

> STARPOINT <

Safety instructions

This safety instruction has to be kept on file for the whole lifetime of the product and forwarded with the product.

TRANSLATION OF THE ORIGINAL SAFETY INSTRUCTION



RUD®

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STARPOINT
VRS
VRS-F
 (with wrench)

RUD®

EG-Konformitätserklärung

entsprechend der EG-Maschinenrichtlinie 2006/42/EG, Anhang II A und ihren Änderungen

Hersteller: **RUD Ketten
Rieger & Dietz GmbH u. Co. KG**
Friedensinsel
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Hiermit erklären wir, dass die nachfolgend bezeichnete Maschine aufgrund ihrer Konzipierung und Bauart, sowie in der von uns in Verkehr gebrachten Ausführung, den grundlegenden Sicherheits- und Gesundheitsanforderungen der EG-Maschinenrichtlinie 2006/42/EG sowie den unten aufgeführten harmonisierten und nationalen Normen sowie technischen Spezifikationen entspricht.
Bei einer nicht mit uns abgestimmten Änderung der Maschine verliert diese Erklärung ihre Gültigkeit.

Produktbezeichnung: StarPoint Ringschraube
VRS

Folgende harmonisierten Normen wurden angewandt:

<u>DIN EN 1677-1 : 2009-03</u>	<u>DIN EN ISO 12100 : 2011-03</u>
_____	_____
_____	_____
_____	_____

Folgende nationalen Normen und technische Spezifikationen wurden außerdem angewandt:

<u>DGVU-R 109-017 : 2020-12</u>	_____
_____	_____
_____	_____
_____	_____

Für die Zusammenstellung der Konformitätsdokumentation bevollmächtigte Person:
Michael Betzler, RUD Ketten, 73432 Aalen

Aalen, den 15.04.2021 Hermann Kolb, Bereichsleitung MA *Hermann Kolb*

Name, Funktion und Unterschrift Verantwortlicher

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EC-Declaration of conformity

According to the EC-Machinery Directive 2006/42/EC, annex II A and amendments

Manufacturer: **RUD Ketten
Rieger & Dietz GmbH u. Co. KG**
Friedensinsel
73432 Aalen

We hereby declare that the equipment sold by us because of its design and construction, as mentioned below, corresponds to the appropriate, basic requirements of safety and health of the corresponding EC-Machinery Directive 2006/42/EC as well as to the below mentioned harmonized and national norms as well as technical specifications.
In case of any modification of the equipment, not being agreed upon with us, this declaration becomes invalid.

Product name: STARPOINT eye bolt
VRS

The following harmonized norms were applied:

<u>DIN EN 1677-1 : 2009-03</u>	<u>DIN EN ISO 12100 : 2011-03</u>
_____	_____
_____	_____
_____	_____

The following national norms and technical specifications were applied:

<u>DGVU-R 109-017 : 2020-12</u>	_____
_____	_____
_____	_____
_____	_____

Authorized person for the configuration of the declaration documents:
Michael Betzler, RUD Ketten, 73432 Aalen

Aalen, den 15.04.2021 Hermann Kolb, Bereichsleitung MA *Hermann Kolb*

Name, function and signature of the responsible person

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Carefully read the operating instructions before using the VRS STARPOINT lifting points (hereinafter referred to as VRS). Ensure that you have understood all the contents.

Non-observation of the instructions can lead to injuries or damage and will invalidate the guarantee.

1 Safety instructions



WARNING

Incorrectly mounted or damaged VRS and improper use can lead to injuries and damage to objects after a fall.

Check all VRS carefully every time before use.

- Withdraw all body parts (fingers, hands, arms etc.) from the danger zone during the lifting process (risk of crushing).
- The VRS may only be used by authorised and instructed persons in compliance with the DGUV Regulations chapter 109-017 and in compliance with any valid national regulations if used outside Germany.
- The WLL stated on the lifting point must not be exceeded (except vertical load see *Table 2*).
- The VRS has to be rotatable by 360° when securely screwed in.
- The VRS is not suitable for turning movements under load.

- No technical modifications must be made to the VRS.
- No persons are allowed in the danger zone.
- Standing below suspended loads is prohibited.
- Jerky lifting (strong impacts) must be avoided.
- Ensure a stable position of the load during lifting. Swinging must be avoided.
- Damaged or worn VRS must not be used.

2 Intended use

The VRS may only be used for attachment to the load or to load-handling equipment.

They are designed for suspending lifting means.

The VRS can also be used as a lashing point to suspend lashing equipment.

The VRS may only be used for the purposes described here.

3 Instructions for mounting and use

3.1 General information

- Temperature suitability: due to installed bolts in the VRS, the WLL must be reduced accordingly to the strength class of the bolts as follows:
 - 40°C to 100°C → no reduction
 - 100°C to 200°C minus 15 % (212 to 392°F)
 - 200°C to 250°C minus 20 % (392 to 482°F)
 - 250°C to 350°C minus 25 % (482 to 662°F)**Temperatures exceeding 350°C (662°F) are not permissible!**

Pay attention to the application temperature of the nuts supplied (optional).

