

# Load Ring for bolting VLBG-PLUS (ICE Pink)



4 better  
lifting



**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.**

## 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-authorized modification and/or any incorrect use of the equipment not adhered to within these user instructions waives 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 [rud.com.au](http://rud.com.au)

	
<b>EC-Declaration of conformity</b>	
According to the EC-Machinery Directive 2006/42/EC, annex II A and amendments	
Manufacturer:	<b>RUD Ketten</b> Rieger & Dietz GmbH u. Co. KG Friedensinsel 73432 Aalen
<small>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.</small>	
Product name:	<u>Load ring VLBG-PLUS</u>
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>StGR 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

# 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.

- 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 statutory regulations (eg AS 3775.2, AS 3776). Inspections should be carried out by competent persons only
- Do not exceed the working load limit (WLL) indicated on the lifting point.
- VLBG-PLUS must be free to rotate through 360 ° when installed.
- No technical alterations are permitted on the VLBG-PLUS.
- Do not stand under a suspended load or be in the danger zone/fall zone when conducting a lift.
- Shock loading and strong impact should be prevented.
- Always ensure a stable position of the load when lifting. Swinging must be prevented.
- Damaged or worn VLBG-PLUS must be removed from service immediately (Refer to Chapter 4).

## 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.
- The VLBG-PLUS can also be used as lashing points for fixing lashing means.
- The VLBG-PLUS must only be used in the here described operation/user instruction.

## 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:

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

- 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 be avoided, please contact the manufacturer indicating the concentration, period of penetration and temperature of use.
- The places 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 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 sized between M27-M48 from other suppliers, they must be 100% crack tested. 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 a requirement for the test principles according to GS OA 15-04 lifting points.



## NOTE

The dismantling / assembling of the VLBG-PLUS for the exchange or inspection of the bolt may only be executed by a competent person.



## NOTE

The VLBG-PLUS 7 t M36 is delivered with a special bolt, therefore it is not possible to use a DIN/EN-bolt replacement. An exchange is also not possible.

## Versions

- RUD supplies the vario length bolt complete with a washer and crack-detected nut according to DIN EN ISO 7042 (DIN 980) or with a crack inspected collar nut according 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



## NOTE

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. It is best practice for lifting points and lashing points to be separate designated points.

### 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, recommends the following minimum for bolt lengths:
  - 1 x M in steel (minimum quality S235JR [1.0037], ≈ AS 3678 GR250)
  - 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, 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.
- The 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 vertically above the centre of gravity of the load.
- 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 in the same plane if possible.
- Symmetry of loading:  
Determine the WLL of each individual RUD lifting point for symmetrical and asymmetrical loading according to the following formula:

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

$W_{LL}$  = minimum required working load limit of lift point  
 $G$  = load weight (kg)  
 $n$  = number of load bearing legs  
 $\beta$  = angle of inclination of the individual leg

Number of load bearing strands

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

Table 1: Load bearing strands (compare also with Table 2)



#### 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, 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 is supported. Machine through holes up to DIN EN 20273-medium (See Table 4).
- The VLBG-PLUS must be free to rotate 360° when installed. Please observe the following:
  - For a **single use:** Hand tightening 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 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 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 / repair*).

### 3.3 User instructions

#### 3.3.1 General information for the usage

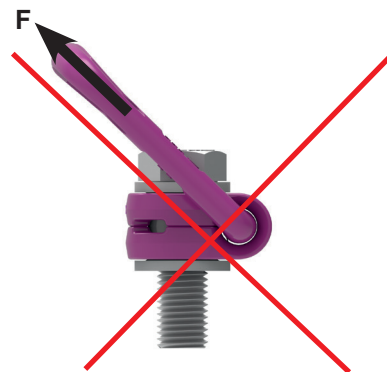
- Regularly observe the appearance of the entire lifting assembly (e.g. fixed lifting point/slings) before using it (secured bolt seat, presence of corrosion, cracks on load-bearing parts, deformations). Refer to Chapter 4 *Inspection / repair*.



