Oil lubrication

The advantage of oil lubrication is the flushing effect. The rolling elements are coated with oil, excess oil flows away and any particles are flushed out of the carriage.

Preference should be given to the use of lubricating oils CLP or CGLP to DIN 51517 and HLP to DIN 51524.

At operating temperatures between +10 °C and +80 °C, the viscosity should be between ISO VG 68 and ISO VG 220, see table, page 39.

If the temperatures are outside the range stated above, oils with appropriate suitability must be used.

For highly dynamic applications, lubricating oils to ISO VG 100 are recommended.

Compatibility

If it is possible to draw upon practical experience or guidelines from the oil manufacturer, oils must not be used until their behaviour in relation to plastics, elastomers and non-ferrous metals has been tested.

The compatibility of oils must always be checked.

This must only be checked under dynamic conditions and at operating temperature.

In case of doubt, the lubricant manufacturer must be consulted.

Miscibility

Oils with a mineral oil base of the same classification are miscible with each other. However, the viscosities should not differ by more than one ISO VG grade.

The miscibility of synthetic oils must always be checked.
In case of doubt, the lubricant manufacturer must be consulted.

Compatibility with process materials (e.g. cooling lubricants) must be checked.

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Lubricant quantities

All the values given are guide values, see tables, page 43.

They are valid for the following conditions:

- operating duration 100%
- $C_0/P = 8$
- v = 0,8 m/s
- stroke 500 mm to 1000 mm
- irrespective of mounting positions, 0° to 90°, *Figure 1*.

Precise values can only be determined in practice. Adequate provision of lubricant is indicated by a visible, unbroken oil film at the profile of the wipers.

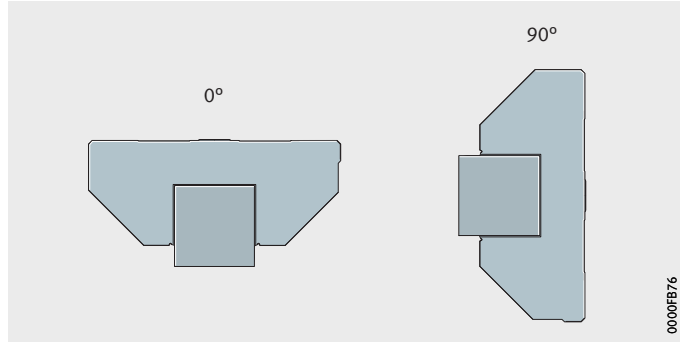


Figure 1
Mounting position

Minimum oil quantity Q_{min}

The minimum oil quantity Q_{min} is valid for commissioning or recommissioning after machine downtime of more than 8 hours, see tables, page 43.

For initial operation, it is measured such that the oil ducts, rolling elements and raceways will be adequately provided with oil.

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Oil lubrication

Oil impulse quantity Q_{imp}

The oil impulse quantity Q_{imp} is valid if the linear guidance system is connected to a central lubrication system and the stroke ratio is less than 200, see tables, page 43 and *Figure 3*, page 52.

The lubricant quantities are valid for all mounting positions.

If heavy contamination is present, it may be necessary to increase the oil relubrication quantity.

The lubrication impulses must be carried out in direct succession.

Carriages with a minimal lubricant quantity metering unit have integral piston distributors. These inject 0,12 cm^3 of lubricant per impulse into the carriages. A separate piston distributor cannot be used with these guidance systems.

KIT series 500 with minimal lubricant quantity metering unit, see page 142.

The oil quantity for the damping carriage RUDS is dependent on the size of the recirculating roller guidance system RUE..-E.

Damping carriages RUDS, see page 192.

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Guide values for lubricant quantities

The guide values are valid under the stated conditions, see page 41.

Oil quantities for RUE and RUDS

Designation[1]	Commissioning quantity	Relubrication quantities			
	Minimum oil quantity Q_{min} cm³	Number of impulses	Oil impulse quantity Q_{imp} cm³	Relubrication interval h	Consumption cm³/h
RUE25-E (-H, -L, -HL)	0,8	1	0,2	5	0,04
RUE35-E (-H, -L, -HL)	1,3	2	0,6	12	0,1
RUE45-E (-H)	1,6	3	0,6	7	0,25
RUE45-E-L (-HL)	2,1	3	0,6	7	0,25
RUE55-E (-H)	2,8	3	0,6	9	0,2
RUE55-E-L (-HL)	3,2	3	0,6	9	0,2
RUE65-E (-H)	5,2	4	0,6	2	1,2
RUE65-E-L (-HL)	5,8	4	0,6	2	1,2
RUE100-E-L	17,6	4	0,6	1	2,4

[1] The oil quantity for the damping carriage RUDS is dependent on the size of the linear recirculating roller bearing and guideway assembly RUE.

Oil quantities for RUE..-E with minimal lubricant quantity metering unit

Designation	Number of impulses	Oil impulse quantity Q_{imp} cm³	Relubrication interval h	Consumption cm³/h
RUE35-E (-E-H)	1	0,12	2,4	0,05
RUE35-E (-E-L, -E-HL)	1	0,12	2,4	0,05
RUE45-E (-E-H)	1	0,12	1,5	0,08
RUE45-E-L (-E-HL)	1	0,12	1,2	0,1
RUE55-E (-E-H)	1	0,12	0,9	0,13
RUE55-E-L (-E-HL)	1	0,12	0,8	0,15
RUE65-E (-E-H)	1	0,12	0,5	0,25
RUE65-E-L (-E-HL)	1	0,12	0,4	0,28

RUE..-E systems with a minimal lubricant quantity metering unit have integral piston distributors. A separate piston distributor cannot be used with this combination.

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Oil lubrication

Oil quantities for RUE..-E with lubricant quantity metering valves SMDS

Designation	Number of impulses	Oil impulse quantity Q_{imp} cm^3	Relubrication interval h	Consumption cm^3/h
RUE35-E-SMDS (-H)	1	0,1	1,3	0,075
RUE35-E-L-SMDS (-HL)	1	0,1	1,3	0,075
RUE45-E-SMDS (-H)	1	0,1	0,6	0,165
RUE45-E-L-SMDS (-HL)	1	0,1	0,6	0,175
RUE55-E-SMDS (-H)	1	0,2	1,2	0,165
RUE55-E-L-SMDS (-HL)	1	0,2	1,1	0,175
RUE65-E-SMDS (-H)	1	0,2	0,3	0,725
RUE65-E-L-SMDS (-HL)	1	0,2	0,3	0,74

The functionality of the lubricant quantity metering valve is already integrated in the RUE25-E. The use of a lubricant quantity metering valve is therefore unnecessary in the case of RUE25-E.

Oil quantities for KUSE

Designation	Minimum oil quantity for commissioning Q_{min} cm^3	Oil impulse quantity Q_{imp} cm^3/h
KUSE20 (-H)	1,2	0,03
KUSE20-L (-HL)	1,6	0,04
KUSE25 (-H)	1,2	0,03
KUSE25-L (-HL)	2	0,05
KUSE30 (-H)	1,6	0,04
KUSE30-L (-HL)	2,8	0,07
KUSE35	2,2	0,04
KUSE35-L	3,2	0,08
KUSE45	2,8	0,07
KUSE45-L	5,2	0,12

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Oil quantities for KUVE

Designation	Minimum oil quantity for commissioning Q_{min} cm^3	Oil impulse quantity Q_{imp} cm^3/h
KUVE15-B (-S, -H, -E, -ES)	0,6	0,02
KUVE15-B-EC (-ESC)	0,6	0,02
KUVE15-W	0,6	0,02
KUVE20-B (-S, -H, -SN, -N, -E, -ES)	0,9	0,03
KUVE20-B-L (-SL, -SNL, -NL)	0,9	0,03
KUVE20-B-EC (-ESC)	0,6	0,02
KUVE20-W	0,9	0,03
KUVE20-WL	0,9	0,03
KUVE25-B (-S, -H, -SN, -N, -E, -ES)	0,9	0,03
KUVE25-B (-S, -H, -SN, -N, -E, -ES) -HS	0,9	0,03
KUVE25-B-L (-SL, -HL, -SNL, -NL)	1,2	0,04
KUVE25-B-EC (-ESC)	0,9	0,02
KUVE25-W	0,9	0,03
KUVE25-WL	1,2	0,04
KUVE30-B (-S, -H, -SN, -N, -E, -ES)	0,9	0,03
KUVE30-B-L (-SL, -HL, -SNL, -NL)	1,5	0,05
KUVE30-B-EC (-ESC)	0,9	0,02
KUVE30-W	0,9	0,03
KUVE35-B (-S, -H, -SN, -N, -E, -ES)	1,4	0,04
KUVE35-B-L (-SL, -HL, -SNL, -NL)	1,8	0,06
KUVE35-B-EC (-ESC)	0,9	0,02
KUVE35-WL	1,8	0,06
KUVE45-B (-S, -H, -SN, -N)	2,2	0,05
KUVE45-B-L (-SL, -HL, -SNL, -NL)	3	0,09
KUVE45-B-EC (-ESC)	1,4	0,03
KUVE55-B (-S)	3	0,09
KUVE55-B-L (-SL)	4,2	0,12

Oil quantities for KUVS

Designation	Minimum oil quantity for commissioning Q_{min} cm^3	Oil impulse quantity Q_{imp} cm^3/h
KUVS10-B	0,5 – 0,6	0,3
KUVS13-B	0,5 – 0,6	0,3
KUVS17-B	0,8 – 0,9	0,5

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Grease lubrication

The advantages of grease lubrication are as follows:

- little requirement for design work;
  it may be possible to dispense with a central lubrication system
- the possibility of long term lubrication
- the use of reservoir lubrication.

Flowable grease lubrication

Due to the risk of increased lubricant egress, flowable greases of grades NLGI 00 and NLGI 000 should be used in accordance with the guide values for oil lubrication, see tables, page 43.

In the case of flowable greases of grade NLGI 0, the lubricant quantity and relubrication interval should be taken from the chapter Grease lubrication.

In clean environmental conditions, the impulse quantity can in certain circumstances be reduced to approx. 20% of the oil impulse quantity stated in the tables.

Minimal lubricant quantity metering unit

For the minimal lubricant quantity metering unit, only flowable greases of grades NLGI 00 and NLGI 000 are permissible.

Lithium soap and lithium complex soap greases with a mineral oil base and EP additives are recommended.

Base oil viscosity

The base oil viscosity is shown in the table:

Guidance system	Base oil viscosity
RUE..-E[1)]	ISO VG 150 to ISO VG 220
KUSE[2)] KUVE..-B[2)] KUVE..-W[2)]	ISO VG 68 to ISO VG 100
KUVS[2)]	ISO VG 68 to ISO VG 100

1) For initial greasing with grease KP2N–20 to DIN 51825.

2) For initial greasing with grease KP2K–30 to DIN 51825.

Grease lubrication

Lithium soap and lithium complex soap greases with a mineral oil base are recommended.

Base oil viscosity

The base oil viscosity is shown in the table:

Guidance system	Base oil viscosity
RUE..-E	ISO VG 150 to ISO VG 220
KUSE KUVE..-B KUVE..-W	ISO VG 68 to ISO VG 150
KUVS	ISO VG 68 to ISO VG 150

For high loads, greases doped with EP additives are absolutely necessary.

