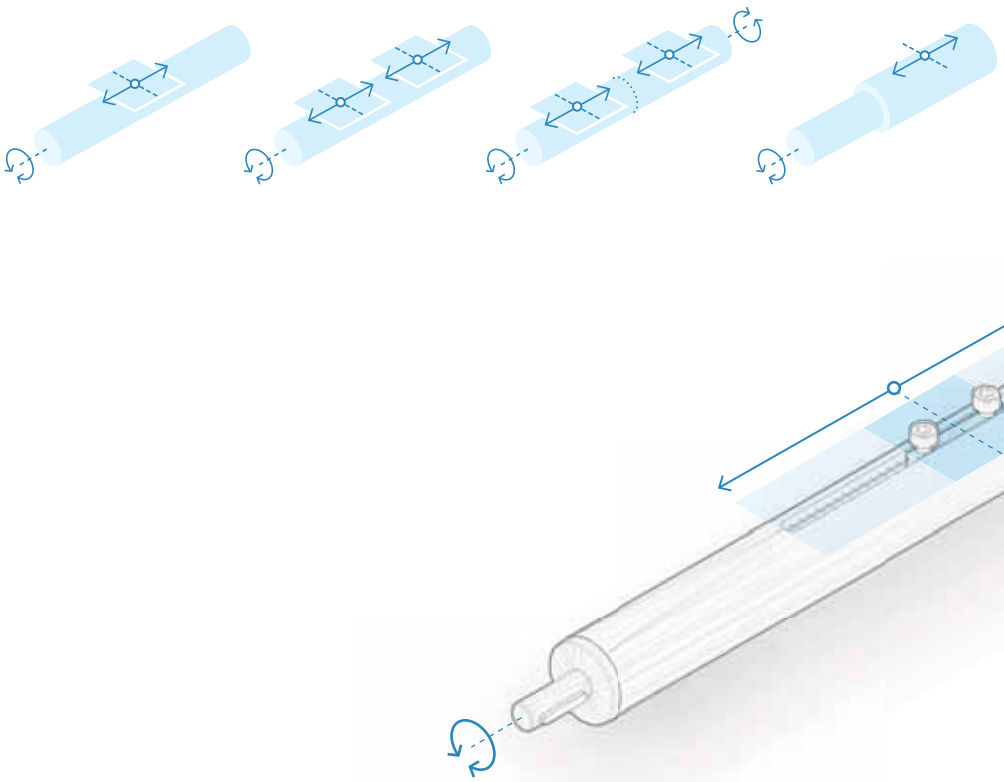


Single tube linear units

The group “Single Tube Linear Units 2A” contains linear units made of chrome-plated steel or bright stainless steel precision tubes. Together with linear unit connectors, these form a solid linear round or square guide. The spindle drive in the guide tube transmits the linear movement to a linear unit connector.

The linear units are freely configurable and are entirely manufactured by Inocon.

Single tube linear units can be divided into four types:

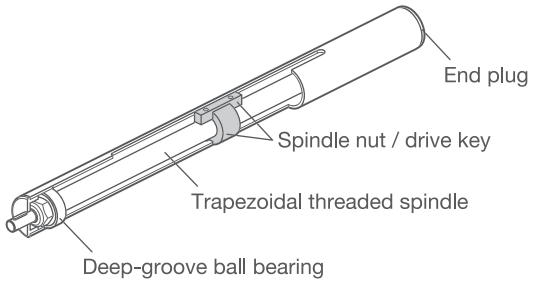
- **Linear units with one guide element:** the linear unit connector is moved along the guide tube by the spindle thread.
- **Linear units with two opposing guide elements:** two linear unit connectors move symmetrically along the guide tube due to different thread directions.
- **Linear units with two independent guide elements:** two linear unit connectors move independently along the guide tube due to separate spindles.
- **Telescope linear units:** an outer tube forms the linear unit connector, which is moved along the inner guide tube by the spindle thread. This increases or decreases the total length of the linear units.

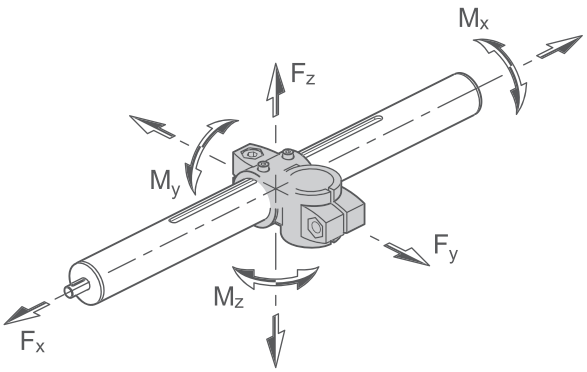
Possible accessories for the single tube linear units offered in group 2D include handwheels in various designs, position indicators and spacer plates for spindle clamping. The accessories are matched to the nominal diameters of the linear units. The matching linear unit connectors are available in group 2B in all typical part types, such as cross, base or flanged linear unit connectors.

Together with the linear unit connectors, single tube linear units can be used to quickly and easily assemble solid linear guides that can be flexibly adapted to many different areas of application, such as for format adjustment and machine building.

An operating manual with instructions for assembly can be downloaded from our website at inocon.de/en/service.

Single tube linear units with one guide element, standard lengths	**VES** *p. 202* 		
Single tube linear units with one guide element	**VE1R** *p. 204* 	**VE1V** *p. 208* 	
Single tube linear units with two opposing guide element	**VE2R** *p. 212* 	**VE2V** *p. 216* 	
Single tube linear units with two independent guide elements	**VE3R** *p. 220* 	**VE3V** *p. 224* 	
Telescope linear units	**VT1S** *p. 228* 	**VT1W** *p. 232* 	

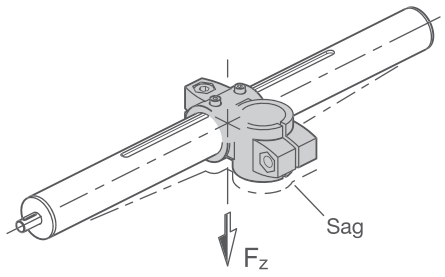




Linear unit nominal diameter	**Fx** in N	**Fy** in N			**Fz** in N			**Mx** in Nm	**My** in Nm	**Mz** in Nm
	l = 500	l = 500	l = 1000	l = 1500	l = 500	l = 1000	l = 1500			
18	400	80	15	-	65	10	-	1,5	4,5	4,5
30	850	500	70	15	550	55	10	6,5	15	15
40	1100	2150	250	65	1900	150	50	15	42	42
50	1750	3100	650	150	3100	650	150	29	69	69
60	2600	4550	1500	400	4550	1400	350	45	125	125

Sag / elastic deformation

The maximum permissible forces and tightening torques listed in the table will result in elastic deformation of the linear unit. For the listed values, this amounts to approximately 0.4 mm. This deformation is shown here using the force Fz as an example.



Positioning precision

The positioning precision indicates the deviation with which a position can be reached. The table shown here lists the maximum arising deviation.

	Trapoidal thread lead screw	Fine thread lead screw
Max. deviation	±0,1 mm / 300 mm stroke	±0,1 mm / 300 mm stroke

Repeatable precision

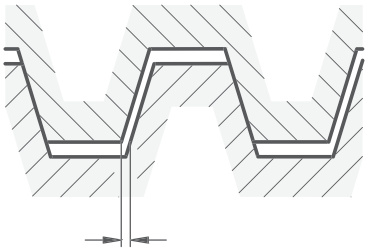
The repeatable precision indicates how precisely a position can be approached multiple times under the same conditions. In most cases, the repeatable precision is higher than the positioning precision because manufacturing tolerances have no influence on the repeatable precision. The trapezoidal and fine thread lead screws have a repeatable precision of ±0.05 mm.

Guide precision

The precision guide tubes of the linear units of steel are manufactured as per DIN EN 10305-4 and also chrome-plated. In the stainless steel version, steel precision guide tubes as per EN10216-5 are used.

Backlash on reversal

Due to the play between the thread flanks of the spindle and spindle nut, backlash (lost motion) occurs when the direction of the drive movement is changed. This backlash must be overcome before the guide element moves in the opposite direction. The backlash on reversal is required to prevent the spindle nut from seizing on the spindle. For linear units with trapezoidal and fine thread spindle, the value is 0.2 mm.



Self-braking

Because trapezoidal and fine thread spindles have pitch angles lower than the angle of friction, they are often self-braking. It is not possible to slide the guide element. In addition, the spindle can be secured against movement with an external spindle clamp. The clamping plates listed as accessories may be used for this.

Lifespan

The lifespan of linear units depends on the expected ambient conditions of the specific application. The following factors come into play here:

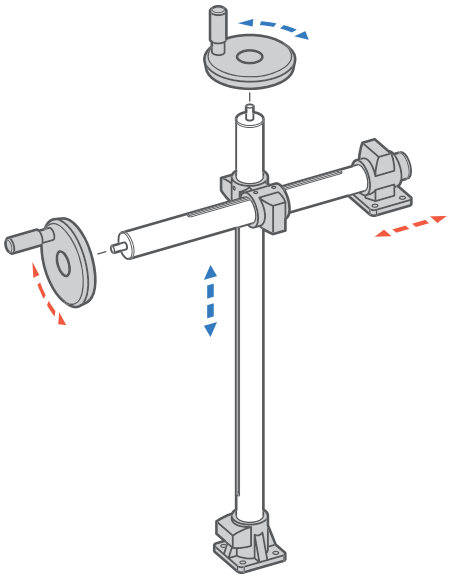
- The installation orientation
- The load to be moved
- The movement speed
- The movement frequency
- Ambient temperature
- External influences
- Compliance with the maintenance intervals

Ambient conditions

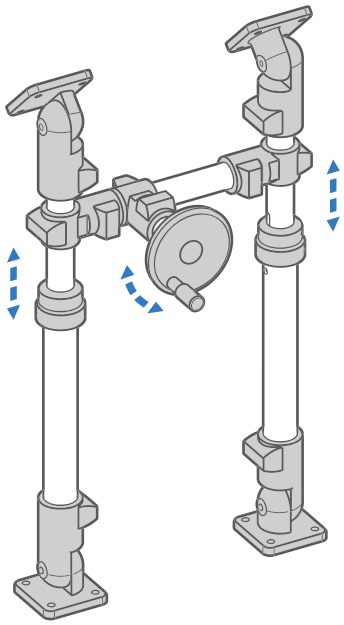
The linear units are designed for ambient temperatures from -20°C to +100°C. Large temperature fluctuations and condensing humidity should also be avoided.

