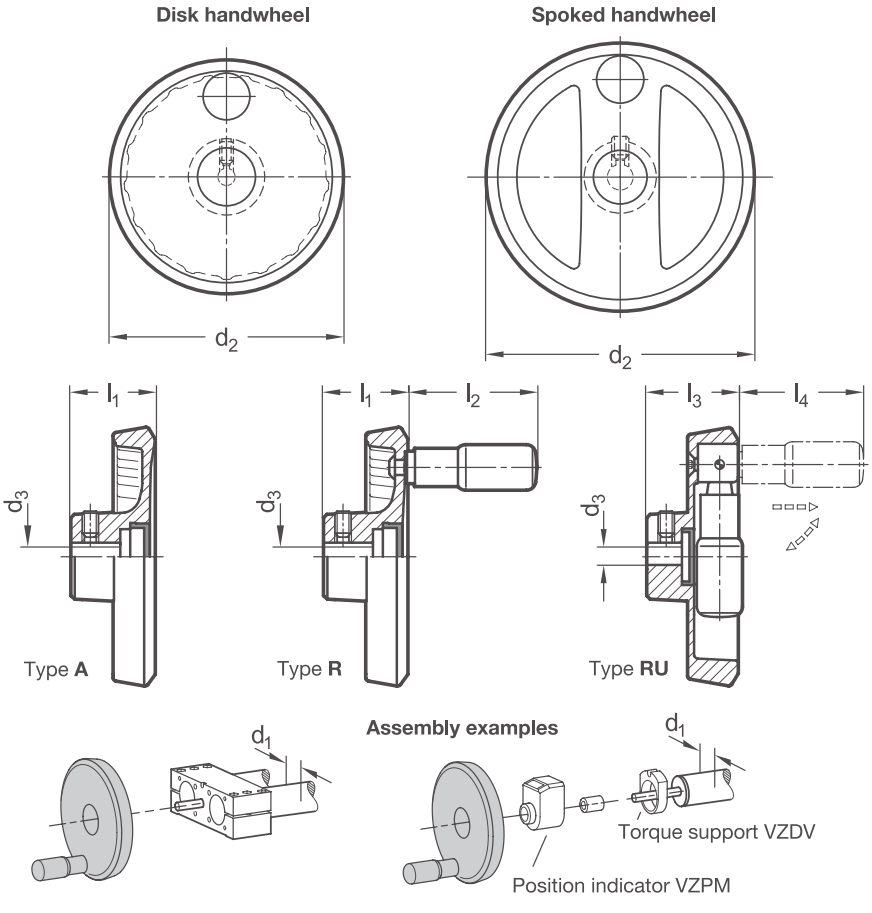
Handwheels VZH are intended for attachment to linear units as well as drive units and transfer units. The manual rotational movement is transmitted to the spindle or shaft via the keyway, resulting finally in a longitudinal movement of the guide element. A grub screw axially secures the hand wheel against the journal or spindle journal.

Dimensions such as outer diameter and hub bores are matched to the size of the respective linear, drive or transfer unit and can be found in the table. The smaller diameters are designed as disk handwheels and the larger diameters as spoked handwheels.

For each type, the handwheels can be ordered with or without revolving cylindrical handle as well as with a revolving retractable handle.

The handwheels are made of black powder-coated die-cast aluminum. The zinc-plated or black oxide-finished steel spindle parts allow the black plastic handles to rotate.

RoHS-compliant product



d_1 Linear unit nominal diameter	d_2 Disk handwheel	Spoked handwheel	d_3 H7	l_1 ≈	l_2 ≈	l_3 ≈	l_4 ≈
18	50*	-	6	26	20	-	-
	80*	-	6	26	43,5	-	-
25	63	-	8	27	20	-	-
	100	-	8	30	58	39	56,5
30	63*	-	8	27	20	-	-
	100	-	8	30	58	39	56,5
40	100	-	12	30	58	39	56,5
	-	125	12	33,5	61,5	45	60,5
50	-	140	12	36,5	76,5	47	75,5
60	-	160	14	39,5	76,5	48	75,5

*only available in form A and R

Type
t

A	Without handle
R	With rotating handle
RU	With rotating, retractable handle (only available for d_2 100-160)