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Miscibility

Greases may be mixed if:

- they have the same base oil type
- they have matching thickener types
- they have similar base oil viscosities:
  the difference must be no more than one ISO VG grade
- they have the same consistency (NLGI grade).

In case of doubt, please contact us.

If the grease quality differs from our specifications, this can lead to negative effects.

Initial grease quantity

Carriages that are not connected to a central lubrication system must be greased before mounting with the initial grease quantity, see tables.

Linear recirculating ball bearing and guideway assemblies KUVE..-B

- Standard designs are delivered with a basic greasing, which must be supplemented before commissioning.
- KUVE25-B..-HS (design High-Speed) systems are supplied with an initial greasing.
- KUVE..-B..-UG is supplied without basic greasing, which means that it only has a preservative (the suffix for this option is -UG).

If a linear guidance system not lubricated by a central lubrication system is not given an initial greasing, there is a risk of damage.

Initial grease quantities for RUE

Designation	Initial grease quantity ≈ g
RUE25-E (-H)	2,3
RUE25-E-L (-HL)	3,5
RUE35-E (-H)	6,9
RUE35-E-L (-HL)	8,1
RUE45-E (-H)	11,5
RUE45-E-L (-HL)	16,1
RUE55-E (-H)	20,7
RUE55-E-L (-HL)	25,3
RUE65-E (-H)	23
RUE65-E-L (-HL)	28,8
RUE100-E-L	92

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Grease lubrication

Initial grease quantities for KUSE

Designation	Initial grease quantity ≈ g
KUSE20-H	3,5
KUSE20-L (-HL)	4,4
KUSE25-H	4,6
KUSE25-L (-HL)	6,3
KUSE30-H	8,1
KUSE30-L (-HL)	10,4
KUSE35	12,7
KUSE35-L	17,3
KUSE45	20,7
KUSE45-L	26,5

Initial grease quantities for KUVE with basic greasing

Designation	Initial grease quantity ≈ g
KUVE15-B (-S, -H, -E, -ES)	0,6
KUVE15-B-EC (-ESC)	0,4
KUVE15-W	0,8
KUVE20-B (-S, -H, -SN, -N, -E, -ES)	0,9
KUVE20-B-L (-SL, -SNL, -NL)	1,1
KUVE20-B-EC (-ESC)	0,8
KUVE20-W	1,2
KUVE20-WL	1,4
KUVE25-B (-S, -H, -SN, -N, -E, -ES)	1,2
KUVE25-B (-S, -H, -SN, -N, -E, -ES) -HS[1)]	–
KUVE25-B-L (-SL, -HL, -SNL, -NL)	1,6
KUVE25-B-EC (-ESC)	1,0
KUVE25-W	1,8
KUVE25-WL	2,1
KUVE30-B (-S, -H, -SN, -N, -E, -ES)	3,1
KUVE30-B-L (-SL, -HL, -SNL, -NL)	3,4
KUVE30-B-EC (-ESC)	2,5
KUVE30-W	4,5
KUVE35-B (-S, -H, -SN, -N, -E, -ES)	4,9
KUVE35-B-L (-SL, -HL, -SNL, -NL)	5,7
KUVE35-B-EC (-ESC)	4,2
KUVE35-WL	6,6
KUVE45-B (-S, -H, -SN, -N)	7,9
KUVE45-B-L (-SL, -HL, -SNL, -NL)	8,6
KUVE45-B-EC (-ESC)	6,4
KUVE55-B (-S)	11,4
KUVE55-B-L (-SL)	13,1

1) KUVE25-B..-HS (design High-Speed) systems are supplied with an initial greasing.

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Initial grease quantities for KUVE..-UG with preservative (without basic greasing)

Designation	Initial grease quantity ≈ g
KUVE15-B (-S, -H, -E, -ES) ..-UG	0,9
KUVE15-B-EC (-ESC) ..-UG	0,6
KUVE15-W..-UG	0,9
KUVE20-B (-S, -H, -SN, -N, -E, -ES) ..-UG	1,7
KUVE20-B-L (-SL, -SNL, -NL) ..-UG	2,2
KUVE20-B-EC (-ESC) ..-UG	1,7
KUVE20-W..-UG	1,7
KUVE20-WL..-UG	2,2
KUVE25-B (-S, -H, -SN, -N, -E, -ES) ..-UG	2,5
KUVE25-B (-S, -H, -SN, -N, -E, -ES) -HS..-UG	2,5
KUVE25-B-L (-SL, -HL, -SNL, -NL) ..-UG	3,5
KUVE25-B-EC (-ESC) ..-UG	1,7
KUVE25-W..-UG	2,5
KUVE25-WL..-UG	3,5
KUVE30-B (-S, -H, -SN, -N, -E, -ES) ..-UG	4,8
KUVE30-B-L (-SL, -HL, -SNL, -NL) ..-UG	6,1
KUVE30-B-EC (-ESC) ..-UG	3,1
KUVE30-W..-UG	4,8
KUVE35-B (-S, -H, -SN, -N, -E, -ES) ..-UG	7,7
KUVE35-B-L (-SL, -HL, -SNL, -NL) ..-UG	9,9
KUVE35-B-EC (-ESC) ..-UG	4,8
KUVE35-WL..-UG	9,9
KUVE45-B (-S, -H, -SN, -N) ..-UG	13,8
KUVE45-B-L (-SL, -HL, -SNL, -NL) ..-UG	17,0
KUVE45-B-EC (-ESC) ..-UG	9,2
KUVE55-B (-S) ..-UG	16,7
KUVE55-B-L (-SL) ..-UG	21,9

Initial grease quantities for KUVS

Designation	Initial grease quantity[1] ≈ g
KUVS10-B	0,3
KUVS13-B	0,9
KUVS17-B	2,3

[1] KUVS systems are supplied with an initial greasing.

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Grease lubrication

Calculation of the lubrication interval Grease operating life

Since it is not possible to calculate all the influencing factors, the precise grease operating life can only be determined under operating conditions. The approximation equation below, however, can be used to determine a guide value for many applications:

$$t_{fG} = t_f \cdot K_P \cdot K_W \cdot K_U$$

t_{fG} h
Guide value for grease operating life in operating hours

t_f h
Factor for basic lubrication interval in operating hours, *Figure 1*

K_P, K_W, K_U –
Correction factors for load, stroke length and environment, see page 52.

The grease operating life is restricted to a maximum of three years due to the ageing resistance of the grease:

- for linear recirculating roller bearing and guideway assemblies RUE-E, to 18 000 h
- for linear recirculating ball bearing and guideway assemblies KUSE, KUVE..-B, KUVE..-W, KUVS, to 26 000 h.

Basic lubrication interval

The basic lubrication interval t_f is valid under the following conditions, *Figure 1*:

- bearing temperature < +80 °C
- load ratio $C_0/P = 20$
- no disruptive environmental influences
- stroke ratio between 10 and 50, *Figure 3*, page 52.

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Speed parameter

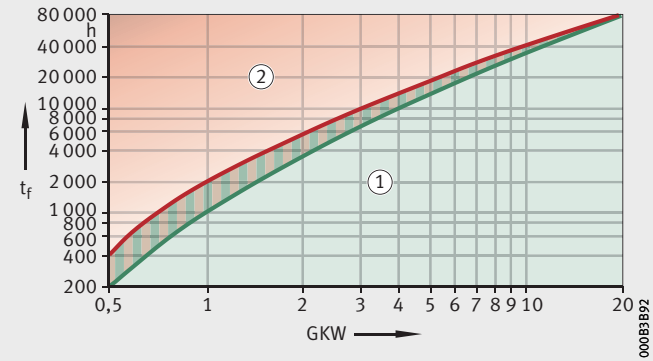
The speed parameter is defined as follows:

$$GKW = \frac{60}{v_m} \cdot K_{LF}$$

GKW –
Speed parameter, *Figure 1*

v_m m/min
Mean travel velocity

K_{LF} –
Bearing factor, see table, page 51.



t_f = basic lubrication interval
GKW = speed parameter
① Relubrication possible
② Regreasing necessary

Figure 1
Determining the basic lubrication interval

The bearing factor K_{LF} takes account of the internal and external structure of the bearing, such as lubricant reservoirs, wipers and additional lubrication devices that influence the grease operating life.

Bearing factor K_{LF} for delivered condition

Linear guidance system	Bearing factor K_{LF}		
	Carriage with initial greasing and		Long term lubrication unit KIT[1] (KIT series 400)
	single lip wipers	double lip wipers	
RUE..-E	0,8	1,2	2,5
KUSE	1,5	–	–
KUVE..-B	2,5	4,5	5,5
KUVE25-B..-HS	–	2,7	–
KUVE..-W	2,5	4,5	5,5
KUVS	1,5	–	–

[1] Valid only with mounting on both sides of the long term lubrication unit KIT on the carriage.

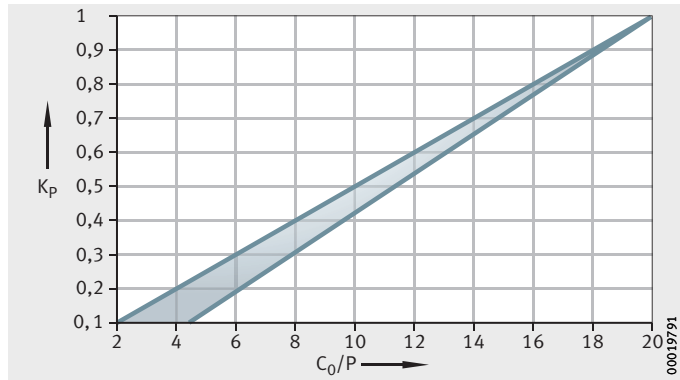
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Grease lubrication

Correction factor for load K_P

The correction factor K_P takes account of the strain on the grease at a load ratio of $C_0/P < 20$, *Figure 2*.

The factors are only valid for high quality lithium soap greases.

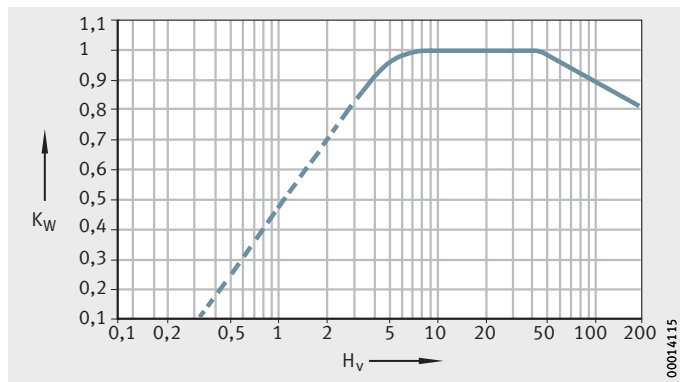


K_P = correction factor for load
C_0/P = load ratio

Figure 2
Correction factor for load

Correction factor for stroke K_W

The correction factor K_W takes account of the displacement distance to be lubricated, *Figure 3*. It is dependent on the stroke ratio.



K_W = correction factor for stroke length
H_v = stroke ratio

Figure 3
Correction factor for stroke length

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Stroke ratio

If the stroke ratio is < 10 or > 50, the grease operating life is reduced due to the risk of fretting corrosion or the loss of grease.

The stroke ratio is calculated as follows:

$$H_v = \frac{H \cdot 10}{L_1}$$

H_v – Stroke ratio

L_1 mm Effective saddle plate length, see dimension tables

H mm Stroke length.

