

# Load Ring for bolting > VRBG / RBG <

## Safety instructions

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

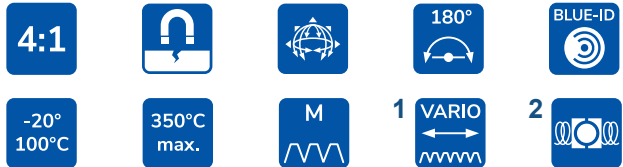


Load Ring for bolting  
RBG<sup>1</sup> / VRBG<sup>2</sup>



**RUD Ketten**  
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RUD-Art.-Nr.: 8503159 - EN / V03 - 05.023



**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:** Ringbock  
VRBS-FIX / VRBK-FIX / VRBG / VRBS / VRBK

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>DGUV-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

**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  
VRBS-FIX / VRBK-FIX / VRBG / VRBS / VRBK

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>DGUV-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



Before initial usage of the boltable Load Rings (hereinafter referred to as VRBG/RBG) please read carefully the safety instructions. Make sure that you have understood 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 VRBG/RBG as well as improper use can lead to injuries of persons and damage of objects when load drops.

Please inspect all VRBG / RBG 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.
- Attention - When suspension ring pivots there is a risk of pinching.
- RUD VRBG / RBG RUD lifting points must only be used by instructed and competent persons considering DGUV 109-017 and outside Germany noticing the country specific statutory regulations.
- Do not exceed the working load limit (WLL) indicated on the lifting point.
- No technical alterations must be implemented on the VRBG / RBG.
- No people may stay in the danger zone.
- Detention under a floating load is forbidden.
- Jerky lifting (strong impacts) should be prevented.
- Always ensure a stable position of the load when lifting. Swinging must be prevented.
- Damaged or worn VRBG / RBG must never be utilised.

## 2 Intended use of VRBG/RBG

RUD VRBG / RBG lifting points must only be used for the assembly at the load or at lifting means.

They are intended to hinge lifting means.

A full working load in all directions is allowed.

RUD VRBG / RBG lifting points can also be used as lashing points to attach lashing means.

RUD VRBG / RBG lifting points must only be used in the hereby described operation purpose.

## 3 Assembly- and instruction manual

### 3.1 General information

- Capability of temperature usage:  
Reduce the bolts' load bearing capacities as follows according to the bolts' class of strength in conjunction with VRBG / RBG as a result of the applied bolts. Due to the DIN/EN bolts that are used with the VRBG/RBG the working load limit should be reduced accordingly:

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

**Temperatures exceeding 350°C (662°F) are prohibited!**

Note the maximum application temperature of the enclosed nuts (optional).

- Clamping nuts as per DIN EN ISO 7042 (DIN 980) can be used up to at max. 150°C.
- Collar nuts as per DIN 6331 can be used up to at max. +300°C. Note additional reduction factors.
- RUD VRBG / RBG lifting points must not be used with aggressive chemicals such as acids, alkaline solutions and their vapours.
- Please mark mounting position of lifting point with a coloured contrast paint for better visibility.
- RUD VRBG / RBG are delivered with 100 % crack tested bolts. Variable bolt length available when using DIN EN ISO 4014 (DIN 931) e.g DIN EN ISO 4762 (DIN 912) bolts.

Permissible bolt types with the requested diameter:

- RBG-3: hexagon bolts according to ISO 4014 (DIN 931) at least with quality 10.9
- VRBG 10 and VRBG 16: hex head bolts accord. ISO 4762 (DIN 912) at least with quality 12.9.

### ATTENTION

Use the corresponding size for the listed class of strength only! Genuine bolts (10.9- and 12.9-bolts) are available from RUD as spare parts.

- If bolts from the aftermarket are used instead of an original RUD bolt, make sure that they have been 100 % crack detected. A written confirmation from the supplier must be added to the documents.

The average notch bar impact test at the lowest permitted usage temperature must be at minimum 36 J. This specification is required as per the test criteria for lifting points GS OA 15-04.