Safety device for vertical linear units

It is possible to install an additional spindle nut that is carried along as a safety nut. This holds the linear unit in position in the event of damage (such as due to overloading or wear) and prevents the guide element from falling when used in a vertical orientation.

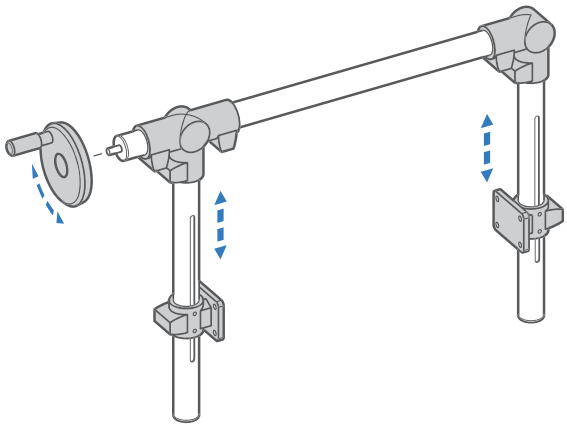


Single tube linear units combination with adjustment in the X / Z direction

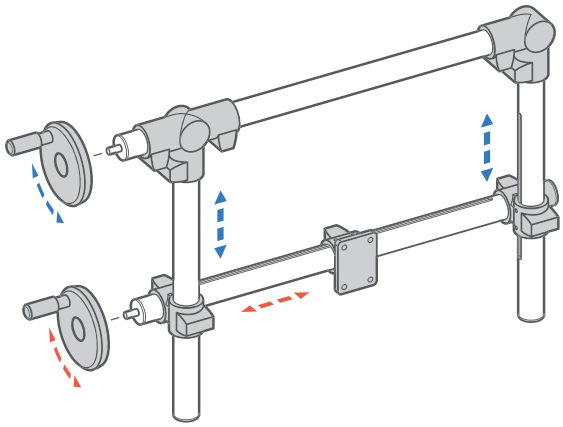


Height adjustment by two telescope linear units

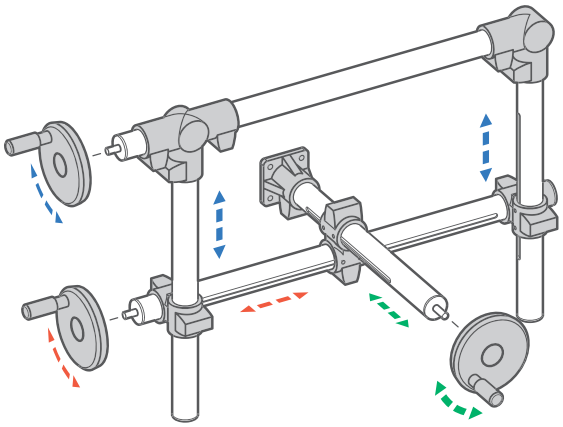
Multi-axis systems are assemblies comprised of multiple linear units. The use of angle gears and transfer units allows multiple linear units to move synchronously. To ensure smooth, even and low-wear movement of the linear units, they must be oriented exactly perpendicular or parallel to each other.



Multi-axis system with adjustment in Z direction



Multi-axis system with adjustment in Z / X direction



Multi-axis system with adjustment in Z / X / Y direction

PRODUCT INFO

Linear units VES are made from chrome-plated steel and can be ordered from stock in the standard lengths given in the table for short delivery times. Configurable linear units in individual lengths are available under VE1R.

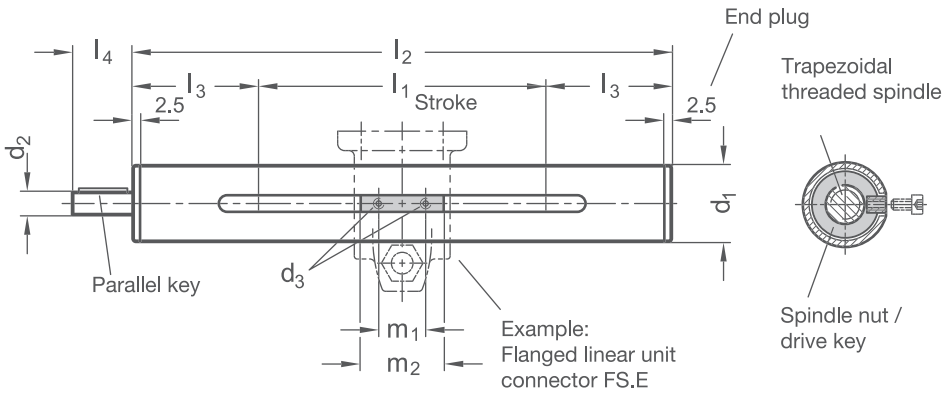
A continuous spindle with ball bearings on each side is installed in the guide tube. The spindle nut transmits the linear movements to a linear unit connector via a drive key along the guide groove.

The guide element bore forms a solid linear round guide together with the guide tube. Multiple connector types are available for selection and can be adjusted or clamped for low play using the slitted bore. Depending on the design, the part to be moved is fastened to the guide element or the guide element itself is installed at the place of use such that the entire linear unit moves together.

The journal length is designed for attachment of a handwheel. The handwheel and the linear unit connectors are not included with the linear unit and must be ordered separately.

Adjustable hand levers are intended for repeated, tool-free clamping of the guide elements. Under the designation HSK, these are available separately for individual use and in other designs. Compared with the tool-operated hex socket cap screw, the clamping force achievable with an adjustable hand lever is lower due to the shorter lever length.

RoHS-compliant product



d_1	l_1 Stroke (standard lengths)					max. Stroke	Threaded spindle	d_2	d_3	l_2	l_3	l_4	m_1	m_2	Parallel key DIN 6885
18	65	165	265	-	-	350	TR 10x3	6	M 3	l_1+140	70	16	17	24	A2x2x12
30	100	150	200	300	-	1250	TR 14x4	8	M 4	l_1+205	102,5	16	23	38	A2x2x12
40	70	170	220	270	320	1570	TR 20x4	12	M 5	l_1+235	117,5	17	42	54	A4x4x12
50	65	115	215	265	315	1565	TR 20x4	12	M 6	l_1+240	120	18	42	54	A4x4x12
60	220	720	-	-	-	1520	TR 24x5	14	M 8	l_1+285	142,5	19	58	70	A5x5x16

Type
t

R1	• Right-hand thread • Shaft journal on one side

Material
w

ST	Steel • Guide tube, DIN EN 10305-4: Steel, chrome-plated • Trapezoidal thread spindle: Steel, with ball bearing • Spindle nut: Red brass / end plug: Plastic

ACCESSORIES

– Handwheels **VZH** → *see page 356*
– Angle gears **YLS / YTS** → *see page 374 / 376*
– Transfer units **VA** → *see page 370*

ORDER KEY

VES - d_1 - l_1 - t - w

Single tube linear units
Outer diameter
Stroke
Type
Material

LINEAR UNIT CONNECTORS

The single tube linear unit VES only becomes a functional axis after attachment of a linear unit connector. Linear unit connectors are available in a variety of designs for different applications. To simplify the selection process, an overview is provided on page 238.






VE1R | Single tube linear units, round, for one guide element

PRODUCT INFO

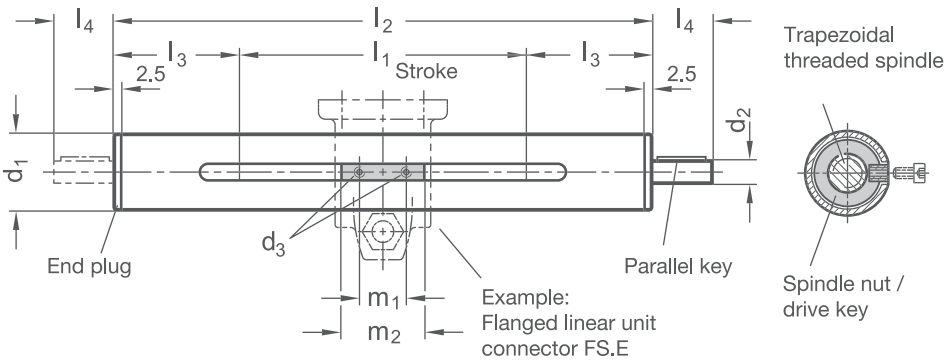
The guide tubes of the **linear units VE1R** are made of chrome-plated steel or bright stainless steel precision tubes. A continuous spindle with ball bearings on each side is installed in the guide tube. The spindle nut transmits the linear movements to a linear unit connector via a drive key along the guide groove.

The guide element bore forms a solid linear round guide together with the guide tube. Multiple connector types are available for selection and can be adjusted or clamped for low play using the slitted bore. Depending on the design, the part to be moved is fastened to the guide element or the guide element itself is installed at the place of use such that the entire linear unit moves together.

Possible accessories are already taken into account in the selection of the linear units according to the options given in the tables. This ensures, for example, that the journal lengths z_1 and z_2 are appropriate for attachment of the accessories. The linear unit connectors and the accessories are not included with the linear units and must be ordered separately.

