

# Load ring for bolting >VLBG-PLUS<



## Safety instructions

This safety instruction/declaration of the manufacturer has to be kept on file for the whole lifetime of the product.  
- Translation of the Original instructions -



Load ring VLBG-PLUS  
for bolting (ICE-PINK)



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**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  
73432 Aalen

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:** Lastbock VLBG-PLUS

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>BGR 500, KAP2.8 : 2008-04</u>	_____
_____	_____
_____	_____
_____	_____

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

Aalen, den 26.09.2016     Dr.-Ing. Arne Kriegsmann (Prokurist/QMB) *Arne Kriegsmann*  
Name, Funktion und Unterschrift Verantwortlicher

**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:** Load ring VLBG-PLUS

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>BGR 500, KAP2.8 : 2008-04</u>	_____
_____	_____
_____	_____
_____	_____

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

Aalen, den 26.09.2016     Dr.-Ing. Arne Kriegsmann (Prokurist/QMB) *Arne Kriegsmann*  
Name, function and signature of the responsible person



Please read user instruction before initial operation of the bolt-on lifting point VLBG-PLUS. Make sure that you have comprehended all subjected matters.

Non observance can lead to serious personal injuries and material damage and eliminates warranty.

## 1 Safety instructions



### ATTENTION

Wrong assembled or damaged VLBG-PLUS as well as improper use can lead to injuries of persons and damage of objects when load drops. Please inspect all VLBG-PLUS before each use.

- Remove all body parts (fingers, hands, arms, etc.) out of the hazard area (danger of crushing or squeezing) during the lifting process.
- The VLBG-PLUS must be used only by authorised and trained people in adherence to BGR/DGUV regulations 100-500, Chapter 2.8 and, outside Germany, when observing the relevant specific national regulations.
- Do not exceed the working load limit (WLL) indicated on the lifting point.
- VLBG-PLUS must be rotatable in the screwed tight status through 360 °.
- No technical alterations must be implemented on the VLBG-PLUS.
- No people may stay in the danger zone.
- Jerky lifting (strong impacts) should be prevented.
- Always ensure a stable position of the load when lifting. Swinging must be prevented.
- Damaged or worn VLBG-PLUS must never be utilised.

## 2 Intended use

- VLBG-PLUS must only be used for the assembly of the load or at load accepting means
- Their usage is intended to be used as lifting means.
- The VLBG-PLUS can also be used as lashing points for the fixture of lashing means.
- The VLBG-PLUS must only be used in the here described usage purpose.

## 3 Assembly- and instruction manual

### 3.1 General information

- Effects of temperature:  
Due to the DIN/EN bolts that are used in the VLBG-PLUS, the working load limit must be reduced accordingly:  
-40 °C to 100 °C → no reduction (-40 °F to 212 °F)  
100 °C to 200 °C minus 15% (212 °F to 392 °F)  
200 °C to 250 °C minus 20% (392 °F to 482 °F)  
250 °C to 350 °C minus 25% (482 °F to 662 °F)  
**Temperatures above 350 °C (662 °F) are not permitted.**

Please observe the maximum usage temperature of the supplied nuts (optionally):

- Clamping nuts according to DIN EN ISO 7042 (DIN 980) must only be used up to +150 °C at the max (302 °F).
- Collar nuts according to DIN 6331 can be used up to +300 °C. Please note also the reduction factors (572 °F).
- RUD-Lifting points must not be used under chemical influences such as acids, alkaline solutions and vapours e.g. in pickling baths or hot dip galvanising plants. If this cannot avoided, please contact the manufacturer indicating the concentration, period of penetration and temperature of use.
- The places where the lifting points are fixed should be marked with colour.
- VLBG-PLUS lifting points from RUD are supplied with a crack test inspected hexagon bolt (length up to Lmax, see table 3).

**M8 - M24: ICE-Bolt**

**M27 - M48: 10.9 bolt**

### ATTENTION

Use only the appropriate strength class of bolt, for each specific size. For sizes M8-M24, only original RUD-ICE-Bolt must be used.