### Variants:

- Metric Vario lengths for RBG 3 are supplied by RUD with a washer and a crack-tested nut as per DIN EN ISO 7042 or with a crack-tested collar nut as per DIN 6331.
- If the VRBG / RBG is exclusively used for lashing, the load-bearing capacity value can be doubled:  
LC = Permitted lashing force = 2 x load-bearing capacity (WLL)



### HINT

If the RBG / RBG 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 RBG / RBG 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 mounting

The following applies in general:

- The installation area must be selected carefully to ensure that the transferred forces can be absorbed by the base material without any deformation. The employers' liability insurance association recommends the following minimum thread engagement length:
  - 1 x M in steel (minimum quality S235JR [1.0037])
  - 1,25x M in cast part (e.g GG 25)
  - 2 x M in aluminium alloys
  - 2,5 x M in light alloys with low strength (M = thread size, e.g. M 20)
- For light metals, non-ferrous metals and gray cast iron, the thread assignment must be selected so that the thread load capacity corresponds to the requirements for the respective base material.
- Define installation location of the VRBG / RBG in such a way that inadmissible stresses caused by twisting or flipping of the load will be avoided:
  - Single strand lifting:** Position suspension ring vertically above load's centre of gravity
  - Double strand lifting:** Position lifting means on each side and above load's centre of gravity
  - Three and four strand lifting:** Position lifting means evenly in one level around load's centre of gravity.

- Symmetry of the load:  
Determine the required load-bearing capacity of the individual lifting point for both symmetrical and asymmetrical loading according to the physical relationship described by the following formula:

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

$W_{LL}$  = Required load-bearing capacity of the lifting point/single strand (kg)  
 $G$  = Load weight (kg)  
 $n$  = Number of load-bearing strands  
 $\beta$  = Angle of inclination of the individual strand

The number of load-bearing strands is:

	Symmetry	Asymmetry
Two-strand	2	1
Three/four-strand	3	1

Table 1: Load-bearing strands (see Table 2)



#### HINT

At unsymmetrical loads, the WLL of a single lifting point must at least correlate with the load weight.

- A plane bolt on surface (ØE, Table 3) with rectangular machined thread holes must be assured. The execution of the threaded hole must be machined acc. to DIN 76 (counterbore diameter at the max. 1.05 x d). The tapped holes must be at least deep enough that the bearing surface of the lifting point sits properly at the surface of the load. Through holes must be machined acc. to DIN EN 20273-middle.

#### Drilling sequence for the 3:

- Mark the blind hole (Dim. "F") then drill and countersink the dimensions "H, G and K".
- After stick in and adjustment the welding blocks the hole for the tapped hole can be drilled.

- The core hole and thread can be machined.
- The VRBG / RBG-Ring must be able to pivot 180° after assembly. Observe the following hints:
    - If the load is rotated and/or turned, the VRBG / RBG must be tightened with the prescribed tightening torque (± 10 % acc. Table 3).



#### HINT

Attention: Do not exceed the specified tightening torque

- If the lifting point VRBG / RBG will be **permanently installed**, the stated torque (± 10 %) must be applied with the values acc. to Table 3. The provided lock washers must be used for the RBG 3.
- For a **single lift** it is sufficient to manually tighten the bolts until they are in contact with the VRBG / RBG contact surface on the bolt surface using a spanner.
- When shocks or vibrating loads occur, especially at through hole bolt constructions in combination with a nut, unintentional opening of the bolt connection may occur.

Securing possibilities: use of a liquid bolt securing glue, f.e. Loctite (adapted to the usage, observe user instruction of manufacturer) or a form closed versions such as hex castel nut, counter nut, etc.

- Finally check correct installation (see section 4 Inspection / Repair / Disposal).

### 3.3 Hints for the usage

#### 3.3.1 General information regarding use

- The whole lifting point must be inspected regularly by a competent person in regard of proper installation, tightening of bolt, strong corrosion, cracks at load bearing parts and deformations (e.g. by the person responsible for attachment). See section 4 Inspection / Repair / Disposal.



#### ATTENTION

Wrong assembled or damaged VRBG / RBG as well as improper use can lead to injuries of persons and damage of objects when load drops.