If the stroke length is very small ($< 2 \cdot L_1$), the grease operating life may be shorter than the calculated guide value. In such cases, special greases are recommended.

Correction factor for environment K_U

The correction factor K_U takes account of shaking forces, vibrations (a cause of fretting corrosion) and shocks as well as environmental influences (contamination and operating media), see table.

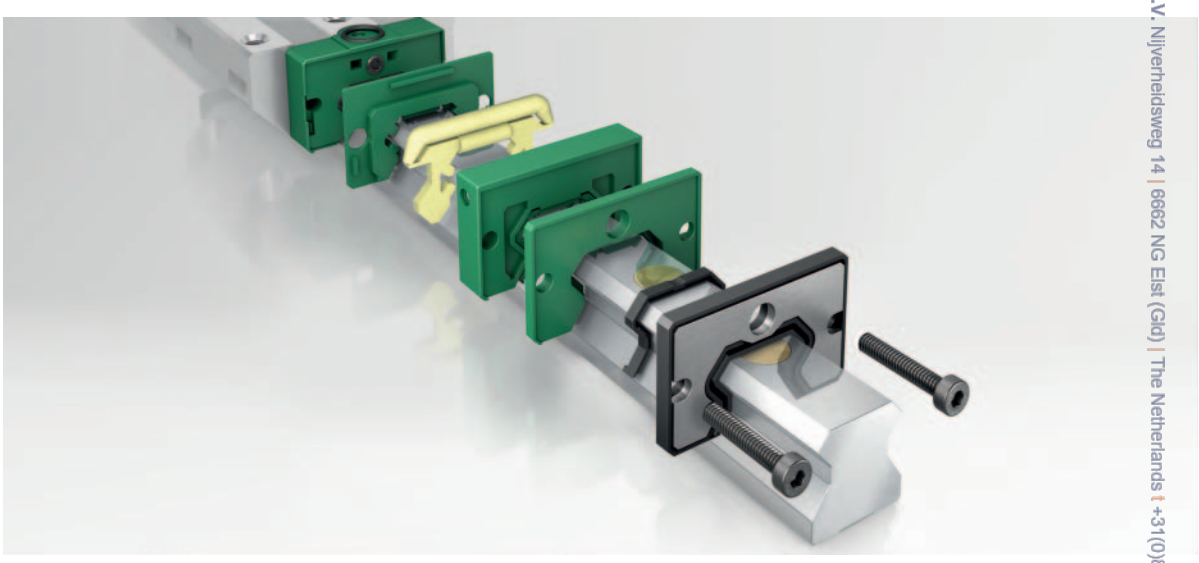
These influences place an additional strain on the grease.

Cooling lubricants can wash greases out of the carriage. If cooling lubricant or moisture comes into contact with the linear system, calculation in approximate terms is possible but, for reasons of unpredictability, it must be regarded as a guide value only and requires monitoring and adjustment in practice. Where necessary, the grease operating life must be completely determined again.

Environmental influence and correction factor

Environmental influence	Correction factor K_U
light	1
moderate	0,8
heavy	0,5

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Sealing and lubrication elements – system KIT

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Sealing and lubrication elements

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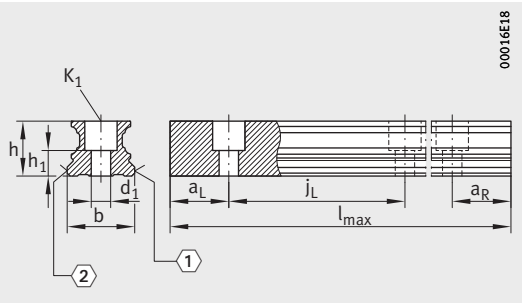


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Four-row linear recirculating ball bearing and guideway assemblies

Guideways and closing methods for KUVE..-B



TKVD

Dimension table (continued) · Dimensions in mm

Designation	For linear guidance system	Mass m ≈ kg/m	Closing plug[1]				Covering strip[2]		
			Plastic		Brass		Adhesive bonded	Clip fit Convex	Retaining plate
			one-piece	two-piece[6]	one-piece	two-piece			
TKVD45	KUVE45-B	9,2	KA20-TN	KA20-TN/A	KA20-M	KA20-M/A	–	–	–
TKVD45-U			–	–	–	–			
TKVD45-ADB		9,2	–	–	–	–	ADB23	–	HPL.ADB17-B
TKVD45-ADK							–	ADK21	
TKVD55-B	KUVE55-B	14	KA24-TN	KA24-TN/A	KA24-M	KA24-M/A	–	–	–
TKVD55-B-U			–	–	–	–			
TKVD55-ADB		14	–	–	–	–	ADB27	–	HPL.ADB17-B
TKVD55-ADK							–	ADK25	

① Locating face. ② Marking.

1) Closing plugs, see page 401.

2) Covering strips, see page 402.

3) The stated torques represent maximum values for the secure transmission of forces in vibration-free, quasistatic applications ($S_0 = 1$). We recommend that the tightening torques for the screw connection of the adjacent construction should be determined at the customer under the conditions specific to the application and operation, observing the information in VDI Guideline 2230 Part 1 (2015) and the information in this description, see page 69 and page 26.

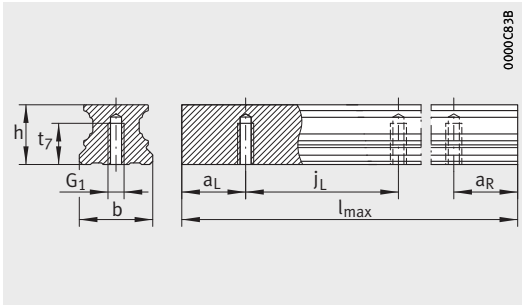
4) Maximum length of single-piece guideways. Longer guideways are supplied as several segments and are marked accordingly. Permissible number of guideway segments, see page 309.

5) a_L and a_R are dependent on the guideway length.

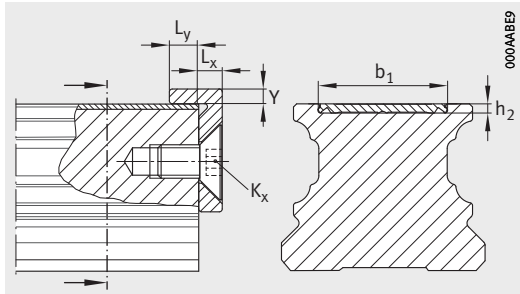
6) Standard.

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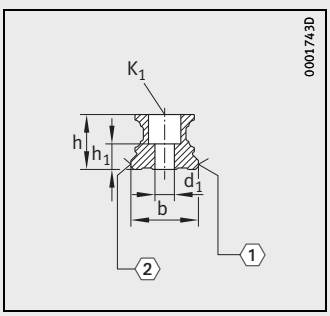


TKVD..-U

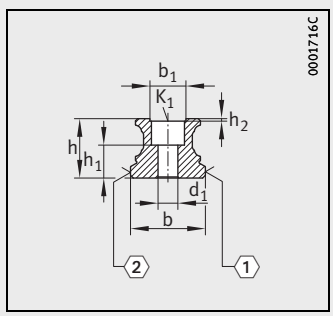


Retaining plate and covering strip

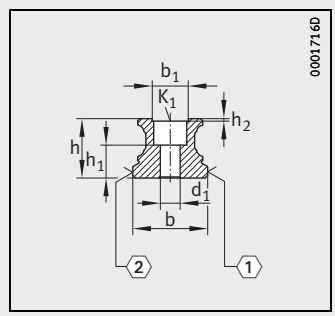
Dimensions															Fixing screws[3]				
K_x	L_x	L_y	Y	l_{max}[4]	h	b	a_L, a_R[5]		j_L	j_B	a_5	h_1	h_2	t_7	b_1	G_1		K_1		d_1
																DIN ISO 4762-12.9				
						−0,005 −0,035	min.	max.				±0,5					M_A Nm		M_A Nm	
–	–	–	–	5 835	34,2	45	20	94	105	–	–	15,7	–	–	–	–	–	M12	140	13,4
														20		M12	140	–	–	–
M5	4	5	2	5 835	34,2	45	20	94	105	–	–	15,7	0,5	–	23	–	–	M12	140	13,4
													1,1		21,7					
–	–	–	–	5 820	41,5	53	20	107	120	–	–	19	–	–	–	–	–	M14	220	15,4
														22		M14	220	–	–	–
M5	4	5	2	5 820	41,5	53	20	107	120	–	–	19	0,5	–	27	–	–	M14	220	15,4
													1,1		25,7					



TKVD

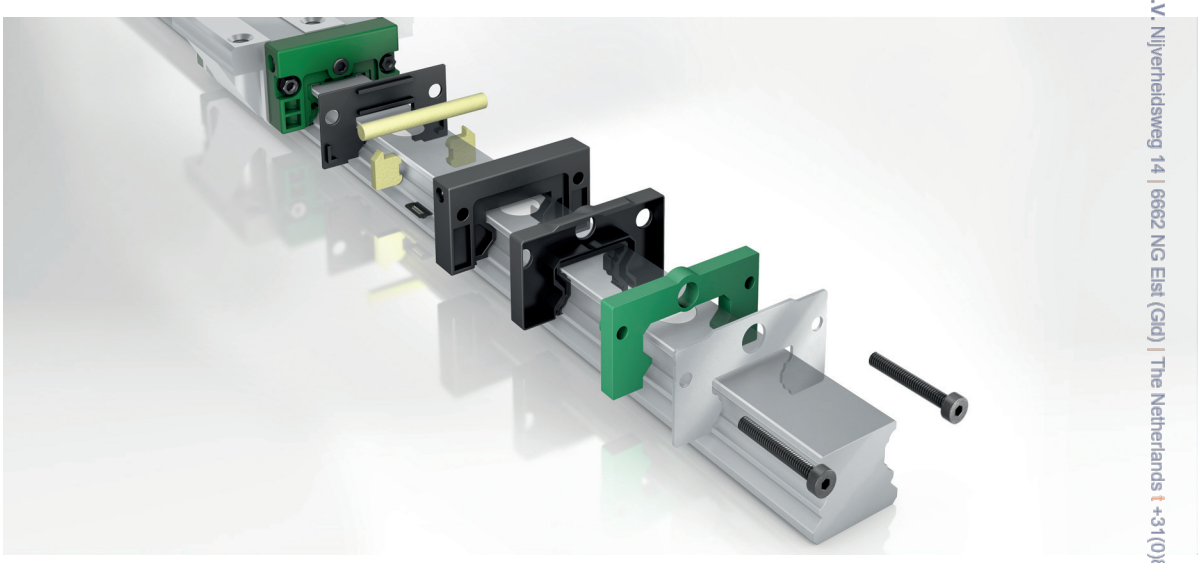


TKVD..-ADB



TKVD..-ADK

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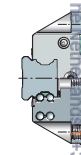
Sealing and lubrication elements – system KIT

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Sealing and lubrication elements

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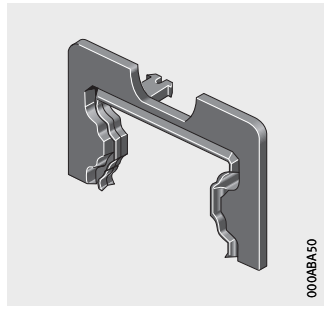


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Sealing elements – system KIT

End wiper – example KIT

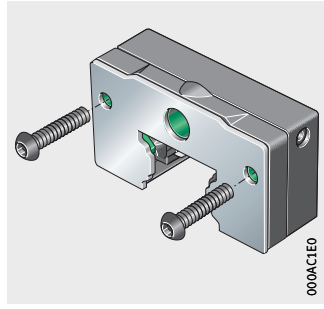
KIT



Lubrication elements – system KIT

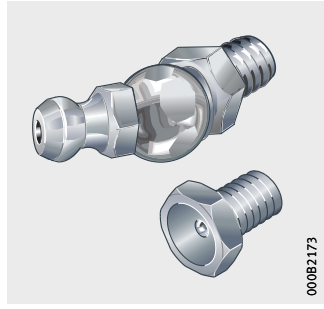
Long term lubrication unit – example KIT

KIT



Lubrication connectors

S



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Sealing and lubrication elements

Sealing and lubrication elements – system KIT

With their extensive range of standard accessories, the linear guidance systems can be easily used in numerous areas.
Since the guidance systems are used in an extremely wide variety of applications, however, additional requirements are often placed on the lubrication and sealing components.