- Lock nuts according to DIN EN ISO 7042 (DIN 980) may be used up to a max. of +150°C.
- Collar nuts according to DIN 6331 may be used up to a max. of +300°C. Please also pay attention to the reduction factors.
- The VRS must not be exposed to aggressive chemicals, acids and their vapours.
- Clearly identify the attachment place for the VRS by means of contrasting colour markings.
- The VRS are supplied by RUD with a fracture-tested special screw (lengths see *Table 4*).

Versions

- The metric vario lengths are supplied by RUD with a washer and a fracture-tested nut according to ISO EN ISO 7042 or with a fracture-tested collar nut according to DIN 6331.
- If the VRS is used only for lashing purposes, the WLL value can be doubled:
 $LC = \text{permissible lashing force} = 2 \times WLL$



NOTE

If the VRS as lashing point is loaded with a force exceeding WLL, it must no longer be used as a lifting point afterwards!

If the VRS as a lashing point is loaded with a force only up to the WLL, it can still be used as a lifting point.

3.2 Notes on assembly

The following always applies:

- The attachment point so that the exerted forces can be absorbed by the base material without deformation.

Lengths of thread engagement derived by the employers' liability insurance association (based on the thread undercut):

1.5 x M in steel (minimum quality S235JR [1.0037])

1.5 x M in cast iron (e.g. GG 25)

Moreover, the employers' liability insurance association recommends as minimum lengths of thread engagement:

2 x M in aluminium alloys

2.5 x M in light metals of low strength

(M = thread size, e.g. M 20)

- In the case of light metals, non-ferrous metals and grey cast iron, the thread arrangement must be selected so that the thread load-bearing capacity corresponds to the requirements of the respective base material.
- Select the position of the VRS so that impermissible loads, such as twisting or turning of the load, can be avoided.
 - Single strand attachment:** vertically above the load's centre of gravity
 - Double strand attachment:** above and on both sides of the load's centre of gravity
 - Three or four-strand attachment:** evenly in one plane around the load's centre of gravity.

- Symmetry of load:
Determine the required WLL of the individual RUD lifting point for symmetrical loading according to the following physical formula context:

$$W_{LL} = \frac{G}{n \times \cos \beta}$$

W_{LL} = req. WLL of the lifting point / single strand (kg)
 G = Load weight (kg)
 n = Number of supporting strands
 β = Inclination angle of the individual strands

Number of supporting strands is:

	Symmetry
Double strand	2
Three/four-strand	3

Table 1: Supporting strands (see also Table 2)



NOTE

At unsymmetrical loads, even if several lifting points are used, the WLL of a single lifting point must be at least equal to the load weight or ask the manufacturer.

- An even bolting surface (ØE, see. Table 4) with a right-angled threaded borehole must be guaranteed. The threaded version must be designed according to DIN 76 (counterbore diameter at the max. 1.05 x d). Threaded boreholes must be deep enough to allow the contact surface of the lifting point to lie flat. Create the through boreholes up to DIN EN 20273-middle.
- The VRS has to be rotatable by 360° when securely screwed in.



NOTE

For the VRS-F type, the star profile wrench must be disengaged.

Please pay attention to the following:

- For a **single lift**, hand-tightening with a star profile wrench until the bolt contact surface touches the screw-in surface is sufficient.



WARNING

The prescribed torque moment must not be exceeded!



NOTE

The star profile wrenches can be retrofitted. Wrench for retrofitting see Table 7.

- If the VRS **is to remain permanently on the load**, it must be tightened with the tightening torque ($\pm 10\%$) depending on version, according to Table 4.
- If the VRS **is to perform flipping actions** (see section 3.3.2 Permissible lifting and flipping actions) tightening with the torque ($\pm 10\%$) depending on version, according to Table 4 is required.



NOTE

If a torque wrench is used, an offset socket wrench is available (see Table 7).

- In case of jolting WLL or vibration, in particular for through bolt connections with nuts, there may be unintended loosening.
Securing options: keeping to the tightening torque or use liquid thread protection such a Loctite (adjusted to the application case, pay attention to manufacturer's instructions).
- Then check that everything has been mounted correctly (see Section 4 Inspection / Repair / Disposal).

3.3 Notes on use

3.3.1 General information on use

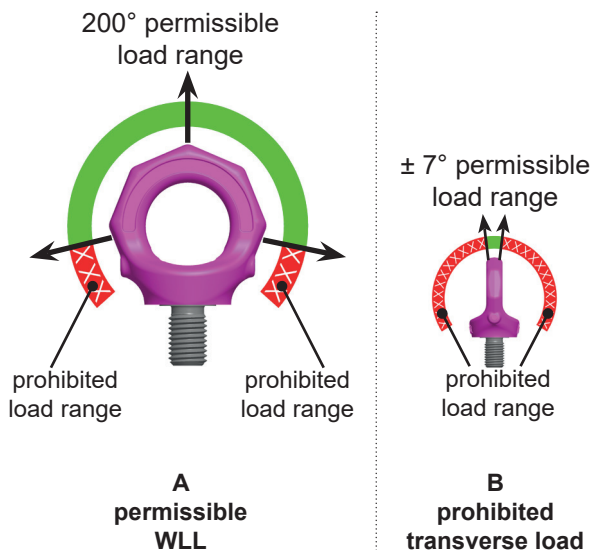
- Before use (e.g. by the striker), inspect the entire lifting point (secure bolt fit, strong corrosion, cracks in supporting parts, deformations). See section 4 *Inspection / Repair / Disposal*.