Surface
o

2	Textured powder-coated, Black RAL 9005

FOR USE WITH

– Single tube linear units, round

– Single tube linear units, square

– Double tube linear units

– Profile linear units

– Drive and transfer units

– Angle gears

ORDER KEY

VZH - d_1 - d_2 - t - o

Handwheel
Linear unit nominal diameter
Handwheel diameter
Type
Surface

ON REQUEST

Plastic handwheels with Ø 50 for d_1 18

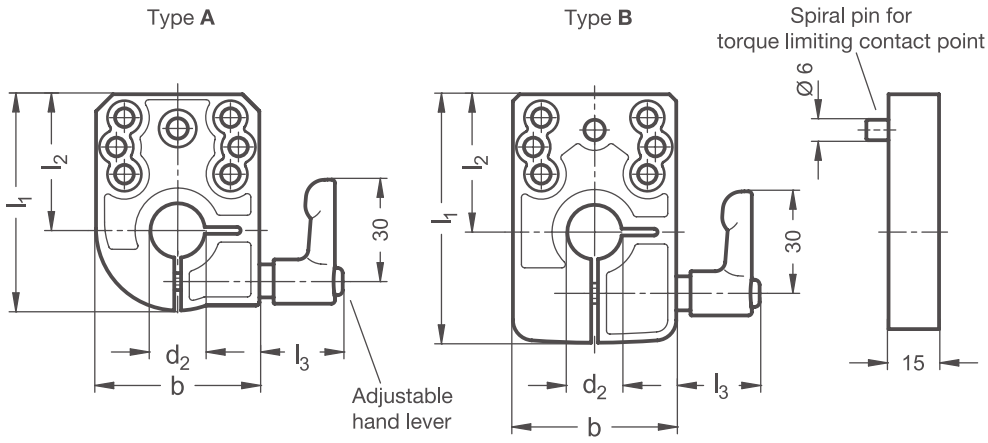
PRODUCT INFO

Clamping plates VZK can be used to clamp the spindles of linear units after completing a movement. The clamping bore diameter is sufficiently reduced by the adjustable hand lever that the spindle journal of the linear unit no longer turns, preventing accidental shifting of the established position.

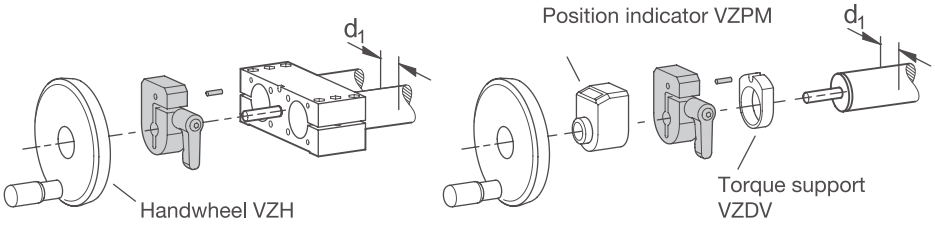
The clamping plate must be chosen based on the size of the linear unit, as indicated in the table. A torque support VZDR / VZDV or VZDD is additionally needed for Ø 18 to install a clamping plate. The spiral pin establishes a positive connection between the clamping plate and the torque support to prevent turning along.

The clamping plates and adjustable hand levers are made of black powder-coated die-cast zinc, and the clamping threaded inserts are made of zinc-plated steel.

RoHS-compliant product



Assembly examples



d_1 Linear unit nominal diameter	b	d_2	l_1		l_2		l_3	Combinable with position indicator	
			Type A	Type B	Type A	Type B		Type A	Type B
30	33	8	47	55	30,5	30,5	24,5	VZPM	VZPE
40	48	12	66,5	73	43	40,5	24,5	VZPM	VZPE
50	48	12	66,5	73	43	40,5	24,5	VZPM	VZPE
60	48	14	66,5	73	43	40,5	24,5	VZPM	VZPE

Type t	
A	For mechanical position indicators (also usable without position indicator, e. g. only with handwheel)
B	For electronic position indicators

FOR USE WITH

– Single tube linear units, round, with torque support VZDR

– Single tube linear units, square, with torque support VZDV

– Double tube linear units with torque support VZDD

ORDER KEY **VZK - d_1 - t**

Clamping plate

Linear unit nominal diameter

Type

PRODUCT INFO

Position indicators VZPM indicate the distance travelled by linear units. They are mounted to the spindle journal of a linear unit using an adapter bushing and a grub screw.