Please inspect all VRBG / RBG before each use.

- RUD components have been designed as per DIN EN 818 and DIN EN 1677 for a dynamic load of 20,000 load cycles.
  - Observe and be aware that multiple load cycles can occur during a lifting operation.
  - Observe the risk of product damage caused by high dynamical influences at high load cycle numbers.
  - BG/DGUV Germany's employer insurance association recommends: At high dynamical loading with a high number of load cycles (permanent use), the stress at WLL acc. to FEM class 1Bm (M3 acc. to DIN EN 818-7) must be reduced. Use a lifting point with a higher WLL.

- During attaching and unhinging of lifting means (chain sling) no crushing, tripping or shearing actions may occur.
- Eliminate damaging of lifting means caused by sharp edges.
- All fittings connected to the VRBG / RBG should be free moving frei beweglich sein muss.
- Any bending force at the suspension ring is prohibited.
- The suspension ring must be freely movable and not touch the edge of the load.
- Make sure that the lifting point is fully engaged into the tapped hole.

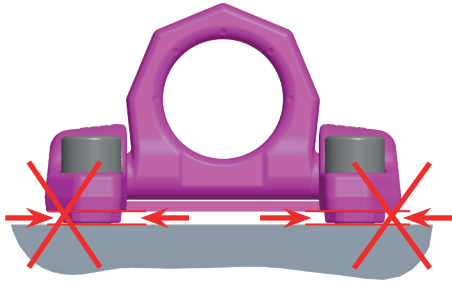


Fig. 1: The lifting point must have been fully bolted in.

### 3.3.2 Recommended turning process



#### WARNING

The suspension ring must not bear or sit on edges or other attachments.



#### WARNING

Observe the requested tightening torque before each lifting or turning process.

- Turning processes in ring plane:

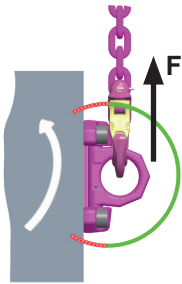


Fig. 2: Turning processes in ring plane

- The suspension ring is swivelled in the pivoting direction (vertical load).

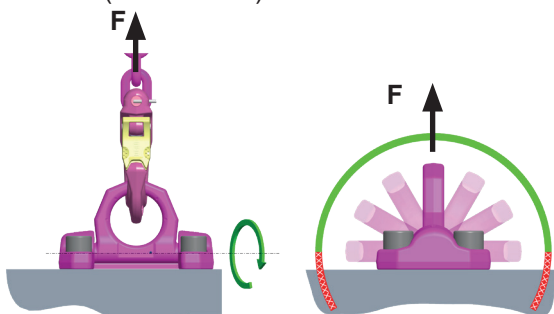


Fig. 3: Pivotion area



#### WARNING

Other load directions are not permitted. Risk of increased wear due to contact between suspension ring and block.

## 4 Inspection / Repair / Disposal

### 4.1 Hints for the regularly inspection

The operator has to determine and dictate the necessary inspection periods and the deadlines by a risk assessment (see sections 4.2 and 4.3).

The persisting appropriateness of the lifting point must be checked by a competent person (auditor) at least once per year.

Depending on the conditions of use e.g. frequent use, increased wear or corrosion, it may be necessary to carry out inspections at shorter intervals than once per year. A verification is also required following damage and after special events. The operator must specify the test cycles.

### 4.2 Inspection criteria for the regularly examination carried out by the operator

- Ensure correct bolt- and nut-size, quality and length
- Solid bolt fixture - Inspection of bolting torque
- Completeness of the lifting point
- Complete, readable WLL statements as well as manufacturer sign.
- Deformation at load bearing components like base body, suspension ring and bolt.
- Mechanical damage, like strong notches, especially in areas where tensile stress occurs.
- Easy pivoting of the VRBG / RBG suspension ring must be ensured.

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

- Reduction of cross section caused by wear > 10 %
- Strong corrosion
- Function and damage of bolts, nuts and bolt threads
- Additional inspections may be necessary depending on the result of the risk assessment (e.g. incipient cracks at load bearing parts).