WARNING

Incorrectly mounted or damaged VRS and improper use can lead to personal injuries and damage to objects after a fall. Check all VRS carefully every time before use.

- RUD components are designed according to DIN EN 818 and DIN EN 1677 for a dynamic WLL of 20,000 load cycles.
 - Please note that during one lifting process, there might be several stress cycles.
 - Please note that due to the high dynamic load with high numbers of stress cycles, there is the risk of damage to the product.
 - The BG/DGUV recommends: at high dynamic WLL with high stress cycles (permanent operation), the working load must be reduced according to the engine group 1Bm (M3 according to DIN EN 818-7). Use a lifting point with a higher WLL.
- When engaging and disengaging the lifting means (lifting chain) no crushing, shearing, catching or impact points may be created.
- Prevent any damage to the lifting means on sharp-edged WLL.
- Before suspending the lifting means, set the VRS lifting point in direction of force (see *Pic. 1*).

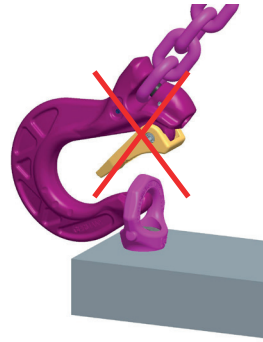


Pic. 1:

A: Admissible load direction at load ring plane

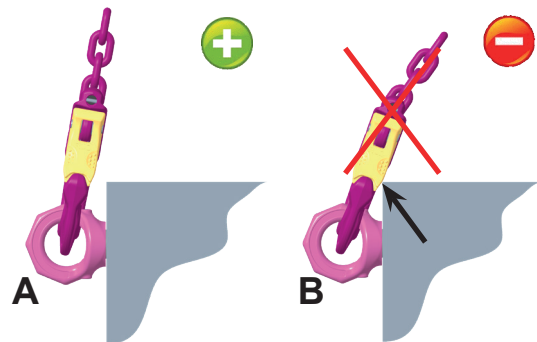
B: Prohibited transversal load to the load ring plane

- Please note that the lifting means must be able to move freely in the VRS lifting point.



Pic. 2: Only use appropriate lifting means for hinging in the VRS

- The lifting means must not be exposed to bending load!

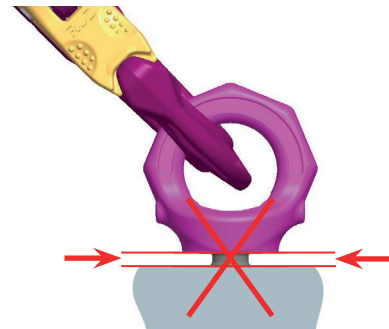


Pic. 3:

A: Admissible load area

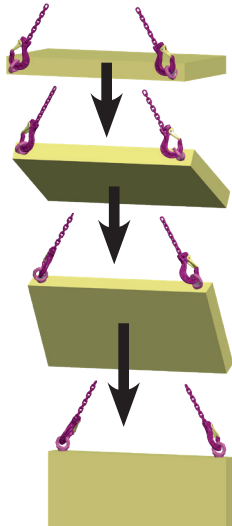
B: Prohibited positioning or placing on edges

- Always bolt the lifting point in fully.



Pic. 4: The lifting point must be fully bolted in.

3.3.2 Permissible lifting and flipping actions



Pic. 5: Possible flipping action with the VRS

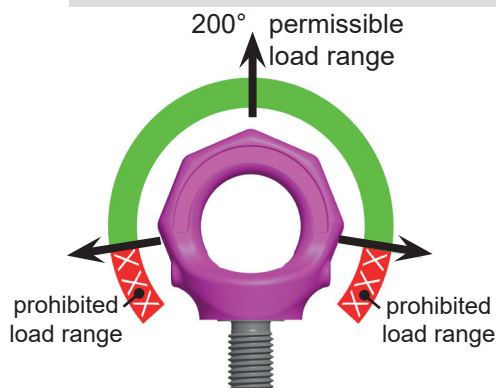
The following actions are permitted:

- Turning actions where the lifting mean will be pivoted towards the plain of the ring, according to the allowed inclination / loading area.



WARNING

The lifting means must not support itself on edges or other attachment parts or rest against them.



Pic. 6: Swivelling in load ring plane

- Flipping actions, where the VRS is turned around the bolt axis (**exception**: see section 3.3.3 *Permissible lifting and flipping actions*). After a maximum turn of 90°, the tightening torque of the bolt must be checked.