The counter of the position indicator should be selected from the table based on the spindle thread pitch and direction and the size of the linear unit. Other options, such as installation orientation or housing color, can be defined in the article number.

The polyamide housing is ultrasonically welded, making it especially sturdy, tight and compact. The position indicator is also temperature-resistant to 80 °C and resistant to oils and solvents. The foam rubber seal provides mechanical decoupling and also acts as a seal. The hollow shaft is made of black oxide-finished steel.

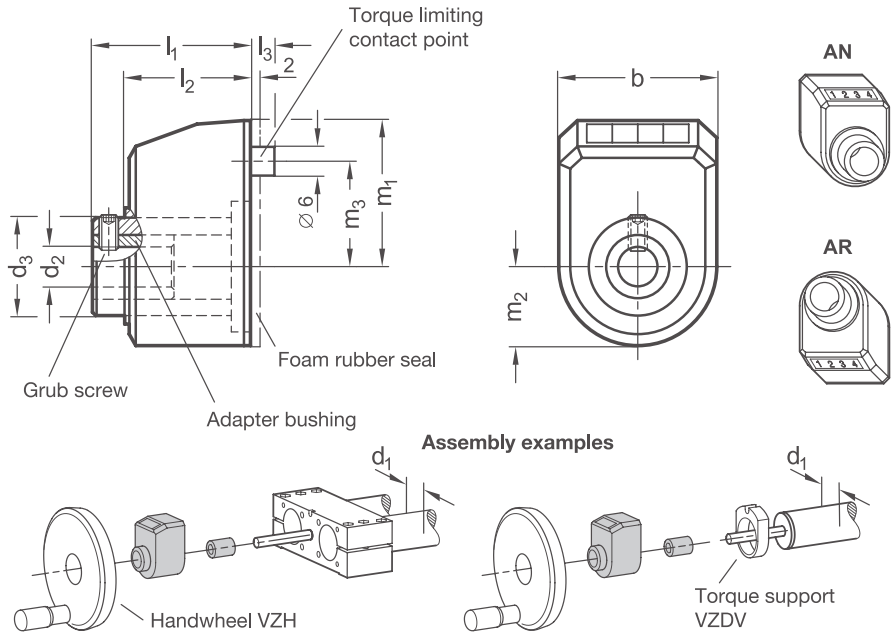
If the position indicator is attached to a single tube linear unit, a torque support VZDR or VZDV is required to prevent the position indicator from turning along. For double tube linear units, a torque support VZDD is required only for diameter 18.

As an alternative to the mechanical indicator system, a position indicator VZPE can also be used, which detects and displays the position electronically.

RoHS-compliant product

elesa

Original design DD52R, DD51, DD50



Linear unit nominal diameter **d_1**	Linear unit spindle pitch **p**	Counter **zw**	Display after one spindle turn	**b**	**d_2** H7	**d_3**	**l_1**	**l_2**	**l_3**	**m_1**	**m_2**	**m_3**	Grub screw	Max. speed rpm
18	3	003	003	24	6	14	26	21	5	28,5	10	18	M3	1500
30	4	004.0	0040	33	8	20	33	26	5,5	30,5	16,5	22	M 4	625
30	1	001.0	0010	33	8	20	33	26	5,5	30,5	16,5	22	M 4	1500
40	4	0004.0	00040	48	12	29	37	30	6	43,5	23	30	M 5	625
40	1	0001.0	00010	48	12	29	37	30	6	43,5	23	30	M 5	1500
50	4	0004.0	00040	48	12	29	37	30	6	43,5	23	30	M 5	625
50	1	0001.0	00010	48	12	29	37	30	6	43,5	23	30	M 5	1500
60	5	0005.0	00050	48	14	29	37	30	6	43,5	23	30	M 5	500

Type
t

R	Numbers increase when turned clockwise
L	Numbers increase when turned counterclockwise