#### ATTENTION

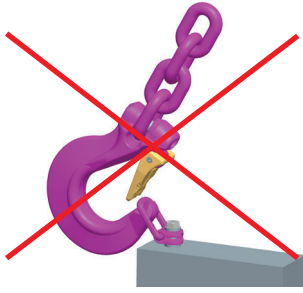
Incorrectly assembled or damaged lifting points as well as improper use can lead to injuries of persons and damage to objects when loads drop. Please inspect all VLBG-PLUS before each use.

- RUD components are designed according to DIN EN 818 and DIN EN 1677 for a dynamic load of 20,000 load cycles.
  - Several load cycles can occur within a lifting procedure
  - Due to the high dynamic stress associated with a high number of load cycles, 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.
- Avoid at all times loading the load ring via a sharp edge
- Set the suspension ring of the VLBG-PLUS in the direction of force before attaching the lifting means.



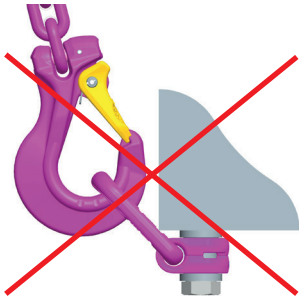
Pic. 1: Forbidden loading direction

- The load ring should be freely movable



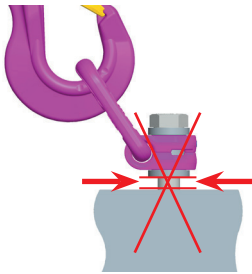
Pic. 2: Use only suitable lifting means for hanging or hooking into the VLBG-PLUS

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



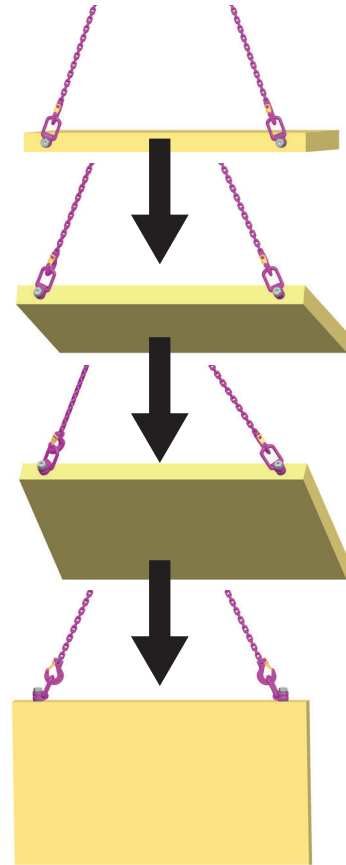
Pic. 3: The load must move freely and must not be loaded at edges

- Always completely engage the lifting point.



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

### 3.3.2 Allowed lifting and turning operations



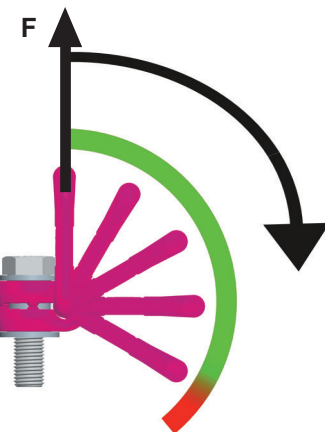
Pic. 5: Possible turning operation with the VLBG-PLUS

#### 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 Disassembling / Assembling the RUD bolt****NOTE**

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

**NOTE**

The bolt in the VLBG-PLUS 7 t M36 cannot be dismantled.

**3.4.1 Disassembling 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. Lightly 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****NOTE**

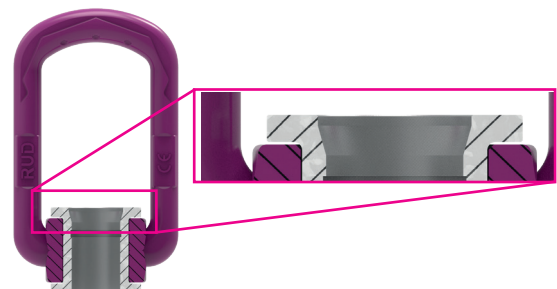
Only the appropriate strength class of bolt for each specific size must be used!  
**M8-M10: ICE-Bolt only!**

1. Insert the bolt into the housing until the retaining ring is positioned on the top of the bushing face
2. Squeeze the retaining ring together with flat pliers so that it sits deeply in the groove of the bolt.
3. Insert the bolt fully into the housing with light hits using a hammer.
4. Check the tightness of the bolt. The bolt must be easily rotatable around 360°.