WARNING

Check the prescribed tightening torque moments before each lifting or flipping action.

3.3.3 Permissible lifting and flipping actions

- Rotating the VRS under load in axis direction of the bolt ($\pm 15^\circ$) is prohibited.
- Not suitable for permanent turning movements under load.

4 Inspection / Repair / Disposal

4.1 Notes on regular checks

The operator must determine and specify the nature and scope of the required tests as well as the periods of repeating tests by means of a risk assessment (see sections 4.2 and 4.3).

The continuous suitability of the lifting point must be checked at least 1x per year by an expert.

Depending on the application conditions, e.g. when used frequently or if there is a higher level of wear occurrence or corrosion, it may be necessary to carry out inspections at intervals of less than a year. This inspection is also absolutely necessary after damage and special incidents. The inspection cycles must be specified by the operator.

4.2 Test criteria for the regular visual inspection by the user

- Correct bolt and nut size, and bolt-in length
- ensure bolts are secure → Check the tightening torque
- Lifting point is complete
- Complete, legible WLL information and manufacturer symbol
- Deformation on supporting parts such as ring and bolt
- Mechanical damage such as large notches, in particular in areas subject to tensile loads
- easy jerk-free rotating of the ring around the bolt axis must be ensured.

4.3 Additional test criteria for the expert / repairer

- Cross-section changes due to wear occurrence > 10%
- Heavy corrosion
- Function and damage of the bolts, nuts and bolt thread.
- Additional inspections may be necessary, depending on the result of the risk assessment (e.g. check for cracks in load-bearing parts).

4.4 Disposal

Dispose of the discarded components / accessories or packaging in line with local regulations.

5 Tabela

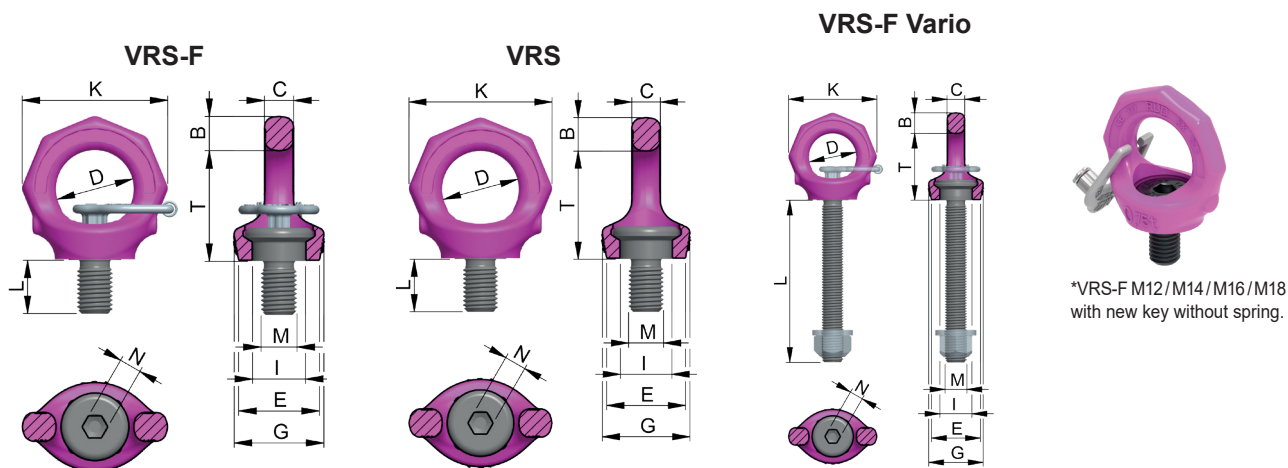
5.1 Working load limit (WLL)