Adjustable hand levers are intended for repeated, tool-free clamping of the guide elements. Under the designation HSK, these are available separately for individual use and in other designs. Compared with the tool-operated hex socket cap screw, the clamping force achievable with an adjustable hand lever is lower due to the shorter lever length.

RoHS-compliant product



d_1	Stroke max. l_1	Edge distance 1 min. k_1	Edge distance 2 min. k_2	d_3	Total length max. ($k_1 + l_1 + k_2$) l_2	m_1	m_2
18	350	40	40	M 3	490	17	24
30	1250	57	57	M 4	1455	23	38
40	1570	70	70	M 5	1805	42	54
50	1565	75	75	M 6	1805	42	54
60	1520	88	88	M 8	1805	58	70

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
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

Spindle thread direction
r

RH	Right-hand thread
LH	Left-hand thread

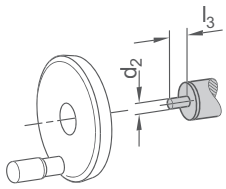
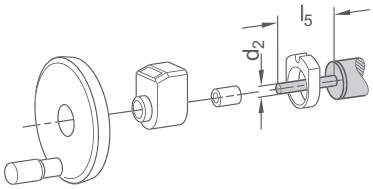
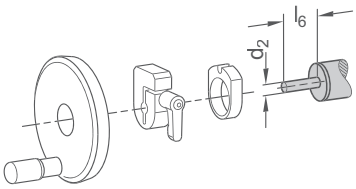
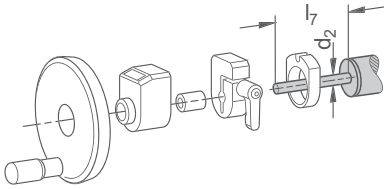
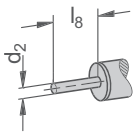
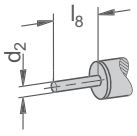
d_1	Spindle Ø	Spindle pitch **p**		Journal diameter d_2	Journal length B l_3	Journal length C l_4	Journal length D l_5	Journal length E l_6	Journal length F l_7	Individual journal length l_8
		Trapezoidal thread	Fine thread, metric							
18	10	3	1	6	16	28	44	-	-	16...65
30	14	4	1	8	16	36	52	31	67	16...67
40	20	4	1	12	17	42	59	32	74	17...74
50	20	4	1	12	18	42	60	33	75	18...75
60	24	5	1,5	14	19	42	61	34	76	19...76

Accessories:

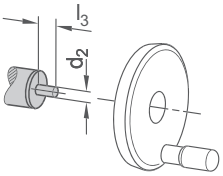
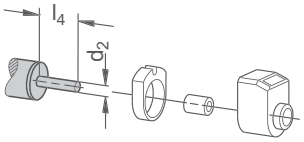
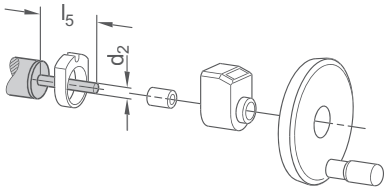
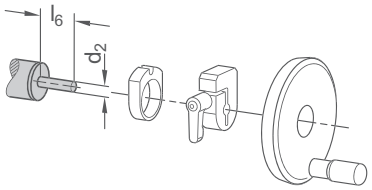
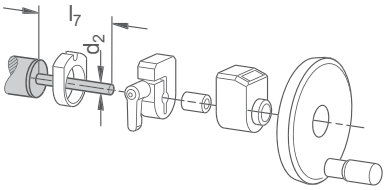
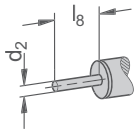
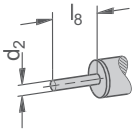
d_1	Torque support	Clamping plate	Position indicator		Handwheel
18	VZDR	-	VZPM	-	VZH
30	VZDR	VZK	VZPM *	VZPE	VZH
40	VZDR	VZK	VZPM	VZPE	VZH
50	VZDR	VZK	VZPM	VZPE	VZH
60	VZDR	VZK	VZPM (only trapezoidal thread)	VZPE	VZH

* only for stroke ≤ 1000 mm

Journal
z_1

B	Journal for handwheel	D	Journal for position indicator and handwheel	E	Journal for spacer plate and handwheel (only for $d_1 \geq 30$)
 Journal length l_3		 Journal length l_5		 Journal length l_6	
F	Journal for spacer plate, position indicator and handwheel (only for $d_1 \geq 30$)	Gxx	Individual length with keyway (for xx enter value from column l_8)	Hxx	Individual length without keyway (for xx enter value from column l_8)
 Journal length l_7		 Journal length l_8		 Journal length l_8	

Journal
z_2

A	Without journal	B	Journal for handwheel	C	Journal for position indicator
		 Journal length l_3		 Journal length l_4	
D	Journal for position indicator and handwheel	E	Journal for spacer plate and handwheel (only for $d_1 \geq 30$)	F	Journal for spacer plate, position indicator and handwheel (only for $d_1 \geq 30$)
 Journal length l_5		 Journal length l_6		 Journal length l_7	
Gxx	Individual length with keyway (for xx enter value from column l_8)	Hxx	Individual length without keyway (for xx enter value from column l_8)		
 Journal length l_8		 Journal length l_8			

ACCESSORIES

- Handwheels **VZH** → *see page 356*
- Position indicators **VZPM / VZPE** → *see page 358 / 360*
- Clamping plates **VZK** → *see page 362*
- Torque supports **VZDR** → *see page 364*
- Angle gears **YLS / YTS** → *see page 374* / 376
- Transfer units **VA** → *see page 370*

ORDER KEY

Name key | Supplemental key

VE1R - d_1 - w - l_1 - k_1 - k_2 - r - p - z_1 - z_2

- Single tube linear unit
- Outer diameter
- Material
- Stroke
- Edge distance 1
- Edge distance 2
- Spindle thread direction
- Spindle pitch
- Journal z_1
- Journal z_2

LINEAR UNIT CONNECTORS

The single tube linear unit VE1R only becomes a functional axis after attachment of a linear unit connector. Linear unit connectors are available in a variety of designs for different applications. To simplify the selection process, an overview is provided on page 238.

VE1V | Single tube linear units, square, for one guide element

PRODUCT INFO

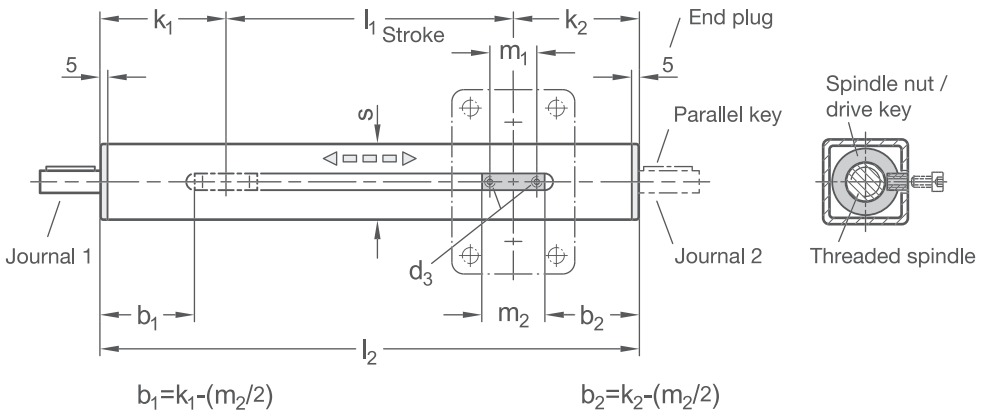
The guide tubes of the **linear units VE1V** are made of chrome-plated steel or bright stainless steel precision tubes. A continuous spindle with ball bearings on each side is installed in the guide tube. The spindle nut transmits the linear movements to a linear unit connector via a drive key along the guide groove.

Together with the guide tube, the guide element bore forms a solid linear square guide mechanism that can receive large torsional forces. Multiple connector types are available for selection and can be adjusted or clamped for low play using the split bore. Depending on the design, the part to be moved is fastened to the guide element or the guide element itself is installed at the place of use such that the entire linear unit moves together.

Possible accessories are already taken into account in the selection of the linear units according to the options given in the tables. This ensures, for example, that the journal lengths z_1 and z_2 are appropriate for attachment of the accessories. The linear unit connectors and the accessories are not included with the linear units and must be ordered separately.

Adjustable hand levers are intended for repeated, tool-free clamping of the guide elements. Under the designation HSK, these are available separately for individual use and in other designs. Compared with the tool-operated hex socket cap screw, the clamping force achievable with an adjustable hand lever is lower due to the shorter lever length.