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

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).

**NOTE**

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



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

3. Lightly tap on the head of the bolt so that the underside of the bolt head sits flush against the bushing
4. Check the tightness and seating of the bolt. The bolt must be easily rotatable around 360°.

**4 Inspection / repair****4.1 Notes 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 to the ongoing appropriateness of the lifting point (see Sections 4.2 and 4.3). Refer 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 be carried out after accidents and special incidents.

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




- Ensure correct bolt and nut size, thread compatibility, quality grade of bolt and depth of thread engagement
- Control of the torque
- Completeness of the lifting point.
- Legible WLL information as well as the manufacturer's identification mark.
- Deformations on load-bearing components such as body, load ring and bolt

- Mechanical damage, such as notches, particularly in high stress areas
- Smooth and free rotation of the VLBG-PLUS must be guaranteed

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

- Cross-section alterations caused by wear > 10%.
- Evidence of corrosion
- Evidence of cracks at load-bearing parts
- Damage to the bolts, nut as well 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).

Table 2: WLL in [t]

Type	Single Leg		2 , 3 or 4 Legs		
					
			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

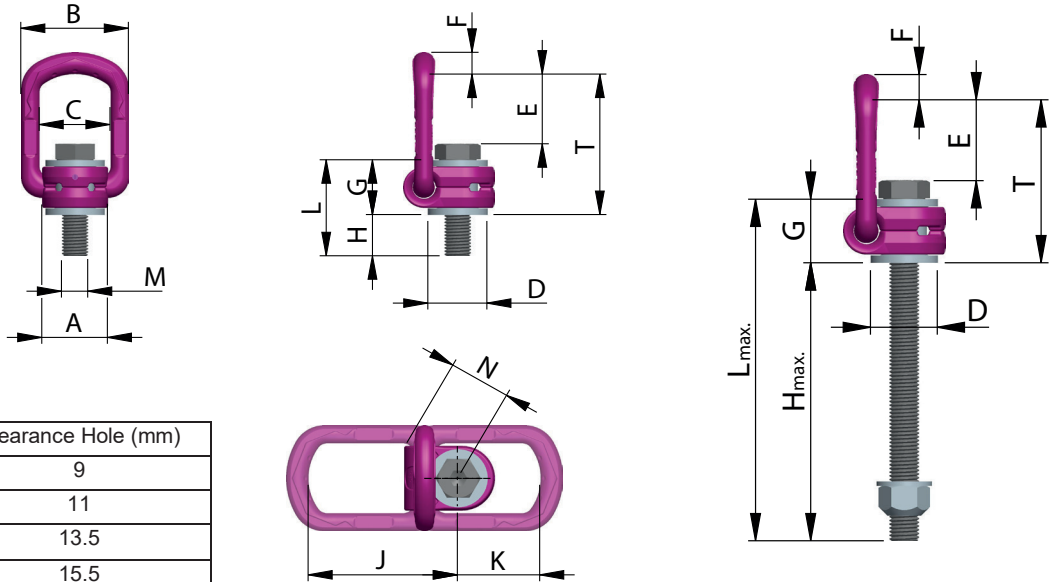
- Clearly readable WLL statement and manufacturer's mark

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]	Tightening 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 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 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 7t M36	7	3.4	60	103	65	60	74	22.5	55	52	--	151	80	107	--	36	67	55	22	146	700 Nm	8500829	--
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  
 SW = wrench size  
 ISK = internal hexagon

Subject to technical modifications

\* from L=351 mm without internal hexagon



Thread diameter (mm)	Clearance Hole (mm)
8	9
10	11
12	13.5
14	15.5
16	17.5
18	20
20	22
24	26
30	33
36	39
42	45
48	52

Table 4: Machine through hole sizing according to DIN 20273 Fasteners; clearance holes for bolts and screws.

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