Method of lift												
Number of legs		1	1	2	2	2	2	2	3 / 4	3 / 4	3 / 4	
Angle of inclination <β		0°-7°	90°	0°-7°	90°	0-45°	>45-60°	Unsymm.	0-45°	>45-60°	Unsymm.	
factor			1		2	1.4	1	1	2.1	1.5	1	
Safety factor 4:1	Safety factor 4:1		for the max. total load weight >G< in metric tons, tightened and adjusted to force direction									
	M6	1/4"-20UNC	0.5	0.1	1	0.2	0.14	0.1	0.1	0.21	0.15	0.1
	M8	5/16"-18UNC	1	0.3	2	0.6	0.42	0.3	0.3	0.63	0.45	0.3
	M8x1	-										
	M10	3/8"-16UNC	1	0.4	2	0.8	0.56	0.4	0.4	0.84	0.6	0.4
	M10x1	7/16"-14UNC										
	M12	1/2"-13UNC	2	0.75	4	1.5	1	0.75	0.75	1.57	1.12	0.75
	M12x1,5	-										
	M14	-										
	M16	5/8"-11UNC	4	1.5	8	3	2.1	1.5	1.5	3.15	2.25	1.5
	M16x1,5	-										
	M18	3/4"-16UNF										
	M20	3/4"-10UNC	6	2.3	12	4.6	3.22	2.3	2.3	4.83	3.45	2.3
	M20x2	-										
	M22	7/8"-9UNC										
	M24	1"-8UNC	8	3.2	16	6.4	4.5	3.2	3.2	6.7	4.8	3.2
	M24x2	1 1/8"-8UN										
	M27	1 1/8"-7UNC										
	M30	1 1/4"-8UN	12	4.5	24	9	6.3	4.5	4.5	9.5	6.75	4.5
	M30x2	1 1/4"-7UNC										
	M33	-										
	M36	1 1/2"-8UN	16	7	32	14	9.8	7	7	14.7	10.5	7
	M36x3	1 1/2"-6UNC										
	M42	1 3/4"-5UNC	24	9	48	18	12.6	9	9	18.9	13.5	9
	M48	2"-4,5UNC	32	12	64	24	16.8	12	12	25.2	18	12
	M56	-	50	16	100	32	22.4	16	16	33.6	24	16
M64	-	60	20	120	40	28	20	20	42	30	20	
Safety factor 4:1		for the max. total load weight >G< in lbs, tightened and adjusted to force direction										
M6	1/4"-20UNC	1100	220	2200	440	310	220	220	460	330	220	
M8	5/16"-18UNC	2200	660	4400	1320	930	660	660	1400	990	660	
M8x1	-											
M10	3/8"-16UNC	2200	880	4400	1760	1240	880	880	1860	1320	880	
M10x1	7/16"-14UNC											
M12	1/2"-13UNC	4400	1650	8800	3300	2330	1650	1650	3500	2470	1650	
M12x1,5	-											
M14	-											
M16	5/8"-11UNC	8820	3300	17640	6600	4660	3300	3300	7000	4950	3300	
M16x1,5	-											
M18	3/4"-16UNF											
M20	3/4"-10UNC	13230	5070	26460	10140	7170	5070	5070	10750	7600	5070	
M20x2	-											
M22	7/8"-9UNC											
M24	1"-8UNC	17630	7050	35260	14100	9970	7050	7050	14950	10570	7050	
M24x2	1 1/8"-8UN											
M27	1 1/8"-7UNC											
M30	1 1/4"-8UN	26450	9920	52900	19840	14020	9920	9920	21040	14880	9920	
M30x2	1 1/4"-7UNC											
M33	-											
M36	1 1/2"-8UN	35270	15430	70540	30860	21820	15430	15430	32730	23140	15430	
M36x3	1 1/2"-6UNC											
M42	1 3/4"-5UNC	52910	19840	105800	39680	27700	19840	19840	41600	29760	19840	
M48	2"-4,5UNC	70540	26450	141100	52910	37000	26450	26450	55500	39680	26450	
M56	-	110200	35280	220400	70560	49392	35280	35280	74088	52920	35280	
M64	-	132270	44000	264400	88000	61600	44000	44000	92400	66000	44000	
		At a lift with one strand and two parallel strands where the inclination angles are at the max. ± 7°, the lifting methode can be assumed as a vertical lift.					When lifting with two, three or four leg lifting means, inclination angles of less than 15° shall be avoided, if possible (Risk of instability).					

Table 2:

Working load limit in metric tons (top) and in lbs (bottom)

Subject to technical modifications



5.2 VRS-F with key / VRS without key - metric

Type VRS-F / VRS	WLL [t]	weight VRS-F [kg/pc.]	weight VRS [kg/pc.]	T [mm]	B [mm]	C [mm]	D [mm]	E [mm]	G [mm]	I [mm]	K [mm]	L [mm]	M	N [mm]	torque [Nm]	Ref.-No.	
																VRS-F with key	VRS without key
M6 *	0.1	0.07	0.07	28	9	7	20	23	28	13.0	37	9	M6	6	5	7900906	7900909
M8	0.3	0.12	0.1	35	11	9	25	25	30	16.3	47	12	M8	6	10	8500911	7100554
M10	0.4	0.13	0.11	35	11	9	25	25	30	16.3	47	15	M10	6	10	7104029	7100555
M12	0.75	0.21	0.19	42	13	10	30	30	34	19.8	56	18	M12	8	25	7101313	7100556
M14	0.75	0.22	0.2	42	13	10	30	30	34	19.8	56	18	M14	8	30	7999330	7100557
M16	1.5	0.36	0.32	49	15	13	35	36	40	23.5	65	24	M16	10	60	7101314	7100558
M18	1.5	0.37	0.33	49	15	13	35	36	40	23.5	65	24	M18	10	60	7903387	7992219
M20	2.3	0.60	0.54	58	17	16	40	41	50	29.3	76	30	M20	12	115	7101315	7100559
M22	2.3	0.62	0.56	58	17	16	40	41	50	29.3	76	30	M22	12	125	7992197	7904625
M24	3.2	1.06	0.97	70	20	19	49	51	60	35.0	92	36	M24	14	190	7101316	7100560
M27	3.2	1.08	1	70	20	19	49	51	60	35.0	92	36	M27	14	250	7994138	7904626
M30	4.5	2.08	1.92	87	26	24	60	66	75	44.0	114	45	M30	17	330	7101317	7100561
M33	4.5	2.13	1.97	87	26	24	60	66	75	44.0	114	45	M33	17	350	7993439	7904627
M36	7	3.5	3.3	104	32	29	73	76	98	53.0	135	54	M36	22	590	7984201	7984198
M42	9	5.4	5	122	36	34	85	86	109	62.0	157	63	M42	24	925	7984202	7984199
M48	12	8.1	76	138	42	38	96	101	128	70.0	179	72	M48	27	1400	7984203	7984200
M56	16	13	11.9	161	50	44	110	112	145	82.0	209	84	M56	32	1400	7910836	7907508
M64	20	17.8	16.2	176	55	48	120	122	157	90.0	228	96	M64	36	1400	7910837	7907509