RoHS-compliant product



s	Stroke max. l_1	Edge distance 1 min. k_1	Edge distance 2 min. k_2	d_3	Total length max. ($k_1 + l_1 + k_2$) l_2	m_1	m_2
30	1250	59	59	M 4	1460	23	38
40	1570	72	72	M 5	1810	42	54
50	1565	77	77	M 6	1810	42	54

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
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

Spindle thread direction
r

RH	Right-hand thread
LH	Left-hand thread

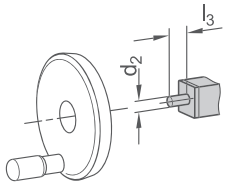
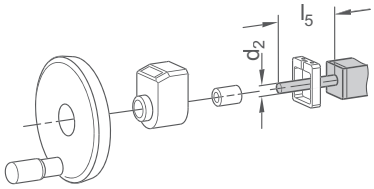
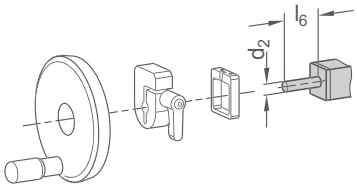
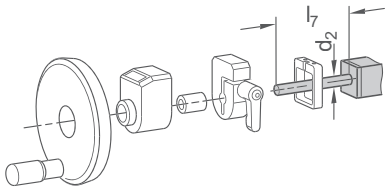
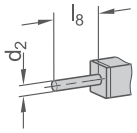
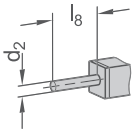
s	Spindle Ø	Spindle pitch p: Trapezoidal thread	Spindle pitch p: Fine thread, metric	Journal diameter d_2	Journal length B l_3	Journal length C l_4	Journal length D l_5	Journal length E l_6	Journal length F l_7	Individual journal length l_8
30	14	4	1	8	16	36	52	31	67	16...67
40	20	4	1	12	17	42	59	32	74	17...74
50	20	4	1	12	18	42	60	33	75	18...75

Accessories:

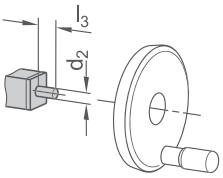
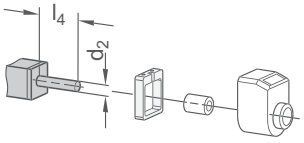
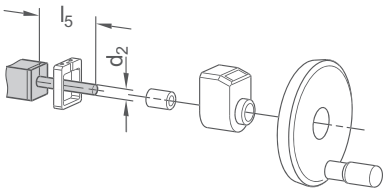
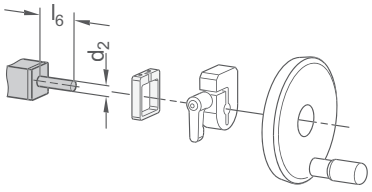
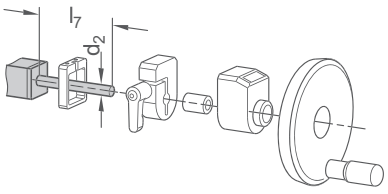
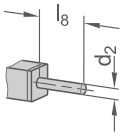
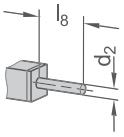
s	Torque support	Clamping plate	Position indicator		Handwheel
30	VZDV	VZK	VZPM *	VZPE	VZH
40	VZDV	VZK	VZPM	VZPE	VZH
50	VZDV	VZK	VZPM	VZPE	VZH

* only for stroke ≤ 1000 mm

Journal
z_1

B	Journal for handwheel	D	Journal for position indicator and handwheel	E	Journal for spacer plate and handwheel (only for $d_1 \geq 30$)
 Journal length l_3		 Journal length l_5		 Journal length l_6	
F	Journal for spacer plate, position indicator and handwheel (only for $d_1 \geq 30$)	Gxx	Individual length with keyway (for xx enter value from column l_8)	Hxx	Individual length without keyway (for xx enter value from column l_8)
 Journal length l_7		 Journal length l_8		 Journal length l_8	

Journal
z_2

A	Without journal	B	Journal for handwheel	C	Journal for position indicator
		 Journal length l_3		 Journal length l_4	
D	Journal for position indicator and handwheel	E	Journal for spacer plate and handwheel (only for $d_1 \geq 30$)	F	Journal for spacer plate, position indicator and handwheel (only for $d_1 \geq 30$)
 Journal length l_5		 Journal length l_6		 Journal length l_7	
Gxx	Individual length with keyway (for xx enter value from column l_8)	Hxx	Individual length without keyway (for xx enter value from column l_8)		
 Journal length l_8		 Journal length l_8			

2A

ACCESSORIES

- Handwheels **VZH** → *see page 356*
- Position indicators **VZPM / VZPE** → *see page 358 / 360*
- Clamping plates **VZK** → *see page 362*
- Torque supports **VZDV** → *see page 366*
- Angle gears → *on request*
- Transfer units **VA** → *see page 370*

ORDER KEY

Name key	Supplemental key
VE1V - s - w - l_1 - k_1 - k_2 - r - p - z_1 - z_2	

- Single tube linear unit
- Outer diameter
- Material
- Stroke
- Edge distance 1
- Edge distance 2
- Spindle thread direction
- Spindle pitch
- Journal z_1
- Journal z_2

LINEAR UNIT CONNECTORS

The single tube linear unit VE1V only becomes a functional axis after attachment of a linear unit connector. Linear unit connectors are available in a variety of designs for different applications. To simplify the selection process, an overview is provided on page 238.

VE2R | Single tube linear units, round, for two opposing guide elements

PRODUCT INFO

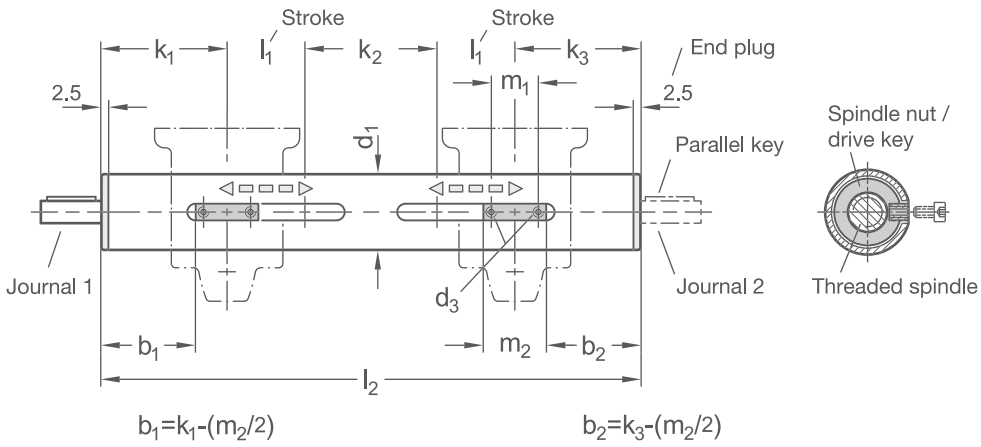
The guide tubes of the **linear units VE2R** are made of chrome-plated steel or bright stainless steel precision tubes. A spindle with ball bearings on both sides is installed in the guide tube. This is comprised of one part with left-hand thread and one with right-hand thread. The spindle nuts positioned on the left and right transmit the symmetrical and opposing linear movements to two linear unit connectors via two drive keys along the guide groove.

The guide element bores form solid linear round guides together with the guide tube. Multiple connector types are available for selection and can be adjusted or clamped for low play using the slitted bore. The parts to be moved are fastened to the guide element, such as for format adjustments, in which one side guide is symmetrically moved to various widths.

Possible accessories are already taken into account in the selection of the linear units according to the options given in the tables.
This ensures, for example, that the journal lengths z_1 and z_2 are appropriate for attachment of the accessories. The linear unit connectorss and the accessories are not included with the linear units and must be ordered separately.

Adjustable hand levers are intended for repeated, tool-free clamping of the guide elements. Under the designation HSK, these are available separately for individual use and in other designs. Compared with the tool-operated hex socket cap screw, the clamping force achievable with an adjustable hand lever is lower due to the shorter lever length.

RoHS-compliant product



d_1	Stroke max. l_1	Edge distance 1 min. k_1	Spacing min. k_2	Edge distance 2 min. k_3	d_3	Total length max. (k_1+k_2+k_3+2x l_1) l_2	m_1	m_2
18	167	40	32	40	M 3	505	17	24
30	601	57	50	57	M 4	1455	23	38
40	753	70	66	70	M 5	1805	42	54
50	748	75	70	75	M 6	1805	42	54
60	715	93	90	93	M 8	1805	58	70

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
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

Spindle thread direction
r

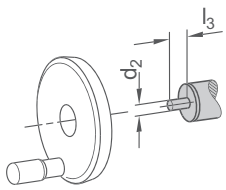
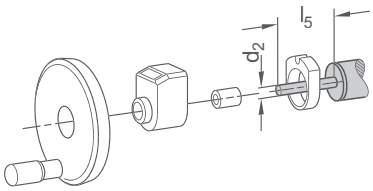
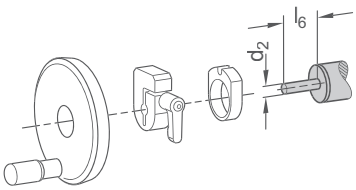
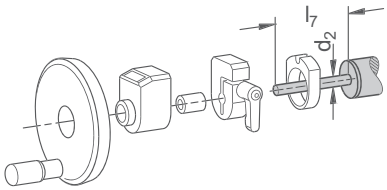
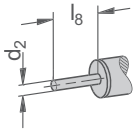
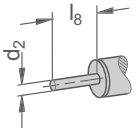
RH	Right-hand thread on journal z_1, Left-hand thread on journal z_2
LH	Left-hand thread on journal z_1, Right-hand thread on journal z_2

d_1	Spindle Ø	Spindle pitch **p**		Journal diameter d_2	Journal length B l_3	Journal length C l_4	Journal length D l_5	Journal length E l_6	Journal length F l_7	Individual journal length l_8
		Trapezoidal thread	Fine thread, metric							
18	10	3	1	6	16	28	44	-	-	16...65
30	14	4	1	8	16	36	52	31	67	16...67
40	20	4	1	12	17	42	59	32	74	17...74
50	20	4	1	12	18	42	60	33	75	18...75
60	24	5	1,5	14	19	42	61	34	76	19...76