- Original bolts (ICE bolt and 10.9 bolts) are available as a spare part from RUD.
- When using 10.9 bolts of the size M27-M48 from other suppliers, make sure that they have been 100 % inspected in regards of cracks. A written confirmation of the absence of cracks must be added to the documentation.

The middle notch toughness at the lowest approved use temperature must be at least 36 J. This is required for the test principles for GS OA 15-04 lifting points.



### HINT

The dismantling / assembling for the exchange or inspecting of the bolt may only be executed by a competent person (compare with Section 3.4 Dismantling / Assembling the RUD bolt).

### Versions

- RUD supplies the Vario length complete with a washer and crack-detected nut corresponding to DIN EN ISO 7042 (DIN 980) or will be supplied with a crack inspected collar nut acc. to DIN 6331.
- If the VLBG-PLUS is used exclusively for lashing, the value of the working load limit can be doubled.  
LC = permissible lashing capacity = 2 x WLL



### HINT

If the VLBG-PLUS is/was used as a lashing point, with a force higher than the WLL, it must not be used as a lifting point afterwards.  
If the VLBG-PLUS is/was used as a lashing point, up to the WLL only, it can still be used afterwards as a lifting point.

### 3.2 Hints for the assembly

Basically essential:

- The material construction to which the lifting point will be attached should be of adequate strength to withstand forces during lifting without deformation. The German testing authority BG, recommends the following minimum for bolt lengths:
  - 1 x M in steel (minimum quality S235JR [1.0037])
  - 1,25 x M in cast iron (for example GG 25)
  - 2 x M in aluminium alloys
  - 2.5 x M in aluminium-magnesium alloys (M = diameter of RUD lifting point bolt, for ex. M 20)
- When lifting light metals, nonferrous heavy metals and gray cast iron the thread has to be chosen in such a way that the working load limit of the thread corresponds to the requirements of the respective base material.
- The lifting points must be positioned on the load in such a way that movement is avoided during lifting:
  - For single leg lifts**, the load ring should be vertically above the centre of gravity of the load.
  - For two leg lifts**, the lifting points must be equidistant to/or above the centre of gravity of the load.
  - For three and four leg lifts**, the lifting points should be arranged symmetrically around the centre of gravity in the same plane, if possible.
- Load symmetry:  
The working load limit of individual RUD lifting points are calculated using the following formula and are based on symmetrical loading:

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

$W_{LL}$  = working load limit  
 $G$  = load weight (kg)  
 $n$  = number of load bearing legs  
 $\beta$  = angle of inclination of the chain to the vertical

The calculation of load bearing legs is as follows:

	symmetrical	asymmetrical
two leg	2	1
three / four leg	3	1

Table 1: Load bearing strands (see table 2)



#### HINT

*With unsymmetrical loads, the WLL of each Lifting Point must be at least as high as the weight of the load.*

- A plane bolt-on surface (ØD, Tab. 3) with a perpendicular thread hole must be guaranteed. The thread must be carried out acc. to DIN 76 (countersink max. 1.05xd). Tapped holes must be machined deep enough so that the bearing surface of the lifting point will be supported.
- The VLBG-PLUS must be rotatable 360° when installed. Please observe the following:
  - For a **single use** hand tightening with a spanner is sufficient. Bolt supporting area must sit proper on bolt-on surface.
  - For **long term application** the VLBG-PLUS must be tightened with torque according to table 3 (+/- 10%).
  - When turning loads using the VLBG-PLUS (see chapter 3.3.2 permissible lifting- and turning process) it is necessary to tighten the bolt with a torque (+/- 10%) acc. to table 3.

- With shock loading or vibrations, especially at through whole fixtures with a nut at the end of the bolt, accidental release can occur.  
**Securing possibilities:** Observe torque moment, use liquid securing glue f.e. Loctite (can be adapted to the usage, observe manufacturer hints) or assemble a form closure bolt locking device f.e. a castle nut with cotter pin, locknut etc.
- Finally check the proper assembly (see chapter 4 *Inspection / repair*).