Table 3: metric

Subject to technical modifications

***Attention:** When tightening the VRS / VRS-F M6, do not exceed the torque value of 12 Nm.

5.3 VRS-F with key / VRS without key - metric with Vario bolt incl. locking nut and washer

Type VRS-F / VRS	WLL [t]	weight VRS-F [kg/pc.]	T [mm]	B [mm]	C [mm]	D [mm]	E [mm]	G [mm]	I [mm]	K [mm]	L [mm]	M	N [mm]	torque [Nm]	Ref.-No.	
															VRS-F with key	VRS without key
M8	0.3	**	35	11	9	25	25	30	16.3	47	13-70	M8	6	10	8600269	
M10	0.4	**	35	11	9	25	25	30	16.3	47	16-70	M10	6	10	8600270	
M12	0.75	**	42	13	10	30	30	34	19.8	56	19-150	M12	8	25	8600271	
M16	1.5	**	49	15	13	35	36	40	23.5	65	25-120	M16	10	60	8600272	
M20	2.3	**	58	17	16	40	41	50	29.3	76	31-160	M20	12	115	8600273	
M24	3.2	**	70	20	19	49	51	60	35.0	92	37-140	M24	14	190	8600274	
M30	4.5	**	87	26	24	60	66	75	44.0	114	46-190	M30	17	330	8600275	

Table 4: metric with Vario bolt ** = weight depends on version

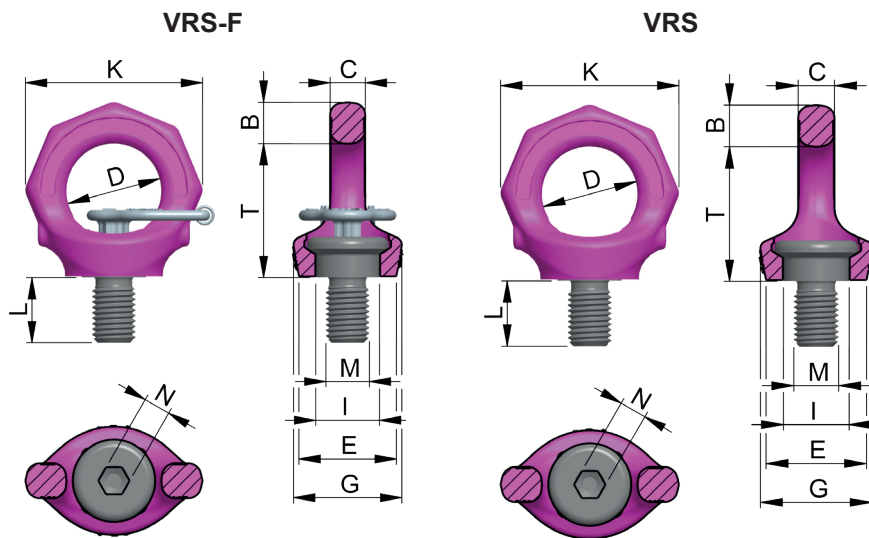
Subject to technical modifications

5.4 VRS-F with key / VRS without key - metric fine thread

Type VRS-F / VRS	WLL [t]	weight VRS-F [kg/pc.]	weight VRS [kg/pc.]	T [mm]	B [mm]	C [mm]	D [mm]	E [mm]	G [mm]	I [mm]	K [mm]	L [mm]	M	N [mm]	torque [Nm]	Ref.-No.	
																VRS-F with key	VRS without key
M8x1	0.3	0.12	-	35	11	9	25	25	30	16.3	47	12	M8x1	6	10	7904332	-
M12x1.5	0.75	0.21	-	42	13	10	30	30	34	19.8	56	18	M12x1.5	8	25	7992929	-
M16x1.5	1.5	0.36	-	49	15	13	35	36	40	23.5	65	24	M16x1.5	10	60	7902676	-
M20x2	2.3	0.6	-	58	17	16	40	41	50	29.3	76	30	M20x2	12	115	7992634	-
M24x2	3.2	1.06	-	70	20	19	49	51	60	35.0	92	36	M24x2	14	190	7992566	-
M30x2	4.5	2.08	-	87	26	24	60	66	75	44.0	114	45	M30x2	17	330	7991856	-
M36x3	7	-	3.3	104	32	29	73	76	98	53.0	135	54	M36x3	22	590	-	7992728