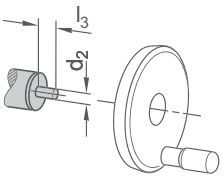
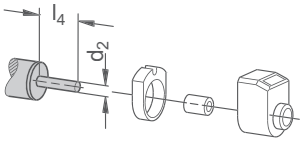
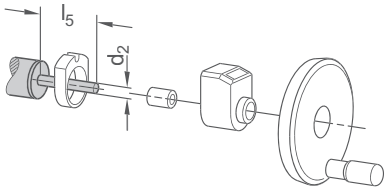
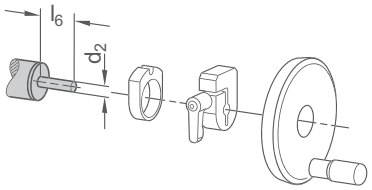
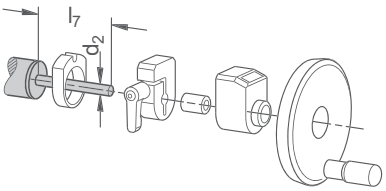
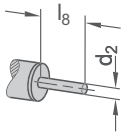
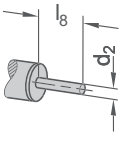
Accessories:

d_1	Torque support	Clamping plate	Position indicator		Handwheel
18	VZDR	-	VZPM	-	VZH
30	VZDR	VZK	VZPM	VZPE	VZH
40	VZDR	VZK	VZPM	VZPE	VZH
50	VZDR	VZK	VZPM	VZPE	VZH
60	VZDR	VZK	VZPM (only trapezoidal thread)	VZPE	VZH

Journal
z_1

B	Journal for handwheel	D	Journal for position indicator and handwheel	E	Journal for spacer plate and handwheel (only for $d_1 \geq 30$)
 Journal length l_3		 Journal length l_5		 Journal length l_6	
F	Journal for spacer plate, position indicator and handwheel (only for $d_1 \geq 30$)	Gxx	Individual length with keyway (for xx enter value from column l_8)	Hxx	Individual length without keyway (for xx enter value from column l_8)
 Journal length l_7		 Journal length l_8		 Journal length l_8	

Journal
z_2

A	Without journal	B	Journal for handwheel	C	Journal for position indicator
		 Journal length l_3		 Journal length l_4	
D	Journal for position indicator and handwheel	E	Journal for spacer plate and handwheel (only for $d_1 \geq 30$)	F	Journal for spacer plate, position indicator and handwheel (only for $d_1 \geq 30$)
 Journal length l_5		 Journal length l_6		 Journal length l_7	
Gxx	Individual length with keyway (for xx enter value from column l_8)	Hxx	Individual length without keyway (for xx enter value from column l_8)		
 Journal length l_8		 Journal length l_8			

ACCESSORIES

- Handwheels **VZH** → *see page 356*
- Position indicators **VZPM / VZPE** → *see page 358 / 360*
- Clamping plates **VZK** → *see page 362*
- Torque supports **VZDR** → *see page 364*
- Angle gears **YLS / YTS** → *see page 374 / 376*
- Transfer units **VA** → *see page 370*

ORDER KEY

Name key | Supplemental key

VE2R - d_1 - w - l_1 - k_1 - k_2 - k_3 - r - p - z_1 - z_2

- Single tube linear unit
- Outer diameter
- Material
- Stroke
- Edge distance 1
- Spacing
- Edge distance 2
- Spindle thread direction
- Spindle pitch
- Journal z_1
- Journal z_2

LINEAR UNIT CONNECTORS

The single tube linear unit VE2R only becomes a functional axis after attachment of a linear unit connector. Linear unit connectors are available in a variety of designs for different applications. To simplify the selection process, an overview is provided on page 238.

VE2V

Single tube linear units, square, for two opposing guide elements

PRODUCT INFO

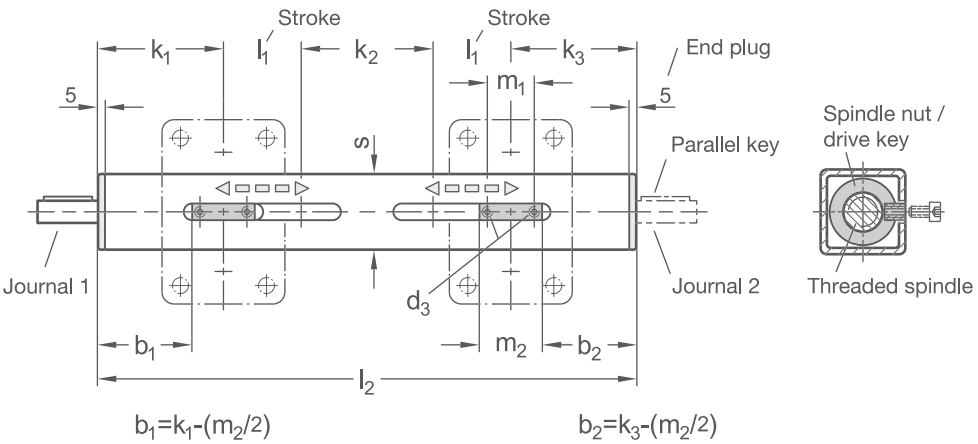
The guide tubes of the **linear units VE2V** are made of chrome-plated steel or bright stainless steel precision tubes. A spindle with ball bearings on both sides is installed in the guide tube. This is comprised of one part with left-hand thread and one with right-hand thread. The spindle nuts positioned on the left and right transmit the symmetrical and opposing linear movements to two linear unit connectors via two drive keys along the guide groove.

Together with the guide tube, the guide element bores form solid linear square guide mechanisms that can receive large torsional forces. Multiple connector types are available for selection and can be adjusted or clamped for low play using the split bore. The parts to be moved are fastened to the guide element, such as for format adjustments, in which one side guide is symmetrically moved to various widths.

Possible accessories are already taken into account in the selection of the linear units according to the options given in the tables. This ensures, for example, that the journal lengths z_1 and z_2 are appropriate for attachment of the accessories. The linear unit connectors and the accessories are not included with the linear units and must be ordered separately.

Adjustable hand levers are intended for repeated, tool-free clamping of the guide elements. Under the designation HSK, these are available separately for individual use and in other designs. Compared with the tool-operated hex socket cap screw, the clamping force achievable with an adjustable hand lever is lower due to the shorter lever length.

RoHS-compliant product



s	Stroke max. l_1	Edge distance 1 min. k_1	Spacing min. k_2	Edge distance 2 min. k_3	d_3	Total length max. (k_1+k_2+k_3+2x l_1) l_2	m_1	m_2
30	601	59	50	59	M 4	1460	23	38
40	753	72	66	72	M 5	1810	42	54
50	748	77	70	77	M 6	1810	42	54

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
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

Spindle thread direction
r

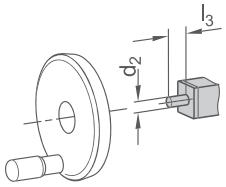
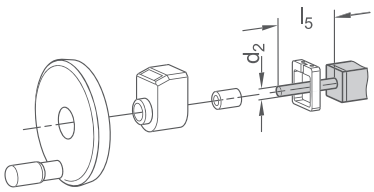
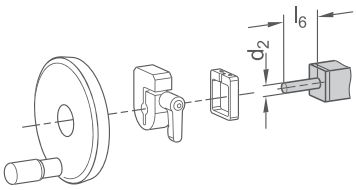
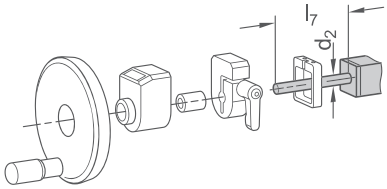
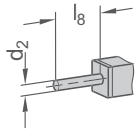
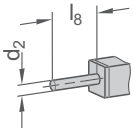
RH	Right-hand thread on journal z_1, Left-hand thread on journal z_2
LH	Left-hand thread on journal z_1, Right-hand thread on journal z_2

s	Spindle Ø	Spindle pitch p: Trapezoidal thread	Spindle pitch p: Fine thread, metric	Journal diameter d_2	Journal length B l_3	Journal length C l_4	Journal length D l_5	Journal length E l_6	Journal length F l_7	individual journal length l_8
30	14	4	1	8	16	36	52	31	67	16...67
40	20	4	1	12	17	42	59	32	74	17...74
50	20	4	1	12	18	42	60	33	75	18...75

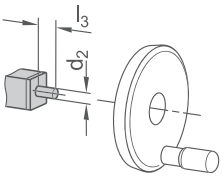
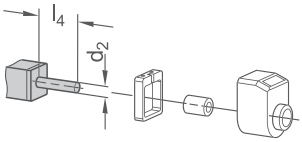
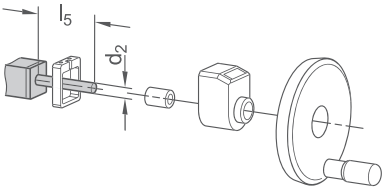
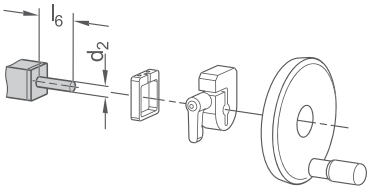
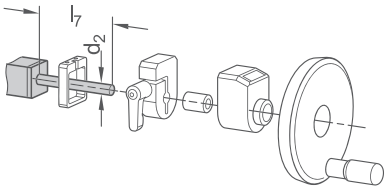
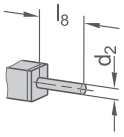
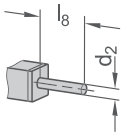
Accessories:

s	Torque support	Clamping plate	Position indicator		Handwheel
30	VZDV	VZK	VZPM	VZPE	VZH
40	VZDV	VZK	VZPM	VZPE	VZH
50	VZDV	VZK	VZPM	VZPE	VZH

Journal
Z_1

B	Journal for handwheel	D	Journal for position indicator and handwheel	E	Journal for spacer plate and handwheel (only for $d_1 \geq 30$)
 Journal length l_3		 Journal length l_5		 Journal length l_6	
F	Journal for spacer plate, position indicator and handwheel (only for $d_1 \geq 30$)	Gxx	Individual length with keyway (for xx enter value from column l_8)	Hxx	Individual length without keyway (for xx enter value from column l_8)
 Journal length l_7		 Journal length l_8		 Journal length l_8	

