

# 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)



### 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)  
Name, Funktion und Unterschrift Verantwortlicher *Arne Kriegsmann*



### 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)  
Name, function and signature of the responsible person *Arne Kriegsmann*



Please read user instruction before initial operation of the bolt-on liftingpoint VLBG-PLUS. Make sure that you have comprehend 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.

- Reference should be made to German Standards accord. BGR 500 (DGUV rules 100-500) or other country specific statutory regulations and inspections are to be carried out by competent persons only.
- The VLBG-PLUS must be rotatable 360° when installed.

## 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 chart 3).

**M8-M24: ICE-Bolt**

**M27-M48: 10.9 bolt**

**Only the corresponding strength class must be used for the choosen size!**

- If self provided 10.9 bolts are used for the sizes M27-M48, these parts must be 100 % free of cracks.

Original ICE-Bolts of the sizes M8-M24 can be ordered from RUD. The minimum notch bar impact test value at the lowest possible temperature must be at least 36 Joule. This is a requirement of the testing principles for lifting points according to GS MO 15-04 (Point 6.4.1).



### HINT

To remove bolt from the body, use a hammer and knock front end of the bolt.

Disassembly and exchange of bolt must only be carried out by a competent person.

### Versions

- The type VLBG-PLUS 7 t M36 is only delivered with a **special bolt**, therefore it is **not possible to use a DIN/EN-bolt**.
- 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

### 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 positioned 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 (kg)  
 $G$  = 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:

|                   | Symmetrie | Unsymmetrie |
|-------------------|-----------|-------------|
| Zweistrang        | 2         | 1           |
| Drei-/ Vierstrang | 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 ( $\varnothing D$ ) 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 chart 3.
- With shock loading or vibrations, especially at through hole 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 criteria*).

### 3.3 User instructions

#### 3.3.1 General information for the usage

- Before every usage, control in regularly periods the whole lifting point in regard of the continuous aptitude as a lifting mean, whether it is tightened (torqued), or has strong corrosion, wear, deformations etc. (see chapter 4 *Inspection criteria*).

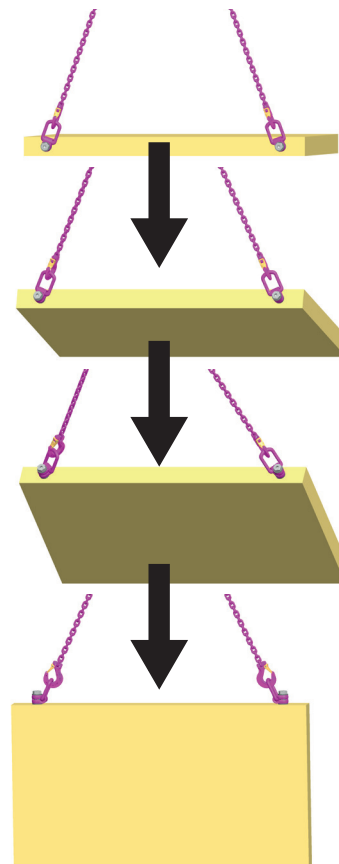


#### ATTENTION

*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.*

- Adjust to the direction of pull, before attaching to the lifting means. The load ring should be free movable and must not touch edges.
- All fittings connected to the VLBG-PLUS should be free moving. When connecting and disconnecting the lifting means (sling chain) pinches and impacts should be avoided.
- Damage of the lifting means caused by sharp edges should be avoided as well.

#### 3.3.2 Allowed lifting and turning operations



Pic. 1: Possible turning operation with the VLBG-PLUS

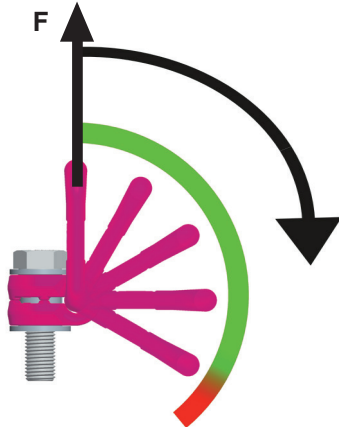
### The following turning operations are allowed

- 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. 2: 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. 3: Forbidden turning direction at loading in the direction of the axle.

