Load Ring for bolting
VLBG-PLUS

NB: Please ensure that the safety instructions have been fully read and understood before initial use of the VLBG-PLUS bolt-on lifting point. Failure to do so may result in serious injuries and/or material damage and eliminates manufacturers warranty.

Part 1 - User Instructions

1. Safety instructions

This safety instruction/declaration of the manufacturer must be kept on file for the lifetime of the product.

ATTENTION: Please inspect all lifting points prior to use. Damage, incorrect assembly or improper use may result in serious injuries and/or material damage.

EC-Declaration of the manufacturer

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

We hereby declare that the design and construction of the equipment detailed within this document, adheres to the appropriate level of health and safety of the corresponding EC regulation.

Any un-authorised modification and/or any incorrect use of the equipment not adhered to within these user instructions waivers this declaration invalid.

Designation of the equipment:

Type: **VLBG-PLUS bolt-on lifting point**

Manufacturer's mark:

Drawings (iges, dxf and step), product information and other support material can be downloaded from www.rud.com.au.

RUD

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:

DIN EN 1677-1 : 2009-03 | DIN EN ISO 12100 : 2011-03

The following national norms and technical specifications were applied:

BGR 500, KAP2.8 : 2008-04

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

Part 2 - User Instructions

2.1. Safety Instructions

ATTENTION: Please inspect all lifting points prior to use. Damage, incorrect assembly or improper use may result in serious injuries and/or material damage.

Ensure that the safety instructions have been fully read and understood before initial use of the VLBG-PLUS bolt-on lifting point. Failure to do so may result in serious injuries and/or material damage and eliminates manufacturers warranty.

- Reference should be made to relevant standards (eg AS 3775.2, AS 3776) and other statutory regulations. Inspections should be carried out by competent persons only.
- The VLBG-PLUS must be free to rotate 360° when installed.

2.2 Intended use

- VLBG-PLUS lifting points must only be attached to a load or used as load accepting means.
- Their usage is intended to be used as lifting means.
- RUD VLBG-PLUS lifting points can also be used as lashing points for fixing lashing means.
- VLBG-PLUS lifting points must only be used in the here described operation /user instruction.

Part 3 - Assembly and instruction manual

3.1 General information

- VLBG-PLUS can be used for the flipping and turning of loads (see NOTE in section 3.2 Hints for the assembly).
- Effects of temperature:
  The WLL of the VLBG-PLUS lifting points must be reduced as follows:

-40°C up to 100°C	no reduction
100°C up to 200°C	minus 15 % (212 up to 392°F)
200°C up to 250°C	minus 20 % (392 up to 482°F)
250°C up to 350°C	minus 25 % (482 up to 662°F)

Temperatures above 350°C (662°F) are not permitted!

Please observe the maximum usage temperature of the supplied nuts

- Lock nuts acc. to DIN EN ISO 7042 (DIN 980) must be used to max. 150° C (302°F).
- Collar nuts acc. to DIN 6331 can be used up to +300°C (572°F). In addition to that observe the reduction factor.

ATTENTION: RUD-Lifting points must not be used under chemical influences such as acids, alkaline solutions and vapors e.g. in pickling baths or hot dip galvanising plants. If this cannot be avoided, please contact the manufacturer, indicating the concentration, period of penetration and temperature of use.

- The place where the VLBG-PLUS lifting points are fixed should be clearly marked.
- 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 chosen 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).

NOTE: To remove bolt from the body, use a hammer/mallet and tap the front end of the bolt. Disassembly and exchange of bolts must only be carried out by a competent person!

- The metric vario length can either be equipped with a washer and a crack detected nut acc. to DIN EN ISO 7042 or with a crack inspected collar nut acc. to DIN 6331 or 2 x crack inspected collar nuts Class 8 AS1112.1.
- 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

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/DGUV, recommends the following minimum for bolt lengths:

- 1 x M in steel (minimum quality S235JR [1.0037]) ≈ AS3678 GR250.
- 1.25 x M in cast iron (however when castings of lower strength (<200 MPa) are used the thread engagement must be at least 1.5M)
- 2 x M in aluminum alloys
- 2.5 x M in light metals of low strength
- (M = thread size, e.g. M20)

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.

- VLBG-PLUS lifting points must be positioned at the load in such a way that improper loading like turning or twisting of the load will be avoided:
  - **For single leg lifts:** Load ring should be positioned vertically above the centre of gravity.
  - **For two leg lifts:** Lifting points must be equidistant to/ or above the centre of gravity of the load.
  - **For three and four leg lifts:** Lifting points should be arranged symmetrically around the centre of gravity and in same plane if possible.

Symmetry of loading:

Determine the working load limit of each individual RUD lifting point for symmetrical and asymmetrical loading according to the following physical formula:

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

W_{LL} = required of lifting point/individual leg (kg)
G = load weight (kg)
n = number of load bearing legs
ß = angle of inclination of the individual leg

Number of load bearing strands

	Symmetrical	Asymmetrical
Double leg	2	1
3/4 leg	2	1

Load bearing strands (compare also with table 1)

NOTE: With asymmetrical loads, the WLL of each Lifting Point must be the same as the weight of the load. For special applications, please consult the RUD engineering team.