Journal
Z_2

A	Without journal	B	Journal for handwheel	C	Journal for position indicator
		 Journal length l_3		 Journal length l_4	
D	Journal for position indicator and handwheel	E	Journal for spacer plate and handwheel (only for $d_1 \geq 30$)	F	Journal for spacer plate, position indicator and handwheel (only for $d_1 \geq 30$)
 Journal length l_5		 Journal length l_6		 Journal length l_7	
Gxx	Individual length with keyway (for xx enter value from column l_8)	Hxx	Individual length without keyway (for xx enter value from column l_8)		
 Journal length l_8		 Journal length l_8			

2A

ACCESSORIES

- Handwheels **VZH** → *see page 356*
- Position indicators **VZPM / VZPE** → *see page 358 / 360*
- Clamping plates **VZK** → *see page 362*
- Torque supports **VZDV** → *see page 366*
- Angle gears → *on request*
- Transfer units **VA** → *see page 370*

ORDER KEY

Name key | Supplemental key

VE2V - s - w - l_1 - k_1 - k_2 - k_3- r - p - z_1 - z_2

- Single tube linear unit
- Outer diameter
- Material
- Stroke
- Edge distance 1
- Spacing
- Edge distance 2
- Spindle thread direction
- Spindle pitch
- Journal z_1
- Journal z_2

LINEAR UNIT CONNECTORS

The single tube linear unit VE2V only becomes a functional axis after attachment of a linear unit connector. Linear unit connectors are available in a variety of designs for different applications. To simplify the selection process, an overview is provided on page 238.






VE3R | Single tube linear units, round, for two independent guide elements

PRODUCT INFO

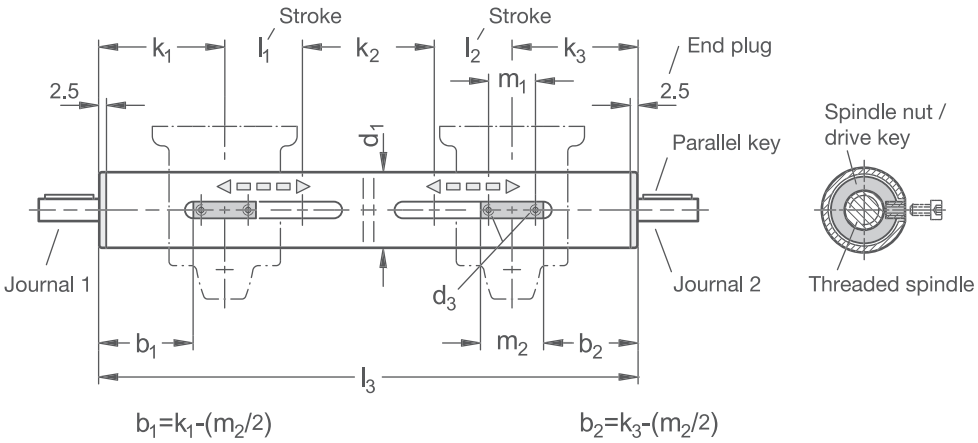
The guide tubes of the **linear units VE3R** are made of chrome-plated steel or bright stainless steel precision tubes. Two independent spindles with ball bearings on each side are installed in the guide tube. The thread direction of the spindles can be chosen as desired for each side. The spindle nuts positioned on each spindle transmit the linear movements to the linear unit connector via a drive key along the guide groove, independently of the opposite side.

The guide element bores form solid linear round guides together with the guide tube. Multiple connector types are available for selection and can be adjusted or clamped for low play using the slitted bore. The parts to be moved are fastened to the guide element, such as for format adjustments, in which one side guide is moved independently from the opposite side to various widths.

Possible accessories are already taken into account in the selection of the linear units according to the options given in the tables. This ensures, for example, that the journal lengths z_1 and z_2 are appropriate for attachment of the accessories. The linear unit connectors and the accessories are not included with the linear units and must be ordered separately.

Adjustable hand levers are intended for repeated, tool-free clamping of the guide elements. Under the designation HSK, these are available separately for individual use and in other designs. Compared with the tool-operated hex socket cap screw, the clamping force achievable with an adjustable hand lever is lower due to the shorter lever length.

RoHS-compliant product



d_1	Stroke max. l_1	Stroke max. l_2	Edge distance 1 min. k_1	Spacing min. k_2	Edge distance 2 min. k_3	d_3	Total length max. (k_1+ k_2+ k_3 + l_1+ l_2) l_3	m_1	m_2
30	601	601	57	50	57	M 4	1455	23	38
40	753	753	76	66	76	M 5	1805	42	54
50	748	748	80	70	80	M 6	1805	42	54
60	715	715	98	90	98	M 8	1805	58	70

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
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

Spindle 1 thread direction (on journal z_1)
r_1

RH	Right-hand thread
LH	Left-hand thread

Spindle 2 thread direction (on journal z_2)
r_2

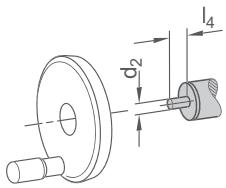
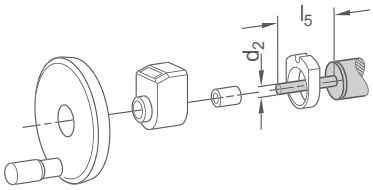
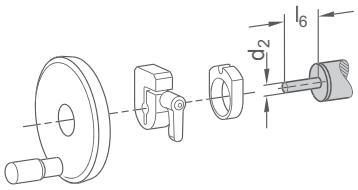
RH	Right-hand thread
LH	Left-hand thread

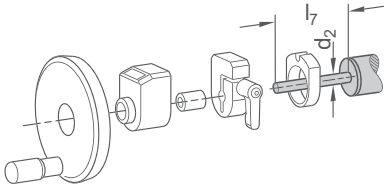
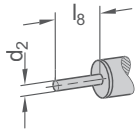
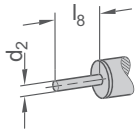
d_1	Spindle Ø	Spindle pitch spindle 1 p_1		Spindle pitch spindle 2 p_2		Journal diameter d_2	Journal length B l_4	Journal length D l_5	Journal length E l_6	Journal length F l_7	individual journal length l_8
		Trapezoidal thread	Fine thread, metric	Trapezoidal thread	Fine thread, metric						
30	14	4	1	4	1	8	16	52	31	67	16...67
40	20	4	1	4	1	12	17	59	32	74	17...74
50	20	4	1	4	1	12	18	60	33	75	18...75
60	24	5	1,5	5	1	14	19	61	34	76	19...76

Accessories:

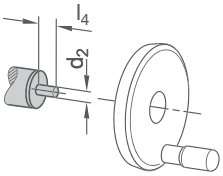
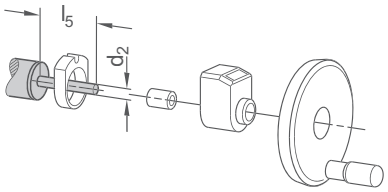
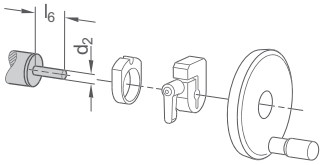
d_1	Torque support	Clamping plate	Position indicator		Handwheel
30	VZDR	VZK	VZPM	VZPE	VZH
40	VZDR	VZK	VZPM	VZPE	VZH
50	VZDR	VZK	VZPM	VZPE	VZH
60	VZDR	VZK	VZPM (only trapezoidal thread)	VZPE	VZH

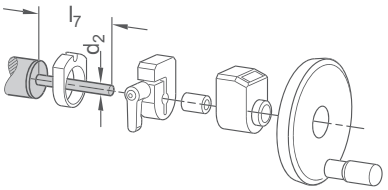
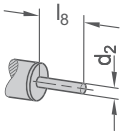
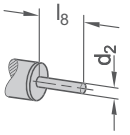
Journal
z_1

B	Journal for handwheel	D	Journal for position indicator and handwheel	E	Journal for spacer plate and handwheel (only for $d_1 \geq 30$)
 Journal length l_4		 Journal length l_5		 Journal length l_6	

F	Journal for spacer plate, position indicator and handwheel (only for $d_1 \geq 30$)	Gxx	Individual length with keyway (for xx enter value from column l_8)	Hxx	Individual length without keyway (for xx enter value from column l_8)
 Journal length l_7		 Journal length l_8		 Journal length l_8	

Journal
z_2

B	Journal for handwheel	D	Journal for position indicator and handwheel	E	Journal for spacer plate and handwheel (only for $d_1 \geq 30$)
 Journal length l_4		 Journal length l_5		 Journal length l_6	

F	Journal for spacer plate, position indicator and handwheel (only for $d_1 \geq 30$)	Gxx	Individual length with keyway (for xx enter value from column l_8)	Hxx	Individual length without keyway (for xx enter value from column l_8)
 Journal length l_7		 Journal length l_8		 Journal length l_8	

ACCESSORIES

- Handwheels **VZH** → *see page 356*
- Position indicators **VZPM / VZPE** → *see page 358 / 360*
- Clamping plates **VZK** → *see page 362*
- Torque supports **VZDR** → *see page 364*
- Angle gears **YLS / YTS** → *see page 374 / 376*
- Transfer units **VA** → *see page 370*

ORDER KEY

Name key | Supplemental key

VE3R - d_1 - w - l_1 - l_2 - k_1 - k_2 - k_3 - r_1 - p_1 - z_1 - r_2 - p_2 - z_2

- Single tube linear unit
- Outer diameter
- Material
- Stroke 1
- Stroke 2
- Edge distance 1
- Spacing
- Edge distance 2
- Spindle 1 thread direction
- Spindle 1 thread pitch
- Journal z_1
- Spindle 2 thread direction
- Spindle 2 thread pitch
- Journal z_2

LINEAR UNIT CONNECTORS

The single tube linear unit VE3R only becomes a functional axis after attachment of a linear unit connector. Linear unit connectors are available in a variety of designs for different applications. To simplify the selection process, an overview is provided on page 238.