### 3.3 User instructions

#### 3.3.1 General information for the usage

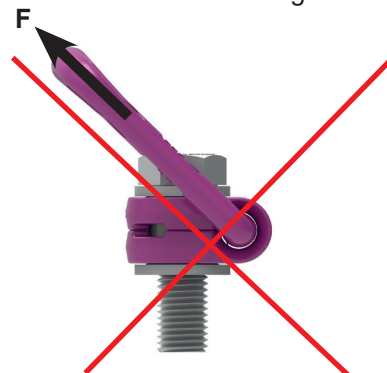
- Always regularly observe the appearance of the whole lifting point (e.g. fixed lifting point/slings) before using it (secured bolt seat, strong corrosion, cracks on load-bearing parts, deformations). Refer to chapter 4 *Inspection / repair*.



#### ATTENTION

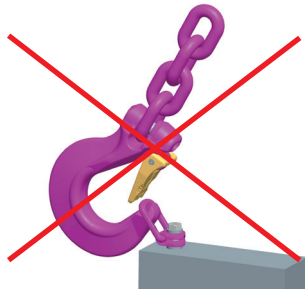
*Wrong assembled or damaged VLBG-PLUS as well as improper use can lead to injuries of persons and damage of objects when load drops. Please inspect all VLBG-PLUS before each use.*

- RUD components are designed according to DIN EN 818 and DIN EN 1677 for a dynamic load of 20,000 load cycles.
  - Keep in mind that several load cycles can occur with a lifting procedure
  - Keep in mind that, due to the high dynamic stress with high numbers of load cycles, that there is a danger that the product will be damaged
  - The BG/DGUV recommends: For higher dynamic loading with a high number of load cycles (continuous operation), the working load stress must be reduced according to the driving mechanism group 1Bm (M3 in accordance with DIN EN 818-7). Use a lifting point with a higher working load limit.
- When attaching and removing the lifting means (e.g. lifting chains), crushing, shearing, trapping and impact spots must be prevented.
- Prevent damage being caused to the lifting means by loading at sharp edged.
- Set the suspension ring of the VLBG-PLUS in the direction of force before attaching the lifting means.



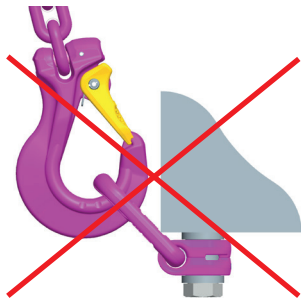
Pic. 1: Forbidden loading direction

- Keep in mind that the lifting means in the VLBG-PLUS must be freely movable.



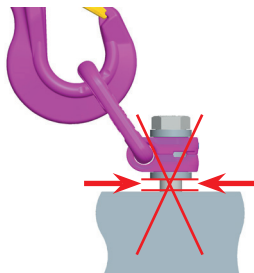
Pic. 2: Use only suitable lifting means for hanging or hooking into the VLBG-PLUS

- A bending load of the suspension ring is not permitted!



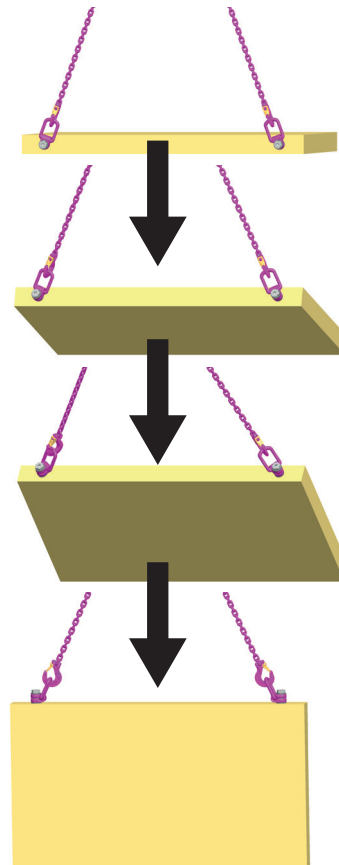
Pic. 3: The load must move freely and must not be loaded at edges

- Always completely engage the lifting point.