Application-oriented complete package

If the standard components are not adequate for reliable operation and a long operating life, it is possible to draw on a finely graduated system of sealing and lubrication elements. These special accessories protect the rolling element system of the guidance systems against contamination and ensure long lubrication intervals even under the most demanding operating conditions.

KIT structure

The elements are configured as the system KIT and are designed for various application conditions.

Starting from the degree of contamination, the best combination in each case can be quickly and easily compiled:

- Possible combinations, see page 382 and page 392
- Description of sealing elements, see page 366
- Overview of sealing elements, see page 374 and page 388
- Description of lubrication elements, see page 370
- Overview of lubrication elements, see page 382 and page 392.

Only a proportion of the KITs can be retrofitted. Parts that cannot be retrofitted must be ordered together with the linear recirculating ball bearing and guideway assembly and are supplied already fitted.

Degree of contamination

The degree of contamination will vary depending on the market sector, the application and the environmental conditions.

The definitions at this point, see table, are therefore only an initial aid in the selection of KITs.

Definition of the degree of contamination

Degree of contamination			
Very slight	Slight	Moderate	Heavy[1)]
Clean environment	Coarse (large) metal swarf Clean environment No cooling lubricants	Coarse (large) metal swarf Slight exposure to, for example, cooling lubricants	Hot swarf (metal, aluminium) of widely varying size and shape, including very small swarf from HSC machining Aggressive media and dust as well as cooling lubricants

1) If this degree of contamination is present, a KIT can give only a restricted level of protection. Additional measures implemented by the customer, such as additional covers on the guidance system, will give a considerable increase in the operating life.

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Sealing and lubrication elements

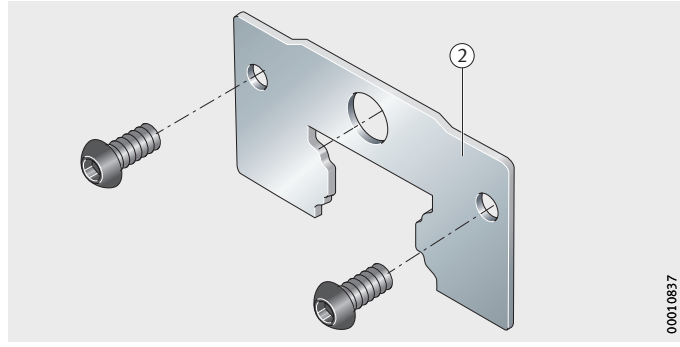
Sealing elements

Additional sealing elements are available both for open upper lubrication holes as well as for close upper lubrication holes:

- End plates, see page 366
- End wipers, see page 367
- Additional wipers, see page 368
- Sealing strips, see page 369.

End plates

End plates are corrosion-resistant, non-contact components, *Figure 1*. They protect the end wipers located behind them against, for example, coarse contaminants and hot swarf. There is a narrow gap between the guideway and the seal.



② End plate, non-contact

Figure 1
End plate
KIT.KWVE..-210

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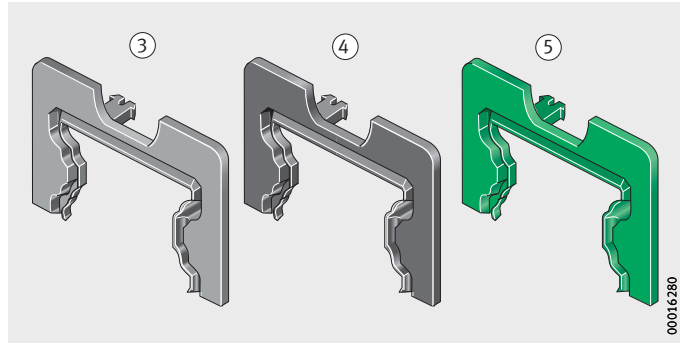
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End wipers

End wipers are contact seals that are fixed to the end faces of the carriages. End wipers protect the guidance system against the ingress of contaminant particles and can extend the relubrication intervals. The selection of the suitable sealing system is based on the application of the guidance system. End wipers are available as a gap seal (grey), single lip smooth-running end wiper (green) and a single lip end wiper (black) with increased sealing action, *Figure 2*.

Single lip end wipers (green, black) have a seal lip oriented outwards that protects the carriage against the ingress of contaminant particles. In combination with oil lubrication, the single lip end wiper facilitates the rinsing out of contaminant particles (flushing effect).

Gap seals are non-contact seals. They have a small gap around the contour of the guideway. There is no increase in displacement force. The gap seal should only be used in a clean environment.



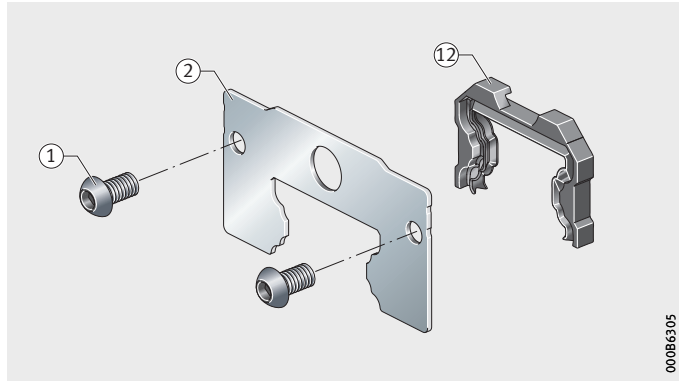
③ Gap seal, grey
④ End wiper, single lip, black
⑤ Standard: Smooth-running end wiper, single lip, green

Figure 2
End wipers
Example
KIT.KWVE..-110, -100, KIT.KWVE..-220 (with end plate)

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High-Speed

Linear recirculating ball bearing and guideway assemblies of the series High-Speed are only available in a standard KIT combination (120/900/120). It is not necessary to indicate this when ordering.



① Fixing screws
② End plate, non-contact
⑫ End wiper, double lip (black)

Figure 3
End wiper KIT.KWVE25B-120

Since the series High-Speed has an optimised end piece, KIT.KWVE25-B-120 can only be used for this version.
Other KIT combinations are not available.

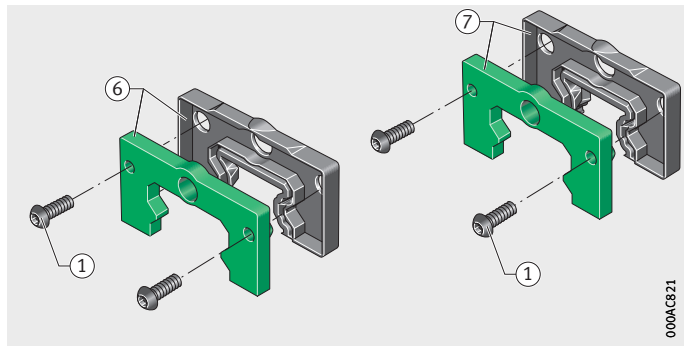
Additional wipers

Additional wipers with squeeze plate

In addition to the standard seal, other additional wipers may be used behind each other (cascading arrangement). These are screw mounted with a squeeze plate in front of the first wiper on the carriage, *Figure 4*.

The additional wipers are of a single or double lip design and are made from special high performance material.

Double lip additional wipers with a squeeze plate have one seal lip oriented outwards and one seal lip oriented inwards. The seal lip oriented inwards prevents the escape of lubricant from the carriage, which means that an increase in the relubrication interval can be achieved. Double lip end wipers are recommended for use with grease lubrication (reservoir lubrication).



① Fixing screw
⑥ Additional wiper, single lip, with squeeze plate
⑦ Additional wiper, double lip, with squeeze plate

Figure 4
Additional wipers
Example
KIT.KWVE..-300, -370

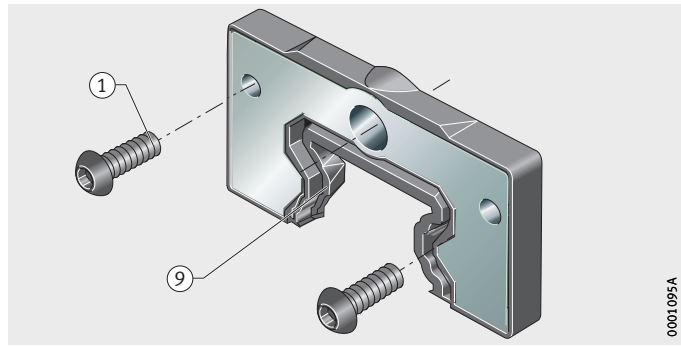
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Additional wipers

Additional wipers for heavy contamination, such as dust or liquids, are used in combination with further wipers.

Additional wipers are of a single lip design and are made from FPM, *Figure 5*.



① Fixing screw
⑨ Additional wiper, single lip

Figure 5
Additional wiper
Example
KIT.KWVE..-320

Sealing strips

Sealing strips are contact components that are fitted to the upper and lower longitudinal sides of the carriage, *Figure 6*. They protect the rolling element system against contamination and loss of lubricant.

Single lip

Linear recirculating ball bearing and guideway assemblies are available with a single lip upper sealing strip as well as a single lip lower sealing strip.

Upper sealing strips should be used in addition to end wipers and lower sealing strips especially in applications where lubrication is critical, such as those involving fine dust or aggressive coolants.



⑩ Lower sealing strips, single lip
⑪ Upper sealing strips, single lip

Figure 6
Sealing strips
KIT.KWVE..-900, -910

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Lubrication elements

A long term lubrication unit is available as a lubrication component.

Long term lubrication unit KIT series 400

For linear recirculating ball bearing and guideway assemblies KUVE, KITs with a long term lubrication unit are available.

Operating life of the linear guidance system

The operating life is defined as the life actually achieved by a linear guidance system. This may deviate significantly from the basic rating life.

A sufficiently long operating life is only achieved, assuming the bearing arrangement is correctly designed, through optimum lubrication and sealing. This can be achieved using the long term lubrication unit, *Figure 7*, page 371.

Grease operating life and relubrication interval

If guidance systems cannot be relubricated, the grease operating life becomes the decisive factor, see page 50. This indicates the length of time for which a grease can be used without its function being impaired.

As the load increases, the grease is subjected to increasing strain. As a result, it ages more quickly. Premature destruction of the grease structure has an adverse effect on the performance characteristics of the grease. The grease operating life declines and relubrication must be carried out earlier.