VE3V | Single tube linear units, square, for two independent guide elements

PRODUCT INFO

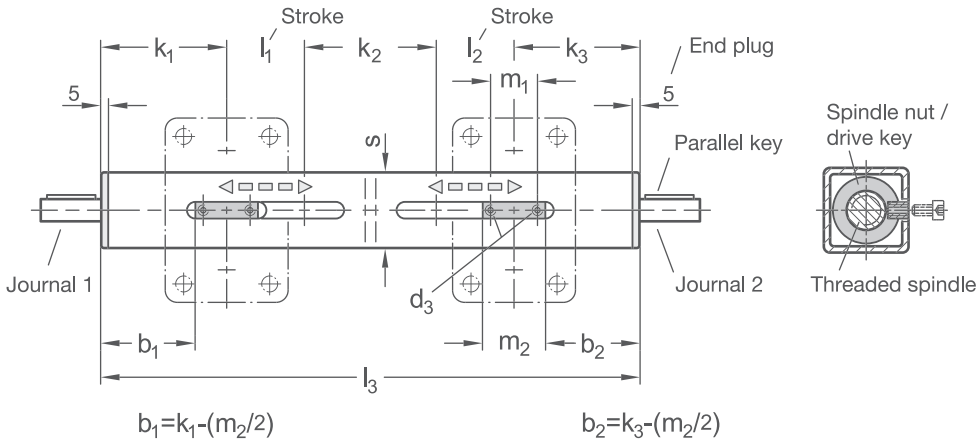
The guide tubes of the **linear units VE3V** are made of chrome-plated steel or bright stainless steel precision tubes. Two independent spindles with ball bearings on each side are installed in the guide tube. The thread direction of the spindles can be chosen as desired for each side. The spindle nuts positioned on each spindle transmit the linear movements to a linear unit connector via a drive key along the guide groove, independently of the opposite side.

Together with the guide tube, the guide element bores form solid linear square guide mechanisms that can receive large torsional forces. Multiple connector types are available for selection and can be adjusted or clamped for low play using the split bore. The parts to be moved are fastened to the guide element, such as for format adjustments, in which one side guide is moved independently from the opposite side to various widths.

Possible accessories are already taken into account in the selection of the linear units according to the options given in the tables. This ensures, for example, that the journal lengths z_1 and z_2 are appropriate for attachment of the accessories. The linear unit connectors and the accessories are not included with the linear units and must be ordered separately.

Adjustable hand levers are intended for repeated, tool-free clamping of the guide elements. Under the designation HSK, these are available separately for individual use and in other designs. Compared with the tool-operated hex socket cap screw, the clamping force achievable with an adjustable hand lever is lower due to the shorter lever length.

RoHS-compliant product



s	Stroke max. l_1	Stroke max. l_2	Edge distance 1 min. k_1	Spacing min. k_2	Edge distance 2 min. k_3	d_3	Total length max. (k_1+ k_2+ k_3 + l_1+ l_2) l_3	m_1	m_2
30	601	601	59	50	59	M 4	1460	23	38
40	753	753	78	66	78	M 5	1810	42	54
50	748	748	82	70	82	M 6	1810	42	54

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
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

Spindle 1 thread direction (on journal z_1)
r_1

RH	Right-hand thread
LH	Left-hand thread

Spindle 2 thread direction (on journal z_2)
r_2

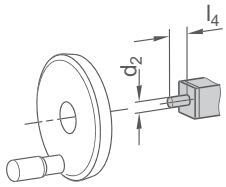
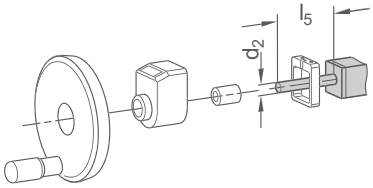
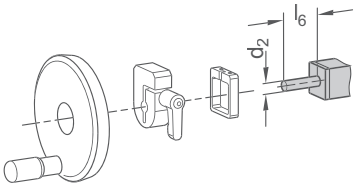
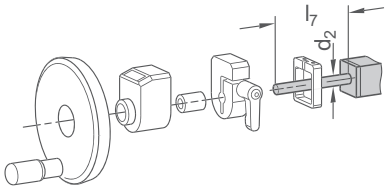
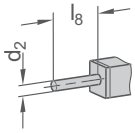
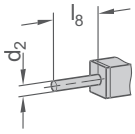
RH	Right-hand thread
LH	Left-hand thread

s	Spindle Ø	Spindle pitch spindle 1 p_1		Spindle pitch spindle 2 p_2		Journal diameter d_2	Journal length B l_4	Journal length D l_5	Journal length E l_6	Journal length F l_7	individual journal length l_8
		Trapezoidal thread	Fine thread, metric	Trapezoidal thread	Fine thread, metric						
30	14	4	1	4	1	8	16	52	31	67	16...67
40	20	4	1	4	1	12	17	59	32	74	17...74
50	20	4	1	4	1	12	18	60	33	75	18...75

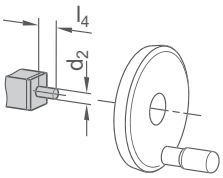
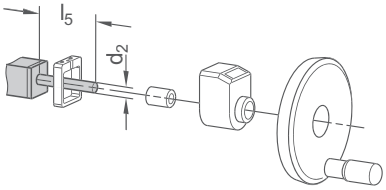
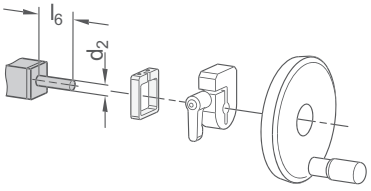
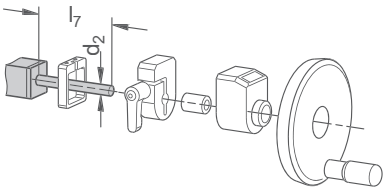
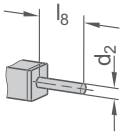
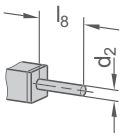
Accessories:

s	Torque support	Clamping plate	Position indicator		Handwheel
30	VZDV	VZK	VZPM	VZPE	VZH
40	VZDV	VZK	VZPM	VZPE	VZH
50	VZDV	VZK	VZPM	VZPE	VZH

Journal
z_1

B	Journal for handwheel	D	Journal for position indicator and handwheel	E	Journal for spacer plate and handwheel (only for $d_1 \geq 30$)
 Journal length l_4		 Journal length l_5		 Journal length l_6	
F	Journal for spacer plate, position indicator and handwheel (only for $d_1 \geq 30$)	Gxx	Individual length with keyway (for xx enter value from column l_8)	Hxx	Individual length without keyway (for xx enter value from column l_8)
 Journal length l_7		 Journal length l_8		 Journal length l_8	

Journal
z_2

B	Journal for handwheel	D	Journal for position indicator and handwheel	E	Journal for spacer plate and handwheel (only for $d_1 \geq 30$)
 Journal length l_4		 Journal length l_5		 Journal length l_6	
F	Journal for spacer plate, position indicator and handwheel (only for $d_1 \geq 30$)	Gxx	Individual length with keyway (for xx enter value from column l_8)	Hxx	Individual length without keyway (for xx enter value from column l_8)
 Journal length l_7		 Journal length l_8		 Journal length l_8	

ACCESSORIES

- Handwheels **VZH** → *see page 356*
- Position indicator **VZPM / VZPE** → *see page 358 / 360*
- Clamping plates **VZK** → *see page 362*
- Torque supports **VZDV** → *see page 366*
- Angle gears → *on request*
- Transfer units **VA** → *see page 370*

ORDER KEY

Name key | Supplemental key

VE3V - s - w - l_1 - l_2 - k_1 - k_2 - k_3 - r_1 - p_1 - z_1 - r_2 - p_2 - z_2

- Single tube linear unit
- Outer diameter
- Material
- Stroke 1
- Stroke 2
- Edge distance 1
- Spacing
- Edge distance 2
- Spindle 1 thread direction
- Spindle 1 thread pitch
- Journal z_1
- Spindle 2 thread direction
- Spindle 2 thread pitch
- Journal z_2

LINEAR UNIT CONNECTORS

The single tube linear unit VE3V only becomes a functional axis after attachment of a linear unit connector. Linear unit connectors are available in a variety of designs for different applications. To simplify the selection process, an overview is provided on page 238.