Hollow shaft / adapter bushing material
w

ST	Steel black oxide-finished
EM	Stainless steel, AISI 304

Installation orientation
e

AN	Inclined, top
AR	Inclined, bottom

Surface / material
o

GR	Polyamide (PA), orange RAL 2004
OR	Polyamide (PA), gray RAL 7035

FOR USE WITH

– Single tube linear units, round, with torque support VZDR

– Single tube linear units, square, with torque support VZDV

– Double tube linear units with torque support VZDD for Ø 18

ORDER KEY

VZPM - d_1 - p - t - w - e - o

Position indicator
Linear unit nominal diameter
Linear unit spindle pitch
Type
Hollow shaft / adapter bushing material
Installation orientation
Surface / Material

ON REQUEST

– Other / doubled thread pitches

VZPE | Position indicator, electronic with adapter bushing

PRODUCT INFO

Position indicators VZPE indicate the distance travelled by linear units. They are mounted to the spindle journal of a linear unit using an adapter bushing and a grub screw.

Position indicators are matched to the size of the linear unit in the table. The position indicators must be adjusted for the thread pitch and direction of the respective linear unit using the operating buttons. The energy supply is ensured by a long-life battery.

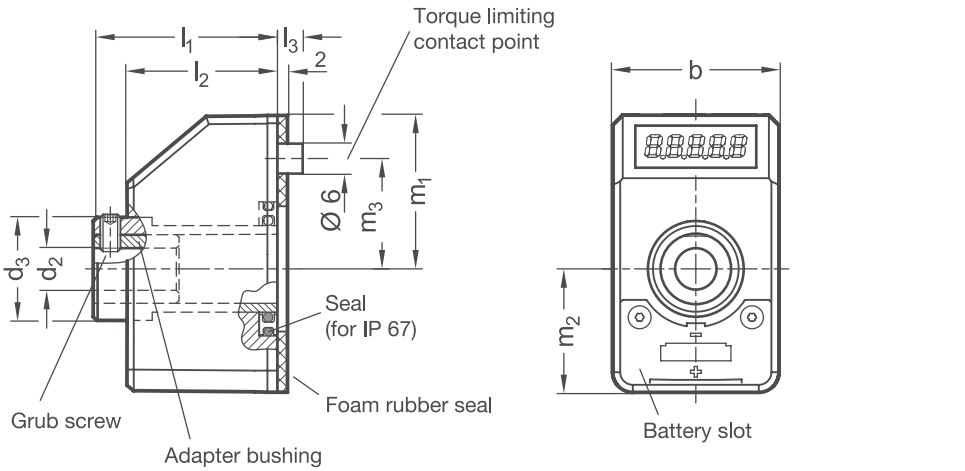
The polyamide housing is ultrasonically welded, making it especially sturdy, tight and compact. The position indicator is also temperature-resistant to 50 °C and resistant to oils and solvents. The foam rubber seal provides mechanical decoupling and also acts as a seal. The hollow shaft is made of stainless steel. In the IP 67 version, it is sealed with an NBR seal.

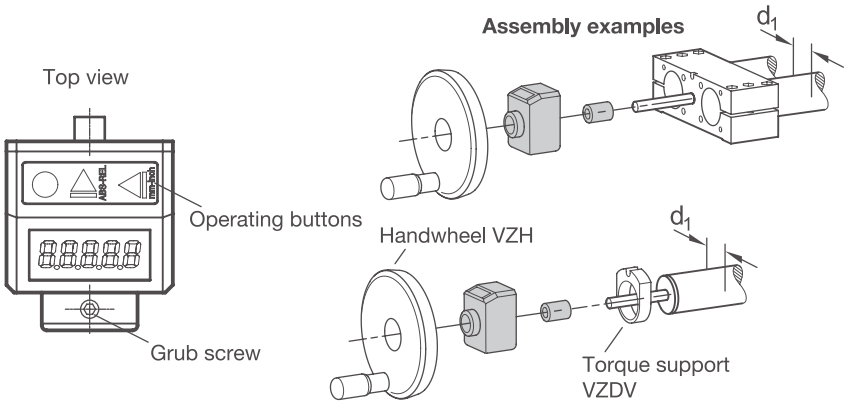
If the position indicator is attached to a single tube linear unit, a torque support VZDR or VZDV is required to prevent the position indicator from turning along.