### 4.4 Disposal

Dispose worn out components / attachments or packaging according to the local waste removal requirements.

Lifting method										
Number of legs	1	1	2	2	2	2	3 / 4	3 / 4	3 / 4	3 / 4
Inclination angle <math>\beta</math>	0°-7°	90°	0°-7°	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
<b>Type</b>	<b>For max. total load in metric tons, bolted and adjusted to the direction of pull</b>									
RBG 3 t	3	3	6	6	4.2	3	3	6.3	4.5	3
VRBG 10 t	10	10	20	20	14.0	10	10	21	15	10
VRBG 16 t	16	16	32	32	22.4	16	16	33.6	24	16
<b>Type</b>	<b>For max. total load in lbs, bolted and adjusted to the direction of pull</b>									
RBG 3 t	6600	6600	13200	13200	9240	6600	6600	13860	9900	6600
VRBG 10 t	22000	22000	44000	44000	30800	22000	22000	46200	33000	22000
VRBG 16 t	35200	35200	70400	70400	49300	35200	35200	74000	52800	35200
<b>EN:</b> At a lift with one strand and two parallel strands where the inclination angles are at the max. $\pm 7^\circ$ , the lifting methode can be assumed as a vertical lift.					<b>EN:</b> When lifting with two, three or four leg lifting means, inclination angles of less than $15^\circ$ shall be avoided, if possible (Risk of instability).					

Table 2: Working load limit in metric tons (top) and in lbs (bottom)

Type	WLL [t]	weight [kg]	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	I [mm]	K [mm]	L [mm]	M [mm]	N [mm]	T [mm]	torque [Nm]	bolts	Ref.-No.
RBG 3*	3	1.07	34	16	5	48	22	92	6	18	30	25	178	16	71	67	120	ISO 4014 (DIN 931) M16x50-10.9	0051817
VRBG 10	10	5.4	125	22	6	65	143	78	8	30	50	43	213	20	100	103	300	ISO 4762 (DIN 912) M20x70-12.9	7994537
VRBG 16	16	11.3	170	30	8	90	198	104	10	46	70	63	270	30	134	131	600	ISO 4762 (DIN 912) M30x90-12.9	7993255

Table 3: Dimensioning

Subject to technical alterations



**HINT**

\* The RBG 3 lifting points can be produced acc. to customer's needs with KMAT-Ref.-No.: 8600318:

- M16 thread engagement lengths 25-205 mm
- M16x1,5 thread engagement 25-50 mm
- 5/8"-11 UNC thread engagement length 25-160 mm.

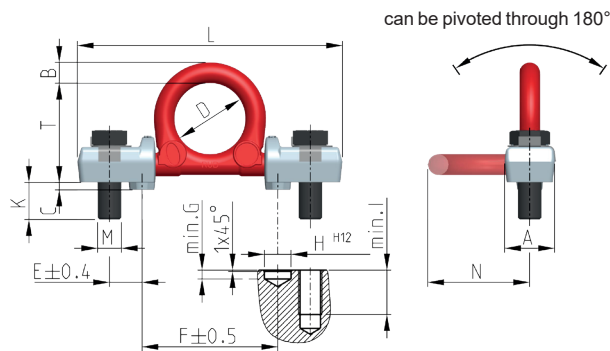


Fig. 4: RBG 3

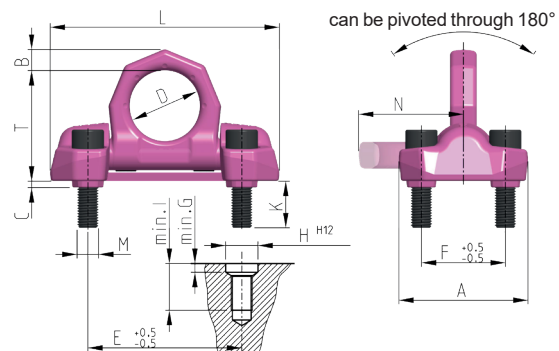


Fig. 5: VRBG 10 / VRBG 16