Pic. 4: The lifting point must be completely screwed in.

### 3.3.2 Allowed lifting and turning operations



Pic. 5: Possible turning operation with the VLBG-PLUS

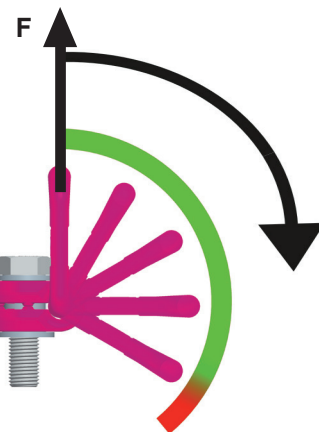
#### The following turning operations are allowed

- Turning operations where the load ring will be turned into the load direction



#### WARNING

The load ring must not support itself at edges or other attachments. Also the attached lifting mean must not touch the head of the bolt.



Pic. 6: Pivoting in load direction

- Turning operations where the VLBG-PLUS will be turned around the bolt axle (**exception**: see chapter 3.3.3 *Forbidden lifting and turning operations*). After a full turn by 180° the torque of the bolt must be checked.



**WARNING**

Observe the requested torque value before each lifting or turning operation.

**3.3.3 Forbidden lifting and turning operations**

The following operations are forbidden:

**WARNING**

The turning of the VLBG-PLUS under load in the direction of the bolt axle (+15°) is forbidden.



Pic. 7: Forbidden turning direction at loading in the direction of the axle.

**3.4 Dismantling / Assembling the RUD bolt****HINT**

The dismantling / assembling and/or the exchange of the RUD bolt must only be executed by a competent person!

**3.4.1 Dismantling the bolt of the VLBG-PLUS M8-M48**

1. Position VLBG-PLUS with the thread end upwards at the bushing on the top of the bench vice without clamping the hexagon head of the bolt.  
Attention: Do not clamp head of bolt!
2. Slightly hit the bolt from the top to drive it out from the bushing (Pic. 8).  
Attention: In doing so, the thread must not be damaged!



Pic. 8: Dismantling position of the VLBG-PLUS

**3.4.2 Assembling the bolt of the VLBG-PLUS M8-M10****HINT**

Only the appropriate strength class of bolt for each specific size must be used!  
**M8-M10: ICE-Bolt only!**

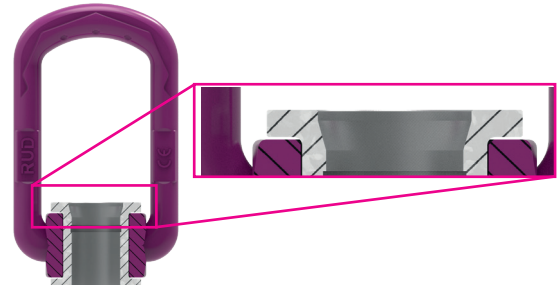
1. Insert the bolt into the drill hole in the socket until the retaining ring is positioned on the socket
2. Squeeze the retaining ring together with flat pliers so that it sits deeply in the groove of the nut.

3. Now insert the bolt with light hits with a hammer fully into the socket.
4. Finally, control the tightness of the bolt. The bolt must be easily rotatable by 360°.

**3.4.3 Assembling the bolt for VLBG-PLUS M12-M48****HINT**

Only the stated strength of class for the respective size of the bolts must be used!  
**M12-M24: ICE-Bolt | M27-M48: 10.9**

1. Insert the bolt into the bushing at the tapered end, where the chamfer is (refer to Pic. 9).



Pic. 9: VLBG-PLUS in sectional view.

The insertion chamfer is visible on top of the bushing

2. Insert the bolt into the socket in such a way that the retaining ring is circumferential deepened in the socket and seated (refer to Pic. 10).

**TIP**

Turn the bolt a few times under slight pressure so that it is centered in the retaining ring!