Table 5: metric fine thread

Subject to technical modifications

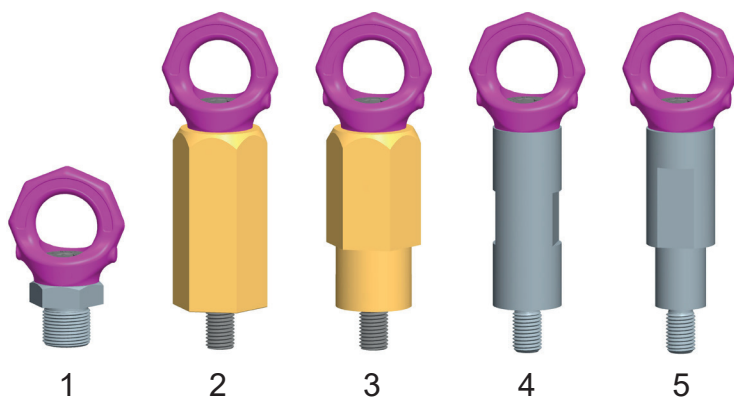


5.5 VRS-F with key / VRS without key - UNC / UN / UNF

Type VRS-F / VRS	WLL [t]	weight VRS-F [kg/pc.]	weight VRS [kg/pc.]	T [mm]	B [mm]	C [mm]	D [mm]	E [mm]	G [mm]	I [mm]	K [mm]	L [mm]	M	N [mm]	torque [Nm]	Ref.-No.	
																VRS-F with key	VRS without key
1/4"-20UNC	0.1	-	0.24	28	9	7	20	23	28	13.0	37	9	1/4"-20UNC	7/32"	5	7906917	7999105
5/16"-18UNC	0.3	0.13	-	35	11	9	25	25	30	16.3	47	12	5/16"-18UNC	1/4"	10	7999106	-
3/8"-16UNC	0.4	0.12	0.11	35	11	9	25	25	30	16.3	47	15	3/8"-16UNC	1/4"	10	7104480	7103959
7/16"-14UNC	0.4	0.13	0.12	35	11	9	25	25	30	16.3	47	15	7/16"-14UNC	1/4"	10	7904195	7903118
1/2"-13UNC	0.75	0.21	0.19	42	13	10	30	30	34	19.8	56	18	1/2"-13UNC	5/16"	25	7104481	7103960
5/8"-11UNC	1.5	0.35	0.32	49	15	13	35	36	40	23.5	65	24	5/8"-11UNC	3/8"	60	7104482	7103961
3/4"-16UNF	1.5	-	0.35	49	15	13	35	36	40	23.5	65	30	3/4"-16UNF	3/8"	60	-	7997676
3/4"-10UNC	2.3	0.58	0.54	58	17	16	40	41	50	29.3	76	30	3/4"-10UNC	1/2"	115	7104483	7103962
7/8"-9UNC	2.3	0.61	0.57	58	17	16	40	41	50	29.3	76	32	7/8"-9UNC	1/2"	115	7104484	7103963
1"-8UNC	3.2	1.04	0.97	70	20	19	49	51	60	35.0	92	36	1"-8UNC	9/16"	190	7104485	7103964
1 1/8"-8UN	3.2	1.08	1.01	70	20	19	49	51	60	35.0	92	36	1 1/8"-8UN	9/16"	250	7903386	7999385
1 1/8"-7UNC	3.2	1.08	1.01	70	20	19	49	51	60	35.0	92	36	1 1/8"-7UNC	9/16"	250	7903383	7999384
1 1/4"-8UN	4.5	-	1.95	87	26	24	60	66	75	44.0	114	45	1 1/4"-8UN	5/8"	330	-	7998707
1 1/4"-7UNC	4.5	2.08	1.95	87	26	24	60	66	75	44.0	114	45	1 1/4"-7UNC	5/8"	330	7104486	7103965
1 1/2"-8UN	7	3.6	2.9	104	32	29	73	76	98	53.0	135	54	1 1/2"-8UN	7/8"	590	-	7991917
1 1/2"-6UNC	7	3.6	2.9	104	32	29	73	76	98	53.0	135	54	1 1/2"-6UNC	7/8"	590	7104487	7103966
1 3/4"-5UNC	9	5	4.6	122	36	34	85	86	109	62.0	157	63	1 3/4"-5UNC	1"	925	7104488	7103967
2"-4.5UNC	12	7.6	7	138	42	38	96	101	128	70.0	179	72	2"-4.5UNC	1 1/8"	1400	7104489	7103968

Table 6: Inch thread (UNC / UN / UNF)

Subject to technical modifications



**For special versions see
separate safety instructions.**

**Other special lengths and special
surfaces are available on request!**

- 1 VRS with pipe inch thread acc. to DIN EN ISO 228-1
- 2 VRS with hexagonal extension adaptor
Type 1+2
(without recess)
KMAT-No.: 8600620
- 3 VRS with hexagonal extension adaptor
Type 3
(with recess)
KMAT-No.: 8600621