If the shortened relubrication intervals are not observed, the guidance system will fail before the end of the expected operating life. With decreasing grease operating life, the operating life of the linear guidance system is thus reduced.

Longer operating life by means of a long term lubrication unit

The volume of lubricating grease in the carriage is increased by the lubrication pockets in the saddle plate. If a long term lubrication unit of KIT series 400 is also fitted, this gives an additional improvement in the lubricant balance, *Figure 7*, page 371. The lubricant is stored in a high capacity reservoir and continuously released to the raceways via a transfer medium. Depending on the operating and environmental conditions, it is possible to achieve long relubrication intervals or even complete freedom from maintenance.

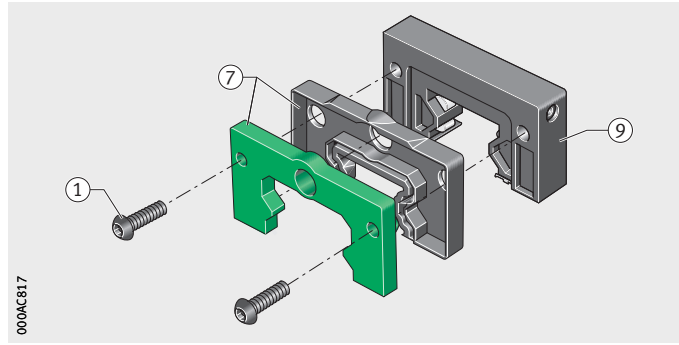
The operating life of four-row linear recirculating ball bearing and guideway assemblies KUVE..-B with and without a long term lubrication unit is shown in *Figure 8*, page 371.

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Function irrespective of position

Long term lubrication units are particularly suitable in applications where lubrication is of critical importance. They are screw mounted between the end piece and the wiper and function with equal reliability in either a horizontal or vertical mounting position.



① Fixing screws
⑦ Additional wiper, double lip, with squeeze plate
⑨ Long term lubrication unit

Figure 7
Long term lubrication unit

With initial greasing

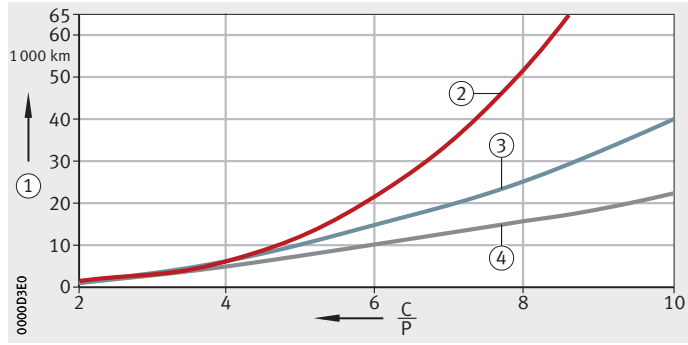
Due to their initial greasing, long term lubrication units are ready for immediate operation. If they are ordered together with a KUVE, both the linear recirculating ball bearing and guideway assembly KUVE and the long term lubrication unit have an initial greasing.

If the long term lubrication unit is retrofitted, it is absolutely essential that the carriage is given an initial greasing.
Initial grease quantities, see page 47.

The long term lubrication unit must always be used on both sides of the carriage, in order to achieve the stated bearing factor K_{LF} and thus the maximum operating life.

Double lip end seal

Integrated double lip end seals give protection against grease loss and contamination.



① Displacement distance
② KUVE with long term lubrication unit (restricted by material fatigue)
③ KUVE without long term lubrication unit (restricted by material fatigue)
④ Competitor systems

Figure 8
Operating life with and without long term lubrication unit

Long term lubrication units should not be used with Corrotect-coated guideways.

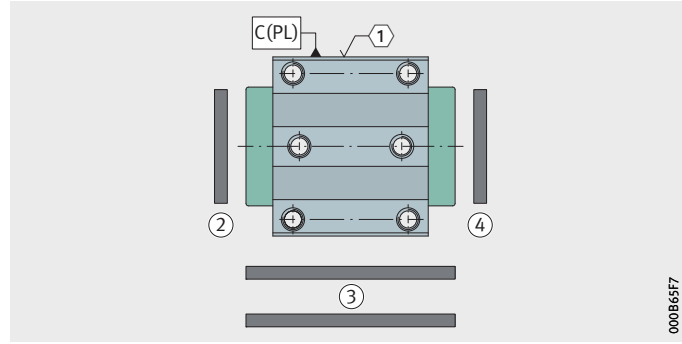
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Configuration of KIT.KWVE

Unless indicated otherwise, the locating edge is defined as being at the top. The KIT designation is given in the sequence left/centre/right. If no KIT numbers are indicated, the standard version will be supplied, see tables Sealing and lubrication elements KIT for KUVE...-B, page 374, and for KUVE..-W, page 388.

KIT components can be fitted on the left, centre and right of the carriage, *Figure 9*.

KWVE..-100/900/200



① Locating face
② KIT.KWVE..-B-100
③ KIT.KWVE..-B-900
④ KIT.KWVE..-B-200

Figure 9
Example of KIT configuration

Retrofitting by the customer

The KITs available for retrofitting by the customer are indicated accordingly as retrofittable in the KIT tables, see page 374 and page 388.

KIT left, right

The KIT components are identical for all carriage designs.

KIT components for retrofitting by the customer of the linear recirculating ball bearing and guideway assembly KUVE-..B must be ordered for all types and designs using the designation KIT.KWVE..-B.

KIT components for retrofitting by the customer of the linear recirculating ball bearing and guideway assembly KUVE-..W must be ordered for all types and designs using the designation KIT.KWVE..-W.

The scope of delivery includes the wear components and fixing screws required for retrofitting.

Example: **KIT.KWVE20-B-330**.

KIT centre

If retrofitting is to be carried out by the customer, attention must be paid to the carriage length.

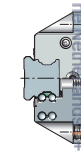
KIT components for retrofitting by the customer of long carriages must be ordered using the designation KIT.KWVE..-B-L-900.

KIT components for retrofitting by the customer of short carriages must be ordered using the designation KIT.KWVE..-B-C-900.

Example: **KIT.KWVE20-B-L-900**.

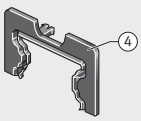
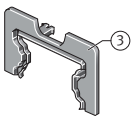
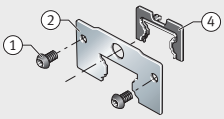
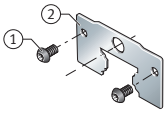
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Sealing and lubrication elements

Sealing and lubrication elements KIT (left, right) for KUVE..-B

Designation and KIT end number KIT.KWVE..-B	Image	Description
000	–	No KIT at corresponding position.
100		④ End wiper contact type, single lip
110		③ Gap seal
200		① Fixing screw K_1 ② Sheet metal wiper non-contact ④ End wiper contact type, single lip
210		① Fixing screw K_1 ② Sheet metal wiper non-contact

〈1〉 Locating face

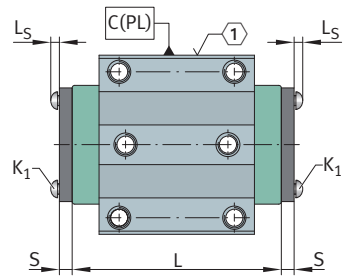
Attention!
The table is only intended as a guide.
Specific application conditions must be taken into consideration when selecting the elements.

The sealing and lubrication elements KIT can be combined flexibly.
Recommended and possible combinations, see page 382.
Recommended lubrication connectors, see page 384.

1) Definition, see page 365.

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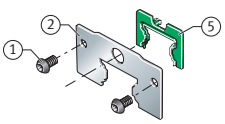
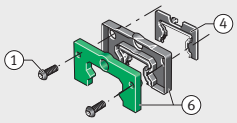
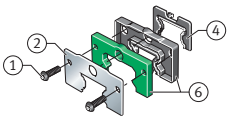
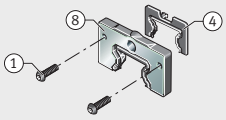
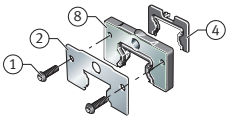
Degree of contamination[1]			Size	Retrofit-table	Tolerances			Increase in displacement force				Designation and KIT end number
Slight	Moder-ate	Heavy			K_1	L_S mm	S mm	None	Slight	Moder-ate	Heavy	KIT.KWVE..-B
			15									**000**
			20									
			25									
■	–	–	30	■	–	–	–0,8	■	–	–	–	
			35									
			45									
			55									
			15									**100**
			20									
			25									
■	■	–	30	■	–	–	–0,8	–	–	■	–	
			35									
			45									
			55									
			15									**110**
			20									
			25									
■	–	–	–	■	–	–	–0,8	■	–	–	–	
			–									
			–									
			–									
			15		M2×4	1,3						**200**
			20		M2×4	1,3						
			25		M3×5	1,65						
■	■	–	30	■	M3×5	1,65	0	–	–	■	–	
			35		M3×5	1,65						
			45		M4×6	2,2						
			55		M4×6	2,2						
			15		M2×4	1,3						**210**
			20		M2×4	1,3						
			25		M3×5	1,65						
■	–	–	30	■	M3×5	1,65	0	■	–	–	–	
			35		M3×5	1,65						
			45		M4×6	2,2						
			55		M4×6	2,2						



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Sealing and lubrication elements

Sealing and lubrication elements KIT (left, right) for KUVE..-B (continued)

Designation and KIT end number KIT.KWVE..-B	Image	Description
220[2]		① Fixing screw K_1 ② Sheet metal wiper, non-contact ⑤ Smooth-running end wiper contact type, single lip
300		① Fixing screw K_1 ④ End wiper, contact type, single lip ⑥ Additional wiper, single lip (PU), with squeeze plate
310		① Fixing screw K_1 ② Sheet metal wiper, non-contact ④ End wiper, contact type, single lip ⑥ Additional wiper, single lip (PU), with squeeze plate
320		① Fixing screw K_1 ④ End wiper, contact type, single lip ⑧ Additional wiper, single lip (FPM)
330		① Fixing screw K_1 ② Sheet metal wiper, non-contact ④ End wiper, contact type, single lip ⑧ Additional wiper, single lip (FPM)

〈1〉 Locating face

Attention!
The table is only intended as a guide.
Specific application conditions must be taken into consideration when selecting the elements.

The sealing and lubrication elements KIT can be combined flexibly.
Recommended and possible combinations, see page 382.
Recommended lubrication connectors, see page 384.

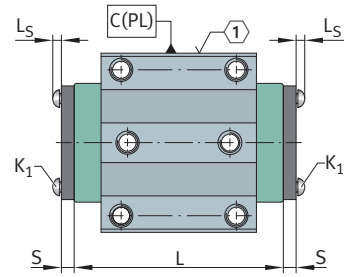
1) Definition, see page 365.

2) Standard for KUVE..-B.