Pic. 10: Retaining ring positioned as circumferential in the recess

3. Use a light tap on the head of the bolt so that the bolt can be assembled up to the end stop of the bolt head on the socket.
4. Finally, control the tightness and seating of the bolt. The bolt must be easily rotatable by 360°.

**4 Inspection / repair****4.1 Hints for periodical inspections**

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 continuing suitability of the anchor point must be checked at least 1x year by an expert.

Depending on the usage conditions, f.e. frequent usage, increased wear or corrosion, it might be necessary to check in shorter periods than one year. The inspection has also to be carried out after accidents and special incidents.

## 4.2 Test criteria for the regular visual inspection by the user

- Correct bolt sizes and nut sizes, bolt quality and screw-in lengths
- Always observe tightness of the bolts  
→ inspect the torque
- Comprehensiveness of the lifting point.
- Comprehensive, legible load-bearing information as well as the manufacturer's identification mark.
- Deformations on load-bearing parts such as basic body, hanging or hooking in suspension ring and bolt
- Mechanical damage such as significant notches, particularly in areas subject to tensile stress.
- Easy rotation of the VLBG-PLUS must be ensured

## 4.3 Additional test criteria for the competent person / repair worker

- Cross-section alterations caused by wear > 10%.
- Strong corrosion
- Cracks on load-bearing parts
- function of and damage to the bolts, nut as well as the screw thread (disassembly / assembly of the bolt see section 3.4).
- further checks may be required, depending on the result of the risk assessment (e.g. testing for cracks in load-bearing parts).

Method of lift											
Number of legs		1	1	2	2	2	2	2	3 / 4	3 / 4	3 / 4
Angle of inclination <math>\beta</math>		0°-7°	90°	0°-7°	90°	0-45°	>45-60°	Un-symm.	0-45°	>45-60°	Un-symm.
factor		1	1	2	2	1,4	1	1	2,1	1,5	1
Type	Thread	WLL in tonnes, bolted and adjusted to the direction of pull									
VLBG-PLUS 0.63t	M 8	0.63	0.63	1.26	1.26	0.88	0.63	0.63	1.32	0.95	0.63
VLBG-PLUS 0.9t	M 10	0.9	0.9	1.8	1.8	1.3	0.9	0.9	1.9	1.35	0.9
VLBG-PLUS 1.35t	M 12	1.35	1.35	2.7	2.7	1.9	1.35	1.35	2.84	2	1.35
VLBG-PLUS 1.2t	M 14	1.2	1.2	2.4	2.4	1.68	1.2	1.2	2.52	1.8	1.2
VLBG-PLUS 2t	M 16	2	2	4	4	2.8	2	2	4.25	3	2
VLBG-PLUS 2t	M 18	2	2	4	4	2.8	2	2	4.25	3	2
VLBG-PLUS 3.5t	M 20	3.5	3.5	7	7	4.9	3.5	3.5	7.35	5.25	3.5
VLBG-PLUS 4.5t	M 24	4.5	4.5	9	9	6.3	4.5	4.5	9.5	6.75	4.5
VLBG-PLUS 6.7t	M 30	6.7	6.7	13.4	13.4	9.5	6.7	6.7	14.1	10	6.7
VLBG-PLUS 8t	M 36	8	8	16	16	11.2	8	8	17	11.8	8
VLBG-PLUS 10t	M 42	10	10	20	20	14	10	10	21.2	15	10
VLBG-PLUS 15t	M 42	15	15	30	30	21.2	15	15	31.5	22.4	15
VLBG-PLUS 20t	M 48	20	20	40	40	28	20	20	42	30	20
Type	Thread	WLL in lbs, bolted and adjusted to the direction of pull									
VLBG-PLUS 0.63t	M 8	1390	1390	2780	2780	1960	1390	1390	2950	2080	1390
VLBG-PLUS 0.9t	M 10	1980	1980	3960	3960	2800	1980	1980	4200	2970	1980
VLBG-PLUS 1.35t	M 12	2970	2970	5940	5940	4200	2970	2970	6300	4450	2970
VLBG-PLUS 1.2t	M 14	2640	2640	5280	5280	3730	2640	2640	5600	3960	2640
VLBG-PLUS 2t	M 16	4400	4400	8800	8800	6220	4400	4400	9330	6600	4400
VLBG-PLUS 2t	M 18	4400	4400	8800	8800	6220	4400	4400	9330	6600	4400
VLBG-PLUS 3.5t	M 20	7700	7700	15400	15400	10880	7700	7700	16330	11500	7700
VLBG-PLUS 4.5t	M 24	9920	9920	19840	19840	14020	9920	9920	21040	14880	9920
VLBG-PLUS 6.7t	M 30	14770	14770	29540	29540	20880	14770	14770	31330	22150	14770
VLBG-PLUS 8t	M 36	17630	17630	35260	35260	24930	17630	17630	37400	26440	17630
VLBG-PLUS 10t	M 42	22040	22040	44080	44080	31160	22040	22040	46750	33060	22040
VLBG-PLUS 15t	M 42	33070	33070	66140	66140	46760	33070	33070	70150	49600	33070
VLBG-PLUS 20t	M 48	44090	44090	88180	88180	62350	44090	44090	93520	66130	44090
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: WLL in tons (above / top) and in lbs (below / bottom)