- A plane bolt-on surface (ØD, table 2) with a perpendicular thread hole must be guaranteed. The thread must be carried out acc. to DIN 76 (countersink max. 1.05xd).
- The holes must be drilled with a sufficient depth in order to guarantee compatibility with the supporting surface

The VLBG-PLUS must be free to rotate 360° when installed. Please observe the following:

- **For single use**: Tightening by hand with a spanner is sufficient. Lifting point must be fully engaged into thread hole and the bearing surface must sit properly at the bolt-on area of the load.
- **For long term application**: The VLBG-PLUS must be tightened with torque according to table 2 (+/- 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 2.)
- 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 i.e. Loctite (can be adapted to the usage, observe manufacturer requirements) or assemble a form closure bolt locking device i.e. a castle nut with cotter pin, locknut etc.
- Finally check the proper assembly (see chapter 4 Inspection criteria).

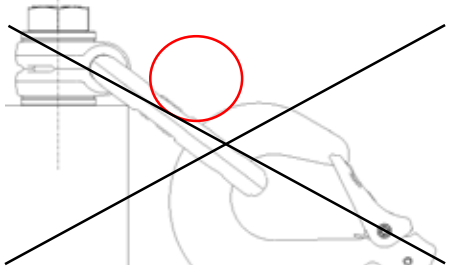
3.3 Usage

3.3.1 General information for use

- Inspect all lifting points prior to use (refer section 4 - Inspection criteria).

ATTENTION: Please inspect all lifting points prior to use. Damage, incorrect assembly or improper use may result in serious injuries and/or material damage.

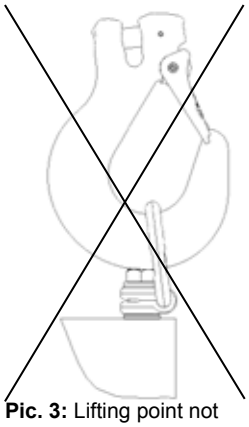
- The load ring should be free movable and must not touch edges (Pic. 1).



Pic 1: Forbidden support at edges

- Please observe that all fittings connected to the VLBG-PLUS are free to articulate. During connecting and disconnecting of lifting means (sling chain) pinches and impacts should be avoided (Pic. 2 & 3).

Pic. 2: Lifting point free to articulate

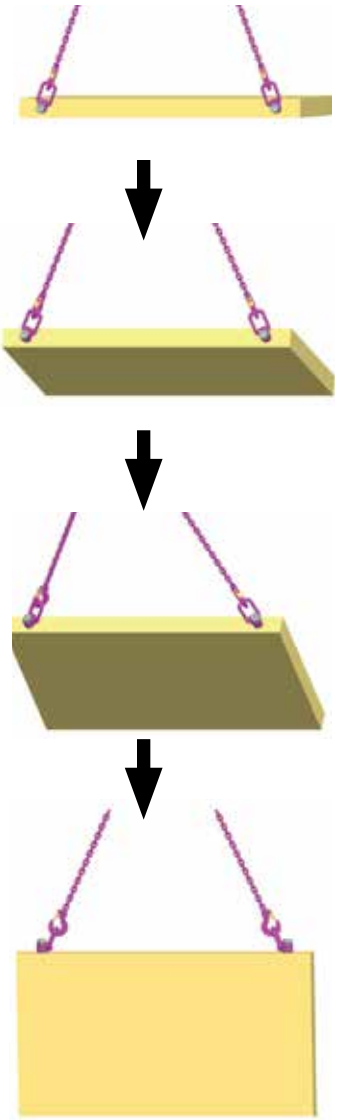


Pic. 3: Lifting point not free to articulate

- Damage of the lifting means caused by sharp edges must be avoided at all times.
- VLBG-PLUS are suitable for rotating and turning of loads. Observe allowed load directions.
- Remove items from hazardous area/environments as soon as possible.
- Avoid any shock or dynamic loading.
- 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).
- Adjust to the direction of pull, before attaching to thelifting 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.

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.

3.3.2 Allowed lifting and turning operations



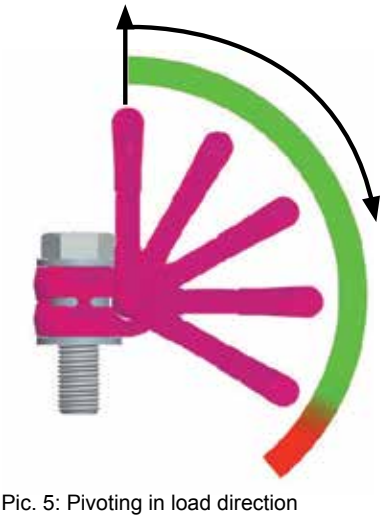
Pic. 4: Possible turning operation with the VLBG-PLUS

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. 5: 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.