### 3.4 Hints for periodical inspections

Have VLBG-PLUS checked by a competent person in periods which are determined by the usage, but at least 1x per year, in regard of the ongoing appropriateness of the lifting point (see chapter 4 *Inspection criteria*).

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 Inspection criteria

Observe and control the following points before each operation, in regularly periods, after the assembly and special incidents.

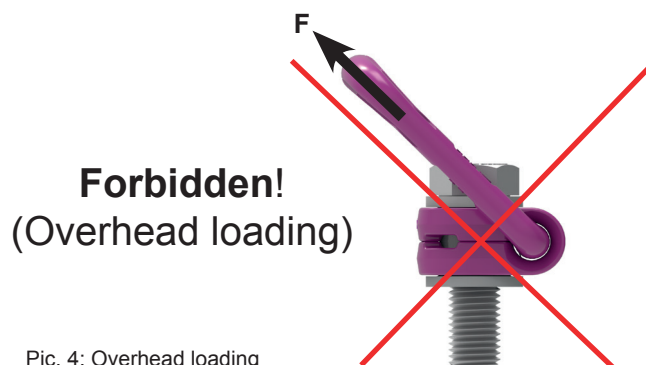
- Ensure correct bolt and nut size, quality and length.
- Ensure compatibility of bolt thread and tapped hole - control of the torque
- The lifting point should be complete.
- The working load limit and manufacturers stamp should be clearly visible.
- Deformation of the component parts such as body, load ring and bolt.
- Mechanical damage, such as notches, particularly in high stress areas.
- Wear should be not more than 10 % of cross sectional diameter.
- Evidence of corrosion.
- Evidence of cracks.
- Damage at the bolt, nut and/or thread.
- The body of the VLBG-PLUS must be free to rotate.

RUD components are tested in accordance with DIN EN 1677, with a minimum of 20.000 load cycles at 1.5 x WLL.

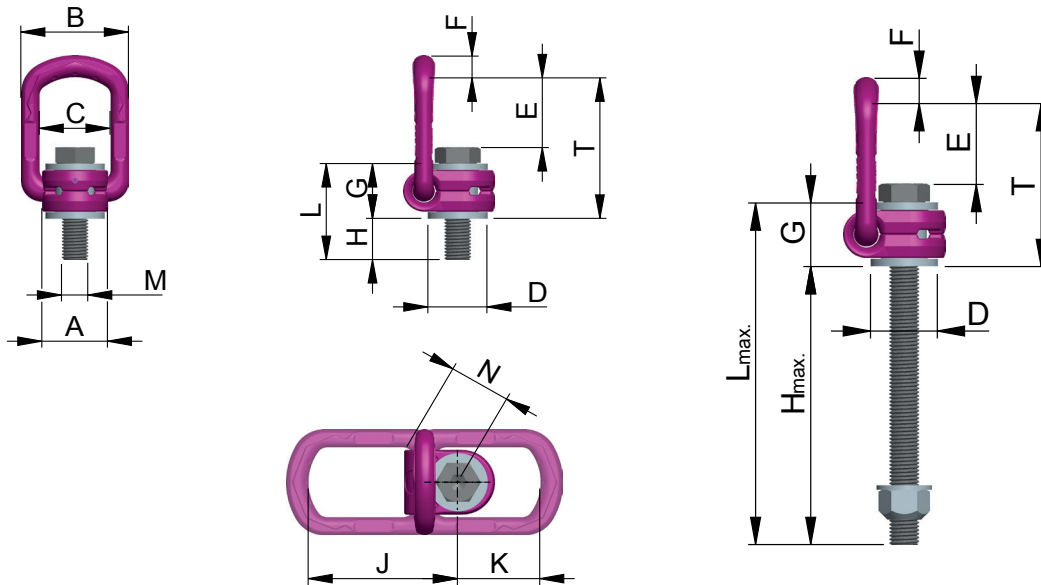
The BG/DGUV recommends: At a high dynamic loading with high numbers of load cycles (continuous work) the bearing stress acc. to FEM group 1B<sub>m</sub> (M3 acc. to DIN 818-7) must be reduced.