RoHS-compliant product

elesa

Original design DD52R-E, DD51-E





Linear unit nominal diameter d_1	b	d_2 H7	d_3	l_1	l_2	l_3	m_1	m_2	m_3	Grub screw	LCD display	Max. speed rpm
30	33,5	8	19,5	34	28,5	5,5	30,5	25	22	M 4	5	1000
40	48	12	28,5	41	34	6	40	32,5	30	M 5	6	1000
50	48	12	28,5	41	34	6	40	32,5	30	M 5	6	1000
60	48	14	28,5	41	34	6	40	32,5	30	M 5	6	1000

Ambient conditions
u

1	Protection rating IP 65
2	Protection rating IP 67

Surface
o

GR	Polyamide (PA), orange RAL 2004
OR	Polyamide (PA), gray RAL 7035

FOR USE WITH

– Single tube linear units, round, with torque support VZDR

– Single tube linear units, square, with torque support VZDV

– Double tube linear units

– Profile linear units

ORDER KEY

VZPE - d_1 - u - o

Position indicator
Linear unit nominal diameter
Ambient conditions
Surface

ON REQUEST

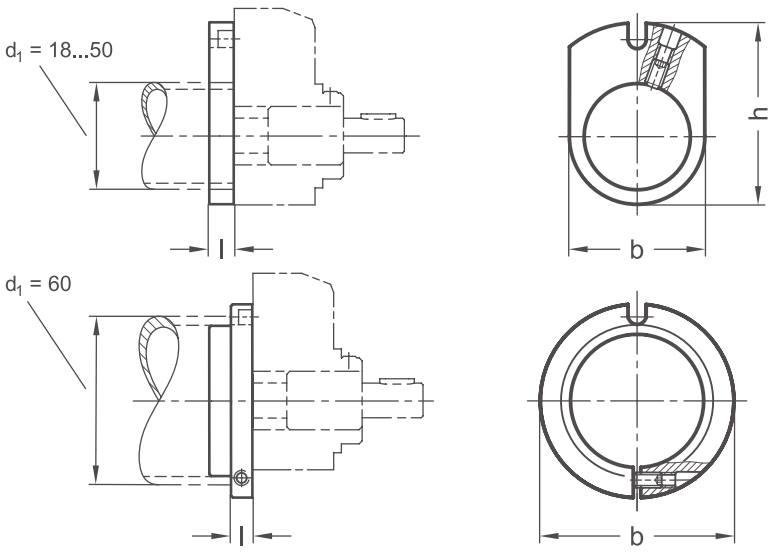
– Position indicator with wireless data transmission

PRODUCT INFO

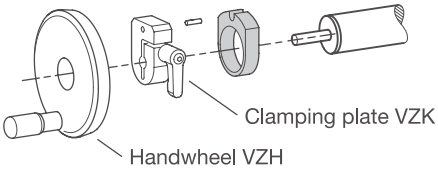
Torque supports VZDR are used together with round single tube linear units. They prevent the turning of clamping plates VZK and position indicators VZPM or VZPE attached as accessories.

The torque supports are made of black anodized aluminum and are clamped to the linear unit with a non-positive connection. They fix the position indicator or clamping plate in place via the radial groove open on one side.

RoHS-compliant product



Assembly example



d_1 Linear unit nominal diameter	b	h	l
18	24	33	10
30	35	42	10
40	47	56,5	10
50	58	61	10
60	64	-	7

Surface / Material o	
S	Aluminum, black anodized

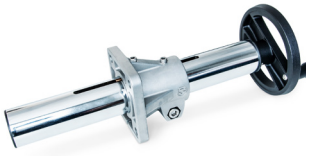
FOR USE WITH

– Single tube linear units, round

ORDER KEY **VZDR - d_1 - o**

Torque support
Linear unit nominal diameter
Surfaces / material

Innovative assembly components


INOCON GmbH
Industriestraße 31
53359 Rheinbach
Germany

Phone +49 2226-90987-0
Fax +49 2226-90987-99
info@inocon.de

inocon.de