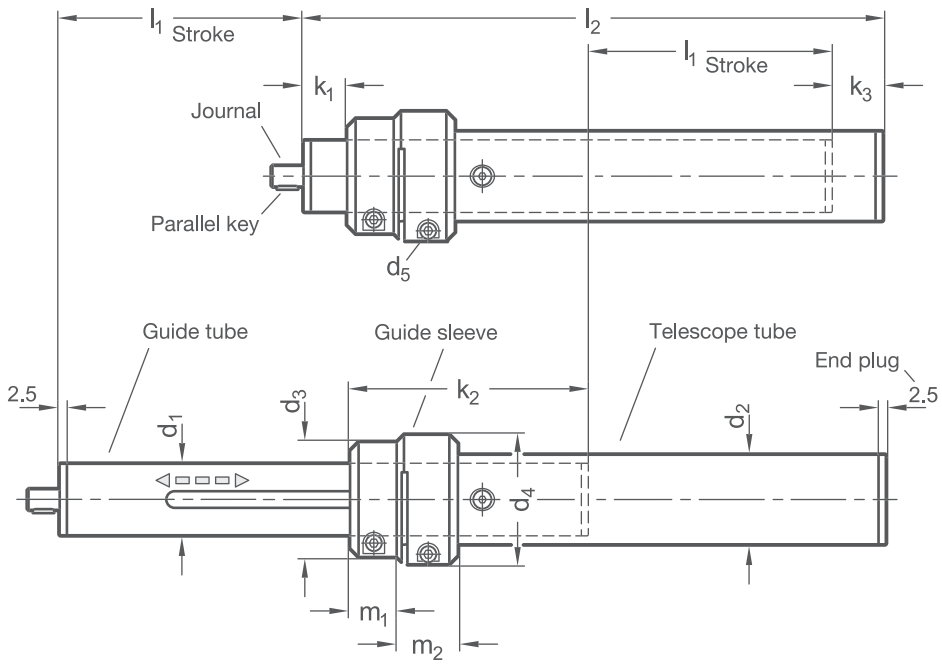

PRODUCT INFO

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
30	...400	70	73	12	35	49	54	M 5	1000	15	21
40	...600	90	94	12	50	64	72	M 6	1400	26	34

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

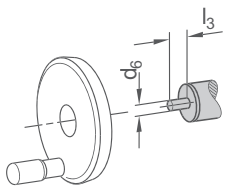
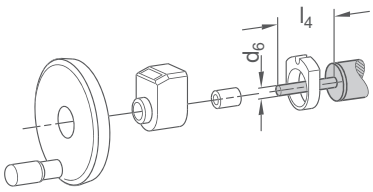
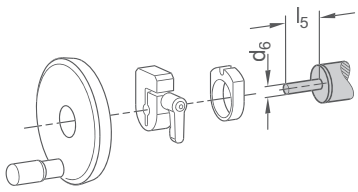
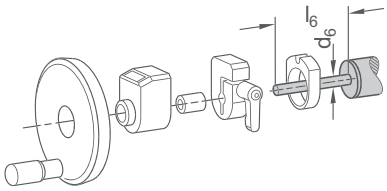
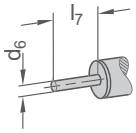
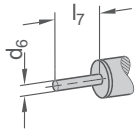
Spindle thread direction
r

RH	Right-hand thread
LH	Left-hand thread

d_1	Spindle Ø	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 journal length l_7
		Trapezoidal thread	Fine thread, metric						
30	14	4	1	8	16	52	31	67	16...67
40	20	4	1	12	17	59	32	74	17...74

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	

ACCESSORIES

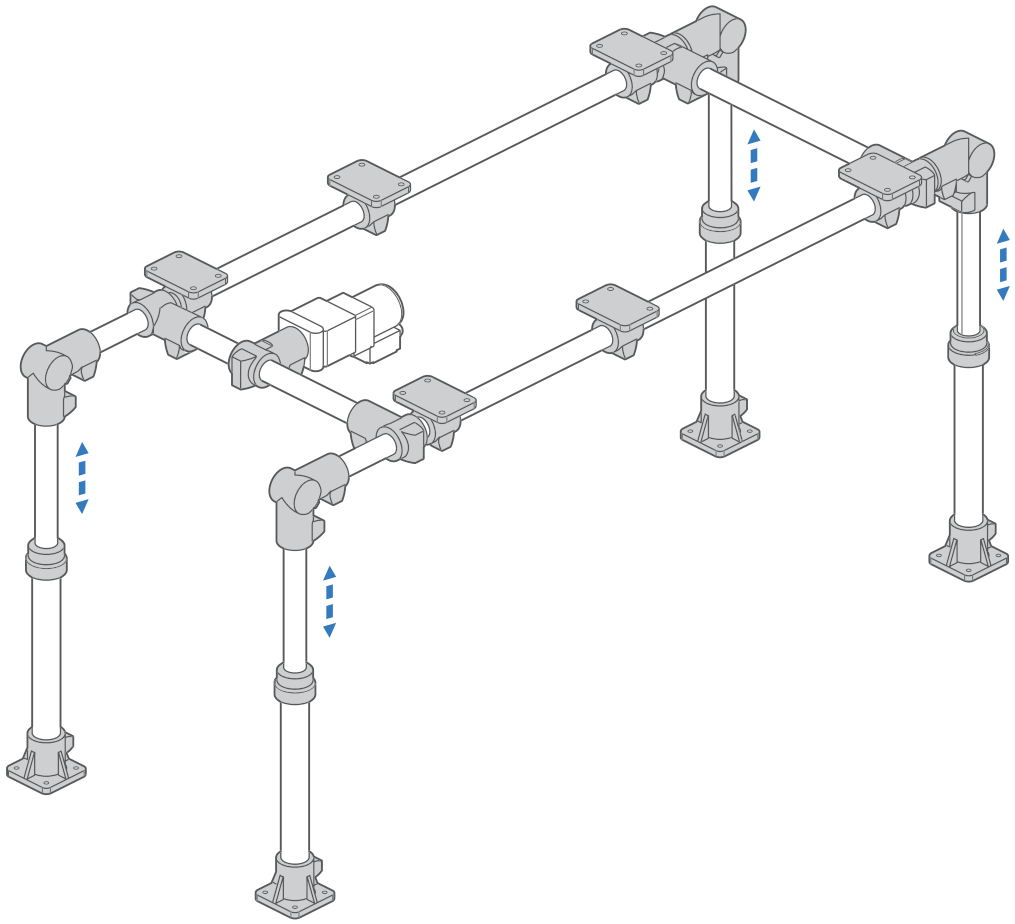
- Handwheels **VZH** → *see page 356*
- Position indicators **VZPM / VZPE** → *see page 358 / 360*
- Clamping plates **VZK** → *see page 362*
- Torque supports **VZDR** → *see page 364*

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

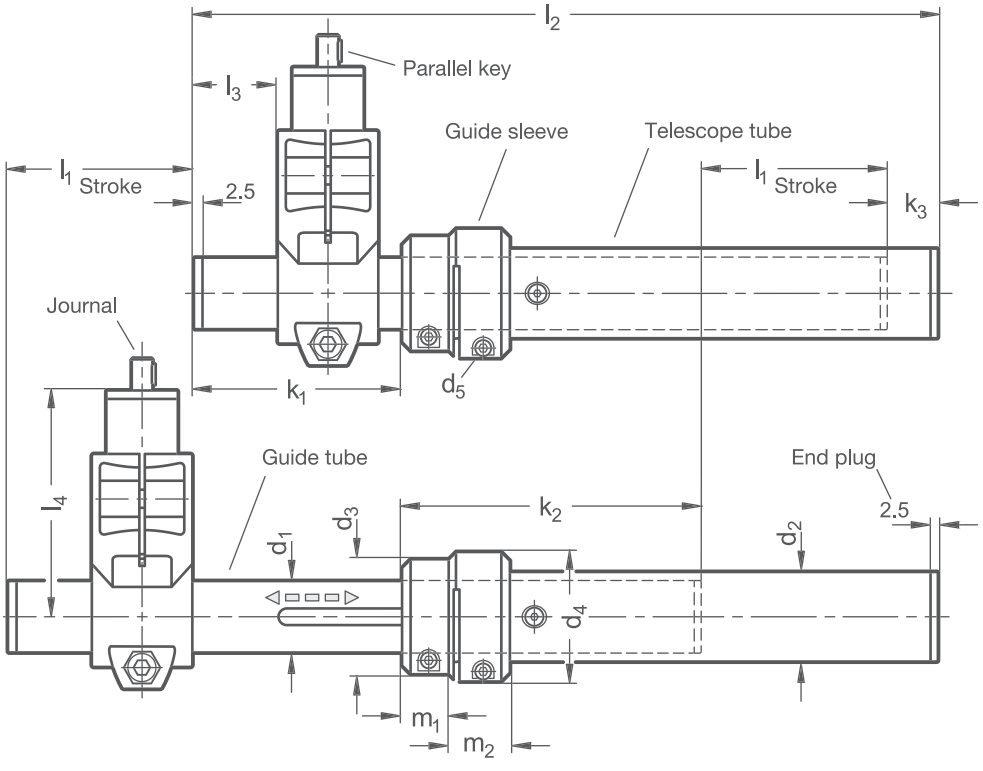
PRODUCT INFO

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
30	...400	120	73	12	35	49	54	M 5	1000	70	86	15	21
40	...600	156	94	12	50	64	72	M 6	1400	90	125	26	34

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

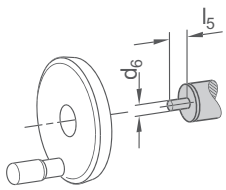
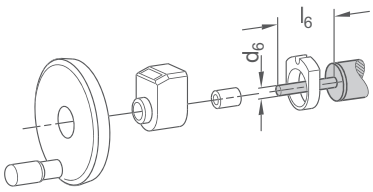
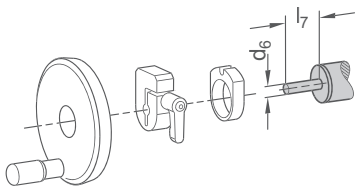
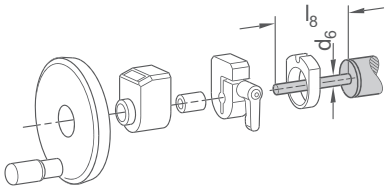
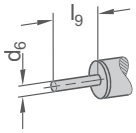
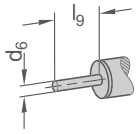
RH	Right-hand thread
LH	Left-hand thread

d_1	Spindle Ø	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						
30	14	4	1	8	16	52	31	67	16...67
40	20	4	1	12	17	59	32	74	17...74

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	

2A

ACCESSORIES

- Handwheels **VZH** → *see page 356*
- Position indicators **VZPM / VZPE** → *see page 358 / 360*
- Clamping plates **VZK** → *see page 362*
- Torque supports **VZDR** → *see page 364*

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