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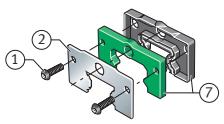
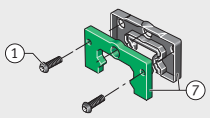
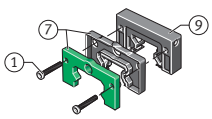
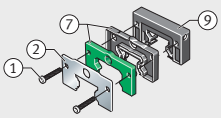
Degree of contamination[1]			Size	Retrofit-table	Tolerances			Increase in displacement force				Designation and KIT end number
Slight	Moder-ate	Heavy			K_1	L_S mm	S mm	None	Slight	Moder-ate	Heavy	KIT.KWVE..-B
			15		M2×4	1,3						**220**[2]
			20		M2×4	1,3						
			25		M3×5	1,65						
■	–	–	30	■	M3×5	1,65	0	–	■	–	–	
			35		M3×5	1,65						
			45		M4×6	2,2						
			55		M4×6	2,2						
			15		M2×8	1,3						**300**
			20		M2×8	1,3						
			25		M3×8	1,65						
■	■	■	30	■	M3×8	1,65	4,2	–	–	–	■	
			35		M3×8	1,65						
			45		M4×10	2,2						
			55		M4×10	2,2						
			15		M2×9	1,3						**310**
			20		M2×9	1,3						
			25		M3×10	1,65						
■	■	■	30	■	M3×10	1,65	5,0	–	–	–	■	
			35		M3×10	1,65						
			45		M4×10	2,2						
			55		M4×10	2,2						
			–		–	–	–					**320**
			20		M2×8	1,3						
			25		M3×8	1,65						
■	■	■	30	■	M3×8	1,65	3,7	–	–	–	■	
			35		M3×8	1,65						
			45		M4×10	2,2						
			–		–	–	–					
			–		–	–	–					**330**
			20		M2×8	1,3						
			25		M3×8	1,65						
■	■	■	30	■	M3×8	1,65	4,5	–	–	–	■	
			35		M3×8	1,65						
			45		M4×10	2,2						
			–		–	–	–					



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Sealing and lubrication elements

Sealing and lubrication elements KIT (left, right) for KUVE..-B (continued)

Designation and KIT end number KIT.KWVE..-B	Image	Description
360		① Fixing screw K_1 ② Sheet metal wiper, non-contact ⑦ Additional wiper, double lip (PU), with squeeze plate
370		① Fixing screw K_1 ⑦ Additional wiper, double lip (PU), with squeeze plate
400		① Fixing screw K_1 ⑦ Additional wiper, double lip (PU), with squeeze plate ⑨ Long term lubrication unit
430		① Fixing screw K_1 ② Sheet metal wiper, non-contact ⑦ Additional wiper, double lip (PU), with squeeze plate ⑨ Long term lubrication unit

⟨1⟩ Locating face

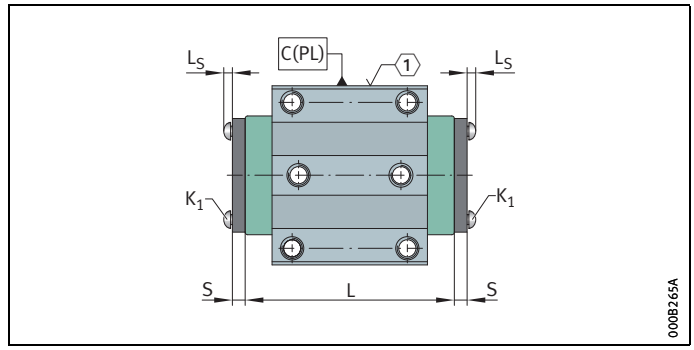
Attention!
The table is only intended as a guide.
Specific application conditions must be taken into consideration when selecting the elements.

The sealing and lubrication elements KIT can be combined flexibly.
Recommended and possible combinations, see page 382.
Recommended lubrication connectors, see page 384.

1) Definition, see page 365.

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Degree of contamination[1]			Size	Retrofit-table	Tolerances			Increase in displacement force				Designation and KIT end number
Slight	Moder-ate	Heavy			K_1	L_S mm	S mm	None	Slight	Moder-ate	Heavy	KIT.KWVE..-B
			15		M2×9	1,3						**360**
			20		M2×9	1,3						
			25		M3×10	1,65						
■	■	■	30	■	M3×10	1,65	5	–	–	–	■	
			35		M3×10	1,65						
			45		M4×10	2,2						
			55		M4×10	2,2						
			15		M2×8	1,3						**370**
			20		M2×8	1,3						
			25		M3×8	1,65						
■	■	–	30	■	M3×8	1,65	4,2	–	–	–	■	
			35		M3×8	1,65						
			45		M4×10	2,2						
			55		M4×10	2,2						
			15		M2×17	1,3	14,1					**400**
			20		M2×17	1,3	13,2					
			25		M3×18	1,65	13,2					
■	■	–	30	■	M3×18	1,65	13,2	–	–	–	■	
			35		M3×18	1,65	13,2					
			45		M4×20	2,2	14,7					
			–		–	–	–					
			15		M2×18	1,3	14,9					**430**
			20		M2×18	1,3	14					
			25		M3×19	1,65	14					
■	■	■	30	■	M3×19	1,65	14	–	–	–	■	
			35		M3×19	1,65	14					
			45		M4×22	2,2	15,5					
			–		–	–	–					



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Sealing and lubrication elements

Sealing and lubrication element KIT (centre) for KUVE..-B

Designation and KIT end number KIT.KWVE..-B[2]	Image	Description
000	–	No KIT at corresponding position.
900[3]		⑩ Lower sealing strip, single lip
910		⑩ Lower sealing strip, single lip ⑪ Upper sealing strip, single lip

Attention!
The table is only intended as a guide.
Specific application conditions must be taken into consideration when selecting the elements.

The sealing and lubrication elements KIT can be combined flexibly.
Recommended and possible combinations, see page 382.
Recommended lubrication connectors, see page 384.

1) Definition, see page 365.

2) If retrofitting is to be carried out by the customer, attention must be paid to the carriage length.
See Retrofitting by the customer, page 372.

3) Standard for KUVE..-B.

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Degree of contamination[1]			Size	Retrofit-table	Tolerances			Increase in displacement force				Designation and KIT end number
Slight	Moder-ate	Heavy			K_1	L_S mm	S mm	None	Slight	Moder-ate	Heavy	KIT.KWVE..-B
■	–	–	15 20 25 30 35 45 55	■	–	–	–	■	–	–	–	**000**
■	■	–	15 20 25 30 35 45 55	■	–	–	–	–	■	–	–	**900**[3]
■	■	■	15 20 25 30 35 45 55	–	–	–	–	–	–	■	–	**910**

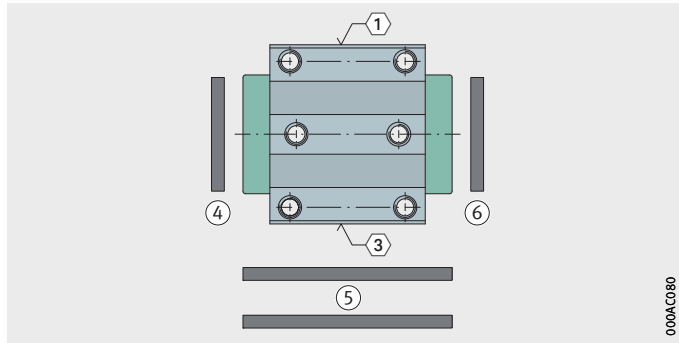
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Possible combinations – KIT allocation (left) to KIT right														
Designation and KIT end numbers														
KIT.KWVE..-B	000	100	110	200	210	220	300	310	320	330	360	370	400	430
000	●	–	●	–	●	–	–	–	–	–	–	–	–	–
100	–	●	–	●	–	●	●	●	●	●	●	●	–	–
110	●	–	●	–	●	–	–	–	–	–	–	–	–	–
200	–	●	–	●	–	●	●	●	●	●	●	●	–	–
210	●	–	●	–	●	–	–	–	–	–	–	–	–	–
220	–	●	–	●	–	●	●	●	●	●	●	●	–	–
300	–	●	–	●	–	●	●	●	–	–	–	–	–	–
310	–	●	–	●	–	●	●	●	–	–	–	–	–	–
320	–	●	–	●	–	●	–	–	●	●	–	–	–	–
330	–	●	–	●	–	●	–	–	●	●	–	–	–	–
360	–	●	–	●	–	●	–	–	–	–	●	●	–	–
370	–	●	–	●	–	●	–	–	–	–	●	●	–	–
400	–	–	–	–	–	–	–	–	–	–	–	–	●	●
430	–	–	–	–	–	–	–	–	–	–	–	–	●	●

● Possible combination.

Possible combinations – KIT allocation (left or right) to KIT centre														
Designation and KIT end numbers														
KIT.KWVE..-B	000	100	110	200	210	220	300	310	320	330	360	370	400	430
000	●	–	●	–	●	–	–	–	–	–	–	–	–	–
900	–	●	–	●	–	●	●	●	●	●	●	●	●	●
910	–	●	–	●	–	●	●	●	●	●	●	●	●	●

● Possible combination.



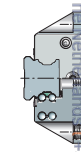
① Locating face top
or
③ Locating face bottom
④ Left
⑤ Centre
⑥ Right

Figure 10
Definition of side allocation

The side allocation of the KIT (left, centre, right) is independent of the orientation of the locating face. When ordering, the required orientation of the locating face (top or bottom) must be indicated.

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Lubrication connectors for KUVE..-B

Linear recirculating ball bearing and guideway assemblies must be lubricated with grease or oil. Depending on the position of the lubrication connector and the other accessories, suitable lubrication connectors are available as special accessories.

Lubrication connectors:

- Standard lubrication connectors, *Figure 11*
- Lubrication connectors for manual lubricators, *Figure 12* and table, page 385
- Lubrication connectors for central lubrication, *Figure 14*, page 386, and table, page 387.

S04: KUVE20-B
S05: KUVE25-B to KUVE55-B
S16: KUVE15-B

W = hexagon

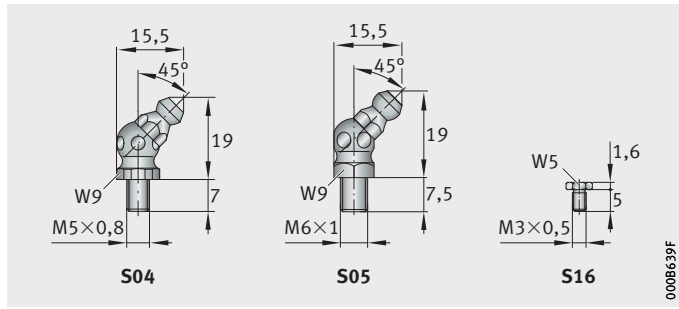
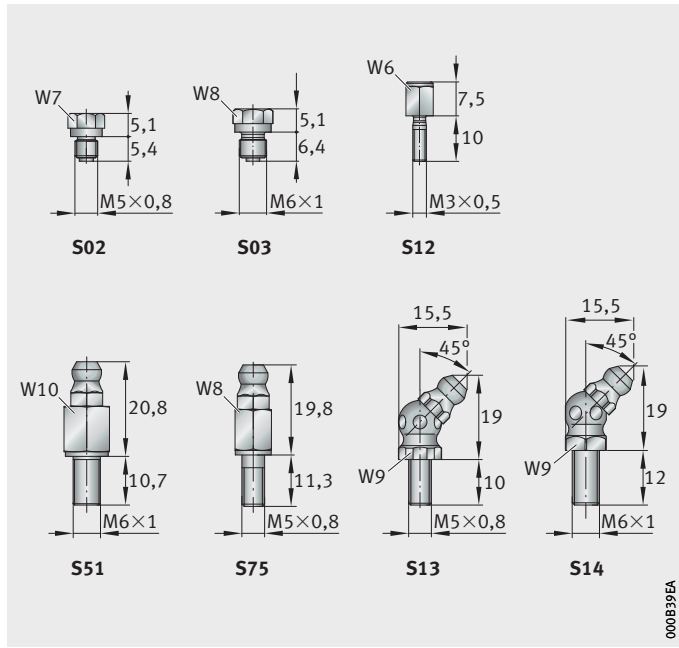