| Method of lift                           |        |   |       |       |       |       |        |         |       |        |         |
|--|--------|---|-------|-------|-------|-------|--------|---------|-------|--------|---------|
| Number of legs                           |        | 1   | 1     | 2     | 2     | 2     | 2      | 2       | 3 & 4 | 3 & 4  | 3 & 4   |
| Angle of inclination <math>\alpha</math> |        | 0°  | 90°   | 0°    | 90°   | 0-45° | 45-60° | unsymm. | 0-45° | 45-60° | unsymm. |
| 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    | 1.3   | 0.94   | 0.63    |
| VLBG-PLUS 0.9t                           | M 10   | 0.9   | 0.9   | 1.8   | 1.8   | 1.26  | 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    | 2.8   | 2      | 1.35    |
| VLBG-PLUS 1.2t                           | M 14   | 1.2   | 1.2   | 2.4   | 2.4   | 1.7   | 1.2    | 1.2     | 2.5   | 1.8    | 1.2     |
| VLBG-PLUS 2t                             | M 16   | 2   | 2     | 4     | 4     | 2.8   | 2      | 2       | 4.2   | 3      | 2       |
| VLBG-PLUS 2t                             | M 18   | 2   | 2     | 4     | 4     | 2.8   | 2      | 2       | 4.2   | 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  | 9.4   | 6.7    | 6.7     | 14    | 10     | 6.7     |
| VLBG-PLUS 8t                             | M 36   | 8   | 8     | 16    | 16    | 11.2  | 8      | 8       | 16.8  | 12     | 8       |
| VLBG-PLUS 10t                            | M 42   | 10  | 10    | 20    | 20    | 14    | 10     | 10      | 21    | 15     | 10      |
| VLBG-PLUS 15t                            | M 42   | 15  | 15    | 30    | 30    | 21    | 15     | 15      | 31.5  | 22.5   | 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    | 1388  | 1388  | 2776  | 2776  | 1943  | 1388   | 1388    | 2914  | 2082   | 1388    |
| VLBG-PLUS 0.9t                           | M 10   | 1983  | 1983  | 3966  | 3966  | 2776  | 1983   | 1983    | 4161  | 2974   | 1983    |
| VLBG-PLUS 1.35t                          | M 12   | 2975  | 2975  | 5950  | 5950  | 4165  | 2975   | 2975    | 6247  | 4462   | 2975    |
| VLBG-PLUS 1.2t                           | M 14   | 2644  | 2644  | 5288  | 5288  | 3701  | 2644   | 2644    | 5552  | 5552   | 2644    |
| VLBG-PLUS 2t                             | M 16   | 4408  | 4408  | 8816  | 8816  | 6171  | 4408   | 4408    | 9256  | 9256   | 4408    |
| VLBG-PLUS 2t                             | M 18   | 4408  | 4408  | 8816  | 8816  | 6171  | 4408   | 4408    | 9256  | 6612   | 4408    |
| VLBG-PLUS 3.5t                           | M 20   | 7714  | 7714  | 15428 | 15428 | 10799 | 7714   | 7714    | 16199 | 11571  | 7714    |
| VLBG-PLUS 4.5t                           | M 24   | 9918  | 9918  | 19836 | 19836 | 13885 | 9918   | 9918    | 20827 | 14877  | 9918    |
| VLBG-PLUS 6.7t                           | M 30   | 14766   | 14766 | 29532 | 29532 | 20672 | 14766  | 14766   | 31008 | 22149  | 14766   |
| VLBG-PLUS 8t                             | M 36   | 17632   | 17632 | 35264 | 35264 | 24684 | 17632  | 17632   | 37027 | 26448  | 17632   |
| VLBG-PLUS 10t                            | M 42   | 22040   | 22040 | 44080 | 44080 | 30856 | 22040  | 22040   | 46284 | 33060  | 22040   |
| VLBG-PLUS 15t                            | M 42   | 33060   | 33060 | 66120 | 66120 | 46284 | 33060  | 33060   | 69426 | 49590  | 33060   |
| VLBG-PLUS 20t                            | M 48   | 44080   | 44080 | 88160 | 88160 | 61712 | 44080  | 44080   | 92568 | 66120  | 44080   |