- 4 VRS with round extension adaptor
Type 1
(without recess)
KMAT-No.: 8600622
- 5 VRS with round extension adaptor
Type 2
(with recess)
KMAT-No.: 8600623

5.6 Overview of keys for VRS

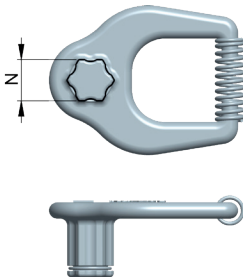
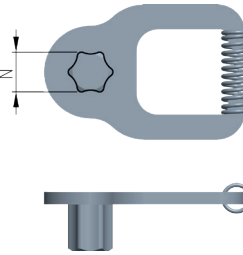
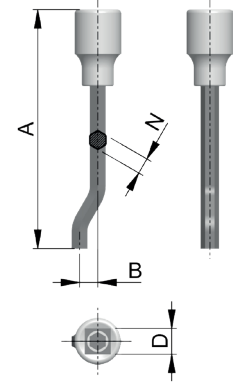
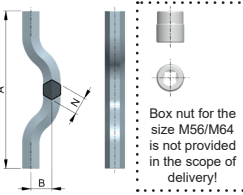
Type		weight [kg/pc.]	A [mm]	B [mm]	D [mm]	N [mm]	suitable for VRS		Ref.-No.
							WLL [t]	thread (Maß M mm)	
Star key metric (suitable for retrofitting)									
	Star key SW 6	0.02	--	--	--	6	0.1 0.3 0.4	M6 M8 M10	7983986
	Star key SW 8	0.03	--	--	--	8	0.75	M12 M14	7905453
	Star key SW 10	0.03	--	--	--	10	1.5	M16 M18	7903254
	Star key SW 12	0.04	--	--	--	12	2.3	M20 M22	7904282
	Star key SW 14	0.08	--	--	--	14	3.2	M24 M27	7904283
	Star key SW 17	0.12	--	--	--	17	4.5	M30 M33	7904284
	Star key SW 22	0.15	--	--	--	22	7	M36	7904285
	Star key SW 24	0.3	--	--	--	24	9	M42	7904286
	Star key SW 27	0.4	--	--	--	27	12	M48	7904287
	Star key SW 32	1.1	--	--	--	32	16	M56	7911045
Star key SW 36	1.3	--	--	--	36	20	M64	7911046	
Star key UNC / UN (suitable for retrofitting)									
	Star key SW 7/32"	0.02	--	--	--	7/32"	0.1 0.3 0.4	1/4"-20UNC 5/16"-18UNC 3/8"-16UNC	7913717
	Star key SW 1/4"	0.02	--	--	--	1/4"	0.4 0.4	7/16"-14UNC	7983995
	Star key SW 5/16"	0.02	--	--	--	5/16"	0.75	1/2"-13UNC	7983996
	Star key SW 3/8"	0.03	--	--	--	3/8"	1.5	5/8"-11UNC 3/4"-16UNF	7983997
	Star key SW 1/2"	0.04	--	--	--	1/2"	2.3	3/4"-10UNC 7/8"-9UNC	7983998
	Star key SW 9/16"	0.08	--	--	--	9/16"	3.2	1"-8UNC 1 1/8"-8UNC 1 1/8"-7UNC	7983999
	Star key SW 5/8"	0.12	--	--	--	5/8"	4.5	1 1/4"-8UNC 1 1/4"-7UNC	7984000
	Star key SW 7/8"	0.15	--	--	--	7/8"	7	1 1/2"-8UNC 1 1/2"-6UNC	7984001
	Star key SW 1"	0.3	--	--	--	1"	9	1 3/4"-5UNC	7984002
	Star key SW 1 1/8"	0.4	--	--	--	1 1/8"	12	2"-4.5UNC	7984003
Socket wrench metric									
	Socket wrench SW 6	0.09	118	7.5	1/2"	6	0.1 0.3 0.4	M6 M8 M10	7997749
	Socket wrench SW 8	0.11	118	9	1/2"	8	0.75	M12 M14	7997750
	Socket wrench SW 10	0.15	138	12	1/2"	10	1.5	M16 M18	7997751
	Socket wrench SW 12	0.2	137	14	1/2"	12	2.3	M20 M22	7997752
	Socket wrench SW 14	0.24	140	16.5	1/2"	14	3.2	M24 M27	7997753
	Socket wrench SW 17	0.47	152	22	3/4"	17	4.5	M30 M33	7902078
	Socket wrench SW 22	1	192	26	1"	22	7	M36	7902079
	Socket wrench SW 24	1.2	276	29	1"	24	9	M42	7902080
Socket wrench SW 27	2	304	33	1"	27	12	M48	7902081	
	Socket wrench SW 32	2.4	324	38	--	32	16	M56	7908744
	Socket wrench SW 36	3.1	324	43	--	36	20	M64	7908745

Table 7: Key overview

Subject to technical modifications