Figure 11
Standard lubrication connectors



W = hexagon

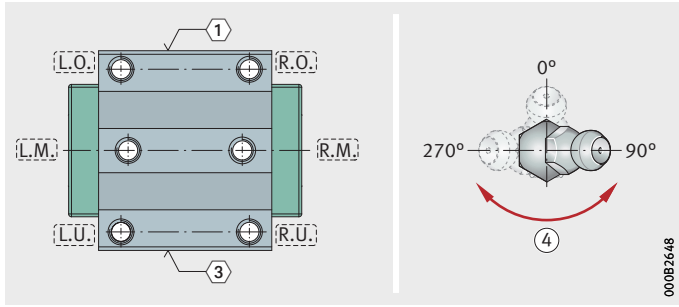
Figure 12
Lubrication connectors for manual lubricators

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Lubrication connectors for manual lubricators

Size	Designation KUVE..-B	Positions: L.M., R.M. Thread	Straight KIT 000 100 110 200 210 220	Straight KIT 300 310 320 330 360 370	Angled (45°) KIT 000 100 110 200 210 220	Angled (45°) KIT 300 310 320 330 360 370	Positions: L.U., L.O., R.U., R.O. Thread	Straight KIT 000 100 110 200 210 220	Straight KIT 300 310 320 330 360 370
15	All	M3	S16[1)]	S12	–	–	M3	S16	S16
20	-E, -EC, -N, -NL, -ES, -ESC, -SN, -SNL	M5	S02	S75	S04[1)]	S13	M3	S16	S16
	-B, -L, -H, -HL, -S, -SL						M5	S02	S02
25	-E, -EC, -N, -NL, -ES, -ESC, -SN, -SNL	M6	S03	–	S05[1)]	S14	M3	S16	S16
	-B, -L, -H, -HL, -S, -SL						M6	S03	S03
30	-N, -NL, -SN, -SNL	M6	S03	S51	S05[1)]	S14	M5	S02	S02
	-B, -L, -E, -EC, -H, -HL, -S, -SL, -ES, -ESC						M6	S03	S03
35	All	M6	S03	S51	S05[1)]	S14	M6	S03	S03
45	All	M6	S03	S51	S05[1)]	S14	M6	S03	S03
55	All	M6	S03	S51	S05[1)]	S14	M6	S03	S03

[1)] Standard.

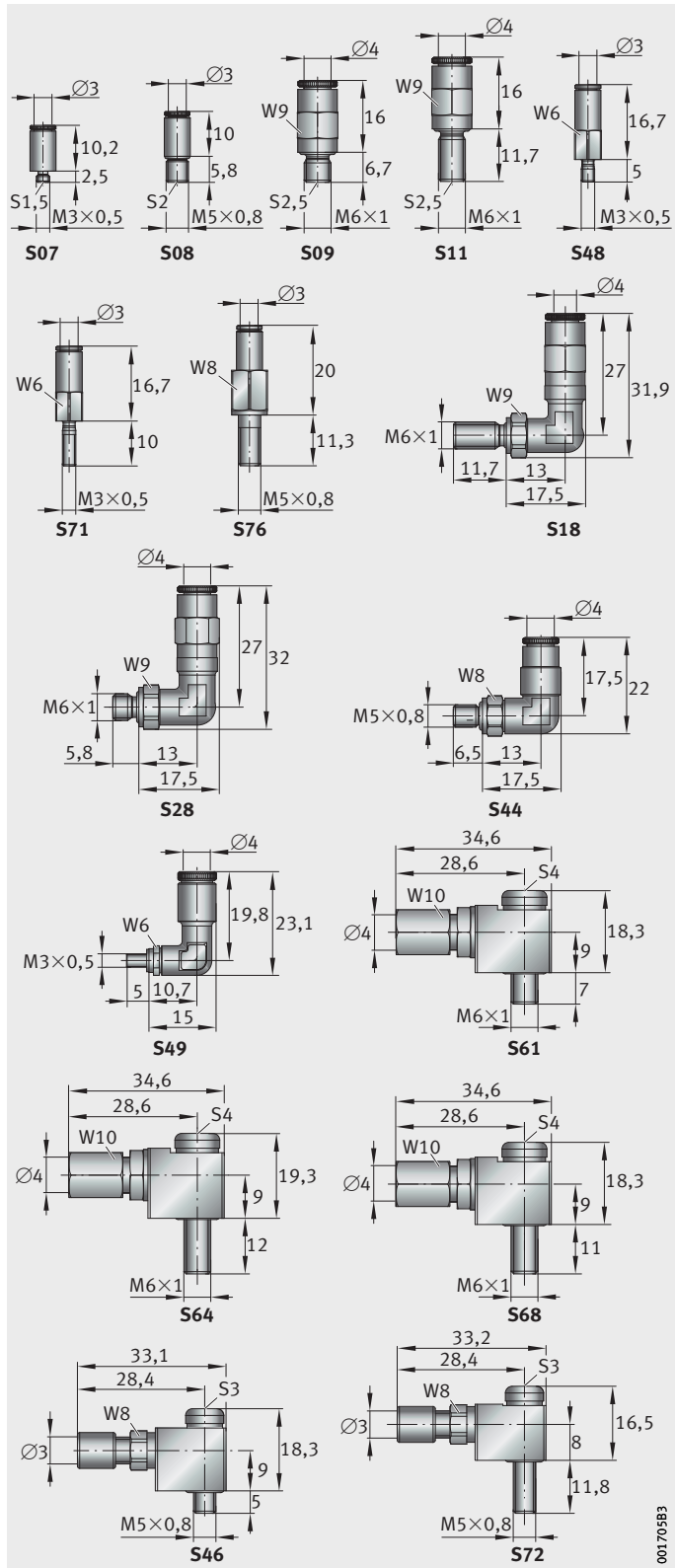


① Locating face top
or
③ Locating face bottom
④ Alignment of the angled lubrication connectors from viewpoint of carriage

Figure 13
Definition of lubrication connectors

The position and alignment of the lubrication connectors is independent of the orientation of the locating face. When ordering, the required orientation of the locating face (top or bottom) must be indicated.

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W = hexagon
S = hexagon socket

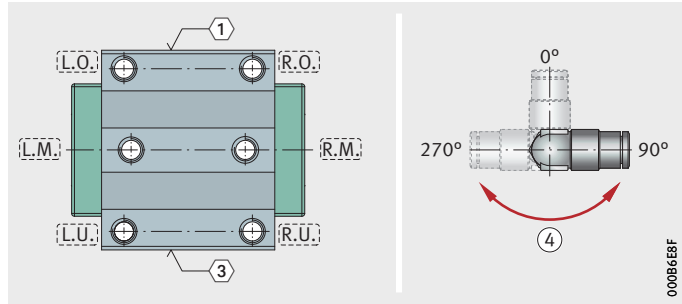
Figure 14
Lubrication connectors for central lubrication

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Lubrication connectors for central lubrication

Size	Designation KUVE..-B	Positions: L.M., R.M.									Positions: L.U., L.O., R.U., R.O.		
		Thread	Straight KIT			Angled (90°) KIT					Thread	Straight KIT	
			000 100 110	200 210 220	300 310 320 330 360 370	000 100 110	200 210 220	300	310 320 330 360	370		000 100 110 200 210 220	300 310 320 330 360 370
15	All	M3	S07	S48	S71	S49	S49	–	–	–	M3	S07	S07
20	-E, -EC, -N, -NL, -ES, -ESC, -SN, -SNL	M5	S08	S08	S76	S44	S46	–	S72 [1]	–	M3	S07	S07
	-B, -L, -H, -HL, -S, -SL										M5	S08	S08
25	-E, -EC, -N, -NL, -ES, -ESC, -SN, -SNL	M6	S09	S09	S11	S28	S61	S18	S18	S18 S68	M3	S07	S07
	-B, -L, -H, -HL, -S, -SL										M6	S09	S09
30	-N, -NL, -SN, -SNL	M6	S09	S09	S11	S28	S61	S18 S64	S18	S18 S68	M5	S08	S08
	-B, -L, -E, -EC, -H, -HL, -S, -SL, -ES, -ESC										M6	S09	S09
35	All	M6	S09	S09	S11	S28	S61	S18 S64	S18	S18 S64	M6	S09	S09
45	All	M6	S09	S09	S11	S28	S61	S18 S64	S18	S18 S64	M6	S09	S09
55	All	M6	S09	S09	S11	S28	S61	S18 S64	S18	–	M6	S09	S09

[1] Not permissible for KIT320.



① Locating face top
or
③ Locating face bottom
④ Alignment of the angled lubrication connectors from viewpoint of carriage

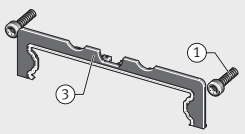
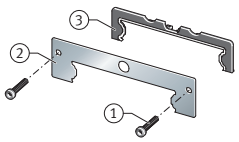
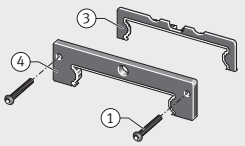
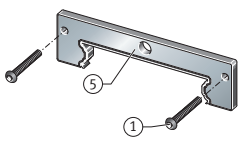
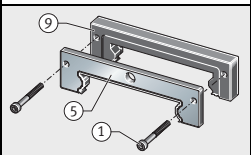
Figure 15
Definition of lubrication connectors

The position and alignment of the lubrication connectors is independent of the orientation of the locating face. When ordering, the required orientation of the locating face (top or bottom) must be indicated.

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Sealing and lubrication elements

Sealing and lubrication elements KIT (left, right) for KUVE..-W

Designation and KIT end number KIT.KWVE..-W	Image	Description
000	–	No KIT at corresponding position.
100[2]		① Fixing screw K_1 ③ End wiper contact type, single lip
200		① Fixing screw K_1 ② Sheet metal wiper non-contact ③ End wiper contact type, single lip
300		① Fixing screw K_1 ③ End wiper contact type, single lip ④ Additional wiper single lip (NBR)
370		① Fixing screw K_1 ⑤ Additional wiper double lip (NBR)
400		① Fixing screw K_1 ⑤ Additional wiper double lip (NBR) ⑨ Long term lubrication unit

⟨1⟩ Locating face

Attention!
The table is only intended as a guide.
Specific application conditions must be taken into consideration when selecting the elements.

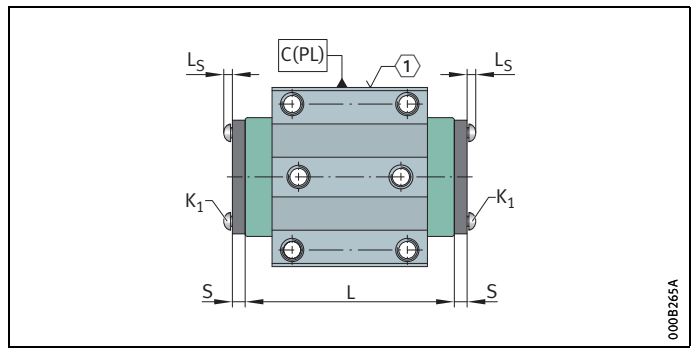
The sealing and lubrication elements KIT can be combined flexibly.
Recommended and possible combinations, see page 392.
Recommended lubrication connectors, see page 394.