Table 2: WLL in tons (above / top) and in lbs (below / bottom)



| Type                | WLL [t] | weight [kg] | A  | B   | C   | D  | E   | F    | G  | H  | H max. | J   | K   | L   | L max. | M  | N   | SW | ISK | T   | torque  | Ref.-No. |         |
|---------------------|---------|-------------|----|-----|-----|----|-----|------|----|----|--------|-----|-----|-----|--------|----|-----|----|-----|-----|---------|----------|---------|
|                     |         |             |    |     |     |    |     |      |    |    |        |     |     |     |        |    |     |    |     |     |         | Standard | Vario   |
| VLBG-PLUS 0.63t M8  | 0.63    | 0.3         | 30 | 54  | 34  | 24 | 40  | 12   | 29 | 11 | 76     | 75  | 45  | 40  | 105    | 8  | 32  | 13 | 5   | 75  | 30 Nm   | 8504651  | 8600470 |
| VLBG-PLUS 0.9t M10  | 0.9     | 0.32        | 30 | 54  | 34  | 24 | 39  | 12   | 29 | 15 | 96     | 75  | 45  | 44  | 125    | 10 | 32  | 17 | 6   | 75  | 60 Nm   | 8504652  | 8600471 |
| VLBG-PLUS 1.35t M12 | 1.35    | 0.33        | 32 | 54  | 34  | 26 | 38  | 12   | 29 | 18 | 116    | 75  | 45  | 47  | 145    | 12 | 32  | 19 | 8   | 75  | 150 Nm  | 8504653  | 8600472 |
| VLBG-PLUS 1.2t M14  | 1.2     | 0.52        | 33 | 56  | 36  | 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       | 1.3         | 33 | 56  | 36  | 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 | 50  | 16.5 | 43 | 37 | 222    | 130 | 78  | 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  | 16.5 | 43 | 32 | 187    | 113 | 64  | 75  | 230    | 20 | 48  | 30 | 12  | 110 | 400 Nm  | 8504657  | 8600476 |
| VLBG-PLUS 4.5t M24  | 4.5     | 1.5         | 50 | 82  | 54  | 45 | 67  | 18   | 43 | 37 | 222    | 130 | 78  | 80  | 265    | 24 | 48  | 36 | 14  | 125 | 760 Nm  | 8504659  | 8600478 |
| VLBG-PLUS 6.7t M30  | 6.7     | 3.3         | 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       | 3.4         | 77 | 122 | 82  | 70 | 97  | 26.5 | 77 | 63 | 223    | 205 | 110 | 140 | 300    | 36 | 87  | 55 | 22  | 197 | 800 Nm  | 8504662  | 8600481 |
| VLBG-PLUS 10t M42   | 10      | 6.7         | 77 | 122 | 82  | 70 | 94  | 26.5 | 77 | 73 | 273    | 205 | 110 | 150 | 350    | 42 | 70  | 65 | 24  | 197 | 1000 Nm | 8504663  | 8600482 |
| VLBG-PLUS 15t M42   | 15      | 11.2        | 95 | 156 | 100 | 85 | 109 | 36   | 87 | 63 | 413    | 230 | 130 | 150 | 500    | 42 | 100 | 65 | 24* | 222 | 1500 Nm | 8504664  | 8600483 |
| 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 | 8504665  | 8600484 |



SW = wrench size  
ISK = internal hexagon

\* from L=351 mm without internal hexagon

Table 3: Dimensioning

Subject to technical modifications