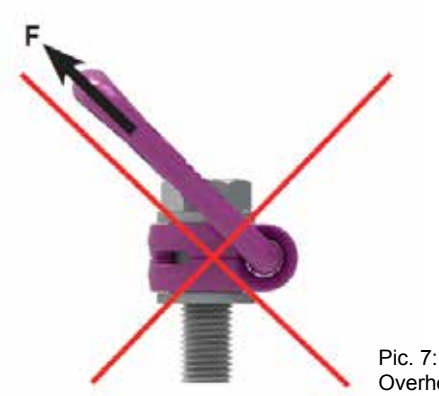
WARNING: Observe the requested torque value before each lifting or turning operation.

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. 6: Forbidden turning direction at loading in the direction of the axle.



Pic. 7: Forbidden! Overhead loading

3.4 Hints for periodical inspections

Lifting points should be checked by a competent person in periods which are determined by the usage, at least annually, in regard of the ongoing appropriateness of the lifting point (see section 4 Inspection criteria). Refer to AS 3775.2 for guidance.

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

Part 4 - Inspection criteria

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

- Ensure correct bolt and nut size, thread compatibility, quality grade of bolt and depth of thread engagement.
- Control of the torque
- Completeness of lifting point
- Clearly readable WLL statement and manufacturer's mark should be visible.
- Deformation of load bearing components such as body, load ring and bolt.
- Mechanical damage, such as notches, particularly in high stress areas.
- Wear should be at the max. 10% of cross sectional diameter.
- Evidence of corrosion.
- Evidence of cracks at load bearing areas.
- Damage at bolts, nuts and/or thread.
- Smooth and free rotation of the VLBG-PLUS must be guaranteed.

RUD components are designed for a dynamic loading of 20,000 load cycles at nominal working load.

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

Load Ring for bolting
VLBG-PLUS

Table 1: WLL in [t]

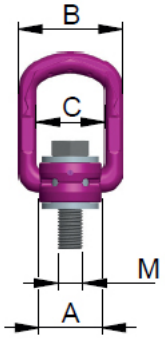
Type	Single Leg		2 , 3 or 4 Legs		
	G	G	G		
			60°	90°	120°
VLBG-PLUS 0.63 t M8	0.63	0.63	1.1	0.89	0.63
VLBG-PLUS 0.90t M10	0.90	0.90	1.6	1.3	0.90
VLBG-PLUS 1.35t M12	1.35	1.35	2.3	1.9	1.35
VLBG-PLUS 2.0t M16	2.0	2.0	3.5	2.8	2.0
VLBG-PLUS 3.5t M20	3.5	3.5	6.1	4.9	3.5
VLBG-PLUS 4.5t M24	4.5	4.5	7.8	6.3	4.5
VLBG-PLUS 6.7t M30	6.7	6.7	11.6	9.4	6.7
VLBG-PLUS 8.0t M36	8.0	8.0	13.8	11.3	8.0
VLBG-PLUS 10.0t M42	10.0	10.0	17.3	14.1	10.0
VLBG-PLUS 15.0t M42	15.0	15.0	26.0	21.2	15.0
VLBG-PLUS 20.0t M48	20.0	20.0	34.6	28.2	20.0

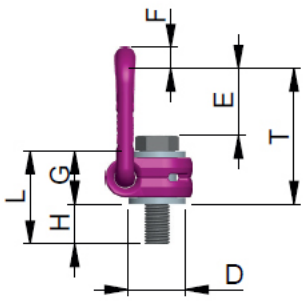
- Clearly readable WLL statement and manufacturer's mark

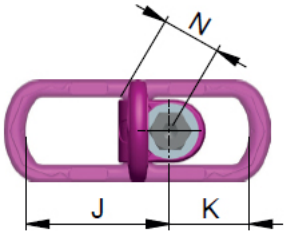
Table 2: Dimensioning

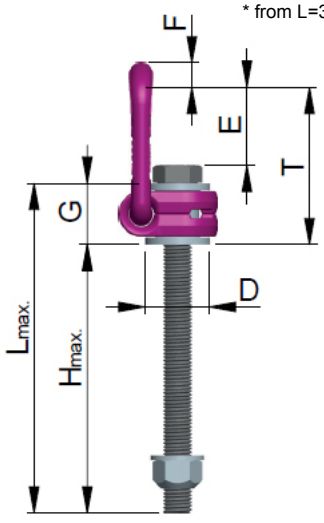
Type	WLL [t]	weight [kg]	A	B	C	D	E	F	G	H Stand.	H max.	J	K	L Stand.	L max.	M	N	SW	ISK	T	torque	Ref.-No. Standard	Ref.-No. Vario
VLBG-PLUS 0.63t M8	0.63	0.3	30	54	34	24	40	12	29	11	76	75	45	40	105	8	32	13	5	75	30 Nm	8504651	8600470
VLBG-PLUS 0.9t M10	0.9	0.32	30	54	34	24	39	12	29	15	96	75	45	44	125	10	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









Subject to technical modifications