Type	WLL [t]	weight [kg]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H stand [mm]	H max [mm]	J [mm]	K [mm]	L Stand [mm]	L max [mm]	M	N [mm]	SW	ISK	T [mm]	torque	Art.-No.	
																						Standard	Vario
VLBG-PLUS 0.63t M8	0.63	0.3	30	52	34	24	40	10	29	11	76	75	45	40	105	8	32	13	5	75	30 Nm	8504651	8600470
VLBG-PLUS 0.9t M10	0.9	0.31	30	52	34	24	39	10	29	15	96	75	45	44	125	10	32	17	6	75	60 Nm	8504652	8600471
VLBG-PLUS 1.35t M12	1.35	0.34	32	52	34	26	38	10	29	18	116	75	45	47	145	12	32	19	8	75	150 Nm	8504653	8600472
VLBG-PLUS 1.2t M14	1.2	0.5	34.5	56	38	30	39	13.5	36	24	34	86	47	60	70	14	38	24	10	85	150 Nm	8504654	8600473
VLBG-PLUS 2t M16	2	0.55	34.5	56	38	30	39	13.5	36	22	149	86	47	58	185	16	38	24	10	85	150 Nm	8504655	8600474
VLBG-PLUS 2t M18	2	1.3	50	82	54	45	55	17	43	37	222	113	64	80	90	18	48	30	12	110	200 Nm	8504656	8600475
VLBG-PLUS 3.5t M20	3.5	1.3	50	82	54	45	55	17	43	32	187	113	64	75	230	20	48	30	12	110	400 Nm	8504657	8600476
VLBG-PLUS 4.5t M24	4.5	1.4	50	82	54	45	67	17	43	37	222	130	78	80	265	24	48	36	14	125	760 Nm	8504659	8600478
VLBG-PLUS 6.7t M30	6.7	3.2	60	103	65	60	67	22.5	61	49	279	151	80	110	340	30	67	46	17	147	1000 Nm	8504661	8600480
VLBG-PLUS 8t M36	8	6.2	77	122	82	70	97	26.5	77	63	223	205	113	140	300	36	79	55	22	196	800 Nm	7983553	8600289
VLBG-PLUS 10t M42	10	6.7	77	122	82	70	94	26.5	77	73	273	205	113	150	350	42	79	65	24	196	1000 Nm	7983554	8600290
VLBG-PLUS 15t M42	15	10.9	95	156	100	85	109	36	87	63	413	230	130	150	500	42	100	65	24*	222	1500 Nm	7982966	8600291
VLBG-PLUS 20t M48	20	11.6	95	156	100	95	105	36	87	73	303	230	130	160	350	48	100	75	27	222	2000 Nm	7982967	8600292

Table 3: Dimensioning

Subject to technical modifications

SW = wrench size

ISK = internal hexagon /

\* from L=351 mm without internal hexagon