1) Definition, see page 365.

2) Standard for KUVE..-W.

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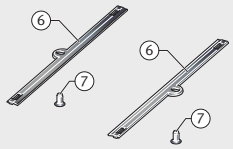
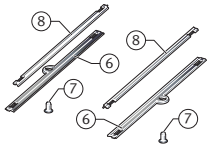
Degree of contamination[1]			Size	Retrofit-table	Tolerances			Increase in displacement force				Designation and KIT end number
Slight	Moder-ate	Heavy			K_1	L_S mm	S mm	None	Slight	Moder-ate	Heavy	KIT.KWVE..-W
■	–	–	15 20 25 30 35	■	–	–	–	■	–	–	–	**000**
■	■	–	15 20 25 30 35	■	–	–	0	–	–	■	–	**100**[2]
■	■	–	15 20 25 30 35	■	M2×12 M2,5×16 M3×16 M3×20 M4×22	2 2,5 3 3 4	0,8	–	–	■	–	**200**
■	■	■	– 20 25 30 35	■	– M2,5×18 M3×18 M3×22 M4×25	– 1,5 1,65 1,65 2,2	– 4,5	–	–	–	■	**300**
■	■	–	– 20 25 30 35	■	– M2,5×18 M3×18 M3×22 M4×25	– 1,5 1,65 1,65 2,2	– 4,5	–	–	–	■	**370**
■	■	■	15 20 25 30 35	■	M2×25 M2,5×28 M3×28 M3×30 M4×35	1,3 1,5 1,65 1,57 2,2	13 13 14 14 15	–	–	–	■	**400**



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Sealing and lubrication elements

Sealing and lubrication elements KIT (centre) for KUVE..-W

Designation and KIT end number KIT.KWVE..-W	Image	Description
000	–	No KIT at corresponding position.
900[2]		⑥ Lower sealing strip, single lip ⑦ Grooved drive stud (not for size 15)
910		⑥ Lower sealing strip, single lip ⑦ Grooved drive stud (not for size 15) ⑧ Upper sealing strip, single lip

Attention!
The table is only intended as a guide.
Specific application conditions must be taken into consideration when selecting the elements.

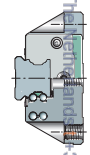
The sealing and lubrication elements KIT can be combined flexibly.
Recommended and possible combinations, see page 392.
Recommended lubrication connectors, see page 394.

[1] Definition, see page 365.

[2] Standard for KUVE..-W.

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Degree of contamination[1]			Size	Retrofit-table	Tolerances			Increase in displacement force				Designation and KIT end number
Slight	Moder-ate	Heavy			K_1	L_S mm	S mm	None	Slight	Moder-ate	Heavy	KIT.KWVE..-W
■	–	–	15 20 25 30 35	■	–	–	–	■	–	–	–	**000**
■	■	–	15 20 25 30 35	–	–	–	–	–	■	–	–	**900**[2]
■	■	■	15 20 25 30 35	–	–	–	–	–	–	■	–	**910**



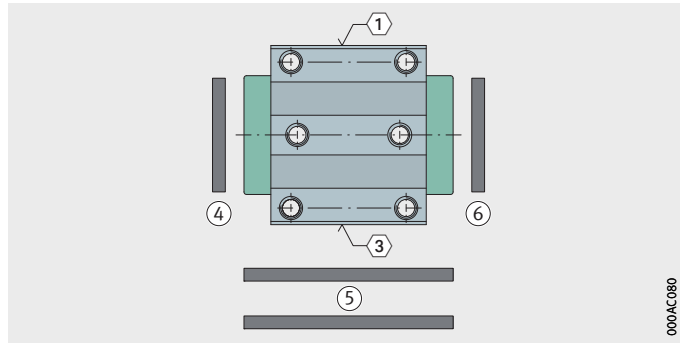
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Possible combinations – KIT allocation (left) to KIT right						
Designation and KIT end numbers KIT.KWVE..-W	000	100	200	300	370	400
000	●	–	–	–	–	–
100	–	●	●	●	●	–
200	–	●	●	●	●	–
300	–	●	●	●	–	–
370	–	●	●	–	●	–
400	–	–	–	–	–	●

● Possible combination.

Possible combinations – KIT allocation (left or right) to KIT centre						
Designation and KIT end numbers KIT.KWVE..-W	000	100	200	300	370	400
000	●	–	–	–	–	–
900	–	●	●	●	●	●
910	–	●	●	●	●	●

● Possible combination.



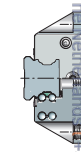
① Locating face top
or
③ Locating face bottom
④ Left
⑤ Centre
⑥ Right

Figure 16
Definition of side allocation

The side allocation of the KIT (left, centre, right) is independent of the orientation of the locating face. When ordering, the required orientation of the locating face (top or bottom) must be indicated.

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Lubrication connectors for KUVE..-W

Linear recirculating ball bearing and guideway assemblies must be lubricated with grease or oil. Depending on the position of the lubrication connector and the other accessories, suitable lubrication connectors are available as special accessories.

Lubrication connectors:

- Standard lubrication connectors, *Figure 17*
- Lubrication connectors for manual lubricators, *Figure 18* and table, page 395
- Lubrication connectors for central lubrication, *Figure 20*, page 396, and table, page 397.

S04: KUVE20-W
S05: KUVE25-W to KUVE35-W
S16: KUVE15-W

W = hexagon

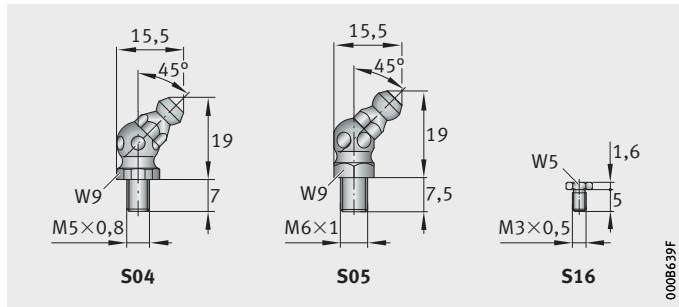


Figure 17
Standard lubrication connectors

W = hexagon
S = hexagon socket

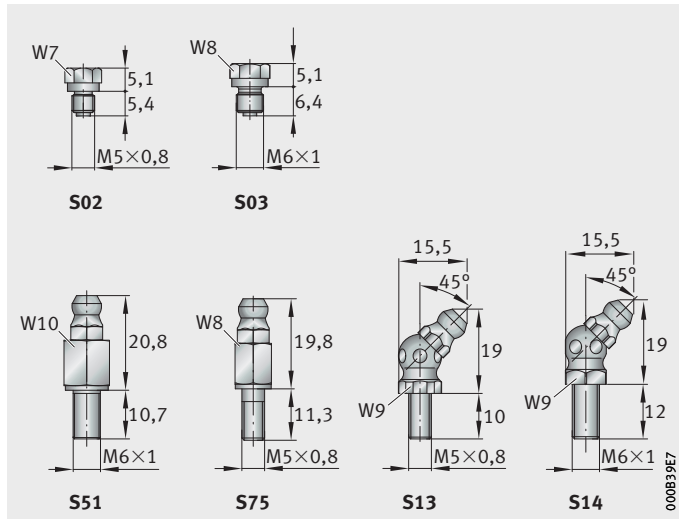


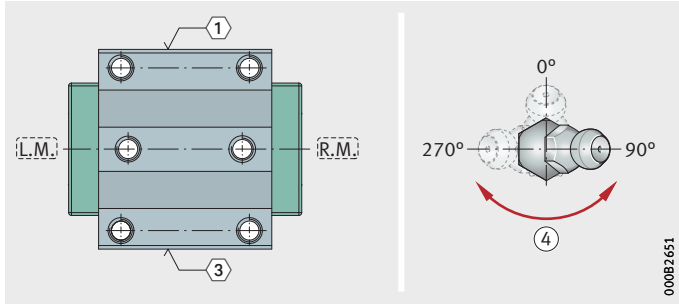
Figure 18
Lubrication connectors for manual lubricators

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Lubrication connectors for manual lubricators

Size	Thread	Positions: L.M., R.M.			
		Straight KIT		Angled (45°) KIT	
		000 100 200	300 370	000 100 200	300 370
15	M3	S16[1)]	–	–	–
20	M5	S02	S75	S04[1)]	S13
25	M6	S03	S51	S05[1)]	S14
30	M6	S03	S51	S05[1)]	S14
35	M6	S03	S51	S05[1)]	S14

1) Standard.

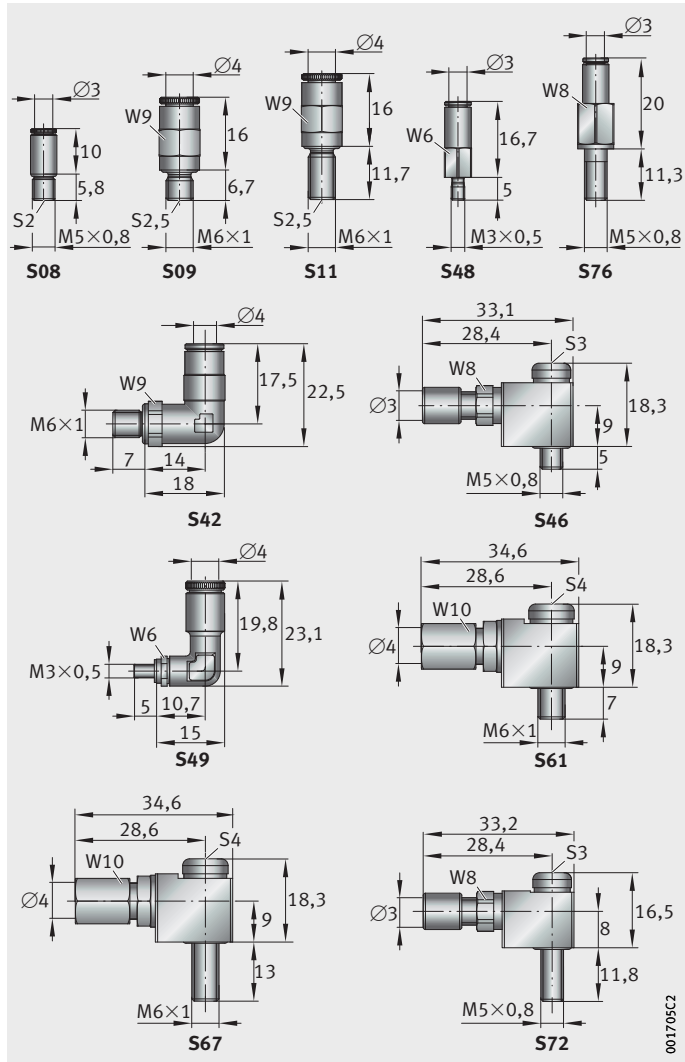


① Locating face top
or
③ Locating face bottom
④ Alignment of the angled lubrication connectors from viewpoint of carriage

Figure 19
Definition of lubrication connectors

The position and alignment of the lubrication connectors is independent of the orientation of the locating face. When ordering, the required orientation of the locating face (top or bottom) must be indicated.

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W = hexagon
S = hexagon socket

Figure 20
Lubrication connectors for central lubrication

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